52206 Program Description I

Program Title A CHESS GAME

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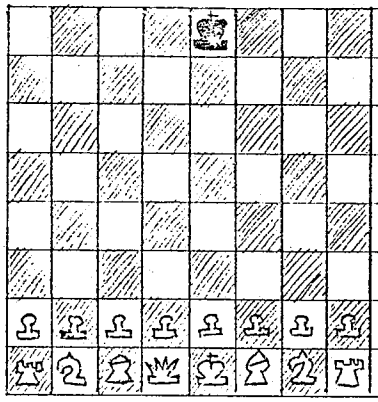
Program Description, Equations, Variables THIS GAME PROGRAM WILL ALLOW YOU TO PLAY CHESS AGAINST ANY HP-67/97. HERE THE CALCULATOR PLAYS THE 16 WHITE PIECES, AND YOU HAVE ONLY THE BLACK KING. THE INITIAL POSITION IS THE STANDARD ONE GIVEN BELOW. CALCULATOR WILL TRY TO CHECKMATE IN SIX MOVES OR LESS; IF IT SUCCEEDES, IT WILL BE CONSIDERED THE WINNER. OF COURSE, YOUR GOAL IS TO PLAY IN SUCH A WAY AS TO MAKE A CHECKMATE WITHIN 6 MOVES (OR LESS) IMPOSSIBLE. ALSO, YOU CAN TRY TO FORCE A STALEMATED POSITION, THIS IS, A POSITION IN WHICH YOU ARE NEITHER IN CHECK NOR ABLE TO MAKE ANY LEGAL MOVE; IN THIS CASE YOU WILL BE THE WINNER, TOO.



GAME CONVENTIONS

A) WHITE (HP): OUTPUT OF WHITE'S MOVES IS PERFORMED ACCORDINGLY TO THE FOLLOWING CONVENTION:

PIECE	CODE	PIECE	CODE
KING, K	6	B, BISHOP	3
QUEEN, Q	5	kt, KNIGHT	2
ROOK, R	4	P, PAWN	1

YOU WILL EASILY REMEMBER THIS, BECAUSE THE CODE IS STRONGLY RELATED TO THE VALUE OF THE PIECE

- OUTPUT IS OF THE FORM XYZ.N, WHERE

X= CODE OF THE PIECE THAT WHITE HAS JUST MOVED

Y= CODE OF THE PIECE IN WHOSE COLUMN LAYS NOW THE MOVED PIECE (IT MAY HAVE UP TO 2 DIGITS: THE FIRST ONE THEN SPECIFIES IF IT IS A KING SIDE OR QUEEN SIDE PIECE)

Z= INDICATES IN WHICH SQUARE OF THE COLUMN REST THE MOVED PIECE, COUNTING UPWARDS FROM THE BOTTOM OF THE COLUMN.

N= NUMBER OF WHITE (HP) MOVES ALREADY PERFORMED

Operating Limits and Warnings

- SOME EXAMPLES WILL MAKE THIS CLEAR:

1) SHOULD WHITE MOVE PAWN TO KING'S BISHOP 4 ON ITS 2nd MOVE, THE OUTPUT WOULD BE:

1634.2 (= P-KB4 ON THE 2nd MOVE)

IF THERE WAS NO AMBIGUITY BETWEEN KING'S BISHOP AND QUEEN'S BISHOP, THE OUTPUT WOUL BE:

134.2 (= P-B4 ON THE 2nd MOVE)

2) IF THE OUTPUT WERE 5627.4, THIS WOULD BE DECODED LIKE THIS:

X ≡ 5 , STANDS FOR QUEEN , Q
Y ≡ 62; 6 STANDS FOR KING , K , AND 2 STANDS FOR KNIGHT , kt
Z ≡ 7 STANDS FOR 7th SQUARE OF A COLUMN
N ≡ 4 , REPRESENTS THE FOURTH MOVE OF WHITE

} THUS, THIS

WOULD MEAN THAT WHITE PLAYS ITS QUEEN (5) TO THE 7th SQUARE (7) OF ITS KING(6) SIDE KNIGHT COLUMN ON ITS 4th MOVE (4).

