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1620 USERS GROUP PROGRAM REVIEW AND EVALUATION

(fill out in typewriter or pencil, do not use ink)

Program No. _____ Date _____

Program Name: _____

1. Does the abstract adequately describe what the program is and what it does? Yes___ No___
   Comment _____

2. Does the program do what the abstract says? Yes___ No___
   Comment _____

3. Is the Description clear, understandable, and adequate? Yes___ No___
   Comment _____

4. Are the Operating Instructions understandable and in sufficient detail? Yes___ No___
   Comment _____
   Are the Sense Switch options adequately described (if applicable)? Yes___ No___
   Are the mnemonic labels identified or sufficiently understandable? Yes___ No___
   Comment _____

5. Does the source program compile satisfactorily (if applicable)? Yes___ No___
   Comment _____

6. Does the object program run satisfactorily? Yes___ No___
   Comment _____

7. Number of test cases run_____. Are any restrictions as to data, size, range, etc. covered adequately in description? Yes___ No___
   Comment _____

8. Does the Program Meet the minimal standards of the 1620 Users Group? Yes___ No___
   Comment _____

9. Were all necessary parts of the program received? Yes___ No___
   Comment _____

10. Please list on the back any suggestions to improve the usefulness of the program. These will be passed onto the author for his consideration.

Please return to:

Mr. Richard L. Pratt
Data Corporation
7500 Old Xenia Pike
Dayton, Ohio 45432

Your Name _____

Company _____

Address _____

User Group Code _____

THIS REVIEW FORM IS PART OF THE 1620 USER GROUP ORGANIZATION'S PROGRAM REVIEW AND EVALUATION PROCEDURE. NONMEMBERS ARE CORDIALLY INVITED TO PARTICIPATE IN THIS EVALUATION.

11/09/64

CAST-Cross and Simple Tabulation Program

Author:
Howard Givner
Office of Testing and Research
Brooklyn College
Bedford Avenue & Avenue H
Brooklyn 10, N.Y. 11210
User # 1026

Modifications or revisions to this program, as they occur, will be announced in the appropriate Catalog of Programs for IBM Data Processing Systems. When such an announcement occurs, users should order a complete new program from the Program Information Department.

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DECK KEY

1. Squished machine language object deck
2. Sample problem data and header cards
   (a) The third card is for jobs 1 and 2
   (b) The second card from the end is for job 3
3. Output for Sample Problem

LISTINGS

SPS Source Deck

Squished Object Deck

Sample Problem

Sample Output

iv

ABSTRACT

TITLE Cross and Simple Tabulation Program (C.A.S.T.)

AUTHOR Howard Givner
Office of Testing & Research
Brooklyn College
Bedford Ave. & Ave. H
Brooklyn, New York 11210

DATE March 6,1964 USERS# 1026

DESCRIPTION

This program is designed to tabulate punch-card coded responses that are numerical (0-9), or consist of a single zone punch by itself (& or -), or are blank, for up to 200 items. Responses for a individual can be on more than one card if necessary. The number of response values and individuals to be counted is limited by core size and the numberof tabulations to be done in one pass. Format cards entered prior to the data provide for flexible data preparation. One control item may be cross-tabulated with all other items with one pass of the data. No direct divide, indirect addressing, or special instructions are required. Coding is in SPS. Fortran with Format input-output routines are used, with slight modifications.

CROSS-TABULATION

Operation: LOAD program deck and put back in drawer.

Input: (1) Format Card(s)
(2) Parameter Card
(3) Header Card(s)
(4) Data Cards
(5) Trailer Card(s)--optional to allow stacking

For detailed description of input see the pages which follow.

Switch Settings:

		ON	OFF
switch	1	interrupt output	run
switch	2	card output	typewriter output
switch	3	not interrogated	not interrogated
switch	4	stacked input	halt after one job

If switch 1 was used to interrupt job, several options are available:

INSERT 4908300 to zero counters and restart job.
INSERT 4910416 to resume output.
INSERT 4909584 to read in more data to be tabulated in addition.
After inserting, push release and start (RELEASE-START).

Messages:

FORM means format card is coded incorrectly, or the requirements for storing the specifications exceeds alloted area. Push START to reread.
ERROR F7 means data was non-numerical, it is treated as blank.
OVERLAP means the job requires more storage than is available (in a 40K machine).
STOP means the operator turned on switch 1.

