80
PROGRAMS
FOR THE TRS-80*

Business * Education * Personal

Utility * Technical * Games

From the publishers of

80microcomputing™

80
PROGRAMS

From the publishers of

80 microcomputing ™

Edited by Jim Perry & Chris Brown

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INTRODUCTION

THE THREE R's

I N T R O D U C T I O N

The Radio Shack computer system is a revolutionary device in economic, rather than in technical terms. Never before has so much computing power been available to so many people for so low a price. Its impact on the American life style has yet to be determined, but is bound to be significant.

The reduction in cost of the basic system and the associated peripherals will probably continue, as the market expands and the available technology develops. The long predicted era of the peoples' computer may finally be at hand.

An example of the power and flexibility of even a moderately priced system is the book you now hold in your hands. With the exception of the brief descriptions appearing at the beginning of each program, this volume was produced by a TRS-80 system.

First, program tapes from the files of Instant Software, Inc. were loaded from cassette into memory and saved on disc. Then, program listings, formatted by software, were printed out and photographically reduced to become the actual pages of the book. The table of contents, chapter heading pages and this introduction were written and edited with an Electric Pencil. Even the letters of acceptance to authors were filed, printed and addressed by our TRS-80.

The book is divided into eight chapters. Each covers a broad range of program topics and, hopefully, includes something for everyone. We suggest that you scan each chapter to familiarize yourself with what is included. Then, choose what you like.

Some of the programs are quite long and will present a challenge to those hardy enough to tackle typing them in. You will make fewer errors and become less fatigued, if you attempt only one page at a time. Also, take short breaks between bouts at the keyboard and double check each line for accuracy.

Finally,it is our intention that this book provide the reader with more than a listing of program lines. We hope that it will be a teaching aid that will enable you to write better programs of your own. A wide range of programming styles and techniques are present, and some are better than others - try and find out as much as possible about program structure from these examples. We have loaded and run every program but have made no attempt to alter style - we leave that to you. Change lines, clean up subroutines, reduce lengths where possible, get rid of GOTO statements if you can - experiment!

The Editors.

THE THREE R's

Geography Test 1	Rod Hallen
Arithmetic Drill	G.M. Leupp
Spelling Tutor	Derfler & Leupp
Math Duel	William Laird
Calculate Areas 1	Carl Goldner
States	Robert F. Nichol
Presidents	Robert F. Nichol
Constitution	RobertF. Nichol
Whole Number Concepts	Robert F. Nichol
Music Intervals Test	Hanley Jackson
Percent 1	John Roland
Video Reading Trainer	Rod Hallen
Math Help	Ted Carter
Hide N Spell	Jacob Rusell

GEOGRAPHY TEST 1: by Rod Hallen

This program will help get your foreign and state capitals straight, and keep them that way. A great reference tool or study aid for the worldly TRS-80 owner.
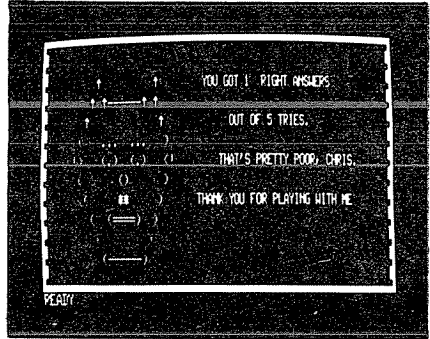

```
10 REM*-COMPUTER ASSISTED EDUCATION MARK VIII TRS-80
20 REM*-ROD HALLEN TOMBSTONE, AZ  15 OCTOBER 1978
30 REM*-EDU-KID  "GEO1"  TAPE 15 SIDE 1 150
40 CLS:DIME$(20),F$(20),G$(20),N$(20),S$(12),S1$(12),A(50,2)
50 DIMB$(50,4),B1$(20):GOSUB600
60 PRINTCHR$(157);"          [       [";TAB(63);CHR$(174);
70 PRINTCHR$(149);"      [ [------[ [      HI! I'M EDU-KID";TAB(63);CHR$
   (170);
80 PRINTCHR$(157);"      [          [";TAB(63);CHR$(174);
90 PRINTCHR$(149);"     ( ---    --- )      I BELIEVE THAT";TAB(63);CHR$
   (170);
100 PRINTCHR$(157);"   1>  (.)    (.)  <1";TAB(63);CHR$(174);
110 PRINTCHR$(149);"     (       ()      )      LEARNING CAN BE FUN1";TAB(63);
    CHR$(170);
120 PRINTCHR$(157);"      (    **    )";TAB(63);CHR$(174);
130 PRINTCHR$(149);"      ( (====)  )      LET'S PLAY WITH GEOGRAPHY.";TAB(6
    3);CHR$(170);
140 PRINTCHR$(157);"      (        )";TAB(63);CHR$(174);
150 PRINTCHR$(149);"        (------)";TAB(63);CHR$(170);
160 PRINTCHR$(157);TAB(63);CHR$(174);
170 GOSUB620
180 PRINT:INPUT "WHAT IS YOUR NAME ";N$:CLS
190 GOSUB600
200 GOSUB610
210 PRINTCHR$(183);TAB(22);"GEOGRAPHY CHOICE";TAB(63);CHR$(187);
220 GOSUB610
230 PRINTCHR$(183);"    1.....STATE CAPITOLS        2.....FOREIGN CAPITOLS";TA
    B(63);CHR$(187);
240 GOSUB610
250 GOSUB610
260 PRINTCHR$(183);"               0.....NONE OF THE ABOVE";TAB(63);CHR$(18
    7);
270 GOSUB610
280 GOSUB610
290 GOSUB620
300 PRINT:INPUT"WHICH ONE WOULD YOU LIKE TO TRY ";C:IFC=0THEN340
310 PRINT:INPUT"HOW MANY DO YOU WANT TO ANSWER (1 TO 50) ";P
320 IFP=0 OR P>50THEN 340
330 P=P+R:CLS:IFW+R=0THEN840ELSE960
340 PRINT:INPUT"DO YOU WANT TO TRY MORE ";A$:PRINT:PRINT
350 IFLEFT$(A$,1)="Y"THENCLS:GOTO190
360 S=R/(W+R):CLS:IFS>.90THEN S$="GREAT":GOTO420
370 IFS>.85THENS$="VERY GOOD":GOTO420
380 IFS>.79THENS$="GOOD":GOTO420
390 IFS>.69THENS$="O.K.":GOTO420
400 IFS>.50THENS$="FAIR":GOTO420
410 S$="PRETTY POOR":CLS
420 REM
430 GOSUB600
440 GOSUB610
450 PRINTCHR$(183);"       [        [       YOU GOT";R;" RIGHT ANSWERS";TAB(6
    3);CHR$(187);
470 PRINTCHR$(183);"    [ [------[ [ ";TAB(63);CHR$(187);
480 PRINTCHR$(183);"    [        [       OUT OF";W+R;"TRIES.";TAB(63)
    ;CHR$(187);
500 PRINTCHR$(183);"    (  ...  ... )";TAB(63);CHR$(187);
510 PRINTCHR$(183);"   1>  (.)  (.)  <1      THAT'S ";S$;", ";N$;".";TAB(63
    );CHR$(187);
```

```
530 PRINTCHR$(183);"    (    ()    )";TAB(63);CHR$(187);
540 PRINTCHR$(183);"    (    **    )        THANK YOU FOR PLAYING WITH ME";TAB
    (63);CHR$(187);
550 PRINTCHR$(183);"    (  (====)  )";TAB(63);CHR$(187);
560 PRINTCHR$(183);"    (        )";TAB(63);CHR$(187);
570 PRINTCHR$(183);"        (------)";TAB(63);CHR$(187);
580 GOSUB620
590 END
600 PRINTCHR$(183);:FORK=1TO62:PRINTCHR$(131);:NEXT:PRINTCHR$(187);:RETURN
610 PRINTCHR$(183);TAB(63);CHR$(187);:RETURN
620 PRINTCHR$(183);:FORK=1TO62:PRINTCHR$(176);:NEXT:PRINTCHR$(187);:RETURN
630 REM*-WRONG ANSWER SUBROUTINE-*
640 M=RND(6):PRINT:PRINT"        ";:W=W+1:A(H,C)=0
650 ONMGOTO660,670,680,690,700,710
660 PRINT"SORRY, ";N$;", BUT THAT IS NOT RIGHT.":GOTO720
670 PRINTN$;", YOU SHOULD KNOW BETTER THAN THAT.":GOTO720
680 PRINT"YOU'D BETTER TRY THAT ONE AGAIN LATER.":GOTO720
690 PRINTN$;", EDUKID SAYS - TAKE ONE GIANT STEP - BACKWARDS !":GOTO720
700 PRINT"TRY AGAIN LATER !":GOTO720
710 PRINT"THAT'S CLOSE, ";N$;", BUT CLOSE ONLY COUNTS IN HORSESHOES !"
720 PRINT:PRINT"        IT'S ";F$:PRINT:FORK=1TO2000:NEXT:RETURN
730 REM*-RIGHT ANSWER SUBROUTINE-*
740 M=RND(6):PRINT:PRINT"        ";:R=R+1:A(H,C)=1
750 ONMGOTO760,770,780,790,800,810
760 PRINT"YOU'RE ABSOLUTELY RIGHT !":GOTO820
770 PRINT"YOU GOT IT, ";N$;", KEEP IT UP.":GOTO820
780 PRINT"THAT'S ANOTHER ONE.":GOTO820
790 PRINT"GOOD GOING.":GOTO820
800 PRINTN$;", YOU'RE DOING O.K.":GOTO820
810 PRINT"I KNEW YOU'D GET THAT ONE !"
820 PRINT:IFR/5=INT(R/5)THENPRINT"THAT'S";R;"CORRECT ANSWERS SO FAR."
830 FORK=1TO500:RETURN
840 REM*-QUESTION AND ANSWER SUBROUTINE-*
850 IFC=1THENC$="STATE" ELSEC$="COUNTRY"
860 PRINT"O.K.";N$;", iF i GIVE YOU THE CAPITOL, YOU NAME THE ";C$;"."
870 PRINT:PRINT"   IF i GIVE YOU THE ";C$;" YOU TELL ME THE CAPITOL."
880 PRINT:PRINT"        ANSWER STOP IF YOU WANT TO STOP."
890 FORJ=1TO1000
900 FORK=1TO50
910 FORL=1TO4
920 READB1$
930 B$(K,L)=B1$
940 NEXTL
950 NEXTK
960 FORJ=1TOP
970 H=RND(50):IFA(H,C)=1THEN970
980 IF(J+H)/2=INT((J+H)/2)THEN1030
990 E$=B$(H,1):F$=B$(H,2):IFC=2THENE$=B$(H,3):F$=B$(H,4)
1000 PRINT:PRINTE$;" ";:INPUTG$:IFG$="STOP"THEN340
1010 IFF$=G$THENGOSUB740ELSEGOSUB640
1020 GOTO1060
1030 F$=B$(H,1):E$=B$(H,2):IFC=2THENF$=B$(H,3):E$=B$(H,4)
1040 PRINT:PRINTE$;" ";:INPUTG$:IFG$="STOP"THEN340
1050 IFF$=G$THENGOSUB740ELSEGOSUB640
1060 IFR=50THENFORK=1TO2000:NEXT:GOTO360
1070 IFR=PTHENJ=P
1080 NEXTJ:GOTO340
1090 DATA"PHOENIX","ARIZONA","LONDON","ENGLAND"
1100 DATA"SACRAMENTO","CALIFORNIA","DUBLIN","IRELAND"
1110 DATA"ALBANY","NEW YORK","AMSTERDAM","HOLLAND"
1120 DATA"TOPEKA","KANSAS","BRUSSELS","BELGIUM"
1130 DATA"PORTLAND","OREGON","PARIS","FRANCE"
1140 DATA"SPRINGFIELD","ILLINOIS","MADRID","SPAIN"
1150 DATA"AUSTIN","TEXAS","LISBON","PORTUGAL"
1160 DATA"JACKSON","MISSISSIPPI","OSLO","NORWAY"
1170 DATA"TALLAHASSEE","FLORIDA","STOCKHOLM","SWEDEN"
1180 DATA"CHARLESTON","WEST VIRGINIA","HELSINKI","FINLAND"
1190 DATA"LANSING","MICHIGAN","REYKJAVIK","ICELAND"
1200 DATA"DOVER","DELAWARE","COPENHAGEN","DENMARK"
1210 DATA"OLYMPIA","WASHINGTON","BONN","WEST GERMANY"
1220 DATA"CARSON CITY","NEVADA","EAST BERLIN","EAST GERMANY"
1230 DATA"NASHVILLE","TENNESSEE","WARSAW","POLAND"
1240 DATA"BOISE","IDAHO","PRAGUE","CZECHOSLOVAKIA"
1250 DATA"ST. PAUL","MINNESOTA","VIENNA","AUSTRIA"
1260 DATA"HONOLULU","HAWAII","BUDAPEST","HUNGARY"
1270 DATA"OKLAHOMA CITY","OKLAHOMA","BERN","SWITZERLAND"
1280 DATA"ATLANTA","GEORGIA","ROME","ITALY"
1290 DATA"RALEIGH","NORTH CAROLINA","ATHENS","GREECE"
1300 DATA"SANTA FE","NEW MEXICO","MOSCOW","RUSSIA"
1310 DATA"MONTPELIER","VERMONT","BAGHDAD","IRAQ"
1320 DATA"RICHMOND","VIRGINIA","TEHERAN","IRAN"
1330 DATA"AUGUSTA","MAINE","ISTANBUL","TURKEY"
1340 DATA"CHEYENNE","WYOMING","NEW DELHI","INDIA"
1350 DATA"FRANKFORT","KENTUCKY","BANGKOK","THAILAND"
1360 DATA"LITTLE ROCK","ARKANSAS","PEKING","CHINA"
1370 DATA"PIERRE","SOUTH DAKOTA","TOKYO","JAPAN"
1380 DATA"HARTFORD","CONNECTICUT","RABAT","MOROCCO"
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1390 DATA"BATON ROUGE","LOUISIANA","CAIRO","EGYPT"
1400 DATA"MONTGOMERY","ALABAMA","CANBERRA","AUSTRALIA"
1410 DATA"HELENA","MONTANA","WELLINGTON","NEW ZEALAND"
1420 DATA"DENVER","COLORADO","OTTOWA","CANADA"
1430 DATA"PROVIDENCE","RHODE ISLAND","WASHINGTON D.C.","USA"
1440 DATA"TRENTON","NEW JERSEY","MEXICO CITY","MEXICO"
1450 DATA"JUNEAU","ALASKA","HAVANA","CUBA"
1460 DATA"CONCORD","NEW HAMPSHIRE","BOGOTA","COLUMBIA"
1470 DATA"BISMARCK","NORTH DAKOTA","QUITO","EQUADOR"
1480 DATA"SALT LAKE CITY","UTAH","LIMA","PERU"
1490 DATA"LINCOLN","NEBRASKA","LA PAZ","BOLIVIA"
1500 DATA"DES MOINES","IOWA","SANTIAGO","CHILE"
1510 DATA"JEFFERSON CITY","MISSOURI","BRASILIA","BRAZIL"
1520 DATA"MADISON","WISCONSIN","BUENES AIRES","ARGENTINA"
1530 DATA"BOSTON","MASSACHUSETTS","MONTEVIDEO","URUGUAY"
1540 DATA"COLUMBIA","SOUTH CAROLINA","CARACAS","VENEZUELA"
1550 DATA"INDIANAPOLIS","INDIANA","ASUNCION","PARAGUAY"
1560 DATA"COLUMBUS","OHIO","SOFIA","BULGARIA"
1570 DATA"HARRISBURG","PENNSYLVANIA","BUCHAREST","RUMANIA"
1580 DATA"ANNAPOLIS","MARYLAND","JERUSALEM","ISRAEL"
```

ARITHMETIC DRILL: by G.M. Leupp

This program takes you through the basics with varying levels of difficulty. Ideal as a self-teaching aid, since the computer can be prompted "H" for "help me", if an unsolveable problem is encountered.


```
1000 CLS
1020 REM 2282 BYTES. TRS-80 LEVEL II BASIC.
1060 RANDOM
1080 PRINT"              BASIC ARITHMETIC DRILL":PRINT
1100 PRINT"THIS PROGRAM WILL RANDOMLY GENERATE 2 NUMBERS FOR EACH PROBLEM
1120 PRINT"AND WILL ALSO RANDOMLY GENERATE WHETHER IT WILL BE ADDITION,
1140 PRINT"SUBTRACTION, DIVISION OR MULTIPLICATION.  PROBLEMS WILL BE
1160 PRINT "PRESENTED AT 3 LEVELS OF DIFFICULTY.  PAY CLOSE ATTENTION TO
1180 PRINT "THE ALGEBRAIC SIGNS! IF YOU HAVE TROUBLE WITH THE ANSWER
1200 PRINT"AND WANT HELP FROM THE COMPUTER TYPE 'H' AND THE CORRECT
1220 PRINT"ANSWER WILL BE DISPLAYED.  DO YOUR BEST AND I'LL KEEP SCORE TO
1240 PRINT "LET YOU KNOW HOW WELL YOU'VE DONE WHEN YOU'RE FINISHED.
1260 PRINT:PRINT "ROUND ALL YOUR DIVISION ANSWERS TO TWO DECIMAL PLACES.
1280 PRINT:INPUT"HOW MANY PROBLEMS DO YOU WANT AT EACH DIFFICULTY LEVEL";Z
1300 PRINT"                  GOOD LUCK!
1320 INPUT"             PRESS 'ENTER' WHEN READY";A$
1340 RANDOM
1360 IF T>Z RESTORE
1380 FOR K=1 TO 250: NEXT K: CLS
1400 PRINT CHR$(23)
1420 IF T>3*Z-1 THEN 2140
1440  IF T=0 THEN 1500
1460  IF INT(T/Z)=T/Z THEN 1920
1480 IF D>1 THEN 2060
1500 L=RND(10)
1520 M=RND(10)
1540  PRINT
1560  N=RND(4)
1580  IF N=1 PRINT L;"+";M;"= ";: CA=L+M
```

```
1600  IF N=2 PRINT L;"-";M;"=";: CA=L-M
1620  IF N=3 PRINT L;"/";M;"=";: CA=INT(L/M*100+.5)/100
1640  IF N=4 PRINT L;"*";M;"=";: CA=L*M
1660  INPUT A$
1680  R=R+1
1700  IF A$<>"H" THEN 1780
1720  PRINT"THE CORRECT ANSWER IS";CA;
1740  T=T+1
1760  FOR I=1 TO 300: NEXT: GOTO 1360
1780  A=VAL(A$)
1800  IF A=CA THEN 1860
1820  PRINT"SORRY,  PLEASE TRY AGAIN."
1840  GOTO 1580
1860  GOSUB 2340
1880  GOTO 1360
1900  PRINT
1920  PRINT CHR$(23)
1940  INPUT"DO YOU WANT SOME HARDER PROBLEMS (Y OR N)";R$
1960  IF R$="N" THEN 2140
1980  D=D+1
2000  PRINT
2020  PRINT"O.K. HERE GOES . . ."
2040  PRINT
2060  IF D=1 L=RND(100): M=RND(10): GOTO 2100
2080  L=RND(1000): M=RND(100)
2100  GOTO 1580
2120  PRINT
2140  PRINT: PRINT"YOU HAD A TOTAL OF";R;"TRIES AND
2160  PRINT"ANSWERED CORRECTLY";C;"TIMES FOR
2180  PRINT"A GRADE OF";INT(C/R*100+.5);"PERCENT."
2200  PRINT:IF C=R PRINT:PRINT"CONGRATULATIONS!!  GREAT WORK!":PRINT
2220  PRINT"I'M FINISHED BUT IF YOU WANT TO CONTINUE, TYPE 'RUN'."
2240  PRINT:PRINT:END
2260  DATA"CORRECT.","YOU'RE RIGHT.","YES INDEED."
2280  DATA"RIGHT ON...","EXCELLENT.","O.K. DO IT AGAIN"
2300  DATA"THAT'S CORRECT.","NICE WORK.","VERY GOOD.","ALL RIGHT!        "
2320  DATA"YES. YOU'RE OK!"
2340  READ A$
2360  PRINT:PRINT
2380  PRINT "      ";A$
2400  LET C=C+1: REM TO ACCUMULATE CORRECT RESPONSES
2420  T=T+1
2440  GOTO 1360:RETURN
2460  END
```

11

SPELLING TUTOR: by Frank Derfler and G.M. Leupp

Every writer, editor and student should have copy of this program in storage. Type in the words that you habitually misspell (up to 50). Your TRS-80 will then ask you to pronounce the word, identify the correctly spelled version of it, order randomly placed letters into the word, or supply missing letters to complete the spelling of the word. A real workout.
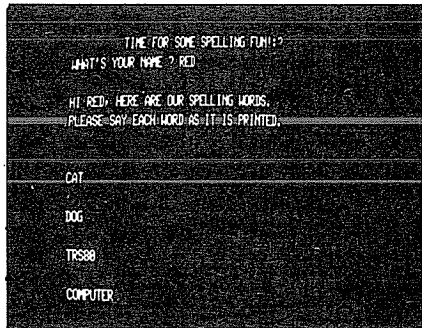

```
220 CLEAR 300
240 DIM W$(50)
260 PRINT"                    SPELLING TUTOR
280 PRINT:PRINT"THIS PROGRAM WILL DRILL UP TO 50 WORDS OF ANY LENGTH.
290 REM ACTUALLY, THE NUMBER OF WORDS IS RESTRICTED ONLY BY MEMORY RESTRICTIONS.
295 REM IF MORE THAN 50, DIM STATEMENT IN LINE 240 SHOULD BE INCREASED ACCORDING
    LY.
300 PRINT:PRINT:INPUT"HOW MANY WORDS WOULD YOU LIKE TO STUDY";X
320 PRINT:PRINT"OK, PLEASE TYPE EACH BELOW. THEN PRESS THE 'ENTER' KEY.
340 PRINT"CAREFUL . . . DON'T MAKE ANY MISTAKES!":PRINT
360 FOR I=1 TO X
380 PRINT I;"";:INPUT W$(I)
400 IF W$(I)="" THEN GOTO 380
420 NEXT
440 CLS
460 PRINT"          TIME FOR SOME SPELLING FUN!:?
480 INPUT"WHAT'S YOUR NAME ";Z$
500 PRINT:PRINT"HI ";Z$;", HERE ARE OUR SPELLING WORDS."
520 PRINT"PLEASE SAY EACH WORD AS IT IS PRINTED.
540 FOR Y=1 TO 1500:NEXT:REM DELAY LOOP
560 FOR W=1 TO X
580 PRINT:PRINT
600 FOR I=1 TO X
620 PRINT W$(I):FOR V=1 TO 1000:NEXT
640 PRINT
660 NEXT
680 FOR V=1 TO 1000:NEXT:CLS
700 PRINT"GOOD WORK! NOW i AM GOING TO GIVE YOU ONE WORD AT A TIME WITH
710 PRINT"THE LETTERS BACKWARDS.  SEE IF YOU CAN TYPE EACH ONE CORRECTLY.
720 FOR Z=1 TO 1000: NEXT Z:REM DELAY LOOP
740 FOR I=1 TO X
760 PRINT
780 M$=W$(I)
800 FOR R=LEN(M$) TO 1 STEP -1: PRINT MID$(M$,R,1);:NEXT R
820 INPUT"     ";S$: IF S$=M$ GOSUB 900ELSE GOSUB 980
840 IF F>0 THEN 820
860 IF I=X THEN 1060
880 NEXT I
900 G=O+1: ON G GOTO 920,940,960
920 PRINT"          GOOD! YOU GOT THAT ONE!":F=0: O=O+1: PRINT: RETURN
940 PRINT"          WASN'T THAT EASY!": F=0: O=O+1: PRINT: RETURN
960 PRINT"          SUPER, ";Z$: O=0: F=0: PRINT: RETURN
980 G=F+1: ON G GOTO 1000,1020,1040
1000 PRINT"          OOOPS! NOT QUITE ";Z$;". TRY AGAIN.":F=F+1: RETURN
1020 PRINT"          N0, ONE MORE TIME.":F=F+1: RETURN
1040 PRINT"          SORRY, ";Z$;". THE WORD IS      '";W$(I);"'": F=0: RETURN
1060 FOR C=1 TO 1000: NEXT C: CLS
1080 CLS:PRINT"     NOW I AM GOING TO PRINT EACH WORD WITH SOME LETTERS
1100 PRINT"     MISSING AND AN * PUT IN THEIR PLACE.  CAN YOU SPELL THEM
1120 PRINT"     CORRECTLY?  IF YOU DON'T KNOW THE WORD, TYPE 'H' FOR HELP
1140 PRINT"     AND I WILL GIVE YOU ONE MORE LETTER. TYPE 'HH' IF
1150 PRINT"     YOU REALLY GET STUMPED.
```

```
1160 PRINT: FOR C=1 TO 1000: NEXT C
1180 FOR I=1 TO X
1200 M$=W$(I)
1220 IF LEN(M$)>4 THEN 1260
1240 PRINT LEFT$(M$,2);: FOR Y=3 TO LEN(M$): PRINT"*";: NEXT Y: GOTO 1380
1260 PRINTLEFT$(M$,2);"**";MID$(M$,5,1);:FOR Y=6 TO LEN(M$)
1280 PRINT"*";:NEXT Y: GOTO 1380
1300 IF LEN(M$)>4 THEN 1340
1320 PRINTLEFT$(M$,3);: FOR Y=4 TO LEN(M$): PRINT"*";: NEXT Y: GOTO 1380
1340 PRINTLEFT$(M$,3);: PRINT"*";: PRINTMID$(M$,5,1);: FOR Y=6 TO LEN(M$)
1350 PRINT"*";
1360 NEXT Y: GOTO 1380
1380 REM
1400 INPUT"    ";H$: IF H$="H" THEN 1300
1410 IF H$="HH" GOSUB 1040: GOTO 1440
1420 IF H$=M$ GOSUB 900 ELSE GOSUB 980
1440 IF F>0 THEN 1380
1460 IF I=X THEN 1480: NEXT I
1480 NEXT I
1500 FOR V=1 TO 1500: NEXT V: CLS:  PRINTTAB(20)"NOW FOR MORE FUN!"
1520 PRINT:PRINT: PRINT"SOME OF THE NEXT WORDS MAY BE CORRECT. SOME OF THEM
1540 PRINT"(MAYBE ALL OF THEM) WILL HAVE THE WRONG LETTERS IN THEM.
1560 PRINT"YOUR JOB IS TO TYPE EACH WORD CORRECTLY."
1580 FOR V=1 TO 1000: NEXT V: PRINT: PRINT: PRINT: FOR I=1 TO X
1600 M$=W$(I)
1620 V$="AEIOU"
1640 K$=M$
1660 FOR D=1 TO LEN(M$)
1680 D$=MID$(M$,D,1)
1700 IF D$="A" OR D$="E" OR D$="I" OR D$="O" OR D$="U" THEN 1740
1720 GOTO 1780
1740 V=RND(5): Q$=MID$(V$,V,1)
1760 K$=LEFT$(K$,D-1)+Q$+RIGHT$(K$,LEN(K$)-D)
1780 NEXT D
1800 PRINT K$
1820 INPUT"    ";L$: IF L$=M$ GOTO 1880 ELSE GOSUB 980
1830 IF F>0 THEN 1820
1840 IF I=X THEN 1910
1860 NEXT I
1880 E=E+1: GOSUB 900
1900 GOTO 1840
1910 IF E/X<.8 PRINT"          Y O U  C A N  D O  B E T T E R.":GOTO 1940
1920 PRINTTAB(10)"H U R R A Y"
1940 PRINTTAB(10)"Y O U    G O T  ";E;"  R I G H T"
1960 PRINTTAB(10)"O U T    O F   T H E   L A S T  ";X;"  W O R D S !"
1980 PRINT:INPUT"      DO YOU WANT TO REVIEW THE SAME WORDS AGAIN (Y OR N)";A$
1990 IF A$<>"N" CLS: E=0 GOTO 520
2000 PRINT:PRINT"      THAT WAS FUN ";Z$;".  LET'S DO IT AGAIN SOON."
```

MATH DUEL: by William Laird

Think you can add, subtract, multiply and divide? Think again. Your TRS-80 will have your head spinning in minutes with this program. All levels of play from grade school to graduate. An excellent choice for those trying to wean themselves off calculators.
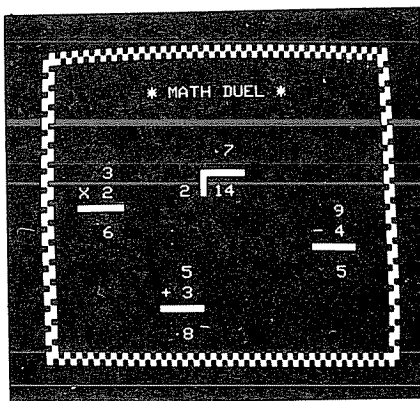

```
5 CLS:RANDOM:TT(1)=0:TT(2)=0:T(1)=0:T(2)=0:DEFINT C,D,G,I,L,M,Q,T,X,Y,Z,W:CLEAR1
   00
10 CLS:PRINTCHR$(23):FORI=15360TO15423:POKEI,134:NEXT:FORI=16319TO16383:POKEI,15
   2:NEXT:FORI=15360TO16320STEP64:POKEI,158:NEXT:FORI=15422TO16382STEP64:POKEI
   ,158:NEXT
15 PRINT@146,"* MATH DUEL *";:PRINT@394,"3";:PRINT@454,"X 2";:FORI=12TO27:SET(I,
   24):NEXT:PRINT@586,"6";
20 FORI=56TO69:SET(I,19):NEXT:FORI=19TO22:SET(56,I):NEXT:PRINT@352,"7";:PRINT@47
   2,"2";:PRINT@478,"14";
25 FORI=40TO55:SET(I,39):NEXT:PRINT@728,"5";:PRINT@788,"+ 3";:PRINT@920,"8";
30 FORI=96TO111:SET(I,30):NEXT:PRINT@564,"9";:PRINT@624,"- 4";:PRINT@756,"5";
35 FORI=1TO4000:NEXT
40 CLS:PRINT@260,CHR$(23)"HOW MANY PLAYERS? (1 OR 2)";
42 BB$=INKEY$:FORI=1TO25000:N$=INKEY$:N=VAL(N$):IFN$<>""ONNGOTO45,45
43 NEXT:N=1
45 PRINT@452,"DO YOU WISH TO PRACTICE ";:PRINT@516,"OR TAKE A TIMED TEST?";
46 PRINT@644,"TYPE 1 FOR PRACTICE";:PRINT@718,"2 FOR TEST";
47 BB$=INKEY$:FORI=1TO25000:E$=INKEY$:E=VAL(E$):IFE$<>""ONEGOTO50,50
48 NEXT:E=1
50 CLS:PRINTCHR$(23):PRINT@398,"WHAT IS YOUR NAME";
51 INPUT"              ";A$(1)
53 IFN=2THENPRINT@644,"WHAT IS THE CHALLENGERS NAME?"ELSE60
55 INPUT"        ";A$(2)
60 GOSUB600:GOSUB700
76 IFN=2THENPRINT@855,A$(1);" FIRST, ";A$(2);" SECOND";
80 BB$=INKEY$:FORI=1TO25000:Q$(1)=INKEY$:Q(1)=VAL(Q$(1)):IFQ$(1)<>""ONQ(1)GOTO82
   ,82,82,82,82
81 NEXT:Q(1)=1
82 IFN=1GOTO85
83 BB$=INKEY$:FORI=1TO25000:Q$(2)=INKEY$:Q(2)=VAL(Q$(2)):IFQ$(2)<>""ONQ(2)GOTO85
   ,85,85,85,85
84 NEXT:Q(2)=1
85 CLS:GOSUB600:GOSUB720
86 IFN=2THENPRINT@855,A$(1);" FIRST, ";A$(2);" SECOND";
88 PRINT@708,"TYPE THE NUMBER CORRESPONDING TO YOUR LEVEL";
89 BB$=INKEY$:FORI=1TO25000:B$(1)=INKEY$:B(1)=VAL(B$(1)):W=1:IFB$(1)<>""ONB(1)GO
   TO93,94,95,96,97
90 NEXT:B(1)=1
91 BB$=INKEY$:FORI=1TO25000:B$(2)=INKEY$:B(2)=VAL(B$(2)):W=2:IFB$(2)<>""THENONB(
   2)GOTO93,94,95,96,97
92 NEXT:B(2)=1
93 DA(W)=10:DM(W)=3:GOTO98
94 DA(W)=44:DM(W)=5:GOTO98
95 DA(W)=54:DM(W)=10:GOTO98
96 DA(W)=85:DM(W)=12:GOTO98
97 DA(W)=99:DM(W)=20
98 DA$(W)=STR$(DA(W)):DM$(W)=STR$(DM(W)):D(W)=LEN(DA$(W))*100:IFW=1ANDN=2THENGOT
   O91ELSEW=1:ONQ(1)GOTO100,200,300,400,500
100 GOSUB610
110 RA(1)=RND(DA(W)):RA(2)=RND(DA(W)):RC=RA(1)+RA(2):RC$=STR$(RC):L=LEN(RC$)-1
120 GOSUB620:PRINT@534,"+";:GOSUB950
140 GOTO630
150 STOP
200 GOSUB610
```

```
210 RA(1)=RND(DA(W)):RA(2)=RND(DA(W)):IFRA(1)>RA(2)THENRC=RA(1)-RA(2):RC$=STR$(R
    C):L=LEN(RC$)-1:GOTO220
215 R1=RA(1):RA(1)=RA(2):RA(2)=R1:RC=RA(1)-RA(2):RC$=STR$(RC):L=LEN(RC$)-1
220 GOSUB620:PRINT@534,"-":GOSUB950
240 GOTO630
250 STOP
300 GOSUB610
310 RA(1)=RND(12):RA(2)=RND(DM(W)):RC=RA(1)*RA(2):RC$=STR$(RC):L=LEN(RC$)-1
315 IFRA(1)<RA(2)THENR=RA(1):RA(1)=RA(2):RA(2)=R
320 GOSUB620:PRINT@534,"X":GOSUB950
340 GOTO630
350 STOP
400 GOSUB610
410 RA(1)=RND(DM(W)):RA(2)=RND(DM(W)):RD=RA(1)*RA(2):RC$=STR$(RA(1)):L=LEN(RC$)-
    1:RD$=STR$(RD)
415 PRINTCHR$(23):FORI=48TO73:SET(I,25):NEXT:FORI=25TO29:SET(48,I):NEXT
420 PRINT@602,RD:PRINT@588,USING"#####";RA(2):GOSUB950
440 IFLEN(RD$)=LEN(RC$)THENP=476:GOTO1000
441 IFLEN(RD$)-1=LEN(RC$)THENP=478ELSEP=480
450 GOTO1000
451 STOP
500 Z=RND(4):ONZGOTO100,200,300,400
600 CLS:FORI=15360TO15423:POKEI,183:NEXT:FORI=16320TO16383:POKEI,183:NEXT:FORI=1
    5360TO16320STEP64:POKEI,191:NEXT:FORI=15423TO16383STEP64:POKEI,191:NEXT:RET
    URN
610 CLS:L=0:RC$="":R$(1)="":R$(2)="":R$(3)="":R$(4)="":R$(5)="":RETURN
620 PRINTCHR$(23):PRINT@472,USING"#####";RA(1):PRINT@536,USING"#####";RA(2):FORI
    =44TO71:SET(I,27):NEXT:RETURN
630 IFL=1THENP=672
640 IFL=2THENP=670
650 IFL=3THENP=668
660 IFL=4THENP=666
670 IFL=5THENP=664
680 GOTO1000
690 STOP
700 PRINT@148,"* * PROBLEM TYPES * *"::PRINT@260,"1. ADDITION"::PRINT@324,"2. SU
    BTRACTION"::PRINT@388,"3. MULTIPLICATION"::PRINT@452,"4. DIVISION"::PRINT@5
    16,"5. MIXED PROBLEMS"::PRINT@708,"TYPE THE NUMBER CORRESPONDING TO THE KIN
    D OF PROBLEMS";
705 PRINT@772,"YOU WISH TO SOLVE";
710 RETURN
720 PRINT@145,"* * DIFFICULTY LEVELS * *"::PRINT@260,"1. BEGINNER"::PRINT@324,"2
    . NOVICE"::PRINT@388,"3. PROFESSIONAL"::PRINT@452,"4. EXPERT"::PRINT@516,"5
    . MASTER"::PRINT@708,"TYPE THE NUMBER CORRESPONDING TO YOUR LEVEL";
730 RETURN
900 CLS:FORI=15381TO15416:POKEI,131:NEXT:FORI=15495TO15544:POKEI,131:NEXT:FORI=1
    5623TO15672:POKEI,131:NEXT:FORI=15751TO15800:POKEI,131:NEXT
910 FORI=15495TO15687STEP64:POKEI,191:NEXT:FORI=15381TO15701STEP64:POKEI,191:NEX
    T:FORI=15389TO15709STEP64:POKEI,191:NEXT:FORI=15399TO15719STEP64:POKEI,191:
    NEXT:FORI=15408TO15728STEP64:POKEI,191:NEXT:FORI=15416TO15736STEP64:POKEI,1
    91:NEXT
920 PRINT@87,"GRADE"::PRINT@95,"CORRECT"::PRINT@105,"MISSED"::PRINT@114,"TOTAL";
    :PRINT@201,USING"%          %";A$(1)::PRINT@214,G(1);"%"::PRINT@222,C(1)::PR
    INT@232,M(1)::PRINT@241,T(1);
930 IFN=2THENPRINT@329,USING"%          %";A$(2)::PRINT@342,G(2);"%"::PRINT@350,C
    (2)::PRINT@360,M(2)::PRINT@369,T(2);
940 RETURN
950 PRINT@4,A$(W);
960 RETURN
1000 BB$=INKEY$:T(W)=T(W)+1
1005 FORI=1TOD(W)
1010 IFR$(1)=""THENR$(1)=INKEY$:IFR$(1)<>""THENPRINT@P,R$(1);ELSE1110
1020 IFL>=2ANDR$(2)=""THENR$(2)=INKEY$:IFR$(2)<>""THENPRINT@P+2,R$(2);ELSE1110
1030 IFL>=3ANDR$(3)=""THENR$(3)=INKEY$:IFR$(3)<>""THENPRINT@P+4,R$(3);ELSE1110
1040 IFL>=4ANDR$(4)=""THENR$(4)=INKEY$:IFR$(4)<>""THENPRINT@P+6,R$(4);ELSE1110
1050 IFL>=5ANDR$(5)=""THENR$(5)=INKEY$:IFR$(5)<>""THENPRINT@P+8,R$(5);ELSE1110
1051 IFE=1THENV(W)=1:GOTO1060
1052 V(W)=I/D(W):IFV(W)<.65THENV(W)=(I/D(W))+(1-(I/D(W)))/1.5ELSEV(W)=1
1060 IFL=1THENR$=R$(1):GOTO1120
1070 IFL=2THENR$=R$(1)+R$(2):GOTO1120
1080 IFL=3THENR$=R$(1)+R$(2)+R$(3):GOTO1120
1090 IFL=4THENR$=R$(1)+R$(2)+R$(3)+R$(4):GOTO1120
1100 IFL=5THENR$=R$(1)+R$(2)+R$(3)+R$(4)+R$(5):GOTO1120
1110 NEXT:D(W)=D(W)+10:PRINT@142,"* * TIME OUT * *":IFQ(W)=4ORZ=4THENFORI=1TO5:P
     RINT@346+(P-476),VAL(RC$)::FORU=1TO250:NEXT:PRINT@346,"        "::FORU=1TO8
     0:NEXTU,I:GOTO1170
1111 FORI=1TO5:PRINT@792,USING"#####";VAL(RC$)::FORU=1TO180:NEXT:PRINT@792,"
     "::NEXTI:GOTO1170
1120 IFVAL(R$)=VAL(RC$)THENGOTO1200ELSE1140
1125 D(W)=INT(D(W)*V(W))
1130 FORI=1TO1000:NEXT:GOTO1160
1140 PRINT@148,"M I S S E D "::IFQ(W)=4ORZ=4THENFORI=1TO5:PRINT@346+(P-476),VAL(
     RC$)::FORU=1TO250:NEXT:PRINT@346+(P-476),"        "::FORU=1TO80:NEXTU,I:GOTO1
     170
1141 FORI=1TO5:PRINT@792,USING"#####";VAL(RC$)::FORU=1TO250:NEXT:PRINT@792,,"
     "::NEXTI:GOTO1170
1160 C(W)=C(W)+1:GOTO1180
```

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1170 M(W)=M(W)+1:FORI=1TO1000:NEXT:CLS
1180 G(W)=INT(C(W)/T(W)*100):TT(W)=TT(W)+1
1182 IFN=2ANDTT(2)=20THEN2000
1184 IFN=1ANDTT(1)=20THEN2000
1190 IFN=2ANDW=1THENW=2ELSEW=1
1195 ONQ(W)GOTO100,200,300,400,500
1200 IFQ(W)=4ORZ=4THENPRINT@344,"RIGHT"ELSEPRINT@792,"RIGHT"
1210 GOTO1125
2000 TT(W)=0:GOSUB900:GOSUB2200:PRINT@644,"DO YOU WISH TO CHANGE THE TYPE OF PRO
     BLEM? (YES/NO)"
2010 BB$=INKEY$:FORI=1TO25000
2020 Q$=INKEY$
2030 IFLEFT$(Q$,1)="Y"THENGOSUB600:GOSUB700:GOTO76
2040 IFLEFT$(Q$,1)="N"THEN2100
2050 NEXT:GOTO2100
2060 STOP
2100 PRINT@772,"DO YOU WISH TO CHANGE THE PROBLEM DIFFICULTY? (YES/NO)
2110 BB$=INKEY$:FORI=1TO25000
2120 Q$=INKEY$
2130 IFLEFT$(Q$,1)="Y"THENGOSUB600:GOSUB720:GOTO86
2140 IFLEFT$(Q$,1)="N"THEN2170
2150 NEXT
2170 W=1:ONQ(W)GOTO100,200,300,400,500
2200 PRINT@452,"DO YOU WISH TO CONTINUE THE GAME? (YES/NO)"
2210 BB$=INKEY$:FORI=1TO25000:Q$=INKEY$
2220 IFLEFT$(Q$,1)="Y"THENRETURN
2230 IFLEFT$(Q$,1)="N"THEN2250
2240 NEXT:RETURN
2250 PRINT@662,"* HIT BREAK TO END *";:IFN=2ANDG(1)>G(2)THENFORI=1TO500:PRINT@73
     ,"* WINNER *";:PRINT@201,USING"%        %";A$(1);:FORU=1TO40:NEXTU:PRINT@2
     01,"        ";:PRINT@73,"        ";:FORU=1TO20:NEXTU:NEXT
2260 IFN=2ANDG(2)>G(1)THENFORI=1TO500:PRINT@73,"* WINNER *";:PRINT@329,USING"%
     %";A$(2);:FORU=1TO40:NEXTU:PRINT@329,"        ";:PRINT@73,"
     ";:FORU=1TO20:NEXTU:NEXT
2270 IFG(1)=G(2)THENFORI=1TO500:PRINT@75,"T I E";:FORU=1TO40:NEXTU:PRINT@75,"
     ";:FORU=1TO20:NEXTU::NEXTI
2280 CLS:END
```

CALCULATING AREAS, 1: by Carl A. Goldner

This educational program illustrates methods of finding the areas of rectangles, circles and triangles. It is an excellent resource program for lower level math studies or math review use.
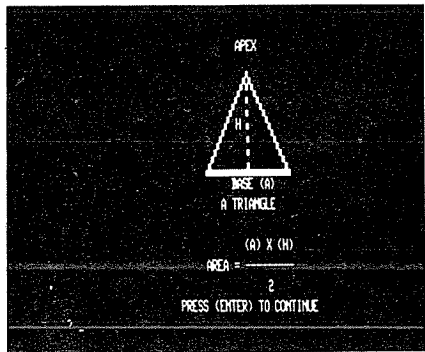

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10 CLS :DEFDBL A: PRINT@274,"* * * CALCULATING AREAS * * *"
15 PRINTTAB(28)"PART  ONE"
17 PRINT:PRINTTAB(28)"RECTANGLES"
18 PRINTTAB(29)"CIRCLES"
19 PRINTTAB(28)"TRIANGLES"
20 PRINTTAB(31)"BY"
25 PRINT
30 FOR X = 1 TO 1000: NEXT X
40 CLS:PRINT@215,"* * * INDEX * * *":PRINT
50 PRINT TAB(8)"TO FIND THE AREA OF ANY RECTANGLE . . . . .TYPE 1"
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60 PRINT TAB(8) "TO FIND THE AREA OF ANY CIRCLE . . . . . . TYPE 2"
70 PRINT TAB(8)"TO FIND THE AREA OF ANY TRIANGLE . . . . . TYPE 3"
80 PRINT TAB(8)"TO TAKE EXAMINATION . . . . . . . . . . . .TYPE 4"
100 PRINT:PRINTTAB(14)"TYPE 1 , 2 , 3 AND 4 AND PRESS (ENTER)"
110 PRINT: PRINT TAB(21)"YOUR SELECTION PLEASE";: INPUT S
115 IF S<1 OR S>4 THEN GOTO 40
120 CLS: ON S GOTO 200,600,2000,3000
200 CLS:PRINT@347,"RECTANGLES":PRINT:FORX=1TO200:NEXT
205 FORX=1TO200:NEXT
210 PRINT TAB(10)"A RECTANGLE IS A PLANE FIGURE BOUNDED BY FOUR STRAIGHT LINES A
       ND ENCLOSING FOUR RIGHT ANGLES."
215 PRINT:GOSUB15000
220 CLS:PRINT@91,"FOR EXAMPLE":FORX=1TO250:NEXT
225 PRINT@221,"SIDE (A)"
226 PRINT@396,"SIDE (B)"
230 Y=14:FORX=44TO85:SET(X,Y):NEXT
240 Y=22:FORX=44TO85:SET(X,Y):NEXT
250 X=44:FORY=15TO21:SET(X,Y):NEXT
260 X=45:FORY=15TO21:SET(X,Y):NEXT
270 X=84:FORY=15TO21:SET(X,Y):NEXT
280 X=85:FORY=15TO21:SET(X,Y):NEXT
292 PRINT@604,"RECTANGLE"
294 PRINT:PRINTTAB(24)"AREA = (A) X (B)"
320 PRINT:GOSUB15000
330 CLS:PRINT@335,"TO FIND THE AREA, FIRST BE CERTAIN THE LENGTH OF EACH SIDE IS
       GIVEN IN THE SAME UNITS OF MEASUREMENT."
340 PRINT:GOSUB15000
350 CLS:PRINT@269," AREA EQUALS SIDE (A) TIMES SIDE (B)"
360 PRINT:PRINTTAB(13)"IF LENGTH OF SIDES IS IN INCHES THEN THE AREA IS INSQUARE
       INCHES. IF LENGTH IS IN FEET THEN AREA IS IN SQUARE FEET";
370 PRINT".LIKEWISE MILES GIVE AREAS IN SQUARE MILES.    METERS GIVE AREAS IN SQ
       UARE METERS AND LENGTHS IN KILOMETERS GIVE AREAS IN SQUARE KILOMETERS."
380 PRINT:GOSUB15000
381 W=0
382 CLS:PRINT@331,"IF SIDE (A) IS 12 INCHES  AND SIDE (B) IS 15 INCHES  WHAT IS
       THE AREA OF THIS RECTANGLE?"
384 PRINT:GOSUB 15000
386 CLS:PRINT@334,"180 SQUARE FEET . . . . . . . TYPE 1"
388 PRINTTAB(14)"150 SQUARE INCHES . . . . . . TYPE 2"
390 PRINTTAB(14)"180 SQUARE INCHES . . . . . . TYPE 3"
392 PRINTTAB(14)"150 SQUARE FEET . . . . . . . TYPE 4"
394 GOSUB10000
396 IF A<1 OR A>4 THEN GOTO 386
398 IF A=3 THEN GOTO 402
400 W=W+1:PRINTTAB(22)"SORRY, THAT IS WRONG":IFW<3THEN PRINTTAB(28)"TRY AGAIN":F
       ORX=1TO500:NEXT:GOTO386
401 IFW=3 THEN PRINTTAB(14)"THE CORRECT ANSWER IS 180 SQ. INCHES":PRINTTAB(24)"M
       ORE STUDY NEEDED":FORX=1TO2000:NEXT:GOTO200

402 PRINT:PRINTTAB(29)"CORRECT
       ":FORX=1TO500:NEXT
405 CLS:W=0
406 PRINT@399,"HOW MANY SIDES DOES A RECTANGLE HAVE?":PRINT:PRINT
408 GOSUB15000
410 CLS:PRINT@334,"THREE SIDES . . . . . . . . . TYPE 1"
412 PRINTTAB(14)"FIVE SIDES . . . . . . . . . .TYPE 2"
414 PRINTTAB(14)"SIX SIDES . . . . . . . . . . . TYPE 3"
416 PRINTTAB(14)"FOUR SIDES . . . . . . . . . .TYPE 4"
418 GOSUB10000
420 IFA<1 OR A>4 THEN GOTO 410
422 IF A=4THEN GOTO 432
424 W=W+1:PRINT:PRINTTAB(22)"SORRY, THAT IS WRONG"
426 IFW<3THENPRINTTAB(28)"TRY AGAIN":FORX=1TO500:NEXT:GOTO410
428 IFW=3THENPRINTTAB(16)"THE CORRECT ANSWER IS FOUR SIDES":PRINTTAB(24)"BACK TO
       STUDYING":FORX=1TO2000:NEXT:GOTO200
432 PRINTTAB(29)"CORRECT":FORX=1TO500:NEXT
499 W=0
500 CLS:PRINT@332,"A CITY LOT HAS A 60 FOOT STREET FRONTAGE AND A DEPTHOF 100 YA
       RDS.  WHAT IS THE AREA IN SQUARE YARDS?":PRINT
501 GOSUB15000
502 CLS:PRINT@333,"6000 SQUARE YARDS . . . . . . . TYPE 1"
503 PRINTTAB(13)"2000 SQUARE YARDS . . . . . . . TYPE 2"
504 PRINTTAB(13)"1998 SQUARE YARDS . . . . . . . TYPE 3"
505 PRINTTAB(13)"666 SQUARE YARDS  . . . . . . . TYPE 4"
506 GOSUB10000
507 IFA<1 OR A>4 THEN GOTO 502
508 IF A=2 THEN GOTO 530
510 W=W+1:PRINT:PRINTTAB(22)"SORRY, THAT IS WRONG"
515 IFW<3THEN PRINTTAB(28)"TRY AGAIN":FORX=1TO500:NEXT:GOTO502
520 IFW=3THEN PRINTTAB(16)"THE CORRECT ANSWER IS 2000 SQ. YARDS":PRINTTAB(24)"BA
       CK TO STUDYING":FORX=1TO2000:NEXT:GOTO200
530 PRINTTAB(29)"CORRECT":FORX=1TO500:NEXT:GOTO40
600 CLS:PRINT@343,"WHAT IS A CIRCLE?":FORX=1TO500:NEXT:PRINT
610 PRINTTAB(6)"A CIRCLE IS A PLANE FIGURE BOUNDED BY AN ENDLESS, CURVING LINE,
       EVERY POINT OF WHICH IS EQUAL DISTANT FROM A COMMON POINT CALLED THE CENTER
       ."
620 GOSUB15000
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630 CLS:PRINT@24,"PARTS OF A CIRCLE":FORX=1TO500:NEXT
640 PRINTTAB(6)"THE LENGTH OF ONE COMPLETE CIRCUIT ON THE BOUNDING LINE OFA CIRC
    LE IS CALLED THE CIRCUMFERENCE OF THE CIRCLE."
650 PRINTTAB(6)"ALL CIRCLES HAVE A POINT CALLED THE CENTER OF THE CIRCLE. THE  C
    ENTER  IS  EQUAL  DISTANCE FROM ALL POINTS ON THE BOUNDINGLINE"
660 PRINTTAB(6)"THE DISTANCE FROM THE CENTER TO ANY POINT ON THE BOUNDING LINE I
    S CALLED THE RADIUS OF THE CIRCLE."
670 PRINTTAB(6)"THE DISTANCE FROM ANY POINT ON THE BOUNDING LINE,  THROUGHTHE CE
    NTER AND  TO  THE  POINT DIRECTLY OPPOSITE ON THE BOUNDINGLINE IS CALLED TH
    E DIAMETER OF THE CIRCLE.  IT IS EQUAL TO TWICETHE RADIUS."
680 PRINTTAB(6)"THE SPACE ENCLOSED BY THE BOUNDING LINE IS CALLED THE AREAOF THE
     CIRCLE."
690 GOSUB15000
790 CLS:PRINT@393,"THE AREA OF A CIRCLE IS EQUAL TO THE DIAMETER TIMES THEDIAMET
    ER  TIMES  ONE-FOURTH  OF  PI (0.7854) OR ,  MORE COMMONLYEXPRESSED AS DIAM
    ETER SQUARED TIMES 0.7854"
795 PRINT:GOSUB15000
799 W=0
800 CLS:PRINT@328,"A CIRCLE HAS A RADIUS OF 3 FEET, WHAT IS ITS AREA?"
801 PRINT:PRINTTAB(18)"7.0686 SQ. FT. . . . . .TYPE 1"
802 PRINTTAB(18)"14.1372 SQ. FT. . . . . TYPE 2"
803 PRINTTAB(18)"28.1944 SQ. FT. . . . . TYPE 3"
804 PRINTTAB(18)"21.2058 SQ. FT. . . . . TYPE 4"
805 GOSUB10000
806 IFA<1 OR A>4 THEN GOTO 800
810 IF A=3 THEN GOTO 835
815 W=W+1:PRINT:PRINTTAB(22)"SORRY, THAT IS WRONG"
820 IFW<3 THEN PRINTTAB(28)"TRY AGAIN":FORX=1TO500:NEXT
825 IFW=3 THEN GOTO 830 ELSE 800
830 PRINT:PRINTTAB(14)"THE CORRECT ANSWER IS 28.1944 SQ. FT.":PRINTTAB(25)"STUDY
     SOME MORE":FORX=1TO2000:NEXT:GOTO600
835 PRINT:PRINTTAB(29)"CORRECT":FORX=1TO500:NEXT
930 W=0
940 CLS:PRINT@151,"LET'S TRY ONE MORE"
945 PRINT:PRINTTAB(12)"A CIRCLE 5 FEET IN DIAMETER HAS AN AREA OF"
950 PRINT:PRINTTAB(15)"19.635 SQUARE INCHES. . . . .TYPE 1"
960 PRINTTAB(15)      "19.745 SQUARE FEET. . . . . .TYPE 2"
970 PRINT TAB(15)      "24.215 SQUARE FEET. . . . . .TYPE 3"
980 PRINT TAB(15)      "19.635 SQUARE FEET. . . . . .TYPE 4"
990 GOSUB10000
991 IF A<1 OR A>4 THEN GOTO940
992 IF A=4 THEN GOTO 999
993 W=W+1: PRINT:PRINTTAB(22)"SORRY, THAT IS WRONG"
994 IF W<3 THEN PRINTTAB(28)"TRY AGAIN":FORX=1TO500:NEXT
995 IF W=3 THEN GOTO 996 ELSE 940
996 PRINT:PRINTTAB(14)"THE CORRECT ANSWER IS 19.635 SQ. FT.":PRINTTAB(24)"MORE S
    TUDY NEEDED":FORX=1TO2000:NEXT:GOTO600
999 PRINT:PRINTTAB(29)"CORRECT":FORX=1TO500: NEXT:GOTO40
2000 CLS:PRINT@407,"WHAT IS A TRIANGLE?"
2010 FORX=1TO200:NEXT
2020 PRINT:PRINTTAB(10)"A TRIANGLE IS A PLANE FIGURE BOUNDED BY THREE STRAIGHTLI
     NES AND ENCLOSING THREE ANGLES."
2030 PRINT:GOSUB15000
2040 CLS:PRINT@86,"PARTS OF A TRIANGLE"
2050 PRINT:PRINTTAB(5)"A TRIANGLE HAS THREE (3) SIDES, EACH OF WHICH IS A STRAIG
     HTLINE."
2060 PRINT:PRINTTAB(5)"A  TRIANGLE  CONTAINS  THREE (3) ANGLES,   THE SUM OF WHI
     CHALWAYS EQUALS 180 DEGREES."
2070 PRINT:PRINTTAB(5)"THE SPACE ENCLOSED BY THE SIDES OF A TRIANGLE IS CALLED T
     HEAREA OF THE TRIANGLE.     WE ARE INTERESTED IN THIS PART OF THETRIANGLE"
2080 PRINT:GOSUB15000
2090 CLS:PRINT@95,"APEX"
2092 PRINT@351,"H"
2095 X=66:FORY=8TO23STEP2:SET(X,Y):NEXT
2100 X=51:Y=23:K=15:FORL=0TOK:SET(X+L,Y-L):NEXT
2110 X=66:Y=8:K=15:FORL=0TOK:SET(X+L,Y+L):NEXT
2120 Y=23:FORX=52TO80:SET(X,Y):NEXT
2130 PRINT@542,"BASE (A)"
2140 PRINTTAB(28)"A TRIANGLE"
2150 PRINT:PRINTTAB(32)"(A) X (H)"
2160 PRINTTAB(25)"AREA = ---------"
2170 PRINTTAB(36)"2"
2173 GOSUB15000
2174 CLS:PRINT@133,"KNOWING  THE  LENGTH  OF  THE  BASE  AND THE ALTITUDE IT ISP
     OSSIBLE TO FIND THE AREA OF THE TRIANGLE."
2176 PRINT:PRINTTAB(5)"THE AREA  IS EQUAL TO HALF OF THE BASE TIMES THE ALTITUD
     E, OR, (A) THE BASE TIMES (H) THE ALTITUDE DIVIDED BY 2."
2177 PRINT:PRINTTAB(5)"THEREFORE, A  TRIANGLE  WITH  A  BASE  OF 12 INCHES AND A
     N ALUITUDE OF 24 INCHES WOULD HAVE AN AREA OF -"
2178 PRINT:PRINTTAB(22)"12 X 24"
2180 PRINTTAB(14)"AREA IS -------- = 144 SQUARE INCHES"
2182 PRINTTAB(25)"2"
2184 GOSUB15000
2186 W=0
2190 CLS:PRINT@208,"A TRIANGLE HAS HOW MANY OF THESE?"
2200 PRINT:PRINTTAB(15)"THREE SIDES . . . . . . . . .TYPE 1
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2210 PRINTTAB(15)"THREE ANGLES . . . . . . . . TYPE 2
2220 PRINTTAB(15) "A BASE . . . . . . . . . . . TYPE 3
2230 PRINTTAB(15) "AN APEX . . . . . . . . . . TYPE 4
2240 PRINTTAB(15) "AN ALTITUDE. . . . . . . . . TYPE 5
2250 PRINTTAB(15)"ALL OF THE ABOVE . . . . . . TYPE 6
2260 PRINT:PRINTTAB(11)"TYPE 1, 2, 3, 4, 5 OR 6 THEN PRESS (ENTER)"
2262 GOSUB1010
2265 IF A<1 OR A>6 THEN GOTO2190
2270 IF A=6 THEN GOTO 2295
2275 W=W+1:PRINT:PRINTTAB(22)"SORRY, YOU ARE WRONG"
2280 IF W<3 THEN PRINTTAB(28)"TRY AGAIN":FORX=1TO500:NEXT
2285 IFW=3 THEN GOTO2290 ELSE 2190
2290 PRINT:PRINTTAB(14)"THE CORRECT ANSWER IS ALL OF THE ABOVE":PRINTTAB(24)"MOR
     E STUDY NEEDED":FORX=1TO2000:NEXT:GOTO2000
2295 PRINT:PRINTTAB(29)"CORRECT":FORX=1TO500:NEXT
2300 W=0
2400 CLS:PRINT@395,"GIVEN A TRIANGLE WITH A BASE MEASURING 15 FEET AND ANALTITUD
     E OF 20 FEET WHAT IS THE AREA OF THE TRIANGLE?"
2410 PRINT:GOSUB15000
2420 CLS:PRINT@269,"300 SQUARE FEET . . . . . . . TYPE 1
2430 PRINTTAB(13)"300 FEET . . . . . . . . . . .TYPE 2
2440 PRINTTAB(13)"150 SQUARE INCHES. . . . . . . TYPE 3
2450 PRINTTAB(13)"150 SQUARE FEET. . . . . . . . TYPE 4
2460 GOSUB10000
2465 IFA<1 OR A>4 THEN GOTO2420
2470 IF A=4 THEN GOTO 2495
2475 W=W+1:PRINT:PRINTTAB(22)"SORRY, THAT IS WRONG"
2480 IFW<3 THEN PRINTTAB(28)"TRY AGAIN":FORX=1TO500:NEXT
2485 IFW=3 THEN GOTO2490 ELSE2420
2490 PRINT:PRINTTAB(16)"THE CORRECT ANSWER IS 150 SQ. FT.":PRINTTAB(24)"MORE STU
     DY NEEDED":FORX=1TO2000:NEXT:GOTO 2000
2495 PRINT:PRINTTAB(29)"CORRECT": FORX=1TO500:NEXT:GOTO40
3000 CLS
3010 PRINT@327,"A FARMER'S FIELD IS ONE THOUSAND (1000) FEET LONG AND ONE    HUN
     DRED EIGHTY FIVE (185) FEET WIDE."
3020 PRINT:PRINTTAB(17)"WHAT IS THE AREA OF THIS FIELD?"
3030 R=0:W=0
3040 PRINT:GOSUB15000
3050 CLS:PRINT@334,"18500 SQUARE FEET . . . . . TYPE 1"
3060 PRINTTAB(14)  "185000 SQUARE INCHES. . . . TYPE 2"
3070 PRINTTAB(14)  "185000 SQUARE FEET. . . . . TYPE 3"
3080 PRINTTAB(14)  "185000 FEET . . . . . . . . TYPE 4"
3090 GOSUB10000
3092 IFA<1 OR A>4THENGOTO3050
3095 IF A=3THENGOSUB5000ELSEGOSUB5010
3100 CLS:PRINT@391,"A CIRCLE TEN (10) FEET IN DIAMETER HAS AN AREA OF- - -?"
3120 PRINT:GOSUB15000
3130 CLS:PRINT@332,"78.54 SQUARE FEET. . . . . . . TYPE 1"
3140 PRINTTAB(12)"7854 SQUARE FEET . . . . . . . TYPE 2"
3150 PRINTTAB(12)"785.4 SQUARE FEET. . . . . . . TYPE 3"
3160 PRINTTAB(12)".7854 SQUARE FEET. . . . . . . TYPE 4"
3170 GOSUB10000
3175 IF A<1 OR A>4THENGOTO3130
3180 IFA=1THENGOSUB5000ELSEGOSUB5010
3190 CLS:PRINT@197,"THE AREA OF A TRIANGLE IS EQUAL TO WHICH OF THE FOLLOWING?"
3200 PRINT:PRINTTAB(12)"(D) X (D) X 0.7854 . . . . . . . .TYPE 1"
3210 PRINTTAB(12)"(A X H) / 2 . . . . . . . . . . .TYPE 2"
3220 PRINTTAB(12)"(A) X (H) . . . . . . . . . . . . TYPE 3"
3230 PRINTTAB(12)"(A) X (B) . . . . . . . . . . . . TYPE 4"
3250 GOSUB10000
3255 IF A<1 OR A>4THENGOTO3190
3260 IFA=2THENGOSUB5000ELSEGOSUB5010
3270 CLS:PRINT@389,"A SAILBOAT NEEDS A NEW SAIL. tHE BOOM (BASE) IS TWENTY-FOUR(
     24) FEET  LONG  AND THE MAST (ALTITUDE) IS THIRTY-SIX (36) FEETHIGH.  HOW M
     UCH CANVAS WILL BE NEEDED?"
3280 PRINT:GOSUB15000
3290 CLS:PRINT@334,"864 SQUARE FEET . . . . . . TYPE 1"
3300 PRINTTAB(14)"1728 SQUARE FEET. . . . . . TYPE 2""
3310 PRINTTAB(14)"432 SQUARE FEET. . . . . . .TYPE 3"
3320 PRINTTAB(14)"216 SQUARE FEET. . . . . . .TYPE 4"
3330 GOSUB10000
3335 IF A<1 OR A>4THENGOTO3290
3340 IFA=3THENGOSUB5000ELSEGOSUB5010
3350 CLS:PRINT@204,"THE AREA OF A CIRCLE IS FOUND AS FOLLOWS"
3360 PRINT:PRINTTAB(12)"(A) X (B). . . . . . . . . . . . .TYPE 1"
3370 PRINTTAB(12)"(A X H) / 2. . . . . . . . . . . .TYPE 2"
3380 PRINTTAB(12)"(A) X (B) X 0.7854 . . . . . . .TYPE 3"
3390 PRINTTAB(12)"(D) X (D) X 0.7854 . . . . . . .TYPE 4"
3410 GOSUB10000
3415 IFA<1 OR A>4THENGOTO3350
3420 IFA=4THENGOSUB5000ELSEGOSUB5010
3430 CLS:PRINT@389,"A MERRY-GO-ROUND  IS  FIFTY (50) FEET  IN DIAMETER,  ADDINGA
     NOTHER TEN (10) FEET  ALL  AROUND,   WHAT IS THE AREA THAT WILLHAVE TO BE C
     LEARED TO SET UP THE MERRY-GO-ROUND?
3440 PRINT:GOSUB15000
3450 CLS:PRINT@334,"3848.46 SQUARE FEET . . . . . TYPE 1"
3460 PRINTTAB(14)  "3600.00 SQUARE FEET . . . . . TYPE 2"
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3470 PRINTTAB(14)  "2827.44 SQUARE FEET . . . . . TYPE 3"
3480 PRINTTAB(14)  "4900.00 SQUARE FEET . . . . . TYPE 4"
3490 GOSUB10000
3495 IFA<1 ORA>4THENGOTO3450
3500 IF A=1THENGOSUB5000ELSEGOSUB5010
3510 CLS:PRINT@265,"A TRIANGULAR  FIELD TWO HUNDRED (200) FEET ON ONE SIDE (BASE
     ) AND  THREE HUNDRED (300) FEET IN ALTITUDEIS TO BE SEEDED FOR A LAWN."
3520 PRINT:PRINTTAB(9)"ONE POUND WILL SEED TWO HUNDRED (200) SQUARE FEET.  HOWMU
     CH SEED SHOULD YOU BUY?"
3530 PRINT:GOSUB15000
3540 CLS:PRINT@334,  "300 POUNDS . . . . . . . . .TYPE 1"
3550 PRINTTAB(14)"150 POUNDS . . . . . . . . .TYPE 2"
3560 PRINTTAB(14)"800 POUNDS  . . . . . . . .TYPE 3"
3570 PRINTTAB(14)"600 POUNDS . . . . . . . . .TYPE 4"
3580 GOSUB10000
3585 IF A<1 OR A>4 THENGOTO3540
3590 IFA=2THENGOSUB5000ELSEGOSUB5010
3600 CLS:PRINT@203,"THE AREA OF A RECTANGLE IS FOUND AS FOLLOWS"
3640 PRINT:PRINTTAB(13)"(D) x (D) X 0.7854 . . . . . . .TYPE 1"
3650 PRINTTAB(13)  "(A X H) / 2 . . . . . . . . . . TYPE 2"
3660 PRINTTAB(13)  "(A) X (H). . . . . . . . . . . .TYPE 3"
3670 PRINTTAB(13)  "(A) X (B). . . . . . . . . . . .TYPE 4"
3680 GOSUB10000
3685 IF A<1 OR A>4 THENGOTO3600
3690 IF A=4THENGOSUB5000ELSEGOSUB5010
3700 CLS:PRINT@391,"A NEIGHBOR WANTS YOU TO MOW HIS LAWN.   THE YARD MEASURES100
      BY 200 FEET AND THE HOUSE COVERS 36 BY 50 FEET.      HOW MUCHAREA IS THERE
      TO BE MOWED?"
3710 PRINT:GOSUB15000
3720 CLS:PRINT@334,"20000 SQUARE FEET. . . . . .TYPE 1"
3730 PRINTTAB(14)"1800 SQUARE FEET . . . . . .TYPE 2"
3740 PRINTTAB(14)"21800 SQUARE FEET. . . . . .TYPE 3"
3750 PRINTTAB(14)"18200 SQUARE FEET. . . . . .TYPE 4"
3760 GOSUB10000
3765 IFA<1 OR A>4THENGOTO3720
3770 IFA=4THENGOSUB5000ELSEGOSUB5010
3780 CLS:PRINT@333,"HOW MANY SQUARE YARDS OF CARPETING WILL BE REQUIRED FOR WALL
      TO WALL COVERAGE IN A ROOM THAT MEASURES 12 FEET BY 24 FEET?"
3790 PRINT:GOSUB15000
3800 CLS:PRINT@334,"96 SQUARE YARDS . . . . . . .TYPE 1"
3810 PRINTTAB(14)"32 SQUARE YARDS . . . . . . .TYPE 2"
3820 PRINTTAB(14)"24 SQUARE YARDS . . . . . . .TYPE 3"
3830 PRINTTAB(14)"72 SQUARE YARDS . . . . . . .TYPE 4"
3840 GOSUB10000
3845 IF A<1 OR A>4THENGOTO3800
3850 IFA=2THENGOSUB5000ELSEGOSUB5010
3900 GOTO5900
5000 PRINT:PRINTTAB(29)"CORRECT":R=R+1:FORX=1TO500:NEXT:GOTO5020
5010 PRINT:PRINTTAB(23)"SORRY, THAT IS WRONG":W=W+1:FORX=1TO500:NEXT
5020 CLS:PRINT@402,"YOU HAVE ";R;" RIGHT, AND ";W;" WRONG":FORX=1TO750:NEXT:RETU
     RN
5900 G=R*10
5910 CLS:PRINT@406,"YOUR GRADE IS ";G;" %"
5915 IF G=>70 THEN PRINTTAB(25)"CONGRATULATIONS":FORX=1TO2000:NEXT:END
5917 IF G<70 THENPRINTTAB(24)"SORRY, TRY AGAIN"
5920 FORX=1TO2000:NEXT:GOTO200
9999 GOTO9999
10000 PRINT:PRINTTAB(13)"TYPE 1, 2, 3 OR 4  THEN PRESS (ENTER)"
10010 PRINTTAB(22)"YOUR ANSWER. PLEASE";:INPUTA:RETURN
15000 PRINTTAB(20)"PRESS (ENTER) TO CONTINUE":INPUT:RETURN
```

STATES: by Robert F. Nichol

A good drill on your knowledge of the fifty states. Capitals, largest cities, populations, nicknames and alphabetical order routines are all included. An excellent educational exercise for grade school Geography and American History classes. Say, which state is known as the Granite State?

```
M E N U :

1 - INFORMATION FOR A STATE
2 - ALPHABETICAL ORDER
3 - STATES AND CAPITALS
4 - STATES AND LARGEST CITIES
5 - STATES AND POPULAR NAMES
6 - STATES AND POPULATIONS

(/M/ TO RETURN TO THIS MENU)

ENTER NUMBER OF YOUR CHOICE? _
```
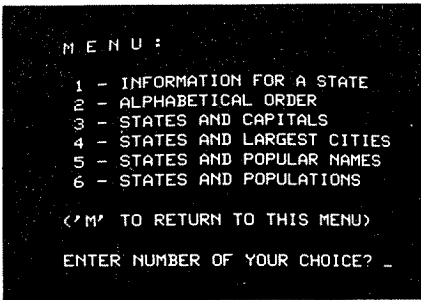
```
100 CLS:RANDOM:CLEAR100:DIMS$(50),S(50),C$(50),L$(50),P(50),PA$(50),PB$(50)
110 N=50
115 DEFDBLP:DIMP(50)
120 FORX=1TON:READS$(X),C$(X),L$(X),P(X),PA$(X),PB$(X):NEXT X
500 CLS:PRINTCHR$(23)
510 PRINT@64,"M E N U :":PRINT
520 PRINT" 1 - INFORMATION FOR A STATE
530 PRINT" 2 - ALPHABETICAL ORDER
540 PRINT" 3 - STATES AND CAPITALS
550 PRINT" 4 - STATES AND LARGEST CITIES
560 PRINT" 5 - STATES AND POPULAR NAMES
570 PRINT" 6 - STATES AND POPULATIONS
580 PRINT:PRINT"('M' TO RETURN TO THIS MENU)
590 PRINT:INPUT"ENTER NUMBER OF YOUR CHOICE";CH
600 IFCH<1 OR CH>6 THEN500
610 ON CH GOTO 1000, 3000, 5000, 7000, 9000, 11000
1000 REM PRINT INFORMATION FOR A SPECIFIC STATE
1010 CLS:PRINTCHR$(23)
1020 PRINT"ENTER NAME OF STATE":PRINT:INPUT"     ";S$
1030 IFS$="M" THEN 500
1040 FOR X=1TON
1050 IF S$(X)=S$ THEN 1100
1060 NEXT X
1070 PRINT:PRINT:PRINTS$;" IS NOT A STATE":PRINT:PRINT"IN THE UNITED STATES!"
1080 FOR TI=1TO750: NEXT TI: GOTO1010
1100 CLS:PRINT@0,CHR$(23);
1110 PRINT"STATE - ";S$(X)
1120 PRINT:PRINT"CAPITAL - ";C$(X)
1130 PRINT:PRINT"LARGEST CITY - ";L$(X)
1140 PRINT:PRINT"POPULATION (1970) - ";:PRINT USING "#####,####"; P(X)
1150 IF PB$(X)<>"?" THEN 1170
1160 PRINT:PRINT"POPULAR NAME:":PRINT:PRINT"    ";PA$(X):GOTO1200
1170 PRINT:PRINT"POPULAR NAMES:":PRINT:PRINT"    ";PA$(X)
1180 PRINT:PRINT"    ";PB$(X)
1200 PRINT:PRINT:INPUT"HIT ENTER TO CONTINUE";EN:GOTO1010
3000 REM ENTER STATES IN ALPHABETICAL ORDER
3010 W=0:CLS:PRINT@0,CHR$(23);"STATES IN ALPHABETICAL ORDER"
3015 PRINT:PRINT"NAME OF FIRST STATE";:INPUTS$:IFS$=S$(1)THEN 3020 ELSE PRINT"WR
     ONG, ALABAMA IS FIRST!":W=W+1
3020 FOR X=2TON
3030 PRINT:INPUT"NEXT STATE";S$
3035 IF S$="M" THEN 500
3040 IFS$=S$(X) THEN 3060
3050 W=W+1:PRINT"WRONG, ";S$(X);" IS NEXT!"
3060 NEXT X:PRINTSTRING$(32,131);
3070 PRINT:PRINT"RIGHT =";N-W;" WRONG =";W;:PRINT:PRINT:PRINT"SCORE =";:PRINT US
     ING"###.##";100*(N-W)/N;:PRINT" %"
3080 PRINT:PRINT:INPUT"HIT ENTER TO RETURN TO MENU"; EN: GOTO 500
5000 REM STATES AND THEIR CAPITALS
5010 FORX=1TO50: S(X)=0: NEXT X
5020 R=0: W=0
5030 CLS: PRINT@0,CHR$(23);
5040 INPUT"HOW MANY QUESTIONS (1-50)";Q:IFQ<1ORQ>50 THEN 5030
5050 CLS
5060 PRINT@64,CHR$(23);"M E N U :
5070 PRINT:PRINT"  1 - GIVE CAPITAL
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5080 PRINT:PRINT"  2 - GIVE STATE
5090 PRINT:PRINT"  3 - MIXED
5100 PRINT:PRINT:INPUT"ENTER NUMBER OF YOUR CHOICE"; SC: IF SC<1 OR SC>3 THEN505
     0
5110 ON SC GOTO5120, 5500, 5800
5120 FOR X=1TOQ: CLS: PRINT@128,CHR$(23);
5130 S=RND(N): IF S(S)=1 THEN 5130
5150 S(S)=1:PRINT"WHAT IS THE CAPITAL OF":PRINT:PRINT"     ";S$(S)
5160 PRINT:INPUT"      ";C$:PRINT
5165 IF C$="M" THEN 5205
5170 IF C$=C$(S) THEN R=R+1: PRINT"CORRECT!":GOTO5200
5180 W=W+1: PRINT"WRONG...";C$(S):PRINT:PRINT"IS THE CAPITAL OF ";S$(S)
5200 IF SC = 3 THEN 5850 ELSE IFX<QTHENPRINT:INPUT"HIT ENTER TO CONTINUE";EN: NE
     XT
5205 PRINT:PRINT"RIGHT =";R;"WRONG =";W
5210 PRINT:PRINT"SCORE =";PRINTUSING"###.##";100*(R/(R+W+.000001));:PRINT" %"
5220 PRINT:PRINT:INPUT"HIT ENTER TO CONTINUE"; EN: GOTO500
5500 FOR X=1TOQ: CLS: PRINT@128,CHR$(23);
5510 S=RND(N): IF S(S)=1 THEN 5510
5520 S(S)=1:PRINTC$(S);" IS THE CAPITAL OF
5530 PRINT:INPUT"      ";S$:PRINT
5540 IFS$="M"THEN5610
5550 IFS$=S$(S) THEN R=R+1:PRINT"CORRECT!": GOTO 5600
5560 W=W+1: PRINT"WRONG...";C$(S):PRINT:PRINT"IS THE CAPITAL OF ";S$(S)
5600  IF SC=3 THEN 5850 ELSE IF X<Q THEN PRINT:INPUT"HIT ENTER TO CONTINUE";EN:
     NEXT
5610 GOTO5205
5800 FOR X=1TOQ: CLS: PRINT@128,CHR$(23);
5810 S=RND(N):IFS(S)=1 THEN 5810
5820 M=RND(2)
5830 ON M GOTO 5150, 5520
5850 IF X<Q THEN PRINT:INPUT"HIT ENTER TO CONTINUE";EN: NEXT
5860 GOTO 5205
7000 REM STATES AND LARGEST CITIES
7010 FOR X=1TO50: S(X)=0: NEXT X
7020 R=0: W=0
7030 CLS: PRINT@0,CHR$(23);
7040 INPUT"HOW MANY QUESTIONS (1-50)";Q: IF Q<1 OR Q>50 THEN 7030
7050 CLS
7060 PRINT@64,CHR$(23);"M E N U :
7070 PRINT:PRINT"  1 - GIVE LARGEST CITY
7080 PRINT:PRINT"  2 - GIVE STATE
7090 PRINT:PRINT"  3 - MIXED
7100 PRINT:PRINT:INPUT"ENTER NUMBER OF YOUR CHOICE";SC: IF SC<1 OR SC>3 THEN 705
     0
7110 ON SC GOTO 7120, 7500, 7800
7120 FOR X=1TOQ: CLS: PRINT@128,CHR$(23);
7130 S=RND(N): IF S(S)=1 THEN 7130
7150 S(S)=1: PRINT"WHAT IS THE LARGEST CITY IN":PRINT:PRINT"     ";S$(S)
7155 F$=L$(S):IFS$(S)="MAINE"ORS$(S)="OREGON"THENF$=LEFT$(L$(S),8)
7160 PRINT:INPUT"      ";L$:PRINT
7170 IFL$="M" THEN 7205
7180 IF L$=F$ THEN R=R+1: PRINT"CORRECT!": GOTO 7200
7190 W=W+1: PRINT"WRONG...";L$(S):PRINT"IS THE LARGEST CITY IN ":PRINTS$(S)
7200 IF SC=3 THEN 7840 ELSE IFX<QTHENPRINT:INPUT"HIT ENTER TO CONTINUE";EN:NEXT
7205 GOTO 5205
7500 FOR X=1TOQ: CLS: PRINT@128,CHR$(23);
7510 S=RND(N): IF S(S)=1 THEN 7510
7520 S(S)=1: PRINTL$(S):PRINT:PRINT"IS THE LARGEST CITY IN
7530 PRINT:INPUT"      ";S$:PRINT
7540 IF S$="M" THEN 7580
7550 IF S$=S$(S) THEN R=R+1: PRINT"CORRECT!": GOTO 7570
7560 W=W+1: PRINT"WRONG...";L$(S):PRINT"IS THE LARGEST CITY IN ":PRINTS$(S)
7570 IF SC=3 THEN 7840 ELSE IF X<Q THEN PRINT:INPUT"HIT ENTER TO CONTINUE";EN: N
     EXT
7580 GOTO 5205
7800 FOR X=1TOQ: CLS: PRINT@128,CHR$(23);
7810 S=RND(N): IF S(S)=1 THEN 7810
7820 M=RND(2)
7830 ON M GOTO 7150, 7520
7840 IF X<Q THEN PRINT:INPUT"HIT ENTER TO CONTINUE";EN: NEXT
7850 GOTO5205
9000 REM STATES AND POPULAR NAMES
9010 R=0:W=0:CLS:PRINT@0,CHR$(23);
9015 FORX=1TON:S(X)=0:NEXT
9020 INPUT"HOW MANY QUESTIONS (1-50)";Q:IFQ<1 OR Q>50 THEN9010
9030 CLS: PRINT@64,CHR$(23);"M E N U :
9040 PRINT:PRINT"  1 - GIVE POPULAR NAME
9050 PRINT:PRINT"  2 - GIVE STATE
9060 PRINT:PRINT"  3 - MIXED
9070 PRINT:PRINT:INPUT"ENTER NUMBER OF YOUR CHOICE";SC:IF SC<1 OR SC>3 THEN9030
9080 ON SC GOTO 9500, 9120, 9800
9120 FORX=1TOQ: CLS: PRINT@0,CHR$(23);
9130 S=RND(N): IF S(S)=1 THEN 9130
9150 S(S)=1
9160 PRINT"WHAT STATE IS KNOWN AS":PRINT:PRINT"     ";PA$(S)
9170 IFPB$(S)="?"THEN9180 ELSE PRINT:PRINT"    OR ";PB$(S)
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9180 PRINT:INPUTS$
9190 IFS$="M"THEN 5205
9200 IFS$=S$(S)THENR=R+1:PRINT:PRINT"CORRECT!":GOTO9220
9210 W=W+1:PRINT:PRINT"WRONG...THE ANSWER IS ":PRINT:PRINTS$(S)
9220 PRINT:IF SC=3 THEN9840 ELSE IF X<Q THEN INPUT"HIT ENTER TO CONTINUE";EN: NE
     XT
9230 GOTO5205
9500 FORX=1TOQ: CLS: PRINT@0,CHR$(23);
9510 S=RND(N): IF S(S)=1 THEN 9510
9520 S(S)=1
9530 PRINT"WHAT IS THE NICKNAME OF
9540 PRINT:PRINTS$(S);:INPUTP$
9550 IFP$="M"THEN5205
9560 IFP$=PA$(S)ORP$=PB$(S)THENR=R+1: PRINT:PRINT"CORRECT!": GOTO9590
9570 W=W+1:PRINT:PRINT"WRONG...";S$(S):PRINT"IS KNOWN AS
9580 PRINT:PRINT"       ";PA$(S):IFPB$(S)<>"?"THENPRINT"       OR ";PB$(S)
9590 PRINT:IFSC=3THEN9840 ELSE IF X<Q THEN INPUT"HIT ENTER TO CONTINUE";EN: NEXT
9600 GOTO5205
9800 FORX=1TOQ:CLS: PRINT@0,CHR$(23);
9810 S=RND(N): IFS(S)=1 THEN 9810
9820 M=RND(2)
9830 ON M GOTO 9150, 9520
9840 PRINT:IFX<QTHENINPUT"HIT ENTER TO CONTINUE";EN:NEXT
9850 GOTO5205
11000 REM STATES AND POPULATIONS
11010 FORX=1TO50: S(X)=0: NEXT X
11020 R=0: W=0
11030 CLS: PRINT@0,CHR$(23);
11040 INPUT"WHAT PERCENT ACCURACY (1-50)";A:IFA<1ORA>50 THEN11030
11050 CLS:PRINT@0,CHR$(23);
11060 INPUT"HOW MANY QUESTIONS (1-50)";Q:IFQ<1 OR Q>50 THEN 11050
11070 CLS
11080 FORX=1TOQ:CLS;PRINT@0,CHR$(23)
11090 S=RND(N): IF S(S)=1 THEN 11090
11100 S(S)=1
11110 PRINT"WHAT IS THE POPULATION OF
11120 PRINT:PRINTS$(S);:INPUT"   ";P$:IFP$="M"THEN 5205
11125 P=VAL(P$)
11130 IFP>P(S)-P(S)*A/100 AND P< P(S)+P(S)*A/100 THEN R=R+1: PRINT:PRINT"RIGHT!
      POPULATION IS ";:PRINTUSING"###,######";P(S):GOTO11150
11140 W=W+1:PRINT:PRINT"WRONG! POPULATION IS ";:PRINTUSING"###,######";P(S)
11150 PRINT:PRINT"YOU WERE OFF BY ";:PRINTUSING"#,###.##";ABS(100-100*P/(P(S)+.0
      00001));:PRINT" %"
11200 PRINT:IF X<Q THEN INPUT"HIT ENTER TO CONTINUE";EN: NEXT
11210 GOTO5205
15000 REM DATA STATEMENTS FOR STATE INFORMATION
15010 DATA ALABAMA, MONTGOMERY, BIRMINGHAM, 3444165, HEART OF DIXIE, COTTON STAT
      E
15020 DATA ALASKA, JUNEAU, ANCHORAGE, 302173, GREAT LAND, ?
15030 DATA ARIZONA, PHOENIX, PHOENIX, 1772482, GRAND CANYON STATE, ?
15040 DATA ARKANSAS, LITTLE ROCK, LITTLE ROCK, 1923295, LAND OF OPPORTUNITY, WON
      DER STATE
15050 DATA CALIFORNIA, SACRAMENTO, LOS ANGELES, 19953134, GOLDEN STATE, ?
15060 DATA COLORADO, DENVER, DENVER, 2207259, CENTENNIAL STATE, ?
15070 DATA CONNECTICUT, HARTFORD, HARTFORD, 3032217, CONSTITUTION STATE, NUTMEG
      STATE
15080 DATA DELAWARE, DOVER, WILMINGTON, 548104, FIRST STATE, DIAMOND STATE
15090 DATA FLORIDA, TALLAHASSEE, JACKSONVILLE, 6789443, SUNSHINE STATE, PENINSUL
      A STATE
15100 DATA GEORGIA, ATLANTA, ATLANTA, 4589575, EMPIRE STATE OF THE SOUTH, ?
15110 DATA HAWAII, HONOLULU, HONOLULU, 769913, ALOHA STATE, PARADISE OF THE PACI
      FIC
15120 DATA IDAHO, BOISE, BOISE, 713008, GEM STATE, ?
15130 DATA ILLINOIS, SPRINGFIELD, CHICAGO, 11113976, PRAIRIE STATE, ?
15140 DATA INDIANA, INDIANAPOLIS, INDIANAPOLIS, 5193669, HOOSIER STATE, ?
15150 DATA IOWA, DES MOINES, DES MOINES, 2825041, HAWKEYE STATE, ?
15160 DATA KANSAS, TOPEKA, WICHITA, 2249071, SUNFLOWER STATE, ?
15170 DATA KENTUCKY, FRANKFORT, LOUISVILLE, 3219311, BLUE GRASS STATE, ?
15180 DATA LOUISIANA, BATON ROUGE, NEW ORLEANS, 3643180, PELICAN STATE, ?
15190 DATA MAINE, AUGUSTA, PORTLAND (EAST), 993663, PINE TREE STATE , ?
15200 DATA MARYLAND, ANNAPOLIS, BALTIMORE, 3922399, OLD LINE STATE, FREE STATE
15210 DATA MASSACHUSETTS, BOSTON, BOSTON, 5689170, BAY STATE, OLD COLONY
15220 DATA MICHIGAN, LANSING, DETROIT, 8875083, WOLVERINE STATE, ?
15230 DATA MINNESOTA, ST PAUL, MINNEAPOLIS, 3805069, NORTH STAR STATE, GOPHER ST
      ATE
15240 DATA MISSISSIPPI, JACKSON, JACKSON, 2216912, MAGNOLIA STATE, ?
15250 DATA MISSOURI, JEFFERSON CITY, ST LOUIS, 4677399, SHOW ME STATE, ?
15260 DATA MONTANA, HELENA, BILLINGS, 694409, TREASURE STATE, ?
15270 DATA NEBRASKA, LINCOLN, OMAHA, 1483791, CORNHUSKER STATE, ?
15280 DATA NEVADA, CARSON CITY, LAS VEGAS, 488738, SILVER STATE, ?
15290 DATA NEW HAMPSHIRE, CONCORD, MANCHESTER, 737681, GRANITE STATE, ?
15300 DATA NEW JERSEY, TRENTON, NEWARK, 7168164, GARDEN STATE, ?
15310 DATA NEW MEXICO, SANTA FE, ALBUQUERQUE, 1016000, LAND OF ENCHANTMENT, ?
15320 DATA NEW YORK, ALBANY, NEW YORK, 18241266, EMPIRE STATE, ?
15330 DATA NORTH CAROLINA, RALEIGH, CHARLOTTE, 5082059, TARHEEL STATE, ?
15340 DATA NORTH DAKOTA, BISMARCK, FARGO, 617761, FLICKERTAIL STATE, SIOUX STATE
```

```
15350 DATA OHIO, COLUMBUS, CLEVELAND, 10652017, BUCKEYE STATE, ?
15360 DATA OKLAHOMA, OKLAHOMA CITY, OKLAHOMA CITY, 2559253, SOONER STATE, ?
15370 DATA OREGON, SALEM, PORTLAND (WEST), 2091385, BEAVER STATE, ?
15380 DATA PENNSYLVANIA, HARRISBURG, PHILADELPHIA, 11793909, KEYSTONE STATE, ?
15390 DATA RHODE ISLAND, PROVIDENCE, PROVIDENCE, 949723, LITTLE RHODY, ?
15400 DATA SOUTH CAROLINA, COLUMBIA, COLUMBIA, 2590516, PALMETTO STATE, ?
15410 DATA SOUTH DAKOTA, PIERRE, SIOUX FALLS, 666257, COYOTE STATE, SUNSHINE STA
      TE
15420 DATA TENNESSEE, NASHVILLE, MEMPHIS, 3924164, VOLUNTEER STATE, ?
15430 DATA TEXAS, AUSTIN, HOUSTON, 11196730, LONE STAR STATE, ?
15440 DATA UTAH, SALT LAKE CITY, SALT LAKE CITY, 1059273, BEEHIVE STATE, ?
15450 DATA VERMONT, MONTPELIER, BURLINGTON, 444732, GREEN MOUNTAIN STATE, ?
15460 DATA VIRGINIA, RICHMOND, NORFOLK, 4648494, OLD DOMINION, ?
15470 DATA WASHINGTON, OLYMPIA, SEATTLE, 3409169, EVERGREEN STATE, ?
15480 DATA WEST VIRGINIA, CHARLESTON, HUNTINGTON, 1744237, MOUNTAIN STATE, ?
15490 DATA WISCONSIN, MADISON, MILWAUKEE, 4417933, BADGER STATE, ?
15500 DATA WYOMING, CHEYENNE, CHEYENNE, 332416, EQUALITY STATE, ?
```

PRESIDENTS: by Robert F. Nichol

Who was the thirty-ninth president of the United States? What number president was Millard Fillmore, and where was he born? When was Harry S. Truman first innaugurated? The Presidents program gives all the data you'll need to answer these thought-provoking questions. As an added plus, it will also require you to spell all Presidential names correctly.

```
PRESIDENT - RICHARD NIXON

PARTY - REPUBLICAN

# OF PRESIDENCY - THIRTY-SEVENTH

YEAR OF INNAUGURATION - 1969

STATE OF BIRTH - CALIFORNIA

HIT ENTER TO CONTINUE? _
```

```
100  CLS:RANDOM:CLEAR100:N=39:DIMS$(N),S(N),C$(N),L$(N),P(N),PA$(N)
120  FORX=1TON:READS$(X),C$(X),L$(X),P(X),PA$(X):NEXT X
500  CLS:PRINTCHR$(23)
510  PRINT@64,"M E N U :":PRINT
520  PRINT" 1 - PRESIDENTIAL FACTS
530  PRINT" 2 - PRESIDENTS IN ORDER
540  PRINT" 3 - PARTY
550  PRINT" 4 - # OF PRESIDENCY
560  PRINT" 5 - STATE OF BIRTH
570  PRINT" 6 - YEAR OF INNAUGURATION
580  PRINT:PRINT"('M' TO RETURN TO THIS MENU)
590  PRINT:INPUT"ENTER NUMBER OF YOUR CHOICE";CH
600  IFCH<1 OR CH>6 THEN500
610  ON CH GOTO 1000, 3000, 5000, 7000, 9000, 11000
1000 REM PRINT INFORMATION FOR A SPECIFIC PRESIDENT
1010 CLS:PRINTCHR$(23)
1020 PRINT"ENTER NAME OF PRESIDENT":PRINT:INPUT"      ";S$
1030 IFS$="M" THEN 500
1040 FOR X=1TON
1050 IF S$(X)=S$ THEN 1100
1060 NEXT X
1070 PRINT:PRINT:PRINTS$:PRINT"IS NOT A PRESIDENT":PRINT:PRINT"OF THE UNITED STA
     TES!"
```

```
1080 FOR TI=1TO750: NEXT TI: GOTO1010
1100 CLS:PRINT@0,CHR$(23);
1110 PRINT"PRESIDENT - ";S$(X)
1120 PRINT:PRINT"PARTY - ";C$(X)
1130 PRINT:PRINT"# OF PRESIDENCY - ";L$(X);:IFX=22THENPRINT"          AND T
     WENTY-FOURTH"ELSEPRINT
1140 PRINT:PRINT"YEAR OF INNAUGURATION - ";P(X);:IFX=22THENPRINT"
          AND 1893"ELSE PRINT
1180 PRINT:PRINT"STATE OF BIRTH - ";PA$(X)
1200 PRINT:PRINT:INPUT"HIT ENTER TO CONTINUE";EN:GOTO1010
3000 REM ENTER PRESIDENTS IN ORDER
3010 W=0:CLS:PRINT@0,CHR$(23);"PRESIDENTS IN NUMERICAL ORDER
3015 PRINT"NAME OF FIRST PRESIDENT":INPUTS$:IFS$=S$(1)THEN 3020 ELSE PRINT
     "NO, GEORGE WASHINGTON IS FIRST!":W=W+1
3020 FOR X=2TON
3030 PRINT:PRINT"PRESIDENT #";X;"IS":INPUTS$
3035 IF S$="M" THEN 500
3040 IFS$=S$(X) THEN 3060
3050 W=W+1:PRINT"WRONG, ";S$(X);" IS NEXT!"
3060 NEXT X:PRINTSTRING$(32,131);
3070 PRINT:PRINT"RIGHT =";N-W;" WRONG =";W;:PRINT:PRINT:PRINT"SCORE =";:PRINT US
     ING"###.##";100*(N-W)/N;:PRINT" %"
3080 PRINT:PRINT:INPUT"HIT ENTER TO RETURN TO MENU"; EN: GOTO 500
5000 REM PRESIDENTS AND THEIR PARTY
5010 FORX=1TON: S(X)=0: NEXT X
5020 R=0: W=0
5030 CLS: PRINT@0,CHR$(23);
5040 PRINT"HOW MANY QUESTIONS (1-";N;")";:INPUTQ:IFQ<1ORQ>N THEN 5030
5050 CLS
5120 FOR X=1TOQ: CLS: PRINT@128,CHR$(23);
5130 S=RND(N): IF S(S)=1 THEN 5130
5150 S(S)=1:PRINT"WHAT IS THE PARTY OF":PRINT:PRINT"     ";S$(S)
5160 PRINT:INPUT"     ";C$:PRINT
5165 IF C$="M" THEN 5205
5170 IF C$=C$(S) THEN R=R+1: PRINT"CORRECT!":GOTO5200
5180 W=W+1: PRINT"WRONG...";C$(S):PRINT:PRINT"IS THE PARTY OF ";S$(S)
5200 IFX<QTHENPRINT:INPUT"HIT ENTER TO CONTINUE";EN: NEXT
5205 PRINT:PRINT"RIGHT =";R;"WRONG =";W
5210 PRINT:PRINT"SCORE = ";:PRINTUSING"###.##";100*(R/(R+W+.000001));:PRINT" %"
5220 PRINT:PRINT:INPUT"HIT ENTER TO CONTINUE"; EN: GOTO500
7000 REM PRESIDENT AND # OF PRESIDENCY
7010 FOR X=1TON: S(X)=0: NEXT X
7020 R=0: W=0
7030 CLS: PRINT@0,CHR$(23);
7040 PRINT"HOW MANY QUESTIONS (1-";N;")";:INPUTQ: IF Q<1 OR Q>N THEN 7030
7050 CLS
7060 PRINT@64,CHR$(23);"M E N U :
7070 PRINT:PRINT"  1 - GIVE PRESIDENCY
7080 PRINT:PRINT"  2 - GIVE PRESIDENT
7090 PRINT:PRINT"  3 - MIXED
7100 PRINT:PRINT:INPUT"ENTER NUMBER OF YOUR CHOICE";SC: IF SC<1 OR SC>3 THEN 705
     0
7110 ON SC GOTO 7120, 7500, 7800
7120 FOR X=1TOQ: CLS: PRINT@128,CHR$(23);
7130 S=RND(N): IF S(S)=1 THEN 7130
7135 S(S)=1
7140 IFS=22THENPRINT"WHAT WAS THE FIRST PRESIDENCY OF":PRINT:PRINT"     ";S$(S):
     GOTO7160
7145 IFS=24THENPRINT"WHAT WAS THE 2ND PRESIDENCY OF":PRINT:PRINT"     ";S$(S):GO
     TO7160
7150  PRINT"WHAT IS THE PRESIDENCY OF":PRINT:PRINT"     ";S$(S)
7160 PRINT:INPUT"     ";L$:PRINT
7170 IFL$="M" THEN 7205
7175 IFVAL(L$)<>STHEN7190
7180 R=R+1: PRINT"CORRECT!": GOTO 7200
7190 W=W+1: PRINT"WRONG...";S:PRINT"IS THE PRESIDENCY OF ":PRINTS$(S)
7200 IF SC=3 THEN 7840 ELSE IFX<QTHENPRINT:INPUT"HIT ENTER TO CONTINUE";EN:NEXT
7205 GOTO 5205
7500 FOR X=1TOQ: CLS: PRINT@128,CHR$(23);
7510 S=RND(N): IF S(S)=1 THEN 7510
7520 S(S)=1: PRINT"WHO WAS THE ";L$(S):PRINT:PRINT"PRESIDENT OF THE UNITED STATE
     S
7530 PRINT:INPUT"     ";S$:PRINT
7540 IF S$="M" THEN 7580
7550 IF S$=S$(S) THEN R=R+1: PRINT"CORRECT!": GOTO 7570
7560 W=W+1: PRINT"WRONG...THE ";L$(S):PRINT"PRESIDENT OF THE U. S. WAS":PRINTS$(
     S)
7570 IF SC=3 THEN 7840 ELSE IF X<Q THEN PRINT:INPUT"HIT ENTER TO CONTINUE";EN: N
     EXT
7580 GOTO 5205
7800 FOR X=1TOQ: CLS: PRINT@128,CHR$(23);
7810 S=RND(N): IF S(S)=1 THEN 7810
7820 M=RND(2)
7830 ON M GOTO 7150, 7520
7840 IF X<Q THEN PRINT:INPUT"HIT ENTER TO CONTINUE";EN: NEXT
7850 GOTO5205
9000 REM PRESIDENT AND STATE OF BIRTH
```

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9010 R=0:W=0:CLS:PRINT@0,CHR$(23);
9015 FORX=1TON:S(X)=0:NEXT
9020 PRINT"HOW MANY QUESTIONS (1-";N-1;")";:INPUTQ:IFQ<1 OR Q>N-1 THEN9010
9120 FORX=1TOQ: CLS: PRINT@0,CHR$(23);
9130 S=RND(N): IF S(S)=1 THEN 9130
9150 S(S)=1
9154 IFS=22THENS(24)=1
9156 IFS=24THENS(22)=1
9160 PRINT"WHERE WAS PRESIDENT":PRINT:PRINTS$(S);" BORN
9180 PRINT:INPUTP$
9190 IFP$="M"THEN 5205
9200 IFP$=PA$(S)THENR=R+1:PRINT:PRINT"CORRECT!":GOTO9220
9210 W=W+1:PRINT:PRINT"WRONG...HE WAS BORN IN ":PRINT:PRINTPA$(S)
9220 PRINT:IF X<Q THEN INPUT"HIT ENTER TO CONTINUE";EN: NEXT
9230 GOTO5205
11000 REM PRESIDENT AND YEAR OF INNAUGURATION
11010 FORX=1TON: S(X)=0: NEXT X
11020 R=0: W=0
11030 CLS: PRINT@0,CHR$(23);
11050 CLS:PRINT@0,CHR$(23);
11060 PRINT"HOW MANY QUESTIONS (1-";N;")";:INPUTQ:IFQ<1 OR Q>N THEN 11050
11070 CLS
11080 FORX=1TOQ:CLS:PRINT@0,CHR$(23)
11090 S=RND(N): IF S(S)=1 THEN 11090
11100 S(S)=1
11104 IFS=22THENPRINT"WHEN WAS ";S$(S):PRINT"FIRST ";:GOTO11120
11106 IFS=24THENPRINT"WHEN WAS ";S$(S):PRINT"RE-";:GOTO11120
11110 PRINT"WHEN WAS ";S$(S)
11115 PRINT          .
11120 PRINT"INNAUGURATED";:INPUT"   ";P$:IFP$="M"THEN 5205
11125 P=VAL(P$)
11130 IFP=P(S)THENR=R+1:PRINT:PRINT"RIGHT!":GOTO11200
11140 W=W+1:PRINT:PRINT"NO, HE WAS INNAUGURATED IN";P(S)
11200 PRINT:IF X<Q THEN INPUT"HIT ENTER TO CONTINUE";EN: NEXT
11210 GOTO5205
15000 DATA GEORGE WASHINGTON, FEDERALIST, FIRST, 1789, VIRGINIA
15010 DATA JOHN ADAMS, FEDERALIST, SECOND, 1797, MASSACHUSETTS
15020 DATA THOMAS JEFFERSON, DEMOCRATIC-REPUBLICAN, THIRD, 1801, VIRGINIA
15030 DATA JAMES MADISON, DEMOCRATIC-REPUBLICAN, FOURTH, 1809, VIRGINIA
15040 DATA JAMES MONROE, DEMOCRATIC-REPUBLICAN, FIFTH, 1817, VIRGINIA
15050 DATA JOHN QUINCY ADAMS, DEMOCRATIC-REPUBLICAN, SIXTH, 1825, MASSACHUSETTS
15060 DATA ANDREW JACKSON, DEMOCRAT, SEVENTH, 1829, SOUTH CAROLINA
15070 DATA MARTIN VAN BUREN, DEMOCRAT, EIGHTH, 1837, NEW YORK
15080 DATA WILLIAM HARRISON, WHIG, NINTH, 1841, VIRGINIA
15090 DATA JOHN TYLER, DEMOCRAT, TENTH, 1841, VIRGINIA
15100 DATA JAMES POLK, DEMOCRAT, ELEVENTH, 1845, NORTH CAROLINA
15110 DATA ZACHARY TAYLOR, WHIG, TWELFTH, 1849, VIRGINIA
15120 DATA MILLARD FILLMORE, WHIG, THIRTEENTH, 1850, NEW YORK
15130 DATA FRANKLIN PIERCE, DEMOCRAT, FOURTEENTH, 1853, NEW HAMPSHIRE
15140 DATA JAMES BUCHANAN, DEMOCRAT, FIFTEENTH, 1857, PENNSYLVANIA
15150 DATA ABRAHAM LINCOLN, REPUBLICAN, SIXTEENTH, 1861, KENTUCKY
15160 DATA ANDREW JOHNSON, REPUBLICAN, SEVENTEENTH, 1865, NORTH CAROLINA
15170 DATA ULYSSES GRANT, REPUBLICAN, EIGHTEENTH, 1869, OHIO
15180 DATA RUTHERFORD HAYES, REPUBLICAN, NINETEENTH, 1877, OHIO
15190 DATA JAMES GARFIELD, REPUBLICAN, TWENTIETH, 1881, OHIO
15200 DATA CHESTER ARTHUR, REPUBLICAN, TWENTY-FIRST, 1881, VERMONT
15210 DATA GROVER CLEVELAND, DEMOCRAT, TWENTY-SECOND, 1885, NEW JERSEY
15220 DATA BENJAMIN HARRISON, REPUBLICAN, TWENTY-THIRD, 1889, OHIO
15230 DATA GROVER CLEVELAND, DEMOCRAT, TWENTY-FOURTH, 1893, NEW JERSEY
15240 DATA WILLIAM MCKINLEY, REPUBLICAN, TWENTY-FIFTH, 1897, OHIO
15250 DATA THEODORE ROOSEVELT, REPUBLICAN, TWENTY-SIXTH, 1901, NEW YORK
15260 DATA WILLIAM TAFT, REPUBLICAN, TWENTY-SEVENTH, 1909, OHIO
15270 DATA WOODROW WILSON, DEMOCRAT, TWENTY-EIGHTH, 1913, VIRGINIA
15280 DATA WARREN HARDING, REPUBLICAN, TWENTY-NINTH, 1921, OHIO
15290 DATA CALVIN COOLIDGE, REPUBLICAN, THIRTIETH, 1923, VERMONT
15300 DATA HERBERT HOOVER, REPUBLICAN, THIRTY-FIRST, 1929, IOWA
15310 DATA FRANKLIN ROOSEVELT, DEMOCRAT, THIRTY-SECOND, 1933, NEW YORK
15320 DATA HARRY TRUMAN, DEMOCRAT, THIRTY-THIRD, 1945, MISSOURI
15330 DATA DWIGHT EISENHOWER, REPUBLICAN, THIRTY-FOURTH, 1953, TEXAS
15340 DATA JOHN KENNEDY, DEMOCRAT, THIRTY-FIFTH, 1961, MASSACHUSETTS
15350 DATA LYNDON JOHNSON, DEMOCRAT, THIRTY-SIXTH, 1963, TEXAS
15360 DATA RICHARD NIXON, REPUBLICAN, THIRTY-SEVENTH, 1969, CALIFORNIA
15370 DATA GERALD FORD, REPUBLICAN, THIRTY-EIGHTH, 1974, MICHIGAN
15380 DATA JAMES CARTER, DEMOCRAT, THIRTY-NINTH, 1977, GEORGIA
```

CONSTITUTION: by Robert F. Nichol

In this program, your TRS-80 becomes a knowledge expert on the Constitution of the United States. Details on articles and ammendments, order of ratification and number are supplied. A recommended program for Social Studies, Government and American History classes.
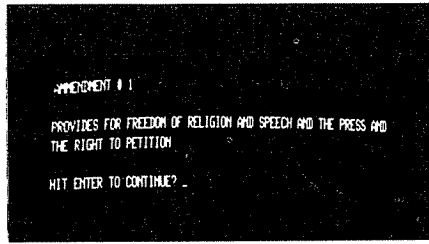

```
10 CLS
20 POKE16553,255
140 PU$="####.##"
150 DIM S$(13), S(13), AR$(22), AR(22), AM$(25), AM(25)
200 FORX=1TO13:READS$(X):NEXT
210 FORX=1TO22: READ AR$(X):NEXT
220 FOR X=1TO25: READ AM$(X): NEXT
500 CLS:PRINT@0,CHR$(23);"M  E  N  U  :":PRINT
510 PRINT"  1-INFORMATION ON ARTICLES
520 PRINT:PRINT"  2-INFORMATION ON AMMENDMENTS
530 PRINT:PRINT"  3-QUIZ ON ARTICLES
540 PRINT:PRINT"  4-QUIZ ON AMMENDMENTS
550 PRINT:PRINT"  5-ORDER OF RATIFICATION
560 PRINT:PRINT:PRINT"(ENTER 'M' TO RETURN TO MENU)
570 PRINT:INPUT"ENTER NUMBER OF YOUR CHOICE";CH:CLS:CH=INT(CH):IFCH<1ORCH>5THEN5
    00
580 ON CH GOTO 1000, 3000, 5000, 7000, 9000
1000 REM INFORMATION ON ARTICLES
1010 CLS:PRINT@448,CHR$(23);"ENTER # OF ARTICLE";:INPUT AR$: IF AR$="M" THEN 500
     ELSE AR=VAL(AR$):CLS: AR=INT(AR): IFAR<1 OR AR>7 THEN1010
1020 PRINT"ARTICLE #";AR:PRINT
1030 ON AR GOTO 1040, 1050, 1060, 1070, 1080, 1090, 1100
1040 A=1: B=7: GOTO1200
1050 A=8: B=11: GOTO1200
1060 A=12: B=14: GOTO1200
1070 A=15: B=18: GOTO1200
1080 A=19: B=19: GOTO1200
1090 A=20: B=21: GOTO1200
1100 A=22: B=22
1200 FORX=A TO B: PRINTAR$(X): NEXT
1210 PRINT:INPUT"HIT ENTER TO CONTINUE";EN$: GOTO  1010
3000 REM INFORMATION OF AMMENDMENTS
3010 CLS:PRINT@448, CHR$(23);"ENTER # OF AMMENDMENT";:INPUT AM$: IFAM$="M"THEN 5
     00 ELSE AM=VAL(AM$): CLS: AM=INT(AM): IFAM<1ORAM>25THEN 3010
3020 PRINT"AMMENDMENT #";AM:PRINT
3040 PRINT AM$(AM)
3050 PRINT:INPUT"HIT ENTER TO CONTINUE";EN$: GOTO 3010
5000 REM QUIZ ON THE ARTICLES OF THE CONSTITUTION
5005 FORS=1TO22: AR(S)=0:NEXT:N=0:R=0
5007 INPUT"HOW MANY TRIES PER QUESTION (1-3)";TR: IF TR<1 OR TR>3 THEN CLS: GOTO
     5007
5010 FOR C=1 TO 22: N=N+1
5020 CLS: PRINT@256,"WHICH ARTICLE OF THE CONSTITUTION
5030 X=RND(22): IFAR(X)=1 THEN 5030
5040 AR(X)=1:PRINT:PRINTAR$(X)
5045 PRINT
5051 IFX<8THENB=1: GOTO5060
5052 IFX<12THENB=2:GOTO5060
5053 IFX<15THENB=3: GOTO5060
5054 IFX<19THENB=4: GOTO5060
5055 IFX<20THENB=5:GOTO5060
5056 IFX<22THENB=6:GOTO5060
5057 B=7
5060 FOR Y=1TO TR: INPUT A$: A=VAL(A$):  IF A$="M" THEN N=N-1: GOTO 9110
5065 IF A=B THEN R=R+1:PRINT:PRINT"CORRECT!!!":GOTO5100
5070 NEXTY
5080 PRINT:PRINT"SORRY, THE ANSWER WAS ARTICLE #";B
5100 PRINT:INPUT"HIT ENTER TO CONTINUE";EN$:NEXTC
```

```
5110 PRINT:GOTO9110
7000 REM QUIZ ON THE AMMENDMENTS TO THE CONSTITUTION
7010 FORS=1TO25: AM(S)=0:NEXT: N=0: R=0
7020 INPUT"HOW MANY TRIES PER QUESTION (1-3)"; TR: IF TR<1 OR TR>3 THEN CLS: GOT
     O 7020
7030 FOR C=1TO 25: N=N+1
7040 CLS: PRINT@256,"WHICH AMMENDMENT TO THE CONSTITUTION
7050 X=RND(25): IF AM(X)=1 THEN 7050
7060 AM(X)=1: PRINT: PRINT AM$(X)
7070 PRINT
7080 FOR Y=1TO TR: INPUT A$: A=VAL(A$): IF A$="M" THEN N=N-1: GOTO9110
7090 IF A=X THEN R=R+1: PRINT:PRINT"CORRECT!!!":GOTO 7120
7100 NEXT Y
7110 PRINT:PRINT"SORRY, THE ANSWER WAS AMMENDMENT #";X
7120 PRINT:INPUT"HIT ENTER TO CONTINUE";EN$: NEXT C
7130 PRINT: GOTO 9110
9000 REM ORDER OF RATIFICATION BY STATES
9010 INPUT"HOW MANY TRIES PER QUESTION (1-3)";TR:CLS:TR=INT(TR):IFTR<1ORTR>3THEN
     9010
9015 PRINTCHR$(23):N=0:R=0:Y=1
9020 FORS=1TO13:N=N+1:Y=1
9030 PRINT"WHAT STATE WAS #";S
9040 INPUT S$: IF S$="M"THENN=N-1:GOTO9110
9050 IFS$=S$(S)THENR=R+1:GOTO9100
9060 Y=Y+1:IFY<TR+1 THEN9040
9070 PRINT"THE ANSWER WAS ";S$(S)
9100 PRINT:Y=1:NEXTS
9110 PRINT:PRINT"RIGHT =";R;" WRONG =";N-R
9120 PRINT:PRINT"SCORE =";:PRINTUSING PU$; 100*R/(N+.00001);:PRINT" %"
9130 PRINT:INPUT"HIT ENTER TO RETURN TO MENU";EN$: GOTO 500
20000 DATA DELAWARE, PENNSYLVANIA, NEW JERSEY, GEORGIA, CONNECTICUT, MASSACHUSET
      TS, MARYLAND, SOUTH CAROLINA, NEW HAMPSHIRE, VIRGINIA, NEW YORK, NORTH CARO
      LINA, RHODE ISLAND
20010 DATA ESTABLISHES THE HOUSE OF REPRESENTATIVES, ESTABLISHES THE SENATE,  PR
      ESCRIBES FOR THE TIME AND PLACE AND MANNER OF HOLDING         ELECTIONS, PR
      OVIDES FOR EACH HOUSE TO DETERMINE THE RULES FOR ITS         PROCEEDINGS
20020 DATA ESTABLISHES COMPENSATION AND PRIVELEGES OF SENATORS AND         REPRE
      SENTATIVES, ESTABLISHES THE POWERS OF CONGRESS, PROHIBITS THE STATES FROM E
      XERCISING CERTAIN POWERS
20030 DATA ESTABLISHES THE OFFICE OF THE PRESIDENT, ESTABLISHES THE PRESIDENT AS
      THE COMMANDER-IN-CHIEF, PROVIDES THAT THE PRESIDENT SHALL REPORT TO CONGRE
      SS UPON THE    STATE OF THE UNION, PROVIDES FOR IMPEACHMENT
20040 DATA ESTABLISHES JUDICIAL POWERS, ESTABLISHES THE SUPREME COURT, DEFINES T
      REASON
20050 DATA ESTABLISHES THE RIGHTS OF THE STATES, ENTITLES THE CITIZENS OF EACH S
      TATE TO THE RIGHTS OF CITIZENS INALL OF THE STATES, PROVIDES FOR EXTRADITIO
      N OF A CITIZEN FROM ONE STATE TO ANOTHER, PROVIDES FOR ADMISSION OF NEW STA
      TES
20060 DATA PROVIDES FOR AMMENDMENTS TO THE CONSTITUTION
20070 DATA PROVIDES FOR TREATIES, REQUIRES AN OATH TO SUPPORT THE CONSTITUTION
20080 DATA PROVIDES RULES FOR THE RATIFICATION OF THE CONSTITUTION
20090 DATA PROVIDES FOR FREEDOM OF RELIGION AND SPEECH AND THE PRESS AND    THE R
      IGHT TO PETITION
20100 DATA PROVIDES FOR THE RIGHT TO KEEP AND BEAR ARMS
20110 DATA SPEAKS ABOUT QUARTERING OF SOLDIERS
20120 DATA REGULATES THE RIGHT OF SEARCH AND SEIZURE
20130 DATA ESTABLISHES PROVISIONS CONCERNING PROSECUTION AND TRIAL AND      PUNIS
      HMENT
20140 DATA PROVIDES THE RIGHT TO A SPEEDY TRIAL AND TO CONFRONT WITNESSES  AGAIN
      ST YOU
20150 DATA PROVIDES FOR THE RIGHT TO A TRIAL BY JURY
20160 DATA PROHIBITS EXCESSIVE BAIL OR FINES AND CRUEL PUNISHMENT
20165 DATA PROVIDES THAT THE ENUMERATION IN THE CONSTITUTION OF CERTAIN     RIGHT
      S SHALL NOT BE CONSTRUED TO DENY OR DISPARAGE OTHERS        RETAINED BY THE
      PEOPLE
20170 DATA RESERVES THE RIGHTS OF THE STATES UNDER THE CONSTITUTION
20180 DATA CONSTRUES JUDICIAL POWERS
20190 DATA ESTABLISHES THE MANNER OF CHOOSING THE PRESIDENT AND THE         VICE-
      PRESIDENT
20200 DATA ABOLISHED SLAVERY
20210 DATA IS KNOWN AS THE RECONSTRUCTION AMMENDMENT
20220 DATA PROVIDES FOR EQUAL RIGHTS FOR WHITE AND COLORED CITIZENS
20230 DATA AUTHORIZES INCOME TAXES
20240 DATA PROVIDES FOR THE DIRECT POPULAR ELECTION OF SENATORS
20250 DATA PROHIBITED THE MANUFACTURE THE SALE AND THE TRANSPORTATION OF   INTOX
      ICATING LIQUORS
20260 DATA EXTENDED NATION-WIDE SUFFRAGE TO WOMEN
20270 DATA ESTABLISHES THE TERMS OF THE PRESIDENT AND VICE PRESIDENT TO     BEGIN
      ON JANUARY 20 AND THAT OF SENATORS ON JANUARY 3
20280 DATA REPEALED THE PROHIBITION AMMENDMENT
20290 DATA BARS THE PRESIDENT FROM SERVING MORE THAN TWO ELECTIVE TERMS
20300 DATA GRANTS CITIZENS OF THE DISTRICT OF COLUMBIA THE RIGHT TO VOTE   IN PR
      ESIDENTIAL ELECTIONS
20310 DATA BARS THE USE OF A POLL TAX AS A PREREQUISITE IN FEDERAL         ELECT
      IONS
20320 DATA ESTABLISHES THE PROCEDURES TO BE FOLLOWED IN THE EVENT OF THE   DEATH
      OR DISABILITY OF THE PRESIDENT
```

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WHOLE NUMBER CONCEPTS: by Robert F. Nichol

More math for those who need it. This unique program will require you to round off decimals, translate words into numbers, identify place positions and more. Worthwhile drills on some necessary, but often neglected math procedures.
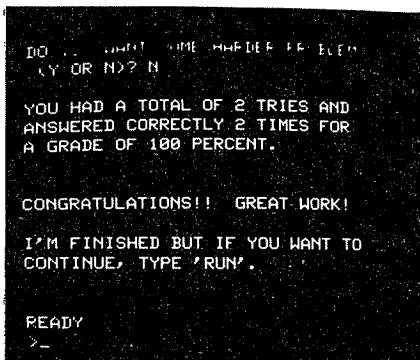

```
10 RANDOM:CLEAR200
16 ON ERROR GOTO6000
50 CLS:PRINT:PRINT:PRINTCHR$(23);"MATH QUIZ TOPICS:":PRINT
60 PRINT"    1 - GIVE DIGIT
70 PRINT"    2 - GIVE PLACE VALUE
80 PRINT"    3 - ROUND OFF
90 PRINT"    4 - WORDS TO NUMBER
100 PRINT"    5 - NUMBER TO WORDS
120 PRINT:PRINT:PRINT:PRINT"(TO RETURN TO MENU, ENTER 'M')":PRINT:INPUT"ENTER NU
    MBER OF YOUR CHOICE";Z:CLS:IFZ<1ORZ>5ORZ<>INT(Z)THEN50
130 ONZGOTO1000,2000,3000,4000,5000
1000 REM GIVE DIGIT OF GIVEN PLACE VLAUE
1010 INPUT"ENTER MAXIMUM NUMBER OF DIGITS (3-9)";X:CLS:IFX<3ORX>9THEN1010
1020 N=0:R=0
1030 GOSUB2020
1040 PRINTCHR$(23)
1060 P=RND(U):N$=MID$(X$,U+1-P,1)
1065 PRINTX$;" ";
1070 PRINT"WHAT DIGIT IS IN THE ";:GOSUB1100:PRINTG$;" PLACE    ";
1080 INPUTA$:IFA$="M"THENCLS:PRINT@460,CHR$(23);"SCORE: ";(R/N)*100;"%":FORT=1TO
     1500:NEXT:GOTO50
1090 N=N+1:R=R+1:IFA$=N$THENPRINT"CORRECT"ELSE PRINT"WRONG, THE DIGIT IN THE":PR
     INTG$;" PLACE IS ";N$;"!!!":FORT=1TO500:NEXT:R=R-1
1095 PRINT:GOTO1030
1100 ONPGOTO1110,1120,1130,1140,1150,1160,1170,1180,1190
1110 G$="ONES":RETURN
1120 G$="TENS":RETURN
1130 G$="HUNDREDS":RETURN
1140 G$="THOUSANDS":RETURN
1150 G$="TEN THOUSANDS":RETURN
1160 G$="HUNDRED THOUSANDS":RETURN
1170 G$="MILLIONS":RETURN
1180 G$="TEN MILLIONS":RETURN
1190 G$="HUNDRED MILLIONS":RETURN
2000 REM GIVE PLACE VALUE OF A GIVEN DIGIT
2010 INPUT"ENTER MAXIMUM NUMBER OF DIGITS (3-9)";X:CLS:IFX<3ORX>9THEN2010
2012 N=0:R=0
2015 GOSUB2020:GOTO2070
2020 FORC=0TO9:C(C)=0:NEXT:X$="":U=X:IFX>5THENU=RND(X-3)+3
2030 C(1)=RND(9):FORD=2TOU
2040 C(D)=RND(10)-1:FORG=1TOD-1:IFC(D)=C(G)THEN2040
2050 NEXTG,D
2060 FORD=1TOU:X$=X$+RIGHT$(STR$(C(D)),1):NEXT:RETURN
2070 P=RND(U):N$=MID$(X$,U+1-P,1)
2080 PRINTCHR$(23);"IN THE NUMBER ";X$;" WHAT IS
2090 PRINT"THE PLACE VALUE OF THE ";N$
2100 PRINT"      ";:INPUTA$:GOSUB1100
2110 IFA$="M"THENCLS:PRINT@460,CHR$(23);"SCORE: ";(R/N)*100;"%":FORT=1TO1500:NEX
     T:GOTO50
2120 N=N+1:R=R+1:IFA$=G$THENPRINT"CORRECT"ELSEPRINT"WRONG, THE ";N$;" IS IN THE"
     :PRINTG$;" PLACE!!!":FORT=1TO500:NEXT:R=R-1
2130 PRINT:GOTO2015
3000 REM ROUNDING OFF
```

```
3010 INPUT"ENTER MAXIMUM NUMBER OF DIGITS (3-9)";X:CLS:IFX<3ORX>9THEN3010
3015 N=0:R=0
3020 GOSUB2020
3030 P=RND(U-1)+1
3040 PRINTCHR$(23);"ROUND ";X$;" TO THE NEAREST":GOSUB1100:PRINTG$;"  ";:INPUTA$
3045 IFC(U+2-P)>4THENC(U+1-P)=C(U+1-P)+1
3050 FORL=U+1-PTO1STEP-1:IFC(L)>9THENC(L)=0:C(L-1)=C(L-1)+1
3051 NEXTL
3052 IFC(0)>0THENK=0ELSEK=1
3054 D$="":FORD=KTOU+1-P:D$=D$+RIGHT$(STR$(C(D)),1):NEXT
3060 E$="":FORV=1TOP-1:E$=E$+"0":NEXTV:D$=D$+E$
3070 IFA$="M"THENCLS:PRINT@460,CHR$(23);"SCORE: ";(R/N)*100;"%":FORT=1TO1500:NEX
     T:GOTO50
3080 N=N+1:IFA$<>D$THENPRINT"WRONG, THE ANSWER IS ";D$;"!!!":FORT=1TO500:NEXT
3090 IFA$=D$THENPRINT"CORRECT":R=R+1
3100 PRINT:GOTO3020
4000 REM GIVING NUMBER FOR A GIVEN WORD EXPRESSION
4005 Y=0:N=0
4007 INPUT"WHAT IS THE MAXIMUM NUMBER OF DIGITS (3-9)";X:CLS:IFX<3ORX>9THEN4007
4008 GOSUB4010:GOTO4100
4010 A$="":R$="":N$="":F$="":X$=""
4020 GOSUB2020:F$=X$
4030 L=LEN(X$):J=INT(L/3):K=L-J*3:IFL<4THENV=0
4032 IFL>3THENV=1
4034 IFL>6THENV=2
4035 IFK=0THEN4050
4040 A$=LEFT$(X$,K):A=VAL(A$):X$=RIGHT$(X$,L-K):L=LEN(X$)
4048 GOSUB4500
4050 FORZ=1TOJ:A$=LEFT$(X$,3):A=VAL(A$):X$=RIGHT$(X$,L-3):L=LEN(X$):GOSUB4500:NE
     XTZ
4060 RETURN
4100 PRINTN$;" ="
4110 INPUTQ$
4120 IFQ$="M"THENCLS:PRINT@460,CHR$(23);"SCORE: ";(Y/N)*100;"%":FORT=1TO1500:NEX
     TT:GOTO50
4130 N=N+1:IFQ$<>F$THENPRINT"WRONG, THE ANSWER IS ";F$;"!!!"
4140 IFQ$=F$THENPRINT"CORRECT":Y=Y+1
4150 PRINT:GOTO4008
4500 IFLEN(A$)<3THEN4510
4510 R$=LEFT$(A$,1):A$=RIGHT$(A$,2):R=VAL(R$):A=VAL(A$):IFR=0THEN4520
4515 GOSUB4600:N$=N$+" HUNDRED"
4520 IFA>9ANDA<20THENR=VAL(RIGHT$(A$,1)):GOSUB4700:GOSUB4900:RETURN
4525 R=0:IFLEN(A$)=2THENR=LEFT$(A$,1):R=VAL(R$)
4530 A$=RIGHT$(A$,1):A=VAL(A$):IFR=0THEN4540
4535 GOSUB4800
4540 R=A:IFR=0THENGOTO4560
4550 GOSUB4600
4560 GOSUB4900:RETURN
4600 ONRGOTO4610,4620,4630,4640,4650,4660,4670,4680,4690
4610 N$=N$+" ONE":RETURN
4620 N$=N$+" TWO":RETURN
4630 N$=N$+" THREE":RETURN
4640 N$=N$+" FOUR":RETURN
4650 N$=N$+" FIVE":RETURN
4660 N$=N$+" SIX":RETURN
4670 N$=N$+" SEVEN":RETURN
4680 N$=N$+" EIGHT":RETURN
4690 N$=N$+" NINE":RETURN
4700 IFR=0THENN$=N$+" TEN":RETURN
4705 ONRGOTO4710,4715,4720,4725,4730,4735,4740,4745,4750
4710 N$=N$+" ELEVEN":RETURN
4715 N$=N$+" TWELVE":RETURN
4720 N$=N$+" THIRTEEN":RETURN
4725 N$=N$+" FOURTEEN":RETURN
4730 N$=N$+" FIFTEEN":RETURN
4735 N$=N$+" SIXTEEN":RETURN
4740 N$=N$+" SEVENTEEN":RETURN
4745 N$=N$+" EIGHTEEN":RETURN
4750 N$=N$+" NINETEEN":RETURN
4800 ONRGOTO4805,4810,4820,4830,4840,4850,4860,4870,4880
4805 RETURN
4810 N$=N$+" TWENTY":RETURN
4820 N$=N$+" THIRTY":RETURN
4830 N$=N$+" FORTY":RETURN
4840 N$=N$+" FIFTY":RETURN
4850 N$=N$+" SIXTY":RETURN
4860 N$=N$+" SEVENTY":RETURN
4870 N$=N$+" EIGHTY":RETURN
4880 N$=N$+" NINETY":RETURN
4900 IFV<1THENRETURN
4910 ONVGOTO4920,4930
4920 N$=N$+" THOUSAND":V=V-1:RETURN
4930 N$=N$+" MILLION":V=V-1:RETURN
5000 REM WRITE WORD EXPRESSION FOR A GIVEN NUMBER
5010 Y=0:N=0
5020 INPUT"ENTER MAXIMUM NUMBER OF DIGITS (3-9)";X:CLS:IFX<3ORX>9THEN5020
5030 H$="":GOSUB4010:E=LEN(N$):N$=RIGHT$(N$,E-1)
```

```
5040 PRINT"WRITE  ";F$;"  OUT IN WORDS..."
5050 INPUTH$
5060 IFH$="M"THENCLS:PRINT@460,CHR$(23);"SCORE: ";(Y/N)*100;"%":FORT=1TO1500:NEX
     TT:GOTO50
5070 N=N+1:IFH$<>N$THENPRINT"WRONG, THE CORRECT ANSWER IS":PRINTN$
5080 IFH$=N$THENPRINT"CORRECT":Y=Y+1
5090 PRINT:GOTO5030
6000 RESUME 50
```

MUSICAL INTERVALS TEST: by Hanley Jackson

This unusual program will be popular with musically inclined TRS-80 owners. Your computer will visually generate two notes and ask you to identify the interval involved. All intervals between prime and major 7th are fair territory, and you need not have perfect pitch to do well.
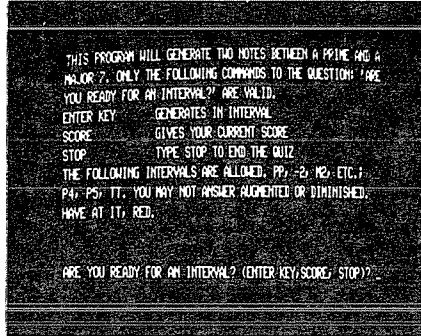

```
10  CLEAR 1000:FILL$="    "
20  CLS
25  INPUT"WHAT LINE LENGTH ";LL
30  INPUT"WHAT IS THE PROGRAM NAME";PROGRAM$
35  GOSUB 500
40  OPEN "I",1,PROGRAM$
50  IF P=60 THEN GOSUB 500
60  IF EOF(1) THEN GOTO 1000
65  IF P>56 THEN GOSUB 500
70  LINEINPUT #1,TEMP$
80  A=LEN(TEMP$)
85  L1$=TEMP$
90  IF A <= LL THEN 200
100 L1$=LEFT$(TEMP$,LL)
110 L2$=RIGHT$(TEMP$,(A-LL))
120  B=LEN(L2$)
130 IF B <= LL-5 THEN 200
140 L2$=MID$(TEMP$,LL+1,LL-5)
142 L3$=RIGHT$(TEMP$,A-(2*LL-5))
143 C=LEN(L3$)
145 IF C<=LL-5 THEN 200
```

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```
150 L3$=MID$(TEMP$,2*LL-4,LL-5)
155 S=3*LL-10:IF S>=A THEN 200
160 L4$=RIGHT$(TEMP$,A-S)
200 LPRINT L1$:P=P+1: IF A<LL+1 THEN 50
210 LPRINT FILL$;L2$:P=P+1: IF B<LL-4 THEN 50
220 LPRINT FILL$;L3$:P=P+1: IF C<LL-4 THEN 50
230 LPRINT FILL$;L4$:P=P+1:GOTO 50
500 LPRINT CHR$(12)
530 PP=PP+1
535 LPRINT
540 LPRINT"PAGE #";PP;"OF ";PROGRAM$
545 LPRINT""
550 P=0:RETURN
1000 LPRINT:LPRINT:LPRINT
1010 LPRINT"DONE"
1015 LPRINT CHR$(12)
1020 CLOSE
1025 CMD"DIR :2"
1030 INPUT"NEXT PROGRAM ";N$
1040 RUN N$
```

PERCENT 1: by John Roland

This is an excellent drill on ratios and percent for the younger generation or anyone else who cares to improve his or her level of skill in these areas.
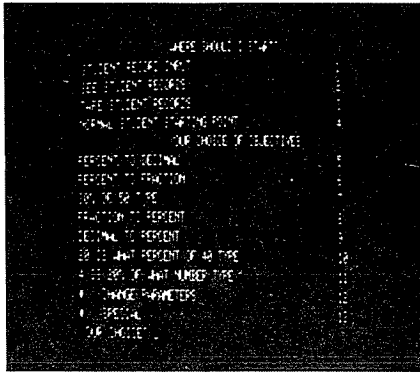

```
10 CLEAR450:DEFSTRA-C:DEFINTI-P:ND=6:CY="YES":CR="YOU'RE RIGHT, ":CW="SORRY, YOU
      MADE A MISTAKE, ":DIMCM(31),CN(31),NT(31),OB(31,6):L=10:P=100:C1="YOU HAD
      ":C2=" % CORRECT.":C3=" PLEASE SEE ":C4=" FOR AN ASSIGNMENT."
15 C5="DO YOU WANT TO GO ON":C6="DO YOU KNOW HOW TO "
20 GOSUB895
25 CLS:PRINT,"WHERE SHOULD I START?":PRINT"STUDENT RECORD INPUT",,"1","SEE STUDE
      NT RECORDS",,"2","TAPE STUDENT RECORDS",,"3","NORMAL STUDENT STARTING POINT
      ",,"4",,"YOUR CHOICE OF OBJECTIVES",,"PERCENT TO DECIMAL",,"5","PERCENT TO
      FRACTION",,"6"
30 PRINT"30% OF 50 TYPE",,,"7","FRACTION TO PERCENT",,"8","DECIMAL TO PERCENT",,
      "9","20 IS WHAT PERCENT OF 40 TYPE",,"10","4 IS 20% OF WHAT NUMBER TYPE",,"
      11":PRINT"*   CHANGE PARAMETERS",,"12","*   SPECIAL",,,"13"
35 INPUT"YOUR CHOICE";I:IFI<>1ANDCT=""THENCLS:INPUT"WHAT IS THE TEACHER'S NAME";
      CTELSEIFI=1THEN50
40 IF(NZ=0)OR(I=12)THENCLS:PRINT"PLEASE GIVE PARAMETERS":INPUT"% TO A DECIMAL, %
      <= (AN INTEGER)";NZ:INPUT"A% OF B = C (A COMMA B COMMA C ALL INTEGERS)";NY
      ,NX,NU:INPUT"FRACTION TO A PERCENT (NUMERATOR COMMA DENOMINATOR BOTH INTEGE
      RS)";NW,NV:GOTO25
45 IF(I>4)AND(I<12)THENCLS:NA=30:INPUT"WHAT IS YOUR FIRST NAME";CM
50 ONIGOTO55,945,970,85,160,245,400,470,690,550,795,40,905
55 CLS:PRINT"WHEN READY TO INPUT PUSH 'ENTER'.":GOSUB880
60 INPUT#-1,CT,NB,NZ,NY,NX,NW,NV,NU
65 FORN=0TONBSTEP2
```

```
70  INPUT#-1,CN(N),CM(N),OB(N,0),OB(N,1),OB(N,2),OB(N,3),OB(N,4),OB(N,5),OB(N,6),
    NT(N),CN(N+1),CM(N+1),OB(N+1,0),OB(N+1,1),OB(N+1,2),OB(N+1,3),OB(N+1,4),OB(
    N+1,5),OB(N+1,6),NT(N+1)
75  NEXTN:PRINT"INPUT IS COMPLETE. PUSH 'ENTER'.":GOSUB880
80  GOTO25
85  CLS:RANDOM:IFNB<29THENGOSUB895ELSEPRINT"TELL ";CT;" THAT MY RECORD MEMORY IS
    FULL":A="":A=INKEY$:IFA<>""THENGOSUB895ELSE85
90  CLS:INPUT"WHAT IS YOUR FIRST NAME (TYPE NAME THEN PUSH 'ENTER')";CM:PRINT:INP
    UT"WHAT IS YOUR LAST NAME";CN
95  FORNA=0TONB:IFCM=CM(NA)ANDCN=CN(NA)THENNT(NA)=NT(NA)+1:GOTO115
100 IFCM=CTTHEN25
105 NEXTNA
110 CLS:PRINT"YOU MUST BE NEW TO THIS PROGRAM, ";CM;". LET'S START AT THE
    BEGINNING.":FORNA=0TONB:IFCN(NA)=""THENCN(NA)=CN:CM(NA)=CM:GOTO130:ELSEN
    EXTNA
115 FORN=0TOND:IFOB(NA,N)<60THEN120ELSENEXT
120 I=N+5:CLS:PRINT"REMEMBER YOU MUST PUSH 'ENTER' AFTER EVERY ANSWER. ONCE YOU
    PUSH 'ENTER' YOU CAN'T CHANGE YOUR ANSWER.":GOSUB880
125 GOTO50
130 IFNA=NBTHENNB=NB+1:IFNB=31THENNB=30:CN(30)="":GOTO85
135 PRINT"    THIS PROGRAM IS TO TEACH AND TEST YOU ON SEVERAL DIFFERENT PARTS
    ABOUT PERCENT.    WHEN YOU DO POORLY ON A PART,  YOU WILL HAVE THE IDEA EXP
    LAINED AND WORK A FEW EXAMPLES WITH THE     COMPUTER.";
140 PRINT" THEN YOU WILL BE TOLD TO ASK ";CT,"FOR AN ASSIGNMENT ON THAT PART.
    IF YOU PASS A PART, 6 OUT OF  10 CORRECT, THEN YOU MAY GO ON TO THE NEXT PA
    RT AND THE COMPUTERWILL REMEMBER YOUR SCORE FOR THE NEXT TIME."
145 PRINT:PRINT"BECAUSE THIS IS A MACHINE IT IS VERY FUSSY.  YOU MUST ANSWER THE
    QUESTION EXACTLY RIGHT OR IT WILL BE WRONG.  YOU CAN ALWAYS     CHANGE YOUR
    ANSWER BEFORE YOU PUSH 'ENTER' BY USING THE LEFT     ARROW KEY."
150 PRINT"REMEMBER TO PUSH 'ENTER' AFTER EVERY ANSWER.":INPUT"DO YOU SEE THE LEF
    T ARROW KEY ABOVE THE WHITE 'ENTER' KEY";A:IFA=CYTHEN160
155 PRINT"LOOK JUST ABOVE THE WHITE 'ENTER' KEY TO SEE THE LEFT ARROW KEY.":GOTO
    150
160 CLS:PR=0:K=0:J=0:PRINTC6;"CHANGE 45% TO A DECIMAL, ";CM;:INPUTA:IFA<>CYTHEN1
    95
165 FORM=1TOL:N=RND(NZ):CLS:PRINTM,"CHANGE";N;" % TO A DECIMAL."
170 INPUT"YOUR ANSWER";X:IFX=.0001THENGOTO85
175 Y=N*P:IFY<=N+.0005ANDY>=N-.0005THENPRINTCR;CM;PR:PR=PR+L:GOSUB880ELSEJ=J+1:PRIN
    TCW;CM,N/P:GOSUB880
180 IFJ=5THEN195ELSENEXTM
185 PRINT@256,C1;PR;C2:GOSUB880
190 IFPR>=60THEN240
195 CLS:PRINT"YOU NEED SOME HELP,";CM;".  LET ME TRY TO SHOW YOU HOW TO DO THIS
    KIND OF PROBLEM."
200 PRINT:PRINT"TO CHANGE A % TO A DECIMAL ALWAYS MOVE THE DECIMAL TWO PLACES TO
    THE LEFT.  LOOK AT THIS EXAMPLE.":PRINT@404,"60% = .60":PR=0:PRINT:INPUT"A
    RE YOU READY TO TRY YET";A:IFA=CYTHEN205ELSE200
205 FORM=1TOL:CLS:N=RND(100):PRINT"YOU TRY THIS ONE.   CHANGE";N;" % TO A DECIMAL
    ."
210 INPUT"WHAT IS YOUR ANSWER";X:Y=X*P:IFY<=N+.0005ANDY>=N-.0005THENPRINTCR;CM:P
    R=PR+L:GOSUB880ELSE220
215 GOTO225
220 PRINTCW;CM:IFN>=X*P*LTHENPRINT"YOU MOVED THE DECIMAL TOO FAR.":GOSUB880ELSEI
    FX=NTHENPRINT"YOU DIDN'T MOVE THE DECIMAL.":GOSUB880ELSEPRINT"ASK ";CT;" FO
    R HELP.":GOSUB880
225 NEXT
230 PRINT@256,C1;PR;C2:PRINTC3;CT;C4:GOSUB880
235 GOTO85
240 OB(NA,0)=PR:PRINT"YOU HAVE FINISHED PART 1, TELL ";CT;".":PRINTC5;:INPUTA:IF
    A<>CYTHEN85
245 CLS:PR=0:PRINT"TIME TO START PART TWO.":INPUT"CHANGE A PERCENT TO A
    FRACTION IN SIMPLEST    FORM";A:IFA=CYTHENK=0:I=1:GOTO310
250 CLS:PR=0:I=1:PRINT"OK.  SO YOU NEED SOME HELP.  LET ME TRY.  TO CHANGE A PER
    CENT TO A FRACTION IN SIMPLEST FORM WE FIRST WRITE IT OVER 100 LIKE    THIS
    ."
255 PRINT@340,"60% = 60 / 100":GOSUB890
260 PRINT:PRINT"THEN FIND THE BIGGEST NUMBER THAT DIVIDES EVENLY INTO BOTH 60
    AND 100. THINK.":GOSUB890
265 PRINT"I THOUGHT OF 20. ":PRINT:PRINT"            60 / 20 = 3":PRINT"
    100 / 20 = 5"
270 PRINT:PRINT"SO WE SAY    60% = 60 / 100 = 3 / 5";:GOSUB890
275 CLS:PRINT"NOW YOU TRY ONE.":PRINT:PRINT"CHANGE 30% TO A FRACTION IN SIMPLEST
    FORM."
280 PRINT:INPUT"YOUR ANSWER";A:B="3/10":IFA=BTHEN290
285 PRINTCW,  "MAKE SURE THAT YOU SIMPLIFY AND TYPE IN THE ANSWER CORRECTLY. TRY
    AGAIN.":FORN=1TO1000:NEXTN:GOTO275
290 PRINTCR," LET'S TRY ANOTHER.":GOSUB880
295 CLS:PRINT"CHANGE 55 % TO A FRACTION IN SIMPLEST FORM.":PRINT:INPUT"YOUR ANSW
    ER";A:B="11/20":IFA=BTHENPRINTCR:GOTO305ELSEPRINTCW;"MAKE SURE THAT YOU SIM
    PLIFY, TRY      AGAIN.":GOSUB880
300 GOTO295
305 GOSUB880
310 CLS:IFI<=LTHENV=RND(100):PRINTI,"CHANGE ";V;" % TO A FRACTION IN SIMPLEST FO
    RM."ELSEGOTO375
315 FORN=2TO4STEP2:U=V/N:W=INT(U):IFU<>WTHEN325
320 NEXTN
325 FORM=5TO25STEP20:U=V/M:W=INT(U):IFU<>WTHEN335
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330 NEXTM
335 U=N-2:IFU=0THEN350
340 X=V/U:Y=P/U:U=M-20:IFU<0THEN365
345 X=X/U:Y=Y/U:GOTO365
350 U=M-20:IFU<0THEN360
355 X=V/U:Y=P/U:GOTO365
360 X=V:Y=P
365 INPUT"YOUR ANSWER";A:B=STR$(Y):B="/"+MID$(B,2,3):B=MID$(STR$(X),2,3)+B:IFA=C
    TTHEN85ELSEIFA=BTHENPRINT:PRINTCR,CM:PR=PR+L:GOSUB880ELSEPRINT:PRINTCW;CM,B
    :GOSUB880
370 I=I+1:GOTO310
375 PRINT@256,C1;PR;C2:GOSUB880
380 IFPR>=60ANDK=0THEN385ELSE390
385 OB(NA,1)=PR:PRINTC5;:INPUTA:IFA=CYTHEN400ELSE85
390 IFK=0THENK=1:GOTO250ELSEPRINTC3;CT;C4:GOSUB880
395 GOTO85
400 CLS:PR=0:PRINTC6;"FIND 7 % OF $2.50";:INPUTA:IFA=CYTHENK=0:GOTO430
405 CLS:PRINT"OK, LET ME TRY TO HELP.  TO FIND 7 % OF $2.50 WE FIRST CHANGE   7%
    TO A DECIMAL.":INPUT"WHAT IS 7 % AS A DECIMAL";A:B=".07":IFA=BTHEN415
410 PRINT"SORRY, ABOUT THAT.  WE ALWAYS MOVE THE DECIMAL TWO PLACES TO THE LEFT
    LIKE THIS  7% = .07 .":INPUT"DO YOU UNDERSTAND";A:IFA<>CYTHEN410
415 PRINT"OK, NOW MULTIPLY .07 X 2.50 .":INPUT"WHAT IS YOUR ANSWER";A:IF(A=".175
    ")OR(A=".1750")THEN425
420 PRINTCW;"  CALL ";CT:INPUT"  PLEASE.  SHOULD THIS STUDENT CONTINUE";A:IFA<>
    CYTHEN85
425 PRINTCR,CM:K=L:PR=0:GOSUB880
430 FORI=1TOL:V=RND(NY):U=RND(NX):W=U*V/P:CLS:PRINTI,"WHAT IS ";V;" % OF ";U;" ?
    ":PRINT:INPUT"YOUR ANSWER N=";A:B=MID$(STR$(W),2,7):IFA=CTTHEN85ELSEIFA=BTH
    ENPRINTCR;CM:PR=PR+L:GOSUB880ELSEPRINTCW;CM,B:GOSUB880
435 NEXTI
440 PRINT@256,C1;PR;C2:IFPR>=60ANDK=0THEN465
445 IFK=LTHEN455
450 GOTO405
455 PRINTC3;CT;C4:GOSUB880
460 GOTO85
465 OB(NA,2)=PR:PRINTC5;:INPUTA:IFA=CYTHEN470ELSE85
470 K=0:PR=0:CLS:PRINTC6;:INPUT"CHANGE A FRACTION TO A PERCENT";A:IFA<>CYTHEN510
475 FORM=1TOL
480 CLS:W=RND(NW):V=RND(NV):U=W/V*P:IFU>500THEN480
485 PRINTM,"CHANGE ";W;"/";V;" TO A PERCENT.":INPUT"WHAT IS YOUR ANSWER.  REMEMB
    ER USE NO MORE THAN 5 DIGITS. DO NOT ROUND.";A:B=STR$(U):B=MID$(B,2,6)+"%":
    IFA=CTTHEN85ELSEIFB=ATHENPRINT:PRINTCR;CM:PR=PR+L:GOSUB880ELSEPRINT:PRINTCW
    ;CM,B:GOSUB880
490 NEXTM
495 PRINT@256,C1;PR;C2:GOSUB880
500 IFPR<60ANDK=0THEN510ELSEIFK=1THENPRINTC3;CT;C4:GOSUB880
505 IFK=1THENGOTO85ELSEIFPR>=60THENOB(NA,3)=PR:PRINTC5;:INPUTA:IFA=CYTHEN690ELSE
    85
510 CLS:PR=0:K=1:PRINT"CHANGING A FRACTION TO A PECENT IS VERY EASY.  REMEMBER T
    WO    THINGS.":PRINT:PRINT@212," /   MEANS DIVIDE BY":PRINT@340,"MULTIPLY
    YOUR ANSWER BY 100.":PRINT:PRINT"LET'S TRY ONE TOGETHER.":PRINT:PRINT"CHANG
    E 2 / 5 TO A PERCENT."
515 PRINT:PRINT"FIRST DIVIDE 2 BY 5.  (REMEMBER YOUR DECIMAL POINT).":PRINT:INPU
    T"WHAT IS YOUR ANSWER";U:V=.4:IFU=VTHENPRINT"WELL DONE. NOW MULTIPLY YOUR A
    NSWER BY 100.":GOTO520ELSEPRINT"SORRY, THE CORRECT ANSWER IS .40.  NOW MULT
    IPLY .40 BY 100."
520 INPUT"WHAT IS YOUR ANSWER, (DON'T FORGET THE % SIGN).";A:B="40%":IFA=BTHENPR
    INTCW;"LET'S TRY ANOTHER.":FORN=1TO2000:NEXT:GOTO530
525 B="40":IFA=BPRINT"YOU FORGOT THE PERCENT SIGN.":FORN=1TO2000:NEXTELSEPRINTCW
    ;" THE CORRECT ANSWER IS 40%.  LET'S TRY ANOTHER.":GOSUB880
530 CLS:PRINT"CHANGE 12 / 25 TO A PERCENT.":INPUT"YOUR ANSWER TO THE DIVISION";A
    :B=".48":IFA=BTHENPRINTCR;" NOW MULTIPLY BY 100."ELSEPRINTCW;" THE CORRECT
    ANSWER IS .48."
535 INPUT"WHAT IS YOUR ANSWER TO THE MULTIPLICATION. (REMEMBER %.)";A:B="48%":IF
    A=BTHENPRINTCR;" LET'S TRY 10.":GOSUB880
540 GOTO475
545 PRINT"CALL ";CT:INPUT"SHOULD THIS STUDENT CONTINUE";A:IFA=CYGOTO475ELSE85
550 PR=0:K=0:CLS:PRINTC6;"DO THIS KIND OF PROBLEM?":PRINT:PRINT"14 IS WHAT PERCE
    NT OF 105";:INPUTA:IFA<>CYTHEN600
555 FORI=1TOL:V=RND(NY):U=RND(NX):W=U*V/P:B=STR$(V):B=MID$(B,2,6)+"%"
560 CLS:PRINTI,W;" IS WHAT PERCENT OF ";U;"?":PRINT:INPUT"WHAT IS YOUR ANSWER";A
    :IFA=CTTHEN85ELSEIFA<>BTHENPRINTCW;CM,B:GOSUB880ELSEPR=PR+L:PRINTCR;CM:GOSU
    B880
565 NEXTI
570 PRINT@256,C1;PR;C2:IFPR>=60ANDK=0THEN575ELSE580
575 OB(NA,5)=PR:PRINTC5;:INPUTA:IFA=CYTHEN795ELSE85
580 IFPR<60ANDK=0THENGOSUB880ELSEGOTO590
585 GOTO600
590 PRINTC3;CT;C4:GOSUB880
595 GOTO85
600 CLS:K=0:PRINT"LET ME TRY TO HELP.  FIRST LET'S LOOK AT A PROBLEM.":PRINT@148
    ,"50 IS WHAT PERCENT OF 250?":GOSUB880
605 PRINT:INPUT"IF WE KNEW THE PERCENT AND THE 250 WHAT OPERATION WOULD WE DO TO
    FIND 50";A:IFA="MULTIPLY"THEN615
610 PRINT"I'M NOT SURE WHAT YOU MEAN. I WANTED YOU TO TYPE 'MULTIPLY'.":GOTO620
615 PRINTCR;CM
```

