

# 7000 Coding Sheet

See Memo by  
E. W. Coffman  
Jan 31, 58  
for code

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Program: "Transac Test Prog"  
Date: Jan 58?  
Code: By: Ziller? HK

Location	Operation		Ind. Conn.	Address	I	J	2nd Address		2nd I
	CLASS	MOD.					L. Reg.	B.S. Off.	
1	X	LDX		0		3			
2	X	LPX		$Y_i$		2			
3	F	LD		X	2				
4	F	ADD		B					
5	F	DIV		D					
6	I	B	N	57					
7	F	ADD	U	$\alpha$					
8	F	COMP		B					
9	I	B	F	61					
10	V	ST		X3			8	108	
11	F	LD		$A_{3i+2}$	3				
12	F	MPY		X	2				
13	F	ADD		$A_{3i+1}$	3				
14	F	MPY		X	2				
15	F	ADD		$A_{3j}$	3				
16	F	ST		F	2				
17	X	CB	RAF	(3)		2			
18									

$0 \rightarrow j$   
 $Y_i \rightarrow i$   
 $X_i$   
 $X_i + B$   
 $(X_i + B) / D$   
 Br if  $< 0$  (No Br)  
 $T = \alpha + \frac{X_i + B}{D}$   
 Test  $m \beta$   
 Br if  $\text{jump}$  (No Br)  
 $J \rightarrow j$   
 $A_{3i+2}$   
 $A_i X$   
 $(A_i + A_j) \times$   
 $F_i = A_0 + A_1 X + A_2 X^2$   
 store  
 Branch back 3 times.

# 7000 Coding Sheet

Page: 1 of 1  
 Program: Matrix Inversion  
 (inner loop only)  
 Date: Feb 24, 1958  
 Coded By: DWS + HGK

Location	Operation		Ind. Conn.	Address	I	J	2nd Address		2nd I	
	CLASS	MOD.					L. Reg.	B.S. Off.		
X →	X	Adv, C, Br	R	-		12				Br not taken
L+1	F	Load		L(a <sub>ij</sub> )	12					
L+2	F	MPY		L(b <sub>jk</sub> )	13					
L+3	F	ADD		L(c <sub>je</sub> )	14					
L+4	F	STO		L(d <sub>ie</sub> )	14					
L+5 ←	X	Adv, C, Br		L+5		14				Branch taken n times

For total time takes 1000 n times time for above loop and add ~11% for rest of calculation.

# 7000 Coding Sheet

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 Program: SAMPLE VFL Prog  
 Date: JUNE 10, 58  
 Coded By: H6K

Location	Operation		Mod.	Ind. Conn.	Address	I	J	2nd Address		2nd I
	Class							L. Reg.	B.S. Off.	
A1	V	LD			I(a)	XI		B	8	
A2	V	ADD	+		I(b)	XI		B	8	$a_i + b_i$
A3	V	COMP			I(c)			B	8	$a_i + b_i = c_i ?$
A4	I	B		E	C1					Branch if equal
B1	V	STO			I(m)	XI		B	8	store $a_i + b_i \rightarrow m_i$
B2	X	Incr			I(D)		XI			incr index $i + \Delta \rightarrow i$
B3	X	C+Br			A1	XI				count down
<del>B4</del>										
C1	V	ADD	-		I(c)			B	8	<del>store</del> $a_i + b_i - c_i$
C2		B			B1					

Assume Sequence:

- A
  - B
  - A
  - C
  - B
- > wrong way

go thru A 2n times  
 B 2n times  
 C n times

Run for field lengths  
 6 bits, 8 bits, 16 bits,  
 32 bits, 48 bits

# 7000 Coding Sheet

Page: 1 of 1  
 Program: Monte Carlo Branching  
 Date: Feb 11, 58  
 Coded By: HSK & SGC

