# HEWLETT-PACKARD HP-41 USERS' LIBRARY SOLUTIONS Games II



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#### INTRODUCTION

This HP-41C Solutions book was written to help you get the most from your calculator. The programs were chosen to provide useful calculations for many of the common problems encountered.

They will provide you with immediate capabilities in your everyday calculations and you will find them useful as guides to programming techniques for writing your own customized software. The comments on each program listing describe the approach used to reach the solution and help you follow the programmer's logic as you become and expert on your HP calculator.

#### **KEYING A PROGRAM INTO THE HP-41C**

There are several things that you should keep in mind while you are keying in programs from the program listings provided in this book. The output from the HP 82143A printer provides a convenient way of listing and an easily understood method of keying in programs without showing every keystroke. This type of output is what appears in this handbook. Once you understand the procedure for keying programs in from the printed listings, you will find this method simple and fast. Here is the procedure:

1. At the end of each program listing is a listing of status information required to properly execute that program. Included is the SIZE allocation required. Before you begin keying in the program, press **XEQ ALPHA** SIZE **ALPHA** and specify the allocation (three digits; e.g., 10 should be specified as 010).

Also included in the status information is the display format and status of flags important to the program. To ensure proper execution, check to see that the display status of the HP-41C is set as specified and check to see that all applicable flags are set or clear as specified.

- 2. Set the HP-41C to PRGM mode (press the **PRGM** key) and press **GTO** • to prepare the calculator for the new program.
- 3. Begin keying in the program. Following is a list of hints that will help you when you key in your programs from the program listings in this handbook.
  - a. When you see " (quote marks) around a character or group of characters in the program listing, those characters are ALPHA. To key them in, simply press **ALPHA**, key in the characters, then press **ALPHA** again. So "SAMPLE" would be keyed in as **ALPHA** "SAMPLE" **ALPHA**.
  - b. The diamond in front of each LBL instruction is only a visual aid to help you locate labels in the program listings. When you key in a program, ignore the diamond.
  - c. The printer indication of divide sign is /. When you see / in the program listing, press +.
  - d. The printer indication of the multiply sign is  $\ddagger$ . When you see  $\ddagger$  in the program listing, press  $\blacktriangleright$ .
  - e. The I- character in the program listing is an indication of the **APPEND** function. When you see I-, press **APPEND** in ALPHA mode (press **A** and the K key).
  - f. All operations requiring register addresses accept those addresses in these forms:

nn (a two-digit number) IND nn (INDIRECT: , followed fy a two-digit number) X, Y, Z, T, or L (a STACK address: followed by X, Y, Z, T, or L) IND X, Y, Z, T or L (INDIRECT stack: followed by X, Y, Z, T, or L)

Keystrokes

Indirect addresses are specified by pressing and then the indirect address. Stack addresses are specified by pressing • followed by X, Y, Z, T, or L. Indirect stack addresses are specified by pressing • and X, Y, Z, T, or L.

Display

#### **Printer Listing**

01+LBL "SAM	LBL ALPHA SAMPLE ALPHA	01 LBL <sup>T</sup> SAMPLE
PLE"	ALPHA THIS IS A ALPHA	02 <sup>T</sup> THIS IS A
02 "THIS IS		
A "	ALPHA APPEND SAMPLE	03′⊢SAMPLE
03 "FSAMPLE "		04 AVIEW
04 AVIEW	6	05 6
05 6	ENTER+	06 ENTER 1
06 ENTER↑		07 0
07 -2	2 (13)	07 -2
08 /	÷	08 /
09 ABS	XEQ ALPHA ABS ALPHA	09 485
10 STO IND		03 AD5
L	STO L	10 STO IND L
11 "R3="		$11^{T}R3 =$
12 ARCL 03	$H_3 = 0.000$	
13 AVIEW	AVIEW	12 ARCL 03
14 RTN	ALPHA	13 AVIEW
	RTN	14 RTN

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  - \* Requires three memory modules
  - **\*\*** Requires four memory modules
  - + Requires card reader

#### **PROGRAM DESCRIPTION**

#### THE CAVES

#### By James Surber

Welcome to the "THE CAVES". The Caves is an adventure game in which the player (a wizard) moves about a series of 67 caves to pick up nine items of considerable value (for a total 1200 points) without dying from the hazards. The construction of the caves is a single stranded helix with interconnecting tunnels. The even numbered caves have tunnels going up to seven caves, while the odd numbered caves have tunnels going down to seven caves. These tunnels, and the tunnels going to the two intermediate caves on either side, make each cave connected to the three adjacent caves.

Upon entering the caves, you will be in cave number 0 which will always be empty and "SAFE". Five pieces of equipment will be given to you before starting through the caves, and three more pieces may be picked up while going through the game. These are to help you to get through the hazards and pick up the valuables. You will be given at the start of the game the following:

Keys, Water, Knife, Gloves, and a Lamp.

Only these five original pieces of equipment can be "SNATCHED" (taken) by the bats. Possession of these items is indicated in the display by setting flags 0-4; each number representing a different piece of equipment. (When set, these flag numbers appear along the bottom of the display.) The three pieces that are picked up along the way are immune to the bats due to a magical spell they have over them. These pieces are:

Wand, Magic Word, and a Cape.

If you lose any of the five original pieces of equipment the Wand will magically "PRESTO" return all lost pieces in one wand usage. The Wand will work only twice after each visit to the Wand Cave (not accumulative). The Magic Word "ABRAKADABRA" will take you out of the game at any time or place you wish to use it. The Cape will render you invisible to any dragon you may find in the cave. If the Cape is lost along the way, it may be reacquired by returning to the Cape Cave.

You will be given warnings of some of the hazards in the adjacent caves after you enter a new cave and have encountered any hazards present. These warnings appear after the word "SAFE" and do not have tones associated with them. Below is a list of the warnings and their hazards.

> "FEEL DRAFT" a bottomless pit - end of the game. (no score) "YYEEEIIII THE PITS"

"SMELL DRAGON" if no cape, the dragon will eat you - end of the game. (no score) "CHOMP"

"HEAR SPLASH" cave is full of water and you will drown - end of the game. (no score) "ALL WASHED UP"

"DARK CAVE" if no lamp is present, you will fall into a bottomless pit - end of the game. (no score) "OOPS NO LAMP" "YYEEEIIII THE PITS"

"HEAR SQUEEKS" bats will "SNATCH" one piece of your equipment. "SNATCH" "BATS TOOK ( )"

"HEAR VOICE" a wizard will tell you all that occupies the six closest caves (usually the three on either side). He does not see stairs or forks.

"SEE LIGHT" a tunnel out of the caves will take you out - end of the game. (with score) "END GAME" "SCORE = ( )"

There will be other surprises lurking in "The Caves" without warning. These will be inconvenient or lethal only if equipment has been "SNATCHED".

There are caves with stairs and forks in them. The stairs will display "UP OR DOWN?". This will randomly place you either above (higher number) or below (lower number) the cave that the stairs are currently in. The fork will randomly select two caves and display them with no warnings. You must then choose between them. Once you are placed in a new cave (in both the stairs and fork cases), you must suffer any hazards there and will be given new warnings and adjacent caves. At each re-entry into a cave with stairs or forks, you will be given new random caves. You never know what you might find at the end of your tunnel.

At anytime you may go "BACK" and return to the last cave you were in. This function will also work with stairs and forks.

A list of all valuables and their points is given below. After you have placed a valuable "IN PACK" it is removed from the cave and that cave will be empty upon re-entry. When all the valuables are found the HP-41 will "beep" so you'll know when you have finished.

DIAMONDS		100
IVORY		100
MING VAS	E	100
PEARLS		100
CRYSTAL	(in one of the two "small caves")	100
RUBIES	(locked in a chest)	150
SILK	(locked in a chest)	150
AG	(silver - too hot, use gloves)	200
AU	(gold - too cold, use gloves)	200

#### OPERATING LIMITS AND WARNINGS AND OPTIONS

The space requirement for this program is 319 registers.

The initialization of this program is done during the time the display is showing "THE CAVES". This process takes time to randomize the caves for your game. Please be patient while the HP-41 is "thinking". The same seed will generate the same game each time you play.

Flag 11 is used at one brief point in the program. If the calculator is shut off during the running of the program flag 11 may be set, therefore, the game will automatically start when it is turned back on. As long as you turn the calculator off at a prompt for a move this will not occur.

If the optional printer is used all warnings and the wizards' wise words will be printed in lower case letters.

STATUS

SIZE: 076 FIX: 0 USER MODE: 0N TOTAL PROGRAM BYTES: 1703

DA	TA REGISTERS	
	00-67	CAVES
	68-70	ADJACENT CAVES
	71	LAST CAVE
	72	POINTS TOTAL
	73	POSITION
	74	SEED
	75	LOOP CONTROLS
1		

FLAGS USED		
0	Set:	KEYS PRESENT
	Clear:	KEYS SNATCHED
1	Set:	LAMP PRESENT
	Clear:	LAMP SNATCHED
2	Set:	WATER PRESENT
	Clear:	WATER SNATCHED
3	Set:	KNIFE PRESENT
	Clear:	KNIFE SNATCHED
4	Set:	GLOVES PRESENT
	Clear:	GLOVES SNATCHED
5	Set:	WAND PRESENT
	Clear:	WAND ABSENT
6	Set:	WORD PRESENT
	Clear:	WORD ABSENT
7	Set:	CAPE PRESENT
	Clear:	CAPE ABSENT

4

FLAGS USED cont.		
8	Set:	DISPLAY WARNINGS, CAVE CONTENTS
	Clear:	DISPLAY "NO WARNING"
9	Set:	BATS TOOK NOTHING
	Clear:	BATS TOOK ()
10	Set:	1 ST WAND USAGE
	Clear:	WAND USAGE USED
11	Set:	CHEST WITH SILK
	Clear:	CHEST WITH RUBIES
13	Set:	TEST WARNINGS
	Clear:	XEQ HAZARD
25	Set:	NORMAL WARNING
	Clear:	FORK WARNINGS
27	Set:	USER MODE ON
	Clear:	USER MODE OFF
29	Set:	DECIMAL POINT
	Clear:	NO DECIMAL POINT

#### **SAMPLE PROBLEM**

Once upon a time, there was a wizard who set out to make his name in the wonderful world of wizardry and to earn a fabulous fortune. The titillating trail that awaited him was the awesome task of travelling through "THE CAVES". As he traveled through this magically made maze he increased his strength to a new and higher order by receiving magical powers (the Wand, the Magic Word, and the cape). His fortune was found by placing the nine valuables of the caves in his pack. These powers and valuables could make him the world's wealthiest wizard. To start his journey he planted a magical seed (a fractional number) to form his puzzle. At this time he was given his equipment (keys, water, knife, gloves and lamp). The number he chose was 0.741. The following tells of the treacherous trek he took.

Note: The last line of the display after moving to a new cave is in the format: #\*, #, #, #. The first number (with the asterisk) is the cave you are in, the other three are the adjacent caves.

DISPLAY	INPUT	FUNCTION	COMMENTS
PACKING	Load Program [GTO	]	
	[XEQ]"SIZE"076 [XEQ]"CAVES"		
SEED? THE CAVES SAFE NO WARNING	.741	[R/S]	Note flags
0* 1,3,5 MOVING TO 1 SMALL CAVE CRYSTAL CRYSTAL IN PACK SCORE = 100 SAFE NO WARNING	1	[R/S]	
1* 0,2,0 MOVING TO 2 PEARLS PEARLS IN PACK SCORE = 200 SAFE NO WARNING	2	[R/S]	
2* 1,3,9 MOVING TO 3 SAFE NO WARNING	3	[R/S]	

DISPLAY	INPUT	FUNCTION	COMMENTS
3* 2,4,0 MOVING TO 4 AU TOO COLD USE GLOVES IN PACK SCORE = 400 SAFE NO WARNING	4	[R/S]	
4* 3,5,11 MOVING TO 5 FORK	5	[R/S]	
5* LT/RT, 45, 10 MOVING TO 10 HEAR SQUEEKS SNATCH		[XEQ] "I"	To go the cave on the right
BATS TOOK KNIFE SAFE HEAR SPLASH			Note annunciator '3' no longer on
10* 9,11,17 MOVING TO 9 SAFE HEAR SQUEEKS	9	[R/S]	
9* 8,10,2 MOVING TO 8 SAFE SEE LIGHT	8	[R/S]	
8* 7,9,15 MOVING TO 15 SAFE SEE LIGHT	15	[R/S]	
15* 14,16,8 MOVING TO 16 SAFE HEAR SPLASH	16	[R/S]	
16* 15,17,23 MOVING TO 23 DIAMONDS DIAMONDS IN PACK SCORE = 500 SAFE NO WARNING	23	[R/S]	

DISPLAY	INPUT	FUNCTION	COMMENTS
23* 22,24,16 MOVING TO 24 WEB	24	[R/S]	
BATS TOOK KNIFE GO BACK			(You don't have a knife to cut through
	To go back	[XEQ] "J"	the web)
SAFE NO WARNING			
23* 22,24,16 MOVING TO 22 SAFE HEAR VOICE HEAR VOICE	22	[R/S]	
22* 21,23,29 MOVING TO 29 HEAR VOICE WIZARD CAVE 26 LOCKED DOOR CAVE 27 EMPTY CAVE 28 EMPTY CAVE 29 HEAR VOICE CAVE 30 MAGIC WORD CAVE 31 IVORY CAVE 32 DARK CAVE SAFE NO WARNING	29	[R/S]	
29* 28,30,22	(Deview Equipment		
BATS TOOK KNIFE SAFE NO WARNING 29* 28 30 22	(Review Equipment	, [νεά] ε	
29. 20,30,22	(Review Score)	ראדטן "ח	
SCORE = 500	(Review Score)		
29* 28,30,22 MOVING TO 30 MAGIC WORD SAFE HEAR VOICE	30	[R/S]	

DISPLAY	INPUT	FUNCTION	COMMENTS	
30* 29,31,27 MOVING TO 37 MAGIC WAND SAFE HEAR VOICE	37	[R/S]		
37* 36,38,30 SAFE NO WARNING	36	[R/S]		
36* 35,37,43 MOVING TO 35 UGLY TROLL BATS TOOK KNIFE CHOMP	35	[R/S]		
If the wizard had been wise he would have used his magic wand after he got it at cave 37. The knife would have protected him against the UGLY TROLL and he could have continued on to his fame and fortune. To reincarnate the wizard for another chance enter a seed at the prompt.				

				SIZE: 076
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
	This program requires 243 program registers			
	and 76 data registers.			
1	Load program			
2	Initialize		[XEQ] "CAVES"	SEED?
3	Key in any fractional number	SEED	# [R/S]	THE CAVES
	(between 1 and 0)			
4	To move to a new cave (only one of those	# of cave [R/S]		MOVING TO ()
	listed on the display)			(hazards or
				valuables)
				SAFE
				(warnings)
				(new adjacent
				caves)
				# <b>*,</b> #, #, #
5	If "FORK" displayed and "#*, LT/RT, #, #"		[XEQ] "H"	Same as 4
			(left)	
			[XEQ] "I"	
			(right)	
6	If "STAIRS" displayed and "UP OR DOWN?"		[XEQ] "F"	Same as 4
			(up)	
			[XEQ] "G"	
			(down)	
7a	If after "MAGIC WORD" was found in a cave		[XEQ] "A"	ABRAKADABRA
	and you wish to exit "THE CAVES"		(abra)	END GAME
	with a score (partial or total score)			SCORE = ()
7b	If no "MAGIC WORD" was found			NO MAGIC
				(cave display)

				SIZE: 076
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
8a	If you have found the "WAND" and the bats		[XEQ] "B"	PRESTO
	have "SNATCHED" some of your equipment the		(wand)	SAFE
	WAND will return all equipment taken			(warnings)
				(cave display
				of old caves)
8b	If no "WAND" has been found or if the			NO WAND
	"WAND" has been used twice since last			SAFE
	"WAND CAVE" visit (visits not accumulative)			(warnings)
				(cave display
				of old caves)
9	At any time you wish to review the warnings		[XEQ] "C"	(warnings)
	for the adjacent caves (this will not		(warn)	(cave display
	function when a Fork or Stairs is displayed)			of old caves)
10	If you wish a review of the score to date		[XEQ] "D"	SCORE = ()
			(score)	(cave display
				of old caves)
11	If you wish a review of the equipment		[XEQ] "E"	BATS TOOK ( )
	"SNATCHED" by the bats		(equip)	(hazards or
				valuables)
				SAFE
				(warnings)
				(cave display
				of old caves)
12	If you wish or were instructed to "GO BACK"		[XEQ] "J"	Same as <b>4</b>
	to the last cave (this will function with		(back)	
	Forks and Stairs)			
13	If at anytime you stop midgame and turn		[XEQ] "C"	Same as 9

11

				SIZE: 076
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
	your HP off you may recall your position			
	and the game by simply recalling warnings			
	(user mode on)			
14	If you lose the game a new game may be			SEED?
	started by simply keying in a new seed	SEED		

01+LBL "CAV		49 RCL 75	
ES"		50 INT	
02 CLRG		_51 SIU IND	
US "SEED ?"	Seed		
04 PRUMPI		52 KIN 574 DL 07	CONTROL LOOP
05 SIU 74		03#LBL 97 E4 VEC 00	
U6 "THE CHV		34 AEW 78 FF 100 75	
ES"		55 186 75 E2 CTO 07	
07 HYIEW	INITIALIZATION	56 GIU 97	
08 LF 29	OF REGISTERS	DI KIN EONDI I	
07 3F 27 10 VEO EO	AND FLAGS	59 PCL 71	GO BACK
10 AER 37 11 EIV G		60 CTO 84	
11 FIA 8 10 1 004		61+1 B) I	
17 9TO 75		62 RCL 70	GO RIGHT
14 XEO 97		63 GTO "*"	
15 18.026		64+1 BL H	
16 STO 75		65 RCL 69	GO LEFT
17 XEQ 97		66+LBL "↑"	
18 24.026		67 "MOVING	MOVING IO ()
19 STO 75		то "	
20 XEQ 97		68 ARCL X	
21 TONE 9		69 AVIEW	
22 <b>+</b> LBL 66		70 XEQ 56	
23 1	CTODE	71+LBL 84	STODE LACT
24 STO 68	ADIACENT CAVES	72 X<> 73	STURE LAST
25 3	TO O	73 STO 71	UAVE
26 STO 69	10 0	74 RCL 73	
27 5		75 X=0?	
28 STO 70			
29 GTO 55			
30+LBL 99		78 A=17	
31 KUL 74	RANDOM	(7 GIU 67 00 DC1 77	
32 7821	NUMBER	00 KUL (3 01 1	FIND ADJACENT
	GENERATOR		CAVES
04 .2110( 75 i	dententition	83 STO 68	0,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
33 - 76 FRC		84 2	
37 STA 74		85 +	
38 *		86 STO 69	
39 INT		87 2	ODD OR EVEN
40 RTN		88 MOD	
41+LBL 98		89 X≠0?	
42 66	STORAGE	90 GTO 68	
43 XEQ 99	LOOP	91 RCL 73	
44 X=0?		92 7	
45 GTO 98		93 -	ODD
46 RCL IND		94 0	LOWER CAVE
X		95 X(Y?	
47 X≠0?		96 X()Y	
1 48 GIU 98		1 97 510 70	

98 GTO 55		146 CF 13 147 "NO WARN	
100 RCL 73		ING"	NU WARNINGS
101 7	EVEN	148 FC?C 08	
102 +	UPPER CAVE	149 HVIEW 150 PSF	
103 07		151+LBL 77	
105 X<>Y		152 CLA	DISPLAY CAVES
106 STO 70		153 ARCL 73	
107 GTO 55		154 "F* "   155 OPC  20	
100+LBL 07		155 HRCE 68	
110 STO 68	STORE	157 ARCL 69	
111 64	ADJALENT CAVES TO 67	158 "F, "	
112 STO 69		159 ARCL 70	
113 66 114 STO 70		160 PROMPT	
115 GTO 55		162+LBL 78	
116+LBL 56		163 SF 25	DISPLAY WARNINGS
117 RCL 68	TEST	164 RCL IND	WARNINGS
118 A-12 119 RTN	IF LEGAL MOVE	165 EC2 25	
120 X<>Y		166 GTO 77	
121 RCL 69		167 20	
122 X=Y?		168 X>Y?	
123 KIN 124 X<>Y		170 SE 08	
125 RCL 70		171 XEQ IND	
126 X=Y?		Y	
127 RIN 128 "ILLECOL		172 RIN 17741 RI 01	
CAVE"		174 "MAGIC W	MAGIC WAND
129 XEQ 33		AND"	
130 RCL 73		175 FS? 13	
131 GIU 00 13201 BI 55	XFO HAZARDS	176 GIU 33 177 XEO 32	
133 RCL IND	& VALUABLES	178 SF 05	
73		179 SF 10	
134 GTO IND		180 GTO 00	
^ 135+LBL 00		181 VLBL B 182 FC2 05	
136 "SAFE"	SAFE	183 "NO WAND	USE MAGIC
137 XEQ 33			WAND
138+LBL U 179 SE 17	FIND WARNINGS	184 FS? 05	
140 RCL 68	TIND WARNINGS	185 FRESTO	
141 XEQ 78		187 FC? 05	
142 RCL 69		188 GTO E	
143 XEW 78 144 RCL 70		189 FC?C 10 190 CE 05	
145 XEQ 78		191 XEQ 58	

192 GTO 00		237 "LOCKED	
193+LBL 59		CHEST"	
194 CF 13		238 XEQ 33	LOCKED CHEST
195 CF 10	INITIALIZE	239 FS? 13	ROUTINE
196 CF 08	&	240 CF 11	
197 CF 07	RESET FLAGS	241 FS2 13	
198 CF 06	RESET TENGS	242 RTN	
199 CE 05		243 SF 08	
200+1 BI 58		244 XE0 36	
2001 SF 04		245 FF 08	
201 0, 0, 202 SF 07	RESEL FLAGS	246 EC2 00	
202 0, 00 207 SE 00		240 FC: 00 247 CTO 00	
200 01 02 204 CE 01	WAND & GAME	249 EC2 11	
204 37 81 205 85 88		240 / C: II 249 "PHPTES"	
200 OF 00 904 CE 00		247 KODILU 250 EC20 11	
200 CF 07 907 DTN		200 FOSC 11 951 NOTEKN	
207 KIN 2004 DI 62		2JI JILN 353 VEO 77	
200¥LBL 02	MAGIC WORD	2J2 AEQ 33 AE7 1E0	
207 "MHGIU M		2J3 1J0 954 CTO 74	
UKU~		234 GIU 34 2554 DI 02	
210 FS/ 13		200¥LBL 06	
211 610 33		236 "HG"	AG (SILVER)
212 XEQ 32		257 XEW 33	•
213 SF 06		258 FS7 13	
214 GTO 00		259 RIN	
215+LBL A		260 "IUU HUI	
216 FC? 06			
217 "NO MAGI	USE MAGIC	261 GIU 35	AU (GOLD)
C "	WORD	262+LBL 07	
218 FS? 06		263 "HU"	
219 "ABRAKAD		264 XEU 33	
ABRA"		265 FS7 13	
220 XEQ 33		266 RIN	
221 FC? 06		267 "TOU CUL	
222 GTO 77		D "	
223 GTO 57		268+LBL 35	
224 <b>+</b> LBL 03		269 XEQ 33	
225 "CAPE"		270 FS? 04	DOUTINE
226 FS? 13	CADE	271 "USE "	ROUTINE
227 GTO 33	CAPE	272 FC? 04	
228 XEQ 32		273 XEQ 43	
229 "INVISIB		274 "HGLOVES	
LE TO"			
230 "H DRAGO		275 XEQ 33	
Ы		276 FC? 04	
231 XEQ 33		277 GTO 00	
232 SF 07		278 CLA	
233 GTO 00		279 200	
234 <b>+</b> LBL 04		280 GTO 34	PEARLS
235 SF 11	SILK	281+LBL 09	
236 <b>+</b> LBL 05	RUBIES	282 "PEARLS"	
		283 GTO 37	

