



REVISION NOTICE

This publication replaces previous descriptions of "Matrix Multiply 3," program D1-230.2. Program designations have been changed to their current nomenclature.

FUNCTION

The "Matrix Multiply 3" enables the user to multiply $A(i_xj)$ by matrix $B(i_xj)$ and store the product, matrix $C(i_xj)$. Matrix $A(i_xj)$ and $B(i_xj)$ are not necessarily square, but j_A and i_B must be equal.

INPUT

The following data is contained in "INPUT":

1. Matrix A, consisting of i rows and j columns in extended range floating point format 2, as defined by Floating Point Interpretive System 2, program H1-24.1, is stored consecutively (row major, column minor) beginning in location A.
2. Matrix B, consisting of i rows and j columns in extended range floating point format 2, as defined by program H1-24.1, is stored consecutively (row major, column minor) beginning in location B.
3. The Program H1-24.1 is stored beginning in location F.
4. A calling sequence containing the following information:
 - a. The location of program H1-24.1 (F)
 - b. The initial location of matrix A (A_0)
 - c. The number of rows i_A at $q=23$, and the number of columns j_A at $q=29$ in matrix A.
 - d. The initial location of matrix B (B_0).
 - e. The number of rows i_B at $q=23$, and the number of columns j_B at $q=29$ in matrix B.
 - f. The initial location of matrix C (C_0).

MATRIX MULTIPLY 3

CALLING SEQUENCE

<u>LOCATION</u>	<u>ORDER</u>	<u>ADDRESS</u>	<u>NOTES</u>
XXXX	R	L ₀	Initial location of program
XXXX + 1	U	L ₀	D1-230.2
XXXX + 2	Z	F	Initial location of H1-24.1
XXXX + 3	Z	A ₀	Reserve 2(i _A x j _A) locations
XXXX + 4	Z	i _A j _A	i _A in track; j _A in sector
XXXX + 5	Z	B ₀	Reserve 2(i _B x j _B) locations
XXXX + 6	Z	i _B j _B	i _B in track; j _B in sector
XXXX + 7	Z	C ₀	Reserve 2(i _A x j _B) locations
XXXX + 8	etc.		

OUTPUT

The elements of matrix C in extended range floating point format 2 are stored consecutively beginning in location C₀.

LIMITS

$2 \leq i_A \leq 63$ $2 \leq i_B \leq 63$ (i and j need not be equal).
 $2 \leq j_A \leq 63$ $2 \leq j_B \leq 63$

TIME

Approximately .95 (i_A x j_A x j_B) seconds are required.

STORAGE

187 locations (2 tracks, 59 sectors) are required in memory for storage of instructions and constants. No temporary storage is used except as required by program H1-24.1.

D1-

LGP-30 CODING SHEET

Job No. _____

Prog. No. 30.2

Prep. by WENGERT Ck'd. by _____

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Date 9-4-58

Problem EXT. RANGE FLT. PT. MATRIX MULT.

Track _____

Program Input Codes	STOP	Location	Instruction Op.	Address	STOP	Contents of Address	Notes
		<input checked="" type="checkbox"/>					
		0000	B	[]		$\alpha + 2$	
		01	Y	0225			
		02	Y	0226			
		03	Y	0132	<input checked="" type="checkbox"/>		
		04	Y	0133			
		05	Y	0141			
		06	Y	0142			
		07	B	0000	<input checked="" type="checkbox"/>		
		08	A	0258			
		09	Y	0024		$\alpha + 3$	
		10	A	0139			
		11	Y	0026	<input checked="" type="checkbox"/>	$\alpha + 4$	
		12	A	0131			
		13	Y	0043		$\alpha + 5$	
		14	A	0139			
		15	Y	0030	<input checked="" type="checkbox"/>	$\alpha + 6$	
		16	A	0131			
		17	Y	0039		$\alpha + 7$	
		18	Y	0041			
		19	Y	0131	<input checked="" type="checkbox"/>		
		20	U	0151			
		21	A	0150			
		22	Y	0144			
		23	U	0141	<input checked="" type="checkbox"/>		
		24	B	[$\alpha + 3$]		A0	
		25	H	0140			
		26	B	[$\alpha + 4$]		IAJA	
		27	H	0256	<input checked="" type="checkbox"/>		
		28	M	0257		1@6	
		29	C	0251		IA@23	
		30	B	[$\alpha + 6$]		IBJB	
		31	H	0217	<input checked="" type="checkbox"/>		