To retrieve BLANK cards form OUTPUT, sort on column 9 or

(1) clear memory to zeros (160000600000)
(2) place output in punch hopper
(3) set switch to SELECT,NON-STOP on card punch
(4) INSERT 391000100040049, push RELEASE and START
(5) start punch and punched cards will be selected from blanks.

FORMAT CARDS

Format cards give the program information about where the data is to be found on the data cards and the number of cards necessary to contain a set of items.

Only the following characters are valid in a format card:

/ C 0 1 2 3 4 5 6 7 8 9 I X

Specification Code	Storage Requirement	Meaning
nX	7	skip n columns of input
n/	5n	read n additional cards before extracting data
nIw	5n	store n w-digit integers 1 ≤ w ≤ 9

In all cases, 1 ≤ n ≤ 99. If n=1, it may be omitted.

A "C" on the Format Card means that there are more specifications on the card following.

Blanks may appear anywhere on the Format Card to increase readability.

The total storage requirement for format specifications may not exceed 1995.

NOTE: By the judicious use of slashes as format specifications it is possible to do a tabulation of a sample of all the data available without actually sorting out a sample by hand.

PARAMETER CARD

This card must contain in columns 1-10 the values for each of the following in the order stated.

col.	
1-3	number of items, including control item if any.
4-6	number of the control item or zero if no control item.
7	mode of data: 0=numerical only; 1=11,12, and 0-9.
8	tally output option.
9	row percents output option.
10	column percents output option.

(8, 9, 10: 1=output desired. 0=no output desired.)

HEADER CARD(s)

These cards should be prepared with exactly the same format as the data cards which they will precede. In each data field to be processed whould be punched the maximum value attainable for each item. (blank < 12 < 11 < 0 < 1...9 < 10 < etc.)

TRAILER CARD(s)

A trailer is used to separate jobs when they are stacked. It should have an 028 multiple punch in the first column of the first field to be processed and be blank elsewhere.

DATA RESTRICTIONS

(1) Numerical data fields must be unsigned.

(2) Only 6000 counterw positions are provided for in the 40K version. The number of counters needed is equal to $(C+A)(B+nC)$ where
n=number of items.
A=maximum value of control item or zero if no control is used.
B=sum of maximum values of all items except control item.
C=2 for numerical data and 4 for data with 11 and 12 punches.

(3) Blanks will be processed and tabulated separately.

(4) The number of items must not exceed 200.

(5) This program may be run ona 20K machine without modification.

OUTPUT DESCRIPTION

The user of this program must provide labels for the output by using titles related to the meaning of the codes on the input data cards. As a guide to assist in labelling and sorting the output, each line of output contains a 3-number prefix.

The first of the three numbers indicates which input code is the source of information for the table values on that line.

-4 indicates a total for all codes and blank responses
-3 indicates blank or alphabetic responses
-2 indicates a + response
-1 indicates a - response

IF DATA CONTAINS ZONE PUNCHES

-2 indicates a total for all codes and blank responses
-1 indicates a total for blank or alphabetic responses

IF DATA IS NUMERICAL ONLY

In all cases 0 is for 0 responses, 1 is for 1, 2 for 2, etc.

The second number indicates which item is the source of information for the table value on that line.

The third number is a line number (starting with zero and going up to nine, then back to zero again) and is used in the cases where the number of response codes is more than 13, in which case the tabulations for the first 13 codes (blank,+,-,0 to 9, or blank, 0 to 11) will be on the first line, tabulations for the next 13 codes (10 to 22, or 12 to 24) will be in the next line, et cetera.

The first line of output for each job contains the number of cases processed, and the number of the item which was crossed with all other items (columns 4 to 6 on the header card.)

SAMPLE JOBS

The data shown on page 6 was abstracted from data obtained in a survey of college students in which 31 questions were asked. The responses were then coded and punched onto cards, each response code being punched in the column whose number is the same as the number of the question for which it is the response code. Three of the items Q.8, Q.20, and Q.24 were chosen to be processed as a sample of what this program does. These questions and their codes are presented here.