Location	Operation		MOD.	Ind. Conn.	Address	I	J COUNT	2nd Address		2nd I	
	CLASS							L	B.S. off. Reg.		
$\beta$	V	TMT			$I(X_1)$		4	X8			Transmit $X_1, Z_1, R_1^2$
$\beta+1$	I	B	ZN	57	RST						Branch if neg (no br.)
$\beta+2$	F	LD			$I(d)$						Load d
$\beta+3$	I	B	ZN	40	MOCL						Br if no collision (no br.)
$\beta+4$	X	LDX			$I(m)$		1				$m \rightarrow X1$
$\beta+5$	I	B	ZN	40	$\gamma$	1					Br if in m (branches)
$\delta+m$		B	U		$\delta$						Uncond. Br. from table
$\delta$	F	LD			X5						that $w = (w \text{ in } X5)$
$\delta+1$	I	B	ZN	40	OZ1						Br if $w=0$ (no br.)
$\delta+2$	F	LD			$I(P_2)$						$P_2$
$\delta+3$	F	MPY	-		Acc.						$-P_2^2$
$\delta+4$	F	ADD			X4						$-P_2^2 + R_2^2$
$\delta+5$	I	B	ZN	60	$\alpha$						Br if neg (no br.)
$\delta+6$	F	LD	-		X5						$-w$
$\delta+7$	F	ADD			$I(w_2)$						$w_2 - w$
$\delta+8$	I	B	ZN	60							Br if neg. (no br.)
$\delta+9$	X	LDX			$I(k)$		2				$k \rightarrow X2$
$\delta+10$	F	LD			$I(w_0)$	2					$w_0$ from table
$\delta+11$	F	ADD	-		X5						$w_0 k - w$
$\delta+12$	I	B	ZN	60	$\delta+15$						Br if neg (loop 5 times before Br.)
$\delta+13$	X	I			#1		2				Sum. Incl. $k+1 \rightarrow k$
$\delta+14$		B	U		$\delta+10$						Uncond. Br.
$\delta+15$	X	LDX			$M(g)$		3				$g \rightarrow X3$
$\delta+16$	F	LD			$I(E_0)$						$E_0$
$\delta+17$	F	ADD	-		$I(E)$						$(E_0) - E$
$\delta+18$	F	ST			X6						Store $I-E$
$\delta+19$	F	ADD	-		$I(E)$	3					$(E_0 - E) - E_2$
$\delta+20$	I	B	ZN	60	$\delta+23$						Br if neg (loop once)
$\delta+21$	X	I			# $\Delta L$		3				Sum. Incl. $g+\Delta L \rightarrow g$
$\delta+22$		B	U		$\delta+17$						
$\delta+23$	F	LD			$I(v)$						Test v (no. colls)
$\delta+24$	I	B	ZN	40	Zec						Br if 0 (no br.)
$\delta+25$	X	GLD			X2, X3		4				Load geometric $g+k \rightarrow X4$
$\delta+26$	F	LD			$I(L_0)$		4				Table value $L_0 g$
$\delta+27$	F	ADD			X5						$L_0 g + w$
$\delta+28$	F	ST			$I(L_0)$		4				$L_0 g + w \rightarrow L_0 g$
$\delta+29$		B	U		$\alpha$						Uncond. Br.

# 7000 Coding Sheet

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 Program: Mash Calc. Arithmetic  
 Date: Dec 30, '59  
 Coded By: H&K.