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```
620 INPUT"LET'S DIVIDE BY 250.  WHAT DID YOU GET";A:B=".20":IFA=BTHEN630ELSEB=".
    2":IFA=BTHEN630
625 PRINT"SORRY, I GET .20 .  CHECK YOUR DIVISION.":GOSUB880
630 INPUT"OK, OUR ANSWER IS .20 .  LET'S MULTIPLY BY 100 AND TACK ON A %  SIGN";
    A:IFA="20%"THENPRINTCR;CM:GOTO640
635 PRINT"SORRY, YOU SHOULD HAVE TYPED 20%."
640 GOSUB880
645 FORI=1TOL:V=RND(100):U=RND(100):W=U*V/P:B=STR$(V):B=MID$(B,2,6)+"%":CLS:PRIN
    TW," IS WHAT PERCENT OF ";U;"?":PRINT:INPUT"WHAT IS YOUR ANSWER";A:IFA=CTTH
    EN85ELSEIFA=BTHENPRINTCR;CM:GOTO670
650 B=LEFT$(B,2):IFA=BTHENPRINT"YOU FORGOT THE PERCENT SIGN.":GOTO670
655 W=V/P:B=STR$(W):B=MID$(B,2,6):IFA=BTHEN660ELSEB=B+"%":IFA=BTHEN660ELSE665
660 PRINT"YOU FORGOT TO MULTIPLY BY 100.":GOTO670
665 PRINT:PRINT"I DON'T KNOW WHAT YOU DID WRONG.":K=K+1
670 GOSUB880
675 IFK>4THEN680ELSENEXTI:IFK<3THEN590
680 PRINT:PRINTCT,", I CAN'T HELP THIS STUDENT.  THE ERRORS          APPARENTLY AR
    E NOT IN USING THE % SIGN OR MULTIPLYING BY 100.":GOSUB880
685 GOTO85
690 CLS:PR=0:INPUT"DO YOU KNOW HOW TO CHANGE .37 TO A PERCENT";A:IFA<>CYTHEN720
695 FORI=1TOL
700 CLS:U=RND(1000):V=RND(4):V=L[V:W=U/V:PRINTI,"CHANGE ";;C="###.#####":PRINTUS
    INGC;W;:PRINT" TO A PERCENT.":PRINT:INPUT"YOUR ANSWER";A:B=MID$(STR$(W*P),2
    ,4)+"%"
705 IFA=CTTHEN85ELSEIFA=BTHENPRINTCR;CM:PR=PR+L:GOSUB880ELSEPRINTCR;CM,B:GOSUB88
    0
710 NEXTI
715 PRINT@256,C1;PR;C2:IFPR<60THENFORN=0TO1000:NEXTN:GOTO720ELSEOB(NA,4)=PR:PRIN
    TC5;:INPUTA:IFA=CYTHEN550ELSE85
720 CLS:PR=0:K=0:INPUT"THIS IS EASY.  DO YOU KNOW WHICH WAY IS TO THE RIGHT";A:I
    FA<>CYTHENPRINT"THIS WAY";CHR$(94);CHR$(94);CHR$(94)
725 INPUT"CAN YOU COUNT TO TWO";A:IFA<>CYTHENPRINT"1","2"
730 PRINT"WHEN WE MULTIPY BY 100, WE MOVE THE DECIMAL TWO PLACES TO THE   RIGHT.
    ":PRINT"LOOK AT THIS EXAMPLE.":PRINT:PRINT@404,"1.234 = 123.4%":PRINT:PRINT
    "WE CAN'T FORGET THE % SIGN.":GOSUB880
735 FORI=1TOL
740 CLS:U=RND(1000):V=RND(4):V=L[V:W=U/V:PRINTI,"CHANGE ";;C="###.#####":PRINTUS
    INGC;W;:PRINT" TO A PERCENT.":PRINT:INPUT"YOUR ANSWER";A:B=MID$(STR$(W*P),2
    ,4)+"%":IFA=CTTHEN85
745 IFA=BTHENPRINTCR;CM:PR=PR+L:GOTO770
750 B=MID$(STR$(W*P),2,4):IFA=BTHENPRINTCW," YOU FORGOT YOUR PERCENT SIGN.  THAT
    MAKES THE ANSWER WRONG.":GOTO770
755 B=MID$(STR$(W),2,6):IFA=BTHENPRINTCW," YOU FORGOT TO MULTIPLY BY 100.  YOU A
    LSO FORGOT YOUR PERCENT SIGN.  YOU MUST MOVE YOUR DECIMAL TWO PLACES TO THE
    RIGHT AND YOU MUST USE THE PERCENT SIGN.":GOTO770
760 B=B+"%":IFA=BTHENPRINTCW," YOU FORGOT TO MULTIPLY BY 100.  YOU MUST MOVE YOU
    R DECIMAL TWO PLACES TO THE RIGHT.":GOTO770
765 PRINTCW;CM;" I DON'T KNOW WHAT YOU DID WRONG.":K=K+1:IFK>4GOTO785
770 GOSUB880
775 NEXTI:PRINT@256,C1;PR;C2,,,C3;CT;C4:GOSUB880
780 GOTO85
785 PRINTCT;" I CAN'T SEEM TO HELP THIS STUDENT.  THE ERRORS ARE   NOT THOSE FOR
    WHICH I AM PROGRAMMED.":GOSUB880
790 GOTO85
795 CLS:PR=0:PRINTC6;"DO THIS TYPE OF PROBLEM?":PRINT:PRINT"4 IS 20 PERCENT OF W
    HAT NUMBER";:K=0:INPUTA:IFA=CYTHEN860
800 PR=0:PRINT"LET ME TRY TO HELP.  TWO THINGS TO REMEMBER.":PRINT:PRINT"FIRST,
    CHANGE % TO A DECIMAL.":PRINT:PRINT"SECOND,  DIVIDE BOTH SIDES OF THE EQUAT
    ION BY THE DECIMAL.":PRINT:PRINT"FOR EXAMPLE.":GOSUB890
805 CLS:PRINT@281,"4 IS 20 PERCENT OF WHAT NUMBER?":PRINT@345,"4=.20*N":GOSUB890
810 PRINT@409,"THEN DIVIDE 4/.20":PRINT@473,"20=N":GOSUB890
815 PRINT"LET'S TRY ONE TOGETHER.":PRINT@670,"9 IS 30 PERCENT OF WHAT NUMBER?":
    INPUT"THE NEXT LINE SHOULD BE";A:IFA="9=.30*N"THENPRINTCRELSEPRINTCW,"9=.30
    *N":K=K+1
820 INPUT"THEN WHAT OPERATION";A:IFA="DIVIDE"THENPRINTCRELSEPRINTCW,"DIVIDE":K=K
    +1
825 INPUT"WHAT IS THE NEXT LINE";A:IFA="30=N"THENPRINTCRELSEPRINTCW,"30=N":K=K+1
830 PRINT"NOW TRY ONE BY YOURSELF AND GIVE ME THE FINAL ANSWER.":INPUT"80 IS 40
    PERCENT OF WHAT NUMBER?   N=";A:B="200":IFA=BTHENPRINTCR:GOSUB880ELSEPRINTC
    W;"200":K=K+1:GOSUB880
835 IFK=4THENPRINTCT;" I CAN'T HELP THIS STUDENT.":GOSUB880
840 FORN=1TO5:V=RND(NU):W=RND(NY):CLS:PRINTN,V;" IS ";W;" PERCENT OF WHAT NUMBER
    ?":V=V*P/W:B=STR$(V):B=MID$(B,2,6):INPUT"WHAT IS YOUR ANSWER. USE ONLY 5 DI
    GITS. DO NOT ROUND.";A
845 IFA=CTTHEN85ELSEIFA=BTHENPRINTCR;CM:PR=PR+L:GOSUB880ELSEPRINTCW;CM,B:GOSUB88
    0
850 NEXT:PRINT@256,C1;PR*2;C2:PRINTC3;CT;C4:GOSUB880
855 GOTO85
860 FORN=1TOL:V=RND(NU):W=RND(NY):CLS:PRINTN,V;" IS ";W;" PERCENT OF WHAT NUMBER
    ?":V=V*P/W:B=STR$(V):B=MID$(B,2,6):INPUT"WHAT IS YOUR ANSWER. USE ONLY 5 DI
    GITS. DON'T ROUND.";A:IFA=CTTHEN85
865 IFA=BTHEN PRINTCR;CM:PR=PR+L:GOSUB880ELSEPRINTCW;CM,B:GOSUB880
870 NEXTN:PRINT@256,C1;PR;C2:IFPR>=60THENOB(NA,6)=PR:GOSUB880ELSE800
875 GOTO85
880 FORO=0TOP:A=INKEY$:IFA=""THENNEXTELSERETURN
885 IFT=0THENPRINT@233,"REMEMBER, PUSH 'ENTER'.":PRINT@297,CHR$(30):T=L:GOTO880:
    ELSEPRINT@297,"PUSH 'ENTER', PLEASE.   ";:T=0:GOTO880
```

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```
890 A="":A=INKEY$:IFA=""THEN890ELSERETURN
895 CLS:PRINTCHR$(23):PRINT@532,"PERCENT I":GOSUB890
900 RETURN
905 REM
940 A="":A=INKEY$:IFA=""THEN905ELSE85
945 CLS:PRINT"WHAT'S YOUR CHOICE?":PRINT:PRINT:PRINT"A STUDENT BY NAME","1":PRINT:PRIN
    T"ALL STUDENTS",,"2":PRINT:PRINT"RETURN TO STUDENT START","3":PRINT:PRINT"E
    RASE ALL OF S RECORD","4":INPUTI:ONIGOTO950,955,85,950
950 CLS:INPUT"WHICH STUDENT DO YOU WANT (LAST NAME COMMA FIRST NAME)";CN,CM
955 FORN=0TONB:IF(CN=CN(N))AND(CM=CM(N))OR(I=2)THENPRINTCN(N),CM(N),OB(N,0),OB(N
    ,1),OB(N,2),OB(N,3),OB(N,4),OB(N,5),OB(N,6),"NR TURNS   ";NT(N):U=(N+1)/5:V=
    INT(U):IFI=4THENCN(N)="":CM(N)="":NT(N)=0:FORM=0TO6:OB(N,M)=0:NEXTM:ELSEIFU
    =VTHENGOSUB890
960 NEXT:GOSUB890
965 GOTO945
970 CLS:INPUT"READY TO PRINT#";A:IFA<>CYTHEN85
975 PRINT#-1,CT,NB,NZ,NY,NX,NW,NV,NU
980 FORN=0TONBSTEP2
985 PRINT#-1,CN(N),CM(N),OB(N,0),OB(N,1),OB(N,2),OB(N,3),OB(N,4),OB(N,5),OB(N,6)
    ,NT(N),CN(N+1),CM(N+1),OB(N+1,0),OB(N+1,1),OB(N+1,2),OB(N+1,3),OB(N+1,4),OB
    (N+1,5),OB(N+1,6),NT(N+1)
990 NEXT
995 PRINT"ALL IS PRINTED.":GOSUB880
1000 GOTO85
```

VIDEO READING TRAINER: by Rod Hallen

With this program your TRS-80 becomes the electronic equivalent of the old-fashioned flash card. It will drill you unmercifully, just as Miss Gibbs used to do in reading class. Random letter and number groups are flashed for varying duration of time on the video terminal. The user must input the equivalent symbols to prove recognition. Character group sizes and flash period durations are variable.
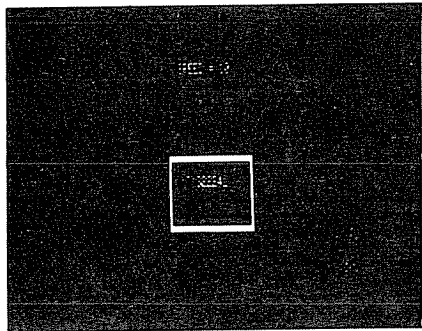
```
40 CLS:DIMA$(26):B$="          ":T=1000
50 A$="ABCDEFGHIJKLMNOPQRSTUVWXYZ"
60 PRINT@74,"* - - - - - - - - - - - - - - - - *"
65 PRINT@213,"VIDEO READING TRAINER"
70 PRINT@401,"PART 1 (NUMBERS AND LETTERS)"
80 PRINT@528,"(C) COPYRIGHT 1978 ROD HALLEN"
90 PRINT@650,"* - - - - - - - - - - - - - - - *"
100 FORJ=1TO2000:NEXTJ:CLS
110 PRINT@404,"NUMBER OF DIGITS ";:INPUTU:IFU=0THENEND
120 IFU>6THENU=6
130 CLS:PRINT@404,"INITIAL SPEED ";:INPUTY:CLS
140 IFY>100THENY=100
150 IFY<10THENY=10
160 Y1=Y
170 FORK=1TO1000
```

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```
180 CLS:GOSUB440
181 PRINT@343,CHR$(151);:FORQ=1TO14:PRINTCHR$(131);:NEXTQ:PRINTCHR$(171);
182 PRINT@407,CHR$(149);:PRINT@422,CHR$(170);
183 PRINT@471,CHR$(149);:PRINT@486,CHR$(170);
184 PRINT@535,CHR$(181);:FORQ=1TO14:PRINTCHR$(176);:NEXTQ:PRINTCHR$(186);
190 R=0:IFK/2<>INT(K/2)THENFORJ=1TO1500:NEXTJ
200 FORI=1TO20
210 IFK/2=INT(K/2)THENGOSUB560ELSEGOSUB460
218 PRINT@407,CHR$(149);"              ";CHR$(170);
220 PRINT@471,CHR$(149);"              ";CHR$(170);
230 FORP=1TO500:NEXTP:NEXTI:IFR=10THENI=20
240 NEXTI
250 IFR=10THEN300ELSEY1=Y1-20
260 IFY1<10THENY1=10
270 PRINT@198,"THIS APPEARS TO BE A LITTLE TOO FAST FOR YOU."
280 PRINT@335,"LET'S SLOW IT DOWN A BIT."
290 FORP=1TO2000:NEXTP:GOTO180
300 IFK/2=INT(K/2)THENY1=Y1+10
310 IFY1<=100THEN370
320 IFU=8THEN410
330 CLS:PRINT@259,"CONGRATULATIONS! YOU ARE MOVING UP TO THE NEXT PLATEAU."
340 PRINT@393,"YOU WILL NOW BE SEEING";U+1;"CHARACTERS AT A TIME."
350 PRINT@536,"ARE YOU READY ";:INPUTC$:IFLEFT$(C$,1)="N"THEN390
360 U=U+1:Y=Y-10:Y1=Y
370 NEXTK
390 CLS:PRINT@396,"YOUR SPEED WITH";U;"DIGITS IS NOW";Y1-10;"."
400 PRINT@517,"AFTER YOU REST UP, SEE IF YOU CAN'T IMPROVE ON THAT.":GOTO420
410 PRINT@458,"YOU HAVE COMPLETED PART 1. GO ON TO PART 2."
420 PRINT:PRINT:PRINT:END
440 PRINT@25,"SPEED =";Y1:RETURN
450 REM*-RANDOM NUMBER GENERATOR SUBROUTINE-*
460 X=INT(RND(0)*10[U-1)
470 IFX<(10[U-1)/10THEN460
480 PRINT@414-U/2,X;
490 FORJ=1TOT/Y1:NEXTJ
500 PRINT@410,"              ";
510 FORP=1TO250:NEXT:PRINT@413-U/2,;:INPUTZ:IFZ=0THEN390
520 IFX=ZTHENR=R+1:RETURN
530 PRINT@471,CHR$(149);:PRINT@477-U/2,"*";X;"* ";:PRINT@486,CHR$(170);:FORP=1TO
    1000:NEXTP
540 PRINT@472,"                ";:RETURN
550 REM*-RANDOM CHARACTER GENERATOR SUBROUTINE-*
560 B$=""
565 FORM=1TOU
570 X=RND(26):B$=B$+MID$(A$,X,1)
580 NEXTM
590 PRINT@415-U/2,B$;
600 FORJ=1TOT/Y1:NEXTJ
610 PRINT@410,"              ";
620 FORP=1TO250:NEXT:PRINT@413-U/2,;:INPUTZ$:IFZ$="0"THEN390
630 IFZ$=B$THENR=R+1:RETURN
640 PRINT@471,CHR$(149);:PRINT@478-U/2,"* ";B$;" *";:PRINT@486,CHR$(170);:FORP=1
    TO1000:NEXTP
645 PRINT@472,"                ";
650 RETURN
```

MATH HELP: by Ted Carter

More practice on math basics with emphasis put on speed and accuracy. Five levels of difficulty available.
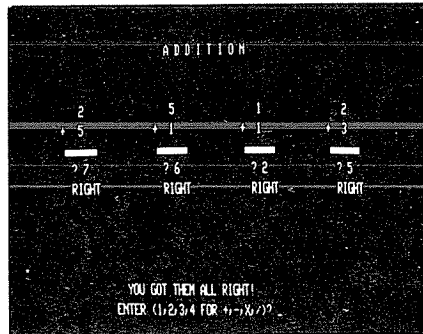

```
100  CLS
110  DIMA(15)
120  PRINT@ 140,"****  M A T H   P R A C T I C E  ****"
130  PRINT@ 278,"1 = ADDITION"
140  PRINT@ 342,"2 = SUBTRACTION"
150  PRINT@ 406,"3 = MULTIPLICATION"
160  PRINT@ 470,"4 = DIVISION"
170  PRINT@ 602,"WHICH";:INPUTL
177  IF (L<1)OR(L>4)THEN100
180  ON L GOTO1000,2000,3000,4000
1000 REM---ADDITION
1002 CLS:Q=0
1004 PRINT@ 150,"A D D I T I O N"
1006 GOSUB 8800
1008 GOSUB9000
1010 GOSUB 8000
1012 G$="+"
1015 FOR P=0 TO 3
1020 PRINT@ 326+P*16,A(P)
1030 NEXTP
1040 FORP=0TO3
1050 PRINT@388+P*16,G$;" ";A(P+4)
1055 A(12+P)=A(P)+A(P+4)
1060 NEXTP
1072 GOSUB 1076
1074 GOTO1182
1076 REM---DRAW LINE
1080 Y=22
1090 FOR P=0 TO 3
1100 M=P*32+10
1110 FOR X=M TO M+10
1120 SET(X,22)
1130 NEXTX
1140 NEXTP
1145 RETURN
1182 GOSUB 1190
1184 GOTO1240
1190 FOR P=0 TO 3
1200 N=P*16+518
1210 PRINT@ N,"";
1220 INPUTA(P+8)
1230 NEXTP
1235 RETURN
1240 GOSUB 1246
1242 GOTO1360
1246 REM---RIGHT/WRONG
1248 FOR P=0 TO 3
1260 IF A(P+8)=A(P+12) GOTO1300
1265 IF A(P+8)=A(P+4) GOTO1300
1270 PRINT@ 582+P*16,"WRONG"
1280 GOTO1350
1300 PRINT@ 582+P*16,"RIGHT"
1310  Q=Q+1
1350 NEXTP
```

```
1355   RETURN
1360   IF Q=4 GOTO1400
1370   PRINT@730,"TRY AGAIN!"
1380   PRINTTAB(18) "HIT 'ENTER' TO CONTINUE...";
1388   INPUTA$
1390   GOTO180
1400   PRINT@ 911,"YOU GOT THEM ALL RIGHT!"
1402   PRINT@ 973,"ENTER (1,2,3,4 FOR +,-,X,/)";
1410   INPUTL
1420   GOTO180
2000   REM---SUBTRACTION
2002 CLS
2004   PRINT@147,"S U B T R A C T I O N"
2006   Q=0
2008 G$="-"
2010   GOSUB 8800
2020 GOSUB9000
2030   GOSUB 8000
2032   FOR P=0 TO 3
2034   A(12+P)=A(P)+A(P+4)
2036   PRINT@ 326+P*16,A(12+P)
2040   NEXTP
2050 FORP=0TO3
2055 PRINT@388+P*16,G$;" ";A(P)
2060 NEXTP
2070   GOSUB 1076
2190   GOSUB 1190
2200   GOSUB 1246
2210   GOTO1360
2220   END
3000   REM---MULTIPLICATION
3002 CLS
3004   PRINT@147,"M U L T I P L I C A T I O N"
3006   Q=0
3008   GOSUB 8800
3009 GOSUB9000
3010   GOSUB 8000
3015   FOR P=0 TO 3
3022   PRINT@ 326+P*16,A(P)
3030   NEXTP
3040 G$="X"
3050   FOR P=0 TO 3
3055   A(P+12)=A(P)*A(P+4)
3070 PRINT@388+P*16,G$;" ";A(P+4)
3080   NEXTP
3085 GOSUB1076
3090   GOSUB 1190
3100   GOSUB 1246
3200   GOTO1360
3999   GOTO3999
4000   REM---DIVISION
4010   CLS
4020   PRINT@ 150,"D I V I S I O N"
4030   Q=0
4040   GOSUB 8800
4045 GOSUB9000
4050   PRINT@ 330,""
4060   GOSUB 8000
4070   FOR P=0 TO 3
4080   A(P+12)=A(P)*A(P+4)
4162   FOR J=P*32+10 TO P*32+24
4164   SET(J,22)
4170   NEXTJ
4220   PRINT@ 512+P*16,A(P);
4230   PRINT@ 518+P*16,A(P+12);
4240   FOR K=0 TO 3
4245   M=K+22
4250   SET(P*32+10,M)
4260   NEXTK
4290   NEXTP
4300   FOR P=0 TO 3
4310   PRINT@ 326+P*16,"";
4320   INPUTA(P+8)
4330   NEXTP
4410   GOSUB 1246
4420   GOTO1360
4999   GOTO4999
8000   REM---RND
8010   FOR P=0 TO 7
8020   ON S GOTO8100,8200,8300,8400,8500
8100   A(P)=RND(5)
8110   GOTO8600
8200   A(P)=RND(12)
8210   GOTO8600
8300   A(P)=RND(50)
8310   GOTO8600
8400   A(P)=RND(99)
```

```
8410   GOTO8600
8500   A(P)=RND(999)
8600   NEXTP
8610   RETURN
8800   REM----SKILL LEVEL
8810   PRINT@ 339,"SKILL LEVEL (1 TO 5)";
8820   INPUTS
8822   IF(S<1)OR(S>5)THEN8810
8830   RETURN
9000   REM-ERASE
9010   PRINT@320,"";:PRINTCHR$(30)
9020   RETURN
9030   END
```

HIDE 'n SPELL: by Jacob Rusell

First, identify the misspelled word in a group of four words. If you're right, your TRS-80 will then ask you to type the correctly spelled version. There is no hiding from the teacher in this game, and speed counts, too. An excellent choice for English majors and computer magazine staffers.
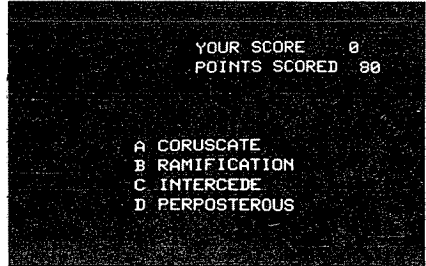

```
15  REM   DISPLAY HIDE N' SPELL, DIMENSION ARRAYS,INITILIZE THE          ARRAYS.
20  REM   ASK IF THE PLAYER NEEDS INSTRUCTIONS.
25  CLS :PRINT @ 334,CHR$(23);"HIDE N' SPELL"
30  CLEAR 30 :DIM W$(60) :DIM MW$(60) :DIM CH(15) :O$="####"
35  P1=60
40  FOR I=1 TO P1 :READ W$(I),MW$(I) :NEXT I :FOR C=1 TO 100 :NEXT C
45  CLS :PRINT @ 330,"DO YOU NEED INSTRUCTIONS ? (TYPE Y FOR YES, N FOR NO.)"
50  CN$=INKEY$ :IF CN$="" THEN 50 ELSE IF CN$="Y" THEN 60
55  IF CN$="N" THEN 110 ELSE 50
60  CLS :PRINT @ 192," FOUR WORDS WILL BE DISPLAYED ON THE SCREEN BESIDE THE" :PR
        INT"LETTERS A, B, C AND D. YOU ARE TO PRESS THE LETTER OF THE" :PRINT"MISSP
        ELLED WORD. IF YOU ARE CORRECT YOU WILL BE ASKED TO SPELL" :PRINT"THE WORD
        CORRECTLY.";
65  PRINT" THE FASTER YOU FIND THE WORD THE HIGHER" :PRINT"YOUR SCORE. IF YOU FAI
        L TO CORRECT THE WORD YOUR POINTS SCORED" :PRINT"WILL BE HALVED."
70  PRINT" BECAREFUL, YOU GET ONLY ONE CHANCE TO FIND THE WORD AND ONLY" :PRINT"O
        NE CHANCE TO CORRECT IT. HIT ANY KEY TO START THE GAME."
80  CN$=INKEY$ :IF CN$="" THEN 80
90  REM   INITILIZE PROGRAM VARIABLES.
95  REM   PRINT YOUR SCORE AND POINTS SCORED.
110 B=0 :SC=0 :RANDOM
120 CLS :PRINT @ 74,CHR$(23);"YOUR SCORE" :PRINT @ 96,USING O$;SC :PRINT @ 138,"
        POINTS SCORED"
130 REM   CANCEL LATE RESPONCES. SET POINTS SCORED TO 100.
135 REM   SELECT 4 WORDS TO BE DISPLAYED. PICK WHICH WORD WILL          BE MISS
        PELLED.
140 CA$=INKEY$ :PS=100 :PRINT @ 164,USING O$;PS
150 T=RND(4) :Q1=RND(P1) :I=Q1
155 IF T=1 THEN A$=MW$(I) :AN$="A" :X1=I :GOTO 165
160 A$=W$(I)
165 Q2=RND(P1) :IF Q2=Q1 THEN 165 ELSE I=Q2
170 IF T=2 THEN B$=MW$(I) :AN$="B" :X1=I :GOTO 180
175 B$=W$(I)
```

```
180 Q3=RND(P1) :IF Q3=Q1 OR Q3=Q2 THEN 180 ELSE I=Q3
185 IF T=3 THEN C$=MW$(I) :AN$="C" :X1=I :GOTO 195
190 C$=W$(I)
195 Q4=RND(P1) :IF Q4=Q1 OR Q4=Q2 OR Q4=Q3 THEN 195 ELSE I=Q4
200 IF T=4 THEN D$=MW$(I) :AN$="D" :X1=I :GOTO 210
205 D$=W$(I)
210 FOR I1=0 TO B :IF CH(I1)=X1 THEN 150 ELSE NEXT I1
215 B=B+1 :CH(I1)=X1 :I=X1
220 PRINT @ 384,"A ";A$ :PRINT @ 448,"B ";B$ :PRINT @ 512,"C ";C$ :PRINT @ 576,"
    D ";D$
230 REM  COUNT DOWN POINTS SCORED.
235 REM  CHECK FOR CORRECT ANSWER. CHECK FOR CORRECT SPELLING.
240 FOR C=1 TO 150 :CN$=INKEY$ :IF CN$="" OR CN$>"D" OR CN$<"A" THEN NEXT C ELSE
    IF CN$=AN$ THEN 260 ELSE 300
250 PS=PS-10 :PRINT @ 164,USING O$;PS :IF PS>0 GOTO 240 ELSE 340
260 GOSUB 400
270 PRINT @ 266,"CORRECT! NOW SPELL THE WORD"; :PRINT @ N,""::INPUT W$ :IF W$=W$
    (I) THEN SC=SC+PS ELSE SC=SC+PS/2 :GOTO 290
280 PRINT @ 96,USING O$;SC; :PRINT @ 266,CHR$(31) :PRINT @ 266,"RIGHT!" :FOR C=1
    TO 500 :NEXT C :GOTO 360
290 PRINT @ 96,USING O$;SC; :PRINT @ 164,USING O$;PS/2 :PRINT @ 266,CHR$(30) :PR
    INT @ 266,"SORRY YOU ARE WRONG" :PRINT @ N,CHR$(30) :PRINT @ N," ";W$(I) :
    FOR C=1 TO 1500 :NEXT C :GOTO 360
300 PS=0 :PRINT @ 164,USING O$;PS :PRINT @ 266,CHR$(31) :PRINT @ 266,"SORRY ";CN
    $; " IS NOT RIGHT" :FOR C=1 TO 500 :NEXT C :GOSUB 400
320 PRINT @ 266,"THIS IS THE WORD :" :PRINT @ N," ";W$(I) :FOR C=1 TO 1500 :NEX
    T C :GOTO 360
340 PRINT @ 266,CHR$(31) :PRINT @ 266,"TIME IS UP" :FOR C=1 TO 500 :NEXT C :GOSU
    B 400
345 PRINT @ 266,"THIS IS THE WORD :" :PRINT @ N," ";W$(I) :FOR C=1 TO 1500 :NEX
    T C
350 REM  CHECK TO SEE IF GAME SHOULD END.
360 IF B<15 AND B<P1 THEN PRINT @ 266,CHR$(31) :GOTO 140
363 REM  GAME OVER ROUTINE.
365 FOR I1=1 TO B :CH(I1)=0 :NEXT I1
370 PRINT @ 138,CHR$(31) :PRINT @ 266,"    GAME OVER" :PRINT @ 384,"TO PLAY HIDE
    N' SPELL AGAIN" :PRINT @ 464,"TYPE Y"
375 CN$=INKEY$ :IF CN$="" THEN 375 ELSE IF CN$="Y" THEN 45 ELSE 375
390 REM  DISPLAY CORRECT ANSWER SUBPROGRAM.
400 PRINT @ 266,CHR$(31)
410 IF AN$="B" THEN 430 ELSE IF AN$="C" THEN 440 ELSE IF AN$="D" THEN 450
420 PRINT @ 384,"A ";A$ :N=416 :RETURN
430 PRINT @ 448,"B ";B$ :N=480 :RETURN
440 PRINT @ 512,"C ";C$ :N=544 :RETURN
450 PRINT @ 576,"D ";D$ :N=608 :RETURN
480 REM  LINE 500 IS THE BEGINNING OF THE DATA STATEMENTS.
500 DATA "MAVERICK","MAVERIK"
502 DATA "EVANGELIST","EVANGULIST"
504 DATA "WHEREWITHAL","WHEREWITHALL"
506 DATA "BAILIWICK","BAILEWICK"
508 DATA "QUIBBLE","QUIBLE"
510 DATA "CEMETERY","CEMETARY"
512 DATA "MARRIAGE","MARRAIGE"
514 DATA "LIBERTINE","LIBERTEEN"
516 DATA "DENOMINATION","DENOMMINATION"
518 DATA "CONTEMPORARY","CONTEMPARARY"
520 DATA "JARGON","JARGEN"
522 DATA "FETTER","FETER"
524 DATA "LANYARD","LANDYARD"
526 DATA "FIGURINE","FIGUREEN"
528 DATA "ORDNANCE","ORDNENCE"
530 DATA "CITADEL","CITADIL"
532 DATA "PAVILION","PAVELION"
534 DATA "ACCOLADE","ACOLADE"
536 DATA "VIGIL","VIGEL"
538 DATA "PALADIN","PALIDIN"
540 DATA "ACCOUTERMENTS","ACOUTERMENTS"
542 DATA "HORRENDOUS","HORENDOUS"
544 DATA "ILLUSTRIOUS","ILUSTRIOUS"
546 DATA "GAUNTLET","GANTLET"
548 DATA "CORRELATE","CORELATE"
550 DATA "SOLICITOUS","SOLLICITOUS"
552 DATA "COPIOUS","COPEOUS"
554 DATA "PREPOSTEROUS","PERPOSTEROUS"
556 DATA "VERACIOUS","VIRACIOUS"
558 DATA "CAPRICIOUS","CAPRECIOUS"
560 DATA "PORTENTOUS","PORTENTIOUS"
562 DATA "SPONTANEOUS","SPONTANEIOUS"
564 DATA "CRENELATE","CRENOLATE"
566 DATA "TIMOROUS","TIMORIOUS"
568 DATA "MISCREANT","MISCREEANT"
570 DATA "MENDACIOUS","MENDACOUS"
572 DATA "CORUSCATE","CORRUSCATE"
574 DATA "PRECARIOUS","PRECAREOUS"
576 DATA "INIQUITOUS","INIQUITIOUS"
578 DATA "PUNCTILIOUS","PUNCTILLIOUS"
580 DATA "INDIVISIBLE","INDIVISABLE"
```

```
582 DATA "ATTENDANCE","ATTENDENCE"
584 DATA "CENTIMETER","CENTEMETER"
586 DATA "PREDICAMENT","PERDICAMENT"
588 DATA "INFALLIBLE","INFALABLE"
590 DATA "VALUABLE","VALUEBLE"
592 DATA "PURSUIT","PERSUIT"
594 DATA "POIGNANT","POIGNENT"
596 DATA "RAMIFICATION","RAMEFICATION"
598 DATA "REFLECTOR","REFLECTER"
600 DATA "INVIGORATE","INVIGERATE"
602 DATA "REVERENCE","REVERANCE"
604 DATA "CLARIFICATION","CLAREFICATION"
606 DATA "INTERCEDE","INTERSEDE"
608 DATA "SUPERSEDE","SUPERCEDE"
610 DATA "PROCEED","PROCEDE"
612 DATA "TANGIBLE","TANGEBLE"
614 DATA "RESPONSIBLE","RESPONSABLE"
616 DATA "DESPONDENT","DESPONDANT"
618 DATA "INDEPENDENCE","INDEPENDANCE"
```

BUSINESS

Projected Profits	G.R. Glau
Real Estate Analysis	Keith Burrowes
Order Blank	G. Wagner
Mail List	Chuck Ross
Custom Writing Program	J.N. Adams
Inventory	Don Allen
Contractor	C.J. Stinson
Rough Lumber List	D. Brickner
Surveyor's Program	William Dotson
Tax Withholding	Cliff DeJong
Grade Book	Anne Weiss
Information Management System	George Doss
Cash Register	John Hamilton

PROJECTED PROFITS: by G.R. Glau

A sales summary program in which the user may adjust sales figures to display present, as well as predicted future revenues. Quite useful in times of double digit inflation rates and inventory adjustments.

```
1 CLS
5 GOSUB3500
10 M0=.0885:M1=.085:M2=.0668:M3=.0499:M4=.0604
20 M5=.0724:M6=.0998:M7=.1019:M8=.0704:M9=.0982
30 N1=.1027:N2=.1042
100 S1=300000
110 S2=80000
111 REM S1= TOTAL SALES      S2= OVERHEAD
130 S3=210000
140 S4=S3/S1
150 REM S4= GROSS COST PERCENTAGE OF SALES
200 CLS:INPUT" INPUT ANY CHANGE IN SALES (5%= .05)";A
210 IF A= 0 THEN 250
220 K4 = S1 * (1+A )
230 GOTO300
250 K4=S1
300 CLS:INPUT"ANY CHANGE IN OVERHEAD (5%= .05)";B
310 IFB=0THEN350
320 K5=S2*(1+B )
330 GOTO400
350 K5=S2
400 REM NEW SALES = K4; NEW OVERHEAD = K5
410 CLS:INPUT"INPUT ANY CHANGE IN GROSS COSTS (5%= .05)";C
420 IFC=0THEN450
430 K7=S4*(1+C)
440 GOTO500
450 K7=S4
500 REM K7= COST OF SALES %
510 GOTO2000
600 CLS:PRINT"MONTH";TAB(9);"EST SALES";
610 PRINTTAB(21);"COST/SALES";TAB(33);"GROSS PRFT";
620 PRINTTAB(45);"O'HEAD";TAB(57);"NET"
650 PRINT"JAN";TAB(8);J1;TAB(20);P1;TAB(32);L1;TAB(44);G9;TAB(56);G1
660 PRINT"FEB";TAB(8);J2;TAB(20);P2;TAB(32);L2;TAB(44);G9;TAB(56);G2
670 PRINT"MAR";TAB(8);J3;TAB(20);P3;TAB(32);L3;TAB(44);G9;TAB(56);G3
680 PRINT"APR";TAB(8);J4;TAB(20);P4;TAB(32);L4;TAB(44);G9;TAB(56);G4
690 PRINT"MAY";TAB(8);J5;TAB(20);P5;TAB(32);L5;TAB(44);G9;TAB(56);G5
700 PRINT"JUNE";TAB(8);J6;TAB(20);P6;TAB(32);L6;TAB(44);G9;TAB(56);G6
710 PRINT"JULY";TAB(8);J7;TAB(20);P7;TAB(32);L7;TAB(44);G9;TAB(56);G7
720 PRINT"AUG";TAB(8);J8;TAB(20);P8;TAB(32);L8;TAB(44);G9;TAB(56);G8
730 PRINT"SEPT";TAB(8);J9;TAB(20);P9;TAB(32);L9;TAB(44);G9;TAB(56);H0
740 PRINT"OCT";TAB(8);K1;TAB(20);Q1;TAB(32);E1;TAB(44);G9;TAB(56);H1
750 PRINT"NOV";TAB(8);K2;TAB(20);Q2;TAB(32);E2;TAB(44);G9;TAB(56);H2
760 PRINT"DEC";TAB(8);K3;TAB(20);Q3;TAB(32);E3;TAB(44);G9;TAB(56);H3
770 GOSUB3000
780 PRINT"TOTALS";TAB(8);W8; TAB(20);W7; TAB(32);W9;
790 PRINTTAB(44);K5; TAB(56);G0
1999 GOTO1999
2000 REM HERE WE'RE GETTING THE MONTHLY FIGURES
2010 J1=INT(K4*M0):J2=INT(K4*M1):J3=INT(K4*M2):J4=INT(K4*M3):J5=INT(K4*M4)
2020 J6=INT(K4*M5):J7=INT(K4*M6):J8=INT(K4*M7):J9=INT(K4*M8 )
2030 K1=INT(K4*M9):K2=INT(K4*N1):K3=INT(K4*N2)
2040 W8=INT(J1+J2+J3+J4+J5+J6+J7+J8+J9+K1+K2+K3)
2050 REM G4 = SALES $$$
2200 REM COST OF SALES= SALES/MONTH (J1) * K7
2210 P1=INT(J1*K7):P2=INT(J2*K7):P3=INT(J3*K7):P4=INT(J4*K7)
2220 P5=INT(J5*K7):P6=INT(J6*K7):P7=INT(J7*K7):P8=INT(J8*K7)
```

```
2230 P9=INT(J9*K7):Q1=INT(K1*K7):Q2=INT(K2*K7):Q3=INT(K3*K7)
2240 W7=P1+P2+P3+P4+P5+P6+P7+P8+P9+Q1+Q2+Q3
2600 G9=INT(K5/12)
2700 G1=J1-P1-G9:G2=J2-P2-G9:G3=J3-P3-G9:G4=J4-P4-G9:G5=J5-P5-G9
2710 G6=J6-P6-G9:G7=J7-P7-G9:G8=J8-P8-G9
2720 H0=J9-P9-G9:H1=K1-Q1-G9:H2=K2-Q2-G9:H3=K3-Q3-G9
2750 G0=G1+G2+G3+G4+G5+G6+G7+G8+H0+H1+H2+H3
2800 REM L1= GROSS $$
2810 L1=J1-P1:L2=J2-P2:L3=J3-P3:L4=J4-P4:L5=J5-P5:L6=J6-P6:L7=J7-P7:L8=J8-P8
2820 L9=J9-P9:E1=K1-Q1:E2=K2-Q2:E3=K3-Q3
2825 L1=INT(L1):L2=INT(L2):L3=INT(L3):L4=INT(L4):L5=INT(L5):L6=INT(L6)
2826 L7=INT(L7):L8=INT(L8):L9=INT(L9):E1=INT(E1):E2=INT(E2):E3=INT(E3)
2830 W9=INT(L1+L2+L3+L4+L5+L6+L7+L8+L9+E1+E2+E3)
2900 GOTO600
3000 FORX=1TO64:PRINT"-";:NEXTX
3010 RETURN
3500 PRINT"THIS IS A SALES SUMMARY PROGRAM, IN WHICH YOU CAN CHANGE"
3510 PRINT"SALES FIGURES TO NOT ONLY DISPLAY WHAT YOU HAVE DONE,"
3520 PRINT"BUT ALSO WHAT THE FUTURE MIGHT BRING."
3530 PRINT
3540 PRINT"TO CHANGE ANY OF THE FIGURES (SALES, OVERHEAD, GROSS COST),"
3550 PRINT"ANSWER THE QUESTIONS. REMEMBER THAT TO DECREASE A FIGURE,"
3560 PRINT"JUST PUT A MINUS SIGN BEFORE YOUR ANSWER. FOR EXAMPLE:"
3570 PRINT"    .05 MEANS YOU WANT TO INCREASE THE FIGURE BY 5%, AND"
3580 PRINT"    -.07 MEANS YOU WANT TO DECREASE THE FIGURE BY 7%."
3590 PRINT
3600 PRINT"NOTE ALSO THAT YOU CAN CHANGE ANY OF THE FIGURES"
3610 PRINT"IN ANY COMBINATION--RAISE SALES, LOWER OVERHEAD, ETC."
3620 PRINT
3630 PRINT"HIT ENTER TO CONTINUE.........";:INPUTZ
3640 RETURN
```

REAL ESTATE ANALYSIS: by Keith Burrowes

This program allows the real estate professional, or any property owner, to keep track of the profitability of investments. The myriad of variables concerned with real estate investments are considered in figuring profitability in this program. A very worthwhile program for times of tight money and high interest rates.


```
10 CLS
20 CLEAR500
30 DEFINTX,N,Q
40 DIM A(5),SP(5),CP(5),TG(5),GP(5),YD(5),D(50),SC(50),SD(50)
50 PRINTTAB(10)"REAL ESTATE ANALYSIS PROGRAM"
55 Z=0
60 PRINT
70 INPUT"PROPERTY STREET ADDRESS";A$
80 INPUT"CITY";B$
90 INPUT"NUMBER OF UNITS";X
100 PRINT
110 PRINT"INCOME DATA :"
120 INPUT"GROSS MONTHLY INCOME ";R
130 INPUT"VACANCY ALLOWANCE IN DECIMAL FORM ";V
140 PRINT
```

```
150 PRINT"EXPENSE DATA :"
160 INPUT"PROPERTY TAXES";PT
165 INPUT"UTILTIES";UT
170 INPUT"INSURANCE";IS
180 INPUT"MAINTENANCE";MT
190 INPUT"GARDENING";GN
200 INPUT"MANAGEMENT";MG
210 OE=PT+UT+IS+MT+GN+MG
220 RN=12*R*(1-V)-OE
230 PRINT
240 INPUT"CORRECTIONS (YES OR NO)";C$
250 IF C$="NO" THEN 290
260 IF C$="YES" THEN 100
270 PRINT"ENTER YES OR NO"
280 GOTO240
290 PRINT
295 IF Z<>0 THEN 810
300 PRINT"PURCHASE DATA :"
310 INPUT"PURCHASE PRICE";PP
320 INPUT"ONE TIME COSTS";OC
330 INPUT"FIRST MORTGAGE AMOUNT";F1
340 INPUT"INTEREST IN DECIMAL FORM ";I1
350 INPUT"IS FIRST MORTGAGE PAYMENT STIPULATED";D$
360 IF D$<>"YES" THEN 390
370 INPUT"FIRST MORTGAGE PAYMENT AMOUNT";P1
380 GOTO 410
390 P1=0
400 INPUT"FIRST MORTGAGE PERIOD IN YEARS ";Y1
410 INPUT"ANY SECOND MORTGAGE (YES OR NO)";I$
420 IF I$="YES" THEN 480
430 IF I$="NO" THEN 460
440 PRINT"ENTER YES OR NO"
450 GOTO 410
460 F2=0:I2=0:P2=0:Y2=0:I4=0:B2=0
470 GOTO560
480 INPUT"SECOND MORTGAGE AMOUNT";F2
490 INPUT"INTEREST IN DECIMAL FORM";I2
500 INPUT"IS SECOND MORTGAGE PAYMENT STIPULATED";E$
510 IF E$<>"YES" THEN 540
520 INPUT"SECOND MORTGAGE PAYMENT AMOUNT";P2
530 GOTO560
540 P2=0
550 INPUT"SECOND MORTGAGE PERIOD IN YEARS";Y2
560 PRINT
565 IF Z<>0 THEN 810
570 PRINT"TAX RELATED DATA :"
580 INPUT"VALUE OF BUILDING FOR DEPRECIATION";BG
590 INPUT"REMAINING USEFUL LIFE IN YEARS";L
600 INPUT"SALVAGE VALUE OF BUILDING";SV
610 PRINT
620 PRINT"FOR DEPRECIATION METHOD ENTER NUMBER AS FOLLOWS:"
630 PRINT
640 PRINT"STRAIGHT LINE        = 1"
650 PRINT"125% DECLINING BALANCE = 2"
660 PRINT"150% DECLINING BALANCE = 3"
670 PRINT"200% DECLINING BALANCE = 4"
680 PRINT
690 INPUT"YOUR CHOICE";D
695 IF Z<>0 THEN 810
700 PRINT
710 PRINT"INVESTOR'S DATA :"
720 INPUT"MOST LIKELY APPRECIATION RATE (DECIMAL FORM)";A(3)
730 INPUT"MINIMUM EXPECTED APPRECIATION RATE (10% CHANCE)";A(1)
740 INPUT"MAXIMUM EXPECTED APPRECIATION RATE (10% CHANCE)";A(5)
750 A(2)=(A(1)+A(3))/2
760 A(4)=(A(3)+A(5))/2
770 INPUT"NUMBER OF YEARS INVESTMENT WILL BE HELD";N
790 INPUT"BROKER'S SALES COMMISSION IN DECIMAL FORM";BR
800 INPUT"COMBINED FEDERAL & STATE TAX BRACKET (DEC. FORM)";T
810 GOSUB 5000
820 GOSUB 6000
830 'PRINT TITLES
840 LPRINT
850 LPRINT"REAL ESTATE INVESTMENT ANALYSIS"
860 LPRINT"OF AN INVESTMENT IN A"
870 IF X=1 THEN 900
880 LPRINTX;"UNIT STRUCTURE AT"
890 GOTO910
900 LPRINT"SINGLE FAMILY DWELLING AT"
910 LPRINTA$
920 LPRINTB$
930 LPRINT
940 LPRINT"PROPOSED COST PRICE              $";PP+OC
950 LPRINT"FIRST MORTGAGE AT";100*I1;"%";TAB(34)"$";F1
960 IF I$="NO"THEN 980
970 LPRINT"SECOND MORTGAGE AT";100*I2;"%";TAB(34)"$";F2
980 LPRINT"TOTAL CASH OUTLAY FOR PURCHASE     $";PP+OC-F1-F2
```

```
990 LPRINT:LPRINT
1000 PRINT"SELECT ANALYSIS SEGMENT YOU WISH :"
1010 PRINT"FOR ANNUAL CASH FLOW TYPE 1"
1020 PRINT"FOR GROSS MULTIPLIER TYPE 2"
1030 PRINT"FOR FIRST YEAR YIELD TYPE 3"
1040 PRINT"FOR YIELD AFTER SALE TYPE 4"
1050 PRINT"TO ENTER NEW DATA OR STOP TYPE 5"
1055 PRINT
1060 INPUT"YOUR CHOICE";S
1070 ON S GOTO 1150,2000,2300,2600,1075
1075 PRINT
1080 INPUT"DO YOU WISH TO ENTER NEW DATA FOR THIS PROPERTY";C$
1090 IF C$<>"YES"THEN END
1100 PRINT
1105 PRINT"TO CHANGE PARAMETERS BELOW, TYPE NUMBER INDICATED"
1110 PRINT"FOR INCOME & EXPENSE DATA ONLY, TYPE 1"
1115 PRINT"FOR PURCHASE DATA ONLY, TYPE 2"
1120 PRINT"FOR TAX RELATED DATA ONLY, TYPE 3"
1125 PRINT"FOR INVESTOR'S DATA ONLY, TYPE 4"
1130 INPUT"YOUR CHOICE";Z
1135 ON Z GOTO 100,300,570,700
1150 LPRINT"ANNUAL CASH FLOW ANALYSIS"
1160 LPRINTSTRING$(25,"-")
1170 LPRINT
1180 LPRINTTAB(10)"ANNUAL CASH FLOW - BEFORE INCOME TAX"
1190 LPRINT
1200 LPRINT"ANNUAL INCOME :"
1210 LPRINT
1220 LPRINT"GROSS ANNUAL RENTS                   $";12*R
1230 LPRINT"LESS VACANCY ALLOWANCE AT";100*V;"%";TAB(35)"$";INT(V*12*R+.5)
1240 LPRINT"NET ANNUAL INCOME                    $";INT(12*R*(1-V)+.5)
1250 LPRINT
1260 LPRINT"ANNUAL OPERATING EXPENSES :"
1270 LPRINT
1280 LPRINT"PROPERTY TAXES                  $";PT
1290 LPRINT"UTILITIES                       $";UT
1300 LPRINT"INSURANCE                       $";IS
1310 LPRINT"MAINTENANCE                     $";MT
1320 LPRINT"GARDENING                       $";GN
1330 LPRINT"MANAGEMENT                      $";MG
1340 LPRINT"PAYMENT ON FIRST MORTGAGE       $";INT(12*P1+.5)
1350 IFI$="NO" THEN 1370
1360 LPRINT"PAYMENT ON SECOND MORTGAGE      $";INT(12*P2+.5)
1370 LPRINT"TOTAL OPERATING EXPENSES        $";INT(OE+12*(P1+P2)+.5)
1380 LPRINT
1390 LPRINT"OPERATING CASH FLOW BEFORE TAXES  $";INT(RN-12*(P1+P2)+.5)
1400 LPRINT
1410 LPRINT"NOTE:YOUR GROSS MONTHLY INCOME (IGNORING VACANCIES) IS $";R
1420 LPRINT"    FIRST MORTGAGE MONTHLY PAYMENT IS                $";INT(P1+.5)
1430 IF I$="NO" THEN 1450
1440 LPRINT"    SECOND MORTGAGE MONTHLY PAYMENT IS               $";INT(P2+.5)
1450 LPRINT"    MONTHLY AVERAGE OF OTHER EXPENSES IS             $";INT(OE/12+
.5)
1460 LPRINT"    NET MONTHLY CASH FLOW (IGNORING VACANCIES) IS    $";INT(R-P1-P
2-OE/12+.5)
1470 LPRINT
1480 IF R<(P1+P2+OE/12) THEN LPRINT"NOTE THAT INCOME IS LESS THAN EXPENSES"
1490 LPRINT
1500 LPRINTTAB(10)"ANNUAL CASH FLOW - AFTER INCOME TAX"
1510 LPRINT
1520 LPRINT"NET ANNUAL INCOME                    $";INT(12*R*(1-V)+.5)
1530 LPRINT
1540 LPRINT"ANNUAL OPERATING EXPENSES            $";OE
1550 LPRINT"INTEREST EXPENSE, FIRST YEAR         $";INT(I3+I4+.5)
1560 LPRINT"ONE TIME EXPENSES, FIRST YEAR        $";OC
1570 LPRINT"DEPRECIATION, FIRST YEAR             $";INT(D1+.5)
1580 LPRINT"TOTAL DEDUCTIBLE EXPENSE             $";INT(OE+I3+I4+OC+D1+.5)
1590 LPRINT
1600 LPRINT"FIRST YEAR TAXABLE INCOME            $";INT(RN-I3-I4-OC-D1+.5)
1610 IF (R*12*(1-V))>(I3+I4+OE+OC+D1) THEN 1700
1620 LPRINT"OTHER INCOME SHELTERED BY            $";INT(I3+I4+OC+D1-RN+.5)
1625 LPRINT
1630 LPRINT"AT";100*T;"% TAX BRACKET, TAX BENEFIT IS $";INT(T*(I3+I4+OC+D1-RN)+.
5)
1640 LPRINT
1650 LPRINT"SPENDABLE CASH, INCLUDING SHELTER IS $";INT(RN-12*(P1+P2)+T*(I3+I4+O
C+D1-RN)+.5)
1660 GOTO1740
1700 LPRINT"FIRST YEAR TAX IS                    $";INT(T*(RN-I3-I4-OC-D1)+.5)
1710 LPRINT
1720 LPRINT"SPENDABLE CASH AFTER TAX IS          $";INT(RN-12*(P1+P2)-T*(RN-I3-I4-
OC-D1)+.5)
1740 LPRINT
1750 LPRINT"IN ADDITION TO THE ABOVE, THE MORTGAGE BALANCES HAVE BEEN REDUCED BY
    $";INT(12*(P1+P2)-I3-I4+.5)
1754 LPRINT
1755 LPRINT"DEPRECIATION METHOD USED WAS ";P$
```

```
1756 LPRINT"DEPRECIABLE BUILDING VALUE = $";BG;"WITH A";L;"YEAR LIFE"
1757 IF D<>1 THEN1760
1758 LPRINT"SALVAGE VALUE = $";SV
1760 LPRINT:LPRINT
1770 GOTO1000
2000 LPRINT"GROSS MULTIPLIER"
2010 LPRINTSTRING$(16,"-")
2020 LPRINT
2030 LPRINT"COST PRICE IS";INT(((PP+OC)/(12*R))*100+.5)/100;"TIMES ANNUAL GROSS.
     "
2040 LPRINT:LPRINT
2050 GOTO 1000
2300 LPRINT"FIRST YEAR YIELD"
2310 LPRINTSTRING$(16,"-")
2320 LPRINT
2330 LPRINT"TAKING INTO ACCOUNT SPENDABLE DOLLARS PLUS TAX"
2340 LPRINT"SHELTER, IF ANY, AND REDUCTION IN MORTGAGE PRINCIPAL,"
2350 LPRINT"YOUR GAIN AFTER INCOME TAX IS $";INT(RN-T*(RN-I3-I4-OC-D1)-I3-I4+.5)
2360 LPRINT"THIS REPRESENTS AN AFTER TAX YIELD ON AN INVESTMENT"
2370 LPRINT"OF $";PP+OC-F1-F2;"OF";INT(((RN-T*(RN-I3-I4-OC-D1)-I3-I4)/(PP+OC-F1-
     F2))*100+.5);"% FIRST YEAR."
2380 LPRINT"IF THE MORTGAGE REDUCTION IS EXCLUDED, THE FIRST"
2390 LPRINT"YEAR'S CASH YIELD IS";INT(((RN-12*(P1+P2)-T*(RN-I3-I4-OC-D1))/(PP+OC
     -F1-F2))*100+.5);"%."
2400 LPRINT
2410 LPRINT"NOTE: ONE TIME COSTS OF $";OC;"THE FIRST YEAR,"
2420 LPRINT"YIELDED A NON-RECURRING TAX BENEFIT OF $";T*OC
2430 LPRINT:LPRINT
2440 GOTO1000
2600 LPRINT"YIELD AFTER EVENTUAL SALE"
2610 LPRINTSTRING$(25,"-")
2620 LPRINT
2630 LPRINT"ASSUMPTIONS :"
2640 LPRINT"YOU BUY AT A TOTAL COST PRICE OF $";PP+OC;"AND"
2650 LPRINT"HOLD THE PROPERTY FOR";N;"YEARS. THE ";F$
2660 LPRINT"DEPRECIATION METHOD WAS USED WITH A USEFUL LIFE OF";L
2670 LPRINT"YEARS. THE AMOUNT TO BE DEPRECIATED IS $";BG;"."
2680 LPRINT"RATHER THAN USE A SINGLE VALUE FOR APPRECIATION, A"
2690 LPRINT"RANGE IS USED FOR SENSITIVITY ANALYSIS AS SHOWN BELOW."
2700 LPRINT:LPRINT
2710 LPRINT"RESULTS :":LPRINT
2720 G$="   ###      ###      ###      ###      ###"
2730 H$="$$##,###   $$##,###   $$##,###   $$##,###   $$##,###"
2740 LPRINT"ANNUAL APPRECIATION RATE(%) ";
2750 LPRINTTAB(30);
2760 LPRINT USING G$;A(1)*100,A(2)*100,A(3)*100,A(4)*100,A(5)*100
2770 LPRINT"ESTIMATED PROBABILITY(%)";
2780 LPRINTTAB(30);
2790 LPRINT USING G$;10,20,40,20,10
2795 LPRINT
2800 LPRINT"EXPECTED SALES PRICE";
2810 LPRINTTAB(30);
2820 FOR Q=1 TO 5
2830 SP(Q)=PP*(1+A(Q))[N
2840 NEXT Q
2850 LPRINT USING H$;SP(1),SP(2),SP(3),SP(4),SP(5)
2860 LPRINT"LESS SALES EXPENSE";
2870 LPRINTTAB(30);
2880 LPRINT USING H$;BR*SP(1),BR*SP(2),BR*SP(3),BR*SP(4),BR*SP(5)
2890 LPRINT"LESS FIRST MORTGAGE BALANCE";
2900 LPRINTTAB(30);
2910 LPRINT USING H$;B1,B1,B1,B1,B1
2920 IF I$="NO" THEN 2960
2930 LPRINT"LESS SECOND MORTGAGE BALANCE";
2940 LPRINTTAB(30);
2950 LPRINT USINGH$;B2,B2,B2,B2,B2
2960 LPRINT"NET CASH PROCEEDS FROM SALE";
2970 LPRINTTAB(30);
2980 FOR Q=1 TO5
2990 CP(Q)=SP(Q)*(1-BR)-B1-B2
3000 NEXT Q
3010 LPRINT USING H$;CP(1),CP(2),CP(3),CP(4),CP(5)
3020 LPRINT
3030 LPRINT"LONG TERM CAPITAL GAINS:"
3040 LPRINT"BEGINNING BOOK VALUE";
3050 LPRINTTAB(30);
3060 LPRINT USING H$;PP,PP,PP,PP,PP
3070 LPRINT"LESS ACCUMULATED DEPREC";
3080 LPRINTTAB(30);
3090 LPRINT USING H$;D2,D2,D2,D2,D2
3100 LPRINT"ENDING BOOK VALUE";
3110 LPRINTTAB(30);
3120 LPRINT USING H$;PP-D2,PP-D2,PP-D2,PP-D2,PP-D2
3130 LPRINT"TAXABLE GAIN ON SALE";
3140 LPRINTTAB(30);
3150 FOR Q=1 TO 5
3160 TG(Q)=SP(Q)*(1-BR)-(PP-D2)
```

48

```
3170 NEXT Q
3180 LPRINT USING H$;TG(1),TG(2),TG(3),TG(4),TG(5)
3190 LPRINT"40% LONG TERM CAP GNS TAX";
3200 LPRINTTAB(30);
3210 LPRINT USING H$;.4*TG(1)*T,.4*TG(2)*T,.4*TG(3)*T,.4*TG(4)*T,.4*TG(5)*T
3220 LPRINT:LPRINT:LPRINT
3230 'CALC OF EFFECT OF ANNUAL CASH FLOW ON YIELD
3240 SC(1)=RN-12*(P1+P2)-T*(RN-I3-I4-OC-D1)
3250 'SUBSEQ YRS EXCL T*OC. I3 & I4 REDUCE AN AV OF 10%.
3260 FOR Q=2 TO N
3270 SC(Q)=SC(1)-T*OC-.1*T*(I3+I4)
3290 NEXT Q
3310 SC=0
3320 FOR Q= 1 TON
3330 SC=SC+SC(Q)
3340 NEXTQ
3350 LPRINT"OVERALL YIELD:"
3360 LPRINT"CASH GAIN AFTER TAX (NOTE 1)";
3370 LPRINTTAB(30);
3380 FOR Q=1 TO5
3390 GP(Q)=CP(Q)-.4*TG(Q)*T
3400 NEXT Q
3410 LPRINT USING H$;GP(1),GP(2),GP(3),GP(4),GP(5)
3420 LPRINT"LESS ORIGINAL CASH OUTLAY";
3430 LPRINTTAB(30);
3440 Y=PP+OC-F1-P2
3450 LPRINT USING H$;Y,Y,Y,Y,Y
3460 LPRINT"NET GAIN AFTER TAX";
3470 LPRINTTAB(30);
3480 LPRINT USING H$;GP(1)-Y,GP(2)-Y,GP(3)-Y,GP(4)-Y,GP(5)-Y
3490 'CALC OF INTERNAL RATE OF RETURN
3500 FOR Q=1 TO 5
3510 GOSUB 7000
3520 YD(Q)=YD(Q)*100
3525 PRINT"YIELD NUMBER";Q;" = ";YD(Q);"%"
3530 NEXTQ
3540 LPRINT"INTERNAL RATE OF RETURN(%)";
3550 LPRINTTAB(30);
3560 LPRINT USING G$;YD(1),YD(2),YD(3),YD(4),YD(5)
3570 LPRINT:LPRINT
3580 LPRINT"EXPECTED YIELD = ";INT(YD(1)*.1+YD(2)*.2+YD(3)*.4+YD(4)*.2+YD(5)*.1+
    .5);"%."
3590 MU=(YD(1)+YD(2)+YD(3)+YD(4)+YD(5))/5
3600 LPRINT"MEAN OF YIELDS = ";INT(MU+.5);"%."
3610 LPRINT"STD DEVIATION OF YIELDS = ";INT(SQR(((YD(1)-MU)[2+(YD(2)-MU)[2+(YD(3
    )-MU)[2+(YD(4)-MU)[2+(YD(5)-MU)[2)/4)+.5);"%."
3620 LPRINT
3630 LPRINT"NOTES :"
3640 LPRINT"1.TAX WAS COMPUTED USING 40% LONG TERM CAPITAL GAINS RATE."
3650 LPRINT"THE REMAINING 60% NOT INCLUDED MAY BE SUBJECT TO MINIMUM"
3660 LPRINT"TAX. FOR THE CASES ANALYSED, THIS AMOUNT RANGES FROM"
3670 LPRINT"$";INT(.6*TG(1)+.5);"TO $";INT(.6*TG(5)+.5);"."
3680 LPRINT"2.THE EFFECT OF THE AFTER TAX ANNUAL CASH FLOW WAS"
3690 LPRINT"INCLUDED IN THE YIELD CALCULATION."
3710 LPRINT"THE INTEREST PORTION OF THE MORTGAGE PAYMENTS"
3720 LPRINT"WAS REDUCED 10% OVER THE PERIOD TO ALLOW FOR THE"
3730 LPRINT"TAX EFFECT. ON THIS BASIS, THE VALUE OF THE ANNUAL"
3740 LPRINT"AFTER TAX CASH FLOW IS $";INT(SC+.5)
3750 IF D=1 THEN 3850
3760 LPRINT"3.THE USE OF ACCELERATED DEPRECIATION MAY REQUIRE"
3770 LPRINT"PARTIAL CONVERSION TO ORDINARY INCOME. STRAIGHT LINE"
3780 LPRINT"DEPRECIATION WOULD HAVE AMOUNTED TO $";INT(D3+.5);"AFTER";N;"YEARS"
3790 LPRINT"WHEREAS ACCELERATED DEPRECIATION AMOUNTED TO $";INT(D2+.5)
3800 LPRINT"THE DIFFERENCE IS $";INT(D2-D3+.5);". SALVAGE VALUE = $";SV
3850 LPRINT:LPRINT
3860 GOTO1000
5000 'SUBROUTINE TO CALCULATE MORTGAGE UNKNOWNS
5005 I5=I1/12:I6=I2/12
5010 IF P1<>0 THEN5060
5020 IF Y1=0 THEN STOP
5040 P1=F1*((I5)/(1-(1/(1+I5)[(Y1*12))))
5060 IF I$="NO" THEN 5110
5070 IF P2<>0 THEN 5110
5080 IF Y2=0 THEN STOP
5100 P2=F2*((I6)/(1-(1/(1+I6)[(Y2*12))))
5110 I3=12*P1-((P1/I5)-F1)*((1+I5)[12-1)
5120 B1=F1-((P1/I5)-F1)*((1+I5)[(12*N)-1)
5130 IF I$="NO" THEN 5160
5140 I4=12*P2-((P2/I6)-F2)*((1+I6)[12-1)
5150 B2=F2-((P2/I6)-F2)*((1+I6)[(12*N)-1)
5160 RETURN
6000 'SUBROUTINE TO CALCULATE DEPRECIATION
6010 D2=0
6020 ON D GOTO 6030,6080,6160,6250
6030 F$="STRAIGHT LINE"
6040 D1=(BG-SV)/L
6050 D3=((BG-SV)/L)*N
```

```
6055 D2=D3
6060 RETURN
6080 F$="125% DECLINING BALANCE"
6090 FOR Q=1 TO N
6100 D(Q)=((BG-D2)/L)*1.25
6110 D2=D2+D(Q)
6120 NEXT Q
6130 D1=D(1)
6140 GOTO6050
6160 F$="150% DECLINING BALANCE"
6170 FOR Q=1 TON
6180 D(Q)=((BG-D2)/L)*1.5
6190 D2=D2+D(Q)
6200 NEXT Q
6210 D1=D(1)
6220 GOTO6050
6250 F$="200% DECLINING BALANCE"
6260 FOR Q= 1 TO N
6270 D(Q)=((BG-D2)/L)*2
6280 D2=D2+D(Q)
6290 NEXT Q
6300 D1=D(1)
6310 GOTO6050
7000 'SUBROUTIWHAT NUMBER?":V=V*P/W:B=STR$(V):B=MID$(B,2,6):INPUT"WHAT IS YOUR A
     NSWER. USE ONLY 5 DIGITS. DO NOT ROUND.";A
845  IFA=CTTHEN85ELSEIFA=BTHENPRINTCR;CM:PR=PR+L:GOSUB880ELSEPRINTCW;CM,B:GOSUB88
     0
850  NEXT:PRINT@256,C1;PR*2;C2:PRINTC3;CT;C4:GOSUB880
855  GOTO85
860  FORN=1TOL:V=RND(NU):W=RND(NY):CLS:PRINTN,V;" IS ";W;" PERCENT OF WHAT NUMBER
     ?":V=V*P/W:B=STR$(V):B=MID$(B,2,6):INPUT"WHAT IS YOUR ANSWER. USE ONLY 5 DI
     GITS. DON'T ROUND.";A:IFA=CTTHEN85
865  IFA=BTHEN PRINTCR;CM:PR=PR+L:GOSUB880ELSEPRINTCW;CM,B:GOSUB880
870  NEXTN:PRINT@256,C1;PR;C2:IFPR>=60THENOB(NA,6)=PR:GOSUB880ELSE800
875  GOTO85
880  FORO=0TOP:A="":A=INKEY$:IFA=""THENNEXTELSERETURN
885  IFT=0THENPRINT@233,"REMEMBER, PUSH 'ENTER'.":PRINT@297,CHR$(30):T=L:GOTO880:
     ELSEPRINT@297,"PUSH 'ENTER', PLEASE.   ";:T=0:GOTO880
890  A="":A=INKEY$:IFA=""THEN890ELSERETURN
895  CLS:PRINTCHR$(23):PRINT@532,"PERCENT I":GOSUB890
900  RETURN
905  REM
940  A="":A=INKEY$:IFA=""THEN905ELSE85
945  CLS:PRINT"WHAT'S YOUR CHOICE?":PRINT:PRINT"A STUDENT BY NAME","1":PRINT:PRIN
     T"ALL STUDENTS",,"2":PRINT:PRINT"RETURN TO STUDENT START","3":PRINT:PRINT"E
     RASE ALL OF S RECORD","4":INPUTI:ONIGOTO950,955,85,950
950  CLS:INPUT"WHICH STUDENT DO YOU WANT (LAST NAME COMMA FIRST NAME)";CN,CM
955  FORN=0TONB:IF(CN=CN(N))AND(CM=CM(N))OR(I=2)THENPRINTCN(N),CM(N),OB(N,0),OB(N
     ,1),OB(N,2),OB(N,3),OB(N,4),OB(N,5),OB(N,6),"NR TURNS    ";NT(N):U=(N+1)/5:V=
     INT(U):IFI=4THENCN(N)="":CM(N)="":NT(N)=0:FORM=0TO6:OB(N,M)=0:NEXTM:ELSEIFU
     =VTHENGOSUB890
960  NEXT:GOSUB890
965  GOTO945
970  CLS:INPUT"READY TO PRINT#";A:IFA<>CYTHEN85
975  PRINT#-1,CT,NB,NZ,NY,NX,NW,NV,NU
980  FORN=0TONBSTEP2
985  PRINT#-1,CN(N),CM(N),OB(N,0),OB(N,1),OB(N,2),OB(N,3),OB(N,4),OB(N,5),OB(N,6)
     ,NT(N),CN(N+1),CM(N+1),OB(N+1,0),OB(N+1,1),OB(N+1,2),OB(N+1,3),OB(N+1,4),OB
     (N+1,5),OB(N+1,6),NT(N+1)
990  NEXT
995  PRINT"ALL IS PRINTED.":GOSUB880
1000 GOTO85
```

ORDER BLANK: by G. Wagner

This computerized order blank system will make record-keeping a breeze for the small businessman. All types of sales data can be entered by keyboard with disk storage, providing quick access. An ideal choice for any mail order operation.
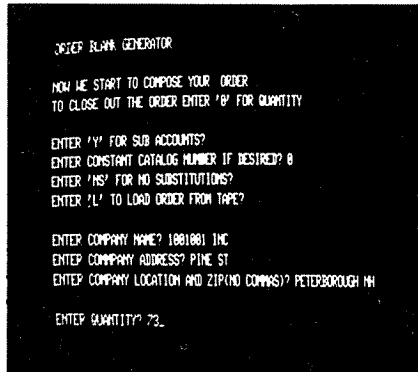

```
3 CLS : CLEAR 2000
5 DEFINT I,J,K,L,M,N,Q
7 DEFSTR A,C,D,F,O
9 DIM Q(50),CN(50),DS(50),UP(50),AC(50)
11 PRINT "ORDER BLANK GENERATOR": PRINT
12 PRINT "NOW WE START TO COMPOSE YOUR  ORDER
14 PRINT "TO CLOSE OUT THE ORDER ENTER '0' FOR QUANTITY
15 PRINT
16 INPUT "ENTER 'Y' FOR SUB ACCOUNTS";   AQ
17 INPUT "ENTER CONSTANT CATALOG NUMBER IF DESIRED";CC
18 DATA "GERALD W. WAGNER
19 DATA "1104 ASPEN DRIVE
20 DATA "TOMS RIVER, NJ 08753
30 READ A1,A2,A3
35 RESTORE
40 INPUT "ENTER 'NS' FOR NO SUBSTITUTIONS";AS
60 U$="### %           %%                         % $###.## $####.##
70 U4$="### %           %%                       %%% $###.## $####.##"
80 U1$="### %                   % $###.## $####.##"
90 U2$="   %                             %%%"
93 U3$=" $####.##"
95 INPUT "ENTER 'L' TO LOAD ORDER FROM TAPE";CD
97 IF CD="L" GOTO 1500
99 GOSUB 800
100 FOR I=J+1TO50
110 GOSUB 500 : IF Q(I)=0 GOTO 140
120 GOSUB 550
130 NEXT I
135 PRINT "STORAGE CAPACITY EXHAUSTED, NO NEW LINES
140 N=I-1 : GOSUB 600
150 IF D="" GOTO 157 ELSE GOTO 153
153 CD=D : D="" : GOTO 170
157 GOSUB 700
160 INPUT CD
170 IF CD="R" GOTO 250
180 IF CD="C" GOTO 360
190 IF CD="T" GOTO 450
200 IF CD="P" GOTO 1000
210 IF CD="E" END
220 IF CD="N" GOTO 3
222 IF CD="S" GOTO 1400
223 IF CD="L" GOTO 1500
225 IF CD="A" GOTO 480
227 IF CD="B" GOTO 1250
228 IF CD="D" GOTO 1300
229 IF CD="F" GOTO 430
230 PRINT "BAD CODE, TRY AGAIN" : GOTO  160
250 REM ORDER REVIEW ROUTINE
255 K=-9 : L=0
260 K=K+10 : L=L+10
270 IF K>N GOTO 150
280 IF L>N LET L=N
290 CLS : PRINT "QTY  CAT NO.";TAB(25) "DESCRIPTION";TAB(48) "COST EA COST TOT"
300 FOR I=KTOL
310 GOSUB 550
320 NEXT
340 INPUT "HIT ENTER TO CONTINUE";D
```

```
350 GOTO 260
360 REM LINE CHANGE ROUTINE
362 GOSUB 370 : GOSUB 500
364 PRINT "THIS IS CHANGED LINE"
366 GOSUB 550 : GOTO 450 :
370 REM LINE CHANGE SUBRT
380 INPUT "ENTER CATALOG NUMBER TO BE CHANGED/DELETED";CT
390 FOR I=1TON
400 IF CN(I)=CT GOTO 420
410 NEXT : PRINT "CATALOG NUMBER NOT FOUND ON ORDER" : GOTO 150
420 PRINT "THIS IS OLD LINE"
422 GOSUB 550
425 RETURN
430 REM FREE SPACE ROUTINE
433 PRINT "FREE STRING SPACE IS";FRE(A)
436 PRINT "THIS IS ";FRE(A)/2000*100;"% OF RESERVED SPACE"
438 GOTO 150
450 REM TOTALS REVIEW
460 GOSUB 600
470 GOTO 150
480 REM ADD TO ORDER ROUTINE
490 J=N : GOTO 100
500 REM SUBRT TO ACCEPT A LINE OF DATA  OR FIX A LINE
510 INPUT "ENTER QUANTITY";Q(I)
515 IF Q(I)=0 RETURN
520 INPUT "ENTER CATALOG NUMBER";CN(I)
525 IF CD<>"C" CN(I)=CC+CN(I)
527 IF RIGHT$(CN(I),4)="NCCN" INPUT "ENTER CAT. #, NO CC NO";CN(I)
530 INPUT "ENTER DESCRIPTION";DS(I)
540 INPUT "ENTER UNIT PRICE";UP(I)
541 IF AQ<>"Y" GOTO 545
542 INPUT "ENTER 2 CHAR SUB ACNT";AC(I)
545 RETURN
550 REM LINE PRINT SUBRT
560 IF AQ<>"Y" PRINT USING U$;Q(I),CN(I),DS(I),UP(I),Q(I)*UP(I)
570 IF AQ="Y" PRINT USING U4$;Q(I),CN(I),DS(I),AC(I),UP(I),Q(I)*UP(I)
590 RETURN
600 REM END OF ORDER SUBRT
601 ST=0 : NA=1 : AN(1)=AC(1) : J=0 :   S(1)=0
602 FOR I=1TON : IF AQ<>"Y" GOTO 610
603 FOR I3=1TONA
604 IF AC(I)=AN(I3) GOTO 605 ELSE 607
605 S(I3)=S(I3)+Q(I)*UP(I)
606 GOTO 610
607 NEXT I3 : NA=NA+1
608 S(NA)=Q(I)*UP(I)
609 AN(NA)=AC(I)
610 ST=ST+Q(I)*UP(I)
611 NEXT I
618 PRINT
620 PRINT "TOTAL NUMBER OF LINE ITEMS";  N
640 P=INT(ST)+2-ST  'EVEN $ ROUNDUP
645 T=ST+P
650 PRINT   "SUBTOTAL"; USING U3$;ST
660 PRINT   "POSTAGE "; USING U3$;P
670 PRINT   "TOTAL   "; USING U3$;T
672 IF AQ<>"Y" GOTO 690
673 PRINT "SUB ACNT TOTALS"
675 FOR I=1TONA
677 S(I)=S(I)+S(I)/ST*P
680 PRINT AN(I); TAB(8) USING U3$;S(I)
685 NEXT
686 IF CD="P" GOTO 690
687 INPUT "HIT ENTER TO CONTINUE";D
690 RETURN
700 REM MENU SUBRT
705 PRINT TAB(25) "MENU"
710 PRINT "ENTER 'R' TO REVIEW ORDER, 'T' TO REVIEW TOTALS
720 PRINT "ENTGR 'C' TO CHANGE, 'D' TO DELETE ANY LINE
730 PRINT "ENTER 'S' TO SAVE, 'L' TO LOAD ORDER TO/FROM TAPE
740 PRINT "ENTER 'P' TO PRINT THE ORDER
750 PRINT "ENTER 'E' TO END THE PROGRAM, 'N' TO START NEW ORDER
760 PRINT "ENTER 'A' TO ADD TO ORDER, 'B' TO CHANGE ADDRESSEE
770 PRINT "ENTER 'F' FOR FREE STRING SPACE"
780 RETURN
800 REM SUBRT TO ENTER COMPANY
810 PRINT
820 INPUT "ENTER COMPANY NAME";C1
830 INPUT "ENTER COMMPANY ADDRESS";C2
840 INPUT "ENTER COMPANY LOCATION AND ZIP(NO COMMAS)";C3
845 PRINT : RETURN
850 REM ADDRESSEE PRINT SUBRT
860 PRINT TAB(20) C1
870 PRINT TAB(20) C2
880 PRINT TAB(20) C3
890 RETURN
1000 REM ORDER PRINT ROUTINE
```

```
1002 GOSUB 600
1003 PRINT
1005 INPUT "READY PRINTER, HIT ENTER";D
1010 LPRINT TAB(10) "COMPUTERIZED ORDER
1013 GOSUB 1015 : GOSUB 1060 : GOTO 1100
1015 REM ADDRESSEE LABEL PRINT SUBRT
1020 LPRINT : LPRINT "TO:"
1030 LPRINT TAB(10) C1
1040 LPRINT TAB(10) C2
1050 LPRINT TAB(10) C3
1055 RETURN
1060 REM ORDERER LABEL PRINT SUBRT
1065 LPRINT : LPRINT TAB(5) "FROM:"
1070 LPRINT TAB(15) A1
1080 LPRINT TAB(15) A2
1090 LPRINT TAB(15) A3
1095 RETURN
1100 REM ORDER PRINT ROUTINE CONTINUED
1110 LPRINT
1113 IF AS="NS" LPRINT "NO SUBSTITUTIONS PLEASE"
1116 LPRINT
1120 LPRINT "QTY CATALOG NUMBER      UN COST TOT COST
1130 LPRINT "    DESCRIPTION
1140 LPRINT STRING$(39,"-")
1150 FOR I=1TON
1160 LPRINT USING U1$;Q(I),CN(I),UP(I),UP(I)*Q(I)
1170 LPRINT USING U2$;DS(I),AC(I)
1190 LPRINT STRING$(39,"-")
1200 LPRINT TAB(22) "SUBTOTAL"; USING U3$;ST
1210 LPRINT TAB(22) "POSTAGE "; USING U3$;P
1220 LPRINT TAB(22) "TOTAL   "; USING U3$;T
1221 IF AQ<>"Y" GOTO 1228
1222 LPRINT "SUB ACNT TOTALS"
1223 FOR I=1TONA
1224 LPRINT AN(I);"  " USING U3$; S(I)
1226 NEXT
1228 LPRINT : LPRINT
1229 LPRINT TAB(18) "CUT" : LPRINT STRING$(39,"-")
1230 LPRINT : LPRINT "SHIPPING LABEL" : LPRINT TAB(5) "TO:
1232 GOSUB 1070
1233 LPRINT : LPRINT STRING$(39,"-")
1234 GOSUB 1015
1236 FOR I1=1TO8 : LPRINT : NEXT
1238 PRINT
1240 GOTO 150
1250 REM ADDRESSEE REVIEW AND CHANGE
1260 GOSUB 850 : GOSUB 800 : GOTO 150
1300 REM LINE DELETE ROUTINE
1310 GOSUB 370 : M=I : N=N-1
1320 FOR I=MTON
1330 Q(I)=Q(I+1)
1340 CN(I)=CN(I+1)
1350 DS(I)=DS(I+1)
1360 UP(I)=UP(I+1)
1365 AC(I)=AC(I+1)
1370 NEXT : GOTO 150
1400 REM ROUTINE TO SAVE ORDER TO TAPE
1401 PRINT
1403 OUT 255,4
1405 INPUT "READY CASSETTE TO SAVE ORDER, PRESS RECORD, PRESS ENTER";D
1407 FOR I=1TO3000 : NEXT
1410 PRINT#-1,C1,C2,C3,N
1420 FOR I=1TON
1430 PRINT#-1,Q(I),CN(I),DS(I),UP(I),AC(I)
1440 NEXT : GOTO 150
1500 REM LOAD ORDER FROM TAPE ROUTINE
1505 PRINT
1507 OUT 255,4
1510 INPUT "READY TAPE, PRESS ENTER";D
1512 OUT 255,0
1515 INPUT "PRESS PLAY, PRESS ENTER";D
1520 INPUT#-1,C1,C2,C3,N
1530 FOR I=1TON
1540 INPUT#-1,Q(I),CN(I),DS(I),UP(I),AC(I)
1550 NEXT
1560 GOTO 150
```

MAIL LIST: by Chuck Ross

Keep your information flow-
ing in this handy program. Your
TRS-80 will become an elec-
tronic secretary, offering you
twelve program options. Choose
from such routines as search, lists
by city, state, name, zip code,
etc. Does everything but pay the
postage.


```
10  CLEAR 1000:CLS:DIM N1$(101),N2$(101),A$(101),C1$(101),C2$(101),C3$(101),PH$(1
    01),O$(101)
20  CLS:PRINT@ 25,"MAILING LIST"
30  PRINT"1    ENTER NAMES INTO LIST"
40  PRINT "2    SEARCH FOR ONE NAME"
50  PRINT"3    LIST ALL NAMES IN ONE CITY "
60  PRINT"4    LIST ALL NAMES WITH THE SAME OPTION LINE"
70  PRINT"5    LIST ALL NAMES WITH THE SAME CITY AND OPTION "
80  PRINT"6    LIST ALL NAMES WITH THE SAME ZIP CODE"
90  PRINT "7    LIST ALL NAMES IN LIST "
100 PRINT "8    ADD NEW NAMES TO THE LIST"
110 PRINT "9    MAKE CORRECTIONS"
120 PRINT"10    SAVE CURRENT FILE ON TAPE"
130 PRINT"11    INPUT A FILE FROM TAPE "
140 PRINT"12    TOTAL NUMBER OF NAMES ON LIST"
150 INPUT A:CLS: ON A GOTO 160,270,460,650,800,970,1130,1330,1470,1690,1760,1830
160 PRINT"ENTER ** FOR NAME AFTER LAST DATA ENTRY"
170 FOR R=1 TO 100
180 PRINT"#";R
190 INPUT"ENTER LAST NAME";N1$(R)
200 IF N1$(R)="**" GOTO 30
210 INPUT"ENTER FIRST NAME AND MIDDLE INITIAL";N2$(R)
220 INPUT"STREET ADDRESS";A$(R)
230 INPUT"ENTER CITY, STATE, ZIP CODE(EXP. TUCSON, AZ, 85730)";C1$(R),C2$(R),C3$
    (R)
240 INPUT"PHONE #";PH$(R)
250 INPUT"OPTION CODE";O$(R)
260 NEXT R
270 INPUT"DO YOU WANT THE RESULTS PRINTED ON VIDEO DISPLAY OR PRINTER";Q$:CLS
280 PRINT@30,"NAME TO BE SEARCHED"
290 PRINT@128,"LAST NAME";
300 INPUT N1$
310 PRINT @168,"FIRST NAME";
320 INPUT N2$
330 PRINT
340 FOR R=1 TO 100:IF (N1$=N1$(R)) AND(LEFT$(N2$,4)=LEFT$(N2$(R),4)) THEN 380
350 NEXT R
360 PRINT"NAME NOT FOUND IN LIST"
370 GOTO 30
380 PRINT N2$(R);" ";N1$(R)
385 IF LEFT$(Q$,1)="P" GOSUB1920:GOTO440
390 PRINT A$(R):PRINTC1$(R);" ";C2$(R);" ";C3$(R)
400 INPUT "DO YOU WANT THE PHONE #(YES OR NO)";Z1$
410 IF Z1$="YES" THEN PRINT PH$(R)
420 INPUT"DO YOU WANT THE OPTION CODE";Z2$
430 IF Z2$="YES" THEN PRINT O$(R)
440 INPUT"PRESS ENTER KEY TO RETURN TO COMMAND LIST";Z3$
450 GOTO 30
460 INPUT"DO YOU WANT THE LIST WITH OPTION CODE(YES OR NO)";Z1$
470 INPUT"DO YOU WANT THE LIST ON VIDEO OR PRINTER";Q$
480 INPUT"WHAT IS THE CITY NAME";C1$
490 PRINT
500 FOR R=1 TO 100
510 IF C1$=C1$(R) THEN 540
520 IF N1$(R)="***" THEN 620
530 GOTO 610
540 PRINT:IF LEFT$(Q$,1)="P" THEN GOSUB1920:GOTO610
```

```
550 PRINT N2$(R);" ";N1$(R)
560 PRINT A$(R)
570 PRINT C1$(R);" ";C2$(R);" ";C3$(R)
580 IF Z1$="YES" THEN PRINT O$(R)
590 PRINT
600 PRINT
610 NEXT R
620 PRINT
630 INPUT"PRESS ENTER KEY TO RETURN TO COMMAND LIST";Z3$
640 GOTO 30
650 INPUT "WHAT IS THE KEYWORD(OPTION CODE)";K$
660 INPUT"DO YOU WANT THE LIST ON VIDEO OR PRINTER";Q$
670 FOR R = 1 TO 100
680 IF O$(R)=K$ THEN 710
690 IF N1$(R)="**" THEN 780
700 GOTO760
710 PRINT:IF LEFT$(Q$,1)="P" THEN GOSUB1920:GOTO760
720 PRINT N2$(R);" ";N1$(R)
730 PRINT A$(R)
740 PRINT C1$;" ";C2$;" ";C3$(R)
750 PRINT:PRINT
760 NEXT R
770 PRINT
780 INPUT"PRESS ENTER KEY TO RETURN TO COMMAND LIST";Z3$
790 GOTO 30
800 INPUT"ENTER CITY NAME";C1$
810 INPUT"ENTER KEYWORD(OPTION CODE)";K$
820 INPUT"DO YOU WANT THE LIST ON VIDEO OR PRINTER";Q$
830 PRINT
840 FOR R=1 TO 100
850 IF N1$(R)="**" THEN 940
860 IF K$=O$(R) THEN 880
870 GOTO 930
880 IF C1$<>C1$(R) THEN 930
890 PRINT:IF LEFT$(Q$,1)="P" THEN GOSUB1920:GOTO930
900 PRINT N2$(R);" ";N1$(R)
910 PRINT A$(R)
920 PRINT C1$(R);" ";C2$(R);" ";C3$(R)
930 NEXT R
940 PRINT:PRINT
950 INPUT"PRESS ENTER KEY TO RETURN TO COMMAND LIST";Z3$
960 GOTO 30
970 INPUT"ENTER THE ZIP CODE";C3$
980 INPUT "DO YOU WANT LIST ON VIDEO OR PRINTER";Q$
990 PRINT
1000 FOR R=1 TO 100
1010 IF C3$=C3$(R) THEN 1040
1020 IF N1$(R)="**" THEN 1100
1030 GOTO1090
1040 PRINT:IF LEFT$(Q$,1)="P" THEN GOSUB 1920:GOTO 1090
1050 PRINT N2$(R);" ";N1$(R)
1060 PRINT A$(R)
1070 PRINT C1$(R);" ";C2$(R);" ";C3$(R)
1080 PRINT:PRINT
1090 NEXT R
1100 PRINT
1110 INPUT"PRESS ENTER KEY TO RETURN TO COMMAND LIST";Z3$
1120 GOTO 30
1130 INPUT"WANT LIST WITH OPTION CODE(YES OR NO)";Z1$
1140 INPUT"WANT LIST WITH PHONE #";Z2$
1150 INPUT "DO YOU WANT THE LIST ON VIDEO OR PRINTER";Q$
1160 FOR R= 1 TO 5
1170 PRINT
1180 NEXT R
1190 FOR R= 1 TO 100
1200 IF N1$(R)="**" THEN 1290
1210 IF LEFT$(Q$,1)="P" THEN GOSUB 1920:GOTO 1280
1220 PRINT N2$(R);" ";N1$(R)
1230 PRINT A$(R)
1240 PRINT C1$(R);" ";C2$(R);" ";C3$(R)
1250 IF Z1$="YES" THEN PRINT O$(R)
1260 IF Z2$="YES" THEN PRINT PH$(R)
1270 PRINT:PRINT:PRINT
1280 NEXT R
1290 FOR R=1 TO 5
1300 PRINT
1310 NEXT R
1320 GOTO 30
1330 INPUT"HOW MANY NAMES ARE IN THE LIST";A
1340 PRINT"TYPE ** AFTER THE LAST DATA ENTRY"
1350 PRINT
1360 FOR R=(A+1) TO 100
1370 PRINT"#";R
1380 INPUT"ENTER LAST NAME";N1$(R)
1390 IF N1$(R)="**" THEN 30
1400 INPUT"ENTER FIRST NAME AND MIDDLE INITIAL";N2$(R)
1410 INPUT"ADDRESS";A$(R)
```

```
1420 INPUT"CITY, STATE, ZIP CODE";C1$(R),C2$(R),C3$(R)
1430 INPUT"OPTION CODE";O$(R)
1440 INPUT"PHONE #";PH$(R)
1450 NEXT R
1460 GOTO 30
1470 INPUT"LAST NAME";N1$
1480 INPUT "FIRST NAME AND MIDDLE INITIAL";N2$
1490 FOR R=1 TO 100
1500 IF N1$(R)="**"THEN 1670
1510 IF (N1$=N1$(R)) AND (LEFT$(N2$,4)=LEFT$(N2$(R),4)) THEN 1560
1520 NEXT R
1530 PRINT "SORRY NAME NOT FOUND IN LIST"
1540 PRINT
1550 GOTO30
1560 INPUT"NEW LAST NAME";N1$(R)
1570 INPUT"NEW FIRST NAME AND MIDDLE INITIAL";N2$
1580 INPUT"ADDRESS";A$
1590 A$(R)=A$
1600 INPUT"CITY,STATE,ZIP CODE";C1$,C2$,C3$
1610 C1$(R)=C1$:C2$(R)=C2$:C3$(R)=C3$
1620 INPUT"OPTION CODE";O$
1630 O$(R)=O$
1640 INPUT "PHONE #";PH$
1650 PH$(R)=PH$
1660 PRINT"O. K."
1670 PRINT
1680 GOTO30
1690 INPUT"# OF NAMES IN LIST";YY
1700 INPUT"MAKE PREPARATIONS FOR CASSETTE, WHEN READY HIT ENTER";KK
1710 PRINT "SAVING LIST---"
1720 FOR R=1 TO YY
1730 PRINT#-1, R,N1$(R),N2$(R),A$(R),C1$(R),C2$(R),C3$(R),O$(R),PH$(R)
1740 NEXT R
1750 CLS:PRINT"LIST SAVED":GOTO30
1760 INPUT"SET CASSETTE TO PLAY.  WHEN READY TO LOAD LIST HIT ENTER";KK
1770 INPUT"ENTER THE # OF NAME IN THE LIST";YY
1780 PRINT"LIST LOADING----"
1790 FOR R=1 TO YY
1800 INPUT#-1, R, N1$(R),N2$(R),A$(R),C1$(R),C2$(R),C3$(R),O$(R),PH$(R)
1810 NEXT R
1820 CLS:PRINT"LIST LOADED":GOTO30
1830 PRINT
1840 R=0
1850 FOR E=1 TO 100
1860 IF N1$(E)="**" THEN 1890
1870 R=R+1
1880 NEXT E
1890 PRINT"THERE ARE ";R;" NAMES IN THE LIST"
1900 GOTO30
1910 END
1920 LPRINT" "
1930 LPRINT N2$(R);" ";N1$(R)
1940 LPRINT A$(R)
1950 LPRINTC1$(R);" ";C2$(R);" ";C3$(R)
1960 IFZ1$="YES" THEN LPRINT O$(R)
1970 IF Z2$="YES" THEN LPRINT PH$(R)
1980 LPRINT" ":RETURN
```

CUSTOM WRITING PROGRAM: by J.N. Adams

Make this program the foundation of your electronic word-processing system. Over ten processing formats are possible, including text editing, storage and hardcopy output.
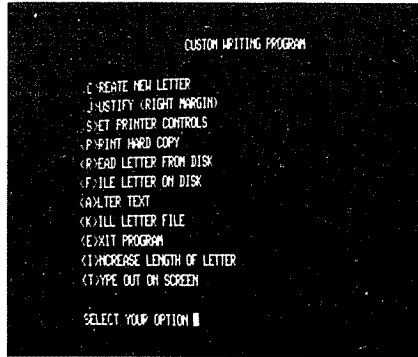

```
10 REM - LETTER WRITING PROGRAM -
40 CLEAR(4500):DEFINTH-O,P,S,Y,Z,E:DIMBB$(56):DIMC$(11)
50 FORI=1TO11:READC$(I):NEXTI
60 DATAC,J,S,P,R,F,A,K,E,I,T
70 TA=10
80 CLS:PRINT@18,"CUSTOM WRITING PROGRAM"
90 PRINT@128,"<C>REATE NEW LETTER":PRINT"<J>USTIFY (RIGHT MARGIN)":PRINT"<S>ET P
   RINTER CONTROLS":
   PRINT"<P>RINT HARD COPY"
100 PRINT"<R>EAD LETTER FROM DISK":PRINT"<F>ILE LETTER ON DISK":   PRINT"<A>LTE
    R TEXT":
    PRINT"<K>ILL LETTER FILE"
110 PRINT"<E>XIT PROGRAM":PRINT"<I>NCREASE LENGTH OF LETTER":PRINT"<T>YPE OUT ON
     SCREEN"
120 PRINT"":PRINT"SELECT YOUR OPTION";
130 GOSUB1280:I=1
140 IFC$(I)=A$THEN150:ELSEI=I+1:IFI<12THEN140ELSE130
150 ONIGOSUB380,550,290,1180,870,740,440,180,270,1310,1140
160 GOTO80
170 REM - KILL SUBROUTINE -
180 CLS:PRINT@18,"KILL LETTER FILE":PRINT""
190 PRINT"WHAT IS THE NAME OF THE FILE?";:O=8:I=0
200 GOSUB1040:NA$=B$(I)+"/TXT":PRINT"":PRINT"THE FILE NAME IS ";NA$:PRINT"":PRIN
    T"IS THIS THE CORRECT FILE (Y/N)?";
210 GOSUB1280:IFA$="Y"THEN250:ELSEIFA$="N"THEN190:ELSEIFA$="E"THENRETURN:ELSE210
220 PRINT"":PRINT"WHICH DRIVE IS IT ON (0 - 3)?";:GOSUB1280
230 IFVAL(A$)<0ORVALA$>3THEN220ELSENA$=NA$+":"+A$
240 PRINT:PRINT"TO KILL THIS FILE PRESS ENTER (E TO EXIT)";:GOSUB1280:IFA$="E"TH
    ENRETURNELSECLS:PRINT@276,"** KILLING FILE **"
250 KILLNA$:RETURN
260 REM - EXIT -
270 CLS:PRINT@276,"** RETURNING TO TRSDOS **":CMD"S"
280 REM - SET SUBROUTINE -
290 CLS:PRINT"CONTROLS NOW ARE:":PRINT"":PRINT"LINES PER PAGE........";PP:PRINT"
    CHARACTERS PER LINE...";OO:PRINT"TAB POSITION..........";TA:PRINT"":PRINT"H
    OW MANY LINES PER PAGE?";:O=2:I=0
300 GOSUB1040:IFB$(0)=""THEN320ELSEIFVAL(B$(0))>66ORVAL(B$(0))<6THENPRINT"?":GOT
    O300
310 PP=VAL(B$(0)):GOSUB360
320 PRINT"":PRINT"HOW MANY CHARACTERS PER LINE?";:O=3
330 GOSUB1040:IFB$(0)=""THEN340ELSEIFVAL(B$(0))>128ORVAL(B$(0))<1THENPRINT"?":

          GOTO330:ELSEOO=VAL(B$(0))
340 RETURN
350 REM - TOP OF PAGE -
360 TP=INT((PP-NN)/2):RETURN
370 REM - CREATE SUBROUTINE -
380 FL=1:II=0:GOSUB290:CLS:PRINT"ENTER LETTER:":O=OO:I=0
390 II=II+1:PRINTUSING"##. ";II;:FORR=1TOOO:PRINT"-";:NEXTR:GOSUB1300:P=P-OO-1:P
    RINT@P,"";:GOSUB1040:BB$(II)=B$(I):NN=II:GOSUB360
400 IFII>55THENFL=0:RETURN
410 IFBB$(II)="END"THENII=II-1:NN=II:FL=0:GOSUB360:RETURN
420 GOTO390
430 REM - ALTER SUBROUTINE -
440 IFNN<1THENRETURN
450 CLS:PRINT"WHICH LINE DO YOU WANT TO CHANGE? (1 TO ";NN;")";:O=2:I=0:GOSUB104
    0
```

57

```
460 IFB$(I)="E"THEN RETURN
470 NU=VAL(B$(I)):IFNU<1ORNU>NNTHEN450
480 PRINT"LINE ";NU;" READS:":PRINTBB$(NU):PRINT:PRINT"IS THIS THE CORRECT LINE?
    (Y/N) ";:GOSUB1280:IFA$="N"THEN450
490 PRINT"":PRINT"DO YOU WANT TO RETYPE THIS LINE? (Y/N)";:GOSUB1280:IFA$="Y"THE
    N 500:ELSEIFA$="N"THEN450:ELSE480
500 PRINT:PRINTBB$(NU):PRINT"ENTER NEW LINE ";NU:O=OO:I=0:GOSUB1040:BB$(NU)=B$(0
    )
510 PRINT"":PRINT"LINE ";NU;" NOW READS:":PRINTBB$(NU):PRINT"":PRINT"IS THIS COR
    RECT (Y/N)?";
520 GOSUB1280:PRINT"":IFA$="Y"THEN450
530 GOTO500
540 REM - JUSTIFY SUBROUTINE -
550 IFNN<1THENRETURN
560 CLS:PRINT"DO YOU WANT TO RIGHT JUSTIFY THIS LETTER? (Y/N)";:GOSUB1280:PRINT"
    "
570 IFA$="N"THENRETURN
580 IFOO<1THENGOSUB290:CLS
590 FORII=1TONN:PRINTUSING"###.";II;:PRINT" ";BB$(II):PRINT"          ";:FORI=1TOOO:P
    RINT"-";:NEXTI:PRINT
600 PRINT"DO YOU WISH TO RIGHT JUSTIFY THIS LINE? (Y/N)";:GOSUB1280:PRINT"":IFA$
    ="N"THEN710
610 JU=OO-LEN(BB$(II)):YY=0:IFJU>INT(LEN(BB$(II))*.16)THENPRINT"":PRINT"** SHOR
    T LINE ***":GOTO710
620 IFJU<1THEN680
630 LN=LEN(BB$(II))
640 FORX=LNTO1STEP-1
650 IFMID$(BB$(II),X,1)=CHR$(32)THEN BB$(II)=LEFT$(BB$(II),X)+" "+RIGHT$(BB$(II)
    ,((LN-X)+YY)):JU=JU-1:YY=YY+1:IFJU<1THEN680
660 NEXTX
670 IF JU<>0THEN630
680 PRINT"THE LINE NOW READS:":PRINTUSING"###.";II;:PRINT" ";BB$(II)
690 PRINT"TO CONTINUE PRESS >ENTER< ";:GOSUB1280
700 PRINT""
710 NEXTII
720 RETURN
730 REM - FILE SUBROUTINE -
740 IFNN<1THENRETURNELSE:CLS:PRINT"WHAT DO YOU WANT TO CALL THIS LETTER?";:O=8:I
    =0:GOSUB1040
750 NA$=B$(I)+"/TXT":PRINT:PRINT"THE FILE NAME WILL BE ";NA$
760 PRINT"":PRINT"IS THIS ALRIGHT? ";:
770 GOSUB1280:IFA$="N"THEN740ELSEIFA$="E"THENRETURN
780 PRINT"":PRINT"ON WHICH DRIVE DO YOU WANT TO FILE (0-3)?";:
790 GOSUB1280:NA$=NA$+":"+A$
800 PRINT"":PRINT"TO WRITE THE FILE PRESS ENTER (TO EXIT PRESS E)";:
810 GOSUB1280:IFA$="E"THENRETURN
820 CLS:PRINT@276,"** WRITING DISK **":OPEN"O",1,NA$
830 PRINT#1,PP;",";NN;",";TP;",";OO
840 FORX=1TONN:PRINT#1,BB$(X):NEXTX
850 CLOSE:RETURN
860 REM - READ SUBROUTINE -
870 CLS:PRINT@18,"READ LETTER FROM DISK":PRINT""
880 PRINT"ENTER NAME OF LETTER ";:O=8:I=0:GOSUB1040
890 NA$=B$(I)+"/TXT"
900 PRINT"":PRINT"ON WHICH DRIVE IS THE FILE (0-3)?";:
910 GOSUB1280:NA$=NA$+":"+A$
920 PRINT"":PRINT"THE FILE NAME IS ";NA$:PRINT"":PRINT"WHEN READY PRESS >ENTER<"
    ;:GOSUB1280:PRINT"":PRINT"** READING DISK **"
930 IFA$="E"THENRETURN
940 OPEN"I",1,NA$:INPUT#1,PP,NN,TP,OO
950 FORX=1TONN:INPUT#1,BB$(X):NEXTX
960 CLOSE:GOSUB1140:RETURN
970 REM - SINGLE KEY ENTRY -
980 A$=""
990 PRINT@P,CHR$(143);:L=1
1000 A$=INKEY$:IFA$<>""THENPRINT@P,A$;:RETURN
1010 L=L+1:IFL<16THEN1000
1020 PRINT@P," ";:FORL=1TO10:NEXT:GOTO990
1030 REM - MULT KEY ENTRY -
1040 PRINTCHR$(14);:B$(I)=""
1050 A$=INKEY$:IFA$=""THEN1050
1060 IFFL=1THENIFASC(A$)=44THEN1050
1070 IFA$=CHR$(13)THENPRINTCHR$(15):RETURN
1080 IFA$=CHR$(8)THENIFB$(I)<>""THENPRINTA$;:B$(I)=LEFT$(B$(I),LEN(B$(I))-1): GO
    TO1050:ELSEGOTO1050
1090 IFA$=CHR$(24)THENPRINTCHR$(29);STRING$(P,CHR$(25));CHR$(30);:GOTO1040
1100 IFASC(A$)<320RASC(A$)>90THEN1050
1110 IFLEN(B$(I))=0THEN1050
1120 PRINTA$;:B$(I)=B$(I)+A$:GOTO1050
1130 REM - TYPE SUBROUTINE -
1140 IFOO<1ORNN<1THENRETURN
1150 CLS:PRINT"THE LETTER NOW READS:"
1160 FORII=1TONN:PRINTUSING"###.";II;:PRINT" ";BB$(II):FORX=1TO250:NEXTX:NEXTII:
    PRINT"": PRINT"PRESS ENTER TO CONTINUE:";:GOSUB1280:RETURN
1170 REM - PRINT SUBROUTINE -
1180 IFNN<1THENRETURN
1190 CLS:PRINT"THE PRESENT TAB SETTING IS ";TA;", IS THIS OK? (Y/N)";
```

```
1200 GOSUB1280:IFA$="Y"THEN1230
1210 PRINT"":PRINT"WHAT IS THE TAB POSITION?";:O=2:I=0
1220 GOSUB1040:IFVAL(B$(0))<0ORVAL(B$(0))>64THENPRINT"?":GOTO1220:ELSETA=VAL(B$(
     0))
1230 PRINT"":PRINT"PRESS ENTER TO CONTINUE, E TO EXIT";:GOSUB1280:PRINT"":IFA$="
     E"THEN RETURN
1240 POKE16424,PP:IFPEEK(14312)>127THENPRINT"** PRINTER NOT READY **":GOTO1230
1250 LPRINTSTRING$(TP,138)
1260 OP=PP-(TP+NN)
1270 FORII=1TONN:LPRINTTAB(TA)BB$(II):NEXTII:LPRINTSTRING$(OP,138):RETURN
1280 GOSUB1300:GOSUB980:RETURN
1290 REM - LOCATE CURSOR -
1300 P=(256*PEEK(16417)+PEEK(16416))-15359:RETURN
1310 IFNN<1THENRETURNELSECLS:PRINT"ENTER ADDITIONAL LINES:":  II=NN:O=OO:I=0:GOS
     UB390:RETURN
```

INVENTORY: by Don Allen

This program provides a tape storage routine useful for inventory control in a home and business furnishing company. Single line, full page or selected line printouts are available. Slight modification will make this program suitable for any type of small business.
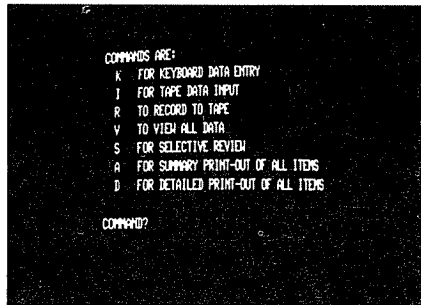

```
10 CLS:PRINTTAB(21)"** INVENTORY **"
30 PRINT"THIS PROGRAM PROVIDES A TAPE STORAGE INVENTORY ROUTINE WHICH"
40 PRINT"CAN BE USED FOR HOME OR SMALL BUSINESS FURNISHINGS/EQUIPMENT."
50 PRINT"SIMPLE REVISIONS IN HEADINGS AND NOMENCLATURE WILL ENABLE ITS"
60 PRINT"USE FOR OTHER TYPES OF INVENTORIES, ACTIVITY LOGS, OR DIARIES."
70 PRINT"SUGGESTIONS AND DETAILS FOR CONVERTING THE PROGRAM TO OTHER"
80 PRINT"USES ARE LISTED WITHIN ACCOMPANYING PROGRAM NOTES.":PRINT
90 PRINT"THE PROGRAM PERMITS SELECTION OF PRINT-OUT OF: (1) A SINGLE"
100 PRINT"LINE ITEM; (2) A FULL SCREEN 'PAGE'; (3) A SORTED SELECTION OF"
110 PRINT"LINE ITEMS; OR (4) ALL LINE ITEMS IN DETAILED OR SUMMARY FORM."
120 PRINT"INSTRUCTIONS FOR SELECTING OPTIONS ARE LISTED IN PROGRAM."
130 PRINT"PRESS ENTER TO CONTINUE:"
140 A$=INKEY$:IFA$=""THEN140
150 CLS:PRINT@192,"TO KEEP MEMORY IF 'BREAK' OCCURS, USE ''GOTO 220''."
160 PRINT:PRINT"ENSURE THAT PRINTER IS ON-LINE WHEN REQUESTING PRINT-OUT.":PRINT
    :PRINT"PRESS ENTER TO START:"
170 A$=INKEY$:IFA$=""THEN170
180 CLS:CLEAR6800:DIMN(3,65),A$(4,65)
190 E1$="   ####":F1$="   #####"
200 T$(1)="LINE":T$(2)="LOC":T$(3)="ID #":T$(4)="$ VAL":T$(5)="ITEM NAME"
210 T$(6)="CONDITION":T$(7)="DETAILS"
220 CLS:W1=0:Q1=0:X1=0:P1=0:CT$="KIRVSAD"
230 J=0:PRINT:PRINT"COMMANDS ARE:":PRINT"  K   FOR KEYBOARD DATA ENTRY"
240 PRINT"  I   FOR TAPE DATA INPUT":PRINT"  R   TO RECORD TO TAPE"
250 PRINT"  V   TO VIEW ALL DATA ":PRINT"  S   FOR SELECTIVE REVIEW"
260 PRINT"  A   FOR SUMMARY PRINT-OUT OF ALL ITEMS"
270 PRINT"  D   FOR DETAILED PRINT-OUT OF ALL ITEMS"
280 PRINT:PRINT"COMMAND?"
290 C$=INKEY$:IFC$=""THEN290
```

```
300 CLS:FOR J=1 TO LEN(CT$)
310 IF C$=MID$(CT$,J,1)THEN 350
320 NEXTJ
330 PRINT"WHAT?"
340 GOTO230
350 ON J GOTO  360,540,830,640,1220,1400,1400
360 PRINT"ENTER DATA:":PRINT
370 PRINT"LAST ITEM LISTED IS";P:INPUT"ENTER NEXT #";N(1,P):CLS
380 PRINT"LOCATIONS ARE CODED AS:":PRINT"LR = LIVING ROOM     DR = DINING ROOM"
390 PRINT"KI = KITCHEN        1B = BEDROOM # 1"
400 PRINT"BA = BATHROOM       2B = BEDROOM # 2"
410 PRINT"GA = GARAGE         3B = BEDROOM # 3"
420 PRINT:INPUT"WHERE LOCATED";A$(1,P)
430 CLS:INPUT"IDENTIFICATION # ATTACHED TO ITEM (LAST 4 DIGITS)";N(2,P):PRINT
440 INPUT"DOLLAR VALUE (WHOLE DOLLAR)";N(3,P):PRINT
450 INPUT"ITEM NAME";A$(2,P):PRINT
460 INPUT"CONDITION (EXCEL, GOOD, FAIR, OR POOR)";A$(3,P):PRINT
470 INPUT"DETAILS (INCLUDE DATE ACQUIRED)";A$(4,P):PRINT
480 P=P+1
490 IFP>65PRINT"MEMORY FULL --- SAVE DATA ON TAPE AND RUN PROGRAM FOR NEW DATA."
    :GOTO230
500 PRINT"FOR MORE ENTRIES, TYPE ''M'';  FOR INDEX, TYPE ''I''."
510 A$=INKEY$:IFA$=""THEN510
520 CLS:IFA$="M"THEN360
530 GOTO220
540 PRINT"PUT INVENTORY DATA TAPE IN RECORDER AND PRESS ''PLAY'';"
550 PRINT:PRINT"PRESS ''ENTER'' TO INPUT DATA."
560 A$=INKEY$:IFA$=""THEN560
570 PRINT:PRINT"PLEASE STANDBY WHILE I COPY TAPE:":PRINT
580 INPUT#-1,P
590 FOR J=0 TO P-1
600 INPUT#-1,N(1,J),A$(1,J),N(2,J),N(3,J),A$(2,J),A$(3,J),A$(4,J)
610 NEXTJ
620 INPUT"TAPE HAS BEEN COPIED - - PRESS 'ENTER' FOR INDEX:";A$
630 CLS:GOTO220
640 IFP>0GOTO680
650 PRINT@192,"NOTHING IN FILE;  PRESS ENTER TO CONTINUE."
660 A$=INKEY$:IFA$=""THEN660
670 GOTO220
680 GOSUB 970
690 FOR J=0TOP-1
700 GOSUB990:W1=W1+N(3,J):X1=X1+1:P1=P1+1:IFX1<10GOTO800
710 IF X1=10X1=0:Q1=Q1+W1:PRINT"PAGE VAL.=$";W1;" ;TOT.VAL.=$";Q1;" **":A$="":W1
    =0
720 PRINT"SELECT: N=NEXT PAGE;  P=PRINT;  D=DETAILS;  C=REVISE;  I=INDEX."
730 A$=INKEY$:IFA$=""THEN730
740 IFA$="I"THEN220
750 IFA$="D"INPUT"TYPE AND ENTER ITEM #";J:J=J-1:Q1=0:W1=0:X1=10:P1=P:GOSUB970:G
    OSUB990:GOSUB1010:A$=N"
760 IFA$="P"GOSUB1630:A$="N"
770 IFA$="C"INPUT"TYPE AND ENTER ITEM #";J:T=P:P=J-1:GOTO1020
780 IFP>P1CLS:GOSUB970:GOTO800
790 IFA$="N"GOTO220
800 IFP>P1NEXTJELSEX1=10:GOTO710
810 X1=10:GOTO720
820 CLS:GOTO230
830 IFP>0GOTO850
840 GOTO650
850 PRINT"PUT TAPE TO RECEIVE DATA IN RECORDER: SET RECORDER TO RECORD;."
860 PRINT:PRINT"PRESS 'ENTER' TO START RECORDING.":PRINT
870 A$=INKEY$:IFA$=""THEN870
880 PRINT:PRINT"STANDBY WHILE I RECORD DATA.":GOTO900
890 PRINT"STANDBY:":R1=P:P=P-1:FORJ=PTOP:GOTO250
900 PRINT#-1,P:FORJ=0TOP-1
910 PRINT#-1,N(1,J),A$(1,J),N(2,J),N(3,J),A$(2,J),A$(3,J),A$(4,J)
920 NEXTJ
930 IFR1<>0THENP=R1
940 PRINT"RECORDING IS COMPLETE;  PRESS ENTER TO CONTINUE."
950 A$=INKEY$:IFA$=""THEN950
960 CLS:GOTO220
970 CLS:PRINTTS(1);TAB(6)T$(2);TAB(12)T$(3);TAB(19)T$(4);TAB(26)T$(5);TAB(54)T$(
    6)
980 PRINTSTRING$(62,"-"):RETURN
990 PRINTN(1,J);TAB(6)A$(1,J);:PRINTUSING E1$;N(2,J);:PRINTUSING F1$;N(3,J);
1000 PRINTTAB(26)A$(2,J);TAB(54)A$(3,J):RETURN
1010 W1=N(3,J):PRINT:PRINT"DETAILS:";A$(4,J):RETURN
1020 CLS:PRINT"TO DELETE ALL DATA FOR THIS ENTRY, TYPE ''X'' FOR NEXT INPUT;"
1030 PRINT:PRINT"FOR REVISIONS, IF DATA IS CORRECT, JUST PRESS ENTER;"
1040 PRINT"IF NOT, TYPE AND ENTER REVISED DATA.":PRINT
1050 PRINT"ITEM # IS ";J
1060 PRINT"LOCATED IN :";A$(1,P);:INPUT":      CHANGE";C1$
1070 IFC1$="X"THEN1690
1080 IFC1$<>""A$(1,P)=C1$:C1$=""
1100 PRINT"ITEM ID # :";N(2,P);:INPUT":      CHANGE";N(2,P)
1110 PRINT"VALUE IS :";N(3,P);:INPUT":      CHANGE";N(3,P)
1120 PRINT"ITEM NAME :";A$(2,P);:INPUT":      CHANGE";C3$
1130 IFC3$<>""A$(2,P)=C3$:C3$=""
```

```
1150 PRINT"CONDITION IS :";A$(3,P);:INPUT":       CHANGE";C4$
1160 IFC4$=""C4$=A$(3,P)
1170 A$(3,P)=C4$
1180 PRINT"DETAILS: ";A$(4,P);:INPUT":       CHANGE";C5$
1190 IFC5$<>""A$(4,P)=C5$:C5$=""
1210 J=P:P=T:GOSUB970:GOSUB990:GOSUB1010:X1=10:Q1=0:P1=P:GOTO710
1220 IFP>0GOTO1240
1230 GOTO650
1240 PRINT"SELECT FOR REVIEW: 1=LIV.ROOM  2=DIN.ROOM  3=KITCHEN  4=BATH"
1250 PRINT"5=BEDROOM #1  6=BEDROOM #2  7=BEDROOM #3  8=GARAGE  9=ITEM #."
1260 INPUT"TYPE AND ENTER #:";Z
1270 IFZ<1ORZ>9PRINT"REDO":GOTO1240
1280 IFZ=9A$="D":GOTO750
1290 GOSUB970
1300 ONZGOTO1310,1320,1330,1340,1350,1360,1370,1380
1310 FORJ=0TOP-1:IFA$(1,J)="LR"GOSUB990:GOSUB1500
1315 NEXT:X1=10:GOTO1520
1320 FORJ=0TOP-1:IFA$(1,J)="DR"GOSUB990:GOSUB1500
1325 NEXT:X1=10:GOTO1520
1330 FORJ=0TOP-1:IFA$(1,J)="KI"GOSUB990:GOSUB1500
1335 NEXT:X1=10:GOTO1520
1340 FORJ=0TOP-1:IFA$(1,J)="BA"GOSUB990:GOSUB1500
1345 NEXT:X1=10:GOTO1520
1350 FORJ=0TOP-1:IFA$(1,J)="1B"GOSUB990:GOSUB1500
1355 NEXT:X1=10:GOTO1520
1360 FORJ=0TOP-1:IFA$(1,J)="2B"GOSUB990:GOSUB1500
1365 NEXT:X1=10:GOTO1520
1370 FORJ=0TOP-1:IFA$(1,J)="3B"GOSUB990:GOSUB1500
1375 NEXT:X1=10:GOTO1520
1380 FORJ=0TOP-1:IFA$(1,J)="GA"GOSUB990:GOSUB1500
1385 NEXT:X1=10:GOTO1520
1390 GOTO220
1400 IFP>0THEN1420
1410 GOTO650
1420 CLS:PRINT@520,"PRINTING --- PLEASE WAIT:"
1430 LPRINTT$(1);TAB(6)T$(2);TAB(12)T$(3);TAB(19)T$(4);TAB(26)T$(5);TAB(54)T$(6)
1440 LPRINTSTRING$(62,"-")
1450 FORJ=0TOP-1
1460 LPRINTN(1,J);TAB(6)A$(1,J);:LPRINTUSING E1$;N(2,J);:LPRINTUSING F1$;N(3,J);
1470 LPRINTTAB(26)A$(2,J);TAB(54)A$(3,J):W1=W1+N(3,J)
1480 IFC$="D"LPRINTT$(7);":";A$(4,J):LPRINT
1490 NEXT:LPRINT:LPRINT"TOTAL VALUE = $";W1:GOTO220
1500 W1=W1+N(3,J):X1=X1+1:IFJ=P-1X1=10:GOTO1520
1510 IFX1<10RETURN
1520 IFX1=10X1=0:Q1=Q1+W1:PRINT"PAGE VAL.=$";W1;"   ";TOT.VAL.=$";Q1;"   **":W1=0
1530 PRINT"SELECT: N=NEXT PAGE;  P=PRINT;  D=DETAILS;  C=REVISE;  I=INDEX."
1540 A$=INKEY$:IFA$=""THEN1540
1550 IFA$="I"THEN220
1560 IFA$="P"GOSUB1630:A$="N"
1570 IFA$="D"INPUT"TYPE AND ENTER ITEM #";J:J=J-1:Q1=0:X1=10:GOSUB970:GOSUB990:G
     OSUB1010:J=P-1:GOTO1520
1580 IFA$="C"INPUT"TYPE AND ENTER ITEM #";J:T=P:P=J-1:GOTO1020
1590 IFP-1>JCLS:GOSUB970:GOTO1610
1600 IFA$="N"GOTO220
1610 IFP-1>JTHENRETURNELSEX1=10:GOTO1520
1620 GOTO220
1630 Z1=896:S1=15360:E1=16383:PRINT@Z1,"PATIENCE PLEASE"
1640 FORA1=S1TOE1:B1=PEEK(A1)
1650 IFB1=42N1=0:LPRINTCHR$(13):RETURN
1660 LPRINTCHR$(B1);:N1=N1+1
1670 IFN1=64Z1=Z1+2:PRINT@896,STRING$(50," "):PRINT@Z1,"PATIENCE PLEASE";:LPRINT
     CHR$(13):N1=0
1680 NEXTA1:RETURN
1690 CLS:J=J-1:FORX=JTOT:A$(1,X)=A$(1,X+1):A$(2,X)=A$(2,X+1)
1700 A$(3,X)=A$(3,X+1):A$(4,X)=A$(4,X+1):N(2,X)=N(2,X+1):N(3,X)=N(3,X+1)
1710 NEXTX:P=T-1:GOTO220
```

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CONTRACTOR: by C.J. Stinson

This program will be a valuable aid in cost estimation for the busy private contractor. Hard copy output requires a line printer.

```
25 CLS:PRINT"CONTRACTOR COST ESTIMATING"
30 CLEAR100:INPUT"READY LINE PRINTER - PRESS ENTER";B$
35 CLS:IF PEEK(14312)<=127 GOTO50
40 PRINT@906,"*** LINE PRINTER NOT READY ***";
44 FORI=1TO200:NEXT:GOTO35
50 CLS
52 E$="$$##,###.##":F$="##,###.##"
100 PRINT:D=D+1:INPUT"JOB NAME";A$
110  INPUT"NUMBER OF INSTALLATIONS";Q
120  GOSUB1800
130  GOSUB2500
150  INPUT"OVERHEAD (% OF DIRECT LABOR)";C
155  O=C/100
160  INPUT"PROFIT (% OF JOB COST)";Z
170  P=Z/100
190  INPUT"PRESS 'ENTER' TO DISPLAY RESULTS";B$
200 B=Q*M:K=Q*L:J=H*Q:V=(L+H)*O
310 W=V*Q:R=(B+K+J+W)*P:X=R/Q:S=B+K+J+R+W:T=S/Q
380 GOSUB3000
400  INPUT"TO MAKE ANOTHER RUN PRESS 'ENTER'";B$
410 CLS:GOTO50
1800  REM
1810  INPUT"DO YOU NEED TO ITEMIZE MATERIAL COSTS (Y/N)";B$
1820 IFB$="N"THEN1850
1822 IFB$<>"Y"THEN1810
1825 LPRINT" ":LPRINT"mATERIAL COST";
1830  GOSUB2000:M=C:RETURN
1850  INPUT"MATERIAL COST PER UNIT";M:RETURN
2000 CLS:C=0:LPRINTTAB(48)"ESTIMATE # ";
2130 LPRINT"    ITEM";TAB(20)"COST";TAB(32)"QUANTITY";TAB(52)"EXTENDED"
2170 PRINT@0,"ENTER  ITEM,COST,QUANTITY"," ","          ";
2180 PRINT@28,"";: INPUTB$,A,G:E=A*G
2200  IF A=0 THEN2300
2210 LPRINTLEFT$(B$,16);TAB(16)USINGF$;A;:LPRINTTAB(38)G;TAB(48)USINGF$;E
2220 C=C+E:GOTO2170
2300 LPRINTTAB(32)"TOTAL";TAB(46)USINGE$;C:LPRINT" "
2310  INPUT"PRESS 'ENTER' TO CONTINUE COST ESTIMATE";B$
2320 CLS:RETURN
2500  REM
2510  INPUT"DO YOU NEED TO ITEMIZE SHOP LABOR (Y/N)";B$
2520 IFB$="N"THEN2570
2521 IFB$<>"Y"THEN2510
2522 LPRINT" ":LPRINT"SHOP LABOR";
2525  GOSUB2000
2530  L=C:GOTO2600
2570  INPUT"SHOP LABOR PER UNIT";L
2600  INPUT"DO YOU NEED TO ITEMIZE ON-SITE LABOR (Y/N)";B$
2610 IFB$="N"THEN2670
2612 IFB$<>"Y"THEN2600
2615 LPRINT" ":LPRINT"ON-SITE LABOR";
2620  GOSUB2000
2630  H=C:RETURN
2670  INPUT"ON-SITE LABOR PER UNIT";H:RETURN
3000 LPRINT" "
3010 LPRINT"JOB NAME";TAB(10)A$;TAB(40)"ESTIMATE # ";D
3020 LPRINT"ESTIMATE PARAMETERS","PER UNIT","EXTENDED"
3030 LPRINT:LPRINT"NUMBER OF INSTALLATIONS"," ",Q
```

```
3040 LPRINT"MATERIAL COST";:LPRINTTAB(30)USINGF$;M;:LPRINTTAB(46)USINGF$;B
3050 LPRINT"SHOP LABOR COST";:LPRINTTAB(30)USINGF$;L;:LPRINTTAB(46)USINGF$;K
3060 LPRINT"ON-SITE LABOR COST";:LPRINTTAB(30)USINGF$;H;:LPRINTTAB(46)USINGF$;J
3070 LPRINT"OVERHEAD","(";C;"%)";:LPRINTTAB(30)USINGF$;V;:LPRINTTAB(46)USINGF$;W
3080 LPRINT"PROFIT","(";Z;"%)";:LPRINTTAB(30)USINGF$;X;:LPRINTTAB(46)USINGF$;R
3090 LPRINT" ":LPRINT"JOB PRICE";:LPRINTTAB(28)USINGE$;T;:LPRINTTAB(44)USINGE$;S
     :LPRINT
3100 RETURN
```

ROUGH LUMBER LIST: by D. Brickner

Accurately estimate rough lumber requirements for building with the Lumber List program. An excellent adjunct to the small contractor's or do-it-yourselfer's bag of tricks.