Q. 8	Sex?	male(+)	female(-)		
Q.20	Class?	freshman(1)	sophomore(2)	junior(3)	senior(4)
Q.24	Soc. Org.?	none(blank)	fraternity or sorority(1)	house plan(2)	

Page 7 shows how the output obtained by processing the data shown on page 6 should be labelled.

Some inferences that may be made from the output are indicated below. Note that there is an assumed decimal pt point in the output of percentages, i.e., 1000 means 100.0% and 333 means 33.3%

10% of the men responding are freshmen.
25% of the freshmen responding are men.
37 people responded. 20 were men.
None of the 8 freshmen belongs to a social organization.

SAMPLE DATA FOR CROSS-TABULATION PROGRAM

```
7X  I1  11X  I1  3X  I1          format card for job 1 and job 2
0030011111              JOB 1 PARAMETER CARD
9999999-99999999999499929999999          HEADER CARD
10-5840+778143-5820479-1-025624
-071284+675847962453761l0-54  4
1   201+-84734940-4461214648762
42-0258+786542021451205 2-14875
321-024+456223-21322-021775 745
1543201-64520145261334212546767
1545702-025162016254402126152O1
715-620+492079564214-30 23465+1
18-5284+5-5 6580326491+ 906-254
4376254-650-62554671782 9653402
4329586-375320162941705 9154265
1-00555+7 4220632 2314 2415200-
 154079+2-08745 3154226140-213
-0132+3+34012-026452201 6-31+23
7988495-930+-362+0+2+0311012-94
 4  487-5  8 2  -  32 01 031320
484372--6104526504345321O169537
4515204-625102645262104182Sl+04
0620487+953495815263598 01--+ 8
12-310-+01320-3112-30131-013134
4407765-23611+40-0+1+1+ 326-660
7958496-622010-32+31626 7058237
12-3102+6-4645-61511784 3-47182
10-3876+32432157565210-12184673
1111112+12-0-+   7445122-001623
-01320-+31320-3469130-91-900133
1349752+049208895642325 1467844
+13-048+79858 9738924 4 35820-+
7751481+3-0491029772432 +10-+++
6131402-3134026447+21302-016947
1876895-61+23-0261+343229537497
10-4673+58437592+3-2879 455--32
4076928-72-082267521320 -976735
4626432-8-04627335912-0 1647329
0164325--+03291643240+226154732
1926732 5-013284026 251 0236472
434+263 05045261046 274 162843+

0030001100              JOB 2 PARAMETER CARD
19 X  I1  3X  I1          format card for job 3
0020010100              JOB 3 PARAMETER CARD
```

Revision 11/13/64

6.0.146

OUTPUT FOR SAMPLE JOB 1 (CROSS-TAB)

37 CARDS PROCESSED. 1 = Q.8

TALLIES

		(blank)	(+)	(-)	(0)	(1)	(2)	(3)	(4)		
						FR	SOPH	JR	SR		
-4	2-0	2	0	0	0	8	10	8	9	TOTAL	
-3	2-0	2	0	0	0	0	0	0	0	BLANK	Q.20 vs. Q8
-2	2-0	0	0	0	0	2	7	5	6	MALE (+)	
-1	2-0	0	0	0	0	6	3	3	3	FEMALE (-)	

		NONE				F. or S.	H.P.		
-4	3-0	18	0	0	0	14	5	TOTAL	
-3	3-0	2	0	0	0	0	0	BLANK	
-2	3-0	10	0	0	0	8	2	MALE	Q.24 vs Q.8
-1	3-0	6	0	0	0	6	3	FEMALE	

ROW PERCENTS

		BLNK				FR	SOPH	JR	SR		
-4	2-0	54	0	0	0	216	270	216	243	% TOTAL	
-3	2-0	1000	0	0	0	0	0	0	0	% BLANK	Q.20 vs. Q8
-2	2-0	0	0	0	0	250	700	625	666	% MALE	
-1	2-0	0	0	0	0	750	300	375	333	% FEMALE	

		NONE				F. or S.	H.P.		
-4	3-0	486	0	0	0	378	135	% TOTAL	
-3	3-0	111	0	0	0	0	0	% BLANK	
-2	3-0	555	0	0	0	571	400	% MALE	Q.24 vs. Q.8
-1	3-0	333	0	0	0	428	600	% FEMALE	

