

PROGRAM DESCRIPTION:

Program Title: Test of the Difference Between Two Sample Means,  
for Independent Samples, Subroutine, ERFPP

Author: R. L. Stearman; Installation: Booz-Allen Applied Research, Inc.  
Washington Operations

Purpose:

To determine whether the difference between means of two independent samples is statistically significant.

Restrictions:

The subroutine makes use of the ERFPP sample statistics subroutine (F6-105) which must be stored at  $L_0 + 1000$ . It also utilizes the alphanumeric print out subroutine and the ERFPP interpretive, input, output and square root subroutines. The subroutine is not restricted to the case of equal population variances for the samples involved. Observations within samples must be stored sequentially, but samples need not be in sequence. The subroutine is not restricted to samples of equal size.

Method:

The method used is that described by Stearman (Stearman, Robert L., Statistical Concepts in Microbiology. Bacteriol. Revs., 19, 160-215 (1955)) in the sections entitled "Test of the difference between two treatments: independent samples," pages 179-183; and "Test of two sample estimates of the variance," pages 183, 184.

The subroutine first computes and stores the sample statistics:

$$x_1 = \frac{\sum_{j=1}^{n_1} x_{1j}}{n_1}$$

$$S.S._1 = \sum_{j=1}^{n_1} (x_{1j} - \bar{x}_1)^2$$

$$d.f._1 = n_1 - 1$$

$$s_1^2 = S.S._1/n_1$$

$$s_1^2/n_1$$

$$\bar{x}_2 = \frac{\sum_{j=1}^{n_2} x_{2j}}{n_2}$$

$$S.S._2 = \sum_{j=1}^{n_2} (x_{2j} - \bar{x}_2)^2$$

$$d.f._2 = n_2 - 1$$

$$s_2^2 = S.S._2/n_2$$

$$s_2^2/n_2$$

where  $x_{1j}$  is the  $j$ -th observation on the  $i$ -th sample ( $i = 1, 2$ ) ( $j = 1, 2, \dots, n_1$  and  $j = 1, 2, \dots, n_2$ ). The values of  $\bar{x}_1$ ,  $s_1^2$ ,  $\bar{x}_2$ ,  $s_2^2$ , are tabulated.

The F-test of the two sample estimates,  $s_1^2$  and  $s_2^2$ ; of the variance is computed and printed with the necessary degrees of freedom, where

$$F = s_1^2/s_2^2 \quad (s_1^2 > s_2^2)$$

or

$$F < s_2^2/s_1^2 \quad (s_2^2 \geq s_1^2)$$

with degrees of freedom for both numerator and denominator. Having printed out the value of F and its degrees of freedom, the operator is asked whether the F-value obtained is statistically significant. The t-test of the difference between the means depends on the answer.

If the variances are not statistically significantly different, the variances are pooled and the necessary value of t computed, where:

$$\text{pooled S.S.} = S.S._1 + S.S._2$$

$$\text{pooled d.f.} = d.f._1 + d.f._2$$

$$\text{pooled } s^2 = \text{pooled S.S.}/\text{pooled d.f.}$$

and

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\text{pooled } s^2}{n_1} + \frac{\text{pooled } s^2}{n_2}}}$$

The operator is then asked to enter  $t$  with the pooled degrees of freedom into  $L_0 + 0138$ . The subroutine then tests the significance of the value of  $t$  obtained thus: the treatment difference is statistically significant if

$$\begin{array}{l} t > t' \\ \text{or} \\ t < -t' \end{array}$$

where  $t'$  is the value of  $t$  entered in  $L_0 + 0138$  and the treatment difference is not statistically significant if

$$-t' < t < t'$$

Having tested the value of  $t$ , the subroutine prints out the conclusion along with values for both  $t$  and  $t'$  and returns to the program.

If the variances are statistically significantly different, the variances may not be pooled, so  $t$  is given as

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

The statistical significance of the difference between the means cannot be subjected to an exact test without a knowledge of the values of the population variances,  $\sigma_1^2$ , and  $\sigma_2^2$ , for the populations sampled. An approximate solution to the problem is used by testing the value of  $t$  obtained against a weighted average of the values of  $t$  for each of the degrees of freedom. The operator is asked to enter  $t$  with d.f.<sub>1</sub> and  $t$  with d.f.<sub>2</sub> (denoted by  $t_1$  and  $t_2$ , respectively) starting in location  $L_0 + 0134$ . The subroutine then computes

$$t' = \frac{t_1(s_1^2/n_1) + t_2(s_2^2/n_2)}{(s_1^2/n_1) + (s_2^2/n_2)}$$

The statistical significance is tested in the manner previously described, i.e., the treatment difference is statistically significant if

$$\begin{array}{l} t > t' \\ \text{or} \\ t < -t' \end{array}$$

and the treatment difference is not statistically significant if

$$-t' < t < t'$$

This test is a conservative test. Having tested the value of  $t$ , the subroutine prints out the conclusion along with values for  $t$  and  $t'$  and then returns to the program.

Coding Information:Storage:

The subroutine occupies 9 tracks and 3 sectors. An additional track and 45 sectors is required for the sample statistics subroutine.

Calling Sequence:

<u>Location</u>	<u>Instruction</u>	<u>Address</u>
$\alpha$	R	L <sub>0</sub>
$\alpha + 1$	U	L <sub>0</sub>
$\alpha + 2$	Z	location of ERFP Interpretive S.r.
$\alpha + 3$	Z	location of alphanumeric S.r.
$\alpha + 4$	Z	location of $x_{11}$
$\alpha + 5$	Z	$n_1$ (at $q = 29$ )
$\alpha + 6$	Z	location of $x_{21}$
$\alpha + 7$	Z	$n_2$ (at $q = 29$ )
$\alpha + 8$	etc.	

Input and Output: are described under Method.

Program Stops: none.

Time

Either of the sample problems described on the following pages requires about five minutes for a complete solution.

Sample Program:

The data given in two examples (table 3, page 178, and table 4, page 182) can be used to test the subroutine. A general program is included for this purpose. The program assumes nothing as to location of the needed subroutines; this information is supplied by the operator on interrogation by the program.

Operating Procedure:

Store the program as well as the t-test subroutine and its accompanying sample statistics subroutine, the alphanumeric subroutine, and the ERFP interpretive, input, output and square root subroutines. Transfer to the initial location of the program. The following is the interrogation procedure:

<u>Flex Output</u>	<u>Operator Input</u>
A	location of alphanumeric s.r., in decimal
ERFP	location of ERFP interpretive s.r. in decimal
t-test s.r.	location of t-test s.r. in decimal
loc x11	location of $x_{11}$ , in decimal

Flex Output & Operator Input Continued

Flex Output

Operator Input

n1	sample size $n_1$ in hex, at $q = 31$
loc x21	location $x_{21}$ , in decimal
n2	sample size $n_2$ in hex, at $q = 31$

Following the interrogation, the machine is now ready for the input of the data format. Additional output and input is that of the t-test subroutine.