```
10 CLEAR 200:DEFINT G-K:DEFSTR A-E,L-R,Y:IT=12:B="FT":C="IN":D="T"
20  Y="Y":N="N":BL=" ":E(0)=BL:E(1)=BL:Q="???":A=BL:BT=B:O="(":P=")":BS="/"
25 SJ=.35:LW=" LENGTHS":LF="1ST FLR ":LG="2ND FLR "
30 CLS:PRINT@78,"ROUGH LUMBER LIST PROGRAM REV 0.0"
40 PRINT"":PRINT"NAME (";A;P;:INPUT A
45 PRINT"NUMBER OF STORIES (";JS;P;:INPUT JS
50 XY=S1:M="LENGTH IS":R="LENGTH ":GOSUB950:S1=XY
60 XY=S2:M="WIDTH IS":R="WIDTH ":GOSUB950:S2=XY
70 M="BASEMENT ":JT=J4:GOSUB930:J4=JT:IF J4=0 J5=1:GOTO90
80 M="CONCRETE FLOOR ":JT=J5:GOSUB930:J5=JT:IF J5=0 J6=0:GOTO110
90 IF S1=S2 J6=1:GOTO110
100 M="FLOOR JOISTS RUN LENGTHWISE ":JT=J6:GOSUB930:J6=JT
110 M="TRUSS ROOF ":JT=J9:GOSUB930:J9=JT:IF J9=1 JA=0:GOTO130
120 M="INCLUDE TRUSS MATERIALS ":JT=JA:GOSUB930:JA=JT:IF JA=1 J7=0:S8=0:GOTO210
130 IF S8=0 ST=0:SU=0:GOTO150
140 G=ST/IT:I=ST-G*IT+.5:M="ROOF PITCH IS"+STR$(G)+BL+B+STR$(I)+BL+C+BS
150 XY=SU:R="ROOF PITCH (RISE/RUN) ":GOSUB950:IF LEN(L)=0 GOTO190
160 BT=BS:GOSUB900:BT=B:IF J=0 PRINTQ:GOTO150
170 L=MID$(L,J+1):GOSUB900:IF J=0 PRINTQ:GOTO150
180 ST=XY:GOSUB990:SU=XY:S8=ST/SU
190 IF S1=S2 THEN J7=0:GOTO210
200 M="RAFTERS RUN LENGTHWISE ":JT=J7:GOSUB930:J7=JT
210 LX=LF:X1=SB:X2=SC:X3=SD:GOSUB250:SB=X1:SC=X2:SD=X3:IF JS<2 GOTO290
220 LX=LG:X1=SE:X2=SF:X3=SG:GOSUB250:SE=X1:SF=X2:SG=X3:GOTO290
250 M=LX+"EXT. *MASONRY*"+LW:XX=X1:GOSUB800:X1=XX
260 M=LX+"EXT. *FRAME*"+LW:XX=X2:GOSUB800:X2=XX
270 M=LX+"*INTERIOR*"+LW:XX=X3:GOSUB800:X3=XX:RETURN
290 XY=SH:M="EAVE OVERHANG IS":R="EAVE OVERHANG ":GOSUB 950:SH=XY
300 XY=SI:M="GABLE OVERHANG IS":R="GABLE OVERHANG ":GOSUB 950:SI=XY
310 M="COST TO BE CALCULATED ":JT=JK:GOSUB930:JK=JT:IF JK=1 SJ=.35:GOTO380
320 M="COST FIGURE OF MERIT "
330 IF SJ=0 GOTO360
340 PRINT"CURRENT ";M;"IS"
350 PRINT USING"$$###.##";SJ;:PRINT" PER BOARD FOOT"
360 PRINT M;:L="":INPUT L:IF LEN(L)<>0 SJ=VAL(L)
380 M="REVIEW INPUT":E(0)=BL:JT=0:GOSUB930:IF JT=1 GOTO395
390 E(0)=Y:E(1)=N:GOTO40
```

```
395 CLS:PRINT"ROUGH LUMBER LIST FOR: ";A:PRINT STRING$(64,"*");
400 A0="2X":B0="4X":C0="2":D0="4":E0="6":O0="8":P0="10":R0="12"
402 A1="FOUNDATION GRD RWS4S":B1="CONSTRUCTION GRADE"
404 C1="STANDARD OR BETTER":D1="INT 5/8 PLYSCORD"
406 E1="CLEAR":O1="EXT 1/2 PLYSCORD":P1="1ST FLR "
408 R1="MUD SILLS ":A2="JOISTS":B2="BLK & BOX"
410 C2="SHEATHING":D2="FIRRING":E2="WALL STUDS":O2="SHOE"
412 P2="DBL PLATE":R2="HEADERS":A3="TRUSS ":B3="CHORD"
414 C3="WEB":D3="ATTIC ":E3="CEILING ":O3="BEAMS"
416 P3="ROOF ":R3="OVERHANG ":A4="STUD":B4="2ND FLR "
418 X1=240:X2=16:X3=.6/SJ:X4=16:X5=.65/SJ:X6=.35/SJ
420 X7=16:X8=.62/SJ:X9=16:XA=.96/SJ:XB=16:XP=.999:XZ=24
460 PRINT@128,"PIECES";TAB(9)"SIZE";TAB(15)"LENGTH";TAB(24)"DESCRIPTION";TAB(46)
    "USE"
465 M=P1:KL=0:SM=SB:SN=SC:SO=SD
470 PRINTSTRING$(64,"*");:WS=1.1:FB=0:IF J5=0 GOTO710
480 KT=2*WS*(S1+S2)/IT+XP:L0=B1:L1=A0+E0:L2=STR$(KT):L3=A1:L4=R1:GOSUB 1000
490 L1=A0+O0:L2=" 6":L4=R1+"ON PIER":GOSUB1000:FB=FB+(KT+8)*X3+XP
510 KF=1:IF J6=0 U=S1:V=S2:GOTO530
520 U=S2:V=S1
530 IF U/KF>X1 THEN U=U+24:KF=KF+1:GOTO530
540 KT=INT(U/KF/XZ+XP)*2:K=WS*V*KF/X2+XP:L0=STR$(K):L1=A0+P0
550 L2=STR$(KT):L3=B1:L4=M+A2:GOSUB1000:FB=FB+K*KT*1.67+XP
600 XT=V*(KF+2)+U*2:K=XT/X1+XP:KT=INT(XT/K/XZ+XP)*2
610 L0=STR$(K):L2=STR$(KT):L4=M+B2:GOSUB1000
620 FB=FB+K*KT*1.67+XP:K=(WS*S1*S2/4608)+XP:L0=STR$(K):L1=B0+O0
630 L2=BL:L3=D1:L4=M+C2:GOSUB1000:FB=FB+K*20*X5+XP:IF KL<>0 GOTO710
640 K=V/X1+XP:KT=INT(V/K/XZ+XP)*2:K=K*(KF-1):L0=STR$(K):L1=B0+O0
650 L2=STR$(KT):L3=B1:L4=M+O3:GOSUB1000:FB=FB+K*KT*2+XP
710 L2=A4:L3=C1:IF SM<=0 GOTO740
720 K=WS*SM*(1/X4+.02083)+XP:L0=STR$(K):L1=A0+C0:L4=M+D2
730 GOSUB1000:FB=FB+K*2.67*X6+XP
740 K=WS*(SN+SO)*(1/X7+.02083)+XP:L0=STR$(K):L1=A0+D0:L4=M+E2
750 GOSUB1000:FB=FB+K*5.33*X6+XP
760 KT=WS*(SM+SN+SO)/IT+XP:L0=BL:L2=STR$(KT):L3=B1:L4=M+O2:GOSUB1000
770 FB=FB+KT*.667:L2=STR$(KT*2):L4=M+P2:GOSUB1000:FB=FB+KT*2*.667
780 KT=WS*(SM+SN)/XZ+XP:L1=B0+R0:L2=STR$(KT):L4=M+R2:GOSUB1000:FB=FB+KT*4
790 IF KL=0 AND JS=2 KL=1:M=B4:SM=SE:SN=SF:SO=SG:GOTO510
795 GOTO1200
800 IF XX=0 GOTO820
810 F=XX/IT:I=XX-F*IT+.5:PRINT"SUM OF ";M;" IS";F;B;I;C
820 PRINT M;:L="":INPUT L:IF LEN(L)=0 RETURN
830 IF L="Z" XX=0:GOTO810
840 GOSUB900:IF J=0 PRINTQ:GOTO820
850 XX=XX+VAL(L)²IT+VAL(MID$(L,J+2)):GOTO820
900 FOR J=1 TO LEN(L)-LEN(BT)+1
910 IF BT=MID$(L,J,LEN(BT)) RETURN
920 NEXT J:J=0:RETURN
930 PRINTM;O;E(JT);P;:L="":INPUT L:IF LEN(L)=0 RETURN
932 IF L=Y THEN JT=0:RETURN
935 IF L=N THEN JT=1:RETURN
940 PRINT Q:GOTO930
950 IF XY=0 GOTO970
960 G=XY/IT:I=XY-G*IT+.5:PRINTM;G;B;I;C
970 L="":PRINTR;:INPUT L:IF LEN(L)=0 RETURN
980 GOSUB900:IF J=0 PRINTQ:GOTO970
990 XY=VAL(L)*IT+VAL(MID$(L,J+2)):RETURN
1000 PRINTL0;TAB(9)L1;TAB(16)L2;TAB(24)L3;TAB(45)L4:RETURN
1200 IF J7=0 U=S1:V=S2:GOTO1220
1210 U=S2:V=S1
1220 XH=S8*U/2:XY=(U/2+SH)/COS(ATN(S8)):XW=V+2*SI
1222 IF XH=0 GOTO1235
1225 KT=((XH+6)/XZ+.74):KT=KT*2:K=WS*U/X7+XP:L0=STR$(K):L1=A0+D0
1230 L2=STR$(KT):L3=B1:L4=D3+A4+"S":GOSUB1000:FB=FB+K*KT*.667+XP
1234 KQ=WS*V/X9+XP
1235 IF J9=1 GOSUB1500:GOTO1250
1240 IF JA=0 THEN GOSUB1700
1250 KT=WS*2*XY*XW/4608+XP:L0=STR$(KT):L1=B0+O0:L2=BL:L3=O1
1260 L4=P3+C2:GOSUB1000:FB=FB+KT*16*X8+XP:IF SH=0 GOTO1305
1270 XT=2*SH*KQ:K=XT/X1+XP:KT=INT(WS*XT/K/XZ+XP)*2:L0=STR$(K):L1=A0+D0
1280 L2=STR$(KT):L3=C1:L4=P3+R3+"BOX":GOSUB1000:FB=FB+K*KT*.66*X6+XP
1290 KT=WS*2*SH*V/4608+XP:L0=STR$(KT):L1=B0+O0:L2=BL
1300 L3=O1:L4=R3:GOSUB1000:FB=FB+KT*16*X8+XP
1305 IF JK=1 GOTO1320
1310 FB=FB*SJ:PRINT"TOTAL COST IS ";:PRINTUSING"$$#######.##";FB
1320 M="DO YOU WISH TO REPEAT THE PROGRAM ":E(0)=BL:JT=0
1340 GOSUB930:IF JT=1 THEN END
1350 E(0)=Y:E(1)=N:GOTO30
1500 KF=1:IF J7=0 U=S1:V=S2:GOTO1530
1510 U=S2:V=S1
1530 IF U/KF>X1 THEN U=U+24:KF=KF+1:GOTO1530
1540 KT=INT(U/KF/XZ+XP)*2:K=INT(WS*V/X9+XP)*KF+XP:L0=STR$(K)
1550 L1=A0+E0:L2=STR$(KT):L3=B1:L4=E3+A2:GOSUB1000:FB=FB+K*KT
1560 XT=V*(KF+2):K=XT/X1+XP:KT=INT(XT/K/XZ+XP)*2:L0=STR$(K)
1570 L2=STR$(KT):L4=E3+B2:GOSUB1000:FB=FB+K*KT:KT=INT(XY/XZ+XP)*2
1580 L0=STR$(2*KQ+4):L2=STR$(KT):L4=P3+"RAFTERS":GOSUB1000::FB=FB+(2*KQ+4)*KT
```

```
1590 KT=INT(U/3/XZ+XP)*2:LØ=STR$(KQ):L2=STR$(KT):L4="COLLAR "+O3
1600 GOSUB1000:FB=PB+KQ*KT:XT=V+2*SI:K=XT/336+XP
1610 KT=INT(XT/K/XZ+XP)*2:LØ=STR$(K):L1=AØ+OØ:L2=STR$(KT):L3=E1
1620 L4="RIDGE "+O3:GOSUB1000:FB=PB+K*KT*1.33*XA+XP:RETURN
1700 XT=U/2:KF=XT/96+XP:WV=XT/KF
1710 KT=INT(U/XZ+XP)*2:LØ=STR$(KQ):L1=AØ+DØ:L2=STR$(KT):L3=B1
1720 L4=A3+"LOWER "+B3:GOSUB1000:FB=PB+KQ*KT*.66+XP
1730 KT=INT(XY/XZ+XP)*2:LØ=STR$(KQ*2+4):L2=STR$(KT):L4=A3+"UPPER "+B3
1740 GOSUB1000:FB=PB+(KQ*2+4)*KT*1.33+XP:XT=XH+6:K=96/XT+XP
1750 KT=INT(XT*K/XZ+XP)*2:K=KQ/K+XP:LØ=STR$(K):L2=STR$(KT)
1760 L4=A3+"KING POST":GOSUB1000:FB=PB+KQ/K*KT*.66+XP:JI=1
1770 IF JI>=KP RETURN
1780 XT=WV*S8*JI+6:K=96/XT+XP:KT=INT(XT*K/XZ+XP)*2:K=2*INT(KQ/K+XP)
1790 LØ=STR$(K):L2=STR$(KT):L4=A3+"VERT "+C3:GOSUB1000
1800 FB=PB+K*KT*.66+XP:XT=WV*S8*JI:XT=SQR(XT*XT+WV*WV)+6
1810 K=96/XT+XP:KT=INT(XT*K/XZ+XP)*2:K=2*INT(KQ/K+XP)
1820 LØ=STR$(K):L2=STR$(KT):L4=A3+"SLANT "+C3:GOSUB1000
1830 FB=PB+K*KT*.66+XP:JI=JI+1:GOTO1770
```

SURVEYOR'S PROGRAM: by William Datson

Balance any traverse by the compass rule method with this quick program. If interior angles and one bearing are known, plug values in and let your TRS-80 make the calculations. A time saver for the professional surveyor.
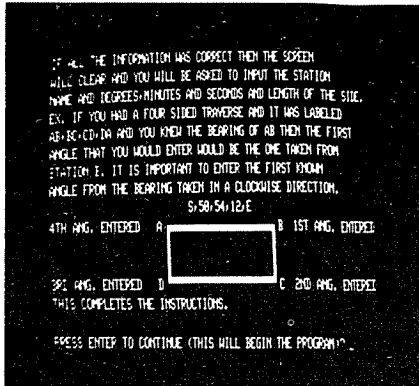

```
4 CLS
5 PRINT@24,"TRAVERSE BALANCE":FORX=1TO1000:NEXT
10 CLS:INPUT"DO YOU WISH INSTRUCTIONS (Y OR N)";IN$:IFIN$="Y"THENGOSUB10000ELSE2
    0
15 D=0:M=0:S=0
20 CLS:INPUT"HOW MANY ANGLES";N
25 INPUT"WHAT DIRECTION (R OR L)";DZ$
27 INPUT"WHAT IS THE KNOWN BEARING";C$,E,F,G,D$
29 INPUT"IS ALL INFORMATION CORRECT (Y OR N)";Q$
30 CLS:IFQ$="N"THEN20ELSE31
31 FORX=1TON
40 INPUT"INPUT STATION NAME AND D,M,S";A$,A,B,C:A$(X)=A$:A(X)=A:B(X)=B:C(X)=C:IN
    PUT"LENGTH";L(X)
50 D=D+A:M=M+B:S=S+C
60 IFS>60THENGOSUB200
70 IFM>60THENGOSUB300
80 NEXTX
81 INPUT"IS ALL INFORMATION CORRECT ( Y OR N )";Q$
82 IFQ$="N"THENGOTO22000
85 CLS
100 PRINT"THE TOTAL OF THE INTERIOR ANGLES IS"
110 PRINTD;"DEGREES";M;"MINUTES";S;"SECONDS"
120 CO=180*(N-2)
130 GOSUB2000
140 GOTO3000
200 S=S-60:M=M+1:RETURN
300 M=M-60:D=D+1:RETURN
2000 MC=60
```

```
2020 IFD<COTHEN2030ELSE2060
2030 IFS>0THENS=60-S:MC=59:CO=CO-1
2040 IFM>0THENM=MC-M:CO=CO-1
2050 D=CO-D
2060 IFD=COTHEN2070ELSE2080
2070 D=0:GOTO2190
2080 PRINT"THE CORRECTION IS"
2090 PRINTD;"DEGREES";M;"MINUTES";S;"SECONDS"
2100 PRINT"THE CORRECTED ANGLES ARE"
2110 PRINT"ANGLE","DEGREES","MINUTES","SECONDS"
2120 FORX=1TON
2130 IFS>0THENC(X)=C(X)+(S/N)
2140 IFM>0THENB(X)=B(X)+(M/N)
2150 IFD>0THENA(X)=A(X)+(D/N)
2160 PRINTA$(X),A(X),B(X),C(X)
2170 NEXTX
2180 RETURN
2190 PRINT"THE CORRECTION IS"
2191 PRINTD;"DEGREES";M;"MINUTES";S;"SECONDS"
2192 PRINT"THE CORRECTED ANGLES ARE"
2200 PRINT"ANGLE","DEGREES","MINUTES","SECONDS"
2210 FORX=1TON
2220 IFS>0THENC(X)=C(X)-(S/N)
2230 IFM>0THENB(X)=B(X)-(M/N)
2240 IFD>0THENA(X)=A(X)-(D/N)
2250 PRINTA$(X),A(X),B(X),C(X)
2260 NEXTX
2270 RETURN
3000 IFDZ$="L"THEN11000ELSE3010
3010 INPUT"PRESS ENTER TO CONTINUE";N$
3015 CLS
3020 CB$=C$+D$:GOSUB20000
3030 FORX=1TON
3050 E=E+180
3060 IFE>=360THENE=E-360
3080 GOSUB4000
3090 GOSUB5000
3100 GOSUB6000
3110 IFX=NTHENGOTO8000ELSENEXT
3120 END
4000 IFG+C(X)>60THEN4010ELSE4020
4010 G=G+C(X):G=G-60:F=F+1:GOTO4030
4020 G=G+C(X)
4030 IFF+B(X)>60THEN4040ELSE4060
4040 F=F+B(X):F=F-60:E=E+1
4050 E=E+A(X)
4052 IFE>=360THENE=E-360
4053 RETURN
4060 F=F+B(X):E=E+A(X)
4061 IFE>=360THENE=E-360
4062 RETURN
5000 IFE>=0ANDE<90THENE$="N":F$="E":RETURN
5010 IFE=90ANDF>0THENE$="S":F$="E":RETURN
5020 IFE=90ANDF=0ANDG=0THENE$="N":F$="E":RETURN
5030 IFE>90ANDE<180THENE$="S":F$="E":RETURN
5040 IFE=180ANDF>0THENE$="S":F$="W":RETURN
5050 IFE=180ANDF=0ANDG=0THENE$="S":F$="E":RETURN
5060 IFE>180ANDE<270THENE$="S":F$="W":RETURN
5070 IFE=270ANDF>0THENE$="N":F$="W":RETURN
5080 IFE=270ANDF=0ANDG=0THENE$="S":F$="W":RETURN
5090 IFE>270ANDE<360THENE$="N":F$="W":RETURN
5100 IFE=360ANDF>0THENE$="N":F$="E":RETURN
5110 IFE=360ANDF=0ANDG=0THENE$="N":F$="E":RETURN
6000 H=E:I=F:J=G:IFE>=0ANDE<=90THENE=E:F=F:GOTO6060
6010 IFE>90ANDE<180THENGOTO7000
6020 IFE>=180ANDE<270THENGOTO7020
6030 IFE>=270ANDE<=360THENGOTO7040
6060 E$(X)=E$:E(X)=E:F(X)=F:G(X)=G:F$(X)=F$
6070 E=H:F=I:G=J
6080 RETURN
7000 E=180-E:IFF>0THENE=E-1:F=60-F
7010 GOTO6060
7020 E=E-180
7030 GOTO6060
7040 IFE=360THENE=0:F=F:GOTO6060
7050 IFE<360ANDF>0THENE=360-E:E=E-1:F=60-F:GOTO6060
8000 FORX=1TON
8010 B$(X)=A$(X)+A$(X+1)
8020 IFX<NTHENNEXTELSEB$(X)=A$(X)+A$(1)
9010 FORX=1TON:PRINT"THE BEARING OF ";B$(X);" IS ";E$(X);E(X);F(X);G(X);F$(X):NE
     XTX
9040 FORX=1TON:Z(X)=E(X):Y(X)=F(X):X(X)=G(X):NEXTX
9060 FORX=1TON:X(X)=X(X)/60:Y(X)=Y(X)+X(X):Y(X)=Y(X)/60:Z(X)=Z(X)+Y(X):Z(X)=Z(X)
     *.0174533:LA(X)=L(X)*COS(Z(X)):DE(X)=L(X)*SIN(Z(X)):NEXT
9150 FORX=1TON
9160 IFE$(X)="S"ANDLA(X)>0THENLA(X)=LA(X)*-1ELSELA(X)=LA(X)
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9170 IFF$(X)="W"ANDDE(X)>0THENDE(X)=DE(X)*-1ELSEDE(X)=DE(X)
9180 IFE$(X)="N"ANDLA(X)<0THENLA(X)=LA(X)*-1ELSELA(X)=LA(X)
9190 IFF$(X)="E"ANDDE(X)<0THENDE(X)=DE(X)*-1ELSEDE(X)=DE(X)
9200 NEXTX
9205 INPUT"PRESS ENTER TO CONTINUE";Q$
9210 PRINTTAB(12)"UNADJUSTED";TAB(36)"ADJUSTED"
9211 PRINTTAB(0)"COURSE";TAB(12)"LAT";TAB(24)"DEP";TAB(36)"LAT";TAB(48)"DEP"
9240 FORX=1TON:LC=LC+LA(X):DC=DC+DE(X):NEXT
9250 IFLC<0ANDDC>0THENLC=LC*-1:DC=DC*-1:GOTO9300
9260 IFLC<0ANDDC<0THENLC=LC*-1:DC=DC*-1:GOTO9300
9270 IFLC<0ANDDC<0THENLC=LC*-1:DC=DC*-1:GOTO9300
9280 IFLC<0ANDDC<0THENLC=LC*-1:DC=DC*-1:GOTO9300
9300 FORX=1TON:CL=CL+L(X):NEXT
9340 FORX=1TON:LI(X)=LA(X):DI(X)=DE(X):NEXT
9350 FORX=1TON:C(X)=(LC/CL)*L(X):NEXT
9390 FORX=1TON:D(X)=(DC/CL)*L(X):NEXT
9410 FORX=1TON:DE(X)=DE(X)+D(X):NEXT
9420 FORX=1TON:LA(X)=LA(X)+C(X):NEXT
9440 FORX=1TON:PRINTTAB(2)B$(X);TAB(12)LI(X);TAB(24)DI(X);TAB(36)LA(X);TAB(48)DE
     (X):NEXT
9445 PRINT
9450 FORX=1TON:GH=GH+LA(X):HG=HG+DE(X):NEXT
9455 FORX=1TON:HN=HN+LI(X):NH=NH+DI(X):NEXT
9460 PRINTTAB(0)"TOTAL";TAB(12)HN;TAB(24)NH;TAB(36)GH#;TAB(48)HG#
9465 GOSUB21000
9470 INPUT"DO YOU HAVE MORE CALCULATIONS";Q$
9480 IFQ$="Y"THEN10ELSEEND
10000 CLS:PRINT"    THIS PROGRAM WILL BALANCE BY COMPASS RULE ANY"
10010 PRINT"TRAVERSE AS LONG AS ALL INTERIOR ANGLES AND ONE "
10020 PRINT"BEARING ARE KNOWN. YOU WILL BE PROMPTED TO ENTER THE"
10030 PRINT"NUMBER OF INTERIOR ANGLES, WHETHER THE INTERIOR ANGLES"
10040 PRINT"ARE RIGHT OR LEFT ( R OR L ) AND WHAT THE KNOWN BEARING"
10050 PRINT"IS. THE NUMBER OF INTERIOR ANGLES SHOULD BE GIVEN AS A"
10060 PRINT"NUMBER BETWEEN THREE AND ONE HUNDRED. THE DIRECTION OF"
10070 PRINT"THE INTERIOR ANGLES SHOULD BE ENTERED AS EITHER AN R FOR"
10080 PRINT"ANGLES TAKEN IN A CLOCKWISE DIRECTION OR L FOR ANGLES"
10090 PRINT"TAKEN IN A COUNTERCLOCKWISE DIRECTION. THE KNOWN "
10100 PRINT"BEARING SHOULD BE ENTERED AS   EX. S,50,54,12,E. AFTER"
10110 PRINT"ALL THIS INFORMATION IS ENTERED YOU WILL BE ASKED IF IT"
10120 PRINT"IS  CORRECT. IF IT IS THEN TYPE A Y, IF IT IS NOT CORRECT"
10130 PRINT"THEN TYPE AN N."
10140 INPUT"PRESS ENTER TO CONTINUE";Q$
10150 CLS:PRINT"IF ALL THE INFORMATION WAS CORRECT THEN THE SCREEN"
10160 PRINT"WILL CLEAR AND YOU WILL BE ASKED TO INPUT THE STATION "
10170 PRINT"NAME AND DEGREES,MINUTES AND SECONDS AND LENGTH OF THE SIDE."
10180 PRINT"EX. IF YOU HAD A FOUR SIDED TRAVERSE AND IT WAS LABELED"
10190 PRINT"AB,BC,CD,DA AND YOU KNEW THE BEARING OF AB THEN THE FIRST"
10200 PRINT"ANGLE THAT YOU WOULD ENTER WOULD BE THE ONE TAKEN FROM"
10210 PRINT"STATION B. IT IS IMPORTANT TO ENTER THE FIRST KNOWN "
10220 PRINT"ANGLE FROM THE BEARING TAKEN IN A CLOCKWISE DIRECTION."
10230 FORX=42TO82:Y=28:SET(X,Y):NEXT:FORY=28TO36:X=82:SET(X,Y):NEXT:FORX=82TO42S
     TEP-1:Y=36:SET(X,Y):NEXT:FORY=36TO28STEP-1:X=42:SET(X,Y):NEXT
10240 PRINT@537,"S,50,54,12,E";:PRINT@595,"A";:PRINT@618,"B";:PRINT@787,"D";:PRI
     NT@810,"C";:PRINT@621,"1ST ANG. ENTERED";:PRINT@813,"2ND ANG. ENTERED";:PRI
     NT@576,"4TH ANG. ENTERED";:PRINT@768,"3RD ANG. ENTERED";
10250 PRINT@832,"";:PRINT"THIS COMPLETES THE INSTRUCTIONS."
10998 PRINT@896,"";:INPUT"PRESS ENTER TO CONTINUE (THIS WILL BEGIN THE PROGRAM)";
     Q$
10999 RETURN
11000 REM
11005 CB$=C$+D$:GOSUB20000
11010 FORX=1TON
11020 E=E+180
11025 IFE>=360THENE=E-360
11030 GOSUB12000
11040 GOSUB13000
11050 GOSUB14000
11060 IFX=NTHEN16000ELSENEXTX
11070 REM
12000 IFG-C(X)<0THEN12010ELSE12020
12010 G=G+60:G=G-C(X):F=F-1:GOTO12030
12020 G=G-C(X)
12030 IFF-B(X)<0THEN12040:ELSE12070
12040 F=F+60:F=F-B(X):E=E-1
12050 IFE-A(X)<0THENE=E+360
12060 E=E-A(X):RETURN
12070 IFE-A(X)<0THENE=E+360
12080 E=E-A(X):F=F-B(X):RETURN
13000 IFE>=0ANDE<90THENE$="N":F$="E":RETURN
13010 IFE=90ANDF>0THENE$="S":F$="E":RETURN
13020 IFE=90ANDG=0THENE$="N":F$="E":RETURN
13030 IFE>90ANDE<180THENE$="S":F$="E":RETURN
13040 IFE=180ANDF>0THENE$="S":F$="W":RETURN
13050 IFE=180ANDF=0THENE$="S":F$="E":RETURN
13060 IFE>180ANDE<270THENE$="S":F$="W":RETURN
13070 IFE=270ANDF>0THENE$="N":F$="W":RETURN
13080 IFE=270ANDF=0ANDG=0THENE$="S":F$="W":RETURN
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13090 IFE>270ANDE<360THENE$="N":F$="W":RETURN
13100 IFE=360ANDF>0THENE$="N":F$="E":RETURN
13110 IFE=360ANDF=0ANDG=0THENE$="N":F$="W":RETURN
14000 H=E:I=F:J=G:IFE>=0ANDE<=90THENE=E:F=F:GOTO14060
14010 IFE>90ANDE<180THENGOTO15000
14020 IFE>=180ANDE<270THENGOTO15020
14030 IFE>=270ANDE<360THENGOTO15040
14060 E$(X)=E$:E(X)=E:F(X)=F:G(X)=G:F$(X)=F$
14070 E=H:F=I:G=J
14080 RETURN
15000 E=180-E:IFF>0THENE=E-1:F=60-F
15010 GOTO14060
15020 E=E-180
15030 GOTO14060
15040 IFE=360THENE=0:F=F:GOTO14060
15050 IFE<360ANDF>0THENE=359-E:F=60-F:GOTO14060
16000 FORX=1TON
16010 B$(X)=A$(X)+A$(X+1)
16020 IFX<NTHENNEXTELSEB$(X)=A$(X)+A$(1)
16050 INPUT"PRESS ENTER TO CONTINUE";Q$
16055 CLS
17000 FORX=1TON:PRINT"THE BEARING OF ";B$(X);" IS ";E$(X);E(X);F(X);G(X);F$(X):N
      EXT
17010 FORX=1TON:Z(X)=E(X):Y(X)=F(X):X(X)=G(X):NEXT
17020 FORX=1TON:X(X)=X(X)/60:Y(X)=Y(X)+X(X):Y(X)=Y(X)/60:Z(X)=Z(X)+Y(X):Z(X)=Z(X
      )*.0174533:LA(X)=L(X)*COS(Z(X)):DE(X)=L(X)*SIN(Z(X)):NEXT
17030 FORX=1TON
17040 IFE$(X)="S"ANDLA(X)>0THENLA(X)=LA(X)*-1ELSELA(X)=LA(X)
17050 IFF$(X)="W"ANDDE(X)>0THENDE(X)=DE(X)*-1ELSEDE(X)=DE(X)
17060 IFE$(X)="N"ANDLA(X)<0THENLA(X)=LA(X)*-1ELSELA(X)=LA(X)
17070 IFF$(X)="E"ANDDE(X)<0THENDE(X)=DE(X)*-1ELSEDE(X)=DE(X)
17080 NEXT
17090 INPUT"PRESS ENTER TO CONTINUE";Q$
17100 PRINTTAB(12)"UNADJUSTED";TAB(36)"ADJUSTED"
17110 PRINTTAB(0)"COURSE";TAB(12)"LAT";TAB(24)"DEP";TAB(36)"LAT";TAB(48)"DEP"
17120 FORX=1TON:LC=LC+LA(X):DC=DC+DE(X):NEXT
17125 IFLC>0ANDDC>0THENLC=LC*-1:DC=DC*-1:GOTO17130
17126 IFLC<0ANDDC<0THENLC=LC*-1:DC=DC*-1:GOTO17130
17127 IFLC<0ANDDC>0THENLC=LC*-1:DC=DC*-1:GOTO17130
17128 IFLC>0ANDDC<0THENLC=LC*-1:DC=DC*-1:GOTO17130
17130 FORX=1TON:CL=CL+L(X):NEXT
17140 FORX=1TON:LI(X)=LA(X):DI(X)=DE(X):NEXT
17150 FORX=1TON:C(X)=(LC/CL)*L(X):NEXT
17160 FORX=1TON:D(X)=(DC/CL)*L(X):NEXT
17170 FORX=1TON:DE(X)=DE(X)+D(X):NEXT
17180 FORX=1TON:LA(X)=LA(X)+C(X):NEXT
17190 FORX=1TON:PRINTTAB(2)B$(X);TAB(12)LI(X);TAB(24)DI(X);TAB(36)LA(X);TAB(48)D
      E(X):NEXT
17200 PRINT
17210 FORX=1TON:GH=GH+LA(X):HG=HG+DE(X):NEXT
17220 FORX=1TON:HN=HN+LI(X):NH=NH+DI(X):NEXT
17230 PRINTTAB(0)"TOTAL";TAB(12)HN;TAB(24)NH;TAB(36)GH;TAB(48)HG
17235 GOSUB21000
17240 INPUT"DO YOU HAVE MORE CALCULATIONS";Q$
17250 IFQ$="Y"THEN10ELSEEND
19100 REM**** INITIAL AZIMUTH ROUTINE ****
19110 REM**** IF INITIAL BEARING IN NE QUADRANT NO ACTION. IF IN SE QUADRANT SUB
      TRACT KNOWN BEARING FROM 180. IF IN SW ADD TO 180. IF IN NW SUBTRACT FROM 3
      60.
20000 IFCB$="NE"THENRETURN
20010 IFCB$="SE"THEN20020ELSE20050
20020 IFG>0THENG=60-G:F=59-F:E=179-E:RETURN
20030 IFF>0THENF=60-F:E=179-E:RETURN
20040 E=180-E:RETURN
20050 IFCB$="SW"THEN20060ELSE20080
20060 E=E+180:RETURN
20070 REM
20080 IFCB$="NW"THEN20090ELSE20130
20090 IFG>0THENG=60-G:F=59-F:E=359-E:RETURN
20100 IFF>0THENF=60-F:E=359-E:RETURN
20110 E=360-E:RETURN
20120 END
20130 CLS:PRINT"ERROR IN EITHER PREFIX OR SUFFIX OF THE BEARING":FORX=1TO1000:NE
      XT:GOTO10
21000 INPUT"PRESS ENTER TO CONTINUE";AZ$
21010 CLS
21020 FORX=1TON
21030 AB(X)=DE(X):AC(X)=LA(X):AB(X)=AB(X)[2:AC(X)=AC(X)[2:AD(X)=AB(X)+AC(X):AE(X
      )=SQR(AD(X))
21040 REM AE(X)= CORRECTED LENGTH
21050 NEXTX
21060 FORX=1TON
21061 IFDE(X)<0THENDE(X)=DE(X)*-1
21062 IFLA(X)<0THENLA(X)=LA(X)*-1
21070 AF(X)=DE(X)/LA(X)
21080 AG(X)=ATN(AF(X))
```

```
21090 AG(X)=AG(X)*57.29578
21100 REM AG(X) = THE DECIMAL DEGREES
21110 NEXT
21115 FORX=1TON
21120 AH(X)=INT(AG(X))
21130 AI(X)=AG(X)
21140 AI(X)=AI(X)-INT(AI(X))
21150 AI(X)=AI(X)*60
21160 AJ(X)=INT(AI(X))
21170 AK(X)=AI(X)-INT(AI(X))
21180 AK(X)=AK(X)*60
21190 AL(X)=INT(AK(X))
21200 PRINT"THE CORRECTED BEARING OF ";B$(X);" IS ";E$(X);AH(X);AJ(X);AL(X);F$(X
      )
21205 PRINT"AND THE CORRECTED LENGTH OF ";B$(X);" IS ";AE(X)
21210 PRINT
21230 NEXT
21240 RETURN
22000 FORX=1TON:A(X)=0:B(X)=0:C(X)=0:D=0:M=0:S=0:NEXT:CLS:GOTO31
```

TAX WITHOLDING: by Cliff De Jong

This program will be useful to the small businessman or self-employed computer specialist at tax time. All considerations the IRS finds interesting are taken into account. A full-page display of tax specifics at program's end.


```
5 DIMTL(15),TA(16),TB(16),WL(6),WB(7),SD(1),TW(1),NM(1),EC(1),W(1)
7 CLS:PRINT"FILING STATUS":INPUT"S=SINGLE OR M=MARRIED FILING JOINTLY";F$:IFF$="
      S"THENJ=1ELSEJ=0
8 REM READ TAX AND WITHHOLDING TABLES
10 FORFS=0TOJ
20 FORI=0TO14+FS:READTL(I):NEXT
30 FORI=1TO15+FS:READTA(I):NEXT
40 FORI=1TO15+FS:READTB(I):NEXT
50 FORI=0TO6:READWL(I):NEXT
60 FORI=1TO7:READWA(I):NEXT
70 FORI=1TO7:READWB(I):NEXT:NEXTFS
80 SD(0)=3400:SD(1)=2300:FS=J
90 REM GET INPUTS
120 INPUT"WAGES(#1)";W(0):INPUT"WAGES(#2)";W(1)
130 INPUT"OTHER INCOME";OI:GI=W(0)+W(1)+OI
140 INPUT"ITEMIZED DEDUCTIONS";D:D=D-SD(FS):IFD<0THEND=0
145 INPUT"TAX CREDITS";TC
150 INPUT"ACTUAL EXEMPTIONS";AE:TI=GI-D-AE*1000
160 FORI=0TO1:IFW(I)=0THEN200
165 PRINT"FOR WAGE EARNER #",I+1
170 INPUT"   TAX WITHHELD TO DATE";TW(I)
180 INPUT"   NUMBER OF MONTHS";NM(I)
190 INPUT"   CURRENT EXEMPTIONS CLAIMED";EC(I)
200 NEXTI
205 REM PRINT WITHHOLDING TABLES
210 CLS:GOSUB21040:TX=TX-TC:PRINT"TAX LIABILITY=",TAB(16)TX,TAB(43)TB(I)*100,"%
      BRACKET"
220 FORJ=0TO1:IFW(J)=0THEN240
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230 WI=W(J)-EC(J)*1000:GOSUB31040:A(J)=AW
240 NEXTJ
250 FORJ=0TO1:IFW(J)=0THEN320
260 PRINT@77,"FOR WAGE EARNER #",J+1
265 PRINT"EXEMPTIONS CLAIMED","REFUND","TAKE HOME INCR"
270 K=0:IFJ=0 K=1
280 FORE=0TO10:WI=W(J)-E*1000:GOSUB31040
290 PW=TW(J)+AW*(1-NM(J)/12)+TW(K)+A(K)*(1-NM(K)/12)
295 R%=PW-TX:TH%=(A(J)-AW)/52
300 PRINTTAB(7)E,TAB(31)R%,TAB(52)TH%:NEXTE
310 IFW(1)<>0ANDJ=0INPUT"PRESS ENTER TO CONTINUE";F$
320 NEXTJ
330 END
9990 REM TAXAND WITHHOLDING TABLES
10000 DATA3400,5500,7600,11900,16000,20200,24600,29900,35200,45800,60000,85600,1
      09400,162400,215400
10010 DATA0,294,630,1404,2265,3273,4505,6201,8162,12720,19678,33502,47544,81464,
      117504
10020 DATA.14,.16,.18,.21,.24,.28,.32,.37,.43,.49,.54,.59,.64,.68,.7
10030 DATA2400,6600,10900,15000,19200,23600,28900
10040 DATA0,630,1404,2265,3273,4505,6201
10050 DATA.15,.18,.21,.24,.28,.32,.37
10060 DATA2300,3400,4400,6500,8500,10800,12900,15000,18200,23500,28800,34100,415
      00,55300,81800,108300
10070 DATA0,154,314,692,1072,1555,2059,2605,3565,5367,7434,9766,13392,20982,3767
      7,55697
10080 DATA.14,.16,.18,.19,.21,.24,.26,.30,.34,.39,.44,.49,.55,.63,.68,.7
10090 DATA1420,3300,6800,10200,14200,17200,22500
10100 DATA0,282,912,1626,2666,3566,5368
10110 DATA.15,.18,.21,.26,.3,.34,.39
21030 REM SUB 21040 ESTIMATES TAX LIABILITY TX
21035 REM FOR TAXABLE INCOME TI
21040 IFTI<TL(0)TX=0:RETURN
21050 FORI=1TO14+FS:IFTI<TL(I)THEN21070
21060 NEXTI:I=15+FS
21070 TX=TA(I)+TB(I)*(TI-TL(I-1)):RETURN
31030 REM SUB 31040 ESTIMATES ANNUAL WITHHOLDING AW
31035 REM FOR WITHHOLDING INCOME WI
31040 IFWI<WL(0)AW=0:RETURN
31050 FORI=1TO6:IFWI<WL(I)THEN31070
31060 NEXTI:I=7
31070 AW=WA(I)+WB(I)*(WI-WL(I-1)):RETURN
```

GRADE BOOK: by Anne Weiss

The teacher's choice. This program will compute quarterly, semester or yearly grade averages. Grades can be weighted and/or converted to a base of 100 percentage points. All entries can be easily changed or corrected and are displayed in actual gradebook format. The only thing left undone is tomorrow's lesson plan.


```
10 REM *    *    *    *    *    *    *    *    *    *    *
15 REM *    *    *    GRADES  *    *    *    *    *    *
25 REM *    *    *    *    *    *    *    *    *    *    *
30 CLS:INPUT"ENTER 1 FOR DIRECTIONS, 0 TO PROCEED";Q:IFQ=1THEN850
```

```
40 DEFINTA-Z
50 DATA "TESTS","QUIZZES","HOMEWORK","CLASSWORK","PROJECTS"
60 DATA "SEMESTER EXAM","1ST OR 3RD QUARTER","1ST SEMESTER AVERAGE"
70 DATA "YEARLY EXAM","THIS QUARTER","","THIS SEMESTER"
75 DIMA$(11),C(11),G1(11)
80 FORI=0TO11:READA$(I):NEXT
90 CLS
100 PRINT"HOW MANY GRADES OF EACH TYPE WILL YOU ENTER?":PRINT
110 FORI=0TO8:PRINTA$(I):NEXT:PRINT@128,"";
120 FORI=0TO 8:PRINTA$(I);TAB(25)"";:INPUTN(I):NEXT
130 FORI=0TO4:T=T+N(I):NEXT:PRINT
140 PRINT"I WILL COUNT ONLY THE FIRST";T;" GRADES FOR THIS QUARTER"
150 INPUT"ENTER 1 TO PROCEED, 0 TO RECOUNT GRADES ";Q
160 IFQ=0THENT=0:GOTO90
165 DIMR(T),G(T),B(T)
170 CLS
180 PRINTTAB(30)"DO YOU WANT TO"
190 PRINT"1   COUNT ALL GRADES THE SAME WEIGHT";TAB(50)"OR"
200 PRINT"2   WEIGHT THEM DIFFERENTLY"
210 INPUT"ENTER 1 OR 2 ";Q1
220 PRINT
230 PRINT"HAVE YOUR GRADES BEEN SCORED ON OR CONVERTED TO A BASIS OF"
240 INPUT"1=100 POINTS EACH   2=NOT ALL ON 100 POINTS ";Q2
250 PRINT:FOR I=1TOT:IFQ2=1THENB(I)=100:GOTO270
260 PRINT"ENTER THE TOTAL SCORE POSSIBLE FOR GRADE #";I;:INPUTB(I)
270 IFQ1=1THEN310
280 PRINT"DOES GRADE #";I;" REPRESENT T,Q,H,C,P ";:INPUTT$
290 R(I)=-1:FORL=0TO5:IFT$=LEFT$(A$(L),1)THENR(I)=L
300 NEXT:IFR(I)=-1PRINT"ERROR-TRY AGAIN":GOTO280
310 NEXT
320 FOR I=5TO8STEP3:IFN(I)=0THENB(I)=1:GOTO350
330 IFQ2=1THENB1(I)=100:GOTO350
340 PRINT"ENTER THE TOTAL SCORE POSSIBLE FOR ";A$(I);:INPUTB1(I)
350 NEXT:IFQ1=1THEN415
360 PRINT:FORI=0TO4:IFN(I)=0THENC(I)=0:GOTO390
370 PRINT"WHAT PER CENT DOES ";A$(I);:INPUT" COUNT THIS QUARTER ";C(I)
380 P=P+C(I)
390 NEXT:PRINT
400 IFP>99ANDP<101THEN415
405 PRINT"ERROR - DOESN'T TOTAL 100 PER CENT - TRY AGAIN"
410 P=0:GOTO360
415 P=0:IFN(6)=0THEN427
420 X=5:GOSUB780:IFN(7)=0THEN427
425 X=7:GOSUB780
427 INPUT"PUSH ENTER TO RECORD GRADES ";Q
430 P1=100:CLS:T1=T:G=0:FORI=0TO4:N1(I)=N(I):Y(I)=0:NEXT
440 PRINT"TYPE IN GRADES AND PUSH ENTER KEY AFTER EACH ONE"
450 PRINT"A GRADE OF -1 WILL BE DROPPED FROM THE AVERAGE"
460 PRINT"A GRADE OF 0 WILL BE COUNTED AS A ZERO"
465 PRINT"ENTER A GRADE OF -2 IF YOU MAKE AN ERROR":PRINT
470 FORK=1TOT
480 PRINT@5*64+16*K-16,"#";K;
490 INPUT G(K)
495 IFG(K)=-2THEN430
500 IFG(K)=-1THENN1(R(K))=N1(R(K))-1:T1=T1-1:GOTO540
510 G(K)=100*G(K)/B(K)+.5
520 IFQ1=1THEN540
530 Y(R(K))=Y(R(K))+G(K)
540 NEXT:IFQ1=1THEN580
550 FORJ=0TO4:IFN(J)=0THEN570
555 IFN1(J)=0THENP1=P1-C(J):GOTO570
560 Y(J)=Y(J)*C(J)/N1(J):G=G+Y(J)
570 NEXT:G1(9)=G/P1+.5:GOTO610
580 FORK=1TOT:IFG(K)<0THEN600
590 G=G(K)+G
600 NEXT:G1(9)=G/T1+.5
610 PRINT:PRINT"THE AVERAGE FOR ";A$(9);" IS ";G1(9)
620 IFN(6)=0THEN760
630 P1=100:FORI=5TO6:IFN(I)=0THENG1(I)=0:GOTO650
640 PRINT"ENTER GRADE FOR ";A$(I);:INPUTG1(I)
645 IFG1(I)=-1THENP1=P1-C(I):G1(I)=0
648 IFG1(I)=-2THEN630
650 NEXT
660 G=G1(5)*C(5)*100/B1(5)+G1(6)*C(6)+G1(9)*C(9)
670 G1(11)=G/P1+.5
680 PRINT:PRINT"THE AVERAGE FOR THIS SEMESTER IS";G1(11)
690 IFN(7)=0THEN760
700 P1=100:FORI=7TO8:IFN(I)=0THENG1(I)=0:GOTO720
710 PRINT"ENTER GRADE FOR ";A$(I);:INPUTG1(I)
715 IFG1(I)=-1THENP1=P1-C(I):G1(I)=0
718 IFG1(I)=-2THEN700
720 NEXT
730 G=G1(7)*C(7)+G1(8)*C(8)*100/B1(8)+G1(11)*C(11)
740 G=G/P1+.5
750 PRINT:PRINT"THE AVERAGE FOR THE YEAR IS ";G
760 INPUT"PUSH ENTER TO AVERAGE MORE GRADES, PUSH BREAK TO STOP";Q
770 GOTO430
```

```
780 FORI=XTOX+1:IFN(I)=0THENC(I)=0:GOTO810
790 IFX=7THEN820
800 PRINT"WHAT PER CENT DOES ";A$(I);:INPUT" COUNT THIS SEMESTER ";C(I)
810 GOTO830
820 PRINT"WHAT PER CENT DOES ";A$(I);:INPUT" COUNT FOR THE YEAR ";C(I)
830 P=P+C(I):NEXT
840 C(X+4)=100-P:P=0:RETURN
850 CLS:PRINTTAB(30)"GRADES":PRINT
860 PRINT"THIS PROGRAM WILL COMPUTE QUARTER, SEMESTER OR YEAR AVERAGES"
870 PRINT:PRINT"YOU MAY COUNT ALL GRADES EQUALLY, OR YOU MAY"
880 PRINT"WEIGHT THEM BY DIFFERENT PER CENTAGES":PRINT
890 PRINT"THE PROGRAM WILL CONVERT ALL GRADES TO A BASIS OF 100"
900 PRINT:PRINT"IF YOU ENTER A 0, THE GRADE WILL BE COUNTED AS ZERO"
910 PRINT"IF YOU ENTER A -1, THE GRADE WILL NOT BE COUNTED"
920 PRINT"ENTER A -2 TO CORRECT A WRONG GRADE"
930 PRINT:PRINT"ENTER THE GRADES JUST AS THEY APPEAR IN YOUR BOOK"
940 PRINT:INPUT"PUSH ENTER TO BEGIN";Q
950 GOTO40
```

BUSINESS INFORMATION MANAGEMENT SYSTEM:
by George Doss

Keep track of any kind of business data with this nifty program. Data can be loaded via tape and accessed by video terminal. Sort, list, update and deletion routines are included. Makes record keeping a snap.
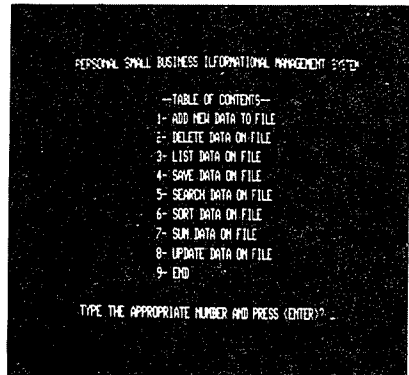

```
20 CLEAR6000:DIMPR$(100):DIMK$(100):DIMK(100)
30 CLS:PRINT:INPUT"DO YOU HAVE OLD DATA TO LOAD? 1=YES 2=NO";IP:IFIP=1THEN290
40 IFIP>2GOTO30
50 CLS:PRINTTAB(2)"ENTER COLUMN HEADINGS (MAX 60 SPACES)"
60 INPUTCH$
70 PRINTTAB(2)"ENTER NEW RECORDS. TO STOP ENTERING PROCEDURE ENTER END"
80 PRINTTAB(2)CH$
90 FORR=1TO100
100 INPUTPR$(R)
110 IFPR$(R)="END"GOTO130
120 NEXT
130 NR=R-1:GOTO140
140 CLS:PRINT:PRINTTAB(7)"PERSONAL/SMALL BUSINESS ILFORMATIONAL MANAGEMENT SYSTE
    M "
150 PRINT:PRINTTAB(23)"--TABLE OF CONTENTS--"
160 PRINTTAB(22)"1- ADD NEW DATA TO FILE"
170 PRINTTAB(22)"2- DELETE DATA ON FILE"
180 PRINTTAB(22)"3- LIST DATA ON FILE"
190 PRINTTAB(22)"4- SAVE DATA ON FILE"
200 PRINTTAB(22)"5- SEARCH DATA ON FILE"
210 PRINTTAB(22)"6- SORT DATA ON FILE"
220 PRINTTAB(22)"7- SUM DATA ON FILE"
230 PRINTTAB(22)"8- UPDATE DATA ON FILE"
260 PRINTTAB(22)"9- END"
270 PRINT:PRINTTAB(8):INPUT"TYPE THE APPROPRIATE NUMBER AND PRESS <ENTER>";IP:IF
    IP>11GOTO140
```

```
280 ONIPGOTO330  ,1000 ,420  ,1240 ,1130 ,1350 ,1150 ,880  ,1320
290 CLS:INPUT"PRESS <ENTER> WHEN TAPE IS PREPARED";IP
300 INPUT#-1,CH$:PRINTCH$
310 INPUT#-1,NR:PRINTTAB(60)NR
320 FORR=1TONR:INPUT#-1,PR$(R):PRINTPR$(R):NEXT
321 GOTO140
330 REM *** ADD ROUTINE ***
340 PR$(R)=PR$(R)
350 AN$="":CLS:PRINTTAB(2)"ENTER NEW RECORD."
360 PRINTTAB(2)CH$
370 INPUTPR$(NR+1)
380 NR=NR+1
400 INPUT"DO YOU WANT TO ADD ANOTHER RECORD? (Y OR N)";AN$
410 IFAN$="Y"THEN350  ELSE140
420 REM *** LIST DATA ROUTINE ***
430 R=1:CLS:INPUT"ENTER MODE: A(ALL), O(ONE), R(RANGE)";AN$
440 IFAN$="A"THEN480
450 IFAN$="O"THEN600
460 IFAN$="R"THEN680
470 IFAN$<>"A"ORAN$<>"O"ORAN$<>"R"THEN430
480 FL=0:AA$="":CLS:INPUT"ENTER THE LENGTH OF THE FIRST FIELD";FL:INPUT"DO YOU W
    ANT THE DATA LISTED TO VIDEO OR PRINTER (V OR P)";AA$
490 IFAA$="P"THEN546
500 PRINT:PRINTCH$:FORR=1TONR
510 IFPR$(R)<>""THEN530
520 IFPR$(R)=""NEXT:GOTO540
530 PRINTPR$(R):NEXT
540 PRINT:PRINT"NUMBER OF RECORDS = ";NR:PRINT:INPUT"PRESS <ENTER> TO CONTINUE";
    E:GOTO140
546 CLS:INPUT"IS THE PRINTER READY? (Y OR N)";IP$:IFIP$="Y"550ELSE480
550 LPRINTCH$:LPRINTCHR$(10):FORR=1TONR
560 IFPR$(R)<>""THEN580
570 IFPR$(R)=""NEXT:GOTO590
580 LPRINTPR$(R):NEXT
590 LPRINTCHR$(10):LPRINT"NUMBER OF RECORDS = ";NR:PRINT:INPUT"PRESS <ENTER> TO
    CONTINUE";E:GOTO140
600 FV$="":CLS:PRINTTAB(2):INPUT"ENTER FIELD VARIABLE TO BE IDENTIFIED. FOR EXAM
    PLE, A SPECIFIC  CODE OR NUMBER";FV$
610 GOSUB770
620 KS=0:KL=0:AN$="":INPUT"ENTER KEY START POSITION, LENGTH";KS,KL
628 CLS:PRINTCH$
630 FORR=1TONR
640 IFMID$(PR$(R),KS,KL)=FV$THEN660
650 IFFV$<>MID$(PR$(R),KS,KL)NEXT:GOTO670
660 PRINTPR$(R):NEXT
670 PRINT:INPUT"DO YOU WANT TO SEE ANOTHER RECORD? (Y OR N)";AN$:IFAN$="Y"THEN60
    0 ELSE140
680 KS=0:KL=0:AN$="":CLS:GOSUB770  :REM RANGE SUBROUTINE
690 INPUT"ENTER KEY START POSITION, LENGTH";KS,KL
700 INPUT"ENTER LOWER BOUND";LB
710 INPUT"ENTER UPPER BOUND";UB
718 CLS:PRINTCH$
720 FORR=1TONR
730 IFVAL(MID$(PR$(R),KS,KL))>UBNEXT:GOTO760
740 IFVAL(MID$(PR$(R),KS,KL))<LBNEXT:GOTO760
750 PRINTPR$(R):NEXT
760 PRINT:INPUT"DO YOU WANT TO SET DIFFERENT BOUNDS? (Y OR N)";AN$:IFAN$="Y"THEN
    680  ELSE140
770 CLS:PRINT"KEY TABLE (KEY START POSITION, LENGTH)"
780 PRINTMID$(CH$,1,5);TAB(12)"1,5"
790 PRINTMID$(CH$,8,7);TAB(12)"8,7"
800 PRINTMID$(CH$,17,7);TAB(12)"17,7"
810 PRINTMID$(CH$,26,7);TAB(12)"26,7"
820 PRINTMID$(CH$,35,7);TAB(12)"35,7"
830 PRINTMID$(CH$,44,7);TAB(12)"44,7"
840 PRINTMID$(CH$,53,8);TAB(12)"53,8"
870 RETURN
880 REM *** UPDATE ROUTINE ***
890 AN$="":AA$="":FV$="":FL=0:CLS:PRINTTAB(2):INPUT"ENTER FIRST FIELD OF RECORD
    TO BE UPDATED";FV$
900 PRINTTAB(2):INPUT"ENTER FIRST FIELD LENGTH";FL
910 FORR=1TONR
920 IFLEFT$(PR$(R),FL)=FV$THEN940
930 IFFV$<>LEFT$(PR$(R),FL)NEXT:GOTO990
940 PRINTTAB(2)PR$(R)
950 PR$(R)=""
960 PRINTTAB(2)"ENTER ALL DATA FOR THE RECORD BEING UPDATED":PRINT:PRINTTAB(2)CH
    $
970 INPUTPR$(R)
980 PRINT:INPUT"DO YOU WANT TO UPDATE ANOTHER RECORD? (Y OR N)";AN$:IFAN$="Y"THE
    N890  ELSE140
990 PRINT:PR$(R)=PR$(R+1):INPUT"NOT ON FILE. DO YOU WANT TO TRY ANOTHER RECORD?
    (Y OR N)";AA$:IFAA$="Y"THEN890  ELSE140
1000 REM *** DELETE ROUTINE ***
1010 R=1:AA$="":AN$="":AB$="":FL=0:FD$="":CLS:PRINTTAB(2):INPUT"ENTER FIELD OF R
     ECORD TO BE DELETED";FD$
1020 PRINTTAB(2):INPUT"ENTER FIRST FIELD LENGTH";FL
```

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```
1030 FORR=1TONR+D
1040 IFLEFT$(PR$(R),FL)=FD$THEN1060
1050 IFFD$<>LEFT$(PR$(R),FL)NEXT:GOTO1120
1060 PRINTTAB(2)CH$
1070 PRINTTAB(2)PR$(R)
1080 PRINT:INPUT"DO YOU WANT TO DELETE THIS RECORD? (Y OR N)";ANS:IFANS="Y"THENP
     R$(R)=""ELSE1100
1090 PR$(R)=PR$(NR):D=D+1:NR=NR-1
1100 INPUT"DO YOU WANT TO DELETE ANOTHER RECORD? (Y OR N)";AA$
1110 IFAA$="Y"THEN1010 ELSE140
1120 PRINT:INPUT"NOT ON FILE. DO YOU WANT TO TRY ANOTHER RECORD? (Y OR N)";AB$:I
     FAB$="Y"THEN1010 ELSE140
1130 REM *** SEARCH ROUTINE ***
1140 GOTO600
1150 REM *** SUM OF DATA ROUTINE ***
1160 CLS:KS=0:KL=0:SM#=0:FT#=0:GOSUB770
1170 INPUT "ENTER KEY START POSITION, LENGTH";KS,KL
1180 FORR=1TONR
1190 FT#=VAL(MID$(PR$(R),KS,KL))
1200 SM#=SM#+FT#
1210 NEXT
1220 PRINT"SUM OF ";MID$(CH$,KS,KL)"    EQUALS ";SM#
1230 PRINT:INPUT"DO YOU WANT TO SUM ANOTHER FIELD? (Y OR N)";ANS:IFANS="Y"THEN11
     60 ELSE140
1240 REM *** SAVE ROUTINE ***
1250 CLS:INPUT"PREPARE THE RECORDER. PRESS <ENTER> WHEN READY";E
1260 CLS:PRINT:PRINTCHR$(23):PRINTTAB(10)"DATA LOADING"
1270 PRINT#-1,CH$
1280 PRINT#-1,NR
1290 FORR=1TONR:PRINT#-1,PR$(R):NEXT
1300 PRINT:PRINTTAB(10)"END OF FILE"
1310 CLS:GOTO140
1320 REM ***END ROUTINE ***
1330 CLS:INPUT"HAVE YOU SAVED THE FILE? (y OR N)";ANS
1340 IFANS="N"THEN1240 ELSEEND
1350 REM *** SORT ROUTINE ***
1360 KS=0:KL=0:ANS="":GOSUB770
1370 INPUT"ENTER KEY START POSITION, KEY LENGTH";KS,KL
1380 FORR=1TONR
1390 K(R)=R:K$(R)=MID$(PR$(R),KS,KL)
1400 NEXT
1410 INPUT"SORT TITLE: ";TI$
1412 ANS="":INPUT"DO YOU WANT THE SORT IN ASCENDING ORDER (LOW TO HIGH) OR IN DE
     SCENDING ORDER (HIGH TO LOW)? ENTER LH OR hl";ANS
1414 IFANS="HL"GOTO1570
1416 IFANS="LH"GOTO1680
1430 INPUT"DO YOU WANT THE SORT ON VIDEO OR PRINTER (V OR P)";ANS
1440 IFANS="V"GOTO1460
1450 IFANS="P"GOTO1508
1460 CLS:PRINTTAB(10)TI$:PRINTCH$
1470 FORR=1TONR:F=K(R):PRINTPR$(F):NEXT
1480 PRINT:INPUT"ANOTHER SORT (Y OR N): ";AA$
1490 IFAA$="Y"GOTO1360
1500 IFAA$="N"GOTO140
1508 CLS:INPUT"IS THE PRINTER READY? (Y OR N)";IU$:IFIU$="y"1510ELSE1430
1510 LPRINTTI$:LPRINTCHR$(10):LPRINTCH$
1520 FORR=1TONR:F=K(R):LPRINTPR$(F):NEXT
1530 GOTO1480
1570 NN=NR:NN=NN+1:E=1:F=1
1580 CLS:PRINT:PRINTTAB(20)"NOW SORTING"
1590 NN=NN/2:NN=INT(NN)
1600 IFNN=0:GOTO1670
1610 D=NR-NN
1620 FORL=1TOD:E=L+NN:K$=K$(E):K=K(E):F=L
1630 IFK$(F)=>K$GOTO1660
1640 E=F+NN:K$(E)=K$(F):K(E)=K(F):F=F-NN
1650 IFF>0GOTO1630
1660 E=F+NN:K$(E)=K$:K(E)=K:NEXTL:GOTO1590
1670 GOTO1430
1680 NN=NR:NN=NN+1:E=1:F=1
1690 CLS:PRINT:PRINTTAB(20)"NOW SORTING"
1700 NN=NN/2:NN=INT(NN)
1710 IFNN=0GOTO1780
1720 D=NR-NN
1730 FORL=1TOD:E=L+NN:K$=K$(E):K=K(E):F=L
1740 IFK$(F)<=K$GOTO1770
1750 E=F+NN:K$(E)=K$(F):K(E)=K(F):F=F-NN
1760 IFF>1GOTO1740
1770 E=F+NN:K$(E)=K$:K(E)=K:NEXTL:GOTO1700
1780 GOTO1430
```

CASH REGISTER: by John Hamilton

Keep an electronic record of all cash drawer transactions and have a hard copy output available for your records. Useful when the tax man extracts his pound of flesh.
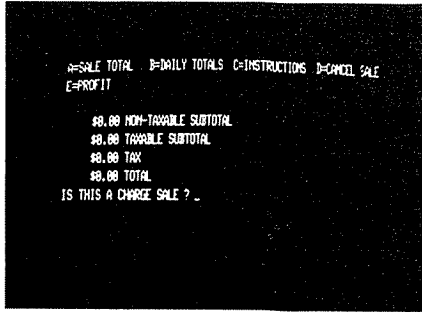

```
10 '                **** CASHREGISTER PROGRAM ****
20 '
40 '
50 ' THIS PROGRAM IS DESIGNED TO EMULATE A CASHREGISTER
60 '
70 '
80 'VARIABLES:
90 '
100 ' NAME     FUNCTION
110 '
120 ' A( )     DEPARTMENT ABBREVIATION
130 ' AA       BUSINESS NAME
140 ' B( )     EMPLOYEE ID
150 ' C( )     DEPARTMENT CODE
160 ' CR       CASSETTE DATA TRANSFER STRING VARIABLE
170 ' CT       CASSETTE DATA TRANSFER STRING VARIABLE
180 ' CV       CASSETTE DATA TRANSFER STRING VARIABLE
190 ' D        CHARACTER INPUT VARIABLE
200 ' DA       CHARACTER OUTPUT VARIABLE (CHARGE OR CASH)
210 ' DB       DATE
220 ' E        DOLLAR OUTPUT FORMAT
230 ' I        LOOP COUNTER AND SUBSCRIPT VARIABLE
240 ' J( )     DEPARTMENT TAXIBILITY (1=YES 0=NO)
250 ' K        EMPLOYEE SALES TOTALS SUBSCRIPT
260 ' KI       SALE ITEM COUNT
270 ' KP       SALES SLIP COUNT
280 ' L        SCREEN PRINT POSITION
290 ' LP       PRINTER REQUEST
300 ' LQ       PRINTER REQUEST
310 ' LQ$      INPUT CHARACTER VARIABLE
320 ' M        SCREEN PRINT POSITION
330 ' N        NUMBER OF DEPARTMENTS
340 ' NA       SUBSCRIPT VARIABLE
350 ' NB       CASSETTE LOAD COUNTER
360 ' NC       CASSETTE DUMP FLAG
370 ' NN       CASSETTE DATA TRANSFER VARIABLE POINTER
380 ' P        POSITION POINTER
390 ' P( , )   PRINTER BUFFER OF DEPT. SALES
400 ' T        SALES TAX PERCENTAGE
410 ' TC       RUNNING TOTAL OF CHARGE SALES
420 ' tt       RUNNING TOTAL OF SALES TAX
430 ' U        DECIMAL ADJUST
440 ' V        DECIMAL ADJUST
450 ' W        ITEM PRICE
460 ' W1       QUANTITY COUNT
470 ' WS       SALE NONTAXABLE SUBTOTAL
480 ' WT       SALE TAXABLE SUBTOTAL
490 ' WV       SALES TAX AMOUNT
500 ' X( )     DEPARTMENT TOTALS
510 ' Y( )     SALESPERSON SALE TOTALS
520 ' Z        AMOUNT RECEIVED
530 ' ZN       DAILY NONTAXABLE SUBTOTAL
540 ' ZT       DAILY TAXABLE SUBTOTAL
550 '                *** INITIALIZATION ***
560 CLEAR 2000
570 DEFINT I-N:DEFSTR A-E
580 E="$$#####.##"
590 DIM A(22),B(20),C(22),J(22),X(22),Y(20),P(50,2)
600 FOR I=1 TO 22:C(I)=CHR$(I+68):NEXT I
```

```
610 CLS:PRINT TAB(20)"CASH-REGISTER PROGRAM 1.0":PRINT " "
620 INPUT "IS A PRINTER TO BE USED ";LQ$
621 IF LEFT$(LQ$,1)="N" THEN GOTO 630
625 QQ=PEEK(14312)
626 IF QQ=63 THEN 630
627 PRINT "CHECK TO SEE IF YOUR PRINTER IS CONNECTED AND ON.":GOTO 625
630 IF LEFT$(LQ$,1)="Y" THEN LQ=1 ELSE LQ=0
640 IF LQ=1 THEN LPRINT CHR$(30)
650 INPUT "IS CASSETTE TO BE USED FOR DATA STORAGE ";NC$
660 IF LEFT$(NC$,1)="Y" THEN NC=1 ELSE NC=0
670 INPUT "WHAT IS THE BUSINESS NAME ";AA
680 INPUT "WHAT IS TODAY'S DATE ";DB
690 '            *** DEPARTMENTAL CODE ASSIGNMENT***
700 PRINT "HOW MANY TYPES OF TRANSACTIONS (I.E. RENT, REC ON ACCT, MISC)"
710 INPUT "    DO YOU WISH TO USE ";N
720 CLS:PRINT "ENTER A DESCRIPTIVE CODE FOR EACH TYPE; MAX OF 12 LETTERS."
730 PRINT "ANSWER SALES TAX QUESTION WITH Y OR N WHEN IT APPEARS."
740 FOR I=1 TO N
750 L=68+I*64
760 IF L>960 THEN L=900
770 PRINT C(I);" ="
780 D=INKEY$:IFD=""THEN GOTO780
800 IF ASC(D)=13 THEN GOTO 850
810 IF ASC(D)=8 THEN A(I)=LEFT$(A(I),LEN(A(I))-1):L=L-1:PRINT @ L," ":GOTO 780
820 PRINT @ L,D:L=L+1
830 A(I)=A(I)+D
840 GOTO 780
850 L=L+2
860 PRINT @ L,": SALES TAX ";
870 INPUT D$
880 IF LEFT$(D$,1)="Y"THEN J(I)=1:GOTO 920
890 IF LEFT$(D$,1)="N"THEN J(I)=0:GOTO 920
910 GOTO 870
920 L=L+12
940 NEXT I
950 INPUT "WHAT PERCENTAGE IS THE SALES TAX ";T
960 T=T*.01
970 NC$=""
980 INPUT "IS ANY DATA TO BE ENTERED FROM CASSETTE ";NC$
990 IF LEFT$(NC$,1)="N" THEN GOTO 1180
1000 INPUT "HOW MANY TRANSACTION ARE TO BE READ FROM CASSETTE ";NB
1010 INPUT "CASSETTE READY TO PLAY BACK DATA ";NC$
1020 FOR I=1 TO NB
1030 INPUT#-1,K,TC,TT,ZN,ZT,WS,WT,CR,KP
1040 B(K)=CR
1050 Y(K)=Y(K)+WS+WT
1060 INPUT#-1,CR,CF
1070 P=1
1080 GOSUB 2920
1090 NN=VAL(CT)
1100 FOR I1=1 TO NN
1110 GOSUB 2920
1120 NA=VAL(CT)
1130 GOSUB 2920
1140 X(NA)=X(NA)+VAL(CT)
1150 NEXT I1
1160 IF CF="CONT" THEN GOTO 1060
1170 NEXT I
1180 IF NC=1 THEN INPUT"CASSETTE READY TO RECORD DATA ";NC$:
'            *** I
NSTRUCTIONS ***
1190 CLS:PRINT TAB(27)"INSTRUCTIONS"
1200 PRINT TAB(5) "IMMEDIATELY FOLLOWING THESE INSTRUCTIONS YOU WILL BE ASKED"
1210 PRINT "TO ENTER AN I.D. CODE. THIS IDENTIFIES THE PERSON MAKING THE"
1220 PRINT "SALE. AFTER THAT THE DISPLAY WILL BE IN THE SALE MODE WITH THE"
1230 PRINT "OPERATIONS AND TYPES OF SALES ABBREVIATED AT THE TOP OF THE "
1240 PRINT "SCREEN. TO ENTER AN ITEM FOR SALE FIRST PRESS THE KEY THAT "
1250 PRINT "CORRESPONDS TO THE TYPE OF SALE, THEN KEY IN THE PRICE AND "
1260 PRINT "PRESS 'ENTER'.ANY TIME AN ERROR IS MADE IT CAN BE CORRECTED"
1270 PRINT "BY PRESSING THE BACKSPACE KEY (ARROW POINTING TO THE LEFT) "
1280 PRINT "BEFORE PRESSING 'ENTER'.FOR A SALE OF MORE THAN ONE OF THE SAME"
1290 PRINT "ITEM, KEY IN THE QUANTITY BEFORE PRESSING THE TYPE OF SALE THEN"
1300 PRINT "KEY IN THE TYPE AND THE COST OF A SINGLE ITEM. THE TOTAL COST "
1310 PRINT "WILL BE COMPUTED. WHEN ALL OF THE ITEMS HAVE BEEN ENTERED "
1320 PRINT "PRESSING 'A' WILL CALCULATE THE TAX AND TOTAL."
1330 PRINT TAB(30) "PRESS 'ENTER' TO CONTINUE."
1340 D=INKEY$:IF D="" THEN GOTO 1340
1350 '            *** SALE ENTRIES ***
1360 '            * FIND OR CREATE EMPLOYEE SALES RECORD *
1370 CLS:INPUT "WHAT IS YOUR THREE LETTER ID CODE ";D
1380 FOR K=1 TO 20
1390 IF B(K)=D THEN GOTO 1420
1400 IF B(K)="" THEN B(K)=D:GOTO 1420
1410 NEXT K
1420 CLS:L=64:WT=0:WS=0:K1=0
1430 '            * TYPE OF TRANSACTION CODE HEADING *
1440 PRINT "A=SALE TOTAL    B=DAILY TOTALS    C=INSTRUCTIONS    D=CANCEL SALE"
```

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```
1450 FOR I=1 TO N
1460 PRINT @ L,C(I);"=";A(I)
1470 L=L+16
1480 NEXT I
1490 M=FIX(L/64)*64+64
1500 PRINT @ 943,"          $          "
1510 W1=0:L=943
1520 D=INKEY$
1530 IF D="" THEN GOTO 1520
1540 '              ** SALES TRANSACTION **
1550 IF ASC(D)=8 THEN GOTO 1500: ' BACKSPACE
1560 IF ASC(D)>68 THEN GOTO 1690: ' DEPARTMENTAL CODE
1570 IF ASC(D)>=48 AND ASC(D)<=57 THEN GOTO 1640: ' ITEM MULTIPLIER
1580 IF D="A" THEN GOTO 2030: ' SALE TOTAL
1590 IF D="B" THEN GOTO 2520: ' DAILY TOTAL
1600 IF D="C" THEN GOTO 1190: ' INSTRUCTIONS
1610 IF D="D" THEN GOTO 2480: 'CANCEL SALE
1620 GOTO 1520
1630 '              * ITEM MULTIPLIER ROUTINE *
1640 PRINT @ L,D
1650 W1=W1*10+VAL(D)
1660 L=L+1
1670 GOTO 1520
1680 '              ** DEPARTMENTAL SALE ROUTINE **
1690 PRINT @ 948,D
1700 L=951:W=0:U=10:V=1:I=ASC(D)-68
1710 IF I<=20 THEN GOTO 1740ELSE PRINT @ 896,"ERROR IN DEPT. CODE"
1720 D=INKEY$:IF D="" THEN GOTO 1720
1730 PRINT @ 896,STRING$(20,32):GOTO 1500
1740 D=INKEY$
1750 IF D="" THEN GOTO 1740
1760 IF ASC(D)=13 THEN PRINT @ 943,"              ":GOTO 1920: ' 'ENTER ITEM(S)
1770 IF ASC(D)=8 THEN GOTO 1500:' REDO ITEM(S)
1780 IF D="D" THEN GOTO 2480: 'CANCEL SALE
1790 '              * ENTRY OF SALE ITEM(S) *
1800 PRINT @ L,D
1810 L=L+1
1820 IF D="." THEN U=1:V=.1:GOTO 1740
1830 IF V>=.01 THEN GOTO 1890: ' INPUT ERROR ROUTINE
1840 PRINT @ 896,"ERROR IN INPUT VALUE,PRESS BACKSPACE TO REDO"
1850 D=INKEY$:IF D="" THEN GOTO 1850
1860 IF ASC(D)<>8 THEN GOTO 1850
1870 PRINT @ 896,STRING$(44," ")
1880 GOTO 1500
1890 W=W*U+VAL(D)*V:V=V*V
1900 GOTO 1740
1910 '              * DISPLAY AND ADDITION OF SALE ITEM(S) *
1920 IF W1=0 THEN W1=1
1930 W=W*W1
1940 PRINT @ M,USING E+" "+A(I);W
1950 IF LQ=1 THEN LPRINT USING E+" "+A(I);W
1960 WT=WT+J(I)*W: ' SALE TOTAL OF TAXABLE ITEMS
1970 WS=WS-(J(I)-1)*W: ' SALE TOTAL OF NON-TAXABLE ITEMS
1980 P(K1,1)=I: P(K1,2)=W ' DEPARTMENTAL RUNNING TOTAL
1990 M=M+32:K1=K1+1
2000 IF M>=1023 THEN M=M-64
2010 GOTO 1500
2020 '              * DISPLAY OF SALE TOTALS *
2030 PRINT @ 948,"          "
2040 PRINT @ M," ":PRINT USING E+" NON-TAXABLE SUBTOTAL";WS
2050 IF LQ=1 THEN LPRINT USING E+" NON-TAXABLE SUBTOTAL";WS
2060 PRINT USING E+" TAXABLE SUBTOTAL";WT
2070 IF LQ=1 THEN LPRINT USING E+" TAXABLE SUBTOTAL";WT
2080 WV=FIX(100*T*WT+.5)/100
2090 PRINT USING E+" TAX";WV
2100 IF LQ=1 THEN LPRINT USING E+" TAX";WV
2110 PRINT USING E+" TOTAL";WS+WT+WV
2120 IF LQ=1 THEN LPRINT USING E+" TOTAL";WS+WT+WV
2130 INPUT "IS THIS A CHARGE SALE ";D
2140 IF D="D" THEN GOTO 2480
2150 IF LEFT$(D,1)="Y" AND LQ=0 THEN TC=TC+WS+WT:GOTO 2240
2160 IF LEFT$(D,1)="Y" THEN TC=TC+WS+WT:DA="CHARGE":LPRINT "CHARGE SALE":GOTO 22
     10:ELSE DA="CASH"
2170 INPUT "AMOUNT RECEIVED = ";Z
2180 IF LQ=1 THEN LPRINT USING E+" AMOUNT RECEIVED";Z
2190 PRINT USING "CHANGE DUE = "+E;Z-WS-WT-WV
2200 IF LQ=0 GOTO 2240ELSE LPRINT USING E+" CHANGE DUE";Z-WS-WT-WV
2210 LPRINT " ":LPRINT "THANK YOU,COME AGAIN SOON! ";DB
2220 LPRINT CHR$(15) AA CHR$(14);"          ";B(K);"          ";KP
2230 FOR I=1 TO 4:LPRINT " ":NEXT I
2240 KP=KP+1:PRINT "PUSH 'ENTER' FOR NEW SALE          ";"NO. ";KP
2250 D=INKEY$
2260 IF D="" THEN GOTO 2250
2270 ZN=ZN+WS:ZT=ZT+WT
2280 TT=TT+WV: 'RUNNING TOTAL OF SALES TAX
2290 IF NC=0 THEN GOTO 2390
2300 CT="":NN=1
```

```
2310 CR=B(K)
2320 PRINT#-1,K,TC,TT,ZN,ZT,WS,WT,CR,KP
2330 FOR I=0 TO Kl-1
2340 CT=CT+STR$(P(I,1))+";"+STR$(P(I,2))+";"
2350 IF I=Kl-1 THEN CF="DONE" ELSE CF="CONT"
2360 IF LEN(CT)>=230 OR I=Kl-1 THEN
        CR=STR$(NN)+";"+CT:
        PRINT#-1
     ,CR,CF:
        CT="":NN=0
2370 NN=NN+1
2380 NEXT I
2390 Y(K)=Y(K)+WS+WT: 'RUNNING TOTAL OF EMPLOYEE SALES
2400 FOR I=0 TO Kl-1
2410 X(P(I,1))=P(I,2)+X(P(I,1))
2420 IF LQ=1 THEN LPRINT USING E+" "+A(P(I,1));P(I,2)
2430 NEXT I
2440 IF LQ=0 THEN GOTO 1370
2450 LPRINT USING E+" TAX";WV
2460 LPRINT USING E+" TOTAL";WS+WT+WV
2470 LPRINT B(K);"      ";DA;"      ";DB;"      ";KP
2480 IF LQ=0 GOTO 1370
2490 FOR I=1 TO 4:LPRINT " ":NEXT I
2500 GOTO 1370
2510 '                ** DAILY TOTALS ROUTINE **
2520 CLS:L=128:K=1:LQ$=""
2530 IF LQ=1 THEN INPUT "DO YOU WANT A PRINTED OUTPUT ";LQ$
2540 IF LEFT$(LQ$,1)="Y" THEN LP=1 ELSE LP=0
2550 CLS:PRINT TAB(20) "DEPARTMENTAL SALES"
2560 IF LQ=1 AND LP=1 THEN LPRINT TAB(10) CHR$(15) "DEPARTMENTAL SALES" CHR$(14)
     :LPRINT " "
2570 FOR I=1 TO N
2580 PRINT @ L,USING A(I)+" ="+E;X(I)
2590 IF LQ=1 AND LP=1 THEN LPRINT USING A(I)+" ="+E;X(I)
2600 L=L+32
2610 NEXT I
2620 PRINT TAB(30) "PRESS 'ENTER' TO CONTINUE"
2630 D=INKEY$:IF D="" THEN GOTO 2630
2640 CLS:L=128
2650 PRINT @ 20,"PERSONEL SALES"
2660 IF LQ=1 AND LP=1 THEN LPRINT " ": LPRINT TAB(10) CHR$(15) "PERSONEL SALES"
     CHR$(14):LPRINT " "
2670 PRINT @ L,USING B(K)+E;Y(K)
2680 IF LQ=1 AND LP=1 THEN LPRINT USING B(K)+E;Y(K)
2690 L=L+32:K=K+1
2700 IF K=21 OR B(K)="" THEN GOTO 2710ELSE GOTO 2670
2710 PRINT TAB(20) "PRESS ENTER TO CONTINUE"
2720 D=INKEY$:IF D="" THEN GOTO 2720
2730 CLS:PRINT USING "TOTAL CHARGE SALES "+E;TC
2740 PRINT USING "TOTAL SALES TAX "+E;TT
2750 PRINT USING "TOTAL NON-TAXABLE SALES "+E;ZN
2760 PRINT USING "TOTAL TAXABLE SALES "+E;ZT
2770 PRINT USING "TOTAL SALES "+E;ZN+ZT
2780 PRINT "NUMBER OF SALES ";KP
2790 IF LQ=0 OR LP=0 GOTO 2880
2800 LPRINT " ":LPRINT TAB(14) CHR$(15) "TOTALS" CHR$(14):LPRINT " "
2810 LPRINT USING "TOTAL CHARGE SALES"+E;TC
2820 LPRINT USING "TOTAL SALES TAX"+E;TT
2860 LPRINT "NUMBER OF SALES =";KP
2870 FOR I=1 TO 4:LPRINT " ":NEXT I
2880 PRINT "PRESS 'ENTER' TO CONTINUE"
2890 D=INKEY$
2900 IF D="" THEN GOTO 2890
2910 GOTO 1370
2920 CT=""
2930 CV=MID$(CR,P,1)
2940 IF CV=";" THEN P=P+1:RETURN
2950 CT=CT+CV
2960 P=P+1
2970 GOTO 2930
```

GAMES PEOPLE PLAY

Precision Radar Approach	John Robinson
Demons	Mike Schelhorn
Baseball	John Rodgers
Air Raid	Kevin Copeland
Ski Racer	Mike Zielinski
Petals Around The Rose	Jim Wright
Battleship	Ty Halderman
Word Search	Len Gorney
Invisible Maze	Dennis Nau
Super Maze	James Haines
O'Hare	W. MacDonald
Four In A Row	Mikal Pedersen
Thirteen Ways	G. Crowther
Siege Of Camelot	Sanford Deutsch
Deduction	Al Leavitt

PRECISION RADAR APPROACH: by John Robinson

Assume ILS control of the aircraft as it approaches a socked-in airport on its downwind leg. Order the pilot's turn into the pattern for base and final with an eye to proper alignment on the glide slope and glide path. He is approaching over a large metropolitan area, so rate of descent is critical. Five levels of difficulty from Tri-pacer to F4 Tomcat. A real white knuckle program.

```
10 DEFINT I,J,K,L
20 GOSUB 7100:PRINT@384,"                        PAR"
30 PRINT@512,"     PRECISION APPROACH RADAR"
40 GOSUB 6500:CLS
50 PRINT@448,"DO YOU NEED INSTRUCTIONS (Y/N)";:INPUT Y$
60 IFLEFT$(Y$,1)="N"THEN290ELSEIFLEFT$(Y$,1)<>"Y"THEN50
70 CLS:PRINT:PRINT"    * * * INSTRUCTIONS FOR PAR * * *":PRINT
80 PRINT"YOU WILL NOW BECOME AN 'AIR TRAFFIC CONTROLLER' VIA THE TRS80."
90 PRINT"THE WEATHER HAS SUDDENLY BECOME VERY BAD:":PRINT
100 PRINT"100 FOOT CEILING WITH VISIBILITY 1/4 MILE AND FOG.":PRINT
110 PRINT"AS AN AIR TRAFFIC CONTROLLER, YOU MUST ISSUE INSTRUCTIONS"
120 PRINT"TO THE PILOT VIA THE KEYBOARD, WHICH WILL ALLOW HIM"
130 PRINT"TO LAND HIS AIRCRAFT SAFELY.":PRINT
134 PRINT"HIT ENTER TO CONTINUE."
135 Y$=INKEY$:IFY$=""THEN135ELSECLS
140 PRINT"THE DISPLAY IS DIVIDED INTO TWO (2) SECTIONS.":PRINT
150 PRINT"THE UPPER SECTION IS USED TO CONTROL THE AIRCRAFT'S HEIGHT "
160 PRINT"ABOVE GROUND. THE INSTRUCTIONS TO CLIMB OR DESCEND ARE ISSUED"
170 PRINT"VIA THE UP/DOWN ARROWS (";CHR$(91);CHR$(92)"). THE AIRCRAFT MUST BE IN
      LEVEL"
180 PRINT"FLIGHT AFTER TOUCHDOWN ON THE RUNWAY.":PRINT
190 PRINT"THE LOWER SECTION IS USED TO CONTROL THE FLIGHT OF THE AIRCRAFT"
192 PRINT"OVER THE SURFACE OF THE EARTH. INSTRUCTIONS TO TURN LEFT OR"
194 PRINT"RIGHT ARE ISSUED VIA THE LEFT/RIGHT ARROWS (";CHR$(93);CHR$(94);")."
196 PRINT"HIT ENTER TO CONTINUE."
197 Y$=INKEY$:IFY$=""THEN197ELSECLS
198 PRINT:PRINT"THE AIRCRAFT WILL FIRST APPEAR ON THE LOWER SECTION OF THE"
200 PRINT"DISPLAY AND MOVE FROM LEFT TO RIGHT. AFTER THE AIRCRAFT HAS"
202 PRINT"BEEN TURNED ON TO FINAL APPROACH TO LAND, IT WILL APPEAR IN"
204 PRINT"THE UPPER SECTION OF THE DISPLAY AND MOVE FROM RIGHT TO LEFT."
206 PRINT"THE AIRCRAFT ONLY APPEARS IN THE UPPER SECTION OF THE DISPLAY"
208 PRINT"WHILE ON FINAL APPROACH.":PRINT
210 PRINT"IF AN AIRCRAFT IS TOO HIGH TO LAND, TURN THE AIRCRAFT TO THE"
212 PRINT"RIGHT AND PROCEED TO GO BACK FOR ANOTHER APPROACH."
214 PRINT"DURING THE TIME THAT THE AIRCRAFT IS NOT BEGINNING DISPLAY"
216 PRINT"IN THE UPPER SECTION, HIT THE UP ARROW TO CLIMB TO A SAFE"
218 PRINT"ALTITUDE."
220 PRINT"HIT ENTER TO CONTINUE."
221 Y$=INKEY$:IFY$=""THEN221ELSECLS
222 CLS:GOSUB 6100:GOSUB 6200
224 PRINT@64,"UPPER SECTION CONTROLLED BY UP/DOWN ARROWS(";CHR$(91);CHR$(92);")"
    ;
226 PRINT@193,"RUNWAY";:PRINT@237," BUILDINGS ";
228 PRINT@384,"LOWER SECTION CONTROLLED BY LEFT/RIGHT ARROWS(";CHR$(93);CHR$(94)
    ;")";
230 PRINT@641,"RUNWAY";:PRINT@670,"CENTER LINE";
231 PRINT@64*8,TAB(20)"<------- (DIRECTION TO LAND IN)";
232 PRINT@896,"HIT ENTER TO CONTINUE.":DM=-1
233 Y$=INKEY$:IFY$=""THEN233ELSECLS
290 GOSUB 7200
300  GOSUB 6100 : GOSUB 6200
490 RY=0:Y=3:X=127:SET(127,3):LG=0
500 X2=2:Y2=19:RT=90:XT=1:YT=0:SET(X2,Y2)
505 X1=X2:Y1=Y2
510 IF DM THEN A$="" ELSE A$=INKEY$
```

```
511 IF NOT DM THEN 515
512 D0=D0-1:IF D0>0 THEN 515 ELSE READ D0,A:A$=CHR$(A)
513 IF A=9 THEN A=94 ELSE IF A=10 THEN A=92 ELSE IF A=8 THEN A=93
514 PRINT@64*15+PS,CHR$(A);:PS=PS+2
515 IF RT>360 THEN RT=RT-360
520 IF A$=CHR$(9) THEN RT=RT-15*TR:GOSUB 6300:GOTO 540
530 IF A$=CHR$(8) THEN RT=RT+15*TR:GOSUB 6300
540 X2=X2+XT:Y2=Y2+YT
550 GOSUB 6000:X1=X2:Y1=Y2:GOSUB 6400:GOSUB 6000
560 IF Y2<29 OR Y2>38 AND X2>109 THEN 1100
1010 X1=X:Y1=Y
1030 IF A$=CHR$(91) THEN RY=RY-.15*CR
1040 IF A$=CHR$(10) THEN RY=RY+.15*CR
1050 GOSUB 6000:X1=X2:X=X2:Y=Y+RY:Y1=Y:GOSUB 6600:GOSUB 6000
1080 GOTO 505
1100 IF A$<>CHR$(91) THEN 505
1110 X1=X:Y1=Y:GOSUB 6000
1120 X=127:Y=3:SET(X,Y)
1130 LG=0:RY=0:GOTO 505
5000 END
6000 REM TEST AND SET
6010 IF POINT(X1,Y1) THEN RESET(X1,Y1) ELSE SET(X1,Y1)
6020 RETURN
6100 REM GRAPHICS FOR GLIDESLOPE
6110 FOR I = 2 TO 29 : SET(I,14) : NEXT I
6120 FOR I = 32 TO 127 : SET(I,14)
6130 IF I < 47 THEN 6170
6145 IF I => 97 THEN K=RND(7) : GOTO 6160
6150 K = (RND(I-47))*.12
6160 FOR L = 13-K TO 13 : SET(I,L) : NEXT L
6170 NEXT I
6180 RETURN
6200 REM GRAPHICS FOR RUNWAY
6210 FOR I = 2 TO 29
6220 FOR J = 33 TO 35
6230 SET(I,J)
6240 NEXT J,I
6250 FOR I = 32 TO 122 STEP 10 : SET(I,34) : NEXT I
6260 RETURN
6300 REM CALCULATE TURN RATES
6310 XT=SIN(RT*.0174533)*SP
6320 YT=(COS(RT*.0174533)*SP)/2
6330 RETURN
6400 REM CHECK X-Y CO-ORDINATES
6405 IF LG<LC AND X2<2 AND INT(Y)=13 THEN 7030
6410 IF X2>127 OR X2<0 THEN 6440
6420 IF Y2>47 OR Y2<16 THEN 6440
6430 RETURN
6440 GOSUB 7100
6450 PRINT@256,"     RADAR CONTACT LOST"
6460 PRINT@384," AIRCRAFT OUT OF RANGE"
6470 GOSUB 6500
6480 DM=0:CLS:PRINT@448,"";:INPUT"WOULD YOU LIKE TO TRY AGAIN (Y/N)";Y$
6490 IFLEFT$(Y$,1)="Y"THEN290ELSEIFLEFT$(Y$,1)="N"THENSTOPELSEGOTO6480
6495 STOP
6500 REM TIME DELAY ROUTINE
6510 FOR I = 1 TO 3000 : NEXT I : RETURN
6600 REM CHECK FOR Y C0-0RDINATE - GLIDESLOPE
6610 IF Y=>0 THEN 6660
6620 GOSUB 7100
6630 PRINT@256,"       AIRCRAFT TOO HIGH";
6640 PRINT@384," CANNOT INTERCEPT GLIDESLOPE"
6650 GOTO 6470
6660 IF POINT(X,Y) THEN 6670 ELSE 6705
6670 IF X<48 THEN 6710
6680 GOSUB 7100
6690 PRINT@448,"...........CRASH!!!"
6700 GOTO 6470
6705 IF X>47 THEN RETURN
6710 IF X>29 AND Y=>13 THEN 6800
6720 IF X>1 AND Y=>13 THEN 6860
6730 IF X<=1 AND Y<13 THEN RETURN
6790 RETURN
6800 IF Y2=>36 OR Y2<33 THEN 6680
6810 GOSUB 7100
6820 PRINT@256,"EXCELLENT APPROACH....EXCEPT"
6830 PRINT@384,"AIRCRAFT MADE A CRASH LANDING"
6840 PRINT@512,"    SHORT OF THE RUNWAY"
6850 GOTO 6470
6860 IF Y2=>36 OR Y2<33 THEN 6970
6870 IF POINT(X,Y) THEN 6925
6880 LG=LG+1:IF LG<LC THEN RETURN
6890 GOSUB 7100
6900 PRINT@448,".....PERFECT APPROACH"
6910 PRINT@576,".....PERFECT LANDING"
6920 GOTO 6470
6925 GOSUB 7100
```

```
6930 PRINT@448,"PERFECT APPROACH....EXCEPT"
6940 PRINT@576,"THE PILOT BORED A HOLE"
6950 PRINT@704,"   IN THE RUNWAY"
6960 GOTO 6470
6970 IF Y<13 THEN RETURN
6980 GOSUB 7100
6990 PRINT@320,"PERFECT APPROACH....EXCEPT"
7000 PRINT@448,"THE AIRCRAFT MISSED THE RUNWAY"
7010 PRINT@576,".........AND CRASHED"
7020 GOTO 6470
7030 GOSUB 7100
7040 PRINT@320,"PERFECT APPROACH....EXCEPT"
7050 PRINT@448,"THE AIRCRAFT RAN OFF THE END"
7060 PRINT@576,"    OF THE RUNWAY"
7070 PRINT@704,"     AND CRASHED"
7080 GOTO 6470
7090 RETURN
7100 REM CLEAR AND CHAR SIZE
7110 CLS:PRINT CHR$(23):RETURN
7200 REM LEVEL OF PLAY
7210 IF DM THEN L=1:CLS:PRINT"FOLLOWING IS A DEMONSTRATION OF A SAMPLE LANDING P
     ATTERN!" ELSE CLS:PRINT:INPUT"SELECT LEVEL OF PLAY (1 THRU 5)";Y$:L=VAL(Y$)
7220 IF L<1 OR L>5 THEN 7210
7230 PRINT:ON L-1 GOTO 7280,7330,7380,7430
7235 CR=1:SP=1:TR=2:LC=8
7240 PRINT"LEVEL 1":PRINT
7250 PRINT"A PIPER TRI-PACER WILL ENTER ON A RIGHT DOWN WIND LEG":PRINT
7255 PRINT"THIS WILL BE EASY"
7260 PRINT:IF DM THEN PRINT "HIT 'ENTER' WHEN READY TO WATCH DEMONSTRATION." ELS
     E PRINT"HIT 'ENTER' WHEN READY TO TAKE CONTROL."
7261 Y$=INKEY$:IFY$=""THEN7261
7265 CLS:IF DM PRINT@64*15,"KEYS HIT: ";:PS=POS(0)
7270 RETURN
7280 CR=2:SP=2:TR=3:LC=8
7290 PRINT"LEVEL 2":PRINT
7300 PRINT"A TIWN CESSNA 421 WILL ENTER ON A RIGHT DOWN WIND LEG":PRINT
7310 PRINT"THIS COULD BE A DIFFICULT APPROACH"
7320 GOTO 7260
7330 CR=3:SP=3:TR=3:LC=8
7340 PRINT"LEVEL 3":PRINT
7350 PRINT"A BOEING 727 WILL ENTER ON A DOWN WIND LEG":PRINT
7360 PRINT"GET READY, THIS IS GOING TO BE TOUGH"
7370 GOTO 7260
7380 CR=4:SP=4:TR=3:LC=7
7390 PRINT"LEVEL 4":PRINT
7400 PRINT"A FAST MOVING F14 TOMCAT WILL BE NEXT FOR AN APPROACH":PRINT
7410 PRINT"ONLY THE BEST WILL BE ABLE TO VECTOR THIS AIRCRAFT FOR"
7412 PRINT"AN APPROACH.....GOOD LUCK, THE PILOT WILL NEED IT"
7420 GOTO 7260
7430 GOSUB 7100
7440 PRINT@448,".........UFO!!!!!"
7450 CR=RND(6):TR=RND(6):SP=RND(20):LC=INT(28/SP)
7460 IF INT(RND(3))<>2 THEN 7480
7470 CR=CR*-1
7480 IF INT(RND(3))<>2 THEN 7500
7490 TR=TR*-1
7500 GOSUB 6500:CLS
7510 RETURN
8000 DATA 80,0,20,9,8,9,8,9,4,9,4,9,4,9,42,0,1,10,2,10,2,10,19,0,2,91,1,91,1,91,
     30,0
9000 END
```

DEMONS: by Mike Schelhorn

Choose one of fourteen characters according to your preference for their relative strengths and weaknesses in the areas of magic, charisma, combat skill, etc. Make your move and let the game begin.

#	NAME	CLEVERNESS	CHARISMA	MAGIC	COMBAT	STRENGTH	TALISMAN
1	NOBLEMAN	2	2	6	7	7	SWORD
2	PRINCESS	2	3	8	5	5	PENDENT
3	WIZARD	2	2	10	4	6	STAFF
4	ENCHANTRESS	2	3	10	4	5	STAFF
5	WARRIOR	1	1	5	10	8	SHIELD
6	AMAZON	1	1	5	10	8	BATTLEAX
7	WOODCUTTER	1	2	5	8	10	FLASK
8	SHEPHERDESS	1	3	5	8	10	AMULET
9	TROUBADOUR	2	4	6	5	5	LYRE
10	SONGSTRESS	2	4	6	5	5	LYRE
11	JESTER	3	3	7	5	4	RING
12	HUNTRESS	2	2	6	7	7	AMULET
13	SCHOLAR	3	2	8	4	4	CROSS
14	PRIESTESS	3	3	7	4	5	CROSS

WHICH CHARACTER DO YOU CHOOSE?

```
10 DEFINTA-Z:CLEAR(550):DIM M$(14):RANDOM:T$(0)="SWORD":T$(1)="LYRE":T$(2)="BATT
   LEAX":T$(3)="AMULET":T$(4)="SHIELD":T$(5)="RING":T$(6)="PENDENT":T$(7)="CRO
   SS":T$(8)="STAFF":T$(9)="FLASK"
15 MA$(2)="SPEARBOLT":MA$(3)="FIREBLAST":MA$(4)="FIREBALL":MA$(5)="LIGHTNING":MA
   $(7)="SCREEN"
30 CLS:PRINT"#   NAME   CLEVERNESS  CHARISMA  MAGIC COMBAT  STRENGTH TALISMAN":FO
   RA=1TO14:READC$,I,C,M,F,H,T:PRINTA;"   ";C$;TAB(16)I;TAB(26)C;TAB(34)M;TAB(4
   1)F;TAB(48)H;TAB(55)T$(T):NEXT:INPUT"WHICH CHARACTER DO YOU CHOOSE";B:CLS:I
   FB=0GOTO50
40 RESTORE:FORA=1TOB:READC$,I,C,M,F,H,T:NEXT:H1=H:M1=M:T(T)=1:IFB/2=INT(B/2)THEN
   G=0:GOTO190:ELSEG=1:GOTO190
50 INPUT"NAME";C$:INPUT"CLEVERNESS";I:INPUT"CHARISMA";C:INPUT"STRENGTH";H:INPUT"
   MAGIC";M:INPUT"COMBAT";F:H1=H:M1=M:INPUT"GENDER";A$:IFLEFT$(A$,1)="M"THENG=
   0ELSEG=1
60 PRINT"TALISMANS":FORT=0TO9:PRINTT+1;"   ";T$(T):NEXT:INPUT"WHICH TALISMAN DO Y
   OU WANT";A:T(A-1)=1
190 M$(0)="[[[[[[[[[[   [[[[[[[[[[[[[[######":M$(1)="[[[[[[[[[[[   [[[[[[[[[[[######
    ##":M$(2)="[[[[[[[[[$$$$[[[[[[[[[   ########":M$(3)="[[[[[+[[$$$$$[[[[[   ##
    #######":M$(4)="[[[[[[$$$$[[[[[[   ####+#####"
200 M$(5)="[[[[[[[[[[[[[[[[   ########   ":M$(6)="[[[[[[[[[[[[[[[   #########
    $":M$(7)="[[[[[[[[[[[[[   + ########   $$":M$(8)="[[[[[[[[[[[[   #######
    #   $$$$":M$(9)="[[[[[[[[[[[   #######   $$$$$"
210 M$(10)="[[[+[[[[   [[[########   $$$$$$":M$(11)="[[[[[[   [[[[#########   $$$$
    +$$$":M$(12)="[[   [[[[[#########   $$$$$$$$":M$(13)="   [[[[[[[#########
    $$$$$$$$":M$(14)="[[[[[[[#########   $$$$$$$$"
220 GOSUB700:FORA=1TO3
230 X=RND(15)-1:Z=RND(31):A$="?":IFMID$(M$(X),Z,1)="?"THEN230ELSEGOSUB970:NEXT
240 X=RND(15)-1:Z=RND(31):IFMID$(M$(X),Z,1)="?"THEN240ELSEA$="H":B$=A$:GOSUB970:
    D=1:X1=X:Z1=Z
350 CLS:PRINT CHR$(23):FORA=0TO14:PRINTM$(A):NEXT:PRINT"DAY #";D;:INPUT"ENTER YO
    UR MOVE";B:A$=B$:GOSUB970:CLS:ONB+1GOTO360,400,410,420,430,440,450,460,470
355 GOSUB700:A$="*":GOSUB970:GOTO350
360 CLS:INPUT"DO YOU WISH TO REBUILD YOUR MAGIC OR STRENGTH";D$:IFLEFT$(D$,1)="M
    "THEN380
370 IF H1=H PRINT"YOU ARE ALREADY AT MAXIMUM STRENGTH":GOTO990
372 IFT(9)=1PRINT"A DRINK FROM YOUR MAGIC FLASK HEALS ALL YOUR WOUNDS":S=1:H1=H:
    GOTO990
375 H1=H1+2:IFH1>HTHENH1=H:S=3:GOTO990ELSE990
380 IF M1=M PRINT"YOU ARE ALREADY AT MAXIMUM MAGIC LEVEL":GOTO990
390 M1=M1+3:IFM1>MTHENM1=M:S=2:GOTO990ELSE990
400 Z1=Z+1:GOTO480
410 Z1=Z+1:X1=X-1:GOTO480
420 X1=X-1:GOTO480
430 Z1=Z-1:X1=X-1:GOTO480
440 Z1=Z-1:GOTO480
450 Z1=Z-1:X1=X+1:GOTO480
460 X1=X+1:GOTO480
470 Z1=Z+1:X1=X+1
480 IF X1<0ORX1>140RZ1<1ORZ1>31THEN490ELSE500
490 PRINT"YOU MADE AN INCORRECT MOVE ,TRY AGAIN":GOTO990
500 X=X1:Z=Z1:B$=MID$(M$(X),Z,1):A$="*":GOSUB970:IFB$=" ":S=1:GOTO550
510 IF B$="+"S=1:GOSUB1000:GOSUB940:GOTO580
520 IF B$="[":S=2:GOTO550
530 IFB$="#"S=3:GOTO550
540 IFB$="$"S=4:GOTO550
545 IFB$="?"THENB$=" ":S=5:GOSUB1000:GOSUB940:GOTO2400
547 IFB$="H"GOTO3010
550 IFI+S<5+RND(3)-2ANDRND(5)=1CLS:GOSUB1000:GOSUB940
555 X1=X:Z1=Z:S=INT(S*6/H1+.4)-N:D=D+S:IFD+D2>150+D1GOTO2990
```

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```
560 ONRND(5)GOTO350,350,350,350,2000
570 GOSUB350:GOTO350
580 CLS:INPUT"DO YOU WISH TO TELEPORT";D$:IF D$="NO"555
590 IF X=3THENP=1:GOTO620
595 IF X=4THENP=2:GOTO620
600 IF X=7THENP=3:GOTO620
610 IF X=10THENP=4ELSEP=5
620 A$=B$:GOSUB970:A$="*":IF M1<3 THEN PRINT"YOU ONLY HAVE ";M1;"MAGIC POINTS TH
    E PORTAL IS BEGINNING TO WORK ,YOU GET RANDOMIZED TO A DIFFERENT DESTINATIO
    N":GOSUB940:GOTO640
630 S=S+3:PRINT"HERE IS A DISPLAY OF THE WAY THE PORTALS ARE LAID OUT :":PRINT"1
    +    2+":PRINT"   3+":PRINT"4+   5+":PRINT"YOU ARE AT ";P;:INPUT"WHICH ONE DO Y
    OU WISH TO TRAVEL TO";A:M1=M1-3:ON A GOTO 650,660,670,680,690
640 A=RND(5):IFP=AGOTO640ELSEONAGOTO650,660,670,680,690
650 X=3:Z=6:GOSUB970:GOTO555
660 X=4:Z=26:GOSUB970:GOTO555
670 X=7:Z=18:GOSUB970:GOTO555
680 X=10:Z=4:GOSUB970:GOTO555
690 X=11:Z=28:GOSUB970:GOTO555
700 CLS:PRINT"TREASURE",TR:PRINT"DAY #",D:PRINT"DAYS TO GO",150-D+D1-D2:PRINT"NA
    ME",C$:PRINT"CLEVERNESS",I:PRINT"CHARISMA",C:PRINT"COMBAT",F:PRINT"TOTAL ST
    RENGTH",H:IFH1>HTHENH1=H
710 PRINT"STRENGTH",H1:PRINT"WOUNDS",H-H1:PRINT"TOTAL MAGIC",M:PRINT"PRESENT MAG
    IC",M1:PRINT"MAGIC USED",M-M1:PRINT"TALISMANS";:FORA=0TO9:IFT(A)=1PRINT,T$(
    A),
720 NEXT:GOSUB940:RETURN
800 FORR=90TO103:FORY=3TO8:SET(R,Y):NEXTY,R:FORR=79TO116:FORY=11TO26:SET(R,Y):NE
    XTY,R:FORY=27TO29:FORR=86TO109:SET(R,Y):NEXTR,Y:P=11:FORY=30TO44STEP2:P=P-1
    :FORR=0TOP:SET(R+86,Y):SET(R+86,Y+1):SET(109-R,Y):SET(109-R,Y+1):NEXTR,Y
810 FORR=76TO89:FORY=46TO47:SET(R,Y):SET(30+R,Y):NEXTY,R:FORR=92TO101:SET(R,9):N
    EXT:FORR=93TO100:SET(R,10):NEXT:FORR=75TO80:FORY=25TO26:SET(R,Y):SET(R+39,Y
    ):NEXTY,R:FORR=84TO85:FORY=15TO26:RESET(R,Y):RESET(R+26,Y):NEXTY,R
820 RESET(90,3):RESET(103,3):RESET(97,6):FORR=94TO99:RESET(R,8):NEXTR:RESET(93,4
    ):RESET(94,4):RESET(100,4):RESET(99,4):FORY=4TO6:SET(89,Y):SET(104,Y):NEXT:
    FORY=3TO5:SET(88,Y):SET(105,Y):NEXT
830 IFL=90RL=10RL=12THENFORY=0TO2:SET(93,Y):SET(100,Y):NEXT
840 IFL=90RL=10ORL=17ORL=18THENFORY=3TO36:SET(76,Y):SET(75,Y):NEXT
850 IFL=90RL=10THENFORY=3TO8:SET(71,Y):SET(80,Y):NEXT:FORR=71TO80:SET(R,9):NEXT
860 IFL=15THENFORY=9TO28:SET(76,Y):NEXT
870 IFL=11THENFORY=27TO28:SET(75,Y):SET(77,Y):SET(79,Y):SET(115,Y):SET(117,Y):SE
    T(119,Y):NEXT:FORY=2TO4:SET(88,Y):SET(89,Y):SET(104,Y):SET(105,Y):NEXT
880 IFL=18THENP=-1:FORY=24TO46STEP2:P=P+1:FORR=86-PTO109+P:SET(R,Y+1):NEXTR:N
    EXTR,Y:FORY=6TO9:SET(88,Y):SET(105,Y):NEXT:FORR=88TO105:SET(R,3):NEXT
890 IFL=16THENFORR=40TO70:FORY=25TO27:SET(R,Y):NEXTY,R:FORR=71TO74:SET(R,26):NEX
    T
900 IFL=13THENFORR=70TO120:FORY=2TO47:IFPOINT(R,Y)RESET(R,Y):NEXTY,R:ELSESET(R,Y
    ):NEXTY,R
930 GOSUB940:CLS:RETURN
940 FOR A=1TO2500:NEXT:RETURN
950 DATA NOBLEMAN,2,2,6,7,7,0,PRINCESS,2,3,8,5,5,6,WIZARD,2,2,10,4,6,8,ENCHANTRE
    SS,2,3,10,4,5,8,WARRIOR,1,1,5,10,8,4,AMAZON,1,1,5,10,8,2,WOODCUTER,1,2,5,8,
    10,9,SHEPHERDESS,1,3,5,8,10,3,TROUBADOUR,2,4,6,5,5,1,SONGSTRESS,2,4,6,5,5,1
960 DATAJESTER,3,3,7,5,4,5,HUNTRESS,2,2,6,7,7,3,SCHOLAR,3,2,8,4,4,7,PRIESTESS,3,
    3,7,4,5,7
970 E=31-Z:M1$=MID$(M$(X),1,Z-1):M2$=MID$(M$(X),Z+1,E):M$(X)=M1$+A$+M2$:RETURN
990 A$="*":GOSUB940:GOSUB970:GOTO550
1000 S1=0:H3=0:EM=0:M2=0:I1=0:T1=0:L=RND(28):ONLGOTO1010,1020,1040,1060,1070,108
     0,1090,1100,1110,1120,1130,1140,1150,1200,1210,1220,1230,1240,1300,1310,132
     0,1330,1340,1360,1370,1380,1390,1400
1010 A=RND(10)-1:IFT(A)=1PRINT"YOU LOSE YOUR ";T$(A):T(A)=0:RETURN
1020 PRINT"YOU ACCIDENTLY STUMBLE UPON A VORTEX OF EVIL":IFT(7)=1PRINT"YOUR HOLY
     ";T$(7);" DESTROYS IT":RETURNELSE IFT(6)=1PRINT"YOUR MAGIC ";T$(6);" DESTR
     OYS IT":RETURN
1025 IF M1>=4PRINT"YOU SPEND 4 MAGIC POINTS FIGHTING IT.":M1=M1-4:RETURN
1030 PRINT"IT IS TOO MUCH FOR YOU AND YOU DIE":GOTO3000
1040 PRINT"YOU ARE ATTACKED BY A SWARM OF KILLER ANTS":IF H1>=5PRINT"YOU RECIEVE
     4 WOUNDS IN THE FIGHT THAT ENSUES":H1=H1-4:RETURN
1050 PRINT"YOU ARE CRITICALLY WOUNDED AND DIE":GOTO3000
1060 IFT(3)=0ORS<>5 PRINT"RATS EAT SOME OF YOUR FOOD.":PRINT"YOU HAVE 12 LESS DA
     YS TO COMPLETE YOUR QUEST.":D2=D2+12:RETURN
1070 IFS<>5ORB$="+"PRINT"YOU STUMBLE INTO A TELEPORTATION VORTEX":PRINT"YOU ARE
     TELEPORTED TO ANOTHER PLACE":GOSUB940:A$=B$:GOSUB970:A$="*":X=RND(15)-1:Z=R
     ND(31):B$=MID$(M$(X),Z,1):GOSUB970:X1=X:Z1=Z:RETURNELSE1000
1080 IFS<>5PRINT"YOU ENTER AN EVIL AREA WHICH TAKES TWELVE DAYS TO TRAVERSE":S=1
     2:RETURN
1090 IFS<>5ANDRND(2)=1PRINT"YOU LOSE ALL YOUR TREASURE":TR=0:RETURNELSE1000
1100 C1$="GLORB":F2=8:H2=6:H3=1:M2=10:T1=500:GOTO1250
1110 C1$="DEVIL":F2=9:H2=9:H3=1:S2=6:GOTO1160
1120 C1$="DEMON":F2=8:H2=7:H3=1:S2=2:GOTO1160
1130 C1$="WEREWOLF":F2=8:H2=8:S1=1:GOTO1160
1140 C1$="GARGOYLE":F2=7:I1=3:H2=7:T1=100:GOTO1160
1150 C1$="WRAITH":F2=6:I1=3:H2=4:H3=1:S1=1:T1=200:M2=8:GOTO1160
1160 PRINT"YOU ENCOUNTER A ";C1$:GOSUB800:IFT(7)=1PRINT"YOUR HOLY ";T$(7);" FRIG
     HTENS HIM AWAY":RETURN:ELSEGOTO1450
1200 C1$="BANDIT":I1=2:F2=6:M2=6:H2=6:GOTO1250
1210 C1$="EVIL WARRIOR":I1=2:F2=10:M2=4:H2=8:T1=50:GOTO1250
1220 C1$="GIANT":I1=3:F2=8:M2=4:H2=14:T1=100:GOTO1250
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1230 Cl$="WARLOCK":I1=3:F2=4:H2=5:M2=12:T1=50:GOTO1250
1240 Cl$="WITCH":I1=3:F2=4:H2=4:M2=12:T1=50:GOTO1250
1250 PRINT"YOU MEET A ";Cl$:GOSUB800:GOTO1450
1300 Cl$="WILDMAN":I1=2:F2=6:H2=6:T1=25:GOTO1350
1310 Cl$="WOLF":F2=5:H2=5:GOTO1350
1320 Cl$="BEAR":I1=3:F2=8:H2=10:GOTO1350
1330 Cl$="SNAKE":I1=2:F2=4:H2=4:GOTO1350
1340 Cl$="LION":I1=3:F2=7:H2=7:
1350 PRINT"YOU COME FACE TO FACE WITH A ";Cl$:IFT(3)=1THEN PRINT"YOUR ";T$(3);"
     FRIGHTENS IT AWAY":RETURNELSE1450
1360 Cl$="GRIFFON":F2=8:H2=8:T1=50:S1=1:GOTO1410
1370 Cl$="DRAGON":F2=9:H2=9:S1=2:T1=1000:GOTO1410
1380 Cl$="CENTAUR":F2=6:H2=8:I1=3:M2=6:T1=50:GOTO1410
1390 Cl$="TROLL":F2=6:H2=9:H3=1:I1=2:T1=100:GOTO1410
1400 Cl$="GOBLIN":T1=200:F2=7:H2=7:M2=4:I1=2
1410 PRINT"YOU MEET A ";Cl$
1450 IFI1+RND(3)-2<C+T(1)PRINT"YOUR GREAT SINGING LULLS THE ";Cl$;" TO SLEEP":RE
     TURN
1460 PRINT"THE ";Cl$;" IS IN A NASTY MOOD"
1470 PRINT"YOU MAY ATTEMPT TO FLEE. WHETHER YOU SUCCEED OR NOT YOU RECIEVE ONE W
     OUND":INPUT"DO YOU TRY TO FLEE";D$:IFLEFT$(D$,1)="N"THEN1500
1480 IFH1>H2+RND(5)-3PRINT"YOU LEAVE THE ";Cl$;" BEHIND BUT RECIEVE ONE WOUND":H
     1=H1-1:GOSUB940:A$=B$:GOSUB970:ONRND(8)GOTO400,410,420,430,440,450,460,470
1490 H1=H1-1:PRINT"YOU ARE UNSUCCESSFUL AND RECIEVE ONE WOUND"
1498 REM*COMPUTER MOVE
1500 A=0:YM=0:EM=0:J=0:K=0:Q=0:PRINTC$;" MAGIC=";M1,Cl$;" MAGIC=";M2:PRINTC$;" S
     TRENGTH=";H1,Cl$;" STRENGTH=";H2:IFM2=0THENIFS1=2THENEM=3:J=1:GOTO1560ELSE1
     560
1510 EM=RND(8):IFEM=8ANDM2>5THENM2=M2-6:EM=0::H2=H2+H2:J=0:GOTO1560
1520 IFEM=7ANDM2>2THENM2=M2-3:J=2:GOTO1560
1530 IFEM=6ANDM2>2THENM2=M2-3:J=2:H2=H2+2:EM=0:GOTO1560
1540 IFEM=1THENM2=M2-EM:J=-2:GOTO1560
1550 IFM2-EM>=0THENM2=M2-EM:J=2ELSEEM=0
1560 REM*BEGIN HUMAN MOVE
1570 IFT(5)=1INPUT"DO YOU FIRE A BLAST WITH YOUR RING";D$ELSE1590
1580 IFLEFT$(D$,1)<>"N"THENYM=3:K=2:GOTO1700
1590 IFM1>0INPUT"DO YOU USE MAGIC";D$:ELSEFORY=1TO500:NEXT:GOTO1700
1600 IFLEFT$(D$,1)="N"THEN1700
1610 CLS:PRINT"# SPELL","COST","EFFECTS":PRINT"1 APPARITION","1","+2 COMBAT":P
     RINT"2 ";MA$(2),"2","-1 STRENGTH ENEMY":PRINT"3 ";MA$(3),"3","-2 STRENGTH
      ENEMY":PRINT"4 ";MA$(4),"4","-3 STRENGTH ENEMY":PRINT"5 ";MA$(5),"5","-4
      STRENGTH ENEMY"
1620 PRINT"6 STRENGTH","3","+2 YOUR STRENGTH":PRINT"7 ";MA$(7),"3","DEFLECTS E
     NEMY MAGIC":PRINT"8 SUPER POWER","6","DOUBLES STRENGTH":PRINT"9 TELEPATHY
     ","1","KNOW ENEMY MOVE":PRINT"10 MAGIC BLADE","3","HURTS '2' CREATURES"
1630 INPUT"WHICH SPELL DO YOU CHOOSE";YM:CLS:IFYM=8ANDM1>5THENM1=M1-6:YM=0:H1=H1
     +H1:K=2:GOTO1700
1635 IFYM=10ANDM1>2ANDS1=1THENM1=M1-3:K=2:S1=0:GOTO1700
1640 IFYM<>9THEN1660ELSEM1=M1-1:YM=0:K=1:PRINT"THE ";Cl$;" CHOOSES ";
1650 IFEM>0PRINT"MAGIC SPELL #";EM:GOTO1560ELSEPRINT"COMBAT":GOTO1560
1660 IFYM=7ANDM1>2THENM1=M1-3:K=2:GOTO1700
1670 IFYM=6ANDM1>2THENM1=M1-3:K=2:YM=0:H1=H1+2:GOTO1700
1680 IFYM=1THENK=-2:YM=0:M1=M1-1:GOTO1700
1690 IFM1-YM>=0ANDYM<>9THENM1=M1-YM:K=2:GOTO1700
1695 YM=0:PRINT"YOU DON'T HAVE ENOUGH MAGIC FOR THAT SPELL":GOTO1590
1700 IFJ>0ANDK>0THEN1800
1705 IFS1=2ANDT(0)=0ANDT(2)=0ANDK=0THENPRINT"ONLY MAGIC OR THE SWORD OR BATTLEAX
     E CAN KILL THE ";Cl$:K=K+4
1710 FH=F+INT(H1/3+I)+2*T(0)-K:FE=F2+INT(H2/2)-J:PRINT"FH=";FH,"FE=";FE:B=RND(5)
     :IFFE>=FH+3THENONBGOTO1750,1760,1760,1760,1790
1720 IFFE>FHTHENONBGOTO1750,1790,1750,1750,1760
1730 IFFE=FHTHENONBGOTO1750,1780,1800,1800,1800
1740 IFFH>=FE+3THENONBGOTO1770,1790,1780,1780,1770ELSEONBGOTO1790,1790,1780,1780
     ,1770
1750 A=1-T(4):GOTO1795
1760 A=2-T(4):GOTO1795
1770 Q=2:GOTO1795
1780 Q=1:GOTO1795
1790 Q=1:A=1-T(4)
1795 IFT(2)=1PRINT"YOUR ";T$(2);" SCORES ONE HIT":Q=Q+1
1800 IFEM>1ANDEM<6THEN1810ELSE1825
1810 IFYM=7ANDEM<6ANDEM>1PRINT"YOUR MAGIC SCREEN DEFLECTS ";Cl$;" MAGIC ";MA$(EM
     ):GOTO1850ELSEIFT(6)=1ANDEM<6ANDEM>0PRINT"YOUR ";T$(6);" ABSORBS ENEMY MAGI
     C ";MA$(EM):GOTO1825
1820 A=A+EM-1:PRINT"THE ";Cl$;" HITS YOU WITH A ";MA$(EM)
1825 IFYM<1ORYM>5GOTO1850
1830 IFEM=7PRINT"ENEMY MAGIC SCREEN DEFLECTS YOUR MAGIC ";MA$(YM):GOTO1850
1840 PRINT"YOUR ";MA$(YM);" HIT THE ";Cl$:Q=Q+YM-1
1850 H1=H1-A:H2=H2-Q:PRINT"YOU RECEIVED ";A;" WOUNDS AND THE ";Cl$;" RECIEVED ";
     Q:IFH1<=0PRINT"THE ";Cl$;" KILLS YOU":GOTO3000
1870 IFH2<=0PRINT"YOU KILL THE ";Cl$:TR=TR+T1:GOSUB940:GOSUB700:RETURN
1880 IFT(8)=1ANDM1<MPRINT"YOUR MAGIC ";T$(8);" REGENERATES 1 MAGIC POINT":M1=M1+
     1
1890 H2=H2+H3:IFH2<3ANDRND(3)=1PRINT"THE ";Cl$;" RUNS AWAY":TR=TR+T1:GOSUB940:GO
     SUB700:RETURN
1895 IFH1>2ORL<14ORL>19THEN1500
1900 INPUT"DO YOU WISH TO SURRENDER";D$:IFD$="NO"THEN1500
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1910 PRINT"THE ";C1$;" ACCEPTS YOUR OFFER OF SURRENDER":PRINT"YOU GIVE UP ALL TA
     LISMANS,MAGIC,TRESURE AND 20 DAYS FOOD":D2=D2+20:M1=0:TR=0:FORA=0TO9:T(A)=0
     :NEXT:PRINT"THE ";C1$;" WALKS HAPPILY AWAY":GOSUB700:GOSUB940:GOSUB970:GOTO
     570
2000 ON RND(11)GOTO2010,2030,2050,2070,2090,2110,2130,2140,2150,2160,2170
2010 PRINT"YOU MEET AN ELF":IF C+T(1)<5THENPRINT"HE GETS FRIGHTENED AND RUNS AWA
     Y.":GOTO570
2020 PRINT"THE ELF GIVES YOU A CHARM WHICH INCREASES YOUR MAGIC 1 POINT.":M=M+1:
     M1=M1+1:GOTO570
2030 PRINT"YOU MEET AN ENCHANTED FROG":INPUT"DO YOU KISS IT";D$:IF D$="NO"THEN57
     0
2040 IFG=0THENPRINT"THE FROG IS CHANGED INTO A HANDSOME PRINCE WHO OFFERS YOU HI
     S   LOVE AND A MAGIC CHARM WHICH INCREASES YOUR MAGIC 1 POINT":M=M+1:M1=M1+
     1:GOTO570
2045 PRINT"THE FROG IS TURNED INTO A BEAUTIFUL PRINCESS WHO FALLS IN  LOVE WITH
     YOU":PRINT"SHE GIVES YOU A MAGIC NECKLACE WHICH ADDS 1 TO YOUR MAGIC":M=M+1
     :M1=M1+1:GOTO570
2050 PRINT"YOU MEET A HERMIT":IF C+T(1)<4PRINT"HE GETS FRIGHTENED AND RUNS AWAY.
     ":GOTO570
2060 PRINT"THE HERMIT GIVES YOU SIX DAYS WORTH OF FOOD TO BE RID OF YOU":D1=D1+6
     :GOTO570
2070 PRINT"YOU MEET A SIMPLETON WHO OFFERS YOU SIX DAYS FOOD":D1=D1+6:GOTO570
2090 PRINT"YOU MEET A KOBOLD":IFC+T(3)<3PRINT"HE IS FRIGHTENED AND DISAPEARS":GO
     TO570
2100 PRINT"HE LIKES YOU AND GIVES YOU A CHARM THAT ADDS 1 TO YOUR HEALTH":H1=H1+
     1:H=H+1:GOTO570
2110 IFG=0ANDH1<HPRINT"YOU MEET A ELF PRINCE WHO HEALS YOUR WOUNDS":H1=H:GOTO570
2120 IFH1<HPRINT"YOU MEET A NYMPH WHO HEALS ALL YOUR WOUNDS":H1=H:GOTO570ELSE570
2130 IFH1<HPRINT"YOU MEET A HEALER WHO HEALS YOUR WOUNDS":H1=H:GOTO570ELSE570
2140 IFH1=HTHEN2150ELSEPRINT"YOU DRINK FROM A MAGIC SPRING WHICH HEALS ALL YOUR
     WOUNDS":H1=H:GOTO570
2150 IFM1=MGOTO350ELSEPRINT"YOU EAT A MAGIC FRUIT WHICH RESTORES YOUR MAGIC":M1=
     M:GOTO570
2160 PRINT"A LUCKY SHOT KILLS A WILD BOAR. YOU GET TWELVE MORE DAYS OF FOOD":D1=
     D1+12:GOTO570
2170 IFG=0PRINT"YOU MEET A UNICORN WHO ALLOWS YOU TO RIDE ON HIS BACK":N=1:GOTO5
     70
2180 IFC+T(3)+T(1)>4PRINT"YOU MEET A WINGED HORSE WHO ALLOWS YOU TO RIDE ON HIS
     BACK":N=1:GOTO570ELSE570
2400 T=RND(3):CLS:T1=0:GOSUB2700:PRINT"YOU HAVE MADE IT TO THE ENCHANTED CASTLE"
     :PRINT"THE CASTLE CONTAINED :";:FORA=1TOT:ONRND(3)GOTO2500,2500,2530
2500 T2=RND(20)*100:GOTO2640
2530 ON RND(10)GOTO2540,2550,2560,2570,2580,2590,2600,2610,2620,2630
2540 IFT(0)=1ORT(2)=1THEN2550ELSEPRINTT$(0);". THIS ADDS TWO TO YOUR COMBAT":T(0
     )=1:GOTO2640
2550 IFT(1)=1THEN2560ELSEPRINTT$(1);".THIS ADDS ONE TO YOUR CHARISMA":T(1)=1:GOT
     O2640
2560 IFT(2)=1ORT(0)=1THEN2570ELSEPRINTT$(2);".THIS ADDS ONE TO YOUR COMBAT":T(2)
     =1:GOTO2640
2570 IFT(3)=1THEN2580ELSEPRINTT$(3);".THIS WARDS OFF EVIL ANIMALS":T(3)=1:GOTO26
     40
2580 IFT(4)=1THEN2590ELSEPRINTT$(4);".THIS SUBTRACTS ONE WOUND WHEN YOU ARE HIT"
     :T4=1:GOTO2640
2590 IFT(5)=1THEN2600ELSEPRINTT$(5);" THIS ALLOWS YOU TO CAST THE BLAST SPELL FO
     R FREE":T(5)=1:GOTO2640
2600 IFT(6)=1THEN2610ELSEPRINTT$(6);".THIS NEGATES ENEMY MAGIC":T(6)=1:GOTO2640
2610 IFT(7)=1THEN2620ELSEPRINTT$(7);".THIS DESTROYS DEMONS":T(7)=1:GOTO2640
2620 IFT(8)=1THEN2630ELSEPRINTT$(8);" THIS REGENERATS MAGIC IN COMBAT":T(8)=1:GO
     TO2640
2630 IFT(9)=1THEN2540ELSEPRINTT$(9);".THIS HELPS YOU HEAL WHEN WOUNDED":T(9)=1
2640 T1=T2+T1:T2=0:NEXT:TR=TR+T1:PRINTT1;" TREASURE,YOU NOW HAVE ";TR:GOSUB940:G
     OSUB940:GOTO350
2700 FORY=21TO47:FORR=6TO7:SET(R,Y):SET(R+19,Y):SET(R+92,Y):SET(R+114,Y):NEXTR,Y
     :FORR=0TO5:Y=21:SET(R,Y):SET(R+26,Y):SET(R+92,Y):SET(R+122,Y):NEXT:FORY=15T
     O21:FORR=0TO1:SET(R,Y):SET(R+30,Y):SET(R+92,Y):SET(R+126,Y):NEXTR,Y
2710 FORR=1TO31STEP4:SET(R,15):SET(R+1,15):SET(R+94,15):SET(R+95,15):NEXT:FORR=0
     TO31:SET(R,16):SET(R+94,16):NEXT:FORR=26TO97STEP4:SET(R,26):SET(R+1,26):NEX
     T:FORR=26TO97:SET(R,27):NEXT
2720 FORR=52TO72:SET(R,38):NEXT:FORY=39TO47:SET(52,Y):SET(72,Y):NEXT:FORR=0TO127
     :SET(R,47):NEXT:RETURN
2990 PRINT"YOU RUN OUT FOOD AND DIE OF STARVATION"
3000 PRINT"YOU ARE DEAD":IF RND(4)=1PRINT"YOU ARE REINCARNATED WITH ALL YOUR FOR
     MER POWERS AND TALISMANS":H1=H:M1=M:GOSUB940:D=1:GOSUB700:GOTO570ELSE3050
3010 PRINT"YOU WIN":PRINT"YOU END UP WITH ";TR;" TREASURE"
3020 IFTR>4000PRINT"YOU ARE A BIG WINNER!":PRINT"YOU HAVE ENOUGH TREASURE DO BUY
     THAT PALACE YOU'VE DREAMED OF":PRINT"YOU LIVE HAPPILY EVER AFTER FOR THE R
     EST OF YOUR DAYS":GOTO 3050
3025 IFTR>2500PRINT"YOU DID ALRIGHT ,YOU HAVE ENOUGH TREASURE TO BUY ALMOST ANYT
     HING":GOTO3050
3030 IFTR>1000PRINT"YOU HAVE ENOUH TREASURE TO LIVE COMFORTABLY FOR THE REMAINDE
     R OF YOUR LIFE":GOTO3050
3040 PRINT"YOU DON'T HAVE ENOUGH TREASURE TO BUY EVEN A COTTAGE.  YOU LIVETHE R
     EST OF YOUR LIFE IN JAIL FOR THIEVERY":GOTO3050
3050 GOSUB940:CLS:INPUT"WOULD YOU LIKE ANOTHER GAME";A$:IFLEFT$(A$,1)="Y"THEN10E
     LSEPRINT"OKAY , GOODBYE"
```

BASEBALL: by John Rodgers

With this program, America's favorite pastime can now be your TRS-80's, as well. A full nine inning format, three choices of pitches, bat swing timing and occasional errors keep things interesting. An excellent choice for disgruntled Red Sox, Yankee and Dodger fans.
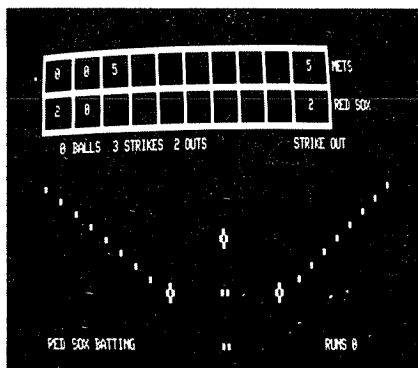

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5 CLS:PRINT"B A S E B A L L"
7 PRINT"WOULD YOU LIKE INSTRUCTIONS....1-YES....2-NO":INPUTA:IFA=1THEN9750ELSE10
10 CLS:INPUT"NAME OF 1ST TEAM";A$
15 INPUT"NAME OF 2ND TEAM";B$:CLS
55 FORA=0TO104:SET(A,1):SET(A,7):SET(A,13):NEXTA
62 FORB=1TO13
65 SET(0,B):SET(10,B):SET(20,B):SET(30,B):SET(40,B):SET(50,B)
67 SET(60,B):SET(70,B):SET(80,B):SET(90,B):SET(104,B):NEXTB
70 PRINT@117,A$;:PRINT@245,B$;
75 PRINT@111,U;:PRINT@239,V;
80 GOSUB507
90 SET(42,38):SET(43,37):SET(43,39):SET(44,38)
100 SET(82,38):SET(83,37):SET(83,39):SET(84,38)
110 SET(62,30):SET(63,29):SET(63,31):SET(64,30)
120 SET(62,38):SET(64,38):SET(62,46):SET(64,46):W=36:X=90
150 SET(X,W):IFX=125THEN170ELSEW=W-2:X=X+5:GOTO150
170 W=36:X=36
180 SET(X,W):IFX=1THEN190ELSEW=W-2:X=X-5:GOTO180
190 PRINT@960,A$" BATTING";
200 PRINT@1010,"RUNS" L;
205 PRINT@365,"                    ";
210 RESET(63,46):RESET(63,47):SET(63,37):GOSUB220:GOTO300
220 BB=0:IFPOINT(83,38)PRINT@365,"MAN ON 1ST";:BB=1
230 IFPOINT(63,30)PRINT@365,"MAN ON 2ND";:BB=2
240 IFPOINT(43,38)PRINT@365,"MAN ON 3RD";:BB=3
250 IFPOINT(83,38)IFPOINT(63,30)PRINT@365,"MAN ON 1ST & 2ND";:BB=4
260 IFPOINT(83,38)IFPOINT(43,38)PRINT@365,"MAN ON 1ST & 3RD";:BB=5
270 IFPOINT(63,30)IFPOINT(43,38)PRINT@365,"MAN ON 2ND & 3RD";:BB=6
280 IFPOINT(83,38)IFPOINT(63,30)IFPOINT(43,38)PRINT@365,"BASES LOADED      ";:BB=
    7
290 RETURN
300 CC=0:EE=0
325 IFS>16IFV+L>UTHEN5900
350 O=0:D$=INKEY$:IFD$="1"THEN360
352 IFD$="2"THENCC=1:GOTO360
353 IFD$="3"THENCC=2:GOTO360
355 GOTO350
360 H=37
370 AA=0:SET(63,H):RESET(63,H-1)
371 IFH<>47THEN380ELSEZ=RND(5):IFZ=3Z=1
372 IFZ=4Z=2
373 EE=EE+1:IFEE=5THEN374ELSEC$=INKEY$:GOTO1550
374 IFZ=5Z=1
375 IFZ=1J=J+1:PRINT@365,"STRIKE            ";:GOSUB8000:GOSUB490:RESET(63,H):GOTO
    200
376 IFZ=2I=I+1:PRINT@365,"BALL              ";:GOSUB8000:GOSUB500:IFI=4I=0:J=0:GOS
    UB490:O=1:GOTO910
378 GOTO200
380 C$=INKEY$:IFC$=" "THENAA=1
384 IFC$=" "IFH<46THENRESET(63,H):Z=1:GOTO375
387 IFAA=1IFH=46GOSUB500:GOTO900
390 ONCCGOTO1500,1510
395 H=H+1:GOTO370
490 IFO=5J=J+1:RESET(63,46)
491 IFO=7RESET(63,46):J=0:I=0
493 IFI=4J=0:I=0
494 IFJ=3PRINT@365,"STRIKE OUT        ":GOSUB507:FORY=0TO200:NEXTY:K=K+1:J=0:I=0
    :SS=SS+1
```

```
500 IFK=3I=0:J=0:PRINT@322,I;"BALLS " J;"STRIKES " K;"OUTS"
502 IFK=3:PRINT@365,"3 OUTS     ";:GOSUB8000:GOTO5900
504 IFK=3K=0
507 PRINT@322,I;"BALLS " J;"STRIKES " K;"OUTS":RETURN
900 O=RND(9):W=0
901 IFO=90=5
902 IFO=60=7
903 IFO=80=7
904 IFO=1PRINT@365,"SINGLE          ":GOSUB8000
905 IFO=2PRINT@365,"DOUBLE          ":GOSUB8000
906 IFO<5HH=HH+1
907 GOTO925
910 PRINT@365,"WALK            ":GOSUB8000:RESET(63,47):W=1
925 IFO=5PRINT@365,"STRIKE          ";:GOSUB8000:GOSUB490:GOTO200
940 IFO=3PRINT@365,"TRIPLE          ":GOSUB8000
950 IFO=4PRINT@365,"H O M E R U N    ":RR=RR+1:IFBB=7THEN955ELSEGOSUB8000:GOTO96
    0
953 GOTO960
955 PRINT@365,"GRAND SLAM      ":GOSUB8000
960 IFO=7PRINT@365,"FLIED OUT        ":GOSUB8000:K=K+1:GOSUB490:GOTO200
962 I=0:J=0:GOSUB507
964 IFW=1IFBB=0THEN985
966 IFW=1ONBBGOTO1000,985,985,1000,970,985,1000
968 GOTO980
970 BB=1:GOTO1000
980 IFO=1IFBB=0THEN985ELSE1000
981 IFO=2IFBB=0THEN1800ELSE1000
982 IFO=3IFBB=0THEN1840ELSE1000
983 IFO=4IFBB=0THEN1870ELSE1000
985 GOSUB1400
990 GOSUB1950:GOSUB2010:GOTO990
1000 ONOGOTO1010,1020,1030,1040
1010 ONBBGOTO1050,1060,1070,1080,1090,1100,1110
1020 ONBBGOTO1120,1130,1140,1150,1160,1170,1180
1030 ONBBGOTO1190,1200,1210,1220,1230,1240,1250
1040 ONBBGOTO1260,1270,1280,1290,1300,1310,1320
1050 GOSUB1400
1055 GOSUB1950:GOSUB2010:GOSUB3010:GOTO1055
1060 GOSUB1400
1065 GOSUB1950:GOSUB2010:GOSUB4010:GOTO1065
1070 GOSUB1400
1075 GOSUB1950:GOSUB2010:GOSUB5010:GOTO1075
1080 GOSUB1400
1085 GOSUB1950:GOSUB2010:GOSUB3010:GOSUB4010:GOTO1085
1090 GOSUB1400
1095 GOSUB1950:GOSUB2010:GOSUB3010:GOSUB5010:GOTO1095
1100 GOSUB1400
1105 GOSUB1950:GOSUB2010:GOSUB4010:GOSUB5010:GOTO1105
1110 GOSUB1400
1115 GOSUB1950:GOSUB2010:GOSUB3010:GOSUB4010:GOSUB5010:GOTO1115
1120 GOSUB1400
1123 GOSUB1960:GOSUB2010:GOSUB3010:GOTO1123
1125 GOSUB1400
1127 GOSUB1950:GOSUB3010:GOSUB4010:GOTO1127
1130 GOSUB1400
1133 GOSUB1960:GOSUB2010:GOSUB4010:GOTO1133
1135 GOSUB1400
1137 GOSUB1950:GOSUB3010:GOSUB5010:GOTO1137
1140 GOSUB1400
1143 GOSUB1960:GOSUB2010:GOSUB5010:GOTO1143
1145 GOSUB1400
1147 GOSUB1950:GOSUB3010:GOTO1147
1150 GOSUB1400
1153 GOSUB1960:GOSUB2010:GOSUB3010:GOSUB4010:GOTO1153
1155 GOSUB1400
1157 GOSUB1950:GOSUB3010:GOSUB4010:GOSUB5010:GOTO1157
1160 GOSUB1400
1163 GOSUB1960:GOSUB2010:GOSUB3010:GOSUB5010:GOTO1163
1165 GOSUB1400
1167 GOSUB1950:GOSUB3010:GOSUB4010:GOTO1167
1170 GOSUB1400
1173 GOSUB1960:GOSUB2010:GOSUB4010:GOSUB5010:GOTO1173
1175 GOSUB1400
1177 GOSUB1950:GOSUB3010:GOSUB5010:GOTO1177
1180 GOSUB1400
1183 GOSUB1960:GOSUB2010:GOSUB3010:GOSUB4010:GOSUB5010:GOTO1183
1185 GOSUB1400
1187 GOSUB1950:GOSUB3010:GOSUB4010:GOSUB5010:GOTO1187
1190 GOSUB1400
1192 GOSUB1970:GOSUB2010:GOSUB3010:GOTO1192
1194 GOSUB1400
1195 GOSUB1975:GOSUB3010:GOSUB4010:GOTO1195
1197 GOSUB1400
1198 GOSUB1950:GOSUB4010:GOSUB5010:GOTO1198
1200 GOSUB1400
1202 GOSUB1970:GOSUB2010:GOSUB4010:GOTO1202
1204 GOSUB1400
```

```
1205 GOSUB1975:GOSUB3010:GOSUB5010:GOTO1205
1207 GOSUB1400
1208 GOSUB1950:GOSUB4010:GOTO1208
1210 GOSUB1400
1212 GOSUB1970:GOSUB2010:GOSUB5010:GOTO1212
1214 GOSUB1400
1215 GOSUB1975:GOSUB3010:GOTO1215
1217 GOSUB1400
1218 GOSUB1950:GOSUB4010:GOTO1218
1220 GOSUB1400
1222 GOSUB1970:GOSUB2010:GOSUB3010:GOSUB4010:GOTO1222
1224 GOSUB1400
1225 GOSUB1975:GOSUB3010:GOSUB4010:GOSUB5010:GOTO1225
1227 GOSUB1400
1228 GOSUB1950:GOSUB4010:GOSUB5010:GOTO1228
1230 GOSUB1400
1232 GOSUB1970:GOSUB2010:GOSUB3010:GOSUB5010:GOTO1232
1234 GOSUB1400
1235 GOSUB1975:GOSUB3010:GOSUB4010:GOTO1235
1237 GOSUB1400
1238 GOSUB1950:GOSUB4010:GOSUB5010:GOTO1238
1240 GOSUB1400
1242 GOSUB1970:GOSUB2010:GOSUB4010:GOSUB5010:GOTO1242
1244 GOSUB1400
1245 GOSUB1975:GOSUB3010:GOSUB5010:GOTO1245
1247 GOSUB1400
1248 GOSUB1950:GOSUB4010:GOTO1248
1250 GOSUB1400
1252 GOSUB1970:GOSUB2010:GOSUB3010:GOSUB4010:GOSUB5010:GOTO1252
1254 GOSUB1400
1255 GOSUB1975:GOSUB3010:GOSUB4010:GOSUB5010:GOTO1255
1257 GOSUB1400
1258 GOSUB1950:GOSUB4010:GOSUB5010:GOTO1258
1260 GOSUB1400
1261 GOSUB1980:GOSUB2010:GOSUB3010:GOTO1261
1262 GOSUB1400
1263 GOSUB1983:GOSUB3010:GOSUB4010:GOTO1263
1264 GOSUB1400
1265 GOSUB1986:GOSUB4010:GOSUB5010:GOTO1265
1266 GOSUB1400
1267 GOSUB1950:GOSUB5010:GOTO1267
1270 GOSUB1400
1271 GOSUB1980:GOSUB2010:GOSUB4010:GOTO1271
1272 GOSUB1400
1273 GOSUB1983:GOSUB3010:GOSUB5010:GOTO1273
1274 GOSUB1400
1275 GOSUB1986:GOSUB4010:GOTO1275
1276 GOSUB1400
1277 GOSUB1950:GOSUB5010:GOTO1277
1280 GOSUB1400
1281 GOSUB1980:GOSUB2010:GOSUB5010:GOTO1281
1282 GOSUB1400
1283 GOSUB1983:GOSUB3010:GOTO1283
1284 GOSUB1400
1285 GOSUB1986:GOSUB4010:GOTO1285
1286 GOSUB1400
1287 GOSUB1950:GOSUB5010:GOTO1287
1290 GOSUB1400
1291 GOSUB1980:GOSUB2010:GOSUB3010:GOSUB4010:GOTO1291
1292 GOSUB1400
1293 GOSUB1983:GOSUB3010:GOSUB4010:GOSUB5010:GOTO1293
1294 GOSUB1400
1295 GOSUB1986:GOSUB4010:GOSUB5010:GOTO1295
1296 GOSUB1400
1297 GOSUB1950:GOSUB5010:GOTO1297
1300 GOSUB1400
1301 GOSUB1980:GOSUB2010:GOSUB3010:GOSUB5010:GOTO1301
1302 GOSUB1400
1303 GOSUB1983:GOSUB3010:GOSUB4010:GOTO1303
1304 GOSUB1400
1305 GOSUB1986:GOSUB4010:GOSUB5010:GOTO1305
1306 GOSUB1400
1307 GOSUB1950:GOSUB5010:GOTO1307
1310 GOSUB1400
1311 GOSUB1980:GOSUB2010:GOSUB4010:GOSUB5010:GOTO1311
1312 GOSUB1400
1313 GOSUB1983:GOSUB3010:GOSUB5010:GOTO1313
1314 GOSUB1400
1315 GOSUB1986:GOSUB4010:GOTO1315
1316 GOSUB1400
1317 GOSUB1950:GOSUB5010:GOTO1317
1320 GOSUB1400
1321 GOSUB1980:GOSUB2010:GOSUB3010:GOSUB4010:GOSUB5010:GOTO1321
1322 GOSUB1400
1323 GOSUB1983:GOSUB3010:GOSUB4010:GOSUB5010:GOTO1323
1324 GOSUB1400
1325 GOSUB1986:GOSUB4010:GOSUB5010:GOTO1325
```

```
1326 GOSUB1400
1327 GOSUB1950:GOSUB5010:GOTO1327
1400 X=0:A=63:B=46:C=83:D=38:E=63:F=30:G=43:H=38:RETURN
1500 FORX=0TO5:NEXT:GOTO395
1510 FORX=0TO13:NEXT:IFH=42THENCC=0:GOTO395
1520 GOTO395
1550 IFC$=" "THENZ=1:GOTO374
1560 GOTO373
1800 GOSUB1400
1810 X=X+1:IFX=6THEN1820ELSEGOSUB2010:GOTO1810
1820 GOSUB1400
1830 GOSUB1950:GOSUB3010:GOTO1830
1840 GOSUB1400
1845 X=X+1:IFX=6THEN1850ELSEGOSUB2010:GOTO1845
1850 GOSUB1400
1855 X=X+1:IFX=6THEN1860ELSEGOSUB3010:GOTO1855
1860 GOSUB1400
1865 GOSUB1950:GOSUB4010:GOTO1865
1870 GOSUB1400
1875 X=X+1:IFX=6THEN1880ELSEGOSUB2010:GOTO1875
1880 GOSUB1400
1885 X=X+1:IFX=6THEN1890ELSEGOSUB3010:GOTO1885
1890 GOSUB1400
1895 X=X+1:IFX=6THEN1900ELSEGOSUB4010:GOTO1895
1900 GOSUB1400
1905 GOSUB1950:GOSUB5010:GOTO1905
1950 X=X+1:IFX>5THENGOTO200
1955 RETURN
1960 X=X+1:IFX=6ONBBGOTO1125,1135,1145,1155,1165,1175,1185
1965 RETURN
1970 X=X+1:IFX=6ONBBGOTO1194,1204,1214,1224,1234,1244,1254
1972 RETURN
1975 X=X+1:IFX=6ONBBGOTO1197,1207,1217,1227,1237,1247,1257
1977 RETURN
1980 X=X+1:IFX=6ONBBGOTO1262,1272,1282,1292,1302,1312,1322
1981 RETURN
1983 X=X+1:IFX=6ONBBGOTO1264,1274,1284,1294,1304,1314,1324
1984 RETURN
1986 X=X+1:IFX=6ONBBGOTO1266,1276,1286,1296,1306,1316,1326
1987 RETURN
2010 SET(A,B):IFB<46RESET(A-5,B+2)
2020 A=A+5:B=B-2:RETURN
3010 SET(C,D):RESET(C+5,D+2)
3020 C=C-5:D=D-2:RETURN
4010 SET(E,F):RESET(E+5,F-2)
4020 E=E-5:F=F+2:RETURN
5010 IFG=68G=63
5013 IFH=48H=46
5016 SET(G,H):RESET(G-5,H-2)
5020 G=G+5:H=H+2:IFG=63THENL=L+1:RESET(G,H)
5030 RETURN
5900 GOSUB220:PRINT@365,"                    ";:IFBB=1ORBB=2ORBB=3THENLL=LL+1
5930 IFBB=4ORBB=5ORBB=6THENLL=LL+2
5960 IFBB=7THENLL=LL+3
6000 S=S+1:RESET(83,38):RESET(63,30):RESET(43,38):IFS=1ORS=19U=U+L:PRINT@65,L;
6020 IFS=2ORS=20V=V+L:PRINT@193,L;
6030 IFS=3ORS=21U=U+L:PRINT@70,L;
6040 IFS=4ORS=22V=V+L:PRINT@198,L;
6050 IFS=5ORS=23U=U+L:PRINT@75,L;
6060 IFS=6ORS=24V=V+L:PRINT@203,L;
6070 IFS=7U=U+L:PRINT@80,L;
6080 IFS=8V=V+L:PRINT@208,L;
6090 IFS=9U=U+L:PRINT@85,L;
6100 IFS=10V=V+L:PRINT@213,L;
6110 IFS=11U=U+L:PRINT@90,L;
6120 IFS=12V=V+L:PRINT@218,L;
6130 IFS=13U=U+L:PRINT@95,L;
6140 IFS=14V=V+L:PRINT@223,L;
6150 IFS=15U=U+L:PRINT@100,L;
6160 IFS=16V=V+L:PRINT@228,L;
6170 IFS=17U=U+L:PRINT@105,L;
6180 IFS=18V=V+L:PRINT@233,L;
6182 ONSGOTO9000,9500,9000,9500,9000,9500,9000,9500,9000,9500,9000,9500,9000,950
     0,9000,9500,9000,9500,9000,9500,9000,9500,9000,9500
6185 PRINT@111,U;:PRINT@239,V;
6190 IFS=17IFV>UPRINT@235," X";:S=18
6191 IFTT=1IFV=UTHEN6350
6192 IFS=18IFV=UGOSUB8000:K=0:CLS:TT=1:L=0:PRINT"EXTRA INNINGS":GOSUB8000:CLS:GO
     TO55
6193 IFS=19ORS=21ORS=23THEN6350
6194 IFS=18ORS=20ORS=22ORS=24PRINT@322,A$;" HITS "XX;" L.O.B "YY;" S.O. "ZZ;"
     H.R. "QQ
6196 IFS=18ORS=20ORS=22ORS=24PRINT@386,B$;" HITS "UU;" L.O.B "VV;" S.O. "WW;"
     H.R. "TT
6200 IFS=18ORS=20ORS=22ORS=24IFU>VPRINT@183," WINNER";:GOSUB8000:PRINT@183,"
     ";:GOTO6200
```

