REVISION NOTICE

This publication replaces previous descriptions of "Matrix Transpose 2," program D1-430.4. The program designations have been changed to this current nomenclature.

FUNCTION

"Matrix Transpose 2" enables the user to transpose a square matrix. The transposed matrix will either replace the given matrix in memory or will be placed in another storage area.

INPUT

The elements of a square matrix are stored in consecutive drum locations beginning in M_0. All elements must be represented in the extended range floating point format 2, as described in Floating Point Interpretive System 2, program H1-24.1.

OUTPUT

The elements of the transposed matrix are stored beginning in M'o = Mo or are sufficiently distant from Mo so that there is no overlap.

MATRIX TRANSPOSE 2

CALLING SEQUENCE

Location	Order	Address
XXXX - 1	E	0000
XXXX	R	Lo
XXXX + 1	U	Lo
XXXX + 2	(n at 15)	Mo
XXXX + 3	Z	M'o
XXXX + 4	etc.	

The E0000 order in XXXX - 1 is required only if the previous instructions are interpreted by program H1-24.1.

In XXXX + 2, n is the order of the matrix $1<n<32$.

STORAGE

2 1/2 tracks are required in memory for storage of instructions and constants. No temporary storage is used.

LGP-30 CODING SHEET

Page 1 of 5

Job No. _____ Prog. No. 30.4 Prep. by JOHNSON Ck'd. by _____ Date 7-10-58

Problem EXT. RANGE MATRIX TRANSPOSE Track _____

Program Input Codes	Stop	Location	Instruction Op.	Address	Stop	Contents of Address	Notes
	,						
	,	☒					
		0000	B[	] ,		a + 2	
		01	Y	0063 ,		KEY #	
		02	Y	0061 ,		TEST LOCATION	
		03	Y	0113 ,	☒	B[a]	
		04	E	0038 ,		1W0000	
		05	M	0051 ,		1@13	
		06	U	0158 ,			
		07	B	0063 ,	☒	KEY #	
		08	U	0027 ,			
		09		,			
		10	Y	0039 ,		(0032)	M
		11	S	0061 ,	☒	TEST LOCATION	
		12	T	0039 ,		RETURN TO MINOR LOOP	
		13	B	0063 ,		KEY # - MODIFY LOOP	
		14	A	0050 ,		n + 1	
		15	U	0027 ,	☒		
		16	B	0045 ,		(0049) TRANSPOSE ONLY	M
		17	A	0060 ,		n	
		18	U	0019 ,			
		19	Y	0048 ,	☒	"STORE INSTRUCTION"	
		20	U	0023 ,			
		21	B	[ ] ,		"TEST LOCATION"	
,0000001	'	22		10 ,		2@28	
		23	Y	0045 ,	☒	(0020) Baij	M
		24	B	0039 ,		Baij	
		25	A	0147 ,		1@28	
		26	U	0031 ,			
		27	Y	0045 ,	☒	(0015)	
		28	Y	0039 ,		Baij	
		29	Y	0063 ,		KEY #	
		30	U	0202 ,			
		31	Y	0046 ,	☒	(0026)	M

' Conditional Stop Code ☒ Carriage Return

Royal McBee Corporation

LGP-30 CODING SHEET

Job No. _____ Prog. No. 30.4 Prep. by JOHNSON Ck'd. by _____ Date 9-10-58 Page 2 of 5

Problem EXT. RANGE MATRIX TRANSPOSE Track _____

Program Input Codes	Stop	Location	Instruction Op.	Address	Stop	Contents of Address	Notes
	,						
	,	☒					
		0032	U	00010	.		
		33	B	00048	.	(49)	
		34	A	00163	.	1@29	
		35	Y	00107	.	☒ H[aji+1]	
		36	Y	00101	.	B[aji+1]	
		37	U	00052	.		
,0000001	'	38	1W	00000	.	EXTRACTOR	
		39	B	[ ]	.	☒	M
		40	H	00062	.	STORAGE	
		41	U	00045	.		
		42	T	[ ]	.	(207) RETURN	
		43	H	00058	.	☒ COUNTER	
		44	U	00016	.		
		45	B	[ ]	.	aji	M
		46	H	[ ]	.	aij	
		47	B	00062	.	☒ STORAGE	
		48	H	[ ]	.	aji	
		49	U	00033	.		
,0000002	'	50	[	]	.	n+1	
		51	4	00000	.	☒ 1@13	
		52	B	00131	.	1@29	M
		53	A	00039	.	(37)	
		54	Y	00119	.	H[aij+1]	
		55	Y	00106	.	☒ B[aji+1]	
		56	U	00101	.		
,0000004	'	57	1	00000000	.	1@3	
		58	[	]	.	COUNTER	
		59			.	☒	
		60	[	]	.	n	
		61	B	[ ]	.	TL	
		62	[	]	.		
		63	[	]	.	☒ KEY #	

' Conditional Stop Code ☒ Carriage Return

Royal McBee Corporation

LGP-30 CODING SHEET

Job No. ____ Prog. No. 30.4 Prep. by JOHNSON Ck'd. by ____ Date 7-10-58 Page 3 of 5