Conditional Stop Code



Carriage Return

Royal McBee Corporation

Job No. _____ Prog. No. 30.2 Prep. by WENGERT Ck'd. by _____

Problem EXT. RANGE FLT. PT. MATRIX MULT. Track _____

Program Input Codes	Stop	Location	Instruction Op.	Address	Stop	Contents of Address	Notes
		<input checked="" type="checkbox"/>					
		0032	E0118			XZ0063	
		33	D0230			.5@0	
		34	V0035				
		35	H0150			<input checked="" type="checkbox"/> 2jB	
		36	N0251			iA@23	
		37	M0216			1@2	
		38	V0039				
		39	A[x+7]			<input checked="" type="checkbox"/> Co	
		40	Y0254				
		41	B[x+7]			Co	
		42	Y0227				
		43	B[x+5]			<input checked="" type="checkbox"/> Bo	
		44	H0248				
		45	B0217			iBjB	
		46	M0218			1@6	
		47	H0247			<input checked="" type="checkbox"/> iB@29	
		48	B0256			iAJA	
		49	E0207			XZ0063	
		50	H0255			jA@29	
		51	D0230			<input checked="" type="checkbox"/> .5@0	
		52	H0242			2jA	
		53	S0125			2@29	
		54	A0140			A0	
		55	Y0137			<input checked="" type="checkbox"/> A0+2jA-2	
		56	V0060				
		57	S0243			1@29	
		58	T0111				
		59	V0249			<input checked="" type="checkbox"/> Error Halt	
		60	B0150			2jB	
		61	N0247			iB	
		62	M0216			1@2	
		63	V0100			<input checked="" type="checkbox"/>	

Conditional Stop Code



Carriage Return

Job No. _____ Prog. No. 30.2 Prep. by WENGFERT Ck'd. by _____

Problem EXT. RANGE FLT. PT. MATRIX MULT Track _____

Program Input Codes	Stop	Location	Instruction Op.	Address	Stop	Contents of Address	Notes
		<input checked="" type="checkbox"/>					
		0 1 0 0	S	0108		2@29	
		0 1	A	0248		B ₀	
		0 2	V	0138		B ₀ + 2jB ₀ - 2	
		0 3	V	0104	<input checked="" type="checkbox"/>		
		0 4	B	0247		iB @ 29	
		0 5	S	0255		jA @ 29	
		0 6	T	0249		→ Error Halt	
		0 7	V	0057	<input checked="" type="checkbox"/>		
,0000003'		0 8		8		(0100)	
		0 9	[]		
		1 0	[]		
		1 1	B	0140	<input checked="" type="checkbox"/>	A ₀	
		1 2	V	0134			
		1 3	A	0249		2@29	
		1 4	V	0143			
		1 5	V	0119	<input checked="" type="checkbox"/>		
,0000001'		1 6	[]	800P[L _{A_i}] + 2(0201)	
		1 7	F	0140			
		1 8	X	0063		(0032)	
		1 9	B	0248	<input checked="" type="checkbox"/>	B ₀	
		2 0	V	0135			
		2 1	A	0150		2jB	
		2 2	V	0144			
		2 3	V	0132	<input checked="" type="checkbox"/>		
,0000002'		2 4					
		2 5		8		2@29	
		2 6	B	0143			
		2 7	A	0249	<input checked="" type="checkbox"/>		
		2 8	V	0143			
		2 9	B	0144			
		3 0	V	0021			
,0000005'		3 1		4	<input checked="" type="checkbox"/>		