```
6300  IFS=18ORS=20ORS=22ORS=24IFV>UPRINT@311," WINNER";:GOSUB8000:PRINT@311,"
      ";:GOTO6300
6350  HH=0:LL=0:SS=0:RR=0
6400  IFK=3L=0:GOTO504
7000  L=0:RETURN
8000  FORX=0TO400:NEXT:RETURN
9000  PRINT@960,B$" BATTING      ";:XX=XX+HH:YY=YY+LL:ZZ=ZZ+SS:QQ=QQ+RR:GOTO6185
9500  PRINT@960,A$" BATTING      ";:UU=UU+HH:VV=VV+LL:WW=WW+SS:TT=TT+RR:GOTO6185
9750  CLS:PRINT"THIS IS A 2-PLAYER GAME"
9760  PRINT"ENTER TEAM NAME THEN PRESS ENTER..FIRST TEAM ENTERED BATS F IRST (TEAM
      NAMES MUST BE LIMITED TO 11 LETTERS INCLUDING SPACES)"
9770  PRINT"THE PITCHER HAS 3 CHOICES..#1-KEY..FAST BALL...#2-KEY..SLOW   BALL...#3
      -KEY..CURVE BALL (COMBINATION OF SLOW AND FAST)"
9780  PRINT"TO HIT BALL, BATTER MUST PRESS SPACE BAR WHEN BALL IS BETWE EN   THE 2
      SET POINTS AT BOTTOM OF SCREEN (PLATE)"
9790  PRINT"IT WILL GIVE THE BATTER A RANDOM   STRIKE, SINGLE, DOUBLE, TRIPLE, HOM
      ERUN, OR A -FLIED OUT-"
9800  PRINT"IF BATTER ELECTS NOT TO PRESS SPACE BAR, HE WILL BE GIVEN A   RANDOM BA
      LL OR STRIKE (IT IS POSSIBLE TO DRAW A WALK)"
9810  PRINT"IF SPACE BAR IS PRESSED BEFORE THE BALL REACHES THE PLATE,  OR AFTER I
      T PASSES THE PLATE, AN AUTOMATIC STRIKE RESULTS"
9815  PRINT"PRESS ENTER TO CONTINUE":INPUTA
9820  CLS:PRINT"IN THE CASE OF A TIE, THE SCORE BOARD RESETS AND PLAY CONTINUES U
      NTIL THERE IS A WINNER"
9840  PRINT"AT THE END OF THE GAME A LIST OF HITS, MEN LEFT ON BASE, STRIKE OUTS,
      AND HOME RUNS WILL BE DISPLAYED FOR EACH TEAM"
9850  PRINT"PRESS ENTER TO BEGIN":INPUTA:RUN10
```

AIR RAID: by Kevin Copeland

Good guys vs. enemy towns: level the town before being shot down. Watch your monitor second by second, as buildings crumble and bombs release. Unlike horse shoes, being "close" doesn't count in this program.
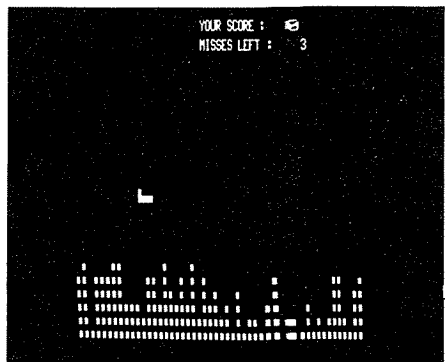

```
1   CLS
3   INPUT"DO YOU WANT INSTRUCTIONS (Y/N) ";A$
5   IFLEFT$(A$,1)="Y"THENGOSUB6000
7   CLS
10  S=0
20  F=0
30  M=3
40  G=0
45  H=0
50  PRINT@30,"YOUR SCORE : ";S:PRINT@94,"MISSES LEFT : ";M;
60  FF=0
90  FORJ=16TO110STEP2
100 FORI=RND(6)*2+35TO47STEP2
110 SET(J,I)
120 NEXTI
130 NEXTJ
150 P=6
155 V=27
160 K=1
300 P=P+K+K:IFP>120THENGOSUB1000
310 IFP<6THENGOSUB1000
315 SET(P-1,V)
320 SET(P,V)
```

91

```
322 SET(P-4*K,V-1):RESET(P-6*K,V):RESET(P-6*K,V-1)
330 RESET(P-5*K,V)
400 REM MOVE BOMB
410 IFINKEY$=" "THENFF=1
412 IFFF<>1THEN600
420 IFF=1THEN450
425 F=1
430 Y=V
450 Y=Y+2
460 RESET(P-2*K,Y-2)
465 IFY>47THEN3000
467 IFPOINT(P,Y)<>0THENS=S+(47-V)*8:G=1
470 SET(P,Y)
600 REM
999 GOTO300
1000 REMPICK NEW DIRECTION + SET UP SHIP
1001 IFY>47THENY=47
1002 RESET(P-K-K,Y)
1003 RESET(P-6*K,V-1)
1005 FORI=1TO6:RESET(P-I*K,V):NEXTI
1010 K=1:P=6:IFRND(2)=1THENK=-1:P=120
1020 V=RND(10)*2+5
1030 IFG=0THENIFF=1THENGOSUB5000
1040 F=0
1050 IFH=0THENGOSUB5000
1060 H=0
1070 PRINT@94,"MISSES LEFT : ";M;
1075 FF=0
1099 RETURN
3000 REMFASTMOVE
3002 PRINT@94,"MISSES LEFT : ";M;
3005 PRINT@30,"YOUR SCORE : ";INT(S/10);:FF=0
3010 FORI=P-2*KTOP-12*KSTEP-2*K
3030 T=49:FORJ=47TO37STEP-2
3040 IFPOINT(I,J)<>0THENT=T-2:SET(I,T)
3050 IFJ<>TTHENRESET(I,J)
3060 NEXTJ:NEXTI:F=0
3070 IFG=0THENGOSUB5000
3080 H=1:G=0
3090 GOTO600
4000 REM OUT OF MISSES
4005 PRINT@94,"MISSES LEFT : ";M;
4006 PRINT@0,"    ";
4010 FORI=1TO1000:NEXTI
4020 CLS
4025 IFS>BTHENB=S
4030 PRINT"YOUR FINAL SCORE : ";INT(S/10)
4040 PRINT
4045 PRINT"HIGH SCORE : ";INT(B/10):PRINT
4050 PRINT"DO YOU WANT TO PLAY AGAIN ";:Y=1:N=0
4060 INPUTA$
4070 IFLEFT$(A$,1)="Y"THENCLS:GOTO10
4080 PRINT
4090 PRINT"TOO - DA - LOO"
4100 END
5000 REM MISSED
5010 M=M-1
5015 PRINT@94,"MISSES LEFT : ";M
5020 FORI=1TO12
5030 PRINT@150,"YOU MISSED":PRINT@0,"";
5035 FORJ=1TO50:NEXTJ
5040 PRINT@150,"          ";:PRINT@0,"";
5045 FORJ=1TO50:NEXTJ
5050 NEXTI
5060 IFM<1THEN4000
5070 G=0:H=1
5080 RETURN
6000 REM INSTRUCTIONS
6010 CLS
6015 PRINT
6020 PRINT"INSTRUCTIONS FOR    ** AIR-RAID **"
6030 PRINT"WRITTEN FOR THE TRS-80 LEVEL II WITH 4K BY KEVIN COPELAND."
6050 PRINT:PRINT"THIS IS A TV-TYPE GAME WHERE YOU ARE THE PILOT"
6060 PRINT"OF A WORLD WAR II BOMBER PLANE AND YOU HAVE BEEN"
6070 PRINT"GIVEN THE TASK OF DEMOLISHING A SMALL TOWN IN"
6080 PRINT"GERMANY.  YOU HAVE AS MANY BOMBS AS YOU NEED,"
6090 PRINT"HOWEVER, YOU CAN ONLY MISS THREE TIMES.  MORE THAN"
6100 PRINT"THAT AND THE ENEMY HAS HAD A CHANCE TO SHOOT YOU"
6110 PRINT"DOWN.  GOING CLEAR ACROSS THE SCREEN WITHOUT DROPPING A"
6113 PRINT"BOMB COUNTS AS A MISS."
6120 PRINT"PRESS THE SPACE BAR TO DROP YOUR BOMBS."
6130 PRINT"GOOD LUCK.":PRINT"PRESS 'S' TO START THE GAME."
6140 IFINKEY$="S"THENCLS:RETURN
6150 GOTO6140
```

SKI RACER: by Mike Zielinski

Ever wondered what it's like to be a downhill racer? Now you'll know. Choose your best event (giant slalom, slalom, downhill, etc.) and race the clock! Missed gates count against you, so keep your eyes on the course and fingers on the keyboard. Up to ten players. Ski Heil!
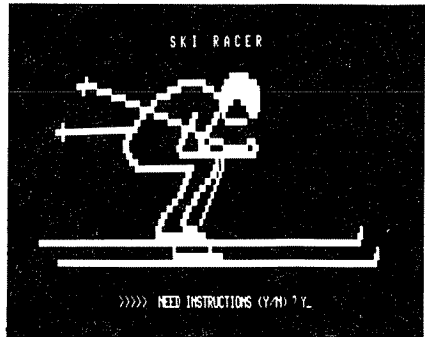

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10 CLEAR 200 : DEFSTR A : DEFINT B-E,G,I-Q,S-Z
20 DIM G(215),R$(10),R(10,4) : A=CHR$(34)
30 AL=STRING$(21,45) : AQ=STRING$(5,62) : AQ=AQ+"   "
40 GOSUB 7000
50 PRINT @ 910, AQ;"NEED INSTRUCTIONS (Y/N) "; : INPUT Q$
60 IF Q$="Y" GOSUB 6000
70 PRINT : PRINT AQ;"HOW MANY RACERS (UP TO TEN) "; : INPUT R
80 IF R=1FORW=1TO500:NEXTW:CLS:GOTO100
82 FORQ=1 TO R
85 IFR<1ORR>10THENPRINT"PLEASE, ONLY UP TO TEN":FORI=1TO500:NEXTI:CLS:GOTO70
90 PRINT" RACER # ";Q;:INPUT "NAME PLEASE";R$(Q) : NEXT
95 FORP=1TO500:NEXTP:CLS
100 PRINT : PRINT TAB(23) "1. GIANT SLALOM"
110 PRINT TAB(23)"2. SLALOM" : PRINT TAB(23)"3. STRAIGHT GATES
120 PRINT TAB(23)"4. RANDOM GATES" : PRINT : PRINT TAB(4) AQ;
130 INPUT"WHICH COURSE DO YOU WISH TO RUN (1,2,3, OR 4) ";Q
135 IFQ<1ORQ>4THENPRINT"PLEASE, ONLY USE 1,2,3, OR 4":FORI=1TO500:NEXTI:CLS:GOTO100
140 PRINT TAB(11) "ONE MOMENT WHILE I SET THE GATES . . ."
150 F=1: ON Q GOSUB 8000,8200,8400,8600 : RN=1: IF R=1 THEN 180
160 FOR Z=1 TO R : PRINT : PRINT TAB(22) R$(Z);" IS UP TO RACE"
170 PRINT TAB(22) "FOR RUN NUMBER";RN
180 PRINT: PRINT TAB(8) AQ;"PRESS <ENTER> WHEN READY TO RACE ";
190 INPUT Q$
200 X=479:F=1:C=1:G=0:M=0:N=0:H=0
210 CLS : GOSUB 2000 : CLS
220 FOR T=8 TO 215:PRINT@ 57,(T-8)/10+H:PRINT@X,"[";
300 IF G(T)=0 GOTO 400ELSE ON F GOTO 310,320
310 PRINT@ G(T),"L";:F=2:GOTO 330
320 PRINT@ G(T),"R";:F=1
330 G(T)=G(T)-512
400 IF G(T-8)=0 GOTO 500
410 G=G+1 : ON C GOTO 420,430
420 C=2 : IF X>G(T-8) THEN 440ELSE 450
430 C=1 : IF X<G(T-8) THEN 440ELSE 450
440 M=M+1 : PRINT @ 320,"MISSED GATE";G; : GOTO 460
450 H=H+ABS(G(T-8)-X)/10
460 G(T-8)=G(T-8)+512
500 S$=INKEY$ : IF S$<>"" THEN N=ASC(S$)
510 IF N=65 X=X-8 ELSE IF N=59 X=X+8
520 IF N=83 X=X-6 ELSE IF N=76 X=X+6
530 IF N=68 X=X-4 ELSE IF N=75 X=X+4
540 IF N=70 X=X-2 ELSE IF N=74 X=X+2
550 IF X<=448 X=448
560 IF X>=511 X=511
600 PRINT @ 999,""
610 IF T=206 PRINT TAB(4) AL;" FINISH  LINE ";AL
620 NEXT T
630 FT=T/10+H+M*5 : GOSUB 4000
640 PRINT @ 598,"YOU MISSED";M;"GATES
650 PRINT TAB(8)"FOR A HANDICAPPED FINISH TIME OF";
660 PRINT FM"MIN. &"FS"SEC."
670 IF R=1 THEN 800
680 R(Z,RN)=FT
690 NEXT Z
700 GOSUB 2500 : GOSUB 2500
710 IF RN>2 THEN 770
720 CLS : PRINT TAB(20)"RESULTS AFTER "; : ON RN GOTO 730,740
730 PRINT"FIRST HEAT" : GOTO 750
740 PRINT"SECOND HEAT"
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 750 GOSUB 3000
 760 GOSUB 5000
 770 RN=RN+1 : IF RN<4 THEN 160
 780 CLS : PRINT TAB(20) "FINAL RACE RESULTS"
 790 PRINT "FINISH"; : GOSUB 3000
 800 PRINT : PRINT TAB(12) AQ; "WANT TO RACE AGAIN (Y/N) ";
 810 INPUT Q$
 820 IF Q$="N" PRINT : PRINT "OK BUT I'M ALWAYS..." : END
 830 IF R=1 THEN 200
 840 FOR Z=1 TO R : FOR Y=1 TO 4 : R(Z,Y)=0 : NEXT Y,Z
 850 GOTO 100
2000 PRINT CHR$(23):PRINT @ 26,"THREE":GOSUB2500
2010 PRINT @26," TWO ":GOSUB 2500: PRINT @26," ONE":GOSUB 2500
2020 RETURN
2500 FOR Q=1 TO 500 : NEXT : RETURN
3000 PRINT TAB(24)"HEAT NUMBER" TAB(53) "TOTAL"
3010 PRINT"POSITION"TAB(16)"1"TAB(29)"2"TAB(42)"3"TAB(54)"TIME"
3020 PRINT AL;AL;AL
3030 FOR Z=1 TO R : R(Z,4)=R(Z,1)+R(Z,2)+R(Z,3) : NEXT Z
3040 IF RN<3 THEN 3120
3050 FOR Q=1 TO R : FOR Z=1 TO R-1
3060 IF R(Z,4)<=R(Z+1,4) THEN 3110
3070 Z$=R$(Z) : Z1=R(Z,1) : Z2=R(Z,2) : Z3=R(Z,3) : Z4=R(Z,4)
3080 R$(Z)=R$(Z+1) : FOR Y=1 TO 4 : R(Z,Y)=R(Z+1,Y) : NEXT Y
3090 R$(Z+1)=Z$ : R(Z+1,1)=Z1 : R(Z+1,2)=Z2
3100 R(Z+1,3)=Z3 : R(Z+1,4)=Z4
3110 NEXT Z,Q
3120 FOR Z=1 TO R : PRINT  Z;R$(Z); : FOR Y=1 TO 4
3130 FT=R(Z,Y) : GOSUB 4000
3140 PRINT TAB(13*Y) FM$":"FS$;
3150 NEXT Y : PRINT : NEXT Z
3160 RETURN
4000 FM=INT(FT/60) : FS=INT((FT-(FM*60))*10)/10
4010 FM$=STR$(FM) : FS$=STR$(FS) : FS$=RIGHT$(FS$,LEN(FS$)-1)
4020 IF FS<10 THEN FS$="0"+FS$
4030 RETURN
5000 PRINT : PRINT TAB(14) AQ; "PRESS <ENTER> TO CONTINUE ";
5010 INPUT Q$
5020 RETURN
6000 CLS : PRINT @ 19,"THIS IS A GAME OF SKI RACER"
6010 PRINT @ 75,AL;AL
6020 PRINT"    THE OBJECT OF THE GAME IS TO STEER YOUR SKIER ";
6030 PRINT"DOWN THE        MOUNTAIN PAST THE GATES YOU ";
6040 PRINT"ENCOUNTER, AROUND THE LEFT OF THE   GATES LABELED ";
6050 PRINT A"L"A AND THE RIGHT OF THE GATES LABELED "A"R"A".
6060 PRINT"   YOU CONTROL THE SKIER WITH THE KEYS ON BOTH ";
6070 PRINT"SIDES OF THE "A"G"A" & "A"H"A" KEYS. POSITION YOUR";
6080 PRINT" HANDS AS IF YOU WERE TYPING, LEAVING THE "A"G"A;
6090 PRINT" & "A"H"A" EXPOSED.
6100 PRINT"    YOUR LITTLE FINGERS MOVE THE SKIER TO THE ";
6110 PRINT"LEFT AND RIGHT AT   THE FASTEST RATE AND YOUR INDEX";
6120 PRINT" FINGERS THE SLOWEST RATE. THE   MIDDLE AND RING ";
6130 PRINT"FINGERS ARE IN A RANGE BETWEEN THE FASTEST AND   ";
6140 PRINT"THE SLOWEST RATES.   EXPERIMENT !!
6150 GOSUB 5000: GOSUB 6500
6160 PRINT"   IN SKI RACING, THE BEST TIME CAN BE ACHIEVED BY";
6170 PRINT" CUTTING THE  GATES AS CLOSE AS POSSIBLE. IT IS ";
6180 PRINT"LEGAL TO KNOCK GATES DOWN,    PROVIDED YOU HIT ";
6190 PRINT"THEM FROM THE CORRECT SIDE.
6200 PRINT"   EACH GATE YOU MISS HANDICAPS YOUR TIME BY 5 ";
6210 PRINT"SECONDS. ON ALL  OF THE RACE COURSES, THE FIRST ";
6220 PRINT"GATE IS ALWAYS A LEFT." : PRINT
6230 PRINT"   OH YES, AND A PERFECT TIME IS 21.6
6240 GOSUB 5000: GOSUB 6500
6250 PRINT"   IF THERE IS MORE THAN ONE SKIER, A CONTEST IS ";
6260 PRINT"HELD CONSISTINGOF THREE HEATS. THE WINNER IS ";
6270 PRINT"BASED ON THE BEST TOTAL TIME OF   ALL THREE HEATS.
6280 PRINT"   ALL SKIERS RUN IN ORDER IN EACH HEAT. AT THE ";
6290 PRINT"END OF EACH HEATI WILL LIST THE SKIERS AND THEIR";
6300 PRINT" TIMES. AFTER THE THIRD HEAT I  WILL LIST THE ";
6310 PRINT"SKIERS IN THEIR FINISH POSITIONS WITH ALL ";
6320 PRINT"TIMES    AND TOTALS.
6330 RETURN
6500 CLS : PRINT @ 24,"S K I    R A C E R" : PRINT @ 75, AL;AL
6510 RETURN
7000 CLS : PRINT @ 88,"S K I    R A C E R" : FOR Q2=1 TO 10
7010 READ QS,QF : FOR Q=QS TO QF : READ Z
7020 POKE Q,Z : NEXT Q,Q2
7030 RETURN
7040 DATA 15559,15592,136,172,141,140,176,176,144,32,32,32,32
7050    DATA 32,32,32,32,32,160,176,184,140,140,140,140,180,176
7060    DATA 32,160,188,191,191,191,189,188,144
7070 DATA 15629,15656,130,131,131,140,164,176,184,134,131
7080    DATA 131,32,32,32,32,32,32,32,32,131,191,159,135,131
7090    DATA 143,191,191,149
7100 DATA 15684,15719,176,180,176,176,176,176,176,176,176,176
7110    DATA 176,176,176,184,134,129,32,131,131,137,140,140,176
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7120     DATA 184,151,32,160,152,135,130,140,140,140,140,130,131
7130 DATA 15749,15783,129,32,32,32,32,32,32,32,32,32,168,151,32
7140     DATA 32,32,32,32,32,32,32,184,135,32,130,191,179,140
7150     DATA 140,164,176,176,176,176,140,180
7160 DATA 15824,15847,139,172,176,176,176,176,176,176,176,178
7170     DATA 179,179,131,131,131,163,151,151,131,131,131,131
7180     DATA 131,129
7190 DATA 15897,15904,160,158,129,32,176,140,163,134
7200 DATA 15959,15967,176,140,131,160,152,135,32,152,129
7210 DATA 16021,16058,184,135,32,32,136,183,176,144,134,32,32
7220     DATA 32,32,32,32,32,32,32,32,32,32,32,32,32,32,32,32
7230     DATA 32,32,32,32,32,32,32,32,32,160
7240 DATA 16065,16125,140,140,140,140,140,140,140,140,140,140
7250     DATA 140,140,140,140,140,140,140,140,140,140,140,143,143
7260     DATA 143,159,143,143,143,143,143,172,140,140,140,140
7270     DATA 140,140,140,140,140,140,140,140,140,140,140,140
7280     DATA 140,140,140,140,140,140,140,140,140,140,140,135
7290     DATA 32,32,160
7300 DATA 16132,16189,140,140,140,140,140,140,140,140,140,140
7310     DATA 140,140,140,140,140,140,140,140,140,140,143,143
7320     DATA 143,143,143,143,143,143,143,140,140,140,140,140
7330     DATA 140,140,140,140,140,140,140,140,140,140,140,140
7340     DATA 140,140,140,140,140,140,140,140,140,140,140,135
8000 GOSUB9000
8010 FOR Q=16TO 200 STEP 9 : ON F GOTO 8020,8030
8020 G(Q)=978:F=2:NEXT:RETURN
8030 G(Q)=1005:F=1:NEXT:RETURN
8200 GOSUB9000
8210 FOR Q=16TO 200 STEP 6 : ON F GOTO 8220,8230
8220 G(Q)=987:F=2:NEXT:RETURN
8230 G(Q)=996:F=1:NEXT:RETURN
8400 GOSUB9000
8410 FORQ=16TO200 STEP 4:G(Q)=992:NEXT:RETURN
8600 GOSUB 9000:Q=8
8610 RT=RND(20)+998 : LT=RND(20)+965
8620 ST=((RT-LT)/6)+RND((RT-LT)/10)
8630 Q=Q+ST
8640 ON F GOTO 8650,8680
8650 G(Q)=LT : F=2
8660 RT=RND(20)+998
8670 IF Q>190 RETURN ELSE 8620
8680 G(Q)=RT : F=1
8690 LT=RND(20)+965
8700 IF Q>190 RETURN ELSE 8620
9000 FORQ=0TO215:G(Q)=0:NEXT:RETURN
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PETALS AROUND THE ROSES: by Jim Wright

Guess the outcome of a roll of five dice. Only two clues are given, but if you're quick at discerning patterns and finding order amidst chaos, you'll love this program.
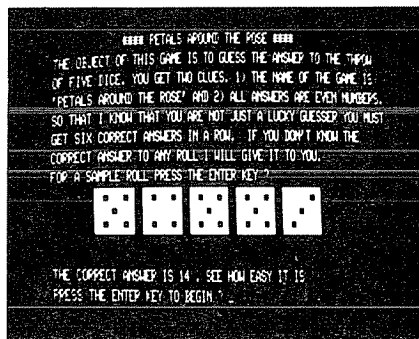

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10 DEFINTI:CLS
12 PRINT"            **** PETALS AROUND THE ROSE ****"
14 PRINT"THE OBJECT OF THIS GAME IS TO GUESS THE ANSWER TO THE THROW"
15 PRINT"OF FIVE DICE. YOU GET TWO CLUES. ";
16 PRINT"1) THE NAME OF THE GAME IS"
17 PRINT"'PETALS AROUND THE ROSE' AND 2) ALL ANSWERS ARE EVEN NUMBERS."
18 PRINT"SO THAT I KNOW THAT YOU ARE NOT JUST A LUCKY GUESSER";
19 PRINT" YOU MUST"
20 PRINT"GET SIX CORRECT ANSWERS IN A ROW.  IF YOU DON'T ";
21 PRINT"KNOW THE "
22 PRINT"CORRECT ANSWER TO ANY ROLL I WILL GIVE IT TO YOU."
23 PRINT"FOR A SAMPLE ROLL PRESS THE ENTER KEY ";:INPUTA$:H=1:GOTO41
24 PRINT"PRESS THE ENTER KEY TO BEGIN THE GAME ";:INPUTA$
27 PRINT@768,"THE CORRECT ANSWER IS";T;". SEE HOW EASY IT IS !!"
28 PRINT"PRESS THE ENTER KEY TO BEGIN ";:INPUTA$
39 H=2:C=0
40 CLS:PRINT"I'M SHAKING THE DICE....";:FORI=1TO2000:NEXTI:CLS
41 Y=24:T=0:FORX=15 TO 85 STEP17:N=RND(6)
42  IF(N/2-INT(N/2)=0)THENGOTO50
44  T=T+N-1
50 FORI=XTOX+13:FORJ=YTOY+6
60  SET(I,J):NEXTJ:NEXTI
100  ON N GOSUB1010,1020,1010,1030,1010,1020
110  ON N GOSUB1070,1070,1020,1020,1020,1030
120  ON N GOSUB1070,1070,1070,1070,1030,1040
125 IFH=3 GOTO 2015
130 NEXTX
135 IF H=1 GOTO 27
150 PRINT@128,"TYPE IN THE ANSWER YOU THINK IS CORRECT."
155 PRINT"IF YOU HAVE NO IDEA TYPE IN 'P' FOR PLEASE HELP ME ";
160 A$="":INPUTA$
161 ONERRORGOTO1160
165 A=VAL(A$):IFA=TGOTO200
170 C=0:IFASC(A$)=80GOTO230
175 GOTO250
200 C=C+1:PRINT@896,"          ******** YEA!!!!!!!!********"
201 PRINT@960,"THAT'S";C;"IN A ROW CORRECT ";
203 IFC<6GOTO205
204 FORL=1TO3000:NEXTL:GOTO1100
205 PRINT"LET'S SEE YOU DO IT AGAIN";
210 FORL=1TO3000:NEXTL:GOTO40
230 PRINT@896,"DON'T GIVE UP SO EASILY, THE ANSWER IS";T;"."
231 PRINT@960,"TYPE IN 'S' FOR IT'S SIMPLE I'LL TRY AGAIN!!";
232 INPUTA$:GOTO40
250  PRINT@896,"AWWWW!!! YOU JUST ARN'T THINKING SIMPLE ENOUGH THE"
251 PRINT@960,"ANSWER IS";T;". TYPE IN 'A' FOR PETALS AROUND THE ROSE ";
252 INPUTA$:GOTO40
1010  RESET(X+6,Y+3):RESET(X+7,Y+3):RETURN
1020  RESET(X+10,Y+1):RESET(X+11,Y+1):RESET(X+3,Y+5):RESET(X+4,Y+5):RETURN
1030  RESET(X+3,Y+1):RESET(X+4,Y+1):RESET(X+10,Y+5):RESET(X+11,Y+5):RETURN
1040  RESET(X+3,Y+3):RESET(X+4,Y+3):RESET(X+10,Y+3):RESET(X+11,Y+3):RETURN
1070  RETURN
1100 CLS
1105 PRINT"CONGRATULATIONS!!! YOU ARE NOW ONE OF THE HOLDERS OF"
1110 PRINT"THE 'SECRET OF THE ROSE'.  JUST AS YOU CAME THROUGH"
1115 PRINT"MANY TRIALS AND FRUSTRATIONS TO CRACK THE SECRET YOU"
1120 PRINT"MUST NOW VOW TO ALLOW ALL OTHERS TO SHARE THE SAME"
1125 PRINT"FRUSTRATIONS.  EVEN UNDER THREATS TO YOUR LIFE YOU"
1130 PRINT"MUST PLEDGE NEVER TO TELL ANYONE THE 'SECRET'."
1135 Y=1:N=2
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1140 PRINT:PRINT"WOULD YOU LIKE TO CONTINUE AND FRUSTRATE ANOTHER Y/N ";
1145 INPUTA$:IFA$="Y"ORA$="YES"GOTO1
1150 CLS:END
1160 RESUME150
2000 CLS:RESTORE:C=0:H=3
2003 CLS:T=0
2005 FORX=15TO85STEP17:READN
2010 GOTO42
2015 NEXTX
2020 C=C+1:IFC=3 RESTORE
2025 PRINT@896,"THE ANSWER IS";T;
2030 PRINT"ENTER 1)TO CONTINUE TEST 2)TO START GAME ";
2035 INPUTZ
2040 ON Z GOTO 2003,1
2045 DATA 4,1,6,3,6,5,6,5,4,4,6,5,6,2,2
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BATTLESHIP: by Ty Halderman

Drama on the high seas. Position your five vessels as you choose to open this game. Then let the computer do the same. Conduct a careful search for the enemy, then take your best shot. Computer may tend to cheat a little in this game.
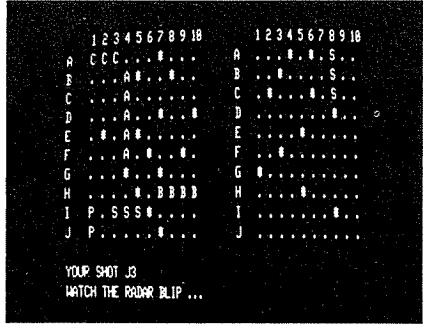
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5 CLS:PRINTCHR$(23):PRINT@530,"BATTLESHIP":FORT=1TO1000:NEXT
15 CLS:CLEAR50:GOSUB 60
20 CLEAR:DIMM$(11,11),C$(10,10),H$(11,11):RANDOM:SK$="I HAVE SUNK YOUR "
25 DEFFNX(A$)=ASC(A$)-64:DEFFNZ(A$)=VAL(RIGHT$(A$,1)):DEFFNY(A$)=
FNZ(A$)<>(FNZ(A
   $)<>0)*(-1)-10*(FNZ(A$)=0)
30 FORI=1TO5:READA$(I),S(I),L$(I):NEXT
35 DATA AIRCRAFT CARRIER,4,A,BATTLESHIP,3,B,CRUISER,2,C,SUBMARINE,2,S,PT BOAT,1,
   P
40 FORI=0TO11:FORJ=0TO11:M$(I,J)=" ":H$(I,J)=".":NEXTJ,I
45 FORI=1TO10:FORJ=1TO10:M$(I,J)=".":C$(I,J)=".":NEXTJ,I
50 FORI=1TO4:S$(I)=" ":NEXT
55 GOTO 80
60 GOSUB 570
65 PRINTCHR$(27)"ENTER ONE ENDPOINT OF YOUR SHIP, AND THEN THE DIRECTION FROM
TH
        AT POINT -- <L>EFT  <R>IGHT  <U>P  <D>OWN ."
70 PRINT"A POINT MAY BE ENTERED AS A1 OR A-1 OR A,1 OR A 1
        FOR A-10, YO
        U MAY ENTER JUST A
75 RETURN
80 FORI=1TO5:GOSUB 570
85 PRINT@768,CHR$(30);:PRINTA$(I)" - "S(I)+1" LONG : ";:LINEINPUT" BEGINNING POI
   NT ? ";X1$:X1=FNX(X1$):Y1=FNY(X1$)
90 PRINTCHR$(30);:INPUT"DIRECTION ";X2$:IFX2$="U"THENX2=X1:X1=X1-S(I):Y2=Y1:IFX1
   <1THEN 125
95 IFX2$="D"THENX2=X1+S(I):Y2=Y1:IFX2>10THEN 125
100 IFX2$="R"THENY2=Y1+S(I):X2=X1:IFY2>10THEN 125
105 IFX2$="L"THENY2=Y1:Y1=Y1-S(I):X2=X1:IFY1<1THEN 125
110 IFX1>10ORX1<1ORY1>10ORY1<1THEN 125
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115 IFX2$<>"R"ANDX2$<>"L"ANDX2$<>"U"ANDX2$<>"D"THEN 125
120 GOTO 130
125 PRINT"ERROR MADE : RE-ENTER !":GOTO 85
130 FORJ=X1TOX2:FORK=Y1TOY2
135 IFM$(J,K)<>"."THENPRINT"THERE'S ALREADY A SHIP THERE.":GOTO 85
140 NEXTK,J
145 FORJ=X1TOX2:FORK=Y1TOY2:M$(J,K)=L$(I):NEXTK,J
150 NEXT I:GOSUB 570  :PRINT:PRINT"STAND BY WHILE I TRY TO HIDE MY SHIPS FROM YO
    U."
155 C2=1:C4=2:C6=3:C1=RND(3):C3=C1+1:IFC3=4THENC3=1
160 C5=C3+1:IFC5=4THENC5=1
165 FORI=1TO5
170 Z=RND(0)
175 IFZ>.5THENX1=RND(10-S(I)):Y1=RND(10):Y2=Y1:X2=X1+S(I):GOTO 185
180 Y1=RND(10-S(I)):X1=RND(10):X2=X1:Y2=Y1+S(I)
185 FORJ=X1TOX2:FORK=Y1TOY2:IFRND(0)>.85GOTO 195
190 IFH$(J,K+1)<>"."ORH$(J+1,K)<>"."ORH$(J-1,K)<>"."THEN 170
195 IFH$(J,K)<>"."ORH$(J,K-1)<>"."THEN 170
200 NEXTK,J
205 FORJ=X1TOX2:FORK=Y1TOY2:H$(J,K)=L$(I):NEXTK,J
210 NEXTI:PRINT@768,CHR$(30)"OK --- I'M READY !!"
215 IFCC=17THENPRINT:PRINT"YOU WON !!":GOTO 445
220 IFCM=17THENPRINT:PRINT"YOU LOST !!  HERE ARE THE"17-CC"HITS YOU DIDN'T MAKE
    :":GOSUB 450 :GOTO 445
225 LINEINPUT"YOUR SHOT ";A$:A=FNX(A$):B=FNY(A$)
230 IFA>10ORB>10ORA<1ORB<1THENPRINT"YOU GOOFED !"CHR$(27)CHR$(29);:GOTO 225
235 IFC$(A,B)<>"."THENPRINT"YOU ALREADY SHOT THERE !"CHR$(27)CHR$(29);:GOTO 225
240 PRINT"WATCH THE RADAR BLIP ..."
245 IF H$(A,B)<>"."THENC$(A,B)=H$(A,B):CC=CC+1:H$(A,B)=".":ELSE
    C$(A,B)="*"
250 GOSUB 570
255 ONHGOTO 355 , 400 , 400 , 400
260 IFS$(1)=" "ANDS$(2)=" "ANDS$(3)=" "THENR=0:GOTO 290
265 FORQI=1TO4:IFS$(QI)<>" "THEN 275
270 NEXTQI
275 FORI=1TO5:IFS$(QI)=L$(I)THEN 285
280 NEXT I
285 S$(QI)=" ":H=1:X=X(QI):Y=Y(QI):GOTO 355
290 A=RND(10):B=RND(10):IFCM=15ANDGF=1THEN 325
295 BS=B:AS=A
300 IFB>3THENB=B-3:GOTO 300
305 IFA>3THENA=A-3:GOTO 305
310 IFCM=15THENCG=CG+1:IFCG=50THENGF=1
315 IFA=C1ANDB=C2ORA=C3ANDB=C4ORA=C5ANDB=C6THEN 320 ELSE 290
320 A=AS:B=BS
325 IFM$(A,B)="H"ORM$(A,B)="*"GOTO 290
330 IFCM>=12ANDPX=1ORCM=15THENGOSUB 460 :IFSP<SLTHHEN310
335 IFM$(A,B)="."THENM$(A,B)="*":GOSUB 570  :GOTO 215
340 H=1:X=A:Y=B:FORI=1TO5:IFM$(A,B)=L$(I)THEN 350
345 NEXT I
350 M$(A,B)="H":CM=CM+1:GOSUB 570  :GOTO 215
355 Z=RND(4):ONZGOSUB 530 , 525 , 540 , 535
360 IFM$(X+P,Y+Q)="H"ORM$(X+P,Y+Q)="*"ORM$(X+P,Y+Q)=" "THEN 355
365 SL=0:SP=1:A=X:B=Y:ONZGOSUB 465 , 465 , 500 , 500 :IFSP>=S(I)+1GOTO 370 ELSE
    355
370 IFM$(X+P,Y+Q)="."THENM$(X+P,Y+Q)="*":GOSUB 570  :GOTO 215
375 IFM$(X+P,Y+Q)<>L$(I)THENR=R+1:S$(R)=M$(X+P,Y+Q):M$(X+P,Y+Q)="H":CM=CM+1:GOSU
    B 570  :X(R)=X+P:Y(R)=Y+Q:GOTO 215
380 M$(X+P,Y+Q)="H":CM=CM+1:H=2:GOSUB 570  :P=P*2:Q=Q*2
385 IFH=S(I)+1THENH=0:PRINTSK$;A$(I)
390 IFI=5THENPX=1
395 GOTO 215
400 IFM$(X+P,Y+Q)="."THENM$(X+P,Y+Q)="*":GOTO 410
405 GOTO 415
410 ONZGOSUB 525 , 530 , 535 , 540 :GOSUB 570  :GOTO 215
415 IFM$(X+P,Y+Q)="*"ORM$(X+P,Y+Q)=" "THENCK=1:ONZGOSUB 525 , 530 , 535 , 540

420 CK=0:IFM$(X+P,Y+Q)<>L$(I)THENR=R+1
425 IFM$(X+P,Y+Q)<>L$(I)THENS$(R)=M$(X+P,Y+Q):M$(X+P,Y+Q)="H":CM=CM+1:X(R)=X+P:Y
    (R)=Y+Q:GOSUB 570  :GOTO 215
430 M$(X+P,Y+Q)="H":CM=CM+1:H=H+1:GOSUB 570  :GOSUB 545
435 IFH=S(I)+1THENH=0:PRINTSK$;A$(I)
440 GOTO 215
445 INPUT"WOULD YOU LIKE TO PLAY AGAIN";F$:IFCHR$(ASC(F$))="Y"THEN 20 ELSECLS:EN
    D
450 FORHH=1TO10:FORYY=1TO10:M$(HH,YY)=H$(HH,YY):NEXT:NEXT
455 GOTO 570
460 SL=17-CM:SP=1
465 FORF=A+1TOA+4:IFF>10THEN 485
470 IFM$(F,B)<>"H"ANDM$(F,B)<>"*"THENSP=SP+1:GOTO 480
475 GOTO 485
480 NEXT F
485 FORF=A-1TOA-4STEP-1:IFF<1THEN 495
490 IFM$(F,B)<>"H"ANDM$(F,B)<>"*"THENSP=SP+1:NEXT
495 IFSP>=SLTHENRETURN
500 SP=1:FORF=B+1TOB+4:IFF>10THEN 510
```

98

```
505 IFM$(A,F)<>"H"ANDM$(A,F)<>"*"THENSP=SP+1:NEXT
510 FORF=B-1TOB-4STEP-1:IFF<1THENRETURN
515 IFM$(A,F)<>"H"ANDM$(A,F)<>"*"THENSP=SP+1:NEXT
520 RETURN
525 P=-1:Q=0:RETURN
530 P=1:Q=0:RETURN
535 P=0:Q=-1:RETURN
540 P=0:Q=1:RETURN
545 IFP>0THENP=P+1
550 IFP<0THENP=P-1
555 IFQ>0THENQ=Q+1
560 IFQ<0THENQ=Q-1
565 RETURN
570 PRINTCHR$(28);:PRINTTAB(4)"1 2 3 4 5 6 7 8 9 10";
575 PRINTTAB(34)"1 2 3 4 5 6 7 8 9 10"CHR$(26)CHR$(29);
580 FORIL=1TO10:PRINTCHR$(IL+64)TAB(4);
585 FORIC=1TO10:PRINTM$(IL,IC);:PRINT" ";:NEXT IC
590 PRINT"<>";:FORTT=1TO20:NEXT:PRINTCHR$(8)CHR$(8);
595 PRINTTAB(30)CHR$(IL+64)TAB(34);:FORIC=1TO10:PRINTC$(IL,IC);:PRINT"
    :PRINTCHR$(26)CHR$(29);:NEXTIL:PRINTCHR$(31):RETURN
600 '   PROGRAM NOTES : THIS PROGRAM REQUIRES 16K LEVEL II WITH
        DISK BAS
    IC ( DEFINED FUNCTIONS ARE USED ). WITHOUT
        THIS REM STATEMENT, IT
    USES ABOUT 5800 BYTES.
605 '   REM STATEMENTS WERE LEFT OUT TO CONSERVE RAM, AS THIS
        PROGRAM WI
    LL USE MOST OF AVAILABLE USER RAM IN THE
        ABOVE SYSTEM.  REMOVE THIS
    STATEMENT & 600 BEFORE
        RUNNING.
```

WORD SEARCH: by Len Gorney

Here we have two different versions of the old puzzle, with the TRS-80 doing the searching. Input the puzzle matrix in a fourteen by fourteen, displayed configuration or choose a fifty by fifty matrix without display. Tell the computer how many letters in the word, input the word and watch your minicomputer do its stuff.
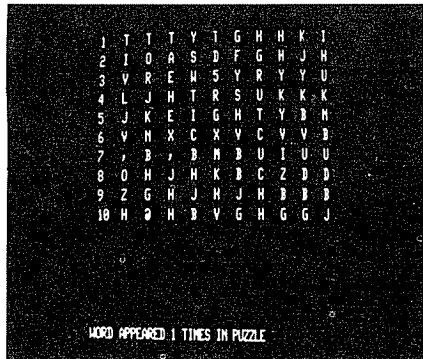

```
10  CLEAR1500:DEFINTA,C,N,R,V,W,Z:DEFSTRD,P:DIMD(7),P(50,50)
20  CLS:PRINTCHR$(23):PRINT"W  O  R  D  S  E  A  R  C  H";
30  PRINT@192,"THIS WILL HELP YOU SOLVE ONE OF THE MOST TIME CONSUMING PUZZLES EV
    ER INVENTED, WORDSEARCH.  yOURJOB, TO FIND THE HIDDEN WORDS,  IS TAKEN OVER
    BY THE TRS-80."
40  FORZ=0TO7:READD(Z):NEXTZ:PRINT:PRINT
50  PRINT"DO YOU WANT INSTRUCTIONS (Y/N)";:INPUTA$:IFLEFT$(A$,1)="Y"THENGOTO970EL
    SEIFLEFT$(A$,1)<>"N"THEN50
60  DATA"NORTHWEST","NORTH   ","NORTHEAST","EAST    ","SOUTHEAST","SOUTH   ","
    SOUTHWEST","WEST     "
70  CLS:PRINT"VERSION   DESCRIPTION":PRINT
80  PRINT"  1      MAXIMUM 14 BY 14 PUZZLE SIZE WITH SCREEN PRINOUT"
90  PRINT"  2      MAXIMUM 50 BY 50 PUZZLE SIZE NO SCREEN PRINTOUT"
100 INPUT"PLEASE ENTER VERSION NUMBER ( 1 OR 2 )";V
110 IFV<1ORV>2THEN70
120 PRINT:INPUT"PLEASE ENTER NUMBER OF ROWS IN YOUR PUZZLE";R:IFR<=0THENSTOP
130 IFV=1ANDR>14THEN70
140 INPUT"PLEASE ENTER NUMBER OF COLUMNS IN YOUR PUZZLE";C:IFC<=0THENSTOP
```

```
150 INPUT"DO YOU WANT THIS OUTPUT TO THE LINEPRINTER";Y$:IFLEFT$(Y$,1)="Y"THENY=
    1:GOSUB1110:ELSEY=0
160 IFV=1ANDC>14THEN70
170 CLS:A=3
180 IFV=2THEN220
190 FORZ=1TOC:PRINT@A," ";Z;:IFZ>9ANDC>9THEN200ELSEA=A+4:NEXTZ:GOTO210
200 FORZ=10TOC:PRINT@A," ";Z;:A=A+4:NEXTZ
210 A=65:FORZ=1TOR:PRINT@A,Z;:A=A+64:NEXTZ
220 A=70:A2=832:A3=832
230 FORR2=1TOR
240 FORC2=1TOC
250 PRINT@960,"PLEASE INPUT LETTER AT ROW";R2;"COLUMN";C2;
260 GOSUB950:P(R2,C2)=P(0,0)
270 IFV=1THENPRINT@A,P(0,0);ELSEPRINT@A2,P(0,0);
280 A=A+4:A2=A2+1:NEXTC2:IFV=2THENGOSUB940
290 A=((R2+1)*64)+6:A2=832:IFV=2THENGOSUB960
300 NEXTR2
310 PRINT@960,"INPUT  Y  FOR CORRECTIONS ELSE INPUT  N";:GOSUB950
320 IFP(0,0)="N"THEN480
330 PRINT@960,"INPUT  00  FOR ROW NUMBER TO STOP CORRECTIONS ROUTINE";:GOSUB940
340 R2=0:C2=0
350 A3=960:GOSUB960:PRINT@960,"INPUT ROW NUMBER OF LETTER IN ERROR";
360 GOSUB960:R2=VAL(P(0,0)):GOSUB950:R2=10*R2+VAL(P(0,0))
370 IFR2<=0THEN480
380 IFR2<=RTHEN400
390 GOSUB960:PRINT@960,"YOUR PUZZLE HAS ONLY";R;"ROWS";:GOSUB940:GOTO350
400 PRINT@960,"INPUT COLUMN NUMBER OF LETTER IN ERROR";
410 GOSUB960:C2=VAL(P(0,0)):GOSUB950:C2=10*C2+VAL(P(0,0))
420 IFC2<=CANDC2>=1THEN440
430 GOSUB960:PRINT@960,"YOUR PUZZLE HAS ONLY";C;"COLUMNS";:GOSUB940:GOTO400
440 A=(R2*64)+((C2*4)+2)
450 PRINT@960,"INPUT CORRECT LETTER FOR ROW";R2;"COLUMN";C2;:GOSUB950:P(R2,C2)=P
    (0,0)
460 IFV=2THEN350
470 FORZ=1TO5:FORZ=1TO5:PRINT@A," ";:PRINT@A,P(0,0);:NEXTZ:NEXTZZ:GOTO350
480 PRINT@960,"HOW MANY LETTERS ARE IN THE WORD TO SEARCH FOR";:GOSUB950:W2=VAL(
    P(0,0)):GOSUB950:W2=10*W2+VAL(P(0,0)):A3=832
490 IFW2<=0THENGOSUB1200ELSEIFV=2THENGOSUB960
500 IFW2>RANDW2>2THENPRINT@960,"WORD IS BIGGER THAN PUZZLE, TRY AGAIN. (USE TWO
    DIGITS, 02 = 2)";:FORI=1TO800:NEXT:PRINT@960,CHR$(30):GOTO480
510 A3=960:GOSUB960:PRINT@960,"PLEASE INPUT YOUR";W2;"LETTER WORD";
520 A=993:A2=832
530 FORW=1TOW2
540 GOSUB950:P(0,W)=P(0,0)
550 IFV=2THENPRINT@A2,P(0,W);ELSEPRINT@A,P(0,W);
560 A=A+1:A2=A2+1
570 NEXTW
580 IFY=1THENFORW=1TOW2:LPRINTP(0,W);:NEXTW:LPRINTTAB(20)," "
590 N=0
600 FORR4=1TOR
610 FORC4=1TOC
620 IFP(R4,C4)<>P(0,1)THEN880ELSEZ=0
630 W3=0:W4=2:R7=-1:C7=-1
640 R5=R4:C5=C4
650 IFR7<0THENR5=R5-1
660 IFC7<0THENC5=C5-1
670 IFR7>0THENR5=R5+1
680 IFC7>0THENC5=C5+1
690 IFR5<=0ORC5<=0ORR5>RORC5>CTHEN770
700 IFP(R5,C5)<>P(0,W4)THEN770
710 W4=W4+1
720 IFW4>W2THEN740
730 W3=1:GOTO650
740 PRINT@960,"WORD STARTS AT ROW";R4;"COLUMN";C4;"TO THE ";D(Z);:GOSUB940:IFY=1
    THENLPRINT"WORD STARTS AT ROW";R4;"COLUMN";C4;"TO THE ";D(Z);
750 N=N+1:W4=2:W3=0
760 IFLEFT$(D(Z),1)="W"THEN880
770 IFW3<>1THEN790
780 W4=2:W3=0
790 IFZ=0THENC7=0:GOTO870
800 ONZGOTO810,820,830,840,850,860,880
810 C7=1:GOTO870
820 R7=0:GOTO870
830 R7=1:GOTO870
840 C7=0:GOTO870
850 C7=-1:GOTO870
860 R7=0
870 Z=Z+1:GOTO640
880 NEXTC4
890 NEXTR4
900 A3=960:GOSUB960:IFN<>0THEN920
910 PRINT@960,"WORD IS  N O T  IN PUZZLE";:GOSUB940:GOTO480
920 PRINT@960,"WORD APPEARED";N;"TIMES IN PUZZLE";:GOSUB940:IFY=1THENLPRINT"WORD
    APPEARED";N;"TIMES IN THE PUZZLE";
930 GOTO480
940 FORZ2=1TO1000:NEXTZ2:RETURN
950 P(0,0)="":P(0,0)=INKEY$:IFP(0,0)=""THEN950ELSERETURN
```

100

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960 FORA4=A3TOA3+62:PRINT@A4," ";:NEXTA4:RETURN
970 CLS:PRINT"THIS PUZZLE HAS TWO VERSIONS.  vERSION #1 ALLOWS YOU TO INPUT A PU
      ZZLE MATRIX HAVING A MAXIMUM OF 14 ROWS AND 14 COLUMNS.  tHIS VERSION WILL
      PRINT THE MATRIX ON THE SCREEN AS YOU PUT .IN THE ";
980 PRINT"  LETTERS.  VERSION #2 ALLOWS A MAXIMUM OF 50 ROWS AND 50 COLUMNS BUT
      WILL NOT PRINT THE MATRIX ON THE SCREEN.  ";
990 PRINT"AFTER YOU CHOOSE  WHICH VERSION YOU WANT TO USE,  YOU WILL BE ASKED HO
      W MANY ROWS AND THEN HOW MANY COLUMNS YOU WANT IN YOUR PUZZLE.  BE SURE NO
      TTO CHOOSE MORE THAN 14 FOR EITHER IF ";
1000 PRINT"YOU CHOSE VERSION #1 AND    NOT MORE THAN 50 IF YOU CHOSE VERSION  #2.
        NOW ENTER YOUR    PUZZLE.  DON'T WORRY IF YOU MAKE ANY ERRORS AS YOU WI
      LL BE GIVENA CHANCE TO CORRECT THEM.  WHEN YOU ARE ";
1010 PRINT"DONE CORRECTING ERRORS  OR IF YOU DO NOT HAVE ANY, ENTER 00 WHEN ASKE
      D 'INPUT ROW NUMBEROF LETTER IN ERROR'."
1020 PRINT:PRINT"HIT ENTER TO CONTINUE."
1030 A$=INKEY$:IFA$=""THEN1030
1040 CLS:PRINT:PRINT"NOW THE COMPUTER NEEDS TO KNOW HOW MANY LETTERS ARE IN THE
      WORD IT IS GOING TO LOOK FOR.  ***THIS NUMBER MUST BE INPUT AS A TWO DIGIT
      NUMBER (02 FOR 2)*** ";
1050 PRINT"NEXT YOU INPUT THE WORD YOU WANT TO FIND AND THE COMPUTER WILL FIND I
      T FOR YOU AND TELL YOU WHERE ";
1060 PRINT"ITIS AND HOW MANY TIMES IT APPEARS IN THE PUZZLE.  INPUTTING 00   WHE
      N IT ASKS 'HOW MANY LETTERS TO SEARCH FOR' WILL BRING YOU TO AN OPTION TO E
      ND PROGRAM OR DO ANOTHER PUZZLE."
1070 PRINT:PRINT"HAVE FUN!"
1080 PRINT:PRINT"HIT ENTER TO CONTINUE."
1090 A$=INKEY$:IFA$=""THEN1090
1100 GOTO60
1110 A=PEEK(14312):IFA=255THENPRINT"YOU NEED TO TURN YOUR PRINTER ON!":FORI=1TO4
      20:NEXTI:GOTO150
1120 IFA=223PRINT"YOU NEED PAPER!":FORI=1TO420:NEXTI:GOTO150
1130 IFA<>63THENPRINT"SOMETHING IS WRONG WITH YOUR LINE PRINTER":FORI=1TO420:NEX
      TI:GOTO150
1140 FORX1=1TOR:FORX2=1TOC
1150 LPRINTP(X1,X2);" ";
1160 NEXT X2
1170 LPRINTCHR$(13)
1180 NEXTX1
1190 CLS:RUN
1200 CLS:PRINT:PRINT"DO YOU WANT TO:"
1210 PRINT"1.) DO ANOTHER PUZZLE."
1220 PRINT"2.) END PROGRAM."
1230 INPUTA:IFA=1THENRUN
1240 IFA<>2THENGOTO1200
1250 END
```

INVISIBLE MAZE: by Dennis Nau

Place your maze blockers in secrecy and watch your opponent bounce off the walls as he works his way through the maze. A good choice for married couples.


```
20 DEFINTA-P:DEFSTRQ-Z:DIMA(195),W(3),X(2),Y(3)
30 C=0:D=1:E=2:Q=CHR$(14):R=CHR$(15):S=CHR$(9):T=CHR$(8)
40 U=CHR$(91):V=CHR$(10):W(0)=CHR$(94):W(1)=CHR$(93)
```

101

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50 W(2)=U:W(3)=CHR$(92):Z3="   ":Z4="Y":Z5="N"
60 READY(0),Y(1),Y(2),Y(3)
70 CLS:FORG=DTO195:A(G)=C:NEXT:N=C:K=100
80 PRINT"HOW MANY BLOCKERS WILL YOU USE ( MAX";K;")";:INPUTO
90 IFO<=COR0>KTHEN80ELSEPRINT""
100 IFLEN(X(B))>CTHEN125
110 INPUT"WHAT IS 1ST PLAYERS NAME";X(D):PRINT""
120 INPUT"WHAT IS 2ND PLAYERS NAME";X(E)
125 GOSUB370
130 PRINT@C,X(D);" PLACE YOUR BLOCKERS, "X(E);" NO PEEKING";
140 B=D:GOSUB400:B=E:GOSUB370
150 PRINT@C,X(E);" PLACE YOUR BLOCKERS, "X(D);" NO PEEKING";
160 GOSUB 400 :N=D:CLS:PRINT"WHO WILL GO FIRST"               '
170 PRINT"1 = ";X(D);"    2 = ";X(E);:INPUTG:PRINT""
180 INPUT"DO YOU WANT TRAIL MARKINGS (Y/N)";Z2
190 IFLEFT$(Z2,D)=Z4THENZ2=Z4
200 IFLEFT$(Z2,D)=Z5THENZ2=Z5
210 IFZ2<>Z4ANDZ2<>Z5THEN180
220 IFG=DTHEN260
230 B=E
240 CLS:PRINT@C,X(B);"'S TURN";
250 F=203:GOSUB380:GOSUB620:GOSUB600:GOTO270
260 B=D:GOTO240
270 Z=INKEY$
280 PRINTQ;Q;R;
290 IFZ=""THEN270
300 L=P-D
310 GOSUB700
320 IFF>195THENF=203:GOTO270
330 GOSUB620:GOSUB600
340 IFZ2=Z5THENPRINT@L,Z3;
350 IFB=DANDA(F)=EORB=EANDA(F)=DORA(F)=3THEN750
360 PRINT@P,W(M);:GOSUB600:GOTO270
370 CLS
380 PRINT@65,Y(D):FORG=DTO13:PRINTTAB(1)Y(E):NEXT
390 PRINT@961,Y(3);:RETURN
400 F=188:K=O:GOSUB620:GOSUB600:Z1=LEFT$(X(B),D)
410 Z=INKEY$
420 PRINTQ;Q;R;
430 IFZ=""THEN410
440 GOSUB700:GOSUB620:GOSUB600
450 IFZ=" "ANDK<OTHEN650
460 IFZ<>Z1THEN410
470 IFB=DANDA(F)<>COR(B=EANDA(F)=EORA(F)=3)THEN410
480 IFF=188ORF=8THEN410
490 IFB=EANDA(F)=DTHENA(F)=3ELSEA(F)=E
500 IFB=DTHENA(F)=D
510 PRINT@P,Z1;:K=K-D:IFK=CRETURN
520 PRINT@C,X(B);K;" BLOCKERS LEFT                     ";
530 GOSUB600:GOTO410
540 IFF-15=-7ANDN=DTHEN790
550 IFF-15<=CTHENRETURNELSEF=F-15:M=E:RETURN
560 IFF+15>195THENRETURNELSEF=F+15:M=3:RETURN
570 IFINT((F-D)/15)=(F-D)/15ORF-D<DRETURN
580 F=F-D:M=D:RETURN
590 IFINT(F/15)=F/15ORF+D>195THENRETURNELSEF=F+D:M=C:RETURN
600 G=15360+P:H=VARPTR(G)
610 POKE16416,PEEK(H):POKE16417,PEEK(H+D):RETURN
620 GI=F/15:G=INT(F/15):H=G*15
630 IFGI=GTHENI=5ELSEI=D
640 J=F-H:P=((G+E)*64)+((J*4)-I):RETURN
650 IFA(F)=CTHEN410
660 IFB=DANDA(F)=DTHENA(F)=C
670 IFB=EANDA(F)=ETHENA(F)=C
680 IFB=EANDA(F)=3THENA(F)=D
690 PRINT@P-D,Z3;:GOSUB600:K=K+D:GOTO520
700 IFZ=UGOSUB540
710 IFZ=VGOSUB560
720 IFZ=TGOSUB570
730 IFZ=SGOSUB590
740 RETURN
750 FORG=DTO10
760 FORH=DTO15:PRINT@P-D,Y(0);:NEXTH
770 FORH=DTO15:PRINT@P-D,Z3;:NEXTH:NEXTG
780 IFB=DTHEN230ELSE260
790 CLS:PRINTCHR$(23):PRINT@528,X(B);" WINS":FORG=DTO1500:NEXT
800 PRINT@C,"PRESS ENTER TO REVIEW MAZE"
810 PRINT"1 = ";X(D);"'S BLOCKERS"
820 PRINT"2 = ";X(E);"'S BLOCKERS"
830 PRINT"3 = BOTH PLAYERS BLOCKERS":INPUTH:GOSUB370
840 FORO=DTO195:IFA(O)=CTHEN860
850 F=O:GOSUB620:PRINT@P,RIGHT$(STR$(A(O)),D);
860 NEXT
870 PRINT@C,"";:INPUT"LIKE TO PLAY AGAIN (Y/N)";Z2
880 IF LEFT$(Z2,D)=Z4THEN70
890 DATACONTLETCONT
900 DATADEFDEFDEFDEFDEFDEFDEFDEFDEFDEFDEFDEFDEFDEFDEFDEFDEFDEFDEFDEFDEFDEFDEF
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102

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910  DATAUS INGERRDEF ERRDEF ERRDEF ERRDEF ERRDEF ERRDEF ERRDEF ERRDEF ERRDEF ERRDEFE
     RRDEF ERRDEF ERRDEF ERRUS ING
920  DATASETSETSETSETSETSETSETSETSETSETSETSETSETSETSETSETSETSETSETSETSETSETSETSET
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SUPER MAZE: by James Haines

More amazing fun with the maze premise. You determine the dimensions, and the TRS-80 draws the maze. May not be for the lazy. Use your arrow keys quickly; the guard is fast approaching!


```
10  CLEAR 100:DEFINT K,E,F,H,D,W,V,L,Q,Y:KK=1:KH=4
100 CLS:H=-1:PRINT @ 87,"*** SUPER-MAZE ***":PRINT:PRINT
110 INPUT"WIDTH,LENGTH";B,C:IF B<>INT(B) OR C<>INT(C) PRINT"INTEGERS ONLY, PLEAS
    E.":GOTO 110 ELSE IF B<2 PRINT"TOO NARROW.":GOTO 110 ELSE IF B>16 PRINT"TOO
    WIDE.":GOTO 110 ELSE IF C<2 PRINT"TOO SHORT.":GOTO 110 ELSE IF C>14 PRINT"
    TOO LONG.":GOTO110
120 RANDOM:DIM AR(B*C*2):D=INT((B*C)/240*3+.5): IF D=0 THEN D=1
121 INPUT"DIFFICULTY FACTOR (1- EASIEST, 10-HARDEST) ";AA:IF AA<1 OR AA>10 OR AA<
    >INT(AA) PRINT"ENTER INTEGERS BETWEEN 1 AND 10 ONLY, PLEASE.":GOTO 121 ELSE
    AB=((10-AA)*(56/(B*C)+.75)*21.6+180)*B*C/224*1.5:CLS:IF (B*C)<19 THEN 145
130 PRINT @ 527,"ALLOW";D;"MINUTE(S) FOR MAZE GENERATION."
140 FOR N=1 TO 7:FOR P=1 TO 100:NEXT P :PRINT @ 533," ";:FOR P=1 TO 100:NEXT P:P
    RINT @ 532,D;:NEXT N:CLS
145 PRINT @ 537,"GENERATING MAZE"
150 DIM A(B-1,C-1),A1(7),QW(4):A1(1)=1:A1(3)=-1:A1(4)=1:A1(6)=-1:V=RND(B)-1:A(V,
    0)=1:E=V:FORN=0TO4:QW(N)=N+1:NEXT
180 K1=(RND(4)-2)*2
190 FOR K=KK TO KH:K1=K1+2:IF K1=8 THEN K1=0
200 JK=E+A1(K1):KL=F+A1(K1+1): IF JK<0 OR KL<0 OR JK>(B-1) OR KL>(C-1) THEN 286
210 IF A(JK,KL)<>0 THEN 286 ELSE IF W THEN 280
215 JK=E+A1(K1)*2: KL=F+A1(K1+1)*2: IF JK<0 OR KL<0 OR JK>(B-1) OR KL>(C-1) THEN
    230 ELSE IF A(JK,KL)=1 THEN 286
230 IF A1(K1)=0 THEN L=1:L1=0 ELSE L=0:L1=1
235 JK=E+A1(K1)+L: KL=F+A1(K1+1)+L1: IF JK>(B-1) OR KL>(C-1) THEN 250 ELSE IF A(
    JK,KL)=1 THEN 286
250 JK=JK-2*L: KL=KL-2*L1: IF JK<0 OR KL<0 THEN 280 ELSE IF A(JK,KL)=1 THEN 286
280 E=E+A1(K1):F=F+A1(K1+1):IF W THEN A(E,F)=-1:AT=AT+2:AR(AT)=E:AR(AT+1)=F:E=E-
    A1(K1):F=F-A1(K1+1) ELSE A(E,F)=1
285 GOTO 180
286 NEXT K: IF WW THEN 800 ELSE WW=1
290 FOR W=0 TO 1: FOR H1=0 TO C-1: FOR H=0 TO B-1: IF W THEN 310 ELSE IF A(H,H1)
    =1 THEN E=H:D=1:F=H1:GOTO 180 ELSE 312
310 IF A(H,H1)=0 THEN A(H,H1)=-2:E=H:F=H1:AT=0:AR(0)=H:AR(1)=H1:GOTO 180
312 NEXT H,H1,W
320 CLS: FOR N=0 TO (8*(B-1)) STEP 8:IF (N/8)=V THEN 330 ELSE FOR M=N TO N+7:SET
    (M,0):NEXT M
330 NEXT N
350 PRINT @ 832,:SET (1,0): IF A(0,0)=-2 THEN A9=1
360 FOR N=0 TO C-1:FOR M=0 TO 2:SET(0,N*3+M):NEXT:FOR M=0 TO B-1:IF N=(C-1) THEN
    440 ELSE D=A(M,N)+A(M,N+1):IF A(M,N+1)=-2 THEN 440 ELSE IF ABS(D)=2 OR D=-
    3 THEN 440 ELSE IF A9=1 THEN A9=0:GOTO 440 ELSE FOR R=0 TO 7:SET(M*8+R,(N+
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         1)*3):NEXT R
440 IF M=(B-1) THEN 460 ELSE IF A(M,N)=A(M+1,N) OR (A(M,N)+A(M+1,N))=-3 THEN 470
460 FOR R=0 TO 3: IF M=B-1 THEN 461 ELSE IF N=0 AND A(M+1,N)=-2 THEN 462
461 SET(M*8+7,N*3-R+3)
462 NEXT R
470 NEXT M,N: S=0
500 FOR N=0 TO B-1: IF A(N,C-1)=1 THEN S=S+1
510 NEXT N: M=RND(S):S=0
550 FOR N=0 TO (B-1): IF A(N,C-1)=1 THEN S=S+1
560 IF S=M THEN M1=N:M=0:SET (N*8+7,C*3):GOTO 590
570 FOR R=1 TO 8: SET(N*8-1+R,C*3):NEXT R
590 NEXT N:X=V*8+4:Y=2
591 IF AA=10 THEN FORN=0 TO C-1:FORM=0 TO B-1:A(M,N)=3:NEXTM,N
594 IF AB<24 THEN AB=24
595 PRINT@960,"TIME LIMIT: ";INT((AB/12)-INT(AB/720)*60);" SECONDS.     PRESS 'B'
        TO BEGIN.";
600 A$=INKEY$:IF A$<>"B" THEN 600 ELSE SET(V*8+4,2)
606 GOSUB 4000
610 X5=X5+1.3:IF X5>AB AND FL=0 GOSUB 3000
615 PRINT@999,INT(X5/720);:PRINT@1012,INT(X5/12)-INT(X5/720)*60;:A$=INKEY$:IF A$
        ="" AND FL GOTO 4200 ELSE IF A$="" THEN 610
618 E=ASC(A$):IF E<>8 AND E<>9 AND E<>10 AND E<>91 THEN X5=X5+2:IF FL THEN 4200
        ELSE 610
620 ON (E-7) GOTO 640,650,660
630 IF Y<3 THEN 710 ELSE K=0:K1=-2:GOTO 670
640 IF X<5 THEN 710 ELSE K=-5:K1=0:GOTO 670
650 K=3:K1=0:GOTO 670
660 K=0:K1=1
670 IF POINT(X+K,Y+K1) THEN 710 ELSE X5=X5+4
690 RESET(X,Y):X=X+SGN(K)*8:Y=Y+SGN(K1)*3:SET(X,Y):X2=X2+1: IF (Y/3)<C THEN A(X/
        8,Y/3)=0
691 IF (X4+E)=101 OR (X4+E)=17 THEN X3=X3+1
700 X4=E:PRINT@966,X2;:PRINT@982,X3;: IF Y>C*3 THEN 2000  ELSE IF FL THEN 4200 E
        LSE 610
710 IF FL THEN 4200 ELSE GOSUB 3000
720 GOTO 610
800 IF AY=AT THEN AY=0:GOTO 312 ELSE AY=AY+2:E=AR(AY):F=AR(AY+1):GOTO 180
2000 FOR N=1 TO 500:NEXT:CLS:PRINT @ 512,CHR$(23);"CONGRATULATIONS!! YOU MADE IT
        !!":PRINT
2010 INPUT"WANT TO TRY ANOTHER";A$:A$=LEFT$(A$,1):IF A$<>"Y" AND A$<>"N" PRINT:P
        RINT"ANSWER 'YES' OR 'NO' ONLY,     PLEASE.":PRINT:GOTO 2010 ELSE IF A$="Y
        " RUN ELSE PRINT:PRINT"O.K. I'LL SIGN OFF...":FOR N=1 TO 1000:NEXT:CLS:END
3000 FOR N=1 TO 5:PRINT @ 960,STRING$(63," ");:FORP=1TO200:NEXT:PRINT@960,"INTRU
        DER ALERT. CALL OUT THE GUARD!":FOR P=1 TO 200:NEXT P,N
3005 X5=X5+156:FLAG=1:PRINT@960,"SEAL OFF THE EXIT!";STRING$(42," ");:FORP=1TO55
        0:NEXT:FOR N=0 TO 7:SET(M1*8+N,C*3):FOR M=1 TO 20:NEXT M,N:FOR N=1 TO 500
3006 PRINT @ 960,"GUARD APPROACHING ENTRANCE...";:FOR N=1 TO 500:NEXT:FORN=1 TO
        5:K=RND(4)-1:K1=RND(4)-1:SET(XB,0):QW(K):QW(K)=QW(K1):QW(K1)=XB:NEXT
3010 GN=GN+1:K=0:K1=0:XB=V*8+4:YB=2:IF AA=10 THEN 3020 ELSE FOR N=0 TO C-1:FORM=
        0 TO B-1:A(M,N)=0:NEXTM,N:X5=X5+60*B*C/224
3020 PRINT@960,"GUARD ENTERING MAZE...        ";:FOR N=1 TO 500:NEXT:SET(XB,0):F
        OR N=1 TO 200:NEXT:RESET(XB,0):SET(XB,YB):A(XB/8,YB/3)=1: IF XB=X AND YB=Y
        THEN SET(X,0):GOTO 4340
3030 GOSUB 4000:FOR N=V*8+7 TO V*8 STEP -1:SET(N,0):FOR M=1 TO 20:NEXT M,N:RETUR
        N
4000 PRINT@960,"MOVES:",,"ERRORS","TIME:        MINUTES      SECONDS";:PRINT@966,X2
        ;:PRINT@982,X3;:RETURN
4200 FOR QX=0 TO 4:ON QW(QX) GOTO 4206,4210,4220,4230,4250
4206 IF YB<3 THEN 4242 ELSE K=0:K1=-2:GOTO 4240
4210 IF XB<5 THEN 4242 ELSE K=-5:K1=0:GOTO 4240
4220 K=3:K1=0:GOTO 4240
4230 K=0:K1=1
4240 L3=INT(XB/8+SGN(K)): L4=INT(YB/3+SGN(K1)): IF POINT(XB+K,YB+K1) THEN 4242 E
        LSE IF L3>(B-1) OR L4>(C-1) THEN 4242 ELSE L=A(L3,L4): IF L=1 AND ZZ THEN 4
        260 ELSE IF L=0 THEN 4300
4242 NEXT QX
4243 GOTO 4203
4250 ZZ=ZZ+1:IF ZZ>1 THEN 4315 ELSE 4200
4260 A(XB/8,YB/3)=2:GOTO 4310
4300 A(XB/8,YB/3)=1
4310 IF (XB+SGN(K)*8)=X AND (YB+SGN(K1)*3)=Y THEN 4340 ELSE RESET(XB,YB):XB=XB+S
        GN(K)*8:YB=YB+SGN(K1)*3:SET(XB,YB):X5=X5+(QX+1)*2+ZZ*9:ZZ=0:GOTO 610
4315 IF XB<>V*8+4 OR YB<>2 THEN 4350
4320 PRINT@960,"MUST HAVE BEEN A FALSE ALARM...";STRING$(32," ");:FOR N=V*8 TO V
        *8+7:RESET(N,0):FOR M=1 TO 20:NEXT M,N:RESET(XB,YB):FOR N=0TO6:RESET(M1*8+N
        ,C*3):FOR M=1 TO 20:NEXT M,N:FORN=1 TO 2000:NEXT:GOSUB 4000
4330 X5=X5+60:AB=120*720+AB:FL=0:GOTO 610
4340 RESET(XB,YB):SET(XB+SGN(K)*4,YB+SGN(K1)*1.5):PRINT@960,"AHA!! I CAUGHT YOU!
        ";STRING$(44," ");:FOR N=1 TO 5000:NEXT:CLS:END
4350 PRINT@960,STRING$(63," ");:PRINT@960,"GUARD NUMBER ";GN;" IS LOST. DISINTEG
        RATE HIM.":FOR N=1 TO 1500:NEXT:RESET(XB,YB):PRINT@960,"CALL OUT GUARD NUM
        BER";GN+1;".";STRING$(20," ");:FOR N=1 TO 1500:NEXT
4360 FOR N=V*8 TO V*8+7:RESET(N,0):FOR M=1 TO 20:NEXT M,N:GOSUB 3006:GOTO 610
```

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OHARE: by W.D. MacDonald

You guessed it. With this program, you can enjoy all the romance and excitement of being a real life air traffic controller at the busiest airport in the world. Excellent graphics depict a hectic radar display complete with transponder idents for all commercial traffic in the pattern. All you have to do is direct the aircraft to the runway as they appear from several points of the compass. An outstanding simulation with six levels of difficulty. Keep the Rolaids handy for this one.
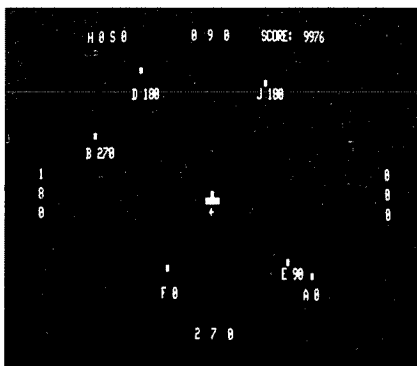

```
1 CLEAR100:RANDOM:DEFINT I,X,Y:DEFSNG Q,R:DIM F$(21),PS%(21),XX(21),  X(25),Y(25
  ),H%(21),HN%(21),DR$(21),S%(21),DXI(21),DYI(21),XII(25),YII(25)
2 REM W.D.MACDONALD
19 WD%=RND(4):IF WD%=2 THEN19 ELSE600
20 POKE 15902,248:POKE 15901,224:POKE 15903,240:PRINT@606,CHR$(90+WD%);:POKE 158
   08,49:POKE 15872,56:POKE15936,48:POKE15871,48:POKE15935,48:POKE15999,48:POK
   E 16347,50:POKE16350,55:POKE16353,48:POKE15387,48:POKE15390,57:POKE15393,48
   :PRINT@0,CD$;VL$;:RETURN
600 CLS:PRINT@153,"LEVEL OF PLAY"
610 PRINT@271,"1   SENIOR SUPERVISING AIR CONTROLLER"
620 PRINT@399,"2   JOURNEYMAN AIR CONTROLLER"
630 PRINT@527,"3   ADVANCED APPRENTICE CONTROLLER"
640 PRINT@655,"4   SECOND YEAR APPRENTICE CONTROLLER"
650 PRINT@783,"5   FIRST YEAR APPRENTICE CONTROLLER"
660 PRINT@911, "6   CONTROLLER RECRUIT"
670 PRINT@0,"";:INPUT"LEVEL OF PLAY";LV%:IF LV%>6 THEN LV%=6
680 IF LV%<1 THEN LV%=1
1000 F$(1)="A":F$(2)="B":F$(3)="D":F$(4)="E":F$(5)="F":F$(6)="G":F$(7)="J":F$(8)
   ="K":F$(9)="M":F$(10)="N":F$(11)="P":F$(12)="Q":F$(13)="T":F$(14)="U":F$(15
   )="V":F$(16)="W":F$(17)="X":F$(18)="Y":F$(19)="Z":F$(20)="I":SC%=10000
1020 FOR I=1TO20:S%(I)=180:NEXT
1025 FOR I=1TO20STEP4:H%(I)=000:HN%(I)=H%(I):H%(I+1)=270:HN%(I+1)=H%(I+1):H%(I+2
   )=180:HN%(I+2)=H%(I+2):H%(I+3)=090:HN%(I+3)=H%(I+3):NEXTI
1030 FOR I=3TO21 STEP4:X(I)=(10+2*LV%)*I+RND(20):XII(I)=X(I):Y(I)=10-RND(4):YII(
   I)=Y(I)::NEXTI
1040 FOR I=1TO21STEP4:X(I)=120-RND(15)-(13+2*LV%)*(I):XII(I)=X(I):Y(I)=40-RND(10
   ):YII(I)=Y(I):NEXTI
1050 FOR I=2TO21STEP4:X(I)=25-RND(15):XII(I)=X(I):Y(I)=38-RND(8)-(8+LV%*2)*I:YII
   (I)=Y(I):NEXTI
1060 FOR I=4TO21STEP4:Y(I)=(8+LV%*2)*I-RND(8):YII(I)=Y(I):X(I)=105-RND(20):XII(I
   )=X(I):NEXTI
1065 DT%=0:Q=.001333:R=.000666:TP!=6.2830:TS%=360:SF!=1:YF!=.583:WN%=1:TF%=25:CF
   !=.0174533:SX%=6:WT%=120:FV%=1:FF%=45:TU%=2:TH%=3:SF%=64:GOSUB2000
1070 FOR I=WN%TO20STEPWN%
1075 B$=INKEY$:IF B$="" THEN1080 ELSE GOSUB3000
1080 IF X(I)>SX% AND X(I)<WT% AND Y(I)>FV% AND Y(I)<FF% THEN1090 ELSE NEXT I:GOT
   O1092
1090 B$=INKEY$:IFB$="" THEN 1091 ELSE GOSUB3000
1091 QT%=QT%+1:XX(QT%)=I:PS%(XX(QT%))=(INT((X(I)-TU%)/TU%)+SF%*INT((Y(I)+TH%)/TH
   %)):NEXTI
1092 CLS:PRINT@8,F$(J);"H";HN%(J);"S";S%(J);:PRINT@40,"SCORE: ";SC%;:GOSUB20:IF
   QT%=0 THEN 1093 ELSE FOR Z%=WN%TOQT%:IF POINT(X(XX(Z%)),Y(XX(Z%))) THEN GOS
   UB 6000 ELSE SET(X(XX(Z%)),Y(XX(Z%))):PRINT@PS%(XX(Z%)),F$(XX(Z%));H%(XX(Z%
   ));:NEXTZ%:GOSUB20
1093 QT%=0
1120 GOSUB2000:SC%=SC%-DT%:GOTO2020
2000 DT%=8
```

105

```
2004 ET%=DT%+ET%:IF ET%>720 THEN 2005 ELSE 2010
2005 WD%=RND(4):IF WD%=2 THEN 2005 ELSE ET%=0:PRINT@470," WARNING !! WIND DIRECT
     ION UPDATE"
2010 OT%=NT%:RETURN
2020 CT%=0:FOR I=WN%TO20
2021 B$=INKEY$:IF B$="" THEN 2023 ELSE GOSUB 3000
2023 IF ABS(H%(I)-HN%(I))<23 THEN H%(I)=HN%(I):GOTO2026
2024 IF DR$(I)="R" THEN H%(I)=H%(I)-3*DT% :IF H%(I)<0 THEN H%(I)=H%(I)+360:GOTO2
     026
2025 IF DR$(I)="L" THEN H%(I)=H%(I)+3*DT%:IF H%(I)>=360 THEN H%(I)=H%(I)-360
2026 B$=INKEY$: IF B$="" THEN2060 ELSE GOSUB3000
2060 ON WD% GOTO 2065,2065,2070,2075
2065 IF POINT(61,15+CT%) THEN GOTO2080 ELSE FOR T=1TO2:SET(61,15+CT%):NEXTT:RESE
     T(61,15+CT%):GOTO2080
2070 IF POINT(40+CT%*2,26) THEN GOTO2080 ELSE  FOR T=1TO2:SET(40+CT%*2,26):NEXTT
     :RESET(40+CT%*2,26):GOTO2080
2075 IF POINT(82-CT%*2,26) THEN GOTO2080 ELSE FOR T=1TO2:SET(82-CT%*2,26):NEXTT:
     RESET(82-CT%*2,26)
2080 B$=INKEY$:IF B$="" THEN 2081 ELSE GOSUB 3000
2081 CT%=CT%+3:IF CT%>9 THEN CT%=0
2100 XI!(I)=XI!(I)+(S%(I))*DT%*Q*COS(H%(I)*CF!):X(I)=XI!(I):YI!(I)=YI!(I)-(S%(I)
     )*DT%*R*SIN(H%(I)*CF!):Y(I)=YI!(I)
2105 B$=INKEY$:IF B$="" THEN2110 ELSE GOSUB3000
2110 NEXTI:GOTO1070
3000 K$=B$:B$="":IF K$="C" THEN CM$="":HM$="":N%=0:CD$="":VL$="":J=0:K%=0:K$="":
     RETURN
3002 IF K$="R" THEN K%=1:CD$=K$:HM$="":K$="":DR$(J)="R":N%=0:PRINT@0,"        ":P
     RINT@0,CD$:RETURN
3003 IF K$="L" THENK%=1:CD$=K$:HM$="":K$="":DR$(J)="L":N%=0:PRINT@0,"        ":PR
     INT@0,CD$:RETURN
3004 IF K$="S" THEN K%=2:CD$=K$:K$="":N%=0:SM$="":PRINT@0,"        ":PRINT@0,CD$:
     RETURN
3006 ON K% GOTO 3050,3060
3010 CM$=K$:K$="":PRINT@0,CM$;
3030 FOR L=WN%TO20:IF F$(L)=CM$ THEN3040 ELSE NEXTL:PRINT@0,"FLIGHT NOT IN THIS
     SECTOR";:CM$="":N%=0:RETURN
3040 J=L:PRINT@0,STRING$(25," "):PRINT@8 ,F$(J);"H";HN%(J);"S";S%(J);:CD$="":VL$
     ="":RETURN
3050 H$(N%)=K$:HM$=HM$+H$(N%):N%=N%+1:K$="":PRINT@0,STRING$( 7," ");:PRINT@0,CD$
     ;HM$;
3052 IF N%>=3 THEN HN%(J)=VAL(HM$):VL$=STR$(HN%(J)):HM$="":N%=0:IF HN%(J)
     THEN H%(J)=H%(J)+360
3053 RETURN
3060 S$(N%)=K$:SM$=SM$+S$(N%):N%=N%+1:K$="":PRINT@0,STRING$( 7," ");:PRINT@0,CD$
     ;SM$;
3062 IF N%>=3 THEN S%(J)=VAL(RIGHT$(SM$,3)):VL$=STR$(S%(J)):SM$="":N%=0
3063 IF S%(J)>180 THEN S%(J)=180
3064 IF S%(J)<100 THEN S%(J)=100
3065 RETURN
6000 IF (X(XX(Z%))=58 OR X(XX(Z%))=59 OR X(XX(Z%))=60 OR X(XX(Z%))=61 OR X(XX(Z%
     ))=62 OR X(XX(Z%))=63) AND (Y(XX(Z%))=25 OR Y(XX(Z%))=26) THEN GOSUB6120 EL
     SE GOSUB 6200
6001 RETURN
6020 XI!(XX(Z%))=000:YI!(XX(Z%))=000:S%(XX(Z%))=0:RETURN
6120 IF X(XX(Z%))=61 AND H%(XX(Z%))=270 AND WD%=1  THEN GOSUB 6280:RETURN
6130 IF Y(XX(Z%))=26 AND H%(XX(Z%))=000 AND WD%=3  THEN GOSUB 6280:RETURN
6140 IF Y(XX(Z%))=26 AND H%(XX(Z%))=180 AND WD%=4  THEN GOSUB 6280 ELSE GOSUB615
     0:RETURN
6141 RETURN
6150 PRINT@470, F$(XX(Z%)); " MISSED RUNWAY- LANDING ABORTED";:H%(XX(Z%))=H%(XX(
     Z%))+135:IF H%(XX(Z%))>360 THEN H%(XX(Z%))=H%(XX(Z%))-360:HN%(XX(Z%))=H%(XX
     (Z%)):DR$(XX(Z%))="R":SC%=SC%-500:RETURN
6200 CLS:PRINT@416,"A MID-AIR COLLISION HAS OCCURRED":SC%=SC%-5000
6210 FOR L%=1TO25:IF L%=XX(Z%) THEN NEXT L%
6220 IF X(L%)=X(XX(Z%)) AND Y(L%)=Y(XX(Z%)) THEN PRINT@480,F$(L%);" AND ";F$(XX(
     Z%)); " ARE GOING DOWN.";:XI!(L%)=0:YI!(L%)=0:S%(L%)=0
6230 NEXT L%
6240 GOSUB6020
6260 RETURN
6280 IF S%(XX(Z%))<120 THEN PRINT@470, F$(XX(Z%));" LANDED SHORT OF RUNWAY-SPEED
     TOO LOW!!";:GOSUB6020:SC%=SC%-2500:RETURN
6290 IF S%(XX(Z%))>150 THEN PRINT@470, F$(XX(Z%)); " OVERSHOT RUNWAY-SPEED TOO H
     IGH!!";:GOSUB6020:SC%=SC%-2500:RETURN
6300 TL%=TL%+1:PRINT@470, F$(XX(Z%));" LANDED SAFELY. ";:PRINT@487 ,"TOTAL LANDE
     D IS ";TL%;:SC%=SC%+100:IF TL%=20 THEN PRINT@534,"GAME OVER-FINAL SCORE: ";
     SC%; ELSE GOSUB6020:RETURN
```

FOUR IN A ROW: by Mikal Pedersen

Match wits with your TRS-80 in an effort to get four X's or O's in a row. Vertical, horizontal and diagonal matching allowed with optional time limit on moves available. Several levels of play and usual computer gloating included.
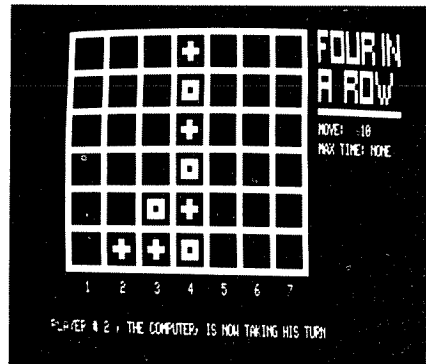

```
2 POKE16553,255:CLEAR40
10 DEFINTA,B,C,D,F,I,J,K,L,M,R,P,S,T,V:DEFSTRN:DEFSNGY
30 DIM RM(7),FM(7),FS(7),AP(7,6),AV(7,6),MN(7),MH(7),ML(7),T(32),B(32),S(7):PA=0
100 GOSUB1000:GOSUB2000
140 GOSUB25000
180 IFPSW=1ANDP1=1THEN370
191 IFPSW=2ANDP2=1THEN370
210 GOSUB3000
230 ROW=LR:COL=LC
250 GOSUB4000
260 IFPSW=1ANDMH(COL)=30GOSUB29000
261 IFPSW=2ANDML(COL)=-30GOSUB29000
290 GOSUB26000
320 IFPSW=1THENPSW=2ELSEPSW=1
340 IFYW<>1THENMV=MV+1
351 PRINT@368,"MOVE:   ";MV;  :GOTO 180
370 PRINT@960,"PLAYER #";PSW;", THE COMPUTER, IS NOW TAKING HIS TURN          "
    ;
390 GOSUB5000
400 IFPSW=1ANDD1<>0THENGOSUB7000
410 IFPSW=2ANDD2<>0THENGOSUB7000
470 GOSUB26000
480 GOTO320
1000 CLS:FORI=15360TO15423:POKEI,143:POKEI+320,188:POKEI+960,188:NEXTI:FORI=1536
     0TO15684STEP64:POKEI,191:POKEI+63,191:NEXTI
1031 FORI=1TO32:READT(I):NEXTI
1032 DATA 156,140,168,140,172,168,128,168,168,140,172,128,168,168,144,168
1034 DATA 128,156,140,148,128,128,156,140,148,156,140,148,148,128,128,148
1036 FORI=1TO32:READB(I):NEXTI
1037 DATA 151,129,170,176,186,170,176,186,170,131,169,128,170,170,130,174
1039 DATA 128,151,131,149,128,128,151,131,148,181,176,149,138,154,154,128
1050 FORI=1TO16:POKEI+15500,T(I):POKEI+15564,B(I):NEXTI:FORI=1TO16:POKEI+15518,T
     (I+16):POKEI+15582,B(I+16):NEXTI:RETURN
2000 FORI=1TO7:FORJ=1TO6:AP(I,J)=0:NEXTJ,I
2030 FORJ=1TO6:FORI=1TO7:READAV(I,J):NEXTI,J
2040 DATA 2,3,4,6,4,3,2,2,3,4,8,4,3,2,2,5,8,10,8,5,2,3,5,9,11,9,5,3,3,5,7,9,7,5,
     3,3,4,5,7,5,4,3
2090 FORI=1TO7:MN(I)=1:NEXTI:P1=0:Y1=0:Y2=0:TZ=0
2120 PRINT@453,"ENTER NAME OF FIRST PLAYER('C' FOR COMPUTER)";:INPUT N1
2130 IFN1=""GOTO2120:ELSEN1=LEFT$(N1,12)
2140 IFN1="C"THENP1=1ELSE2150
2142 I=0:GOSUB2400
2143 D1=0:INPUTN$
2145 IFLEFT$(N$,1)="B"GOTO2150
2146 IFLEFT$(N$,1)="I"THEND1=1:GOTO2150
2147 IFLEFT$(N$,1)="A"THEND1=2:ELSEGOTO2142
2150 P2=0:PRINT@517,"ENTER NAME OF SECOND PLAYER('C' FOR COMPUTER)";:INPUTN2
2160 IFN2=""GOTO2150:ELSEN2=LEFT$(N2,12)
2170 IFN2="C"THENP2=1ELSE2190
2172 I=64:GOSUB2400
2173 D2=0:INPUTN$
2175 IFLEFT$(N$,1)="B"THEN2190
2176 IFLEFT$(N$,1)="I"THEND2=1:GOTO2190
2177 IFLEFT$(N$,1)="A"THEND2=2:ELSEGOTO2172
2190 PSW=1:MV=1
2210 PRINT@650,"DO YOU WANT PLAYING PIECES ERASED AFTER ";
2211 PRINT@714,"EACH MOVE THAT HAS BEEN PLAYED (Y OR N)";:INPUT N
2214 IFLEFT$(N,1)="N"ORN="Y"THEN2220ELSE2210
2220 IFLEFT$(N,1)="Y"THENVSW=2ELSEVSW=1
```

```
2350 RESTORE:YT=0
2351 IFP1=1ANDP2=1THENRETURN
2360 PRINT@650,"DO YOU WISH TO SET A TIME LIMIT FOR EACH ";
2361 PRINT@714,"MOVE (Y OR N)                              " ;:PRINT@731,"";:I
     NPUT N
2364 IFLEFT$(N,1)="Y"ORLEFT$(N,1)="N"THEN2366ELSE2360
2366 IFLEFT$(N,1)="Y"THEN2368
2367 YT=0:RETURN
2368 PRINT@842,"ENTER NUMBER OF SECONDS (00.5 TO 100.0) THAT";
2369 PRINT@906,"YOU WISH TO LIMIT EACH MOVE";
2370 INPUTYT
2371 YT=INT(YT*10)/10
2372 IFYT<.5ORYT>100THEN2370
2380 RETURN
2400 PRINT@517+I,"ENTER 'B','I' OR AN 'A'";:PRINT@453+I,"ARE YOU A BEGINNER, INT
     ERMEDIATE OR ADVANCED PLAYER";
2410 RETURN
3000 GOSUB27000
3001 IFPSW=1THENP=560ELSEP=752
3002 IFPSW=2ANDP1=1THENP=560
3003 PRINT@P,"TIMER(PLAYER";PSW;")";
3004 IFPSW=1THENP=631ELSEP=823
3005 IFPSW=2ANDP1=1THENP=631
3006 PRINT@P,"SECONDS";
3007 P=P-7
3008 YSEC=0.1:YW=0
3009 I=0:NF="##.#"
3010 PRINT@960,"IT'S YOUR TURN, ";
3020 IFPSW=1PRINTN1;ELSEPRINTN2;
3030 PRINT ", ENTER COLUMN NUMBER ?          ";
3039 PRINT@P,"";:PRINT USING NF;YSEC;
3040 A$=INKEY$
3042 I=I+1
3043 IFI<>1THEN3050
3044 YSEC=YSEC+.1
3045 PRINT@P," ¬";:PRINT USING NF;YSEC;
3046 I=0
3047 IFYT=0THEN3050
3048 IFYSEC<YTTHEN3050
3049 YW=1:GOTO320
3050 IFA$=""GOTO3040
3060 IFASC(A$)=13GOTO3040ELSELC=VAL(A$)
3080 IFLC=0GOTO140
3100 IFLC<0ORLC>7THEN3010
3110 IFMN(LC)<7THENLR=MN(LC) ELSE3010
3111 IFPSW=1THENY1=Y1+YSECELSEY2=Y2+YSEC
3160 RETURN
4000 MH(COL)=0:ML(COL)=0
4035 IFROW>6ORROW<1RETURN
4050 GOSUB11000:GOSUB12000:GOSUB13000:RETURN
5000 GOSUB 6000
5010 GOSUB 6100
5015 IF SW<>0THENLC=TW:LR=MN(LC):GOTO29000
5020 IFSS=0THEN5050
5030 LC=TV:LR=MN(LC):IFSS=1GOTO470ELSEGOSUB6200
5040 RETURN
5050 GOSUB6300
5060 IFSS=0THEN5080
5070 LC=TV:LR=MN(LC):RETURN
5080 IFRND(100)<35GOTO5140
5090 GOSUB6400
5100 IFSS<>0GOTO5070
5110 GOSUB6500
5120 IFSS<>0GOTO5070
5130 GOTO5200
5140 GOSUB6500
5150 IFSS<>0GOTO5070
5160 GOSUB6400
5200 IFMV=1GOSUB6600:RETURN
5210 GOSUB6700:GOSUB6800:RETURN
6000 FORK=1TO7:COL=K:ROW=MN(K):GOSUB4000:NEXTK:RETURN
6100 SW=0:SS=0:FORK=1TO7
6110 IFMN(K)>6THEN6170
6120 LC=K:LR=MN(LC)
6130 IFPSW=1ANDML(K)=-30THENSS=SS+1:TV=K:GOTO6170
6140 IFPSW=2ANDMH(K)=30THENSS=SS+1:TV=K:GOTO6170
6150 IFPSW=1ANDMH(K)=30THENSW=SW+1:TW=K
6160 IFPSW=2ANDML(K)=-30THENSW=SW+1:TW=K
6170 NEXTK:RETURN
6200 IFRND(100)>25RETURN
6230 PRINT@833,"MY CONGRATULATIONS ON AN EXCELLENT MOVE,";:PRINT@896," I RESIGN
     GRACIOUSLY TO A WORTHY OPPONENT";:FORI=1TO1000:NEXTI:GOTO29018
6300 SS=0:FORK=1TO7:IFMN(K)>6THEN6330
6310 IFPSW=1ANDMH(K)=20ANDML(K)=-20THENSS=1:TV=K
6320 IFPSW=2ANDML(K)=-20ANDMH(K)=20THENSS=1:TV=K
6330 NEXTK:RETURN
6400 SS=0:FORK=1TO7:IFMN(K)>6THEN6430
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6410 IFPSW=1ANDMH(K)=20THEN6440
6420 IFPSW=2ANDML(K)=-20THEN6440
6430 NEXTK:RETURN
6440 SS=SS+1:IFSS=1THENTV=K:GOTO6430
6450 IFAV(K,MN(K))>AV(TV,MN(TV))THENTV=K
6460 GOTO6430
6500 SS=0:FORK=1TO7:IFMN(K)>6THEN6530
6510 IFPSW=1ANDML(K)=-20THEN6540
6520 IFPSW=2ANDMH(K)=20THEN6540
6530 NEXTK:RETURN
6540 SS=SS+1:IFSS=1THENTV=K:GOTO6430
6550 IFAV(K,MN(K))>AV(TV,MN(TV))THENTV=K
6560 GOTO6530
6600 RANDOM
6610 I=INT(RND(7)):LC=I:LR=MN(LC)
6620 IFI<1THEN6600ELSERETURN
6700 FORI=1TO7:IFMN(I)<7RETURNELSENEXTI
6710 GOSUB27000
6800 FORI=1TO7:IFMN(I)>6THENNEXTI:ELSELC=I:LR=MN(LC)
6810 FORI=1TO7:IFMN(I)>6THEN6830
6820 IF AV(LC,LR)<AV(I,MN(I))THENLC=I:LR=MN(LC)
6830 NEXTI:RETURN
7000 I=RND(6):IFMV<3ORTZ=1RETURN
7001 IFI>4GOTO 7010:ELSEPRINT@960,"
          ";:ON I GOTO 7002,7003,7004,7005
7002 PRINT@960,"HMMMMM, COLUMN";LC;"IS A POSSIBILITY.";:GOTO7010
7003 PRINT@960,"I AM THINKING ABOUT";LC;".";:GOTO7010
7004 PRINT@960,"COLUMN";LC;"DOESN'T SEEM TOO BAD.";:GOTO7010
7005 PRINT@960,"I AM EXAMINING COLUMN";LC;"FOR A POSSIBLE MOVE.";:GOTO 7010
7010 TE=LC:FORI=0TO7:RM(I)=0:FM(I)=0:FS(I)=0:NEXTI
7020 FORI=1TO7:IFMN(I)<7THENRM(0)=RM(0)+1:RM(RM(0))=I
7030 NEXTI:IFRM(0)=1THENTZ=1
7040 IFRM(0)=1RETURN
7045 IF PSW=1ANDD1=1THENGOSUB9000:RETURN
7046 IF PSW=2ANDD2=1THENGOSUB9000:RETURN
7050 FORJ=1TORM(0):TC=RM(J):TR=MN(TC)
7060 MN(TC)=MN(TC)+1:IFPSW=1THENPSW=2:AP(TC,TR)=10:ELSEPSW=1:AP(TC,TR)=-10
7065 GOSUB6000
7070 GOSUB6100
7080 IFSW<>0THENRM(J)=0:GOTO7110
7090 IFSS>1THEN7130
7100 IFSS=1THENFM(0)=FM(0)+1:FM(FM(0))=TC:FS(FM(0))=TV
7110 MN(TC)=MN(TC)-1:AP(TC,TR)=0:IFPSW=1THENPSW=2ELSEPSW=1
7120 NEXTJ:GOTO7150
7130 MN(TC)=MN(TC)-1:AP(TC,TR)=0:IFPSW=1THENPSW=2ELSEPSW=1
7140 LC=TC:LR=MN(LC):RETURN
7150 RM(0)=0:FORI=1TO7:IFRM(I)<>0THENRM(0)=RM(0)+1:RM(RM(0))=RM(I)
7160 NEXTI:IF RM(0)>2GOTO7170ELSEI=INT(RND(100))
7165 IFI<10PRINT@960,"THERE AREN'T TWO MANY CHOICES I HAVE LEFT        ";:FORI=1TO1
     000:NEXTI
7170 IF RM(0)=0THEN LC=TE:LR=MN(LC):RETURN
7180 IF RM(0)=1THEN LC=RM(1):LR=MN(LC):RETURN
7185 IF FM(0)=0 THEN 7190
7186 TG=0:GOSUB8000:IF TG<>0THEN RETURN
7187 IFRM(0)<4ORMV>28GOSUB8500
7190 FORI=1TORM(0):IF TE=RM(I)THEN LC=TE:LR=MN(LC):RETURN:ELSENEXTI
7192 TF=MN(TE):AV(TE,TF)=0
7195 I=INT(RND(100)):IFI>40GOTO7200ELSEPRINT@960,"OOPS! FORGET ALL ABOUT THAT MO
     VE!!               ";:FORI=1TO900:NEXTI
7200 I=INT(RND(RM(0)))
7210 IFI<1GOTO7200
7220 LC=RM(I):LR=MN(LC):RETURN
8000 FORJ=1TOFM(0)
8010 TC=FM(J):TR=MN(TC)
8020 MN(TC)=MN(TC)+1
8030 IFPSW=1THENPSW=2:AP(TC,TR)=10:ELSEPSW=1:AP(TC,TR)=-10
8040 TC=FS(J):TR=MN(TC)
8050 MN(TC)=MN(TC)+1
8060 IFPSW=1THENPSW=2:AP(TC,TR)=10:ELSEPSW=1:AP(TC,TR)=-10
8070 GOSUB 6000
8080 GOSUB 6100
8090 IF SW<>0 THEN 8200
8100 AP(TC,TR)=0:MN(FS(J))=MN(FS(J))-1
8105 MN(FM(J))=MN(FM(J))-1
8110 TC=FM(J):TR=MN(TC):AP(TC,TR)=0
8130 NEXT J:TG=0:RETURN
8200 AP(TC,TR)=0:MN(FS(J))=MN(FS(J))-1
8205 MN(FM(J))=MN(FM(J))-1
8210 TC=FM(J):TR=MN(TC):AP(TC,TR)=0
8230 LC=FM(J):LR=MN(LC):TG=1:PRINT@896,"**** GOTCHA *****";:RETURN
8500 IF FM(0)=RM(0)RETURN
8510 FORI=1TORM(0):FORK=1TOFM(0):IFRM(I)=FM(K)THENRM(I)=0
8520 NEXTK,I
8530 K=1:FORI=1TORM(0):IFRM(I)=0GOTO8540:ELSERM(K)=RM(I):K=K+1
8540 NEXTI:RM(0)=K-1:RETURN
9000 TE=LC:TF=LR:MN(LC)=MN(LC)+1:IFPSW=1THENPSW=2:AP(LC,LR)=10:ELSEP SW=1:AP(LC,L
     R)=-10
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9010 GOSUB6000:GOSUB6100:LC=TE:LR=TF
9020 MN(LC)=MN(LC)-1:AP(LC,LR)=0:IFPSW=1THENPSW=2ELSEPSW=1
9030 IFSW=0RETURN
9040 K=1:FORJ=1TORM(0):IFRM(J)=LCTHEN9050
9045 RM(K)=RM(J):K=K+1
9050 NEXTJ:RM(0)=K-1
9060 IFRM(0)=1THENLC=RM(1):LR=MN(LC):RETURN
9070 I=INT(RND(RM(0))):IFI<1ORI>RM(0)GOTO9070
9080 LC=RM(I):LR=MN(LC):GOTO9000
11000 IFROW=1THENRETURN
11020 SUM=0:SR=ROW-3
11040 IFSR<1THENSR=1
11050 FORI=SRTOROW-1:SUM=SUM+AP(COL,I):NEXTI
11060 IFSUM>MH(COL)THENMH(COL)=SUM
11070 IFSUM<ML(COL)THENML(COL)=SUM
11080 SUM=0:SR=ROW-2
11100 IFSR<1ORROW=6THENRETURN
11110 FORI=SRTOROW-1:SUM=SUM+AP(COL,I):NEXTI
11120 IFSUM>MH(COL)THENMH(COL)=SUM
11130 IFSUM<ML(COL)THENML(COL)=SUM
11140 RETURN
12000 ONCOLGOTO12110,12210,12310,12410,12510,12610,12710
12110 S(0)=1:S(1)=AP(2,ROW)+AP(3,ROW)+AP(4,ROW):GOTO 12800
12210 S(0)=2:S(1)=AP(3,ROW)+AP(4,ROW)+AP(5,ROW)
12220 S(2)=AP(1,ROW)+AP(3,ROW)+AP(4,ROW):GOTO 12800
12310 S(0)=3:S(1)=AP(1,ROW)+AP(2,ROW)+AP(4,ROW)
12320 S(2)=AP(4,ROW)+AP(5,ROW)+AP(6,ROW)
12330 S(3)=AP(2,ROW)+AP(4,ROW)+AP(5,ROW):GOTO 12800
12410 S(0)=4:S(1)=AP(2,ROW)+AP(3,ROW)+AP(1,ROW)
12420 S(2)=AP(5,ROW)+AP(6,ROW)+AP(3,ROW)
12430 S(3)=AP(3,ROW)+AP(5,ROW)+AP(2,ROW)
12440 S(4)=AP(5,ROW)+AP(6,ROW)+AP(7,ROW):GOTO 12800
12510 S(0)=3:S(1)=AP(3,ROW)+AP(4,ROW)+AP(2,ROW)
12520 S(2)=AP(6,ROW)+AP(7,ROW)+AP(4,ROW)
12530 S(3)=AP(4,ROW)+AP(6,ROW)+AP(3,ROW):GOTO 12800
12610 S(0)=2:S(1)=AP(4,ROW)+AP(5,ROW)+AP(3,ROW)
12620 S(2)=AP(5,ROW)+AP(7,ROW)+AP(4,ROW):GOTO 12800
12710 S(0)=1:S(1)=AP(5,ROW)+AP(6,ROW)+AP(4,ROW):GOTO 12800
12800 FOR I=1 TO S(0)
12810 IF S(I)>MH(COL) THEN MH(COL)=S(I)
12820 IF S(I)<ML(COL) THEN ML(COL)=S(I)
12830 NEXT I
12840 RETURN
13000 ON COL GOTO 13100,13200,13300,13400,13500,13600,13700
13100 ON ROW GOTO 14120,14220,14320,14420,14520,14620
13200 ON ROW GOTO 15120,15220,15320,15420,15520,15620
13300 ON ROW GOTO 16120,16220,16320,16420,16520,16620
13400 ON ROW GOTO 17120,17220,17320,17420,17520,17620
13500 ON ROW GOTO 18120,18220,18320,18420,18520,18620
13600 ON ROW GOTO 19120,19220,19320,19420,19520,19620
13700 ON ROW GOTO 20120,20220,20320,20420,20520,20620
14120 S(0)=1:S(1)=AP(2,2)+AP(3,3)+AP(4,4):GOTO 21000
14220 S(0)=1:S(1)=AP(2,3)+AP(3,4)+AP(4,5):GOTO 21000
14320 S(0)=1:S(1)=AP(2,4)+AP(3,5)+AP(4,6):GOTO 21000
14420 S(0)=1:S(1)=AP(2,3)+AP(3,2)+AP(4,1):GOTO 21000
14520 S(0)=1:S(1)=AP(2,4)+AP(3,3)+AP(4,2):GOTO 21000
14620 S(0)=1:S(1)=AP(2,5)+AP(3,4)+AP(4,3):GOTO 21000
15120 S(0)=1:S(1)=AP(3,2)+AP(4,3)+AP(5,4):GOTO 21000
15220 S(0)=2:S(1)=AP(1,1)+AP(3,3)+AP(4,4)
15230 S(2)=AP(3,3)+AP(4,4)+AP(5,5):GOTO 21000
15320 S(0)=3:S(1)=AP(1,2)+AP(3,4)+AP(4,5)
15330 S(2)=AP(3,4)+AP(4,5)+AP(5,6)
15340 S(3)=AP(1,4)+AP(3,2)+AP(4,1):GOTO 21000
15420 S(0)=3:S(1)=AP(1,3)+AP(3,5)+AP(4,6)
15430 S(2)=AP(1,5)+AP(3,3)+AP(4,2)
15440 S(3)=AP(3,3)+AP(4,2)+AP(5,1):GOTO 21000
15520 S(0)=1:S(1)=AP(1,6)+AP(3,4)+AP(4,3)
15530 S(2)=AP(3,4)+AP(4,3)+AP(5,2):GOTO 21000
15620 S(0)=1:S(1)=AP(3,5)+AP(4,4)+AP(5,3):GOTO 21000
16120 S(0)=1:S(1)=AP(4,2)+AP(5,3)+AP(6,4):GOTO 21000
16220 S(0)=3:S(1)=AP(2,1)+AP(4,3)+AP(5,4)
16230 S(2)=AP(4,3)+AP(5,4)+AP(6,5)
16240 S(3)=AP(1,4)+AP(2,3)+AP(4,1):GOTO 21000
16320 S(0)=5:S(1)=AP(1,1)+AP(2,2)+AP(4,4)
16330 S(2)=AP(2,2)+AP(4,4)+AP(5,5)
16340 S(3)=AP(4,4)+AP(5,5)+AP(6,6)
16350 S(4)=AP(1,5)+AP(2,4)+AP(4,2)
16360 S(5)=AP(2,4)+AP(4,2)+AP(5,1):GOTO 21000
16420 S(0)=5:S(1)=AP(1,2)+AP(2,3)+AP(4,5)
16430 S(2)=AP(2,3)+AP(4,5)+AP(5,6)
16440 S(3)=AP(1,6)+AP(2,5)+AP(4,3)
16450 S(4)=AP(2,5)+AP(4,3)+AP(5,2)
16460 S(5)=AP(4,3)+AP(5,2)+AP(6,1):GOTO 21000
16520 S(0)=3:S(1)=AP(1,3)+AP(2,4)+AP(4,6)
16530 S(2)=AP(2,6)+AP(4,4)+AP(5,3)
16540 S(3)=AP(4,4)+AP(5,3)+AP(6,2):GOTO 21000
16620 S(0)=1:S(1)=AP(4,5)+AP(5,4)+AP(6,3):GOTO 21000
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17120 S(0)=2:S(1)=AP(1,4)+AP(2,3)+AP(3,2)
17130 S(2)=AP(5,2)+AP(6,3)+AP(7,4):GOTO 21000
17220 S(0)=4:S(1)=AP(3,1)+AP(5,3)+AP(6,4)
17230 S(2)=AP(5,3)+AP(6,4)+AP(7,5)
17240 S(3)=AP(1,5)+AP(2,4)+AP(3,3)
17250 S(4)=AP(2,4)+AP(3,3)+AP(5,1):GOTO 21000
17320 S(0)=6:S(1)=AP(2,1)+AP(3,2)+AP(5,4)
17330 S(2)=AP(3,2)+AP(5,4)+AP(6,5)
17340 S(3)=AP(5,4)+AP(6,5)+AP(7,6)
17350 S(4)=AP(1,6)+AP(2,5)+AP(3,4)
17360 S(5)=AP(2,5)+AP(3,4)+AP(5,2)
17370 S(6)=AP(3,4)+AP(5,2)+AP(6,1):GOTO 21000
17420 S(0)=6:S(1)=AP(1,1)+AP(2,2)+AP(3,3)
17430 S(2)=AP(2,2)+AP(3,3)+AP(5,5)
17440 S(3)=AP(3,3)+AP(5,5)+AP(6,6)
17450 S(4)=AP(2,6)+AP(3,5)+AP(5,3)
17460 S(5)=AP(3,5)+AP(5,3)+AP(6,2)
17470 S(6)=AP(5,3)+AP(6,2)+AP(7,1):GOTO 21000
17520 S(0)=4:S(1)=AP(1,2)+AP(2,3)+AP(3,4)
17530 S(2)=AP(2,3)+AP(3,4)+AP(5,6)
17540 S(3)=AP(3,6)+AP(5,4)+AP(6,3)
17550 S(4)=AP(5,4)+AP(6,3)+AP(7,2):GOTO 21000
17620 S(0)=2:S(1)=AP(1,3)+AP(2,4)+AP(3,5)
17630 S(2)=AP(5,5)+AP(6,4)+AP(7,3):GOTO 21000
18120 S(0)=1:S(1)=AP(3,3)+AP(4,4)+AP(4,2):GOTO 21000
18220 S(0)=3:S(1)=AP(4,1)+AP(6,3)+AP(7,4)
18230 S(2)=AP(2,5)+AP(3,4)+AP(4,3)
18240 S(3)=AP(3,4)+AP(4,3)+AP(6,1):GOTO 21000
18320 S(0)=5:S(1)=AP(3,1)+AP(4,2)+AP(6,4)
18330 S(2)=AP(4,2)+AP(6,4)+AP(7,5)
18340 S(3)=AP(2,6)+AP(3,5)+AP(4,4)
18350 S(4)=AP(3,5)+AP(4,4)+AP(6,2)
18360 S(5)=AP(4,4)+AP(6,2)+AP(7,1):GOTO 21000
18420 S(0)=5:S(1)=AP(2,1)+AP(3,2)+AP(4,3)
18430 S(2)=AP(3,2)+AP(4,3)+AP(6,5)
18440 S(3)=AP(4,3)+AP(6,5)+AP(7,6)
18450 S(4)=AP(3,6)+AP(4,5)+AP(6,3)
18460 S(5)=AP(4,5)+AP(6,3)+AP(7,2):GOTO 21000
18520 S(0)=3:S(1)=AP(2,2)+AP(3,3)+AP(4,4)
18530 S(2)=AP(3,3)+AP(4,4)+AP(6,6)
18540 S(3)=AP(4,6)+AP(6,4)+AP(7,3):GOTO 21000
18620 S(0)=1:S(1)=AP(2,3)+AP(3,4)+AP(4,5):GOTO 21000
19120 S(0)=1:S(1)=AP(3,4)+AP(4,3)+AP(5,2):GOTO 21000
19220 S(0)=2:S(1)=AP(3,5)+AP(4,4)+AP(5,3)
19230 S(2)=AP(4,4)+AP(5,3)+AP(7,1):GOTO 21000
19320 S(0)=3:S(1)=AP(4,1)+AP(5,2)+AP(7,4)
19330 S(2)=AP(3,6)+AP(4,5)+AP(5,4)
19340 S(3)=AP(4,5)+AP(5,4)+AP(7,2):GOTO 21000
19420 S(0)=3:S(1)=AP(3,1)+AP(4,2)+AP(5,3)
19430 S(2)=AP(4,2)+AP(5,3)+AP(7,5)
19440 S(3)=AP(4,6)+AP(5,5)+AP(7,3):GOTO 21000
19520 S(0)=2:S(1)=AP(3,2)+AP(4,3)+AP(5,4)
19530 S(2)=AP(4,3)+AP(5,4)+AP(7,6):GOTO 21000
19620 S(0)=1:S(1)=AP(3,3)+AP(4,4)+AP(5,5):GOTO 21000
20120 S(0)=1:S(1)=AP(4,4)+AP(5,3)+AP(6,2):GOTO 21000
20220 S(0)=1:S(1)=AP(4,5)+AP(5,4)+AP(6,3):GOTO 21000
20320 S(0)=1:S(1)=AP(4,6)+AP(5,5)+AP(6,4):GOTO 21000
20420 S(0)=1:S(1)=AP(4,1)+AP(5,2)+AP(6,3):GOTO 21000
20520 S(0)=1:S(1)=AP(4,2)+AP(5,3)+AP(6,4):GOTO 21000
20620 S(0)=1:S(1)=AP(4,3)+AP(5,4)+AP(6,5):GOTO 21000
21000 FOR I=1TOS(0)
21020 IF S(I)>MH(COL) THEN MH(COL)=S(I)
21030 IF S(I)<ML(COL) THEN ML(COL)=S(I)
21040 NEXT I
21050 RETURN
25000 CLS
25030 I1=128:I2=256:I3=384:I4=512:I5=640:I6=768
25040 FOR I=15363TO15405:POKEI,140:POKEI1+I,140:POKEI2+I,140:POKEI3+I,140:POKEI4
     +I,140:POKEI5+I,140:POKEI6+I,140:NEXTI
25050 FOR I=15363TO16131STEP64:POKEI,191:POKEI+6,191:POKEI+12,191:POKEI+18,191:P
     OKEI+24,191:POKEI+30,191:POKEI+36,191:POKEI+42,191:NEXTI
25055 FOR I=15363TO15405STEP6:POKEI,188:NEXTI
25060 FOR I=16131TO16173STEP6:POKEI,143:NEXTI
25080 FOR I=1TO16:POKE 15407+I,T(I):POKE 15471+I,B(I):NEXTI
25090 FOR I=17TO32:POKE 15518+I,T(I):POKE 15582+I,B(I):NEXTI
25091 FOR I=1TO16:POKE 15663+I,140:NEXTI
25092 PRINT@368,"MOVE:    ";MV;
25093 IF YT=0 THEN PRINT@432,"MAX TIME: NONE";ELSE PRINT@432,"MAX TIME: ";YT;
25120 NT="1234567"
25130 FORI=1TO7:PRINT@838+((I-1)*6),MID$(NT,I,1):NEXTI
25160 IF VSW=2 THEN 25500
25170 FORROW=1TO6:FORCOL=1TO7
25240 GOSUB 25800
25250 NEXT COL, ROW
25270 RETURN
25500 ROW=RL:COL=CL
25530 GOSUB 25800
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25540 RETURN
25800 IF AP(COL,ROW)=0 THEN RETURN
25820 IF AP(COL,ROW)=10 THEN 25850
25830 Cl=191:C2=179:C3=191
25840 GOTO 25860
25850 Cl=140:C2=191:C3=140
25860 P=((COL-1)*6)+16069-((ROW-1)*128)
25870 POKE P,Cl:POKE P+1,C2:POKE P+2,C3
25880 RETURN
26000 Cl=140:C2=191:C3=140
26030 IF PSW=1 THEN 26063
26050 Cl=191:C2=179:C3=191
26063 IF VSW=1 THEN 26070
26064 IF MV=1 THEN 26068 ELSE C4=128
26066 P=((CL-1)*6)+16069-((RL-1)*128)
26067 POKE P,C4:POKE P+1,C4:POKE P+2,C4
26068 CL=LC:RL=LR
26070 P=((LC-1)*6)+15429
26080 FOR I=LR TO 6
26090 POKE P,Cl:POKE P+1,C2:POKE P+2,C3
26100 IF I=6 GOTO 26150
26101 TT=100
26102 IF PSW=1ANDP1=1 THEN TT=50
26103 IF PSW=2ANDP2=1THEN TT=50
26104 IFP1=1ANDP2=1THENTT=25
26105 FOR J=1TOTT:NEXT J
26110 POKE P,128:POKE P+1,128: POKE P+2,128
26130 P=P+128
26140 NEXT I
26150 MN(LC)=MN(LC)+1
26160 IF PSW=1 THEN AP(LC,LR)=10 ELSE AP(LC,LR)=-10
26180 RETURN
27000 FOR I=1TO7
27001 IF MN(I)<7 THEN RETURN
27002 NEXT I
27010 PRINT@960,"GAME IS A TIE - NO WINNERS                     ";
27020 FOR I=1TO2500:NEXT I
27030 GOTO 29018
29000 GOSUB 26000
29006 IF PSW=1 AND P1=0 THEN 29013
29010 IF PSW=2 AND P2=0 THEN 29013
29011 PRINT@896,"THE COMPUTER DECLARES VICTORY WITH THE LAST MOVE"
29012 GOTO 29018
29013 PRINT@896,"PLAYER";PSW;" HAS WON WITH THE LAST MOVE MADE";
29018 GOSUB 29500
29019 N=INKEY$
29020 IF MN(1)+MN(2)+MN(3)+MN(4)+MN(5)+MN(6)+MN(7)=49 THEN 29022
29021 GOSUB 25800:FORI=1TO500:NEXTI:POKEP,128:POKEP+1,128:POKEP+2,128:FORI=1TO10
     0:NEXTI
29022 IF N="" THEN 29019
29023 IF N="N" THEN 29060
29024 GOTO 1
29060 CLS:PRINT "GAME OVER"
29070 END
29500 IF VSW<>2 THEN 29600
29510 FOR ROW=1TO6
29515 FOR COL=1TO7
29520 GOSUB 25800
29530 NEXT COL,ROW
29600 IFY1<>0PRINT@832,"PLAYER 1'S TIME: ";Y1;"SECONDS           ";
29601 IF Y2<>0PRINT@865,"PLAYER 2'S TIME: ";Y2;"SECONDS";
29605 PRINT@960,"ANOTHER GAME (Y OR N)?                 ";:ROW=LR:COL=L
     C:PA=PA+1
29610 RETURN
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THIRTEEN WAYS: by Glenn Crowther

Luck and skill both play a role in this tricky game. See how many ways you can do it. Keep a calculator handy for scoring, too.
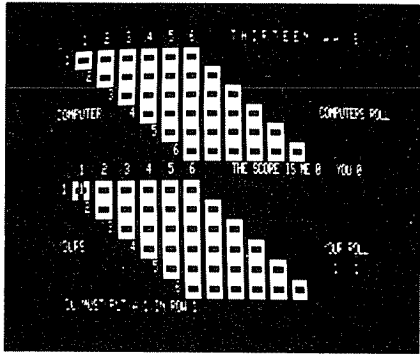

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10 CLS:PRINT@217,"W E L C O M E":PRINT@405,"T O    T H E    G A M E":PRINT@595,"T
   H I R T E E N    W A Y S":GOSUB630
15 A$=CHR$(183)+CHR$(179)+CHR$(187)
20 PRINT@896,"DO YOU WANT INSTRUCTIONS? (TYPE Y OR N)";
30 Z$=INKEY$:IFZ$=""THEN30ELSEIFZ$="Y"THEN50
40 IFZ$="N"THEN640ELSEPRINT@896,CHR$(31);:GOTO20
50 CLS:PRINT@512,"WHILE A BOARD IS PRINTED ABOVE PLEASE READ THE FOLLOWING:"
60 PRINT:PRINT"YOU WILL PLAY AGAINST THE COMPUTER IN A GAME OF BOTH LUCK"
70 PRINT"AND SKILL. THE PLAYER TO GO FIRST WILL BE DRAWN AT"
80 PRINT"RANDOM EACH GAME.   THE ONE HAVING THE MOST POINTS AT THE"
90 PRINT"END OF THE GAME WILL BE THE WINNER.
100 GOSUB630:GOSUB630:GOSUB700:GOSUB620
110 PRINT@512,CHR$(31);:PRINT@512,"ABOVE IS THE BOARD THE COMPUTER WILL USE DURI
   NG THE GAME."
120 PRINT"YOUR BOARD WILL LOOK THE SAME.";:GOSUB630
130 PRINT@704,"I WILL NOW WALK YOU THROUGH SOME OF THE DIFFERENT"
140 PRINT"POSSIBILITIES THAT WILL OCCUR DURING THE GAME.":GOSUB630
150 PRINT"I WILL ALSO SHOW YOU HOW THE SCORING GOES.";:GOSUB620
160 PRINT@512,CHR$(31);:PRINT@512,"FIRST LET US ROLL THE DICE.":GOSUB630
170 POKE15732,52:POKE15737,51:GOSUB630
180 PRINT@576,"THE ROLL WAS A 4 AND A 3.   NOW THE COMPUTER HAS"
190 PRINT"THE CHOICE OF PUTTING A 4 IN ROW 3 - OR PUTTING A 3 IN ROW 4.":GOSUB63
   0:GOSUB630
200 PRINT"LET US PUT THE 3 IN ROW 4.":GOSUB630
210 POKE15640,51
220 PRINT"IF YOU WILL NOW LOOK IN ROW 4 YOU WILL SEE A 3 IN COLUMN 6.":GOSUB630:
   GOSUB620
230 PRINT@512,CHR$(31);:PRINT@512,"HOWEVER, THE 3 IS REALLY IN COLUMN 3 BECAUSE"
240 PRINT"ALL OF THE COLUMNS RUN DIAGONALLY.":GOSUB630
250 PRINT"THE NUMBERS AT THE TOP OF THE COLUMNS ARE FOR A GUIDE ONLY.":GOSUB630
260 PRINT"NOW LET US TAKE YOU THROUGH ANOTHER ROLL OF THE DICE.":GOSUB630
270 PRINT"THE ROLL WAS A 4 AND A 3 AGAIN.   NOW THE COMPUTER HAS NO"
280 PRINT"CHOICE BUT TO PUT THE 4 IN ROW 3 - LIKE THIS - LOOK ABOVE.":GOSUB630:G
   OSUB630
290 POKE15576,52:GOSUB620
300 PRINT@512,CHR$(31);:PRINT@512,"NOW LET US ROLL THEM AGAIN.":GOSUB630
310 PRINT"HOW ODD! THE ROLL WAS THE SAME.":GOSUB630
320 PRINT"WELL THE 3 IN ROW 4 IS TAKEN AND THE 4 IN ROW 3 IS TAKEN":GOSUB630
330 PRINT"SO GUESS WHAT THE COMPUTER HAS TO DO NOW????":GOSUB630
340 PRINT"IT MUST PUT AN 'X' SOMEWHERE ON THE BOARD.":GOSUB630
350 PRINT"NOW COMES THE TIME FOR ME TO INTRODUCE YOU TO THE SCORING.":GOSUB620
360 PRINT@512,CHR$(31);:PRINT@471,"60   50   50   40   30   30"
370 PRINT"SHOWN ABOVE IS THE DIAGONAL SCORING - I.E"
380 PRINT"THE 60 IS FOR THE 1'S AND THE 30 IS FOR THE 5'S OR 6'S.":GOSUB630:GOSU
   B630
390 PRINT"A DIAGONAL WOULD LOOK LIKE THIS - LOOK ABOVE.
400 FORA=15432TO15772STEP68:POKEA,50:NEXT:GOSUB630:GOSUB630
410 PRINT"THIS DIAGONAL OF 2'S WOULD GIVE YOU 50 BONUS POINTS.":GOSUB630
420 PRINT"BONUS?   HOW DO YOU GET OTHER POINTS?":GOSUB620
430 PRINT@512,CHR$(31);:PRINT"GOING BACK TO THE FIRST MOVE - THE 3 WAS PUT IN RO
   W 4.":GOSUB630
440 PRINT"THAT WOULD HAVE BEEN 3 POINTS.":GOSUB630
450 PRINT"NEXT WE PUT A 4 IN ROW 3 - THATS 4 MORE POINTS FOR 7.":GOSUB630
460 PRINT"NEXT WE PUT AN 'X' SOMEWHERE - OOPS!! WE HAVE NOT PUT"
470 PRINT"THE 'X' ANYWHERE YET.":GOSUB620
480 PRINT@512,CHR$(31);:PRINT@512,"LET US PUT THE 'X' IN ROW 6 COLUMN 6"
490 PRINT"SINCE THE DIAGONAL 6 ONLY GIVES US 30 POINTS."
500 POKE15788,88:GOSUB630:GOSUB630
510 PRINT"ANYWAY THE 'X' COUNTS NOTHING SO WE STILL HAVE 7 POINTS.":GOSUB630
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520 PRINT"i WILL NOW INTRODUCE YOU TO TWO MORE SCORING BONUSES.":GOSUB630
530 PRINT"FIRST THE COMPLETE ROW BONUS OF 50 POINTS - SEE ROW 2.":GOSUB630
540 B=1:FORA=15496TO15516STEP4:POKEA,B+48:B=B+1:NEXT:GOSUB630:GOSUB630
550 PRINT"AND LAST THE 100 POINT BONUS DOWN THE MIDDLE - LOOK ABOVE.":GOSUB630
560 B=6:FORA=15448TO15768STEP64:POKEA,B+48:B=B-1:NEXT:GOSUB630:GOSUB630:GOSUB620
570 PRINT@512,CHR$(31);:PRINT@512,"":PRINT
580 PRINT"IF A BONUS IS REACHED BEFORE ALL THE 36 PLACES ARE MARKED"
590 PRINT"THEN THE GAME ENDS WITH THE BONUS.":PRINT
600 PRINT"WHEN YOU ARE READY FOR THE GAME PUSH ENTER.";
610 Z$=INKEY$:IFZ$=""THEN610ELSE640
620 PRINT@896,"HIT ENTER TO CONTINUE."
625 Z$=INKEY$:IFZ$=""THEN625ELSERETURN
630 FORW=1TO2250:NEXT:RETURN
640 DIMP1%(2,6,6),V%(6,6),TT%(13),T2%(36,3)
650 GOSUB660:GOSUB700:GOSUB720:GOSUB800:GOTO890
660 RANDOM:CLS:H=0:G=0:S1=0:S2=0:RESTORE:FORA=1TO6:READAV(A):NEXTA
670 FORA=1TO6:FORB=1TO6:READV%(A,B):NEXTB,A
680 FORA=1TO12:TT%(A)=0:NEXT:TT%(13)=1
690 FORA=1TO6:FORB=1TO6:P1%(1,A,B)=0:P1%(2,A,B)=0:NEXTB,A:RETURN
700 PRINT@4,"1    2    3    4    5    6";:PRINT@32,"T H I R T E E N    W A Y S";
710 F=67:GOSUB740:RETURN
720 PRINT@452,"1    2    3    4    5    6";:F=515
740 FORA=1TO6:IFA=4ANDF<300PRINT@256,"COMPUTER";:PRINT@305,"COMPUTERS ROLL";
750 IFA=4ANDF>300PRINT@704,"YOURS";:PRINT@753,"YOUR ROLL";
760 PRINT@F-3,A;
770 FORB=1TO6:PRINT@F,A$;:F=F+4:NEXTB:F=F+44:NEXTA:RETURN
800 P=RND(2):PRINT@896,"AFTER A RANDOM DRAW -";:ONPGOTO810,820
810 PRINT" I GO FIRST";:GOTO830
820 PRINT" YOU GO FIRST";
830 GOSUB1850:PRINT@896,"IF YOU EVER WANT TO REPRINT THE BOARD TYPE 99,99";:GOSU
    B1850:RETURN
840 REM REPRINT BOARD
850 C=15428:FORQ=1TO2:FORA=1TO6:FORB=1TO6
860 IFP1%(Q,A,B)=1POKEC+(A-1)*68+(B-1)*4,B+48:GOTO880
870 IFP1%(Q,A,B)=2POKEC+(A-1)*68+(B-1)*4,88
880 NEXTB,A:C=15876:NEXTQ:RETURN
890 D1=RND(6):D2=RND(6):H=H+1
900 PRINT@480,"THE SCORE IS ME";S1;"   YOU";S2;
910 ONPGOTO920,930
920 POKE15732,D1+48:POKE15737,D2+48:POKE16179,32:POKE16183,32:GOTO940
930 POKE16179,D1+48:POKE16183,D2+48:POKE15732,32:POKE15737,32:GOTO950
940 GOSUB1110:GOTO1090
950 IFD1=D2IFP1%(2,D1,D2)=0THEN1040
960 IFP1%(2,D1,D2)=0ANDP1%(2,D1,D1)=0PRINT@896,"DO YOU WANT TO PUT (1) A";D2;"IN
     ROW";D1;"OR (2) A";D1;"IN ROW";D2;:PRINTCHR$(31);:INPUTZ:ELSE990
970 IFZ=99CLS:GOSUB700:GOSUB720:GOSUB840:POKE16179,D1+48:POKE16183,D2+48:GOTO960
980 IFZ<1ORZ>2PRINT@896,"YOU DID NOT TYPE 1 OR 2";:GOSUB1850:GOTO960:ELSE1050
990 IFP1%(2,D1,D2)=0THEN1040ELSEIFP1%(2,D2,D1)=0THEN=D1:D1=D2:D2=D:GOTO1040
1000 PRINT@896,"YOU HAVE NO MOVE - WHAT (ROW,NUMBER) WILL YOU PUT AN 'X'";:PRINT
     CHR$(31);:INPUTY,Z:IFY=99CLS:GOSUB700:GOSUB720:GOSUB840:POKE16179,D1+48:POK
     E16183,D2+48:GOTO1000
1010 IFY<1ORY>6ORZ<1ORZ>6PRINT@896,"YOU MUST TYPE ONLY NUMBERS FROM 1 TO 6";:GOS
     UB1850:GOTO1000
1020 IFP1%(2,Y,Z)<>0PRINT@896,"YOU HAVE ALREADY USED ROW";Y;"NUMBER";Z;:GOSUB185
     0:GOTO1000
1030 P1%(2,Y,Z)=2:D1=Y:D2=Z:GOTO1070
1040 PRINT@896,"YOU MUST PUT A";D2;"IN ROW";D1;:GOSUB1850:GOTO1060
1050 IFZ=2THEND=D1:D1=D2:D2=D
1060 P1%(2,D1,D2)=1:S2=S2+D2
1070 IFP1%(2,D1,D2)=1POKE15876+(D1-1)*68+(D2-1)*4,D2+48ELSEPOKE15876+(D1-1)*68+(
     D2-1)*4,88
1080 GOTO1620
1090 IFP1%(1,D1,D2)=1POKE15428+(D1-1)*68+(D2-1)*4,D2+48ELSEPOKE15428+(D1-1)*68+(
     D2-1)*4,88
1100 GOTO1620
1110 REM COMPUTER MOVES
1120 IFD1<>D2THEN1140
1130 IFP1%(1,D1,D2)=0THEN1180ELSE1200
1140 IFP1%(1,D1,D2)=0THEN1160
1150 IFP1%(1,D2,D1)=0THEN1170ELSE1200
1160 IFP1%(1,D2,D1)=0THEN1190ELSE1180
1170 D=D1:D1=D2:D2=D
1180 PRINT@896,"I HAVE TO PUT A";D2;"IN ROW";D1;:GOSUB1850:GOTO1240
1190 PRINT@896,"I AM THINKING OF MY MOVE";:GOSUB1850:GOTO1220
1200 PRINT@896,"I AM THINKING OF WHERE I WILL PUT AN 'X'";:PRINTCHR$(31);:GOSUB1
     270
1210 PRINT@896,"I WILL PUT AN 'X' IN ROW";D1;"NUMBER";D2;:GOSUB1850:GOTO1260
1220 IFV%(D1,D2)<V%(D2,D1)THEND=D1:D1=D2:D2=D
1230 PRINT@896,"I WILL PUT A";D2;"IN ROW";D1;:GOSUB1850
1240 P1%(1,D1,D2)=1:GOSUB 1420 :S1=S1+D2:TT%(D1)=TT%(D1)+1:TT%(D2+6)=TT%(D2+6)+1
     :IFD1+D2=7THENTT%(13)=TT%(13)+1
1250 RETURN
1260 P1%(1,D1,D2)=2:RETURN
1270 REM "X" ONE NUMBER OUT
1280 C=0:FORA=1TO6:FORB=1TO6:IFP1%(1,A,B)>0THEN1360
1290 C=C+1:T2%(C,1)=TT%(A)+TT%(B+6)
1300 IFA+B<>7THEN1330
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1310 T2%(C,1)=T2%(C,1)+TT%(13)
1320 IFTT%(13)>TT%(A)ANDTT%(13)>TT%(B+6)THENT2%(C,1)=T2%(C,1)+TT%(13):GOTO1350
1330 IFTT%(A)<TT%(B+6)THENT2%(C,1)=T2%(C,1)+TT%(B+6):GOTO1350
1340 T2%(C,1)=T2%(C,1)+TT%(A)
1350 T2%(C,2)=A:T2%(C,3)=B
1360 NEXTB,A:IFC=1THEN1410
1365 P3=C
1370 P3=INT(P3/2):IFP3<1THEN1410
1375 FORP1=1TOP3:FORP2=P1TOP4-P3STEPP3:P5=P2
1380 FORD=1TO3:T(D)=T2%(P2+P3,D):NEXTD
1385 IFT(1)=>T2%(P5,1)THEN1400
1390 FORD=1TO3:T2%(P5+P3,D)=T2%(P5,D):NEXTD
1395 P5=P5-P3:IFP5=>1THEN1385
1400 FORD=1TO3:T2%(P5+P3,D)=T(D):NEXTD,P2,P1:GOTO1370
1410 D1=T2%(1,2):D2=T2%(1,3):GOSUB1570:RETURN
1420 REM ADJUST THE VALUE TABLE WITH PLUS VALUES
1430 C=0:FORA=1TO6:IFP1%(1,A,D2)=2THEN1460
1440 IFP1%(1,A,D2)<>1THENC=C+1
1450 NEXTA:IFC>1GOSUB1540ELSERETURN
1460 C=0:FORA=1TO6:IFP1%(1,D1,A)=2THEN1490
1470 IFP1%(1,D1,A)<>1THENC=C+1
1480 NEXTA:IFC>1GOSUB1550ELSERETURN
1490 IFD1+D2<>7RETURN
1500 B=1:C=6:D=0:FORA=1TO6:IFP1%(1,B,C)=2RETURN
1510 IFP1%(1,B,C)<>1THEND=D+1
1520 B=B+1:C=C-1:NEXTA:IFD>1GOSUB1560ELSERETURN
1530 RETURN
1540 FORA=1TO6:V%(A,D2)=V%(A,D2)+INT(AV(D2)/C):NEXTA:RETURN
1550 FORA=1TO6:V%(D1,A)=V%(D1,A)+INT(50/C):NEXTA:RETURN
1560 B=1:C=6:FORA=1TO6:V%(B,C)=V%(B,C)+INT(100/D):B=B+1:C=C-1:NEXTA:RETURN
1570 REM ADJUST THE VALUE TABLE WITH MINUS VALUES
1580 FORA=1TO6:V%(D1,A)=V%(D1,A)-1:NEXTA
1590 FORA=1TO6:V%(A,D2)=V%(A,D2)-1:NEXTA
1600 IFD1+D2<>7RETURN
1610 B=1:C=6:FORA=1TO6:V%(B,C)=V%(B,C)-1:B=B+1:C=C-1:NEXTA:RETURN
1620 REM CHECK FOR END OF THE GAME
1630 IFH=72THEN1780
1640 E=0:C=0:FORA=1TO6:FORB=1TO6:IFP1%(P,A,B)=1THENC=C+1
1650 NEXTB:IFC=6THENE=50:G=1:GOTO1670
1660 C=0:NEXTA
1670 C=0:FORA=1TO6:FORB=1TO6:IFP1%(P,B,A)=1THENC=C+1
1680 NEXTB:IFC=6THENG=1:ONAGOTO1700,1710,1710,1720,1730,1730
1690 C=0:NEXTA:GOTO1740
1700 E=E+60:GOTO1740
1710 E=E+50:GOTO1740
1720 E=E+40:GOTO1740
1730 E=E+30
1740 B=1:C=6:D=0:FORA=1TO6:IFP1%(P,B,C)=1THEND=D+1
1750 B=B+1:C=C-1:NEXTA:IFD=6THENG=1:E=E+100
1760 IFG<>1THENIFP=1THENP=2:GOTO890:ELSEP=1:GOTO890
1770 IFP=1THENS1=S1+EELSES2=S2+E
1780 PRINT@475,"THE FINAL SCORE IS ME";S1;"YOU";S2;
1790 PRINT@896,"THE GAME IS OVER AND";:IFS1>S2THENPRINT" I WIN";ELSEIFS2>S1THENP
     RINT" YOU WIN";ELSEPRINT" IT IS A TIE";
1800 PRINTCHR$(31);:GOSUB1850
1810 PRINT@896,"DO YOU WANT TO PLAY ANOTHER GAME (Y OR N)";:PRINTCHR$(31);:INPUT
     Z$
1820 IFZ$="Y"THEN650
1830 IFZ$="N"PRINT@896,"THANKS FOR THE GAME!!!";:GOSUB1850:CLS:END
1840 GOTO1810
1850 PRINTCHR$(31);:FORW=1TO1500:NEXTW:RETURN
1860 DATA60,50,50,40,30,30
1870 DATA18,16,16,14,13,29,18,16,16,14,29,13
1880 DATA18,16,16,30,13,13,18,16,32,14,13,13
1890 DATA18,32,16,14,13,13,34,16,16,14,13,13
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SIEGE OF CAMELOT: by Sanford Deutsch

Outstanding graphics and a zany plot make Camelot worth your programming effort. Heros and villains, knights and bowmen respond to your keyboard commands, while you follow their antics in detail on the monitor. Beware of Modred; he's attacking again, and your provisions in the castle are getting low.
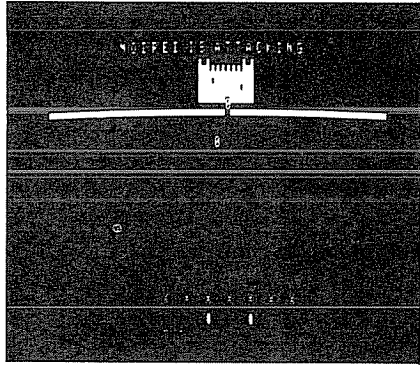