COLUMN PERCENTS

		% BLNK				% FR	% SOPH	% JR	% SR		
-4	2-0	54	0	0	0	216	270	216	243	% TOTAL	
-3	2-0	1000	0	0	0	0	0	0	0	BLANK	
-2	2-0	0	0	0	0	100	350	250	300	MALE	Q.20 vs. Q8
-1	2-0	0	0	0	0	400	200	200	200	FEMALE	

		% NONE				% F. or S.	% H.P.		
-4	3-0	486	0	0	0	378	135	% TOTAL	
-3	3-0	1000	0	0	0	0	0	BLANK	
-2	3-0	500	0	0	0	400	100	MALE	Q24 vs. Q8
-1	3-0	400	0	0	0	400	200	FEMALE	

OUTPUT FOR SAMPLE JOB 2 (SIMPLE TAB)

37 CARDS PROCESSED. 0

			blank	+	-	0	1	2	3	4
-4	1-0	Q.8	2	20	15					
-4	2-0	Q.20	2	0	0	0	8	10	8	9
-4	3-0	Q.24	18	0	0	0	14	5		

OUTPUT FOR SAMPLE JOB 3

37 CARDS PROCESSED. Q.20 = 1 (CROSS-TAB NUMERICAL ONLY)

		(blank)	(0)	(1)	(2)		
		NONE		F. or S.	H.P.		
-2	2-0	18	0	14	5	TOTAL	
-1	2-0	2	0	0	0	BLANK	Q24 vs. Q20
0	2-0	0	0	0	0	— (0)	
1	2-0	8	0	0	0	FR (1)	
2	2-0	5	0	4	1	SOPH (2)	
3	2-0	1	0	5	2	JUNIOR (3)	
4	2-0	2	0	5	2	SENIOR (4)	

34000000010237000810050039000810010026000860006649000680000M900000360000000500
CROSS-TABULATIONZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZZ
3600240005OZ26000470005416000054-00011100054-000031-0139-001045000120024049002420
001600035-0100260009000299170006000J40-39360000000500490000001234567891234567 89-
36000720050015003000000049001080000000000000000000000000000000000000000000009
41000240120016000 35-029449000000000036000000050036003010050036003760050049000000
36002200050026000300029925000000-02941200030-00011200035-00011400035-021947000240
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LMNO89-JKLMNOP9-JKLMNOPQZ0000000000000000000000000000000000000000000000000000000
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484656595 40Z1600498-0540490040800000160131 9R000-1601283-00051600498-0864490-0854
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314-00021401314-38644600756011001400582-0082460120001100260132900081430127 2-1158
10312601182013142600000000814901344000003200081000002601329000824301272010 3-1234
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-404400000000000000000000000000000000000000000000000000000000000000000000-1934
L000000000000000000000L000000000000000000000000000000000000000000000000-3416
L0000000000L00000000000000000000000000000000000000000000000000000000000-3546
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44460417201200470736001300490465600000260326904231150344700002490328202604 2-4268
99072751104299000-22607428000002207807074284901740000002107428074281107275 0-4343
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11611935J195216118690-0011704512-18594508600080531607649000M11704940J193516-8577
7649000L9491019600000241186911922460879201100460866001200270499211935490867-8653
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```
00010*          CROSS-TABULATION PROGRAMZ
00020       DS  5
00030READF RACDQ
00040       TF  PLACE+6,READF-1
00050       TR  Q+159,CNO-4
00060       TDM X
00070INIT   TFM MC+6,81
00080       TFM 81,1,10
00090       CM  Q,,10
00100GO     BNE CNO
00110SHIFT  TR  Q-1,Q+1
00120       BNR GO-12,Q
00130       B   ENDF,,810
00140       DC  1,-,*
00150CNO    CM  Q,70,10
00160       TDM X
00170       BL  TYPES
00180MC     TD  ,Q
00190       AM  MC+6,1
00200       CM  MC+6,83
00210       BH  FERROR
00220       B   SHIFT
00230TYPES  CM  Q,49,10
00240       BE  ITYPE
00250       CM  Q,67,10
00260       BE  XTYPE
00270       CM  Q,21,10
00280       BE  SS
00290       CM  Q,43,10
00300       BNE FERROR
00310       RACDQ
00320       B   READF+24
00330FERRORRCTY
00340       WATY*+15
00350HALT   H   46565,95400
00360       DC  1,-,*
00370       TFM GO+6,CNO
00380       B   READF
00390ITYPE  TFM PLACE+11,90000,711
00400       TFM INCREM+11,5
00410       TFM GO+6,*+24
00420       B   SHIFT
00430       CM  Q,70,10
00440       BL  FERROR
00450       TD  PLACE+9,Q
00460       TDM X,1
00470       B   FORMIT+12
00480XTYPE  TFM PLACE+11,,10
00490       TFM INCREM+11,2
00500       AM  PLACE+6,5
00510       CM  PLACE+6,EF
00520       BH  FERROR
00530       TF  *+18,PLACE+6
00540       TFM ,HTYPE
00550       TDM X
00560       B   FORMIT
00570X      DS  ,*
00580SS     TFM INCREM+11,5
00590       TFM PLACE+11,SLASH
```