284+LBL 10		330 GTO 42	
285 "MING VA	MING VASE	331*LBL 14	
SE"		332 "WEB"	
286 GTO 37	,	333 FS? 13	WFR
287+LBL 11	,	334 610 33	WLD
288 "IVORY"	,	775 XF0 31	
200 I.C.		776 XF0 44	
207 GTO C. 29041 RI 12		777 F92 07	
270¥LDE IE 201 "DIGMAND	DIAMONDS		
271 DIANOND	,		
5" 2024/01 77	,	337 GIU 40	
2727LDL 07 207 VED 77	DISPLAY	340+LBL 10	
293 AEW 33	VALUABLES	341 "FIKE"	
294 FS/ 13		342 557 13	
295 KIN	,	343 610 33	FIRE
296 100	,	344 XEQ 31	
297+LBL 34	IN PACK	345 FS? 02	
298 "H IN PH		346 "USE "	
CK"	ŗ	347 FC? 02	
299 XEQ 33	,	348 XEQ 43	
300 ST+ 72	,	349 "HWATER"	
301 RCL 72	,	350 XEQ 33	
302 1200		351 FS? 02	
303 X=Y?	BEEP IF	352 GTO 00	
304 BEEP	1200 POINTS	353 GTO 46	
305 XEQ 48	r	354+LBL 16	
306 0		355 "LOCKED	
307 STO IND	REMOVE VALUABLE		LOCKED
73	FROM CAVE	756 FS2 13	DOOR
	,	757 CTO 33	
309+LBL 31	,	758 XF0 31	
310 TONE 5	,	759+1 B1 36	
711 TONE 3	BAD	740 597 00	
712 TONE 0	TONES	721 "105 "	IISF KFY
717 CTO 37		301 USE 740 ECO 80	POUTINE
71/A 10 70	,	352 FU? 00 777 VEO 47	NUUTINE
3147LDE 32 745 TANE 1	COOD TONES	353 AEQ 43	
313 IUNE 1 714 TONE 7	dood tones	364 "FKE1" 7/5 VEO 77	
310 IUME 3 717 TONE E	,	360 AEW 33 777 Eco 60	
317 IUME J 710al Di 77	,	300 F32 00 727 DTN	
310¥LDL 33 719 ovien	AVIFW	367 KIN 770 F00 00	
317 MYIEW 700 Dee		368 657 00	
320 FOE 704 DTN	,	369 610 00	
321 KIN 7004 DI 17	I	370+LBL 46	DRANDT FAD
3227LBL 13 707 WHOLV TO		371 "GO BHCK 	PRUMPIFUR
323 "UGLI IK	UGLY IKULL		GO BACK
ULL" 704 500 17	,	372 PRUMPI	
324 F37 I3 Fae ata 77	1	373 GIU J	
325 GIU 33	,	374+LBL 08	CRYSTAL
326 XEW 31	,	375 SF 08	
327 XEW 44	1	376+LBL 17	
328 FS? 03	,	377 "SMALL C	SMALL CAVES
329 GTO 00	,	AVE"	

378 XEQ 33	426+LBL 20	
379 FS? 13	427 "SEE LIG	SEE LIGHT
380 CF 08   701 ECO 17	HI" 400 ECO 17	
381 F3( 13 700 PTN	420 F3/ 13 490 CTO 77	
302 KIN 707 HDDOD DI	427 GIU 33 470 VEO 70	
DROP BIG CAPE	430 AEQ 32   471▲  DI 57	
6 CHME 704 ECOC 07	431¥LDL J7 472 "END COM	
384 F3/C 0/ 205 VEO 71	- 432 END GHM	END GAME
30J AEW 31 702 ECOC 00	477 VEO 77	
797 CTO 00	433 AE& 33 474 VEO 48	
301 810 80 388 "CRYSTOL	435 PROMPT	
"	436 GTO 45	
789 CTO 37	437+1 BL D	
390+1 BI 18	438 XF0 48	
391 ES2 13	439 GTO 77	GIVE SCORE
392 RTN	440+LBL 48	
393 "STAIRS"	441 "SCORE =	
394 XEQ 33 STAIRS		SCORE = ()
395 "UP OR D	442 ARCL 72	
OWN ?"	443 XEQ 32	
396 PROMPT	444 RTN	
397 GTO 18	445+LBL 21	
398+LBL F	446 "DARK CA	
399 RCL 73 <sup>UP</sup>	VE"	
400 67	447 FS? 13	DARK CAVE
401 XEQ 99	448 GTO 33	
402 X <y?< td=""><td>449 XEQ 33</td><td></td></y?<>	449 XEQ 33	
403 GTO F	450 CLA	
404 GTO 84	451 XEW 31	
405+LBL G DOWN	452 FSE	
406 RCL 73	403 "USE LHM	
	454 500 01	
408 XEW 77 400 V1V2	404 FO( 01 455 VEO 77	
	455 AE& 55 456 ES2 01	
	457 GTO 00	
	458 "00PS NO	NO LAMP
A17 ES2 17	LAMP"	
414 RTN	459 XEQ 33	
415 "FORK" FORK	460+LBL 22	
416 XEQ 33	461 "FEEL DR	
417 67	AFT"	
418 XEQ 99	462 FS? 13	FEEL DRAFT
419 STO 69	463 GTO 33	
420 67	464 XEQ 31	
421 XEQ 99 FIND & STORE	465 "YYEEEII	
422 STO 70 THE CAVES FOR	II"	DITC
423 "LT/RT" FORK	466 "F THE P	P112
424 ASTO 68	ITS"	
425 GTO 77	467 GTO 45	

468+1 BL 23		514 "FKEY "	
469 "HEOR SP		515 EC2 01	
LOCU"		516 VULOMD "	
LH3N 470 F00 47		JIB FLAMF	EQUIPMENT
470 FS? 13		517 FC? 02	LIST
471 GTO 33	WATER	518 "HWATER	
472 XEQ 31			
473 "ALL WAS		519 FC2 03	
HED UP"		520 "HKNIEF	
474 CTO 45			
474 GIU 43			
475+LBL 24		521 FC? 04	
476 "SMELL D		522 "HGLOVES	
RAGON"			
477 FS? 13		523 FC? 09	
478 GTO 33		524 "ENOTHIN	
479 VEN 71	DRAGONS	C	
400 500 07			
400 F3: 0/		323 XEQ 33	
481 GIU 03		526 GTU 00	
482+LBL 42		527+LBL 43	ΒΔΤς ΤΟΟΚ
483 "CHOMP"		528 "BATS TO	BATS TOOR
484+LBL 45	CHOMP	l ok "	
485 XE0 33		529 PTN	
406 TONE 1		570+101 26	
407 TONE 9	END GAME TONES	530¥LBL 20	
487 IUNE 0		531 "HEHR VU	
488 GIU "CHV		ICE"	
ES"		532 FS? 13	
489 <b>+</b> LBL 44		533 GTO 33	WIZARDS
490 FS? 03		534 XEQ 33	
491 "USE "		535 TONE 4	
492 FC2 03		574 TONE 5	WIZ. TONES
407 VEN 47	KNIEF ROUTINE	530 TONE 5	
473 AE& 43 404		D37 TUNE 6	
494 "FKNIFE"		538 "WIZHRD"	
495 XEQ 33		539 XEQ 33	
496 RTN		540 SF 13	
497+LBL 25		541 RCL 73	SET BOUNDS
498 "HEAR SQ		542 3	OF WIZARD
UEEKS"		543 -	
499 XEO 33		544 1	
500 ECO 17	RATS		
J00 F3: 13 E01 DTN	BITTS		
301 KIN 500 Tous o		546 X<>Y	
502 IUNE 9		547 STO 75	
503 TONE 9		548 6	
504 4		549 +	
505 XEQ 99		550 67	
506 CF IND X		551 X>Y2	
507 SE 09		552 X()Y	
508 "SNOTCH"		557 1000	
500 JAATON 500 VEO 77			
JU7 AE& 33 E1041 D' E		334 /	
DIDAFTRE F	RAIS LOOK ()	555 ST+ 75	
511 XEQ 43		556+LBL 96	TEST CAVE
512+LBL 47		557 "CAVE "	CONTENT
513 FC? 00		558 ARCL 75	

559	RCL	IND	
75			
560	0		
561	XEQ	95	
562	18		
563	XEQ	95	
564	19		
565	XEQ	95	
566	XEQ	33	
567	X≠03	2	
568	XEQ	IND	
X			
569	ISG	75	
570	GTO	96	
571	CF 1	3	
572	GTO	<u>90</u>	
5734	•LBL	95	η ιατα
574	X<>Y	ć.	FMPTY
575	X=Y?	2	
576 "	"⊢ E	EMPTY	
577	RTN		
578	. ENI	).	END

#### **PROGRAM DESCRIPTION**

#### 5 X 5 CHESS

#### by Valentin Albillo

This program challenges the user to play chess against the HP-41. The game is played on a  $5 \times 5$  board instead of the standard  $8 \times 8$  board, however, all standard chess rules are implemented, including pawn promotion.

The program is printer compatible. If the printer is present, it will print the board, making extensive use of the graphic capabilities of the printer. The player has the option of having the board printed after every move or just after the calculator's move (the latter saves time and space).

An  $8 \times 8$  version of the game was originally considered, however, it was found that:

a) the 8 x 8 board could not be represented clearly if the player has an HP-82143A printer.

b) an 8 x 8 game occupied the full memory of an HP-41, so, unless the user has an HP-41CV or a quad module, neither a printer nor a card reader can be plugged in, making it very difficult to load and run the game.

c) an 8 x 8 game, using the same playing logic as the 5 x 5 version, took several hours per move and played a very weak game.

On the other hand the  $5 \times 5$  version provides the following advantages:

a) the board is printed using BLDSPEC special characters, so the player can clearly see the positions of the pieces without using an actual board. All handling of the board is automatic.

b) though the board is  $5 \times 5$ , the standard chess pieces are used and are arranged in the same order: king, queen, bishop, knight, rook, and a row of pawns. All pieces have the same powers and restrictions as in standard chess.

c) this 5 x 5 version fits in 3 memory modules, leaving a port free to plug in a card reader and a printer if desired. Also, due to the reduction in size, the game progresses faster than in the 8 x 8 version, taking an average of 20 moves per game (vs. 40 in the 8 x 8 case). Both armies get into battle early, and the game is more active.

d) as the number of alterations for a given position is less than in the 8 x 8 version, the calculator's level of play is much better. The HP-41 plays a good, non-trivial game and will checkmate the player if he/she does not play well enough!! All standard chess rules are implemented, with the following three exceptions:

a) as the king is already in the corner, no castling is necessary.

b) as there is only one empty row between the pawns, a pawn may advance just one position on its first move.

c) no capture "en passant" is allowed.

The above exceptions are due mostly to the size of the board. All other rules are the same. Pawn promotion is allowed: if a pawn reaches the opposite side, it becomes any desired piece (except a king or a pawn). In the case of pawn promotion, the calculator always selects a queen.

If one of the calculator's moves results in a check being given to the opposing king, then the display shows CHECK after the move. There are two exceptions to this rule:

a) if a pawn, promoted to a queen by the calculator, results in a check to the opposing king, this is not indicated.

b) if the calculator moves a piece that, while not giving check by itself, leaves the opposing king under attack from another piece, the check is not indicated.

#### PROGRAM CHARACTERISTICS

This program is actually composed of 2 separate programs: MCHESS and P (for print board). The main program, MCHESS is independent of P and if the printer is not to be used then only MCHESS needs to be loaded. However, if a printer exists in the user's system, the P routine should be loaded. The print board routine is separate from the main program so that a user without a printer need not waste memory space. The user can also create his/ her own subroutine without having to change the main program.

A separate data card is used that contains all BLDSPEC characters used by the P routine to print the pieces, as well as other useful constants. This card must be loaded at the beginning of every game. The following is a list of the contents of the card:

R18 = 1	R26 = -7	R34 = 20.023	R42 = black pawn
R19 = -1	R27 = -11	R35 = 16.023	R43 = dotted square
R20 = -10	R28 = 19	R36 = 16.023	R44 = white pawn
R21 = -8	R29 = 17	R37 = black king	R45 = id. rook
R22 = 10	R30 = 7	R38 = id. queen	R46 = id. knight
R23 = 8	R31 = 11	R39 = id. bishop	R47 = id. bishop
R24 = -19	R32 = 16.019	R4O = id. knight	R48 = id. queen
R25 = -17	R33 = 24.031	R41 = id. rook	R49 = id. king

Registers 18 through 36 contain numeric constants while registers 37 through 49 contain the alpha BLDSPEC characters used to represent the pieces. If a user without a printer were to create this card, he/she would have to load (any) alpha characters into registers 37-49 as the program requires these registers to be loaded with alpha data to run properly (whether it prints or not).

The BLDSPEC characters used to represent the characters in this game are:

```
R37=black king = 0,96,122,127,122,96,0
                                           R49=white one = 112,95,69,64,69,95,112
R38= id. queen = 0,96,114,127,114,96,0
                                           R48=
                                                    id.
                                                         = 112,95,77,64,77,95,112
R39= id. bishop = 0,100,110,123,110,100,0
                                                    id.
                                                         = 110,91,81,68,81,91,110
                                           R47=
R40= id. knight = 0,108,102,119,126,108,0
                                           R46=
                                                    id. = 110,83,89,72,65,83,126
                                           R45=
                                                    id.
                                                         = 103,89,67,65,67,89,103
               = 0,102,124,126,124,102,0
R41= id. rook
                                                         = 96,95,89,65,89,95,96
               = 0,96,102,126,102,96,0
                                          R44=
                                                    id.
R42= id. pawn
                 R43 = 85,0,65,0,65,0,85
```

The calculator's average "thinking" time is 5 minutes per move. This is an average for a non printer game; if a printer is used execution time will be slowed by approximately 52%. Actual time varies substantially with position, from a minimum of 15 seconds to a maximum of about 15 minutes. However, an entire game should last no more than 1-1/2

GENERAL NOTES

Size MUST be set to exactly 97.

hours (without a printer).

The initial positions of the pieces are as follows:

black (HP-41) : king queen bishop knight rook pawn pawn pawn pawn pawn pawn

white (you) : pawn pawn pawn pawn pawn king queen bishop knight rook

The calculator will never make an illegal move, but the player's moves are not tested for legality (the player is assumed to play honestly). If the player's king is under check, and the player moves another piece, the HP-41 will actually take your king on its next move!

There are two versions of the print routine "P" because of the different buffer capacities of HP-82143A (old) and HP-82162A (new) printers. If the board is to be printed correctly, the user must be careful to load the appropriate routine.

Do not turn the calculator off while it is making its move as you may generate errors due to the change in status of some flags at power-on. You may, however, turn the calculator off when it is halted and resume the game later.

The playing time can be shortened by simplifying positions, changing pieces, avoiding open spaces, etc. The execution time depends quadratically on the number of options the calculator has and linearly on the number of the player's responses to each option.

STATUS		
SIZE:	097	
FIX:	0	
USER MODE:	OFF	P(82143A) 80 BYTES
TOTAL PROGRAM BYTES:	972	P(82162A) 82 BILES



DATA REGISTERS Cont.

<ul> <li>44 White Pawn</li> <li>45 Id. Rook</li> <li>46 Id. Knight</li> <li>47 Id. Bishop</li> <li>48 Id. Queen</li> <li>49 Id. King</li> </ul>	BLDSPEC special characters
37-96 <b>}</b> board (i	ncludes edges)
NOTE: Board and BLD	SPEC chars. overlap without trouble

FLAGS USED		
00	Set:	Board always print
	Clear:	Prints after HP's
01	Set:	White King or Knight tested
	Clear:	Queen, Rook or Bishop tested
02	Set:	Id. Pawn moves
	Clear:	W. Pawn not moving
03	Set:	Id. King moves
	Clear:	W. King not moving
04	Set:	Id. Pawn promotes
	Clear:	W. Pawn not promoting
05	Set:	B. King or Knight tested
	Clear:	B. Queen, Rook or Bishop tested
06	Set:	B. Pawn moves
	Clear:	B. Pawn not moving
07	Set:	B. King moves
	Clear:	B. King not moving
08	Set:	B. Pawn promotes
	Clear:	B. Pawn not promoting
09	Set:	B. Queen, Rook or Bishop can follow
4.0	Clear:	lhey can't
10	Set:	W. Queen, Rook or Bishop can follow
	Clear:	lhey can't
11	Set:	Auto Start
10	clear:	NO AUTO Start
12	Set:	Double wide Print
25	clear:	Normal Width
25	Set:	Non-eage location
55	crear:	Drint Roand
22	Cloops	Princ Duard Do not print board
10	ciear.	Move is off boord
10	Cloan	Movo is valid
10	Sot .	Move is vallu
19	Clean.	Rotton move than last
	crear:	

### SAMPLE PROBLEM

DISPLAY	INPUT	FUNCTION	COMMENTS
	Load P*	[GTO]	
PACKING	Load MCHESS	[GTO]	
PACKING		[XEQ] SIZE 097	
		[XEQ] MCHESS	
CARD	Load data card (2	2 tracks)	
If a printer exis	sts in the system t	then the board will n	now be printed
HP 1st?	Ν	[R/S]	
PRINT YOUR MOVE?**	Y	[R/S]	
FROM?	41	[R/S]	
T0?	31	[R/S]	
I MOVE FROM 22 to 31			
PRINT YOUR MOVE?**	γ*	[R/S]	
FROM?	43	[R/S]	
TO?	33	[R/S]	
I MOVE FROM 31 to 42 CHECK		[R/S]	
PRINT YOUR MOVE?**	γ*	[R/S]	
FROM?	51	[R/S]	
TO?	41	[R/S]	
I MOVE FROM 42 to 53 (Note:	pawn promoted to q	jueen)	
PRINT YOUR MOVE?**	γ*	[R/S]	
FROM:	33	[R/S]	
TO?	24	[R/S]	
I MOVE FROM 53 to 52 CHECK			
PRINT YOUR MOVE?**		[R/S]	
FROM	-1	[R/S]	
CHECKMATE I WON			

\*Necessary only if a printer exists in the system. Remember, there are two versions of "P"--be careful to load the appropriate one. \*\*This prompt appears only if a printer is in the system.

	,	Initial t configura	board ation	12345 1 <b>1123</b> 2 <b>11111</b> 3 4 <u>88888</u> 5 <u>8889</u>		
	The	player <b>'</b> s	move		The calcu	lator's move
From 41 to	31		12345 1 <b>±±±±±</b> 2 <b>⊥⊥⊥⊥⊥</b> 38000000 4008888 588892			I MOVE FROM 22 TO 31 1 2 3 4 5 1 1 2 2 4 5 1 1 2 2 4 5 2 1 1 1 1 1 3 1 1 1 1 1 4 1 9 9 9 9 1 5 4 8 9 9 1
From 43 to	33		12345 1 <b>1122</b> 210111 310800 408888 588920			I MOVE FROM 31 TO 42, CHECK 1 2 3 4 5 1 1 2 2 4 5 2 1 1 1 2 2 2 2 2 1 1 1 1 1 3 1 2 2 2 2 4 1 1 1 2 2 2 5 2 2 2 2 2 5 2 2 2 2 2 5 2 2 2 2
From 51 to	41		12345 111122 2100111 300000 481000 508020			I NOVE FROM 42 TO 53 1 2 3 4 5 1 1 2 3 4 5 2 1 1 1 2 2 2 2 1 1 1 1 1 3 1 1 2 2 2 3 1 1 2 2 2 4 4 1 1 1 2 4 5 1 4 1 2 2
From 33 to	24		12345 1 <b>1122</b> 210181 300000 480088 508192			I MOVE FROM 53 TO 52, CHECK 1 2 3 4 5 1 1 2 2 4 5 2 1 1 2 2 4 2 1 1 2 2 4 3 1 1 2 2 4 3 1 1 2 2 4 5 1 1 2 2 2

				SIZE: 097
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
1	If you want to print the board, load the			
	appropriate version of the "P" routine.		[GTO]	PACKING
	(Printer in MAN mode) Load the MCHESS		[GTO]	PACKING
	program.			
2	Start the program		[XEQ] "MCHESS"	
	If size not properly set, will see			SET SIZE 097
	"Set Size 097"		[XEQ] "SIZE 097"	
			[R/S]	CARD
	When size is properly set (97) will see			CARD
3	Load the data card (2 tracks)			
3a	(If desired, unplug the card reader and			
	plug in the printer here)			HP 1st?
4	If the calculator is to move 1st		[R/S]	I MOVE
	If you want the 1st move	N	[R/S]	*PRINT YOUR
	(Note: The challenger is <u>always</u> white)			MOVE? or FROM
IF Y	DU_MOVE_FIRST			
5a	If a printer is in the system, will see:			PRINT YOUR
				MOVE?
	If you want to print after every move	Y	[R/S]	FROM?
	If you want to print only after the			
	calculator moves		[R/S]	FROM?
6a	Enter the xy (row,column) coordinate for			
	the piece you wish to move	ХҮ	[R/S]	T0?
7	Enter the xy coordinate for where you	ХҮ	[R/S]	I MOVE FROM
	want the piece moved			T0 or
				PIECE?

				SIZE: 097
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
8	If PIECE? appears, you just promoted a			
	pawn & must enter the code for the selected			
	piece. Codes are:			
	queen: 5.09 bishop: 4.03			I MOVE FROM
	knight:3.03 rook: 2.05	Code	[R/S]	T0
9	If you cannot make a legal move, but are			
	not under check - a stalemate	0	[R/S]	STALEMATE
10	If your king is under check, and you can't			CHECKMATE
	save it – checkmate	-1	[R/S]	I WON
IFT	HE CALCULATOR MOVES FIRST			
	"I MOVE" shows in the display.			I MOVE
5b	After the move is completed, will see			FROM TO
	(CHECK is displayed if your king is now			(CHECK)
	under check)			PRINT YOUR
				MOVE?* or
				FROM?
6b	Refer to 5a - 10 for your move.			
11	If you checkmate the calculator		СН	ECKMATE I WON
12	If the calculator cannot make a legal			STALEMATE
	move, but is not under check			
13	If the HP-41's king is not under check,			
	has no legal moves, but has some illegal			
	moves, the display will show			CHECKMATE
				YOU WON
	However, this is actually a stalemate, so			
	please, notice this and concede the tie.			
	Thank you.			

\* This display appears only if there is a printer in the system.