Location	Operation class	Mod.	Ind. Conn.	Address	I	J	2nd Address		2nd I
							L	B.S. Off. Reg.	
$\alpha$	X LDX			0		1			Load 0 $\rightarrow$ R
$\alpha+1$	X LDX			0		2			0 $\rightarrow$ R
$\alpha+2$	X LDX			L(J)		3			J initialized (count = J, V = 0)
$\alpha+3$	F LD			L(X <sub>1</sub> )	3				X <sub>1</sub>
$\alpha+4$	F ADD	-		L(X <sub>3</sub> )	3				-X <sub>3</sub>
$\alpha+5$	F STO			X7					Store (X <sub>1</sub> -X <sub>3</sub> )
$\alpha+6$	F LD			L(Y <sub>2</sub> )	3				Y <sub>2</sub>
$\alpha+7$	F ADD	-		L(Y <sub>4</sub> )	3				-Y <sub>4</sub>
$\alpha+8$	F STO			X8					Store (Y <sub>2</sub> -Y <sub>4</sub> )
$\alpha+9$	F LD			L(X <sub>2</sub> )	3				X <sub>2</sub>
$\alpha+10$	F ADD	-		L(X <sub>4</sub> )	3				-X <sub>4</sub>
$\alpha+11$	F STO			X9					Store (X <sub>2</sub> -X <sub>4</sub> )
$\alpha+12$	F LD			L(Y <sub>1</sub> )	3				Y <sub>1</sub>
$\alpha+13$	F ADD	-		L(Y <sub>3</sub> )	3				-Y <sub>3</sub>
$\alpha+14$	F STO			X10					Store (Y <sub>1</sub> -Y <sub>3</sub> )
$\alpha+15$	X LDG			X3, X6		4			(P) = J + P
$\alpha+16$	X LDG			X3, X16		5			(P) = J + P
$\alpha+17$	F LD			L(P <sub>1</sub> )	4				P <sub>1</sub> P
$\alpha+18$	F ADD	-		L(P <sub>-1</sub> )	5				-(P-1)P
$\alpha+19$	F ST			X11					Store
$\alpha+20$	F LD			L(P)	5				P <sub>1</sub> P
$\alpha+21$	F ADD	-		L(P-1)	4				-(P-1)P
$\alpha+22$	F ST			X12					Store
$\alpha+23$	F LD			L(R)	1				R
$\alpha+24$	F ADD			L(R <sub>2</sub> )	1				+R <sub>2</sub>
$\alpha+25$	F ADD			L(R <sub>3</sub> )	1				+R <sub>3</sub>
$\alpha+26$	F ADD			L(R <sub>4</sub> )	1				+R <sub>4</sub>
$\alpha+27$	F AEX	-		#+2					add -2 to X <sub>1</sub> (#+2)
$\alpha+28$	F STO			X12					Store sum R
$\alpha+29$	F LD			X9					
$\alpha+30$	F MPY			X10					
$\alpha+31$	F ST			X13					
$\alpha+32$	F LD			X7					(X <sub>2</sub> -X <sub>4</sub> )(Y <sub>1</sub> -Y <sub>3</sub> )
$\alpha+33$	F MPY			X8					
$\alpha+34$	F ADD	-		X13					
$\alpha+35$	F MPY			X12					R[(X <sub>1</sub> -X <sub>3</sub> )(Y <sub>2</sub> -Y <sub>4</sub> )-(X <sub>2</sub> -X <sub>4</sub> )(Y <sub>1</sub> -Y <sub>3</sub> )
$\alpha+36$	F STO			X13					Store

# 7000 Coding Sheet

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Program: Mesh Calc

Date: Dec 30, '58

Coded By: H.G.K.

Location	Operation		Ind. Conn.	Address	I	J	2 <sup>nd</sup> Address		2 <sup>nd</sup> I
	CLASS	MOD.					L. Reg.	B.S. Off.	
α+37	F	LD		X10					
α+38	F	MPY		X12					
α+39	F	STO		X14					$(y_1 - y_3)(P_E - P_P)$
α+40	F	LD		X8					
α+41	F	MPY		X11					
α+42	F	ADD	-	X14					
α+43	F	ST		X14					$(y_2 - y_4)(P_P - P_P) - (y_1 - y_3)(P_P - P_P)$
α+44	F	LD		X9					
α+45	F	MPY		X11					
α+46	F	ST		X15					$(x_2 - x_4)(P_P - P_P)$
α+47	F	LD		X12					
α+48	F	MPY		X7					$(x_1 - x_3)(P_P - P_P)$
α+49	F	ADD	-	X15					
α+50	F	DIV		X13					
α+51	F	ST		L(h <sub>1</sub> )	2				store h <sub>1</sub>
α+52	F	LD		X14					
α+53	F	DIV		X13					
α+54	F	ST		L(g <sub>1</sub> )	2				store g <sub>1</sub>
α+55	X	I		#1		1			L+1 → L
α+56	X	I		#2		2			L+2 → L
α+57	X	CB	FAF	α+3		3			Count + Branch (no inc & loop)
α+58	V	SWAP		X6			X16		swap X6 + X16
α+59	X	COMPY		L(K)		2			test R
α+60	I	B	F40	α+2					Branch if R ≠ K
α+61		(Next)							