```
00600       TDM X,1
00610       B   FORMIT+12
00620FORMITAM   PLACE+6,2
00630       CM  PLACE+6,EF
00640       BH  FERROR
00650       CM  MC+6,82
00660       BH  *+72
00670       TF  COUNT+9,81
00680       BD  INCREM,X
00690       TF  *+18,PLACE+6
00700       TF  ,81
00710       B   COUNT+24
00720       SF  81
00730       TF  COUNT+9,82
00740       BD  INCREM,X
00750       TF  *+18,PLACE+6
00760       TF  ,82
00770       B   COUNT+24,
00780INCREMAM   PLACE+6
00790       CM  PLACE+6,EF
00800       BH  FERROR
00810PLACE  TFM
00820COUNT  SM  *+9,1,10
00830       BH  INCREM
00840       TD  X,CNO-1
00850       TFM GO+6,CNO
00860       TR  Q-1,Q+1
00870       B   INIT
00880ENDF   BNR FERROR,X
00890       AM  PLACE+6,5
00900       CM  PLACE+6,EF
00910       BH  FERROR
00920       TF  *+18,PLACE+6
00930       TFM ,RTPAR
00940Q      DS  ,08051
00950       BB
00960DIV    MM  TA,1000,8
00970       TFM 60
00980       CM  TA,,8
00990       BE  DE
01000       CM  LAP,,8
01010       BE  DE
01020       TFM E1+6,57
01030       TFM E1+18,96
01040E1     AM  ,1,10
01050       S   ,LAP
01060       BNN *-24
01070       TF  *+18,E1+6
01080       SM  ,1,10
01090       TF  *+18,E1+18
01100       A   ,LAP
01110       TF  *+18,E1+18
01120       CF
01130       AM  E1+6,1
01140       AM  E1+18,1
01150       BD  E1,E1+18
01160DE     SF  57
01170       BB
01180XSPEC  BN  7888
```

```
01190       BNR 04324,06433,,TEST FOR INPUT,NOT OUTPUT
01200       AM  07275,2
01210       TFM *+71,Q+1
01220       TF  *+35,07275
01230       TF  *+35,07275
01240       A   *+35
01250       A   *+23
01260       TR  Q+1
01270       B   06364
01280F1     DSA LTPAR
01290EF     DS  2000
01300       DORG04312
01310       B   XSPEC
01320       DORG08300
01330START  H
01340       BTM READF,F1
01350       BTM RACD,F3-5
01360       BTM WC,ITEMS
01370       BTM WC,NTROL
01380       BTM WC,MODE
01390       BTM WC,SW1
01400       BTM WC,SW2
01410       BTM COMPLT,SW3
01420       CM  MODE,,8
01430       BE  *+48
01440       TFM MINZ,-3,8
01450       TFM INC,4,8
01460       B   *+36
01470       TFM MINZ,-1,8
01480       TFM INC,2,8
01490       TDM B1+1,1
01500       TFM LAP,KEY+4
01510       TFM I,1,8
01520       BTM RACD,F1-5
01530       BNR *+60,Q+2
01540       TFM 07649,00041,10
01550       BTM COMPLT,LAP
01560       TFM 07649,00039,10
01570       B   P
01580D1     C   I,ITEMS
01590       BH  B1
01600       BE  *+36
01610       BT  WC,LAP
01620       B   *+24
01630       BT  COMPLT,LAP
01640       TF  *+18,LAP
01650       CM  ,-9000,8
01660       BNE *+36
01670       TF  *+18,LAP
01680       TFM
01690MINZ   DS  ,*
01700       TF  *+18,LAP
01710       AM
01720INC    DS  ,*
01730       AM  LAP,4
01740       AM  I,1,8
01750       B   D1
01760B1     NOP D4
01770       TDM B1+1,9
```