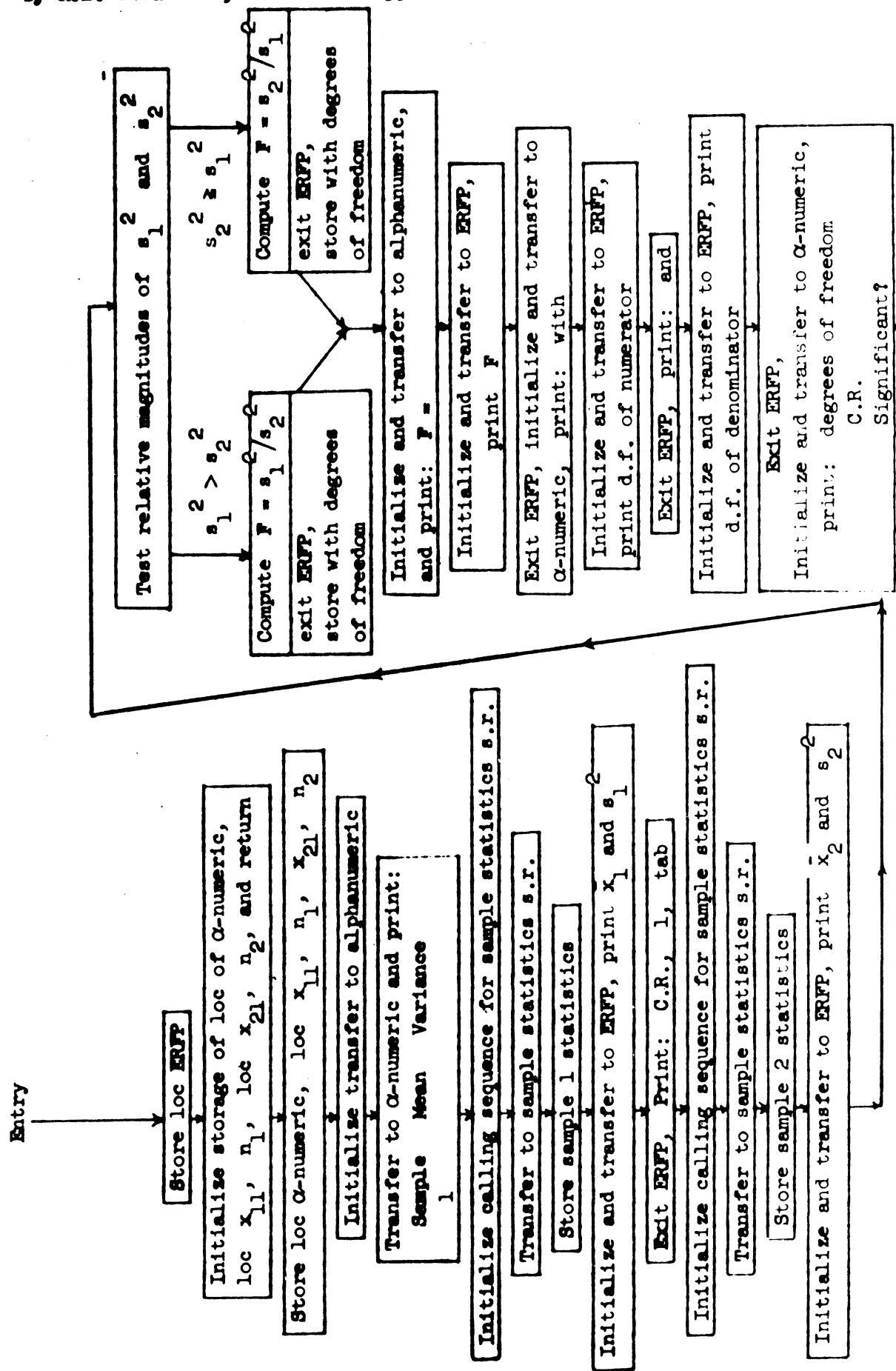
Upon completion of the test, the depression of break point switch 8 on a start compute signal on break point 8 stop in  $L_0 + 0163$ , the program enters the interrogation procedure at loc  $x_{11}$ .

The program occupies 2 tracks and 1 sector. The only program stop is the break point 8 stop described above.

Memory Allocation:

Central Program:	0300
T-Test S.R.	: 0600
Sample Statistics	1600
Alphanum.	: 3400
ERFP	: 3500

Test of the Difference Between Two Sample Means,  
Flow Chart



Next Page

from preceding page

Enter YES or NO Code Flex

Hit the square and subtract no at 29 test

zero or positive

Subtract 1 at 29 test

negative

Initialize and transfer to ERFP  
Compute pooled S.S., d.f., and variance

Compute t

Exit ERFP

Initialize and transfer to ERFP Print: enter t with

Initialize and transfer to ERFP Print, pooled d.f.

Exit ERFP

Initialize and transfer to alphanumeric  
Print: degrees of freedom in

Print Lo + 0138

Carriage Return

Initialize and transfer to ERFP  
Input 't' from flex into Lo + 0138

Initialize and transfer to alphanumeric, print:  
Try again! yes or no  
Is F significant?

negative

zero or positive

Hit the square

Initialize and transfer to alphanumeric  
Print: degrees of freedom, C.R.  
and t with

Initialize and transfer to ERFP  
Print d.f. for sample 2

Exit ERFP

Initialize and transfer to alphanumeric  
Print: degrees of freedom starting in  
Print Lo + 0134

Carriage Return

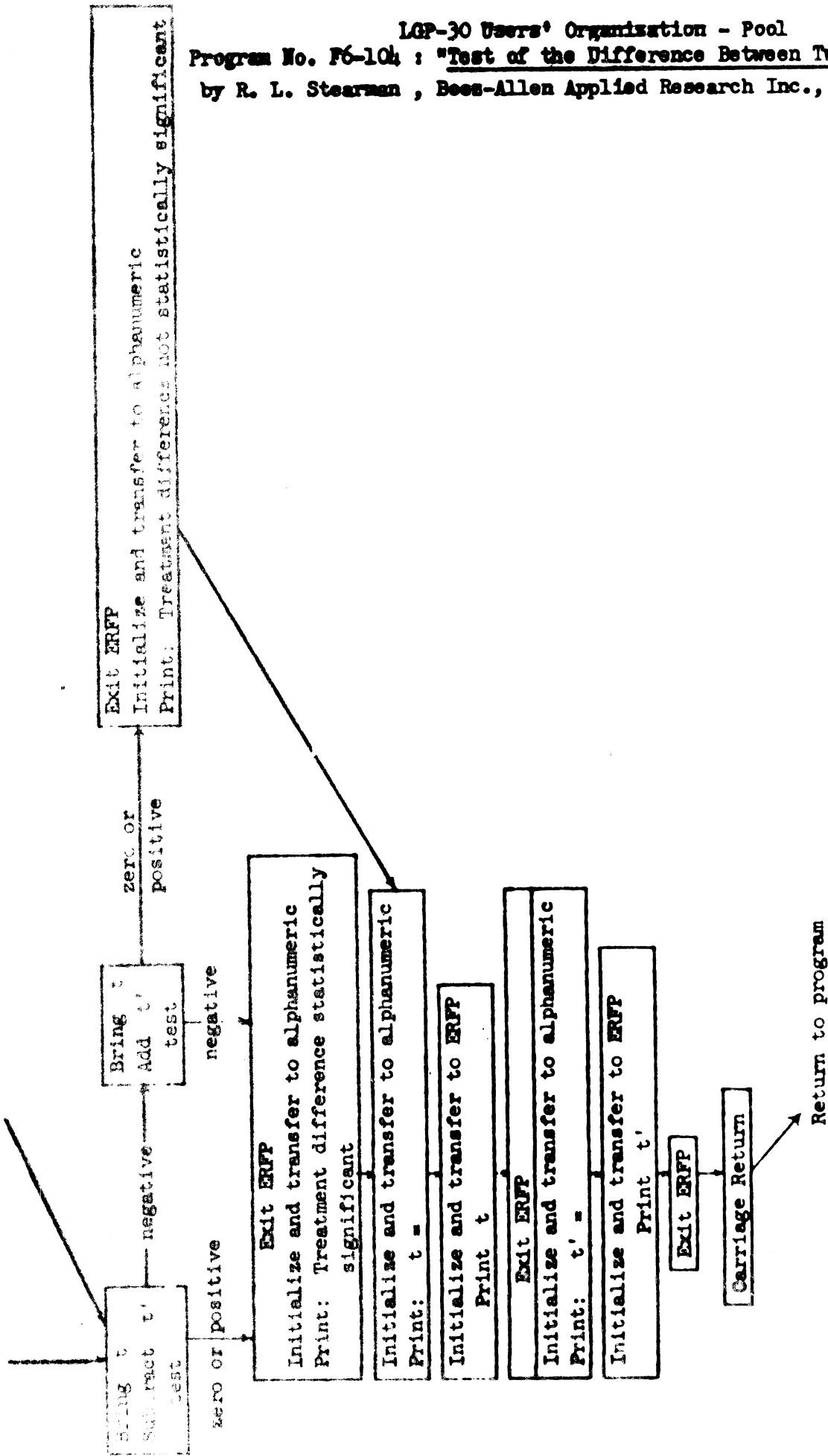
Initialize and transfer to ERFP  
Enter  $t_1$  and  $t_2$  from flex starting at Lo + 0134

Compute and print

Compute and print

Sample Means

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 by R. L. Stearns , Bees-Allen Applied Research Inc., Bethesda, Maryland.





