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Program Description I

Program Title SOLVING MASTERMIND WITH HP 67/97

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Program Description, Equations, Variables WITH THE CORRECTION YOU TELL THE CALCULATOR IT COMPUTES HOW MANY DIGITS OF THE LAST GUESS IT HAS TO CHANGE (SIMPLY ADDING 1 TO THESE DIGITS) NOW IT COMPARES THIS NEW GUESS WITH THE LAST ONE AND, IF THERE IS NO CONTRADICTION, WITH THE NEXT OLDER ONE AND SO ON. IF THERE IS ANYWHERE A CONTRADICTION THE ORDER OF THE DIGITS IS CHANGED (PERMUTATED) AND THE CHANGED GUESS IS COMPARED A SECOND TIME AND SO ON. HAS A GUESS NOWHERE A CONTRADICTION IT IS PRINTED OUT.

EXAMPLE: NUMBER TO FIND: 5412

CALCULATOR'S GUESSES: 2nd 1222 CORR: 1.1 FIRST GUESS (1111) IS NOT STORED, BECAUSE IT IS ONLY USEFUL FOR SECOND GUESS

3rd 3132 (1.1)

4th 4124 (0.3)

4125 (NUMBER IN CALCULATOR AFTER CHANGEMENT) COMPARED WITH 4th GUESS: (3.0) CONTRADICTION * CONTRADICTION

PERMUTATIONS OF THE CALCULATOR:

4152	2.1	2451	0.3 / (0.2)	5214	1.2
4512	1.2	2415	0.3 / 0.2	5241	0.3 / 0.2
4521	2.1	2145	1.2	5421	1.2
4251	1.2	2154	2.1	5412	0.3 / 1.1 / 1.1
4215	1.2	2514	1.2		
		2541	0.3 / 0.2		

NO CONTRADICTION!

Operating Limits and Warnings THE CALCULATOR CAN ONLY MAKE 9 GUESSES. (BUT YOU'LL NEVER FIND A NUMBER THAT TAKES THE CALCULATOR LONGER THAN 9 GUESSES)

This program has been verified only with respect to the numerical example given in Program Description II. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	q LBL fa	32 25 11	PREPARES SEED	7	6	06	PREPARES COUNTER FOR STEP 83
2	A ABS	35 64		8	STO 7	33 07	
3	A π	35 73		9	f LBL 1	31 25 01	
4	+	61		060	RCL 5	34 05	
5	f LN	31 52		1	f x=0	31 51	
6	STO C	33 13		2	GTO D	22 14	
7	A RTN	35 22		3	f DS2	31 33	
8	f LBL A	31 25 11		4	RCL 6	34 06	
9	RCL C	34 13		5	RCL (i)	34 24	
010	f CLREG	31 43		6	q x=y	32 61	
1	f P+S	31 42	FIRST GUESS	7	GTO 1	22 01	CHANGES NUM- BERS OF THE LAST GUESS
2	f CLREG	31 43		8	6	06	
3	q	09		9	q x=y	32 51	
4	q	09		070	STO - (i)	33 51 24	
5	7	07		1	1	01	
6	x	71		2	STO + (i)	33 61 24	
7	q FRAC	32 83		3	STO - 5	33 51 05	
8	STO C	33 13		4	GTO 1	22 01	
9	6	06		5	f LBL D	31 25 14	
020	x	71		6	RCL (i)	34 24	
1	1	01	STORES AND SHOWS CORRECTION	7	STO 6	33 06	COMPUTES PERMUTATIONS
2	+	61		8	A F2?	35 71 02	
3	f INT	31 83		9	GTO 4 E	22 31 15	
4	STO 6	33 06		080	f LBL 2	31 25 02	
5	STO 1	33 01		1	RCL 8	34 08	
6	SFO 2	33 02		2	STO 9	33 09	
7	STO 3	33 03		3	7	07	
8	STO 4	33 04		4	A STI	35 33	
9	1	01		5	q DS2(i)	32 33	
030	3	03		6	GTO 4	22 04	
1	STO 8	33 08	ADDS CORRECTION TO LAST GUESS	7	RCL 2	34 02	
2	GTO 4 B	22 31 15		8	RCL 1	34 01	
3	f LBL B	31 25 12		9	STO 2	33 02	
4	STO 5	33 05		090	A R4	35 53	
5	DSP 1	23 01		1	STO 1	33 01	
6	f -x-	31 84		2	6	06	
7	DSP 0	23 00		3	STO 7	33 07	
8	1	01		4	A SF 3	35 51 03	
9	0	00		5	GTO 5	22 05	
040	STO D	33 14		6	f LBL 4	31 25 04	
1	÷	81	TEST FOR NUMBERS IN WRONG POSITION	7	A F3?	35 71 03	
2	STO + (i)	33 61 24		8	GTO 5	22 05	
3	4	04		9	RCL 2	34 02	
4	RCL 5	34 05		100	RCL 3	34 03	
5	q FRAC	32 83		1	STO 2	33 02	
6	f x=0	31 51		2	A SF 3	35 51 03	
7	A SF 2	35 51 02		3	GTO 6	22 06	
8	RCL D	34 14		4	f LBL 5	31 25 05	
9	x	71		5	RCL 4	34 04	
050	RCL 5	34 05		6	RCL 3	34 03	
1	f INT	31 83	COMPUTES HOW MANY NUMBERS OF THE LAST GUESS HAVE TO BE CHANGED	7	STO 4	33 04	
2	+	61		8	f LBL 6	31 25 06	
3	-	51		9	A x=y	35 52	
4	STO 5	33 05		110	STO 3	33 03	
5	5	05		1	f LBL 7	31 25 07	
6	A STI	35 33		2	D	00	