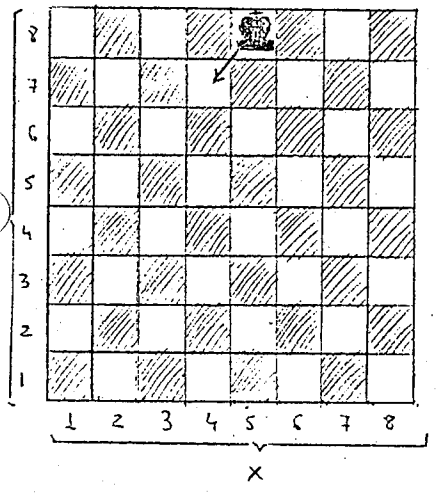
3) SIMILARLY, IF THE OUTPUT WERE 164.1, PROCEEDING LIKE BEFORE, WE WOUL DECODE IT SO: WHITE HAS PLAYED ITS PAWN (1) TO THE FOURTH SQUARE (4) OF ITS KING'S (6) COLUM ON ITS FIRST (1) MOVE.

AND SO ON.

~ THERE ARE THREE KINDS OF OUTPUT:

- NORMAL OUTPUT IS OF THE FORM XYZ.N , IN DSP 1
- CHECK OUTPUT IS OF THE FORM -XYZ.N, IN DSP 1
- CHECKMATE OUTPUT IS OF THE FORM -XYZ.00000N, IN DSP 9

B) BLACK



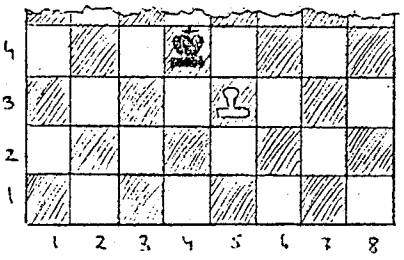
BLACK MOVES (YOUR MOVES), ARE INPUT IN QUITE A DIFFERENT WAY. TO MOVE YOUR BLACK KING, YOU MUST INPUT THE XY NUMBER OF THE SQUARE IT MOVES TO, FOLLOWING THE X-Y NOTATION INDICATED IN THE FIGURE.

FOR INSTANCE, IN THE INITIAL POSITION YOUR KING IS IN 58; TO MOVE YOUR KING TO THE LOCATION INDICATED BY THE ARROW, YOU MUST INPUT

47 R/S

IF YOUR KING TAKES A WHITE PIECE ON ITS MOVE, THE PROCEDURE IS THE SAME AS BEFORE, BUT YOU MUST CHANGE THE SIGN; FOR INSTANCE, TO CAPTURE THE WHITE PAWN (SEE THE GRAPHIC), YOU MUST INPUT

-53 R/S



TO RUN THE PROGRAM, YOU WILL NEED A DATA CARD, WITH THE FOLLOWING DATA STORED:

PRIMARY REGISTER	0	1	2	3	4	5	6	7	8	9	A	B
CONTENTS	164	524	527	154	557	525	3634	537	155	336	1523	322

PRIMARY REGISTER	C	D	E	I
CONTENTS	334	10	0.8	0

SECONDARY REGISTER	0	1	2	3	4	5	6	7	8	9
CONTENTS	3525	5527	565	325	0	346	3534	567	5627	353

REMARKS

- DATA CARD IS NEEDED ONLY WHEN LOADING THE PROGRAM
- HP-97 OWNERS, SWITCH TO "NORMAL" POSITION IF YOU WANT TO HAVE THE MOVES PRINTED
- PROGRAM DOES NOT ALWAYS INDICATE CHECK STATUS
- BE EXTREMELY CAREFUL NOT TO MAKE ANY ILLEGAL MOVE, BECAUSE THAT WILL RUIN THE GAME: HP HAS NO WAY OF RECOGNISE AN ILLEGAL MOVE, AND WILL MAKE NONSENSICAL MOVES.

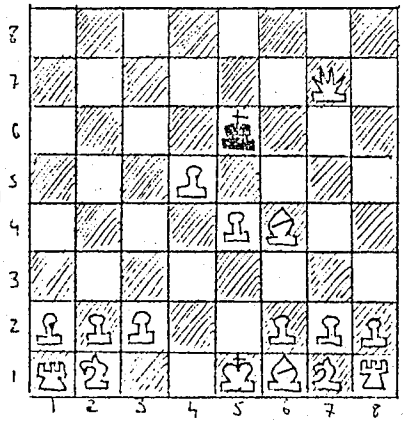
2) ANOTHER GAME. PERHAPS I HAVE IMPROVED MY PLAYING STYLE.