```
01780       BLC *,77
01790       TFM INDEX,,8
01800       TFM NCDS,,8
01810       CM  NTROL,,8
01820       BNE *+48
01830       TDM J
01840       TFM MAX,,8
01850       B   *+84
01860       TDM J,1,11
01870       MM  NTROL,4,10
01880       SF  95
01890       TFM *+35,KEY
01900       A   *+23,99
01910       TF  MAX
01920       TFM INDEX,,8
01930       TFM I,1,8
01940       TFM *+47,INDEX
01950       TFM *+71,KEY+4
01960       TFM *+66,INDEX+4
01970D2     TF  FAC
01980       C   I,NTROL
01990       BE  *+24
02000       A   FAC
02010       TF  ,FAC
02020       TF  *-49,*-6
02030       AM  *-25,4
02040       AM  *-30,4
02050       AM  I,1,8
02060       C   I,ITEMS
02070       BNH D2
02080       MM  ITEMS,4,10
02090       SF  95
02100       TFM *+35,INDEX
02110       A   *+23,99
02120       TF  IS
02130       TF  TA,MAX
02140       AM  TA,1,8
02150       M   IS,TA
02160       SF  96
02170       TF  IT,99
02180       CF  96
02190       SM  99,6000,8
02200       SF  96
02210       TF  TA,99
02220       BNH *+48
02230       BTM WATY,F5-5
02240       BTM COMPLT,TA
02250       B   START
02260       MM  MAX,4,10
02270       SF  95
02280       AM  99,KAY
02290       TFM *+18,KAY
02300D7     TFM ,,8
02310       AM  *-6,4
02320       C   *-18,99
02330       BNH D7
02340       MM  IT,4,10
02350       SF  95
02360       AM  99,NCTS
```

```
02370       TFM *+18,NCTS+4
02380D3     TFM ,,8
02390       AM  *-6,4
02400       C   *-18,99
02410       BNH D3
02420       TFM LAP,NAY+4
02430       B   D1-84
02440D4     AM  NCDS,1,8
02450       TFM I2,,8
02460       BNF *+72,J
02470       MM  NTROL,4,10
02480       SF  95
02490       TFM *+35,NAY
02500       A   *+23,99
02510       TF  I2
02520       MM  I2,4,10
02530       SF  95
02540       TFM *+30,KAY
02550       A   *+18,99
02560       AM  ,1,8
02570       TFM I,1,8
02580D5     C   I,NTROL
02590       BE  D51
02600       C   I,ITEMS
02610       BH  D51+24
02620       MM  I,4,10
02630       SF  95
02640       TF  LAP,99
02650       M   IS,I2
02660       SF  95
02670       TF  TA,99
02680       TF  FAC,I
02690       SM  FAC,1,8
02700       MM  FAC,4,10
02710       SF  95
02720       TFM *+35,INDEX
02730       A   *+23,99
02740       TF  IN
02750       TFM *+35,NAY
02760       A   *+23,LAP
02770       A   IN
02780       MM  IN,4,10
02790       SF  95
02800       TFM *+30,NCTS
02810       A   *+18,99
02820       AM  ,1,8
02830       A   TA,IN
02840       MM  TA,4,10
02850       SF  95
02860       BNF *+48,J
02870       TFM *+30,NCTS
02880       A   *+18,99
02890       AM  ,1,8
02900D51    AM  I,1,8
02910       B   D5
02920       BNLCD4-24
02930P      TD  MODE,J
02940       BC2 *+36
02950       BTM WATY,F2-5
```