00000000

A 3400

HPF 3400

t-test 0600

loc x11 2800

n1 j

loc x11 2832

n2 j

Test data from table 5, page 178 of  
Steinman, Herbert L., Statistical concepts in microbiology  
Bacteriol. Revs. 19, 160-215, (1955)

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TEST DATA AND SOLUTION

80002800'

2210000'00+06'1410000'00+06'6300000'00+07'2490000'00+06'2920000'00+06'

7900000'00+07'1610000'00+06'3970000'00+06'1180000'00+06'9300000'00+07'

9400000'00+07'1630000'00+06'

group'

80002832'

3230000'00+06'2020000'00+06'8000000'00+07'1980000'00+06'3230000'00+06'

9700000'00+07'1810000'00+06'1160000'00+06'1390000'00+06'1120000'00+06'

9800000'00+07'1610000'00+06'

exit'

Samples

Mean

Variance

Samples	Mean		Variance	
1	.1723333	03	.10025902	03
2	.1646667	03	.1138315	03

F = .1723333 01

with .1100000 02

degrees of freedom

and .1100000 02

Significant: 00

Enter 1 with .1200000 02

degrees of freedom in (7)38

Accepted solution (04)03 exit

Treatment difference not statistically significant

t = .772195- 00

t\* = .1100000 02

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Loc x11 2800

Program No. F6-104 : "Test of the Difference Between Two  
Sample Means for Independent Samples"

n1 j

Loc x11 2832

n2 q

Test data from table 4, page 182

Stevenson, op cit

TEST DATA AND SOLUTION

00000000

00000000'00+06'00000000'00+06'00000000'00+06'00000000'00+06'00000000'00+06'00000000'00+06'

00000000'00+06'00000000'00+06'00000000'00+06'00000000'00+06'00000000'00+06'00000000'00+06'

00000000'00+06'00000000'00+06'

group

00000000

00000000'00+06'00000000'00+06'00000000'00+06'00000000'00+06'00000000'00+06'00000000'00+06'

00000000'00+06'00000000'00+06'00000000'00+06'00000000'00+06'00000000'00+06'00000000'00+06'

00000000'00+06'00000000'00+06'00000000'00+06'00000000'00+06'

exit

Sample	Mean		Variance	
1	.8627500	03	.4025455	03
2	.4264286	03	.8042442	02

F = .5000000 01  
with .1100000 02 and .1300000 02  
degrees of freedom

Significant? yes

Enter 1 with .1100000 02 degrees of freedom  
and 2 with .1300000 02 degrees of freedom starting in 0734  
00000000 20000000 00+06 00000000 00+06 exit

Treatment difference statistically significant  
t = .7359133 02  
t' = .2195000 01

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JOB NO.

PROGRAM NO.

PROGRAM PREPARED BY:

PROGRAM CHECKED BY:

DATE

PS-104

R.J. Stearman

POOL Review

3/31/60

PROBLEM:

"TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES, SUBROUTINE, ERFP"

TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
01010 [1]	/						
01010 [2]	/	X					
		0 0 0 0	x b	0 0 0 0	/	loc erfp	store loc erfp
		0 1	y	0 1 0 0	/	*	
		0 2	b	0 0 0 0	/	loc a-num	initialize storage of
		0 3	a	0 1 0 6	/	X	loc alphanumeric S.R.
		0 4	y	0 0 1 5	/		loc x11 n1
		0 5	a	0 1 0 6	/	loc x11	loc x21 n2
		0 6	y	0 0 1 7	/		
		0 7	a	0 1 0 6	/	X	n1
		0 8	y	0 0 1 9	/		
		0 9	a	0 1 0 6	/	loc x21	
		1 0	y	0 0 2 1	/		
		1 1	a	0 1 0 6	/	X	n2
		1 2	y	0 0 2 3	/		
		1 3	a	0 1 0 6	/		initialize program re-
		1 4	y	0 8 4 2	/		turn
		1 5	x b	0 0 0 0	/	X	loc a-num store locations & con-
		1 6	y	0 1 0 1	/		stants
		1 7	x b	0 0 0 0	/	loc x11	
		1 8	y	0 1 0 2	/		
		1 9	x b	0 0 0 0	/	X	n1
		2 0	y	0 1 0 3	/		
		2 1	x b	0 0 0 0	/	loc x21	
		2 2	y	0 1 0 4	/		
		2 3	x b	0 0 0 0	/	X	x2
		2 4	y	0 1 0 5	/		
		2 5	a	0 1 0 1	/		initialize alphanumeric
		2 6	a	0 0 2 9	/		
		2 7	y	0 0 2 8	/	X	
		2 8	x r	0 0 0 0	/		re alphanumeric
		2 9	x u	0 0 0 0	/		
0 0 0 0 0 0 2		3 0	2 0 2 0	1 0 7 f	/	cr, cr, uc, S	reading
		3 1	0 8 7 2 3 f	4 2	/	X	lc, a, m, p

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PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	0 0 2 2	0 j	l f 3 0 1 0		l,e,tab,uc	heading
0,0,0,0,0,0,6		3 3	3 f	0 8, 4 f 7, 2		M,lc,e,a	
		3 4	3 2	3 0 1 0 3 a		n,tab,uc,v	
		3 5	0 8	7 2 1 f 2 2		lc,a,r,i	
		3 6	7 2	3 2 6 f 4 f		a,n,c,e	
		3 7	2 0	0 j 3 0 v q		cr,l,tab,out	
		3 8	b	0 1 0 0		loc erfp	initialize calling se-
		3 9	y	0 0, 4 6			quence for sample stat-
		4 0	b	0 1, 0 2		loc xll	istics subroutine
		4 1	y	0 0, 4 7			
		4 2	b	0 1, 0 3		nl	
		4 3	y	0 0, 4 8			
		4 4	r	1 0, 0 0			sample statistics sub-
		4 5	m	1 0, 0 0			routine
		4 6	x z	0 0, 0 0		loc erfp	
		4 7	x z	0 0, 0 0		loc xll	
		4 8	x z	0 0, 0 0		nl	
		4 9	b	1 1, 1 1		mean l	store sample 1 statist-
		5 0	c	0 1, 0 8			ics
		5 1	b	1 1, 1 2			
		5 2	c	0 1, 0 9			
		5 3	b	1 1, 1 5		S.S.l	
		5 4	c	0 1, 1 0			
		5 5	b	1 1, 1 6			
		5 6	c	0 1, 1 1			
		5 7	b	1 1, 1 7		vl	
		5 8	c	0 1, 1 2			
		5 9	b	1 1, 1 8			
		6 0	c	0 1, 1 3			
		6 1	b	1 1, 1 3		d.f.l	
		6 2	c	0 1, 1 4			
		6 3	a	0 1, 5 9			around storage