01+LBL "MCH	Initialize	50 RCL IND	empty registers
ESS"		L	
02 CLRG		51 X=02	
07 ETV 0		52 OCTO TND	
00 / IA 0 04 CE 00		JZ HOTO IND	
04 LF 29		L	Next position
05 "SET SIZ		53 ISG L	
E 97"		54 GTO 01	Clear row between
06 SF 25		55 SPEC 74	
			pawiis
07 RUL 96	Size <97?	36 ULA	
08 FC?C 25	Prompt to	57 ASTO 79	If printer-print
09 PROMPT	Sot cize $0^7$	58 FS? 55	board
10 SF 25	Jet S12e 9/	59 XEQ "P"	(Sonamato prog.)
11 RCL 97		20 "N"	(Separate prog.)
11 KOL 27	Size >97		
12 FB/C 20	Prompt to	61 HSTU Y	Who's first?
13 PROMPT	Sot sizo 97	62 "HP 1ST?	
14 18.049	Jet 312e 37		
15 RDTAX		63 AON	
16 9	Load constants &	CA DDOMDT	
10 / 17 CTO 1/	special char.	64 EKONET	If calc. to move
17 510 16	Dir for Pook	65 HSIU X	first
18 ST- 17		66 AOFF	
19 6.5	move not stored	67 X≠Y?	CTO 00
20 STO 92	on data cards	68 GTO 00	
21 CT_ 52	Store Kings (Ki)		Your move
	3 ( )	67¥LDL 77	
22 3.07	Stopp Queens (0)	70 CF 00	
23 STO 93	store queens (Q)	71 FS? 55	
24 ST- 57		72 XEQ 16	
25 4.03	Store Bishops (B)	73 "EROM2"	
26 CTO 04	,		
20 310 74		74 FRUMFI	
27 81- 58	Stopp Bawns (B)	75 "1"	Chackmato?
28 1.01	Store rawiis (r)	76 X<0?	CHECKIIIa CE :
29 STO 83		77 GTO 04	
30 STO 84		78 X=02	Stalemate?
71 CTO 05		70 ATO AE	
31 310 83		79 GIU 00	Board pos to
32 810 86		80 XEQ 06	Dog numbon
33 STO 87		81 STO 00	Reg. number
34 ST- 65		82 "TO?"	Reg. no. of piece
35 ST- 66		83 PROMPT	
74 CT_ 47			Board pos. to
30 31 - 61		34 AEQ 06	rog #
37 31- 68		85 STO 01	$P_{\text{eff}}$
38 ST- 69		86 CLX	Reg. # of dest.
39 INT		87 X<> IND	Move piece
40 -	Store Knights(Kn)	ро	
41 STO 95	<b>č</b> , , ,	00 CTO TUD	
TI 010 70 40 CT EO		UMI UIC 00	
42 31- 39	Stopp Dealer (D)	61	
43 2.05	SLORE KOOKS (K)	89 XEQ 07	Queening move?
44 STO 96		90 FC? 55	No printer?
45 ST- 60		91 GTO 00	
46 "0"	Store boundaries	97 ECT AA	Print ontion?
70 A 47 EC 004		72 F3( 88 97 NF3 858	
47 30.071		93 XEW "P"	
48 SÍGN	50.091 in LASIX	94 <b>+</b> LBL 00	Calc. move
49+LBL 01	<u>Store "A" in all</u>	95 "I MOVE"	

96 AVIEW		143 XEQ "P"	print board
97 01		144 EC2 55	If printer stop
		145 CTOD	II princer, scop
98 810 09	Init. "good move"		
99 96.055	value	146 610 99	
100 STO 02	Board index	147+LBL 07	Oueening move?
101 CHS		148 60	Pow 1
101 CHO 100 CTO 00		149 PCI 01	Now I Destination
102 310 00	Initial best move	147 KOL 01 460 UNUO	Destination
103+LBL 11	value	150 X2Y?	Piece not in
104 RCL IND	Scan for move	151 RTN	last row?
<u>я</u> 2	Bocall position	152 2	Rook value
105 SICN	Recall position	153 RCL IND	Cot piece value
100 010M		Q1	Get prece value
106 X=0?	Off board?		
107 GTU 00	Skip eval. pos.	154 8217	Not a pawn?
108 LASTX	Black niece? (b)	155 RTN	Piece to replace
109 X<02	Final h marine	156 "PIECE?"	
110 VEO 12	Eval. D moves	157 PROMPT	pawii
		150 CTO THID	
111 <b>+</b> LBL ИИ			Store new piece
112 DSE 02	Next nosition	01	Pawn promotion?
113 GTO 11	Next position	159 RTN	
114 RCL 09		160+LBL 08	
115 DT	Best move value	161 DBS	
113 P1	No good move?	161 800	Rook
116 X=Y?	Stalemate	162 2	Not pawn move?
117 GTO 05	Starteniate	163 XKY?	
118 "YOU"		164 RTN	David 1
119 -25		165 92	ROW I
112 20 100 DCL 00	Best move	166 PC1 17	Destination
120 RCL 00	Your checkmate?	100 KCL 13	Not in last row
121 X <y?< th=""><th>Chackmate</th><th>167 8477</th><th></th></y?<>	Chackmate	167 8477	
122 GTO 04	Checkilla Le	168 RTN	Outcom
123 CLX		169 -5.09	Queen
124 X/> IND	Final move	170 STO IND	Store piece
10 10 100		17	value
		171 071	
125 SIU IND			Announce
13	-	172+LBL 04	Announce
126 XEQ 08	Pawn promotion?	173 ASTO X	Checkmate
127 "EROM "		174 "CHECKMA	
100 DCL 10	Origin	TF"	
120 KUL 12	Cot board loc	175 00150	
129 XEQ 09	get board roc.	ITJ HVIEW	
130 "H TO "		176 BEEP	
131 RCL 13	Destination	177 CLA	
172 XEO 09	Get board loc.	178 ARCL X	
177 PCL 00	Move value	179 "H WON"	
133 KUL 00		100 DDOMDT	
134 FRC	10		Announco
135 RCL 22	10	181+LBL 05	Announce Ctala aska
136 *		182 "STALEMA	Stalemate
137 FRC		TE"	
170 8+07	Is move	183 BEEP	
170 MF0:	checking?	184 PROMPT	
139 THA CHEC	checking:	1054101 00	Tuanclata
К"		183 <b>4</b> FRF 02	Transface reg.
140 BEEP		186 INT	address to
141 AVIEW		187 ENTER↑	board position.
142 ES2 55	If printer.	188 ENTER↑	

189 9		237 GTO 00	b piece
190 /		238 CF 09	Init. empty space
191 INT		239 X=0?	Empty space?
192 +		240 SF 09	1 3 1
193 51		241 XEQ 12	Get move value
194 -		242 FS? 05	Kn or Ki move?
195 ARCL X		243 GTO 00	
196 RTN		244 FS? 09	Empty space?
197 <b>+</b> L8L 06	Translate board	245 GTO 15	Linply space:
198 ENTERT	position to	246+LBL 00	
199 ENTERT	registor	247 ISG 04	Novt move
200 1	addross	248 GTO 14	Mext move
201 -	address	249 RTN	
202 5		250+LBL 36	King move
203 /		251 SE 07	Knight move
204 INT		252+1 BL 33	
205 2		257 SE 05	
206 /		254+1 BI 32	Rook move (b)
200 / -		254+EDE 52	Bishop move (b)
201		255+EDE 54	Queen move (b)
200 40		250VEDE 55	
202 T 310 DTN		207 KIN 2504! DI 17	Pawn move (b)
210 KIN 2114 DI 10		200+LDL 10 250 CE 82	Pawn move flag
211 <del>*</del> L8L 12	Test b move	2J7 OF 00 0/0 DC1 00	Current p pos.
212 310 03	Store piece to	260 RUL 02	Offset forw. move
213 HBB 214 CE 85	test	261 9 979 VEO 80	Poss. move
214 LF 00	Init, piece type	262 XEQ 09	forward?
213 LF 06	indicators	263 F57 18	Off board?
216 CF 07		264 1	Unoccupied dest?
217 2	B nawn?	263 X=0/	Evaluate move
218 X>Y?	Evaluate moves	266 XEW 12	Current move or
219 GIU 13		267 RCL 02	Forw night diag
220 X<>Y	Con index for	268 RCL 22	Poss move might?
221 30	stope 210 g 210	269 XEU 09	FUSS. MOVE FIGHT
222 +		270 FS? 18	UT DUARU?
223 XEQ IND	32-30,(245-251)	271 CLX	$   _{1}$
×	22.26	272 X>0?	white piece? (w)
224 RCL IND	32-35, move	273 XEQ 12	Evaluate move
X	dir. pointer	274 RCL 02	Pawn position
225 STO 04	Store pointer	275 8	Forw left diag.
226 <b>+</b> LBL 14		276 XEQ 09	Poss. move left
227 RCL 02	Board index	277 FS? 18	Off board?
228 STO 05	Copy board index	278 RTN	
229 <b>+</b> LBL 15	-	279 X<=0?	B piece?
230 RCL IND	First possible	280 RTN	
04	move offset	281 <b>+</b> LBL 12	Evaluate b move
231 ST+ 05	Add to current	282 CF 08	Init. pawn prom
232 RCL 05	pos. dest.	283 STO 07	flag
233 XEQ 08	Move off board?	284 FRC	Dest. contents
234 FS? 18		285 1 E2	
235 GTO 00	Next poss. move	286 *	Value of contents
<u>236 X(0</u> ?	<u>If dest. contains</u>	287 STO 06	Value of move
288 RCL Z	Dost position	335 STO IND	Back in dest.
--------------	-------------------	----------------	-------------------
200 CTN 00	Dest. position		
207 310 00		<u> </u>	
290.4	B king move	336 RIN	
291 ES2 07		337+LBL 12	B Pawn move
000 CT 0/	Decrease move	770 5	B I ami move
292 31- 06	value	330 .3	
293 FS? 06	B nawn move?	339 ST+ 06	Increase move
294 XEQ 12		340 92	valuo
005 500 07	Not king move?	741 DCL GO	
290 FU? 07	Evaluate move	341 KUL 00	Dest. Position
296 XEQ 13		342 X(Y?	Not aueenina?
297 RCI 00		343 RTN	1
	Best move value	744 05 00	<b>.</b> .
270 KUL 00	Current move	344 36 80	Queening
299 X<=Y?	value	345 9	
300 RTN	varue	346 ST+ 06	Inchasco movo
701 001 07	Worse?	747 DTM	Increase move
301 KUL 03	Test niece	341 KIN	value
302 FS? 08	Depending Dawn?	348♦LBL 13	
303 -5.09	Fromoting Fawn:	349 FS? 06	P Davin mayo?
704 CTO IND	Promote to Queen	750 CTO 17	D Pawii illove:
304 310 140	Move niece to		Pawn 2nd move
08	Hove prece to	351 RCL 03	Current niece
305 CLX	dest.	352 30	ourrent prece
706 CTO IND	Clear move orig.	757 -	
300 310 100	C C		
02	W side board	354 RUL IND	32-36. move dir.
307 56.096	W STUC DOULD	X	nointon
308 STO 11	Index	355 STO 01	pornicer
700 CTO 00	Init. better	754AL DI 07	
307 310 07	move flag		Dest. position
310 CF 19	h move test	357 KUL 08	•
311+LBL 21		358 STO 10	
312 RCL IND	Piece to test	359+LBL 10	
44		740 PCL TND	Offset to dest.
		SOU KUL IND	
313 SIGN		01	
314 X=0?	UTT DOard?	361 ST+ 10	D
315 CTO 00		362 RCL 10	Dest. position
	Piece to move	7/7 VEO 00	Off board?
316 LHSIA	P on no piece?	363 AEQ 00	
317 X<=0?	B-or no prece:	364 FS? 18	Naut maria
318 GTO 00	Next piece	365 GTO 00	Next move
719 VEN 07	Eval. white move	366 XEQ 12	Evaluate move
317 AL& 01	Worst move then		Move of equal
320 FS? 19		367 6-13	value to last
321 GTO 04	IdSt:	368 RIN	
322+LBL 00		369 FS? 05	KI OR KN MOVE
727 ISC 11	Next pos. to test	370 СТО 00	Next move
			Place value
324 GIU 21		371 LHOIA	
325 RCL 09	Index	372 X=0?	Empty:
326 STO 00	Best move value	373 GTO 10	
727 PCL 02	B board position	774 AL RI 00	
327 NUL 82	b bourd posicion		Novt din nointan
328 510 12		375 186 01	next une pointer
329 RCL 08	Move destination	376 GTO 03	
330 STO 13		377 RTN	
771 +1 01 04		770 AL DI 17	Destination
331VLDL 04	- ·		
332 RCL 03	B piece	379 RUL 08	UTTSET TORW, left
333 STO IND	Back in origin	380 RCL 22	diagonal test
Q2		381 XED 00	-
	Dest niece	702 PCL 00	Destination
1 334 RUL 87		1 _ JOL NUL 80	

383 8	Offset forw,	431 GTO 29	
384 <b>+</b> LBL 00	right diagonal	432 <b>+</b> LBL 00	Next move
385 XEQ 09	Add offset & test	433 ISG 14	Increment Offset
386 FS? 18	dest.	434 GTO 28	pointer
387 RTN	Off board?	435 RTN	
388+LBL 12	orr sourd.	436+LBL 36	W King move
389 INT	Piece	437 SF 03	5
390 6	King	438+LBL 33	W Knight move
391 X≠Y?	Is dest piece	439 SF 01	
392 RTN	is dest. prece	440+LBL 32	W Rook move
393 .41		441+LBL 34	W Rishon move
394 ST+ 06	Increment move	442 <b>•</b> LBL 35	W Oueen move
395 RDN	value piece	447 RTN	W Queen nove
396 RTN		444 A 1 PI 12	W Fawii illove
397+LBL 07	W move evaluation	445 CE 02	W Pawn move ridy
398 CF 01	Init. piece flags	443 31 62 446 PCL 11	Pawn position
399 CE 02		440 KCL 11 447 PCL 17	Forward offset
400 CE 03		447 KUL 17 440 VEO 00	Add offset & test
400 0, 00	Rook	440 AEQ 07	Off board?
402 2122	Is piece a Pawn?	447 F3/ 18 450 1	
407 CTO 12		400 I 454 V-00	Unoccupied dest?
403 610 12		451 X=0?	Evaluate move
404 ////	Gen. index for	452 XEW 13	Worse than last
403 30	steps 402 & 403	453 857 19	move? yes
405 + 407 VEO IND	32-36 (431-437)	454 RIN	Current move orig
407 XEQ IND	Set piece flags	455 RCL 11	Forw, left diag.
	32-36 move	456 RCL 20	offset
408 RUL IND	offset pointer	457 XEQ 00	Test move
X	Store offset	458 FS? 19	Worse move?
409 510 14	pointon	459 RTN	Current move orig
410+LBL 28	Current move	460 RCL 11	Forw right offset
411 RUL 11		461 RCL 21	i of w, i right of right
412 510 15	origin	462 <b>+</b> LBL 00	Add offset & test
413+LBL 29		463 XEQ 09	Off board?
414 RCL IND	First poss. move	464 FS? 18	
14	offset	465 RTN	yes Occupied by which
415 ST+ 15	Actual dest.	466 X≠0?	piccor?
416 RCL 15		467 X>0?	precest
417 XEQ 08	Move off board?	468 RTN	
418 FS? 18		469 <b>+</b> LBL 13	Evaluate w move
419 GTO 00	Next poss. move	470 FRC	
420 X>0?	W piece there?	471 ABS	
421 GTO 00	Next possibility	472 1 E2	
422 CF 10	Init. empty	473 *	Value of dest.
423 X=0?	space flag	474 FS? 03	contents
424 SF 10	Empty space? Yes	475 .4	W King move?
425 XEQ 13	Move value?	476 FS? 03	Decreased value
426 FS? 19	Worse than last?	477 -	W King move
427 RTN	Yes	478 FS? 02	Decreased value
428 FS? 01	W Ki or Kn?	479 XEQ 13	W Pawn move?
429 GTO 00	Next possibility	480 RCL 06	Eval. Pawn move
430 FS? 10	Blank space?	481 X<>Y	B move value

482 -		Diff between b	500	V-02	alpha then
407 PCI	aa		527	A-0:	Off board
403 NUL 404 UZ1	_ 00	a w move varue	530	SF 18	
484 X(.	2 î 	Best b move value	531	LASTX	Recall contents
485 X<=	=Y?	Worse move?	532	.END.	of destination
486 SF	19	Yes			
487 X<=	=Y?	Worse move?			
488 RTM	4	Vos			
489 RCI	89	Potton movo got			
100 NOL 100 V/1		berrer move - ger			
470 AN.	20	white's best			
491 843	í <i>:</i>	Better move?			
492 STO	J 09	New w best move			
493 RTM	4	value			
494+LBI	_ 13	Eval w Pawn move			
495.5		Increased move			
496 +					
497 PCI	7	value			
400 70	- <u>-</u>	Destination			
470 00		Row 5			
499 X()	> Y 	Init. w Pawn			
500 CF	64	promotion flag			
501 X<=	=Y?	Move to row 5?			
502 SF	04	Prom move value			
503 RCL	_ Z	Prom. move varue			
504 9		Increased value			
505 EC1	2 Q4	Due to promo.			
500 FC:	: 07 /	Promotion?			
J06 (L/	<u>э</u>	No promotion			
507 +		Add to move value			
508 RTM	4				
509+LBL	_ 16				
510 "Y'					
511 AST	ΓΟ Υ				
512 "PF	RINT Y	Print every move?			
0118 "					
517 "L	MOUES				
JIJ F	HOVE?				
514 HUM	4				
515 PR(	DMPT				
516 AST	ro x				
517 AOF	FF				
518 X=\	<u>/</u> ?				
519 SF	GO	If Yes SFOO			
500 DTK	J .				
	1 00				
J217LBL 500 ·	_ 07	Add offset			
522 +	~~	Mayo off board?			
523+LBL	- 68	move off board?			
524 CF	18	Init. valid move			
525 SF	25	† lag			
526 RCL	_ IND	Init. error			
X		ignore flag			
527 SIC	GN	Recall contents			
528 FS3	20 25	of dest nos if			
		nonevistent or			

HP-82143 Version		HP-82162A Version	
01*LBL "P" 02 SF 21 03 ADV 04 SF 12 05 9 06 SKPCOL 07 49.053 08 STO 13 09*LBL 00 10 ACCHR 11 2 12 SKPCOL 13 X<>Y 14 ISG X 15 GTO 00 16 PRBUF 17 56.06 18 STO 15 19*LBL 01 20 RCL 13 21 ACCHR 22*LBL 02 23 2 24 SKPCOL 25 RCL IND 15 26 INT 27 43 28 + 29 RCL IND 15 30 ACSPEC 31 ISG 15 32 GTO 02 33 4.009 34 ST+ 15 35 ISG 13 36 GTO 01 37 ADV 38 ADV 39 ADV 40 CF 12 41 .END.	Print board routine Set double width mode Skip 9 columns Characters "1" & "5" "1" - "5" Next numeral (8) Index to row 1 First row of column headers Numeral index Row header Skip 2 columns Get piece from board Generate index to special characters Get special char. Accumulate spec. char. in print buffer Next board pos. Next row Increment row index	01+LBL "P" 02 SF 21 03 ADV 04 SF 12 05 9 06 SKPCOL 07 49.053 08 STO 13 09+LBL 00 10 ACCHR 11 2 12 SKPCOL 13 X<>Y 14 ISG X 15 GTO 00 16 56.06 17 STO 15 18+LBL 01 19 PRBUF 20 RCL 13 21 ACCHR 22+LBL 02 23 2 24 SKPCOL 25 RCL IND 15 26 INT 27 43 28 + 29 RCL IND X 30 ACSPEC 31 ISG 15 32 GTO 02 33 4.009 34 ST+ 15 35 ISG 13 36 GTO 01 37 PRBUF 38 ADV 39 ADV 40 ADV 41 CF 12 42 END	

#### **PROGRAM DESCRIPTION**

#### PINBALL

#### by Craig A. Pearce

Welcome to the "Wizard of Pinball" game. This program simulates, as closely as possible, the actual play in a genuine pinball machine. The user interacts with the game through the digit keys 1 and 3 (designated the left and right flippers respectively), and the digit 2, which is the tilt option. Failing to hit the correct flipper will still leave the user the option of "tilting" the machine and placing the ball back in play (maybe!).

The "Wizard of Pinball" allows from 1 to 4 players, with play alternating from player 1 to player 2 and so on back to player 1. Each player will receive a total of 5 balls for each game. The ability to win a free ball is also possible. In this case, the same player stays until the extra ball is lost, after which the play rotates to the next player (unless another free ball is won).

Shooting the ball is accomplished by pressing any numeric key. As in most genuine pinball games, the "Wizard of Pinball" returns the same ball to the same player to be reshot if no score was made and the ball exits immediately. The game allows up to three free game thresholds that award a credit (free game) when passed. Also, the program checks for a score that passes the previous "high - score to date". Another free game is awarded if any or all of the players pass this previously stored "HI-SCR".

THE DEVICES

Listed below are the several different scoring devices used in the program. The "device" name is given first as it is displayed on the HP-41. The full name of the device is given in parentheses after the formatted name, followed by a brief description of the device and of how it scores.

- "\*STAR-50" (Star Rollovers) These are stars, like buttons on the play field. Each time the ball rolls over one of these buttons, the player receives 50 points.
- "\*LANE-300" (Lane Rollovers) Lane rollovers are special paths that the ball travels through and scores an immediate 300 points for the player.
- "THUMP-x00" (Thumper-Bumpers) Sometimes called "Jet or Pop Bumpers". In this game 100 points are scored each time the ball strikes the bumpers. At any given time, the ball can bounce 1 to 10 times, scoring 100 to 1000 points. When this display comes up, the value of "x00" is the amount of points scored; x being the number of bumps the ball made.
- "SPIN-xyO" (Spinner Gate) Spinner gates on pinball machines are the devices that spin on a horizontal axis as the ball passes under

them. In this game, the spinner gate can spin up to 25 times, scoring 10 points for each spin, and showing the actual points made (also a tone is heard for each spin). In addition, for each 5 spins of the gate, the Out Bonus is advanced by 1000 points.

- "KICK-x00" (Kick Out Hole) Kick out holes (or saucers) are those devices that the ball drops into, scores some points and is kicked back out into play. On "Wizard", the points for the kick out hole begins at 2000 and advances by 2000 each time the ball drops in one, until a point value of 10,000 is reached. This value is held for all additional hits of the hole.
- "SLING-10" (Sling Shot Kickers) The sling shot kickers are devices that propel the ball away when struck, and score 10 points.
- "DROP-X" (Drop Targets) Drop targets are scoring devices that fall away when struck, and score some points in the process. They are reset with each new ball, or when they are all down, which is a special case. In this game, there are three drop targets. Hitting the first and the second results in an immediate 10 points and a display of "DROP-1" and "DROP-2". When the third is hit, the player receives 100 points and is awarded another ball; the display will show SHOOT AGAIN. Although the targets are reset and can be knocked down again, only one extra ball can be earned per ball in play. When the current ball is lost, the same player then plays the "extra ball" (it is possible to win another extra ball with the free ball currently in play).
- "\*A-" to "\*F-" (Alpha Targets) These are stationary targets that award the player an immediate 500 points each time they are struck. Also, during the play of any one ball, the calculator remembers the targets hit (in any order) and provides for higher Out Bonus scoring as follows:

Hitting A & B displays "BONUS x 2" and the player will receive twice the Out Bonus when the ball exits.

Getting A,B,C, & D displays "BONUS x 3" with resulting triple Out Bonus score.

If all 6 targets are hit in one turn, the Out Bonus is quintupled.

OUT BONUS All of the above devices whose formatted name begins with a "\*" increase the Out Bonus by 1000 points (unless otherwise stated). When the ball exits the OUT HOLE, the player collects all the Out Bonus points accumulated during that play. The maximum limit on Out Bonus points is 29,000. This value is then multiplied by the "BONUS x" factor, allowing for a maximum of 145,000 points when the ball exits. The display shows the total out bonus points and decrements this count by 1000, adding 1000 points to the player's score each time.

#### FLIPPERS, TILTING, AND OUT

When the ball reaches the left or right flipper the display will show LEFT-1 or RGHT-3 (respectively). At this point the player has approximately one second to press the appropriate key (1 or 3) in order to put the ball back into play. Failure to hit the proper key will result in the ball exiting through the Out Hole.

Whenever the ball enters the Out Hole, the display shows "OUT" for about one second. During this time the player has the option of TILTING the machine in a last attempt to put the ball back in play. Tilting is accomplished by pressing key "2" while OUT is displayed. The chances are 4 out of 5 that the ball will be placed back in play. However, if that one remaining chance comes up, the display will show \*TILT\* and all bonus points are lost! Also, any free ball gained during that turn will be lost! The player's score is displayed and the play moves on.

END OF GAME

When the end of the game is reached, and the last player's score is reviewed, the program will select a random number as the MATCH DIGIT. This number is always between 00 & 90 (multiples of 10) and is compared against the last digits of the player(s) score(s). If any player has a match a free game is awarded. The display will be shown as MATCHxO, this is the number chosen by the calculator. If any player's score has passed the high score to date, the old HISCR- is changed; otherwise, it remains the same. The high score will be displayed as "HISCR-xxx,xxO. If any (or all) player score(s) passed the HISCR, a CREDIT is awarded.

Finally, all the player's scored are reviewed a final time and compared against the 3 free game thresholds. For each player who's score passes each of these thresholds, another free game is credited. Finally, the display shows GAME OVER.

STATUS	
SIZE:	064
FIX:	0,2
USER MODE:	ON
TOTAL PROGRAM BYTES:	1108 (Including utility program)

FLAGS USED		
00	Set:	Hi-score has been beat
	Clear:	No new hi-score
01	Set:	Reset player count to O
	Clear:	Don't reset count
02	Set:	Score has been made
	Clear:	No score yet
03	Set:	Free ball awarded
	Clear:	No free ball
04	Set:	Score spinner gate
	Clear:	Score thumper-bumpers
05	Set:	Target A has been hit
	Clear:	Target A not hit
06	Set:	Target B has been hit
	Clear:	Target B not hit
07	Set:	Target C has been hit
	Clear:	Target C not hit
08	Set:	Target D has been hit
	Clear:	Target D not hit
09	Set:	Target E has been hit
	Clear:	Target E not hit
10	Set:	Target F has been hit
	Clear:	Target F not hit
20	Set:	Bonus has a multiplier
01	Clear:	No multiplier
21	Set:	Printer is enabled
00	Clear:	Printer disabled
22	Set:	Digit key pressed
07	clear:	UIGIT Key not pressed
21	Set:	USEK MODE UN
20	clear:	USEK MODE UFF
28	Set:	Set radix to point
	clear:	Set rauta to comma

When "PINBALL WIZARD" is run, or when "[shift] [a]" is pressed, all flags from FOO to F1O are cleared automatically. All flag operations are handled by the program.

