TITLE:	Matrix Interleafer (SADOI Only)
TYPE:	Complete program
SYMBOLS:	n_A = number of elements per row (or number of columns) of matrix A
	n_B = number of elements per row of matrix B
	r_A = number of rows of matrix A
	d_A = number of decimal digits to be punched in output of A
	d_B = number of decimal digits to be punched in output of B

DESCRIPTION:

This routine augments a rectangular matrix A with another rectangular matrix B to form a final matrix C, which has $(n_A + n_B)$ columns and r_A rows; it is assumed that A and B have the same number of rows. Thus, the Kth row of C will have the elements A_{K1}, A_{K2}, ..., A_{KnA}, B_{K1}, B_{K2}, ..., B_{KnB}. Because the elements of the matrices A and B may be known to different degrees of accuracy, this program requires specification of the number of decimal digits to be punched in each part of the final matrix. The elements of C may or may not have an N inserted after n_A characters, depending on the parameter x. If x = 0, no N is inserted; if x = 1, an N is inserted. An N is punched at the end of each row of C. This last feature may be utilized to prepare tapes for M13, M24, etc. where a row of a matrix terminated by an N must be augmented by a row of another matrix.

A parameter tape is prepared as follows:

n_A, space, r_A, space, d_A, space, n_B, space, d_B, space x.

Each parameter is an unsigned integer, with no extra 5th hole characters among the digits of each parameter.

DATA:

The data tapes for the matrices A and B are prepared by punching each element as a <u>signed</u> fraction with up to 12 decimal digits. Each row of the matrix may or may not be terminated by an N, J, F, or L character, at the user's discretion, with the exception that <u>the last row must be</u>

terminated by one of the characters +, -, N, J, F, or L.

EXAMPLE: The two following input tapes,

<pre>
3   2   2   2   2 0⎤   ⎛ 2   2   2   3   2 0
+01 +02 +03   ⎟   and   ⎜ +009 +019F
+04 +05 +06 +   ⎬   ⎨ +0386 +05 -
                   ⎟   ⎜ +0322 +07 +079
+07 +08 N   ⎟   ⎝ +06 +09 +1 L
+09 +10 J   ⎦
</pre>

will produce the same output tape, (except that the carriage-return character comes in a different place)

<pre>
+01 +02 +03   +01 +02
+07 +08 N   +03 +07 +08 N
+04 +05 +06   +04 +05
+09 +10 N   +06 +09 +10 N
</pre>

RESTRICTIONS:

$$n_A, \; n_B \leq 800$$
$$d_A, \; d_B \leq 12$$
$$(n_A + 1) \, r_A \leq 10{,}240$$

METHOD OF USE:

1. Clear start master; stops 2400F (If FF000, sum check on readin has failed; reread master). At the 2400F stop, a white switch up and down will copy tape from the reader until a 1-hole delay is reached.

2. Insert parameter, black switch up; stops 2402F

3. Insert Matrix A, black switch up; stops 2002F 7

4. Insert Matrix B, black switch up; reads, punches, stops 2400F

TIME REQUIRED?

$$\cong 4d_A \, r_A \, n_A + 4(d_B + 1) \, r_B \, n_B \qquad \text{seconds}$$

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ERROR STOPS: FFOLO indicates drum transfer failure; this may also occur if the input is incorrectly prepared.

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APPROVED BY

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LOCATION	ORDER		NOTES
	008K		Constants
8	26 (Y5)		Initial drum store address
	00 2560F		
9	F5 [ ]F	by 16(1), 12(3)	Row read end constant
	00 (+)		
10	12 515F		A print end constant
	L5 [ ]F	by 15(1)	
11	12 515F		B print end constant
	L5 [ ]F	by 18(1)	
12	L5 8(1)		block order during
	22 14(3)		B readin
13	J0 (+)		Record parameter
	50 2(3)		during A readin
	00K(1)		
14	92 61F		
	92 61F		Punch delays
15	92 61F		
	92 135F		
16	L5 15L		Plant parameter
	42 8L		Store address
17	19 4F		
	40 1F		Count at 1
18	81 4F		Read parameters
	40 F		
19	50 F		
	22 6L		
20	74 43(P17)		
	00 4F		
21	91 4F		Terminate on 5th hole
	36 6L		character
22	S5 8(3)		
	40 [ ]F	by 2',9'	Store parameter
23	F5 8L		
	42 8L		