Problem EXT. RANGE MATRIX TRANSPOSE Track ____

Program Input Codes	Stop	Location	Instruction Op.	Address	Stop	Contents of Address	Notes
	,						
	, ☒						
		0100			.		
		01	B[ ]		.	B[a j i+1]	(56) M
		02	H	0152	.	STORAGE	
		03	U	0106	. ☒		
		04	H	0021	.	(134)	
		05	U	0113	.		
		06	B[ ]		.	B[a i j+1]	M
		07	H[ ]		. ☒	a j i+1	
		08	U	0109	.		
		09	B	0152	.	STORAGE	
		10	U	0119	.		
		11			. ☒		
		12	XZ	0001	.	1@29	
		13	B[ ]		.	B[a]	N
		14	H[ ]		.	H[a']	
		15	U	0154	. ☒		
		16	B	0058	.	COUNTER	
		17	S	0146	.	1@28	
		18	U	0121	.		
		19	H[ ]		. ☒	a i j+1	M
		20	U	0016	.	TO LOOP	
		21	T	0042	.	TEST TO TAKEOUT	
		22	H	0058	.	COUNTER	
		23	B	0063	. ☒	KEY #	
		24	A	0145	.	1@28	
		25	Y	0063	.	KEY #	
		26	Y	0113	.	B[a]	
		27	U	0132	. ☒		
		28	B	0114	.	H[ ]	N
		29	A	0144	.	1@28	
		30	U	0135	.		
		31	XZ	0001	. ☒	1@29	

' Conditional Stop Code ☒ Carriage Return

LGP-30 CODING SHEET

Job No. _____ Prog. No. 30.4 Prep. by JOHNSON Ck'd. by _____ Date 7-10-58 Page 4 of 5

Problem EXT. RANGE MATRIX TRANSPOSE Track _____

Program Input Codes	Stop	Location	Instruction Op.	Address	Stop	Contents of Address	Notes
	,						
	, ☒						
		0132	B	00021	.	TEST	
		33	A	01466	.	1@28	
		34	U	01004	.		
		35	Y	01114	.	☒ H[a']	N
		36	A	02001	.	1@29	
		37	Y	02223	.	H[a'+1]	
		38	U	01411	.		
		39	Y	00021	.	☒ TEST LOCATION	
		40	U	01113	.		
		41	B	01113	.	B[a]	N
		42	A	00600	.	n	
		43	U	01488	.	☒	
		44	XZ	00002	.	1@28	
		45	XZ	00002	.	1@28	
		46	XZ	00002	.	1@28	
		47	XZ	00002	.	☒ 1@28	
		48	Y	01113	.	B[a]	N
		49	S	00021	.	TEST LOCATION	
		50	T	01113	.	TEST TO RE-LOOP	
		51	U	01116	.	☒ NEW LOOP	
		52	[	]	.	STORAGE	
		53			.		
		54	B	01112	.	1@29	N
		55	A	01113	.	☒ B[a i j]	
		56	Y	02222	.	B[a i j+1]	
		57	U	02222	.		
		58	H	00600	.	(006) n	
		59	A	01455	.	☒ 1@28	
		60	H	00500	.	n+1	
		61	S	00222	.	2@28	
		62	U	02008	.		
		63	XZ	00001	.	☒ 1@29	

' Conditional Stop Code ☒ Carriage Return

Royal McBee Corporation

LGP-30 CODING SHEET

Page 5 of 5

Job No. ____ Prog. No. 30.4 Prep. by JOHNSON Ck'd. by ____ Date 7-10-58

Problem EXT. RANGE MATRIX TRANSPOSE Track ____

Program Input Codes	Stop	Location	Instruction Op.	Address	Stop	Contents of Address	Notes
	'						
	' ☒						
		0200			.		
		01	XZ	0001	.	1@29	
		02	B	0061	.	(30) TEST LOCATION	
		03	A	0060	. ☒	n	
		04	H	0061	.	TEST LOCATION	
		05	B	0058	.	COUNTER	
		06	S	0145	.	1@28	
		07	U	0042	. ☒		
		08	H	0058	.	(162) COUNTER	
		09	B	0000	.	LO	
		10	A	0112	.	1@29	
		11	Y	0214	. ☒	B AT 3	
		12	A	0112	.	1@29	
		13	Y	0042	.	ESTABLISH TAKEOUT	
		14	B	[ ]	.	AT 3 M'o	
		15	Y	0114	. ☒	M'o INITIALIZE	
		16	A	0112	.	1@29	
		17	Y	0223	.		
		18	S	0063	.	DETERMINE WHETHER	
		19	T	0226	. ☒	TO MOVE MATRIX	
		20	S	0144	.		
		21	U	0225	.		
		22	B	[ ]	.		N
		23	H	[ ]	. ☒		
		24	U	0128	.		
		25	T	0007	.	(221)	
		26	B	0060	.	n	
		27	N	0058	. ☒	n-1	
		28	M	0057	.	1@3 POSITION	
		29	A	0063	.	KEY #	
		30	A	0146	.	1@28	
		31	U	0139	. ☒		

' Conditional Stop Code ☒ Carriage Return