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50  CLS:CLEAR 125
60  PRINT CHR$(23):PRINT@ 332,"SIEGE  OF  CAMELOT"
70  FOR I=1TO2000:NEXT
80  DB$="0":DK$="*":AB$="X":AK$="$":OA=852:OD=418:OE=350
90  AL=0:DL=0:J=0:L=0
100 CLS:PRINT@ 91,CHR$(189);:PRINT@ 92,CHR$(190);:PRINT@ 93,STRING$(6,CHR$(184))
    ;
110 PRINT@ 99,CHR$(186);:PRINT@ 100,CHR$(188);:PRINT@ 101,CHR$(149);
120 PRINT@ 155,STRING$(2,CHR$(191));:PRINT@ 157,CHR$(189);
130 PRINT@ 158,STRING$(5,CHR$(191));:PRINT@ 163,CHR$(187);
140 PRINT@ 164,CHR$(191);:PRINT@ 165,CHR$(149);
150 PRINT@ 219,STRING$(10,CHR$(179));:PRINT@ 229,CHR$(177);
160 PRINT@ 219,STRING$(5,CHR$(179));:PRINT@ 225,STRING$(4,CHR$(179));
170 PRINT@ 229,CHR$(177);:PRINT@ 192,STRING$(27,CHR$(176));
180 PRINT@ 230,STRING$(26,CHR$(176));
190 IF NG=1 THEN PRINT@ 224,CHR$(179);:GOTO 1000
200 PRINT@ OE,DB$;:PRINT@ 354,DB$;:FOR I=1TO750:NEXT
210 PRINT@ OA,AB$;:FOR I=1TO500:NEXT:OA=OA+4
220 T=T+1:IF T=7 THEN 230  ELSE 210
230 T=0:FOR I=1TO100:NEXT:PRINT@ 924,AK$;
240 FOR I=1TO500:NEXT:PRINT@ 932,AK$;:FOR I=1TO1000:NEXT
250 PRINT@ 354," ";:PRINT@ OD,DB$;:FOR I=1TO750:NEXT
260 PRINT@ 354,"?";:FOR I=1TO1250:NEXT:PRINT@ 354," ";:FOR I=1TO250:NEXT
270 PRINT@ 354,"I";:FOR I=1TO35:NEXT:PRINT@ 354," ";:FOR I=1TO20:NEXT
280 T=T+1:IF T=10 THEN 290  ELSE 270
290 T=0
300 PRINT@ OD," ";:FOR I=1TO20:NEXT:OD=OD-1:PRINT@ OD,DB$;
310 FOR I=1TO100:NEXT:T=T+1:IF T=2 THEN 320  ELSE 300
320 T=0
330 PRINT@ OD," ";:FOR I=1TO20:NEXT:OD=OD-64:PRINT@ OD,DB$;
340 FOR I=1TO100:NEXT:T=T+1:IF T=2 THEN 350  ELSE 330
350 FOR I=1TO500:NEXT
360 PRINT@ OD-64,CHR$(140);:FOR I=1TO500:NEXT:PRINT@ OD," ";
370 OD=OD-64:PRINT@ OD,DB$;:FOR I=1TO500:NEXT:T=0
380 PRINT@ 12,"M O D R E D   I S   A T T A C K I N G  ! ! !";
390 FOR I=1TO750:NEXT:PRINT@ 12,STRING$(42,CHR$(128));:FOR I=1TO100:NEXT
400 T=T+1:IF T=3 THEN 410  ELSE 380
410 T=0:FOR I=1TO500:NEXT:PRINT@ OD," ";:PRINT@ OD,CHR$(179);
420 FOR I=1TO750:NEXT
430 PRINT@ OE," ";:FOR I=1TO20:NEXT:OE=OE+1:PRINT@ OE,DB$;
440 FOR I=1TO100:T=T+1:IF T=2 THEN 450  ELSE 430
450 T=0:PRINT@ OE," ";:FOR I=1TO20:OE=OE-64:PRINT@ OE,DB$;
460 FOR I=1TO750:NEXT:PRINT@ OD,CHR$(140);
470 FOR I=1TO500:NEXT:PRINT@ OD,DB$;:PRINT@ OE," ";:FOR I=1TO500:NEXT
480 PRINT@ OD,CHR$(179);
490 FOR I=1TO1000:NEXT:CLS:PRINT:PRINT
500 PRINT TAB(3)"THE TIME - 523 A.D."
510 PRINT TAB(3)"THE PLACE - CAMELOT"
520 PRINT TAB(3)"THE SITUATION - SERIOUS":PRINT
530 PRINT TAB(6)"MODRED - KING ARTHUR'S DREADED NEPHEW - WOULD"
540 PRINT TAB(15)"LIKE TO MAKE CAMELOT HIS SUMMER HOME":PRINT
550 PRINT TAB(6)"KING ARTHUR - WHO USES THE PLACE ON WEEKENDS -"
560 PRINT TAB(20)"WILL HAVE NONE OF THIS NONSENSE!":PRINT
570 PRINT TAB(6)"AND SO - THE BATTLE IS JOINED ....":PRINT
580 PRINT TAB(30)"TO CONTINUE . . . . . PRESS /"
590 K$=INKEY$:IF K$="/"THEN 600  ELSE 590
600 CLS:PRINT:PRINT TAB(22)"WHO'S WHO AT CAMELOT":PRINT
610 PRINT TAB(3)"INTRODUCING -":PRINT
620 PRINT TAB(6)"KING ARTHUR'S BOWMEN    0   0   0   0   0   0   0"
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630 PRINT TAB(6) "KING ARTHUR'S KNIGHTS              *         *":PRINT:PRINT
640 PRINT TAB(6)"MODRED'S BOWMEN      X    X    X    X    X    X    X"
650 PRINT TAB(6)"MODRED'S KNIGHTS              #         #":PRINT:PRINT:PRINT
660 PRINT TAB(30)"TO CONTINUE . . . . . PRESS /";
670 K$=INKEY$:IF K$="/"THEN 680  ELSE 670
680 CLS:PRINT TAB(19)"HOW THE ISSUE WILL BE DECIDED":PRINT
690 PRINT"TO CAPTURE CAMELOT -"
700 PRINT TAB(3)"MODRED MUST SUCCEED AT ONE OF THE FOLLOWING"
710 PRINT TAB(3)"STRATEGIES - BEFORE HIS PROVISIONS RUN OUT:":PRINT
720 PRINT TAB(6)". GET A MAN INTO THE CASTLE WITHOUT LOSING MORE THAN"
730 PRINT TAB(8)"ONE OF HIS TWO KNIGHTS - OR MORE THAN 4 MEN IN TOTAL":PRINT
740 PRINT TAB(6)". ELIMINATE ANY 7 OF KING ARTHUR'S MEN":PRINT
750 PRINT TAB(6)". STARVE CAMELOT OUT":PRINT
760 PRINT "OTHERWISE - THE SIEGE OF CAMELOT FAILS AND MODRED MUST"
770 PRINT TAB(12)"SPEND THE SUMMER IN HOT AND HUMID LONDON!"
780 PRINT TAB(30)"TO CONTINUE . . . . . PRESS /";
790 K$=INKEY$:IF K$="/" THEN 800  ELSE 790
800 CLS:PRINT:PRINT TAB(25)"WHO CAN DO WHAT":PRINT
810 PRINT "BOWMEN -":PRINT TAB(3)"CAN ADVANCE, WITHDRAW OR MOVE HORIZONTALLY -"
820 PRINT TAB(3)"EITHER 1 OR 2 RODS"
830 PRINT"KNIGHTS -":PRINT TAB(3)"CAN ADVANCE OR WITHDRAW DIAGONALLY -"
840 PRINT TAB(3)"FROM 1 TO 6 RODS"
850 PRINT"A MAN IS ELIMINATED WHEN HIS POSITION IS OCCUPIED BY"
860 PRINT"ANOTHER MAN - WHETHER FRIEND OR FOE, BOWMAN OR KNIGHT"
870 PRINT:PRINT TAB(30)"TO CONTINUE . . . . . PRESS /"
880 K$=INKEY$:IF K$="/"THEN 890  ELSE 880
890 CLS:PRINT:PRINT TAB(20)"ENTERING THE CASTLE":PRINT
900 PRINT"THE CASTLE CAN BE ENTERED BY ANY"
910 PRINT"OF MODRED'S MEN - BUT ONLY IF -":PRINT
920 PRINT TAB(3)"MODRED'S MAN IS POSITIONED 'DEAD CENTER' IN"
930 PRINT TAB(3)"FRONT OF THE CASTLE (WHERE DRAWBRIDGE OPENS)":PRINT
940 PRINT TAB(3)"AND THAT POSITION DEFENDED UNTIL MODRED'S NEXT TURN":PRINT
950 PRINT TAB(3)"THEN - ANY FORWARD MOVE WILL GAIN ACCESS TO THE CASTLE":PRINT:P
    RINT
960 PRINT TAB(30)"TO CONTINUE . . . . . PRESS /"
970 K$=INKEY$:IF K$="/"THEN 980  ELSE 970
980 CLS:PRINT:PRINT TAB(24)"HOW TO MOVE MEN":PRINT
990 PRINT"PRESS SPACE BAR UNTIL MAN TO BE MOVED IS BLINKING":PRINT
1000 PRINT"THEN SELECT DIRECTION IN WHICH MAN IS TO MOVE":PRINT
1010 PRINT"THEN SELECT DISTANCE MAN IS TO MOVE":PRINT
1020 PRINT"FOLLOWING OUTCOME OF MOVE - PLAY AUTOMATICALLY GOES TO OPPONENT":PRIN
    T:PRINT
1030 PRINT "BEFORE CONTINUING -"
1040 PRINT TAB(3)"DECIDE WHO WILL ACT FOR KING ARTHUR AND WHO FOR MODRED":PRINT
1050 PRINT TAB(16)"TO BEGIN THE SIEGE OF CAMELOT . . . . . PRESS /";
1060 K$=INKEY$:IF K$="/"THEN 1070 ELSE 1060
1070 NG=1:GOTO 90
1080 D1=404:D2=408:D3=412:D4=416:D5=420:D6=424:D7=428:D8=348:D9=356
1090 A1=852:A2=856:A3=860:A4=864:A5=868:A6=872:A7=876:A8=924:A9=932
1100 DS=404:AS=852:PD=200:PA=200:LD=139:LA=181
1110 FOR I=1TO7:PRINT@ DS,DB$:DS=DS+4:NEXT
1120 PRINT@ D8,DK$;:PRINT@ D9,DK$;
1130 FOR I=1TO7:PRINT@ AS,AB$;:AS=AS+4:NEXT
1140 PRINT@ A8,AK$;:PRINT@ A9,AK$;
1150 PRINT@ 64,"KING ARTHUR'S";:PRINT@ 128,"PROVISIONS:";:PRINT@ 146,"DAYS";
1160 PRINT@ 106,"MODRED'S";:PRINT@ 170,"PROVISIONS:";:PRINT@ 188,"DAYS";
1170 PRINT@ LD,PD;:PRINT@ LA,PA;
1180 PRINT@ 0,STRING$(63,128);
1190 IF TR=2 THEN 1350
1210 R=R+1
1220 IF R>9 THEN R=1
1230 IF R=1 THEN P=A1
1240 IF R=2 THEN P=A2
1250 IF R=3 THEN P=A3
1260 IF R=4 THEN P=A4
1270 IF R=5 THEN P=A5
1280 IF R=6 THEN P=A6
1290 IF R=7 THEN P=A7
1300 IF R=8 THEN P=A8
1310 IF R=9 THEN P=A9
1320 IF P=0 THEN 1180
1330 GOTO 1490
1350 R=R+1
1360 IF R>9 THEN R=1
1370 IF R=1 THEN Q=D1
1380 IF R=2 THEN Q=D2
1390 IF R=3 THEN Q=D3
1400 IF R=4 THEN Q=D4
1410 IF R=5 THEN Q=D5
1420 IF R=6 THEN Q=D6
1430 IF R=7 THEN Q=D7
1440 IF R=8 THEN Q=D8
1450 IF R=9 THEN Q=D9
1460 IF Q=0 THEN 1180
1470 GOTO 1580
1480 REM ** PULSE/ACTIVITY SELECTION ROUTINE - ATTACKING FORCE **
1490 PRINT@ 960,"PRESS SPACE BAR TO CHOOSE MAN              PRESS M TO MOVE MAN
    ";
```

```
1500 K$=INKEY$
1510 PA=PA-.1:PA=PA+.05:PA=INT(PA*10)/10
1520 PRINT@ LA,PA,:IF PA=0 THEN 3700
1530 PRINT@ P," ";:FOR I=1TO20:NEXT
1540 IF R<8 THEN PRINT@ P,AB$; ELSE PRINT@ P,AK$;:FOR I=1TO20:NEXT
1550 IF K$="M" THEN 1660
1560 IF K$=" " THEN 1180 ELSE 1500
1580 PRINT@ 960,"PRESS SPACE BAR TO CHOOSE MAN        PRESS M TO MOVE MAN
     ";
1590 K$=INKEY$
1600 PD=PD-.1:PD=PD+.05:PD=INT(PD*10)/10
1610 PRINT@ LD,PD,:IF PD=0 THEN 3730
1620 PRINT@ Q," ";:FOR I=1TO20:NEXT
1630 IF R<8 THEN PRINT@ Q,DB$; ELSE PRINT@ Q,DK$;:FOR I=1TO20:NEXT
1640 IF K$="M" THEN 2470
1650 IF K$=" " THEN  1350 ELSE 1580
1660 REM ** BOWMAN MOVE ROUTINE - ATTACKING FORCE **
1670 PRINT@ 960,STRING$(63,CHR$(128));:IF R>7 THEN 2040
1680 PRINT@ 960,"LEFT (L)        RIGHT (R)        ADVANCE (A)        WITHDRAW (W)
     ";
1690 K$=INKEY$
1700 PA=PA-.1:PA=PA+.05:PA=INT(PA*10)/10
1710 PRINT@ LA,PA,:IF PA=0 THEN 3700
1720 IF K$="L" THEN B=-1:GOTO 1780
1730 IF K$="R" THEN B=1:GOTO 1780
1740 IF K$="A" THEN B=-64:GOTO 1780
1750 IF K$="W" THEN B=64:GOTO 1780
1760 IF K$="" THEN 1690
1770 IF B=0 THEN 1680
1780 PRINT@ 960,STRING$(63,CHR$(128));
1790 PRINT@ 965,"HOW MANY RODS WOULDST THOU MOVE - BOWMAN? (1 OR 2)";
1800 K$=INKEY$
1810 PA=PA-.1:PA=PA+.05:PA=INT(PA*10)/10
1820 PRINT@ LA,PA,:IF PA=0 THEN 3700
1830 IF K$="1" THEN L=1:J=0:GOTO 1870
1840 IF K$="2" THEN L=2:J=0:GOTO 1870
1850 IF K$="" THEN 1800
1860 IF L=0 THEN 1790
1870 PRINT@ P," ";:P=P+B:J=J+1:IF P=288 Z=1
1880 IF Z=1 PRINT@ 288,AB$;:Z=2:GOSUB 3170 :GOSUB 3770 :GOSUB 2430 :GOTO 1950
1890 IF Z=2 THEN 1920
1900 IF P<256 THEN PRINT@ P-B,AB$;:P=P-B:GOSUB 3170 :GOSUB 3770 :GOTO 1950
1910 IF P>959 THEN PRINT@ P-B,AB$;:P=P-B:GOSUB 3170 :GOSUB 3770 :GOTO 1950
1920 PRINT@ P,AB$;:GOSUB 3170 :GOSUB 3770
1930 IF P<256 THEN 3660
1940 IF J=L THEN 1950 ELSE 1870
1950 IF R=1 THEN A1=P
1960 IF R=2 THEN A2=P
1970 IF R=3 THEN A3=P
1980 IF R=4 THEN A4=P
1990 IF R=5 THEN A5=P
2000 IF R=6 THEN A6=P
2010 IF R=7 THEN A7=P
2020 S=0:J=0:B=0:L=0:TR=2:GOTO1180
2030 REM ** KNIGHT MOVE ROUTINE - ATTACKING FORCE **
2040 PRINT@ 960,STRING$(63,128);:C=0
2050 PRINT@ 960,"TO CHARGE: LEFT (L) RIGHT (R)    TO WITHDRAW: LEFT (Z) RIGHT (/)
     ";
2060 K$=INKEY$
2070 PA=PA-.1:PA=PA+.05:PA=INT(PA*10)/10
2080 PRINT@ LA,PA,:IF PA=0 THEN 3700
2090 IF K$="L"THEN C=-66:W=0:GOTO 2150
2100 IF K$="R"THEN C=-62:W=0:GOTO 2150
2110 IF K$="Z"THEN C=62:W=1:GOTO 2150
2120 IF K$="/"THEN C=66:W=1:GOTO 2150
2130 IF K$=""THEN 2060
2140 IF C=0 THEN 2050
2150 PRINT@ 960,STRING$(63,128);
2160 IF W=1 THEN 2180
2170 PRINT@ 969,"HOW MANY RODS WOULDST THOU CHARGE - SIRE? (1 TO 6)";:GOTO 2190
2180 PRINT@ 968,"HOW MANY RODS WOULDST THOU WITHDRAW - SIRE? (1 TO 6)";
2190 K$=INKEY$
2200 PA=PA-.1:PA=PA+.05:PA=INT(PA*10)/10
2210 PRINT@ LA,PA,:IF PA=0 THEN 3700
2220 IF K$="1" THEN M=1:GOTO 2330
2230 IF K$="2" THEN M=2:GOTO 2330
2240 IF K$="3" THEN M=3:GOTO 2330
2250 IF K$="4" THEN M=4:GOTO 2330
2260 IF K$="5" THEN M=5:GOTO 2330
2270 IF K$="6" THEN M=6:GOTO 2330
2280 IF K$=""THEN 2190
2290 IF M=0 THEN 2160
2300 PRINT@ 960,STRING$(63,128);
2310 IF R=8 THEN A8=P:TR=2:GOSUB 3770 :GOTO 1180
2320 IF R=9 THEN A9=P:TR=2:GOSUB 3770 :GOTO 1180
2330 PRINT@ P," ";:P=P+C:IF P=288 THEN Z=1
2340 IF P>959 THEN PRINT@ P-C,AK$:P=P-C:GOTO 2300
```

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2350 IF Z=1 THEN PRINT@ P,AK$;:Z=2:GOSUB 3170 :GOSUB 3770 :GOSUB 2430 :GOTO 2420
2360 IF Z=2 THEN 2390
2370 IF P<256 THEN PRINT@ P-C,AK$;:P=P-C:GOTO 2300
2380 GOSUB 3170 :GOSUB 3770
2390 Z=0:PRINT@ P,AK$;:J=J+1:IF P<256 THEN 3660
2400 IFJ>=M THEN 2420
2410 GOTO 2330
2420 S=0:M=0:J=0:GOTO 2300
2430 PRINT@ 11,"M O D R E D  M A N  A T  D R A W B R I D G E !!!";
2440 FOR I=1TO750:NEXT:PRINT@ 11,STRING$(49,CHR$(128));:FOR I=1TO100:NEXT
2450 S=S+1: IF S=3 THEN RETURN ELSE 2430
2460 REM ** BOWMAN MOVE ROUTINE - DEFENDING FORCE **
2470 PRINT@ 960,STRING$(63,CHR$(128));:IF R>7 THEN 2810
2480 PRINT@ 960,"LEFT (L)        RIGHT (R)        ADVANCE (A)        WITHDRAW (W)
     ";
2490 K$=INKEY$
2500 PD=PD-.1:PD=PD+.05:PD=INT(PD*10)/10
2510 PRINT@ LD,PD;:IF PD=0 THEN 3730
2520 IF K$="L" THEN B=-1:GOTO 2580
2530 IF K$="R" THEN B=1:GOTO 2580
2540 IF K$="A" THEN B=64:GOTO 2580
2550 IF K$="W" THEN B=-64:GOTO 2580
2560 IF K$="" THEN 2490
2570 IF B=0 THEN 2480
2580 PRINT@ 960,STRING$(63,CHR$(128));
2590 PRINT@ 965,"HOW MANY RODS WOULDST THOU MOVE - BOWMAN? (1 OR 2)";
2600 K$=INKEY$
2610 PD=PD-.1:PD=PD+.05:PD=INT(PD*10)/10
2620 PRINT@ LD,PD;:IF PD=0 THEN 3730
2630 IF K$="1" THEN L=1:J=0:GOTO 2670
2640 IF K$="2" THEN L=2:J=0:GOTO 2670
2650 IF K$="" THEN 2600
2660 IF L=0 THEN 2590
2670 PRINT@ Q," ";:Q=Q+B:J=J+1
2680 IF Q<256 THEN PRINT@ Q-B,DB$;:Q=Q-B:GOSUB 3370 :GOSUB 4010 :GOTO 2720
2690 IF Q>959 THEN PRINT@ Q-B,DB$;:Q=Q-B:GOSUB 3370 :GOSUB 4010 :GOTO 2720
2700 PRINT@ Q,DB$;:GOSUB 3370 :GOSUB 4010
2710 IF J=L THEN 2720 ELSE 2670
2720 IF R=1 THEN D1=Q
2730 IF R=2 THEN D2=Q
2740 IF R=3 THEN D3=Q
2750 IF R=4 THEN D4=Q
2760 IF R=5 THEN D5=Q
2770 IF R=6 THEN D6=Q
2780 IF R=7 THEN D7=Q
2790 J=0:L=0:B=0:TR=1:GOTO 1180
2800 REM ** KNIGHT MOVE ROUTINE - DEFENDING FORCE **
2810 PRINT@ 960,STRING$(63,128);:C=0
2820 PRINT@ 960,"TO CHARGE: LEFT (L) RIGHT (R)   TO WITHDRAW: LEFT (Z) RIGHT (/)
     ";
2830 K$=INKEY$
2840 PD=PD-.1:PD=PD+.05:PD=INT(PD*10)/10
2850 PRINT@ LD,PD;:IF PD=0 THEN 3730
2860 IF K$="L"THEN C=62:W=0:GOTO 2920
2870 IF K$="R"THEN C=66:W=0:GOTO 2920
2880 IF K$="Z"THEN C=-66:W=1:GOTO 2920
2890 IF K$="/"THEN C=-62:W=1:GOTO 2920
2900 IF K$=""THEN 2830
2910 IF C=0 THEN 2820
2920 PRINT@ 960,STRING$(63,128);
2930 IF W=1 THEN 2950
2940 PRINT@ 969,"HOW MANY RODS WOULDST THOU CHARGE - SIRE? (1 TO 6)";:GOTO 2960
2950 PRINT@ 968,"HOW MANY RODS WOULDST THOU WITHDRAW - SIRE? (1 TO 6)";
2960 K$=INKEY$
2970 PD=PD-.1:PD=PD+.05:PD=INT(PD*10)/10
2980 PRINT@ LD,PD;:IF PD=0 THEN 3730
2990 IF K$="1"THEN M=1:GOTO 3100
3000 IF K$="2"THEN M=2:GOTO 3100
3010 IF K$="3"THEN M=3:GOTO 3100
3020 IF K$="4"THEN M=4:GOTO 3100
3030 IF K$="5"THEN M=5:GOTO 3100
3040 IF K$="6"THEN M=6:GOTO 3100
3050 IF K$=""THEN 2960
3060 IF M=0 THEN 2930
3070 PRINT@ 960,STRING$(63,128);
3080 IF R=8 THEN D8=Q:TR=1:GOSUB 4010 :GOTO 1180
3090 IF R=9 THEN D9=Q:TR=1:GOSUB 4010 :GOTO 1180
3100 PRINT@ Q," ";:Q=Q+C
3110 IF Q>959 THEN PRINT@ Q-C,DK$;:Q=Q-C:GOTO 3070
3120 IF Q<256 THEN PRINT@ Q-C,DK$;:Q=Q-C:GOTO 3070
3130 GOSUB 3370 :GOSUB 4010
3140 PRINT@ Q,DK$;:J=J+1:IF J>=M THEN 3160
3150 GOTO 3100
3160 M=0:J=0:GOTO 3070
3170 REM ** ENEMY CONTACT ROUTINE - ATTACKING FORCE **
3180 IF P=D1 OR P=D2 OR P=D3 OR P=D4 OR P=D5 OR P=D6 OR P=D7 OR P=D8 OR P=D9 THE
     N 3190 ELSE 3360
```

```
3190 K=0
3200 IF R=8 OR R=9 THEN AS$=AK$ ELSE AS$=AB$
3210 PRINT@ P," ";:FOR I=1TO15:NEXT:PRINT@ P,AS$;:FOR I=1TO15:NEXT
3220 K=K+1:IF K=7 THEN 3240
3230 GOTO 3210
3240 IF D1=P THEN D1=0
3250 IF D2=P THEN D2=0
3260 IF D3=P THEN D3=0
3270 IF D4=P THEN D4=0
3280 IF D5=P THEN D5=0
3290 IF D6=P THEN D6=0
3300 IF D7=P THEN D7=0
3310 IF D8=P THEN D8=0
3320 IF D9=P THEN D9=0
3330 PRINT@ 0,STRING$(63,CHR$(128));
3340 DL=DL+1:PRINT@ 18,"HAH!!! - THAT'S";DL;" FOR MODRED!!!";
3350 FOR I=1TO1000:NEXT:IF DL=7 THEN 3660
3360 RETURN
3370 REM ** ENEMY CONTACT ROUTINE - DEFENDING FORCE **
3380 IF Q=A1 OR Q=A2 OR Q=A3 OR Q=A4 OR Q=A5 OR Q=A6 OR Q=A7 OR Q=A8 OR Q=A9 THE
     N 3390 ELSE 3580
3390 K=0
3400 IF R=8 OR R=9 THEN DS$=DK$ ELSE DS$=DB$
3410 PRINT@ Q," ";:FOR I=1TO15:NEXT:PRINT@ Q,DS$;:FOR I=1TO15:NEXT
3420 K=K+1:IF K=7 THEN 3440
3430 GOTO 3410
3440 IF A1=Q THEN A1=0
3450 IF A2=Q THEN A2=0
3460 IF A3=Q THEN A3=0
3470 IF A4=Q THEN A4=0
3480 IF A5=Q THEN A5=0
3490 IF A6=Q THEN A6=0
3500 IF A7=Q THEN A7=0
3510 IF A8=Q THEN A8=0:L1=1
3520 IF A9=Q THEN A9=0:L2=1
3530 IF L1=1 AND L2=1 THEN 3590
3540 PRINT@ 0,STRING$(63,CHR$(128));
3550 AL=AL+1:PRINT@ 15,"HAH!!! - THAT'S";AL;" FOR KING ARTHUR!!!";
3560 FOR I=1TO1000:NEXT
3570 IF AL=5 THEN 3620
3580 RETURN
3590 PRINT@ 0,STRING$(63,CHR$(128));
3600 PRINT@ 15,"BOTH MODRED'S KNIGHTS ARE DONE IN ! ! !";
3610 FOR I=1TO2000:NEXT:PRINT@ 15,STRING$(40,CHR$(128));
3620 PRINT@ 15,"  C A M E L O T   I S   S A V E D ! ! !";
3630 FOR I=1TO750:NEXT:PRINT@ 17,STRING$(38,CHR$(128));:FOR I=1TO100:NEXT
3640 T=T+1:IF T=3 THEN 3650 ELSE 3620
3650 L1=0:L2=0:Z=0:Y=0:T=0:S=0:J=0:NG=1:TR=0:GOTO 4240
3660 PRINT@ 11,"m O D R E D   I S   V I C T O R I O U S ! ! !";
3670 FOR I=1TO750:NEXT:PRINT@ 11,STRING$(44,CHR$(128));:FOR I=1TO100:NEXT
3680 T=T+1:IF T=3 THEN 3690 ELSE 3660
3690 Z=0:J=0:M=0:T=0:S=0:NG=1:TR=2:GOTO 4240
3700 PRINT@ 11,"M O D R E D ' s   A R M S   D E P L E T E D ! ! !";
3710 FOR I=1TO750:NEXT:PRINT@ 11,STRING$(47,CHR$(128));:FOR I=1TO100:NEXT
3720 S=S+1:IF S=3 THEN 3620 ELSE 3700
3730 PRINT@ 12,"C A M E L O T   S T A R V E D   O U T ! ! !";
3740 FOR I=1TO750:NEXT:PRINT@ 12,STRING$(41,CHR$(128));:FOR I=1TO100:NEXT
3750 S=S+1:IF S=3 THEN 3660 ELSE 3730
3760 REM ** OWN MAN CONTACT ROUTINE - ATTACKING FORCE **
3770 ON R GOTO 3780 ,3790 ,3800 ,3810 ,3820 ,3830 ,3840 ,3850 ,3860
3780 IF P=A2 OR P=A3 OR P=A4 OR P=A5 OR P=A6 OR P=A7 OR P=A8 OR P=A9 THEN 3870 E
     LSE 3990
3790 IF P=A1 OR P=A3 OR P=A4 OR P=A5 OR P=A6 OR P=A7 OR P=A8 OR P=A9 THEN 3870 E
     LSE 3990
3800 IF P=A1 OR P=A2 OR P=A4 OR P=A5 OR P=A6 OR P=A7 OR P=A8 OR P=A9 THEN 3870 E
     LSE 3990
3810 IF P=A1 OR P=A2 OR P=A3 OR P=A5 OR P=A6 OR P=A7 OR P=A8 OR P=A9 THEN 3870 E
     LSE 3990
3820 IF P=A1 OR P=A2 OR P=A3 OR P=A4 OR P=A6 OR P=A7 OR P=A8 OR P=A9 THEN 3870 E
     LSE 3990
3830 IF P=A1 OR P=A2 OR P=A3 OR P=A4 OR P=A5 OR P=A7 OR P=A8 OR P=A9 THEN 3870 E
     LSE 3990
3840 IF P=A1 OR P=A2 OR P=A3 OR P=A4 OR P=A5 OR P=A6 OR P=A8 OR P=A9 THEN 3870 E
     LSE 3990
3850 IF P=A1 OR P=A2 OR P=A3 OR P=A4 OR P=A5 OR P=A6 OR P=A7 OR P=A9 THEN 3870 E
     LSE 3990
3860 IF P=A1 OR P=A2 OR P=A3 OR P=A4 OR P=A5 OR P=A6 OR P=A7 OR P=A8 THEN 3870 E
     LSE 3990
3870 IF P=A1 THEN A1=0
3880 IF P=A2 THEN A2=0
3890 IF P=A3 THEN A3=0
3900 IF P=A4 THEN A4=0
3910 IF P=A5 THEN A5=0
3920 IF P=A6 THEN A6=0
3930 IF P=A7 THEN A7=0
3940 IF P=A8 THEN A8=0:L1=1
3950 IF P=A9 THEN A9=0:L2=1
```

```
3960 IF R<8 THEN PRINT@ P,AB$; ELSE PRINT@ P,AK$;
3970 PRINT@ 13,"OAF !!! - THOU DIDST IN ONE OF THINE OWN MEN !!!";
3980 FORI=1TO1000:NEXT:AL=AL+1:IF L1=1 AND L2=1 THEN 3590
3990 RETURN
4000 REM ** OWN MAN CONTACT ROUTINE - DEFENDING FORCE **
4010 ON R GOTO 4020 ,4030 ,4040 ,4050 ,4060 ,4070 ,4080 ,4090 ,4100
4020 IF Q=D2 OR Q=D3 OR Q=D4 OR Q=D5 OR Q=D6 OR Q=D7 OR Q=D8 OR Q=D9 THEN 4110 E
     LSE 4230
4030 IF Q=D1 OR Q=D3 OR Q=D4 OR Q=D5 OR Q=D6 OR Q=D7 OR Q=D8 OR Q=D9 THEN 4110 E
     LSE 4230
4040 IF Q=D1 OR Q=D2 OR Q=D4 OR Q=D5 OR Q=D6 OR Q=D7 OR Q=D8 OR Q=D9 THEN 4110 E
     LSE 4230
4050 IF Q=D1 OR Q=D2 OR Q=D3 OR Q=D5 OR Q=D6 OR Q=D7 OR Q=D8 OR Q=D9 THEN 4110 E
     LSE 4230
4060 IF Q=D1 OR Q=D2 OR Q=D3 OR Q=D4 OR Q=D6 OR Q=D7 OR Q=D8 OR Q=D9 THEN 4110 E
     LSE 4230
4070 IF Q=D1 OR Q=D2 OR Q=D3 OR Q=D4 OR Q=D5 OR Q=D7 OR Q=D8 OR Q=D9 THEN 4110 E
     LSE 4230
4080 IF Q=D1 OR Q=D2 OR Q=D3 OR Q=D4 OR Q=D5 OR Q=D6 OR Q=D8 OR Q=D9 THEN 4110 E
     LSE 4230
4090 IF Q=D1 OR Q=D2 OR Q=D3 OR Q=D4 OR Q=D5 OR Q=D6 OR Q=D7 OR Q=D9 THEN 4110 E
     LSE 4230
4100 IF Q=D1 OR Q=D2 OR Q=D3 OR Q=D4 OR Q=D5 OR Q=D6 OR Q=D7 OR Q=D8 THEN 4110 E
     LSE 4230
4110 IF Q=D1 THEN D1=0
4120 IF Q=D2 THEN D2=0
4130 IF Q=D3 THEN D3=0
4140 IF Q=D4 THEN D4=0
4150 IF Q=D5 THEN D5=0
4160 IF Q=D6 THEN D6=0
4170 IF Q=D7 THEN D7=0
4180 IF Q=D8 THEN D8=0
4190 IF Q=D9 THEN D9=0
4200 IF R<8 THEN PRINT@ Q,DB$; ELSE PRINT@ Q,DK$;
4210 PRINT@ 13,"OAF !!! - THOU DIDST IN ONE OF THINE OWN MEN !!!";
4220 FOR I=1TO1000:NEXT:DL=DL+1
4230 RETURN
4240 PRINT@ 960,STRING$(63,CHR$(128));
4250 PRINT@ 960,"TO REVIEW INSTRUCTIONS - PRESS I    FOR ANOTHER GAME - PRESS G
     ";
4260 K$=INKEY$
4270 IF K$="I" THEN 600
4280 IF K$="G" THEN 90    ELSE 4260
```

DEDUCTION: by Al Leavitt

If you like to play the game of Clue, you'll enjoy this program. You must deduce the symbol the computer has selected in each of four locations in ten or less moves. If you do, you win. It's that simple.
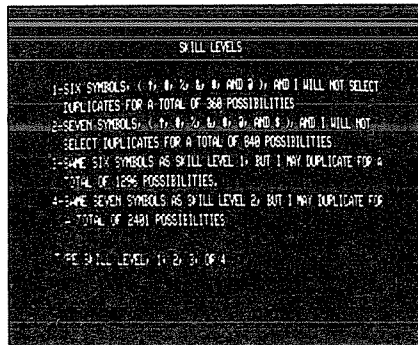

```
10 DIMD(3),R(3),S(6),T(3):RANDOM
15 DEFSTRR-U:DEFINTA-P
20 S(0)="[":S(1)="#":S(2)="%":S(3)="&":S(4)="*":S(5)="@"
```

```
 30 S(6)="$":CLS:PRINT@25,"DEDUCTION":PRINT:PRINT
 50 PRINT"DO YOU WANT TO PLAY DEDUCTION WITH ME?  IF YOU DO, TELL ME THE  SKILL L
    EVEL TO USE AND I WILL RANDOMLY SELECT ONE SYMBOL FOR    EACH OF FOUR LOCAT
    IONS.";
 60 PRINT"  FOR THE FIRST MOVE YOU SELECT A SET OF FOUR SYMBOLS, ONE FOR EACH OF
    THE FOUR LOCATIONS."
 70 PRINT"IF A PAIR OF OUR SELECTIONS HAVE THE SAME  SYMBOL AND LOCATION  YOU SCO
    RE A DOUBLE.  IF A PAIR OF OUR SELECTIONS HAVE THE SAME  SYMBOL BUT NOT THE
    SAME LOCATION YOU SCORE A SINGLE."
 80 PRINT"ON SUCCEEDING MOVES YOU USE THE INFORMATION IN YOUR SCORES TO   ALTER Y
    OUR SELECTIONS.  YOU WIN IF YOU DEDUCE THE SYMBOL I HAVE SELECTED FOR EACH
    OF THE FOUR LOCATIONS IN TEN OR FEWER MOVES."
 90 PRINT@960,"";:INPUT"DEPRESS ENTER TO CONTINUE";U
100 CLS:PRINT@151,"SKILL LEVELS":PRINT
110 PRINT"1-SIX SYMBOLS, ( [, #, %, &, *, AND @ ), AND I WILL NOT SELECT    DUPL
    ICATES FOR A TOTAL OF 360 POSSIBILITIES"
120 PRINT"2-SEVEN SYMBOLS, ( [, #, %, &, *, @, AND $ ), AND I WILL NOT     SELE
    CT DUPLICATES FOR A TOTAL OF 840 POSSIBILITIES"
130 PRINT"3-SAME SIX SYMBOLS AS SKILL LEVEL 1, BUT I MAY DUPLICATE FOR A    TOTA
    L OF 1296 POSSIBILITIES."
140 PRINT"4-SAME SEVEN SYMBOLS AS SKILL LEVEL 2, BUT I MAY DUPLICATE FOR   A TO
    TAL OF 2401 POSSIBILITIES"
150 PRINT@832,"TYPE SKILL LEVEL, 1, 2, 3, OR 4";
160 U=INKEY$:N=VAL(U):IFN<1ORN>4GOTO160
170 CLS:PRINT"SYMBOLS";TAB(23)"LOCATIONS";TAB(49)"SCORES"
180 PRINT"LEVEL";N;:FORI=1TO4:PRINT@79+(I-1)*7,I;:NEXT
190 PRINT@108,"DOUBLES   SINGLES":FORI=0TO5:PRINT@131+I*64,S(I);
200 NEXT:IFN=2ORN=4PRINT@515,S(6)
210 PRINT@576,"MOVE":PRINT"NO":FORI=0TO3:ONNGOTO220,240,260,270
220 L=RND(6)-1:FORJ=0TOI:IFT(J)<>S(L)NEXT:GOTO280
230 GOTO220
240 L=RND(7)-1:FORJ=0TOI:IFT(J)<>S(L)NEXT:GOTO280
250 GOTO240
260 L=RND(6)-1:GOTO280
270 L=RND(7)-1
280 T(I)=S(L):NEXT:FORI=1TO10:PRINT@642,I:FORK=0TO3
290 PRINT@768,"TYPE SYMBOL FOR LOCATION NUMBER ";K+1
300 U=INKEY$:ONNGOTO310,330,310,330
310 FORJ=0TO5:IFU<>S(J)NEXT:GOTO300
320 GOTO340
330 FORJ=0TO6:IFU<>S(J)NEXT:GOTO300
340 PRINT@80+I*64+K*7,U;:R(K)=U:NEXTK:GOTO440
350 PRINT@768,"TYPE LOCATION THAT YOU WANT TO CHANGE";
360 U=INKEY$:L=VAL(U):IFL<1ORL>4GOTO360
370 L=L-1:C=80+I*64+L*7:PRINT@C," ";
380 PRINT@768,"TYPE NEW SYMBOL FOR LOCATION NUMBER ";L+1;
390 U=INKEY$:ONNGOTO400,420,400,420
400 FORJ=0TO5:IFU<>S(J)NEXT:GOTO390
410 GOTO430
420 FORJ=0TO6:IFU<>S(J)NEXT:GOTO390
430 PRINT@C,U;:R(L)=U
440 PRINT@768,"SHALL I DO MY THING-TYPE YES OR NO     ";
450 U=INKEY$:IFU<>"N"ANDU<>"Y"GOTO450
460 IFU="N"GOTO350
470 E=0:FORJ=0TO3:D(J)=0:NEXT:FORJ=0TO3:FORK=0TO3
480 IFR(K)=T(J)ANDD(J)=0THEND(J)=1
490 NEXTK,J:FORJ=0TO3:E=E+D(J):NEXT:D=0:FORJ=0TO3:D(J)=0:NEXT
500 FORJ=0TO3:IFR(J)=T(J)THEND(J)=1
510 NEXT:FORJ=0TO3:D=D+D(J):NEXT:E=E-D:IFD=4GOTO530
520 PRINT@110+I*64,D;"       ";E;:NEXT
530 FORI=768TO1000:PRINT@I," ";:NEXT
540 IFD=4PRINT@856,"YOU'VE WON":GOTO580
550 PRINT@849,"TOUGH LUCK, YOU'VE LOST";
560 PRINT@913,"WINNING SELECTIONS WERE";
570 FORI=0TO3:PRINT@977+7*I,T(I);:NEXT
580 PRINT"  ANOTHER GAME (Y/N)?"
590 Z$=INKEY$:IFZ$=""THEN590
600 IFZ$="Y"THEN15
610 END
```

CQ DX 8Ø

Antenna Design & VSWR	Walter Atkins
Oscar Satellite Locator	Ron Bower
FCC Advanced Test	Maurice Prather
Antenna System Design	William Ford
Oscar Telemetry Program	Mark Herro
Radio Log	Darrell Offutt
Design	Dale & Brian Matheny
Intro to Digital Logic	Dave Fornshil

ANTENNA DESIGN AND VSWR : by Walter J. Atkins

This program will calculate exact resonant lengths at any frequence for four popular ham antennas. The program will also calculate any of the following, if three of four values are known: forward power, reflected power, VSWR, % reflected power for a given VSWR. In addition, maximum V. and I. along the transmission line are calculated for any value of input power. A must program for the antenna farming ham.
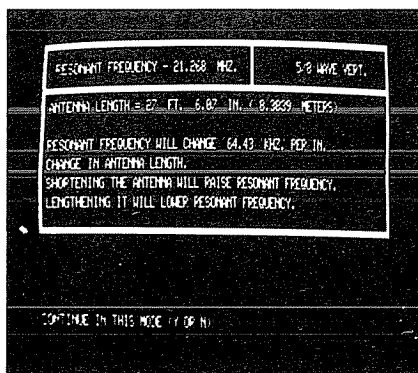
```
200  GOSUB9500
300  CLS:PRINTCHR$(23):PRINT"WOULD YOU LIKE A":PRINT"DESCRIPTION OF THE PROGRAM":
     PRINT"( Y OR N ) ?"
400  I$=INKEY$:IFI$=""THEN 400
500  IFI$="Y" THEN 800
600  IFI$<>"N" THEN 300
700  GOTO900
800  GOSUB10500
900  CLS:PRINTCHR$(23):PRINT"WHICH DO YOU WISH ?":PRINT:PRINT"1) ANTENNA DESIGN C
     ALCULATIONS"
1000 PRINT:PRINT"2) VSWR CALCULATIONS":PRINT:PRINT"INPUT CHOICE ==>";
1100 I$=INKEY$:IFI$=""THEN1100
1200 U=VAL(I$)
1300 IFU>2ORU<1THEN900:  ELSECLS:ONUGOTO5900,1400
1400 CLS:PRINT"* * * VOLTAGE STANDING WAVE RATIO CALCULATIONS * * *"
1500 PRINT:PRINTTAB(5);"FOLLOWING OPTIONS ARE AVAILABLE:"
1600 PRINT"1)INPUT FORWARD POWER & REFLECTED POWER, CALCULATE VSWR."
1700 PRINT"2)INPUT FORWARD POWER & VSWR, CALCULATE REFLECTED POWER."
1800 PRINT:PRINT"3)INPUT VSWR, CALCULATE % REFLECTED POWER."
1900 PRINT:PRINT"4)INPUT FORWARD POWER, VSWR, TRANSMISSION LINE IMPEDANCE,"
2000 PRINT"CALCULATE MAX. VOLTAGE & CURRENT ON TRANSMISSION LINE.":PRINT
2100 PRINT"5)RESTART PROGRAM":PRINT
2200 PRINT"INPUT CHOICE ==>"
2300 I$=INKEY$:IFI$=""THEN2300
2400 D=VAL(I$)
2500 IFD<1ORD>5THEN1400:ELSEONDGOTO2600,3300,3800,4100,900
2600 CLS:INPUT"ENTER ==>FORWARD POWER";A:   IFA<=0THEN2600:ELSEINPUT"ENTER ==>R
     EFLECTED POWER";B:   IFB<0THEN2600:ELSECLS
2650 IF B>A PRINT"ERROR .......REFLECTED POWER CANNOT EXCEED FORWARD POWER. ":FO
     RX=1TO1000:NEXTX:GOTO2600
2700 X=B/A:IFABS(1-X)<1E-4S=999999:GOTO3000
2800 Y=SQR(X):S=(1+Y)/(1-Y)
2900 IFS<326S=INT(S*100+.5)/100
3000 PRINT@80,"FORWARD POWER -";A;" WATTS";
3100 PRINT@143,"REFLECTED POWER - ";B;" WATTS";
3200 PRINT@208,"VSWR =";S;"/1":GOSUB9300:K=0:GOTO5100
3300 CLS:INPUT"ENTER ==>FORWARD POWER";A:
3400 INPUT"ENTER ==>VSWR";S: IF S<1 PRINT"VSWR CANNOT BE LESS THAN 1, PLEASE ENT
     ER AGAIN "   :GOTO3400:  ELSE Y=(S-1)/(S+1)
3500 B=A*Y*Y:CLS:B=INT(B*10+.5)/10
3600 PRINT@80,"FORWARD POWER -";A;" WATTS";:PRINT@143,"VSWR - ";S;"/1"
3700 PRINT@208,"REFLECTED POWER =";B;" WATTS":GOSUB9300:K=0:GOTO5100
3800 CLS:INPUT"ENTER ==>VSWR";S:   IFS<1THENPRINT"VSWR MUST BEGREATER THAN 1"
             FORN1=1TO1000:NEXT:GOTO3800:     ELSE Y=(S-1)/(S+1):C=INT(Y*Y*1000
     0+.5)/100
3900 CLS:PRINT@80,"VSWR -";S;"/1":PRINT@208,"REFLECTED POWER =";C;"%"
4000 PRINT@208,"REFLECTED POWER =";C;"%":GOSUB9300:K=0:GOTO5100
4100 CLS:INPUT"ENTER ==>FORWARD POWER";A:   IFA<=0THENPRINT"FORWARD POWER MUST
     BE POSITIVE":        FORN1=1TO1000:NEXT:GOTO4100
4200 INPUT"ENTER ==>VSWR";S:        IFS<1THENPRINT"VSWR MUST BE GREATER THAN 1":
     GOTO4200
4300 INPUT"ENTER ==>TRANS. LINE IMPEDANCE";G:   IFG<=0THENPRINT"IMPEDANCE MUST
     BE POSITIVE":GOTO4300
```

```
4400 E=SQR(A*S*G):E=INT(E*100+.5)/100
4500 I=INT(E/G*100+.5)/100:CLS
4600 PRINT@70,"FORWARD POWER - ";A;" WATTS":PRINT@135,"VSWR - ";S;"/1"
4700 PRINT@199,"LINE IMPEDANCE = ";G;" OHMS"
4800 PRINT@263,"MAX. LINE VOLTAGE = ";E;" VOLTS"
4900 PRINT@326,"MAX. LINE CURRENT = ";I;" AMPERES"
5000 FORX=10TO90:SET(X,2):SET(X,19):NEXTX:FORY=3TO18:SET(10,Y):SET(90,Y):NEXTY:K
     =0
5100 PRINT@896,"CONTINUE IN THIS MODE (Y OR N)"
5200 T$=INKEY$:IFT$=""THEN5200
5300 CLS
5400 IFLEFT$(T$,1)<>"Y" AND LEFT$(T$,1)<>"N"THEN5100
5500 IFLEFT$(T$,1)="N" AND K=0 THEN 1500
5600 IFLEFT$(T$,1)="N" AND K=1 THEN CLS:GOTO6000
5700 IFLEFT$(T$,1)="Y"AND K=1 THEN6800
5800 IFLEFT$(T$,1)="Y" AND K=0 THEN ON D GOTO 2600,3300,3800,4100
5900 CLS:PRINT"* * * ANTENNA LENGTH CALCULATIONS * * *"
6000 PRINT"FOLLOWING OPTIONS ARE AVAILABLE :"
6100 PRINT:PRINT"1)HALF WAVE DIPOLE":PRINT:PRINT"2)QUARTER WAVE VERTICAL"
6200 PRINT:PRINT"3)3/4 WAVELENGTH VERTICAL"
6300 PRINT"4)5/8 WAVELENGTH VERTICAL":PRINT:PRINT:PRINT"5)RESTART PROGRAM"
6400 U=0:PRINT"INPUT CHOICE ==>"
6500 I$=INKEY$:IFI$=""THEN6500
6600 U=VAL(I$)
6700 IFU>5 OR U<1 THEN 5900
6800 CLS:IFU=5THEN900
6900 IFU=1THENN=468
7000 IFU=2THENN=234
7100 IFU=3THENN=702
7200 IFU=4THENN=585
7300 F=0:PRINT:INPUT"ENTER DESIRED RESONANT FREQUENCY (F) IN MHZ. ==> ";F:CLS
7400 IFF<.022PRINT"FREQUENCY TOO LOW":K=1:GOTO5100
7500 IFF>1E3PRINT"FREQUENCY TOO HIGH":K=1:GOTO5100
7600 L=N/F:P=N/(L*L):P=P*1000
7700 I=L-INT(L):G=INT(L):I=I*12:I=INT(I*100+.5)/100
7800 M=L*.3048:M=INT(M*10000+.5)/10000:PRINT@66,"RESONANT FREQUENCY -";F;" MHZ."
7900 PRINT@193,"ANTENNA LENGTH =";G;" FT. ";I;" IN. (";M;" METERS)"
8000 L=L/2:I=L-INT(L):I=I*12:I=INT(I*100+.5)/100:G=INT(L):M=L*.3048:M=INT(M*1000
     0+.5)/10000
8100 IFU<>1THEN8300
8200 PRINT@257,"ANTENNA HALF LENGTH =";G;" FT. ";I;" IN. (";M;" METERS)"
8300 IFU=1THENA$="1/2 WAVE DIPOLE"
8400 IFU=2THENA$="1/4 WAVE VERT."
8500 IFU=3THENA$="3/4 WAVE VERT."
8600 IFU=4THENA$="5/8 WAVE VERT."
8700 PRINT@321,"RESONANT FREQUENCY WILL CHANGE ";INT(P/12*100+.5)/100;" KHZ. PER
     IN."
8800 PRINT@110,A$:PRINT@385,"CHANGE IN ANTENNA LENGTH."
8900 PRINT@449,"SHORTENING THE ANTENNA WILL RAISE RESONANT FREQUENCY.";
9000 PRINT@513,"LENGTHENING IT WILL LOWER RESONANT FREQUENCY.";
9100 FORX=0TO127:SET(X,0):SET(X,29):NEXTX:FORY=1TO28:SET(0,Y):SET(127,Y):NEXTY
9200 FORX=1TO126:SET(X,7):NEXTX:FORY=1TO6:SET(75,Y):NEXTY:K=1:GOTO5100
9300 FORX=22TO105:SET(X,2):SET(X,15):NEXTX:FORY=2TO15:SET(22,Y):SET(105,Y):NEXTY
9400 RETURN
9500 REM INSTRUCTIONS
9600 H$=STRING$(32,"I")
9700 CLS:PRINTCHR$(23):PRINT@0,H$;:PRINT:PRINT:PRINT:PRINTTAB(9);"ANTENNA DESIGN
     ":PRINT
9800 PRINTTAB(14);"AND":PRINT
9900 PRINTTAB(6);"VOLTAGE STANDING WAVE":PRINT
10000 PRINTTAB(10);"CALCULATIONS"
10100 FORX=64TO896 STEP64:PRINT@X,"I";:NEXTX
10200 FORX=126TO959STEP64:PRINT@X,"I";:NEXTX
10300 PRINT@896,H$;
10400 FOR X=1 TO 2000:NEXT:RETURN
10500 CLS:PRINTCHR$(23)
10600 PRINTTAB(3)"* * * ANTENNA DESIGN * * *":PRINT:PRINT
10700 PRINT"    ANTENNA DESIGN IS A PROGRAM"
10800 PRINT"TO  DESIGN  ANTENNAS  THAT ARE"
10900 PRINT"RESONANT AT A GIVEN FREQUENCY."
11000 PRINT:PRINT"THE ANTENNAS INCLUDED ARE :"
11100 PRINT" 1) HALF WAVE DIPOLE"
11200 PRINT" 2) QUARTER WAVE VERTICAL"
11300 PRINT" 3) 3/4 WAVE VERTICAL"
11400 PRINT" 4) 5/8 WAVE VERTICAL."
11500 PRINT:PRINT"PRESS ENTER TO CONTINUE":INPUT I$
11600 CLS:PRINTCHR$(23)
11700 PRINT"    THE PROGRAM FINDS THE LENGTH"
11800 PRINT"OF THE ANTENNA AND PREDICTS HOW"
11900 PRINT"MUCH  THE  RESONANT  FREQUENCY"
12000 PRINT"WILL CHANGE  PER INCH CHANGE IN"
12100 PRINT"ANTENNA LENGTH."
12200 PRINT:INPUT"PRESS ENTER TO CONTINUE";I$:CLS:PRINTCHR$(23)
12300 PRINT"* * VOLTAGE STANDING WAVE * *"
12400 PRINTTAB(10);"CALCULATIONS":PRINT
12500 PRINT"    VOLTAGE  STANDING WAVE RATIO"
12600 PRINT"IS USED IN TUNING AN ANTENNA OR"
```

```
12700 PRINT"IN  ANALYZING  THE  PERFORMANCE"
12800 PRINT"OF AN  ANTENNA  ALONG WITH IT'S"
12900 PRINT"TRANSMISSION LINE."
13000 PRINT:INPUT"PRESS ENTER TO CONTINUE";I$
13100 CLS:PRINTCHR$(23)
13200 PRINT"   IT  FINDS THE  VSWR FROM THE"
13300 PRINT"FORWARD POWER AND THE REFLECTED"
13400 PRINT"POWER, IT FINDS  THE  REFLECTED"
13500 PRINT"POWER FROM  THE FORWARD POWER &"
13600 PRINT"THE VSWR, AND IT CALCULATES THE"
13700 PRINT"PERCENTAGE  OF REFLECTED  POWER"
13800 PRINT"FOR A SPECIFIED VSWR.":PRINT
13900 PRINT"   THE PROGRAM ALSO FINDS THE"
14000 PRINT"MAXIMUM  VOLTAGE AND  MAXIMUM"
14100 PRINT"CURRENT  ON THE  TRANSMISSION"
14200 PRINT"LINE FEEDING THE ANTENNA.":PRINT
14300 INPUT"PRESS ENTER TO CONTINUE";I$
14400 RETURN
```

OSCAR SATELLITE LOCATOR: by R.K. Bower

Confused as to the elusive Oscar's whereabouts? After you supply the data base, this program will tell you where, when, orbit number, etc. for any future orbit. Takes the worry out of being merely close.


```
100 CLS:CLEAR 300:DEFINT I,J,K,N:RD=57.29578:DIM MO(12)
110 MO(1)=31:MO(3)=31:MO(4)=30:MO(5)=31:MO(6)=30:MO(7)=31
111 MO(8)=31:MO(9)=30:MO(10)=31:MO(11)=30:MO(12)=31
112 MD$(1)="J":MD$(2)="A":MD$(3)="AJ":MD$(4)="X"
113 MD$(5)="A":MD$(6)="AJ":MD$(7)="J"
114 DY$(1)="SUN":DY$(2)="MON":DY$(3)="TUE":DY$(4)="WED"
115 DY$(5)="THU":DY$(6)="FRI":DY$(7)="SAT"
120 PRINT CHR$(23)
121 PRINT@390,"OSCAR SATELLITE LOCATOR":PRINT
122 PRINT " WRITTEN BY R.K. BOWER, AC2C":PRINT
123 PRINT "   VERSION 2.0   1 JUNE 1979"
124 FOR I=1 TO 1500:NEXT I:CLS
130 PRINT TAB(15) "INPUT DATA FOR LAST KNOWN ORBIT":PRINT
140 INPUT "ORBIT NUMBER";NR$:NR=VAL(NR$)
150 PRINT "DAY OF ORBIT, PRESS 'ENTER' IF UNKNOWN:"
151 INPUT "(SUN, MON, TUE, WED, THU, FRI, SAT) ";A$
152 IF A$="" THEN I1=0:I2=4:GOTO 160
153 FOR I=1 TO 7:IF A$=DY$(I) THEN 155
154 NEXT I:PRINT "INVALID INPUT":GOTO 151
155 I1=I:I2=I1
160 INPUT "ORBIT DATE (MM,DD,YY)";M,D,Y
161 GOSUB 1000:IF ER=1 THEN 160
162 OY=Y:OD=Z
170 INPUT "ORBIT EQUATOR CROSSING TIME (XXXX;XX)";A$:OT=VAL(A$)
171 T1=FIX(OT/100):T2=OT-T1*100:OT=T1*60+T2
```

```
172 S$=RIGHT$(A$,3):IF LEFT$(S$,1)=";" THEN 173 ELSE 180
173 S=VAL(RIGHT$(S$,2)):OT=OT+(S/60)
180 INPUT "ORBIT EQUATOR CROSSING LONGITUDE (0 TO 360)";OL
190 INPUT "LONGITUDINAL PROGRESSION (DEGREES)";DR
200 INPUT "ORBITAL PERIOD (MINUTES)";OP:PRINT
210 INPUT "YOUR LONGITUDE (EITHER E/W OR 0-360)";HL$
211 IF RIGHT$(HL$,1)="E" THEN HL=360-VAL(HL$) ELSE HL=VAL(HL$)
212 B=HL/RD
220 INPUT "FIRST DATE OF INTEREST (MM,DD,YY)";M,D,Y
221 GOSUB 1000:IF ER=1 THEN 220
222 FY=Y:FD=Z
230 INPUT "LAST DATE OF INTEREST (MM,DD,YY)";M,D,Y
231 GOSUB 1000:IF ER=1 THEN 230
232 LY=Y:LD=Z
300 CLS:PRINT:PRINT"NO.     DATE      ORBIT NO.     TIME";TAB(44)"LONG.";TAB(55)"
    ROTATION"
301 FOR I=1 TO 63:PRINT "=";:NEXT I:PRINT:N=1:LD$=""
310 NR=NR+1:OL=OL+DR:OT=OT+OP
320 IF OL=>360 THEN OL=OL-360
330 IF OT<1440 THEN 340
331 OT=OT-1440:IF I1=0 THEN I2=4 ELSE I2=I2+1:IF I2>7 THEN I2=1
332 OD=OD+1:IF OD<366 THEN 340
333 IF OD=366 AND FIX(OY/4)*4=OY THEN 340
334 OY=OY+1:OD=1:IF OY=100 THEN OY=0
340 IF OY<FY THEN 310
341 IF OY=FY AND OD<FD THEN 310
342 IF OY=>LY AND OD>LD THEN DN=1:GOTO 650
350 T1=HL-OL:T2=OL-HL
351 IF T1<0 THEN T1=T1+360 ELSE IF T2<0 THEN T2=T2+360
352 IF T1<=33 OR T2<=26 THEN 500
360 T3=OL+180+.5*DR:IF T3=>360 THEN T3=T3-360
361 T1=HL-T3:T2=T3-HL
362 IF T1<0 THEN T1=T1+360 ELSE IF T2<0 THEN T2=T2+360
363 IF T1<=26 OR T2<=33 THEN 400 ELSE 310
400 PL=OL+180+.5*DR:PT=OT+.5*OP:PD=OD:PY=OY:D$="N TO S"
410 TM(N)=OP/2-16
420 IF PL=>360 THEN PL=PL-360
430 IF PT<1440 THEN 600
431 PT=PT-1440:PD=PD+1:IF PD<366 THEN 600
432 IF PD=366 AND FIX(PY/4)*4=PY THEN 600
433 PY=PY+1:PD=1:IF PY=100 THEN PY=0
434 GOTO 600
500 PL=OL:PT=OT:PD=OD:PY=OY:D$="S TO N"
510 TM(N)=-6
600 IF FIX(PY/4)*4=PY THEN MO(2)=29 ELSE MO(2)=28
601 FOR I=1 TO 12
602 IF PD<=MO(I) THEN 604
603 PD=PD-MO(I):NEXT I
604 PD$=RIGHT$(STR$(I+100),2)+"/"+RIGHT$(STR$(PD+100),2)
605 PD$=PD$+"/"+RIGHT$(STR$(PY+100),2)
606 IF PD$=LD$ PD$="   "+CHR$(34)+"   "+CHR$(34) ELSE LD$=PD$
610 H=FIX(PT/60):M=FIX(PT)-H*60:PT$=STR$(H*100+M+10000)+":"
611 S=FIX((PT-FIX(PT))*60+100.5):S$=RIGHT$(STR$(S),2)+"Z"
612 PT$=RIGHT$(PT$+S$,8)
620 PRINT USING "##.    ";N;:PRINT PD$
621 PRINT TAB(16)NR;MD$(I2);TAB(29)PT$;TAB(44);
622 PRINT USING "###.#";PL;:PRINT TAB(56)D$
630 PD$(N)=LD$:OB$(N)=STR$(NR)+"  "+MD$(I2):PT$(N)=PT$:PL(N)=PL
631 OT(N)=OT:OL(N)=OL
640 N=N+1:IF N<10 THEN 310
650 IF N=1 THEN 670 ELSE PRINT@832,;:GOSUB 2000
660 IF DN=0 THEN 300
670 CLS:PRINT CHR$(23):PRINT@522,"END OF LISTING. . ."
680 W$=INKEY$:IF W$="" THEN 680 ELSE CLS:END
1000 IF Y<0 OR Y>99 THEN 1060
1010 IF FIX(Y/4)*4=Y THEN MO(2)=29 ELSE MO(2)=28
1020 IF M<1 OR M>12 THEN 1060 ELSE IF D<1 OR D>MO(M) THEN 1060
1030 Z=0:ER=0:IF M=1 THEN 1050
1040 FOR I=1 TO M-1:Z=Z+MO(I):NEXT I
1050 Z=Z+D:RETURN
1060 ER=1:PRINT "INVALID DATE":RETURN
2000 PRINT "ENTER LINE NUMBER(S) OF ANY ORBIT(S) TO OBTAIN A PRINTOUT OF"
2001 PRINT "AZIMUTH AND ELEVATION DATA.  IF ENTERING MORE THAN ONE LINE"
2002 PRINT "NUMBER, SEPARATE NUMBERS WITH A SEMICOLON:";
2010 A$="":INPUT A$:IF A$="" RETURN
2011 CLS:I=0:FOR N=1 TO LEN(A$):K=ASC(MID$(A$,N,1))
2012 IF K=>49 AND K<=57 THEN I=I+1:OB(I)=K-48
2013 NEXT N:IF I=0 THEN RETURN
2020 IF DS=1 THEN 2200 ELSE DS=1
2030 PRINT "ENTER NUMBER CORRESPONDING TO SATELLITE:"
2031 PRINT "      1. OSCAR 7":PRINT "      2. OSCAR 8"
2032 PRINT "      3. RS - RS":PRINT "      4. OTHER"
2040 INPUT SN:IF SN<1 OR SN>4 THEN 2030
2050 ON SN GOTO 2060,2070,2080,2090
2060 BR=348.23/RD:HT=910:GOTO 2120
2070 BR=351/RD:HT=560:GOTO 2120
2080 BR=8/RD:HT=590:GOTO 2120
```

```
2090 PRINT:INPUT "SUBPOINT BEARING AT EQX (DEGREES CLOCKWISE FROM NORTH)";BR:BR=
     BR/RD
2100 PRINT:INPUT "AVERAGE HEIGHT OF ORBIT (STATUTE MILES)";HT
2120 A$="":PRINT:INPUT "YOUR LATITUDE (XX.XN OR XX.XS)";A$
2121 A=VAL(A$):IF A>90 THEN 2124
2122 IF RIGHT$(A$,1)="N" THEN A=A/RD:GOTO 2200
2123 IF RIGHT$(A$,1)="S" THEN A=-A/RD:GOTO 2200
2124 PRINT "INVALID LATITUDE INPUT":GOTO 2120
2200 J=1:P$="###.#     ###.#     ##.#     #,###"
2210 K=OB(J):CLS:PRINT"ORBIT:";OB$(K);" ";
2211 IF TM(K)<0 PRINT CHR$(91); ELSE PRINT CHR$(92);
2212 PRINT TAB(17)"EQX: ";PD$(K);" AT ";PT$(K);
2213 PRINT " AT ";:PRINT USING "###.#";PL(K);:PRINT " DEGREES"
2220 OL(K)=OL(K)/RD:TM=TM(K):IR=0:PRINT
2230 PRINT" TIME";TAB(14)"LAT.   LONG.";TAB(33)"AZIMUTH";
2231 PRINT TAB(45)"ELEV.";TAB(57)"RANGE"
2232 FOR N=1 TO 63:PRINT "=";:NEXT N:PRINT
2240 X=COS(BR)*SIN(6.2832*TM/OP)
2241 IF X<=-1 THEN LT=-1.5708:GOTO 2250
2242 IF X=0 THEN LT=0:GOTO 2250
2243 IF X=>1 THEN LT=1.5708:GOTO 2250
2244 LT=ATN(X/SQR(-X*X+1))
2250 X=COS(6.2832*TM/OP)/COS(LT):GOSUB 3000
2251 IF LT<0 THEN Z=-Z
2252 IF BR<3.1416 THEN Z=-Z
2253 LN=Z+.0043633*TM+OL(K):IF LN=>6.2832 THEN LN=LN-6.2832
2254 IF LN<0 THEN LN=LN+6.2832
2260 L=B-LN:IF L<-3.1416 THEN L=L+6.2832
2261 IF L>3.1416 THEN L=L-6.2832
2270 X=SIN(A)*SIN(LT)+COS(A)*COS(LT)*COS(L)
2271 GOSUB 3000:AS=Z
2280 X=(SIN(LT)-SIN(A)*COS(AS))/(COS(A)*SIN(AS))
2281 GOSUB 3000:AZ=Z:IF L<0 THEN AZ=6.2832-AZ
2290 EL=1.5708-ATN((3957+HT)*SIN(AS)/((3957+HT)*COS(AS)-3957))
2300 RG=((3957+HT)*COS(AS)-3957)/COS(1.5708-EL)
2310 IF EL>1.5708 AND IR=1 THEN 2370
2320 IF TM=>OP PRINT "NOT IN RANGE THIS PASS":GOTO02380
2330 IF EL>1.5708 THEN 2360 ELSE IR=1
2340 PT=OT(K)+TM:IF PT=>1440 THEN PT=PT-1440
2341 H=FIX(PT/60):M=FIX(PT)-H*60:PT$=STR$(H*100+M+10000)+":"
2342 S=FIX((PT-FIX(PT))*60+100.5):S$=RIGHT$(STR$(S),2)+"Z"
2343 PT$=RIGHT$(PT$+S$,8):LT=FIX(LT*RD*10)/10
2350 PRINT PT$;TAB(13);:PRINT USING "##.#";ABS(LT);
2351 IF LT<0 PRINT "S"; ELSE IF LT>0 PRINT "N";
2352 PRINT TAB(22);:PRINT USING P$;LN*RD;AZ*RD;El*RD;RG
2360 TM=TM+2:GOTO 23<0
2370 PRINT "      END OF PASS. . .";
2375 PRINT:PRINT "HIT ";CHR$(34);"ENTER";CHR$(34);" TO CONTINUE"
2380 W$=INKEY$:IF W$="" THEN 2380
2390 J=J+1:IF J>I RETURN ELSE 2210
3000 IF X<=-1 THEN Z=3.1416:GOTO 3040
3010 IF X=0 THEN Z=1.5708:GOTO 3040
3020 IF X=>1 THEN Z=0:GOTO 3040
3030 Z=-ATN(X/SQR(-X*X+1))+1.5708
3040 RETURN
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SIMULATED FCC ADVANCED CLASS AMATEUR TEST (PART I): by Maurice Prather

Our Advance Test (Part I) program allows your TRS-80 to become a friendly FCC examiner. The program will guide you through some general and advanced theory sections of the test while prompting you for correct answers all the way. Make a mistake and you'll be gently chided, as well as quickly corrected. Features a multiple choice format and no 30 day waiting period for retest.
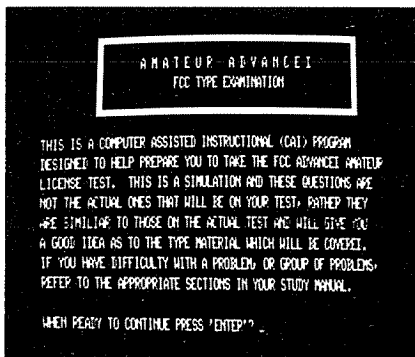

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5 CLS:REM ::::::::: A M A T E U R   A D V A N C E D :::::::::
10 REM :::::::::::::::: FCC  TYPE  EXAMINATION :::::::::::::::
50 NT=25:NR=25
75 CLS:FORX=19TO112:SET(X,0):SET(X,11):NEXT X
80 FORY=0TO11:SET(19,Y):SET(20,Y):SET(112,Y):SET(111,Y):NEXTY
85 PRINT@81,"A M A T E U R   A D V A N C E D";:PRINT@151,"FCC TYPE EXAMINATION";
   :FORX=1TO250:NEXTX:GOSUB 10000
100 CLS:PRINT"PROPAGATION ON THE VHF BANDS USUALLY TAKES PLACE BY THE:"
110 PRINT:PRINTTAB(10)"1) SURFACE WAVE"
120 PRINTTAB(10)"2) SKY WAVE"
130 PRINTTAB(10)"3) SPACE WAVE"
140 PRINTTAB(10)"4) TROPOSPHERIC REFLECTION"
150 PRINTTAB(10)"5) IONOSPHERIC REFRACTION"
160 INPUT Z:IF Z=3 PRINT"CORRECT":FORX=1TO1000:NEXTX:GOTO200
170 IFZ<>3PRINT"WRONG,THE CORRECT ANSWER IS: 4) THE E LAYER":GOSUB5000
200 CLS: PRINT"TRANSIENT IONIZATION CLOUDS IN WHAT LAYER MAKE POSSIBLE"
210 PRINT"OCCASIONAL TRANSMISSIONS ABOVE THE 'MUF'"
220 PRINT:PRINTTAB(10)"1) B
230 PRINTTAB(10)"2) C
240 PRINTTAB(10)"3) F
250 PRINTTAB(10)"4) E
260 PRINTTAB(10)"5) D
270 INPUTZ:IFZ=4PRINT"CORRECT":FORX=1TO1000:NEXTX:GOTO300
280 IFZ<>4PRINT"WRONG,THE CORRECT ANSWER IS: 4) THE SPACE WAVE":GOSUB5000
300 CLS:PRINT"WHEN YOU COMMUNICATE WITH A STATION 400 MILES EAST OF YOU,"
310 PRINT"YOU FIND THAT BOTH STATIONS MUST POINT THEIR ANTENNAS DUE"
320 PRINT"NORTH FOR MAXIMUM SIGNALS - WHY?"
330 PRINT:PRINTTAB(10)"1) BACKSCATTER"
340 PRINTTAB(10)"2) ONE-WAY PROPAGATION
350 PRINTTAB(10)"3) sUPER-REFRACTION
360 PRINTTAB(10)"4) SPORADIC E-LAYER PROPAGATION
370 PRINTTAB(10)"5) ATMOSPHERIC ABSORPTION
380 INPUTZ:IFZ=1PRINT"RIGHT":FORX=1TO1000:NEXTX:GOTO400
385 IFZ<>1PRINT"WRONG,THE CORRECT ANSWER IS: 1) BACKSCATTER":GOSUB5000
400 CLS:PRINT"PROPAGATION CONDITIONS USUALLY RE-OCCUR EVERY:"
410 PRINT:PRINTTAB(10) "1) 30 DAYS"
420 PRINTTAB(10)"2) 27 DAYS"
430 PRINTTAB(10)"3) 37 DAYS"
440 PRINTTAB(10)"4) 79 DAYS"
450 PRINTTAB(10)"5) 14 DAYS"
460 INPUT Z:IFZ=2PRINT "THAT'S CORRECT":FORX=1TO1000:NEXTX:GOTO500
470 IFZ<>2PRINT "NO, THE CORRECT ANSWER IS: 2) 27 DAYS":GOSUB5000
500 CLS:PRINT"IONOSPHERIC ABSORPTION"
510 PRINT:PRINTTAB(10)"1) CAUSES WEAKENING OF SIGNALS"
520 PRINTTAB(10)"2) IS MAINLY CAUSED BY THE D-LAYER"
530 PRINTTAB(10)"3) VARIES INVERSELY TO THE SQUARE OF THE FREQUENCY"
540 PRINTTAB(10)"4) INCREASES WITH IONIZATION INTENSITY"
550 PRINTTAB(10)"5) ALL OF THE ABOVE"
560 INPUTZ:IFZ=5PRINT"VERY GOOD!":FORX=1TO1000:NEXTX:GOTO600
570 IFZ<>5PRINT"INCORRECT, THE ANSWER IS: 5) ALL OF THE ABOVE":GOSUB5000
600 CLS:PRINT"MAXIMUM USABLE FREQUENCY (MUF) DOES NOT DEPEND ON:"
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610 PRINT:PRINTTAB(10)"1) TYPE OF TRANSMISSION USED"
620 PRINTTAB(10)"2) TIME OF THE YEAR"
630 PRINTTAB(10)"3) TIME OF THE DAY"
640 PRINTTAB(10)"4) SUN SPOT ACTIVITY"
650 PRINTTAB(10)"5) NONE OF THE ABOVE"
660 INPUTZ:IFZ=1PRINT "CORRECT":FORX=1TO1000:NEXTX:GOTO700
670 IFZ<>1PRINT"wRONG, THE RIGHT ANSWER IS: 1) TYPE OF TRANSMISSION USED":GOSUB
    5000
700 CLS:FORX=5TO30:SET(X,4):NEXTX:FORY=3TO5:SET(31,Y):SET(33,Y):NEXTY:FORX=34TO6
    3:SET(X,4):NEXTX:FORY=3TO5:SET(64,Y):SET(66,Y):NEXTY:FORX=67TO96:SET(X,4):N
    EXTX:FORY=3TO5:SET(97,Y):SET(99,Y):NEXTY:FORX=100TO120:SET(X,4):NEXTX
701 FORY=5TO10:SET(5,Y):SET(120,Y):NEXTY:FORX=5TO15:SET(X,11):NEXTX:FORX=110TO12
    0:SET(X,11):NEXTX
702 PRINT@15,"16 UF";:PRINT@31,"8 UF";:PRINT@48,"16 UF";
703 PRINT@206,"C-1";:PRINT@223,"C-2";:PRINT@239,"C-3";:FORX=1TO250:NEXTX
705 PRINT@320,"WHAT IS THE TOTAL CAPACITANCE OF THE ABOVE CIRCUIT:"
710 PRINT:PRINTTAB(10)"1)  8 UF    2) 1.6 UF    3)  40 UF"
715 PRINTTAB(10)"4)  4 UF    5)  32 UF"
760 INPUTZ:IFZ=4PRINT"YOU GOT IT!":FORX=1TO1000:NEXTX:GOTO800
770 IFZ<>4PRINT"WRONG, THE CORRECT ANSWER IS:  4)  4 UF":GOSUB5000
800 CLS:PRINT"UPPER ATMOSPHERIC IONIZATION DEPENDS MAINLY ON RADIATION FROM:"
810 PRINT:PRINTTAB(10)"1) OUTER SPACE"
820 PRINTTAB(10)"2) THE SUN"
830 PRINTTAB(10)"3) THE MILKY-WAY"
840 PRINTTAB(10)"4) THE MOON"
850 PRINTTAB(10)"5) THE eARTH"
860 INPUTZ:IFZ=2PRINT"EXCELLENT":FORX=1TO1000:NEXTX:GOTO 900
870 IFZ<>2PRINT"WRONG, THE CORRECT ANSWER IS: 2) THE SUN":GOSUB5000
900 CLS:PRINT"FOR SUCCESSFUL EARTH-MOON-EARTH (EME) CONTACTS, WHICH OF"
910 PRINT"THE FOLLOWING ARE NEEDED:"
920 PRINT:PRINTTAB(10)"1) HIGH GAIN ANTENNA"
930 PRINTTAB(10)"2) EXCELLENT RECEIVER SENSITIVITY"
940 PRINTTAB(10)"3) HIGH POWER TRANSMITTER"
950 PRINTTAB(10)"4) NARROW BANDWIDTH RECEIVER FILTER"
960 PRINTTAB(10)"5) ALL OF THE ABOVE"
970 INPUTZ:IFZ=5PRINT "VERY GOOD!":FORX=1TO1000:NEXTX:GOTO1000
980 IFZ<>5PRINT"YOU MISSED IT!, THE CORRECT ANSWER IS: 5) ALL OF THE ABOVE":GOSU
    B5000
1000 CLS:PRINT"TV FRONT-END OVERLOADING CAUSED BY 80 THRU 10 METER"
1010 PRINT"AMATEUR SIGNALS CAN BE ELIMINATED BY:"
1020 PRINT:PRINTTAB(10)"1) A WAVE-TRAP IN TV FEED LINE"
1030 PRINTTAB(10)"2) A WAVE-TRAP IN TRANSMITTER FEED LINE"
1040 PRINTTAB(10)"3) USING A HIGH-PASS FILTER ON TV"
1050 PRINTTAB(10)"4) USING A HIGH-PASS FILTER ON TRANSMITTER"
1060 PRINTTAB(10)"5) USING AN RF MODULATOR ON TV"
1070 INPUTZ:IFZ=3PRINT "RIGHT YOU ARE!":FORX=1TO1000:NEXTX:GOTO1100
1080 IFZ<>3PRINT"WRONG, THE CORRECT ANSWER IS: 3) USING A HIGH-PASS FILTER"
1085 PRINT"ON THE TV":GOSUB5000
1100 CLS:PRINT"TO BE EFFECTIVE, A LOW-PASS TRANSMITTER FILTER NEEDS:"
1110 PRINT:PRINTTAB(10)"1) TRANSMITTER FEED LINE WAVE-TRAPS"
1120 PRINTTAB(10)"2) HIGH-PASS RECEIVER FILTER"
1130 PRINTTAB(10)"3) CLASS C FINAL AMPLIFIER"
1140 PRINTTAB(10)"4) TRANSMITTER CABINET SHIELDING"
1150 PRINTTAB(10)"5) TRANSMITTER CABINET CROSS-HATCHING"
1160 INPUTZ:IFZ=4PRINT "RIGHT":FORX=1TO1000:NEXTX:GOTO1200
1170 IFZ<>4PRINT"WRONG, THE RIGHT ANSWER IS: 4) TRANSMITTER CABINET SHIELDING":G
    OSUB5000
1200 CLS:PRINT"DIAGONAL LINES ON THE TV SCREEN CAUSED BY RADIO INTERFERENCE AREC
    ALLED:"
1210 PRINT:PRINTTAB(10)"1) iNTERMODULATION LINES"
1220 PRINTTAB(10)"2) COLOR BARS"
1230 PRINTTAB(10)"3) CROSS HATCHING"
1240 PRINTTAB(10)"4) TRANSMISSION LINES"
1250 PRINTTAB(10)"5) HARMONIC LINES"
1260 INPUTZ:IFZ=3PRINT"YOU'RE RIGHT!":FORX=1TO1000:NEXTX:GOTO1300
1270 IFZ<>3PRINT"INCORRECT, THE RIGHT ANSWER IS: 3) CROSS HATCHING":GOSUB5000
1300 CLS:PRINT"THE RULES DEFINE A REPEATER STATION AS:"
1310 PRINT:PRINTTAB(10)"1) A STATION TO AUTOMATICALLY RETRANSMIT SIGNALS FOR"
1315 PRINTTAB(10)"    THE PURPOSE OF EXTENDING THEIR RANGE"
1320 PRINTTAB(10)"2) A STATION ONLY FOR RELAYING SIGNALS BETWEEN TWO"
1325 PRINTTAB(10)"    SPECIFIC STATIONS"
1330 PRINTTAB(10)"3) A SEPERATE STATION FOR RADIO CLUB MEMBERS ONLY"
1340 PRINTTAB(10)"4) a REMOTE CONTROL STATION FOR ANOTHER STATION"
1350 PRINTTAB(10)"5) A STATION LICENSED FOR A LAND LOCATION, OTHER"
1355 PRINT TAB(10)"    THAN THE PRIMARY STATION"
1360 INPUTZ:IFZ=1PRINT"OKAY!":FORX=1TO1000:NEXTX:GOTO1400
1370 IFZ<>1PRINT"WRONG, THE CORRECT ANSWER IS: 1) A STATION TO AUTOMATICALLY"
1375 PRINT"RETRANSMIT SIGNALS FOR THE PURPOSE OF EXTENDING THEIR RANGE":GOSUB500
    0
1400 CLS:PRINT"WHICH OF THE FOLLOWING, REGARDING CONTROL STATION AND"
1405 PRINT"REPEATER OPERATION IS CORRECT:"
1410 PRINT:PRINTTAB(10)"1) tRANSMISSIONS MUST BE ABOVE 146MHZ"
1420 PRINTTAB(10)"2) A REPEATER MUST NOT RECEIVE AND TRANSMIT ON"
1425 PRINTTAB(10)"    DIFFERENT BANDS"
1430 PRINTTAB(10)"3) A SYSTEM NETWORK DIAGRAM FOR EACH SYSTEM OF WHICH"
1435 PRINTTAB(10)"    THE STATION IS A PART MUST BE INCLUDED IN THE"
1436 PRINTTAB(10)"    CONTROL STATION LOG BOOK"
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1440 PRINTTAB(10)"4) ANY AMATEUR STATION MAY RETRANSMIT SIGNALS IF A"
1445 PRINTTAB(10)"   CONTROL OPERATOR IS PRESENT"
1450 PRINTTAB(10)"5) A REPEATER MAY TRANSMIT 24 HOURS DAILY - EVEN WITH"
1455 PRINTTAB(10)"   NO SIGNALS BEING RECEIVED"
1460 INPUTZ:IFZ=3PRINT"YOU GOT IT":FORX=1TO1000:NEXTX:GOTO1500
1470 IFZ<>3PRINT"WRONG, THE RIGHT ANSWER IS: 3) A SYSTEM NETWORK DIAGRAM"
1472 PRINT"FOR EACH SYSTEM OF WHICH THE STATION IS A PART, MUST"
1475 PRINT"BE INCLUDED IN THE CONTROL STATION LOG BOOK":GOSUB5000EDIT1470-1500
1500 CLS:PRINT"A REPEATER TRANSMITTER INPUT POWER LIMIT IS:"
1510 PRINT:PRINTTAB(10)"1) 1,000 WATTS"
1520 PRINTTAB(10)"2) DEPENDENT UPON FREQUENCY,ANTENNA HEIGHT AND TYPE"
1530 PRINTTAB(10)"3) 900 WATTS IF PLATE INPUT ISN'T ACCURATELY MEASURED"
1540 PRINTTAB(10)"4) MINIMUM NECESSARY TO CARRY OUT COMMUNICATIONS"
1550 PRINTTAB(10)"5) ALL OF THE ABOVE"
1560 INPUTZ:IFZ=5PRINT"GOOD":FORX=1TO1000:NEXTX:GOTO1600
1570 IFZ<>5PRINT"WRONG, THE ANSWER IS: 5) ALL THE ABOVE":GOSUB5000
1600 CLS:PRINT"REPEATER OPERATION IS NOT LEGAL ON THE FOLLOWING  WHICH"
1605 PRINT"FREQUENCY PAIRS"
1610 PRINT:PRINTTAB(10)"1) 447.25 INPUT / 442.25 OUTPUT"
1620 PRINTTAB(10)"2) 146.90 INPUT / 147.50 OUTPUT"
1630 PRINTTAB(10)"3) 146.34 INPUT / 146.94 OUTPUT"
1640 PRINTTAB(10)"4) 144.34 INPUT / 144.94 OUTPUT"
1650 PRINTTAB(10)"5) 222.34 INPUT / 223.94 OUTPUT"
1660 INPUTZ:IFZ=4PRINT"VERY GOOD!":FORX=1TO1000:NEXTX:GOTO1700
1670 IFZ<>4PRINT"WRONG, THE ANSWER IS: 4) 144.34 INPUT / 144.94 OUTPUT":GOSUB500
     0
1700 CLS:PRINT@94,CHR$(153);:FORX=10TO59:SET(X,2):NEXTX:FORX=51TO59:SET(X,6):NEX
     TX:PRINT@158,CHR$(164);:PRINT@222,CHR$(145);:FORX=51TO59:SET(X,10):NEXTX:PR
     INT@286,CHR$(134);:FORX=51TO59:SET(X,14):NEXTX:PRINT@350,CHR$(153);:FORX=10
     TO59:SET(X,18):NEXTX
1701 FORY=3TO5:SET(10,Y):NEXTY:FORY=15TO18:SET(10,Y):NEXTY
1702 PRINT@132,CHR$(130);CHR$(135);:PRINT@260,CHR$(160);CHR$(180);:FORY=3TO8:SET
     (29,Y):NEXTY:FORY=12TO17:SET(29,Y):NEXTY:FORX=28TO30:SET(X,9):SET(X,11):NEX
     TX:PRINT@195,"POWER"
1703 PRINT@225,CHR$(160);:PRINT@289,CHR$(137);:PRINT@353,CHR$(166);:FORX=68TO75:
     SET(X,14):NEXTX:FORX=68TO105:SET(X,18):NEXTX:FORX=68TO75:SET(X,10):NEXTX:FO
     RY=3TO10:SET(75,Y):SET(76,Y):NEXTX:FORX=75TO105:SET(X,2):NEXTX
1704 FORX=90TO120:SET(X,7):SET(X,14):NEXTX:FORY=3TO7:SET(104,Y):SET(105,Y):NEXTY
     :FORY=15TO18:SET(104,Y):SET(105,Y):NEXTY:FORY=7TO14:SET(90,Y):SET(89,Y):SET
     (119,Y):SET(120,Y):NEXTY
1705 PRINT@266,"C-1";:PRINT@278,"L-1";:PRINT@295,"L-2";:PRINT@242,"LOAD";:FORX=1
     TO500:NEXTX
1706 PRINT@450,"WHAT TYPE COUPLING IS USED IN THIS CIRCUIT:"
1710 PRINT:PRINTTAB(10)"1) LINKING    2) IMPEDENCE    3) CAPACITIVE"
1720 PRINTTAB(10)"4) RADIO FREQUENCY    5) INDUCTIVE"
1760 INPUTZ:IFZ=5PRINT"YOU'RE RIGHT!":FORX=1TO1000:NEXTX:GOTO1800
1770 IFZ<>5PRINT"SORRY, THE ANSWER IS: 5) INDUCTIVE":GOSUB5000
1800 CLS:PRINT"UNDER WHAT CONDITIONS IS A-M TELEVISION ALLOWED IN THE"
1805 PRINT"AMATEUR HF BANDS:"
1810 PRINT:PRINTTAB(10)"1) FM TV (F-5) MAY NOT BE USED"
1820 PRINTTAB(10)"2) TOTAL BANDWIDTH CAN'T EXCEED AN A-3 SSB SIGNAL"
1830 PRINTTAB(10)"3) IF A DSSB TRANSMITTER IS USED, THE CARRIER MUST BE"
1835 PRINTTAB(10)"   SUPPRESSED AND INFORMATION MUST BE THE SAME IN"
1836 PRINTTAB(10)"   BOTH SIDEBANDS"
1840 PRINTTAB(10)"4) TOTAL BANDWIDTH CAN'T EXCEED 6 KHZ"
1850 PRINTTAB(10)"5) A SSB SUPPRESSED CARRIER TRANSMITTER IS REQUIRED"
1860 INPUTZ:IFZ=2PRINT"GOOD!":FORX=1TO1000:NEXTX:GOTO1900
1870 IFZ<>2PRINT"TOO BAD, THE RIGHT ANSWER IS: 2) TOTAL BANDWIDTH CAN'T"
1875 PRINT"EXCEED AN A-3 SSB SIGNAL":GOSUB5000
1900 CLS:PRINT"YOUR TRANSMITTER HAS A 50 OHM OUTPUT IMPEDENCE.  WHICH"
1905 PRINT"OF THESE ANTENNAS WILL PROVIDE THE BEST MATCH:"
1910 PRINT:PRINTTAB(10)"1) ZEPP END-FED WITH 1/2 WAVE TRANSMISSION LINE"
1920 PRINTTAB(10)"2) END-FED ZEPP"
1930 PRINTTAB(10)"3) HORIZONTAL 1/2 WAVE END-FED WIRE"
1940 PRINTTAB(10)"4) FOLDED, FLAT-TOP 1/2 WAVE, FEED WITH A 700 OHM"
1945 PRINTTAB(10)"   1/2 WAVE TRANSMISSION LINE"
1950 PRINTTAB(10)"5) A 5/8 VERTICAL"
1960 INPUTZ:IFZ=3PRINT"RIGHT":FORX=1TO1000:NEXTX:GOTO2000
1970 IFZ<>3PRINT"WRONG - THE ANSWER IS: 3) HORIZONTAL 1/2 WAVE END-FED WIRE":GOS
     UB5000
2000 CLS:PRINT"HOW MANY PARASITIC ELEMENTS IN A 5 ELEMENT YAGI BEAM:"
2010 PRINT:PRINTTAB(10)"1) NONE"
2020 PRINTTAB(10)"2) 4 ELEMENTS"
2030 PRINTTAB(10)"3) 3 ELEMENTS"
2040 PRINTTAB(10)"4) 1 ELEMENT"
2050 PRINTTAB(10)"5) 2 ELEMENTS"
2060 INPUTZ:IFZ=2PRINT"RIGHT YOU ARE":FORX=1TO1000:NEXTX:GOTO2100
2070 IFZ<>2PRINT"INCORRECT - THE ANSWER IS: 2) FOUR ELEMENTS":GOSUB5000
2100 CLS:PRINT"THE RHOMBIC ANTENNA'S CHIEF DISADVANTAGE IS:"
2110 PRINT:PRINTTAB(10)"1) IT COST TOO MUCH"
2120 PRINTTAB(10)"2) GAIN TOO LOW"
2130 PRINTTAB(10)"3) BEAM WIDTH TOO BROAD"
2140 PRINTTAB(10)"4) TOO DIFFICULT TO ROTATE"
2150 PRINTTAB(10)"5) ALL OF THE ABOVE DISAVANTAGES"
2160 INPUTZ:IFZ=4PRINT"VERY GOOD!":FORX=1TO1000:NEXTX:GOTO2200
2170 IFZ<>4PRINT"WRONG - THE ANSWER IS: 4) TOO DIFFICULT TO ROTATE":GOSUB 5000
2200 CLS:PRINT"WHEN RESONANT AT 7.06 MHZ, WHAT IS THE LENGTH OF A 1/4 WAVE"
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2205 PRINT"RG8/U COAXIAL CABLE TRANSMISSION LINE.(ITS VELOCITY FACTOR"
2207 PRINT"IS .66):"
2210 PRINTTAB(10)"1) 23 FEET"
2220 PRINTTAB(10)"2) 129 FEET"
2230 PRINTTAB(10)"3) 94 FEET"
2240 PRINTTAB(10)"4) 47 FEET"
2250 PRINTTAB(10)"5) 36.5 FEET"
2260 INPUTZ:IFZ=1PRINT"RIGHT":FORX=1TO1000:NEXTX:GOTO2300
2270 IFZ<>1PRINT"WRONG - THE ANSWER IS: 1) 23 FEET":GOSUB5000
2300 CLS:PRINT"THE DISTANCE BETWEEN THE HALF POWER POINTS OF VERTICAL OR"
2305 PRINT"HORIZONTAL RADIATION PATTERNS OF AN ANTENNA ARE CALLED:"
2310 PRINT:PRINTTAB(10)"1) BEAM WIDTH"
2320 PRINTTAB(10)"2) MINOR LOBE"
2330 PRINTTAB(10)"3) FEED POINTS"
2340 PRINTTAB(10)"4) ZERO-DB REFERENCE POINTS"
2350 PRINTTAB(10)"5) NONE OF THE ABOVE"
2360 INPUTZ:IFZ=1PRINT"RIGHT":FORX=1TO1000:NEXTX:GOTO2400
2370 IFZ<>1PRINT"SORRY, THE RIGHT ANSWER IS: 1) BEAM WIDTH":GOSUB5000
2400 CLS:PRINT"WHICH ANTENNA IS UNIDIRECTIONAL:"
2410 PRINT:PRINTTAB(10)"1) INVERTED VEE"
2420 PRINTTAB(10)"2) DIPOLE"
2430 PRINTTAB(10)"3) LONG WIRE"
2440 PRINTTAB(10)"4) UNTERMINATED RHOMBIC"
2450 PRINTTAB(10)"5) TERMINATED RHOMBIC"
2460 INPUTZ:IFZ=5PRINT"CORRECT":FORX=1TO1000:NEXTX:GOTO2500
2470 IFZ<>5PRINT"WRONG - THE ANSWER IS: 5) TERMINATED RHOMBIC":GOSUB5000
2500 CLS:PRINT"FOR A 3 MHZ SIGNAL, THE LENGTH OF YOUR 1/2 WAVE DIPOLE ANTENNA"
2505 PRINT"WILL BE:"
2510 PRINT:PRINTTAB(10)"1) 163 FEET"
2520 PRINTTAB(10)"2) 156 FEET"
2530 PRINTTAB(10)"3) 173.4 FEET"
2540 PRINTTAB(10)"4) 133 FEET"
2550 PRINTTAB(10)"5) 147 FEET"
2560 INPUTZ:IFZ=2PRINT"OKAY!":FORX=1TO1000:NEXTX:GOTO3000
2570 IFZ<>2PRINT"YOU'RE WRONG - THE ANSWER IS: 2) 156 FEET":FORX=1TO1000:NEXTX
2575 PRINT:PRINT"WHEN READY TO CONTINUE, PRESS 'ENTER'";:INPUT Q: GOTO3000
3000 CLS:PRINT@276,CHR$(23)"TEST FINISHED":FORX=1TO1000:NEXTX:GOTO20000
5000 PRINT:FORX=1TO1500:NEXTX:NR=NR-1
5004 INPUT"WHEN READY TO CONTINUE PRESS ENTER";Q:RETURN
10000 PRINT@320,"THIS IS A COMPUTER ASSISTED INSTRUCTIONAL (CAI) PROGRAM "
10001 PRINT"DESIGNED TO HELP PREPARE YOU TO TAKE THE FCC ADVANCED AMATEUR"
10002 PRINT"LICENSE TEST.  THIS IS A SIMULATION AND THESE QUESTIONS ARE"
10003 PRINT"NOT THE ACTUAL ONES THAT WILL BE ON YOUR TEST, RATHER THEY"
10004 PRINT"ARE SIMILIAR TO THOSE ON THE ACTUAL TEST AND WILL GIVE YOU"
10005 PRINT"A GOOD IDEA AS TO THE TYPE MATERIAL WHICH WILL BE COVERED."
10006 PRINT"IF YOU HAVE DIFFICULTY WITH A PROBLEM, OR GROUP OF PROBLEMS,"
10007 PRINT"REFER TO THE APPROPRIATE SECTIONS IN YOUR STUDY MANUAL."
10008 PRINT:INPUT"WHEN READY TO CONTINUE PRESS 'ENTER'";Q
10009 PRINT@320,"THIS PROGRAM IS DIVIDED INTO THREE SECTIONS -- EACH SECTION"
10010 PRINT"CONTAINING 25 QUESTIONS.  AFTER STUDYING EACH QUESTION,"
10011 PRINT"CHOOSE ONE OF THE FIVE ANSWERS YOU THINK IS MOST NEARLY"
10012 PRINT"CORRECT, TYPE IN THE ANSWER NUMBER AND THEN PRESS 'ENTER'."
10013 PRINT"IF YOUR ANSWER IS CORRECT, THE TRS-80 WILL TELL YOU SO, AND"
10014 PRINT"MOVE ON TO THE NEXT QUESTION.  IF YOUR ANSWER IS WRONG THE"
10015 PRINT"TRS-80 WILL TELL YOU THE CORRECT ANSWER SO YOU MAY STUDY"
10016 PRINT"THE QUESTION & ANSWER BEFORE MOVING ON."
10017 PRINT:INPUT"WHEN READY TO CONTINUE, PRESS 'ENTER'.";Q
10018 PRINT@320,"AT THE END OF EACH SECTION YOU WILL BE GIVEN THE NUMBER    "
10019 PRINT"OF ANSWERS YOU GOT RIGHT, AND YOUR PERCENTAGE CORRECT.  BE"
10020 PRINT"SURE AND WRITE DOWN THE NUMBER YOU GOT RIGHT ON SECTIONS 1"
10021 PRINT"AND 2 SO YOU CAN GET YOUR OVERALL CORRECT PERCENTAGE AT THE"
10022 PRINT"END OF SECTION 3."
10023 PRINT:PRINT
10024 PRINT@896,"WHEN READY TO START TEST, PRESS 'ENTER'";:INPUTQ:RETURN
20000 PRINT@256,"ON THIS SECTION YOU GOT";NR; "RIGHT OUT OF";NT;"FOR";INT((N
      R*100/NT)+.5);"%"
20001 PRINT"REMEMBER TO WRITE DOWN THE NUMBER YOU GOT RIGHT.":FORX=1TO2500:NEXTX
20002 PRINT:PRINT"THE FCC REQUIRES AT LEAST A SCORE OF 74% TO PASS THE TEST"
20003 PRINTTAB(15)"TO GET YOUR ADVANCED LICENSE":FORX=1TO1000:NEXTX
20004 PRINT:INPUT"WHEN READY TO CONTINUE, PRESS 'ENTER'";Q
20005 CLS:PRINT@576,"TO PROCEED TO THE SECOND SECTION OF THIS PROGRAM"
20006 PRINTTAB(10)"TYPE 'CLOAD' AND PRESS ENTER.":END
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ANTENNA SYSTEM DESIGN: by Bill Ford

Designing an antenna system for amateur or commercial use? The Antenna System Design program will allow you to compare several combinations of antennas and feedlines in order to determine the optimim ERP (Effective Radiated Power). In addition, the maximum allowable feedline loss in dB for a given ERP is also determined.

LOSSES OF COMMONLY USED COAXIAL CABLE IN DB PER 100 FT.

TYPE	1 MHZ	10 MHZ	100 MHZ	400 MHZ	1000 MHZ
RG17	.06	.24	.95	2.4	4.4
RG-8	.16	.55	2.0	4.5	8.5
RG-11	.18	.62	2.2	4.7	8.5
RG58	.38	1.4	5.2	11.2	20.0
RG59	.38	1.1	3.8	8.5	14.0

VALUES FOR OTHER FREQUENCIES CAN BE OBTAINED BY INTERPOLATION
DO YOU NEED TO INTERPOLATE FROM THE TABLE? _

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1 CLS
10 ' * * *  FEEDLINE LOSS AND EFFECTIVE RADIATED POWER
20 ' * * *   PROGRAM
30 ' * * *  cODED BY BILL FORD.
41 FORS=1TO64:PRINT"=";:NEXTS:PRINT"THIS PACKAGE IS OF PARTICULAR INTEREST TO YO
      U IF YOU AREDESIGNING  AN ANTENNA SYSTEM FOR AN AMATEUR OR
42 PRINT"A COMMERCIAL INSTALLATION.  YOU WILL BE ABLE TO COMPAREVARIOUS COMBINAT
      IONS OF ANTENNA - FEEDLINE TYPES TO OBTAIN THE
MOST PRACTICAL EFFECTIVE RA
      DIATED POWER FOR TYPE OF ANTENNA OR
FEEDLINE IN PROGRAM /A/. PROGRAM ''B''
      ALLOWS YOU TO"
43 PRINT"DETERMINE EXACTLY HOW MUCH LOSS IN DB CAN BE ALLOWED
FOR A PARTICULAR
      EFFECTIVE RADIATED POWER OUTPUT.":FOR S=1 TO64:PRINT"=";:NEXTS:PRINT:PRINT:
      PRINT
44 INPUT"DO YOU WANT TO RUN A OR B";A$:CLS
45 FOR S=1 TO 64:PRINT"=";:NEXT S
46 IF A$="B"THEN GOTO 10000
50 PRINT"THIS PROGRAM COMPUTES THE EFFECTIVE RADIATED POWER"
55 PRINT
60 PRINT"AS WELL AS THE FEEDLINE LOSS OF ANY TRANSMITTER-"
65 PRINT
70 PRINT"ANTENNA SYSTEM. bASED ON TRANSMITTER OUTPUT POWER,"
75 PRINT
80 PRINT"FEEDLINE AND ANTENNA EFFICIENCY"
85 FOR S=1 TO 64:PRINT"=";:NEXT S
90 PRINT:PRINT:INPUT"DO YOU NEED INSTRUCTIONS";A$
100 IF LEFT$(A$,1)="Y" THEN 4000
102 GOSUB 4070
110 CLS:INPUT"WHAT IS THE TRANSMITTER OUTPUT POWER";TP
120 PRINT:PRINT:INPUT"HOW MANY FEET OF FEEDLINE DO YOU PLAN ON USING";FL
121 '* * * IF INTERPOLATION WAS USED THE STEP ASKING FOR FEED-
LINE LOSS IS OMMI
      TTED.  WALUE 'LL' IS  USED DIRECTLY.
125 IF LL<>0 THEN 140
130 PRINT:PRINT:INPUT"WHAT IS THE LOSS IN DB PER 100 FEET OF YOUR FEEDLINE";LL
140 PRINT:PRINT:INPUT"WHAT IS THE GAIN OF YOUR ANTENNA SYSTEM IN DB(IF UNITY GAI
      N DB GAIN IS 0)";AG
150 '* * * CALCULATE TOTAL LOSS FOR ENTIRE LENGTH OF CABLE
160 L=FL/100*LL
161 L1=L
170 GOSUB 5000
175 PL=P1
180 ' * * * now CALCULATE EFFECTIVE RADIATED POWER AFTER
FIRST DETERMINING HOW M
      UCH POWER WILL BE DELIVERED TO ANTENNA
190 PA=TP-P1
200 L=AG
220 GOSUB 5000
1000 CLS
1010 PRINT "TRANSMITTER OUTPUT POWER.........";TP;"WATTS"
1015 PRINT
1020 PRINT"FEEDLINE LENGTH..................";FL;"FEET"
1025 PRINT
1030 PRINT"LOSS/100 FEET...................";LL;"DB"
1035 PRINT
```

```
1040 PRINT"DB LOSS OF ENTIRE RUN............";L1;"DB"
1045 PRINT
1050 PRINT"POWER LOSS OF ENTIRE RUN.........";PA;"WATTS"
1055 PRINT
1060 PRINT"POWER DELIVERED TO ANTENNA.......";PL;"WATTS"
1065 PRINT
1070 PRINT"EFFECTIVE RADIATED POWER.........";E;"WATTS"
1080 PRINT
1100 LL=0:INPUT"            DO YOU WANT ANOTHER CALCULATION";A$
1110 IFLEFT$(A$,1)="Y" GOSUB4070:GOTO110
2000 GOTO 9999
4000 CLS:FOR S=1 TO 64:PRINT"=";:NEXT S:PRINT"YOU WILL BE ASKED TO ENTER VARIOUS
     OPERATING PARAMETERS
4010 PRINT"OF YOUR PROPOSED TRANSMITTING SYSTEM. tHESE WILL BE:
4020 PRINT"TRANSMITTER OUTPUT POWER; LENGTH OF FEEDLINE; FEEDLINE"
4030 PRINT"LOSS AT OPERATING FREQUENCY IN DB PER 100 FT.;AND ANTENNA
4040 PRINT"GAIN IN DB.
     "
4041 PRINT"ENTER ALL FREQUENCIES IN MEGAHERTZ.  FOR YOUR CONVENIENCE, ANABBREVIA
     TED TABLE OF MORE COMMON COAX TYPES AND LOSSES IS
4042 PRINT"GIVEN.USE THIS TABLE, OR ANY OTHER SIMILAR TABLE FOR
4043 PRINT"YOUR CALCULATIONS. aN OPTION WHICH ALLOWS YOU TO INTERPOLATEFROM THE
     TABLE IS ALSO INCLUDED."
4045 FOR S=1 TO 64:PRINT"=";:NEXT S
4050 PRINT:PRINT:INPUT"PRESS /ENTER/ TO CONTINUE";A$
4052 GOSUB 4070
4055 GOTO 110
4070 CLS:PRINT" LOSSES OF COMMONLY USED COAXIAL CABLE IN DB PER 100 FT."
4080 PRINT:PRINT
4085 GOSUB 4090
4087 GOTO4140
4090 PRINT"TYPE       1 MHZ     10 MHZ    100 MHZ    400 MHZ   1000 MHZ
4091 PRINT"RG17        .06       .24        .95        2.4       4.4
4100 PRINT"RG-8        .16       .55        2.0        4.5       8.5
4110 PRINT"RG-11       .18       .62        2.2        4.7       8.5
4120 PRINT"RG58        .38       1.4        5.2        11.2      20.0
4130 PRINT"RG59        .30       1.1        3.8        8.5       14.0
4135 RETURN
4140 PRINT:PRINT"VALUES FOR OTHER FREQUENCIES CAN BE OBTAINED BY INTERPOLATION
4200 INPUT"DO YOU NEED TO INTERPOLATE FROM THE TABLE";A$
4300 IF LEFT$(A$,1)="Y" GOSUB 6000
4400 RETURN
5000 '* * * CALCULATE ACTUAL LOSS FROM DB VALUES
5010 '* * * FIRST OBTAIN LOG FROM DB BY DIVIDING BY 10
5020 L=L/10
5030 '* * * ANTILOG OF "L"
5040 AL=10[L
5050 Pl=TP/AL
5051 E=AL*PL
5055 RETURN
6000 ' * * * INTERPOLATION SUBROUTINE
6010 CLS:PRINT:PRINT:INPUT"WHAT IS OPERATING FREQUENCY";OF:CLS
6015 GOSUB 4090
6020 PRINT:PRINT:INPUT"WHAT IS CLOSEST FREQUENCY BELOW OPERATING FREQUENCYLISTED
     IN TABLE";LF
6025 CLS:GOSUB 4090
6030 PRINT:PRINT:INPUT"WHAT IS THE NEXT HIGHER FREQUENCY LISTED";HF
6035 CLS:GOSUB 4090
6040 PRINT:PRINT:INPUT"GIVE LOSS AT NEXT LOWER FREQUENCY";L1
6045 CLS:GOSUB 4090
6050 PRINT:PRINT:INPUT"GIVE LOSS AT NEXT HIGHER FREQUENCY";L2
6060 FD=HF-LF
6070 LD=L2-L1
6080 OD=OF-LF
6090 OL=OD*LD/FD
7000 LL=OL+L1
7010 CLS:PRINT"LOSS OF TRANSMISSION LINE AT";OF;"MHZ IS";LL;"DB / 100 FEET."
7020 FOR W=1TO1500:NEXT W
7030 RETURN
9999 END
10000  PRINT"THE FIRST PART OF THIS SECTION ALLOWS YOU TO ENTER
THE TRANSMITTER
       OUTPUT POWER AND THE EFFECTIVE RADIATED POWER
YOU DESIRE.  YOU WILL THEN GE
       T THE GAIN NEEDED TO OBTAIN THIS
ERP.  IN THE SECOND PART YOU WILL ENTER TH
       E POWER
10001 PRINT"THAT YOU EXPECT TO BE DELIVERED TO THE  ANTENNA.  YOUWILL THEN GET T
      HE MAXIMUM ALLOWABLE LOSS IN YOUR FEEDLINE."
10005 FORS=1TO64:PRINT"=";:NEXTS:INPUT"DO YOU WANT TO FIND REQUIRED SYSTEM GAIN
      (1)OR MAXIMUM ALLOWABLE FEEDLINE LOSS (2)";T
10006  INPUT"WHAT IS YOUR TRANSMITTER POWER OUTPUT";Pl:IF T=2 THEN GOTO 10500
10019 INPUT"WHAT IS YOUR DESIRED EFFECTIVE RADIATED POWER";E
10020 GOSUB 10030
10025 GOTO 10050
10030 EL=E/Pl
10040 D=10*(LOG(EL)/LOG(10))
```

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```
10041 RETURN
10050 CLS:PRINT "THE REQUIRED GAIN OF YOUR SYSTEM IS";D;"DB."
10051 GOTO 11000
10500 E=0:INPUT"HOW MUCH POWER DO YOU EXPECT TO DELIVER TO THE
ANTENNA";E
10510 GOSUB 10030
10520 CLS:PRINT"THE MAXIMUM ALLOWABLE FEEDLINE LOSS TO MAINTAIN";E;"WATTS TO THE
      ANTENNA WITH A TRANSMITTER POWER OUTPUT  OF";P1;"IS";D;"DB."
11000 PRINT:PRINT:PRINT:PRINT: INPUT "DO YOU WANT  TO:
1---RUN PROGRAM 'A'
      ---THE EFFECTIVE RADIATED POWER PROGRAM.2--RUN PROGRAM 'B'---THE MAXIMUM AL
      LOWABLE LOSS PROGRAM
3--TERMINATE THIS SESSION--";W
11010 CLS:FOR S=T TO 64:PRINT"=";:NEXT S:ON W GOTO 50,10000,30000
30000 PRINT:PRINT:PRINT"* * * * * bye * * * * *":PRINT:PRINT:PRINT
30001 FOR S=1TO64:PRINT"=";:NEXT S
30002 END
```

OSCAR TELEMETRY PROGRAM: by Mark Herro

Keep track of Oscar telemetry parameters with this program. Supply orbit number, frame number, the date and frequency of channels, and the program will tell you such things as solar array current, battery current and voltage, baseplate temperature and mode J power in milliwatts. Good for Oscars seven and eight.


```
FRAME 1   @ 1  10  79
=======================================
SOLAR ARRAY CURRENT= 479.05 MA
BATTERY CURRENT=-798 MA
BATTERY VOLTAGE= 12.05 VOLTS
BASEPLATE TEMP.= 36.6 'C
BATTERY TEMP.= 0 'C
MODE J RF POWER= 0 MW
PRESS <ENTER> TO CONTINUE
```

```
999 '        INITIALIZATION
1000 DEFINT A-X:DEFSNG Y:DEFSTR Z:DIM T(24),Y(18):ZF=STRING$(32,61)
1010 G=0:CLS:PRINTCHR$(23);ZF;"  OSCAR PACKAGE - - TELEMETRY"
1020 PRINTZF:PRINT:PRINT"PRESS:";TAB(15)"FOR:":PRINT
1030 PRINT"  7 - - - - - - OSCAR 7":PRINT:PRINT"  8 - - - - - OSCAR 8"
1040 PRINT:ZI=""
1050 ZI=INKEY$:IF ZI="" THEN 1050
1055 IF ZI=CHR$(13) THEN ZI="8"
1060 IF(ZI="7")+(ZI="8") THEN OS=VAL(ZI) ELSE PRINT"TOUCH 7 OR 8":GOTO 1050
1070 PRINT"OSCAR";OS:FOR I=1TO300:NEXTI:IF OS=7 THEN S=24 ELSE S=6
1080 CLS:PRINTCHR$(23);TAB(10)"OUTPUT SELECT":PRINTZF:PRINT"PRESS:";
1090 PRINTTAB(15)"FOR:":PRINT:PRINT"  V - - - - - VIDEO (NO PRINTER)"
1100 PRINT"  L - - - - - LINE PRINTER":PRINT
1110 PRINT"  S - - - - - SCREEN PRINTER":PRINT:ZI=""
1120 ZI=INKEY$:IF ZI="" THEN 1120
1125 IF ZI=CHR$(13) THEN ZI="V"
1130 IF(ZI="V")+(ZI="L")+(ZI="S") THEN PS=ASC(ZI) ELSE PRINT"TOUCH V, L, OR S":G
     OTO1120
1140 IF ZI="V" THEN PRINT"VIDEO" ELSE IF ZI="L" THEN PRINT"LINE PRINTER"
1150 IF ZI="S" THEN PRINT"SCREEN PRINTER"
1160 FOR I=1TO300:NEXTI
1170 CLS:PRINTCHR$(23):INPUT"ORBIT #";O:PRINT:INPUT"FRAME #";F
1180 PRINT:INPUT"DATE (MM,DD,YY)";M,D,R:CLS:PRINTCHR$(23)
1190 PRINT"=ENTER= THE LAST TWO DIGITS OF":PRINT"EACH CHANNEL PER '?'"
1200 PRINT"(REMEMBER TO ENTER EACH NUMBER":PRINT"IN THE SAME ORDER AS FROM OSCAR
     )"
```

135

```
1210 FOR J=1 TO S:INPUT T(J):NEXT J:CLS:PRINTCHR$(23);:GOTO4000
1219 '         MAINLINE
1220 IF OS=7 THEN FOR I=1 TO 6:READ ZA,ZB,E:NEXTI
1230 G=G+1:READ ZA,ZB,E
1240 GOSUB 5000: IF PS=76 THEN LPRINT ZA;Y(E);ZB ELSE PRINT ZA;Y(E);ZB:PRINT
1250 IF G=S THEN 1300 ELSE IF(G=6)+(G=10)+(G=15)+(G=20) THEN 1260 ELSE 1230
1260 IF PS=83 THEN OUT 254,255:FOR I=1TO1000:NEXTI
1270 IF PS=76 THEN 1230 ELSE PRINT"PRESS (ENTER) TO CONTINUE";:ZI=""
1280 ZI=INKEY$:IF ZI="" THEN 1280
1290 PRINT@192,CHR$(31);:GOTO 1230
1300 IF PS=83 THEN OUT 254,255:FOR I=1TO1000:NEXTI
1310 IF PS=76 THEN 1330 ELSE PRINT"PRESS (ENTER) TO CONTINUE";:ZI=""
1320 ZI=INKEY$:IF ZI="" THEN 1320
1330 CLS:PRINTCHR$(23);"RESTART PROGRAM (Y OR N)?":ZI=""
1340 ZI=INKEY$:IF ZI="" THEN 1340
1350 IF ZI="Y" THEN RUN ELSE CLS:END
1360 END
4000 CLS:PRINTCHR$(23);          'PRINT HEADING
4010 IF PS<>76 THEN 4050
4020 LPRINTCHR$(30);ZF:LPRINTTAB(5)"OSCAR";OS;TAB(15)"ORBIT";O
4030 LPRINTTAB(10)"FRAME";F;TAB(20)"@";D;M;R:LPRINTZF
4040 GOTO 1220
4050 PRINTTAB(5)"OSCAR";OS;TAB(15)"ORBIT";O
4060 PRINTTAB(10)"FRAME";F;TAB(20)"@";D;M;R:PRINTZF;
4070 GOTO 4040
4080 END
4999 '         EQUATION SUBROUTINE
5000 IF T(G)=0 THEN Y(E)=0:RETURN
5010 N=T(G):Y(0)=95.8-1.48*N:Y(1)=7.15*(101-N):Y(2)=57*(N-50)
5020 Y(3)=.1*N+8.25:Y(4)=23*N:Y(5)=1970-20*N:Y(6)=29.5*N
5030 Y(7)=8*(1-.01*N)[2:Y(8)=.253*N:Y(9)=40*(N-50):Y(10)=.1*N+6.4
5040 Y(11)=.1*N:Y(12)=.15*N:Y(13)=11.67*N:Y(14)=11+.82*N
5050 Y(15)=N[2/1.56:Y(16)=.1*N[2+35:Y(17)=.041*N[2:Y(18)=.01*N
5060 RETURN
5070 END
5999 '         TITLES
6000 DATA Solar Array Current=,mA,1
6005 DATA Battery Current=,mA,2
6010 DATA Battery Voltage=,Volts,3
6015 DATA Baseplate Temp.=,'C,0
6020 DATA Battery Temp.=,'C,0
6025 DATA Mode J RF Power=,mW,4
6030 DATA Solar Array Current=,mA,6
6035 DATA +X Quadrant Current=,mA,5
6040 DATA -X Quad. Current=,mA,5
6045 DATA +Y Quad. Current=,mA,5
6050 DATA -Y Quad. Current=,mA,5
6055 DATA 70-2 RF Power=,Watts,7
6060 DATA Ship Time=,Hours,8
6065 DATA  Charge/Discharge Current=  ,mA,9
6070 DATA Battery Voltage=,Volts,10
6075 DATA 1/2 Batt. Voltage=,Volts,11
6080 DATA Batt. Regulator #1=,Volts,12
6085 DATA Batt. Temp.=,'C,0
6090 DATA Baseplate Temp.=,'C,0
6095 DATA 2-10 Transponder Temp.=,'C,0
6100 DATA +X Facet Temp.=,'C,0
6105 DATA +Z Facet Temp.=,'C,0
6110 DATA 70-2 Transponder Temp.=,'C,0
6115 DATA 2-10 Emitter Current=,mA,13
6120 DATA 70-2 Modulator Temp.=,'C,0
6125 DATA  Switching Current=  ,mA,14
6130 DATA 2-10 RF Power,mW,15
6135 DATA 435 MHz Beacon=,mW,16
6140 DATA 2304 MHz Beacon=,mW,17
6145 DATA Telemetry Calibration=,Volts,18
6150 END
```

RADIO LOG PROGRAM: by Darrell Offutt

This radio log program takes the drudgery out of logging, as well as giving the busy ham instant call-up capability by any of several priorities, e.g., by call sign, state, name, etc. A real time and energy saver in the shack.
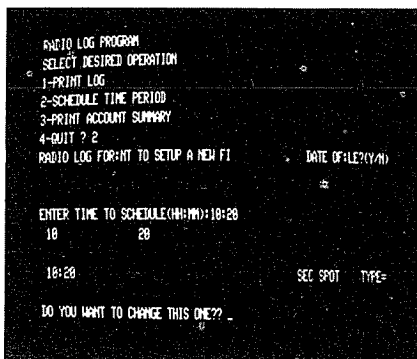

```
10 REM RADIO LOG
20 CLEAR 1000
30 DIM AZ$(300,10),S3(300),S6(300)
50 DEFINT S,P,H,M,C
60 OPEN"R",1,"RADIOLOG:1"
70 IF LOF(1)>0 GOTO 100
82 PRINT"RADIO LOG FILE ON THIS DISKETTE IS EMPTY":INPUT"DO YOU WANT TO SETUP A
   NEW FILE?(Y/N)";Y$:IF Y$="N"GOTO 100
83 IF Y$<>"Y" THEN GOTO82:ELSE LINEINPUT"ENTER NAME OF RADIO STATION:";NA$:INPUT
   "ENTER  DATE OF THIS LOG:";DT$
84 GOSUB 11100:LSET RS$=NA$:LSET DATE$=DT$
86 LSET CR$=MKI$(1)
88 FOR SR=0 TO 24:GOSUB 11000:LSET LR$=MKI$(0):NEXT SR:PUT1,1
100 CO$=":"
110 CLS:PRINT"RADIO LOG PROGRAM"
120 PRINT"SELECT DESIRED OPERATION":A%=4
130 PRINT"1-PRINT LOG"
140 PRINT"2-SCHEDULE TIME PERIOD"
145 PRINT"3-PRINT ACCOUNT SUMMARY"
150 INPUT"4-QUIT  ";A%
160 ONA%GOSUB1000,3000,8000,250
170 GOTO110
250 CLOSE:END
1000 REM PRINT LOG
1010 PRINT"*** TURN PRINTER ON ***"
1015 PL=0:GOSUB2000
1020 FORSR=0TO23:GOSUB11000
1030 PR=CVI(LR$):IFPR=0 THEN GOSUB1250:GOTO1040:ELSEGOSUB1400:GET 1,1
1040 NEXTSR:LPRINTCHR$(12):RETURN
1250 LPRINTTAB(1)SR;":00";TAB(10)"****THIS HOUR HAS NOT BEEN ASSIGNED****":GOSUB
    1300:LPRINT" ":GOSUB1300:RETURN
1300 PL=PL+1:IFPL<50RETURN
1310 PL=0:LPRINTCHR$(12):GOSUB2000:RETURN
1400 FORPX=PRTOPR+5:FORS2=0TO7:GOSUB11200
1410 GET1,PX:LPRINTTAB(1)SR;":";(PX-PR)*10;TAB(10)NM$;TAB(30)AC$;TAB(45)LN$;TAB(
    55)TY$:GOSUB1300
1420 NEXTS2:LPRINT" ":GOSUB1300
1430 NEXTPX:LPRINT" ":GOSUB1300:RETURN
2000 GOSUB11100:GET1,1:LPRINT"RADIO LOG FOR STATION:";RS$:LPRINT"LOG FOR 24 HOUR
     PERIOD:";DATE$
2010 LPRINTTAB(1)"TIME";TAB(10)"SPONSOR";TAB(30)"ACCOUNT";TAB(45)"SPOT";TAB(55)"
     TYPE":LPRINT" ":RETURN
3000 REM SCHEDULE TIME SLOT
3010 GOSUB11100:GET1,1:PRINT"RADIO LOG FOR:";RS$,"DATE OF:";DATE$:PRINT:CR=CVI(C
     R$):HM$=""
3020 LINEINPUT"ENTER TIME TO SCHEDULE(HH:MM):";HM$
3030 IFLEFT$(HM$,1)="Q" OR HM$="" RETURN
3040 GOSUB10000:SR=HR:IFSR<0ORSR>23PRINT"NOT A VALID HOUR****":GOTO3020
3050 GOSUB11000:GET1,1:MR=CVI(LR$):IFMR<>0:GOTO3100
3060 PRINT"NOTHING IS SCHEDULED FOR THAT HOUR****"
3070 MR=CR+1:LSETLR$=MKI$(CR+1):GOSUB11100:LSETCR$=MKI$(CR+6):PUT1,1:CR=CR+6
3080 FORPQ=MRTOMR+5:FORS2=0TO7:GOSUB11200:LSETNM$="**TIME NOT SPRD":LSETAC$="
     ":LSETLN$="  ":LSETTY$="  ":NEXTS2:PUT1,PQ:NEXTPQ
3100 MX=MR+INT(MN/10):S2=0:GOSUB11200:GET1,MX
3120 PRINT:PRINTTAB(1)HM$;TAB(10)NM$;TAB(30)AC$;TAB(45)LN$;" SEC SPOT";TAB(58)"T
     YPE=";TY$:PRINT:Y$="Q"
```

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```
3130 INPUT"DO YOU WANT TO CHANGE THIS ONE?";Y$
3140 IFY$="N" THEN S2=S2+1:IFS2=8 THEN GOTO3020:ELSEGOSUB11200:GOTO3120
3145 IFY$="Q"GOTO3020
3150 IFY$<>"Y" THEN GOTO3130:ELSEPRINT"ENTER FIELD  SPECIFIED OR * FOR NO CHANGE
     OR -Q- TO QUIT":AA$=""
3160 LINEINPUT"ENTER NAME OF SPONSOR:";AA$:IFLEFT$(AA$,1)="*"GOTO3190
3170 IF AA$="" GOTO 3400
3180 LSETNM$=AA$
3190 INPUT"ENTER ACCOUNT NUMBER (OR * OR Q):";AA$:IFLEFT$(AA$,1)="*"GOTO3230
3200 IFLEFT$(AA$,1)="Q"GOTO3400
3210 LSETAC$=AA$
3230 INPUT"ENTER SPOT LENGTH IN SECONDS (OR * OR -q-):";AA$:IFLEFT$(AA$,1)="*"GO
     TO3260
3240 IFLEFT$(AA$,1)="Q"GOTO3400
3250 LSETLN$=AA$
3260 INPUT"ENTER SPOT TYPE-1 CHARACTER (OR * OR -Q-):";AA$:IFLEFT$(AA$,1)="*"GOT
     O3400
3270 IFLEFT$(AA$,1)="Q"GOTO3400
3280 LSETTY$=AA$
3400 PUT1,MX:S2=S2+1:IFS2=8 THEN GOTO3020:ELSEGOSUB11200:GOTO3120
8000 REM SORT AND PRINT ACCOUNT SUMMARIES BY 30/60 SEC SPOTS
8010 LR=1
8020 FORPZ=2TOLOF(1):FORS2=0TO7
8030 GOSUB11200:GET1,PZ:IFAC$="           "GOTO8200
8040 GOSUB8400:IFLN$="30"THENS3(I)=S3(I)+1:GOTO8200
8050 IFLN$="60"THENS6(I)=S6(I)+1:GOTO8200
8200 NEXTS2:NEXTPZ
8210 LPRINT"**** ACCOUNT SUMMARY ****":LPRINT" "
8220 GOSUB11100:GET1,1:LPRINT"FOR:";RS$,"FOR DATE:";DATE$:LPRINT" ":LPRINT" "
8230 FORI=1TOLR-1:
8235 GOSUB 15000
8240 LPRINT"ACCOUNT#:";AT$,S3(I);" 30 SECOND SPOTS",S6(I);"  60 SECOND SPOTS"
8250 NEXT I
8260 LPRINTCHR$(12):RETURN
8400 IFLR=1GOTO8430
8410 FORI=1TOLR-1:GOSUB 15000:IFAC$=MID$(AT$,1,LEN(AC$))GOTO8500
8420 NEXTI
8430 LR=LR+1:I=LR-1
8435 FOR J=1 TO 10:AZ$(I,J)=MID$(AC$,J,1):NEXT J:S3(I)=0:S6(I)=0
8500 RETURN
10000 REM CONVERT HM$HH:MM TO HR,MN INDEXES
10010 IFMID$(HM$,2,1)=CO$ THEN HR=VAL(LEFT$(HM$,1)):I=3:ELSEHR=VAL(LEFT$(HM$,2))
      :I=4
10020 IFMID$(HM$,I+1,1)=>"0"ANDMID$(HM$,I+2,1)<="9" THEN MN=VAL(MID$(HM$,I,2)):E
      LSEMN=VAL(MID$(HM$,I,1))
10025 PRINT HR,MN
10030 RETURN
11000 FIELD 1,SR*2ASDM$,2ASLR$:RETURN
11100 FIELD 1,220ASDM$,20ASRS$,8ASDATE$,2ASJD$,2AS CR$,3ASDX$:RETURN
11200 FIELD 1,S2*31ASDM$,15ASNM$,10ASAC$,2ASLN$,1ASTY$,3ASRR$:RETURN
15000 AT$="          ":FOR J=1 TO 10:MID$(AT$,J,1)=AZ$(I,J):NEXT J:RETURN
```

POWER SUPPLY DESIGN: by Brian and Dale Matheny

The most fundamental of all ham construction projects is now made easy with our power supply program. All you need to know are your output voltage and current requirements, as well as percent maximum tolerable ripple. The program calculates all component values and even draws the finished schematic (in full wave bridge configuration), labeling the parts in the process. Worth its weight in zeners.
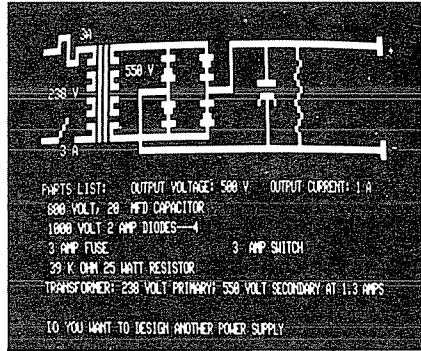

```
10 REM: INPUT ROUTINE
100 CLEAR100
110 CLS
120 AA$="POWER SUPPLY"
140 CLS:PRINT:PRINT" THE RANGE OF OUTPUT VOLTAGES IS FROM -5000 V TO +5000 V"
142 Tl=117:DIMG(28),E(24)
150 PRINT" THE RANGE OF OUTPUT CURRENTS IS FROM 10MA (.01 A) TO 20 AMPS"
160 PRINT" THE DESIRED MAXIMUM AMOUNT OF AC RIPPLE ON THE OUTPUT CAN BE      FROM
      .01% TO 50%"
170 PRINT" THE AC LINE REGULATION CAN BE FROM .01% TO 10%"
180 PRINT:PRINT"NOTE: FOR POSITIVE SUPPLIES GROUND THE NEGATIVE OUTPUT TERMINAL.
      FOR NEGATIVE VOLTAGE SUPPLIES GROUND THE POSITIVE TERMINAL. FOR DUAL VOLTA
      GE SUPPLIES IT IS NECESSARY TO BUILD TWO SUPPLIES AND TIE THE TWO GROUND PO
      INTS TOGETHER."
190 PRINT
200 INPUT"WHAT VOLTAGE IS DESIRED FOR THE OUTPUT";V
205 VZ=V
210 IFV<-5000ORV>5000ORV>-1ANDV<1THENPRINTCHR$(27);:PRINT" ":PRINTCHR$(27);:GOTO
      200
220 PRINT"WHAT IS THE DESIRED OUTPUT CURRENT (IN AMPS)";
230 INPUTC
240 IFC<.01ORC>20PRINTCHR$(27);:GOTO220
245 SM=1:H8=V:V1=V:V=ABS(V):GOSUB1370:SM=0:V=H8:R1=1:R2=2:IFRE>0THEN300
250 INPUT"WHAT IS THE MAXIMUM DESIRED OUTPUT RIPPLE";R1
260 IFR1<.01ORR1>50PRINTCHR$(27);:GOTO250
270 INPUT"WHAT LINE REGULATION";R2
280 IFR2<.01ORR2>10PRINTCHR$(27);:GOTO270
290 REM
295 REM: CHECK ROUTINE TO DETERMINE WHICH SECTION TO SELECT
300 IFV>=-200ANDV<=200THEN320
310 GOTO370
320 IFC>=2ANDC<=20THEN340
330 GOTO370
340 IFR1>=.1ANDR1<=50THEN360
350 GOTO370
360 IFR2>=.1ANDR2<=10THEN530
370 IFV>=-200ANDV<=200THEN390
380 GOTO410
390 IFC>=.01ANDC<=4THEN1260
410 IFV>=-5000ANDV<-200ORV>200ANDV<=5000THEN430
420 GOTO480
430 IFC>=.01ANDC<=2THEN450
440 GOTO480
450 IFR1>=-1ANDR1<=50THEN470
460 GOTO480
470 IFR2>=.1ANDR2<=10THEN2140
480 PRINT"YOUR SPECIFICATIONS ARE NOT POSSIBLE UNDER STANDARD DESIGNS"
490 FORI=1TO1000:NEXTI:RUN140
495 REM: LOW VOLTAGE, HIGH CURRENT
530 CLS:PRINT"THIS IS THE LOW VOLTAGE HIGH CURRENT DESIGN SECTION"
550 PRINT:PRINT"CIRCUITS IN THIS SECTION HAVE THE FOLLOWING PARAMETERS:"
555 PRINT" 1. VOLTAGES FROM -200V TO +200V"
560 PRINT" 2. CURRENT VALUES BETWEEN 2 AND 20 AMPS"
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570 PRINT" 3. LOAD REGULATIONS FROM .1% TO 50% OF RIPPLE"
580 PRINT" 4. LINE REGULATIONS FROM .1% TO 10% OF VARIANCE"
590 V1=V:V=ABS(V)
600 IFV*C<1700PRINT:PRINT"THE WATAGE IS"V*C"WHICH MAY BE TOO";:GOTO630
610 IFV*C>=1700PRINT:PRINT"THE WATTAGE IS"V*C"WHICH IS TOO";:GOTO630
620 GOTO650
630 PRINT" MUCH FOR THE STANDARD":PRINT" 117 VOLT LINE. DO YDO YOU WANT THE 2
    38 VOLT LINE";
640 R$=INKEY$:IFR$=""THEN640ELSEIFR$="Y"THENT1=238ELSEIFR$="N"THENT1=117ELSE640
650 T2=V+(.1*V):F=(V*C*1.3)/T1:D1=T2*1.4
660 C2=C*1.3:C1=D1
670 IFV>-50ANDV<50THENC3=1000*(C/2)/R1
680 IFV<=-50ORV>=50THENC3=800*(C/2)/R1
690 IFR2>3THENR3=V*R2
700 IFR2<=3THENR3=V/.1
710 REM
720 PRINT:PRINT"PRESS SPACE TO CONTINUE"
730 A$=INKEY$:IFA$=""THEN730ELSEIFA$=" "THEN740ELSE730
740 CLS
750 IFSS=1RETURN
780 GOSUB1040
790 REM: STRAIGHT LINE GRAPHICS
800 FORII=15791TO15804:POKEII,140:NEXTII:POKE15805,191:POKE15807,45:FORII=15471T
    O15484:POKEII,131:NEXTII:POKE15485,143:POKE15487,43:POKE15421,176
820 IFAA=1RETURN
825 REM: PARTS LIST SUBROUTINE
830 PRINT@512,"PARTS LIST:    OUTPUT VOLTAGE:";VZ;"V";TAB(40);"OUTPUT CURRENT:";
    C;"A"
840 IFV<5THENC1=5
850 IFC3>1THENC3=INT(C3)
855 GOSUB4500
860 PRINT@576,INT(C1)"VOLT,"C3" MFD CAPACITOR";
870 DC=C*1.5:IFDC<=1THENDC=1
880 GOSUB4200
890 IFD1>1000THENPRINT@640,VD"VOLT"DC"AMP DIODES---"NS*16;:GOTO910
900 PRINT@640,INT(D1)"VOLT"DC"AMP DIODES---4"
910 PRINT@704,MID$(F$,1,4);" AMP FUSE ";:PRINT@736,S;" AMP SWITCH"
920 IFR3>=1000THEN940
930 GOTO960
940 GOSUB4300:P2=INT((V/R3/1000)*V*1.6*100)/100:GOSUB4000:PRINT@768,INT(R3*100)/
    100"K OHM"P2"WATT RESISTOR"
950 GOTO970
960 GOSUB4400:P2=INT((V/R3)*V*1.6*1000)/1000:GOSUB4000:PRINT@768,INT(R3*100)/100
    "OHM"P2"WATT RESISTOR";
970 IFF<3THENEE=3
980 IFF>=3THENEE=F
990 B$=STR$(C2)
1000 PRINT@832,"TRANSFORMER:"INT(T1)"VOLT PRIMARY;"INT(T2*10)/10"VOLT SECONDARY
     AT";MID$(B$,1,4);" AMPS"
1010 IFD1>1000GOSUB2430
1020 IFK=1THENK=0:RETURN
1030 GOTO3000
1040 IFD1<=50THEND1=50
1050 F$=STR$(F)
1060 IFF<3THENEE=3
1070 IFF>=3THENEE=F
1080 POKE15362,168:POKE15363,140:POKE15364,148
1090 POKE15424,131:POKE15425,131:POKE15426,181:POKE15428,181:POKE15429,186:POKE1
     5430,131:POKE15431,163:POKE15432,187:POKE15433,170:POKE15434,170:POKE15435,
     170:POKE15436,179:POKE15437,131:POKE15438,131:POKE15439,131:POKE15440,131:P
     OKE15441,131:POKE15442,13
1
1100 POKE15443,131:POKE15444,163:POKE15445,187:POKE15446,179:POKE15447,131:POKE1
     5448,131:POKE15449,131:POKE15450,131:POKE15451,163:POKE15452,187:POKE15453,
     176:POKE15457,151:POKE15458,131:POKE15459,131:POKE15460,131:POKE15461,131:P
     OKE15462,131:POKE15463,17
1
1110 POKE15464,131:POKE15465,131:POKE15466,131:POKE15467,131:POKE15468,131:POKE1
     5469,171:POKE15470,131
1120 POKE15495,136:POKE15496,172:POKE15497,170:POKE15498,170:POKE15499,168:POKE1
     5500,140:POKE15508,160:POKE15509,190:POKE15510,180:POKE15515,160:POKE15516,
     187:POKE15517,177:POKE15521,149:POKE15527,170:POKE15533,152:POKE15534,129
1130 POKE15559,162:POKE15560,179:POKE15561,170:POKE15562,170:POKE15563,162:POKE1
     5564,179:POKE15568,168:POKE15569,140:POKE15570,140:POKE15571,140:POKE15572,
     140:POKE15573,174:POKE15580,170:POKE15581,140:POKE15582,140:POKE15583,140:P
     OKE15584,140:POKE15585,13
3
1140 POKE15590,163:POKE15591,179:POKE15592,179:POKE15593,129:POKE15597,162:POKE1
     5598,132
1150 POKE15620,144:POKE15623,136:POKE15624,142:POKE15625,170:POKE15626,170:POKE1
     5627,138:POKE15628,140:POKE15632,170:POKE15636,130:POKE15637,175:POKE15638,
     135:POKE15643,130:POKE15644,187:POKE15645,147:POKE15654,129:POKE15655,170:P
     OKE15657,129:POKE15661,13
7
1160 POKE15662,144:POKE15680,176:POKE15681,176:POKE15682,176:POKE15683,134:POKE1
     5685,160:POKE15686,176:POKE15687,178:POKE15688,187:POKE15689,170:POKE15690,
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      170:POKE15691,170:POKE15692,179:POKE15693,176:POKE15694,176:POKE15695,176:P
      OKE15696,186:POKE15697,17
6
1170 POKE15698,176:POKE15699,176:POKE15700,178:POKE15701,187:POKE15702,179:POKE1
     5703,176:POKE15704,176:POKE15705,176:POKE15706,176:POKE15707,178:POKE15708,
     187:POKE15709,131:POKE15719,170:POKE15725,166
1180 FORII=15761TO15790:POKEII,140:NEXTII:POKE15760,138:POKE15783,142:POKE15789,
     142
1190 W$=STR$(T2)
1195 IFF<3THENEE=3
1196 IFF>=3THENEE=F
1198 S=EE:GOSUB4600
1200 PRINT@192,INT(T1*10+.5)/10;"V";:PRINT@386,S;"A";:EE=S
1210 FU=VAL(F$):GOSUB4100:F$=STR$(FU):PRINT@5,MID$(F$,1,4);"A";
1220 IFT2<3THENPRINT@141,MID$(W$,2,6);"V";ELSEPRINT@141,INT(T2);"V";
1240 RETURN
1250 GOTO3000
1255 REM: MEDIUM VOLTAGE, LOW CURRENT
1260 CLS:PRINT"THIS IS THE MEDIUM VOLTAGE LOW CURRENT DESIGN SECTION"
1280 PRINT:PRINT"THE PARAMETERS FOR CIRCUITS IN THIS SECTION ARE:"
1285 PRINT" 1. VOLTAGES CAN BE FROM -200V TO +200V"
1290 PRINT" 2. CURRENTS BETWEEN 10MA (.01A) AND 2 AMPS"
1300 PRINT" 3. LOAD REGULATIONS FROM .01% TO 50% OF RIPPLE"
1310 PRINT" 4. LINE REGULATIONS FROM .01% TO 10% OF VARIANCE"
1320 PRINT:PRINT"YOUR CIRCUIT USES"ABS(V)*C"WATTS OF POWER"
1330 PRINT"DO YOU WANT 238 VOLT LINE"
1340 S$=INKEY$:IFS$=""THEN1340ELSEIFS$="Y"THENT1=238ELSEIFS$="N"THENT1=117ELSE13
     40
1350 CLS
1360 V1=V:V=ABS(V)
1370 IFC>1THEN1450
1380 IFV>4.6ANDV<5.4THENV=5:RE=5
1390 IFV>5.6ANDV<6.4THENV=6:RE=6
1400 IFV>7.6ANDV<8.4THENV=8:RE=8
1410 IFV>11.6ANDV<12.4THENV=12:RE=12
1420 IFV>14.6ANDV<15.4THENV=15:RE=15
1430 IFV>17.4ANDV<18.6THENV=18:RE=18
1440 IFV>23.4ANDV<24.6THENV=24:RE=24
1450 IFSM=1RETURN
1455 T2=V+(.2*V)
1460 F=(V*C*1.2)/T1
1470 D1=T2*1.3
1480 C2=C*1.3:C1=D1
1490 IFR1>=.1THENC3=4000/R1
1500 IFR1<.1THENC3=2000/R1
1510 IFR2>3THENR3=V*R2:GOTO1530
1520 IFR2<=3THENR3=V/.1
1530 REM
1540 PZ=V*C*1.25:IZ=(PZ/V)*.9:R4=(C1-V)/C:P3=((C1-V)*C)*1.5
1550 IFRE=5ANDV1<0THENRG=7905
1560 IFRE=5ANDV1>0THENRG=7805
1570 IFRE=6ANDV1<0THENRG=7906
1580 IFRE=6ANDV1>0THENRG=7806
1590 IFRE=8ANDV1<0THENRG=7908
1600 IFRE=8ANDV1>0THENRG=7808
1610 IFRE=12ANDV1<0THENRG=7912
1620 IFRE=12ANDV1>0THENRG=7812
1630 IFRE=15ANDV1<0THENRG=7915
1640 IFRE=15ANDV1>0THENRG=7815
1650 IFRE=18ANDV1<0THENRG=7918
1660 IFRE=18ANDV1>0THENRG=7818
1670 IFRE=24ANDV1<0THENRG=7924
1680 IFRE=24ANDV1>0THENRG=7824
1690 IFRE>0THENC3=50000:R3=1000
1720 IFRE>0THENV1=V
1730 GOSUB1040
1740 IFRE>0THEN2000
1750 IFR4>1000THENR4=R4/1000:J$="K"
1760 M=R3:R3=R4:GOSUB4400
1765 PRINT@54,INT(R3*100)/100;J$;:R3=M
1770 REM FROM HERE TO 1850 IS THE GRAPHICS FOR THE ZENER DIODE
1780 POKE15409,144:POKE15411,144:POKE15413,144:POKE15420,176
1790 POKE15471,131:POKE15472,131:POKE15473,130:POKE15474,134:POKE15475,130:POKE1
     5476,134:POKE15477,130:POKE15478,131:POKE15479,131:POKE15480,131:POKE15481,
     171:POKE15482,131:POKE15483,131:POKE15484,143:POKE15486,43
1800 POKE15544,160:POKE15545,186:POKE15546,176:POKE15547,132:POKE15548,129
1810 POKE15607,132:POKE15608,161:POKE15609,174:POKE15610,164
1820 POKE15673,170
1830 POKE15737,170
1840 FORII=15791TO15803:POKEII,140:NEXTII:POKE15804,191:POKE15801,142:POKE15806,
     45
1870 K=1
1880 IFRE>0THENC3=3300
1900 GOSUB830
1910 IFRE>0THEN1970
1915 A=P2:P2=P3:GOSUB4000:P3=P2:P2=A
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1920 M=R4:R3=R4:N=P3:P2=P3
1930 GOSUB4400:GOSUB4000:PRINT@800,INT(R3*100)/100"OHM"P2"WATT RESISTOR";
1935 P3=N:R4=M
1940 M$=STR$(V):PZ$=STR$(PZ)
1950 PRINT@672,MID$(M$,1,4);" VOLT,";MID$(PZ$,1,5);" WATT ZENER";
1960 GOTO3000
1970 PRINT" A";RG"VOLTAGE REGULATOR"
1980 IFV1<0PRINT"PUT THE VOLTAGE REGULATOR IN THE NEGATIVE LINE"
1990 GOTO3000
2000 FORII=15791TO15803:POKEII,140:NEXTII:POKE15804,191:POKE15806,45:POKE15798,1
     41
2010 POKE15734,149:POKE15670,149:POKE15606,149:POKE15542,151:POKE15539,131:POKE1
     5540,131:POKE15541,131:POKE15543,131:POKE15544,131:POKE15471,131:POKE15472,
     131:POKE15473,131:POKE15474,131:POKE15475,149:POKE15480,170:POKE15481,131:P
     OKE15482,131
2015 POKE15483,131
2020 POKE15484,143:POKE15420,176:POKE15486,43:POKE15411,156:POKE15412,140:POKE15
     413,140:POKE15414,140:POKE15415,140:POKE15416,172
2030 FORII=2TO5:POKE15474+II,ASC(MID$(STR$(RG),II,1)):NEXTII
2120 GOTO1870
2130 GOTO3000
2135 REM: HIGH VOLTAGE, LOW CURRENT
2140 CLS:PRINT"THIS IS THE HIGH VOLTAGE LOW CURRENT POWER SUPPLY DESIGN SECTION"
2160 PRINT:PRINT"CIRCUITS IN THIS SECTION HAVE THE FOLLOWING PARAMETERS:"
2170 PRINT" 1. VOLTAGES BETWEEN -5000V TO -200V AND +200V TO +5000V"
2175 PRINT" 2. CURRENTS BETWEEN 10MA (.01A) AND 2 AMPS"
2180 PRINT" 3. LOAD REGULATIONS FROM .1% TO 50% OF RIPPLE"
2190 PRINT" 4. LINE REGULATIONS FROM .1% TO 10% OF VARIANCE"
2200 SS=1
2210 V1=V:V=ABS(V)
2220 PRINT
2230 PRINT"YOUR CIRCUT USES"V*C"WATTS"
2240 PRINT"DO YOU WANT TO USE 238 VOLT PRIMARY LINE";
2250 GOSUB640
2260 IFV<=500THEN2262ELSE2264
2262 C3=C*V/(R1*5)
2263 GOTO2270
2264 C3=C*V/(R1*10)
2270 IFR2>3THENR3=V*R2*20
2280 IFR2<=3THENR3=(V/.1)*20
2290 K=1
2300 PRINT:PRINT
2310 GOSUB1040
2320 AA=1
2330 REM
2340 GOSUB800
2350 IFD1>1000THENGOSUB2400
2360 GOSUB830
2370 GOTO3000
2400 IFD1>1000ANDD1<4000THENVD=1000:NS=1
2410 IFD1>=4000ANDD1<8000THENVD=1000:NS=2
2420 RETURN
2430 PRINT@960,"PRESS SPACE FOR DIODE STRING DISPLAY";
2440 T$=INKEY$:IFT$=""THEN2440ELSEIFT$=" "THEN2450ELSE2440
2445 REM: DIODE STRING ARRANGMENT
2450 CLS:PRINT"YOUR VOLTAGE IS TOO MUCH FOR SINGLE DIODES IN THE BRIDGE CIRCUT.
     SO IT IS RECOMMENDED THAT YOU USE THE FOLLOWING DIODE ARRANGEMENT."
2480 PRINT
2490 PRINT"THE RESISTORS AND CAPACITORS ARE TO INSURE EVEN CURRENT AND VOLTAGE D
     ISTRIBUTION AMONG THE INDIVIDUAL RECTIFIERS."
2510 PRINT:PRINT"PRESS SPACE TO CONTINUE"
2520 Z$=INKEY$:IFZ$=""THEN2520
2540 CLS
2550 PRINT@9,".01 UF";TAB(21);".01 UF";TAB(32);".01 UF";TAB(44);".01 UF"
2560 POKE15431,168:POKE15432,140:POKE15433,140:POKE15434,174:POKE15436,170:POKE1
     5437,140:POKE15438,140:POKE15439,172:POKE15443,156:POKE15444,140:POKE15445,
     140:POKE15446,149:POKE15448,157:POKE15449,140:POKE15450,140:POKE15451,148:P
     OKE15454,168
2561 POKE15455,140
2562 POKE15456,140:POKE15457,174:POKE15459,170:POKE15460,140:POKE15461,140:POKE1
     5462,172:POKE15466,156:POKE15467,140:POKE15468,140:POKE15469,149:POKE15471,
     157:POKE15472,140:POKE15473,140:POKE15474,148:POKE15495,170:POKE15499,144:P
     OKE15500,160
2563 POKE15503,170
2564 POKE15507,149:POKE15510,160:POKE15512,144:POKE15515,149:POKE15518,170:POKE1
     5522,144:POKE15523,160:POKE15526,170:POKE15530,149:POKE15533,160:POKE15535,
     144:POKE15538,149:POKE15556,191:POKE15557,140:POKE15558,140:POKE15559,174:P
     OKE15560,140
2565 POKE15561,140
2566 POKE15562,140:POKE15563,157:POKE15564,191:POKE15565,140:POKE15566,140:POKE1
     5567,174:POKE15568,140:POKE15569,140:POKE15570,140:POKE15571,157:POKE15572,
     140:POKE15573,140:POKE15574,174:POKE15575,174:POKE15576,157:POKE15577,140:P
     OKE15578,140
2567 POKE15579,157
2568 POKE15580,140:POKE15581,140:POKE15582,174:POKE15583,140:POKE15584,140:POKE1
     5585,140:POKE15586,157:POKE15587,191:POKE15588,140:POKE15589,140:POKE15590,
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       174:POKE15591,140:POKE15592,140:POKE15593,140:POKE15594,157:POKE15595,140:P
       OKE15596,140
2569   POKE15597,174
2570   POKE15598,174:POKE15599,157:POKE15600,140:POKE15601,140:POKE15602,157:POKE1
       5603,140:POKE15604,140:POKE15605,191:POKE15623,170:POKE15627,129:POKE15628,
       130:POKE15631,170:POKE15635,149:POKE15638,130:POKE15640,129:POKE15643,149:P
       OKE15646,170
2571   POKE15650,129
2572   POKE15651,130:POKE15654,170:POKE15658,149:POKE15661,130:POKE15663,129:POKE1
       5666,149:POKE15687,138:POKE15688,140:POKE15689,137:POKE15690,152:POKE15691,
       137:POKE15692,152:POKE15693,137:POKE15694,140:POKE15695,142:POKE15699,141:P
       OKE15700,134
2573   POKE15701,164
2574   POKE15702,134:POKE15703,164:POKE15704,134:POKE15705,140:POKE15706,140:POKE1
       5707,133:POKE15710,138:POKE15711,140:POKE15712,137:POKE15713,152:POKE15714,
       137:POKE15715,152:POKE15716,137:POKE15717,140:POKE15718,142:POKE15722,141:P
       OKE15723,134
2575   POKE15724,164
2576   POKE15725,134:POKE15726,164:POKE15727,134:POKE15728,140:POKE15729,140:POKE1
       5730,133
2610   PRINT@393,"100 K";TAB(21);"100 K";TAB(32);"100 K";TAB(44);"100 K"
2630   IFNS=1PRINT:PRINT"USE THE ABOVE STRING IN PLACE OF EACH DIODE IN THE SCHEMA
       TIC"ELSEIFNS=2PRINT"USE TWO OF THESE STRINGS IN PLACE OF EACH DIODE IN THE
       SCHEMATIC"
2650   PRINT"DO YOU WANT TO SEE THE SCHEMATIC AGAIN"
2660   F$=INKEY$:IFF$=""THEN2660
2665   IFF$="Y"CLS:GOSUB1040:GOTO2680
2667   IFF$="N"THEN3005ELSE2660
2670   RETURN
2680   AA=1
2690   REM
2700   GOSUB800
2710   RETURN
3000   REM: ENDING ROUTINE
3005   PRINT@960,"DO YOU WANT TO DESIGN ANOTHER POWER SUPPLY";
3010   Q$=INKEY$:IFQ$=""THEN3010
3020   IFQ$="Y"THENCLEAR:GOTO140
3025   IFQ$<>"N"THEN3010
3030   PRINT:PRINT"EXECUTION TERMINATED":END
3990   REM: RESISTOR STANDARD WATTAGE VALUE SELECTION
4000   IFP2<=.125THENP2=.125ELSEIFP2<=.25ANDP2>.125THENP2=.25ELSEIFP2<=1ANDP2>.25T
       HENP2=1ELSEIFP2<=2ANDP2>1THENP2=2ELSEIFP2<=5ANDP2>2THENP2=5ELSEIFP2<=10ANDP
       2>5THENP2=10ELSEIFP2<=25ANDP2>10THENP2=25ELSEIFP2<=50ANDP2>25THENP2=50
4010   IFP2<=75ANDP2>50THENP2=75ELSEIFP2<=100ANDP2>75THENP2=100ELSEIFP2<=125ANDP2>
       100THENP2=125ELSEIFP2<=150ANDP2>125THENP2=150
4020   RETURN
4095   REM: FUSE STANDARD VALUE SELECTION
4100   IFFU<=.03125THENFU=.03125ELSEIFFU<=.0625ANDFU>.03125THENFU=.0625ELSEIFFU<=.
       125ANDFU>.0625THENFU=.125ELSEIFFU<=.25ANDFU>.125THENFU=.25ELSEIFFU<=.5ANDFU
       >.25THENFU=.5ELSEIFFU<=.75ANDFU>.5THENFU=.75ELSEIFFU<=1ANDFU>.75THENFU=1.5
4110   IFFU<=2ANDFU>1.5THENFU=2ELSEIFFU<=4ANDFU>2THENFU=3ELSEIFFU<=4ANDFU>3THENFU=
       4ELSEIFFU<=5ANDFU>4THENFU=5ELSEIFFU<=7ANDFU>5THENFU=7ELSEIFFU<=10ANDFU>7THE
       NFU=10ELSEIFFU<=15ANDFU>10THENFU=15ELSEIFFU<=20ANDFU>15THENFU=20ELSEIFFU<=3
       0ANDFU>20THENFU=30
4120   IFFU<=40ANDFU>30THENFU=30ELSEIFFU<=50ANDFU>30THENFU=50ELSEIFFU<=60ANDFU>50T
       HENFU=60ELSEIFFU<=80ANDFU>60THENFU=80ELSEIFFU<=100ANDFU>80THENFU=100
4130   RETURN
4190   REM: DIODE STANDARD VOLTAGE SELECTION
4200   IFD1<=50THEND1=50ELSEIFD1<=100ANDD1>50THEND1=100ELSEIFD1<=200ANDD1>100THEND
       1=200ELSEIFD1<=400ANDD1>200THEND1=400ELSEIFD1<=600ANDD1>400THEND1=600ELSEIF
       D1<=800ANDD1<600THEND1=800ELSEIFD1<=1000ANDD1<800THEND1=1000
4205   IFDC<=1THENDC=1ELSEIFDC<=2ANDDC>1THENDC=2ELSEIFDC<=3ANDDC>2THENDC=3ELSEIFDC
       <=4ANDDC>3THENDC=4ELSEIFDC<=5ANDDC>4THENDC=5ELSEIFDC<=6ANDDC>5THENDC=6ELSEI
       FDC<=8ANDDC>6THENDC=8ELSEIFDC<=10ANDDC>8THENDC=10ELSEIFDC<=20ANDDC>10THEND
       C=20
4207   IFDC<=30ANDDC>20THENDC=30
4210   RETURN
4290   REM: OVER 1K RESISTOR STANDARD RESISTANCE VALUE SELECTION
4300   R3=R3/1000:FORL=1TO28:READG(L):NEXTL:FORL=1TO26:IFR3<1.3*G(L)ANDR3>.8*G(L)T
       HENR3=G(L):GOTO4307
4305   NEXTL
4307   RETURN
4310   DATA.68,1,1.2,1.5,1.8,2.2,3.3,4.7,5.6,6.8,8.2,10,12,15,22,27,33,39,47,56,10
       0,120,150,220,270,470,1000,2200
4390   REM: UNDER 1K RESISTOR STANDARD RESISTANCE VALUE SELECTION
4400   E(1)=10:E(2)=15:E(3)=22:E(4)=27:E(5)=33:E(6)=47:E(7)=68:E(8)=82:E(9)=100:E(
       10)=150:E(11)=180:E(12)=220:E(13)=270:E(14)=330:E(15)=390:E(16)=470:E(17)=5
       60:E(18)=680:E(19)=.56:E(20)=1:E(21)=3.3:E(22)=.1:E(23)=.33:E(24)=.47
4410   FORL=1TO24:IFR3<=1.2*E(L)ANDR3>=.8*E(L)THENR3=E(L):GOTO4430
4420   NEXTL
4430   RETURN
4490   REM: CAPACITOR STANDARD VOLTAGFE SELECTION
4500   IFC1<=6THENC1=6ELSEIFC1<=10ANDC1>6THENC1=10ELSEIFC1<=12ANDC1>10THENC1=12ELS
       EIFC1<=15ANDC1>12THENC1=15ELSEIFC1<=20ANDC1>15THENC1=20ELSEIFC1<=25ANDC1>15
       THENC1=25ELSEIFC1<=30ANDC1>25THENC1=30ELSEIFC1<=35ANDC1>25THENC1=35ELSEIFC1<=50ANDC1
       >35THENC1=50ELSEIFC1<
```