- IS ASSUMED THAT YOU HAVE RUN THE PREVIOUS EXAMPLE

- START THE GAME: [A] → 164.1 ≡ 1.- P-K4
- MY MOVE : 57 [RJS] → 524.2 ≡ 2.- Q-Kt4
- I ANSWER : 46 [RJS] → 527.3 ≡ 3.- Q-Kt7
- IT'S MY TURN : 56 [RJS] → 154.4 ≡ 4.- P-Q4
- I MOVE : 46 [RJS] → -3634.5 ≡ 5.- B-KB4 , Check
- LET'S TRY 56: 56 [RJS] → -155.000000 ≡ 6.- P-Q5 , CHECKMATE

THE CALCULATOR HAS CHECKMATED MY KING ONCE MORE ; AS IT SEEMS, I CONTINUE BEING AS BAD A CHESSPLAYER AS I WAS . IT IS DIFFICULT TO ME TO WIN THE CALCULATOR , AND I WONDER IF YOU WILL PERFORM THE FEAT.

THE CHECKMATE POSITION IS:



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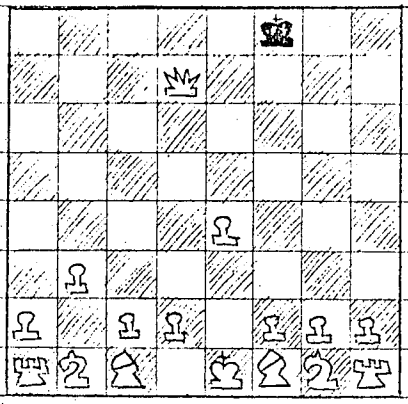
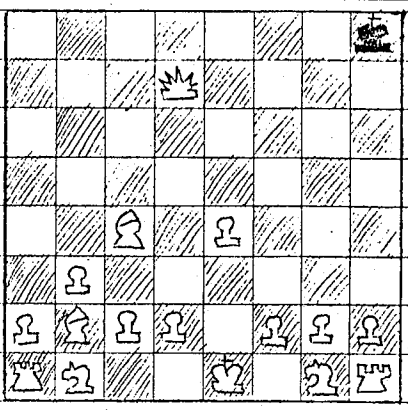
Sketch(es)



POSITION AFTER 4.- P-G kt 3



CHECKMATE POSITION

Sample Problem(s) 1) LET US HAVE A LITTLE STRUGGLE WITH THE CALCULATOR:

- LOAD THE DATA CARD, BOTH SIDES
- LOAD PROGRAM CARD, BOTH SIDES
- START THE GAME [A] → 164.1 ≡ P-K4 ≡ 1.- P-k4
- I DECIDE TO MOVE TO 68 : 68 [R/S] → 524.2 ≡ 2.- Q-Kt 4
- MY ANSWER, 67 : 67 [R/S] → 557.3 ≡ 3.- Q-G7

NOTE THAT MY KING IS IN CHECK, BUT THAT IS NOT INDICATED

- I ANSWER 68 : 68 [R/S] → 1523.4 ≡ 4.- P- Q kt3

(WE HAVE REACHED THE POSITION SHOWN ABOVE, IN THE 1st GRAPHIC)

- I MOVE TO 78 : 78 [R/S] → -331.5 ≡ 5.- B-B4 , check

(THIS TIME CHECK STATUS WAS INDICATED)

- I TRY 88 : 88 [R/S] → -322.000006 ≡ 6.- B-kt 2, CHECKMATE

THIS IS FINISHED = HP-67/97 HAS WON. THE POSITION REACHED IS SHOWN IN THE 2nd GRAPHIC ABOVE. MY PLAYING STYLE WAS VERY POOR.