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CARRIAGE RETURN

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			TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/				/		
	/	⊗			/		
01010010312		011000			/	loc erfp	storage
		01			/	loc a-rum	
		02			/	loc xll	
		03			/	⊗ nl	
		04			/	loc x21	
		05			/	n2	
		06			/	l at 29	
		07	200000000		/	⊗ l at 2	
		08			/	mean 1	
		09			/		
		10			/	S.S.1	
		11			/	⊗	
		12			/	v1 (variance)	
		13			/		
		14			/	d.f.1	
		15			/	⊗	
		16			/	v1/n1	
		17			/		
		18			/	mean 2	
		19			/	⊗	
		20			/	S.S.2	
		21			/		
		22			/	v2	
		23			/	⊗	
		24			/	d.f. 2	
		25			/		
		26			/	v2/n2	
		27			/	⊗	
		28			/	F	
		29			/		
		30			/	d.f. num	
		31			/	⊗	

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PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	<input checked="" type="checkbox"/>					
0 0 0 0 0 2 5		0 1 3 2				d.f. demon	storage
		3 3					
		3 4				t1	
		3 5			<input checked="" type="checkbox"/>		
		3 6				t2	
		3 7					
		3 8				t1	
		3 9			<input checked="" type="checkbox"/>		
		4 0				pooled S.S.	
		4 1					
		4 2				pooled d.f.	
		4 3			<input checked="" type="checkbox"/>		
		4 4				pooled variance	
		4 5					
		4 6				pooled v/n1	
		4 7			<input checked="" type="checkbox"/>		
		4 8				pooled v/n2	
		4 9					
		5 0				t	
		5 1			<input checked="" type="checkbox"/>		
		5 2				demon of t	
		5 3					
		5 4				answer at	29
		5 5		f 7 j	<input checked="" type="checkbox"/>	yes at 29	
		5 6		l f 0		no at 29	
		5 7		z 0 1 3 4		loc t1	
		5 8		z 0 1 3 8		loc t'	
		5 9		b 1 1 1 4	<input checked="" type="checkbox"/>	d.f. 1	store sample 1 (from 00-63)
		6 0		c 0 1 1 5			statistics
		6 1		b 1 1 2 1		v1/n1	
		6 2		c 0 1 1 6			
		6 3		b 1 1 2 2	<input checked="" type="checkbox"/>		

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PROBLEM: "TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES. SUBROUTINE. ERFP" TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	0200	c	0117	/	v1/n1	store sample 1 statistics
		01	b	0100	/		initialize erfp
		02	y	0205	/		
		03	y	0204	/	X	
		04	x	r0000	/		to erfp
		05	x	n0000	/		
		06	8	00b0108	/		print mean 1
		07	x	p0000	/	X	
		08	8	00b0112	/		print variance 1
		09	x	p0000	/		
		10	x	e0000	/		exit erfp
		11	x	p1600	/	X	cr
		12	x	z0000	/		
		13	x	p1000	/		2
		14	x	z0000	/		
		15	x	p2400	/	X	tab
		16	x	z0000	/		
		17	b	0100	/	loc erfp	initialize calling sequence
		18	y	0225	/		for sample statistics
		19	b	0104	/	X loc x21	subroutine
		20	y	0226	/		
		21	b	0105	/	n2	
		22	y	0227	/		
		23	r	1000	/	X	sample statistics sub-routine
		24	u	1000	/		
		25	x	z0000	/	loc erfp	
		26	x	z0000	/	loc x21	
		27	x	z0000	/	X n2	
		28	b	1111	/	mean 2	store sample 2 statistics
		29	c	0118	/		
		30	b	1112	/		
		31	c	0119	/	X	

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PROBLEM:

"TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT  
SAMPLES, SUBROUTINE, ERFP"

TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/						
	/	<input checked="" type="checkbox"/>					
		0232	b1	115	/	S.S. 2	store sample 2 state
		33	c0	120	/		
		34	b1	116	/		
		35	c0	121	/	<input checked="" type="checkbox"/>	
		36	b1	117	/	v2	
		37	c0	122	/		
		38	b1	118	/		
		39	c0	123	/	<input checked="" type="checkbox"/>	
		40	b1	113	/	d.f. 2	
		41	c0	124	/		
		42	b1	114	/		
		43	c0	125	/	<input checked="" type="checkbox"/>	
		44	b1	121	/	v2/n2	
		45	c0	126	/		
		46	b1	122	/		
		47	c0	127	/	<input checked="" type="checkbox"/>	
		48	b0	100	/		initialize erfp
		49	y0	252	/		
		50	y0	251	/		
		51	xr	000	/	<input checked="" type="checkbox"/>	to erfp
		52	xu	000	/		
		53	800	b0118	/		print mean 2
		54	xp	000	/		
		55	800	b0122	/	<input checked="" type="checkbox"/>	print variance 2
		56	xp	000	/		
		57	800	s0112	/	v1	compare v1 and v2
		58	t0	308	/	v1 greater	
		59	800	b0122	/	<input checked="" type="checkbox"/>	v2
		60	800	d0112	/	v1	F = v2/v1
		61	800	e0128	/	F	
		62	xe	000	/		exit erfp
		63	b	0124	/	<input checked="" type="checkbox"/>	d.f. num
		64			/		store d.f.

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LGP-30 CODING SHEET

PREPARED FOR: LGP-30 USERS' ORGANIZATION - POOL				PAGE 7 OF 19
JOB NO.	PROGRAM NO. F6-104	PROGRAM PREPARED BY: R. L. Stearman	PROGRAM CHECKED BY: POOL Review	DATE 3/31/60
PROBLEM: "TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES, SUBROUTINE, ERFP"				TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
		01300	c	0130		d.f. num	store d.f.
		01	b	0125			
		02	c	0131			
		03	b	0114		d.f. denom	
		04	c	0132			
		05	b	0115			
		06	c	0133			
		07	u	0320		around program v1 greater than v2	
		08	8100b	0112		v1	F = v1/v2 (from 0258)
		09	8100d	0122		v2	
		10	8100c	0128		F	
		11	x e	0000			exit erfp
		12	b	0114		d.f. num	store d.f.
		13	c	0130			
		14	b	0115			
		15	c	0131			
		16	b	0124		d.f. denom	
		17	c	0132			
		18	b	0125			
		19	c	0133			
		20	b	0101			initialize (also from 0107)
		21	y	0324			alphanumeric subroutine
		22	y	0323			
		23	x r	0000			to alphanumeric
		24	x u	0000			
.00000003		25	2020	1054		cr,cr,uc,F	F =
		26	0616	0608		sp=,sp,lc	
		27	v q	0000		cut	
		28	b	0100			initialize erfp
		29	y	0332			
		30	y	0331			
		31	x r	0000			to erfp

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IGP-30 CODING SHEET

PREPARED FOR:	MEMBER ORGANIZATION POOL	PAGE 8 OF 19
JOB NO.	PROGRAM PREPARED BY: E. J. Stearman	PROGRAM CHECKED BY: POOL Review
PROBLEM:	TESTING THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES, SHORTLINE, ERFP	DATE 3/31/60
		TRACK

PROGRAM INPUT CODE	LINE NO.	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
		OPERATION	ADDRESS			
	1	XU	0 0 0 0			
	2	8 0 0 b	0 1 2 8			to erfp print F
	3	X P	0 0 0 0			
	4	X E	0 0 0 0	X		exit erfp
	5	b	0 1 0 1			initialize alphanumeric
	6	y	0 3 4 0			
	7	y	0 3 3 9			
	8	X R	0 0 0 0	X		to alphanumeric
	9	X U	0 0 0 0			
	10	2 0 7 1	2 2 5 f		cr,v,i,t	with
	11	6 2 0 6	0 8 v g		h,sp,lc,cut	
	12	b	0 1 0 0	X		initialize erfp
	13	y	0 3 4 7			
	14	y	0 3 4 6			
	15	X R	0 0 0 0			to erfp
	16	X U	0 0 0 0	X		
	17	8 0 0 b	0 1 3 0			print d.f. num
	18	X P	0 0 0 0			
	19	X E	0 0 0 0	X		exit erfp
	20	X P	5 7 0 0	X		a
	21	X Z	0 0 0 0			
	22	X P	2 5 0 0			n
	23	X Z	0 1 0 0 0	X		d
	24	X P	2 1 0 0	X		
	25	X Z	0 0 0 0			
	26	X P	0 3 0 0			space
	27	X Z	0 0 0 0			
	28	b	0 1 0 0	X		initialize erfp
	29	y	0 3 6 3			
	30	y	0 3 6 2			
	31	X R	0 0 0 0			to erfp
	32	X U	0 0 0 0	X		