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INTRODUCTION TO DIGITAL LOGIC: by Dave Fornshil

This well-done program is a self-teaching course designed to introduce the basics of TTL logic to the neophyte. Excellent text and graphics depict all types of gates with user selected input conditions. Gates will actually change state according to keyboard commands, allowing the student to visually follow the action. An excellent primer for further studies of microprocessors and minicomputers.
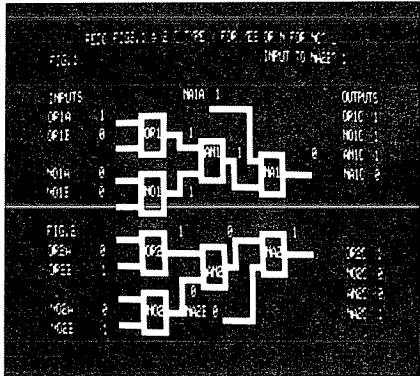

```
20   CLS:  PRINT@24,"   INTRODUCTION     "
30   PRINT@87,"*-------------------*"
40   PRINT@198,"THE INTENT OF THIS SELF-TAUGHT COURSE IS TO TEACHAS  FAST AND EFF
     ECTIVELY AS POSSIBLE THE FUNDAMENTALS OF DIGITAL LOGICS.
50   PRINT@390,"WITH THE AID OF 'LIVE' VISUAL DIAGRAMS THAT CHANGE CONDITIONS OR
     'STATES' ON VARIOUS TYPES OF GATES ONECAN BETTER UNDERSTAND AND RETAIN THE
     MATERIAL."
60   PRINT@582,"ALL TYPES OF GATES WILL BE COVERED AND GRAPHICALLY SHOWN, WITH AL
     L POSSIBLE INPUT AND OUTPUT CONDITIONS   DISPLAYED."
70   PRINT@774,"AFTER EACH GATE HAS BEEN EXPLAINED, A VISUAL DIAGRAM    WILL BE D
     ISPLAYED WHICH WILL ALLOW YOU TO CHOSE YOUR   OWN INPUT CONDITIONS TO STUDY
     THE FUNCTION OF THE "
80   PRINT@966,"GATE.";
90   PRINT@995,"TAP 'ENTER' TO CONTINUE";
100  A$=INKEY$: IF A$="" THEN 100
110  CLS:PRINT@070,"THE LAST PORTION OF THE COURSE WILL COVER     TROUBLESHOOTING
     ,TOO MANY COURSES TEACH EXCELLENT THEORY BUT FALL SHORT IN THE AREA OF"
120  PRINT@262,"APPLYING IT TO TROUBLESHOOTING. GENERAL TROUBLESHOOTING TECHNIQUE
     S WHICH APPLY TO ALL ELECTRONICS WILL BE     DISCUSSEDD FIRST, THEN WHAT APP
     LIES ONLY TO DIGITAL "
130  PRINT@454,"LOGIC WILL BE COVERED. THE CORSE THEN CLOSES WITH TWO IDENTICAL C
     IRCUITS IN  WHICH YOU MAY INSERT DIFFERENT INPUTS AND COMPARE"
140  PRINT@646,"OUTPUTS.";
150  PRINT@995,"TAP 'ENTER' TO CONTINUE";
160  A$=INKEY$: IF A$="" THEN 160
170  CLS:PRINT@015,"GENERAL DIGITIAL LOGIC INFORMATION"
180  PRINT@077,"*--------------------------------*"
190  PRINT@134,"IN THIS COURSE, WE WILL BE WORKING WITH THE MOSTCOMMONLY ACCEPTED
```

```
         TYPE OF LOGIC WHICH IS 'POSTIVE' LOGIC. THERE ARE ALSO 'NEGATIVE' LOGIC SY
         STEMS,BUT"
200 PRINT@326,"ONLY ROUGHLY 20% OF THIS TYPE. 'POSTIVE' LOGIC MEANSA '1' PULSE I
         S GOING IN THE POSTIVE VOLTAGE DIRECTION  , WITH RESPECT TO ELECTRONIC GROU
         ND. USUALLY A POS-"
210 PRINT@518,"ITIVE 5 VOLTS IS CONSIDERED A '1' PULSE. mOST IC'S  (INTEGRATED C
         IRCUITS) OR 'CHIPS' ARE DESIGNED TO RECOGNIZE A 3 VOLT PULSE OR BETTER AS A
         '1' PULSE."
220 PRINT@710,"A '0' PULSE IS DEFINED AS, NOT DIRECT ELECTRONIC GROUND, BUT AN A
         BSENCE OF VOLTAGE. THEREFORE AN OPEN   OR UNCONNECTED INPUT TO A GATE WOULD
         BE SEEN AS A '1'"
230 PRINT@902,"INPUT";
240 PRINT@936,"TAP 'ENTER' TO CONTINUE";
250 A$=INKEY$: IF A$="" THEN 250
260 CLS:PRINT@070,"SO REMEMBER DURING TROUBLESHOOTING AN 'OPEN' WIPRODUCE A '1'
         PULSE TO A GATE.IT SHOULD BE MENTIONED THERE MAY BE SEVERAL
270 PRINT@262,"INPUTS TO A SINGLE GATE AND MAY BE FOUR INDIVIDUAL GATES WITH FOU
         R OUTPUTS ALL CONTAINED WITHIN ONE ICOR CHIP. FOR SIMPLICITY, THIS COURSE H
         AS WORKED
280 PRINT@454,"WITH ONLY TWO INPUTS PER GATE.THE LAST ITEM AND NOT TO BE TAKEN L.
         IGHTLY IS THE   PROBLEM OF 'STATIC ELECTRICITY' ON 'CHIPS',ESPECIAL-"
290 PRINT@646,"LY 'MOS' TYPES. YOU CAN DEFINITELY DESTROY A CHIP BYIMPROPER HAND
         LING.  MOST IMPORTANT--KEEP THEM AWAY FROM STATIC MATERIAL, SUCH AS STYROFO
         AM.";
300 PRINT@936,"TAP 'ENTER' TO CONTINUE";
310 A$=INKEY$: IF A$= "" THEN 310
320 CLS:PRINT:PRINTTAB(25)"  NAND GATE   ":PRINTTAB(24)"*-------------*";
330 PRINT@198,"REMEMBER ONLY ALL '1'INPUTS WILLPRODUCE A '0' OUTPUT"
340 GOSUB 40020
350 GOSUB 30020
360 PRINT@434,"0    0    1";
370 PRINT@562,"0    1    1";
380 PRINT@690,"1    0    1";
390 PRINT@818,"1    1    0";
400 PRINT@526,"NAND";
410 PRINT@774,"A    1 OR 0";
420 INPUT A
430 PRINT@838,"B    1 OR 0";
440 INPUT B
450 IF A=1 THEN 480
460 PRINT@451,"A=0";
470 GOTO 490
480 PRINT@451,"A=1";
490 IF B=1 THEN 520
500 PRINT@579,"B=0";
510 GOTO 530
520 PRINT@579,"B=1";
530 IF A+B=2 THEN 570
540 IF A+B>2 THEN 580
550 PRINT@537,"C=1";
560 GOTO 590
570 PRINT@537,"C=0";
590 PRINT@902,"DO YOU WISH TO TRY SOME OTHER 'NAND' GATE INPUTS?";
600 PRINT@966,"PRESS Y FOR YES OR N FOR NO";
620 INPUTY$: IFLEFT$(Y$,1)="N" GOTO 650 ELSEIFLEFT$(Y$,1)<>     "Y" THEN 620
630 CLS: GOTO 340
650 CLS:PRINTTAB(25)"   AND GATE    ":PRINTTAB(23)"*------------------*":
660 PRINT@198,"REMEMBER ONLY ALL'1' INPUTS WILL OBTAINA '1' OUTPUT.";
670 PRINT@528,"AND";
680 GOSUB 30020
690 GOSUB 40020
700 PRINT@434,"0    0    0";
710 PRINT@562,"0    1    0";
720 PRINT@690,"1    0    0";
730 PRINT@818,"1    1    1";
740 PRINT@774,"A    1 OR 0";
750 INPUT A
760 PRINT@838,"B    1 OR 0";
770 INPUT B
780 IF A=1 THEN 810
790 PRINT@451,"A=0";
800 GOTO 820
810 PRINT@451,"A=1";
820 IF B=1 THEN 850
830 PRINT@579,"B=0";
840 GOTO 860
850 PRINT@579,"B=1";
860 IF A+B>1 THEN 890
870 PRINT@537,"C=0";
880 GOTO 900
890 PRINT@537,"C=1";
900 PRINT@902,"DO YOU WISH TO TRY SOME OTHER 'AND' GATE INPUTS?";
910 PRINT@966,"PRESS Y FOR YES OR N FOR NO";
920 INPUTY$: IFLEFT$(Y$,1)="N" GOTO 960 ELSEIFLEFT$(Y$,1)<> "Y" THEN 920
940 CLS: GOTO670
960 CLS:PRINTTAB(26)"  OR GATE   ":PRINTTAB(23)"*-------------*"
970 PRINT@198," REMEMBER HERE   ONLY ALL '0'INPUTS     PRODUCE A '0' OUTPUT.";
```

```
980 GOSUB 30020
990 GOSUB 40020
1000 PRINT@434,"0     0     0";
1010 PRINT@562,"0     1     1";
1020 PRINT@690,"1     0     1";
1030 PRINT@818,"1     1     1";
1040 PRINT@524,"OR GATE";
1050 PRINT@774,"A   1 OR 0";
1060 INPUT A
1070 PRINT@838,"B   1 OR 0";
1080 INPUT B
1090 IF A=1 THEN 1120
1100 PRINT@451,"A=0";
1110 GOTO 1130
1120 PRINT@451,"A=1";
1130 IF B=1 THEN 1160
1140 PRINT@579,"B=0";
1150 GOTO 1170
1160 PRINT@579,"B=1";
1170 IF A+B>0 THEN 1200
1180 PRINT@537,"C=0";
1190 GOTO 1210
1200 PRINT@537,"C=1";
1210 PRINT@902,"DO YOU WISH TO TRY SOME OTHER 'OR' GATE INPUTS?";"
1220 PRINT@966,"PRESS Y FOR YES OR N FOR NO";
1230 INPUTY$: IFLEFT$(Y$,1)="N" GOTO 1270 ELSEIFLEFT$(Y$,1)<>       "Y" THEN 12
30
1250 CLS: GOTO 980
1270 CLS:PRINTTAB(25)"  NOR GATE  ":PRINTTAB(23)"*---------------*
1280 PRINT@198,"ALL '0' INPUTS WILL PRODUCE A '1' OUTPUT.";
1290 PRINT@528,"NOR";
1300 PRINT@434,"0     0     1";
1310 PRINT@562,"0     1     0";
1320 PRINT@690,"1     0     0";
1330 PRINT@818,"1     1     0";
1340 GOSUB 30020
1350 GOSUB 40020
1360 PRINT@774,"A   1 OR 0";
1370 INPUT A
1380 PRINT@838,"B   1 OR 0";
1390 INPUT B
1400 IF A=1 THEN 1430
1410 PRINT@451,"A=0";
1420 GOTO 1450
1430 PRINT@451,"A=1";
1440 IF B=1 THEN 1470
1450 PRINT@579,"B=0";
1460 GOTO 1480
1470 PRINT@579,"B=1";
1480 IF A+B<1 THEN 1510
1490 PRINT@537,"C=0";
1500 GOTO 1520
1510 PRINT@537,"C=1";
1520 PRINT@902,"DO YOU WISH TO TRY SOME OTHER 'NOR' GATE INPUTS?";
1530 PRINT@966,"PRESS Y FOR YES OR N FOR NO";
1540 INPUTY$: IFLEFT$(Y$,1)="N" GOTO 1580 ELSEIFLEFT$(Y$,1)<>       "Y" THEN 15
40
1560 CLS: GOTO 1290
1580 CLS:PRINT@083," SHORT REVIEW & COMMENTS  ";
1590 PRINT@146,"*----------------------------*";
1600 PRINT@198,"HOW ABOUT ALITTLE BREATHER?  AT THIS POINT ALL    FOUR OF THE BAS
    IC GATES HAVE BEEN COVERED, WHICH WILL NOW BE REVIEWED   AND COMPARED..";
1610 PRINT@390,"THE TRULY'THOUGHT PROVOKING' THING IS BY INTER CONNECTING THESE
    FOUR SIMPLE GATES, WE ARE ABLE TO DEVELOP SOPHISTICATED SYSTEMS, SUCH AS TH
    E"
1620 PRINT@582,"SMALL BUT POWERFUL ONE SETTING HERE BEFORE YOU."
1630 PRINT@646,"WELL, ON WITH THE REVIEW! REMEMBER HOW ON THE 'NAND'  GATE IT TA
    KES ALL '1'S TO OBTAIN A '0' OUTPUT? ALL YOU NEED TO DO IS REMEMBER THAT FA
    CT AND"
1640 PRINT@838,"THAT AN 'AND' GATE IS JUST THE OPPOSITE OUTPUT.   THE SAME COMPAR
    ISON HOLDS TRUE FOR THE 'NOR' AND 'OR' GATES";
1650 PRINT@1000,"TAP 'ENTER' TO CONTINUE";
1660 A$=INKEY$: IF A$= ""THEN 1660
1670 CLS:PRINT@019,"TROUBLESHOOTING TECHNIQUES";
1680 PRINT@081,"*----------------------------------*"
1690 PRINT@134,"TROUBLESHOOTING IS FIRST GATHERING ALL POSSIBLE  INDICATIONS AND
    FACTS THEN REASONING OUT A LOGICALAPPROACH BEFORE STARTING TO 'PROBE'."
1700 PRINT@326,"GENERALLY YOU SHOULD; ASSUME NOTHING, GOOD TEST   EQUIPMENT,SPARE
    ELECTRONIC CARDS, OR FACTS RELAT- ING TO THE TROUBLE.   START FRESH--ON YOU
    R OWN.";
1710 PRINT@518,"STICK WITH THE 'ORIGINAL' CARDS AND THEIR POSITIONS DON'T PRODUC
    E ADDED TROUBLES BY 'SWAPPING'. USE YOUR SENSES,LOOK,FEEL,SMELL AND LISTEN.
    "
1715 PRINT@710,"REMEMBER IF AN INPUT STICKS AT '1' AND YOU ARE    INPUTTING A '1'
    IT WILL APPEAR TO BE WORKING, SAMETHING WITH A '0' INPUT OR OUTPUTS.";
1720 PRINT@990,"TAP 'ENTER' TO CONTINUE";
1725 A$=INKEY$:IF A$="" THEN 1725
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1726 CLS:
1730 PRINT@268,STRING$(5,CHR$(176));
1740 PRINT@272,STRING$(1,CHR$(188));
1750 PRINT@273,STRING$(3,CHR$(140));
1760 PRINT@276,STRING$(1,CHR$(188));
1770 PRINT@337,"OR1";
1780 PRINT@336,STRING$(1,CHR$(191));
1790 PRINT@340,STRING$(1,CHR$(191));
1800 PRINT@400,STRING$(1,CHR$(143));
1810 PRINT@396,STRING$(4,CHR$(131));
1820 PRINT@401,STRING$(3,CHR$(140));
1830 PRINT@404,STRING$(1,CHR$(143));
1840 PRINT@341,STRING$(2,CHR$(140));
1850 PRINT@343,STRING$(1,CHR$(188));
1860 PRINT@407,STRING$(1,CHR$(131));
1870 PRINT@408,STRING$(3,CHR$(131));
1880 PRINT@411,STRING$(1,CHR$(191));
1890 PRINT@475,STRING$(1,CHR$(191));
1900 PRINT@347,STRING$(5,CHR$(176));
1910 PRINT@476,STRING$(3,CHR$(176));
1920 PRINT@479,STRING$(1,CHR$(191));
1930 PRINT@415,STRING$(1,CHR$(191));
1940 PRINT@412,"AN1";
1950 PRINT@416,STRING$(2,CHR$(176));
1960 PRINT@420,STRING$(2,CHR$(176));
1970 PRINT@460,STRING$(4,CHR$(176));
1980 PRINT@285,STRING$(7,CHR$(131));
1990 PRINT@588,STRING$(4,CHR$(131));
2000 PRINT@292,STRING$(1,CHR$(191));
2010 PRINT@652,STRING$(4,CHR$(176));
2020 PRINT@356,STRING$(1,CHR$(191));
2030 PRINT@780,STRING$(4,CHR$(131));
2040 PRINT@420,STRING$(1,CHR$(191));
2050 PRINT@844,STRING$(4,CHR$(176));
2060 PRINT@481,STRING$(1,CHR$(191));
2070 PRINT@972,STRING$(4,CHR$(131));
2080 PRINT@545,STRING$(2,CHR$(131));
2090 PRINT@464,STRING$(1,CHR$(188));
2100 PRINT@528,STRING$(1,CHR$(191));
2110 PRINT@592,STRING$(1,CHR$(143));
2120 PRINT@465,STRING$(3,CHR$(140));
2130 PRINT@593,STRING$(3,CHR$(140));
2140 PRINT@596,STRING$(1,CHR$(143));
2150 PRINT@532,STRING$(1,CHR$(191));
2160 PRINT@468,STRING$(1,CHR$(188));
2170 PRINT@533,STRING$(2,CHR$(140));
2180 PRINT@535,STRING$(1,CHR$(143));
2190 PRINT@471,STRING$(1,CHR$(188));
2200 PRINT@472,STRING$(3,CHR$(140));
2210 PRINT@347,STRING$(5,CHR$(176));
2220 PRINT@411,STRING$(1,CHR$(191));
2230 PRINT@475,STRING$(1,CHR$(191));
2240 PRINT@476,STRING$(3,CHR$(176));
2250 PRINT@529,"NO1";
2260 PRINT@656,STRING$(1,CHR$(188));
2270 PRINT@720,STRING$(1,CHR$(191));
2280 PRINT@784,STRING$(1,CHR$(143));
2290 PRINT@785,STRING$(3,CHR$(140));
2300 PRINT@657,STRING$(3,CHR$(140));
2310 PRINT@660,STRING$(1,CHR$(188));
2320 PRINT@724,STRING$(1,CHR$(191));
2330 PRINT@788,STRING$(1,CHR$(143));
2340 PRINT@725,STRING$(6,CHR$(140));
2350 PRINT@721,"OR2";
2360 PRINT@848,STRING$(1,CHR$(188));
2370 PRINT@849,STRING$(3,CHR$(140));
2380 PRINT@977,STRING$(3,CHR$(140));
2390 PRINT@912,STRING$(1,CHR$(191));
2400 PRINT@976,STRING$(1,CHR$(143));
2410 PRINT@852,STRING$(1,CHR$(188));
2420 PRINT@916,STRING$(1,CHR$(191));
2430 PRINT@980,STRING$(1,CHR$(143));
2440 PRINT@917,STRING$(2,CHR$(140));
2450 PRINT@913,"NO2";
2460 PRINT@919,STRING$(1,CHR$(143));
2470 PRINT@855,STRING$(1,CHR$(191));
2480 PRINT@791,STRING$(4,CHR$(176));
2490 PRINT@731,STRING$(1,CHR$(191));
2500 PRINT@795,STRING$(1,CHR$(191));
2510 PRINT@859,STRING$(5,CHR$(131));
2520 PRINT@799,STRING$(1,CHR$(191));
2530 PRINT@735,STRING$(1,CHR$(191));
2540 PRINT@800,STRING$(2,CHR$(131));
2550 PRINT@796,"AN2";
2560 PRINT@674,STRING$(1,CHR$(191));
2570 PRINT@675,STRING$(3,CHR$(176));
2580 PRINT@547,STRING$(3,CHR$(131));
```

```
2590 PRINT@804,STRING$(2,CHR$(131));
2600 PRINT@674,STRING$(1,CHR$(176));
2610 PRINT@673,STRING$(1,CHR$(176));
2620 PRINT@747,STRING$(5,CHR$(140));
2630 PRINT@491,STRING$(5,CHR$(140));
2640 PRINT@422,STRING$(1,CHR$(188));
2650 PRINT@486,STRING$(1,CHR$(191));
2660 PRINT@550,STRING$(1,CHR$(143));
2670 PRINT@551,STRING$(3,CHR$(140));
2680 PRINT@423,STRING$(3,CHR$(140));
2690 PRINT@426,STRING$(1,CHR$(188));
2700 PRINT@490,STRING$(1,CHR$(191));
2710 PRINT@554,STRING$(1,CHR$(143));
2720 PRINT@742,STRING$(1,CHR$(191));
2730 PRINT@678,STRING$(1,CHR$(188));
2740 PRINT@806,STRING$(1,CHR$(143));
2750 PRINT@932,STRING$(1,CHR$(191));
2760 PRINT@807,STRING$(3,CHR$(140));
2770 PRINT@868,STRING$(1,CHR$(191));
2780 PRINT@679,STRING$(3,CHR$(140));
2790 PRINT@804,STRING$(1,CHR$(191));
2800 PRINT@746,STRING$(1,CHR$(191));
2810 PRINT@737,STRING$(1,CHR$(191));
2820 PRINT@682,STRING$(1,CHR$(188));
2830 PRINT@810,STRING$(1,CHR$(143));
2840 PRINT@743,"NA2";
2850 PRINT@487,"NA1";
2860 PRINT@732,STRING$(3,CHR$(131));
2870 PRINT@927,STRING$(5,CHR$(176));
2880 PRINT@006,"INSERT THE GATE INPUTS ON THE LEFT.
2890 PRINT@192,"INPUTS";
2900 PRINT@246,"OUTPUTS";
2910 PRINT@256,"OR1A";
2920 PRINT@216,"NA1A";
2930 PRINT@320,"OR1B";
2940 PRINT@448,"NO1A";
2950 PRINT@512,"NO1B";
2960 PRINT@704,"OR2A";
2970 PRINT@768,"OR2B";
2980 PRINT@896,"NO2A";
2990 PRINT@960,"NO2B";
3000 PRINT@920,"NA2B";
3010 PRINT@310,"OR1C";
3020 PRINT@374,"NO1C";
3030 PRINT@438,"AN1C";
3040 PRINT@502,"NA1C";
3050 PRINT@758,"OR2C";
3060 PRINT@822,"NO2C";
3070 PRINT@886,"AN2C";
3080 PRINT@950,"NA2C";
3090 PRINT@064,"FIG.1";
3100 PRINT@640,"FIG.2";
3110 PRINT@103,"INPUT TO OR1A";:INPUT F
3120 IF F=1 THEN 3150
3130 PRINT@265,"0";
3140 GOTO 3160
3150 PRINT@265,"1";
3160 PRINT@103,"INPUT TO OR1B";:INPUT G
3170 IF G=1 THEN 3200
3180 PRINT@329,"0";
3190 GOTO 3210
3200 PRINT@329,"1";
3210 IF F+G>=1 THEN 3260
3220 LET O=0
3230 PRINT@316,"0";
3240 PRINT@345,"0";
3250 GOTO 3290
3260 PRINT@316,"1";
3270 LET O=1
3280 PRINT@345,"1";
3290 PRINT@103,"INPUT TO NO1A";:INPUT H
3300 IF H=1 THEN 3330
3310 PRINT@457,"0";
3320 GOTO 3340
3330 PRINT@457,"1";
3340 PRINT@103,"INPUT TO NO1B";:INPUT J
3350 IF J=1 THEN 3380
3360 PRINT@521,"0";
3370 GOTO 3390
3380 PRINT@521,"1";
3390 IF H+J>=1 THEN 3440
3400 PRINT@380,"1";
3410 LET P=1
3420 PRINT@537,"1";
3430 GOTO 3470
3440 PRINT@380,"0";
3450 LET P=0
```

```
3460 PRINT@537,"0";
3470 IF O+P=2 THEN 3520
3480 PRINT@444,"0";
3490 LET T=0
3500 PRINT@418,"0";
3510 GOTO 3550
3520 PRINT@444,"1";
3530 LET T=1
3540 PRINT@418,"1";
3550 PRINT@103,"INPUT TO NA1A";:INPUT S
3560 IF S=1 THEN 3590
3570 PRINT@222,"0";
3580 GOTO 3600
3590 PRINT@222,"1";
3600 IF S+T=2 THEN 3640
3610 PRINT@508,"1";
3620 PRINT@430,"1";
3630 GOTO 3660
3640 PRINT@508,"0";
3650 PRINT@430,,"0";
3660 GOTO 3670
3670 PRINT@103,"INPUT TO OR2A";:INPUT K
3680 IF K=1 THEN 3710
3690 PRINT@713,"0";
3700 GOTO 3720
3710 PRINT@713,"1";
3720 PRINT@103,"INPUT TO OR2B";:INPUT L
3730 IF L=1 THEN 3760
3740 PRINT@777,"0";
3750 GOTO 3770
3760 PRINT@777,"1";
3770 IF K+L<1 THEN 3820
3780 PRINT@663,"1";
3790 PRINT@764,"1";
3800 LET Q=1
3810 GOTO 3850
3820 PRINT@663,"0";
3830 PRINT@764,"0";
3840 LET Q=0
3850 PRINT@103,"INPUT TO NO2A";:INPUT M
3860 IF M=1 THEN 3890
3870 PRINT@905,"0";
3880 GOTO 3900
3890 PRINT@905,"1";
3900 PRINT@103,"INPUT TO NO2B";:INPUT N
3910 IF N=1 THEN 3940
3920 PRINT@969,"0";
3930 GOTO 3950
3940 PRINT@969,"1";
3950 IF M+N<1 THEN 4000
3960 PRINT@828,"0";
3970 PRINT@857,"0";
3980 LET R=0
3990 GOTO 4030
4000 PRINT@828,"1";
4010 PRINT@857,"1";
4020 LET R=1
4030 IF Q+R=2 THEN 4080
4040 PRINT@672,"0";
4050 PRINT@892,"0";
4060 LET W=0
4070 GOTO 4110
4080 PRINT@672,"1";
4090 PRINT@892,"1";
4100 LET W=1
4110 PRINT@103,"INPUT TO NA2B";:INPUT X
4120 IF X=1  THEN 4150
4130 PRINT@925,"0";
4140 GOTO 4160
4150 PRINT@925,"1";
4160 IF W+X=2 THEN 4200
4170 PRINT@684,"1";
4180 PRINT@956,"1";
4190 GOTO 4220
4200 PRINT@684,"0";
4210 PRINT@956,"0";
4220 PRINT@006,"REDO FIGS.1 & 2 ? TYPE Y FOR YES OR N FOR NO";
4230 INPUTY$:IFLEFT$(Y$,1)="N" GOTO 4250 ELSEIFLEFT$(Y$,1)<>        "Y" THEN 42
     40
4240 GOTO 1725
4250 PRINT@006,"REDO JUST FIG.1 ? TYPE Y FOR YES OR N FOR NO";
4260 INPUTY$: IF LEFT$(Y$,1)="N" GOTO 4290 ELSEIFLEFT$(Y$,1)<>        "Y" THEN 42
     70
4270 GOSUB 50010
4280 GOTO 1730
4290 PRINT@006,"REDO JUST FIG.2 ? TYPE Y FOR YES OR N FOR NO";
4300 INPUTY$: IF LEFT$(Y$,1)= "N" GOTO 4350 ELSEIFLEFT$(Y$,1)<>  "Y" THEN 4310
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4310 GOSUB 60010
4320 GOTO 3670
4350 CLS: PRINT@070,"REVIEW THIS COURSE OFTEN AND BUILD A SOLIDFOUNDATION OF THE
     BASICS THEN GO OUT AND    ENJOY ELECTRONICS EITHER AS A HOBBY AND/OR"
4360 PRINT@262,"A PROFESSION.  tHERE IS 'NO END' TO WHAT CAN  BE CREATED THRU TH
     E MIND OF MAN AND ELECTRONICS."
4370 GOTO 4370
30000 END
30010 REM * BASIC GATE DIAGRAM *
30020 PRINT@458,STRING$(13,CHR$(131));
30030 PRINT@714,STRING$(13,CHR$(131));
30040 PRINT@599,STRING$(8,CHR$(131));
30050 PRINT@518,STRING$(4,CHR$(131));
30060 PRINT@646,STRING$(4,CHR$(131));
30070 PRINT@537,"C";
30080 PRINT@451,"A";
30090 PRINT@579,"B";
30100 PRINT@534,STRING$(1,CHR$(170));
30110 PRINT@662,STRING$(1,CHR$(170));
30120 PRINT@598,STRING$(1,CHR$(170));
30130 PRINT@470,STRING$(1,CHR$(171));
30140 PRINT@458,STRING$(1,CHR$(151));
30150 PRINT@522,STRING$(1,CHR$(149));
30160 PRINT@586,STRING$(1,CHR$(149));
30170 PRINT@650,STRING$(1,CHR$(149));
30180 RETURN
40000 END
40010 REM * TRUTH TABLE FRAMING *
40020 PRINT@242,"TRUTH TABLE";
40030 PRINT@306,"A    B    C"
40040 PRINT@368,"---------------";
40050 PRINT@496,"---------------";
40060 PRINT@624,"---------------";
40070 PRINT@752,"---------------";
40080 RETURN
50000 END
50010 PRINT@265," ";
50020 PRINT@329," ";
50030 PRINT@316," ";
50040 PRINT@345," ";
50050 PRINT@457," ";
50060 PRINT@521," ";
50070 PRINT@380," ";
50080 PRINT@444," ";
50090 PRINT@537," ";
50100 PRINT@418," ";
50110 PRINT@222," ";
50120 PRINT@508," ";
50130 PRINT@430," ";
50140 RETURN
60000 END
60010 PRINT@713," ";
60020 PRINT@777," ";
60030 PRINT@663," ";
60040 PRINT@764," ";
60050 PRINT@905," ";
60060 PRINT@969," ";
60070 PRINT@828," ";
60080 PRINT@857," ";
60090 PRINT@672," ";
60100 PRINT@892," ";
60110 PRINT@925," ";
60120 PRINT@684," ";
60130 PRINT@956," ";
60140 RETURN
```

ENERGY CONSERVATION

Electric Heating Estimate	Robert Roy
Energy Consumption	Steve Rumble
Insulation Calculations	Paul Boggs

ELECTRIC HEATING ESTIMATE PROGRAM: by Robert Roy

Type in your data and get your choice of a quick, ballpark estimate or a detailed room by room estimate of your home's heat loss. Losses through walls, ceilings, windows, floors, etc. are considered. Supply your local electric utility rates and you'll receive an annual cost estimate. No need to do the latter part of the program if you're faint of heart.
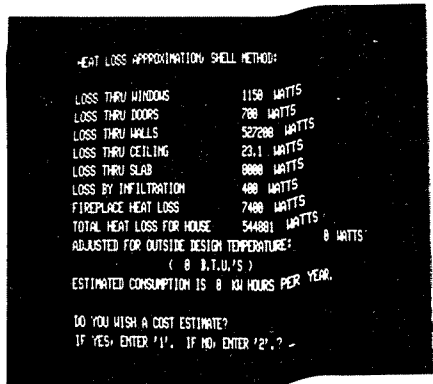

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10 CLEAR250
20 Z$="#####.#"
30 F1(1)=8:F1(2)=11.8:F1(3)=23
40 F2(1)=6.1:F2(2)=3.6:F2(3)=10.1
50 F3(1)=5.28:F3(2)=2.1:F3(3)=1.28:F3(4)=.91:F3(5)=2
60 F4(1)=11.5:F4(2)=2.31:F4(3)=1.4:F4(4)=.99:F4(5)=.59:F4(6)=.52:F4(7)=0
70 F5(1)=8.44:F5(2)=4.55:F5(3)=1.33:F5(4)=.96:F5(5)=0
80 P5(1)=20:P5(2)=8:P5(3)=4:P5(4)=2
90 F6(1)=.5:F6(2)=.4:F6(3)=.325:F6(4)=.275:F6(5)=.225:F6(6)=.04
100 F7(1)=3700:F7(2)=1250:F7(3)=500
110 CLS
120 PRINT"***  ELECTRIC hEATING ESTIMATE PROGRAM  ***"
130 PRINT:PRINT"- - - - - - - -":PRINT
140 PRINT"USE TABLE ONE TO DETERMINE OUTSIDE DESIGN TEMPERATURE AND"
150 PRINT"ANNUAL DEGREE DAYS FOR YOUR AREA.  (USE LOCATION CLOSEST"
160 PRINT"                     TO YOUR OWN.)":PRINT
170 INPUT"THE OUTSIDE DESIGN TEMP. IS  ";D
180 INPUT"THE ANNUAL DEGREE DAYS ARE  ";DG
190 TD=65-D
200 IFTD=<65THENC=17
210 IFTD>65THENC=15
220 IFD=5THENDM=.93
230 IFD=10THENDM=.86
240 IFD=15THENDM=.79
250 IFD=20THENDM=.72
260 IFD=25THENDM=.65
270 IFD=30THENDM=.57
280 IFD=35THENDM=.51
290 IFD=40THENDM=.44
300 IFD=0THENDM=1
310 IFD=-5THENDM=1.07
320 IFD=-10THENDM=1.15
330 IFD=-15THENDM=1.22
340 IFD=-20THENDM=1.29
350 IFD=-25THENDM=1.36
360 IFD=-30THENDM=1.43
370 IFD=-35THENDM=1.5
380 IFD=-40THENDM=1.57
390 CLS
400 PRINT"WOULD YOU LIKE:":PRINT
410 PRINT"    1- A QUICK BALLPARK ESTIMATE FOR THE WHOLE HOUSE"
420 PRINT"                 OR"
430 PRINT"    2- AN ACCURATE ROOM-BY-ROOM ESTIMATE"
440 PRINT
450 INPUT"ENTER CHOICE NUMBER (1 OR 2)";XX
460 ONXXGOTO3290,470
470 CLS
480 PRINT:PRINT"SECTION OFF ANY NON-RECTILINEAR ROOMS IN FLOOR"
490 PRINT"PLAN INTO RECTANGLES ON DRAWING.  NUMBER ALL ROOMS"
500 PRINT"(OR CREATED RECTILINEAR AREAS) SEQUENTIALLY, I.E.:1-15"
510 PRINT:PRINT"DO THE ABOVE FOR ALL FLOORS IN BUILDING,"
520 PRINT"CONTINUING THE SEQUENTIAL NUMBERING (I.E.: 16-27)."
530 PRINT:INPUT"HOW MANY AREAS";R
540 CLS
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550 INPUT"HOW MANY AREAS HAVE EXTERIOR DOORS";RA
560 PRINT:PRINT"IN RESPONSE TO 'AREA NUMBER?', ENTER THE NUMBER OF ONE"
570 PRINT"AREA WITH EXTERIOR DOORS.  tHIS QUESTION WILL BE ASKED"
580 PRINTTAB(20);RA;" TIME(S)."
590 FORB=1TORA
600 PRINT:INPUT"AREA NUMBER";N(B)
610 NEXTB
620 CLS
630 PRINT:INPUT"HOW MANY FIREPLACES IN THIS HOUSE";FZ
640 IFFZ=0GOTO780
650 PRINT:PRINT"IN RESPONSE TO 'AREA NUMBER?', ENTER THE NUMBER OF ONE"
660 PRINT"AREA WHICH HAS A FIREPLACE.  tHIS QUESTION WILL BE ASKED"
670 PRINTTAB(20);FZ;" TIME(S)."
680 FORB=1TOFZ
690 PRINT:INPUT"AREA NUMBER";Z(B)
700 NEXTB
710 CLS
720 PRINT"DO ALL AREAS HAVE THE SAME WALL INSULATION?"
730 PRINT:INPUT"ENTER '1' IF YES, ENTER '2' IF NO";ZW
740 IFZW=2GOTO760
750 GOSUB4050
760 CLS
770 PRINT:PRINT"DO ALL AREAS HAVE THE SAME CEILING HEIGHT?"
780 PRINT:INPUT"ENTER '1' IF YES, '2' IF NO";ZX
790 IFZX=2GOTO810
800 PRINT:INPUT"WHAT IS THE TYPICAL CEILING HEIGHT";ZC
810 CLS
820 PRINT:PRINT"DO ALL THE WINDOWS IN THE HOUSE HAVE THE SAME CONSTRUCTION?"
830 PRINT"(I.E. ALL SINGLE PANE, ALL DOUBLE PANE, ETC.)"
840 PRINT:INPUT"ENTER '1' IF YES, '2' IF NO";ZY
850 IFZY=2GOTO910
860 PRINT:PRINT"WHAT CLASS OF WINDOW IS TYPICAL FOR THIS HOUSE:"
870 PRINT:PRINT"1- TRIPLE PANE"
880 PRINT"2- DOUBLE PANE (OR SINGLE PANE WITH STORM SASH)"
890 PRINT"3- SINGLE PANE"
900 PRINT:INPUT"ENTER CLASS NUMBER";ZD
910 IFZD>3GOTO860
920 CLS
930 PRINT"DO YOU WISH TO CONSIDER THE INFILTRATION"
940 PRINT"CLASS THE SAME FOR ALL AREAS?":PRINT
950 INPUT"ENTER '1' IF YES, '2' IF NO";ZZ
960 IFZZ=2GOTO1040
970 PRINT:PRINT"WHICH CLASS OF BUILDING CONSTRUCTION FOR THIS HOUSE?"
980 PRINT:PRINT"1- DRAFTY (MORE THAN ONE FULL AIR CHANGE PER HOUR)"
990 PRINT"2- POOR TO NORMAL"
1000 PRINT"3- NORMAL (3/4 TO 1 FULL AIR CHANGE PER HOUR)"
1010 PRINT"4- NORMAL TO GOOD"
1020 PRINT"5- 'TIGHT' (1/2 FULL AIR CHANGE PER HOUR)"
1030 PRINT:INPUT"ENTER CLASS NUMBER";ZE
1040 IFZE>5GOTO970
1050 FORA=1TOR
1060 CLS
1070 PRINT"FOR AREA #";A
1080 PRINT:INPUT"ENTER DESCRIPTION OF AREA";DS$(A)
1090 INPUT"ENTER THE DIMENSIONS OF THE AREA (SEPARATE BY COMMA)";L(A),W(A)
1100 IFZX=1THENCH(A)=ZC
1110 IFZX=1THENGOTO1130
1120 INPUT"WHAT IS THE CEILING HEIGHT";CH(A)
1130 INPUT"HOW MANY EXTERIOR WALLS THIS AREA";WN(A)
1140 IFWN(A)=0GOTO1760
1150 CLS
1160 FORB=1TOWN(A)
1170 ONBGOTO1190,1200,1210,1220
1180 IFB>4THENG$="NEXT":GOTO1230
1190 G$="FIRST":GOTO1230
1200 G$="SECOND":GOTO1230
1210 G$="THIRD":GOTO1230
1220 G$="FOURTH"
1230 PRINT:PRINT"ENTER LENGTH OF ";G$;" EXTERIOR WALL";
1240 INPUTLW(B)
1250 K(A)=K(A)+LW(B)
1260 LE(A)=LE(A)+LW(B)
1270 NEXTB
1280 CLS
1290 IFA=Z(1)ORA=Z(2)ORA=Z(3)ORA=Z(4)ORA=Z(5)GOSUB4140
1300 CLS
1310 INPUT"HOW MANY WINDOWS THIS AREA";WY(A):PRINT
1320 IFWY(A)=0GOTO1590
1330 FORB=1TOWY(A)
1340 ONBGOTO1360,1370,1380,1390,1400
1350 IFB>5THENG$="NEXT":IFB>5GOTO1410
1360 G$="FIRST":GOTO1410
1370 G$="SECOND":GOTO1410
1380 G$="THIRD":GOTO1410
1390 G$="FOURTH":GOTO1410
1400 G$="FIFTH"
1410 PRINT"ENTER HEIGHT, WIDTH OF ";G$;" WINDOW (IN INCHES)";
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1420 INPUTWK(B),WJ(B)
1430 IFZY=1THENWR(B)=ZD
1440 IFZY=1THENGOTO1520
1450 PRINT"WHAT CLASS OF WINDOW:"
1460 PRINT:PRINT"1- TRIPLE PANE"
1470 PRINT"2- DOUBLE PANE (OR SINGLE PANE WITH STORM SASH)"
1480 PRINT"3- SINGLE PANE"
1490 IFN=9GOTO3530
1500 PRINT:INPUT"ENTER CLASS NUMBER";WR(B)
1510 IFWR(B)>3GOTO1450
1520 WS(B)=WK(B)*WJ(B)/144
1530 W1(A)=W1(A)+WS(B)
1540 LS(B)=WS(B)*F1(WR(B))
1550 L1(A)=L1(A)+LS(B)
1560 CLS
1570 NEXTB
1580 L1=L1+L1(A)
1590 CLS
1600 IFA<>N(1)ANDA<>N(2)ANDA<>N(3)ANDA<>N(4)ANDA<>N(5)ANDA<>N(6)ANDA<>N(7)GOTO17
     60
1610 INPUT"HOW MANY EXTERIOR DOORS IN THIS AREA";DD(A)
1620 FORB=1TODD(A)
1630 PRINT"WHICH CLASS IS DOOR #";B
1640 PRINT:PRINT"1- WOOD OR METAL WITH STORM DOOR"
1650 PRINT"2- FOAM FILLED"
1660 PRINT"3- SOLID WOOD"
1670 PRINT:INPUT"ENTER CLASS NUMBER";DR(B):PRINT
1680 IFDR(B)>3GOTO1700
1690 GOTO1710
1700 PRINT"RE-ENTER CLASS NUMBER":PRINT:GOTO1630
1710 LD(B)=20*F2(DR(B))
1720 L2(A)=L2(A)+LD(B)
1730 NEXTB
1740 L2=L2+L2(A)
1750 AD(A)=DD(A)*20
1760 CLS
1770 IFZZ=1THENFH(A)=ZE
1780 IFZZ=1GOTO1910
1790 PRINT"INFILTRATION FACTOR:"
1800 PRINT"- - - - - - -"
1810 PRINT:PRINT"WHICH CLASS OF BUILDING CONSTRUCTION HERE:"
1820 PRINT:PRINT"1- DRAFTY (MORE THAN 1 FULL AIR CHANGE PER HOUR)"
1830 PRINT"2- POOR TO NORMAL"
1840 PRINT"3- NORMAL (3/4 TO 1 FULL AIR CHANGE PER HOUR)"
1850 PRINT"4- NORMAL TO GOOD"
1860 PRINT"5- 'TIGHT' (1/2 FULL AIR CHANGE PER HOUR)"
1870 IFN=9GOTO3680
1880 PRINT"6- BASEMENT AREA"
1890 PRINT:INPUT"ENTER CLASS NUMBER";FH(A)
1900 IFFH(A)>6GOTO1810
1910 L6(A)=L(A)*W(A)*CH(A)*F6(FH(A))
1920 L6=L6+L6(A)
1930 CLS
1940 PRINT"FLOOR INSULATION FACTOR:"
1950 PRINT"- - - - - - -"
1960 PRINT"IS THE FLOOR A CONCRETE SLAB?"
1970 INPUT"iF YES, ENTER '1'.  iF NO, ENTER '2'";S
1980 IFS=1GOTO2100
1990 PRINT:PRINT"WHICH CLASS OF CONSTRUCTION:"
2000 PRINT:PRINT"1- DOUBLE WOOD ONLY"
2010 PRINT"2- DOUBLE WOOD WITH CARPET AND PAD"
2020 PRINT"3- DOUBLE WOOD WITH 3-5/8'' FIBERGLAS (R13)"
2030 PRINT"4- DOUBLE WOOD WITH 6'' FIBERGLAS (R19)"
2040 IFN=9GOTO3620
2050 PRINT"5- ANOTHER FLOOR OR BASEMENT BELOW"
2060 PRINT:INPUT"ENTER CLASS NUMBER";FF(A)
2070 IFFF(A)>5GOTO1990
2080 L5(A)=L(A)*W(A)*F5(FF(A))
2090 GOTO2190
2100 PRINT:PRINT"WHICH CLASS OF CONSTRUCTION:"
2110 PRINT:PRINT"1- UNINSULATED SLAB"
2120 PRINT"2- INSULATED SLAB (R5)"
2130 PRINT"3- INSULATED SLAB (R10)"
2140 PRINT"4- BASEMENT SLAB"
2150 IFN=9GOTO3650
2160 PRINT:INPUT"ENTER CLASS NUMBER";FG(A)
2170 IFFG(A)>3GOTO2100
2180 L5(A)=K(A)*P5(FG(A))
2190 L5=L5+L5(A)
2200 CLS
2210 IFZW=1THENWF(A)=ZB
2220 IFZW=1GOTO2340
2230 PRINT"EXTERIOR WALL INSULATION FACTOR:"
2240 PRINT"- - - - - - -"
2250 PRINT:PRINT"WHICH CLASS OF INSULATION:"
2260 PRINT:PRINT"1- SHEATHING, SHEETROCK, NO INSULATION"
2270 PRINT"2- R7 INSULATION"
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2280 PRINT"3- SHEATHING, SHEETROCK, R13 INSULATION"
2290 PRINT"4- SHEATHING, SHEETROCK, R19 INSULATION"
2300 PRINT"5- UNINSULATED BASEMENT WALL"
2310 IFN=9GOTO3480
2320 PRINT:INPUT"ENTER CLASS NUMBER";WF(A)
2330 IFWF(A)>4GOTO2250
2340 WA(A)=LE(A)*CH(A)-W1(A)-AD(A)
2350 L3(A)=WA(A)*F3(WF(A))
2360 L3=L3+L3(A)
2370 CLS
2380 PRINT"CEILING INSULATION FACTOR:"
2390 PRINT"- - - - - - - -"
2400 PRINT:PRINT"WHICH CLASS OF INSULATION:"
2410 PRINT:PRINT"1- SHEETROCK WITH NO INSULATION"
2420 PRINT"2- SHEETROCK WITH 1-5/8'' FIBERGLAS (R7)"
2430 PRINT"3- SHEETROCK WITH 3-5/8'' FIBERGLAS (R13)"
2440 PRINT"4- SHEETROCK WITH 6'' FIBERGLAS (R19)"
2450 PRINT"5- SHEETROCK WITH 10'' FIBERGLAS (R33)"
2460 PRINT"6- SHEETROCK WITH 12'' FIBERGLAS (R38)"
2470 IFN=9GOTO3560
2480 PRINT"7- ANOTHER ROOM ABOVE"
2490 PRINT:INPUT"ENTER CLASS NUMBER";CF(A)
2500 IFCF(A)>7GOTO2400
2510 CA(A)=L(A)*W(A)
2520 L4(A)=CA(A)*F4(CF(A))
2530 L4=L4+L4(A)
2540 CLS
2550 NEXTA
2560 FORA=1TOR
2570 PRINT"AREA DESCRIPTION:   ";DS$(A):PRINT
2580 PRINT"DIMENSIONS:";TAB(30);L(A);" X ";W(A);" FT."
2590 PRINT"CEILING HEIGHT:";TAB(30);CH(A);" FT."
2600 PRINT"GROSS EX. WALL AREA:";TAB(30);LE(A)*CH(A);" SQ. FT."
2610 PRINT"TOTAL NO. OF WINDOWS:";TAB(30);WY(A)
2620 PRINT"TOTAL WINDOW AREA:";TAB(30);W1(A);" SQ. FT."
2630 PRINT"TOT. NO. EX. DOORS:";TAB(30);DD(A)
2640 PRINT"TOT. EX. DOOR AREA:"TAB(30);AD(A);" SQ. FT."
2650 PRINT"NET EX. WALL AREA:";TAB(30);LE(A)*CH(A)-W1(A)-AD(A);" SQ. FT."
2660 PRINT"CEILING AREA:";TAB(30);CA(A);" SQ. FT."
2670 PRINT"FLOOR AREA:";TAB(30);L(A)*W(A);" SQ. FT."
2680 PRINT"CUBIC FEET:";TAB(30);L(A)*W(A)*CH(A);" CU. FT."
2690 IFA<>Z(B)GOTO2760
2700 ONQ(A)GOTO2710,2730,2750
2710 PRINT"THE FIREPLACE IN THIS AREA HAS NO DAMPER"
2720 GOTO2760
2730 PRINT"THE FIREPLACE IN THIS AREA HAS A LOOSE-FITTING DAMPER"
2740 GOTO2760
2750 PRINT"THE FIREPLACE IN THIS AREA HAS A GOOD DAMPER"
2760 PRINT:INPUT"PRESS 'ENTER' TO CONTINUE";A$
2770 CLS
2780 PRINT"WATTS LOSS THROUGH:":PRINT
2790 PRINT"    WINDOWS:        ";L1(A)
2800 PRINT"    DOORS:          ";L2(A)
2810 PRINT"    EX. WALLS:      ";L3(A)
2820 PRINT"    CEILING:        ";L4(A)
2830 PRINT"    FLOOR:          ";L5(A)
2840 PRINT"    INFILTRATION:   ";L6(A)
2850 PRINT"    FIREPLACE:      ";L7(A)
2860 TL(A)=L1(A)+L2(A)+L3(A)+L4(A)+L5(A)+L6(A)+L7(A)
2870 PRINT:PRINT"TOTAL WATTS LOSS FOR THIS AREA:    ";TL(A)
2880 PRINT"ADJUSTED FOR OUTSIDE DESIGN TEMPERATURE";TAB(42);TL(A)*DM
2890 PRINT:PRINT"            ( ";TL(A)*DM*3.413;" B.T.U.'S )"
2900 PRINT:INPUT"PRESS 'ENTER' TO CONTINUE";A$
2910 CLS
2920 NEXTA
2930 CLS
2940 FORA=1TOR
2950 T=T+TL(A)
2960 NEXTA
2970 PRINT"         *  HEAT LOSS SUMMATION  *":PRINT
2980 PRINT"SOURCE";TAB(21);"DESIGN";TAB(33);"LOCATION";TAB(46);"% 0F"
2990 PRINTTAB(21);"HEAT";TAB(33);"ADJUSTED";TAB(46);"TOTAL"
3000 PRINTTAB(21);"LOSS";TAB(33);"LOSS":PRINT
3010 PRINT"WINDOWS";TAB(20);L1;TAB(32);L1*DM;TAB(45);:PRINT USINGZ$;L1*100/T
3020 PRINT"DOORS";TAB(20);L2;TAB(32);L2*DM;TAB(45);:PRINTUSINGZ$;L2*100/T
3030 PRINT"WALLS";TAB(20);L3;TAB(32);L3*DM;TAB(45);:PRINTUSINGZ$;L3*100/T
3040 PRINT"ROOF";TAB(20);L4;TAB(32);L4*DM;TAB(45);:PRINTUSINGZ$;L4*100/T
3050 PRINT"FLOOR";TAB(20);L5;TAB(32);L5*DM;TAB(45);:PRINTUSINGZ$;L5*100/T
3060 PRINT"INFILTRATION";TAB(20);L6;TAB(32);L6*DM;TAB(45);:PRINTUSINGZ$;L6*100/T
3070 PRINT"FIREPLACES";TAB(20);L7;TAB(32);L7*DM;TAB(45);:PRINTUSINGZ$;L7*100/T
3080 INPUT"PRESS 'ENTER' TO CONTINUE";A$
3090 CLS
3100 PRINT"THE TOTAL DESIGN HEAT LOSS FOR THIS HOUSE IS:"
3110 PRINT:PRINTTAB(20);T;" WATTS."
3120 PRINT:PRINT
3130 T=T*DM
3140 PRINT"THE TOTAL ADJUSTED HEAT LOSS FOR THIS HOUSE IS:"
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3150 PRINT:PRINTTAB(20);T;" WATTS."
3160 PRINT:PRINT"                    ( ";T*3.413;" B.T.U.'S )":PRINT
3170 KW=(T*DG*C)/(1000*TD)
3180 PRINT"ESTIMATED CONSUMPTION IS ";KW;" KW HOURS PER YEAR."
3190 PRINT:PRINT"DO YOU WISH A COST ESTIMATE?":PRINT
3200 INPUT"IF YES, ENTER '1'.  IF NO, ENTER '2'.";M
3210 CLS
3220 IFM=2GOTO3270
3230 INPUT"ENTER UTILITY RATE (I.E. FOUR CENTS PER KW HOUR = .04)";PX
3240 RB=KW*PX
3250 RC=FIX(RB)
3260 PRINT:PRINT"THE ESTIMATED ANNUAL COST OF OPERATION IS:   $";RC
3270 PRINT:PRINT"THE PROGRAM IS CONCLUDED."
3280 END
3290 CLS
3300 N=9
3310 PRINT"THIS BALLPARK ESTIMATE IS BASED ON THE NEMA (1962)"
3320 PRINT"               SHELL METHOD"
3330 PRINT:INPUT"ENTER PERIMETER OF HOUSE";PP
3340 PRINT:INPUT"ENTER GROUND FLOOR AREA OF HOUSE";AA
3350 PRINT:INPUT"ENTER HEIGHT TO ROOF INSULATION";CH
3360 CLS
3370 PRINT:INPUT"ENTER APPROXIMATE TOTAL AREA OF WINDOWS";WA
3380 PRINT:INPUT"ENTER NUMBER OF EXTERIOR DOORS";DD
3390 PRINT:INPUT"ENTER NUMBER OF FIREPLACES";F
3400 IFF=0GOTO3470
3410 PRINT:PRINT"DO THE FIREPLACE(S) HAVE:"
3420 PRINT:PRINT"1- NO DAMPER(S) AT ALL"
3430 PRINT"2- POOR (LOOSE-FITTING) DAMPER(S)"
3440 PRINT"3- GOOD (SNUG) DAMPER(S)"
3450 PRINT:INPUT"ENTER '1', '2', OR '3'";DP
3460 IFDP>3GOTO3410
3470 GOTO2200
3480 PRINT:INPUT"ENTER CLASS NUMBER";WF
3490 IFWF>4GOTO2230
3500 CLS
3510 PRINT"WHAT CLASS OF WINDOW IS PREDOMINANT IN THE HOUSE?":PRINT
3520 GOTO1460
3530 PRINT:INPUT"ENTER CLASS NUMBER";WR
3540 IFWR>3GOTO3510
3550 GOTO2370
3560 PRINT:INPUT"ENTER CLASS NUMBER";CF
3570 IFCF>6GOTO3550
3580 CLS
3590 PRINT"IS THE FIRST FLOOR BUILT ON A SLAB?"
3600 PRINT:INPUT"IF YES, ENTER '1'.  IF NO, ENTER '2'";S
3610 GOTO1980
3620 PRINT"5- BASEMENT BELOW"
3630 PRINT:INPUT"ENTER CLASS NUMBER";FF
3640 GOTO3670
3650 PRINT:INPUT"ENTER CLASS NUMBER";FG
3660 IFFG>3GOTO2100
3670 GOTO1760
3680 PRINT:INPUT"ENTER CLASS NUMBER";FH
3690 IFFH>5GOTO3670
3700 CLS
3710 PRINT"HEAT LOSS APPROXIMATION, SHELL METHOD:":PRINT
3720 L1=WA*F1(WR)
3730 PRINT"LOSS THRU WINDOWS";TAB(30);L1;" WATTS"
3740 L2=DD*140
3750 PRINT"LOSS THRU DOORS";TAB(30);L2;" WATTS"
3760 L3=((PP*CH)-WA-(DD*20))*F3(WF)
3770 PRINT"LOSS THRU WALLS";TAB(30);L3;" WATTS"
3780 L4=AA*F4(CF)
3790 PRINT"LOSS THRU CEILING";TAB(30);L4;" WATTS"
3800 IFS=2GOTO3840
3810 L5=PP*P5(FG)
3820 PRINT"LOSS THRU SLAB";TAB(30);L5;" WATTS"
3830 GOTO3860
3840 L5=AA*F5(FF)
3850 PRINT"LOSS THRU FLOOR";TAB(30);L5;" WATTS"
3860 L6=AA*CH*F6(FH)
3870 PRINT"LOSS BY INFILTRATION";TAB(30);L6;" WATTS"
3880 L7=F*F7(DP)
3890 PRINT"FIREPLACE HEAT LOSS";TAB(30);L7;" WATTS"
3900 TW=L1+L2+L3+L4+L5+L6+L7
3910 PRINT"TOTAL HEAT LOSS FOR HOUSE"; TAB(30);TW;" WATTS"
3920 PRINT"ADJUSTED FOR OUTSIDE DESIGN TEMPERATURE:";TAB(44);TW*DM;" WATTS"
3930 PRINT"                    ( ";TW*DM*3.413;" B.T.U.'S )"
3940 KW=(TW*DM*DG*C)/(1000*TD)
3950 PRINT"ESTIMATED CONSUMPTION IS ";KW;" KW HOURS PER YEAR."
3960 PRINT:PRINT"DO YOU WISH A COST ESTIMATE?"
3970 INPUT"IF YES, ENTER '1'.  IF NO, ENTER '2'.";M
3980 CLS
3990 IFM=2GOTO3270
4000 INPUT"ENTER UTILITY RATE (I.E. FOUR CENTS PER KW HOUR = .04)";PX
4010 RB=KW*PX
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4020 RC=FIX(RB)
4030 PRINT:PRINT"THE ESTIMATED ANNUAL COST OF OPERATION IS:    $";RC
4040 PRINT:PRINT:GOTO3270
4050 PRINT:PRINT"WHICH CLASS OF WALL INSULATION IN THIS HOUSE?"
4060 PRINT:PRINT"1- SHEATHING, SHEETROCK, NO INSULATION"
4070 PRINT"2- R7 INSULATION"
4080 PRINT"3- SHEATHING, SHEETROCK, R13 INSULATION"
4090 PRINT"4- SHEATHING, SHEETROCK, R19 INSULATION"
4100 PRINT:INPUT"ENTER CLASS NUMBER";ZB
4110 IFZB>4GOTO4050
4120 RETURN
4130 END
4140 CLS
4150 PRINT"DOES THE FIREPLACE HAVE:"
4160 PRINT:PRINT"1- NO DAMPER AT ALL"
4170 PRINT"2- A POOR (LOOSE-FITTING) DAMPER"
4180 PRINT"3- A GOOD (SNUG) DAMPER"
4190 PRINT:INPUT"ENTER '1', '2', OR '3'";Q(A)
4200 L7(A)=F7(Q(A))
4210 L7=L7+L7(A)
4220 RETURN
```

ENERGY CONSUMPTION PROGRAM: by Steve Rumble

This program is based on a five year utility study. It is designed to keep track of energy consumption data over a five year period in an effort to detect trends in energy costs. It will graph data, as well as visually display it.


```
1 CLS:PRINTCHR$(23):PRINT@454,"5 YEARS' UTILITIES STUDY"
10 CLEAR550:DEFINTC,X,P:DEFSTRD:DIMA(4,12,6),P(12,6):ONERRORGOTO20000
15 C=193:FORX2=1TO12:C=C+64:FORX3=1TO6:P(X2,X3)=X3*8+C:NEXTX3,X2:GOSUB11000
16 GOSUB12000:GOSUB12005
20 D=INKEY$:IFNOT(D>"0"ANDD<"7")THEN20
31 IFNOT(D="1"ORD="2"ORD="6")THEN35
32 GOSUB12000:GOSUB13000:IFD1="N"THEN16
35 ONVAL(D)GOSUB999,2000,3000,5000,5998,7000
40 CLS:Q=1:GOTO16
999 IFQ=1GOSUB11000
1000 GOSUB12000:PRINT"DO YOU WANT TO VIEW THE DATA AS IT IS BEING READ?":PRINT"I
     T TAKES A BIT LONGER, BUT BAD DATA CAN BE DETECTED.  (Y/N)";
1001 D0=INKEY$:IFNOT(D0="Y"ORD0="N")THEN1001ELSEGOSUB12000
1002 PRINT"PREPARE CASSETTE FOR READING ('PLAY') ...":PRINT"HIT 'ENTER' WHEN REA
     DY";
1003 D1=INKEY$:IFNOT(D1=CHR$(13))THEN1003ELSEGOSUB12000
1004 PRINT"DATA BEING READ ...";
1005 INPUT#-1,D:BYS=LEFT$(D,4):GOTO1015
1010 INPUT#-1,D:IFLEN(D)=4THENRETURNELSEIFNOTLEN(D)=221THEN1030
```

```
1015 DY=LEFT$(D,4):C=VAL(MID$(D,5,1)):X1=VAL(DY)-VAL(BY$):P=1:FORX2=CTOC+5::FORX
     3=1TO6:A(X1,X2,X3)=VAL(MID$(D,(36*(P-1))+(6*X3),6)):NEXTX3:P=P+1:NEXTX2
1020 IFX2=13ANDD0="Y"THENGOSUB14000
1025 D="":GOTO1010
1030 CLS:PRINTSTRING$(64,"#"):PRINT@128,"I HAVE DETECTED AN ERROR ON YOUR DATA T
     APE.  BE SURE THAT YOU":PRINT:PRINT"ALWAYS POSITION YOUR DATA TAPE AT THE B
     EGINNING BEFORE ATTEMPT-":PRINT:PRINT"ING TO 'READ' IT."
1035 PRINT@403,"IF YOU FEEL THAT YOU HAVE ALREADY 'READ' SOME":PRINT"VALID DATA
     AND WOULD LIKE TO TRY TO SALVAGE IT, THEN PRESS '1'":PRINT:PRINT"TO RETURN
     TO THE MENU (THEN DISPLAY THE DATA USING OPTION #3).":PRINT:PRINT
1040 PRINT"OTHERWISE PRESS '0' TO RE-START THE PROGRAM."
1045 D=INKEY$:IFNOT(D="0"ORD="1")THEN1045ELSEIFD="0"THENRUNELSERETURN
2000 GOSUB12000:PRINT"PREPARE YOUR CASSETTE FOR WRITING ('RECORD') ...":PRINT"HI
     T 'ENTER' WHEN READY";
2010 D=INKEY$:IFNOTD=CHR$(13)THEN2010
2015 GOSUB12000:PRINT"DATA BEING WRITTEN ...";
2020 FORX1=0TO4:T=0:FORX2=1TO12:FORX3=1TO6:T=T+A(X1,X2,X3):NEXTX3,X2:IFT=0THENX1
     =4ELSEGOSUB2030
2025 NEXTX1:PRINT#-1,"STOP":RETURN
2030 FORC=1TO7STEP6:D(7)="":FORX2=CTOC+5:FORX3=1TO6
2035 D(X3)=RIGHT$(STR$(A(X1,X2,X3)),LEN(STR$(A(X1,X2,X3)))-1):ONLEN(D(X3))GOSUB2
     100,2200,2300,2400,2500,2600:NEXTX3
2040 D(8)=D(1)+D(2)+D(3)+D(4)+D(5)+D(6):D(7)=D(7)+D(8):NEXTX2
2045 D=RIGHT$(STR$(VAL(BY$)+X1),LEN(STR$(VAL(BY$)+X1))-1)+RIGHT$(STR$(C),LEN(STR
     $(C))-1)+D(7)
2050 PRINT#-1,D:D="":NEXTC:RETURN
2100 D(X3)="00000"+D(X3):RETURN
2200 D(X3)="0000"+D(X3):RETURN
2300 D(X3)="000"+D(X3):RETURN
2400 D(X3)="00"+D(X3):RETURN
2500 D(X3)="0"+D(X3):RETURN
2600 RETURN
3000 IFQ=1GOSUB11000
3001 GOSUB12000:IFNOT(BY$="")THEN3045
3005 PRINT"WHAT IS THE FIRST YEAR FOR WHICH YOU HAVE DATA?  (4 DIGITS)";:PRINT@6
     0,"";
3010 FORX=1TO4
3015 D(X)=INKEY$:IFNOT(D(X)>="0"ANDD(X)<="9")THEN3015ELSEPRINTD(X);
3020 NEXT
3030 BY$=D(1)+D(2)+D(3)+D(4):GOSUB12000:PRINT"CONFIRM YOUR BASE YEAR AS ";BY$;".
     (Y/N)";
3035 D=INKEY$:IFNOT(D="Y"ORD="N")THEN3035ELSEIFD="Y"THEN3040
3037 BY$="":GOTO3001
3040 DY$=BY$:GOTO3075
3045 PRINT"YEAR TO BE ADDED, CHANGED OR DISPLAYED?";:PRINT@40,"";
3050 FORX=1TO4
3055 D(X)=INKEY$:IFNOT(D(X)>="0"ANDD(X)<="9")THEN3055ELSEPRINTD(X);
3060 NEXT
3065 DY=D(1)+D(2)+D(3)+D(4):IFVAL(DY)-VAL(BY$)>=0ANDVAL(DY)-VAL(BY$)<=4THEN3075
3070 GOSUB12000:PRINT"YEAR MUST BE BETWEEN ";BY$;" AND ";CHR$(24);VAL(BY$)+4;CHR
     $(24);", INCLUSIVE.":FORX=0TO3999:NEXT:GOSUB12000:GOTO3045
3075 GOSUB12000:GOSUB14000
3076 PRINT"1 = ADD/CHANGE DATA FOR ";DY;".    2 = ADD/CHANGE OR DISPLAY":PRINT"3
      = RETURN TO MENU.";:PRINT@101,"DATA FOR ANOTHER YEAR.";
3080 D=INKEY$:IFNOT(D>"0"ANDD<"4")THEN3080ELSEIFD="1"THEN3090ELSEIFD="3"THENRETU
     RN
3085 GOSUB11000:GOTO3045
3090 X1=VAL(DY)-VAL(BY$):P=17:FORX=2TO7:D(X)="":NEXT:GOSUB12000:PRINT"'ENTER'
     MONTH:";:PRINT@74,"(1-12)";:PRINT@P,"";
3095 FORX=1TO3
3100 D(X)=INKEY$:IFNOT((D(X)>="0"ANDD(X)<="9")ORD(X)=CHR$(13))THEN3100
3105 IFD(X)=CHR$(13)THEN3115ELSEPRINTD(X);
3110 NEXT
3115 X2=VAL(D(1)+D(2)+D(3)):IFNOT(X2>0ANDX2<13)THENGOSUB3500ELSE3125
3120 GOTO3095
3125 P=32:PRINT@24,"COLUMN:";:PRINT@89,"(1-6)";:PRINT@P,"";
3130 FORX=1TO2
3135 D(X)=INKEY$:IFNOT((D(X)>="0"ANDD(X)<="9")ORD(X)=CHR$(13))THEN3135
3140 IFD(X)=CHR$(13)THEN3150ELSEPRINTD(X);
3145 NEXT
3150 X3=VAL(D(1)+D(2)):IFNOT(X3>0ANDX3<7)THENGOSUB3500ELSE3160
3155 GOTO3130
3160 IFINT(X3/2)=X3/2THEND="9"ELSED="."
3170 P=47:PRINT@39,"AMOUNT:";:PRINT@101,"(0-999";D;"99)";:PRINT@P,"";
3175 FORX=1TO7
3180 D(X)=INKEY$:IFNOT((D(X)>="0"ANDD(X)<="9")ORD(X)="."ORD(X)=CHR$(13))THEN3180
3185 IFD(X)=CHR$(13)THEN3195ELSEPRINTD(X);
3190 NEXT
3195 T=VAL(D(1)+D(2)+D(3)+D(4)+D(5)+D(6)+D(7)):IFT>999999THENGOSUB3500ELSEIFT>=1
     000ANDD="."THENGOSUB3500ELSE3205
3200 GOTO3175
3205 A(X1,X2,X3)=T:PRINT@P(X2,X3),"";:IFD="."THENPRINTUSING"###.##";A(X1,X2,X3);
     ELSEPRINTUSING"######";A(X1,X2,X3);
3210 GOSUB12000:GOTO3076
3500 FORC=0TO5:PRINT@P,"OUT OF RANGE";:FORX=0TO199:NEXT:PRINT@P,"            ";:
     FORX=0TO199:NEXTX,C:PRINT@P,"";:RETURN
5000 IFBY$=""THENGOSUB12000ELSE5010
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5005 PRINT"YOU HAVEN'T GIVEN ME ANY DATA TO WORK WITH YET!":FORX=0TO4999:NEXT:RE
     TURN
5010 X0=VAL(BY$):CLS:PRINT@22,"S T A T I S T I C S":PRINT:PRINT:PRINT"1 = STATS
     FOR ONE MONTH":PRINT:PRINT"2 = STATS FOR A PERIOD OF SEVERAL MONTHS":PRINT:
     PRINT"3 = COMPARE STATS FOR ONE MONTH TO STATS FOR ANOTHER MONTH":PRINT
5015 PRINT"4 = COMPARE STATS FOR A PERIOD OF SEVERAL MONTHS TO";STRING$(25," ");
     "STATS FOR A PERIOD OF ONE MONTH":PRINT
5020 PRINT"5 = COMPARE STATS FOR A PERIOD OF SEVERAL MONTHS TO";STRING$(25," ");
     "STATS FOR ANOTHER PERIOD OF SEVERAL MONTHS":PRINT:PRINT"6 = RETURN TO MENU
     ";
5025 D=INKEY$:IFNOT(D>"0"ANDD<"7")THEN5025
5030 ONVAL(D)GOTO5100,5200,5300,5400,5500,5600
5100 CLS:PRINT@22,"STATISTICS FOR ONE MONTH":PRINT:GOSUB5760
5105 INPUT"DATE (MONTH,YEAR)";X2(1),X1(1)
5110 FORX=2TO4:X2(X)=-99:NEXT:X1(1)=X1(1)-X0:GOSUB5850:IFES=5GOSUB5605ELSE5120
5115 GOTO5100
5120 GOSUB5700:GOSUB5800:X1=X1(1):X2=X2(1):FORX3=1TO6:TL(X3)=A(X1,X2,X3):AL(X3)=
     TL(X3):NEXT:FORX=2TO6STEP2:UL(X)=TL(X-1)/TL(X):NEXT:TL(7)=TL(1)+TL(3)+TL(5)
     :AL(7)=TL(7):GOTO5900
5200 CLS:PRINT"STATISTICS FOR A PERIOD OF SEVERAL MONTHS (DATE #1 THRU DATE #2)"
     :GOSUB5760:FORX=1TO2:PRINT"DATE  #";X;"(MONTH,YEAR)";:INPUTX2(X),X1(X):PRIN
     T:NEXT:X2(3)=-99:X2(4)=-99:X1(1)=X1(1)-X0:X1(2)=X1(2)-X0:GOSUB5850
5205 IFES=5THENGOSUB5605ELSE5215
5210 GOTO5200
5215 GOSUB5700:GOSUB5800:GOSUB5750:GOTO5900
5300 CLS:PRINT"COMPARE STATISTICS FOR ONE MONTH TO STATISTICS FOR ANOTHER MONTH"
     :PRINT@88,"(DATE #1 TO DATE #3)":PRINT:GOSUB5760:FORX=1TO3STEP2:PRINT"DATE
      #";X;"(MONTH,YEAR)";:INPUTX2(X),X1(X):PRINT:NEXT:X2(2)=-99:X2(4)=-99:X1(1)
     =X1(1)-X0:X1(3)=X1(3)-X0
5305 IFES=5THENGOSUB5605ELSE5315
5310 GOTO5300
5315 GOSUB5700:GOSUB5800:X1=X1(1):X2=X2(1):FORX3=1TO6:TL(X3)=A(X1,X2,X3):AL(X3)=
     TL(X3):NEXT:FORX=2TO6STEP2:UL(X)=TL(X-1)/TL(X):NEXT:TL(7)=TL(1)+TL(3)+TL(5)
     :AL(7)=TL(7)
5320 X1=X1(3):X2=X2(3):FORX3=1TO6:TR(X3)=A(X1,X2,X3):AR(X3)=TR(X3):NEXT:FORX=2TO
     6STEP2:UR(X)=TR(X-1)/TR(X):NEXT:TR(7)=TR(1)+TR(3)+TR(5):AR(7)=TR(7):GOTO590
     0
5400 CLS:PRINT"COMPARE STATISTICS FOR A PERIOD OF SEVERAL MONTHS TO STATISTICS":
     PRINT@64,"FOR A PERIOD OF ONE MONTH    (DATE #1 THRU DATE #2) TO (DATE #3)":
     PRINT:GOSUB5760:FORX=1TO3:PRINT"DATE  #";X;"(MONTH,YEAR)";:INPUTX2(X),X1(X)
     :PRINT:NEXT
5405 X2(4)=-99:FORX=1TO3:X1(X)=X1(X)-X0:NEXT:GOSUB5850:IFES=5THENGOSUB5605ELSE54
     15
5410 GOTO5400
5415 GOSUB5700:GOSUB5800:GOSUB5750:X1=X1(3):X2=X2(3):FORX3=1TO6:TR(X3)=A(X1,X2,X
     3):AR(X3)=TR(X3):NEXT:FORX=2TO6STEP2:UR(X)=TR(X-1)/TR(X):NEXT:TR(7)=TR(1)+T
     R(3)+TR(5):AR(7)=TR(7):GOTO5900
5500 CLS:PRINT@5,"COMPARE STATISTICS FOR A PERIOD OF SEVERAL MONTHS TO":PRINT@71
     ,"STATISTICS FOR ANOTHER PERIOD OF SEVERAL MONTHS":PRINT@135,"(DATE #1 THRU
      DATE #2) TO (DATE #3 THRU DATE #4)":PRINT:GOSUB5760
5505 FORX=1TO4:PRINT"DATE  #";X;"(MONTH,YEAR)";:INPUTX2(X),X1(X):PRINT:NEXT:FORX
     =1TO4:X1(X)=X1(X)-X0:NEXT:GOSUB5850:IFES=5THENGOSUB5605ELSE5515
5510 GOTO5500
5515 GOSUB5700:GOSUB5800:GOSUB5750:IFX1(3)=X1(4)THEN5525
5520 FORX2=X2(3)TO12:FORX=1TO6:TR(X)=TR(X)+A(X1(3),X2,X):NEXTX,X2:FORX1=X1(3)+1T
     OX1(4)-1:FORX2=1TO12:FORX=1TO6:TR(X)=TR(X)+A(X1,X2,X):NEXTX,X2,X1:FORX2=1TO
     X2(4):FORX=1TO6:TR(X)=TR(X)+A(X1(4),X2,X):NEXTX,X2:GOTO5530
5525 FORX2=X2(3)TOX2(4):FORX=1TO6:TR(X)=TR(X)+A(X1(3),X2,X):NEXTX,X2
5530 C=13-X2(3)+12*(X1(4)-X1(3)-1)+X2(4):TR(7)=TR(1)+TR(3)+TR(5):FORX=1TO7:AR(X)
     =TR(X)/C:NEXT:FORX=2TO6STEP2:UR(X)=TR(X-1)/TR(X):NEXT:GOTO5900
5600 RETURN
5605 CLS:PRINTSTRING$(25,"<");"   E R R O R   ";STRING$(25,">"):PRINT
5610 PRINT"YOU HAVE MADE AN ERROR IN ENTERING YOUR MONTHS AND YEARS DUE TO":PRIN
     T"ANY COMBINATION OF THE FOLLOWING REASONS:":PRINT:PRINT
5615 PRINT"1.  MONTH NOT BETWEEN 1 AND 12":PRINT:PRINT"2.  YEAR NOT BETWEEN";X0;
     "AND";X0+4:PRINT:PRINT"3.  DATE #2 NOT GREATER THAN DATE #1 AND/OR";STRING$
     (25," ");"DATE #4 NOT GREATER THAN DATE #3"
5620 PRINT:PRINT:PRINT"BE CAREFUL!!";TAB(40)"HIT 'ENTER' TO CONTINUE";
5625 E$=INKEY$:IFNOT(E$=CHR$(13))THEN5625ELSERETURN
5700 FORX=1TO4:FORC=1TOX2(X):READDM(X):NEXT:RESTORE:NEXT:RETURN
5750 IFX1(1)=X1(2)THEN5754
5752 FORX2=X2(1)TO12:FORX=1TO6:TL(X)=TL(X)+A(X1(1),X2,X):NEXTX,X2:FORX1=X1(1)+1T
     OX1(2)-1:FORX2=1TO12:FORX=1TO6:TL(X)=TL(X)+A(X1,X2,X):NEXTX,X2,X1:FORX2=1TO
     X2(2):FORX=1TO6:TL(X)=TL(X)+A(X1(2),X2,X):NEXTX,X2:GOTO5756
5754 FORX2=X2(1)TOX2(2):FORX=1TO6:TL(X)=TL(X)+A(X1(1),X2,X):NEXTX,X2
5756 C=13-X2(1)+12*(X1(2)-X1(1)-1)+X2(2):TL(7)=TL(1)+TL(3)+TL(5):FORX=1TO7:AL(X)
     =TL(X)/C:NEXT:FORX=2TO6STEP2:UL(X)=TL(X-1)/TL(X):NEXT:RETURN
5760 PRINT"'ENTER'","NOTE:  USE COMMA TO SEPARATE MONTH AND YEAR":PRINT:RETURN
5800 CLS:PRINTCHR$(23):PRINT@454,"I AM ACCUMULATING DATA":FORX=1TO6:TL(X)=0:UL(X
     )=0:TR(X)=0:UR(X)=0:NEXT:RETURN
5850 ES=0:FORX=1TO4:IFX2(X)=-99THEN5865
5855 IFX2(X)<1ORX2(X)>12THEN5897
5860 IFX1(X)<0ORX1(X)>4THEN5897
5865 NEXT
5870 IFD="1"ORD="3"THEN5898
5875 IFX1(2)<X1(1)THEN5897
5880 IFX1(2)=X1(1)ANDX2(2)<=X2(1)THEN5897
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5885 IFNOTD="5"THEN5898
5890 IFX1(4)<X1(3)THEN5897
5895 IFX1(4)=X1(3)ANDX2(4)<=X2(3)THEN5897ELSE5898
5897 ES=5
5898 RETURN
5900 A$="TOTAL AVERAGE UNIT COST":B$="AMOUNT    AMOUNT   IN CENTS":C$="AVG $$ PER M
     O.":E$="TOTAL $$:":CLS:FORX=1TO4:X1(X)=X1(X)+X0:NEXT
5901 PRINT@10,DM(1);",";X1(1):IFD="2"ORD="4"ORD="5"THENPRINT@20,"THRU";ELSE5903
5902 PRINT@25,DM(2);",";X1(2);
5903 IFD>"2"PRINT@39,DM(3);",";X1(3)
5904 IFD="5"PRINT@49,"THRU;" ";DM(4);",";X1(4);
5905 PRINT@75,A$;:IFD>"2"PRINT@104,A$;
5910 PRINT@138,B$;:IFD>"2"PRINT@167,B$;
5915 PRINT@192,"GAS$$":PRINT@256,"C C F":PRINT@384,"H2O$$":PRINT@448,"G A L":PRI
     NT@576,"PWR$$":PRINT@640,"K W H":PRINT@778,C$;:IFD>"2"PRINT@807,C$;
5920 PRINT@847,E$;:IFVAL(D)>2PRINT@876,E$;
5925 C=1:FORX=200TO584STEP192:PRINT@X,"";:PRINTUSING"#####.##";TL(C);:PRINT@X+10
     ,"";:PRINTUSING"###.##";AL(C);:C=C+2:NEXT
5930 C=2:FORX=264TO648STEP192:PRINT@X,"";:PRINTUSING"########";TL(C);:PRINT@X+10
     ,"";:PRINTUSING"######";AL(C);:PRINT@X+19,"";:PRINTUSING"##.####";UL(C)*100
     #:C=C+2:NEXT
5935 PRINT@793,"";:PRINTUSING"######.##";AL(7);:PRINT@857,"";:PRINTUSING"######.
     ##";:TL(7);:IFD<"3"THEN5990
5940 C=1:FORX=229TO613STEP192:PRINT@X,"";:PRINTUSING"#####.##";TR(C);:PRINT@X+10
     ,"";:PRINTUSING"###.##";AR(C);:C=C+2:NEXT
5945 C=2:FORX=293TO677STEP192:PRINT@X,"";:PRINTUSING"########";TR(C);:PRINT@X+10
     ,"";:PRINTUSING"######";AR(C);:PRINT@X+19,"";:PRINTUSING"##.####";UR(C)*100
     #:C=C+2:NEXT
5950 PRINT@822,"";:PRINTUSING"######.##";AR(7);:PRINT@886,"";:PRINTUSING"######.
     ##";TR(7);
5990 PRINT@960,"MORE STATISTICS?   (Y/N)";
5991 D=INKEY$:IFNOT(D="Y"ORD="N")THEN5991ELSEIFD="Y"THEN5000ELSERETURN
5995 DATAJAN,FEB,MAR,APR,MAY,JUN,JUL,AUG,SEP,OCT,NOV,DEC
5998 IFBY$=""THENGOSUB12000ELSE6000
5999 GOTO5005
6000 CLS:D(1)="GAS DOLLARS":D(2)="GAS CCF'S":D(3)="WATER DOLLARS":D(4)="GALLONS"
     :D(5)="ELECTRICITY DOLLARS":D(6)="KILOWATT HOURS":D(7)="TOTAL DOLLARS"
6001 PRINT@26,"G R A P H S":PRINT:PRINT"1 = ";D(1):PRINT:PRINT"2 = ";D(2):
     PRINT:PRINT"3 = ";D(3):PRINT:PRINT"4 = ";D(4):PRINT:PRINT"5 = ";D(5):PRINT
     :PRINT"6 = ";D(6):PRINT:PRINT"7 = ";D(7)
6005 D=INKEY$:IFNOT(D>"0"ANDD<"8")THEN6005ELSEX3=VAL(D)
6010 F1=1/6:F2=.5:F3=5/6:C4=64:CLS:HV=0:IFX3=7THEN6013
6011 FORX1=0TO4:FORX2=1TO12:IFA(X1,X2,X3)>HVTHENHV=A(X1,X2,X3)
6012 NEXTX2,X1:GOTO6015
6013 FORX1=0TO4:FORX2=1TO12:HT=A(X1,X2,1)+A(X1,X2,3)+A(X1,X2,5):IFHT>HVTHENHV=HT
6014 NEXTX2,X1
6015 D="JFMAMJJASOND":P=16196:FORC=1TO5:FORX=1TO12:POKEP,ASC(MID$(D,X,1)):P=P+1:
     NEXTX,C:FORX=0TO4:PRINT@899+(X*12),VAL(BY$)+X;:NEXT:E=10
6016 IFHV/E<10THEN6020ELSEE=E*10
6017 GOTO6016
6020 R=E/10:SC=(INT(HV/E+1))*R:FORX=1TO10:P1(X)=VAL(MID$(STR$(SC),2,1))*X:NEXT:P
     RINT@769,"0";:C=766:FORX=1TO10:PRINT@C-(X*64),"";:PRINTP1(X);:PRINT@C-(X*64
     )+6,STRING$(60,"-");:NEXT:GOSUB6100:PRINT@65,"VERTICAL SCALE IS 1";R;:POKE1
     5444,58:PRINT@28,D(X3)
6023 P=16132:IFX3=7THEN6025
6024 FORX1=0TO4:FORX2=1TO12:X=INT(A(X1,X2,X3)/SC):R=A(X1,X2,X3)/SC-X:GOTO6026
6025 FORX1=0TO4:FORX2=1TO12:HT=A(X1,X2,1)+A(X1,X2,3)+A(X1,X2,5):X=INT(HT/SC):R=H
     T/SC-X
6026 IFX<2THEN6033
6027 POKEP,130:FORC=1TOX-1:POKEP-(C4*C),170:NEXT
6028 IFR<F1THEN6032ELSEIFR<F2THEN6030
6029 POKEP-(C4*C),170:POKEP-(C4*(C+1)),168:GOTO6065
6030 POKEP-(C4*C),170:POKEP-(C4*(C+1)),160:GOTO6065
6031 POKEP-(C4*C),170:GOTO6065
6032 POKEP-(C4*C),168:GOTO6065
6033 IFX=0THEN6039ELSEPOKEP,130
6034 IFR<F1THEN6038ELSEIFR<F2THEN6037ELSEIFR<F3THEN6036
6035 POKEP-64,170:POKEP-128,168:GOTO6065
6036 POKEP-64,170:POKEP-128,160:GOTO6065
6037 POKEP-64,170:GOTO6065
6038 POKEP-64,168:GOTO6065
6039 IFR<F1THEN6065ELSEIFR<F2THEN6042ELSEIFR<F3THEN6041
6040 POKEP,130:POKEP-64,168:GOTO6065
6041 POKEP,130:POKEP-64,160:GOTO6065
6042 POKEP,130:GOTO6065
6065 P=P+1:NEXTX2,X1
6070 PRINT@960,"MORE GRAPHS (Y/N)";
6075 D=INKEY$:IFNOT(D="Y"ORD="N")THEN6075ELSEIFD="Y"THEN6000ELSERETURN
6100 IFMID$(STR$(HV),2,1)="9"THENR=E
6105 RETURN
7000 CLS : PRINTCHR$(23) : PRINT@452,"THIS SESSION IS TERMINATED" : FORX=0TO1999
     :NEXT:CLS:END
11000 CLS:PRINT@140,"1        2        3        4        5        6"
11005 PRINT@198,"MO  GAS$$    C C F   H2O$$    G A L   PWR$$    K W H"
11010 C=198:FORX=1TO12:C=C+64:PRINT@C,"";:PRINTUSING"##";X;:NEXT:PRINTCHR$(28);:
      RETURN
12000 PRINTCHR$(28); : PRINTSTRING$(128," "); : PRINTCHR$(28); : RETURN
```

160

```
12005 PRINT"MENU:    (1)READ  DATA    (3)ADD / CHANGE    (4)STATISTICS    (6)END"
12010 PRINTTAB(7)"(2)WRITE DATA    OR DISPLAY DATA    (5)GRAPH";
12015 POKE15381,191:POKE15399,191:POKE15445,143:POKE15463,143:RETURN
13000 IFD="1"THENA$="READ"ELSEIFD="2"THENA$="WRITE"ELSEA$="END"
13005 PRINT"VERIFY YOUR CHOICE:   Y = ";A$ : PRINTTAB(21)"N = RETURN TO MENU";
13010 D1=INKEY$:IFNOT(D1="Y"ORD1="N")THEN13010ELSERETURN
14000 FORX=1TO4:POKEX*128+15618,ASC(MID$(DY,X,1)):NEXT:X1=VAL(DY)-VAL(BY$)
14005 FORX2=1TO12:FORX3=1TO5STEP2:PRINT@P(X2,X3),"";:PRINTUSING"###.##";A(X1,X2,
      X3);:NEXT:FORX3=2TO6STEP2:PRINT@P(X2,X3),"";:PRINTUSING"######";A(X1,X2,X3)
      ;:NEXTX3,X2:PRINTCHR$(28);:RETURN
15572 -MEM
20000 IFERL>=1005ANDERL<=1015THENRESUME1030ELSEIFERR/2+1=11THENRESUMENEXTELSERES
      UME5605
```

INSULATION CALCULATIONS:
by Innovative Design Consultants, Inc.

Are you facing another winter heating season in a cold climate? If so, then this program will be of use to you in determining the amount, type and cost effectiveness of the various insulating materials available for use in home applications. A seven year payback period is used as a baseline for ten common insulation situations. Keyed to telephone area codes, this program may prove the most practical you've ever used.
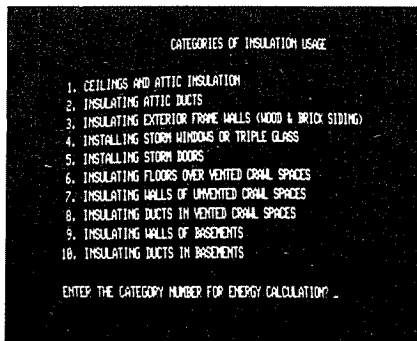
```
10 CLS:CLEAR 100
20 PRINT@453,CHR$(23);"INSULATION CALCULATION"
100 DEFINT A-Y
110 DIM A(20,11) 'AREA CODE(STATE,NUMBER)
120 DIM N(20) '# OF AREA CODES BY STATE
130 DIM E(21,10) 'ENERGY(STATE,CATEGORY)
140 DIM P1(22),P2(22) 'PAYBACK PER CATEGORY
145 DIM T$(25),P$(24) 'DISPLAY PHRASES
150 FOR X=1 TO 20
160 READ N(X)
170 NEXT X
180 FOR X=1 TO 20
190 FOR Y=1 TO N(X)
200 READ A(X,Y)
210 NEXT Y
220 NEXT X
230 FOR X=1 TO 21
240 FOR Y=1 TO 10
250 READ E(X,Y)
```

```
260 NEXT Y
270 NEXT X
280 FOR X=1 TO 22
290 READ P1(X),P2(X)
300 NEXT X
302 FOR X=1 TO 24
304 READ P$(X)
306 NEXT X
310 DATA 11,7,7,10,7,3,7,2,7,3
320 DATA 8,2,1,5,5,3,9,2,4,1
325 REM NEW YORK
330 DATA 203,401,914,212,201,609,215,717,814,412,516
335 REM WASH D.C.
340 DATA 301,302,202,304,703,804,606
345 REM CLEVELAND
350 DATA 216,614,513,419,219,317,812
355 REM CHICAGO
360 DATA 312,815,309,217,608,414,319,616,517,313
365 REM ATLANTA
370 DATA 919,704,615,404,803,912,205
375 REM MIAMI
380 DATA 813,305,904
385 REM MEMPHIS
390 DATA 901,601,501,502,618,314,417
395 REM NEW ORL
400 DATA 504,318
405 REM MINNEAPOLIS
410 DATA 715,507,612,218,701,605,906
415 REM KANSAS CITY
420 DATA 913,316,816
425 REM DALLAS
430 DATA 214,713,512,817,806,915,405,918
435 REM DENVER
440 DATA 303,307
445 REM PHOENIX
450 DATA 602
455 REM SEATLE
460 DATA 206,509,503,208,406
465 REM SAN FRAN
470 DATA 408,209,916,415,707
475 REM L.A.
480 DATA 714,213,805
485 REM BOSTON
490 DATA 413,603,207,802,518,315,607,716,617
495 REM SALT LAKE
500 DATA 702,801
505 REM OMAHA
510 DATA 515,717,308,402
515 REM ALBEQU
520 DATA 505
530 DATA 4670,5600,4440,3980,3290,3290,3290,4440,3290,5600
540 DATA 3410,4020,3260,2950,2490,2490,2490,3260,2490,4020
550 DATA 2630,2980,2550,2380,2120,2120,2550,2120,2980
560 DATA 3170,3760,3020,2730,2290,2290,2290,3020,2290,3760
570 DATA 2200,2870,2040,1710,1210,1210,1210,2040,1210,2870
580 DATA 2410,3870,2050,1320,230,230,2050,230,3870
590 DATA 2160,2770,2010,1700,1250,1250,1250,2010,1250,2770
600 DATA 1850,2720,1630,1200,540,540,540,1630,540,2720
610 DATA 3300,3300,3300,3300,3300,3300,3300,3300,3300,3300
620 DATA 1920,2390,1800,1570,1220,1220,1800,1220,2390
630 DATA 2070,2850,1880,1490,910,910,910,1880,910,2850
640 DATA 1610,1830,1550,1440,1280,1280,1280,1550,1280,1830
650 DATA 2170,3210,1910,1400,620,620,620,1910,620,3210
660 DATA 3480,3480,3480,3480,3480,3480,3480,3480,3480,3480
670 DATA 1160,1160,1160,1160,1160,1160,1160,1160,1160,1160
680 DATA 710,870,670,600,480,480,480,670,480,870
690 DATA 4500,4860,4410,4230,3970,3970,3970,4410,3970,4860
700 DATA 1980,2350,1880,1700,1420,1420,1420,1880,1420,2350
710 DATA 2240,2560,2160,2010,1770,1770,1770,2160,1770,2560
720 DATA 2240,2680,2120,1900,1570,1570,1570,2120,1570,2680
730 DATA 4410,5410,4260,3800,3100,3100,3100,4260,3100,5410
740 REM
750 DATA 310,500,390,630,1340,2150,1610,2580,2120,3400,1210,2420
760 DATA 2240,4480,0,2960,1930,2890,3520,5270,3750,5360
770 DATA 5380,8070,830,1330,2220,3560,1740,2790,4510,7220
780 DATA 3030,6050,3580,7160,1730,2590,3860,5780,2200,4400
790 DATA 2580,5160
795 DATA "R-3 INSULATION","R-11 INSULATION","R-19 INSULATION"
800 DATA "R-30 INSULATION","ONE INCH INSULATION"
805 DATA "FOAM/BLOWN INSULATION","STORM WINDOWS","STORM DOORS"
810 DATA "NO CEILING INSULATION","LESS THAN 3 INCHES"
815 DATA "MORE THAN ONE INCH","UNINSULATED WALLS"
820 DATA "SINGLE WINDOWS","DOUBLE WINDOWS"
825 DATA "SINGLE DOORS W/ GLASS","DOUBLE WITHOUT GLASS"
830 DATA "NO FLOOR INSULATION","NO WALL INSULATION"
835 DATA "UNINSULATED DUCTS","IF YOU HAVE:"
840 DATA "AND YOU WANT TO ADD:","YOURSELF","CONTRACT"
```

```
845 DATA "TWO INCH INSULATION"
850 CLS
1000 PRINT"ENTER YOUR TELEPHONE AREA CODE"
1010 INPUT A
1020 X=1
1030 Y=1
1040 IF A=A(X,Y) THEN 1100
1050 Y=Y+1:IF Y<=11 THEN 1040
1060 X=X+1:IF X<=20 THEN 1030
1070 PRINT"YOUR AREA CODE CAN't BE FOUND!"
1080 PRINT"PLEASE TRY ENTERING ANOTHER"
1090 GOTO 1010
1100 PRINT
1110 PRINT  A
2000 CLS
2010 PRINT TAB(20);"CATEGORIES OF INSULATION USAGE"
2020 PRINT
2030 PRINT" 1. CEILINGS AND ATTIC INSULATION"
2040 PRINT" 2. INSULATING ATTIC DUCTS"
2050 PRINT" 3. INSULATING EXTERIOR FRAME WALLS (WOOD & BRICK SIDING)"
2060 PRINT" 4. INSTALLING STORM WINDOWS OR TRIPLE GLASS"
2070 PRINT" 5. INSTALLING STORM DOORS"
2080 PRINT" 6. INSULATING FLOORS OVER VENTED CRAWL SPACES"
2090 PRINT" 7. INSULATING WALLS OF UNVENTED CRAWL SPACES"
2100 PRINT" 8. INSULATING DUCTS IN VENTED CRAWL SPACES"
2110 PRINT" 9. INSULATING WALLS OF BASEMENTS"
2120 PRINT"10. INSULATING DUCTS IN BASEMENTS"
2130 PRINT@832,CHR$(31);
2200 PRINT@832,"ENTER THE CATEGORY NUMBER FOR ENERGY CALCULATION";
2210 INPUT Z
2220 IF Z<1 OR Z>10 THEN 2130
2500 CLS
2510 PRINT@14,"FOR A PAYBACK PERIOD OF SEVEN YEARS:"
2520 GOSUB 2730:T=7
2530 ON Z GOTO 3000,3200,3300,3400,3500,3600,3700,3800,3900,4000
2540 REM GRAPHICS SUBROUTINE
2550 Y=4:LIN=128:PNT=1
2560 FOR I=1 TO 127 'DRAW LINES
2570 SET(I,Y):SET(I,Y+6)
2580 NEXT I
2590 FOR I=Y TO Y+6
2600 SET(0,I):SET(1,I):SET(45,I)
2610 SET(89,I):SET(109,I):SET(126,I):SET(127,I)
2620 NEXT I
2630 Y=Y+6
2640 PRINT@(LIN+1),T$(PNT);
2650 PRINT@(LIN+23),T$(PNT+1);
2660 PRINT@(LIN+46),T$(PNT+2);
2670 PRINT@(LIN+55),T$(PNT+3);
2680 LIN=LIN+128:PNT=PNT+4
2690 IF T$(PNT)<>""THEN 2560
2700 RETURN
2710 REM
2720 REM HEADER SUBROUTINE
2730 FOR I=1 TO 4
2740 T$(I)=P$(I+19)
2750 NEXT I
2755 RETURN
2760 REM
2770 REM PAYBACK CALCULATION
2780 E=E(X,Z)-P1(C)
2790 T$(T)=STR$(E)
2800 E=E(X,Z)-P2(C)
2810 T$(T+1)=STR$(E)
2820 T=T+4:C=C+1
2830 RETURN
3000 REM CEILING
3010 T$(5)=P$(9):T$(6)=P$(3)
3020 C=1:T=7:GOSUB 2780
3040 T$(9)=P$(9):T$(10)=P$(4)
3050 GOSUB 2780
3060 T$(13)=P$(10):T$(14)=P$(2)
3070 GOSUB 2780
3080 T$(17)=P$(10):T$(18)=P$(3)
3090 GOSUB 2780
3100 T$(21)=P$(10):T$(22)=P$(4)
3110 T$(25)=""
3120 GOSUB2780:GOSUB2550
3130 PRINT@960,"PRESS 'ENTER' TO CONTINUE";
3140 INPUT Z$:GOTO 2000
3200 T$(5)=P$(5):T$(6)=P$(5)
3210 C=6:GOSUB 2780
3220 T$(9)=P$(11):T$(10)=P$(5)
3230 GOSUB2780
3240 T$(13)="":GOSUB 2550
3250 GOTO 3130
3300 T$(5)=P$(12):T$(6)=P$(6)
```

```
3310 C=8:GOSUB 2780
3320 T$(9)="":GOSUB 2550
3330 GOTO3130
3400 T$(5)=P$(13):T$(6)=P$(7)
3410 C=9:GOSUB 2780
3420 T$(9)=P$(14):T$(10)=P$(7)
3430 GOSUB 2780
3440 T$(13)="":GOSUB 2550
3450 GOTO 3130
3500 T$(5)=P$(15):T$(6)=P$(8)
3510 C=11:GOSUB 2780
3520 T$(9)=P$(16):T$(10)=P$(8)
3530 GOSUB 2780
3540 T$(13)="":GOSUB 2550
3550 GOTO3130
3600 T$(5)=P$(17):T$(6)=P$(2)
3610 C=13:GOSUB 2780
3620 T$(9)=P$(17):T$(10)=P$(3)
3630 GOSUB 2780
3640 T$(13)="":GOSUB 2550
3650 GOTO3130
3700 T$(5)=P$(18):T$(6)=P$(2)
3710 C=15:GOSUB 2780
3720 T$(9)=P$(18):T$(10)=P$(3)
3730 GOSUB 2780
3740 T$(13)="":GOSUB 2550
3750 GOTO 3130
3800 T$(5)=P$(19):T$(6)=P$(5)
3810 C=17:GOSUB2780
3820 T$(9)=P$(19):T$(10)=P$(24)
3830 GOSUB 2780
3840 T$(13)="":GOSUB2550
3850 GOTO 3130
3900 T$(5)=P$(18):T$(6)=P$(1)
3910 C=19:GOSUB 2780
3920 T$(9)=P$(18):T$(10)=P$(2)
3930 GOSUB 2780
3940 T$(13)="":GOSUB 2550
3950 GOTO 3130
4000 T$(5)=P$(19):T$(6)=P$(5)
4010 C=21:GOSUB 2780
4020 T$(9)=P$(19):T$(10)=P$(24)
4030 GOSUB 2780
4040 T$(13)="":GOSUB 2550
4050 GOTO 3130
```

MY MINI AND I

|	
Things To Do	Richard Evans
The Dummy Diet	Joe Leonard
Grocery List	Sherman Wantz
Home Finance Program	Dan Booth
Trip Mileage	James Morgan
Tax Shelter Analysis	Oren McBride
Phone Bill Program	Walter McCahan
Stock Market Portfolio	A.S. Turner
Pitching Analysis	Jim Wells
Flight Plan	Jack Adams

THINGS TO DO: by D. Evans

This program will transform your TRS-80 into a remindful mother. Program in your appointments and errands for the coming week, then enjoy your morning coffee each day, along with a quick computer consult to outline the day's activities. Will prove most useful to the forgetful and to those who tend to procrastinate.
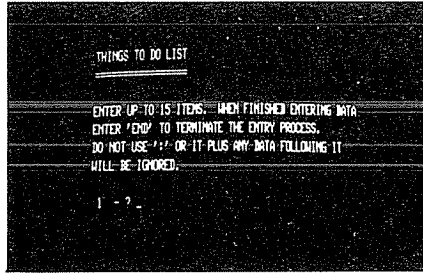

```
1 CLS
2 PRINTCHR$(23)
3 PRINT:PRINT"EVANS/3"
4 PRINT:PRINT:PRINT"THINGS TO DO LIST"
5 FOR I=1 TO 2000:NEXT
10 CLS:CLEAR 1000:DIM A$(15):DIM A(15)
20 PRINT"THINGS TO DO LIST"
30 PRINT"================="
40 PRINT:PRINT"ENTER UP TO 15 ITEMS.  WHEN FINISHED ENTERING DATA"
50 PRINT"ENTER 'END' TO TERMINATE THE ENTRY PROCESS."
55 PRINT"DO NOT USE ':' OR IT PLUS ANY DATA FOLLOWING IT"
56 PRINT"WILL BE IGNORED."
60 FOR A=1 TO 15
70 PRINT@511,A;" - ";:INPUT A$(A)
80 IF A$(A)="END" THEN A=A-1:GOTO 100
90 NEXT
100 CLS:IF A=16 THEN A=15
110 PRINT"YOU WILL BE SHOWN TWO ENTRIES AT A TIME."
120 PRINT"DECIDE WHICH OF THE TWO HAS PRIORITY."
130 PRINT:PRINT"BEFORE STARTING DECIDE ON YOUR ULTIMATE GOAL."
140 PRINT"MAKE EACH DECISION FOR THE ONE WHICH BEST GETS"
150 PRINT"YOU TOWARDS THAT GOAL.  DO NOT DECIDE BASED ON"
160 PRINT"WHAT YOU WOULD RATHER DO!"
180 PRINT:PRINT"PRESS ENTER TO BEGIN:"
190 PRINT:PRINT:INPUT A$
200 CLS
210 FOR B=1 TO A-1
220 FOR C=B+1 TO A
225 CLS
230 PRINT@320,"1 - ";A$(B)
240 PRINT@448,"2 - ";A$(C)
250 PRINT@665,"";:INPUT D
260 IF D<1 OR D>2 THEN 230
270 IF D=1 THEN A(B)=A(B)+1
280 IF D=2 THEN A(C)=A(C)+1
290 NEXT C
300 NEXT B
310 CLS
320 PRINT"HERE'S YOUR LIST..."
325 PRINT:PRINT:PRINT"MOST IMPORTANT IS LISTED FIRST - LEAST LAST."
330 FOR I=1 TO 1000:NEXT
340 CLS
350 FOR I=1 TO A
360 FOR X=1 TO A
370 IF A(X)<16 THEN 390
380 NEXT X
390 H=X
400 FOR X=H TO A
405 IF A(X)=99 THEN 420
410 IF A(X)>A(H) THEN H=X
420 NEXT X
430 PRINTI;" - ";A$(H)
440 A(H)=99
450 NEXT I
460 PRINT@960,"";:INPUT"PRESS ENTER TO REVIEW AGAIN";A$
470 FOR I=1 TO 15
480 A(I)=0
490 NEXT I
500 GOTO 100
```

THE DUMMY DIET: by J.M. Leonard, M.D.

Shed those extra pounds by sticking to your TRS-80's suggested meal menus, totaling only 1250 daily calories. If you don't find a particular suggestion appetizing, just request an alternative. Written by an M.D. for people who need a little help with meal planning at diet time.
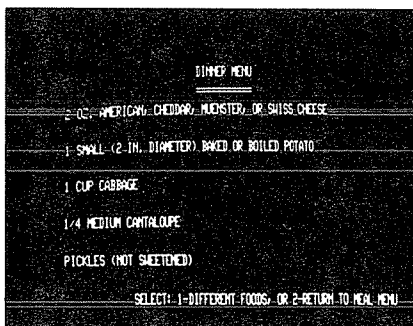

```
1000 '         ******************************
1010 '              THE  DUMMY  DIET
1050 '         ******************************
1060 REM ** BASED ON APPROXIMATELY 1250 CALORIES PER DAY **
1070 CLEAR 5000:DIM S$(90)
1080 CLS:PRINT:PRINT"              T H E   D U M M Y   D I E T"
1090 PRINT"               =========================="
1100 PRINT:PRINT
1110 PRINT"              SELECT ONE :
1120 PRINT
1130 PRINT"              1.- INSTRUCTIONS
1140 PRINT"              2.- MEAL SELECTIONS
1150 PRINT"              3.- END PROGRAM
1160 A$=INKEY$:IF A$="" THEN 1160
1170 IF A$="3" THEN CLS:END
1180 IF A$="2" THEN 1450
1190 IF A$="1" THEN 1210
1200 GOTO 1160
1210 CLS:PRINT:PRINT:PRINT
1220 PRINT"   THIS DIET MAKES SEVERAL ASSUMPTIONS:"
1230 PRINT"        1. YOU ARE OVERWEIGHT"
1240 PRINT"        2. YOU ARE WILLING TO FOLLOW EXACT INSTRUCTIONS"
12`0 PRINT"        3. YOU ARE OTHERWISE HEALTHY (IF IN DOUBT,"
1260 PRINT"           CHECK WITH YOUR DOCTOR FIRST)"
1270 PRINT"        4. YOU ARE NOT TOTALLY SEDENTARY, IE.,"
1280 PRINT"           JUST SITTING OR LYING AROUND ALL DAY."
1290 PRINT
1300 PRINT"              ENTER TO CONTINUE
1310 A$=INKEY$:IF A$="" THEN 1310
1320 CLS:PRINT:PRINT:PRINT
1330 PRINT"     THIS DIET IS SET LOW  ENOUGH  (APPROX. 1250 CAL.) SO THAT SOMEO
     NE WHO ";
1340 PRINT"IS ONLY  MILDLY  OVERWEIGHT  CAN LOSE SLOWLY, WHILE ";
1350 PRINT"SOMEONE VERY OVERWEIGHT CAN LOSE FAIRLY RAPIDLY."  .
1360 PRINT"     THE PROGRAM WILL DISPLAY FOR YOU A MENU FOR ";
1370 PRINT"WHICHEVER MEAL YOU SELECT (BREAKFAST, LUNCH, DINNER, ";
1380 PRINT"SNACK). IF YOU DONT LIKE THE SELECTIONS, OR DONT ";
1390 PRINT"HAVE  THOSE  PARTICULAR  ITEMS ON HAND, JUST REQUEST ";
1400 PRINT"A DIFFERENT FOOD SELECTION UNTIL YOU FIND ONE THAT SOUNDS APPETIZING.
      IF YOU WANT TO SELECT ";
1410 PRINT"FOR A  DIFFERENT MEAL, JUST RETURN TO THE MEAL MENU.
1420 PRINT
1430 PRINT"              ENTER TO CONTINUE
1440 A$=INKEY$:IF A$="" THEN 1440
1450 RESTORE:CLS:PRINT:PRINT
1460 PRINT"              MEAL SELECTIONS
1470 PRINT"              ===============
1480 PRINT
1490 PRINT"              SELECT ONE :
1500 PRINT
1510 PRINT"              1.- BREAKFAST
1520 PRINT"              2.- LUNCH
1530 PRINT"              3.- DINNER
1540 PRINT"              4.- SNACK
1550 PRINT"              5.- EXIT TO PROGRAM MENU
1560 A$=INKEY$:IF A$="" THEN 1560
1570 M=VAL(A$)
```

```
1580 IF M<1 OR M>5 THEN 1560
1590 IF M=5 THEN 1080
1600 FOR N=1 TO 89:READ S$(N):NEXT N
1610 ON M GOTO 1620,1640,1660,1680
1620 CLS:PRINT TAB(24)"BREAKFAST MENU":PRINT TAB(24)"=============="
1630 GOSUB 2210:GOSUB 2110:GOSUB 1930:GOSUB 1980:GOSUB 1900:GOSUB 2020:GOTO 2240
1640 CLS:PRINT TAB(24)"LUNCH MENU":PRINT TAB(24)"=========="
1650 GOSUB 2210:GOSUB 2110:GOSUB 1980:GOSUB 1930:GOSUB 1900:GOSUB 2020:GOTO 2240
1660 CLS:PRINT TAB(24)"DINNER MENU":PRINT TAB(24)"==========="
1670 GOSUB 2210:GOSUB 2110:GOSUB 1800:GOSUB 1900:GOSUB 2020:GOTO 2240
1680 CLS:PRINT TAB(24)"SNACK MENU":PRINT TAB(24)"=========="
1690 GOSUB 1900:GOSUB 2020:GOTO 2240
1700 DATA "1/2 CUP BEETS","1/2 CUP CARROTS","1/2 CUP ONIONS"
1710 DATA "1/2 CUP GREEN PEAS","1/2 CUP PUMPKIN","1/2 CUP WINTER SQUASH"
1720 DATA "1/2 CUP TURNIPS","1 MEDIUM CARROT","TOMATO CATSUP(1 TBSP.)"
1730 DATA "1 CUP ASPARAGUS","1 CUP BROCOLLI","1 CUP BRUSSELS SPROUTS"
1740 DATA "1 CUP CABBAGE","1 CUP CAULIFLOWER","1 CUP CELERY"
1750 DATA "1 CUP CUCUMBERS","1 CUP EGGPLANT","LETTUCE"
1760 DATA "1 CUP MUSHROOMS","1 CUP OKRA","1 CUP PEPPERS"
1770 DATA "1 CUP RADISHES","1 CUP RHUBARB","1 CUP SAUERKRAUT"
1780 DATA "1 CUP STRING BEANS","1 CUP SUMMER SQUASH","1 CUP TOMATOES"
1790 DATA "1 CUP ZUCCHINI","1 CUP SPINACH","1 CUP GREENS"
1800 N=RND(30)
1810 PRINT S$(N):PRINT:RETURN
1820 DATA "SMALL APPLE","1/2 CUP APPLE SAUCE(NO SUGAR ADDED)"
1830 DATA "2 MEDIUM APRICOTS","1/2 SMALL BANNANA","10 CHERRIES"
1840 DATA "2/3 CUP BLUEBERRIES","1/4 MEDIUM CANTALOUPE","2 DATES"
1850 DATA "2 FIGS","1/2 SMALL GRAPEFRUIT","12 GRAPES"
1860 DATA "1/8 MEDIUM HONEYDEW","1 SMALL ORANGE","1 SMALL PEAR"
1870 DATA "1/2 CUP ORANGE JUICE","1 MEDIUM PEACH"
1880 DATA "1/2 CUP PINEAPPLE","2 MEDIUM PLUMS","2 MEDIUM PRUNES"
1890 DATA "2 TBSP RAISINS","1 CUP STRAWBERRIES","1 LARGE TANGERINE"
1900 N=RND(22)
1910 PRINT S$(N+30):PRINT:RETURN
1920 DATA "1 CUP LOW FAT MILK (OR BUTTERMILK OR YOGURT)"
1930 PRINT S$(53):PRINT:RETURN
1950 DATA "1 TBSP CREAM CHEESE","1 TSP MAYONNAISE"
1960 DATA "2 TSP FRENCH DRESSING","2 TSP OIL/VINEGAR DRESSING"
1970 DATA "1 TSP ROQUEFORT DRESSING","1 TSP THOUSAND ISLAND DRESSING"
1980 N=RND (9):IF M=1 AND N>4 THEN 1980
1990 PRINT S$(N+53):PRINT:RETURN
2000 DATA "TEA OR COFFEE (NO SUGAR), OR BOUILLON","PICKLES (NOT SWEETENED)"
2010 DATA "SUGAR-FREE SOFT DRINK","LETTUCE AND TOMATO SALAD"
2020 N=RND(4):IF M=4 AND N=2 THEN 2020
2030 IF M=1 AND N>1 THEN 2020
2040 PRINT S$(N+62):PRINT:RETURN
2050 DATA "1 BISCUIT","1 SLICE BREAD","1/2 CUP COOKED CEREAL"
2060 DATA "3/4 CUP DRY CEREAL","1/2 ENGLISH MUFFIN"
2070 DATA "2 MEDIUM PANCAKES","1 MEDIUM BISCUIT)"
2080 DATA "1 WAFFLE (4 IN. DIAMETER)","4 CRACKERS","1/2 CUP RICE"
2090 DATA "1/2 CUP COOKED SPAGETTI OR NOODLES","1/2 CUP PEAS OR BEANS (EXCEPT ST
     RING BEANS)"
2100 DATA "1/3 CUP CORN","1 SMALL (2 IN. DIAMETER) BAKED OR BOILED POTATO","1/2
     CUP MASHED POTATOES"
2110 N=RND(14)
2120 IF M=1 AND N>7 THEN 2110
2130 IF M=2 AND N<7 THEN 2110
2140 IF M=3 AND N<7 THEN 2110
2150 PRINT S$(N+66):PRINT:RETURN
2160 DATA "FISH, 3 OUNCES","2 HOT DOGS","BEEF, 2 LUNCHMEAT-SIZE SLICES"
2170 DATA "CHICKEN OR TURKEY, 2 LUNCHMEAT-SIZE SLICES"
2180 DATA "LEAN PORK, 2 LUNCHMEAT-SIZE SLICES"
2190 DATA "2 EGGS","2 SLICES LUNCHMEAT","1/2 CUP COTTAGE CHEESE"
2200 DATA "2 OZ. AMERICAN, CHEDDAR, MUENSTER, OR SWISS CHEESE"
2210 N=RND(9)
2220 IF M=1 AND N<6 THEN 2210
2230 PRINT S$(N+80):PRINT:RETURN
2240 PRINT"          SELECT: 1-DIFFERENT FOODS, OR 2-RETURN TO MEAL MENU
2250 A$=INKEY$:IF A$="" THEN 2250
2260 IF A$="1" THEN 1610
2270 IF A$="2" THEN 1450
2280 GOTO 2250
2290 END
```

GROCERY LIST: by S.P. Wantz

Electronically prepare for those expensive weekly forays into the super market with this handy program. Your computer will quiz you with hundreds of examples of food and housewares, in an effort to jog your marketing memory. This program will make shopping more palateable.
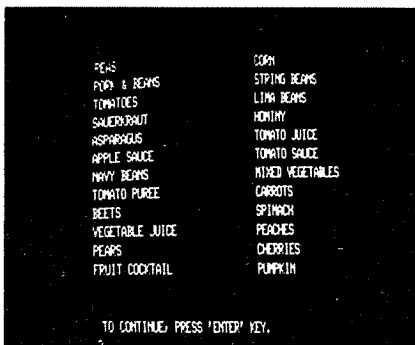

```
10 REM GROCERY STORE SHOPPING CHECKLIST
20 REM RUNS IN LEVEL II BASIC
30 REM PROGRAM REQUIRES ABOUT 4.7K BYTES OF MEMORY
50 CLS
60 PRINT@209,"GROCERY SHOPPER'S CHECKLIST"
70 PRINT@328,"THIS PROGRAM PROVIDES YOU WITH A CHECKLIST OF"
80 PRINT@397,"ITEMS SOLD AT GROCERY SUPERMARKETS."
90 PRINT@521,"USE THE CHECKLIST TO JOG YOUR MEMORY AS YOU"
100 PRINT@589,"PREPARE YOUR WEEKLY SHOPPING LIST."
110 GOSUB 510
120 PRINT@327,"TO DISPLAY THE LIST OF ITEMS IN THE CHECKLIST,"
130 PRINT@391,"PRESS THE 'ENTER' KEY ON YOUR COMPUTER'S"
140 PRINT@455,"KEYBOARD."
150 GOSUB 510
160 N=0
170 GOSUB 300
180 M=M+1
190 READ A$,B$
200 IF A$="NEXT" THEN 280
210 IF B$="NEXT" THEN 270
220 PRINT A$; TAB(30) B$
230 IF M<12 THEN 180
240 M=0: GOSUB 500
250 GOTO180
260 END
270 PRINT A$
280 GOSUB500
285 IF N=10  THEN 420
290 GOSUB 300
295 GOTO180
300 N=N+1:CLS
310  ON N GOTO 320,330,340,350,360,370,380, 390,400,410,420
320 R$="CANNED GOODS":GOTO430
330 R$="JARS AND BOTTLES": GOTO 430
340 R$="PACKAGED/BOXED GOODS": GOTO 430
350 R$="PAPER/PLASTIC PRODUCTS":GOTO 430
360 R$="DAIRY PRODUCTS": GOTO430
370 R$="FROZEN FOODS": GOTO430
380 R$="MEATS/FOWL/SEAFOOD": GOTO 430
390 R$="FRESH VEGETABLES": GOTO 430
400 R$="FRESH FRUIT": GOTO 430
410 R$="MISCELLANEOUS": GOTO 430
420 PRINT@532,"END OF LIST": GOTO 260
430 PRINT@532,R$
500 REM
510 REM SUBROUTINE--PAUSE--
520 PRINT@896," TO CONTINUE, PRESS 'ENTER' KEY.":INPUT H$
530 CLS: M=0
540 RETURN
600 DATA PEAS,CORN,PORK & BEANS,STRING BEANS, TOMATOES,LIMA BEANS
610 DATASAUERKRAUT,HOMINY,ASPARAGUS,TOMATO JUICE,APPLE SAUCE,TOMATO SAUCE
620 DATA NAVY BEANS,MIXED VEGETABLES,TOMATO PUREE,CARROTS,BEETS,SPINACH
630 DATAVEGETABLE JUICE,PEACHES,PEARS,CHERRIES,FRUIT COCKTAIL,PUMPKIN
640 DATAAPRICOTS,PINEAPPLE,CRANBERRY SAUCE,FRUIT JUICE,PRUNES,SOUPS
650 DATACONDENSED MILK,SHORTENING,FLOOR WAX,SOFT DRINKS,BEER,COCOA MIX
660 DATACOFFEE,PEPPER,SPICES,CHOCOLATE SYRUP,CHILI SAUCE,CHILI POWDER
670 DATAMUSHROOMS,PEANUTS,HAM,PORK,TUNAFISH,SALMON
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 680 DATABEEF HASH,SARDINES,SHRIMP,CRABMEAT,OYSTERS,INSECTICIDE
 690 DATA METAL CLEANER,TOILET BOWL CLEANER,SCOURING POWDER,TOMATO PASTE
 700 DATA NEXT
 710 DATA APPLE BUTTER,MUSTARD,PICKLES,OLIVES,INSTANT COFFEE,SALAD DRESSING
 720 DATACATSUP,INSECTICIDE,DISINFECTANT,BLEACH,COOKING OIL,VINEGAR
 730 DATAMAYONNAISE,WINE,SOFT DRINKS,BEER,PEANUT BUTTER,JELLY
 740 DATAHONEY,HORSERADISH,SAUERKRAUT,SPAGHETTI SAUCE,SPICES,SOY SAUCE
 750 DATABOUILLON CUBES,TACO SAUCE,FLOOR WAX,FURNITURE WAX
 760 DATASYRUP,DISTILLED WATER,CARPET SHAMPOO,BARBECUE SAUCE
 770 DATASOFT DRINK MIX,BEETS,STEAK SAUCE,GLASS CLEANER,     ,NEXT
 780 DATABROWN SUGAR,GRANULATED SUGAR,POWDERED SUGAR,POWDERED MILK
 790 DATAEGGS,DEODORIZER,TEABAGS,SALT,BREAD,ROLLS,CAKE,DOUGHNUTS
 800 DATABREADCRUMBS,COLD CEREAL,HOT CEREAL,BLEACH,LIQUID DETERGENT,FABRIC SOFTEN
     ER
 810 DATAHAND SOAP,LAUNDRY SOAP,DISHWASHING DETERGENT,SOUP MIX
 820 DATAINSTANT POTATOES,POTATO CHIPS,SNACKS,CRACKERS,BAKING SODA SOAP PADS
 830 DATAFURNITURE WAX,STEEL WOOL,WASHING SODA,CLEANING POWDER
 840 DATATOILET BOWL CLEANER,GRATED CHEESE,PRETZLES,SPAGHETTI
 850 DATAPASTA,NOODLES,LASAGNA,RICE,MACARINI,PANCAKE MIX
 860 DATACAKE MIX,FLOUR,CANDY,COOKIES,GRITS,CORN STARCH
 870 DATASTARCH,CHARCOAL,PET FOODS,BABY FOOD,PUDDING,GELATIN DESERTS
 880 DATAPRUNES,POPCORN,COCKTAIL SAUCE,TACO SHELLS,TACO MIX,BORAX
 890 DATATOILET BOWL FRESHENER,DISHWATER SOFTENER,GRAVY MIX,DRIED BEANS
 900 DATADRIED PEAS,SOFT DRINK MIX,COFFEE POT FILTERS,DIET FOODS
 910 DATASALAD DRESSING MIX,PIE SHELLS,YEAST,CREAM OF TARTAR
 920 DATA SHAKE 'N BAKE,GRATED CHEESE,MUFFIN MIX
 925 DATA TAPIOCA,NEXT
 930 DATANAPKINS,PAPER PLATES,PAPER CUPS,PAPER TOWELS,TOILET PAPER,FACIAL TISSUE
 940 DATAWAX PAPER,FREEZER PAPER,TRASH BAGS,SANDWICH BAGS
 950 DATAALUMINUM WRAP,BAKING BAGS,VACUUM CLEANER BAGS,NEXT
 960 DATAWHOLE MILK,SKIM MILK,BUTTER MILK,CHOCOLATE MILK
 970 DATAICE CREAM,ICE MILK,WHIPPING CREAM,SOUR CREAM,BUTTER,EGG NOG
 980 DATACOFFEE CREAM,SOLID CHEESE,COTTAGE CHEESE,MARGARINE
 990 DATACREAM CHEESE,NEXT
1000 DATAPIE,CAKE,VEGETABLES,TV DINNERS,FISH STICKS,FISH FILET
1010 DATAFRUIT JUICE,SHRIMP,MEAT PIES,MIXED VEGETABLES,FRENCH FRIES,PIZZA
1020 DATAPIE SHELLS,WHIPPED TOPPING,WAFFLES,NEXT
1030 DATALUNCH MEAT,GROUND BEEF,BEEF ROAST,STEW MEAT,SOUP MEAT,STEAKS
1040 DATAPORK CHOPS,PORK ROAST,LIVER,BACON,CHICKEN,TURKEY,VEAL LAMB
1050 DATAFRANKFURTERS,PORK SAUSAGE,SMOKED HAM,SMOKED SHOULDER
1060 DATAFISH,SHRIMP,NEXT
1070 DATAPOTATOES,ONIONS,TOMATOES,LETTUCE,CUCUMBERS,RADISHES
1080 DATACARROTS,CABBAGE,EGG PLANT,KALE,SPINACH,BEETS
1090 DATAPEAS,LIMA BEANS,CELERY,CAULIFLOWER,STRING BEANS,GARLIC CLOVES
1100 DATABROCCOLI,BRUSSELS SPROUTS,MUSHROOMS TURNIPS,SWEET POTATOES,PEPPERS
1110 DATA SQUASH,ASPARAGUS,YAMS,PUMPKIN,NEXT
1120 DATAORANGES,GRAPEFRUIT,LEMONS,LIMES,APPLES,GRAPES
1130 DATABANANAS,PEARS,PEACHES,PLUMS,CRANBERRIES,AVOCADO
1140 DATA MELONS,PINEAPPLE,CHERRIES,NEXT
1150 DATASKIN CREAM,HAIR SHAMPOO,MOUTHWASH,TOOTHPASTE,MAGAZINES,RAZOR BLADES
1160 DATASHAVING CREAM,AFTER SHAVE LOTION,ASPIRIN,CIGARETS,MATCHES,LIGHTER FLUID
1170 DATA PANTY HOSE,ANTI-PERSPIRANT,NEXT
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HOME FINANCE PROGRAM: by Dan Booth

Mortgage loan amortization and payment schedules, annuities calculations, owner's cost analysis and depreciation schedules are all included in the Home Finance program. A real necessity in this age of inflating land values and real estate speculation.