#### DATA REGISTER ALLOCATION -

All data as shown. shown. W closed in used for,	enclosed Numer hen a re quotes in the	d in quo ic data egister , this i program	otes (" ") is st is shown withou number is follo is merely a desc n.	ring (Alpha) data, to be stored It quotes, again to be stored as wed by an alpha-string NOT en- ription of what the register is
Examples:	R00: '	"0UT "	(Indicates	reg. 00 contains the word "OUT").
	R40: 1	1000	(Indicates	reg. 40 contains the NUMBER 1000).
	R35: N	Match Di	igit (Indicates the Match stores not gram opera	the program uses reg. 35 to store Digit when generated. The user hing in this register prior to pro- tion).
R00: "OUT	. 11	R21: '	'SHOOT"	R42: Player 2 score
R01: "*ST	AR-"	R22: '	'AGAIN"	R43: Player 3 score
R02: "*LA	NE-"	R23: '	'МАТСН-"	R44: Player 4 score
RO3: "THU	IMP-"	R24: '	'HISCR-"	R45: No. of players in game
RO4: "SPI	N-"	R25: '	'SCORE-"	R46: Bonus Count
R05: "KIC	K-"	R26: '	'X 2"	R47: Kick Out Hole score
RO6: "SLI	NG-"	R27: '	'X 3"	R48: No. of current player up
R07: "DR0	P-"	R28: '	'CREDIT"	R49: Bonus multiplier
R08: " *A	"	R29: '	'X 5"	R50: Ball count
R09: " *B	- "	R30: '	'PLAYER"	R51: Drop Target count
R10: " *C	-"	R31: '	'*TILT*"	R52: Total cash spent on games
R11: " *D	)- "	R32: r	not used	R53: Total CREDITs count
R12: " *E	-"	R33: r	not used	R54: 200,000 (Free game threshold #1)
R13: " *F	- "	R34: r	not used	R55: 250,000 (Free game threshold #2)
R14: "RGH	T-3"	R35: N	1atch Digit	R56: 290,000 (Free game threshold #3)
R15: "BAL	L "	R36: H	li-score to date	R57: Indirect use register
R16: "LEF	T-1"	R37: 1	10	R58: Player Indirect register
R17: not	used	R38: 5	50	R59: not used
R18: "GAM	E "	R39: 1	100	R60: not used
R19: " 0	VER"	R40: 1	000	R61: not used
R20: "BON	US "	R41: F	Player 1 score	R62: not used
				R63: Random seed

## SAMPLE PROBLEM

Sample problem:	Seed = .251	One player,	2 credits
DISPLAY	INPUT	FUNCTION	COMMENTS
	Load "WIZARD"		
	Set Size 064		
	Load Data		
	Start Program		
	.251	[XEQ] "WIZARD"	
		[XEQ] "C"	We want to ring up two credits,
1 CREDIT		[XEQ] "C"	so must press [XEQ] "C" twice.
2 CREDITS			
		[XEQ] "B"	There is only one player, so
1 CREDIT			[XEQ] B onceuse one creatt.
PLAYERS = 1			
		[XEQ] "A"	Start the game.
PLAYER NO. 1			
BALL 1 (flashes)			
	5		
NO SCORE - SHOOT AGAIN			
PLAYER NO. 1			
BALL 1			
	2		
*A-500			
OUT			Try some "Body English"
	2		
*STAR - 50			
RGHT - 3	3		
THUMP - 100			
*C-500			
DROP – 1			

DISPLAY	INPUT	FUNCTION	COMMENTS
RGHT - 3 SPIN - 210	3		
SPIN - 240			
RGHT - 3	3		
LEFT – 1	1		
DROP – 2			
THUMP - 500			
SLING - 10			
OUT	0		Try to keep it in play one
*I ANE 200	Z		nore crine.
$^{\text{ALANE}}$ = 300			
SPIN - 40			
SLING - 10			
KICK - 2000			
*STAR - 50			
*A-500			
*LANE - 300			
SPIN - 130			
OUT			Let it go this time.
BONUS SCORE -			
18,000			
17,000			
•			
1,000			
PLAYER 1 - SCORE -			Continue game
Z347U DLAVED NO 1			
RALL 2	6		
SPIN - 160	Ū		
•			
etc.			

				SIZE: 064
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
	This program requires 142 program registers	and 064 d	ata registers.	
1	Load the program		[GTO]	PACKING
2	Set Size 064			
3	Load the data registers			
4	INITIALIZE. The seed may be any			
	fractional number*	Seed	[XEQ] WIZARD	CAP-PINBALL
5	Ring up credits (repeat up to 40 times)		[XEQ] "C"	X CREDITS
6	Ring up number of players (repeat as			
	desired for 1-4 players)		[XEQ] "B"	X CREDITS
				PLAYERS = Y
7	Begin the game		[XEQ] "A"	PLAYER NO. 1
				(flashes) BALL 1
8	Shoot the ball	0-9		NO SCORE -
				SHOOT AGAIN
	If this display appears you must shoot the			PLAYER X
	ball again. Otherwise the display will			BALL Y
	show the device(s) hit by the ball & the			
	points scored, or the flipper the ball is			(or OUT).
	near. The order (& number) of "hit"			
	devices is totally random. Please refer			
	to page 37 for device description.			devicesetc
9	While the ball in is play, one of the			
	following displays may be seen. These			
	displays require an action.			
9a	The ball is near the right flipper			RGHT-3
	push 3 to try and keep it in play	3		devicesetc

45

				SIZE: 064
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
9b	The ball is near the left flipper;			LEFT-1
	to keep it in play	1		devicesetc
9c	The ball is in the exit hole. To try to			OUT
	save the ball (by "tilting")	2		devicesetc
				or *TILT*
			Player	X-score-YYYYO
10	If the player's score is displayed then			
	play goes to the next player. GO TO			PLAYER NO. X
	STEP 8.			BALL Y
11	When ball goes out (no tilt)			BONUS SCORE -
	(for description of bonus score display,			X000
	see page 38)			(X-1) 000
	GO TO STEP 8			•
			Player	X-score-YYYYO
12	When the last player's last ball goes			BONUS SCORE -
	"OUT "			X000
				(X-1) 000
				•
			Player	X-score-YYYYO
				МАТСН – ХО
				HISCR - XXXXX
			Player	1-score-AAAAA
			(Player	2-score-BBBBB)
				!
				GAME OVER
13	To review money spent to date		[XEQ] "E"	\$X.00
14	To review total (existing) credits		[XEQ] "D"	X CREDIT

				SIZE: 064
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
	*If DATA ERROR is displayed, reenter your s	eed & pres	s [R/S]	
	Note: If the "HIGH-SCORE TO DATE" register	does not c	ontain a value,	
	the high score will be O and the first play	er will be	awarded a free	
	game credit no matter how low the score.			
	Since the presence of a printer in the syst	em configu	ration will slow	
	execution time considerably (as well as use	a lot of	paper), it is	
	recommended that a printer <u>not</u> be used.			

APPENDIX C: UTILITY ROUTINE FOR USE WITH "THE WIZARD OF PINBALL" PROGRAM

(NOTE: This program can reside in a three (3) memory module HP-41C, coresident with the WIZARD OF PINBALL program).

Because the WIZARD OF PINBALL uses the previously stored "High Score to Date (HISCR)" to determine if a CREDIT should be awarded, and can make use of the previously stored seed, number of credits, changes made in the Free Game thresholds, etc., a routine has been written to allow the user to save all the variables of the game, and return to it at a later date. This routine is given below:

LBL: "DTXR/W" (Data read/write via the 'X' register).

USE: This program will allow the user to save on magnetic cards the random seed of the game, the Free Game Thresholds, Hi-Score to Date and other data that is required to be restored before the original game continues or is restarted. Specifically, the registers are R36, to be saved on side one of the card, and R52 through R63 to be saved on side two of the card.

When reading in the card, the display will prompt with:

READ SIDE 1 and READ SIDE 2

When writing to a card, the 41C "BEEPS" and displays the word "WARNING" to indicate that a write, and NOT a read is about to be performed. Then, the display will prompt:

PROGRAM LISTING:	
01*LBL "DTX R/W" 02 CF 21 03*LBL A 04 36 05 "READ SI DE 1" 06 AVIEW 07 RDTAX 08 52.063 09 "READ SI DE 2" 10 AVIEW 11 RDTAX 12 RTN 13*LBL e 14 "WARNING " 15 AVIEW 16 BEEP 17 36	18 "WRITE S IDE 1" 19 AVIEW 20 WDTAX 21 52.063 22 "WRITE S IDE 2" 23 AVIEW 24 WDTAX 25 END

WRITE SIDE 1 and WRITE SIDE 2

#### INSTRUCTIONS:

- 1. Get a blank mag-card ready. (This can be reused over and over).
- To WRITE data TO the card, press: [shift] [e] (The HP-41 will BEEP a warning that a write is to be performed, followed by the prompts described above).
- 3. When display reads: "WRITE SIDE 1", feed side one of the card into the reader. When display reads "WRITE SIDE 2", insert side two of the card into the reader. The required registers are now saved.
- 4. To READ data FROM a card, press: [A]
- 5. When display reads "READ SIDE 1", insert that side into the card reader. When display reads "READ SIDE 2", insert side two into the reader.

01+1 RI "1177		50 RCL 53	Credits=0?
	Chock for	51 X=0?	Ves-go to IBLD
		52 GTO D	
02 FRC	Tractional seed	52 G,O D 57 G	No-reset player
03 1/X		33 0	count?
04 LOSTY		54 FS?C 01	Yes-reset to O
OF CTO 27	Stone cood	55 STO 45	
	store seeu	56 RCI 45	51
06 FIX 0		50 KCE 10	Player count at
07 SF 27	Initialize	57 4	4?
08 " CAP-PI		58 X=Y?	
		59 GTO 11	Vac as to IDI 11
MOHLL		60 1	Yes-go to LBL II
09 AVIEW		21 CT / 45	No-increment
10+LBL a		61 317 40	plaver count
11 .010	Cloan Elage 0 10	62 ST- 53	Doduct 1 crodit
104101 10	cieal llags 0-10	63 TONE 5	
		64 XFQ D	Display credits
13 CF IND X		25 DOE	left
14 ISG X		OJ FOE	
15 GTO 10		66+LBL 11	Dicplay number of
16 95 01		67 CLA	Display number of
10 01 01		68 ARCI 30	players
17 LF 20		20 "LC -"	
18 CF 21	Set Status F21		
19 FS? 55	to match FEF	70 HRCL 40	
20 SE 21	LU MALCH F55	71 AVIEW	
21 DTN		72 RTN	
	(Cash Register)	73 <b>+</b> I BI - 0	(Start Game)
ZZŦLBL E	· · · · · · · · · · · · · · · · · · ·		. ,
23 FIX 2		74 KUL 40	Any playons?
24 "\$ "		75 X=0?	Any players:
25 ORCL 52		76 RTN	No-stop
20 million	Recall \$\$\$ spent	77 40	Yes-create loop
26 FIA 0		78 +	counter from 41
27 AVIEW			to # of players
28 RTN	(Coin Incont)	79 RUL 40	co mon prayers
29+LBL C	(com inseric)	80 /	
30 25		81 41	
71 CT/ EO	Add 25\$ to cash	82 STO 58	Store player
31 317 32	register	87 +	pointer
32 TONE 4	register		pomoci
33 39		84 0	
34 RCL 53	No. of Credits	85 <b>*</b> LBL 12	
<b>35</b> XNY2	40 or more?	86 STO IND	Set all players'
76 $670$ $p$	Jump past "INC."	Y	scores to 0
36 GIU D	Incromont crodits	07 Ten V	
37 ISG 53	Increment creates		
38+LBL D		38 GIU 12	
39 CLA	Display credits	89 1	
40 OPCI 57	routine	90 STO 48	Player up=1
AN AN A		91 STO 50	Ball count=1
HI F -		92 TONE 9	Stant un tuno
42 HKUL 28		07 TONE 0	Start up tulle
43 RCL 53		73 IUME O	
44 1		94 IONE 8	
45 X±Y2	Test for Sing	95 TONE 8	
	on plupal	96 TONE 7	
40 F3		97 TONE 7	
47 HVIEW	credit(s)		
48 RTN		78 BEEF	
49+LBL B	(Credit Button)	99 TONE 8	

100 TONE 8		151+LBI 17	(score made)
101 TONE 8		152 SF 02	Set score flag
102 TONE 9		153 CLQ	Display device
103+LBL 13	New ball-	154 OPCL INT	hit
104 41	reset player		
105 STO 58	reset player	155 CTO IND	Do dev routine
106 1			
107 STO 48		0 15641 DI 10	(flippers & out)
108+LBL 14	Same ball	157 _2	(Trippers & ouc)
109 1		107 -2 150 V/NV	If 2 came ac
110 STO 46	next player	150 01/1	11 - 2, same as
111 1.003	Outbonus-1	160 0	o, set uispiay
112 STO 51	Reset drop	100 0	
113 0	targets	101 ANU:	1f = 1 or $-3$ go to
114 STO 47	Kick out hole=0		Tipper routine
115 25		163 KUL 00	else – dsp "OUI"
116 STO 49	Bonus multiplier	164 CLD 1/E DCE	
117 XEQ a	Clear flags	160 FSE	
118 SF 01		166 FU/U 22	Tried a tilt?
119 CF 02		167 610 20	
120 010	Display which		Yes-test for key
121 ARCL 30	player is up	169 X≠Y?	go it?
122 "H NO. "		170 GIU 20	Yes-go get
123 ARCI 48			random #
124 AVIEW		172 XEQ 09	"TILT" if 1
125 PSF		173 1	
126 010	Display ball	174 X=Y?	
120 CEA 127 OPCL 15	count	175 GTO 21	
120 ARCE 13		176 GTO 16	No tilt tried
120 AKCE 30 129 CE 22		177+LBL 20	display "OUT"
170+LBI 15	loop until digit	178 CLA	anspiraj obr
131 OVIEN	kev is pressed	179 ARCL 20	Out bonus
172 PCF	key is pressed	180 ARCL IND	oue bonus
177 500 22		49	
174 CTO 15		181 AVIEW	
175ALDI 16	(select scoring	182 PSE	Act bonus scone
176 12	(serect: scoring	183 RCL 46	Ropus <202
130 12 137 XEO 09	Got pandom #	184 29	Bonus <29!
170 4	$\frac{1}{2}$	185 X <y?< td=""><td>Decet if greater</td></y?<>	Decet if greater
179 _	-32-ranu#2-0	186 STO 46	Reset if greater
140 2002	Second 2	187 RCL 49	multipiler
140 A/0:	Score:	188 24	Reduce to normal
142 592 02	res-go to LBLI/	189 -	
147 CTO 19	Any other score?	190 ST* 46	bonus X multip.
144 "NO "	res-go to LDI18	191 RCL 40	ponus val. =
145 APCL 25	NO-GIVE DALL	192 RCL 46	
146 OPCL 21	Dack to be	193 *	
147 ARCE 21	resnot	194 ST+ IND	Add to player
140 OVTEN		58	score
149 PCF		195 FIX 3	Set display for
150 CTO 14		196 CF 28	bonus loop
100 610 14	Start over	I 197 RCI 46	

198 CLD		248 STO 57	Index register
199+LBL 22	Count down	249+LBL 27	Match digit
200 PSE	bonus loop	250 RCL 36	High score
201 TONE 7	bollus roop	251 RCL IND	Plaver's score
202 DSE X		57	Player's higher?
203 GTO 22		252 X>Y?	Store new high
204 FIX 0	Poset display	253 STO 36	Score new irright
205 SF 28	Reset display	254 X>Y?	High score flag
206+LBL b	Test for lest	255 SF 00	Thim lost 2
207 CLA	lest for last	256 RCL 39	digita of ocour
208 ARCL 30	player up	257 /	algits of score
209 "+ "		258 FRC	
210 ARCL 48		259 RCL 39	
211 "+-"		260 *	
212 ARCL 25		261 RCL 35	
213 ARCL IND		262 X=Y2	Match digit
58	Follow player #	263 XF0 24	Match?
214 AVIEW	with score	264 ISC 57	Match
215 FS2 03		265 CTO 27	Increment player
216 GTO 14	Extra ball?	265 610 21	count/loop
217 RCL 45	Extra ball	260 CEH 267 OPCI 27	Display match
219 RCL 48		268 OPC! 35	digit
210  KCL +0 219  V=V2		200 AKCE 33 249 OVIEW	
220 CTO 25	Last player up	200 RVIEW 270 PSF	
220 010 20	Last player	270 730	
227 $377$ $48$	Increment player	271 CER 272 OPC! 24	Display high
222 011 10 227 0T + 58	counter	272 AKCE 24	score
223 317 33 224 CTO 14	Loop back	273 AKCE 30 274 OVIEU	
224 G10 14	last ball check	275 F926 00	New high?
226 5		276 XEO 24	3
220 0 227 RCI 50		270 AL& 24 377 Def	
$228 X \pm Y2$	Fifth ball?	277 DCL 45	New index.
220 ATA 26	last ball	270 NCL 40 279 40	nlaver 1=41
270 1	Increment ball	200 +	2-42 etc
200 I 071 CT+ 50	count	200 - 201 pri 40	2 72, 200.
231 311 38 272 CTO 17	count	201 KCL 40 202 /	
232 GIO 13	End of game	202 /	
274 10	Generate random	200 41	
237 IO 275 VED 09	number $(0-9)$	204 ° 205 CTA 57	
200 AL& 07 076 1		200 010 01 202 AL DL 20	Display all scores
230 1		200+EBE 20 207 CLO	at end of game
237 -	Find match digit	207 CLH 200 ADC! 70	at end of game
200 10		200 HKCE 30 200 VL V	
207 # 240 STO 35	Stowe match	207 F 200 PCI 57	
240 010 00 241 PCL 45	digit	290 KCL 31 291 TNT	
241 KOL 40 242 40	uiyil Sot un loca faca	292 40	
242 40	set up loop trom	297 -	
240 · 244 RCI 40	41  to  #  OT	275 294 BPCI V	
244 KOL 40 245 /	players where	295 "L - "	1
246 41	41=1, 42=2,etc.	270 F	
240 41		57	
<u> </u>			

297 AVIEW		346 X<>Y	
298 54.056	Tost final	347 17	
299 RCL IND	lest I liai	748 +	
57	scores for free	7/9 7/24	
700 ENTERA	game	342 ANZI 750 CLO	
300 ENTERT 704 - 01 07		330 LLH	
301+LBL 23		351 HRUL IND	Flipper to hit
302 ULX		Y	
303 RCL IND		352 AVIEW	
Z		353 PSE	
304 X<=Y?	Eroo gamo?	354 FC?C 22	Plaver response
305 XEQ 24	Vee	355 GTO 29	No
306 ISG Z	res	356 X=Y2	NU Duanan nachanca?
307 GTO 23		757 CTO 16	Proper response:
709 ISC 57		750+LDL 20	
700 CTO 20		3JO¥LDL 27 750 0	Missed flipper
307 GIU 20		337 0	
310 CLH	Announce end of	360 GIU 18	One free credit
311 HRCL 18	game	361+LBL 24	
312 ARCL 19	game	362 CLX	Increment credits
313 AVIEW		363 1	incremente creates
314 0	No. 1 January	364 ST+ 53	
315 STO 45	No players	365 CLX	
316 BEEP		366 RCL 53	
317 RTN		367 49	
318+1 BI 69	Pseudo-random	768 8/=82	Forty credits?
719 DCL 27	number generator	7/0 CTO E7	No, store 40
317 KUL 03 700 0001		367 310 J3 770 ppu	Yes, give credit
320 3021		370 KUN	, <u>,</u> , , , , , , , , , , , , , , , , ,
321 *		371 IUNE 9	
322 .211327		372 RTN	Stant nollowong
323 +		373 <b>+</b> LBL 01	Start ronovers
324 FRC	Change was and	374 1	Increment out-
325 STO 63	store new seed	375 ST+ 46	bonus
326 *		376 RCL 38	
327 1		377 ST+ IND	Award 50 points
328 +		58	Display device
329 INT		378 ARCI X	name
330 PTN		379 GVIEW	
771 <b>4</b> 1 BL 21	TILT routine	700 TANE 5	
772 CE 07	Clear free ball	701 TONE 5	
332 CF 83 777 CLO	crear rice barr	381 IUME J 300 Tour F	
333 ULH 774 0001 74	Dicplay "*TI T+"	382 IUNE 3	
334 HRUL 31	Dispiay "IILI"	383 IUNE 3	
335 HVIEW		384 IUNE 5	
336 TONE 4		385 GTO 16	
337 TONE 3		386+LBL 02	Lane rollovers
338 TONE 2		387 1	Increment out-
339 TONE 1		388 ST+ 46	bonus
340 TONE 0		389 300	Award 300 points
341 PSE		390 ST+ IND	
342 GTO 6	Next player	58	
343+1 B! 19	Elippone pouting	791 BRC1 V	Display device
744 ENTER+	rippers routine	792 AVIEN	namo
745 ODC		372 HYIEW 707 Tour /	name
34J HBB		373 IUNE B	

394 TONE 6		443 RC1 40	Score 1000*
395 TONE 6		444 *	kick-out
396 CTO 16		445 ST+ IND	RTER BUC
397 <b>♦</b> 1 BL 03	Thumpon humpons	58	
398 PCL 39	Scope 100 points	446 ARCI X	Display device
399 STO 62		447 OVIEW	Display device
400 6	# for toro	448+1 BI 32	Tono for every
401 ENTER*	# TOP LOne	449 TONE 7	1000 points
402 10		450 DSE Y	1000 points
407+1 BI 30	Max. number nits	451 GTO 32	
404 XE0 09	Handle spinner	452 GTO 16	Co book for more
405 X(> 62	Random number	453+1 BL 06	GO DACK FOR MORE
406 RCI 62	Irade with score	454 10	Sling shot
407 STO 61	Store bounces	455 ST+ IND	KICKErs
408 *		58	Score 10 points
409 ST+ IND	lotal points	456 ARCL X	Display device
58	Add to score	457 AVIEW	name
410 ORCI X		458 TONE 5	
411 AVIEW	Device name	459 GTO 16	
412+1 BI 31		460+1BI 97	Go back for more
413 TONE IND	Play tones for	461 ISG 51	Drop targets
7	correct score	462 GTO 33	Increment # hit
414 DSF 62		463 1.003	All dropped,
415 GTO 31		464 STO 51	reset them
416 ES2C 04	Spinner?	465 SE 03	Free ball flag
417 RTN	Yes, return	466 RCL 39	Score 100 points
418 GTO 16	No, go for more	467 ST+ IND	
419+IBI 04	Spinner gate	58	
420 RCL 37	10 points & up	468 CLA	Display same
421 STO 62		469 ARCL 21	player prompt
422 5	Tone # in 'Y'	470 ARCL 22	
423 ENTER↑		471 AVIEW	
424 25	Rndm # limit	472 TONE 8	
425 SF 04	Spinner gate	473 TONE 8	
426 XEQ 30	Score	474 GTO 16	Go back for more
427 RCL 61	Recall spins	475+LBL 33	Not all down
428 5	For each 5 spins,	476 RCL 51	Score 10 points
429 /	add 1 to out-	477 1	
430 INT	bonus	478 -	
431 ST+ 46		479 ARCL X	Display # hit
432 GTO 16	Go back for more	480 AVIEW	
433+LBL 05	Kick-out hole	481 TONE 5	
434 8		482 10	Score points
435 RCL 47	Score >10K	483 ST+ IND	
436 X>Y?	If yes - switch	58	
437 X<>Y	with 8K	484 GTO 16	Go back for more
438 2		485 <b>+</b> LBL 08	Alpha targets
439 +		486 1	Incrementout
440 STO 47	New score	487 ST+ 46	bonus
441 ENTER↑		488 6	Random # (1-6)
442 ENTER↑		489 XEQ 09	· · ·

						at the second second second	
490	ENTER↑		538	GTO 16	Gro back	for	more
491	ENTERT		539	.END.			
492	4						
493	+						
494	X < > Y						
495	7						
496	+						
497	CLA						
498	ARCL IND	Display hit					
×		, ,					
499	SF IND Y	Set target flag					
500	500	5 5					
501	SI+ IND	Score 500 points					
58							
502	HRUL X						
503	HVIEW						
504	TONE 6						
505	TONE 6						
306 507	TONE 6						
507	TONE 6						- vo Mr
508	TUNE 6						
509	FU? 00 CTO 74	Target A?					
510	GIU 34 EC2 04	5					- Contraction of the second seco
512	ГС? 00 СТО 74	Target B?					
517	GTU 34 GE 20	5					
514	26 20 26	Set bonus flag					
515	STO 49	5					
516	510 42 FC2 07	Bonus multiplier					
517	GTO 34	Target C?					
518	EC2 08	Target D?					
519	GTO 34	5					
520	27	Bonus multiplier					
521	STO 49						
522	FC? 09	Target E?					
523	GTO 34	•					
524	FC? 10	Target F?					
525	GTO 34						
526	TONE 9						
527	TONE 9						
528	29	Bonus multiplier					
529	STO 49						
530+	•LBL 34	Display bonus					
531	FC? 20	Bonus?					
532	GTO 16	Go back for more					
533	CLA	Display value					
534	ARCL 20						
535	HRCL IND						
49 57/	001750						
336 577	HVIEW Dee						

### **PROGRAM DESCRIPTION**

#### TRUCK

By Kenneth Sharp

BREAKER - BREAKER 19 --- ALL YOU WOULD-BE EIGHTEEN WHEELERS!!!

You must get your shipment delivered within ten hours or be charged a penalty. Smokies are patrolling the roads and obstructions on the road slow you down. Listen closely to your CB for messages. Any of three roads (95, 89, or 97) will get you to your destination, but you may need to change routes several times during your run. Route changes are permitted only at designated exits. Smokies will fine you if they catch you speeding, wreckers will charge you for repairs if they must pull you from a crash. Get into your rig and put the pedal to the metal. See you on the flip-flop.

#### STATUS

SIZE: 019 FIX: 0 USER MODE: 0N TOTAL PROGRAM BYTES: 1640

DATA REGISTERS				
00-03	Time Smokey will remain	(Route	#95)	
04-06	Time to clear slide	(Route	#89)	
07	Time for road to dry			
08	Time to clear slide	(Route	#97)	
09	Time to repair bridge			
10	Random number			
11	Route			
12	Speed			
13	Previous position			
14	Present position			
15	Money			
16	Present position or HMS conve	rsion		
17	Trip time			
18	Driving time			

FLAGS USED			
00-03	Set:	Smokey Present	(Route #95)
	Clear:	Road Clear	(Route #95)
04-06	Set:	Rock Slide	(Route #89)
	Clear:	Road Clear	(Route #89)
07	Set:	Wet Road	
	Clear:	Road Clear	
08	Set:	Rock Slide	(Route #97)
	Clear:	Road Clear	(Route #97)
09	Set:	Bridge Out	
	Clear:	Road Clear	
27	Set:	USER Mode	
	Clear:	USER Mode Off	
29	Set ·	Digit Grouping	
25	Clear:	No Digit Grouping	

#### **SAMPLE PROBLEM**

You must drive from "Start" to "Destination" in less than 10 hours. You can change roads only at exits. A perfect run will net you \$100.00.