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LGP-30 CODING SHEET

PREPARED FOR: **LGP-30 USERS' ORGANIZATION - POOL** PAGE 9 OF 19

JOB NO. PROGRAM NO. **F6-104** PROGRAM PREPARED BY: **R. L. Stearman** PROGRAM CHECKED BY: **POOL Review** DATE **3/31/60**

PROBLEM: **"TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES, SUBROUTINE EREP"** TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
		<input checked="" type="checkbox"/>					
		0400	8100	b0132			print d.f. denom
		01	x p	0000			
		02	x e	0000			exit erfp
		03	b	0101	<input checked="" type="checkbox"/>		initialize alphanumeric
		04	y	0407			
		05	y	0406			
		06	x r	0000			to alphanumeric
		07	x u	0000	<input checked="" type="checkbox"/>		
0000 0010		08	202	f4f5f		cr,d,e,g	degrees of freedom
		09	1f4	f4f7f		r,e,e,s	Significant?
		10	064	65406		sp,e,f,sp	
		11	541	f4f4f	<input checked="" type="checkbox"/>	f,r,a,e	
		12	2f4	63f20		d,o,m,cr	
		13	201	07f08		cr,uc,s,lc	
		14	225	13222		i,s,n,i	
		15	542	26f72	<input checked="" type="checkbox"/>	f,i,c,a	
		16	325	f1026		n,t,ne,?	
		17	060	608vq		sp,sp,lc,out	
		18	x c	6363	<input checked="" type="checkbox"/>	junk	clear accum. (also from 0416)
		19	x p	0000	<input checked="" type="checkbox"/>		input yes or no
		20	x i	0000			
		21	d	0107		1 at 2	answer to q = 29
		22	b	0154		answer	
		23	s	0155	<input checked="" type="checkbox"/>	yes at 29	test answer for yes
		24	t	0627		try no	
		25	s	0106		1 at 29	
		26	t	0447		significant	
		27	b	0101	<input checked="" type="checkbox"/>		initialize alphanumeric
		28	y	0431			
		29	y	0430			
		30	x r	0000			to alphanumeric
		31	x u	0000	<input checked="" type="checkbox"/>		

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LGP-30 CODING SHEET

PREPARED FOR: <b>LGP-30 USERS' ORGANIZATION - POOL</b>				PAGE <b>10</b>	OF <b>19</b>
JOB NO.	PROGRAM NO. <b>F6-104</b>	PROGRAM PREPARED BY: <b>R. L. Stearman</b>	PROGRAM CHECKED BY: <b>POOL Review</b>	DATE <b>3/31/60</b>	
PROBLEM: <b>*TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES, SUBROUTINE ERFP*</b>				TRACK	

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
, 0 0 0 0 0 1 4		0 4 3 2	2 0 2 0 1 0 5 f			cr,cr,uc,T	Try again! Yes or no.
		3 3	0 8 1 f 1 2 0 6			lc,r,y,sp	Is F significant?
		3 4	7 2 5 j 7 2 2 2			a,g,a,i	
		3 5	3 2 4 0 2 8 2 a			<input checked="" type="checkbox"/> n,',bs,.	
		3 6	3 0 1 0 1 2 0 8			tab,uc,Y,lc	
		3 7	4 f 7 f 0 6 4 6			e,s,sp,o	
		3 8	1 f 0 6 3 2 4 6			r,sp,n,o	
		3 9	2 a 2 0 1 0 2 2			<input checked="" type="checkbox"/> .,cr,uc,I	
		4 0	0 8 7 f 0 6 1 0			lc,s,sp,uc	
		4 1	5 4 0 8 0 6 7 f			F,lc,sp,s	
		4 2	2 2 5 j 3 2 2 2			i,g,n,i	
		4 3	5 4 2 2 6 f 7 2			<input checked="" type="checkbox"/> f,i,c,a	
		4 4	3 2 5 f 1 0 2 6			n,t,uc,?	
		4 5	0 6 0 6 0 8 v q			sp,sp,lc,out	
		4 6	u 0 4 1 8				try again
		4 7	b 0 1 0 1			<input checked="" type="checkbox"/>	initialize (from 0426)
		4 8	y 0 4 5 1				alphanumeric
		4 9	y 0 4 5 0				
		5 0	x r 0 0 0 0				to alphanumeric
		5 1	x n 0 0 0 0			<input checked="" type="checkbox"/>	
, 0 0 0 0 0 0 5		5 2	2 0 2 0 1 0 4 f			cr,cr,uc,E	Enter t with
		5 3	0 8 3 2 5 f 4 f			lc,n,t,e	
		5 4	1 f 0 6 5 f 0 6			r,sp,t,sp	
		5 5	7 j 2 2 5 f 6 2			<input checked="" type="checkbox"/> w,i,t,h	
		5 6	0 6 0 6 0 8 v q			sp,sp,lc,out	
		5 7	b 0 1 0 0				initialize erfp
		5 8	y 0 4 6 1				
		5 9	y 0 4 6 0			<input checked="" type="checkbox"/>	
		6 0	x r 0 0 0 0				to erfp
		6 1	x u 0 0 0 0				
		6 2	8 0 0 b 0 1 1 4				print d.f. 1
		6 3	x p 0 0 0 0			<input checked="" type="checkbox"/>	

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PREPARED FOR:

LGP-30 USERS' ORGANIZATION - POOL

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JOB NO.

PROGRAM NO.  
46-104

PROGRAM PREPARED BY:  
R. L. Stearman

PROGRAM CHECKED BY:  
POOL Review

DATE  
3/31/60

PROBLEM: TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES, SUBROUTINE, ERFP

TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
		01500	x	0000			exit erfp
		0101	b	0101			initialize alphanumeric
		0102	y	0505			
		0103	y	0504			
		0104	x	0000			to alphanumeric
		0105	x	0000			
01010 01009		0106	082	f4f5j		lc,d,e,g	degrees of freedom
		0107	1f	hfhf7f		r,e,e,s	and t with
		0108	06	h65h06		sp,o,f,sp	
		0109	54	lfhfhf		f,r,e,e	
		0110	2f	h63f20		d,e,m,cr	
		0111	723	22f06		a,n,d,sp	
		0112	5f	067j22		t,sp,w,i	
		0113	5f	620606		t,h,sp,sp	
		0114	08	viq0000		lc,out	
		0115	b	0100			initialize erfp
		0116	y	0519			
		0117	y	0518			
		0118	x	0000			to erfp
		0119	x	0000			
		0120	8	00b012h			print d.f. 2
		0121	x	0000			
		0122	x	0000			exit erfp
		0123	b	0101			initialize alphanumeric
		0124	y	0527			
		0125	y	0526			
		0126	x	0000			to alphanumeric
		0127	x	0000			
00000 0103		0128	082	f4f5j		lc,d,e,g	degrees of
		0129	1f	hfhf7f		r,e,e,s	
		0130	06	h65h06		sp,o,f,out	
		0131	u	0550			around print out