LOCATION	ORDER		NOTES
24	L5 1F		
	L4 1F		Count
25	32 3L		
	81 4F		
26	42 15(3)		
	L5 5F		
27	00 20F		
	46 6(2)		Plant A print digits
28	L5 7F		
	00 20F		
29	46 14(2)		Plant B print digits
	L5 3F		
30	L4 9F		
	42 10F		A print end constant
31	00 20F		
	46 9F		A row read end constant
32	L5 6F		
	L4 9F		
33	42 11F		B print end constant
	L5 8F		
34	40 3(2)		Set initial drum
	40 3(3)		addresses
35	L5 3F		Set up record and
	00 20F		
36	46 4(2)		playback parameters
	46 4(3)		
37	41 5F		Clear A row count
	24 (2)		
	00K(2)		
38	50 (+)		Enter N12 to read A
	50 L		
39	26 (N12)		
	92 131F		
40	50 (+)		Playback row from drum
	50 2L		
41	[26 (Y5)	by 19(1)	
	00 2560F]	10L	

LOCATION	ORDER		NOTES
42	00 [ ]F	by 21(1)	
	92 131F		
43	92 515F		
	L5 [ ]F	by 8L, 20L, 22L	
44	50 [ ]F	by 12(1)	
	50 6L		
45	26 (P17)		Print element of A
	F5 5L		
46	42 5L		increment pickup address
	L0 10F		end test
47	32 5L		
	F5 3L		Advance drum call
48	L4 3F		address
	26 (21)		
49	50 (+)		
	50 11L		Enter N12 to read B
50	26 [(N12)]	by 24L,14(3)	jumps to 8(3) for other rows of B
	92 131F		
51	92 515F		
	L5 [ ]F	by 16L,21L,23L	print elements of B
52	50 [ ]F	by 14(1)	
	50 14L		
53	26 (P17)		
	F5 13L		increment pickup address
54	42 13L		
	L0 11F		
55	32 13L		End test
	92 770F		Punch N
56	F5 5F		
	40 5F		Count rows
57	L0 4F		
	36 22L		
58	L5 9F		Reset pickup addresses
	42 5L		
59	42 13L		
	22 2L		

LOCATION	ORDER		NOTES
60	(2.) L5 9F		Reset pickup addresses
	42 5L		
61	42 13L		
	L5 1L		Reset B row read jump
62	46 12L		
	L5 13F		Reset exit jump for
63	40 2(3)		A row read
	92 61F		
64	92 61F		Punch delays
	24 (1)		Stop 2400F
65	(21)50 (21)		
	91 4F		
66	36 2(21)		
	50 2(21)		
67	02 6F		
·	42 3(21)		Tape copy, stop
68	L0 5(21)		
	92 [ ]F		on one-hole delay
69	36 (21)		
	22 3(2.)		
70	00 F		
	00 2F		
71	(21)40 3(2)		
	L5 15(3)		
72	00 39F		
	32 11(2)		If last parameter = 1,
73	92 770F		
	22 11(2)		punch N after A row
	00K(3)		
74	36 2L		From (N12)
	L5 2F	from 10L	not done, re-enter N12
75	26 4(N12)		
	00 F		
76	[J0 (+)] [50 2L]	by 25(2), 13L	record row of A on drum

LOCATION	ORDER		NOTES
77	26 (Y5)	by 19(1),	
	00 2560F	5L	
78	00 [ ]F	by 21(1)	
	F5 3L		
79	L4 3F		advance drum record
	40 3L		address
80	F5 5F		
	40 5F		
81	L0 4F		
	36 11L		
82	L5 (2)	from 12(2)	reset N12 store
	46 21(N12)		address for next row
83	L5 2F		
	L0 38(N12)		Test for proper N12
84	36 3(N12)		re -entry
	22 L		
85	L5 11F		Finished A; reset for
	00 20F		B readin
86	46 9F		
	L5 12F		Block drum record orders
87	40 2L		and set to block N12 jump
	41 5F		clear row count
88	20 1(2)		Stop 20026
	46 12(2)		block jump and
89	22 12(2)		re-enter to print
	00 [ ]F		The users parameter
90	(Y5) 00K		Drum record-playback routine
125	(P17) 00K		Print routine, modified to use location 7 instead of location 2
184	(N12)00K		Readin routine
223	00K(+)		
	26 999N		Marker for storage
	00(N12)		
	02 23K		
	L0 9F		Modify N12 so as to
—	26 (3)		be able to count