Route 95 is 725 miles long. It is heavily patrolled by "smokies". Route 89 is 550 miles long. It is a mountain road plagued by rock slides. Route 97 is 500 miles long. It has a curve that gets slick when wet, rock slides and a bridge that perpetually falls down.

( ) = mile post of exits

DISPLAY	INPUT	FUNCTION	COMMENTS
		[XEQ] "SIZE" 019 [XEQ] "TRUCK"	
SEED?	.987654321	[R/S]	Enter seed for random number
ROUTE?	89	[R/S]	Let's try route 89
SPEED?	55	[R/S]	Let's start at 55MPH
ROUTE NO. 89			
SPEED = 55MPH			
MI. POST O			
CH. SPEED/RT.?	N (ENTER $\uparrow$ )	[R/S]	No need to make changes yet
BREAKER 19			
BRIDGE OUT			
M.P. 490 ON 97			
CLOSED 4 HR.			
ROUTE NO. 89			
SPEED = 55MPH			
MI. POST 55			(One hour has past)

DISPLAY	INPUT	FUNCTION	COMMENTS
CH. SPEED/RT.? BREAKER 19 WET ROAD AT M.P. 165 ON 97 SPEED LMT. 35 ROUTE 89 SPEED = 55MPH MI POST 110	N (ENTER ↑)	[R/S]	That doesn't affect us-no changes
CH. SPEED/RT.? BREAKER 19 SMOKEY AT M.P. 575 ON 95 ROUTE NO. 89 SPEED = 55MPH MI. POST 165	Ν	[R/S]	Route 89 is still clear
CH. SPEED/RT.? BREAKER 19 SMOKEY AT M.P. 290 ON 95 ROUTE NO. 89 SPEED = 55MPH MI. POST 220	Ν	[R/S]	Let's keep going
CH. SPEED/RT.? BREAKER 19 SMOKEY AT M.P. 135 ON 95 ROUTE NO. 89 SPEED = 55MPH MI. POST 275	Ν	[R/S]	No danger yetkeep trucking
CH. SPEED/RT.? SPEED-A/RTB DRIVING TIME	.1622	[R/S] [XEQ] "B" [R/S]	Let's try another road (R/S=Yes) Press "B" for route change 16 min. 22 sec. should put us at the exit

DISPLAY	INPUT	FUNCTION	COMMENTS
BREAKER 19 ROCK SLIDE M.P. 405 ON 97			
ROUTE NO. 97			We made the exit
SPEED = 55MPH			Speed was not changed
MI. POST 340			New Position
CH. SPEED/RT.? BREAKER 19 SMOKEY AT M.P. 135 ON 95 ROUTE NO. 97	Ν	[R/S]	Let's keep going for a while
MI POST 395			
CH. SPEED/RT.? BREAKER 19 ROCK SLIDE M.P. 405 ON 97	Ν	[R/S]	Keep trucking
*ROCKS*			
***CRASH***			OUCH
CALL WRECKER			
REPAIRS-\$45 ROUTE NO. 97 SPEED = 55MPH			Repair bill
MI. POST 405			Wrecker pulled us through slide
CH. SPEED/RT.?		[R/S]	Behind schedulespeed up
SPEED-A/RTB		[XEQ] "A"	Press "A" to change speed
SPEED? ROUTE NO 97	65	[R/S]	Increase speed to 65 MPH
SPEED = 65MPH			New speed

DISPLAY	INPUT	FUNCTION	COMMENTS
MI. POST 405			
CH. SPEED/RT.?	N	[R/S]	Let's move out
BREAKER 19			
ROCK SLIDE			
M.P. 405 ON 97			
CLOSED 11 HR.			
ROUTE NO. 97			
SPEED = 65MPH			
MI. POST 470			
CH. SPEED/RT.?	Ν	[R/S]	Keep going
BREAKER 19			
WET ROAD AT			
M.P. 165 ON 97			
SPEED LMT. 35			
LATE			Well, at least we made it
MONEY = \$18		[R/S]	Lousy pay, isn't it?
TIME: OVER			
1HR.29MIN.3SC.		[R/S]	
ROUTE NO. 97			
SPEED = 0 MPH			
MI. POST 500			Stopped at our destination

				SIZE: 019
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
1	Start		[XEQ] "TRUCK"	SEED?
2	Enter any number 0 <u>&lt;</u> n<1	No.	[R/S]	ROUTE?
3	Enter route* (89, 95, or 97)	No.	[R/S]	SPEED?
4	Enter speed* (85 MPH Maximum)	No.	[R/S]	ROUTE
				SPEED=MPH
				MILE POST
				CH. SPEED/RT?
5	If <u>no</u> changes are desired	N	[R/S]	BREAKER 19
	(Ignore display when "N" [ENTER] is			"CB messages &
	pressed)			consequences"
6	Go to step 5 <u>or</u> 7			
7	If changes are desired (see steps 8 & 10)		[R/S]	SPEED-A/RTB
8	If you wish to change "speed"		[XEQ] "A"	SPEED?
9	Go to step 4			
10	If you wish to change "route" or stop		[XEQ] "B"	DRIVING TIME
	short of an obstacle (also see step 17)			
11	Enter driving time needed to stop at exit	.mmss	[R/S]	BREAKER 19
	in form .mmss (mm=minutes; ss=seconds)			"CB messages&
	(must be less than one hour)*			consequences"
12	Go to step 6			
13	To review current CB messages anytime		[XEQ] "C"	STATUS:
	program is not running			"messages"
14	Go to step 6			
15	To see "time" anytime program is not		[XEQ] "D"	TIME:
	running			HRMINSC
	To return to program		[R/S]	
16	Go to step 6			

61

				SIZE: 019
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
17	If you have gone past your exit and wish			
	to return, execute steps 7 and 10 as			
	directed. Enter driving time as directed			
	in step 11 except enter "Change Direction"			
	before pressing [R/S].	.mmss	CH. DIR**R/S	BREAKER 19
				"CB messages a
				consequences"
18	Go to step 6			
19	To restart game after reaching destination		[XEQ] [SHIFT]"a"	SEED?
	Go to step 2			
20	End of Game (if on time)			ON TIME:
				MONEY \$
			[R/S]	TIME TO GO:
				HRMINSC
21	End of Game (if late)			LATE:
				MONEY \$
			[R/S]	TIME: OVER
				HRMINSC
				ROUTE NO
	*Display will reprompt if entry is invalid			
	** CHS on keyboard			

01+LBL "TRU CK" 02 FIX 0 03 SF 27 04 CF 29 05 CF 21		49 STO 12 50 85 51 - 52 X>0? 53 GTO A 54+LBL 10 55 SE 20	Test for excessive speed
06 FS? 55 07 SF 21 08+LBL a 09 .009 10+LBL 61 11 CF IND X 12 ISG X	Clear Flags 0-9	56 "ROUTE N 56 "ROUTE N 0. " 57 ARCL 11 58 AVIEW 59 PSE 60 "SPEED=" 61 ARCL 12	"Position" Display
13 GTO B1 14 ΣREG ØØ 15 CLΣ 16 ΣREG Ø6 17 CLΣ 18 Ø	Clear necessary registers	62 "F MPH" 63 AVIEW 64 PSE 65 "MI. POS T "	
19 STO 14 20 "SEED ?" 21 PROMPT 22 STO 10 23 100 24 STO 15 25 10	"Seed" for Random Number	66 ARCL 14 67 AVIEW 68 PSE 69 "CH. SPE ED/RT.?" 70 PROMPT 71 X=Y?	Test for speed/ route change
26 STU 17 27+LBL 12 28 "ROUTE ? " 29 PROMPT	"Route" Prompt	73 "SPEED-A /RTB" 74 PROMPT 75+LBL 13	
30 STO 11 31 97 32 X=Y? 77 CTO 0	Test for invalid Route	76 XEQ 60 77 1 78 ST- 17 79 RCL 14	Deduct one hour from time
34 RDN 35 95 36 X=Y? 37 GTO A 70 PDN		80 STO 13 81 RCL 12 82 ST+ 14 83 XEQ IND 11	Store "Previous" position
39 89 40 X=Y? 41 X≠Y? 42 GTO 12 43+LBL A 44 "SPEED ?	"Speed" Prompt	84 GTO 22 85◆LBL 60 86 RCL 12 87 X<=0? 88 XEQ 10 89 "BREAKER 19"	Test if "Moving"
45 PROMPT 46 X=0? 47 GTO A 48 ABS		90 AVIEW 91 BEEP 92 XEQ 62 93 SF IND X	CB Messages

	· · · · · · · · · · · · · · · · · · ·		
94 XEQ IND		143 AVIEW	
95 RTN		145 2	
96+LBL 62	Random Number	146 *	
97 RCL 10	generation	147 ST- 15	
98 9821	5	148 "FINE OF	Fine for speeding
99 *		<b>\$</b> "	
100 .211327		149 ARCL X	
101 +		150 AVIEW	
102 FKU 107 CTO 10		151 PSE	u <del></del>
103 310 10		152 .25 157 et_ 17	"lime" penalty
104 I EI 105 *		103 317 17 154 PCI 16	
106 INT		155 STO 14	Dectore position
107 RTN		156 GTO 10	Restore position
108+LBL 95	Douto OF Tost	157+LBL 22	
109 14	Roule 95-Test	158 RCL 11	Determine "Route"
110 STO 18	see if nast	159 95	beter mine noute
111 135	smokev	160 X=Y?	
112 STO 16	Sillercey	161 GTO 52	
113 FS? 00		162 RUL 11	
114 XEW 19 115 990		163 89 164 V-VO	
115 270 116 9TO 16		164 A-1: 165 CTO 57	
117 FS2 Ø1		166 RCL 14	
118 XEQ 19		167 500	
119 445		168 STO 18	lest to see 11
120 STO 16		169 -	at destination
121 FS? 02		170 X<0?	
122 XEQ 19		171 GTO 51	
123 575		172+LBL 54	Correct "Time"
124 510 15		173 RUL 12 174 7	and "Position"
120 F3: 03 126 XEQ 19		175 ST+ 17	if at Destination
120 AL& 19 127 RTN		176 RCI 18	
128+LBL 14	Test for speeding	177 STO 14	
129 RCL 12		178 RCL 17	
130 55		179 X<0?	
131 -		180 GTO 55	
132 X<=0?		181 "ON TIME	lest for "On
133 RTN	Dolico con		lime" or "Late"
134 "EEE	Police car	182 HVIEW	
 175 OVIEW		100 FOE 1844  B! 56	
135 HVIEW 136 TANE 8		185 "MONFY=\$	
137 TONE 9			
138 TONE 8		186 ARCL 15	
139 TONE 9		187 AVIEW	Display "Earnings"
140 TONE 8		188 0	
141 TONE 9		189 STO 12	
142 "SMOKEY"		190 STOP	

240 465 241 STO 16 242 FS? 06	
241 STO 16 242 FS? 06	
242 FS? 06	
243 XEQ 19	
244 RTN	
to" populty 245+LBL 16 "Hit" roo	rk slide
246 "*ROCKS*	
247 AVIEW	
248 PSE	
+ +o ooo if of 249+LBL 11	
tio see 11 au 250 "***CRAS	
251+LBL 21	
252 AVIEW	
253 PSE	
254 "CALL WR	
ECKER"	
t to see it   256 PSE	
destination   257 RCL 16	
258 STO 14	-
259 XEQ 62	2
260 8 "Repair I	3111
261 *	
262 5	
263 +	
264 ST- 15	
265 "REPAIRS	
一	
266 ARCL X	
t for 267 AVIEW	
tacle 268 PSE	
269 2.5 "lime" p	enaity
270 ST- 17	
271 GIU 10	<b>T</b>
272+LBL 97 Route 97	-lest
	□" <b>,</b>
274 510 10 "ROCK SI 275 1/5	ide" or
275 165 "Bridge"	Jut
te 89-Test to 276 510 16	
$\frac{11}{270} \frac{277}{70} \frac{19}{70}$	
ck Slide" 279 16	
280 STO 18	
281 405	
282 STO 16	
283 FS? 08	
284 XEQ 19	
285 20	
286 STO 18	
	242 r 37 005   244 RTN 244 RTN   246 "*ROCKS* "   246 "*ROCKS* "   247 AVIEW 248 PSE   248 PSE 249+LBL 11 1   250 "***CRAS H***" 251+LBL 21   252 AVIEW 253 PSE   254 "CALL WR ECKER" 255   254 "CALL WR ECKER"   255 AVIEW 253 STO 14   258 STO 14 Determine   260 8 "Repair 14   261 * 262 5   263 + 264 ST- 15   265 "REPAIRS -*" **   264 ST- 15 265 "Repair 14   261 * 264 ST- 15   265 "REPAIRS -*" **   266 ST- 15 265 "Repair 14   261 * 264 ST- 15   265 STO 16 *

287 490		334 "M.P. 29	
200 STO 16		0 ON 95"	
200 0/0 IC 200 EC2 AQ		335 AVIEW	
207 F3: 07 200 VEC 10		776 PSF	
290 XEQ 19		777 DTN	
291 RIN		337 KIN 770, 101 00	
292+LBL 19		338+LBL 02	
293 RCL 16	Test to see if	339 3	
294 RCL 13	past obstacle	340 ST+ 02	
295 -		341 <b>+</b> LBL 25	
296 87=02		342 XEQ 33	
200 AC 0. 207 PTM		343 "M.P. 44	
200 DC) 14		5 ON 95"	
270 RUL 14		744 OVIEW	
299 RCL 16		745 DCC	
300 -		34J F3E	
301 X<=0?		346 KIN	
302 RTN		347+LBL 03	
303 GTO IND		348 3	
18		349 ST+ 03	
304+I BI 20		350+LBL 26	
705 "SPLOSH"		351 XEQ 33	
794 OVIEN	"Hit" Bridge Out	352 "M.P. 57	
300 HYIEW 707 DCC		5 NN 95"	
307 F3E 700 must see		757 OVIEW	
JUS "WEI FEE		754 DOE	
T "		304 FOE 766 DTU	
309 GTO 21	Test speed at	300 KIN	
310 <b>+</b> LBL 18	lest speed at	306*LBL 33	
311 RCL 12	wet Road	357 "SMUKEY	"Smokov" Mossago
312 35		AT"	Shokey Message
313 -		358 AVIEW	
314 X<=0?		359 PSE	
315 RTN		360 RTN	
316 "-+-+SKI	Skid on "Wet	361 <b>*</b> LBL 04	Mile Post for CB
D+-+-"	Road"	362 3	Messages
717 OVIEN		363 ST+ 04	Time for
317 HVIEW 710 DCC		764 PDN	obstacle
318 F3E		725ALDI 27	
319 GIU 11		766 450 17	
320 <b>+</b> LBL 00		300 AEW 17	
321 3		367 "1.6. 14	
322 ST+ 00		5 UN 89"	
323+LBL 23	Mile Posts for	368 AVIEW	
324 XEQ 33	CB Messages	369 PSE	
325 "M.P. 13		370 GTO 15	
5 ON 95"		371+LBL 05	
326 OVIEW		372 3	
707 PCE		373 ST+ 05	
700 DTN		374 RIN	
320 KIN 70041 DI -04		37541 RI 28	
327TLDL 01 770 7		776 VEO 17	
330 3	Input (Increase)	777 "M D 70	
331 ST+ 01	Time for	377 N.F. 30	
332 <b>+</b> LBL 24	obstacle	U UN 89"	
333 XEQ 33		378 HVIEW	

379 PSE 380 GTO 15 381+LBL 06 382 4 383 ST+ 06 384 RDN 385+LBL 29 386 XEQ 17 387 "M.P. 46 5 ON 89" 388 AVIEW 389 PSE		424+LBL 32 425 "BRIDGE OUT" 426 AVIEW 427 PSE 428 "M.P. 49 0 ON 97" 429 AVIEW 430 PSE 431+LBL 15 432 "CLOSED "	"Bridge Out" Warning
390 GTO 15 391+LBL 17 392 "ROCK SL IDE" 393 AVIEW 394 PSE 395 RTN 396+LBL 07 397 3 799 ST+ 07	"Rock Slide" Warning	433 ARCL IND X 434 "⊢ HR." 435 AVIEW 436 PSE 437 RTN 438◆LBL B 439 RCL 12 440 X≠0? 441 CTO 58	"Route" Change
399◆LBL 30 400 "WET ROA D AT" 401 AVIEW 402 PSE 403 "M.P. 16 5 ON 97" 404 AVIEW 405 PSE	"Wet Road" Warning	442 TONE 0 443 "NOT MOV ING" 444 AVIEW 445 PSE 446 GTO 10 447+LBL 58 448 RCL 14 449 STO 16	"Driving Time"
406 "SPEED C MT. 35" 407 AVIEW 408 PSE 409 RTN		430 BRIVING TIME" 451 PROMPT 452 HR 453 STO 18	Prompt Convert from Hours
410+LBL 08 411 4 412 ST+ 08 413 RDN 414+LBL 31 415 YEO 47	Time for obstacle Mile Post for CB	454 INI 455 X≠0? 456 GTO B 457 XEQ 60 458 RCL 18 459 0P°	Test for invalid time
415 AEW 17 416 "M.P. 40 5 ON 97" 417 AVIEW 418 PSE 419 GTO 15 420+LBL 09 421 4	riessayes	460 ST- 17 461 RCL 16 462 STO 13 463 RCL 12 464 RCL 18 465 * 466 ST+ 14	Restore "Positions"
422 ST+ 09 423 RDN		467 RCL 18 468 X<0?	

469 CF 28		518 89	
470 X(0?		519 STO 11	
471 XEQ 63	Test for	520 455	
472 XEQ IND	direction of	521 STO 14	
11	travel	522+LBL 39	
473 FC? 28		523.25	Time required to
474 XEQ 63		524 ST- 17	"Exit"
475 RUL 11	Test for Route	525 GTO 10	
476 93 477 V_VA	Number	526+LBL 38	
477 AFT? 470 CTO EQ		527 RCL 14	
470 GIU JU 470 DCL 11		528 -	
473 KUL II 400 00		529 RND	
480 87 101 V-V0		530 X=0?	
401 A-1: 402 CTO 74		531 GTO IND	
402 610 34			
403 33 404 ENTERA		532 RIN	
495 100	Test for "Exit"	533+LBL 50	
403 100 106 VEN 70		534 40	Test for "Exit"
487 76		535 ENTERT	
488 ENTERA		536 130	
489 340		537 XEW 38	
490 XEQ 38		538 41 570 ENTEDA	
491 37		539 ENIERT 540 505	
492 ENTERT		540 20J 541 VEO 70	
493 400		541 AEQ 30 542 42	
494 XEQ 38		547 ENTERA	
495+LBL 59		543 ENIERI 544 470	
496 "NO EXIT		545 VEN 70	
		546 CTO 59	
497 AVIEW		547 6 GTO 37	
498 PSE		548 47	
499 GTO 22		549 ENTER*	
500+LBL 63	Exchange Present-	550 135	
501 X<> 13	Previous	551 XEQ 38	
502 X<> 14	Position if	552 44	
503 X<> 13	traveling away	553 ENTERA	
504 RTN	from destination	554 285	
505+LBL 35		555 XEQ 38	
506 89		556 45	
507 STO 11	Reenter Position	557 ENTER↑	
508 140	after "exit"	558 450	
509 STO 14		559 XEQ 38	
510 GIU 39		560 46	
511+LBL 36		561 ENTER↑	
512 87 517 6T6 44		562 140	
513 510 11 Et 4 900		563 XEQ 38	
JI4 270 515 eto 44		564 47	
515 310 14 516 CTO 79		565 ENTER↑	
517ALD1 77		566 290	
JI(VEDE J)		567 XEQ 38	
568 48   569 ENTER↑   570 455   571 XEQ   572 GTO   573< LBL   574 89   575 STO   576 135   577 STO   578 GTO   579< LBL   41 580   581 STO	619 STO 14 620 GTO 39 621+LBL 48 622 97 623 STO 11 624 400 625 STO 14 626 GTO 39 627+LBL D 628 "TIME:" 629 RCL 17 630 X<0? 631 "⊢ OVER" 632 X>0?	"Time" Display	
---	---	--------------------------------------	
582 285	633 "⊢ TO GO		
583 SIU 14 594 CTO 39			
585+LBL 42 586 89 587 STO 11	635 PSE 636 HMS 637 ABS	Convert to Hours- Minutes-Seconds	
589 STO 14	630 510 10 639 INT		
590 GTO 39	640 CLA		
591+LBL 43	641 ARCL X		
592 95 597 etn 11	642 "FHR."		
594 130	644 FRC		
595 STO 14	645 1 E2		
596 GTO 39	646 *		
597+LBL 44	647 STO 16		
599 STN 11	649 ARCI X		
600 285	650 "FMN."		
601 STO 14	651 RCL 16		
602 GTO 39	652 FRC		
603+LBL 40 404 95	653 1 E2 654 *		
605 STO 11	655 INT		
606 430	656 ARCL X		
607 STO 14	657 "HSC."		
608 GTO 39 6094 DI 46	658 AVIEW		
607*LDL 40 610 97	660 GTO 10		
611 STO 11	661+LBL C	"Status" Display	
612 100	662 "STATUS:		
613 SIU 14 614 CTO 39		<b>T</b>	
615+LBL 47	664 23.032	Test for CB	
616 97	665 ENTERT	messages	
617 STO 11	666 .01		
618 340	667 <b>+</b> LBL 49		

-		
ſ	668 FS? IND X	
	670 FS? IND	
	671 XEQ IND	Display CB
	672 ISG X 673 ISG Y	Messages
	674 GTO 49 675 GTO 10	
	676 END	

#### **PROGRAM DESCRIPTION**

FLIPO

By Dr. Robert E. Swanson

"FLIPO" is played on an  $8 \times 8$  board; the playing pieces are discs which are black on one side and white on the other. The player with the most discs of his/her color on the board at the end of the game is the winner.

A move consists of placing a piece on an empty square so that at least one of the opponents pieces is enclosed between the piece just played and any other disc of the same color. The surrounded pieces are then flipped, i.e., they become the color of the captor's discs. Any number of discs may be enclosed in one or more rows (a row being a continuous straight horizontal, vertical, or diagonal line of discs). However, an empty square may not be enclosed, only full rows of opponent pieces may be flipped. If more than one row is outflanked by a single move, all pieces must be flipped. A disc may be outflanked only by placing a piece on the board; opponent pieces left enclosed because of other factors are not considered "captured". Working through the sample game should help make these rules clear.

I. Board Information

The board may be represented by an  $8 \times 8$  matrix (8 rows by 8 columns) of squares. The squares are identified by their row number, R, and column number, C, where R and C range from 1 to 8. Each board is represented in the calculator by the register with the same numeric value.

II Generating Plays

In order for the calculator to "recognize" an outflanking location, an algorithm based on Hasegawa's rank order of board positions is used. This ordering assigns corner locations the highest rank and works down from there through all 60 locations. This leads to the development of a routine which generates board positions in rank order to test for outflankability. The first position that meets this simple criterion, then, becomes the machine-generated play for that round.

According to the rules of the game, if you can not outflank any of your opponent's discs, you forfeit your turn. (This is the only condition under which you can skip a turn.) You indicate forfeiture by pressing the [R/S] key without keying in a numeric entry at the prompt for your play. Don't be surprised if the calculator discovers that you have overlooked a play! It will make the play for you and display it, together with the number of flips, in the usual manner. As a matter of fact, you could use the "no play" feature even when you know you have several playable positions, but are unsure which of them to play. The program will terminate the game when neither side can make use of any of the remaining vacant squares. (Or when all squares are occupied.) The board count that is displayed along with the play and the flips needs some clarification for the special case of "no play". The disc counter, RO1, is always 1 disc ahead of the actual number of discs that have been played; i.e. the disc counter expects that the next play will, in fact, take place. A "no play" gets displayed along with the expected disc count. This should not cause any confusion, because a "no play" does not increment RO1. The next play (by the opponent) will be displayed with the same disc count.

#### III. Data Processing

Once a "play" code appears in the stack, whether it was generated by the program or entered by the user, it is tested to see if it corresponds to a vacant board square. (User input is first tested to see if it corresponds to a board square at all.) If the play passes the preliminary screening tests, it is subjected to further scrutiny by the program. It determines: 1) Which, if any, of the 8 adjacent squares are occupied by the opponent's discs, and 2) if there is a peripheral outflanker disc. If an outflanker exists, then all the intervening opponent discs must be "flipped" and counted. If the user's input does not correspond to an outflanking position, then it is rejected and the user is prompted again for input.