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PREPARED FOR: LGP-30 USERS' ORGANIZATION - POOL PAGE 12 OF 19

FORM NO. REPORT NO. 70-104 PROGRAM PREPARED BY: R. L. Stearns PROGRAM CHECKED BY: POOL Review DATE: 3/31/60

PROBLEM: TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES, SPOCCODE, LGP30

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
0 0 0 0 0 3		0 5 3 2		3 w 0 0			print out location
		3 3		2 w 1			
		3 4		f 7 0			track: r0549
		3 5	n	0 5 4 6	☒	1 at 25	u0536
		3 6	e	0 5 3 2			
		3 7	s	0 5 3 3			sector: r0549
		3 8	t	0 5 4 0			u0535
		3 9	u	0 5 3 7	☒		
		4 0	a	0 5 3 4			
		4 1	n	0 5 4 8		1 at 29	
		4 2	y	0 5 4 7			
		4 3	n	0 5 4 6	☒	1 at 25	
		4 4	y	0 5 4 5			
		4 5	xip	0 0 0 0			
		4 6	xiz	0 0 1 6			
		4 7	xip	0 0 0 0	☒		
		4 8	xiz	0 0 0 1			
		4 9	xin	0 0 0 1 0		return	
		5 0	b	0 1 0 1			initialize (from 0531)
		5 1	y	0 5 5 4	☒		alphanumeric
		5 2	y	0 5 5 3			
		5 3	xiz	0 0 0 0			to alphanumeric
		5 4	xin	0 0 0 0			
0 0 0 0 0 6		5 5	0 5 5 4	1 2 4 f	☒	sp, f, s, t	freedom starting in
		5 6	4 f 2 f	4 6 3 f		e, d, o, a	
		5 7	0 6 7 f	5 f 7 2		sp, s, t, a	
		5 8	1 2 5 f	2 2 3 2		r, t, i, p	
		5 9	5 0 6	2 2 3 2	☒	g, sp, a, k	
		6 0	0 6 0 8	7 9 0 0		sp, ic, int	
		6 1	0 0 1	5 7		u013	print track
		6 2	0 5	4 9			
		6 3	u	0 5 3 6	☒		

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PREPARED FOR:	LGP-30 USERS' ORGANIZATION - POOL		PAGE	13	OF	19
JOB NO.	PROGRAM NO.	PROGRAM PREPARED BY	PROGRAM CHECKED BY	DATE		
	76-104	R. L. Stearman	POOL Review	3/31/60		
PROBLEM:	TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES. SUBROUTINE. ERFP				TRACK	

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
		0 6 0 0	b 0	1 5 7		z01?	print sector
		0 1	r 0	5 4 9			
		0 2	r 0	5 3 5			
		0 3	x p 1	6 0 0	<input checked="" type="checkbox"/>		cr
		0 4	x z 0	0 0 0			
		0 5	b 0	1 0 0			initialize erfp
		0 6	y 0	6 0 4			
		0 7	y 0	6 0 8	<input checked="" type="checkbox"/>		
		0 8	x r 0	0 0 0			to erfp
		0 9	x u 0	0 0 0			
		1 0	x i 0	0 0 0			input t1 and t2 starting in L <sub>0</sub> +0.30
		1 1	8 0 0 b 0	1 1 6	<input checked="" type="checkbox"/>	v1/n1	denominators of t & t'
		1 2	8 0 0 a 0	1 2 6		v2/n2	
		1 3	8 0 0 h 0	1 3 8		temp t' denom	
		1 4	x r 0	0 0 0		sq. root	
		1 5	8 0 0 e 0	1 5 2	<input checked="" type="checkbox"/>	t denom	
		1 6	8 0 0 p 0	1 3 4		t1	t'
		1 7	8 0 0 m 0	1 1 6		v1/n1	
		1 8	8 0 0 p 0	1 3 6		t2	
		1 9	8 0 0 n 0	1 2 6	<input checked="" type="checkbox"/>	v2/n2	
		2 0	8 0 0 d 0	1 3 8		temp t' denom	
		2 1	8 0 0 c 0	1 3 8		t'	
		2 2	8 0 0 b 0	1 0 8		mean 1	
		2 3	8 0 0 s 0	1 1 8	<input checked="" type="checkbox"/>	mean 2	
		2 4	8 0 0 d 0	1 5 2		t denom	
		2 5	8 0 0 c 0	1 5 0		t	
		2 6	r 0	7 5 0		t-test	
		2 7	b 0	1 5 4	<input checked="" type="checkbox"/>	answer at 29	test answer for no.
		2 8	s 0	1 5 6		answer at 29	
		2 9	t 0	4 2 7		try again	
		3 0	r 0	1 0 6		1 at 29	
		3 1	t 0	6 3 2	<input checked="" type="checkbox"/>	not significant	

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PREPARED FOR:

LGP-30 USERS' ORGANIZATION - POOL

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JOB NO.

PROGRAM NO. F6-104

PROGRAM PREPARED BY R. L. Stairman

PROGRAM CHECKED BY POOL Review

DATE 3/31/60

PROBLEM: "TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES WITH EQUAL VARIANCE"

Table with columns: PROGRAM INPUT CODES, STOP, LOCATION, OPERATION, ADDRESS, STOP, CONTENTS OF ADDRESS, NOTES. Rows contain binary code, addresses like 0.6.3.2, and descriptions like 'initialize erfp', 'pooled variance', 'denominator of t'.

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PREPARED FOR: <b>LGP-30 USERS' ORGANIZATION - POOL</b>			PAGE 15 OF 19
JOB NO.	PROGRAM NO. <b>F6-104</b>	PROGRAM PREPARED BY: <b>R. L. Stearman</b>	PROGRAM CHECKED BY: <b>POOL Review</b>
PROBLEM: <b>"TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES. SUBROUTINE, ERFP"</b>			DATE <b>3/31/60</b>
			TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
		<input checked="" type="checkbox"/>					
		0700	xr	0000		sq. root	denominator of t
		01	800c	0152		t denom	
		02	800b	0108		mean 1	t
		03	800s	0118	<input checked="" type="checkbox"/>	mean 2	
		04	800d	0152		t denom	
		05	800c	0150		t	
		06	xe	0000			exit erfp
		07	b	0101	<input checked="" type="checkbox"/>		initialize alphanumeric
		08	y	0711			ic
		09	y	0710			
		10	xr	0000			to alphanumeric
		11	xu	0000	<input checked="" type="checkbox"/>		
.0000005		12	2020	104f		cr,cr,uc,E	Enter t with
		13	08325f	4f		lc,n,t,e	
		14	1f065f	06		r,sp,t,sp	
		15	7j225f	62	<input checked="" type="checkbox"/>	w,i,t,h,	
		16	060608	vq		sp,sp,lc,out	
		17	b	0100			initialize erfp
		18	y	0721			
		19	y	0720	<input checked="" type="checkbox"/>		
		20	xr	0000			to erfp
		21	xu	0000			
		22	800b	0142			print pooled d.f.
		23	xp	0000	<input checked="" type="checkbox"/>		
		24	xe	0000			exit erfp
		25	b	0101			initialize alphanumeric
		26	y	0729			
		27	y	0728	<input checked="" type="checkbox"/>		
		28	xr	0000			to alphanumeric
		29	xu	0000			
.0000002		30	082f	4f5j		lc,d,e,s	degrees
		31	1f4f	4f7f	<input checked="" type="checkbox"/>	r,e,e,s	

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PROGRAM NO. F6-104

PROGRAM PREPARED BY: R. L. Stearman

PROGRAM CHECKED BY: POOL Review

DATE 3/31/60

PROBLEM: "TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES, SUBROUTINE, ERFP"