```
02960       B   *+24
02970       BTM WACD,F2-5
02980       BTM WC,NCDS
02990       BTM COMPLT,NTROL
03000       TDM I6,1
03010       BD  P1,SW1
03020N2     TDM I6,2
03030       BD  P1,SW2
03040N3     TDM I6,3
03050       BD  P1,SW3
03060       B   STOP-24
03070P1     TFM I2,1,8
03080P5     C   I2,NTROL
03090       BE  P51
03100       C   I2,ITEMS
03110       BH  P51+24
03120       BC1 STOP
03130       BNF *+72,MODE
03140       TDM 05365,,,T2=0 FOR NO NUMERICAL OUTPUT
03150       BC2 *+36
03160       BTM WATY,F6-5
03170       B   *+24
03180       BTM WACD,F6-5
03190       TFM I1,,8
03200P6     MM  I1,4,10
03210       SF  95
03220       TFM *+35,KAY
03230       A   *+23,99
03240       TF  KAY
03250       TFM I3,,8
03260       TFM I4,-1,8
03270P3     AM  I4,1,8
03280       BC2 *+36
03290       BTM WATY,F4-5
03300       B   *+24
03310       BTM WACD ,F4-5
03320       TF  TA,I1
03330       S   TA,INC
03340       BTM WC,TA
03350       TF  TA,I2
03360       BTM WC,TA
03370       BTM WC,I4
03380       TDM J
03390       TFM I5,,8
03400P2     AM  I5,1,8
03410       AM  I3,1,8
03420       CM  I5,13,8
03430       BNE *+24
03440       TDM J,1,11
03450       MM  I2,4,10
03460       SF  95
03470       TFM *+35,INDEX-4
03480       A   *+23,99
03490       TF  TA
03500       CF  TA-3
03510       TDM TA-4,,11
03520       A   TA,I3
03530       TF  LAP,TA
03540       M   I1,IS
```

```
03550       SF  95
03560       A   TA,99
03570       MM  TA,4,10
03580       SF  95
03590       TFM *+35,NCTS
03600       A   *+23,99
03610       TF  TA
03620       CM  I6,2,10
03630       BL  P4
03640       CM  I1,,8
03650       BNE *+36
03660       TF  LAP,NCDS
03670       B   P8
03680       CM  I6,2,10
03690       BE  P9
03700       TF  LAP,KAY
03710P8     BTM DIV,,10
03720       TF  TA,FAC
03730       B   P4
03740P9     MM  LAP,4,10
03750       SF  95
03760       TFM *+35,NCTS
03770       A   *+23,99
03780       TF  LAP
03790       B   P8
03800P4     MM  I2,4,10
03810       SF  95
03820       TFM *+35,KEY
03830       A   *+23,99
03840       C   I3
03850       BE  *+72
03860       BD  *+36,J
03870       BTM WC,TA
03880       B   P2
03890       BTM COMPLT,TA
03900       B   P3
03910       BTM COMPLT,TA
03920       AM  I1,1,8
03930       C   I1,MAX
03940       BNH P6
03950P51    AM  I2,1,8
03960       B   P5
03970       CM  I6,2,10
03980       BE  N3
03990       BL  N2
04000       BC4 START+12
04010       B   START
04020STOP   RCTY
04030       WATY*+15
04040       H   62635,65700
04050       DC  1,-,*
04060       B   *-36
04070F3     DSA LTPAR,-90300,-90300,-90100,-90100,-90100,-90100,RTPAR
04080F5     DSA LTPAR,HTYPE
04090       DC  2,07
04100       DC  2,56,,O
04110       DC  2,65,,V
04120       DC  2,45,,E
04130       DC  2,59,,R
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04140       DC  2,53,,L
04150       DC  2,41,,A
04160       DC  2,57,,P
04170       DSA -90500,HTYPE
04180       DC  2,19
04190       DC  2,00,,
04200       DC  2,43,,C
04210       DC  2,56,,O
04220       DC  2,64,,U
04230       DC  2,55,,N
04240       DC  2,63,,T
04250       DC  2,45,,E
04260       DC  2,59,,R
04270       DC  2,00,,
04280       DC  2,57,,P
04290       DC  2,56,,O
04300       DC  2,62,,S
04310       DC  2,49,,I
04320       DC  2,63,,T
04330       DC  2,49,,I
04340       DC  2,56,,O
04350       DC  2,55,,N
04360       DC  2,62,,S
04370       DC  2,03,,.
04380       DSA RTPAR
04390F2     DSA LTPAR,-90500,HTYPE
04400       DC  2,17
04410       DC  2,00,,
04420       DC  2,43,,C
04430       DC  2,41,,A
04440       DC  2,59,,R
04450       DC  2,44,,D
04460       DC  2,62,,S
04470       DC  2,00,,
04480       DC  2,57,,P
04490       DC  2,59,,R
04500       DC  2,56,,O
04510       DC  2,43,,C
04520       DC  2,45,,E
04530       DC  2,62,,S
04540       DC  2,62,,S
04550       DC  2,45,,E
04560       DC  2,44,,D
04570       DC  2,03,,.
04580       DSA -91000,SLASH,RTPAR
04590F4     DSA LTPAR,-90300,-90400,-90200,HTYPE
04600       DC  2,06
04610       DC  2,00,,
04620       DC  2,00,,
04630       DC  2,00,,
04640       DC  2,00,,
04650       DC  2,00,,
04660       DC  2,00,,
04670       DSA FI5,FI5,FI5,FI5,FI5,FI5,FI5,FI5,FI5,FI5
04680       DSA FI5,FI5,FI5,RTPAR
04690F6     DSA LTPAR,SLASH,RTPAR
04700*          LISTING OF SYMBOL TABLE
04710I6     DC  2,0
04720J      DS  1
```