#### IV. Routines and Labels

The "See Bd" routine (label C) permits you to call for a review of the calculator's version of the game board before your next play (see User Instruction Notes 4 & 5). As is true for all other portions of the program, "See Bd" may be activated with or without a printer. With the "Automatic See Bd" routine (label A) you can obtain the review auto-matically after each round of play. Key "A" acts as a toggle, i.e., it enables "Automatic See Bd" if previously disabled, and vice versa.

The "Tally" routine (label E) is executed automatically at the end of every game. Its main purpose is to calculate the number of black and white discs on the board, and also the differential black-white count. Pressing key E at a program halt will cause the game to terminate prematurely. (However, you can resume the game by pressing key B; the prompt for your play will appear in the display.) The execution time for "Tally" is fairly long, so to let you know that you have pressed the right key, the message "TALY:" appears almost immediately in the display to replace the "flying goose" annunciator.

Label D calls the routine which allows the user to have the first play of the game. If you want the machine to have the first play, then press the R/S key at the "YOU FIRST?<D>" prompt, otherwise press key D. (The program automatically sets user mode for you.) The "Back" (to your play) routine (label B) will prompt for your next play. This is normally used in two places in the game: 1) When you wish to abort the "See Bd" routine. 2) When you wish to resume the game after a midgame tally.

It should perhaps be noted here that: When you press kets A-E, the routine for which the keyboard access is intended will be executed if, and only if, it is appropriate to do so; otherwise, the program pointer will be returned to the prompt that was in force at that time.

#### V. Game Variations

There are four variations built into this program: 1) The user may choose to play first, or let the calculator have the first play, 2) when the calculator plays first, it can select any one of four possible plays, 3) it is possible to have the program select a play on the user's behalf, and 4) the user may forfeit 1,2,3 or all 4 corners when playing a game with handicaps. This forfeiture option provides a remarkably broad range of difficulty and game variety, especially in view of the second variation. Furthermore, the method used for increasing the level of difficulty does not significantly increase the execution time per game.

VI. Recreating Board Positions

From time to time you may realize that a certain play, or series of plays, just cost you the game. You can quickly reestablish the board positions as they existed at the time of the crucial play and try an alternate tactic IF you have kept a record of the plays. You only need to change one line (temporarily) of the program; just follow these instructions: GTO .348. In PRGM mode see RCL 02. Delete this line and insert a STOP in its place. PRGM mode off; GTO..; PACKING. Begin a new game. (Note: If the machine played first in the game, you will have to be sure that the status of flags 07 and 08 correspond to that particular play.) Enter your plays in the usual manner. The program will halt at the new STOP. Enter the play the machine previously made for that round. After all the desired plays have been entered then: Enter PRGM mode, GTO .348, delete the STOP, reinsert RCL 02, PACK. Press key B, the prompt for your play will appear in the display. You may now continue the game as before.

Alternately, if you have a record of the plays up to the point where you would like to change tactics, you could go back to step 4 and make the same plays (the calculator's plays are not random).

VII. Some Game Notes

You must have at least 256 registers available to play this game.

The game always begins with four discs already positioned on the four central squares: White occupies 44 & 55; Black occupies 45 & 54.

The first player is always black, and the first plays are limited to squares 34, 43, 56, 65.

To view the board at any prompt for your play (including the prompt for your first play) [XEQ] "C" or [XEQ] "A". The latter will cause the board to be displayed after each round of play.

The calculator may be shut off and play resumed later, provided that the data registers have not been disturbed; the stack, however, may be used for other purposes. It's a good idea to record the calculator 's "board" before shutting down. Warning: Do not press [R/S] followed by [XEQ] "B" when the calculator is processing your play and computing its own move. It's too difficult, although not impossible, to recover from the effects of a partial run.

#### GLOSSARY

Adjacent square - A board square which is in physical contact with the square upon which a disc has just been placed.

Board square; register - Each board square is assigned a two-digit number to identify its position in an  $8 \times 8$  matrix. Each board square is represented in the calculator by the correspondingly - numbered data register.

Central squares - The four squares in the center of the playing board; 44, 45, 54, and 55.

Codes, alpha - "B" = black disc, "W" = white disc. On the board "\*" denotes a black disc, and "O" denotes a white disc.

Flip - To turn over the opponents piece(s).

Handicap - Abbr. "Hdc" - The forfeiture of one or more corner board squares by the stronger player to the weaker player before the game begins.

NG (abbr. of No Good) - A message that appears in the display after the user enters an inappropriate number as a play.

No Play - Forfeiture of a play when no opponent discs can be outflanked from any of the remaining vacant squares.

Outflank - Placing a disc so that your opponent's row (or rows) of disc(s) is enclosed by your discs (i.e. one at each end of a row).

Peripheral square - Any board square which is not adjacent to the current play square.

Play square - A square upon which the user has just placed a disc.

Rounds (of play) - A set of two consecutive plays, user's (first) and machine's (second). The first round of a game is an incomplete one if the calculator plays first. The last round may also be incomplete.

#### STATUS

SIZE:	103
FIX:	0,2
USER MODE:	ON/OFF
TOTAL PROGRAM BYTES:	1071

DATA REGISTERS	
00	Pointer, IND GTO
01	Bd COUNT
03	Guard*
04	Guard*
05	Pointer, IND STO
06	Machine last play
07	Your last play
08	0.00001 Guard
09	0.00009
10, 19, 20 94-99	, 29, 30, 39, 40, 49, 50, 59, 60, 69, 70, 79, 80, 89, Guard*
11-18 21-28 31-38 41-48 51-58 61-68 71-78 81-88	Board
90	100 J
91	101   Indirect address
92	102
93	FLP CT
100	0.1
101	"W"
102	"В"
*Guard regis	sters are primarily used to detect illegal plays and sing moves

FLAGS_USED	
01 Set:	Automatic see board
04 Set:	Printer is ON
Clear	Printer is OFF or disconnected
07	Toggled on alternate executions of routine
08	Toggled on every execution of routine
(Statu	s of these flags determine which of four
openir	g plays machine begins game with)
12 Set:	Print double wide
Clear:	Print single wide
21 Set:	Printer enable
Clear:	Printer disable
25 Set:	Ignore error
Clear:	Halt, if error
27 Set:	USER mode on
Clear:	USER mode off
42 Set:	Execute line .286
Clear:	Skip line .286
55 Set:	Printer is on line
Clear:	No printer
42 (Secor	nd definition)
Machir	The plays for you (Machine's play next, if F142
43 You er	itered a play and F143 are clear)

A straightforward game without handicapping, calculator plays first.

You  $\underline{\text{must}}$  have 153 program registers and 103 data registers available for this program.

DISPLAY INPUT FUNCTION COMMENTS Load "FLIPO" РАСК [XEQ] PACK PACKING Set size 103 [XEQ]"FLIPO" HANDICAP? For a no handicap game, just press [R/S] [R/S] Hdc = 0YOU 1ST? <D> Since the calculator is to have the first move, just press [R/S]. However, to see the board before the 1st play, press [XEQ]"A". The prompt will then reappear. [XEQ]"A" YOU 1ST? <D> If playing without a printer, [R/S] must be pushed to see each line of the board. Press [R/S] to continue the game. (Printout of board: 12345678 1:----2:-----7 · \_ \_ \_ \_ \_ \_ \_ \_ 4:---0\*---5:---\*0---6:----7:----The calculator then makes its move and displays 8:-----1.B65.01 W? (1st disc played. Black disc square 65. One white disc was flipped. White move?) Note: Press [XEQ] C to see the board before entering a move. Automatic See Bd is cancelled (only) after the calculator has made the first play. After the last row is viewed, the prompt for whites move reappears. PLAY W? 66 [R/S] 2.W66.01 The calculator makes its move, etc.

DISPLAY	INPUT	FUNCTION	COMMENTS
3.B34.01 PLAY W?	33	[R/S]	The board after moves #12, 13.
4.W33.01 5.B43.01 W?	35		12345678
6.W35.02 7.B36.01 W?	53	[R/S]	2:*
8.W53.03 9.B63.01 W?	46	[R/S]	4:00**
10.W46.01 11.B56.02 W? 12.W64.02 13.B25.02 W?	64	[R/S]	6:*000 7: 8:
To view the board	l press [XEQ] C - a	fter the board is p	printed, the prompt returns
PLAY W?		[XEQ]"C"	
Remember, press [	R/S] if no printer	is attached	
The following sho shown, are listed	ws the last few mo l on page <b>80.</b>	oves of the game. Al	L moves which were not
The board looks 1 have been made. B can outflank Bla one will yield th find the best mov	ike this after the lack is ahead 32 t ck from all 3 vaca be best margin? To re, press [R/S] wit	56th and 57th move 20 29. However, Whit ant squares. Which let the calculator th no numeric entry.	es te
PLAY W? 58.W87.04 59.B77.01 W?		[R/S]	12345678 1:00000000
1 2 3 4 5 6 7 8	3	2	2:*000000* 3:*000000*
1:0 0 0 0 0 0 0 0 0 0 0 2:* 0 0 0 0 0 0 *	) :		4:*0*00*0*
3:* 0 0 0 0 0 0 *		:	5:*0***UU* 5:*****0*
4: * 0 0 0 0 * 0 * 0 * 0 * 0 * 0 * 0 * 0	с. с		7:*-***
6:* * * * 0 * 0 * 7·* * * * * * *		•	5:******0-*
8:* * * * * 0 0 *	4		
PLAY W? 60.W72.02 TALY: (scrolling) TALY: B28, W36	72	[R/S]	
The calculator te	erminates the game	automatically after	r the 60th disc is played.

ł

If the printer is attached tally is printed as: TALY: B28, W36 Where - 8 is the difference between -8 \*\*\* Black and White discs The final board looks like: 12345678 1:000000002:\*000000\* 3:\*000000\* 4:\*0000\*0\* 5:\*0\*0\*00\* 6:\*00\*0\*0\* 7:\*0\*\*\*\*\*\* 8:\*\*\*\*00\*

Game 1 was actually generated entirely by the calculator, but in a slightly different way from that illustrated above: The player entered 65 to get the game started, and the calculator responded with 66 to complete the round. At every prompt thereafter, R/S was pressed without making an entry to have the calculator find each play.

1.	B65.01	31.	B84.01
2.	W66.01	32.	W86.03
3.	B34.01	33.	B85.02
4.	W33.01	34.	W58.01
5.	B43.01	35.	B57.02
6.	W35.02	36.	W68.02
7.	B36.01	37.	B26.03
8.	W53.03	38.	W37.05
9.	B63.01	39.	B23.04
10.	W46.01	40.	W32.03
11.	B56.02	41.	B17.02
12.	W64.02	42.	W18.01
13.	B25.02	43.	B12.02
14.	W16.01	44.	W11.01
15.	B15.01	45.	B21.01
16.	W14.01	46.	W62.05
17.	B42.02	47.	B73.02
18.	W31.01	48.	W76.02
19.	B41.01	49.	B67.03
20.	W51.02	50.	W82.01
21.	B24.01	51.	B81.02
22.	W47.07	52.	W78.05
23.	B52.03	53.	B28.05
24.	W13.02	54.	W27.01
25.	B48.04	55.	B88.05
26.	W38.01	56.	W22.01
27.	B74.01	57.	B71.05
28.	W61.03	58.	W87.04
29.	B75.01	59.	B77.01
30.	W83.02	60.	W72.02

"TALY: B28,W36 -8 \*\*\*"

Execution time: Without printer, 18 minutes With printer, 28 minutes

				SIZE: 103
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
1	This program requires 153 program registers	and 103 da	ata registers.	
2	Load Program		[GTO]	PACKING
3	Set Size 103			
4	Initialize		[XEQ] "FLIPO"	
4a	If Size is not adequate:			SIZE >=103
	Execute Size 103		[R/S]	HANDICAP?
4b	If Size is adequate			HANDICAP?
5a	To play a no-handicap game		[R/S]	Hdc - O
				YOU 1st? <d></d>
5b	To play a game with handicapping			
	(n = 1,2,3 or 4. Any other entry defaults			
	to zero)	n	[R/S]	Hdc = n
				YOU 1st? <d></d>
	NOTE: The following is the format used to i	ndicate th	e display during	play:
	DD.XRC.dd (Y?). Where DD. is the number of	discs pla	ced on the board	so far
	(excludes 4 central discs, but includes any	handicapp	ed discs); X is c	ode for
	player (B for black, W for white); RC is th	e row and	column number of	the newly
	occupied square; dd is the number of flips;	and Y? is	the prompt for y	our play.
	(B if you made the first play, W if you mad	e the seco	nd.)	
6a	If you want to have the first play		[XEQ] "D"	PLAY : B?
	Enter your play	RC	[R/S]	DD.BRC.dd
	The calculator computes its move			DD.WRC.dd B?
	Enter your next move	RC	[R/S]	DD.BRC.dd
				DD.WRC.dd B?
	etc.			

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				SIZE: 103
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
6b	If you want the calculator to make the			
	first move		[R/S]	DD.BRC.dd W?
	Enter your move	RC	[R/S]	DD.WRC.dd
	Calculator computes its move			DD.BRC.dd W?
	Enter your next move	RC	[R/S]	DD.WRC.dd
	etc.			
7	If your RC entry is not valid	RC	[R/S]	DD.XRC.NG W?
	Try again (NG= no good)	RC	[R/S]	
8	If you think you do not have a legal move		[R/S]	
	The calculator will try to find a move			
	If it can't find one:			DD.X0.00
	If it finds a legal move:			DD.XRC.dd
	It then calculates its own move:			DD.XRC.dd Y?
	Continue as in Step 6 above.			
9	At each prompt for your play you may:			DD.XRC.dd Y?
9a	Make your next move	RC	[R/S]	DD.XRC.dd
9b	View the board		[XEQ] "C"	
	If no printer: will display the board one l	ine at a t <sup>.</sup>	ime. Press [R/S]	between lines.
	If a printer is in the system: will print o	ut playing	board & moves of	last round.
	Then prompts			PLAY Y?
9c	Enable (or disable) "Automatic See B"		[XEQ] "A"	
	Displays as in 9b			PLAY Y?
	If you do not wish to view all rows of the			
	calculator's "board", you may return to			
	the play prompt by		[R/S] [XEQ] "B"	PLAY Y?
9c	End the game or obtain mid-game tally		[XEQ] "E"	(scrolling) TALY:
				TALY: BM WN

				SIZE: 103
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
	To continue the game		[XEQ] "B"	PLAY Y?
	Enter your play.			
10	When game ends due to "no plays exist"			
	condition, TALY: executes automatically			
11	If a printer is used it should be in			
	MAN mode.			