PROGRAM INPUT CODES	STO	LOCATION	INSTRUCTION		STO	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
0.0.0 0.0.0.4		0 7 3 2	0 6 4 6 5 4 0 6			sp, o, f, sp	of freedom in
		3 3	5 4 1 r 4 f h f			f, r, e, e	
		3 4	2 f 4 6 3 f 0 6			d, o, n, sp	
		3 5	2 2 3 2 0 6 v g			i, n, sp, out	
		3 6	b 0 1 5 8			z0138	print track
		3 7	r 0 5 4 9				
		3 8	u 0 5 3 6				
		3 9	b 0 1 5 8			z0138	print sector
		4 0	r 0 5 4 9				
		4 1	n 0 5 3 5				
		4 2	x p 1 6 0 0				cr
		4 3	x z 0 0 0 0				
		4 4	b 0 1 0 0				initialize erfp
		4 5	y 0 7 4 8				
		4 6	y 0 7 4 7				
		4 7	x r 0 0 0 0				to erfp
		4 8	x n 0 0 0 0				
		4 9	x i 0 0 0 0				input t' in 0138
		5 0	8 0 0 b 0 1 5 0			t	test (also from 0626)
		5 1	8 0 0 c s 0 1 1 3 0			t'	t greater than t'
		5 2	t t 0 8 4 5				try t less than -t'
		5 3	x e 0 0 0 0				exit erfp (also from 0845)
		5 4	b 0 1 0 1				initialize alphanumeric
		5 5	y 0 7 5 8				
		5 6	y 0 7 5 7				
		5 7	x r 0 0 0 0				to alphanumeric
		5 8	x u 0 0 0 0				
0.0.0 0.0.0.5		5 9	2 0 2 0 1 0 5 f			cr, cr, uc, f	Treatment difference
		6 0	0 8 1 f 4 f 7 2			l e, r, e, e	statistically significant
		6 1	5 f 3 f 4 f 3 2			t, n, e, n	
		6 2	5 f 0 6 2 f 2 2			t, sp, d, i	
		6 3	5 4 5 4 4 f 1 f			f, f, e, r	

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LGP-30 CODING SHEET

PREPARED FOR: <b>LGP-30 USERS' ORGANIZATION - POOL</b>			PAGE <b>17</b> OF <b>19</b>
JOB NO.	PROGRAM NO. <b>F6-104</b>	PROGRAM PREPARED BY: <b>R. L. Stearman</b>	PROGRAM CHECKED BY: <b>POOL Review</b>
PROBLEM: <b>"TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES. SUBROUTINE. ERFP"</b>			DATE <b>3/31/60</b>
			TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
.00000008		0800	4f326f4f			e,n,c,e	Treatment difference
		01	067f5f72			sp,s,t,a	statistically signifi-
		02	5f227f5f			t,i,s,t	cant
		03	226f720j			i,c,a,l	
		04	0j12067f			l,y,sp,s	
		05	225j3222			i,g,n,i	
		06	54226f72			f,i,c,a	
		07	325f08vq			n,t,lc,out	
		08	l b0101				initialize(also from
		09	y0812				alphanumeric 0902)
		10	y0811				
		11	xr0000				to alphanumeric
		12	xu0000				
.0000003		13	20085f06			cr,lc,t,sp	t =
		14	10160608			uc,=,sp,lc	
		15	vq000000			out	
		16	b0100				initialize erfp
		17	y0820				
		18	y0819				
		19	xr0000				to erfp
		20	xu0000				
		21	800b0150				print t
		22	xp0000				
		23	xe0000				exit erfp
		24	b0101				initialize alphanumeric
		25	y0828				
		26	y0827				
		27	xr0000				to alphanumeric
		28	xm0000				
.0000003		29	20085f40			cr,lc,t,!	t =
		30	06101606			sp,us,=,sp	
		31	08vq0000			lc,out	

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LGP-30 USERS' ORGANIZATION - POOL

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PROGRAM NO. P6-104  
 PROGRAM PREPARED BY: R. L. Stearns

PROGRAM CHECKED BY: POOL Review

DATE 3/31/60

PROBLEM: TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES, SUBROUTINE, ERFP

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
		0832	b	0100			initialize erfp
		33	y	0836			
		34	y	0835			
		35	xr	0000			to erfp
		36	xu	0000			
		37	8	00b 0138			print t'
		38	xp	0000			
		39	xe	0000			exit erfp
		40	xp	1600			cr
		41	xz	0000			
		42	xu	0000			return to program
		43	8	00b 0150		t	test (from 0752)
		44	8	00a 0138		t'	i less than - t'
		45	t	0753		significant	
		46	xe	0000			exit erfp
		47	b	0101			initialize alphanumeric
		48	y	0851			
		49	y	0850			
		50	xr	0000			to alphanumeric
		51	xu	0000			
0000012		52	202	0105f		cr,cr,uc,T	Treatment difference not
		53	081	f,h f72		lc,r,e,a	statistically significant
		54	5f3	f,h f32		t,m,a,n	
		55	5f0	62 f22		t,sp,d,i	
		56	545	4,h f1f		f,f,e,r	
		57	4f3	26f hf		e,n,c,e	
		58	061	465f		sp,n,o,t	
		59	067	15f 172		sp,s,t,a	
		60	5f2	27f 15f		t,i,s,t	
		61	226	f72 0j		i,e,a,l	
		62	0j1	2067f		l,y,sp,s	
		63	22	5i3 222		i,g,n,i	

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PREPARED FOR:		LGP-30 USERS' ORGANIZATION - POOL		PAGE	OF
				19	19
JOB NO.	PROGRAM NO.	PROGRAM PREPARED BY:	PROGRAM CHECKED BY:	DATE	
	F6-104	R. L. Stearman	POOL Review	3/31/60	
PROBLEM:				TRACK	
"TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES. SUBROUTINE, ERFP"					

PROGRAM INPUT CODES	STOR	LOCATION	INSTRUCTION		STOR	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
00000002		0900	542	26f72		f,i,c,a	Treatment difference not
		01	325	f08vg		n,t,l,c,out	statistically signifi-
		02		u0808		to remainder of print out	cant
		03					
		04					
		05					
		06					
		07					
		08					Note:
		09					Sample statistics sub-
		10					routine is to be stored
		11					in L <sub>0</sub> + 1000
		12					
		13					
		14					
		15					
		16					
		17					
		18					
		19					
		20					
		21					
		22					
		23					
		24					
		25					
		26					
		27					
		28					
		29					
		30					
		31					

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PREPARED FOR: **LGP-30 USERS' ORGANIZATION - POOL** PAGE 1 OF 5

JOB NO. PROGRAM NO. **PC-104** PROGRAM PREPARED BY: **R. L. Stearman** PROGRAM CHECKED BY: **POOL Review** DATE: **3/31/60**

PROBLEM: **"SAMPLE PROGRAM FOR TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES"** TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
0 0 0 0			xp	16 00			
0 0 1			xs	00 00			cr
0 0 2			xp	08 00			uc
0 0 3			xs	00 00			
0 0 4			xp	57 00			A
0 0 5			xs	00 00			
0 0 6			xp	04 00			lc
0 0 7			xs	00 00			
0 0 8			xp	03 00			sp
0 0 9			xs	00 00			
1 0			xc	63 63		junk	clear accumulator
1 1			xp	00 00			input loc alphanumeric
1 2			xi	00 00			
1 3			r	01 18			binarize
1 4			r	01 08			
1 5			y	00 28			initialize alphanumeric
1 6			y	01 31			
1 7			y	01 32			
1 8			y	00 29			
1 9			y	00 41			
2 0			y	00 42			
2 1			y	01 43			
2 2			y	01 58			
2 3			y	01 22			
2 4			y	01 23			
2 5			y	00 54			
2 6			y	00 55			
2 7			y	01 42			
2 8			xf	00 00			to alphanumeric
2 9			x	00 00			
0 0 0 0 0 0 0 2		3 0	2 0 1 0 4 8 1 8			cr, uc, E, R	ERFP
		3 1	5 4 4 2 0 6 0 8			F, P, sp, lc	