Conditional Stop Code



Carriage Return

Job No. _____ Prog. No. 30.2 Prep. by WENGERT Ck'd. by _____

Problem EXT. RANGE FLT. PT. MATRIX MULT. Track _____

Program Input Codes	Stop	Location	Instruction Op.	Address	Stop	Contents of Address	Notes
	<input checked="" type="checkbox"/>						
		0.1.3.2	RI]		} 24.1	
		3.3	UI]		}	
		3.4	800PI]		Aij	
		3.5	800MI]	<input checked="" type="checkbox"/>	Bi	
		3.6	U0143	.			
,000.0.008		3.7	800PI]		Aij	
		3.8	800NI]		Bij	
		3.9		4.	<input checked="" type="checkbox"/>	1@29	
		4.0	[d+3 A0 (0025)	
		4.1	RI]		} 24.1	
		4.2	UI]		}	
		4.3	800PI]	<input checked="" type="checkbox"/>	Aij	
		4.4	800NI]		Bij	
		4.5	XE0000	.			
		4.6	U0157	.			
		4.7	B0219	.	<input checked="" type="checkbox"/>	2@29	
		4.8	A0227	.		800+1[C0]	
		4.9	U0203	.			
,0.0.000.0.1		5.0	[2jB (0035) (0121)	
		5.1	Y0237	.	<input checked="" type="checkbox"/>	d+8 Exit	
		5.2	U0024	.			
		5.3	B0214	.		Y0250	
		5.4	Y0119	.			
		5.5	Y0212	.	<input checked="" type="checkbox"/>		
		5.6	U0111	.			
		5.7	B0143	.		800PI[A0+2jA]-2	
		5.8	S0137	.			
		5.9	T0126	.	<input checked="" type="checkbox"/>		
		6.0	U0225	.			
		6.1	Y0119	.			
		6.2	U0220	.			
		6.3	B0249	.	<input checked="" type="checkbox"/>	2@29	

Conditional Stop Code



Carriage Return

Job No. _____ Prog. No. 30.2 Prep. by WENGERT Ck'd. by _____

Problem EXT. RANGE FLT. PT. MATRIX MULT. Track _____

Program Input Codes	Stop	Location	Instruction Op.	Address	Stop	Contents of Address	Notes
		<input checked="" type="checkbox"/>					
		0.20.0	A0.143			800P [Aij]	
		0.1	H0.116				
		0.2	U0.238				
		0.3	Y0.227		<input checked="" type="checkbox"/>		
		0.4	S0.254				
		0.5	T0.208				
		0.6	U0.23.1				
		0.7	XZ0063		<input checked="" type="checkbox"/>	C0049	
		0.8	B0.144			800N [Bij]	
		0.9	S0.138			800N [Bij]	
		1.0	T0.212				
		1.1	U0.163		<input checked="" type="checkbox"/>		
		1.2	B0.248			B0	
		1.3	A0.249			2 @29	
		1.4	Y0.250				
		1.5	U0.153		<input checked="" type="checkbox"/>		
<u>,0.0.0.0.0.0.4</u>		1.6	2000.0.0.0.0			1 @2	
		1.7	[]			UB JB (0031)	
		1.8	2000.0.0.0.0			1 @6 (0046)	
		1.9	8		<input checked="" type="checkbox"/>	(0147)	
		2.0	B0.242			2jA	
		2.1	A0.143			800P [Aij]	
		2.2	Y0.137			Aij + 2	
		2.3	U0.111		<input checked="" type="checkbox"/>		
		2.4					
		2.5	R[]			24.1	
		2.6	U[]				
		2.7	8.0.0.H[]		<input checked="" type="checkbox"/>	(0042)	
		2.8	XE[]				
		2.9	U0.147				
<u>,0.0.0.0.0.0.1</u>		3.0	4000.0.0.0.0			.5 @0 (0051) (0033)	
		3.1	B.0.0.2.5		<input checked="" type="checkbox"/>	H0140	

Conditional Stop Code



Carriage Return