THERE IS ANOTHER EXAMPLE IN THE OTHER SIDE OF THIS PAGE

Reference(s)

52206 User Instructions

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	LOAD DATA CARD, BOTH SIDES			
2	LOAD PROGRAM CARD, BOTH SIDES			
3	START THE GAME = WHITE'S FIRST MOVE		A	XYZ.N (*)
4	INPUT YOUR MOVE	XY	R/S	XYZ.N (*)
	XYZ.N IS THE WHITE'S ANSWER. IF IT			
	IS A CHECKMATE, GO TO 5. OTHERWISE, GO TO 4			
5	WHITE HAS CHECKMATED YOUR KING. TO PLAY			
	ANOTHER GAME, GOTO 3			
	(*) XYZ.N MAY BE OF 3 TYPES:			
	DSP 1 = 1) XYZ.N, YOUR KING IS NEITHER IN CHECK			
	NOR CHECKMATED. IF N ≥ 7, YOU			
	ARE THE WINNER. ALSO IF N = 6			
	DSP 1 = 2) -XYZ.N, YOUR KING IS IN CHECK. IF N ≥ 7,			
	YOU ARE THE WINNER. ALSO IF N = 6			
	DSP 9 = 3) -XYZ.00000N }			
	OR -XYZ.000000N } YOU ARE CHECKMATED. YOU			
	HAVE LOST THE GAME			

52206 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	* LBL A	31 25 11	START ROUTINE
	DSP 1	23 01	
	0	00	
	ST I	35 33	
	RCL 0	34 00	
	GSB 2	31 22 02	
	RCL 1	34 01	
	GSB 7	31 22 07	
	INT	31 83	
010	6	06	
	x=y	32 51	
	GTO C	22 13	
	RCL 2	34 02	
	GSB 7	31 22 07	
	FRAC	32 83	
	RCL E	34 15	
	x=y	32 51	
	GTO D	22 14	
	RCL 3	34 03	
020	GSB 2	31 22 02	
	2	02	
	6	06	
	x≠y	32 61	
	GTO 0	22 00	
	RCL 4	34 04	
	* LBL 8	31 25 08	
	GSB 2	31 22 02	
	RCL 5	34 05	
	* LBL 9	31 25 09	CHECKMATE ROUTINE
	CHS	42	
	DSP 9	23 09	
	ISZ	31 34	
	RCL I	35 34	DISPLAYS CHECKMATE
	EEX	43	-XY2.000000N
	7	07	
	÷	81	
	−	51	
	RTN	35 22	
	* LBL 0	31 25 00	
040	GSB 6	31 22 06	
	x≠y	32 61	
	GTO 0	22 00	
	RCL 6	34 06	
	GSB 2	31 22 02	
	GTO 5	22 05	
	* LBL 0	31 25 00	
	GSB 6	31 22 06	
	x≠y	32 61	
	GTO 0	22 00	
050	RCL 6	34 06	
	CHS	42	CHECK
	GSB 2	31 22 02	
	5	05	
	6	06	
	x≠y	32 61	
	GTO 5	22 05	

STEP	KEY ENTRY	KEY CODE	COMMENTS
	RCL 8	34 08	
	GTO 9	22 09	
	* LBL 0	31 25 00	
060	GSB 6	31 22 06	
	x≠y	32 61	
	GTO 0	22 00	
	P≥S	31 42	
	RCL 0	34 00	
	P≥S	31 42	
	GSB 2	31 22 02	
	* LBL 4	31 25 04	
	RCL 4	34 04	
	GTO 9	22 09	
070	* LBL 0	31 25 00	
	RL	35 53	
	1	01	
	5	05	
	x≠y	32 61	
	GTO 0	22 00	
	P≥S	31 42	
	RCL 1	34 01	
	P≥S	31 42	
	GTO 8	22 08	
080	* LBL 0	31 25 00	
	P≥S	31 42	
	RCL 2	34 02	
	P≥S	31 42	
	GTO 8	22 08	
	* LBL D	31 25 14	
	P≥S	31 42	
	RCL 3	34 03	
	P≥S	31 42	
	GSB 2	31 22 02	
090	1	01	
	8	08	
	x≠y	32 61	
	GTO 0	22 00	
	RCL 9	34 09	
	CHS	42	CHECK
	GTO 3	22 03	
	* LBL 0	31 25 00	
	GSB 6	31 22 06	
	x≠y	32 61	
100	GTO 0	22 00	
	P≥S	31 42	
	RCL 5	34 05	
	P≥S	31 42	
	GTO 3	22 03	
	* LBL 0	31 25 00	
	GSB 6	31 22 06	
	x≠y	32 61	
	GTO 4	22 04	
	RCL 9	34 09	
110	GSB 2	31 22 02	
	2	02	
	8	08	