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$01+LBL "FLI49 ×<> 37$ $PO^*$ 50 ×<> 26 $02+LBL$ 12Check current51 ×<> 57 $03$ "SIZE>=1SIZE52 ×<> 75 $03$ "SIZE>=1SIZE52 ×<> 74 $04$ CF 0154 ×<> 52 $05$ CF 1256 ×<> 42 $06$ CF 1356 ×<> 47 $07$ CF 27User mode flag57 ×<> 47 $09$ SF 25Error ignore flag60 ×<> 56 $11$ FC? 2561 ×<> 64 $45$ X<> 556 $11$ FC? C25Recheck SIZE, $64$ X<> 34 $15$ SREG 9467 ×<> 35 $16$ CLST66 ×<> 35 $17$ 9967 ×<> 84 $19$ STO INDR01-R9 $72$ X<> 14 $21$ GTO 15Clear R07 & R93 $72$ ×<> 15 $23$ STO 93Generate 100 ind. $24$ 24 +Generate 100 ind. $24$ 25 STO 90Address, R100 $26$ St<> 87 $26$ St<				
$90^{\circ}$ 56 $5< > 26$ $03^{\circ}$ "SIZE>=1SIZE $52 < < > 57$ $03^{\circ}$ "GSIZE>=1SIZE $03^{\circ}$ "GSIZE>=1SIZE $03^{\circ}$ "GSIZE>=1SIZE $03^{\circ}$ "GCF 01SIZE $05^{\circ}$ CF 12SIZESIZE $06^{\circ}$ CF 27User mode flagSIZE $09^{\circ}$ SF 25Error ignore flagSIZE $09^{\circ}$ SF 25Error ignore flagCG X<> 25 $09^{\circ}$ SF 25Recheck SIZE,CI X<> 64 $11^{\circ}$ CC 25Recheck SIZE,CI X<> 44 $14^{\circ}$ GT 12if necessaryCI X<> 46 $16^{\circ}$ CLSTClear R07 & R03CI X<> 44 $16^{\circ}$ CLSTClear R07 & R03CI X<> 44 $19^{\circ}$ ST 0SI Clear R07 & R03CI X<> 44 $22^{\circ}$ ST 093(flip counter)CI X<> 63 $26^{\circ}$ ST 094address, R10076 $26^{\circ}$ ST 094Generate 100 ind.CI X<> 63 $27^{\circ}$ ST 091Generate 102 ind.CI X<> 84 $27^{\circ}$ ST 092address, R101CI X<> 84 $29^{\circ}$ ST 092register for82X<> 61 $32^{\circ}$ X<> 22register forS4X<> 13 $34^{\circ}$ X<> 22R04R01R9X $35^{\circ}$ XR2R3R0 GT0 $36^{\circ}$ XR2R3R0 GT0 $36^{\circ}$ XR2R3R0 GT0 $36^{\circ}$ XR2R3R0 GT0 $36^{\circ}$ XR2R3R0 G	01+LBL "FLI		49 X<> 37	
$02 \cdot LBL$ 12Check current51 $X <> 57$ $03"$ "SIZE >= 1SIZE53 $X <> 75$ $03"$ GF1255 $X <> 42$ $06$ CF 1255X <> 4256 $X <> 24$ $06$ CF 27User mode flag57X <> 47 $08$ SF 2158X <> 2559 $09$ SF 25Error ignore flag60X <> 56 $10$ ZREG 9761X <> 64 $12$ PROMPT62X <> 34 $15$ ZREG 94if necessary65 $16$ CLST64X <> 34 $15$ SREG 94if necessary65 $19$ STO IND"Self-load" $19$ STO IND"Self-load" $20$ DSE X71 $21$ STO 97Clar RO7 & R93 $22$ STO 97Clar RO7 & R93 $23$ STO 99(flip counter) $24$ St +address, RI00 $26$ St +Generate 100 ind. $27$ STO 91address, RI01 $28$ St > 72register for $31$ X <> 77Store address of $32$ X <> 72register for $34$ X <> 27 $35$ X <> 82 $36$ X <> 82 $36$ X <> 82 $37$ Store address of $38$ X <> 71 $38$ X <> 72 $38$ X <> 73 $34$ X <> 27 $35$ X <> 73 $36$ X <> 84 $31$ K <> 74 $31$ E =5 $32$ X <> 73 $31$ K <> 74 $34$ X <> 28 $35$ X <> 73 $36$ X <> 82 $37$	PO"		50 X<> 26	
63"SIZE51ZE52 $K < 74$ 6364676154 $K < 52$ 64676154 $K < 52$ 65671256 $K < 24$ 67676257 $K < 47$ 68572158 $K < 25$ 695725Error ignore flag60 $K < 65$ 11FC? 25Error ignore flag60 $K < 65$ 11FC? 25Recheck SIZE,61 $K < 53$ 13FC?C 25Recheck SIZE,64 $K < 34$ 14GTO 12if necessary65 $K < 46$ 16CLST68 $K < 35$ 6818LBL 15"Self-load"69 $K < 84$ 19STO INDR01-R9970 $K < 15$ 26DSE X71K < 41	02+LBL 12	Check current	51 X(> 57	
$03"$ $33 \times 7 / 4$ $04 \in F = 01$ $53 \times 7 / 4$ $05 \in F = 12$ $55 \times 7 > 42$ $06 \in F = 13$ $56 \times 7 > 42$ $07 \in F = 27$ User mode flag $08 \in SF = 21$ $57 \times 7 > 47$ $08 \in SF = 25$ Error ignore flag $10 \in EREG = 97$ $61 \times 7 > 64$ $11 \in FC? = 25$ $63 \times 7 > 43$ $11 \in FC? = 25$ $63 \times 7 > 43$ $11 \in FC? = 25$ $63 \times 7 > 43$ $13 \in FC?C = 25$ $64 \times 7 > 34$ $14 \in TO = 12$ if necessary $65 \times 7 > 42$ $15 \in EREG = 94$ $66 \times 7 > 35$ $16 \in CLST$ $66 \times 7 > 35$ $17 = 99$ $67 \times 7 > 58$ $18 + LBL = 15$ "Self-load" $19 \text{ STO IND}$ $R01-R99$ $70 \times 7 = 79$ $67 \times 7 > 551$ $20 = DSE \times$ $71 \times 7 \times 41$ $21 = GTO = 15$ $Clear RO7 \& R93$ $23 = STO = 93$ $(flip counter)$ $24 = 24$ Generate 100 ind. $25 = TO = 90$ Generate 100 ind. $26 = 24$ $address, R101$ $26 = 24$ $address, R102$ $28 = 4$ $Generate 102 ind.$ $29 = STO = 92$ $address, R102$ $31 = X <> 72$ $RCL = 83 \times 31$ $32 \times 72$ $Rext board$ $33 = X <> 72$ $RCL = 87$ $31 = X <> 72$ $RCL = 99$ $81 = X <> 82$ $81 = X <> 83$ $10 = 100$ $10 = 22 \times 72$ $1$	03 "SIZE>=1	SIZE		
04CF $01$ $34$ $X < J$ $32$ $06$ CF $12$ $56$ $X < J$ $42$ $06$ CF $13$ $56$ $X < J$ $42$ $07$ CF $27$ User mode flag $57$ $X < J$ $47$ $08$ SF $21$ User mode flag $58$ $X < J$ $56$ $09$ SF $25$ Error ignore flag $60$ $X < J$ $56$ $11$ FC? $25$ $61$ $X < J$ $65$ $11$ FC? $25$ Recheck SIZE, $61$ $X < J$ $44$ $13$ FC?C $25$ Recheck SIZE, $63$ $X < J$ $44$ $15$ SREG $94$ if $66$ $X < J$ $34$ $16$ CLST $66$ $64$ $X > 34$ $43$ $16$ CLST $66$ $64$ $X > 34$ $16$ CLST $66$ $X < J$ $84$ $16$ CLST $69$ $X < 84$ $17$ $99$ $67$ $X < S4$ $12$ GTO $15$ Clear R07 & R93 $72$ $24$ STO $93$ Generate 100 $16.$ $75$ $24$ STO $91$ address, R100 $76$ $X < 63$ $25$ STO $91$ address, R102 $78$ $X < 36$ $25$ STO $92$ address, R102 $78$ $X < 36$ $28$ STO $92$ address, R102 $86$ $X < 31$ $32$ $X < 77$ next board $83$ $X$	03"		53 X() 74	
$0^{05}$ CF 12 $3^{50}$ X<> $4^{2}$ $0^{07}$ CF 27User mode flag $5^{6}$ X<> $2^{4}$ $0^{7}$ CF 27User mode flag $5^{7}$ X<> $4^{7}$ $0^{9}$ SF 25Error ignore flag $6^{9}$ X<> $2^{5}$ $0^{9}$ SF 25Error ignore flag $6^{1}$ X<> $6^{4}$ $10^{12}$ Ercor 25 $6^{1}$ X<> $6^{4}$ $11^{13}$ FC?C 25Recheck SIZE, $6^{3}$ X<> $4^{3}$ $14^{14}$ GTO 12if necessary $6^{5}$ X<> $4^{6}$ $16^{12}$ CLST $6^{6}$ X<> $3^{5}$ $6^{7}$ X<> $4^{5}$ $19^{13}$ STO IND $8^{11}$ -load" $6^{8}$ X<> $8^{5}$ $19^{13}$ STO IND $8^{11}$ -load" $6^{8}$ X<> $4^{3}$ $20^{13}$ DSE X $7^{11}$ X<> $4^{14}$ $7^{12}$ X<> $14^{14}$ $21^{13}$ GTO 15Clear R07 & R93 $7^{2}$ X<> $4^{8}$ $23^{13}$ STO 93(f1 prounter) $7^{4}$ X<> $15^{14}$ $24^{13}$ ErGenerate 100 ind. $7^{5}$ X<> $6^{6}$ $25^{2}$ STO 94address, R100 $7^{6}$ X<> $33^{14}$ $26^{2}$ Sto 92address, R101 $7^{9}$ X<> $36^{14}$ $28^{2}$ Sto 92address, R102 $80$ X<> $86^{14}$ $31^{13}$ X<> $2^{2}$ Register for $84^{14}$ X<> $13^{13}$ $34^{14}$ X<> $27^{14}$ Rout, L242 $86^{14}$ X<> $13^{13}$ $36^{14}$ S $7^{14}$ S $89^{14}$ S $36^{14}$ S $7^{14}$ S $89^{14}$ S $37^{14}$ S $82^{14}$ S $81^{14}$ S $38^{14}$ S $7^{14}$ S $88^{14}$ S $37^{14}$ S $82^{14}$ S $81^{14}$ S $38^{14}$ S $7^{14}$	04 CF 01		04 X(2 02 FE 923 40	
06CF13 $36$ $X <> 24$ $07$ CF27User mode flag57 $X <> 47$ $08$ SF25Error ignore flag58 $X <> 25$ $09$ SF25Error ignore flag60 $X <> 65$ $11$ FC?2561 $X <> 64$ $12$ PROMPT62 $X <> 53$ $13$ FC?C25Recheck SIZE,64 $14$ GTO12if necessary65 $16$ CLST64 $X <> 34$ $16$ CLST67 $X <> 58$ $19$ STOINDR01-R99 $70$ $X <> 51$ $72$ $26$ DSE X71 $X <> 44$ $21$ GTO15 $72$ $24$ STO93(flip counter) $24$ 24Generate 100 ind.75 $24$ STO93(flip counter) $24$ 24Generate 102 ind. $25$ STO93address, R100 $26$ ST94 $26$ 94Generate 102 ind. $27$ STO91 $28$ 24 $31$ $X <> 77$ $32$ Store address of $32$ $X <> 78$ $331$ $X <> 77$ $34$ $X <> 13$ $35$ $X <> 21$ $36$ $X <> 87$ $37$ $X <> 88$ $31$ $X <> 77$ $33$ $X <> 88$ $34$ $X <> 13$ $35$ $X <> 14$ <	05 CF 12			
$0' \in CF = 27$ User mode flag $37 \times \times > 47$ $0' \in SF = 21$ $0' \in SF = 25$ $S' \in X > 25$ $0' \in SF = 25$ $S' \in X > 25$ $10 \in SREG = 97$ $61 \times \times > 64$ $11 \in FC? = 25$ $61 \times \times > 64$ $12 = PROMPT$ $62 \times \times > 53$ $13 \in FC?C = 25$ Recheck SIZE, $14 \in GTO = 12$ if necessary $15 \in SREG = 94$ $66 \times \times > 35$ $16 \in CLST$ $66 \times \times > 35$ $17 = 99$ $67 \times \times > 58$ $18 \leftarrow LBL = 15$ "Self-load" $19 = STO = IND$ $ROI - R07 \& R93$ $20 = DSE \times$ $71 \times \times > 41$ $21 = GTO = 15$ $Clear R07 \& R93$ $23 = STO = 93$ $(flip counter)$ $24 = 24$ $Generate 100$ ind. $27 = STO = 94$ $Generate 100$ ind. $26 = St = 35 = 10$ $72 \times \times > 33$ $27 = STO = 94$ $Generate 102$ ind. $28 = STO = 92$ $address, R101$ $28 = STO = 92$ $address of$ $31 \times \times > 77$ $Store address of$ $32 \times \times > 72$ $RCL, LBL17$ $33 \times \times > 22$ $Rot Lbard$ $37 \times \times 82$ $88 \times \times 88$ $38 \times \times 71$ $38 \times \times 71$ $89 \times \times 81$ $36 \times \times 12$ $90 \times \times 11$ $46 \times \times 12$ $91 \times \times 18$ $41 \times \times 28$ $92 \times STO = 93$ $42 \times 17$ $93 \times 1 = -5$ $37 \times \times 82$ $92 \times 10 \otimes 8$ $38 \times \times 73$ $96 \times 11$ $45 \times \times 73$ $96 \times 10^{\circ}$ $44 \times \times 76$ $97 \times 93$ $45 \times \times 73$ $96 \times 10^{\circ}$ $46 \times \times 23$ $92 \times 1$	06 CF 13		06 X(2 24 E7 V/\ 47	
$098$ SF 21 $368 \times 7 \times 23$ $10$ ZREG 97Error ignore flag $60$ X<> 56 $11$ FC? 25 $61$ X<> 64 $12$ PROMPT $62$ X<> 53 $13$ FC?C 25Recheck SIZE, $63$ X<> 43 $14$ GTO 12if necessary $64$ X<> 34 $15$ ZREG 94 $66$ X<> 85 $16$ CLST $66$ X<> 85 $17$ 99 $67$ X<> 88 $19$ STO INDR01-R99 $70$ X<> 84 $20$ DSE X $71$ X<> 41 $21$ GTO 15Clear R07 & R93 $72$ X<> 48 $23$ STO 97Clear R07 & R93 $73$ X<> 48 $23$ STO 97Generate 100 ind. $75$ X<> 66 $25$ STO 98address, R100 $78$ X<> 33 $26$ DSE XGenerate 102 ind. $77$ X<> 33 $27$ STO 91address, R100 $78$ X<> 68 $31$ X<> $77$ next board $83$ X<> 31 $33$ X<> $22$ register for $84$ X<> 13 $34$ X<> $27$ RCL, LBL17 $85$ X<> 88 $35$ X<> $78$ routine, L.242 $86$ X<> 81 $36$ X<> $28$ $92$ STO 92 $36$ X<> $21$ $90$ X<> 11 $40$ X<> 12 $91$ X<> 18 $35$ X<> $21$ $90$ X<> 11 $46$ X<> $73$ $92$ STO 92 $36$ X<> $87$ $93$ STO 98 $37$ X<	07 CF 27	User mode flag		
10SF $\geq 5$ Error ignore flag60X<> 6511FC? 2561X<> 6412PROMPT62X<> 5313FC?C 25Recheck SIZE,63X<> 4314GT0 12if necessary64X<> 3415SREG 9465X<> 4616CLST66X<> 35179967X<> 5819STO IND"Self-load"69X<> 8420DSE X71X<> 4121GTO 15Clear R07 & R9373X<> 4823STO 93(flip counter)74X<> 1524Sto 91address, R10076X<> 6625STO 96Generate 100 ind.77X<> 3326St +address, R10178X<> 6829STO 92address, R10280X<> 8629STO 92address of82X<> 6122X72next board83X<> 3133X<> 22register for84X<> 1334X<> 27RCL, LBL1785X<> 3837X<> 8288X<> 8138X<> 2190X<> 1140X<	08 SF 21		50 ANZ 20 50 V/N 52	
102 KeL 9761 $X <> 64$ 11FC? 2561 $X <> 64$ 12PROMPT62 $X <> 54$ 13FC?C 25Recheck SIZE,63 $X <> 43$ 14GTO 12if necessary65 $X <> 46$ 15SREG 9466 $X <> 35$ 179967 $X <> 58$ 18LBL 15"Self-load"68 $X <> 85$ 19STO INDR01-R9970 $X <> 51$ 20DSE X71 $X <> 41$ 21GTO 15Clear R07 & R9373 $X <> 48$ 23STO 93(f1ip counter)75 $X <> 66$ 24 $\Sigma +$ Generate 100 ind.75 $X <> 66$ 25STO 94address, R10076 $X <> 83$ 26RCL 09981 $X <> 36$ 27STO 91Generate 102 ind.79 $X <> 86$ 28 $\Sigma +$ Generate 102 ind.79 $X <> 86$ 29STO 92address, R10280 $X <> 86$ 30RCL 09981 $X <> 83$ 31 $X <> 72$ register for84 $X <> 13$ 33 $X <> 22$ register for84 $X <> 16$ 36 $X <> 87$ 90 $X <> 88$ IND GTO38 $X <> 71$ 90 $X <> 11$ 9036 $X <> 73$ 92STO 92Save initiator35 $X <> 23$ 94STO 98ISG, DSE index44 $X <> 76$ 94	09 SF 23	Error ignore flag	60 X() 65	
11 $11 + 10^{\circ} 2.3$ $62 + 3.5 + 33$ 13FC?C 25Recheck SIZE, $63 \times 5.5 + 43$ 14GTO 12if necessary $65 \times 5.5 + 43$ 15SREG 94 $66 \times 5.35 + 35$ 16CLST $66 \times 5.5 + 35$ 1799 $67 \times 5.5 + 35$ 18+LBL 15"Self-load" $68 \times 5.8 + 35$ 19STO INDR01-R99 $70 \times 5.5 + 35$ 20DSE $\times$ $71 \times 5.4 + 15$ 21GTO 15Clear R07 & R9323STO 97Clear R07 & R9323STO 97Generate 100 ind.24STGenerate 101 ind.25STO 90Generate 102 ind.26SE +Generate 102 ind.27STO 91address, R10228St <> 229St <> 3831X<> 22register for84 $\times <>$ 3134X<> 2735X<> 2190X<	10 ZKEG 77 11 ECO 95		61 X(> 64	
12FC?C 25Recheck SIZE, if necessary63 $\times < >$ 4314GTO 12if necessary64 $\times < >$ 3415SREG 9466 $\times < >$ 3516CLST66 $\times < >$ 35179967 $\times < >$ 8518LBL 15"Self-load"69 $\times < >$ 19STO INDR01-R9970 $\times < >$ 5120DSE X71 $\times < >$ 5121GTO 15Clear R07 & R9372 $\times < >$ 22STO 07(flip counter)74 $\times < > >$ 23STO 93Generate 100 ind.75 $\times < >$ 24S+Generate 102 ind.77 $\times < >$ 25STO 91address, R10178 $\times < >$ 28S+Generate 102 ind.79 $\times < >$ 29STO 92981 $\times < >$ 31 $\times < >$ 27R0L BL178534 $\times < >$ 27R0L BL178535 $\times < >$ 78routine, L.24236 $\times < >$ 88IND GTO38 $\times < >$ 91 $\times < >$ 37 $\times < >$ 92STO 0238 $\times < >$ 9134 $\times < >$ 92STO 0238 $\times < >$ 9134 $\times < >$ 92STO 0238 $\times < >$ 94STO 0837 $\times < >$ 95ST 0938 $\times < >$ 94<	11 FC? 23 19 DDAMDT		62 X(> 53	
14GTO12if necessary64 $\times < >$ 3415SREG94if necessary65 $\times < >$ 3516CLST66 $\times < >$ 35179967 $\times < >$ 5818LBL15"Self-load"68 $\times < >$ 8519STOINDR01-R9970 $\times < >$ 5120DSE $\times$ 71 $\times < >$ 4121GTO15Clear R07 & R9373 $\times < >$ 4823STO93(flip counter)74 $\times < >$ 1524S+Generate 100 ind.75 $\times < >$ 6625STO90address, R10076 $\times < >$ 3626S+Generate 102 ind.79 $\times < >$ 6829STO92address, R10280 $\times < >$ 3628S+Generate for83 $\times < >$ 3131 $\times < >$ 72next board83 $\times < >$ 3133 $\times < >$ 22register for84 $\times < >$ 3835 $\times < >$ 7185 $\times < >$ 38ND GTO38 $\times < >$ 7189 $\times < >$ 81ND GTO38 $\times < >$ 91 $\times < >$ 18 $\times < >$ 1140 $\times < >$ 1291 $\times < >$ 18 $\times < >$ 33 $\times < >$ 22register for84 $\times > >$ 18 <td>13 EC2C 25</td> <td></td> <th>63 X(&gt; 43</th> <td></td>	13 EC2C 25		63 X(> 43	
15 $2REG$ 9411necessary65 $\times < >$ 4616CLST66 $\times < >$ 35179967 $\times < >$ 5819STOINDR01-R9968 $\times < >$ 8519STOINDR01-R9969 $\times < >$ 8420DSE $\times$ 71 $\times < >$ 4121GTO15Clear R07 & R9373 $\times < >$ 4823STO93(f1 p counter)74 $\times < >$ 1423STO93(f1 p counter)74 $\times < >$ 152424 $+$ Generate 100 ind.75 $\times < >$ 6625STO90Generate 102 ind.79 $\times > < >$ 6829STO92address, R10280 $\times < > > < > < < > 30RCL09981\times < > > < < > < < > 8331\times < > 27RCL, LB1785\times < > 388335\times < > 78routine, L.24286\times < > > < < > < > < > 8136\times < > 1290\times < > > < > > < > > < > > < < > < > < > $	14 CTO 12	Recheck SIZE,	64 X<> 34	
16CLST66 $\times < >$ 35179967 $\times < >$ 5818LBL15"Self-load"69 $\times < >$ 8419STOINDR01-R9970 $\times < >$ 8420DSE X71 $\times < >$ 8172 $\times < >$ 8420DSE X71 $\times < >$ 8472 $\times < > >$ 8421GTO15Clear R07 & R9373 $\times < >$ 4421GTO93Generate 100 ind.74 $\times < > >$ 1524STO93Generate 101 ind.75 $\times < > 66$ 25STO90address, R10076 $\times < > 63$ 26S+Generate 102 ind.79 $\times < > 68$ 29STO92address, R10280 $\times < > 86$ 30RCL09981 $\times < > 83$ 31 $\times < > 77$ Store address of82 $\times < > 61$ 32 $\times < > 72$ next board83 $\times < > 31$ 33 $\times < > 22$ register for84 $\times < > 13$ 34 $\times < > 27$ RCL, LBL1785 $\times < 81$ 35 $\times < > 71$ 89 $\times < > 81$ 9038 $\times < > 71$ 89 $\times < 81$ 41 $\times < 28$ 92STO $02$ 42 $\times < 17$ 93 $1 = -5$ 43 $\times < 67$ 94STO $08$ 44 $\times < 76$ 95ST $09$ 45 $\times < 62$ 97 $91$ $100$ 46	15 SREG 94	if necessary	65 X<> 46	
179967 $\times < > 58$ 181815"Self-load" R01-R9967 $\times < > 58$ 19STOINDR01-R9968 $\times < > 84$ 20DSE $\times$ 71 $\times < > 41$ 21GTO15Clear R07 & R9373 $\times < > 48$ 23STO93(f11p counter)74 $\times < > 15$ 24 $\Sigma +$ Generate 100ind.75 $\times < > 66$ 25STO90Generate 101ind.7724 $\Sigma +$ Generate 102ind.7725STO91address, R10178 $\times < > 36$ 26 $\Sigma +$ Generate 102ind.7727Store address of address, R10280 $\times < > 86$ 30RCL09981 $\times < > 38$ 31 $\times < > 77$ Store address of next board83 $\times < > 31$ 34 $\times < 27$ RCL, LBL1785 $\times < > 38$ 37 $\times < 82$ 88 $\times > 88$ IND GTO38 $\times < > 21$ 90 $\times < > 11$ 40 $\times < 12$ 91 $\times < > 18$ 41 $\times < 28$ 92STO6238 $\times < 73$ 94STO6844 $\times < 76$ 94STO6845 $\times < 73$ 96ADVClear print buf46 $\times < 62$ 97ADVClear print buf46 $\times < 23$ 98"HANDICA98	16 CLST		66 X<> 35	
$18 \times LBL$ $15$ "Self-load" R01-R99 $68$ $\times < > 85$ $69$ $19$ STOINDR01-R99 $69$ $\times < > 84$ $69$ $20$ DSE $\times$ $71$ $\times < > 41$ $21$ GTO15 $72$ $\times < > 14$ $22$ STO $97$ (flip counter) $74$ $\times < > 15$ $24$ $\Sigma +$ Generate 100 ind. $75$ $\times < > 66$ $25$ STO $90$ Generate 101 ind. $75$ $\times < > 66$ $26$ $\Sigma +$ Generate 102 ind. $79$ $\times < > 33$ $27$ STO $91$ address, R100 $76$ $\times < > 86$ $28$ $\Sigma +$ Generate 102 ind. $79$ $\times < > 86$ $29$ STO $92$ address, R102 $80$ $\times < > 86$ $30$ RCL $09$ $9$ $81$ $\times < > 83$ $31$ $\times < > 77$ Store address of $82$ $\times < > 61$ $32$ $\times < 77$ next board $83$ $\times < > 31$ $33$ $\times < 22$ register for $84$ $\times < > 13$ $34$ $\times < 27$ RCL, LBL17 $85$ $\times < 38$ $38$ $\times < 78$ routine, L.242 $86$ $\times > 11$ $40$ $\times < 12$ $94$ $\times > 108$ $\times > 11$ $40$ $\times < 12$ $92$ $\times 98$ $\times 98$ $34$ $\times < 23$ $92$ $\times 99$ $(ditto)$ $42$ $\times > 12$ $91$ $\times < 18$ $41$ $\times < 28$ $92$ $5TO$ $69$ $43$	17 99		67 X<> 58	
19STOIND $301-R99$ $69$ $X <> 84$ 20DSEX $70$ $X <> 51$ 20DSEX $71$ $X <> 41$ 21GTO15Clear R07 & R93 $73$ $X <> 48$ 23STO93(flip counter) $74$ $X <> 48$ 23STO93Generate 100 ind. $75$ $X <> 66$ 25STO90address, R100 $76$ $X <> 63$ 26E+Generate 102 ind. $79$ $X <> 36$ 26E+Generate 102 ind. $79$ $X <> 86$ 29STO92address, R102 $80$ $X <> 86$ 29STO92address, R102 $80$ $X <> 86$ 30RCL $99$ 81 $X <> 83$ 31 $X <> 77$ Store address of $82$ $X <> 61$ 32 $X <> 72$ next board $83$ $X <> 31$ 33 $X <> 22$ register for $84$ $X <> 13$ 34 $X <> 27$ RCL, LBL17 $85$ $X <> 88$ 35 $X <> 21$ $90$ $X <> 11$ 40 $X <> 12$ $92$ STO $92$ 343 $X <> 67$ $94$ STO $94$ 35 $X <> 73$ $94$ STO $98$ 44 $X <> 76$ $94$ STO $96$ 45 $X <> 32$ $96$ $97$ $90V$ 46 $X <> 62$ $97$ $90V$ Clear print buf46 $X <> 23$ $97$ $90V$	18+LBL 15		68 X<> 85	
X $R01-R99$ $70 \times X <> 51$ 20DSE X71 X <> 4121GTO 15 $72 \times <> 14$ 22STO 97Clear R07 & R9323STO 93(flip counter)24 $\Sigma +$ Generate 100 ind.24 $\Sigma +$ Generate 101 ind.25STO 90address, R10026 $\Sigma +$ Generate 102 ind.27STO 91address, R10128 $\Sigma +$ Generate 102 ind.29STO 92address, R10230RCL 09931X <> 7233X <> 2227RCL, LBL1734X <> 2735X <> 1636X <> 8737X <> 8238X <> 2138X <> 1140X <> 1238Y <> 1539X <> 2130X <> 1731S << 21	19 STO IND		69 X<> 84	
20DSE $\times$ 71X<> 4121GTO 15Clear R07 & R9373X<> 4822STO 07(flip counter)74X<> 1524 $\Sigma +$ Generate 100 ind.75X<> 6625STO 90address, R10076X<> 6326 $\Sigma +$ Generate 102 ind.79X<> 8629STO 91address, R10280X<> 8629STO 92address, R10280X<> 8629STO 92address, R10280X<> 8631X<> 77Store address of82X<> 6132X<> 72next board83X<> 3133X<> 22register for84X<> 1334X<> 27RCL, LBL1785X<> 3835X<> 78routine, L.24286X<<	×	KU1-K99	70 X<> 51	
21GTO15Clear R07 & R93 (flip counter)73 $x <> 14$ 22STO97(flip counter)74 $x <> 15$ 23STO98Generate 100 ind.75 $x <> 66$ 25STO90Generate 101 ind.77 $x <> 33$ 27STO91address, R10076 $x <> 68$ 26 $\Sigma +$ Generate 102 ind.79 $x <> 68$ 29STO92address, R10280 $x <> 86$ 30RCL981 $x <> 83$ 31 $x <> 77$ Store address of82 $x <> 61$ 32 $x <> 72$ next board83 $x <> 31$ 33 $x <> 22$ register for84 $x <> 13$ 34 $x <> 27$ RCL, LBL785 $x <> 38$ 35 $x <> 78$ routine, L.24286 $x <> 81$ 36 $x <> 87$ 91 $x <> 11$ 9038 $x <> 71$ 99 $x <> 81$ 35 $x <> 82$ 92STO9234 $x <> 28$ 92STO9235 $x <> 73$ 91 $x <> 18$ 41 $x <> 28$ 92STO9243 $x <> 67$ 94STO $88$ 44 $x <> 73$ 96ADV45 $x <> 73$ 96ADV46 $x <> 62$ 97ADV46 $x <> 23$ 98<"HANDICA	20 DSE X		71 X<> 41	
22STO $07$ $07$ $07$ $74$ $X <> 48$ 23STO93(f1) counter) $74$ $X <> 15$ 24 $\Sigma +$ Generate 100 ind. $75$ $X <> 66$ 25STO90Generate 101 ind. $77$ $X <> 33$ 27STO91address, R101 $76$ $X <> 63$ 28 $\Sigma +$ Generate 102 ind. $79$ $X <> 36$ 29STO92address, R102 $80$ $X <> 36$ 30RCL $09$ $9$ $81$ $X <> 83$ 31 $X <> 77$ Store address of $82$ $X <> 61$ 32 $X <> 72$ next board $83$ $X <> 31$ 33 $X <> 22$ register for $84$ $X <> 13$ 34 $X <> 27$ RCL, LBL17 $85$ $X <> 38$ 35 $X <> 78$ routine, L.242 $86$ $X <> 16$ 36 $X <> 82$ $92$ $STO$ $00$ 38 $X <> 71$ $93$ $1 \in -5$ 43 $X <> 67$ $94$ $STO$ $08$ 41 $X <> 28$ $92$ $STO$ $02$ 44 $X <> 73$ $96$ $ADV$ $Clear print buf$ 45 $X <> 32$ $97$ $ADV$ $Clear print buf$ 46 $X <> 23$ $97$ $ADV$ $Clear print buf$	21 GTO 15	Cloar DO7 8 D03	72 X<> 14	
23STO93(Trip counter) Generate 100 ind. address, R10074 $x< > 15$ 24 $\Sigma +$ Generate 100 ind. Generate 101 ind.75 $x< > 66$ 26 $\Sigma +$ Generate 101 ind. address, R10177 $x< > 33$ 27STO91address, R10178 $x< > 36$ 28 $\Sigma +$ Generate 102 ind. Generate 102 ind.79 $x< > 68$ 29STO92address, R10280 $x< > 86$ 30RCL09981 $x< > 83$ 31 $x< > 77$ Store address of store address of 34 $x< > 31$ 33 $x< > 22$ register for routine, L.24284 $x< > 13$ 34 $x< > 27$ RCL, LBL17 8585 $x< > 38$ 35 $x< > 78$ routine, L.24286 $x< > 16$ 36 $x< > 87$ 89 $x< > 88$ IND GTO38 $x< > 71$ 90 $x < > 11$ 40 $x< > 12$ 91 $x< > 18$ 41 $x< > 28$ 92STO $02$ 43 $x< > 67$ 94STO $08$ 44 $x< > 76$ 94STO $08$ 44 $x< > 73$ 96 $ADV$ Clear print buf45 $x< > 62$ 97 $ADV$ 46 $x< > 62$ 97 $ADV$ 48 $x< > 23$ 98<"HANDICA	22 STO 07	(flip counter)	73 X<> 48	
24 $\Sigma +$ address, R10075 $X < > 66$ 25STO90generate 101 ind.77 $X < > 63$ 26 $\Sigma +$ generate 102 ind.79 $X < > 68$ 29STO92address, R10280 $X < > 86$ 30RCL09981 $X < > 83$ 31 $X < > 77$ Store address of82 $X < > 61$ 32 $X < > 72$ next board83 $X < > 31$ 33 $X < > 22$ register for84 $X < > 13$ 34 $X < > 27$ RCL, LBL1785 $X < > 38$ 35 $X < > 78$ routine, L.24286 $X < > 16$ 36 $X < > 87$ routine, L.24286 $X < > 16$ 36 $X < > 82$ 88 $X < > 88$ IND GTO38 $X < > 12$ 90 $X < > 11$ 90 $X < > 11$ 40 $X < > 12$ 90 $X < > 11$ 91 $X < > 18$ 41 $X < > 28$ 92STO $92$ Save initiator42 $X < > 17$ 93 $1 E - 5$ $94$ STO $98$ 44 $X < > 76$ 95ST*<09	23 STO 93	Generate 100 ind.	74 X(> 15	
25STO90Generate 101 ind. address, R101 Generate 102 ind.76 $X < > 33$ 3327STO91address, R101 Generate 102 ind.78 $X < > 33$ 3628 $\Sigma +$ Generate 102 ind. address, R10279 $X < > 68$ 29STO92address, R102 980 $X < > 86$ 8230RCL69981 $X < > 83$ 31 $X < > 77$ Store address of 132 $82$ $X < > 72$ $80$ $X < > 83$ $83$ 33 $X < > 22$ register for register for 84 $83$ $X < > 38$ $83$ $X < > 31$ 34 $X < > 27$ RCL, LBL17 $RCL, LBL17$ $85$ $X < > 38$ $Address, first$ 35 $X < > 78$ $X < > 82$ $87$ $STO90X < > 81Address, first37X < > 8287STO90X < > 8190X < > 1140X < > 1290X < > 1291X < > 188192STO9292Save initiator41X < > 28X < > 7394STO9695ST*09(ditto)43X < > 6794STO969790V969790V46X < > 629798"HANDICA9310V$	24 Σ+	address, R100		
26 $2+$ address, R101 $78$ $x(2 > 36$ $27$ STO91address, R102 $79$ $x(2 > 68$ $29$ STO92 $address$ , R102 $80$ $x(2 > 86$ $30$ RCL $09$ $9$ $81$ $x(2 > 83$ $31$ $x(2 > 77$ Store address of $82$ $x(2 > 61$ $32$ $x(2 > 72$ next board $83$ $x(2 > 38$ $33$ $x(2 > 22$ register for $84$ $x(2 > 13$ $34$ $x(2 > 27$ RCL, LBL17 $85$ $x(2 > 38$ $35$ $x(2 > 78$ routine, L.242 $86$ $x(2 > 16$ $36$ $x(2 > 87$ $89$ $x(2 > 16$ $36$ $x(2 > 87$ $90$ $x(2 > 16$ $36$ $x(2 > 17$ $90$ $x(2 > 11)$ $40$ $x(2 > 17$ $91$ $x(2 > 18)$ $41$ $x(2 > 67$ $94$ $STO$ $08$ $42$ $x(2 > 17)$ $93$ $1$ $43$ $x(2 > 73)$ $96$ $ADV$ $44$ $x(2 > 76$ $95$ $ST*$ $09$ $45$ $x(2 > 73)$ $96$ $ADV$ $47$ $x(2 > 73)$ $98$ "HANDICA $48$ $x(2 > 23)$ $98$ "HANDICA	25 810 90	Generate 101 ind.	76 77 63	
27STO 91Generate 102 ind. address, R10279 $X < > 68$ 29STO 92address, R10280 $X < > 86$ 30RCL 09981 $X < > 83$ 31 $X < > 77$ Store address of next board82 $X < > 61$ 32 $X < > 72$ next board83 $X < > 31$ 33 $X < > 22$ register for routine, L.24284 $X < > 13$ 34 $X < > 27$ RCL, LBL1785 $X < > 38$ 35 $X < > 78$ routine, L.24286 $X < > 16$ 36 $X < > 87$ 87STO 00Address, first37 $X < > 82$ 88 $X < > 88$ IND GTO38 $X < > 71$ 89 $X < > 81$ 41 $X < > 28$ 92STO 02Save initiator42 $X < > 17$ 931 $E - 5$ 43 $X < > 67$ 94STO 08ISG, DSE index44 $X < > 76$ 95ST* 09(ditto)45 $X < > 73$ 96ADVClear print buf46 $X < > 32$ 98<"HANDICA	26 24	address, R101	70 7/ 33	
26 $27$ 9address, R102 $80$ 81 84 83 $86$ 81 84 83 $30$ RCL $99$ $81$ 81 84 83 83 84 84 84 84 84 84 84 84 84 84 84 85 84 84 85 86 86 86 86 86 86 86 86 86 87 87 86 86 86 86 87 87 87 86 86 84 86 87 87 87 87 86 84 84 86 87 87 87 87 86 81 86 81 87 87 87 87 86 81 86 86 87 87 87 88 88 81 90 81 89 81 89 81 89 81 89 81 89 81 89 81 81 86 81 89 81 81 81 82 81 81 82 81 82 81 81 82 81 81 82 81 82 81 82 81 81 82 81 82 81 81 82 81 81 81 82 81 81 81 82 81 81 81 82 81<	27 210 31	Generate 102 ind.		
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30KeL37Store address of next board register for 8382 $X(2)$ 61 	Z2 310 22 Z0 PCI 09	9	81 X<> 83	
32 $x<>$ $72$ next board $83$ $x<>$ $31$ $33$ $x<>>$ $22$ register for $84$ $x<>$ $13$ $34$ $x<>$ $27$ RCL, LBL17 $85$ $x<>$ $38$ $35$ $x<>$ $78$ routine, L.242 $86$ $x<>$ $16$ $36$ $x<>$ $87$ $87$ $510$ $00$ Address, first $37$ $x<>$ $82$ $87$ $510$ $00$ Address, first $37$ $x<>$ $82$ $87$ $510$ $00$ $Address, first$ $38$ $x<>$ $71$ $89$ $x<>$ $81$ $35$ $x<>$ $21$ $90$ $x<>$ $11$ $40$ $x<>$ $12$ $91$ $x<>$ $18$ $41$ $x<>$ $28$ $92$ $510$ $02$ $Save$ initiator $42$ $x<>$ $17$ $93$ $1$ $E-5$ $94$ $ST0$ $08$ $ISG$ , DSE index $44$ $x<>$ $76$ $94$ $ST0$ $08$ $ISG$ , DSE index $95$ $ST*$ $09$ $(ditto)$ $45$ $x<<<73$ $96$ $ADV$ $Clear print buf$ $93$ $1$ $16$ $100$ $100$ $46$ $x<<>62$ $97$ $ADV$ $98$ <"HANDICA	30 KCE 85	Store address of	82 X<> 61	
$33 \times \langle \rangle 22$ register for RCL, LBL17 routine, L.242 $84 \times \langle \rangle 13$ $85 \times \langle \rangle 38$ 	32 X(> 72	next board	83 X<> 31	
34 $X <>$ $27$ RCL, LBL17 routine, L.242 $85$ $X <>$ $38$ $35$ $X <>$ $78$ routine, L.242 $86$ $X <>$ $16$ $36$ $X <>$ $87$ $5TO$ $00$ Address, first $37$ $X <>$ $82$ $87$ $5TO$ $00$ $38$ $X <>$ $71$ $85$ $X <>$ $88$ $X <>$ $36$ $X <>$ $71$ $89$ $X <>$ $88$ $X <>$ $38$ $X <>$ $71$ $90$ $X <>$ $81$ $40$ $X <>$ $12$ $90$ $X <>$ $11$ $40$ $X <>$ $12$ $91$ $X <>$ $18$ $41$ $X <>$ $28$ $92$ $5TO$ $02$ $Save$ $41$ $X <>$ $26$ $94$ $STO$ $08$ $ISG$ , DSE index $44$ $X <>$ $76$ $95$ $ST *$ $09$ (ditto) $45$ $X <>$ $73$ $96$ $ADV$ Clear print buf $46$ $X <>$ $32$ $98$ <"HANDICA	33 X<> 22	register for	84 X<> 13	
$35 \times <> 78$ routine, L.242 $86 \times <> 16$ Address, first $36 \times <> 87$ $87 \times 00$ Address, first $37 \times <> 82$ $88 \times <> 88$ IND GTO $38 \times <> 71$ $89 \times <> 81$ $90 \times <> 11$ $40 \times <> 12$ $91 \times <> 18$ $41 \times <> 28$ $92 \times 002$ $42 \times <> 17$ $93 \times 28$ $43 \times <> 67$ $94 \times 008$ $44 \times <> 76$ $95 \times 81 \times 09$ $45 \times <> 73$ $96 \text{ ADV}$ $46 \times <> 62$ $97 \text{ ADV}$ $48 \times <> 23$ $98 \text{ "HANDICA}$	34 X<> 27	RCL, LBL17	85 X<> 38	
36 X<> 87 87 STO ØØ Address, first   37 X<> 82 88 X<> 88 IND GTO   38 X<> 71 89 X<> 81 90 X<> 11   35 X<> 21 90 X<> 11 91 X<> 18   40 X<> 12 91 X<> 18 93 1 E-5   41 X<> 28 92 STO 02 Save initiator   42 X<> 17 93 1 E-5   43 X<> 67 94 STO 08 ISG, DSE index   44 X<> 76 95 ST* 09 (ditto)   45 X<> 73 96 ADV Clear print buf   46 X<> 32 98<"HANDICA	35 X<> 78	routine, L.242	86 X<> 16	
$37 \times \langle \rangle 82$ $88 \times \langle \rangle 88$ IND GTO $38 \times \langle \rangle 71$ $89 \times \langle \rangle 81$ $35 \times \langle \rangle 21$ $90 \times \langle \rangle 11$ $40 \times \langle \rangle 12$ $91 \times \langle \rangle 18$ $41 \times \langle \rangle 28$ $92 \text{ STO } 02$ $41 \times \langle \rangle 28$ $92 \text{ STO } 02$ $42 \times \langle \rangle 17$ $93 1 \text{ E-5}$ $43 \times \langle \rangle 67$ $94 \text{ STO } 08$ $44 \times \langle \rangle 76$ $95 \text{ ST* } 09$ $45 \times \langle \rangle 73$ $96 \text{ ADV}$ $46 \times \langle \rangle 62$ $98 \text{ "HANDICA}$ $48 \times \langle \rangle 23$ $P2^{\circ}$	36 X<> 87		87 STO 00	Address, first
$38 \times (> 71$ $89 \times (> 81$ $35 \times (> 21$ $90 \times (> 11$ $40 \times (> 12$ $91 \times (> 18$ $41 \times (> 28$ $92 \text{ STO } 02$ $42 \times (> 17$ $93 \text{ 1 E-5}$ $43 \times (> 67$ $94 \text{ STO } 08$ $44 \times (> 76$ $95 \text{ ST* } 09$ $45 \times (> 73$ $96 \text{ ADV}$ $46 \times (> 62$ $98 \text{ "HANDICA}$ $48 \times (> 23$ $P2 \text{ "T}$	37 X<> 82		88 X<> 88	IND GTO
$35 \times \langle \rangle 21$ $90 \times \langle \rangle 11$ $40 \times \langle \rangle 12$ $91 \times \langle \rangle 18$ $41 \times \langle \rangle 28$ $92 \text{ STO } 02$ $42 \times \langle \rangle 17$ $93 1 \text{ E}-5$ $43 \times \langle \rangle 67$ $94 \text{ STO } 08$ $44 \times \langle \rangle 76$ $95 \text{ ST* } 09$ $45 \times \langle \rangle 73$ $96 \text{ ADV}$ $46 \times \langle \rangle 62$ $98 \text{ "HANDICA}$ $48 \times \langle \rangle 23$ $P2  "Control of the second states $	38 X<> 71		89 X<> 81	
40 X<> 12 91 X<> 18   41 X<> 28 92 Sto 02 Save initiator   42 X<> 17 93 1 E-5   43 X<> 67 94 STO 08 ISG, DSE index   44 X<> 76 95 ST* 09 (ditto)   45 X<> 73 96 ADV Clear print buf   46 X<> 32 98<"HANDICA	35 X<> 21		90 X<> 11	
41 $X < > 28$ $92$ $510$ $62$ $5aVe$ $1111ator$ 42 $X < > 17$ $93$ $1 E-5$ $94$ $510$ $08$ $ISG, DSE$ $Idex$ 43 $X < > 67$ $94$ $STO$ $08$ $ISG, DSE$ $Idex$ 44 $X < > 76$ $95$ $ST * 09$ (ditto)45 $X < > 73$ $96$ $ADV$ Clear print buf46 $X < > 62$ $98$ "HANDICA47 $X < > 32$ $98$ "HANDICA	40 X<> 12		91 X(> 18	Sava initiator
42 X< > 17 93 1 2-5   43 X< > 67 94 STO 08 ISG, DSE index   44 X< > 76 95 ST* 09 (ditto)   45 X< > 73 96 ADV Clear print buf   46 X< > 62 97 ADV   47 X< > 32 98<"HANDICA	41 X<> 28		92 SIU 02 97 1 5-5	save initiator
43 X< > 67 94 310 96 136, DSE Index   44 X< > 76 95 ST* 09 (ditto)   45 X< > 73 96 ADV Clear print buf   46 X< > 62 97 ADV   47 X< > 32 98<"HANDICA	42 8<> 17		73 I E-J 94 970 00	ISC DEF inday
44 X(2) 76 90 014 02 (ditt0)   45 X(2) 73 96 ADV Clear print buf   46 X(2) 62 97 ADV 100 0000000000000000000000000000000000	43 X(2 67 77 77		95 ST* 09	$(d_{i++\alpha})$
46 X<> 62 97 ADV   47 X<> 32 98<"HANDICA	44 ANZ (6 45 V/N 77		96 ANV	(uicco) Clean print but
47 X<> 32 48 X<> 23 98 "HANDICA P?"	40 ANZ (0 46 XZN 62		97 ANV	orear print but
48 X<> 23 P?"	47 243 32		98 "HANDICA	
	48 X<> 23		P?"	