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50 CLEAR 2000
85 D$="$###,#.###":E$="$#######,#.##":G$="$#####,#.##":H$="######,#.##":
90 A1$="INITIAL BALANCE : $":A2$="NUMBER OF PAYMENTS PER YEAR : "
92 O1$="REGULAR PAYMENT":O2$="TOTAL OF PAYMENTS":O3$="TOTAL INTEREST PAID"
94 H1$="VALUE OF INVESTMENT":H2$="VALUE OF ACCUM. INTEREST":H3$="TOTAL VALUE"
95 DEFDBL Q,Y,X,W,P,D,O,J,K,R,C,S,L,H,I
100 CLS:PRINTTAB(18);"TRS-80 HOME FINANCE PROGRAMS"
110 PRINT:PRINT"LOAN AMORITIZATION CALC.";:PRINTTAB(50);"1"
120 PRINT:PRINT"LOAN AMORITIZATION SCHEDULE";:PRINTTAB(50);"2"
130 PRINT:PRINT"ANNUITIES CALCULATIONS";:PRINTTAB(50);"3"
140 PRINT:PRINT"HOME OWNERS COST CALC.";:PRINTTAB(50);"4"
150 PRINT:PRINT"DEPRECIATION SCHEDULES";:PRINTTAB(50);"5"
160 PRINT:LINEINPUT"WHICH PROGRAM : ";X$:X=VAL(X$):IFX<1 OR X>5 THEN100
180 ONXGOTO2000,2600,3000,1000,4000
1000 CLS:PRINTTAB(14);"HOME OWNERS REAL MONTHLY COST ESTIMATE"
1010 A1=0:A2=0:A3=0:A4=0:A5=0:A6=0:A7=0:A8=0:A9=0
1020 PRINT:INPUT"YOUR MONTHLY PAYMENT (WITH PROPERTY TAX) :$";A1
1025 X=A1*12:PRINT"ANNUALLY THIS AMOUNTS TO : $";X
1030 PRINT:INPUT"YOUR MORTAGE IS  : $";A2
1035 INPUT"YOUR ANNUAL INTEREST RATE IS : %";A3
1040 Q=(A3/100)*A2:GOSUB2850:V=Q
1045 PRINT"FIRST YEARS INTEREST WILL BE : $";V
1050 PRINT:INPUT"ANNUAL PROPERTY TAXES ARE : $";A4
1055 D=V+A4:PRINT"DEDUCTIBLE INTEREST & TAXES TOTAL : $";D
1060 PRINT:INPUT"YOU ESTIMATE YOUR IN WHAT TAX BRACKET : %";A5
1065 A5=A5/100:Q=A5*D:F=Q
1070 PRINT"YOUR DEDUCTIONS WILL SAVE YOU : ";USINGG$;F
1075 INPUT"ESTIMATE YOUR PROPERTY VALUE INCREASE NEXT YEAR : %";A6
1080 A6=A6/100:Q=A6*A2:S=Q
1085 PRINT"YOUR PROPERTY WILL INCREASE IN VALUE : ";USINGG$;S
1090 M=ABS(X-D):PRINT"YOUR MORTAGE REDUCTION WILL AMOUNT TO : $";M
1095 N=F+S+M:PRINT"YOUR TOTAL BENEFITS NEXT YEAR WILL AMOUNT TO : $";N
1100 Q=N/12:O=Q:J=A1-O
1105 PRINT:PRINT"MONTHLY PAYMENT IS :";TAB(35);USINGG$;A1
1110 PRINT"YOUR MONTHLY BENEFITS ARE :";:PRINTTAB(35);:PRINTUSINGG$;O
1115 PRINT"YOUR REAL MONTHLY COST IS :";:PRINTTAB(35);:PRINTUSINGG$;J
1120 PRINT:PRINT"THE ABOVE RESULTS ARE ESTIMATES ONLY"
1125 LINEINPUT"PRESS ENTER TO RETURN TO MENU ";X$:GOTO10
2000 CLS:PRINTTAB(15);"LOAN AMORITIZATION CALCULATION":LP=1:IFPEEK(14312)<>63THE
     NLP=0:POKE16425,1
2005 IFLP=1LPRINTTAB(15)"LOAN AMORITIZATION CALCULATION":LPRINTSTRING$(3,138)
2010 PRINT:PRINTA1$;:INPUTA1:IFLP=1LPRINTA1$;USINGG$;A1
2015 GOSUB5000:PRINT:PRINTA2$;:INPUTV:IFLP=1LPRINTA2$;V
2020 A2=A2/V/100:X=1+A2:Y=V*A3/12:P=X[Y:B=1/P:C=A1*A2/(1-B):R=C*A3:K=R-A1
2060 PRINTSTRING$(45,"="):IFLP=1LPRINTSTRING$(45,"=")
2065 PRINTO1$;TAB(35);USINGE$;C:IFLP=1LPRINTO1$;TAB(35);USINGE$;C
2070 PRINTO2$;TAB(35);USINGE$;R:IFLP=1LPRINTO2$;TAB(35);USINGE$;R
2075 PRINTO3$;TAB(35);USINGE$;K:IFLP=1LPRINTO3$;TAB(35);USINGE$;K
2080 PRINT:INPUT"CONTINUE (Y/N) ";C$:IFC$="Y"THEN2000ELSEIFC$="N"THEN10
2083 GOTO2080
2600 CLS:PRINTTAB(18);"LOAN AMORITIZATION SCHEDULE":LP=1:POKE16425,1:IFPEEK(1431
     2)<>63THENLP=0
2605 IFLP=1LPRINTTAB(20);"LOAN AMORITIZATION SCHEDULES"
2615 PRINT:PRINT:I=0:R=0:H=0:S=0:X=0:A1=0:A4=0:A3=0
2620 INPUT"BEGINNING BALANCE : $";H:A(0)=H:IFLP=1LPRINT"BEGINNING BALANCE : $";H
2630 INPUT"ANNUAL INTEREST RATE %";A1:L=(A1/12)/100:IFLP=1LPRINT"ANNUAL INTEREST
     RATE %";A1
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2640 INPUT"LOAN TERM (YRS,MONTHS) :";N,A6:N=N*12+A6:IFLP=1LPRINT"LOAN TERM (YRS,
     MONTHS) : ";N/12-A6,A6
2645 INPUT"# OF MONTH OF FIRST PAYMENT : ";A7:IFA7=0A7=1
2646 PRINT"ENTER 0 FOR COMPUTER CALC OF PAYMENT"
2648 INPUT"MONTHLY PAYMENT :$";X:IFX>0THEN2665
2655 X=(1+L):Y=-N:P=X[Y:X=H*(L/(1-P)):X=(INT(100*X))/100
2665 GOSUB2670:GOTO2685
2670 CLS:PRINT@64,"BAL";USINGE$;A(0):IFLP=1LPRINTSTRING$(3,138)
2671 IFLP=1LPRINT"BALANCE ";:LPRINTUSINGE$;A(0);
2673 PRINT@82,"INTEREST %";A1:IFLP=1LPRINT"    INTEREST    %";A1;
2675 PRINT@100,"MONTHLY PAYMENT";:PRINTUSINGD$;X:IFLP=1LPRINT"   MONTHLY PAYMENT
     ";:LPRINTUSINGD$;X
2680 PRINT"MONTH        PRINCIPLE      INTEREST    INT TO DATE    BALANCE"
2681 IFLP=1LPRINT"MONTH        PRINCIPLE      INTEREST    INT TO DATE    BALANCE"
2682 RETURN
2685 A3=A7:N=N+A7-1
2687 A9=0:A(10)=0:FORZ=A3TOA3+12-A7
2690 PRINTZ;:IFLP=1LPRINTZ;
2695 I=H*L:I=(INT(100*I))/100:S=S+I:A4=X-I:H=H-A4
2703 R=R+A4:A9=A9+I:A(10)=A(10)+A4
2704 PRINTTAB(8);USINGD$;A4;:IFLP=1LPRINTTAB(8);USINGD$;A4;
2706 PRINTTAB(23);USINGG$;I;:IFLP=1LPRINTTAB(23);USINGG$;I;
2710 PRINTTAB(35);:PRINTUSINGE$;S;:IFLP=1LPRINTTAB(35);USINGE$;S;
2711 PRINTTAB(49);USINGE$;H:IFLP=1LPRINTTAB(49);USINGE$;H
2712 IFZ=-1THEN2720
2713 IFH<=XTHENI=(INT(100*(H*L)))/100:S=S+I:A4=H-I:Z=-1:H=0:GOTO2704
2714 IFZ=NTHENZ=-1:GOTO2720
2715 NEXTZ:A3=A3+13-A7:A7=1
2720 PRINT"TOTALS";:PRINTTAB(10);"$";A(10);:PRINTTAB(25);"$";A9;
2721 IFLP=1LPRINT"TOTALS";:LPRINTTAB(10);"$";A(10);:LPRINTTAB(25);"$";A9
2725 INPUT"    CONTINUE Y/N";C$:IFC$<>"Y"THEN2800
2727 IF(C$="Y")AND(Z=-1)THEN2800
2730 GOSUB2670:GOTO2687
2800 CLS:PRINT@256,"TOTAL PRINCIPLE PAID ";:PRINTUSING E$;R
2805 IFLP=1LPRINTSTRING$(3,138):LPRINT"TOTAL PRINCIPLE PAID ";:LPRINTUSINGE$;R
2810 PRINT"TOTAL INTEREST PAID ";:PRINTUSING E$;S
2813 IFLP=1LPRINT"TOTAL INTEREST PAID ";:LPRINTUSINGE$;S
2815 G=H*L/30
2818 PRINT:IFLP=1LPRINT" "
2820 IFH=0THEN2830
2823 PRINT"FINAL PAYMENT IS ";:PRINTUSINGE$;H
2824 PRINT"INTEREST PER DAY IS    ";:PRINTUSINGD$;G
2825 IFLP=1LPRINT"FINAL PAYMENT IS    ";USINGE$;H
2826 IFLP=1LPRINT"INTEREST PER DAY IS ";USINGD$;G
2830 INPUT"AGAIN ";C$:IFC$="Y"THEN2600
2845 IFC$="N"THEN10ELSE2830
2850 RETURN
3000 POKE16425,1:LP=1:IFPEEK(14312)>127THENLP=0
3001 CLS:PRINTTAB(18);"ANNUITIES CALCULATIONS"
3005 PRINT:PRINT:PRINT"FUTURE VALUE OF A SINGLE DEPOSIT";TAB(55)"1"
3010 PRINT:PRINT"PRESENT VALUE REQUIRED FOR A FUTURE VALUE";TAB(55)"2"
3015 PRINT:PRINT"FUTURE VALUE OF REGULAR DEPOSITS";TAB(55)"3"
3020 PRINT:PRINT"REGULAR DEPOSITS REQUIRED TO ACHIEVE A FUTURE VALUE";TAB(55)"4"
3030 PRINT:PRINT"EXIT THIS PROGRAM";TAB(55)"5"
3035 PRINT:LINEINPUT"WHICH PROGRAM : ";X$:X=VAL(X$):IFX<1ORX>5THEN3000
3050 ONXGOTO3100,3200,3300,3400,10
3100 CLS:PRINTTAB(10);"FUTURE  VALUE OF A DEPOSIT"
3103 IFLP=1LPRINT"FUTURE VALUE OF A DEPOSIT":LPRINTSTRING$(3,138)
3105 INPUT"INITIAL INVESTMENT : $";A1:IFLP=1LPRINT"INITIAL INVESTMENT : $";A1
3110 GOSUB5000
3115 PRINT:INPUT"NUMBER OF COMPOUNDING PERIODS/YR :";V
3116 IFLP=1LPRINT"NUMBER OF COMPOUNDING PERIODS/YR :";V
3120 A2=A2/V/100:X=1+A2:Y=(A3/12)*V:P=X[Y:Q=P*A1:W=Q-A1:GOSUB5100
3130 GOSUB9500:GOTO3000
3200 CLS:PRINTTAB(12);"PRESENT VALUE REQUIRED FOR A FUTURE VALUE"
3205 IFLP=1LPRINT"PRESENT VALUE REQUIRED FOR A FUTURE VALUE":LPRINTSTRING$(3,138
     )
3210 INPUT"FUTURE VALUE EXPECTED : $";A1:IFLP=1LPRINT"FUTURE VALUE EXPECTED : $"
     ;A1
3220 GOSUB5000:PRINT:INPUT"NUMBER OF COMPOUNDING PERIODS/YR : ";V
3221 IFLP=1LPRINT"NUMBER OF COMPOUNDING PERIODS/YR : ";V
3225 A2=A2/V/100:X=1+A2:Y=-A3/12*V:P=X[Y
3230 Q=P*A1:W=A1-Q:D=A1:A1=Q:Q=D:PRINT:GOSUB5100:IFLP=1LPRINTA$
3235 GOTO3130
3300 CLS:PRINTTAB(20);"FUTURE VALUE OF REGULAR DEPOSITS"
3305 IFLP=1LPRINT"FUTURE VALUE OF REGULAR DEPOSITS":LPRINTSTRING$(3,138)
3310 INPUT"DEPOSIT : $";A1:IFLP=1LPRINT"DEPOSIT : $";A1
3313 GOSUB3315:GOTO3320
3315 GOSUB5000:PRINT:INPUT"NUMBER OF DEPOSITS PER YEAR : ";V
3316 IFLP=1LPRINT"NUMBER OF DEPOSITS PER YEAR : ";V
3317 PRINT:INPUT"NUMBER OF COMPOUNDING PERIODS/YR : ";T:S=V/T
3318 IFLP=1LPRINT"NUMBER OF COMPOUNDING PERIODS/YR : ";T
3319 RETURN
3320 A2=A2/T/100:X=1+A2:Y=A3/12*T:P=X[Y:Q=(A1*V/T)*((P-1)/A2):A1=A1*A3/12*V
3330 W=Q-A1:PRINT:GOSUB5100:GOTO3130
3400 CLS:PRINTTAB(5)"REGULAR DEPOSITS REQUIRED TO ACHIEVE A FUTURE VALUE"
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3405 IFLP=1LPRINTTAB(5)"REGULAR DEPOSITS REQUIRED TO ACHIEVE A FUTURE VALUE":LPR
     INTSTRING$(3,138)
3410 INPUT"FUTURE VALUE   : $";A1:GOSUB3420:GOSUB3315:A2=A2/T/100:X=1+A2:Y=A3/12*
     T:P=X[Y:Q=A1*(A2/(P-1)):Q=Q*T/V:C=Q*V*A3/12
3415 GOTO3430
3420 IFLP=1LPRINT"FUTURE VALUE   : $";A1:RETURN
3430 PRINTSTRING$(50,"="):IFLP=1LPRINTSTRING$(50,"=")
3435 PRINT"REGULAR DEPOSIT REQUIRED";TAB(35);USINGG$;Q:IFLP=1LPRINT"REGULAR DEPO
     SIT REQUIRED";TAB(35);USINGG$;Q
3440 W=A1-C:Q=A1:A1=C:GOSUB5105:GOTO3130
4000 CLS:PRINTTAB(25);"DEPRECIATION SCHEDULES"
4002 POKE 16425,1:LP=1:IFPEEK(14312)<>63THENLP=0
4010 PRINT:PRINT"STRAIGHT LINE METHOD";:PRINTTAB(50);"1"
4020 PRINT:PRINT"SUM OF THE YEARS DIGITS METHOD";:PRINTTAB(50);"2"
4030 PRINT:PRINT"DECLINING BALANCE METHOD";:PRINTTAB(50);"3"
4040 PRINT:PRINT"EXIT THE PROGRAM";:PRINTTAB(50);"4"
4050 PRINT:INPUT"WHICH PROGRAM";X:IFX=4THEN100
4060 IF(X<1)OR(X>4)THEN4000
4065 A(20)=X
4070 ONXGOTO4100,4200,4300
4100 CLS:A$="STRAIGHT LINE":B$=" METHOD":PRINTTAB(23);A$;B$:PRINT:GOSUB4900
4105 I=18:X=A3/A4:GOSUB4500:GOSUB4550:GOTO4000
4200 CLS:A$="SUM OF THE YEARS":B$=" DIGITS METHOD"
4205 PRINTTAB(13);A$;B$:PRINT:GOSUB4900
4210 E=0:FORZ=1TOA4:E=E+Z:NEXTZ
4220 I=18:GOSUB4500:GOSUB4550:GOTO4000
4300 CLS:A$="DECLINING"
4305 B$=" BALANCE METHOD"
4307 PRINTTAB(22);A$;B$:I=22
4310 GOSUB4950
4340 A3=A3/100:A4:GOSUB4500:GOSUB4550:GOTO4000
4500 CLS:PRINTTAB(I);A$;B$:PRINTTAB(3);"YEARS";:PRINTTAB(25);"DEPRECIATION";
4505 IFLP=1LPRINTA$;B$:LPRINTTAB(10);"YEARS";:LPRINTTAB(30);"DEPRECIATION";
4506 PRINTTAB(48);"DEPRECIATED":PRINTTAB(28);"VALUE":PRINTTAB(52);"VALUE"
4510 IFLP=1LPRINTTAB(60);"DEPRECIATED":LPRINTTAB(33);"VALUE";:LPRINTTAB(63);"VAL
     UE":RETURN
4550 A7=0:V=0:U=A1
4555 FORZ=A7TO(A7+11)
4560 GOSUB4600
4563 IFZ=0THENX=0
4565 PRINTTAB(4);Z;:IFLP=1LPRINTTAB(11);Z;
4566 PRINTTAB(24);:PRINTUSING G$;X;:IFLP=1LPRINTTAB(29);USINGG$;X;
4567 PRINTTAB(46);:PRINTUSING E$;V:IFLP=1LPRINTTAB(58);USINGE$;V
4570 IFZ=>A4THEN4590
4575 NEXTZ:A7=A7+12
4580 INPUT"CONTINUE (Y/N) ";C$:IFC$<>"Y"THEN4000+A(20)*100
4585 CLS:GOSUB4500:GOTO4555
4590 GOSUB9500:GOTO4000
4600 W=A(20):ONWGOTO4670,4680,4690
4670 X=A3/A4:V=U:U=A1-X:A1=U:RETURN
4680 IFV<>0THENX=(A4+1-Z)/E*A3:U=A1-X:A1=U:V=U:RETURN
4685 V=U:RETURN
4690 IFV<>0THENX=U*A3:U=A1-X:A1=U:V=U:RETURN
4695 V=U:RETURN
4900 PRINT"PURCHASE PRICE";:PRINTTAB(30);"$";:INPUTA1:IFLP=1LPRINT"PURCHASE PRIC
     E ";USINGH$;A1
4910 PRINT"RESALE PRICE";:PRINTTAB(30);"$";:INPUTA2:IFLP=1LPRINT"RESALE PRICE ";
     USINGH$;A2
4920 A3=A1-A2
4930 PRINT"TERM OF DEPRECIATION (YRS)";:PRINTTAB(30);:INPUTA4:IFLP=1THENLPRINT"T
     ERM OF DEPRECIATION (YRS) :";A4:RETURNELSERETURN
4950 PRINT"PURCHASE PRICE";:PRINTTAB(30);"$";:INPUTA1:IFLP=1LPRINT"PURCHASE PRIC
     E ";USINGH$;A1
4960 PRINT"DECLINING BALANCE FACTOR";:PRINTTAB(30);"%";:INPUTA3:IFLP=1LPRINT"DEC
     LINING BALANCE FACTOR % ";A3
4970 PRINT"TERM OF DEPRECIATION (YRS)";:PRINTTAB(30);:INPUTA4
4980 RETURN
5000 PRINT:INPUT"ANNUAL INTEREST RATE : %";A2:IFLP=1LPRINT"ANNUAL INTEREST RATE
     : %";A2
5010 PRINT:INPUT"TERM  (YEARS,MONTHS) : ";A3,A4:PD=A3:A3=A3*12+A4:IFLP=1LPRINT"T
     ERM  (YEARS,MONTHS) : ";PD,A4
5015 RETURN
5100 PRINTSTRING$(50,"="):IFLP=1LPRINTSTRING$(50,"=")
5105 PRINTH1$;TAB(35);USINGE$;A1:IFLP=1LPRINTH1$;TAB(35);USINGE$;A1
5110 PRINTH2$;TAB(35);USINGE$;W:IFLP=1LPRINTH2$;TAB(35);USINGE$;W
5115 PRINTH3$;TAB(35);USINGE$;Q:IFLP=1LPRINTH3$;TAB(35);USINGE$;Q
5120 RETURN
9500 FORZ=1TO2000:NEXTZ:RETURN
```

TRIP MILEAGE: by James P. Morgan

By using this handy program, you can find the exact interstate highway mileage between major cities en route on your next trip. Driving times at various speeds and full consumption figures are also computed by the program. An excellent choice in the age of the energy crisis.
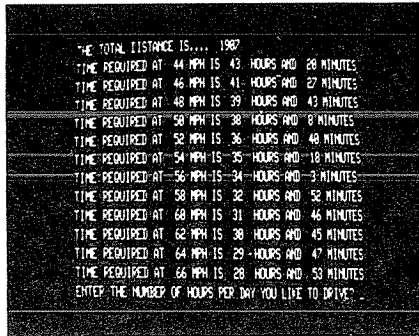

```
5 DIM MI(33,32)
40 PRINT@15,"U.S. MILEAGES AND TRIP ESTIMATOR":PRINT
50 PRINT"THIS PROGRAM WILL FIND THE MILEAGE BETWEEN MAJOR
60 PRINT"U.S. CITIES, DETERMINE DRIVING TIMES AT VARIOUS
70 PRINT"AVERAGE SPEEDS, AND DETERMINE DRIVING DAYS BASED ON
80 PRINT"YOUR CHOICE OF HOURS PER DAY DRIVING TIME. YOU CAN
90 PRINT"CUSTOMIZE THIS PROGRAM FOR YOUR SPECIFIC LOCATION
100 PRINT"BY ADDING YOUR CITY OR TOWN TO THE PROGRAM. IF YOU
110 PRINT"WISH TO DO SO, ANSWER YES WHEN I ASK FOR 'MODIFICATION?'
120 PRINT"AND 'NO' TO MOVE ON TO THE LIST OF CITIES."
130 REM SETS UP MILEAGE ARRAY   B=ROWS, A=COLUMNS
150 FOR A=1 TO 33
160 FOR B=1 TO 32
170 READ MI(A,B)
180 NEXT B:NEXT A
190 PRINT: INPUT "MODIFICATION";A$
200 IF A$="YES" THEN 2000
210 IF A$="NO" THEN 230
220 PRINT"i DON'T UNDERSTAND, YES OR NO?":GOTO 190
225 REM LIST OF THE 32 CITIES DATA FOR THE 33'D IS ZEROED
230 CLS:PRINT"THE LIST OF CITIES IS AS FOLLOWS:":PRINT
235 PRINT"1 ATLANTA","2 BOSTON","3 CHEYENNE","4 CHICAGO"
240 PRINT"5 CINCINNATI","6 CLEVELAND","7 DALLAS","8 DENVER"
245 PRINT"9 DES MOINES","10 DETROIT","11 HOUSTON","12 INDIANOPOLIS"
250 PRINT"13 KANSAS CITY","14 LOS ANGELES","15 LOUISVILLE","16 MEMPHIS"
255 PRINT"17 MILWAUKEE","18 MINNEAPOLIS","19 NEW ORLEANS","20 NEW YORK"
260 PRINT"21 OMAHA","22 PHILADELPHIA","23 PITTSBURGH","24 pORTLAND,ORE"
265 PRINT"25 ST LOUIS","26 SALT LAKE","27 S.fRANCISCO","28 SEATTLE"
270 PRINT"29 TOLEDO","30 TULSA","31 WASH. D.C.","32 WICHITA"
275 PRINT"33 YOUR CITY/TOWN (WITH MODIFICATION)"
281 REM INPUTS AND CALCULATIONS
285 PRINT:INPUT"INPUT THE NUMBER OF DEPARTURE CITY";A
290   INPUT"INPUT THE NUMBER OF DESTINATION CITY";B
295 CLS:PRINT"THE TOTAL DISTANCE IS.... "MI(A,B)
296 REM C=MPH  D=GROSS TIME  E=WHOLE # LEFT OF DECIMAL  F=THE FRACTION RIGHT OF
        THE DECIMAL
297 REM G=THE WHOLE MINUTE DERIVED FROM 60MIN TIMES THE FRACTIONAL HOUR
300 FOR C=44 TO 66 STEP 2:D=MI(A,B)/C:E=INT(D):F=D-E
302 G=INT(60*F)
305 PRINT"TIME REQUIRED AT "C"MPH IS "E" HOURS AND "G"MINUTES"
310 NEXT C
320 REM A1=DRIVING DAY IN HOURS  B1=GROSS DAYS
330 INPUT"ENTER THE NUMBER OF HOURS PER DAY YOU LIKE TO DRIVE";A1
335 CLS:PRINT"THE TOTAL DISTANCE IS...."MI(A,B)
340 FOR C=44 TO 66 STEP 2:D=MI(A,B)/C: B1=D/A1
345 IF B1<1 THEN 355
346 REM C1=WHOLE # GROSS DAYS  D1=FRACTIONAL DAY  E1=HOURS OF FRACTIONAL DAY DER
        IVED FROM D1*DRIVING DAY
350 C1=INT(B1): D1=B1-C1: E1=(D1*A1):F1=E1-INT(E1):G1=INT(F1*60):H1=INT(E1):GOTO
        360
355 C1=0:H1=INT(D):F1=D-H1:G1=INT(F1*60)
360 PRINT"AT "C"MPH IT WILL TAKE "C1"DAYS "H1"HOURS "G1"MINUTES"
365 NEXT C
370 INPUT"AVERAGE MILES PER GALLON YOUR CAR ON A TRIP";A2
375 INPUT"AVERAGE PRICE PER GALLON, GASOLINE";B2:C2=MI(A,B)*B2/A2
377 IF B2>1.50 THEN PRINT "YOU FORGOT THE DECIMAL POINT":GOTO375
379 Z$="$$###.##  ...ESTIMATED COST FOR FUEL"
```

```
380 PRINTUSING Z$;C2
385 INPUT"FOR INFORMATION ON ANOTHER TRIP, TYPE 'YES',OTHERWISE'NO'";A$
390 IF A$="YES" THEN 230
395 IF A$="NO"THEN 3000
400 PRINT"I DON'T UNDERSTAND. YES OR NO?":GOTO 385
405 REM DATA ATLANTA NEXT 3
450 DATA 0,1037,1442,674,440,670,795,1398,870,609,789,493,798,2182
460 DATA 382,371,761,1068,479,841,986,741,687,2601,541,1878,2496
470 DATA 2618,640,770,605,903
475 REM DATA BOSTON NEXT 3
480 DATA1037,0,1907,963,840,628,1750,1949,1280,695,1804,905,1391
490 DATA2979,941,1296,1050,1368,1507,206,1412,296,560,3046,1141
500 DATA2343,3095,2976,739,1537,429,1586
505 REM DATA CHEYENNE NEXT 3
510 DATA1442,1907,0,954,1174,1279,869,100,627,1211,1107,1068,650
520 DATA1137,1161,1101,987,788,1360,1745,495,1677,1390,1159,901
530 DATA436,1186,1228,1176,765,1611,583
535 REM DAT CHICAGO NEXT 3
540 DATA674,963,954,0,287,335,917,996,327,2666,1067,180,500,2054
550 DATA291,530,87,405,912,802,459,738,452,2083,290,1390,2141
560 DATA2013,232,683,671,696
565 REM DATA CLEVELAND NEXT 3 AND SO ON
570 DATA440,840,1174,287,0,244,920,1165,570,259,1030,106,590,2197
580 DATA101,4668,375,692,786,647,693,567,287,2333,340,1610,2362,2300
588 DATA200,736,481,787
600 DATA672,628,1279,335,244,0,1159,1321,652,170,1273,294,779,2367
610 DATA345,712,422,740,1030,473,784,413,129,2418,529,1715,2467
620 DATA 2348,111,925,346,975
630 DATA795,1748,869,917,920,1159,0,781,684,1143,243,865,489
640 DATA1387,819,452,991,936,496,1552,644,1452,1204,2009,630
650 DATA1242, 1753,2087,1084,257,1319,365
660 DATA 1398,1949,100,996,1164,1321,781,0,669,1253,1019,1058
670 DATA 600,1059,1120,1040,1029,841,1273,1771,537,1691,1411
680 DATA 1238,857,504,1235,1307,1218,681,1616,509
690 DATA 870,1280,627,327,571,652,684,669,0,584,905,465,195
700 DATA 1727,566,599,361,252,978,1119,132,1051,7663,1786,333
710 DATA1063,1815,1749,549,443,984,392
720 DATA 699,695,1211,266,259,170,1143,1253,584,0,1265,278,743
730 DATA 2311,360,713,353,7661,1045,637,716,573,287,2349,513
740 DATA 1647,2399,2279,59,909,506,940
750 DATA 789,1804,1107,1076,1029,1273,243,1019,905,1265,0,987
760 DATA 710,1538,928,561,1142,1157,356,1608,865,1508,1313,2205
770 DATA 779,1438,1912,2274,1206,478,1375,608
780 DATA 493,906,1068,181,106,294,865,1058,465,278,987,0,485
790 DATA 2073,111,435,268,586,796,713,587,633,353,2227,235
800 DATA 1504,2256,2194,219,631,558,681
820 DATA 798,1391,650,499,591,779,489,600,195,743,710,485,0
830 DATA 1589,520,830,451,537,447,806,1198,201,1118,838,1809
840 DATA 257,1086,1835,687,248,1043,197
850 DATA 2182,2979,1137,2054,2179,2367,1387,1059,1727,2311,1538
860 DATA 2073,860,1589,0,2108,1817,2087,1889,1883,2786,1595
870 DATA 2426,959,1845,715,379,1131,2276,1452,2631,1400
880 DATA 382,941,1161,292,101,345,119,1120,566,360,928,111,520
890 DATA 2108,0,367,697,379,685,748,687,668,388,2320,263,1597
900 DATA2349,3205,301,659,582,710
910 DATA371,1296,1101,530,408,712,452,1040,599,713,561,435,451,1817
920 DATA367,0,612,826,390,1100,652,1000,752,2259,285,1535,2125,2290
930 DATA 654,401,867,532
940 DATA761,1050,987,87,374,422,991,1029,361,353,1142,268,537
950 DATA 2087,379,612,0,332,994,889,493,825,539,2010,363,1423
960 DATA 2175,1940,319,757,758,734
970 DATA 1068,1368,788,405,692,740,936,841,252,671,1157,586,447
980 DATA 1889,697,826,332,0,1214,1207,357,1143,857,1678,552
990 DATA 1186,1940,1608,637,695,1076,644
1000 DATA479,1507,1361,912,786,1030,496,1273,1078,1045,356,796
1010 DATA 806,1883,685,390,994,1214,0,1311,1007,1211,1070,2505
1020 DATA673,1738,2249,2574,986,647,1078,816
1030 DATA841,206,1746,802,647,473,1552,1771,1119,637,1608,713
1040 DATA1198,2786,748,1100,889,1207,1311,0,1251,100,368,2885
1050 DATA948,2182,2934,2815,578,1344,233,1394
1060 DATA986,1412,495,459,693,784,644,537,132,716,865,587,201
1070 DATA1595,687,652,493,357,1007,1251,0,1183,895,1654,449
1080 DATA931,1683,1638,681,387,1116,298
1090 DATA741,296,1678,738,567,413,1452,1691,1051,573,1508
1100 DATA633,1118,2706,668,1000,825,1143,1211,100,1183,0
1110 DATA288,2821,868,2114,2866,2751,514,1264,133,1314
1120 DATA687,561,1390,452,287,129,1201,1411,763,287,1313,353
1130 DATA838,2426,388,752,539,857,1070,368,895,288,0,2535, 588
1140 DATA1826,2578,2465,228,984,221,1034
1150 DATA2601,3046,1159,2083,2333,2418,2009,1238,1788,2349,2205
1160 DATA2227,1809,959,2320,2259,2010,1678,2505,2885,1654,2821
1170 DATA2535,0,2060,767,636,172,2315,1913,2754,1739
1180 DATA541,1141,901,289,340,529,630,857,333,513,779,235,257
1190 DATA1845,263,285,363,552,673,948,449,868,588,2060,0,1337
1200 DATA 2089,2081,454,396,793,447
1210 DATA1878,2343,436,1390,1610,1715,1242,504,1063,1647,1438
1220 DATA1504,1086,715,1597,15535,1423,1186,1738,2182,931,2114
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175

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1230 DATA1826,767,1337,0,752,836,1612,1172,2047,1003
1240 DATA2496,3095,1188,2142,2362,2467,1753,1235,1815,2399,1912
1250 DATA22566,1835,379,2349,2125,2175,1940,2249,2934,1683,2866
1260 DATA2578,636,2089,752,0,808,2364,1760,2799,1695
1270 DATA2168,2976,1228,2013,2300,2348,2078,1307,1749,2279,2274
1280 DATA2194,1839,1131,2305,2290,1940,1608,2574,2815,1638,2751
1290 DATA2465,172,2081,836,808,0,2245,1982,284,1808
1300 DATA640,739,1176,232,200,111,1084,1218,549,59,1206,219,687
1310 DATA2276,301,654,319,637,986,578,681,514,228,2315,454,1612
1320 DATA2364,245,0,850,447,884
1330 DATA772,1537,65,683,736,925,257,681,443,909,478,631,248
1340 DATA1452,659,401,757,695,647,1344,387,1264,984,1913,396
1350 DATA1172,1760,1982,850,0,1189,182
1360 DATA608,429,1611,671,481,346,1319,1616,984,506,1375,558
1370 DATA1043,2631,582,867,758,1076,1078,233,1116,133,221,2754
1380 DATA793,2047,2799,2684,447,1189,0,1239
1390 DATA903,1587,583,696,787,975,365,509,392,940,608,681,197
1400 DATA1400,710,532,734,644,816,1394,298,1314,1034,1739,447
1410 DATA1003,1695,1808,884,182,1239,0
1420 DATA 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0
1430 DATA 0,0,0,0,0,0,0,0,0,0
1440 DATA 0,0,0,0,0,0
2000 CLS:PRINT"TO MODIFY THE PROGRAM TO INCLUDE YOUR LOCATION
2010 PRINT"ACCOMPLISH THE FOLLOWING...."
2020 PRINT"   1. FIND A ROAD ATLAS OR MAP
2030 PRINT"   2. COMPUTE THE DISTANCES FROM YOUR CITY/TOWN TO
2040 PRINT"      EACH OF THE 32 CITIES LISTED. YOU CAN FIND THE
2050 PRINT"      LIST BY TYPING 'RUN 230'.
2060 PRINT"   3. 'LIST' LINE 275 AND CHANGE IT TO YOUR TOWN/CITY
2070 PRINT"   4. 'LIST' LINES 1420-1440. CHANGE DATA TO REPRESENT
2080 PRINT"      THE MILEAGES YOU FOUND. BE SURE YOU ENTER THEM IN
2090 PRINT"      ORDER, A COMMA BETWEEN EACH AND NO COMMA AT THE END.
2100 PRINT"nOW PREPARE YOUR TAPE RECORDER AND A CASSETTE TO RECORD
2110 PRINT"THE MODIFIED PROGRAM. CHECK WITH 'CLOAD?' TO INSURE A
2120 PRINT"GOOD DATA TRANSFER. THIS PROGRAM NOW BECOMES YOUR
2140 PRINT"CUSTOMIZED MILEAGE AND TIME FINDER. HAPPY DRIVING!!"
2150 END
3000 CLS:PRINT"SO LONG FROM THE U.S.MILEAGE AND TRIP ESTIMATOR":END
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TAX SHELTER ANALYSIS: by Oren McBride

Beat the system by using the tricks of the rich. This program will allow you to find gross revenues, operating expenses, loan payment schedules and interest balance and depreciation figures for any investment.


```
1 REM TAX SHELTER ANALYSIS
2 REM
5 REM ********************************************
10 DIM NA$(20),GR(20),OE(20),TP(20),TA(20),CB(20)
20 DIM AP(20),AI(20),DP(20),BV(20),PT(20),LB(20)
24 REM ********************************************
25 REM REQUEST INVESTMENT DATA
26 REM ********************************************
30 CLS:PRINT ,"TAX SHELTER ANALYSIS":PRINT
40 PRINT"PLEASE READ AND ANSWER QUESTIONS CAREFULLY":PRINT
50 PRINT"WHEN THE DISPLAY STOPS, PRESS ANY KEY TO CONTINUE"
100 IF INKEY$="" GOTO 100
110 CLS:PRINT TAB(15);"TAX SHELTER ANALYSIS"
120 INPUT"INVESTMENT NAME";NA$
140 INPUT"INVESTMENT TIME IN YEARS(MAXIMUM IS 20)";T
150 IF T>20 THEN 140
160 INPUT"CASH INVESTED IN DOLLARS";PP
180 INPUT"AMOUNT BORROWED IN DOLLARS";A
200 INPUT"INTEREST RATE IN %";IR
250 INPUT"PROPERTY TAX ON INVESTMENT IN % (MAY BE 0)";PX
270 INPUT"INCOME TAX IN %";TX
290 INPUT"INVESTMENT CREDIT IN %";CD
300 INPUT"AMOUNT OF INVESTMENT IN DOLLARS THAT MAY BE DEPRECIATED";DI
310 INPUT"PERIOD OF DEPRECIATION IN YEARS";TD
320 INPUT"ESTIMATED VALUE OF INVESTMENT AT END OF INVESTMENT TIME";RV
340 INPUT"FIRST YEAR GROSS REVENUE IN DOLLARS";GR(1)
360 INPUT"ANNUAL INCREASE IN GROSS REVENUE IN %";AN
380 INPUT"FIRST YEAR OPERATING EXPENSE IN DOLLARS";OE(1)
410 INPUT"ANNUAL INFLATION IN %";IL
420 K=.12:IR=IR/100:PX=PX/100:TX=TX/100:CD=CD/100:AN=AN/100:IL=IL/100
430 FOR I=2TO T:GR(I)=GR(I-1)*(AN+1):OE(I)=OE(I-1)*(IL+1):NEXTI
460 CLS:PRINT TAB(20);NA$
470 PRINT "INVESTMENT    = ";PP;TAB(30);"INCOME TAX RATE = ";TX
480 PRINT "PROP TAX RATE = ";PX;TAB(30);"INV CREDIT RATE = ";CD
490 PRINT "INTEREST RATE = ";IR;TAB(30);"RESIDUAL VALUE  = ";RV
495 PRINT@ 340,"THINKING"
500 R=IR/12.:NP=T*12.
509 REM ********************************************
510 REM CALCULATE LOAN PMT(AP), INTEREST(AI), AND LOAN BAL(LB)
511 REM ********************************************
520 P=A*(R*(1.+R)[NP]/((1.+R)[NP-1.)
550 NO=0:PR=0.:IN=0.:BL=A:XP=0.:TI=0.:TR=0.:TY=0.:NY=0:I=1
570 IF NP<NO THEN 710
575 PRINT@ 340,"THINKING"
580 NO=NO+1:IN=BL*R:TI=TI+IN:XP=P
620 IF BL>P THEN 640
630 XP=BL+IN
640 PR=XP-IN:TR=TR+PR:BL=BL-PR:TY=TY+XP
680 IF NY>=INT(NO/12) THEN 570
690 NY=INT(NO/12)
695 PRINT@ 340,"            "
700 AP(I)=TY:AI(I)=TI:LB(I)=BL:TI=0.:TY=0.:I=I+1:GOTO 570
710 PRINT@ 340,"            "
714 REM ********************************************
716 REM CALCULATE DEPRECIATION(DP),BOOK VALUE(BV),PROPERTY TAX
717 REM (PT),TAXABLE PROFIT(TP),TAXES(TA),AND CASH BENEFITS(cb)
718 REM ********************************************
```

```
720 IS=0:FOR I=1 TO TD:IS=IS+I:NEXT I
770 TV=DI
775 FOR I= 1 TO T:DP(I)=0:IF TD<=0 GOTO 790
780 FORI=1TOT:IFI>TD GOTO 790
785 DP(I)=INT(DI*(TD-I+1)/IS+.5)
790 BV(I)=TV-DP(I):TV=BV(I):PT(I)=PX*BV(I)
830 TP(I)=GR(I)-OE(I)-AI(I)-DP(I)-PT(I)
840 TA(I)=TX*TP(I)
850 CB(I)=GR(I)-OE(I)-AP(I)-TA(I)-PT(I):NEXT I
859 REM ******************************************
860 REM HANDLE INVESTMENT CREDIT(CD) AND RESIDUAL VALUE(RV)
861 REM ******************************************
870 CB(1)=CB(1)+CD*DI
880 CB(T)=CB(T)+BV(T)+RV-(TX*.4)*(RV-(A+PP-DI))
884 REM ******************************************
885 REM PRINT RESULTS
886 REM ******************************************
890 PRINT:PRINT TAB(5);"GROSS";TAB(15);"OPERATING";TAB(27);"LOAN";TAB(48);"LOAN"
    ;TAB(57);"DEPRE-"
900 PRINT "YR";TAB(5);"REVENUE";TAB(15);"EXPENSES";TAB(26);"PAYMENT";TAB(36);"IN
    TEREST";TAB(47);"BALANCE";TAB(56);"CIATION"
910 FOR I=1 TO T
911 IF I=1 GOTO 920
912 IF(I-1)-10*INT((I-1)/10) <> 0 GOTO 920
914 IF INKEY$ ="" GOTO 914
920 PRINT I;TAB(4);GR(I);TAB(14);OE(I);TAB(25);AP(I);TAB(35);AI(I);TAB(46);LB(I)
    ;TAB(56);DP(I)
930 NEXT I
935 IF INKEY$="" GOTO 935
940 PRINT:PRINT TAB(5);"BOOK";TAB(14);"PROPERTY";TAB(25);"TAXABLE";TAB(48);"CASH
    "
950 PRINT "YR";TAB(5);"VALUE";TAB(16);"TAX";TAB(25);"PROFIT"TAB(36);"TAXES";TAB(
    47);"BENEFIT"
960 FOR I=1 TO T
961 IF I=1 GOTO 970
962 IF(I-1)-10*INT((I-1)/10) <> 0 GOTO 970
964 IF INKEY$ = "" GOTO 964
970 PRINT I;TAB(4);BV(I);TAB(14);PT(I);TAB(24);TP(I);TAB(35);TA(I);TAB(46);CB(I)
980 NEXT I
984 REM ******************************************
985 REM CALCULATE RETURN ON INVESTMENT AND PAYBACK PERIOD
986 REM ******************************************
990 V=0:FOR I=1 TO T:V=V+CB(I)/(1+K)[I:NEXT I
1030 IF INKEY$<>"" PRINT K,V
1040 IF ABS(V-PP)<=100. GOTO 1080
1050 K=(K*(V/PP)+K)/2.:GOTO 990
1080 CM=0:FOR I=1 TO T:CM=CM+CB(I):DF=CM-PP:IF DF>=0 GOTO 1160
1130 NEXT I
1140 PB=100.:GOTO 1180
1160 PB=I-DF/CB(I):K=K*100.:PRINT
1180 PRINT"PAYBACK PERIOD = ";PB,"   ROI = ";K;"%"
1190 END
```

178

PHONE BILL PROGRAM: by Walter McCahan

Use this program to determine the least expensive way to make toll calls. Time of day, date, rate charged and applicable discounts are all considered in computing your actual toll charges. Check the accuracy of Ma Bell's billing with your own electronic brain.
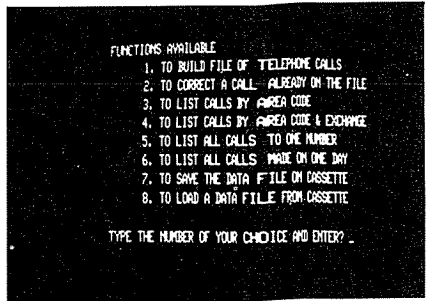

```
5  ' -----------------------------------------------------------------
10 '---------------         TELEPHONE BILL ANALYSIS        ----------
20 '---------------              TRS-80  LEVEL II          ----------
45 '-----------------------------------------------------------------
50 DIM A(250),D(250),E(250),N(250),M(250),C(250)
60 CLS
70 PRINT"        THIS PROGRAM WILL ANALIZE TOLL TELEPHONE CALLS"
80 PRINT"        TO ENABLE THE USER TO MAKE A DECESION"
90 PRINT"        AS TO THE LEAST EXPENSIVE WAY TO MAKE"
100 PRINT"        TOLL CALLS"
110 PRINT
120 INPUT"WHEN READY TO PROCEED PRESS ENTER";X
130 CLS:PRINT:PRINT
140 PRINT"FUNCTIONS AVAILABLE"
150 PRINT"        1. TO BUILD FILE OF TELEPHONE CALLS"
160 PRINT"        2. TO CORRECT A CALL ALREADY ON THE FILE"
170 PRINT"        3. TO LIST CALLS BY AREA CODE"
180 PRINT"        4. TO LIST CALLS BY AREA CODE & EXCHANGE"
190 PRINT"        5. TO LIST ALL CALLS TO ONE NUMBER"
195 PRINT"        6. TO LIST ALL CALLS MADE ON ONE DAY"
200 PRINT"        7. TO SAVE THE DATA FILE ON CASSETTE"
205 PRINT"        8. TO LOAD A DATA FILE FROM CASSETTE"
210 PRINT
220 INPUT"TYPE THE NUMBER OF YOUR CHOICE AND ENTER";B
230 ON B GOTO 300,1600,550,800,1100,1900,1400,1500
240 END
300 CLS:PRINT:PRINT
310 PRINT"        THIS FUNCTION IS USED TO ENTER CALLS INTO"
320 PRINT"        THE DATA FILE.  WHEN READY TO"
330 INPUT"        ENTER CALLS PRESS ENTER";X
340 CLS
350 PRINT"        TO CLOSE THE DATA FILE ENTER 9999 FOR"
360 PRINT"        DAY OF MONTH."
380 PRINT
390 FOR I=1 TO 500
400 INPUT"        DAY OF MONTH";D(I)
405 IF D(I)=9999 GOTO 470
410 INPUT"        AREA CODE";A(I)
420 INPUT"        EXCHANGE";E(I)
430 INPUT"        NUMBER";N(I)
440 INPUT"        MINUTES";M(I)
450 INPUT"        COST";C(I)
460 CLS:NEXT I
470 PRINT:PRINT
480 P1=I
490 PRINT"        ok - DATA FILE IS CLOSED"
500 INPUT"        TO SEE FUNCTIONS AVAILABLE PRESS ENTER";X
510 GOTO 130
520 END
550 CLS
560 PRINT"        THIS FUNCTION LISTS CALLS INTO ALL AREAS COVERED"
570 PRINT"        BY A WATS LINE"
580 PRINT
590 PRINT"        A LIST OF AREAS COVERED BY THE VARIOUS WATS"
600 PRINT"        LINES IS AVAILABLE FROM YOUR LOCAL TELEPHONE"
610 PRINT"        COMPANY
620 PRINT"
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630 PRINT"      WHEN YOU ARE READY TO ENTER THE FIRST AREA"
640 INPUT"         CODE, PRESS ENTER";X
650 CLS:PRINT:PRINT
660 INPUT"         ENTER AREA CODE";F
662 LPRINT:LPRINT:LPRINT:LPRINT:LPRINT
663 Q=0:R=0
664 LPRINT TAB(20)"lISTING BY AREA CODE"
665 GOSUB 3000
670 FOR I = 1 TO Pl
675 IF F=A(I) GOSUB 4000
680 IF F=A(I) Q=Q+C(I)
685 IF F=A(I) THEN R=R+M(I)
690 NEXT I
695 LPRINT TAB(20)"TOTALS";TAB(40) R;TAB(48) USING "###.##";Q
700 PRINT"      DO YOU HAVE ANOTHER AREA CODE TO ENTER"
710 INPUT"         YES   OR   NO";G$
720 IF G$="YES" GOTO 650 ELSE GOTO 130
800 CLS:PRINT:PRINT
810 PRINT"      THIS FUNCTION LISTS ALL CALLS INTO ONE"
820 PRINT"      EXCHANGE. THIS FUNCTION IS USED PRIMARILY"
830 PRINT"      TO STUDY THE FEASIBILITY OF FOREIGN EXCHANGE"
840 PRINT"      LINES"
850 PRINT"      LISTS OF EXCHANGES COVERED AND COSTS ARE"
860 PRINT"      AVAILABLE FROM YOUR LOCAL TELEPHONE COMPANY"
870 PRINT
880 PRINT"      WHEN READY TO ENTER AREA CODE AND EXCHANGE"
890 INPUT"      NUMBERS PRESS ENTER";X
900 CLS:PRINT:PRINT
910 INPUT"      ENTER AREA CODE";H
920 CLS:PRINT
930 INPUT"      ENTER EXCHANGE";K
932 LPRINT:LPRINT:LPRINT:LPRINT:LPRINT
935 CLS:Q=0:R=0
938 LPRINT TAB(20)"LISTING BY AREA CODE & EXCHANGE"
940 GOSUB 3000
950 FOR I =1 TO Pl
960 IF H=A(I) AND K=E(I) GOSUB 4000
964 IF H=A(I) AND K=E(I) THEN Q=Q+C(I)
968 IF H=A(I) AND K=E(I) THEN R=R+M(I)
970 NEXT I
975 LPRINT TAB(20)"TOTALS";TAB(40)R;TAB(48)USING"###.##";Q
980 PRINT"      DO YOU HAVE ANOTHER EXCHANGE AND AREA CODE"
990 INPUT"         YES OR    NO";G$
1000 IF G$="YES" GOTO 900 ELSE GOTO 130
1100 CLS:PRINT:PRINT
1110 PRINT"      THIS FUNCTION LISTS ALL CALLS TO ONE"
1120 PRINT"      NUMBER AND IS USED PRIMARILY TO DECIDE"
1130 PRINT"      THE FEASIBILITY OF INSTALLING A TIE"
1140 PRINT"      LINE."
1150 PRINT"      INFORMATION AND COSTS ON TIE LINES ARE"
1160 PRINT"      AVAILABLE FROM YOUR LOCAL TELCO."
1170 REM
1180 PRINT
1190 INPUT"      WHEN READY TO PROCEED PRESS ENTER";X
1200 CLS:PRINT
1210 INPUT"      ENTER AREA CODE";A
1220 INPUT"      ENTER EXCHANGE";E
1230 INPUT"      ENTER NUMBER";N
1235 LPRINT:LPRINT:LPRINT:LPRINT
1240 CLS:Q=0:R=0
1245 LPRINT TAB(20)"LISTING OF ALL CALLS TO ONE NUMBER"
1250 GOSUB 3000
1260 FOR I= 1 TO Pl
1270 IF A=A(I) AND E=E(I) AND N=N(I) GOSUB 4000
1274 IF A=A(I) AND E=E(I) AND N=N(I) THEN Q=Q+C(I)
1278 IF A=A(I) AND E=E(I) AND N=N(I) THEN R=R+M(I)
1280 NEXT I
1285 LPRINT TAB(20)"TOTALS";TAB(40)R;TAB(48)USING "###.##";Q
1290 PRINT"      DO YOU HAVE ANOTHER NUMBER TO ENTER"
1300 INPUT"         YES   OR    NO";G$
1310 IF G$="YES" GOTO 1200 ELSE GOTO 130
1400 REM
1410 CLS
1420 INPUT"WHEN THE CASSETTE RECORDER IS READY PRESS ENTER";X
1430 CLS:PRINT:PRINT:PRINT"      NOW RECORDING FILE ONTO CASSETTE"
1432 PRINT#-1,Pl
1435 FOR I=1TOPl
1440 PRINT#-1,D(I),A(I),E(I),N(I),M(I),C(I)
1450 NEXT I
1460 CLS:PRINT:PRINT
1470 PRINT"      RECORDING NOW COMPLETE TO SEE FUNCTIONS"
1480 INPUT"      PRESS ENTER";X
1490 GOTO 130
1500 CLS:INPUT"      WHEN CASSETTE IS READY PRESS ENTER";X
1502 PRINT:PRINT:PRINT"         NOW LOADING FILE FROM CASSETTE"
1503 INPUT#-1,Pl
1505 FOR I=1TOPl
```

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1510 INPUT#-1,D(I),A(I),E(I),N(I),M(I),C(I)
1520 NEXT I
1530 PRINT:PRINT
1540 PRINT"      LOADING NOW COMPLETE - TO SEE FUNCTIONS"
1550 INPUT"      AVAILABLE PRESS ENTER";X
1560 GOTO 130
1600 CLS:PRINT"      ENTER THE INFORMATION FOR THE CHECK TO BE CORRECTED"
1610 PRINT:INPUT"      DAY OF MONTH";D
1620 INPUT"      AREA CODE";A
1630 INPUT"      EXCHANGE";E
1640 INPUT"      NUMBER";N
1650 INPUT"      MINUTES";M
1660 INPUT"      COST";C
1670 FORI=1TOP1
1680 IFD=D(I) AND A=A(I) AND E=E(I) AND N=N(I) AND M=M(I) AND C=C(I) GOTO 1740
1690 NEXT I
1700 PRINT"      CHECK NOT FOUND IN FILE"
1710 INPUT"      TO TRY AGAIN ENTER YES - TO SEE FUNCTIONS AVAILABLE ENTER NO";G$
1720 IFG$="YES" GOTO 1600 ELSE GOTO 130
1730 REM
1740 CLS:GOSUB3000
1750 GOSUB4000
1760 PRINT"      ABOVE IS THE CHECK AS IT APPEARS BEFORE CORRECTION"
1770 PRINT:PRINT "      ENTER THE CORREDTED INFORMATION"
1780 INPUT"      DAY OF MONTH";D(I)
1790 INPUT"      AREA CODE";A(I)
1800 INPUT"      EXCHANGE";E(I)
1810 INPUT"      NUMBER";N(I)
1820 INPUT"      MINUTES";M(I)
1830 INPUT"      COST";C(I)
1840 PRINT"      THE CORRECTED CHECK NOW READS":PRINT
1850 GOSUB4000
1860 PRINT"      DO YOU HAVE ANOTHER CHECK TO ENTER"
1870 INPUT"          YES    OR   NO";G$
1880 IF G$="YES" GOTO 1600 ELSE GOTO 130
1900 CLS:PRINT:PRINT
1910 PRINT"      TO LIST ALL CALLS MADE ON ONE DAY"
1920 PRINT"      ENTER THE DAY OF THE MONTH YOU"
1930 INPUT"      WOULD LIKE TO SEE";D
1935 LPRINT:LPRINT:LPRINT:LPRINT:LPRINT
1940 CLS:Q=0:R=0
1945 LPRINT TAB(20)" LIST OF ALL CALLS MADE ON ONE DAY"
1950 GOSUB 3000
1960 FOR I = 1 TO P1
1970 IF D=D(I) GOSUB 4000
1974 IF D=D(I) THEN Q=Q+C(I)
1978 IF D=D(I) THEN R=R+M(I)
1980 NEXT I
1985 LPRINT TAB(20)"TOTALS";TAB(40)R;TAB(48) USING"###.##";Q
1990 PRINT:PRINT
2000 PRINT"      DO YOU HAVE ANOTHER DATE TO ENTER"
2010 INPUT"          YES    OR   NO";G$
2020 IF G$="YES" GOTO 1900 ELSE GOTO 130
3000 LPRINT:LPRINT:LPRINT TAB(10)"DAY";TAB(38)"NUMBER";TAB(48)"COST"
3010 LPRINT TAB(10)"OF";TAB(16)"AREA";TAB(41)"OF";TAB(49)"OF"
3020 LPRINT TAB(9)"MONTH";TAB(16)"CODE";TAB(21)"EXCHANGE";TAB(30)"NUMBER";TAB(39
     )"MINS";TAB(48)"CALL"
3030 LPRINT"------------------------------------------------------------------"
3040 RETURN
4000 LPRINT TAB(10)D(I);TAB(17)A(I);TAB(23)E(I);TAB(30)N(I);TAB(40)M(I);TAB(48)
     USING "###.##";C(I)
4010 RETURN
```

STOCK MARKET PORTFOLIO EVALUATION: by A.S. Turner

Keep track of the profit and loss of that portfolio with this program. Value, income and earnings are considered in the evaluation of each investment. Buy low, sell high.
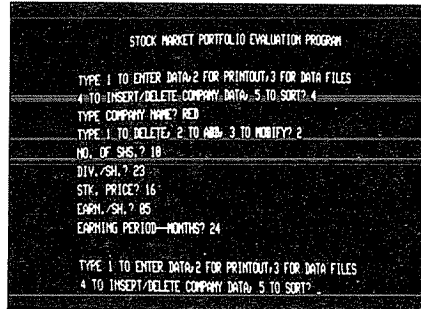

```
100 '**** STOCK MARKET PORTFOLIO EVALUATION PROGRAM ****
101 '
103 'REQUIRES TRS-80 WITH 16K, LEVEL II, LINE PRINTER
104 'PROVIDES PORTFOLIO VALUE, INCOME, AVERAGE YIELD
105 'ALSO YIELD AND P/E RATIO FOR UP TO 40 SECURITIES
106 'CASSETTE TAPE STORAGE OF DATA
107 '
120 'K= NUMBER OF COMPANY NAMES ENTERED
121 DEFINT I,J,K,L,N,Q,S:DEFSTR A,B:DEFDBL M,T
122 CLEAR 4000:K=1
124 DIM S(40),D(40),P(40),E(40),MO(40)
125 DIM A$(40)
126 DIM TXT$(40)
127 LET C$="###,###.##":D$="##.#"
128 LET E$="#########":F$="#######"
129 CLS:PRINT@73,"STOCK MARKET PORTFOLIO EVALUATION PROGRAM"
130 PRINT:PRINT "TYPE 1 TO ENTER DATA,2 FOR PRINTOUT,3 FOR DATA FILES"
135 INPUT"4 TO INSERT/DELETE COMPANY DATA, 5 TO SORT";J
140 ON J GOTO 170,600,1000,3000,3600
170 PRINT:PRINT:PRINT "SELECT DATA TO BE ENTERED"
180 PRINT "TYPE 1 FOR COMPANY NAME, 2 FOR NO. OF SHS."
190 INPUT "3 FOR DIV/SH, 4 FOR STK PRICE, 5 FOR NAME/DATE, 6 FOR EARN./SH.";I
200 ON I GOTO 2000,300,400,500,1400,1700
300 FOR N=1 TO K
310 PRINT A$(N)
320 INPUT "NO. OF SHARES";S(N)
330 NEXT N
340 GOTO 130
400 FOR N=1 TO K
410 PRINT A$(N)
420 INPUT "DIV/SHARE";D(N)
430 NEXT N
440 GOTO 130
500 FOR N=1 TO K
510 PRINT A$(N)
520 INPUT "STOCK PRICE";P(N)
530 NEXT N
540 GOTO 130
600 PRINT " ":PRINT "CHOOSE WHAT PRINTOUT"
610 INPUT "TYPE 1 FOR PORTFOLIO VALUE, 2 FOR INCOME, 3 FOR EARNINGS";J
620 ON J GOTO 640,800,1800
640 CLS:LPRINT"PORTFOLIO OF:  ";N$:LPRINT CHR$(138):LPRINT "DATE",B$:LPRINT CHR$
    (138)
650 LPRINT "COMPANY","NO. OF SHS.","STK. PRICE","VALUE","P/E (MONTHS)","DIV/SH %
    "
651 LPRINT CHR$(138)
670 FOR N=1 TO K
675 IF A$(N)="#" THEN 720
680 LPRINT A$(N),
681 LPRINT USING E$;S(N);
682 LPRINT TAB(30);
685 LPRINT USING C$;P(N);
687 LPRINT TAB(46);
689 LPRINT USING C$;P(N)*S(N);
690 IF E(N)=0 OR MO(N)=0 THEN LPRINT TAB(63) STRING$(11,32);:GOTO 695
691 LPRINT TAB(63) CHR$(32);:LPRINT USING D$;P(N)/(E(N)*12/MO(N));:LPRINT USING
    F$;MO(N);
```

```
695 LPRINT TAB(63);:LPRINT STRING$(8,32);:LPRINT USING D$;100*D(N)/P(N)
696 NEXT N
720 T=0:M=0
730 FOR N=1 TO K
740 T=T+S(N)*P(N):M=M+S(N)*D(N)
750 NEXT N
760 LPRINT CHR$(138):LPRINT " "," ","TOTAL";
762 LPRINT TAB(46);
764 LPRINT USING C$;T;
765 LPRINT TAB(62) STRING$(9,32);"AVG YIELD  ";:LPRINT USING D$;100*M/T
766 LPRINT STRING$(4,138)
770 GOTO 130
800 CLS:LPRINT"PORTFOLIO OF:  ";N$:LPRINT CHR$(138):LPRINT "DATE",B$:LPRINT CHR$
    (138)
810 LPRINT "COMPANY","NO. OF SHS.","DIV.","INCOME":LPRINT CHR$(138)
830 FOR N=1 TO K
835 IF A$(N)="#" THEN 880
840 LPRINT A$(N),
841 LPRINT USING E$;S(N);
842 LPRINT TAB(26);
843 LPRINT USING C$;D(N);
845 LPRINT TAB(46);
847 LPRINT USING C$;S(N)*D(N)
870 NEXT N
880 M=0
890 FOR N=1 TO K
900 M=M+S(N)*D(N)
910 NEXT N
920 LPRINT CHR$(138):LPRINT " "," ","TOTAL";
922 LPRINT TAB(46)
925 LPRINT USING C$;M:LPRINT STRING$(4,138)
930 GOTO 130
1000 PRINT:INPUT "TYPE 1 TO READ DATA FILES, 2 TO RECORD, 3 TO VERIFY";Q
1010 ON Q GOTO 1030,1200,1500
1030 PRINT:PRINT "TO READ DATA FILES FROM CASSETTE"
1040 PRINT "POSITION TAPE AND PRESS PLAY"
1050 INPUT "PRESS ENTER WHEN READY";Z$
1055 INPUT #-1,N$,B$,K
1060 FOR N=1 TO K
1070 INPUT #-1, A$(N)
1071 INPUT #-1,S(N),D(N),P(N),E(N),MO(N)
1072 PRINT N
1080 NEXT N
1090 INPUT#-1, A$(K+1)
1100 PRINT "DATA READ"
1110 GOTO 130
1200 PRINT:PRINT "TO RECORD DATA FILES ON CASSETTE"
1210 PRINT "POSITION TAPE AND PRESS RECORD/PLAY"
1220 INPUT "PRESS ENTER WHEN READY";Z$
1225 PRINT #-1,N$, B$,K
1226 PRINT "B$=";B$;"  K=";K
1230 FOR N=1 TO K
1240 PRINT #-1, A$(N)
1241 PRINT #-1,S(N),D(N),P(N),E(N),MO(N)
1250 PRINT "S(";N;")=";S(N)
1260 NEXT N
1270 PRINT#-1,A$(K+1)
1290 PRINT "DATA RECORDED"
1300 GOTO 130
1400 INPUT"NAME";N$:INPUT "DATE";B$
1410 GOTO 130
1500 PRINT:PRINT"TO VERIFY DATA RECORDED ON CASSETTE"
1510 PRINT"POSITION TAPE AND PRESS PLAY"
1520 INPUT"PRESS ENTER WHEN READY";Z$
1525 INPUT #-1,NT$,BT$,KT
1526 IF BT$=B$ AND KT=K AND NT$=N$ THEN 1530 ELSE 1600
1530 FOR N=1 TO K
1540 INPUT #-1, AT$
1541 INPUT #-1,ST,DT,PT,ET,MT
1542 PRINT N
1550 IF AT$=A$(N) AND ST=S(N) AND DT=D(N) AND PT=P(N) GOTO 1551 ELSE 1600
1551 IF ET=E(N) AND MT=MO(N) THEN 1560 ELSE 1600
1560 NEXT N
1570 INPUT#-1,AT$: IF AT$="#" THEN 1590 ELSE 1600
1590 PRINT "GOOD TAPE":GOTO 130
1600 PRINT "BAD TAPE": GOTO 130
1700 FOR N=1 TO K:PRINT A$(N):INPUT" EARNINGS/SHARE";E(N)
1710 INPUT"PERIOD--HOW MANY MONTHS";MO(N)
1720 NEXT N:GOTO 130
1800 CLS:LPRINT"PORTFOLIO OF:  ";N$:LPRINT CHR$(138):LPRINT"DATE",B$:LPRINT CHR$
    (138)
1810 LPRINT"COMPANY","NO. OF SHS.","DIV.","   EARN. (MONTHS)":LPRINT CHR$(138)
1820 FOR N=1 TO K
1830 IF A$(N)="#" THEN 1870
1840 LPRINT A$(N),:LPRINT USING E$;S(N);:LPRINT TAB(26);
1850 LPRINT USING C$;D(N);:LPRINT TAB(46);:LPRINT USING C$;E(N);:LPRINT USING F$
    ;MO(N)
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1860 NEXT N
1870 LPRINT STRING$(4,138)
1880 GOTO 130
2000 CLS:PRINT "ENTER COMPANY NAMES WITH # AS LAST"
2010 K=0
2020 FOR N=1 TO 40
2030 INPUT "COMPANY NAME";A$(N)
2040 IF A$(N)="#" THEN 130
2050 K=K+1
2060 NEXT N
2070 PRINT "NO MORE SPACE"
2080 GOTO 130
3000 INPUT"TYPE COMPANY NAME";NC$
3010 INPUT"TYPE 1 TO DELETE, 2 TO ADD, 3 TO MODIFY";J
3020 ON J GOTO 3100,3300,3100
3100 FOR N=1 TO 40
3110 IF A$(N)=NC$ THEN 3160
3120 IF A$(N)="#" THEN 3140
3130 NEXT N
3140 PRINT "NAME NOT IN LIST"
3150 GOTO 130
3160 Q=N:ON J GOTO 3170,130,3500
3170 FOR N=Q TO K-1
3180 IF A$(N)="#" THEN 3210
3190 A$(N)=A$(N+1):S(N)=S(N+1):D(N)=D(N+1):P(N)=P(N+1):E(N)=E(N+1):MO(N)=MO(N+1)
     :NEXT N
3200 K=K-1:A$(K+1)="#"
3210 GOTO 130
3300 FOR N=1 TO 40
3310 IF A$(N)="#" THEN Q=N:K=Q:GOTO 3330
3320 NEXT N
3325 Q=K+1:K=Q
3330 '
3340 A$(Q)=NC$:INPUT"NO. OF SHS.";S(Q)
3350 INPUT "DIV./SH.";D(Q): INPUT "STK. PRICE"; P(Q):INPUT"EARN./SH.";E(Q)
3351 INPUT"EARNING PERIOD--MONTHS";MO(Q)
3360 A$(Q+1)="#"
3370 GOTO 130
3500 INPUT "NO. OF SHS.";S(Q)
3510 INPUT "DIV./SH."; D(Q)
3520 INPUT "STK. PRICE"; P(Q):INPUT"EARN./SH.";E(Q)
3530 INPUT"EARNING PERIOD--MONTHS";MO(Q):GOTO 130
3600 FOR L=1 TO 40
3605 IF A$(L)="#" THEN 3710
3610 TA$=A$(L):TP=P(L):TS=S(L):TD=D(L):TE=E(L):TM=MO(L)
3620 FOR N=L+1 TO 40
3625 IF A$(N)="#" THEN 3700
3630 IF TA$<A$(N) THEN 3680
3640 A$(L)=A$(N):P(L)=P(N):S(L)=S(N):D(L)=D(N):E(L)=E(N):MO(L)=MO(N)
3650 A$(N)=TA$:P(N)=TP:S(N)=TS:D(N)=TD:E(N)=TE:MO(N)=TM
3660 TA$=A$(L):TP=P(L):TS=S(L):TD=D(L):TE=E(L):TM=MO(L)
3680 NEXT N
3700 NEXT L
3710 GOTO 130
```

PITCHING ANALYSIS: by J.E. Wells

We all agree that Baseball is firmly founded in statistics. This pitching analysis program is designed to be the foundation of a record-keeping system for any serious amateur team. Keep track of your best hurlers, ERA, IP, hits and performance against the opposition through the long season. Knuckleballers included, too.

```
20 REM
30 CLEAR500:NW=0:NP=0
40 DIMDG$(40),OP$(40),LC$(40),TI(40),ER(40),DC$(40),NN$(6),HT(40)
50 CLS:PRINT"PITCHING ANALYSIS PROGRAM":PRINT
60 PRINT"OPTIONS:":PRINT"  1 - START NEW DATA FILE"
70 PRINT"  2 - OPEN EXISTING DATA FILE"
80 INPUT"SELECTION";A
90 ONAGOTO200,500
100 PRINT"---- ANSWER 1 OR 2 ----":GOTO80
200 REM   START NEW DATA FILE
210 CLS:INPUT"PITCHER'S NAME";NM$
220 INPUT"PITCHER'S TEAM";TM$
225 INPUT"ACE (YES OR NO)";AC$
226 IFLEFT$(AC$,1)="Y"THENAC$="YES":GOTO230
227 IFLEFT$(AC$,1)="N"THENAC$="NO":GOTO230
228 GOTO225
230 INPUT"HAND (RIGHT OR LEFT)";HD$
240 IFLEFT$(HD$,1)="L"THENHD$="LEFT":GOTO260
245 IFLEFT$(HD$,1)="R"THENHD$="RIGHT":GOTO260
250 GOTO230
260 NG=0:GOTO1000
500 REM  OPEN EXISTING DATA FILE
510 CLS:PRINT"INSERT DATA CASSETTE AND PRESS 'PLAY'."
520 INPUT"PRESS 'ENTER' TO CONTINUE......";A$
530 INPUT#-1,NG,NM$,TM$,HD$,AR,WN,LS,AC$
540 FORI=1TONG
550 INPUT#-1,DG$(I),OP$(I),LC$(I),HT(I),TI(I),ER(I),DC$(I)
560 NEXTI
570 PRINT"DATA ENTRY COMPLETE."
580 INPUT"TURN OFF RECORDER AND HIT 'ENTER' TO CONTINUE......";A
590 PRINT
600 GOTO1020
1000 REM   MENU
1010 CLS
1020 PRINT"OPTIONS:"
1030 PRINT"  1 - LIST CURRENT DATA"
1040 PRINT"  2 - CHANGE CURRENT DATA"
1050 PRINT"  3 - DELETE CURRENT DATA"
1060 PRINT"  4 - INPUT NEW DATA"
1070 PRINT"  5 - ANALYZE DATA"
1080 PRINT"  6 - ANOTHER PITCHER"
1090 PRINT"  7 - END PROGRAM"
1100 INPUT"SELECTION";A
1110 IFA<1ORA>7THENPRINT"---- SELECT A NUMBER BETWEEN  1 AND 7 ----":GOTO1100
1120 ONAGOSUB2000,4200,5000,3000,6000,1150,10000
1140 GOTO1010
1150 NP=1:GOTO9000
2000 REM   LIST CURRENT DATA
2005 A1$="###.##"
2010 L=0:CLS:N2=0:N1=1
2020 PRINT"PITCHER: ";NM$;TAB(35);" W-L:";WN;"-";LS;TAB(50);"  ACE: ";AC$
2030 PRINT"   TEAM: ";TM$;TAB(35);" ERA:";
2032 PRINTUSINGA1$;AR;
2034 PRINTTAB(50);" HAND: ";HD$
2040 PRINT
2050 PRINT" NO.";TAB(7);"DATE";TAB(15);"OPP";TAB(23);"LOC";TAB(32);"HITS";TAB(41
     );"IP";TAB(49);"ER";TAB(56);"DEC"
```

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```
2070 FORI=N1TON1+10+N2
2080 PRINTI;TAB(7);DG$(I);TAB(15);OP$(I);TAB(23);LC$(I);TAB(32);HT(I);TAB(40);TI
     (I);TAB(48);ER(I);TAB(56);DC$(I)
2100 IFI=NGTHEN2140
2110 NEXTI
2120 GOSUB11000
2130 N2=3:N1=I:CLS:GOTO2050
2140 GOSUB11000
2150 RETURN
3000 REM   INPUT NEW DATA
3010 CLS
3020 FORI=NG+1TO40
3030 INPUT"DATE OF GAME (MM/DD)";DG$(I)
3040 IFDG$(I)="END"ORDG$(I)=""THEN3180
3050 INPUT"OPPOSING TEAM (XXXX)";OP$(I)
3060 IFLEN(OP$(I))>4ORLEN(OP$(I))<1THENPRINT"---- 1-4 LETTERS PLEASE ----":GOTO3
     050
3070 INPUT"LOCATION (HOME OR AWAY)";LC$(I)
3072 IFLEFT$(LC$(I),1)="H"THENLC$(I)="HOME":GOTO3080
3074 IFLEFT$(LC$(I),1)="A"THENLC$(I)="AWAY":GOTO3080
3076 PRINT"---- USE 'HOME' OR 'AWAY' ----":GOTO3070
3080 INPUT"HITS GIVEN UP";HT(I)
3082 IFHT(I)>10.THENINPUT"GREATER THAN 10 HITS (YES OR NO)";A$:IFLEFT$(A$,1)="Y"
     THEN3090:IFLEFT$(A$,1)="N"THEN3080:PRINT"---- YES OR NO ----":GOTO3082
3090 INPUT"INNINGS PITCHED (X.XX)";TI(I)
3100 IFTI(I)>10.THENINPUT"GREATER THEN 10 INNINGS (YES OR NO)";A$:IFLEFT$(A$,1)=
     "Y"THEN3110:IFLEFT$(A$,1)="N"THEN3090:PRINT"---- YES OR NO ----":GOTO3100
3110 INPUT"EARNED RUNS";ER(I)
3120 IFER(I)>10.THENINPUT"GREATER THAN 10 EARNED RUNS";A$:IFLEFT$(A$,1)="Y"THEN3
     130:IFLEFT$(A$,1)="N"THEN3110:PRINT"---- YES OR NO ----":GOTO3120
3130 INPUT"DECISION (W, L, OR N)";DC$(I)
3140 IFLEFT$(DC$(I),1)="W"THENDC$(I)="WIN":GOTO3160
3145 IFLEFT$(DC$(I),1)="L"THENDC$(I)="LOSS":GOTO3160
3147 IFLEFT$(DC$(I),1)="N"THENDC$(I)="---":GOTO3160
3150 PRINT"USE 'W' FOR WIN, 'L' FOR LOSS, OR 'N' FOR NO DECISION!":GOTO3130
3160 IFI=40THENPRINT"---- MATRIX FULL ----":I=I+1:NW=1:GOTO3180
3170 NW=1:NEXTI
3180 NG=I-1
3190 GOSUB11500
3200 GOSUB12000
3210 GOTO1000
4200 CLS
4210 PRINT"DATA CHANGE OPTION:"
4220 PRINT"  1 - PITCHER'S NAME"
4230 PRINT"  2 - TEAM'S NAME"
4240 PRINT"  3 - HAND"
4245 PRINT"  4 - ACE"
4250 PRINT"  5 - INDIVIDUAL GAME DATA"
4252 PRINT"  6 - LIST GAMES"
4255 PRINT"  7 - END CHANGE ROUTINE"
4260 INPUT"SELECTION";A
4270 ONAGOTO4300,4400,4500,4550,4600,4890,4880
4280 PRINT"---- SELECT A NUMBER BETWEEN 1 AND 7 ----":GOTO4260
4300 CLS
4310 PRINT"CURRENT NAME: ";NM$
4320 INPUT"    NEW NAME: ";NM$:NW=1
4330 GOTO4200
4400 CLS
4410 PRINT"CURRENT TEAM: ";TM$
4420 INPUT"    NEW TEAM: ";TM$:NW=1
4430 GOTO4200
4500 CLS
4510 PRINT"CURRENT HAND: ";HD$
4520 INPUT"    NEW HAND: ";HD$:NW=1
4522 IFLEFT$(HD$,1)="L"THENHD$="LEFT":GOTO4200
4524 IFLEFT$(HD$,1)="R"THENHD$="RIGHT":GOTO4200
4525 PRINT"---- USE 'RIGHT' OR 'LEFT' HAND ONLY ----":GOTO4520
4526 GOTO4510
4550 CLS
4560 PRINT"CURRENT ACE: ";AC$
4570 INPUT"    NEW ACE: ";AC$:NW=1
4575 IFLEFT$(AC$,1)="Y"THENAC$="YES":GOTO4200
4580 IFLEFT$(AC$,1)="N"THENAC$="NO":GOTO4200
4582 PRINT"---- YES OR NO ----":GOTO4570
4585 GOTO4560
4600 CLS
4610 INPUT"GAME NUMBER";GN
4620 IF(GN>NG)OR(GN<1)THENPRINT"---- GAME NUMBER OUT OF RANGE ----":GOTO4610
4630 INPUT"CHANGE DATE";A$
4640 IFLEFT$(A$,1)="N"ORA$=""THEN4670
4650 PRINT"CURRENT DATE: ";DG$(GN)
4660 INPUT"CHANGE TO   : ";DG$(GN):NW=1:A$="N"
4670 INPUT"CHANGE OPPONENT";A$
4680 IFLEFT$(A$,1)="N"ORA$=""THEN4710
4690 PRINT"CURRENT OPPONENT: ";OP$(GN)
4700 INPUT"CHANGE TO        : ";OP$(GN):NW=1:A$="N"
```

```
4705 IFLEN(OP$(GN))>4ORLEN(OP$(GN))<1THENPRINT"---- 1-4 LETTERS PLEASE ----":GOT
     O4700
4710 INPUT"CHANGE LOCATION";A$
4720 IFLEFT$(A$,1)="N"ORA$=""THEN4745
4730 PRINT"CURRENT LOCATION: ";LC$(GN)
4740 INPUT"CHANGE TO          : ";LC$(GN):NW=1:A$="N"
4741 IFLEFT$(LC$(GN),1)="H"THENLC$(GN)="HOME":GOTO4745
4742 IFLEFT$(LC$(GN),1)="A"THENLC$(GN)="AWAY":GOTO4745
4743 PRINT"---- USE 'HOME' OR 'AWAY' ----":GOTO4740
4745 INPUT"CHANGE HITS GIVEN UP";A$
4746 IFLEFT$(A$,1)="N"ORA$=""THEN4750
4747 PRINT"CURRENT HITS GIVEN UP: ";HT(GN)
4748 INPUT"CHANGE             : ";HT(GN):NW=1:A$="N"
4749 IFHT(GN)>10.THENINPUT"GREATER THAN 10 HITS";A$:IFLEFT$(A$,1)="Y"THEN4750:IF
     LEFT$(A$,1)="N"THEN4745:PRINT"---- YES OR NO ----":GOTO4749
4750 INPUT"CHANGE INNINGS PITCHED";A$
4760 IFLEFT$(A$,1)="N"ORA$=""THEN4790
4770 PRINT"CURRENT INNINGS PITCHED: ";TI(GN)
4780 INPUT"CHANGE TO          : ";TI(GN):NW=1:A$="N"
4783 IFTI(GN)>10.THENINPUT"GREATER THAN 10 INNINGS";A$:IFLEFT$(A$,1)="Y"THEN4785
     :IFLEFT$(A$,1)="N"THEN4780:PRINT"---- YES OR NO ----":GOTO4783
4785 GOSUB11500
4790 INPUT"CHANGE EARNED RUNS";A$
4800 IFLEFT$(A$,1)="N"ORA$=""THEN4830
4810 PRINT"CURRENT EARNED RUNS: ";ER(GN)
4820 INPUT"CHANGE TO          : ";ER(GN):NW=1:A$="N"
4823 IFER(GN)>10.THENINPUT"GREATER THAN 10 EARNED RUNS";A$:IFLEFT$(A$,1)="Y"THEN
     4825:IFLEFT$(A$,1)="N"THEN4820:PRINT"---- YES OR NO ----":GOTO4823
4825 GOSUB11500
4830 INPUT"CHANGE DECISION";A$
4840 IFLEFT$(A$,1)="N"ORA$=""THEN4870
4850 PRINT"CURRENT DECISION: ";DC$(GN)
4860 INPUT"CHANGE TO          : ";DC$(GN):NW=1:A$="N"
4861 IFLEFT$(DC$(GN),1)="W"THENDC$(GN)="WIN":GOTO4865
4862 IFLEFT$(DC$(GN),1)="L"THENDC$(GN)="LOSS":GOTO4865
4863 IFLEFT$(DC$(GN),1)="N"THENDC$(GN)="---":GOTO4865
4864 PRINT"---- USE 'W' FOR WIN, 'L' FOR LOSS, OR 'N' FOR NO DECISION ----":GOTO
     4860
4865 GOSUB12000
4870 GOTO4200
4880 RETURN
4890 GOSUB2000
4900 GOTO4200
5000 REM   DELETE CURRENT DATA
5010 CLS
5020 PRINT"OPTION:"
5030 PRINT"  1 - LIST GAMES"
5040 PRINT"  2 - DELETE DATA"
5050 PRINT"  3 - END DELETE ROUTINE"
5060 INPUT"SELECTION";A
5070 ONAGOTO5100,5200,5090
5080 PRINT"---- SELECT 1, 2, OR 3 ----":GOTO5060
5090 RETURN
5100 GOSUB2000
5110 GOTO5000
5200 CLS
5210 PRINT:INPUT"GAME NUMBER TO BE DELETED";GN
5220 IFGN>NGORGN<1THENPRINT:PRINT"---- GAME NUMBER OUT OF RANGE ----":GOTO5210
5230 PRINT:PRINT"GAME NUMBER .... ";GN
5240 PRINT"GAME DATE ...... ";DG$(GN)
5250 PRINT"OPPOSING TEAM .. ";OP$(GN)
5260 PRINT"LOCATION ....... ";LC$(GN)
5270 PRINT"HITS GIVEN UP .. ";HT(GN)
5280 PRINT"INNINGS PITCHED  ";TI(GN)
5290 PRINT"EARNED RUNS .... ";ER(GN)
5300 PRINT"DECISION ....... ";DC$(GN)
5310 PRINT:INPUT"IS THIS THE GAME TO BE DELETED";A$
5320 IFLEFT$(A$,1)="Y"THEN5350
5330 IFLEFT$(A$,1)="N"THEN5010
5340 PRINT"---- TYPE 'YES' OR 'NO' ----":GOTO5310
5350 NG=NG-1:NW=1
5355 IFNG=0THENPRINT"MUST BE MORE THAN ONE DATA RECORD BEFORE DELETE CAN BE MADE
     !":GOSUB11000:GOTO5010
5360 FORI=GNTONG
5370 DG$(I)=DG$(I+1):OP$(I)=OP$(I+1):LC$(I)=LC$(I+1):HT(I)=HT(I+1):TI(I)=TI(I+1)
     :ER(I)=ER(I+1):DC$(I)=DC$(I+1)
5380 NEXTI
5384 GOSUB11500
5386 GOSUB12000
5390 GOTO5010
6000 REM   ANALYZE DATA
6010 CLS:PRINT"DATA ANALYSIS":PRINT
6020 PRINT"IN ORDER TO PERFORM THIS ANALYSIS PLEASE ANSWER THE"
6030 PRINT"FOLLOWING QUESTIONS:"
6040 INPUT"IS GAME IN QUESTION AT 'HOME' OR 'AWAY' ..... ";L1$
6050 IFLEFT$(L1$,1)="H"THENL1$="HOME":GOTO6080
```

```
6060 IFLEFT$(L1$,1)="A"THENL1$="AWAY":GOTO6080
6070 PRINT"---- USE 'HOME' OR 'AWAY' ----":GOTO6040
6080 INPUT"OPPOSING TEAM OF GAME IN QUESTION (XXXX) .... ";OT$
6090 IFLEN(OT$)>4ORLEN(OT$)<1THENPRINT"---- 1-4 LETTERS PLEASE ----":GOTO6080
6100 INPUT"DATE OF GAME IN QUESTION (MM,DD) ........... ";M1,D1
6110 IFM1<1ORM1>12THENPRINT"---- MONTH MUST BE BETWEEN 1 AND 12 ----":GOTO6100
6120 IFD1<1ORD1>31THENPRINT"---- DAY MUST BE BETWEEN 1 AND 31 ----":GOTO6100
6130 PRINT:PRINT"ANALYSIS HAS STARTED ......"
6400 REM   ANALYSIS TEST 1
6410 IFLEFT$(L1$,1)<>"H"THENT$(1)="---":GOTO6700
6420 CT=0
6430 IFLEFT$(AC$,1)<>"Y"THENT$(1)="---":GOTO6700
6440 FORI=NGTO1STEP-1
6450 IFLEFT$(DC$(I),1)="W"THENT$(1)="---":GOTO6700
6460 IFLEFT$(DC$(I),1)="-"THEN6490
6470 CT=CT+1
6480 IFCT=2THEN6510
6490 NEXTI
6500 T$(1)="---":GOTO6700
6510 T$(1)="YES"
6700 REM   ANALYSIS TEST 2
6710 CT=0
6720 FORI=NGTO1STEP-1
6730 IFCT=0ANDLEFT$(DC$(I),1)="-"THEN6760
6740 IFLEFT$(DC$(I),1)="-"THENT$(2)="---":GOTO7000
6750 IFLEFT$(DC$(I),1)="L"THENT$(2)="---":GOTO7000
6760 CT=CT+1
6770 IFCT=3THEN6800
6780 NEXTI
6790 T$(2)="---":GOTO7000
6800 T$(2)="YES"
7000 REM   ANALYSIS TEST 3
7010 CT=0
7020 FORI=NGTO1STEP-1
7030 IFCT=0ANDLEFT$(DC$(I),1)="-"THEN7060
7040 IFLEFT$(DC$(I),1)="-"THENT$(3)="---":GOTO7400
7050 IFLEFT$(DC$(I),1)="W"THENT$(3)="---":GOTO7400
7060 CT=CT+1
7070 IFCT=3THEN7100
7080 NEXTI
7090 T$(3)="---":GOTO7400
7100 T$(3)=" NO"
7400 REM   ANALYSIS TEST 4
7410 WX=0:LX=0
7420 FORI=1TONG
7430 IFOP$(I)<>OT$THEN7460
7440 IFLEFT$(DC$(I),1)="W"THENWX=WX+1
7450 IFLEFT$(DC$(I),1)="L"THENLX=LX+1
7460 NEXTI
7470 IFWX+LX<2THENT$(4)="---":GOTO7700
7480 IFWX/(WX+LX)<.65THENT$(4)="---":GOTO7700
7490 T$(4)="YES"
7700 REM   ANALYSIS TEST 5
7710 RESTORE
7720 FORI=2TO3
7725 A1$=LEFT$(DG$(NG),I-1):A2$=MID$(DG$(NG),I+1,LEN(DG$(NG))-I)
7730 IFMID$(DG$(NG),I,1)="/"THENM2=VAL(A1$):D2=VAL(A2$):GOTO7770
7740 NEXTI
7750 PRINT"---- ERROR DETECTED ON DATE OF GAME ----";NG:GOSUB11000
7760 GOTO1000
7770 IFM2<1ORM2>12THEN7750
7780 IFD2<1ORD2>31THEN7750
7790 IFM1<>M2THEN7820
7800 IFD1-D2>5THENT$(5)=" NO":GOTO8000
7810 T$(5)="---":GOTO8000
7820 FORI=1TO12
7830 READM3,D3
7840 IFM3=M2THEN7860
7850 NEXTI
7860 IFD3-D2+D1>5THENT$(5)=" NO":GOTO8000
7870 T$(5)="---":GOTO8000
7880 DATA1,31,2,28,3,31,4,30,5,31,6,30,7,31,8,31,9,30,10,31,11,30,12,31
8000 REM   ANALYSIS TEST 6
8010 H1=0:I1=0
8020 IFHT(NG-1)<=TI(NG-1)THEN8040
8030 IFHT(NG)>TI(NG)THENT$(6)=" NO":GOTO8400
8040 IFER(NG-1)<=4THEN8060
8050 IFER(NG)>4THENT$(6)=" NO":GOTO8400
8060 T$(6)="---"
8400 REM   DISPLAY ANALYSIS RESULTS
8410 CLS:PRINT
8420 PRINT"ANALYSIS RESULTS":PRINT:PRINT
8430 PRINT"TEST 1";TAB(10);"TEST 2";TAB(20);"TEST 3";TAB(30);"TEST 4";TAB(40);"T
     EST 5";TAB(50);"TEST 6"
8440 PRINT
8450 FORI=1TO6
8460 PRINT" ";T$(I);"      ";
```

```
8470 NEXTI
8475 GOSUB12500
8480 GOSUB11000
8490 GOTO1000
9000 REM  WRITE EXISTING FILE TO TAPE
9005 IFNW=0THEN9120
9010 CLS
9020 IFNP=1THENPRINT"WE MUST WRITE THE CURRENT DATA ON TAPE BEFORE WE START ANOT
     HER  PITCHER.":GOTO9040
9030 PRINT"BEFORE ENDING PROGRAM WE MUST WRITE CURRENT DATA ON TAPE."
9040 PRINT:PRINT"INSERT DATA CASSETTE AND PRESS 'RECORD' AND 'PLAY'."
9050 INPUT"PRESS 'ENTER' WHEN READY......";A$
9060 PRINT#-1,NG,NM$,TM$,HD$,AR,WN,LS,AC$
9070 FORI=1TONG
9080 PRINT#-1,DG$(I),OP$(I),LC$(I),HT(I),TI(I),ER(I),DC$(I)
9090 NEXTI
9100 PRINT"DATA TRANSFER COMPLETE"
9110 INPUT"TURN OFF RECORDER AND PRESS 'ENTER' TO CONTINUE";A$
9120 IFNP=1THEN30ELSE10100
10000 GOTO9000
10100 END
11000 PRINT@977,"(HIT 'ENTER' TO CONTINUE)";
11010 INPUTA
11020 RETURN
11500 REM  CALCULATE EARN RUN AVERAGE
11510 S1=0:S2=0
11520 FORI=1TONG
11530 S1=S1+ER(I):S2=S2+TI(I)
11540 NEXTI
11545 IFS2=0THENAR=0:GOTO11560
11550 AR=S1/(S2/9.)
11560 RETURN
12000 REM  CALCULATE WIN-LOSS RECORD
12010 WN=0:LS=0
12020 FORI=1TONG
12030 IFLEFT$(DC$(I),1)="W"THENWN=WN+1
12040 IFLEFT$(DC$(I),1)="L"THENLS=LS+1
12050 NEXTI
12060 RETURN
12500 REM  ANALYSIS CONCLUSION
12510 PRINT:PRINT:PRINT:PRINTTAB(18);"* * * CONCLUSION * * *":PRINT
12520 FORI=1TO6
12530 IFT$(I)=" NO"THEN12600
12540 NEXTI
12550 FORI=1TO6
12560 IFT$(I)="YES"THEN12590
12570 NEXTI
12580 PRINTTAB(21);"NEUTRAL SITUATION":GOTO12610
12590 PRINTTAB(14);"PITCHER IN FAVORABLE SITUATION":GOTO12610
12600 PRINTTAB(12);"PITCHER IN AN UNFAVORABLE SITUATION"
12610 RETURN
```

FLIGHT PLAN: by Jack Adams

This very detailed program is a must for the private pilot. It uses all pertinent data to calculate and print a flight plan. Fuel consumption, trip leg length, winds aloft, rate of climb and descent and more are all taken into account. Hard copy output is available to be taken along on the flight.


```
10 REM - FLIGHT PLAN WRITTEN BY DR. JACK N. ADAMS, JEROME,  ID.
20 REM - JUNE 1979 * VER 4
30 CLEAR(1800):H=0:X=0:B=0:R=0:K=0:M=1:RD=0.01745329:PP=896
40 CLS:PRINT@26,"FLIGHT PLAN";
50 PRINT@128," 1. DATE:":PRINT" 2. STARTING POINT:":PRINT" 3. ELEVATION:":PRINT"
     4. DESTINATION:":
     PRINT" 5. ELEVATION:":PRINT" 6. FLIGHT ALTITUDE:":PR
     INT" 7. USEABLE FUEL:":PRINT" 8. FUEL CONSUMPTION:"
60 PRINT" 9. RATE OF CLIMB:":PRINT"10. CLIMBING AIRSPEED:":PRINT"11. TRUE AIRSPE
     ED:"
65 GOTO 180
70 PRINT@PP,CHR$(30):PRINT@PP,"WHAT IS TODAY'S DATE?";:PL=21:GOSUB3000:DA$=BA$:
     PRINT@158,DA$;:RETURN
80 PRINT@PP,CHR$(30):PRINT@PP,"WHAT IS THE STARTING POINT?";:PL=27:GOSUB3000:A$=
     BA$:   PRINT@222,A$;:RETURN
90 PRINT@PP,CHR$(30):PRINT@PP,"WHAT IS THE ELEVATION AT ";A$;"?";:GOSUB5010:PL=P
     D-PP-1:   GOSUB3000:E1=VAL(BA$):PRINT@286,E1;:RETURN
100 PRINT@PP,CHR$(30):PRINT@PP,"WHAT IS THE DESTINATION?";:PL=24:GOSUB3000:B$=BA
     $:    PRINT@350,B$;:RETURN
110 PRINT@PP,CHR$(30):PRINT@PP,"WHAT IS THE ELEVATION AT ";B$;"?";:GOSUB5010:PL=
     PD-PP-1:    GOSUB3000:E2=VAL(BA$):PRINT@414,E2;:RETURN
120 PRINT@PP,CHR$(30):PRINT@PP,"WHAT IS THE ALTITUDE OF YOUR FLIGHT? ";PL=35:GOT
     SUB 3000:   A=VAL(BA$):PRINT@478,A;:RETURN
130 PRINT@PP,CHR$(30):PRINT@PP,"WHAT IS YOUR USABLE FUEL?";:PL=25:GOSUB3000:
     G4=VAL(BA$):PRINT@542,G4;:RETURN
140 PRINT@PP,CHR$(30):PRINT@PP,"WHAT IS YOUR FUEL CONSUMPTION RATE?";:PL=35:GOSU
     B3000:   G=VAL(BA$):PRINT@606,G;:RETURN
150 PRINT@PP,CHR$(30):PRINT@PP,"WHAT IS YOUR RATE OF CLIMB?";:PL=27:GOSUB3000:
     D=VAL(BA$):PRINT@670,D;:RETURN
160 PRINT@PP,CHR$(30):PRINT@PP,"WHAT IS YOUR CLIMBING AIR SPEED?";:PL=32:GOSUB30
     00:    O=VAL(BA$):PRINT@734,O;:RETURN
170 PRINT@PP,CHR$(30):PRINT@PP,"WHAT IS YOUR TRUE AIR SPEED?";:PL=28:GOSUB3000:
     P=VAL(BA$):PRINT@798,P;:RETURN
180 GOSUB70:GOSUB80:GOSUB90:GOSUB100:GOSUB110:GOSUB120:GOSUB130:GOSUB140:GOSUB15
     0:    GOSUB160:GOSUB170
190 PRINT@PP,CHR$(30):PRINT@PP,"DO YOU WISH TO CHANGE ANY OF THE ABOVE? (Y/N)";:
     GOSUB5000:IFAB$="N"THEN350
200 PRINT@PP,CHR$(30):PRINT@PP,"ENTER LINE NUMBER TO BE CHANGED ";:GOSUB5010:PL=
     PD-PP-1:GOSUB3000:N=VAL(BA$):    IFN<1ORN>11THEN200
210 ON N GOSUB70,80,90,100,110,120,130,140,150,160,170
220 GOTO190
350 PRINT@PP,CHR$(30):PRINT@PP,"HOW MANY LEGS ON THE FLIGHT FROM ";A$;" TO ";B$;
     "?";:   GOSUB5010:PL=PD-PP-1:GOSUB3000:Q=VAL(BA$)
370 DIM L(Q),C(Q),W(Q),V(Q),U(Q),A(Q),S(Q),F(Q)
380 Q1=Q+1
390 DIM S$(Q1)
430 S$(0)=LEFT$(A$,3)
440 PRINT@PP,CHR$(30):PRINT@PP,"DO YOU WANT A RETURN FLIGHT PLAN (Y/N) ";:GOSUB5
     000:    IFAB$="Y"THENZ=1
460 CLS
470 FOR N=1TOQ
480   PRINT"LEG #";N;"   * * * * * * * * * * * * * * * *"
490   PRINT"END POINT OF LEG (3 LETTERS) ";
500   INPUT R$
520   IF LEN(R$)<>3 THEN PRINT "IDENT FOR END POINT MUST HAVE 3 LETTERS"
530   IF LEN(R$)<>3 THEN 490
540   S$(N)=R$
550   PRINT"LENGTH OF LEG ";
```

190

```
560    INPUT L(N)
570    PRINT"TRUE COURSE ";
580    INPUT C(N):IF C(N)<0 OR C(N)>360 THEN 570
590    C(N)=C(N)*RD
595    IF N=1 THEN 630
600    PRINT"IS WIND DIRECTION SAME AS PREVIOUS LEG? (Y/N) ";:GOSUB5000
610    J=0:PRINT:IF AB$="Y"THENJ=1
620    IF J=1 THEN W(N)=W(N-1):GOTO 660
630    PRINT"WHAT IS THE WIND DIRECTION ";
640    INPUT W(N)
650    IF W(N)<0 OR W(N)>360 THEN 630 ELSE W(N)=W(N)*RD
655    IF N=1 THEN 690
660    PRINT"IS VARIATION SAME AS PREVIOUS LEG? (Y/N) ";:GOSUB5000
670    J=0:PRINT:IFAB$="Y"THENJ=1
680    IF J=1 THEN V(N)=V(N-1):GOTO 720
690    PRINT"WHAT IS THE VARIATION (ENTER EAST AS - ) ";
700    INPUT V(N)
710    V(N)=V(N)*RD
715    IF N=1 THEN 750
720    PRINT"IS WIND SPEED SAME AS PREVIOUS LEG? (Y/N) ";:GOSUB5000
730    J=0:PRINT:IFAB$="Y"THENJ=1
740    IF J=1 THEN U(N)=U(N-1): GOTO 770
750    PRINT"WHAT IS THE WIND SPEED ";
760    INPUT U(N)
770    NEXT N
780 PRINT:PRINT"TURN ON PRINTER AND ADJUST PAPER (PRESS ENTER WHEN READY)";:INPU
    T E$
790 IF PEEK(14312)>127 THEN PRINT:PRINT"** PRINTER NOT READY **":GOTO 7 80
800 LPRINT STRING$(2,138)
810 LPRINT"FLIGHT PLAN FROM ";A$;" TO ";B$
820 LPRINT CHR$(138)
830 LPRINT DA$
840 LPRINT"STARTING ALTITUDE ";E1;"     ENDING ALTITUDE ";E2
850 LPRINT"TIME TO CLIMB TO ";A;:LPRINTUSING "#####.## ";(A-E1)/D;:LPRINT" MIN.
    - TRAVELLING ";
860 LPRINTUSING"#####.##";(A-E1)/D*(O/60);:LPRINT" MILES"
870 LPRINT STRING$(1,138)
880 GOSUB 1270
890 GOSUB 1310
900 GOSUB 1270
920 FOR N=1 TO Q
930    GOSUB 1640
940    GOSUB 1350
950    GOSUB 1270
960    NEXT N
980 GOSUB 1870:GOSUB 1900
990 IF Z<>1 THEN 2060
1000 LPRINT STRING$(2,138)
1010 LPRINT"FLIGHT PLAN FROM ";B$;" TO ";A$
1020 LPRINT CHR$(138)
1030 LPRINT DA$
1040 LPRINT"STARTING ALTITUDE ";E2;"     ENDING ALTITUDE ";E1
1050 LPRINT"TIME TO CLIMB TO ";A+1000;:LPRINTUSING"#####.## ";((A+1000)-E2)/D;
1060 LPRINT" MIN. - TRAVELLING ";:LPRINTUSING"#####.## ";(((A+1000)-E2)/D)*(O/60
     );:LPRINT"MILES"
1070 LPRINT STRING$(2,138)
1080 B=2:H=0:R=0:K=0:X=Q:Z=9
1090 M=1
1100 FOR N=1 TO Q
1110    C(N)=C(N)-3.1415927
1120    IF C(N)<0 THEN C(N)=C(N)+6.2831853
1130    NEXT N
1140 GOSUB 1270
1150 GOSUB 1310
1160 GOSUB 1270
1180 FOR N=Q TO 1 STEP -1
1190    GOSUB 1640
1200    GOSUB 1350
1210    GOSUB 1270
1220    NEXT N
1240 GOSUB 1870:GOSUB 1900
1250 GOTO 2060
1270 LPRINT STRING$(72,95)
1290 RETURN
1310 LPRINT"LEG : STR-END : COURSE :MAGNETIC: LEG LEN :USEABLE :    TIME    : GR
     OUND"
1320 LPRINT"    :         :        : COURSE :         : FUEL  : (T. TIME) : SP
     EED"
1330 RETURN
1350 LPRINT"    :         :        :        :         :        :         "; :
     LPRIN
     TUSING"## ";B7;B8;B9;:LPRINT" :"
1360 RETURN
1380 LPRINT" : ";
1390 RETURN
1410 W=W(N)+V(N)
1420 REM - CALC. MAGNETIC COURSE
```

```
1430 X1=((U(N)/P)*SIN(W-C(N)))
1440 A(N)=C(N)+2*ATN(X1/(1+SQR(1-X1*X1)))
1460 S(N)=ABS(P*COS(A(N)-C(N))-U(N)*COS(W-C(N)))
1470 A(N)=A(N)/RD
1480 IF A(N)<=0 THEN A(N)=A(N)+360
1490 IF A(N)>360 THEN A(N)=A(N)-360
1500 IF M=1 THEN 2030
1510 T=L(N)/S(N)
1520 R=R+T
1530 E7=INT(T):E8=INT((T-E7)*60):E9=INT((((T-E7)*60)-E8)*60)
1540 K=K+L(N)
1560 F(N)=T*G
1570 H=H+F(N)
1580 IF Z=9 THEN 1970
1590 IF N=1 THEN F(N)=G4-F(N):GOTO 1620
1600 IF F(N-1)-F(N)<=0 THEN LPRINT"CAUTION - - STOP FOR FUEL!"
1610 IF F(N-1)-F(N)<=0 THEN F(N)=G4-F(N) ELSE F(N)=F(N-1)-F(N)
1620 RETURN
1640 GOSUB 1410
1650 LPRINTUSING"###";M;
1660 M=M+1
1670 GOSUB 1380
1680 IF B=0 THEN LPRINTS$(X);"-";S$(X+1);ELSE LPRINTS$(X);"-";S$(X-1);
1690 IF B=0 THEN X=X+1 ELSE X=X-1
1700 GOSUB 1380
1710 LPRINT USING"######";C(N)/RD;
1720 GOSUB 1380
1760 LPRINT USING"######";A(N);
1770 GOSUB 1380
1780 LPRINT USING"#######";L(N);
1790 GOSUB 1380
1800 LPRINT USING"####.#";F(N);
1810 GOSUB 1380
1820 LPRINT USING" ##";E7;E8;E9;:LPRINT" ";
1830 GOSUB1380
1840 LPRINT USING"######";S(N)
1850 GOSUB 1870:RETURN
1870 B7=INT(R)
1880 B8=INT((R-B7)*60)
1890 B9=INT((((R-B7)*60)-B8)*60):RETURN
1900 LPRINT CHR$(138)
1910 LPRINT"TOTAL TIME = ";B7;":";B8;"'";B9;"   FUEL USED = ";:LPRINT USING"####
     .##";H;
1920 LPRINT"   DISTANCE = ";:LPRINT USING"####.##";K
1930 LPRINT"AVERAGE GROUND SPEED = ";:LPRINT USING"####.##";K/R
1940 LPRINT STRING$(5,138)
1950 RETURN
1970 IF N=Q THEN F(N)=G4-F(N) : GOTO 1620
1980 IF F(N+1)-F(N)<=0 THEN PRINT "CAUTION - - STOP FOR FUEL!"
1990 IF F(N+1)-F(N)<=0 THEN F(N)=G4-F(N) ELSE F(N)=F(N+1)-F(N)
2000 GOTO 1620
2030 IF N=1 THEN T=(L(N)+(2*(A-E1)/1000))/S(N):GOTO 1520
2040 IF N<>1 THE T=(L(N)+(2*((A+1000)-E2)/1000))/S(N):GOTO 1520
2060 LPRINTCHR$(12):CLS
2070 PRINT"HAVE A GOOD FLIGHT!"
2080 END
3000 PRINTCHR$(14);:BA$=""
3010 AB$=INKEY$:IFAB$=""THEN3010
3020 IFAB$=CHR$(13) THEN PRINTCHR$(15):RETURN
3030 IFAB$=CHR$(8)THENIFBA$<>""THENPRINTAB$;:BA$=LEFT$(BA$,LEN(BA$)-1):GOTO3010:

     ELSEGOTO4010
3040 IFAB$=CHR$(24)THENPRINTCHR$(29);STRING$(PL,CHR$(25));CHR$(30);:GOTO3000
3050 PRINTAB$;:BA$=BA$+AB$:GOTO3010
4000 AB$=""
4010 PRINT@PD,CHR$(143);:L=1
4020 AB$=INKEY$:IFAB$<>""THENPRINT@PD,AB$;:RETURN
4030 L=L+1:IFL<16THEN4020
4040 PRINT@PD," ";:FORL=1TO10:NEXT:GOTO4010
5000 GOSUB5010:GOSUB4000:RETURN
5010 PD=(256*PEEK(16417)+PEEK(16416))-15359:RETURN
```

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UTILITY

Print	Jim Perry
Matrix Sort Routine	Ross Wirth
Peekpoke	Irwin Rappaport
Tape Save	Bob Penhollow
Data Screen	Frank Myers
Autopoke	Jasper Kumpt

PRINT: by Jim Perry

This lifesaving program was written by one of our own in an effort to standardize line printer output when listing programs which have been written in varying degrees of style. The user may select the line length and title, the program does the rest. ASCII storage of files is required in this disk based program. Page numbering and return to directory functions are included.
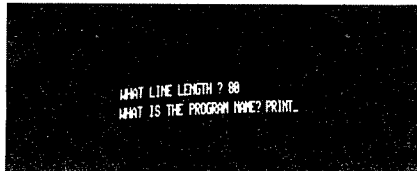
```
10 CLEAR 1000:FILL$="        ":LC=66:PP=1
20 CLS
25 INPUT"WHAT LINE LENGTH ";LL
30 INPUT"WHAT IS THE PROGRAM NAME";PROGRAM$
35 GOSUB 540
40 OPEN "I",1,PROGRAM$
50 REM
60 IF EOF(1) THEN GOTO 1000
65 IF P>56 THEN GOSUB 500
70 LINEINPUT #1,TEMP$
80 A=LEN(TEMP$)
85 L1$=TEMP$
90 IF A <= LL THEN 200
100 L1$=LEFT$(TEMP$,LL)
110  L2$=RIGHT$(TEMP$,(A-LL))
120  B=LEN(L2$)
130 IF B <= LL-5 THEN 200
140 L2$=MID$(TEMP$,LL+1,LL-5)
142 L3$=RIGHT$(TEMP$,A-(2*LL-5))
143 C=LEN(L3$)
145 IF C<=LL-5 THEN 200
150 L3$=MID$(TEMP$,2*LL-4,LL-5)
155 S=3*LL-10:IF S>=A THEN 200
160 L4$=RIGHT$(TEMP$,A-S)
200 LPRINT L1$:P=P+1: IF A<LL+1 THEN 50
210 LPRINT FILL$;L2$:P=P+1: IF B<LL-4 THEN 50
220 LPRINT FILL$;L3$:P=P+1: IF C<LL-4 THEN 50
230 LPRINT FILL$;L4$:P=P+1:GOTO 50
500 P=P+3:FOR I =1 TO LC-P:LPRINT:NEXT I
530 PP=PP+1
535 LPRINT
540 LPRINT"PAGE #";PP;"OF ";PROGRAM$
545 LPRINT""
550 P=0:RETURN
1000 LPRINT:LPRINT:LPRINT
1010 LPRINT"DONE"
1015 LPRINT CHR$(12)
1020 CLOSE
1025 CMD"DIR :2"
1030 INPUT"NEXT PROGRAM ";N$
1040 RUN N$
```

MATRIX SORT ROUTINE: by Ross Wirth

Have you more than one type of related data to be sorted? If so, this novel sort routine will be of interest to you. The routine will sort two-dimensional array by columns or rows. How? By matrix storage of data and the use of secondary indexes, of course.

```
4030 NEXT II
4040 N1=N
4050 C=0:N1=N1-1
4060 IF N1=0 THEN 4160
4070 FOR II=1 TO N1
4080    IF(RC=1)AND(A(S(II),J)<=A(S(II+1),J)) THEN 4140
4090    IF(RC=2)AND(A(I,S(II))<=A(I,S(II+1))) THEN 4140
4100    X=S(II)
4110    S(II)=S(II+1)
4120    S(II+1)=X
4130    C=1
4140 NEXT II
4150 IF C>0 THEN 4050
4160 RETURN
READY
```

```
1000 ' MATRIX SORT SUB ROUTINE BY r.a. WIRTH FROM KB OFFICES
4000 REM GENERALIZED ROW-COLUMN MATRIX SORT
4010 FOR II=1 TO N
4020    S(II)=II
4030 NEXT II
4040 N1=N
4050 C=0:N1=N1-1
4060 IF N1=0 THEN 4160
4070 FOR II=1 TO N1
4080    IF(RC=1)AND(A(S(II),J)<=A(S(II+1),J)) THEN 4140
4090    IF(RC=2)AND(A(I,S(II))<=A(I,S(II+1))) THEN 4140
4100    X=S(II)
4110    S(II)=S(II+1)
4120    S(II+1)=X
4130    C=1
4140 NEXT II
4150 IF C>0 THEN 4050
4160 RETURN
```

PEEKPOKE: by Irwin Rappaport

If you have ever wanted to re-locate a machine language pro-gram and wished a routine in BASIC was available to do it, your wish has been granted. This handy program will handle most of the work for you. Put those programs in their proper place.
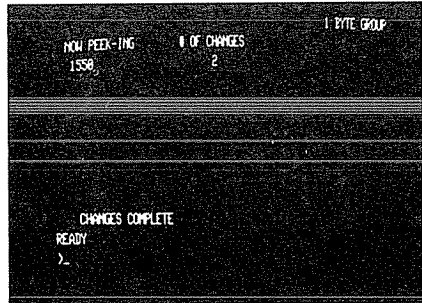
```
10 CLS:INPUT"START PEEK-ING";A:INPUT"STOP PEEK-ING";A1:INPUT"HIGH ORDER BYTE OF
      START ADDRESS OF ORIGINAL PROGRAM ";K1:INPUT"ENDING ADDRESS , AS ABOVE";K2:
      INPUT"HIGH ORDER BYTE OF DESIRED NEW START ADDRESS";K3:I=K3-K1
20 CLS:A9=118:PRINT @ 85,"# OF CHANGES":PRINT @ 48,"1 BYTE GROUP ";:PRINT @ 65,
      "NOW PEEK--ING";
30 P2=0:P1=PEEK(A):IF P1=0 THEN GOSUB 1000:GOTO 30
35 IF P1=203 OR P1=221 OR P1=237 OR P1=253 THEN 50
40 GOSUB 300:GOSUB 1000:GOTO 30
50 GOSUB 1000
60 P2=PEEK(A)
70 GOSUB 500:GOSUB 1000:GOTO 30
300 REM *** 1 BYTE CODE GROUPS , LINES 300-400 ***
305 REM *** SINGLE BYTE CODE ONLY ***
310 IF P1>=63 AND P1<=193 THEN RETURN
315 REM *** LOOK FOR 1 BYTE CODE & LOAD, JUMP, OR CALL ***
320 IF P1=1 OR P1=17 OR P1=33 OR P1=34 OR P1=42 OR P1=49 OR P1=50 OR P1=58 OR P1
      =194 OR P1=195 OR P1=196 OR P1=202 OR P1=204 OR P1=205 OR P1=210 OR P1=212
      OR P1=218 OR P1=220 OR P1=226 OR P1=228 OR P1=234 THEN 330
325 IF P1=236 OR P1=242 OR P1=244 OR P1=250 OR P1=252 THEN 330:ELSE GOTO 340
330 GOSUB 2000:RETURN
335 REM *** 1 BYTE CODE FOR 1 BYTE LOAD ***
340 IF P1=6 OR P1=14 OR P1=22 OR P1=30 OR P1=38 OR P1=46 OR P1=54 OR P1=62 THEN
      350:ELSE GOTO 360
350 GOSUB 2100:RETURN
355 REM *** 1 BYTE + DISPLACEMENT  -  IGNORE AND START AGAIN ***
360 IF P1=16 OR P1=24 OR P1=32 OR P1=40 OR P1=48 OR P1=56 OR P1=198 OR P1=206 OR
      P1=211 OR P1=214 OR P1=219 OR P1=222 OR P1=230 OR P1=238 OR P1=246 OR P1=2
      54 THEN A=A+1:RETURN
395 REM *** DID NOT FIND ANY 1 BYTE CODE - LOOK FOR 2 BYTE ***
400 RETURN
500 REM *** 2 BYTE GROUPS ***
505 REM *** CB GROUPS - IGNORE AND START AGAIN ***
510 IF P1=203 THEN RETURN
520 REM *** CHECK DD GROUPS - LINES 520-580 ***
530 IF P1=221 THEN 540:ELSE GOTO 600
535 REM *** IF DDCB IGNORE, SKIP NEXT 2 ADDRESSES, START AGAIN *
540 IF P2=203 THEN A=A+2:RETURN
545 REM *** DD 2 BYTE OP CODE, NO LOAD OR ADDRESS ***
550 IF P2=9 OR P2=25 OR P2=35 OR P2=41 OR P2=43 OR P2=57 OR P2=225 OR P2=227 OR
      P2=229 OR P2=233 OR P2=249 THEN RETURN
555 REM *** ADDRESSES FOLLOW THESE ***
560 IF P2=33 OR P2=34 OR P2=42 OR P2=54 THEN 570:ELSE 580
570 GOSUB 2000:RETURN
575 REM *** DEFAULT LINE - MUST BE 2 BYTE OP+1 BYTE IND ***
580 A=A+1:RETURN
600 REM *** ED ***
610 IF P1=237 THEN 620:ELSE GOTO 650
615 REM *** ED OP CODE WITH ADDRESSES TO FOLLOW ***
620 IF P2=67 OR P2=75 OR P2=83 OR P2=91 OR P2=115 OR P2=123 THEN 630:ELSE RETURN
630 GOSUB 2000:RETURN
650 REM *** FD ***
665 REM *** FDCB - SKIP 2 ADDRESSES  AND START AGAIN ***
670 IF P2=203 THEN A=A+2:RETURN
675 REM *** 2 BYTE FD OP CODE - NO ADDRESS ***
680 IF P2=9 OR P2=25 OR P2=35 OR P2=41 OR P2=43 OR P2=57 OR P2=225 OR P2=227 OR
      P2=229 OR P2=233 OR P2=249 THEN RETURN
685 REM *** ADDRESSES WILL FOLLOW ***
```

```
690  IF P2=33 OR P2=34 OR P2=42 OR P2=54 THEN 700:ELSE 710
700  GOSUB 2000:RETURN
705  REM *** FD DEFAULT - 2 BYTE OP+1 BYTE IND ***
710  A=A+1:RETURN
745  REM *** SOMETHING WRONG BUT WILL CONTINUE ANYWAY! ***
1000 REM *** UPDATE ADDRESS AND REPORT WHERE AT ***
1010 A=A+1:IF A>A1 THEN PRINT @ 644,"CHANGES COMPLETE";:END:ELSE PRINT @ 129,A;:
     RETURN
1500 REM *** UPDATE AND REPORT NUMBER OF CHANGES ***
1510 C=C+1:PRINT @ 154,C;:RETURN
1700 REM *** REPORT ADDRESSES OF 1 BYTE LOAD CHANGES ***
1710 PRINT @ A9,A;:A9=A9+64:RETURN
2000 REM *** CHECK AND CHANGE ADDRESS IF IN RANGE ***
2010 A=A+1:GOSUB 1000:P=PEEK(A):IF P<K2+1 AND P>K1-1 THEN 2020:ELSE RETURN
2020 POKE A,P+I:GOSUB 1500
2025 REM *** THERE IS 1 DD & 1 FD WITH A 1 BYTE LOAD (DD&FD36) *
2030 IF P2=54 THEN GOSUB 1700
2040 RETURN
2100 REM *** 1 BYTE LOAD , CHECK AND CHANGE ***
2110 GOSUB 1000:P=PEEK(A):IF P<K2+1 AND P>K1-1 THEN 2120:ELSE RETURN
2120 POKE A,P+I:GOSUB 1500:GOSUB 1700:RETURN
```

TAPE SAVE: by B. Penhollow

Don't trash those old machine language programs of yours just because you now own a TRS-80. Instead, save them on cassette and load them into your system with this handy program. CSAVE and CLOAD commands are used, and the secret is in the data statements, which contain short machine language steps that are poked into memory. Decimal and Hex are O.K.
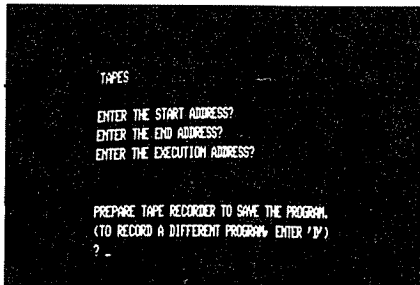

```
20  CLS
30  DATA 62,0,205,18,2,205,135,2,33,0,
         60,62,85,205,100,2,6,6,126,205,
         100,2,35,16,249,17,126,80,33,0,
         80,62.60
40  DATA 205,100,2,6,64,120,205,100,2,14,
         0,125,205,112,80,124,205,112,80,126,
         35,205,112,80,229,55,63,237,82,225,
         40,8,16,241,121
80  DATA 205,100,2,24,214,16,2,24,7,62,
         0,205,112,80,16,251,121,205,100,
         2,62,120,205,100,2,33,0,80,125,
         205,100,2,124,205,100,2
100 DATA 205,248,1,201,0,0,0,0,245,129,
         79,241,205,100,2,201,0,0,0,0,
         0,0,0,0
120 REM *  READ AND POKE DATA -TAPPE SAVE PROGRAM
140 FOR X=0 TO 126
160 READ Y:POKE 20480+X,Y:NEXT X
180      REM * GET FILE NAME
200 PRINT@64,"ENTER PROGRAM NAME (6 CHARACTERS MAX.) "
220 FOR X=0 TO 5
240 A$=INKEY$:IF A$="" THEN 240
260 PRINT@0+X,A$
```

```
280 NEXT X
300 PRINT@128,"ENTER THE START ADDRESS";:INPUT AD$
320 GOSUB 1000:IF AD=0 THEN 360
340 POKE 20509,LSB:POKE 20510,MSB:SA=MSB*256+LSB
360 INPUT"ENTER THE END ADDRESS";AD$
380 GOSUB 1000:IF AD=0 THEN 420 ELSEIF SA>=MSB*256+LSB THEN 300
400 POKE 20506,LSB:POKE 20507,MSB:AD$=""
420 INPUT"ENTER THE EXECUTION ADDRESS";AD$:IF AD$="" THEN MSB=INT(SA/256):LSB=SA
    -MSB*256 ELSE GOSUB 1000
440 POKE 20574,LSB:POKE 20575,MSB
460 PRINT@448,"PREPARE TAPE RECORDER TO SAVE THE PROGRAM.
(TO RECORD A DIFFERENT
       PROGRAM, ENTER 'D')":INPUT A$:PRINT:PRINT:PRINT
480 IF A$="D" THEN CLS:GOTO 200
500 POKE 16526,0:POKE 16527,80
520 X=USR(N):PRINT@64,:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT:PRINT"   **   D O N
    E    **"
540 FOR X=0 TO 150:NEXT X
560 GOTO 460
1000 IF AD$="" THEN AD=0:RETURN ELSE AD=1
1020 IF LEFT$(AD$,1)<>"H" THEN AD=VAL(AD$):MSB=INT(AD/256):LSB=AD-MSB*256:RETURN
1040 L=LEN(AD$):H$=MID$(AD$,L-1,L):GOSUB 1100:LSB=D
1060 IF L<=3 THEN MSB=0:RETURN
1080 H$=MID$(AD$,2,L-3):GOSUB 1100:MSB=D:RETURN
1100 HM=ASC(LEFT$(H$,1)):HL=ASC(RIGHT$(H$,1))
1120 IF HM<58 THEN HM=HM-48 ELSE HM=HM-55
1140 IF HL<58 THEN HL=HL-48 ELSE HL=HL-55
1160 D=HM*16+HL:RETURN
1500 FOR X=0 TO 126:PRINTPEEK(20480+X);" ";:NEXT X:END
```

DATA SCREEN: by F.E. Myers

This program is part of a small data base management system. It will allow you to store and retrieve data, update, delete, or correct a previous file or open a new file.
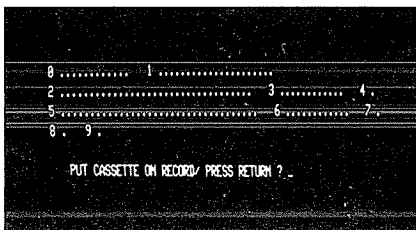

```
10 CLEAR 2500
15 CLS
20 DIM C(60),F(60),L(60),R(60)
30 FOR I=1 TO 7 : PRINT " " : NEXT I
40 PRINT"            DATA ENTRY SCREEN PROGRAM"
50 PRINT"                  VERSION 1.0"
60 PRINT"                   05/23/79"
70 FOR I=1 TO 5 : PRINT" " : NEXT I
80 INPUT"ENTER SCREEN LINE LABELS ARE TO BEGIN (0-13) ";Ll
85 IF Ll<0 OR Ll>13 THEN 80
90 R=Ll : C(1)=0 : C=0 : D=0 : J=1 : Z=0
100 INPUT"ENTER NUMBER OF FIELD LABELS (1-60) ";L
110 FOR I=1 TO L
120 Q=254-D
130 PRINT"LABEL ";I;" DATA SPACE LEFT IS ";Q;" BYTES"
```

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```
140 L2=13-R
150 PRINT"****  nUMBER OF SCREEN LINES REMAINING IS ";L2;" ****"
160 INPUT"ENTER SCREEN LABEL ";D$
170 L(I)=LEN(D$)
180 INPUT"eNTER DATA FIELD LENGTH ";F(I)
190 G=L(I)+F(I)+4
200 IF G>63 THEN PRINT"lINE TOO LONG ";G
210 IF G>63 THEN 160
220 C(I)=C+64*R
230 K=J+L(I)-1
240 E$=E$+D$
250 J=K+1
260 C=C+G
270 IF C>63 THEN R=R+1 : C(I)=R*64 : C=G
280 IF R>13 THEN PRINT"SCREEN FULL, LAST ENTRY IGNORED"
290 IF R>13 THEN 350
320 D=D+F(I)
325 IF D>254 THEN PRINT"DATA SPACE FULL, LAST ENTRY IGNORED "
330 IF D>254 THEN D=D-F(I)
335 IF D>254 THEN 350
340 Z=Z+1
345 NEXT I
350 REM
500 PRINT"DATA ENTRY SCREEN WILL LOOK AS FOLLOWS"
510 FOR I=1 TO 500 : NEXT I
515 CLS
520 J=1
530 FOR I=1 TO Z
540 K=J+L(I)-1
550 X=K+1
560 Y=X-J
570 Q$=MID$(E$,J,Y)
575 PRINT @C(I),Q$;
576 J=K+1
577 PRINT" ";
580 FOR M=1 TO F(I)
590 PRINT".";
600 NEXT M
610 NEXT I
620 PRINT @962," ";
630 INPUT"PUT CASSETTE ON RECORD/ PRESS RETURN ";C$
632 CLS
633 INPUT"eNTER DATA FILE IDENTIFYING LABEL ";J$
634 PRINT#-1,J$
640 PRINT "WRITING lABELS TO CASSETTE "
650 PRINT#-1,Z,E$
660 PRINT"WRITING LABEL AND DATA FIELD LENGTHS "
670 FOR I=1 TO Z
680 PRINT#-1,L(I),C(I),F(I)
690 NEXT I
700 PRINT"END OF PROCESSING"
```

AUTOPOKE: by J.E. Kump

Exploit your Level II's ability to use speedy machine language routines in conjunction with slower BASIC routines. Autopoke will allow you to write most of your program in BASIC and insert machine language routines to speed things up. Strings are used to insert the machine language sections, and the program provides for checks on the error prone strings.
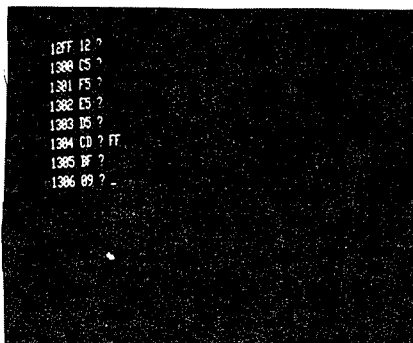

```
64000 PRINT"   ALL ENTRIES IN THIS PROGRAM MUST BE IN HEXIDECIMAL NOTATION EXCE
      PT THE LINE NUMBER OF THE FIRST DATA STRING."
64010 PRINT:PRINT"IF YOU WANT TO ENTER A NEW LINE NUMBER, ENTER X.
IF YOU WANT T
      O JUMP TO THE DATA STRING FORMAT SECTION, ENTER XX."
64100 PRINT:INPUT"ENTER THE ADDRESS YOU WANT TO EXAMINE OR CHANGE";A$:GOSUB64300
      :CLS
64110 D=Z:GOSUB64400:PRINTH$;" ";:D=PEEK(Z):GOSUB64400:PRINTH$;" ";:A$="":INPUTA
      $:IFA$=""THENZ=Z+1:GOTO64110
64120 IFA$="X"THEN64100
64130 IFA$="XX"THEN64200
64140 N=Z:GOSUB64300:POKEN,Z:Z=N+1:GOTO64110
64200 INPUT"FNTER THE FIRST ADDRESS OF THE ROUTINE.";A$:GOSUB64300:M=Z:INPUT"AND
      THE LAST ADDRESS.";A$:GOSUB64300:INPUT"ENTER THE DECIMAL LINE NUMBER OF TH
      E FIRST DATA STRING.";D$
64210 PRINT"THE DECIMAL STARTING ADDRESS IS";M:PRINT"TOTAL BYTES IN THE ROUTINE:
      ";Z-M+1:INPUT"PRESS ENTER FOR THE LISTING OF THE FIRST 60 BYTES OF THE
ROUT
      INE EXACTLY AS IT SHOULD APPEAR IN A DATA STRING.";X:J=M:CLS
64220 PRINT">";D$;"DATA";:FORI=JTOJ+59:N=PEEK(I):IFI>ZTHEN64290
64230 IFN>99P$=RIGHT$(STR$(N),3):GOTO64260
64240 IFN>9P$=RIGHT$(STR$(N),2):GOTO64260
64250 P$=RIGHT$(STR$(N),1)
64260 PRINTP$;:IFI<J+59ANDI<ZPRINT",";
64270 NEXT:PRINT:INPUT"PRESS ENTER FOR THE NEXT 60 BYTES.";A:J=J+60:X=VAL(D$)+10
      :Y=LEN(D$):D$=RIGHT$(STR$(X),Y):GOTO64220
64290 END
64300 F=16:Z=0:J=LEN(A$):FORK=1TOJ:B$(K)=MID$(A$,K,1):X=VAL(B$(K)):IFX>0THEN6433
      0
64310 IFB$(K)="0"THEN64360
64320 X=ASC(B$(K))-55
64330 P=J-K
64340 IFP>0THENX=X*F:P=P-1:GOTO64340
64350 Z=Z+X
64360 NEXT:RETURN
64400 N=1:IFD>255N=3
64410 H$="":FORI=NTO0STEP-1:K=INT(D/F[I):D=D-K*F[I:IFK>9THENH$=H$+CHR$(K+55):NEX
      TELSEH$=H$+RIGHT$(CHR$(K+48),1):NEXT
64420 RETURN
```

TECHNICAL

Differential Amplifiers	Frank Myers
Surveyor Calculations	Duane Bristow
Complex Circuit Analysis	G & M Diebert
Basechange	Ron Moehlis
Numerical Analysis 1	D. Carlsont
Applications For The LM3900	Tony Scarpelli
Data Analysis	Dave Dilllehay
ASHRAE	L & D Associates
Plumbing Design	L & D Associates
The Soundex Code	Robert Hodge
Calendar	Jim Malone

INTRODUCTION TO DIFFERENTIAL AMPLIFIERS:
by Frank J. Myers

This program is an introductory level course in the theory and design of differential amplifier circuits. Excellent graphics and step-by-step prompting make this program an excellent teaching aid for the electronics instructor. Several design problems are included for student practice.
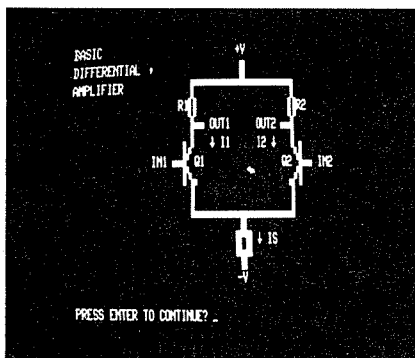

```
970  REM *** THE DIFFERENTIAL AMPLIFIER ***
980  REM *** BY FRANK M. MYERS ***
1000 CLS:PRINT CHR$(23):PRINT@450,"THE DIFFERENTIAL AMPLIFIER"
1010 FOR A=1TO1500:NEXT
1100 CLS:PRINT"    THE DIFFERENTIAL AMPLIFIER CIRCUIT IS THE MOST IM-"
1110 PRINT"PORTANT BUILDING BLOCK IN ANALOG CIRCUIT APPLICATION AND"
1120 PRINT"DESIGN. A DIFFERENTIAL AMPLIFIER, WHICH IS COMMONLY REFERRED"
1130 PRINT"TO AS A DIFF AMP, PROVIDES HIGH VOLTAGE GAIN TO DIFFERENTIAL"
1140 PRINT"SIGNALS APPLIED BETWEEN ITS INPUTS, AND PROVIDES LITTLE OR"
1150 PRINT"NO GAIN TO THOSE SIGNALS WHICH ARE COMMON TO BOTH INPUTS."
1160 PRINT"IN OTHER WORDS, THE DIFFERENTIAL AMPLIFIER PRODUCES AN AM-"
1170 PRINT"PLIFIED OUTPUT SIGNAL LINEARLY RELATED TO THE DIFFERENCE BE-"
1180 PRINT"TWEEN TWO INPUT SIGNALS."
1190 PRINT"    DESIGN SYMMETRY IS THE KEY TO THE OPERATION OF THE"
1200 PRINT"DIFFERENTIAL AMPLIFIER. THIS IS SHOWN IN THE FOLLOWING"
1210 PRINT"CIRCUIT.":PRINT:PRINT
1220 INPUT"PRESS ENTER TO CONTINUE";A
1222 GOSUB 1230
1223 GOSUB 1320
1225 GOTO 1680
1227 REM *** BASIC DIFFERENTIAL AMPLIFIER SCHEMATIC SUBROUTINES ***
1230 CLS:PRINT@64,"BASIC":PRINT@94+B,"+V":PRINT@128,"DIFFERENTIAL"
1240 PRINT@192,"AMPLIFIER"
1270 PRINT@275+B,"R1":PRINT@298+B,"R2":PRINT@345+B,"OUT1"
1280 PRINT@354+B,"OUT2":PRINT@409+B,CHR$(92):PRINT@411+B,"I1":PRINT@418+B,"I2"
1285 PRINT@421+B,CHR$(92):PRINT@462+B,"IN1":PRINT@470+B,"Q1"
1290 PRINT@487+B,"Q2":PRINT@494+B,"IN2"
1300 PRINT@738+B,CHR$(92):PRINT@740+B,"IS":PRINT@862+B,"-V"
1310 RETURN
1320 FOR A=43 TO 82
1330 SET(A+C,9):SET(A+C,30)
1340 NEXT A
1350 FOR A=6 TO 8
1360 SET(62+C,A):SET(63+C,A)
1370 NEXT A
1380 FOR A=19 TO 25
1390 SET(40+C,A):SET(85+C,A)
1400 NEXT A
1410 FOR A=15 TO 19
1420 SET(43+C,A):SET(82+C,A)
1430 NEXT A
1440 SET(43+C,10):SET(43+C,11):SET(82+C,10):SET(82+C,11):SET(44+C,25)
1445 SET(81+C,25)
1450 FOR A=25 TO 30
1460 SET(43+C,A):SET(82+C,A)
1470 NEXT A
1480 SET(42+C,20):SET(41+C,21):SET(41+C,23):SET(42+C,24):SET(83+C,20)
1485 SET(84+C,21)
1490 SET(84+C,23):SET(83+C,24)
1500 FOR A=12 TO 14
1510 SET(42+C,A):SET(44+C,A):SET(81+C,A):SET(83+C,A)
1520 NEXT A
1530 FOR A=44 TO 47
1540 SET(A+C,16):NEXT A
1550 FOR A=78 TO 81
1560 SET(A+C,16):NEXT A
```

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1570 FOR A=36 TO 39
1580 SET(A+C,22):NEXT A
1590 FOR A=86 TO 89
1600 SET(A+C,22):NEXT A
1610 FOR A=31 TO 33
1620 SET(62+C,A):SET(63+C,A):NEXT A
1630 FOR A=36 TO 38
1640 SET(62+C,A):SET(63+C,A):NEXT A
1650 FOR A=33 TO 36
1660 SET(60+C,A):SET(61+C,A):SET(64+C,A):SET(65+C,A):NEXTA
1670 RETURN
1675 REM *** END OF DIFFERENTIAL AMPLIFIER SCHEMATIC SUBROUTINES ***
1680 INPUT"PRESS ENTER TO CONTINUE";A
1690 CLS:PRINT"THE ABBREVIATED TERMS USED IN THE SCHEMATIC OF THE DIF-"
1695 PRINT"FERENTIAL AMPLIFIER ARE DEFINED AS FOLLOWS:"
1700 PRINT:PRINT"Q1=Q2=NPN TRANSISTORS"
1710 PRINT"R1=R2=MATCHED RESISTORS"
1720 PRINT"IS=CONSTANT CURRENT SINK"
1730 PRINT"IN1=INPUT 1"
1740 PRINT"IN2=INPUT 2"
1750 PRINT"OUT1=OUTPUT 1"
1760 PRINT"OUT2=OUTPUT 2"
1770 PRINT"+V=POSITIVE SUPPLY VOLTAGE"
1780 PRINT"-V=NEGATIVE SUPPLY VOLTAGE"
1785 PRINT"I1=CURRENT FLOW THROUGH Q1"
1786 PRINT"I2=CURRENT FLOW THROUGH Q2"
1790 PRINT:INPUT"PRESS ENTER TO CONTINUE";A
1800 CLS:PRINT@18,"CIRCUIT ANALYSIS"
1810 PRINT:PRINT"     AS I SAID EARLIER, THE KEY TO THE DIFFERENTIAL"
1820 PRINT"AMPLIFIER'S PERFORMANCE IS DESIGN SYMMETRY. THEREFORE, FOR"
1830 PRINT"THIS ANALYSIS THE FOLLOWIING ASSUMPTIONS WILL BE MADE:":PRINT
1840 PRINT"     1)  Q1 AND Q2 ARE PERFECTLY MATCHED TRANSISTORS."
1850 PRINT"     2)  R1 AND R2 ARE PERFECTLY MATCHED RESISTORS."
1860 PRINT"     3)  EQUAL INPUT VOLTAGES ARE APPLIED TO EACH INPUT."
1870 PRINT"         (VIN1=VIN2)"
1880 PRINT:PRINT"     THE CONSTANT CURRENT SINK (IS) SINKS A CONSTANT"
1890 PRINT"CURRENT AT ALL TIMES, REGARDLESS OF OTHER CIRCUIT CONDITIONS."
1900 PRINT:INPUT"PRESS ENTER TO CONTINUE";A
1910 CLS:PRINT"BEING THAT VIN1 AND VIN2 ARE OF EQUAL MAGNITUDES,"
1920 PRINT"EXACTLY HALF OF THE CURRENT (IS) FLOWS THROUGH Q1 AND"
1930 PRINT"HALF THROUGH Q2. THESE CURRENTS PRODUCE VOLTAGE DROPS"
1940 PRINT"ACROSS R1 AND R2, WHICH RESULT IN THE OUTPUT VOLTAGES 1"
1950 PRINT"AND 2 (VO1 AND VO2). THIS RELATIONSHIP IS EXPRESSED BY:"
1960 PRINT:PRINT@397,"VOD=(VO1-VO2)=A(VIN1-VIN2)"
1970 PRINT:PRINT"WHERE A IS THE VOLTAGE GAIN OF TRANSISTORS Q1 AND"
1980 PRINT"Q2 AS COMMON EMITTER AMPLIFIERS."
1990 PRINT:PRINT@719,"A=(VO1-VO2)/(VIN1-VIN2)"
2000 PRINT:INPUT"PRESS ENTER TO CONTINUE";A
2010 CLS:PRINT"     AS A RULE, (I1+I2=IS) DURING  NORMAL OPERATION OF THE"
2020 PRINT"DIFFERENTIAL AMPLIFIER. ANY DIFFERENCE BETWEEN VIN1 AND VIN2"
2030 PRINT"WILL CAUSE AN IMBALANCE IN THE CURRENTS I1 AND I2, BUT"
2040 PRINT"(I1+I2) MUST STILL EQUAL (IS).  THE FOLLOWING EXAMPLES WILL"
2050 PRINT"ILLUSTRATE THIS AND SHOW WHAT HAPPENS TO VO1 AND VO2 AS"
2060 PRINT"VIN1 AND VIN2 ARE CHANGED."
2062 PRINT:PRINT"IN THE FIVE EXAMPLES WHICH WILL BE GIVEN, THE FOLLOW--"
2064 PRINT"ING ASSUMPTIONS MUST BE MADE:":PRINT
2066 PRINT"(1) R1=R2=10K   (2) +V=15V   (3)  -V=-15V   (4) -V < VIN < +V"
2067 PRINT"(5) VIN1 - VIN2 < ABS(2)"
2068 PRINT:PRINT:INPUT"PRESS ENTER TO CONTINUE";A
2070 CLS:GOSUB 1230
2072 GOSUB 1320
2074 PRINT@896,:INPUT"PRESS ENTER TO CONTINUE";A
2075 FOR F=1TO5
2076 CLS:PRINT@10,"DIFFERENTIAL AMPLIFIER ANALYTICAL EXAMPLE ";F
2077 PRINT:INPUT"ENTER A VALUE FOR VIN1";V1
2078 PRINT:INPUT"ENTER A VALUE FOR VIN2";V2:PRINT:PRINT
2090 D=V1-V2:IT=3E-3:V=38.46153846:E=2.718281828
2091 R1=10E3:R2=R1:H=15:G=-15
2095 IF ABS(D)>2 PRINT"VIN1 - VIN2 > ABS (2)" : GOTO 2077
2096 CLS:PRINT@10,"DIFFERENTIAL AMPLIFIER ANALYTICAL EXAMPLE ";F
2097 GOSUB 2100
2098 GOTO 2230
2100 I1=(IT*(E[(V*D)]))/(1+(E[(V*D)]))
2110 I2=IT/(1+(E[(V*D)])):IS=I1+I2
2130 V3=(-I1*R1)+H:V4=(-I2*R2)+H
2131 IF ABS(V3)>ABS(G)THENGOTO10000
2132 IF ABS(V4)>ABS(G)THENGOTO10000
2135 B=12:C=24
2140 PRINT@94+B,"+V":PRINT@256,"VIN1=";V1;"V":PRINT@275+B,"R1"
2150 PRINT@298+B,"R2":PRINT@320,"VIN2=";V2;"V":PRINT@345+B,"VO1"
2160 PRINT@355+B,"VO2":PRINT@384,"I1=";I1;"A":PRINT@409+B,CHR$(92)
2170 PRINT@411+B,"I1":PRINT@418+B,"I2":PRINT@421+B,CHR$(92)
2180 PRINT@448,"I2=";I2;"A":PRINT@461+B,"VIN1":PRINT@470+B,"Q1"
2190 PRINT@487+B,"Q2":PRINT@494+B,"VIN2":PRINT@512,"IS=";IS;"A"
2200 PRINT@576,"VO1=";V3;"V":PRINT@640,"VO2=";V4;"V":PRINT@738+B,CHR$(92)
2210 PRINT@740+B,"IS":PRINT@862+B,"-V"
2220 GOSUB 1320
```

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2225 RETURN
2230 PRINT@896,:INPUT"PRESS ENTER TO CONTINUE";A
2240 NEXT F
2250 CLS:PRINT"     NOW THAT YOU THROUGHLY UNDERSTAND THE DIFFERENTIAL"
2260 PRINT"AMPLIFIER, I WILL GIVE YOU A CHANCE TO EXPERIMENT WITH DIF-"
2270 PRINT"FERENT VALUES FOR EACH OF THE CIRCUIT COMPONENTS WHICH MAKE"
2280 PRINT"UP THE BASIC DIFFERENTIAL AMPLIFIER. THIS WILL ALLOW YOU"
2290 PRINT"TO BETTER UNDERSTAND THE EFFECT OF THE COMPONENT VALUES ON"
2300 PRINT"THE OVERALL CIRCUIT OPERATION.  YOUR ONLY RESTRICTION IS THAT"
2310 PRINT"YOU MUST USE THE SAME BASIC DIFFERENTIAL AMPLIFIER CIRCUIT"
2320 PRINT"SCHEMATIC AS I DID."
2330 PRINT"      TO REFRESH YOUR MEMORY OF THAT SCHEMATIC, I WILL DRAW"
2340 PRINT"IT AGAIN BEFORE YOU BEGAN ENTERING THE COMPONENT VALUES.":PRINT:PRINT
2350 INPUT"PRESS ENTER TO CONTINUE";A
2355 B=0:C=0
2360 GOSUB 1230
2370 GOSUB 1320
2380 PRINT@896,:INPUT"PRESS ENTER TO CONTINUE";A
2390 CLS:PRINT@15,"DIFFERENTIAL AMPLIFIER DESIGN":PRINT
2400 INPUT"ENTER A VALUE FOR +V";H
2410 INPUT"ENTER A VALUE FOR -V";G
2420 INPUT"ENTER A VALUE FOR R1";R1
2430 INPUT"ENTER A VALUE FOR R2";R2
2440 INPUT"ENTER A VALUE FOR IS";IT
2450 INPUT"ENTER A VOLTAGE TO BE APPLIED TO INPUT 1";V1
2460 INPUT"ENTER A VOLTAGE TO BE APPLIED TO INPUT 2";V2
2465 D=V1-V2
2470 IF ABS(D)>2PRINT:PRINT"INPUT 1 - INPUT 2 > ABS(2)":GOTO 2450
2472 IF V1>HORV1<GPRINT:PRINT"INPUT 1 EXCEEDS + OR - V":GOTO2450
2474 IF V2>HORV2<GPRINT:PRINT"INPUT 2 EXCEEDS + OR - V":GOTO2460
2480 V=38.46153846:E=2.718281828
2485 CLS:PRINT@15,"DIFFERENTIAL AMPLIFIER DESIGN"
2490 GOSUB 2100
2500 PRINT@896,
2510 INPUT"DO YOU WISH TO ENTER ANOTHER SET OF COMPONENT VALUES";A$
2520 IF A$="YES"THEN2390
2530 CLS:PRINT"THIS ENDS THE THEORY AND PRACTICE SESSION ON DIFFERENTIAL"
2540 PRINT"AMPLIFIERS. NEXT, YOU WILL BE GIVEN A SHORT QUIZ ON THE"
2550 PRINT"SUBJECT, AND GRADED."
2560 FOR A=1TO3000:NEXT
2570 GOSUB 12000
2580 PRINT"(1)    DOES A DIFFERENTIAL AMPLIFIER PROVIDE HIGH VOLTAGE"
2590 INPUT"GAIN TO DIFFERENTIAL SIGNALS";A$
2600 IF A$="YES" GOSUB 13000 ELSE GOSUB 14000
2610 GOSUB 12000
2620 INPUT"(2)    WHAT IS ANOTHER NAME FOR THE DIFFERENTIAL AMPLIFIER";A$
2630 IF A$="DIFF AMP" GOSUB 13000 ELSE GOSUB 14000
2640 GOSUB 12000
2650 PRINT"(3)    DOES A DIFFERENTIAL AMPLIFIER PROVIDE HIGH VOLTAGE"
2660 INPUT"GAIN TO SIGNALS COMMON TO IT'S INPUTS";A$
2670 IF A$="NO" GOSUB 13000 ELSE GOSUB 14000
2680 GOSUB 12000
2690 PRINT"(4)    IS THE OUTPUT SIGNAL OF A DIFFERENTIAL AMPLIFIER"
2700 PRINT"LINEARLY RELATED TO THE DIFFERENCE BETWEEN TWO INPUT SIG-"
2710 INPUT"NALS";A$
2720 IF A$="YES" GOSUB 13000 ELSE GOSUB 14000
2730 GOSUB 12000
2740 PRINT"(5)    WHAT IS THE KEY TO THE PROPER OPERATION OF THE DIF-"
2750 INPUT"FERENTIAL AMPLIFIER";A$
2760 IF A$="DESIGN SYMMETRY" GOSUB 13000 ELSE GOSUB 14000
2770 GOSUB 12000
2780 PRINT"(6)    A CONSTANT CURRENT SINK (OR SOURCE) WILL SINK A CON-"
2790 PRINT"STANT CURRENT REGARDLESS OF OTHER CIRCUIT CONDITIONS WITH"
2800 PRINT"THE EXCEPTION OF POWER LOSS OR DEVICE JUNCTION BREAKDOWN."
2810 PRINT:INPUT"TRUE OR FALSE";A$
2820 IF A$="TRUE" GOSUB 13000 ELSE GOSUB 14000
2830 GOSUB 12000
2840 PRINT"(7)    REFERRING TO THE SCHEMATIC OF THE DIFFERENTIAL AM-"
2850 PRINT"PLIFIER USED IN THE EXAMPLES, I1 + I2 = IS."
2860 PRINT:INPUT"TRUE OR FALSE";A$
2870 IF A$="TRUE" GOSUB 13000 ELSE GOSUB 14000
2880 GOSUB 12000
2890 PRINT"(8)    ASSUME THAT A=-569.914. USING THE FORMULAE GIVEN"
2900 PRINT"IN THE CIRCUIT ANALYSIS SECTION OF THIS PRESENTATION, CAL-"
2910 PRINT"CULATE THE DIFFERENTIAL OUTPUT VOLTAGE (VOD) OF A DIFFEREN-"
2920 PRINT"TIAL AMPLIFIER IF 1.01 VOLTS WAS APPLIED TO INPUT 1 AND"
2930 PRINT"1 VOLT WAS APPLIED TO INPUT 2."
2940 PRINT:INPUT"ENTER YOUR ANSWER HERE";A
2950 IF A=-5.69914 GOSUB 13000 ELSE GOSUB 14000
2960 GOSUB 15000
10000 FOR A=1TO5
10010 CLS:PRINT CHR$(23):PRINT@466,"DESIGN ERROR"
10020 FOR J=1TO50:NEXTJ
10030 CLS
10040 FOR J=1TO50:NEXTJ
10050 NEXT A
```

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10060 PRINT@448,"THE OUTPUT VOLTAGE IS ATTEMPTING TO EXCEED ABS(-V)."
10070 PRINT"CHECK THE VALUE OF R1 AND R2 OR IS."
10080 FOR J=1TO1500:NEXTJ
10090 GOTO 2390
12000 CLS:PRINT@15,"DIFFERENTIAL AMPLIFIER QUIZ":PRINT:PRINT
12010 RETURN
13000 CLS:PRINT CHR$(23):PRINT@470,"CORRECT"
13010 Q=Q+1
13020 FOR A=1TO1000:NEXT
13030 RETURN
14000 CLS
14010 FOR A=1 TO 5
14020 PRINT CHR$(23):PRINT@470,"WRONG"
14030 FOR B=1 TO 50:NEXTB
14040 CLS
14050 FOR B=1 TO 50:NEXTB
14060 NEXT A
14070 RETURN
15000 CLS:A=(Q/8)*100:PRINT CHR$(23)
15010 PRINT@448,"YOUR QUIZ SCORE IS";A;"PERCENT."
15020 FOR B=1TO1500:NEXT
15030 CLS:PRINT CHR$(23):PRINT@470,"THE END"
15040 FOR B=1TO1000:NEXT:CLS
15050 REM *** END OF PROGRAM ***
```