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PREPARED FOR: <b>LGP-30 USERS' ORGANIZATION - POOL</b>				PAGE 2 OF 5
JOB NO.	PROGRAM NO. <b>F6-104</b>	PROGRAM PREPARED BY: <b>R. L. Stearman</b>	PROGRAM CHECKED BY: <b>POOL Review</b>	DATE <b>3/31/60</b>
PROBLEM: <b>*SAMPLE PROGRAM FOR "TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES"</b>				TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
0 0 0 0 0 0 1		0 0 3 2	v	q 0 0 0 0 0 0		out	ERFP
		3 3		x a 6 3 6 3		junk	clear accumulator
		3 4		x i p 0 0 0 0			input loc ERFP
		3 5		x i 0 0 0 0			
		3 6		r 0 1 1 8			binarize
		3 7		u 0 1 0 8			
		3 8		y 0 1 5 1			initialize ERFP
		3 9		y 0 1 5 2			
		4 0		y 0 1 5 7			
		4 1		x r 0 0 0 0			to alphanumeric
		4 2		x u 0 0 0 0			
0 0 0 0 0 0 4		4 3	2 0 5 f	0 a 5 f		cr,t,-,t	t-test s.r.
		4 4	4 f 7 f	5 f 0 6		e,s,t,sp	
		4 5	1 0 7 f	1 f 0 8		uc,S,R,lc	
		4 6	0 6 v q	0 0 0 0		sp,out	
		4 7		x c 6 3 6 3		junk	clear accumulator
		4 8		x p 0 0 0 0			input loc t-test s.r.
		4 9		x i 0 0 0 0			
		5 0		r 0 1 1 8			binarize
		5 1		u 0 1 0 8			
		5 2		y 0 1 5 5			initialize t-test s.r.
		5 3		y 0 1 5 6			
		5 4		x r 0 0 0 0			to alphanumeric
		5 5		x u 0 0 0 0			
0 0 0 0 0 0 3		5 6	2 0 0 j	4 6 6 f		cr,l,e,c	loc xll
		5 7	0 6 4 a	0 j 0 j		sp,x,l,l	
		5 8	0 6 0 8	v q 0 0		sp,lc,out	
		5 9		x e 6 3 6 3		junk	clear accumulator
		6 0		x p 0 0 0 0			input loc xll
		6 1		x i 0 0 0 0			
		6 2		u 0 1 1 9			around storage
0 0 0 0 0 0 1		6 3					

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LGP-30 CODING SHEET

PREPARED FOR:

LGP-30 USERS' ORGANIZATION - POOL

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JOB NO.

PROGRAM NO.  
P-6-104

PROGRAM PREPARED BY:  
R. L. Steerman

PROGRAM CHECKED BY:  
POOL Review

DATE  
8/31/60

PROBLEM:

SAMPLE PROGRAM FOR "TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES"

TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESSES			
0 0 0 0 0 0 0 8		0 1 0 0	2 0 0 0 0 0 0 0			1 at 2	binarize operation and
		0 1	k 0 0 0 0 0 0 0				address r018
		0 2	f 0 0 0 0 0 0 0				u0108
		0 3	3 k w w w j				
		0 4					temp. storage
		0 5	3 j 3 j 3 j 0				
		0 6	w w w w w 0 0				
		0 7					
		0 8	n 0 1 0 7			1 at 29	
		0 9	e 0 1 0 3			1 at 29	
		1 0	h 0 1 0 4			3kwwj	
		1 1	e 0 1 0 5			temp.	
		1 2	m 0 1 0 1			3j3j3j0	
		1 3	a 0 1 0 4			k0000000	
		1 4	h 0 1 0 4			temp.	
		1 5	e 0 1 0 6			temp.	
		1 6	m 0 1 0 2			www00	
		1 7	a 0 1 0 4			f0000000	
		1 8	x u 0 0 0 0			temp.	
		1 9	r 0 1 1 8			return address	
		2 0	u 0 1 0 8				binarize (from 0062)
		2 1	y 0 1 5 9				initialize loc x11
		2 2	x r 0 0 0 0				to alphanumeric
		2 3	x u 0 0 0 0				
0 0 0 0 0 0 0 2		2 4	2 0 3 2 0 j 0 6			cr,n,i,sp	nl
		2 5	0 8 v q 0 0 0 0			lc,out	
		2 6	x r 5 3 6 3			junk	clear accumulator
		2 7	x p 0 0 0 0				input sample size nl
		2 8	x s 0 0 0 0				
		2 9	x t 0 0 0 0				initialize nl
		3 0	x u 0 1 6 0				
		3 1	x r 0 0 0 0				to alphanumeric

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PREPARED FOR: **LGP-30 USERS' ORGANIZATION - POOL** PAGE 4 OF 5

JOB NO. PROGRAM NO. **F6-104** PROGRAM PREPARED BY: **R. L. Stearman** PROGRAM CHECKED BY: **POOL Review** DATE: **3/31/60**

PROBLEM: **SAMPLE PROGRAM FOR "TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES"** TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
		0132	xm	0000			to alphanumeric
0000003		33	200j	466f		cr,l,o,c	loc x21
		34	064a	140j		sp,x,2,1	
		35	0608	vq00		sp,lc,out	
		36	xic	6363		junk	clear accumulator
		37	xp	0000			input loc x21
		38	xi	0000			
		39	r	0118			binarize
		40	u	0108			
		41	y	0161			initialize loc x21
		42	xr	0000			to alphanumeric
		43	xu	0000			
0000002		44	20321	406		cr,n,2,sp	n2
		45	08	vq0000		lc,out	
		46	xic	6363		junk	clear accumulator
		47	xp	0000			input sample size n2
		48	xi	0000			
		49	d	0100		1 at 2	initialize n2
		50	y	0162			
		51	xr	0000			to ERFP
		52	xu	01010			
		53	xi	010100			date input
		54	xs	010100			exit ERFP
		55	xr	0000		loc t-test	t-test
		56	xu	0000		loc t-test	
		57	x*	0000		loc ERFP	
		58	x*	0000		loc alphanumeric	
		59	x#	0000		loc x1	
		60	x#	0000		n1	
		61	x#	0000		loc x21	
		62	x#	0000		n2	
		63	xs	0800			conditional step b.p.8

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PREPARED FOR: <b>LGP-30 USERS' ORGANIZATION - POOL</b>			PAGE 5 / 5
JOB NO.	PROGRAM NO. P6-104	PROGRAM PREPARED BY: R. L. Steerman	PROGRAM CHECKED BY: POOL Review
PROBLEM: SAMPLE PROGRAM FOR "TEST OF THE DIFFERENCE BETWEEN TWO SAMPLE MEANS, FOR INDEPENDENT SAMPLES"			DATE 3/31/60
			TRACK

PROGRAM INPUT CODES	STOP	LOCATION	INSTRUCTION		STOP	CONTENTS OF ADDRESS	NOTES
			OPERATION	ADDRESS			
	/				/		
	/	0 2 0 0		0 0 5 4	/		return for new data
	/	0 1			/		
	/	0 2			/		
	/	0 3			/		
	/	0 4			/		
	/	0 5			/		
	/	0 6			/		
	/	0 7			/		
	/	0 8			/		
	/	0 9			/		
	/	1 0			/		
	/	1 1			/		
	/	1 2			/		
	/	1 3			/		
	/	1 4			/		
	/	1 5			/		
	/	1 6			/		
	/	1 7			/		
	/	1 8			/		
	/	1 9			/		
	/	2 0			/		
	/	2 1			/		
	/	2 2			/		
	/	2 3			/		
	/	2 4			/		
	/	2 5			/		
	/	2 6			/		
	/	2 7			/		
	/	2 8			/		
	/	2 9			/		
	/	3 0			/		
	/	3 1			/		

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