NEW GUESS					REGISTERS				
0 COUNTER	1	2	3	4	5 CORRECTION	6 COUNTER	7 COUNTER	8 COUNTER	9 COUNTER
S0	S1	S2	S3	S4	S5 GUESS + CORRECTION	S6	S7	S8	S9
OLD GUESS									
A	B	C SEED	D 10	E CORRECTION	I USED				



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Program Listing II

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STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
3	STO 5	33 05	} RECALLS ONE OF THE STORED GUESSES	9	GTO 1 6	22 31 13	} NOT HAVE OLD AND NEW GUESSES SAME CORRECTIONS? ARE ALL OLD GUESSES COMPARED WITH THE NEW ONE? PREPARES STORING OF NEW GUESSES
4	RCL 9	34 09		170	1 LBL 9	31 25 09	
5	A STI	35 33		1	CHS	42	
6	RCL (i)	34 24		2	STO (i)	33 24	
7	g FRAC	32 83	3	+	61	} STORES CORRECTION OF THIS GUESS	
8	RCL D	34 14	4	A FO?	35 71 00		
9	x	71	5	.	83		
120	STO E	33 15	} PREPARES COUNTERS	6	1	01	
1	RCL (i)	34 24		7	STO + 5	33 61 05	
2	4	04		8	A FO?	35 71 00	
3	A STI	35 33		9	GTO 1 6	22 31 12	
4	STO 0	33 00	→ STEPS 153, 182-84		180	A RTN	35 22
5	A CFO	35 61 00	} COMPARES NEW GUESS WITH OLD GUESS	1	g LBL 1 6	32 25 12	
6	1 LBL 0	31 25 00		2	0	00	
7	A RV	35 53		3	A STI	35 33	
8	RCL D	34 14		4	g DS2 (i)	32 33	
9	÷	81	} RIGHT POSITIONS	5	GTO E	22 15	
130	ENTER A	41		6	RCL E	34 15	
1	g FRAC	32 83		7	RCL 5	34 05	
2	RCL D	34 14		8	g x ≠ y	32 61	
3	x	71	} TEST FOR EQUAL RIGHT POSITIONS OF OLD AND NEW GUESS	9	GTO 2	22 02	
4	1 INT	31 83		190	1	01	} MAKES OF THE SINGLE NUMBERS A FOUR DIGIT NUMBER
5	RCL (i)	34 24		1	STO - 9	33 51 09	
6	A ABS	35 64		2	1	01	
7	STO (i)	33 24	3	4	04		
8	g x = y	32 51	4	RCL 9	34 09		
9	1 ASB g	31 22 09	5	g x > y	32 81		
140	1 P → S	31 42	6	GTO 7	22 07		
1	A RV	35 53	} PREPARES STORING OF NEW GUESSES	7	g LBL 1 E	32 25 15	
2	STO (i)	33 24		8	1	01	
3	1 P → S	31 42		9	STO + 8	33 61 08	
4	1 DS2	31 33		200	4	04	} STORES NEW GUESS
5	GTO 0	22 00	} TEST FOR EQUAL RIGHT POSITIONS OF OLD AND NEW GUESS	1	A STI	35 33	
6	RCL E	34 15		2	0	00	
7	1 INT	31 83		3	1 LBL C	31 25 13	
8	RCL 5	34 05		4	4	04	
9	g x ≠ y	32 61	} WRONG POSITIONS	5	A RCI	35 34	
150	GTO 2	22 02		6	-	51	
1	A SFO	35 51 00		7	g 10 ^x	32 53	
2	1 LBL E	31 25 15		8	RCL (i)	34 24	
3	RCL 0	34 00	} STORES NEW GUESS	9	A ABS	35 64	
4	A STI	35 33		210	x	71	} STORES NEW GUESS
5	1 P → S	31 42		1	+	61	
6	RCL (i)	34 24		2	1 DS2	31 33	
7	1 P → S	31 42	3	GTO C	22 13		
8	4	04	4	RCL 8	34 08		
9	A STI	35 33	5	A STI	35 33		
160	g LBL 1 C	32 25 13	6	A x ← y	35 52		
1	A x ← y	35 52	} STORES NEW GUESS	7	STO (i)	33 24	
2	1 x = 0	31 51		8	A SPACE	35 84	
3	GTO 1 6	22 31 12		9	1 - x -	31 84	
4	RCL (i)	34 24		220	A RTN	35 22	
5	g x = y	32 51					
6	GTO 9	22 09					
7	1 DS2	31 33					
8	GTO 1 C	22 31 13					

LABELS					FLAGS		SET STATUS		
A START	B CORRECTION	C USED	D USED	E USED	0 USED		FLAGS	TRIG	DISP
a SEED	b USED	c USED	d	e USED	1		ON OFF	DEG ☒	FIX ☒
0 COMP	1 CHANGE	2 PERM	3	4 USED	2 USED		0 ☐ ☒	GRAD ☐	SCI ☐
5 USED	6 USED	7 PREP FOR CORR	8	9 USED	3 USED		1 ☐ ☒	RAD ☐	ENG ☐
							2 ☐ ☒		n ☒