REGISTERS

0 164	1 524	2 527	3 154	4 557	5 525	6 3634	7 537	8 155	9 336
S0 3525	S1 5527	S2 565	S3 325	S4 0	S5 346	S6 3534	S7 567	S8 5627	S9 353
A 1523	B 322	C 334	D 10	E 0.8	I 0				

Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS
	x≠y	32 61	
	GTO 4	22 04	
	RCL 2	34 02	
	GTO 9	22 09	
	* LBL C	31 25 13	
	RCL 4	34 04	
	GSB 7	31 22 07	
120	PRAC	32 83	
	RCL E	34 15	
	x=y	32 51	
	GTO B	22 12	
	RCL 3	34 03	
	GSB 2	31 22 02	
	6	06	
	6	06	
	x≠y	32 61	
	GTO 0	22 00	
130	P≥S	31 42	
	RCL 6	34 06	
	P≥S	31 42	
	GSB 2	31 22 02	
	* LBL 5	31 25 05	
	RCL 7	34 07	
	GTO 9	22 09	
	* LBL 0	31 25 00	
	GSB 6	31 22 06	
	x≠y	32 61	
140	GTO 0	22 00	
	P≥S	31 42	
	RCL 7	34 07	
	P≥S	31 42	
	GTO 8	22 08	
	* LBL 0	31 25 00	
	R↓	35 53	
	x>0	31 81	
	GTO 0	22 00	
	P≥S	31 42	
150	RCL 9	34 09	
	P≥S	31 42	
	GTO 9	22 09	
	* LBL 0	31 25 00	
	P≥S	31 42	
	RCL 8	34 08	
	P≥S	31 42	
	GTO 8	22 08	
	* LBL B	31 25 12	
	RCL A	34 11	
160	GSB 2	31 22 02	
	6	06	
	8	08	
	x≠y	32 61	
	GTO 0	22 00	
	RCL B	34 12	
	GTO 3	22 03	
	* LBL 0	31 25 00	
	GSB 6	31 22 06	

STEP	KEY ENTRY	KEY CODE	COMMENTS
	x≠y	32 61	
170	GTO 0	22 00	
	RCL C	34 13	
	CHS	42	CHECK
	GSB 2	31 22 02	
	6	06	
	8	08	
	x=y	32 51	
	GTO 5	22 05	
	RCL B	34 12	
	GTO 9	22 09	
180	* LBL 0	31 25 00	
	RCL B	34 12	
	CHS	42	CHECK
	* LBL 3	31 25 03	
	GSB 2	31 22 02	
	RCL 2	34 02	
	GTO 9	22 09	
	* LBL 6	31 25 06	AUXILIAR
	RCL D	34 14	
	+	61	SUBROUTINE I
190	RTN	35 22	
	* LBL 7	31 25 07	AUXILIAR
	GSB 2	31 22 02	
	RCL D	34 14	SUBROUTINE II
	÷	81	
	RTN	35 22	
	* LBL 2	31 25 02	DISPLAYS HP MOVE
	x<0	31 71	
	SF 2	35 51 02	
	ABS	35 64	
200	ISG	31 34	
	RCI	35 34	DISPLAYS XYZ.N
	RCL D	34 14	
	÷	81	
	+	61	
	F2?	35 71 02	CHECK?
	CHS	42	YES = -XYZ.N
	R/S	84	INPUT YOUR MOVE
	RTN	35 22	
210			
220			

LABELS

A START	B USED	C USED	D USED	E
a	b	c	d	e
0 USED	1	2 USED	3 USED	4 USED
5 USED	6 USED	7 USED	8 USED	9 USED

FLAGS

0	
1	
2 USED	
3	

SET STATUS

FLAGS			TRIG	DISP
	ON	OFF		
0	☐	☒	DEG ☒	FIX ☒
1	☐	☒	GRAD ☐	SCI ☐
2	☐	☒	RAD ☐	ENG ☐
3	☐	☒		n 1