```
04730I      DS  4
04740I1     DS  4
04750I2     DS  4
04760I3     DS  4
04770I4     DS  4
04780I5     DS  4
04790IN     DS  4
04800IS     DS  4
04810IT     DS  5
04820MODE   DS  4
04830SW1    DS  4
04840SW2    DS  4
04850SW3    DS  4
04860ITEMS  DS  4
04870NTROL  DS  4
04880MAX    DS  4
04890LAP    DS  5
04900NCDS   DS  4
04910TA     DS  5
04920KEY    DSB 4,201
04930INDEX  DSB 4,201
04940NAY    DSB 4,201
04950KAY    DSB 4,105
04960NCTS   DSB 4,6000
04970FAC    DS  ,00060, FIXED AND FLOATING ACCUMULATOR
04980WC     DS  ,04992, NOT LAST ITEM IN LIST
04990COMPLTDS   ,04940, LAST ITEM IN LIST
05000WATY   DS  ,04796, PRINT ON THE TYPEWRITER
05010WACD   DS  ,04748, PUNCH A CARD
05020RACD   DS  ,04512, READ A CARD
05030HTYPE  DS  ,04264, HANDLE ALPHABETIC DATA
05040RTPAR  DS  ,04076, START A, NEW RECORD, GO TO LAST LTPAR
05050LTPAR  DS  ,04044, STORE LEFT PARENTHESIS
05060SLASH  DS  ,04136, START A NEW RECORD
05070FI5    DS  ,-90500
05080DEND   DS  ,*
05090       DEND START
```

```
  00408  READF   00456  INIT    00492  GO      00504  SHIFT   00540  CNO
  00576  MC      00636  TYPES   00756 *FERROR  00780  HALT    00816  ITYPE
  00924  XTYPE   01031  X       01032  SS      01080 *FORMIT  01272 *INCREM
  01308  PLACE   01320  COUNT   01392  ENDF    08051  Q       01476  DIV
  01572  E1      01716  DE      01740  XSPEC   01864  F1      03864  EF
  08300  START   08600  D1      08731  MINZ    08755  INC     08792  B1
  09044  D2      09440  D7      09536  D3      09608  D4      09776  D5
  10160  D51     10196  P       10304  N2      10328  N3      10364  P1
  10376  P5      10520  P6      10604  P3      10760  P2      11132  P8
  11168  P9      11240  P4      11420  P51     11504  STOP    11556  F3
  11596  F5      11677  F2      11743  F4      11852  F6      11864  I6
  11865  J       11869  I       11873  I1      11877  I2      11881  I3
  11885  I4      11889  I5      11893  IN      11897  IS      11902  IT
  11906  MODE    11910  SW1     11914  SW2     11918  SW3     11922  ITEMS
  11926  NTROL   11930  MAX     11935  LAP     11939  NCDS    11944  TA
  11948  KEY     12752  INDEX   13556  NAY     14360  KAY     14780  NCTS
  00060  FAC     04992  WC      04940 *COMPLT  04796  WATY    04748  WACD
  04512  RACD    04264  HTYPE   04076  RTPAR   04044  LTPAR   04136  SLASH
  90500  FI5     38776  DEND
```