SURVEYOR CALCULATIONS: by Duane Bristow

This program will draw a rough plot from bearings, or azimuths and distances. Latitudes and departures, error of closure, and DMP areas in closed traverses are also calculated. Data can be saved on tape, and up to 499 bearings and distances may be entered.

```
10 GOSUB10000:CLEAR100:CLS:Q=449:DIMB(Q),DI(Q),DE(Q),L(Q):ONERRORGOTO70:K1=.0174
   533:K2=57.29578:Q$="#####.###"
20 PRINTTAB(10)"S U R V E Y I N G   C A L C U L A T I O N S":PRINT:PRINT"COPYRIG
   HT 1979 BY DUANE BRISTOW, ALBANY, KY."
30 PRINT:PRINT"THIS PROGRAM ALLOWS THE SURVEYOR TO ENTER EITHER BEARINGS OR    A
   ZIMUTHS AND DISTANCES OF A TRAVERSE. THE PROGRAM WILL THEN DRAWA ROUGH PLAT
   , CALCULATE LATITUDES AND DEPARTURES, ERROR OF     CLOSURE, AND IF THE TRA
   VERSE CLOSES, ";
40 PRINT"DMD AREA.  IT WILL ALSO    CALCULATE THE BEARING OF CLOSURE AND BALANCE
      LATITUDES AND        DEPARTURES.  ALL DATA CAN BE SAVED ON TAPE FOR LATER US
   E.":PRINT"THE PROGRAM ALLOWS ENTRY OF UP TO";Q;"BEARINGS AND DISTANCES."
45 PRINT"USE OF A PRINTER WILL ALLOW A HARDCOPY PLAT.":PRINT:INPUT"ENTER 'B' FOR
      OUTPUT IN BEARINGS OTHERWISE OUTPUT WILL BE        AZIMUTH";BE$
50 Q=0:PRINT"    *** 'B' FOR BACKUP. [ FOR MENU.  ***":GOTO100
70 PRINT:PRINT"ERROR OF TYPE";ERR/2+1;"IN LINE";ERL:RESUME510
95 PRINT"BACKUP! ";:N=N-1
96 IFBE$="B"THENA=B(N+1):GOSUB900ELSEA$=STR$(B(N+1))
97 IFN<0THENN=0
98 PRINT"STATION";N+1;"BEARING ";A$;" DISTANCE";DI(N+1)
100 A$="[":PRINT"STATION";N+1:INPUT"BEARING";A$:IFA$="B"THEN95ELSEIFA$="["THEN5
   00ELSEIFLEFT$(A$,1)="N"ORLEFT$(A$,1)="S"THEN150ELSEIFASC(A$)>57ORASC(A$)<48
   THENPRINT"REDO ";:GOTO100ELSEA=VAL(A$)
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102 IFA<ØTHEN1ØØELSEIFA>36ØTHENA=A-36Ø:GOTO1Ø2
1Ø4 N=N+1:B(N)=A
11Ø INPUT"DISTANCE";DI(N):IFDI(N)<ØTHENPRINT"REDO ";:GOTO11Ø
115 Q=Q+1:DE(N)=SIN(B(N)*K1)*DI(N):L(N)=COS(B(N)*K1)*DI(N)
12Ø IFQ=7THEN5ØELSE1ØØ
15Ø B$=LEFT$(A$,1):A$=RIGHT$(A$,LEN(A$)-1):A=VAL(A$):IFA<ØORA>9ØTHENPRINT"REDO "
    ::GOTO1ØØELSEA$=RIGHT$(A$,1):IFB$="N"THEN18Ø
155 IFA$="E"THEN17ØELSEIFA$<>"W"THENPRINT"REDO ";:GOTO1ØØELSEA=18Ø+A:GOTO1Ø4
17Ø A=18Ø-A:GOTO1Ø4
18Ø IFA$="E"THEN1Ø4ELSEIFA$<>"W"THENPRINT"REDO ";:GOTO1ØØELSEA=36Ø-A:GOTO1Ø4
2ØØ CLS:PRINT"JUST A SEC.":L3=Ø:D3=Ø:L1=Ø:D1=Ø:D2=Ø:FORI=ØTON:D3=D3+DE(I):L
    3=L3+L(I):IFD3>=D2THEND2=D3ELSEIFD3<=D1THEND1=D3
2Ø2 IFL3>=L2THENL2=L3ELSEIFL3<=L1THENL1=L3
2Ø4 NEXT:A$="":A=1Ø4:Q=46:RO=2.28:INPUT"WILL YOU WANT A HARDCOPY OF PLAT";A$:IFL
    EFT$(A$,1)="Y"THENCI=1Ø:LI=6:CH=8Ø:GOTO3ØØØ
2Ø8 CLS:X1=D2-D1:Y1=L2-L1:IFX1>Y1THENX1=A/X1:Y1=X1/ROELSEY1=Q/X1:X1=Y1*RO
21Ø Q=Ø:DD=DE(1):AR=Ø:D3=Ø:L3=Ø:FORI=ØTON
215 AR=AR+DD*L(I):D3=D3+DE(I):L3=L3+L(I):Q=Q+DI(I)
22Ø X8=X1*(D3-D1):Y8=Y1*(L3-L1)
23Ø J=I+1:IFI=NTHENJ=Ø
24Ø DD=DE(I)+DE(J):X9=X1*(D3+DE(J)-D1):Y9=Y1*(L3+L(J)-L1)
245 S=SGN(X9-X8):IFABS(X9-X8)<.5THENX8=X9-.Ø1:S=.ØØØ5
25Ø M=(Y9-Y8)/(X9-X8):B=Y8-M*X8
26Ø FORX=X8TOX9STEPS
27Ø Y=M*X+B:IFX>=-.5ANDX<=127.9ANDY>=-.4ØANDY<=47.5THENSET(X+.5,47.5-Y)
28Ø NEXTX,I
285 A$=INKEY$:PRINT@245,"PRESS ANY";:PRINT@3Ø9,"KEY TO";:PRINT@373,"CONTINUE,";:
    PRINT@5Ø1,"OR PRESS P";:PRINT@565,"FOR";:PRINT@629,"PRINTED";:PRINT@693,"CO
    PY.";
29Ø A$=INKEY$:IFA$=""THEN29ØELSEIFA$="P"ANDPEEK(14312)=63THENGOSUB2ØØØ
3ØØ CLS:IFL3=ØTHENL3=.ØØØØØ1
3Ø5 A=SQR(D3[2+L3[2):IFA<.Ø1*QTHENPRINT"AREA IS";TAB(5Ø)USING"#####.##";ABS(AR/2
    ):Q=1:INPUT"ENTER CONVERSION FACTOR BY WHICH TO DIVIDE";Q:PRINT"AREA IS";AR/2
    B(5Ø)USING"#####.##";ABS(AR/(2*Q))
31Ø PRINT:PRINT"SUM OF LATITUDES IS";TAB(5Ø)USINGQ$;L3:PRINT"SUM OF DEPARTURES I
    S";TAB(5Ø)USINGQ$;D3:PRINT"ERROR OF CLOSURE IS";TAB(5Ø)USINGQ$;A:PRINT"AZIM
    UTH BEARING OF CLOSURE IS";TAB(5Ø):A=K2*ATN(D3/L3):A=A+36Ø:IFL3>ØTHENA=A-1
    8Ø
315 IFA>36ØTHENA=A-36Ø
317 A=INT(A*1ØØØ)/1ØØØ:IFB$="B"THENGOSUB9ØØELSEA$=STR$(A)
32Ø PRINTA$:PRINT:GOTO5Ø
5ØØ CLS
51Ø PRINT"PRESS NUMBER TO:":PRINT"    1.  ADD BEARINGS?":PRINT"    2.  TAPE DA
    TA OR RECALL FROM TAPE?":PRINT"    3.  BALANCE LATITUDES AND DEPARTURES?":
    PRINT"    4.  DRAW PLAT AND CALCULATE AREA AND ERROR OF CLOSURE?"
515 PRINT"    5.  RECALL ALL BEARINGS AND DISTANCES?"
52Ø A$=INKEY$:IFA$=""THEN52ØELSEA=VAL(A$):IFA<1ORA>5THEN52ØELSECLS:ONAGOTO5Ø,6ØØ
    ,8ØØ,2ØØ,1ØØØ:GOTO5ØØ
6ØØ PRINT"PRESS NUMBER TO:":PRINT"    1.  TAPE DATA FROM MEMORY?":PRINT"    2.
    RECALL DATA FROM TAPE?":PRINT"    3.  CHECK RECORDED DATA?":PRINT"    4
    .  NEITHER OF THE ABOVE?"
61Ø A$=INKEY$:IFA$=""THEN61ØELSEA=VAL(A$):IFA<1ORA>4THEN61ØELSECLS:ONAGOTO62Ø,65
    Ø,7ØØ,5ØØ:GOTO6ØØ
62Ø PRINT"SET UP RECORDER WITH BLANK TAPE, PRESS RECORD AND PLAY KEYS.":PRINT"WH
    EN READY ENTER LABEL FOR TAPE.":INPUTA$
625 PRINT#-1,A$,N:FORI=ØTONSTEP15:PRINT@9ØØ,I;"-";I+14;
63Ø PRINT#-1,B(I),DI(I),B(I+1),DI(I+1),B(I+2),DI(I+2),B(I+3),DI(I+3),B(I+4),DI(I
    +4),B(I+5),DI(I+5),B(I+6),DI(I+6),B(I+7),DI(I+7),B(I+8),DI(I+8),B(I+9),DI(I
    +9),B(I+1Ø),DI(I+1Ø),B(I+11),DI(I+11),B(I+12),DI(I+12),B(I+13),DI(I+13),B(I
    +14),DI(I+14)
635 NEXT:PRINT"ALL DATA IS NOW RECORDED ON TAPE!":PRINT:GOTO6ØØ
65Ø PRINT"SET UP RECORDER AND RUN TAPE TO PROPER STARTING POSITION.         PRESS
    PLAY KEY.":INPUT#-1,A$,N:PRINT:PRINT"READING TAPE: ";A$
66Ø FORI=ØTONSTEP15:PRINT@9ØØ,I;"-";I+14;
67Ø INPUT#-1,B(I),DI(I),B(I+1),DI(I+1),B(I+2),DI(I+2),B(I+3),DI(I+3),B(I+4),DI(I
    +4),B(I+5),DI(I+5),B(I+6),DI(I+6),B(I+7),DI(I+7),B(I+8),DI(I+8),B(I+9),DI(I
    +9),B(I+1Ø),DI(I+1Ø),B(I+11),DI(I+11),B(I+12),DI(I+12),B(I+13),DI(I+13),B(I
    +14),DI(I+14)
68Ø NEXT:GOSUB77Ø:PRINT"ALL DATA IS NOW IN MEMORY!":PRINT:GOTO51Ø
7ØØ PRINT"REWIND RECORDER TO PROPER STARTING PLACE AND PRESS PLAY KEY.":INPUT#-1
    ,A$,J:PRINT:PRINT"CHECKING TAPE: ";A$:IFJ<>NTHEN75Ø
71Ø FORI=ØTONSTEP15:PRINT@9ØØ,I;"-";I+14;
72Ø INPUT#-1,L(I),DE(I),L(I+1),DE(I+1),L(I+2),DE(I+2),L(I+3),DE(I+3),L(I+4),DE(I
    +4),L(I+5),DE(I+5),L(I+6),DE(I+6),L(I+7),DE(I+7),L(I+8),DE(I+8),L(I+9),DE(I
    +9),L(I+1Ø),DE(I+1Ø),L(I+11),DE(I+11),L(I+12),DE(I+12),L(I+13),DE(I+13),L(I
    +14),DE(I+14)
725 NEXT:FORI=ØTON:IFABS(L(I)-B(I)+DI(I)-DE(I))>.Ø5THEN75Ø
73Ø NEXT:PRINT"TAPE IS GOOD!":GOSUB77Ø:PRINT:GOTO6ØØ
75Ø PRINT"BAD DATA ON TAPE!!":GOSUB77Ø:PRINT:GOTO6ØØ
77Ø FORI=ØTON:DE(I)=SIN(B(I)*K1)*DI(I):L(I)=COS(B(I)*K1)*DI(I):NEXT:RETURN
8ØØ L3=Ø:D3=Ø:L1=Ø:FORI=ØTON:PRINT@RND(1Ø23),"*";:DE(I)=SIN(B(I)*K1)*DI(I):L(I)=
    COS(B(I)*K1)*DI(I):L3=L3+L(I):D3=D3+DE(I):L1=L1+DI(I):NEXT
81Ø FORI=ØTON:PRINT@RND(1Ø23),"*";:DE(I)=DE(I)-D3*DI(I)/L1:L(I)=L(I)-L3*DI(I)/L1
    :NEXT:PRINT@9ØØ,"ALL LATITUDES AND DEPARTURES BALANCED BY COMPASS RULE.":A$
    ="":PRINT:INPUT"DO YOU WISH TO LIST ADJUSTED BEARINGS AND DISTANCES";A$:IFL
    EFT$(A$,1)<>"Y"THEN5ØØ
82Ø CLS:PRINT"STATION";TAB(12)"BEARING";TAB(24)"DISTANCE";TAB(36)"ADJ. BEARING";
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          TAB(50)"ADJ. DISTANCE"
825  FORI=0TON:IFBE$="B"THENA=B(I):GOSUB900ELSEA$=STR$(B(I))
830  PRINTTAB(5)I;TAB(15)A$;TAB(27)DI(I);:J=SQR(DE(I)[2+L(I)[2)
832  IFL(I)<>0THENA=K2*ATN(DE(I)/L(I))ELSEA=0
833  A=A+360:IFL(I)<0THENA=A-180
834  IFA>=360THENA=A-360
835  IFBE$="B"GOSUB900ELSEA$=STR$(A)
836  PRINTTAB(39)A$;:PRINTTAB(52)J:IFI>0ANDI/14=INT(I/14)THENINPUT"PRESS ENTER";B
     $
840  NEXT:INPUT"PRESS ENTER";A$:GOTO500
900  IFA>270THENA$="N"+STR$(360-A)+" W"ELSEIFA>180THENA$="S"+STR$(A-180)+" W"ELSE
     IFA>90THENA$="S"+STR$(180-A)+" E"ELSEA$="N"+STR$(A)+" E"
910  RETURN
1000 '
1010 PRINT"STATION";TAB(12)"BEARING";TAB(24)"DISTANCE";TAB(36)"LATITUDE";TAB(48)
     "DEPARTURE"
1015 FORI=0TON:A=B(I):IFBE$="B"THENGOSUB900ELSEA$=STR$(A)
1020 PRINTTAB(5)I;TAB(15)A$;TAB(27)DI(I);TAB(39)L(I);TAB(51)DE(I):IFI>0ANDI/12=I
     NT(I/12)THENGOSUB1100
1050 NEXT:GOSUB1100:GOTO500
1100 J=9999:INPUT"ENTER STATION # TO CHANGE DATA OR PRESS ENTER TO CONTINUE";J
1102 IFJ<0ORJ>NTHENRETURNELSEA=B(J):IFBE$="B"THENGOSUB900ELSEA$=STR$(A)
1110 PRINT"BEARING: PRESS ENTER FOR ";A$;" OR ENTER NEW BEARING";:INPUTA$:GOSUB1
     200:B(J)=A:PRINT"DISTANCE:  PRESS ENTER FOR";DI(J);"OR ENTER NEW DISTANCE";
     :INPUTDI(J)
1120 DE(J)=SIN(B(J)*K1)*DI(J):L(J)=COS(B(J)*K1)*DI(J):RETURN
1200 IFLEFT$(A$,1)<>"N"ANDLEFT$(A$,1)<>"S"THENA=VAL(A$):RETURN
1210 B$=LEFT$(A$,1):A$=RIGHT$(A$,LEN(A$)-1):A=VAL(A$):IFA<0ORA>90THENA=0ELSEA$=R
     IGHT$(A$,1):IFB$="N"THEN1280
1220 IFA$="W"THENA=180+A:RETURN
1230 A=180-A:RETURN
1280 IFA$="E"THENRETURNELSEA=360-A:RETURN
2000 FORI=(46-INT(A/RO+.5))TO47:FORJ=1TOA
2010 IFPOINT(J,I)=0THENLPRINT" ";ELSELPRINT"*";
2020 NEXTJ:IFCH>ATHENLPRINT" "
2040 NEXT:RETURN
3000 PRINT"PLAT ON VIDEO SCREEN MAY BE OUT OF PROPORTION EITHER HORIZONALLYOR VE
     RTICALLY TO ALLOW CORRECT SCALE ON HARDCOPY PRINT.":INPUT"# CHARACTERS PER
     LINE";CH:INPUT"# LINES PER INCH";LI:INPUT"# CHARACTERS PER INCH";CI:RO=CI/L
     I
3002 A=CH:IFA>104THENA=104
3004 Q=INT(A/RO+.5):IFQ>46THENQ=46:A=INT(Q*RO+.5)
3010 GOTO208
10000 RETURN
```

COMPLEX CIRCUIT ANALYSIS: by G & M Diebert

Nine configurations of R, L and C circuits are presented in this program. Resonant frequency, R values, L values and C values are input by the user. The computer will calculate' reactance, phase angle and total impedance. A very handy tool for the designer.
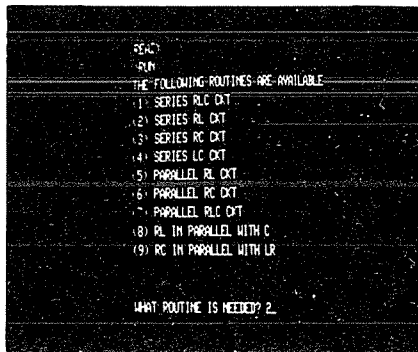
```
5 W=57.296
10 A=3.145927
15 GOSUB6000
30 INPUT"WHAT ROUTINE IS NEEDED";T
40 ONT GOTO100,300,400,500,700,800,900,1000,1100
100 PRINT"SERIES R L C CIRCUIT"
105 PRINT
```

```
110 GOSUB3000
120 Z=((R[2+ABS(X-X1)[2)[.5)
125 U=(X-X1):IFX1>XTHENU=U*(-1)
130 P=ATN((U)/R)*W
140 PRINT"THE REACTANCE OF L IS ";X;" OHMS"
145 PRINT"THE REACTANCE OF C IS ";X1;" OHMS"
150 GOSUB2000
160 PRINT"THE CIRCUIT IMPEDANCE IS ";Z;" OHMS ";
170 IFX>X1THENPRINT"INDUCTIVE WITH A PHASE ANGLE OF ";P;" DEGREES"
180 IFX1>XTHEN PRINT"CAPACITIVE WITH A PHASE ANGLE OF ";P;" DEGREES"
190 GOTO5000
300 PRINT"FOR R & L IN SERIES"
302 PRINT
305 GOSUB3000
310 Z=(R[2+X[2)[.5
320 P=ATN(X/R)*W
330 PRINT"THE CIRCUIT Z IS ";Z;" OHMS INDUCTIVE WITH A PHASE ANGLE OF ";P;" DEGR
    EES"
335 PRINT"THE REACTANCE IS ";X;" OHMS"
340 GOTO5000
400 PRINT"SERIES CIRCUIT OF R & C"
405 PRINT
410 GOSUB3000
415 PRINT"THE REACTANCE OF C IS ";X1;" OHMS"
420 Z=(R[2+X1[2)[.5
430 P=ATN(X1/R)*W
440 PRINT"THE CIRCUIT Z IS ";Z;" OHMS WITH A PHASE ANGLE OF -";P;" DEGREES"
450 GOTO5000
500 PRINT"SERIES L & C"
510 GOSUB3000
520 PRINT"THE CIRCUIT Z IS ";ABS(X-X1);" OHMS"
530 IFX>X1THENPRINT"THE PHASE ANGLE IS 90 DEGREES"
540 IFX1>XTHENPRINT"THE PHASE ANGLE IS -90 DEGREES"
550 IFX=X1THENPRINT"THE PHASE ANGLE IS 0 DEGREES"
560 PRINT"THE XL IS ";X;" OHMS & THE XC IS ";X1;" OHMS"
570 GOTO5000
700 PRINT"R & L IN PARALLEL"
705 PRINT
710 GOSUB3000
720 PRINT"THE XL IS ";X;" OHMS"
730 PRINT"THE CIRCUIT Z IS ";(R*X)/((R[2+X[2))[.5
740 PRINT"THE PHASE ANGLE IS ";ATN(R/X)*W;" DEGREES"
750 GOTO5000
800 PRINT"R & C IN PARALLEL"
810 GOSUB3000
812 J=(R/X1)
815 GOSUB2000
820 PRINT"THE CIRCUIT Z IS ";(R*X1)/((R[2+X1[2)[.5);" OHMS AT -";P;" DEGREES"
840 PRINT"THE XC IS ";X1;" OHMS"
850 GOTO5000
900 PRINT" R L C IN PARALLEL"
910 GOSUB3000
912 U=(R*X1)-(R*X1)
913 J=(R*X*X1)/(X*X1)
915 IFX1>XTHENU=U*(-1)
920 Z=(R*X*X1)/(((X[2)*(X1[2)+(U)[2)[.5)
930 P=ATN(((R*X1)-(R*X))/(X1*X))*W
935 IFX1>XTHENP=P*(-1)
940 PRINT"THE XL IS ";X;" OHMS, XC= ";X1;" OHMS THE IMPEDANCE IS ";
950 PRINTZ;"OHMS WITH A PHASE ANGLE OF ";P;" DEGREES"
960 GOSUB5000
1000 PRINT"R & L IN PARALLEL WITH C"
1010 GOSUB3000
1020 U=(X-X1)
1030 IFX1>XTHENU=U*(-1)
1040 Z=X1*(((R[2+X[2)/(R[2+U[2))[.5)
1045 P=ATN(((X*X1)-X[2-R[2)/(R*X1))*W
1060 PRINT"THE XL = ";X;" OHMS, XC = ";X1;" OHMS, THE CIRCUIT Z IS ";Z;" OHMS"
1080 PRINT"THE CIRCUIT PHASE ANGLE IS ";P;" DEGREES"
1090 GOTO5000
1100 PRINT"R & C IN PARALLEL WITH L & R"
1110 INPUT"WHAT IS THE INDUCTANCE AND SERIES RESISTANCE";L,R1
1120 INPUT"WHAT IS THE CAPACITANCE AND SERIES RESISTANCE";C,R2
1130 INPUT"WHAT IS THE FREQUENCY";F
1140 X=2*A*F*L
1145 X1=1/(2*A*F*C)
1150 Z=(((R1[2+X[2)*(R2[2+X1[2))/((R1+R2)[2+ABS(X-X1)[2))[.5
1160 P=ATN((X*(R2[2+X1[2)-X1*(R1[2+X[2))/(R1*(R2[2+X1[2)+R2*(R1[2+X[2)))*W
1170 PRINT
1175 CLS
1180 PRINT"THE CIRCUIT Z IS ";Z;" OHMS AT AN ANGLE OF ";P;" DEGREES."
1190 PRINT"THE XL OF THE INDUCTANNCE IS ";X;" OHMS AT A ";
1191 PRINT"PHASE ANGLE OF ";ATN(X/R1)*W;" DEGREES"
1195 PRINT"THE XC OF THE CAPACITOR IS ";X1;" OHMS AT A PHASE ANGLE OF ";-ATN(X1/
    R2)*W;"DEGREES"
1200 GOTO5000
2000 P=ATN(J)*W
```

```
2010 RETURN
3000 INPUT"WHAT IS THE FREQUENCY";F
3010 INPUT"WHAT IS THE R VALUE";R
3020 INPUT"WHAT IS THE L VALUE";L
3030 INPUT"WHAT IS THE C VALUE";C
3040 X=2*A*F*L
3045 IFC=0THENRETURN
3050 X1=1/(2*A*F*C)
3060 RETURN
5000 INPUT"ANOTHER 1=YES 0=NO";S
5010 CLS
5020 IFS=1GOTO15
5030 END
6000 PRINT"THE FOLLOWING ROUTINES ARE AVAILABLE"
6010 PRINT"(1) SERIES RLC CKT"
6020 PRINT"(2) SERIES RL CKT"
6030 PRINT"(3) SERIES RC CKT"
6040 PRINT"(4) SERIES LC CKT"
6050 PRINT"(5) PARALLEL RL CKT"
6060 PRINT"(6) PARALLEL RC CKT"
6070 PRINT"(7) PARALLEL RLC CKT"
6080 PRINT"(8) RL IN PARALLEL WITH C"
6090 PRINT"(9) RC IN PARALLEL WITH LR"
6100 PRINT:PRINT:RETURN
```

BASECHANGE: by Ron Moehlis

A godsend for computer freaks whose friends insist on programming in octal or hex decimal. Enter the base and number given, select the new base and zap, the number, as it appears in the new base, is displayed on the monitor. Almost too easy.


```
1 REM *** BASE CHANGE ***
2 REM *** BY RON MOEHLIS ***
5 CLEAR(1000)
6 DEFDBL S,X,Y,W,R,Z
7 CLS
10 DIM B$(50),C$(50)
20 N$="123456789ABCDEF"
30 INPUT"   ENTER THE BASE, THEN THE NUMBER";BI,A$
40 NL=0:NR=0:P=0:S=0
50 FOR I=1 TO LEN(A$)
60 IF MID$(A$,I,1)=" " THEN 140
70 IF MID$(A$,I,1)<>"." THEN 90
80 P=1:GOTO 140
90 IF P=1 THEN 120
100 NL=NL+1
110 B$(NL)=MID$(A$,I,1):GOTO 140
120 NR=NR+1
130 C$(NR)=MID$(A$,I,1)
140 NEXT I
150 S=0
155 IF NL=0 THEN 220
160 FOR I=1 TO NL:Z=1:FOR J=1 TO BI-1
170 IF B$(I)="0" THEN 210
180 IF B$(I)<>MID$(N$,J,1) THEN 200
184 IF NL-I=0 THEN 190
185 FOR K=1 TO NL-I:Z=Z*CDBL(BI):NEXT K
190 S=S+CDBL(J)*Z:GOTO 210
200 NEXT J:PRINT "ERROR IN LEFT ";A$: GOTO 30
210 NEXT I
214 S=INT(S)
```
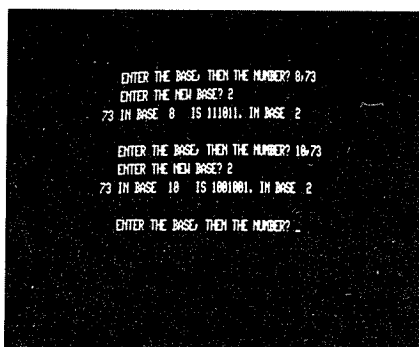
```
215 IF NR=0 THEN 275
220 FOR I=1 TO NR:Z=1:FOR J= 1 TO BI-1
230 IF C$(I)="0" THEN 270
240 IF C$(I)<>MID$(N$,J,1) THEN 260
245 FOR K=1 TO I:Z=Z*CDBL(BI):NEXT K
250 S=S+CDBL(J)/Z:GOTO 270
260 NEXT J:PRINT" ERROR IN RIGHT ";A$: GOTO 30
270 NEXT I
275 INPUT"    ENTER THE NEW BASE";BO
276 IF BO<>10 THEN 340
280 PRINT A$;" IN BASE ";BI;" IS ";S;" IN BASE 10":PRINT
290 GOTO 30
340 D$=A$:SL=INT(S):SR=S-SL:A$="":K=0
350 IF SL=0 THEN 410
360 X=INT(SL/BO):R=SL-X*BO
370 IF R<>0 THEN 390
380 A$="0"+A$:GOTO 400
390 A$=MID$(N$,R,1)+A$
400 SL=X:GOTO 350
410 A$=A$+"."
420 IF SR=0 THEN 490
430 K=K+1:IF K=40 THEN 490
440 W=INT(SR*BO):Y=SR*BO-W
450 IF W>0 THEN 470
455 IF W<0THEN 490
460 A$=A$+"0":GOTO 480
470 A$=A$+MID$(N$,W,1)
480 SR=Y:GOTO 420
490 PRINTD$;" IN BASE ";BI;"  IS ";A$;" IN BASE ";BO
495 PRINT
500 GOTO 30
```

NUMERICAL ANALYSIS 1: by D. Carlson

This program is designed to aid in calculations of three different types of interpolations, including: Neville's Iteration, Natural Cubic Splines and Clamped Splines. More than that, none of our editors can tell you!
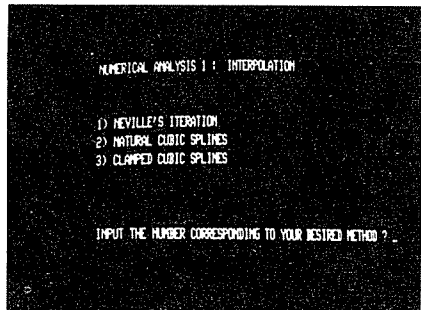

```
100 CLS
110 CLS
120 DEFINT I,J,K,N
130 DEFDBL A,B,C,D,F,L,M,Q,X,Y,Z
140 DIM A(20),B(20),C(20),D(20),L(20),M(20),Q(20,20),X(20),Y(20),Z(20)
150 PRINT "NUMERICAL ANALYSIS 1 :   INTERPOLATION":PRINT:PRINT
160 PRINT "1) NEVILLE'S ITERATION
170 PRINT "2) NATURAL CUBIC SPLINES"
180 PRINT "3) CLAMPED CUBIC SPLINES"
190 PRINT:PRINT:PRINT
200 INPUT "INPUT THE NUMBER CORRESPONDING TO YOUR DESIRED METHOD ";C
210 IF C=1 GOTO 260
220 IF C=2 GOTO 550
230 IF C=3 GOTO 1070
240 PRINT "INVALID REPLY. I REPEAT,"
250 GOTO 200
260 CLS
270 PRINT "NEVILLE'S ITERATED INTERPOLATION":PRINT
280 INPUT "INPUT THE X VALUE YOU WISH TO INTERPOLATE F(X) ON ";X
290 INPUT "INPUT THE NUMBER OF DATA POINTS (MUST BE 20 OR LESS) ";N:N=N-1
300 IF N>20 PRINT "TOO MANY. I REPEAT,"
```

```
310 IF N>20 GOTO 290
320 CLS
330 PRINT "INPUT THE DATA AS X,F(X)":PRINT
340 FOR K=0 TO N
350 INPUT X(K),Q(K,0)
360 NEXT K
370 FOR I=1 TO N
380 FOR J=1 TO I
390 Q(I,J)=((X-X(I))*Q(I-1,J-1)-(X-X(I-J))*Q(I,J-1))/(X(I-J)-X(I))
400 NEXT J
410 NEXT I
420 CLS
430 PRINT "F(";X;") APPROXIMATELY EQUALS ";Q(N,N):PRINT
440 INPUT "ANOTHER X VALUE TO INTERPOLATE ON (Y OR N) ";REPLY$
450 IF (REPLY$="NO") OR (REPLY$="N") GOTO 490
460 IF (REPLY$<>"YES") AND (REPLY$<>"Y") GOTO 440
470 INPUT "INPUT THE NEW X VALUE ";X
480 GOTO 370
490 INPUT "ANOTHER FUNCTION TO INTERPOLATE (Y OR N) ";REPLY$
500 IF (REPLY$="NO") OR (REPLY$="N") THEN END
510 IF (REPLY$<>"YES") AND (REPLY$<>"Y") GOTO 490
520 CLS
530 GOTO 270
540 END
550 A$="##   ##.##########[[[   ##.##########[[[   ##.##########[[["
560 CLS
570 PRINT "NATURAL CUBIC SPLINE INTERPOLATION":PRINT
580 INPUT "INPUT THE NUMBER OF DATA POINTS (MUST BE 20 OR LESS) ";N
590 IF N>20 PRINT "TOO MANY. I  REPEAT,"
600 IF N>20 GOTO 580
610 N=N-1
620 CLS
630 PRINT "INPUT THE DATA AS X,F(X) ":PRINT
640 FOR I=0 TO N
650 INPUT X(I),Y(I)
660 NEXT I
670 FOR I=1 TO N-1
680 A(I)=3*(Y(I+1)*(X(I)-X(I-1))-Y(I)*(X(I+1)-X(I-1))+Y(I-1)*(X(I+1)-X(I)))/((X(
    I+1)-X(I))*(X(I)-X(I-1)))
690 NEXT I
700 L(0)=1:M(0)=0:Z(0)=0
710 FOR I=1 TO N-1
720 L(I)=2*(X(I+1)-X(I-1))-(X(I)-X(I-1))*M(I-1)
730 M(I)=(X(I+1)-X(I))/L(I)
740 Z(I)=(A(I)-(X(I)-X(I-1))*Z(I-1))/L(I)
750 NEXT I
760 L(N)=1:Z(N)=0:C(N)=0
770 FOR J=N-1 TO 0 STEP -1
780 C(J)=Z(J)-M(J)*C(J+1)
790 B(J)=(Y(J+1)-Y(J))/(X(J+1)-X(J))-(X(J+1)-X(J))*(C(J+1)+2*C(J))/3
800 D(J)=(C(J+1)-C(J))/3/(X(J+1)-X(J))
810 NEXT J
820 CLS
830 PRINT "  J          B(J)               C(J)               D(J)":PRINT
840 FOR J=0 TO N-1
850 PRINT USING A$; J,B(J),C(J),D(J)
860 NEXT J
870 PRINT
880 INPUT "INPUT THE X VALUE YOU WISH TO INTERPLOATE F(X) ON ";X:PRINT
890 FOR I=0 TO N-1
900 IF X>=X(I) AND X<=X(I+1) GOTO 940
910 NEXT I
920 IF X<X(0) THEN I=0
930 IF X>X(N) THEN I=N-1
940 F=Y(I)+B(I)*(X-X(I))+C(I)*(X-X(I))[2+D(I)*(X-X(I))[3
950 PRINT "s";I;"(";X;") = ";F:PRINT
960 INPUT "ANOTHER X VALUE TO INTERPOLATE ON (Y OR N) ";REPLY$
970 IF (REPLY$="NO") OR (REPLY$="N") GOTO 1020
980 IF (REPLY$<>"YES") AND (REPLY$<>"Y") GOTO 960
990 CLS
1000 INPUT "INPUT THE NEW X VALUE ";X:PRINT
1010 GOTO 890
1020 INPUT "ANOTHER FUNCTION TO INTERPOLATE (Y OR N) ";REPLY$
1030 IF (REPLY$="NO") OR (REPLY$="N") THEN END
1040 IF (REPLY$<>"YES") AND (REPLY$<>"Y") GOTO 1020
1050 GOTO 550
1060 END
1070 CLS
1080 A$="##   ##.##########[[[   ##.##########[[[   ##.##########[[["
1090 PRINT "CLAMPED CUBIC SPLINE INTERPOLATION":PRINT
1100 INPUT "INPUT THE NUMBER OF DATA POINTS (MUST BE 20 OR LESS) ";N
1110 IF N>20 PRINT "TOO MANY. I REPEAT,"
1120 IF N>20 GOTO 1100
1130 N=N-1
1140 CLS
1150 PRINT "INPUT THE DATA AS X,F(X)":PRINT
1160 FOR I=0 TO N
```

```
1170 INPUT X(I),Y(I)
1180 NEXT I
1190 CLS
1200 INPUT "INPUT F'(X0) ";F0
1210 INPUT "INPUT F'(XN) ";F1
1220 A(0)=3*(Y(1)-Y(0))/(X(1)-X(0))-3*F0
1230 A(N)=3*F1-3*(Y(N)-Y(N-1))/(X(N)-X(N-1))
1240 FOR I=1 TO N-1
1250 A(I)=3*(Y(I+1)*(X(I)-X(I-1))-Y(I)*(X(I+1)-X(I-1))+Y(I-1)*(X(I+1)-X(I)))/((X
     (I+1)-X(I))*(X(I)-X(I-1)))
1260 NEXT I
1270 L(0)=2*(X(1)-X(0)):M(0)=.5:Z(0)=A(0)/L(0):B(0)=F0
1280 FOR I=1 TO N-1
1290 L(I)=2*(X(I+1)-X(I-1))-(X(I)-X(I-1))*M(I-1)
1300 M(I)=(X(I+1)-X(I))/L(I)
1310 Z(I)=(A(I)-(X(I)-X(I-1))*Z(I-1))/L(I)
1320 NEXT I
1330 L(N)=(X(N)-X(N-1))*(2-M(N-1)):Z(N)=(A(N)-(X(N)-X(N-1))*Z(N-1))/L(N):C(N)=Z(
     N)
1340 FOR J=N-1 TO 0 STEP -1
1350 C(J)=Z(J)-M(J)*C(J+1)
1360 B(J)=(Y(J+1)-Y(J))/(X(J+1)-X(J))-(X(J+1)-X(J))*(C(J+1)+2*C(J))/3
1370 D(J)=(C(J+1)-C(J))/3/(X(J+1)-X(J))
1380 NEXT J
1390 CLS
1400 PRINT " j          B(J)               C(J)               D(J)":PRINT
1410 FOR J=0 TO N-1
1420 PRINT USING A$; J,B(J),C(J),D(J)
1430 NEXT J
1440 PRINT
1450 INPUT "INPUT THE X VALUE YOU WISH TO INTERPOLATE F(X) ON ";X:PRINT
1460 FOR I=0 TO N-1
1470 IF X>=X(I) AND X<=X(I+1) GOTO 1510
1480 NEXT I
1490 IF X<X(0) THEN I=0
1500 IF X>X(N) THEN I=N-1
1510 F=Y(I)+B(I)*(X-X(I))+C(I)*(X-X(I))[2+D(I)*(X-X(I))[3
1520 PRINT "S";I;"(";X;") = ";F:PRINT
1530 INPUT "ANOTHER X VALUE TO INTERPOLATE ON (Y OR N) ";REPLY$
1540 IF (REPLY$="NO") OR (REPLY$="N") GOTO 1590
1550 IF (REPLY$<>"YES") AND (REPLY$<>"Y") GOTO 1530
1560 CLS
1570 INPUT "INPUT THE NEW X VALUE ";X:PRINT
1580 GOTO 1460
1590 INPUT "ANOTHER FUNCTION TO INTERPOLATE (Y OR N) ";REPLY$
1600 IF (REPLY$="NO") OR (REPLY$="N") THEN END
1610 IF (REPLY$<>"YES") AND (REPLY$<>"Y") GOTO 1590
1620 GOTO 1070
1630 END
```

DESIGN APPLICATIONS FOR THE LM3900: by Tony Scarpelli

This program features eight OPAMP design applications, based around the LM3900 chip. Pulse generator, active bandpass filter, high and low pass filter and AC amplifier are included. Complete circuit perameters are taken into account and derived component values graphically displayed. Extremely useful to the professional designer.
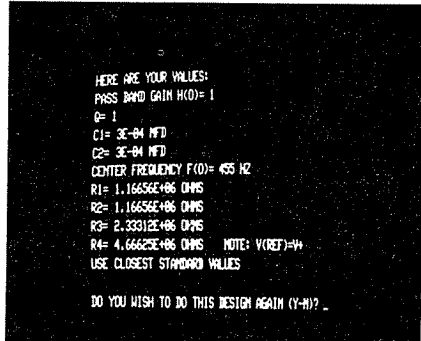
```
5 GOTO 8000
10 REM INVERTING AC AMPLIFIER (N V(BE) BIASING)
15 CLS:PRINT"INVERTING AC AMPLIFIER"
20 PRINT"WE WILL ASSUME THE FOLLOWING VALUES:"
30 PRINT"C(IN)=1 MFD":CIN=1
40 INPUT"IS THIS ALL RIGHT (Y-N)";A$
50 IF A$="Y"THEN 70 ELSE IF A$<>"N"THEN 40
60 INPUT"WHAT VALUE OF C(IN) DO YOU WANT (MFD)";CIN
70 PRINT"R1=100K THUS Z(IN)=100K":R1=100000
80 INPUT"IS THIS ALL RIGHT (Y-N)";A$
90 IF A$="Y"THEN 110 ELSE IF A$<>"N"THEN 80
100 INPUT"WHAT VALUE OF R1 DO YOU WANT (OHMS)";R1
110 INPUT"DO YOU KNOW WHAT THE SOURCE IMPEDANCE IS (Y-N)";A$
120 IF A$<>"N"THEN RS=0:GOTO 140
125 IF A$<>"Y"THEN 110
130 INPUT"WHAT IS IT (OHMS)";RS
140 INPUT"WHAT GAIN A(V) DO YOU WANT";AV
150 R2=AV*R1
160 PRINT"WHAT DC OUTPUT VOLTAGE V(ODC) DO YOU WANT,"
170 INPUT"USUALLY THIS WILL BE 1/2 SUPPLY VOLTAGE";VODC
180 R3=R2/((VODC/.5)-1)
190 IF RS=0 THEN 210
200 F=(1/(6.28*CIN*(R1+RS)))*1000000
210 CLS:PRINT"HERE ARE YOUR VALUES,"
220 PRINT"DUE TO TOLERANCES THEY WILL BE APPROXIMATE:"
230 PRINT:PRINT"C(IN)=";CIN;"MFD"
240 PRINT"Z(IN) & R1=";R1;"OHMS"
250 PRINT"R2=";R2;"OHMS"
260 PRINT"R3=";R3;"OHMS"
270 PRINT"GAIN A(V)=";AV
280 PRINT"V(ODC)=";VODC;"VOLTS"
290 IF RS=0 THEN PRINT"NO LOW FREQUENCY VALUE CAN BE CALCULATED.":GOTO 370
300 PRINT"APPROXIMATE LOW FREQUENCY RESPONSE:"
310 PRINT"F=";F;"HZ"
320 INPUT"DO YOU WANT TO CHANGE LOW FREQ RESPONSE (Y-N)";A$
330 IF A$="N"THEN 370 ELSE IF A$<>"Y"THEN 320
340 INPUT"WHAT FREQUENCY DO YOU WANT (HZ)";F
350 C=(1/(6.28*F*(R1+RS)))*1000000
360 PRINT"USE C(IN)=";C;"MFD INSTEAD"
370 INPUT"DO YOU WANT TO DO THIS DESIGN AGAIN (Y-N)";A$
380 IF A$="Y"THEN 20 ELSE IF A$<>"N" THEN 370
390 GOTO8310
500 REM NON-INVERTING AC AMPLIFIER
505 CLS:PRINT"NON-INVERTING AC AMP"
510 PRINT"WE WILL ASSUME THE FOLLOWING VALUES:"
520 PRINT"C(IN)=.05 MFD":CIN=.05
530 INPUT"IS THIS ALL RIGHT (Y-N)";A$
540 IF A$="Y"THEN 560 ELSE IF A$<>"N" THEN 530
550 INPUT"WHAT VALUE OF C(IN) DO YOU WANT (MFD)";CIN
560 PRINT"R1=100K THUS Z(IN)=100K":R1=100000
570 INPUT"IS THIS ALL RIGHT (Y-N)";A$
580 IF A$="Y"THEN 600 ELSE IF A$<>"N" THEN 570
590 INPUT"WHAT VALUE OF R1 DO YOU WANT (OHMS)";R1
600 INPUT"DO YOU KNOW WHAT THE SOURCE IMPEDANCE IS (Y-N)";A$
610 IF A$="N" THEN RS=0:GOTO 642
620 IF A$<>"Y" THEN 600
630 INPUT"WHAT IS IT (OHMS)";RS
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642 PRINT"WHEN R4=R5 THEN V(REF)=1/2 V+"
644 PRINT"R4=R5=47K":R4=47000:R5=47000
646 INPUT"IS THIS ALL RIGHT (Y-N)";A$
647 IF A$="Y"THEN 650 ELSE IF A$<>"N"THEN 646
648 INPUT"WHAT VALUE OF R4 AND R5 DO YOU WANT (OHMS)";R4,R5
650 INPUT"WHAT GAIN A(V) DO YOU WANT";AV
660 R3=AV*R1
670 PRINT"WHEN R2=R3 THEN V(ODC)=V(REF)":R2=R3
672 INPUT"IS THIS ALL RIGHT (Y-N)";A$
674 IF A$="Y"THEN 680 ELSE IF A$<>"N"THEN 672
676 INPUT"WHAT VALUE OF R2 DO YOU WANT (OHMS)";R2
680 IF RS=0 THEN 700
690 F=(1/(6.28*CIN*(R1+RS)))*1000000
700 CLS:PRINT"HERE ARE YOUR VALUES,"
710 PRINT"DUE TO TOLERANCES AND SIMPLIFIED FORMULAS,"
720 PRINT"THEY WILL BE APPROXIMATE:"
730 PRINT:PRINT"C(IN)=";CIN;"MFD"
740 PRINT"Z(IN) & R1=";R1;"OHMS"
750 PRINT"R3=";R3;"OHMS"
760 PRINT"R2=";R2;"OHMS"
770 PRINT"C(F)=100 MFD"
790 PRINT"R4=";R4;"OHMS     R5=";R5;"OHMS"
800 PRINT"GAIN A(V)=";AV
810 IF RS=0 THENPRINT"NO LOW FREQUENCY VALUE CAN BE CALCULATED.":GOTO 890
820 PRINT"APPROXIMATE LOW FREQUENCY RESPONSE: F=";F;"HZ"
840 INPUT"DO YOU WANT TO CHANGE LOW FREQ RESPONSE (Y-N)";A$
850 IF A$="N"THEN 890 ELSE IF A$<>"Y"THEN 840
860 INPUT"WHAT FREQUENCY DO YOU WANT (HZ)";F
870 C=(1/(6.28*F*(R1+RS)))*1000000
880 PRINT"USE C(IN)=";C;"MFD INSTEAD"
890 INPUT"DO YOU WANT TO DO THIS DESIGN AGAIN (Y-N)";A$
900 IF A$="Y" THEN 510 ELSE IF A$<>"N" THEN 890
910 GOTO 8310
1000 REM HIGH PASS ACTIVE FILTER
1005 CLS:PRINT"HI PASS ACTIVE FILTER"
1010 GOSUB 6000
1020 C3=C1
1030 INPUT"WHAT CORNER FREQUENCY F(O) DO YOU WANT (HZ)";FO
1040 WO=6.28*FO
1050 R1=1/(Q*WO*C1*1E-6*((2*HO)+1))
1060 R2=((Q/(WO*C1*1E-6))*((2*HO)+1)):R3=R2
1070 C2=C1/HO
1080 CLS:PRINT"HERE ARE YOUR VALUES:"
1090 PRINT"PASS BAND GAIN H(O)=";HO
1100 PRINT"Q=";Q
1110 PRINT"C1=";C1;"MFD"
1120 PRINT"C2=";C2;"MFD"
1130 PRINT"C3=";C3;"MFD"
1140 PRINT"CORNER FREQUENCY=";FO;"HZ"
1150 PRINT"R1=";R1;"OHMS"
1160 PRINT"R2=";R2;"OHMS"
1170 PRINT"R3=";R3;"OHMS"
1200 INPUT"DO YOU WANT TO SCALE R2 (Y-N)";A$
1210 IF A$="N"THEN 1310 ELSE IF A$<>"Y"THEN 1200
1220 X=R2
1230 INPUT"WHAT VALUE OF R2 DO YOU WANT (OHMS)";R2
1240 S=X/R2
1250 R1=R1/S
1260 C1=C1*S
1270 C2=C2*S
1280 C3=C3*S
1290 R3=R2
1300 GOTO 1080
1310 INPUT"DO YOU WANT TO SCALE C3 (Y-N)";A$
1320 IF A$="N"THEN 1420 ELSE IF A$<>"Y"THEN 1310
1330 X=C3
1340 INPUT"WHAT VALUE OF C3 DO YOU WANT (MFD)";C3
1350 S=C3/X
1360 C1=C3
1370 C2=C2*S
1380 R1=R1/S
1390 R2=R2/S
1400 R3=R2
1410 GOTO 1080
1420 INPUT"DO YOU WISH TO DO THIS DESIGN AGAIN (Y-N)";A$
1430 IF A$="Y"THEN 1010 ELSE IF A$<>"N"THEN 1420
1440 GOTO 8310
2000 REM LOW PASS ACTIVE FILTER
2005 CLS:PRINT"LO PASS ACTIVE FILTER"
2010 GOSUB 6000
2020 INPUT"WHAT CORNER FREQUENCY F(O) DO YOU WANT (HZ)";FO
2030 WO=6.28*FO
2040 K=1/(4*Q*Q*(1+HO))
2042 PRINT"THE CONSTANT 'K' MUST BE POSITIVE"
2044 PRINT"IT'S CALCULATED VALUE WAS ";K
2046 PRINT"TO CHANGE K YOU MUST CHANGE H(O) OR Q"
2047 INPUT"DO YOU WISH TO CHANGE K (Y-N)";A$
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```
2048 IF A$="N"THEN 2050 ELSE IF A$<>"Y"THEN 2047
2049 GOSUB 6030:GOTO 2020
2050 C2=K*C1
2060 PRINT"C2=";C2;"MFD"
2070 INPUT"DO YOU WANT TO CHANGE C2 TO A STANDARD VALUE (Y-N)";A$
2080 IF A$="N"THEN 2100 ELSE IF A$<>"Y"THEN 2070
2090 INPUT"WHAT VALUE OF C2 DO YOU WANT (MFD)";C2
2100 RA2=(1/(2*Q*K*WO*C1*1E-6))*(1+SQR(1-(4*K*Q*Q*(1+HO))))
2110 PRINT"R2 (+ CALC)=";RA2;"OHMS":R2=RA2
2120 RB2=(1/(2*Q*K*WO*C1*1E-6))*(1-SQR(1-(4*K*Q*Q*(1+HO))))
2130 PRINT"R2 (- CALC)=";RB2;"OHMS"
2135 PRINT"R2 WAS GIVEN THE + CALCULATION"
2160 INPUT"DO YOU WANT TO CHANGE R2 TO A STANDARD VALUE (Y-N)";A$
2170 IF A$="N"THEN 2190 ELSE IF A$<>"Y"THEN 2160
2180 INPUT"WHAT VALUE OF R2 DO YOU WANT (OHMS)";R2
2190 R1=R2/HO
2200 R3=1/((WO*WO*C1*1E-6*C1*1E-6*R2)*K)
2210 PRINT"R3=";R3;"OHMS"
2220 INPUT"DO YOU WANT TO CHANGE R3 TO A STANDARD VALUE (Y-N)";A$
2230 IF A$="N"THEN 2250 ELSE IF A$<>"Y"THEN 2220
2240 INPUT"WHAT VALUE OF R3 DO YOU WANT (OHMS)";R3
2250 R4=2*((R1/2)+R3)
2260 CLS:PRINT"HERE ARE YOUR VALUES:"
2270 PRINT"PASS BAND GAIN H(O)=";HO
2280 PRINT"Q=";Q
2290 PRINT"C1=";C1;"MFD"
2300 PRINT"C2=";C2;"MFD"
2310 PRINT"CORNER FREQUENCY F(O)=";FO;"HZ"
2320 PRINT"R1=";R1;"OHMS"
2330 PRINT"R2=";R2;"OHMS"
2340 PRINT"R3=";R3;"OHMS"
2350 PRINT"R4=";R4;"OHMS"
2360 INPUT"DO YOU WISH TO DO THIS DESIGN AGAIN (Y-N)";A$
2370 IF A$="Y"THEN 2010 ELSE IF A$<>"N"THEN 2360
2380 GOTO 8310
3000 REM SINGLE AMPLIFIER BANDPASS ACTIVE FILTER
3002 CLS:PRINT"SINGLE AMP BANDPASS FILTER"
3004 INPUT"DO YOU NEED PRELIMINARY INFORMATION (Y-N)";A$
3006 IF A$="Y"THEN GOSUB 6210 ELSE IF A$<>"N"THEN 3004
3010 PRINT"NOTE: THIS DESIGN IS GOOD FOR LOW FREQUENCIES,"
3020 PRINT"    LOW GAIN AND LOW Q ( <=10 )."
3030 GOSUB 6020
3040 INPUT"WHAT CENTER FREQUENCY F(O) DO YOU WANT (HZ)";FO
3050 WO=6.28*FO
3060 C2=C1
3070 R1=Q/(HO*WO*C1*1E-6)
3080 R2=Q/(((2*Q*Q)-HO)*WO*C1*1E-6)
3090 R3=(2*Q)/(WO*C1*1E-6)
3100 R4=2*R3
3110 CLS:PRINT"HERE ARE YOUR VALUES:"
3120 PRINT"PASS BAND GAIN H(O)=";HO
3130 PRINT"Q=";Q
3140 PRINT"C1=";C1;"MFD"
3150 PRINT"C2=";C2;"MFD"
3160 PRINT"CENTER FREQUENCY F(O)=";FO;"HZ"
3170 PRINT"R1=";R1;"OHMS"
3180 PRINT"R2=";R2;"OHMS"
3190 PRINT"R3=";R3;"OHMS"
3200 PRINT"R4=";R4;"OHMS      NOTE: V(REF)=V+"
3205 PRINT"USE CLOSEST STANDARD VALUES"
3210 PRINT:INPUT"DO YOU WISH TO DO THIS DESIGN AGAIN (Y-N)";A$
3220 IF A$="Y"THEN 3004 ELSE IF A$<>"N"THEN 3210
3230 GOTO 8310
4000 REM TWO AMPLIFIER BANDPASS ACTIVE FILTER
4005 CLS:PRINT"TWO AMP BANDPASS FILTER"
4010 INPUT"DO YOU NEED PRELIMINARY INFORMATION (Y-N)";A$
4020 IF A$="Y" THEN GOSUB 6210 ELSE IF A$<>"N" THEN 4010
4030 PRINT:INPUT"WHAT Q DO YOU WISH ( >10 <50 )";Q
4040 INPUT"WHAT CENTER FREQUENCY F(O) DO YOU WANT (HZ)";FO
4045 WO=6.28*FO
4050 PRINT"C2=.1 MFD":C2=.1
4060 INPUT"IS THIS ALL RIGHT (Y-N)";A$
4070 IF A$="Y"THEN 4090 ELSE IF A$<>"N"THEN 4060
4080 INPUT"WHAT VALUE OF C2 DO YOU WANT (MFD)";C2
4090 C1=C2
4100 PRINT"K (A CONSTANT) IS USED TO REDUCE THE SPREAD OF ELEMENT"
4102 PRINT"    VALUES OR OPTIMIZE SENSITIVITY ( 1<= K <=10 )"
4105 PRINT"WE START WITH K=3":K=3
4110 INPUT"IS THIS ALL RIGHT (Y-N)";A$
4120 IF A$="Y"THEN 4140 ELSE IF A$<>"N"THEN 4110
4130 INPUT"WHAT VALUE OF K DO YOU WANT";K
4140 R1=Q/(WO*C1*1E-6)
4150 R4=R1:R6=R1
4160 R2=R1*((K*Q)/((2*Q)-1))
4170 R3=R1/((((Q*Q)-1)-(2/K))+(1/(K*Q)))
4180 R7=K*R1
4190 HO=(SQR(Q))*K
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4200 R5=2*R4
4210 R8=2*((R6*R7)/(R6+R7))
4220 CLS:PRINT"HERE ARE YOUR VALUES"
4230 PRINT"Q=";Q
4240 PRINT"CENTER FREQUENCY F(O)=";FO;"HZ"
4250 PRINT"C2=C1=";C1;"MFD"
4260 PRINT"K=";K
4270 PRINT"R1=";R1;"OHMS"
4280 PRINT"R2=";R2;"OHMS"
4290 PRINT"R3=";R3;"OHMS"
4300 PRINT"R4=";R4;"OHMS"
4310 PRINT"R5=";R5;"OHMS    NOTE: V(REF)=V+"
4320 PRINT"R6=";R6;"OHMS"
4330 PRINT"R7=";R7;"OHMS"
4340 PRINT"R8=";R8;"OHMS    NOTE: V(REF)=V+"
4350 PRINT"GAIN=";HO
4360 PRINT"USE STANDARD VALUES FOR FINAL DESIGN"
4370 INPUT"DO YOU WISH TO DO THIS DESIGN AGAIN (Y-N)";A$
4380 IF A$="Y"THEN 4030 ELSE IF A$<>"N"THEN 4370
4390 GOTO 8310
5000 REM THREE-AMPLIFIER BANDPASS ACTIVE FILTER
5005 CLS:PRINT"THREE-AMP BANDPASS FILTER"
5010 INPUT"DO YOU NEED PRELIMINARY INFORMATION (Y-N)";A$
5020 IF A$="Y"THEN GOSUB 6210 ELSE IF A$<>"N"THEN 5010
5030 PRINT:PRINT"Q FOR THIS DESIGN CAN BE >50"
5040 INPUT"WHAT Q DO YOU WANT";Q
5050 INPUT"WHAT CENTER FREQUENCY F(O) DO YOU WISH";FO
5060 WO=6.28*FO
5070 PRINT"C1=C2=.00033 MFD":C1=.00033
5080 INPUT"IS THIS ALL RIGHT (Y-N)";A$
5090 IF A$="Y"THEN 5110 ELSE IF A$<>"N"THEN 5080
5100 INPUT"WHAT VALUE OF C1 DO YOU WISH (MFD)";C1
5110 PRINT"2R1=R2=R3=360K & R1=180K":R1=180000
5120 INPUT"IS THIS ALL RIGHT (Y-N)";A$
5130 IF A$="Y"THEN 5150 ELSE IF A$<>"N"THEN 5120
5140 INPUT"WHAT VALUE OF R1 DO YOU WANT (OHMS)";R1
5150 R2=2*R1
5160 R4=R1*((2*Q)-1)
5170 R5=1/(WO*C1*1E-6)
5180 R6=2*R5
5190 HO=R4/R1
5200 CLS:PRINT"HERE ARE YOUR VALUES"
5210 PRINT:PRINT"Q=";Q
5220 PRINT"CENTER FREQUENCY F(O)=";FO;"HZ"
5230 PRINT"C1=C2=";C1;"MFD"
5240 PRINT"R1=";R1;"OHMS"
5250 PRINT"R2=R3=";R2;"OHMS"
5260 PRINT"R4=";R4;"OHMS"
5270 PRINT"R5=R7=";R5;"OHMS"
5280 PRINT"R6=R8=";R6;"OHMS    NOTE: V(REF)=V+"
5290 PRINT"GAIN=";HO
5300 INPUT"DO YOU WISH TO SCALE R4 (Y-N)";A$
5310 IF A$="N"THEN 5370 ELSE IF A$<>"Y"THEN 5300
5320 X=R4
5330 INPUT"WHAT VALUE OF R4 DO YOU WISH (OHMS)";R4
5340 S=X/R4
5350 R1=R1/S:R2=R2/S:R3=R3/S:HO=R4/R1
5360 GOTO 5200
5370 PRINT"USE CLOSEST 5% STANDARD VALUE FOR FINAL DESIGN"
5380 INPUT"DO YOU WISH TO DO THIS DESIGN AGAIN (Y-N)";A$
5390 IF A$="Y"THEN 5030 ELSE IF A$<>"N"THEN 5380
5400 GOTO 8310
6000 INPUT"DO YOU NEED PRELIMIMARY INFORMATION (Y-N)";A$
6010 IF A$="Y"THEN GOSUB 6205 ELSE IF A$<>"N"THEN 6000
6020 PRINT"THE FOLLOWING ARE GIVEN:"
6030 PRINT"PASS BAND GAIN H(0)=1":HO=1
6040 INPUT"IS THIS ALL RIGHT (Y-N)";A$
6050 IF A$="Y"THEN 6070 ELSE IF A$<>"N"THEN 6040
6060 INPUT"WHAT GAIN DO YOU WANT";HO
6070 PRINT"Q=1":Q=1
6080 INPUT"IS THIS ALL RIGHT (Y-N)";A$
6090 IF A$="Y"THEN 6110 ELSE IF A$<>"N"THEN 6080
6100 INPUT"WHAT Q DO YOU WANT";Q
6110 PRINT"C1=.0003 MFD":C1=.0003
6120 INPUT"IS THIS ALL RIGHT (Y-N)";A$
6130 IF A$="Y"THEN RETURN ELSE IF A$<>"N"THEN 6120
6140 INPUT"WHAT VALUE OF C1 DO YOU WANT (MFD)";C1:RETURN
6200 REM ACTIVE FILTER DESIGN PRELIMINARY INFORMATION
6205 CLS:PRINT"           DESIGNING ACTIVE FILTERS"
6210 PRINT"MULTIPLE AMPLIFIER FILTERS ARE GENERALLY BETTER"
6220 PRINT"  BECAUSE PASSIVE COMPONENTS TOLERANCES EFFECT THEM LESS."
6230 PRINT"USE METAL FILM RESISTORS AND GOOD QUALITY CAPACITORS"
6240 PRINT"  IN THE FINAL DESIGN."
6250 PRINT"USE RESISTANCES >10K AND <=10 MEG."
6260 PRINT"LOWER IMPEDANCES ARE BETTER."
6270 PRINT"SIMULTANEOUS HIGH GAIN, HIGH Q ( >=50 ), AND HIGH"
6280 PRINT"FREQUENCY ( >1 KHZ ) DEGRADE PERFORMANCE."
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6290 PRINT"BIASING V(REF) IN MOST DESIGNS SHOULD BE 1/2 V+"
6295 PRINT"   FOR MAXIMUM AC VOLTAGE SWING."
6300 PRINT"USE STANDARD CAPACITANCE VALUES, AND SCALE RESISTANCES."
6310 RETURN
7000 REM PULSE GENERATOR
7005 CLS:PRINT"PULSE GENERATOR"
7010 INPUT"WHAT IS YOUR SUPPLY VOLTAGE (VOLTS)";V
7020 TR=V/.5
7030 PRINT"YOUR MINIMUM PULSE WIDTH FOR THIS SUPPLY"
7040 PRINT"   VOLTAGE IS";TR;"MICRO-SEC."
7050 PRINT"THE FOLLOWING IS GIVEN:"
7060 PRINT"LOW TRIP POINT V(L)=1.5V":VL=1.5
7070 INPUT"IS THIS ALL RIGHT (Y-N)";A$
7080 IF A$="Y"THEN 7100 ELSE IF A$<>"N"THEN 7070
7090 INPUT"WHAT LOW TRIP POINT DO YOU WANT (VOLTS)";VL
7100 PRINT"HIGH TRIP POINT V(H)=3.0V":VH=3
7110 INPUT"IS THIS ALL RIGHT (Y-N)";A$
7120 IF A$="Y" THEN 7140 ELSE IF A$<>"N"THEN 7110
7130 INPUT"WHAT HIGH TRIP POINT DO YOU WANT (VOLTS)";VH
7140 PRINT"WHAT PULSE WIDTH DO YOU WANT ( >";TR;"MICRO-SEC)(USEC)";:INPUT T2
7150 INPUT"WHAT PULSE REPITITION FREQUENCY DO YOU WISH (HZ)";F
7160 T1=1/F
7170 PRINT"Cl=.01 MFD":Cl=.01
7180 INPUT"IS THIS ALL RIGHT (Y-N)";A$
7190 IF A$="Y"THEN 7210 ELSE IF A$<>"N"THEN 7180
7200 INPUT"WHAT VALUE OF Cl DO YOU WISH (MFD)";Cl
7210 R2=Tl/(Cl*1E-6*LOG(VH/VL))
7220 PRINT"R2=";R2;"OHMS"
7230 PRINT"R2 SHOULD BE APPROX. 100K TO 1 MEG."
7240 PRINT"IF IT IS NOT CHANGE Cl."
7250 INPUT"DO YOU WISH TO CHANGE Cl (Y-N)";A$
7260 IF A$="Y"THEN 7200 ELSE IF A$<>"N"THEN 7250
7270 R3=((V-.5)*R2)/VL
7280 R4=((V-.8)-.5)/((VH/R2)-((V-.5)/R3))
7290 Rl=(T2*1E-6)/(-(Cl*1E-6)*LOG(1-(VH/((V-.8)-.7))))
7300 CLS:PRINT"HERE ARE YOUR VALUES:"
7310 PRINT:PRINT"SUPPLY VOLTAGE=";V;"VOLTS"
7320 PRINT"LOW TRIP POINT V(L)=";VL;"VOLTS"
7330 PRINT"HIGH TRIP POINT V(H)=";VH;"VOLTS"
7340 PRINT"PULSE WIDTH=";T2;"USEC"
7350 PRINT"PULSE REPITITION FREQ.=";F;"HZ"
7360 PRINT"Cl=";Cl;"MFD"
7370 PRINT"Rl=";Rl;"OHMS"
7380 PRINT"R2=";R2;"OHMS"
7390 PRINT"R3=";R3;"OHMS"
7400 PRINT"R4=";R4;"OHMS"
7410 PRINT:PRINT"USE NEAREST 5% STANDARD VALUES IN FINAL DESIGN."
7420 INPUT"DO YOU WISH TO DO THIS DESIGN AGAIN (Y-N)";A$
7430 IF A$="Y"THEN 7010 ELSE IF A$<>"N"THEN 7420
7440 GOTO 8310
8000 CLS:PRINT"        THE LM3900"
8010 PRINT"THIS I.C. CONTAINS 4 AMPLIFIERS CALLED NORTON"
8020 PRINT"AMPLIFIERS.  tHIS TYPE OF AMPLIFIER USES CURRENT"
8030 PRINT"DIFFERENCES ON ITS INPUTS RATHER THAN"
8040 PRINT"VOLTAGE DIFFERENCES.  THUS ITS INPUT AND BIASING"
8050 PRINT"RESISTORS ARE VERY LARGE GIVING IT'S DESIGNS A VERY"
8060 PRINT"HIGH INPUT IMPEDANCE.  THE INPUT RESISTANCE FOR"
8070 PRINT"EACH AMPLIFIER IS 1 MEG OHM.  FOR THE DESIGNS IN"
8080 PRINT"THIS PACKAGE YOU CAN USE A SINGLE POWER SUPPLY"
8090 PRINT"FROM 4 TO 36 VDC.  THE OPEN LOOP VOLTAGE GAIN"
8100 PRINT"FOR A LOAD RESISTANCE OF 10K IS 70DB.  THE OUTPUT"
8110 PRINT"RESISTANCE IS 8K OHMS.  THE UNITY-GAIN FREQUENCY"
8130 PRINT"RESPONSE IS 2.5 MHZ."
8140 PRINT:PRINT"PRESS 'G' TO GO ON."
8150 A$=INKEY$:IF A$="G"THEN 8160 ELSE 8150
8160 CLS:PRINT"DUE TO DIFFERENCES IN AMPLIFIERS AND"
8170 PRINT"WHETHER THE DEVICES ARE SURPLUS, ETC., THE DESIGNS"
8180 PRINT"CANNOT BE EXACT.  ALSO THE DESIGNS MAY CALL"
8190 PRINT"FOR UNSTANDARD COMPONENTS.  BUT THE DESIGNS"
8200 PRINT"CAN GET YOU CLOSE ENOUGH SO THAT BY BREADBOARDING"
8210 PRINT"AND SHIFTING VALUES SLIGHTLY YOU CAN GET"
8220 PRINT"THE CIRCUIT YOU WANT WITH STANDARD VALUES."
8230 PRINT"TRY TO USE STANDARD CAPACITANCE VALUES FIRST"
8240 PRINT"SINCE THERE ARE MORE VALUES OF STANDARD RESISTANCES."
8250 PRINT"BREADBOARD WITH ANY TYPE OF RESISTOR OR CAPACITOR,"
8260 PRINT"BUT FOR FINAL DESIGN, HIGH QUALITY METAL FILM"
8270 PRINT"RESISTORS, AND QUALITY CAPCITORS COULD BE USED"
8280 PRINT"FOR BEST STABIILITY."
8290 PRINT:PRINT"PRESS 'G' TO GO ON."
8300 A$=INKEY$:IF A$="G"THEN 8310 ELSE 8300
8310 CLS:PRINT"HERE ARE THE DESIGNS YOU CAN CHOOSE FROM:"
8320 PRINT:PRINT"1 -- INVERTING AC AMPLIFIER"
8330 PRINT"2 -- NON-INVERTING AC AMPLIFIER"
8340 PRINT"3 -- HIGH PASS ACTIVE FILTER"
8350 PRINT"4 -- LOW PASS ACTIVE FILTER"
8360 PRINT"5 -- SINGLE-AMPLIFIER BANDPASS ACTIVE FILTER"
8370 PRINT"6 -- TWO-AMPLIFIER BANDPASS ACTIVE FILTER"
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8380 PRINT"7 -- THREE-AMPLIFIER BANDPASS ACTIVE FILTER"
8390 PRINT"8 -- PULSE GENERATOR"
8400 PRINT:PRINT"CHOOSE BY NUMBER THE DESIGN YOU WANT"
8410 INPUT D
8420 ON D GOTO 10,500,1000,2000,3000,4000,5000,7000
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DATA ANALYSIS: by Dave Dillehay

Three types of data analysis are offered in this program. They include Linear Regressions, Standard Deviation and X-Bar. Select desired method of analysis, plug your data in and save your time.
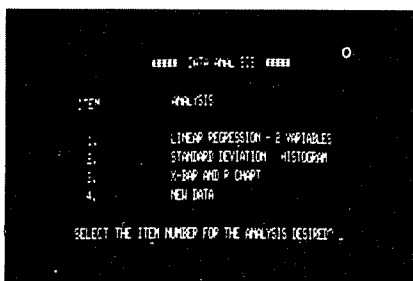

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4 CLS:PRINT"        ***** DATA ANALYSIS *****"
7 PRINT
10 PRINT"ITEM        ANALYSIS":PRINT
20 PRINT"  1.        LINEAR REGRESSION - 2 VARIABLES"
30 PRINT"  2.        STANDARD DEVIATION / HISTOGRAM"
40 PRINT"  3.        X-BAR AND R CHART"
50 PRINT"  4.        NEW DATA"
60 PRINT:INPUT"SELECT THE ITEM NUMBER FOR THE ANALYSIS DESIRED";C
70 ON C GOTO 100,1000,2000,3000
80 PRINT"SELECT FROM 1 TO 4":GOTO 60
100 CLS:PRINT"LINEAR REGRESSION - 2 VARIABLES"
102 CLEAR 10:DIM L1(100,1):N=1
103 P$="###.##"
105 PRINT: PRINT"DATA CAN BE ENTERED IN PAIRS AND ANALYZED"
110 PRINT"AS ONE OF THE FOLLOWING:"
115 PRINTTAB(25)"1. LINEAR - LINEAR"
120 PRINTTAB(25)"2. LOG - LOG"
125 PRINTTAB(25)"3. LOG - LINEAR"
130 PRINT:INPUT"ENTER THE NUMBER BY THE DESIRED CHOICE";C
140 ON C GOTO 150,170,190
145 PRINT"SELECT FROM 1 TO 3":GOTO 130
150 GOSUB 900
155 PRINT N;:INPUT"    ";X,Y
160 IF X=99 AND Y=99 THEN 200
165 L1(N,0)=X:L1(N,1)=Y:N=N+1:GOTO 155
170 GOSUB 900
175 PRINT N;:INPUT"    ";X,Y
180 IF X=99 AND Y=99 THEN 200
185 L1(N,0)=LOG(X):L1(N,1)=LOG(Y):N=N+1:GOTO 175
190 GOSUB 900
192 PRINT N;:INPUT"    ";X,Y
194 IF X=99 AND Y=99 THEN 200
196 L1(N,0)=LOG(X):L1(N,1)=Y:N=N+1: GOTO 192
200 N=N-1
225 CLS:ON C GOTO 230,270,290
230 G=0:FOR A=1 TO N
232 F=A-2*INT((A-1)/2)
234 PRINTTAB(25*(F-1))A;"-";L1(A,0);",";L1(A,1);
235 IF F>=2 THEN PRINT
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236 IF A>=30+G*30 THEN INPUT"PRESS ENTER TO CONTINUE LIST-";A$:G=G+1
238 NEXT A:IF A/2=INT(A/2) THEN PRINT
245 INPUT"DO YOU WANT TO CHANGE, DELETE, OR ADD DATA (Y/N)";A$
250 IF A$="Y" THEN 800
265 GOTO 310
270 G=0:FOR A=1 TO N
272 F=A-2*INT((A-1)/2)
274 PRINTTAB(25*(F-1))A;"-";EXP(L1(A,0));",";EXP(L1(A,1));
275 IF F>=2 THEN PRINT
276 IF A>=30+G*30 THEN INPUT"PRESS ENTER TO CONTINUE LIST-";A$:G=G+1
278 NEXT A:IF A/2=INT(A/2) THEN PRINT
285 GOTO 245
290 G=0:FOR A=1 TO N
292 F=A-2*INT((A-1)/2)
294 PRINTTAB(25*(F-1))A;"-";EXP(L1(A,0));",";L1(A,1);
295 IF F>=2 THEN PRINT
296 IF A>=30+G*30 THEN INPUT"PRESS ENTER TO CONTINUE LIST-";A$:G=G+1
300 NEXT A:IF A/2=INT(A/2) THEN PRINT
305 GOTO 245
310 FOR A=1 TO N:X1=X1+L1(A,0):Y1=Y1+L1(A,1):X2=X2+L1(A,0)*L1(A,0):Y2=Y2+L1(A,1)
    *L1(A,1):Z=Z+L1(A,0)*L1(A,1):NEXT A
315 X3=X1/N:Y3=Y1/N:S1=X2-X1*X3:S2=Y2-Y1*Y3:S=Z-X1*Y3
320 B=S/S1:B1=Y3-B*X3:S3=S2-B*S
325 IF N>2 THEN S4=S3/(N-2)
330 PRINT"NUMBER = ";N
335 PRINT "MEAN OF X = ";X3," OF Y = ";Y3
340 PRINT"SLOPE = ";B,"Y - INTERCEPT = ";B1
345 PRINT:PRINT"SUM OF SQUARES","TOTAL";Y2
350 PRINT"MEAN = ";Y3*Y1;"        SLOPE = ";B*S
352 PRINT"RESIDUAL = ";S3
355 PRINT:PRINT"STANDARD DEVIATIONS"
360 PRINT"X= ";SQR(S1/(N-1)),"Y = ";SQR(S2/(N-1))
362 IF S4<0 THEN PRINT:PRINT:GOTO 375
365 PRINT"ERROR = ";SQR(S4),"Y-BAR = ";SQR(S4/N)
370 PRINT"SLOPE = ";SQR(S4/S1),"Y-INTER. = ";SQR(S4*(1/N+X3*X3/S1))
375 PRINT:IF S4<>0 THENPRINT"F-RATIO FOR SLOPE = ";B*S/S4
380 PRINT"CORR. COEFF. = ";S/SQR(S1*S2)
385 INPUT"DO YOU WANT A PLOT (Y/N)";A$
390 IF A$="N" THEN 805
395 IF A$="Y" THEN 400
398 PRINT"PLEASE ANSWER Y OR N";:GOTO 385
400 CLS:PRINT@475,"WORKING"
405 MN(1,1)=L1(1,1):MN(1,0)=L1(1,0):FOR A=1 TO N:IF L1(A,0)<MN(1,0) THEN MN(1,0)
    =L1(A,0)
410 IF L1(A,1)<MN(1,1) THEN MN(1,1)=L1(A,1)
411 NEXTA
415 FOR A=1 TO N:IF L1(A,0)>MX(1,0) THEN MX(1,0)=L1(A,0)
420 IF L1(A,1)>MX(1,1) THEN MX(1,1)=L1(A,1)
421 NEXTA
425 H1=40/(MN(1,1)-MX(1,1)):J1=-MX(1,1)*H1
430 H2=100/(MX(1,0)-MN(1,0)):J2=27-MN(1,0)*H2
435 CLS:FOR A=0 TO 40:SET(26,A):NEXTA:FOR A=0 TO 30 STEP 10:SET(27,A):NEXT A
440 FOR A=26 TO 127:SET(A,41):NEXTA:FOR A=51 TO 126 STEP 25:SET(A,40):NEXT A
445 PRINT@448,"Y";:PRINT@930,"X";
450 FOR A=1 TO N:SET(L1(A,0)*H2+J2,L1(A,1)*H1+J1):NEXTA
455 PRINT@837,"";:PRINT USING P$;MN(1,1):PRINT@5,"";:PRINT USING P$;MX(1,1);
460 PRINT@908,"";:PRINT USING P$;MN(1,0):PRINT@954,"";:PRINT USING P$;MX(1,0);
465 FOR A=27 TO 125:E=(((A-J2)/H2)*B+B1)*H1+J1
466 IF E<0 THEN 472
470 SET(A,E)
472 NEXT A
475 PRINT@960,"SLOPE=";B;"INTER.=";B1
480 INPUT"    PRESS ENTER TO CONTINUE-";A$:GOTO 800
700 K=0:W=31+G*30:G=G+1:RETURN
800 PRINT"ENTER A COMMAND TO ADD - DELETE - CHANGE - LIST - END"
805 INPUT"COMMAND";A$
810 IF A$="ADD" THEN 835
815 IF A$="DELETE" THEN 840
820 IF A$="CHANGE" THEN 875
825 IF A$="LIST" THEN GOSUB 920:GOTO 225
828 IF A$="END" THEN RUN4
830 PRINT"ILLEGAL COMMAND; ENTER AGAIN":GOTO 800
835 N=N+1:GOSUB 920:GOTO 140
840 PRINT"ENTER PAIR NUMBER TO BE DELETED";:INPUT D
842 GOSUB 920
860 IF D>N THEN PRINT"PAIR ";D;" NOT FOUND-":GOTO 805
865 PRINT"PAIR ";D;" FOUND AND DELETED"
870 FOR A=D TO N:L1(A,0)=L1(A+1,0):L1(A,1)=L1(A+1,1):NEXT A:N=N-1:MX(1,0)=0:MX(1
    ,1)=0:GOTO 245
875 INPUT"ENTER THE DATA PAIR NUMBER TO BE CHANGED";D
880 GOSUB 920
885 IF D>N THEN PRINT"PAIR ";D;" NOT FOUND-":GOTO 805
890 PRINT"PAIR ";D;" FOUND - ENTER NEW VALUES FOR BOTH";:INPUT X,Y
894 GOSUB 930:L1(D,0)=L2(1,0):L1(D,1)=L2(1,1):MX(1,0)=0:MX(1,1)=0:GOTO 245
900 CLS:PRINT"ENTER DATA AS PAIRS - INDEPENDENT VARIABLE FIRST."
910 PRINT"WHEN LAST PAIR IS ENTERED - TYPE 99,99 AND PRESS ENTER.":RETURN
920 X1=0:X2=0:X3=0:Y1=0:Y2=0:Y3=0:Z=0:S=0:S1=0:S2=0:S3=0:S4=0:B=0:B1=0
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930 IF C=1 THEN L2(1,0)=X:L2(1,1)=Y:RETURN
940 IF C=2 THEN L2(1,0)=LOG(X):L2(1,1)=LOG(Y):RETURN
950 IF C=3 THEN L2(1,0)=LOG(X):L2(1,1)=Y:RETURN
1000 DIMN(350),Z1(14)
1005 B=1:CLS:PRINT"STANDARD DEVIATION / HISTOGRAM"
1010 PRINT:PRINT"ENTER YOUR DATA POINTS ONE AT A TIME"
1015 PRINT"PRESS ENTER AFTER EACH VALUE."
1020 PRINT:PRINT"AFTER THE LAST POINT IS ENTERED - TYPE 9999 AND PRESS ENTER."
1025 PRINT B;:INPUT"      ";A
1030 IF A=9999 THEN B=B-1:GOTO1045
1035 N(B)=A:N1=N1+A*A:N2=N2+A
1040 B=B+1:GOTO1025
1045 CLS:SD=SQR((N1-((N2*N2)/B))/B):AV=N2/B
1050 PRINT"AVERAGE = ";AV;"         STANDARD DEVIATION = ";SD
1055 GOSUB 1900
1060 PRINT"MAXIMUM = ";N(B);"         NUMBER OF POINTS = ";B
1065 PRINT"MINIMUM = ";N(1):PRINT
1070 K=1:G=0:FOR X=1 TO B:E=X-8*INT((X-1)/8)
1075 PRINTTAB(4*(E-1));N(X);
1080 IF E>=8 THEN  PRINT:K=K+1
1085 IF K>=14+14*G THEN INPUT"PRESS ENTER TO CONTINUE-";A$:G=G+1
1090 NEXTX:PRINT
1095 INPUT"DO YOU WANT A HISTOGRAM PRINTED (Y/N)";A$
1100 IF A$="N" THEN 1400
1105 IF A$="Y" THEN 1115
1110 PRINT"PLEASE ANSWER Y OR N":GOTO1095
1115 PRINT"ENTER UNIT CELL SIZE - RECOMMEND ABOUT ";SD/2;
1120 INPUTZ
1125 IF (N(B)-N(1))/Z>14 PRINT"YOUR CELL SIZE IS TOO SMALL":GOTO1115
1130 P=Z:W=1:L=0
1135 IF INT(P/10)=0 THEN P=P*10:L=L+1:GOTO 1135
1140 IF L>0 THEN W=1/(10[L)
1145 PRINT"ENTER UPPER BOUNDRY - ";N(B);" TO ";N(B)+Z;
1150 INPUTY
1155 IF Y>N(B)+Z THEN PRINT"TOO LARGE":GOTO1145
1160 IF Y<N(B) THEN PRINT"TOO SMALL":GOTO1145
1165 CLS:PRINT"WORKING":Q=1:D=Y
1170 FOR X=B TO 1 STEP -1
1172 R=Y-N(X)
1175 IF R<Z THEN Z1(Q)=Z1(Q)+1
1180 IF R>=Z THEN Y=Y-Z:Q=Q+1:GOTO1172
1185 NEXTX
1190 CLS:GOSUB1950:FOR X=0 TO 44:SET(27,X):NEXTX
1195 FORQ=1 TO 14
1200 PRINT@960-(64*Q),D-(Z*Q)+W;"-";D-(Z*(Q-1));
1205 FOR X=27 TO 27+ Z1(Q):SET(X,46-(3*Q)):NEXTX
1210 NEXTQ:FOR Q=1 TO 14:PRINT@1020-64*Q,Z1(Q)/F:NEXTQ
1215 PRINT@960,"";:GOTO1400
1400 INPUT"COMMAND";C$
1405 IF C$="HELP"THEN1440
1410 IF C$="END" THEN1475
1415 IF C$="DELETE" THEN1495
1420 IF C$="ADD" THEN 1525
1425 IF C$="CHANGE" THEN 1530
1430 IF C$="LIST" THEN1560
1435 PRINT"ILLEGAL COMMAND; ENTER AGAIN":GOTO1400
1440 PRINT"VALID COMMANDS ARE -"
1445 PRINTTAB(20)"HELP"
1450 PRINTTAB(20)"LIST"
1455 PRINTTAB(20)"DELETE"
1460 PRINTTAB(20)"ADD"
1465 PRINTTAB(20)"CHANGE"
1470 PRINTTAB(20)"END":GOTO1400
1475 INPUT"ARE YOU READY TO STOP?  DATA SAVED";F$
1480 IF LEFT$(F$,1)="Y" THEN RUN4
1485 IF LEFT$(F$,1)="N" THEN 1400
1490 PRINT"ANSWER YES OR NO.":GOTO1475
1495 INPUT"ENTER VALUE TO BE DELETED";A
1500 FOR X=1 TO B
1505 IF A=N(X) THEN 1520
1510 NEXTX
1515 PRINT"VALUE NOT FOUND -":GOTO1400
1520 C=X:FOR X=C TO B:N(X)=N(X+1):NEXT X:B=B-1:GOTO1600
1525 CLS:B=B+1:FOR Q=1 TO 14:Z1(Q)=0:NEXTQ:GOTO1010
1530 INPUT"ENTER VALUE TO BE CHANGED";A
1535 FOR X=1 TO B
1540 IF A=N(X) THEN 1550
1545 NEXT X:PRINT"VALUE NOT FOUND -":GOTO 1400
1550 PRINTN(X);" FOUND - ENTER NEW VALUE";
1555 INPUT A:N8X)=A:GOTO1600
1560 CLS:FOR Q=1 TO 14:Z1(Q)=0:NEXTQ:GOTO 1060
1600 N1=0:N2=0:FOR X=1 TO B
1605 N1=N1+N(X)*N(X):N2=N2+N(X)
1610 NEXTX:GOTO1045
1900 G=B
1905 IF G<=1 THEN RETURN
1910 G=INT(G/2):M=B-G
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220

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1915 F=Ø:FOR I=1 TO M
1920 P=I+G
1925 IF N(I)<=N(P) THEN 1935
1930 T=N(I):N(I)=N(P):N(P)=T:F=1
1935 NEXTI
1940 IF F>Ø THEN 1915
1945 GOTO1905
1950 Z2=Ø:FOR Q=1 TO 14:IF Z2<Z1(Q) THEN Z2=Z1(Q)
1955 NEXTQ
1960 Z3=INT(100/Z2)
1965 IF Z3<1 THEN F=.5:GOTO1995
1970 IF Z3=1 THEN RETURN
1975 IF Z3<=5 AND Z3>=3 THEN F=3:GOTO1995
1980 IF Z3=2 THEN F=2:GOTO1995
1985 IF Z3>10 THEN F=10:GOTO1995
1990 IF Z3>5 AND Z3<10 THEN F=5
1995 FOR Q=1 TO 14:Z1(Q)=F*Z1(Q):NEXTQ:RETURN
2000 CLS:CLEAR10:PRINT"X-BAR, R PLOT":PRINT
2005 INPUT"HOW MANY DATA POINTS WILL BE AVERAGED";C
2010 PRINT"ENTER DATA IN SETS OF ";C
2015 PRINT"A RUNNING AVERAGE WILL BE SHOWN ON EACH SET"
2020 PRINT"IF ANY SET HAS LESS THAN";C;"POINTS, ENTER THE RUNNING"
2025 PRINT"AVERAGE TO MAKE UP THE ";C;"POINTS."
2030 PRINT:PRINT"AFTER THE LAST SET IS ENTERED - TYPE 9999 AND PRESS ENTER."
2035 PRINT:INPUT"PRESS ENTER TO BEGIN DATA ENTRY";A$
2040 DIM N1(100,C+1)
2045 T$="###.##":N=1:PRINT:PRINT"SET NO."
2050 A=1:SM=Ø:FOR A1=1 TO C:M(A1)=Ø:NEXTA1
2055 PRINT"( ";N;" )","RUNNING AVERAGE"
2060 IF A=C+1 THEN A=1:GOTO 2085
2065 INPUT M(A):PRINT"";:FOR Q=1 TO A:SM=SM+M(Q):NEXTQ:SM=SM/A
2070 IF M(A)=9999 THEN N=N-1:GOTO2100
2075 PRINT@914,SM:N1(N,A)=M(A):N1(N,Ø)=SM
2080 A=A+1:SM=Ø:GOTO2060
2085 N=N+1:GOTO 2055
2100 CLS:G=Ø:FOR A = 1 TO N
2105 PRINTA;"-";:FOR AC=1 TO C:PRINTN1(A,AC);:NEXTAC:PRINT
2110 IF A>=12+12*G THEN INPUT"PRESS ENTER TO CONTINUE LIST-";A$:G=G+1
2120 NEXT A
2125 INPUT"DO YOU WISH TO CHANGE ANY DATA (Y/N)";A$
2130 IF A$="Y" THEN 2200
2132 IF A$="N" THEN2135
2134 PRINT"ANSWER Y OR N":GOTO2125
2135 FOR A=1 TO N
2140 GOSUB 2900
2145 MN=N1(A,1):MX=N1(A,C):N1(A,C+1)=MX-MN
2150 NEXT A
2155 N4=Ø:N5=Ø:FOR A=1 TO N
2160 N4=N4+N1(A,Ø):N5=N5+N1(A,C+1):NEXTA
2165 N6=N4/N:N7=N5/N
2170 GOTO 2300
2200 CLS:INPUT"DO YOU NEED TO LIST AGAIN";A$
2202 IF A$="N" THEN 2208
2204 IF A$="Y" THEN 2100
2206 PRINT"ANSWER Y OR N":GOTO2200
2208 INPUT"ENTER SET NUMBER TO BE CHANGED";M
2210 FOR A=1 TO C:PRINT N1(M,A);:NEXT A
2215 PRINT:PRINT"ENTER NEW VALUES FOR ALL POINTS"
2220 SM=Ø:R9=Ø
2225 PRINT"( ";M;" )","RUNNING AVERAGE"
2228 FOR A=1 TO C
2230 INPUT M(A):FOR Q=1 TO A:SM=SM+M(Q):NEXT Q:SM=SM/A
2235 R=343+R9*64
2240 PRINT@R,SM:N1(M,A)=M(A):N1(M,Ø)=SM
2245 SM=Ø:R9=R9+1
2250 NEXT A
2260 GOTO2125
2300 CLS:PRINT@475,"WORKING":R1=Ø:R2=Ø:R3=Ø:R4=Ø
2305 FOR A=1 TO N:IF R1<N1(A,Ø) THEN R1=N1(A,Ø)
2310 IF R3<N1(A,C+1) THEN R3=N1(A,C+1)
2315 NEXT A:R2=R1:R4=R3
2320 FOR A=1 TO N:IF N1(A,Ø)<R2 THEN R2=N1(A,Ø)
2325 IF N1(A,C+1)<R4 THEN R4=N1(A,C+1)
2330 NEXTA
2332 N8=N:IF N>50 THEN 2400
2335 CLS:FOR A=0 TO 44:SET(26,A):NEXT A:FOR A=26 TO 127:SET(A,44):SET(A,33):NEXT
     A
2340 PRINT@960,"          Ø       10      20      30      40      50"
     ;
2345 PRINT@839,"R";:PRINT@390,"X-BAR";
2350 H1=30/(R2-R1):J1=-R1*H1:H2=10/(R4-R3):J2=34-R3*H2
2355 IF N>50 THEN 2400
2356 FOR A=1 TO N
2358 IF N1(A+L*50,Ø)<=Ø THEN 2365
2360 SET(26+2*A,N1(A+L*50,Ø)*H1+J1):SET(26+2*A,N1(A+L*50,C+1)*H2+J2):NEXTA
2365 PRINT@645,"";:PRINT USING T$;R2;:PRINT@5,"";:PRINT USINGT$;R1;:PRINT@773,""
     ;:PRINT USINGT$;R3;
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2375 PRINT@64,"PRESS";:PRINT@128,"ENTER TO";:PRINT@192,"CONTINUE";:INPUT A$:IF N
     N>0 THEN NN=NN-50:L=L+1:GOTO2420
2380 CLS:INPUT"DO YOU WANT TO LIST X-BAR AND R (Y/N)";A$
2385 IF A$="N" THEN 2600
2390 IF A$="Y" THEN 2500
2395 PRINT"PLEASE ANSWER Y OR N":GOTO2380
2400 CLS:N9=N:N=50:NN=N9-50:PRINT"N IS GREATER THAN 50.  ONLY 50 POINTS WILL BE
     PLOTTED."
2405 PRINT"THE OTHER POINTS WILL BE PLOTTED 50 AT A TIME ON DEMAND."
2410 INPUT"PRESS ENTER TO CONTINUE-";A$:GOTO2335
2420 IF NN<0 THEN N=50:GOTO2335
2425 N=50:NN=NN-50:GOTO 2335
2500 N=N8:CLS:PRINT"SET NO.","X-BAR","R":G=0
2505 FOR A=1 TO N:PRINTA,N1(A,0),N1(A,C+1)
2515 IFA>=14+G*14 THEN INPUT"PRESS ENTER TO CONTINUE-";A$:G=G+1
2520 NEXTA:PRINT"AV X-BAR = ";N6;"     AV R = ";N7:INPUT"PRESS ENTER TO CONTINUE
     -";A$
2525 ON C GOSUB 2700,2700,2705,2710,2715,2720,2725,2730,2735,2740
2530 PRINT"X-BAR UPPER CONTROL LIMIT = ";N6+A2*N7
2535 PRINT"X-BAR LOWER CONTROL LIMIT = ";N6-A2*N7
2540 PRINT:PRINT"R UPPER CONTROL LIMIT =";D4*N7
2545 PRINT"R LOWER CONTROL LIMIT =";D3*N7
2550 INPUT"PRESS ENTER TO CONTINUE";A$
2600 INPUT"DO YOU WANT TO PLOT - ADD - CHANGE - LIST - END";A$
2602 L=0:IF A$="PLOT" THEN 2332
2604 IF A$="LIST" THEN 2380
2605 IF A$="Y" THEN 2332
2606 IF A$="CHANGE" THEN 2125
2608 IF A$="ADD" THEN 2620
2610 IF A$="END" THEN RUN 4
2612 PRINT"ILLEGAL COMMAND; ENTER AGAIN":GOTO2600
2620 N=N+1:PRINT@768,"SET NO.":GOTO2050
2700 A2=1.88:D3=0:D4=3.267:RETURN
2705 A2=1.023:D3=0:D4=2.575:RETURN
2710 A2=.729:D3=0:D4=2.283:RETURN
2715 A2=.577:D3=0:D4=2.115:RETURN
2720 A2=.483:D3=0:D4=2.004:RETURN
2725 A2=.419:D3=.076:D4=1.924:RETURN
2730 A2=.373:D3=.136:D4=1.864:RETURN
2735 A2=.337:D3=.184:D4=1.816:RETURN
2740 A2=.308:D3=.223:D4=1.777:RETURN
2900 G=C
2905 IF G<=1 THEN RETURN
2910 G=INT(G/2):M=C-G
2915 F=0:FOR I=1 TO M:P=I+G
2920 IF N1(A,I)<=N1(A,P) THEN 2930
2925 T=N1(A,I):N1(A,I)=N1(A,P):N1(A,P)=T:F=1
2930 NEXT I
2935 IF F>0 THEN 2915
2940 GOTO 2905
3000 CLS:PRINT"THIS SUB-ROUTINE IS OPEN":FOR A=1 TO 1000:NEXTA:RUN4
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10  CLEAR 100:DEFSTR A-H:DEFINT I-N:DEFSNG O-Z:MW=24:DIMWA(9),UW(9,2),YD(MW),YT(M
    W),YB(MW),ID(MW),IT(MW),WW(MW),UG(3,2),AM(9),AN(9),TE(12,7),TA(3,6,5,2),SL(
    5,7):CLS:GOSUB8500:PRINT:INPUT"RESIDENCE IDENTIFIER";AR:FORI=1TO9:READAM(I)
    ,AN(I):NEXTI
230 DATA NORTH,N,NORTHEAST,NE,EAST,E,SOUTHEAST,SE,SOUTH,S,SOUTHWEST,SW,WEST,W,NO
    RTHWEST,NW,PARTITION,PA
250 PRINT:INPUT"CASE IDENTIFIER";BR:PRINT:PRINT"WEATHER CONDITIONS:":INPUT"  DES
    IGN HIGH";TH:INPUT"  DESIGN LOW";TL:INPUT"  DESIGN DAILY RANGE";TR:PRINT:IN
    PUT"SITE LATITUDE, DEGREES";ZL
300 CLS:PRINT"OPAQUE WALL (& DOOR) INPUT":PRINT:PRINT"FOR EACH WALL EXPOSURE, IN
    PUT:":PRINT"  EXPOSURE (NORTH, NORTHEAST, ETC. OR PARTITION)":PRINT"  WALL AR
    EA, SQ. FT.":PRINT"  SUMMER U-VALUE":PRINT"  WINTER U-VALUE"
400 PRINT"AN EXPOSURE OF '0' SIGNIFIES THE END OF WALL DATA":GOSUB9000:CLS
440 PRINT:INPUT"EXPOSURE";BM:IFBM="0"THEN500
450 FORI=1TO9:IFBM=AM(I)ORBM=AN(I)THEN455
452 NEXTI:GOTO440
455 I1=I:INPUT"WALL AREA, SQ. FT.";WA(I1):INPUT"SUMMER U-VALUE";UW(I1,1):INPUT"W
    INTER U-VALUE";UW(I1,2):GOTO440
500 CLS:J=1
510 PRINT TAB(5) AM(J),:FORI=J+1TOJ+3:PRINTAM(I),:NEXTI:PRINT"AREA";:FORI=0TO3:P
    RINTWA(J+I),:NEXTI:PRINT"U--S";:FORI=0TO3:PRINTUW(J+I,1),:NEXTI:PRINT"U--W"
    ;:FORI=0TO3:PRINTUW(J+I,2),:NEXTI
600 PRINT:IFJ<>5THENJ=5:GOTO510
605 PRINT TAB(5) AM(9):PRINT"AREA";WA(9):PRINT"U--S";UW(9,1):PRINT"U--W";UW(9,2)
    :PRINT:GOSUB9000:IFIW=2THEN900
630 CLS:PRINT"W I N D O W    I N P U T"
640 PRINT:PRINT"FOR EACH WINDOW, INPUT:":PRINT"  *  WINDOW DIRECTION":PRINT"  *
    WINDOW TYPE":PRINT"       1 = SINGLE PANE GLASS":PRINT"       2 = DOUBLE P
    ANE GLASS":PRINT"       3 = DOUBLE PANE, HEAT ABSORBING"
700 PRINT "  *  WINDOW AREA, SQ. FT.":PRINT"  *  LENGTH OF OVERHANG":PRINT"  *
    DISTANCE FROM TOP OF WINDOW TO OVERHANG":PRINT"  *  DISTANCE FROM BOTTOM OF
    WINDOW TO OVERHANG":PRINT"A WINDOW DIRECTION OF '0' ENDS WINDOW INPUT"
740 GOSUB9000:CLS:NW=1
770 PRINT:PRINT"WINDOW NUMBER";NW:INPUT"WINDOW DIRECTION";BM:IFBM="0"THEN890
785 FOR I=1 TO 8:IFBM=AM(I)ORBM=AN(I)THEN790
786 NEXTI:GOTO770
790 ID(NW)=I:IFWA(I)<>0THEN800
796 PRINT"NO WALL IN THIS DIRECTION":GOTO780
800 INPUT "WINDOW TYPE";IT(NW):IFIT(NW)<1ORIT(NW)>3THEN800
810 INPUT"WINDOW AREA";WW(NW):INPUT"OVERHANG LENGTH, FT.";YD(NW):IFYD(NW)=0THEN8
    70
850 INPUT"TOP OF WINDOW TO OVERHANG, FT.";YT(NW):INPUT"BOTTOM OF WINDOW TO OVERH
    ANG, FT.";YB(NW)
870 NW=NW+1:GOTO 770
890 NW=NW-1
900 CLS:PRINT"THERE ARE";NW;"WINDOWS":PRINT:FORI=1TO8:NX=0:FORJ=1TONW:IFID(J)=IT
    HENNX=NX+1
950 NEXTJ:IFNX=0THEN970
960 PRINT NX;"FACE ";AM(I)
970 NEXTI:GOSUB9000:IFIW=2THEN2860
990 CLS:INPUT"ROOF PLAN AREA, SQ. FT.";RA:INPUT"ROOF SUMMER U-VALUE";RS:INPUT"RO
    OF WINTER U-VALUE";RW
1020 PRINT:PRINT"INPUT FLOOR TYPE:":PRINT"     1 = CRAWL SPACE":PRINT"     2 = S
    LAB-ON-GRADE":INPUT JF:IFJF=2THEN1100
1070 INPUT"FLOOR PLAN AREA, SQ. FT.";SA:INPUT"FLOOR SUMMER U-VALUE";SS:INPUT"FLO
    OR WINTER U-VALUE";SW
1100 PRINT:PRINT "INPUT GENERAL TYPE OF WALL CONSTRUCTION:":PRINT"     1 = FRAME
    ":PRINT"     2 = MASONRY":INPUT JW:PRINT:INPUT"IS THE ROOF DARK (1) OR LIGH
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     T (2)";JR:JR=JR+4:PRINT:INPUT"VOLUME OF CONDITIONED SPACE";VL:INPUT"AIR CHA
     NGES PER HOUR";VC
1160 FORJ=1TO7:FORI=1TO12:READTE(I,J):NEXTI,J
1210 DATA 17.6,13.6,22.6,18.6,13.6,27.6,23.6,18.6,28.6,23.6,28.6,33.6
1220 DATA 10.3,6.3,15.3,11.3,6.3,20.3,16.3,11.3,21.3,16.3,21.3,26.3
1225 DATA 9,5,14,10,5,19,15,10,20,15,20,25
1226 DATA 2.5,0,7.5,3.5,0,12.5,8.5,3.5,13.5,8.5,13.5,18.5
1230 DATA 38,34,43,39,34,48,44,39,49,44,49,54
1240 DATA 30,26,35,31,26,40,36,31,41,36,41,46
1250 DATA 9,5,14,10,5,19,15,10,20,15,20,25
1280 IFTH>89THEN1310
1290 IFTR<15THENJC=1ELSEJC=2
1295 TD=TH-85:IFTD<0THENTD=0
1300 GOTO1500
1310 IFTH>94THEN1340
1320 IFTR<15THENJC=3ELSEIFTR<25THENJC=4ELSEJC=5
1325 TD=TH-90:GOTO1500
1340 IFTH>99THEN1370
1350 IFTR<15THENJC=6ELSEIFTR<25THENJC=7ELSEJC=8
1355 TD=TH-95:GOTO1500
1370 IFTH>104THEN1400
1380 IFTR<25THENJC=9ELSEJC=10
1385 TD=TH-100:GOTO1500
1400 IFTH<109THENJC=11ELSEJC=12
1410 TD=0:IFJC<>12THENTD=TH-105
1500 UG(1,1)=1.04:UG(1,2)=1.1:UG(2,1)=.65:UG(2,2)=.62:UG(3,1)=.51:UG(3,2)=.43
1510 FORL=1TO2:FORI=1TO3:FORJ=1TO6:FORK=1TO5:READTA(I,J,K,L):NEXTK,J,I,L
1600 DATA 23,56,81,70,40,27,60,85,74,44,31,64,89,78,48
1610 DATA 35,68,93,82,52,38,71,96,85,55,44,77,102,91,61
1620 DATA 19,46,68,59,33,21,48,70,61,35,24,51,73,64,38
1630 DATA 26,53,75,66,40,28,55,77,68,42,30,57,79,70,44
1640 DATA 12,27,42,35,19,14,29,44,37,21,17,32,47,40,24
1650 DATA 19,34,49,42,26,21,36,51,44,28,23,38,53,46,30
1660 DATA 15,32,48,40,23,19,36,52,44,27,23,40,56,48,31
1670 DATA 27,44,60,52,35,30,47,63,55,38,36,53,69,61,44
1680 DATA 12,27,42,35,20,14,29,44,37,22,17,32,47,40,25
1690 DATA 19,34,49,42,27,21,36,51,44,29,23,38,53,46,31
1700 DATA 9,20,30,24,15,11,22,32,26,17,14,25,35,29,20
1710 DATA 16,27,37,31,22,18,29,39,33,24,20,31,41,35,26
1740 ML=1:MJ=INT((TH-85)/5)+1:IFMJ<1THENMJ=1
1770 XJ=0:IFTH<-85ORTH>=110THEN1788
1780 TT=(MJ-1)*5+85:XJ=(TH-TT)/5
1788 GOSUB4000
1830 WG=0:WX=0:TX=TE(JC,JW)+TD
1835 CLS:PRINT"COOLING LOADS:   ";AR;" / ";BR:PRINT"WINDOW GAINS (BTU/HR)","WALL
     GAINS (BTU/HR)":J=98:JK=0
1850 FORI=1TO9:TY=TX:IFI=9THENTY=TE(JC,JW+2)+TD
1855 IFWA(I)=0THEN1870ELSEWH=INT(WA(I)*UW(I,1)*TY+.5)
1860 J=J+64:IFJ=418THENJK=J-64:J=178
1862 BM=AN(I):IFLEN(AN(I))<2THENBM=BM+" "
1863 PRINT@J,BM;:PRINTUSING"####,###";WH;:WG=WG+WH:WX=WX+WA(I)
1870 NEXT I
1880 IFJK=0THENJK=J
1910 RG=INT((TE(JC,JR)+TD)*RA*RS+.5):YG=0:K=66
1950 FORI=1TONW:WX=WX+WW(I):IFID(I)>2ANDID(I)<8THEN2025
1975 MK=ID(I):IFMK>5THENMK=10-ID(I)
1990 TT=TA(IT(I),MJ,MK,ML):IFXJ<>0THENTT=TT+XJ*(TA(IT(I),MJ+1,MK,ML)-TT)
2000 YH=INT(WW(I)*UG(IT(I),1)*TT+.5):GOTO2200
2025 PS=0:IFYD(I)=0THEN2070
2030 PD=SL(ID(I)-2,JZ)
2040 PD=SL(ID(I)-2,JZ):IFYL<>0THENPD=PD+YL*(SL(ID(I)-2,JZ+1)-PD)
2050 PD=PD*YD(I)-YT(I):PS=PD/(YB(I)-YT(I)):IFPS<0THENPS=0
2061 IFPS<0THENPS=0
2065 IFPS>1THENPS=1
2070 MK=ID(I):IFMK>5THENMK=10-ID(I)
2080 TT=TA(IT(I),MJ,MK,ML):IFXJ<>0THENTT=TT+XJ*(TA(IT(I),MJ+1,MK,ML)-TT)
2090 YH=INT((1-PS)*WW(I)*UG(IT(I),1)*TT+.5):IFPS=0THEN2200
2110 TT=TA(IT(I),MJ,1,ML):IFXJ<>0THENTT=TT+XJ*(TA(IT(I),MJ+1,1,ML)-TT)
2120 YH=YH+INT(PS*WW(I)*UG(IT(I),1)*TT+.5)
2200 YG=YG+YH:K=K+64:IFK>890THENK=146
2203 PRINT@K," ";:PRINTUSING"## ##,###";I;YH;
2205 NEXT I
2220 YF=0:IFJF=2THEN2260
2240 YF=INT(SA*SS*(TE(JC,7)+TD)+.5)
2260 IFTH>100THEN2290
2270 TT=0.7+(TH-85)/15*1.2:GOTO2350
2290 IFTH>105THEN2320
2300 TT=1.9+(TH-100)/5*0.3
2310 GOTO 2350
2320 TT=2.2+(TH-105)/5*0.4:IFTT>2.6THENTT=2.6
2350 YI=INT(TT*WX+.5):J=JK+126:PRINT@J,"TOTAL GAINS";:J=J+66:PRINT@J,"WALLS",:PR
     INTUSING"####,###";WG;:J=J+64:PRINT@J,"WINDOWS",:PRINTUSING"####,###";YG;:J
     =J+64:PRINT@J,"ROOF",:PRINTUSING"####,###";RG;
2375 IFYF>0THENJ=J+64:PRINT@J,"FLOOR",:PRINTUSING"####,###";YF;
2377 J=J+64:PRINT@J,"INFILTRATION";:PRINTUSING"####,###";YI;:TG=WG+RG+YG+YF+YI:J
     =J+70:PRINT@J,"TOTAL",:PRINTUSING"####,###";TG;
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2420 YC=INT(TG/1000+.5)/10:PRINT@960,"APPROXIMATE A/C SIZE:";YC;"TONS";:GOSUB900
     0
2500 CLS:PRINT"HEATING LOADS:   ";AR;" / ";BR:PRINT"WINDOW LOSSES (BTU/HR)","WALL
     LOSSES (BTU/HR)":J=98:JK=0
2510 TT=70-TL:WL=0:FORI=1TO9:IFWA(I)=0THEN2550
2535 TS=TT:IFI=9THENTS=TS/2
2540 WM=INT(UW(I,2)*WA(I)*TS+.5):WL=WL+WM
2545 J=J+64:IFJ=418THENJK=J-64:J=178
2547 BM=AN(I):IFLEN(AN(I))<2THENBM=BM+" "
2548 PRINT@J,BM;:PRINTUSING"####,###";WM;
2550 NEXT I
2560 IFJK=0THENJK=J
2570 RL=INT(RW*RA*TT+.5):ZG=0:K=66:FORI=1TONW
2610 ZH=INT(WW(I)*UG(IT(I),2)*TT+.5):ZG=ZG+ZH
2615 K=K+64:IFK>890THENK=146
2617 PRINT@K," ";:PRINTUSING"## ##,###";I;ZH;
2620 NEXT I
2625 J=JK+126:PRINT@J,"TOTAL LOSSES";:J=J+66:PRINT@J,"WALLS";:PRINTUSING"####,##
     #";WL;:J=J+64:PRINT@J,"WINDOWS";:PRINTUSING"####,###";ZG;:J=J+64:PRINT@J,"R
     OOF",:PRINTUSING"####,###";RL;:ZF=0:IFJF=2THEN2680
2660 ZF=INT(SA*SW*TT/2+.5):J=J+64:PRINT@J,"FLOOR";:PRINTUSING"####,###";ZF;
2680 ZI=INT(0.018*VL*VC*TT+.5):J=J+64:PRINT@J,"INFILTRATION",:PRINTUSING"####,##
     #";ZI;:ZT=WL+RL+ZG+ZF+ZI:J=J+70:PRINT@J,"TOTAL";:PRINTUSING"####,###";ZT;:X
     T=INT(ZT*1.5+.5):PRINT@896,"WITH 50% MARGIN:";XT;"BTU/HR";
2810 XT=INT(ZT*1.3+.5):PRINT@960,"WITH 30% MARGIN:";XT;"BTU/HR";:GOSUB9000
2850 CLS:PRINT"FOR PARAMETRIC ANALYSES. . .":INPUT"CASE IDENTIFIER";BR
2860 PRINT:PRINTTAB(5)"1 = ROTATE BUILDING":PRINTTAB(5)"2 = CHANGE WINDOW PARAME
     TERS":PRINTTAB(5)"3 = CHANGE WALL U-VALUES":PRINTTAB(5)"4 = CHANGE ROOF U-V
     ALUE":PRINTTAB(5)"5 = CHANGE FLOOR U-VALUE"
2915 PRINTTAB(5)"6 = CHANGE NUMBER OF AIR CHANGES PER HOUR":PRINTTAB(5)"0 = END
     OF CHANGES":INPUT"INDEX";IJ:ONIJ+1GOTO1830,5000,5500,6000,6500,7000,7500
4000 FORJ=1TO7:FORI=1TO5:READSL(I,J):NEXTI,J
4090 DATA 0.8,1.9,10.1,1.9,0.8
4100 DATA 0.8,1.6,5.4,1.6,0.8
4110 DATA 0.8,1.4,3.6,1.4,0.8
4120 DATA 0.8,1.3,2.6,1.3,0.8
4130 DATA 0.8,1.2,2,1.2,0.8
4140 DATA 0.8,1,1.7,1,0.8
4150 DATA 0.8,0.9,1.4,0.9,0.8
4170 JZ=INT((ZL-25)/5)+1:IFJZ>7THENJZ=7ELSEIFJZ<1THENJZ=1
4190 YL=0:IFZL<=25ORZL>=55THENRETURN
4200 YY=(JZ+4)*5:YL=(ZL-YY)/5:RETURN
5000 PRINT:PRINT"ROTATIONS ARE MADE CLOCKWISE IN MULTIPLES OF 45 DEGREES":INPUT'
     INPUT NUMBER OF DEGREES OF ROTATION";IK:IK=IK/45
5040 FORLL=1TOIK:XX=WA(8):UU=UW(8,1):UV=UW(8,2):FORI=8TO2STEP-1:WA(I)=WA(I-1):UW
     (I,1)=UW(I-1,1):UW(I,2)=UW(I-1,2):NEXTI:WA(1)=XX:UW(1,1)=UU:UW(1,2)=UV:NEXT
     LL
5110 FORI=1TONW:ID(I)=ID(I)+IK:IFID(I)>8THENID(I)=ID(I)-8
5140 NEXTI:IW=2:GOTO500
5500 CLS
5510 PRINT:INPUT"WINDOW NUMBER";NU:IFNU=0THEN2860
5520 IFNU>NWTHEN5510
5525 PRINT"CURRENT DATA:":PRINTTAB(2)"DIRECTION",AM(ID(NU)):PRINTTAB(2)"TYPE",IT
     (NU):PRINTTAB(2)"OVERHANG",YD(NU):IFYD(NU)=0THEN5530
5527 PRINTTAB(2)"TOP DIST.",YT(NU):PRINTTAB(2)"BOTTOM DIST.",YB(NU)
5530 PRINT:INPUT"WINDOW TYPE";IT(NU):IFIT(NU)<1ORIT(NU)>3THEN5530
5560 INPUT"OVERHANG LENGTH, FT.";YD(NU):IFYD(NU)=0THEN5510
5580 INPUT"TOP OF WINDOW TO OVERHANG, FT.";YT(NU):INPUT"BOTTOM OF WINDOW TO OVE
     HANG, FT.";YB(NU):GOTO5510
6000 CLS:INPUT"EXPOSURE";BM:IFBM="0"THEN2860
6010 FORI=1TO9:IFBM=AM(I)ORBM=AN(I)THEN6030
6020 NEXTI:GOTO6000
6030 IK=I:INPUT"SUMMER U-VALUE";UW(IK,1):INPUT"WINTER U-VALUE";UW(IK,2):GOTO6000
6500 CLS:INPUT"SUMMER U-VALUE";RS:INPUT"WINTER U-VALUE";RW:GOTO2860
7000 CLS:INPUT"SUMMER U-VALUE";SS:INPUT"WINTER U-VALUE";SW:GOTO2860
7500 INPUT"NUMBER OF AIR CHANGES PER HOUR";VC:PRINT:GOTO2860
8500 FORI=15360TO15871:POKEI,191:NEXTI
8510 PRINT@71," A S H R A E    R E S I D E N T I A L    L O A D S "
8520 PRINT@550," ":RETURN
9000 PRINT@1000,"HIT ANY KEY TO CONTINUE";:FORJ=1TO99:NEXTJ:PRINT@1000,STRING$(2
     3," ");:FORJ=1TO99:NEXTJ:IFINKEY$=""THEN9000ELSERETURN
```

Similar to the Ashrae program, but applicable to plumbing design requirements. Flow rates, nodal configurations, head levels, etc. are all taken into account in calculating pipe size and other variables in the system. Most useful to the private contractor or design consultant.
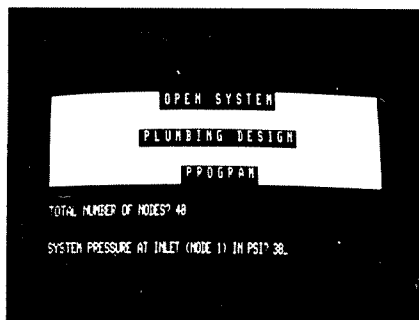

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5 DEFINTI-N:CLEAR200
10 GOSUB2500' DIMENSION VARIABLES
15 Z$=STRING$(160,191)
20 CLS:PRINTZ$;Z$;
22 PRINT@20," O P E N   S Y S T E M ";
24 PRINT@144," P L U M B I N G   D E S I G N ";
26 PRINT@280," P R O G R A M ";:PRINT@383," ";
30 INPUT"TOTAL NUMBER OF NODES";NN
40 PRINT:INPUT"SYSTEM PRESSURE AT INLET (NODE 1) IN PSI";PP
45 GOSUB7000' FILL IN PIPE SIZES
50 CLS:PRINT"INPUT NODAL CONNECTIONS IN THE FORM 'NN,MM'"
60 NC=0
70 INPUT"NN,MM";N1,M1
80 IFN1=0THEN100
90 NC=NC+1:II(NC)=N1:JJ(NC)=M1:PRINT:GOTO70
100 CLS:PRINT"INPUT LENGTHS BETWEEN NODES, IN FEET"
110 FORI=1TONC:GOSUB3000:INPUTXL(I):NEXTI
115 CLS:PRINT"ELEVATION ABOVE NODE 1 IN FEET":PRINT
116 FORI=2TONN:PRINT"@ NODE";I;:INPUTEL(I):NEXTI
120 GOSUB2000' SET UP FLOW PATH MATRIX    .
130 CLS:INPUT"DO YOU WISH TO INPUT DISCHARGE RATES (D) OR FIXTURE UNITS (F)";A$
135 IFA$="D"THEN140ELSECLS:PRINT"INPUT THE NUMBER OF FIXTURE UNITS":PRINT:GOTO15
    0
140 CLS:PRINT"INPUT THE REQUIRED DISCHARGE RATES IN GPM":PRINT
150 FORI=1TOIP:PRINT"@ NODE";LP(I,1);:INPUTF
160 FORJ=1TONC:IFJJ(J)=LP(I,1)ANDII(J)=LP(I,2)THEN174
170 NEXTJ
174 IFA$="D"THEN180
175 PRINTTAB(10);:INPUT"FLUSH VALVES (1) OR FLUSH TANKS (2)";K
176 IFK=1ANDF<5THENF=5
177 AP(I)=8:IFK=1THENAP(I)=15:F=-F
180 FL(J)=F
190 NEXTI
200 CLS:INPUT"MAXIMUM VELOCITY, FPS";VM
210 IFA$="F"THEN215
211 PRINT:INPUT"MINIMUM PRESSURE, PSI";PM
212 FORI=1TOIP:AP(I)=PM:NEXTI
215 GOSUB7500' CHECK FOR PROBLEMS DUE TO TOO GREAT EL. CHANGE
220 FORI=1TOIP
222 IX=LP(I,1):IY=LP(I,2)
224 FORJ=1TONC:IFIX=JJ(J)ANDIY=II(J)THEN228
226 NEXTJ
228 FX=FL(J):FY=ABS(FX)
230 IQ=2
240 IFLP(I,IQ)=1THEN300
250 IX=LP(I,IQ):IY=LP(I,IQ+1)
260 FORJ=1TONC:IFIX=JJ(J)ANDIY=II(J)THEN280
270 NEXTJ
280 FZ=FL(J):FL(J)=ABS(FL(J))+FY:IFFZ<0ORFX<0THENFL(J)=-FL(J)
290 IQ=IQ+1:GOTO240
300 NEXTI
310 IFA$="F"THENGOSUB6500' ADJUST FROM FIXTURE UNITS TO GPM
360 CLS:PRINT"SYSTEM DESIGN FLOWS ARE:":PRINT
370 FORI=1TONC:GOSUB3000:PRINTUSING"####.##";FL(I);:PRINT" GPM"
375 IFI=NCORI=INT(I/10)*10THENGOSUB9000:CLS
380 NEXTI
410 ' ASSUME MAX VELOCITY IN ALL PIPES.
420 ' INPUT VALVES, FITTINGS, ETC.
500 ' CALCULATE INITIAL PIPE SIZES
505 IW=1
510 FORI=1TONC:PS=SQR(.408*FL(I)/VM)
511 GOSUB8000
```

```
 512 NEXTI
 515 CLS:PRINT"INITIAL PIPE SIZES FOR NOMINAL VELOCITY OF";VM;"FPS":PRINT
 517 FORI=1TONC:GOSUB3000:PRINTUSING"###.##";SP(IS(I));:PRINT" INCHES":IFINT(I/10
     )*10ORI=NCTHENGOSUB9000:CLS
 518 NEXTI
 520 IFIW=2THEN620
 525 PRINT"INPUT THE TOTAL K-VALUE FOR EACH BRANCH, INCLUDING ALL VALVES & FITTIN
     GS:":PRINT
 530 FORI=1TONC:GOSUB3000:INPUTXK(I):NEXTI
 590 '
 600 '   CALCULATE PRESSURE DROP FOR EACH PIPE SEGMENT
 610 '
 620 FORI=1TONC:GOSUB4000:NEXTI
 630 '
 640 '   CALCULATE PRESSURE AT THE END OF EACH BRANCH
 650 '
 660 GOSUB5000
 670 '
 680 '   CHECK FOR MINIMUM PRESSURE REQUIREMENT
 690 '
 700 FORI=1TOIP
 710 IFPE(I)<AP(I)THEN800
 720 NEXTI
 730 GOTO900
 800 '
 810 '   ADJUST PIPE SIZES
 820 '
 830 GOSUB6000
 840 GOTO700
 900 '
 910 CLS:PRINTTAB(20)"PIPE SIZE, IN.";TAB(40)"VELOCITY, FPS":PRINTTAB(20)STRING$(
     14,"-");TAB(40)STRING$(13,"-"):
 920 FORI=1TONC:GOSUB3000:PRINTUSING"######.##";SP(IS(I));
 922 V=.408*FL(I)/SQ(IS(I))[2
 924 PRINTUSING"################.#";V
 930 IFI=NCORI=INT(I/10)*10THENGOSUB9000:CLS
 950 NEXTI
1040 CLS:PRINT"RESIDUAL PRESSURES ARE:":PRINT
1050 FORI=1TOIP:PRINT"NODE";:PRINTUSING"###";LP(I,1);:PRINT": ";:PRINTUSING"###.
     #";PE(I);:PRINT" PSI":IFINT(I/10)*10=ITHENGOSUB9000:CLS
1060 NEXTI
1070 PRINT:INPUT"ANOTHER CASE (Y/N)";B$
1080 IFB$="N"THENEND
1090 INPUT"DO YOU WISH TO CHANGE THE MAXIMUM VELOCITY";B$
1100 IFB$="Y"THENINPUT"VELOCITY";VM
1105 IW=2:IFA$="F"THEN510
1110 INPUT"DO YOU WISH TO CHANGE THE MINIMUM PRESSURE";B$
1120 IFB$="Y"THENINPUT"PRESSURE";PM:FORI=1TOIP:AP(I)=PM:NEXTI
1130 GOTO510
2000 ' FLOW PATH MATRIX--LP
2010 IP=0
2020 FORI=2TONN
2030 FORJ=1TONC
2040 IFII(J)=ITHEN2200
2050 NEXTJ
2060 IP=IP+1:LP(IP,1)=I:IQ=1:IS=I
2070 FORJ=1TONC
2080 IFJJ(J)=ISTHEN2110
2090 NEXTJ
2100 PRINT"NODE";I;"NOT CONNECTED":STOP
2110 IQ=IQ+1:LP(IP,IQ)=II(J):IFII(J)=1THEN2200
2120 IS=II(J):GOTO2070
2200 NEXTI
2210 CLS:PRINT"NODE NUMBERS FOR EACH POSSIBLE FLOW PATH ARE:":PRINT
2220 FORI=1TOIP
2230 PRINT"PATH";:PRINTUSING"###";I;:PRINT":    ";
2240 IQ=1
2250 PRINTUSING"####";LP(I,IQ);
2260 IFLP(I,IQ)=1THEN2280
2270 IQ=IQ+1:GOTO2250
2280 PRINT
2290 NEXTI
2300 GOSUB9000:RETURN
2500 '------------------------------------------------------------
2510 '  DIMENSION STATEMENTS WITH VARIABLE DEFINITIONS
2520 '------------------------------------------------------------
2530 DIM II(50)'      THE "FROM" NODE NUMBER IN EACH SEGMENT
2540 DIM JJ(50)'      THE "TO" NODE NUMBER IN EACH SEGMENT
2550 DIM XL(50)'      THE LENGTH OF EACH SEGMENT IN FEET
2560 DIM LP(20,20)'   MATRIX GIVING THE NODE NUMBERS IN EACH
2570 '                FLOW PATH FROM THE OUTLET BACK TO THE
2580 '                METER (NODE 1)
2590 DIM FL(50)'      FLOW IN EACH SEGMENT, GPM, OR FIXTURE
2595 '                UNITS
2600 DIM IS(50)'      CODE NUMBER (1-13) FOR SEGMENT SIZES
2610 DIM DP(50)'      PRESSURE DROP IN EACH SEGMENT, PSI
2620 DIM XK(50)'      K-VALUES FOR EACH SEGMENT
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2630 DIM PE(20)'          RESIDUAL PRESSURES AT THE DISCHARGE
2640 '                    POINTS, PSI
2650 DIM SP(13)'          NOMINAL SIZES OF COMMERCIALLY AVAILABLE
2655 '                    TYPE L COPPER PIPE
2660 DIM SQ(13)'          ACTUAL I.D. OF PIPE SIZES
2670 DIM A(3,6)'          COEFFICENTS FOR CONVERTING FROM
2680 '                    FIXTURE UNITS TO GPM
2690 DIM EL(50)'          ELEVATION OF EACH NODE ABOVE NODE 1
2700 DIM AP(20)'          MINIMUM PRESSURE AT EACH DISCHARGE
2710 '                    POINT, PSI
2720 RETURN'-------------------------------------------------
3000 '   PRINTING ROUTINE
3010 PRINT"NODE";:PRINTUSING"###";II(I);:PRINT" TO NODE";:PRINTUSING"###";JJ(I);
     :PRINT": ";:RETURN
4000 '  PIPE SEGMENT PRESSURE DROPS
4020 '   HAZEN/WILLIAMS
4025 PS=SQ(IS(I))
4030 DP(I)=(FL(I)/.443/140/PS[2.63)[1.85*XL(I)
4040 '  EFFECT OF FITTINGS & VALVES
4050 V=.408*FL(I)/PS[2
4060 DP(I)=DP(I)+XK(I)*62.4*V[2/144/2/32.2
4070 '  EFFECT OF ELEVATION DIFFERENCES
4080 DP(I)=DP(I)+(EL(JJ(I))-EL(II(I)))/2.31
4090 RETURN
5000 '   TOTAL PRESSURE DROP FOR EACH FLOW PATH
5010 FORI=1TOIP
5020 PE(I)=0
5030 IQ=2
5040 IFLP(I,IQ-1)=1THEN5100
5050 FORJ=1TONC
5060 IFLP(I,IQ)=II(J)ANDLP(I,IQ-1)=JJ(J)THEN5080
5070 NEXTJ
5080 PE(I)=PE(I)+DP(J)
5090 IQ=IQ+1:GOTO5040
5100 PE(I)=PP-PE(I)
5110 NEXTI
5120 RETURN
6000 '   INCREASE THE SIZE OF THE PIPE WITH THE HIGHEST TOTAL
6010 '   PRESSURE DROP (IGNORINNG ELEVATION CHANGE) IN THE
6020 '   BRANCH WHERE THE RESIDUAL PRESSURE IS THE FURTHEST FROM
6025 '   THE REQUIRED MINIMUM PRESSURE
6030 DD=0
6040 FORI=1TOIP
6050 IFPE(I)>AP(I)THEN6060
6055 IF(AP(I)-PE(I))>DDTHENDD=AP(I)-PE(I):J=I
6060 NEXTI
6070 IQ=2:DD=0
6080 IFLP(J,IQ)=0THEN6150
6090 FORI=1TONC
6100 IFLP(J,IQ)=II(I)ANDLP(J,IQ-1)=JJ(I)THEN6120
6110 NEXTI
6120 DQ=DP(I)-(EL(JJ(I))-EL(II(I)))/2.31
6125 IFDQ>=DDANDIS(I)<13THENDD=DQ:K=I
6130 IQ=IQ+1:GOTO6080
6150 I=K:IS(I)=IS(I)+1
6160 GOSUB3000:PRINT"PIPE SIZE CHANGED TO";SP(IS(I));"INCHES"
6170 DX=DP(I)
6175 '
6180 '   CALCULATE NEW PRESSURE DROP
6190 '
6200 GOSUB4000
6210 '
6220 '   ADJUST RESIDUAL PRESSURES
6230 '
6240 FORJ=1TOIP
6250 IQ=2
6260 IFLP(J,IQ-1)=1THEN6400
6270 IFLP(J,IQ)=II(I)ANDLP(J,IQ-1)=JJ(I)THENPE(J)=PE(J)+DX-DP(I):GOTO6400
6350 IQ=IQ+1:GOTO6260
6400 NEXTJ
6410 RETURN
6500 '   CONVERT FROM FIXTURE UNITS TO FLOWS IN GPM
6510 FORI=1TO3:FORJ=1TO6:READA(I,J):NEXTJ,I
6541 CLS:PRINT"FIXTURE UNIT COUNT":PRINT
6550 FORI=1TONC
6552 IG=2:IFFL(I)<0THENIG=1:FL(I)=-FL(I)
6556 GOSUB3000:PRINTUSING"#####";FL(I)
6558 IFI=NCORI=INT(I/10)*10THENGOSUB9000:CLS
6560 ID=3:IFFL(I)>900THEN6600
6562 ID=2:IFIG=1THENID=1:GOTO6600
6564 IFFL(I)>=8THEN6600
6566 IFFL(I)>=3THENFL(I)=FL(I)-1:RETURN
6568 IFFL(I)=2THENFL(I)=1.5:RETURN
6570 FL(I)=1:RETURN
6580 ID=2:IFFL(I)<=2THEN6600
6590 ID=1
6600 X=LOG(LOG(FL(I)))
```

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```
6610 Y=0
6620 FORJ=1TO6
6630 Y=A(ID,J)+X*Y
6640 NEXTJ
6650 FL(I)=EXP(Y)
6660 NEXTI
6670 RETURN
7000 '   COMMERCIALLY AVAILABLE PIPE SIZES & ACTUAL I.D.'S
7010 FORI=1TO13:READSP(I),SQ(I):NEXTI:RETURN
7500 '   FIND OUT IF REQUIRED RESIDUAL PRESSURE CANNOT BE MET
7510 '   WITH ANY PIPE SIZE DUE TO LARGE ELEVATION CHANGES
7520 IZ=1
7530 FORJ=1TOIP
7540 PR=PP-EL(LP(J,1))/2.31
7560 IFPR>AP(J)THEN7600
7570 IFIZ=1THENIZ=2:CLS:PRINT"PRESSURE REQUIREMENT CANNOT BE MET AT THE FOLLOWIN
     G":PRINT"NODE(S) BECAUSE OF EXCESSIVE ELEVATION CHANGE:":PRINT
7580 PRINTLP(J,1),
7600 NEXTJ
7610 IFIZ=2THENENDELSERETURN
8000 '   TAKE AN INITIAL PIPE SIZE AND ADJUST IT TO COMMERCIALLY
8010 '   AVAILABLE SIZES
8020 FORJ=1TO13
8030 IFPS<=SQ(J)THENIS(I)=J:GOTO8090
8040 NEXTJ
8080 IS(I)=13:RETURN
8090 V=.408*FL(I)/SQ(IS(I))[2
8100 IFV>VMANDIS(I)<>13THENIS(I)=IS(I)+1
8110 RETURN
9000 PRINT@1000,"HIT ANY KEY TO CONTINUE";:FORK=1TO150:NEXT:PRINT@1000,STRING$(2
     3," "):FORK=1TO150:NEXT:IFINKEY$=""THEN9000ELSERETURN
10000 '----------------------------------------------------------------
10010 '   DATA STATEMENTS
10020 '----------------------------------------------------------------
10030 '
10040 '   PIPE SIZES
10050 '
10060 DATA.5,.545,.75,.785,1,1.025,1.25,1.265,1.5,1.505,2,1.985
10070 DATA2.5,2.465,3,2.945,4,3.905,6,5.845,8,7.725,10,9.625
10080 DATA12,11.565
10090 '
10100 '   COEFFICIENTS FOR FIXTURE UNITS/FLOW CONVERSION
10110 '
10120 DATA.09811,.05451,-1.35161,3.33835,-2.25487,3.57807
10130 DATA.44468,-.83676,-2.49225,8.69041,-6.56646,3.28639
10140 DATA-.11254,.61512,.23036,-3.17483,4.14544,1.98677
```

SOUNDEX CODE: by Robert Hodge

If genealogical research is of interest to you, then this program will be right up your alley. It is designed to accurately generate the Soundex Code. This code is used in the recordkeeping system at the National Archives, translate letter groups into numbers and is based on phonics, rather than spelling. Plug the name in; out pop the numbers.
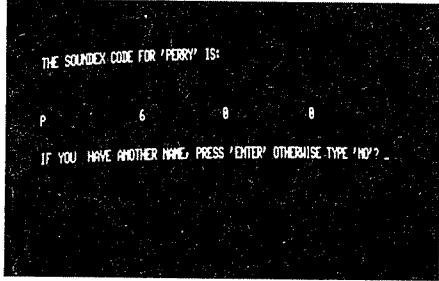
```
100 CLS
105 PRINT TAB(20)"THE SOUNDEX CODE"
110 PRINT:PRINT"A NUMBER  OF RECORDS IN THE NATIONAL ARCHIVES HAVE BEEN INDEXED
    ACCORDING   TO  A   SYSTEM  ALLOWING   SIMILAR   SOUNDING   NAMES TO BE GROUPED
    TOGETHER REGARDLESS OF SPELLING.  THIS    SYSTEM    IS TERMED THE 'SOUNDEX SY
    STEM'."
115 PRINT:PRINT"IF ONE IS GOING TO THE ARCHIVES,   IT WOULD BE HELPFUL AND TIME-
    SAVING TO HAVE THE SOUNDEX    CODES   ALREADY  AVAILBLE FOR THE SURNAMES (L
    AST NAMES) ONE WILL BE SEEKING."
120 PRINT:PRINT"i AM PROGRAMMED TO DETERMINE THE SOUNDEX CODE FOR YOU":PRINT:INP
    UT"TAP ENTER WHEN READY";A
125 DIMA$(25),B$(25),C(25)
130  CLS
135 PRINT"TYPE THE SURNAME (LAST NAME) TO BE CODED AND PRESS 'ENTER'":INPUT"";A$
140 A=LEN(A$)
145 C(1)=ASC(LEFT$(A$,1))
150 FOR  B=2 TO A
155 B$(B)=MID$(A$,B,1)
160 NEXT B
165 FOR B=2 TO A
170 C(B)=ASC(B$(B))
175 NEXT B
180 FOR B=1 TO A
185 IF C(B)=66  OR C(B)=70 OR C(B)=80 OR C(B)=86 THEN C(B)=1
190 IF C(B)=67  OR C(B)=71 OR C(B)=74 OR C(B)=75 THEN C(B)=2
195 IF C(B)=81  OR C(B)=83 OR C(B)=88 OR C(B)=90 THEN C(B)=2
200 IF C(B)=68  OR C(B)=84  THEN   C(B)=3
205 IF C(B)=77  OR C(B)=78 THEN   C(B)=5
210 IF C(B)=76  THEN C(B)=4
215 IF C(B)=82  THEN C(B)=6
220 IF C(B)>6  THEN C(B)=0
225 IF C(B-1)=C(B) THEN  C(B)=0
230 NEXT B
235 CLS:X=0
240 PRINT"THE SOUNDEX CODE FOR '"A$"' IS:"
245 PRINT:PRINT:PRINT LEFT$(A$,1),
250 FOR B=2 TO A
255 IF C(B)=0 GOTO 275
260 PRINT C(B),
265 X=X+1
270 IF X=3 GOTO 295
275 NEXT B
280 FOR B=1 TO 3-X
285 PRINT "0",
290  NEXT B
295 PRINT:INPUT"IF YOU  HAVE ANOTHER NAME, PRESS 'ENTER' OTHERWISE TYPE 'NO'";A$
300 IF A$="NO" GOTO 305ELSE   130
305 CLS:END
```

CALENDAR: by Jim Malone

Valid for the period from January, 4713 B.C. to December 31, 9999, this clever program will find great applications among astronomers or anyone else interested in converting from Julian to Gregorian systems of date keeping. A pictoral representation of any monthly calendar during that period is also provided.
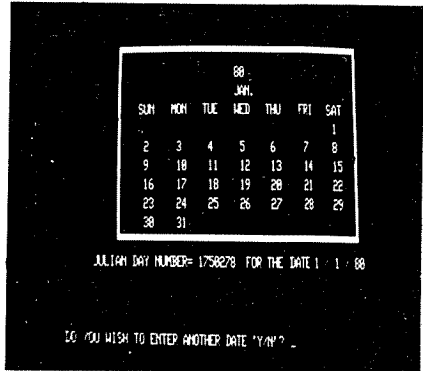
```
10 CLEAR:DIM B(38):DEFDBL J,D,M,Y,K,A
20 DATA 275,281,287,293,299,305,333,339,345,351,357,363,369,397,403,409,415,421,
   427,433,461,467,473,479,485,491,497,525,531,537,543,549,555,561,589,595,601
30 CLS:PRINT "THIS PROGRAM WILL ACCEPT ANY DATE IN THE DISTANT PAST TO THE     DI
   STANT FUTURE AND DISPLAY THE CALENDAR FOR THAT MONTH ALONG    ";
40 PRINT" WITH THE JULIAN DAY NUMBER.";
50 PRINT" THIS PROGRAM WILL ACCEPT EITHER       JULIAN DATE (CIVIL SYSTEM) OR GREG
   ORIAN DATE.  IT AUTOMATICALLY CHANGES FROM ONE SYSTEM TO THE OTHER ON JULIA
   N DAY NUMBER        2299160 (4 OCT. 1582).";
60 PRINT "TO THE GREGORIAN DATE OF 15 OCT.1582      (JD# 2299161)."" IN THE JULI
   AN CALENDAR (CIVIL SYSTEM) THEIR IS   NO YEAR 0. THE CALENDAR JUMPS FROM 1
   BC (-1) TO 1 AD (1). THE    JULIAN CALENDAR STARTS AT 1 JAN. 4713 BC."
70 PRINT:PRINT"THIS PROGRAM IS VALID FROM 1 JAN. 4713 BC TO 31 DEC. 9999 AD"
80 PRINT:PRINT"THE BC YEARS ARE INPUT AS NEGATIVE YEARS, WHILE THE AD YEARS AREI
   NPUT AS POSTIVE YEARS. E.G. MM,DD,-YYYY FOR BC."
90 PRINT:INPUT"DO YOU WISH TO CONTINUE Y/N";L$:IF L$="Y" THEN 120
100 IF L$="N" THEN CLS
110 CLS:PRINT"TYPE RUN AND 'ENTER' TO START OVER";:END
120 RESTORE:CLS:PRINT@0,"JAN=1 (31 DAYS)";:PRINT@64,"FEB=2 (28 DAYS EXCEPT FOR L
    EAP YEAR THEN 29 DAYS)";:PRINT@128,"MAR=3 (31 DAYS)";:PRINT@192,"APR=4 (30
    DAYS)";:PRINT@256,"MAY=5 (31 DAYS)";:PRINT@320,"JUN=6 (30 DAYS)";:PRINT@384
    ,"JUL=7 (31 DAYS)";
130 PRINT@448,"AUG=8 (31 DAYS)";:PRINT@512,"SEP=9 (30 DAYS)";:PRINT@576,"OCT=10
    (31 DAYS)";:PRINT@640,"NOV=11 (30 DAYS)";:PRINT@704,"DEC=12 (31 DAYS)";:PRI
    NT@960,;:INPUT"INPUT DATE 'MM,DD,YYYY'";MA,DA,YA
140 IF YA<-4713 THEN PRINT"DATE LESS THAN 4713BC. ";:GOTO 340
150 IF YA>9999 THEN PRINT"DATE MORE THAN 9999AD. ";:GOTO 340
160 IF YA=0 THEN PRINT"THEIR IS NO YEAR 0 IN THE JULIAN (CIVIL SYSTEM) CALENDAR.
    ";:GOTO 340
170 IF YA=1582 THEN 1310
180 IF MA<1  THEN PRINT"NOT A VALID DATE. ";:GOTO 340
190 IF MA>12 THEN PRINT"NOT A VALID DATE. ";:GOTO 340
200 IF DA<1 THEN PRINT"NOT A VALID DATE. ";:GOTO 340
210 IF MA=1 THEN GOSUB 1470
220 IF MA=2 THEN GOSUB 1490
230 IF MA=3 THEN GOSUB 1470
240 IF MA=4 THEN GOSUB 1510
250 IF MA=5 THEN GOSUB 1470
260 IF MA=6 THEN GOSUB 1510
270 IF MA=7 THEN GOSUB 1470
280 IF MA=8 THEN GOSUB 1470
290 IF MA=9 THEN GOSUB 1510
300 IF MA=10 THEN GOSUB 1470
310 IF MA=11 THEN GOSUB 1510
320 IF MA=12 THEN GOSUB 1470
330 GOTO 350
340 PRINT"TYPE RUN AND 'ENTER' TO START OVER.";:END
350 M=MA:Y=YA:D=DA:CLS
360 GOSUB 600
370 IF JD>2299160 THEN GOSUB 900 ELSE GOSUB 690
380 PRINT@709,"JULIAN DAY NUMBER=";JD;" FOR THE DATE";M;"/";D;"/";Y;
390 M=MA:Y=YA:D=1
400 GOSUB 600
410 IF JD=>2299170 THEN GOSUB 900    ELSE GOSUB 690
420 FOR Z= 1 TO 37
430 READ B(Z)
440 NEXT Z
450 FOR Z=1 TO 7
460 IF Z=DW THEN 480
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470 NEXT Z
480 F=B(Z):PRINT@F,D;:Z1=Z
490 FOR Z=Z1+1 TO 38
500 JD=JD+1
510 IF JD=>2299161 THEN GOSUB 900   ELSE GOSUB 690
520 IF MA<>M THEN 1070
530 F=B(Z):PRINT@F,D;
540 NEXT Z
550 STOP
560 END
570 END
580 CLS:PRINT @ 960, "INPUT ";
590 INPUT"MM,DD,YYYY";M,D,Y
600 IF Y<=0 THEN Y=Y+1
610 A=FIX((M-14)/12)
620 JD=FIX((Y+A+4800)*1461/4)+FIX(((M-2)-(A*12))*30.59)+D-32113
630 IF JD=>2299170 THEN 650
640 RETURN:END
650 JD=JD-FIX(.75*FIX((Y+100+A)/100))+2
660 RETURN
670 END
680 END
690 DN=JD-1720995
700 IF DN=>123 THEN K3=0
710 IF DN<123 THEN K3=365.25
720 Y2=FIX((DN-122.1-K3)/365.25)
730 IF Y2=>0 THEN Y3=Y2
740 IF Y2<0 THEN Y3=Y2+1
750 IF Y2=>0 THEN K2=0
760 IF Y2<0 THEN K2=366
770 M1=FIX((DN-FIX(365.25*Y3)+K2)/30.6001)
780 IF M1=14   THEN M=M1-13
790 IF M1=15 THEN M=M1-13
800 IF M1<14 THEN M=M1-1
810 IF M>2 THEN Y1=Y2
820 IF M=1   THEN Y1=Y2+1
830 IF M=2 THEN Y1=Y2+1
840 IF Y1>0 THEN Y=Y1
850 IF Y1<=0 THEN Y=Y1-1
860 D=DN-FIX(365.25*Y3)-FIX(30.6001*M1)+K2
870 DW=JD/7:DW=1+FIX(7*ABS(DW-FIX(DW)))
880 RETURN
890 END
900 K=(-FIX(Y/100)+FIX(Y/400))
910 DN=JD-1720997
920 Y1=FIX((DN-122.1-K)/365.25)
930 M1=FIX((DN-FIX(365.25*Y1)-K)/30.6001)
940 IF M1=14 THEN M=M1-13
950 IF M1=15 THEN M=M1-13
960 IF M1<14 THEN M=M1-1
970 IF M>2 THEN Y=Y1
980 IF M=1 THEN Y=Y1+1
990 IF M=2 THEN Y=Y1+1
1000 D=DN-FIX(365.25*Y1)-FIX(30.6001*M1)-K
1010 DW=JD/7:DW=1+FIX(7*ABS(DW-FIX(DW)))
1020 RETURN
1030 END
1040 END
1050 'THIS PORTION OF PROG. IS PART OF CAL. DISPLAY
1060 CLS
1070 PRINT@94,YA
1080 IF MA=1 THEN M$="JAN."
1090 IF MA=2 THEN M$="FEB."
1100 IF MA=3 THEN M$="MAR."
1110 IF MA=4 THEN M$="APR."
1120 IF MA=5 THEN M$="MAY."
1130 IF MA=6 THEN M$="JUN."
1140 IF MA=7 THEN M$="JUL."
1150 IF MA=8 THEN M$="AUG."
1160 IF MA=9 THEN M$="SEP."
1170 IF MA=10 THEN M$="OCT."
1180 IF MA=11 THEN M$="NOV."
1190 IF MA=12 THEN M$="DEC."
1200 PRINT@159,M$
1210 PRINT@205,"SUN";:PRINT@211,"MON";:PRINT@217,"TUE";:PRINT@223,"WED";:PRINT@2
     29,"THU";:PRINT@235,"FRI";:PRINT@241,"SAT";
1220 FOR X=19 TO 109
1230 SET (X,0):SET(X,30)
1240 NEXT X
1250 FOR Z=0 TO 30
1260 SET(19,Z):SET(109,Z)
1270 NEXT Z
1280 PRINT@960,"DO YOU WISH TO ENTER ANOTHER DATE 'Y/N'";
1290 INPUT L$
1300 IF L$="Y" THEN 120 ELSE CLS:END
1310 IF MA=10 THEN 1330
1320 GOTO 180
```

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```
1330 IF DA=5 THEN 1440
1340 IF DA=6 THEN 1440
1350 IF DA=7 THEN 1440
1360 IF DA=8 THEN 1440
1370 IF DA=9 THEN 1440
1380 IF DA=10 THEN 1440
1390 IF DA=11 THEN 1440
1400 IF DA=12 THEN 1440
1410 IF DA=13 THEN 1440
1420 IF DA=14 THEN 1440
1430 GOTO 180
1440 PRINT"THIS DAY WAS LOST WHEN THE CALENDAR WAS CONVERTED FROM JULIAN TOGREGO
     RIAN. ";:GOTO 340
1450 END
1460 END
1470 IF DA>31 THEN 1530 ELSE RETURN
1480 END
1490 IF DA>29 THEN 1530 ELSE RETURN
1500 END
1510 IF DA>30 THEN 1530 ELSE RETURN
1520 END
1530 PRINT"NOT A VALID DATCLEARENDDATAMKI$LOC4ENDSTEP/VARPTRENDT
```