99 TONE 9		148+LBL 04	
100 PROMPT	(At prompt.	149 RCL 77	
101 RCL 04	X=0.00001)	150 X<> 67	
102 X<>Y	Key in handicap.4	151 X<> 88	
103 885	neg in nanareap, i	152 X<> 78	
104 INT		153 X<> 58	
105 X>Y?	Entered n>4?	154 STO 77	
106 CLX	default to 0	155 RTN	
107 STO 04	Save handican	156+LBL 16	From 115
108 ST+ 01	Adj disc countor	157 GRAD	SF 12
109 XEQ 55		158 CF 12	51 42
110 FIX 0	10.373	159 "YOU 1ST	
111 "Hdc="		? <d>"</d>	
112 XEQ 56	To 604	160 PROMPT	CF 12
113 XEQ IND	To $116$ $125$ $127$	161 DEG	
X	127  or  147	162 <b>+</b> LBL D	10
114 ADV	.137, 01 .147	163 RCL 10	Nov+ IND GTO
115 PSE	To 155 161 16	164 STO 00	addross
116 GTO IND	10.155, LDI 10	165 1/X	Address Accupy contor
00	Boodiust oddrossos	166 ST+ 44	board squares
117+LBL 01	Redujust addresses	167 ST+ 45	board squares
118 RCL 28	stored in certain	168 ST+ 54	
119 X<> 67	board registers	169 ST+ 55	To 172 175 177
120 X<> 88	to prepare for	170 GTO IND	10.1/3, 1/3, .1/7
121 STO 28	game with	04	1/9, 07.101
122 RCL 27	nandicaps	171+LBL C	DIS/Enable - See
123 X<> 78		172+LBL E	BU & TATTY ROUL.
124 X<> 58		173 GTU IND	DACK LU .155
125 STO 27			
126+LBL 00		174 VLBL 04	Occupy the
127 RTN		173 514 88	handican squares
128+LBL 02		176¥LBL 03	nundreup squares
129 RCL 21		170 + 01 02	
130 X<> 67		170 CT+ 11	
131 X<> 88		177 317 11 1904 DI 01	
132 STO 21		100¥LDL 01 101 CT+ 10	
133 RUL 22		102AL PL 00	(0 1  in  X)
134 X() 78		183 FC2 42	Machine plays
130 X() 08		183 FC: 42 184 FHS	first?
136 510 22		185 STO IND	Occupied sa coce
137 KIN 1704 DL 07		90	& sign digit
138VLBL 03		186 SIGN	+1  or  -1
137 KUL 82 140 V/N 27		187 " W"	White discs
140 AN / 07 141 V/N 00		188 ASTO IND	Copy "W" into
141 ANZ 00 142 CTO 02		91	R101 & R102
142 010 02 147 DCL 70		189 ASTO IND	
143 KUL 72 144 873 78		92	
145 X(> 58		190 " B"	Black discs
146 STO 72		191 X<0?	Machine first?
147 RTN		192 ASTO IND	Save in R100
I		<sup>L</sup> 91	

		T	
193 X>0?		238 X<>Y	occupied square
194 ASTO IND	User first?	239 ENTER↑	code
92	Save in R101	240 CLX	Proparo stack for
195 CTO IND	Save in Kibi	241 STO 04	Prepare Stack TUP
195 GIO IND		242 CTO 01	
04		242 GIO 01	Clr rnd counter
196+LBL 04			To .253
197 ST* 88	Copy machine's	244 RUL IND	Machine's next
198 <b>+</b> LBL 03	sign digit into	×	trial play
199 ST* 81	the handican	245 FRC	с. тат р. жу
200+LBL 02	squares	246 X=0?	Unoccupied ca2
201 ST* 11	39001 83	247 GTO 01	
20241 BL 01		248 LASTX	10.253
202*EDE 01 207 CT# 10		249 X=Y2	
203 314 10		250 CTO 02	All sq tested?
204 <b>+</b> LBL 00	(+1 or -1 in X)	250 010 02	To .262
205 HBS		201 KT 250 V/NU	< X = +0.1  or  -0.1 > 1
206 CHS	-1		Ptr. from last red.
207 ST* 45	Black's sign digit	253 GIU 17	Try next sa in sea
208 ST* 54	Brack 5 Sign argit	254+LBL 01	ing next sq in seq
209 SF 04	Dicable "Deview"	255 RDN	
210 FS?C 01	DISADIE REVIEW	256 ABS	T- 250
211 GTO C	Automatic see bid	257 XEQ 00	10.359
212+1 BI 10	.513	258 X≠0?	Any flips found?
212 VEDE 10		259 GTO 03	To .275
213 KUL 02 314 CTO 00	18	260 X(>Y	
214 510 00	Next IND GTO add	261 PCL IND	Copy next pointer
21J F3: 42	You first?	T T	inX
ZIE GIU IND			.242: process sa
X	283		0.0009 in X
217 RCL 01	1 (finct disc)	263¥LBL 02	0.00 (Fix 2)
218 XEQ 55		264 INI	$\sum_{i=1}^{n} (i \neq i)$
219 ARCL IND	ck prtr status	265 510 IND	save o (No play)
91	Alpha code, B	05	III RUG OF U/
220 RCL 06		266 "⊢ "	(last play)
221 STO 05	Pointer, save last	267 ARCL X	
222 RCL 46	play	268 FS? 04	Is printer on?
223 RCL 64		269 PRA	
224 FS? 08	34 Machine	270 SIGN	(for possible
225 RCI 34	65 selects	271 RCL 07	termination of
226 X(Y2	43 its first	272 RCL 06	game)
227 RCI 65	56 play	273 -	(Your last play -
221 KCC 00 220 EC2 07	oo pray	274 X≠02	machine's in X)
220 53: 01		275 ENTERA	1 of the last 2
227 (1/1)		276 + I BL 03	not 'no play'?
230 FL? 08		277 DEED	noe no pray :
231 F576 07	loggie FU/ every	271 DECI 270 V-V2	Continue remained
232 X=0?	other time;	210 A-1: 370 ECA 40	Mashing 3
233 SF 07	(always false; an	2(7 F3/ 42 200 cto of	machine played
234 FC?C 08	AND filler	280 610 01	tor you?
235 SF 08	Toggle F08	281 FS? 01	Auto See Bd mode?
236 RCL IND	every time	282 GTO 04	To .504; rtn to
90	Copy R100 into X	283 ADV	.283 via .578
237 CHS		284 <b>+</b> LBL 18	
	+0.1, your	285 FS? 42	Start new message?

286 "PLAY:"		333 GTO 04	To .504
287 ARCL IND	Conv your alpha	334+LBL 01	From .328
92	code in R102	335 XEQ 57	.608
288 "⊢?"	into alpha rog	336 DEG	CF 42 or 43
289 7	Theo alpha reg.	337 DSE 05	Change frm 7 to 6
290 STO 05		338+1 BL 02	Erom 304
291 CF 12	Save ptr. to save		Occupied sa code
292 CLST	your next play &	90	& mach's sign
293 TONE 6	flips in RU/	740 592 42	digit
294 CRAN		348 F3: 42 341 CTO 01	No logal play?
295 PROMPT	In case .304 xeqd	742 CHS	To 247
296 615	Dsp. mach.'s play	747 PCI 01	10.347
297 INT	(Safeguard	744 YEO 02	
298 STO 03	against 0.1)	745 OPCL IND	# OT discs +1
299 STO 04	Save play or O	343 AKCE 18D	.590 (ARUL X, etc.)
700 PCL 01	In case .304 xeq	71 746 DA	Mach's alpha code
701 VEO 55	No. of discs +1		(+.1 or1 now
702 OPCI IND	Ck. prtr status	740ALDI 01	in X)
002 HKCL 100	Append you disc	740 PCL 01	From .340
707 PCL 07	a-code	347 RUL 02 750 CTO 17	18
704 V-02	Recover your play	350 610 17	To .242
304 A-0: 705 CTO 02	No play for you?	331VLDL H 750 5000 01	Auto See Bd
305 GTO 02	To $337$	352 FU?U 01	Toggle flag O1
300 KHU 707 DCL 10	SF 43 CF 42	353 SF 01 7544 DL 07	From .309 etc. &
307 RUL 10 700 V/NV	10	334+LBL 03	.325
300 4/-42	Validato	300 FIX 0	Your invalid play
307 81-12		356 HRUL 03	'No Good'
310 610 03	$\frac{20}{20}$	357 "F NG"	Disable xeg'n of
311 RUL 87	og entry	358+LBL B	.499 if B was
312 81=12		309 GIU IND	pressed
313 610 03			To .283 or .155
314 ANZI 715 DOL IND		360+LBL 00	(Play Sq. in X./
315 RUL IND		361 XEQ 01	(1  in  Y)
	Cuand magistan?	362 X(> 1	Copy(-Sa) into X
316 X=Y?	duard register:	363 RUL 09	0.0009 (ISG DSF
317 610 03		364 -	index)
318 FRU	Square already	365 XEQ 01	Process next pr
319 XF0: 700 CTO 07	takon?	366 842 1	0 00001
320 610 03	Cly ynd countor	367 RUL 08	150 DSE index-10
321 STU 04	Occupied sa code	368 +	Drocoss novt pr
322 RUL IND	machie sign in V	369 XEQ 01	Process next pr.
90 707 DOL 07	Mach S Sign In A	370 842 1	
323 RUL 03	Four play in $x$	371 RUL 08	
324 XEQ 00	10.359 No.61 in	372 -	ISG, DES INdex=II
320 N=0? 70/ CTC 07	NO TIIPS TOUNA?	373 XEW 01	Process 4th pr.
326 GIU 03	10.353	374 ULX	
327+LBL 01		375 X<> 93	Flip ct; clr R93
328 X=Y?	Cont. the game?	376 X=0?	No flips found?
329 610 01	10.333	377 KIN	lo .257 or .324
330 5	To term. game	378 R1	Play Sq. in X
331 510 00	For IND GTO	379 INT	
332 BEEP		380 X<>Y	Flip count in X

381 RCL 91	101	427 RCL IND	sq/edge is
382 /		Y	encountered
383 +		428 FRC	
384 STO IND	Save fling in DOG	429 X=Y?	Another opp disc?
<u>й5</u>	(mach) DO7 (vov)	430 GTO 13	
385 ARCI X	(mach.),RU7 (you)	431 CHS	
386 X<>Y	1.0	472 X±Y2	A vacant cauana
387 CHS	.1 & opp. sign	432 AFT.	A vacant square
700 STCN	.1 & players sign	433 KTN 474 SICH	or edge:
700 JIGH	Current player's	434 31GN 475 0DC	
307 LH31A 700 OPC	sign dig	43J HD3 474 CUC	
370 HD3 704 CT, IND	0.1	436 UN3	-1
391 21+ IND	Code, occupied sq	437 X<21	
		438 RT	Play sq in X
392 RUN		439 RT	Peripheral sq in
393 SI* IND	Copy curr, player	440+LBL 14	X
Ŷ	sign digit in	441 DSE X	Start moving
394 ABS	the play so	442 AOFF	toward the play
395 ST+ 01	Inc disc counter	443 X=Y?	sa
396 ST+ 04	Inc. and counton	444 GTO 01	back to starting
397 FS? 04	nninton on?	445 R↑	pt 2 + q AAQ
398 PRA	printer on:	446 ST* IND	μι.: ιο .449 1
399 RCL 60	60	Y	-I Change the sign
400 RCL 01		447 ST- 93	dist (flis)
401 X<=Y?	Any vac. sq left?	448 RDN	
402 ENTER↑	continue playing	449 GTO 14	Increment the
403 RTN	To .257 or .324	450+LBL 01	flip counter
404+LBL 01	Process adj sqs	451 RTN	
405 STO Z	Save play sq in Z	452 RTN	
406 X(>Y	+.1 or1 in X	457+1 BI F	Tally routine
407 ISG Y	Adj in Y	454+1 BI 05	From .512 or .578
408 00FF	(NOP)	455 7	
409 RCI IND	Copy adi reg.	456 870 00	Ptr for IND GTO
Y KOL IND	into X	450 510 80 457 VEN 55	Ck printer status
410 EPC		457 AL& 55	
411 X=Y2	Opp's disc here?	450 VEO 57	.608 (AVIEW)
412 XEO 13	off a most merer	437 AL& 31	, , , , , , , , , , , , , , , , , , ,
417 X() T	Test adi so on	400 130	Pointer, R11-88
414 CHS	opp side of the	461 11.000	Error ignore flag
415 STO 7	current	462 36 23	
413 318 2 416 V/NV	directional axis	463 0 474 ENTERA	
410 AV71 417 ICC V	arrectionar axis	464 ENIERI	Error for right
410 0055		463 LN	scroll
410 HOFF 410 DCL TWD		466¥LBL 06	Calculate the
417 RUL IND		467 RUL IND	number of black
1 400 EPC			discs now on the
420 FRU 401 VAVO	No one dias have?	468 FKL	board and do a
921 AFT: 400 DTV	NO OPP aisc nere?	469 X≠0?	difierential
422 KIN		470 SIGN	uifferential
423 <b>7</b> 181 13	Keep moving out	471 X<0?	count.
424 KUN 405 ICC V	in same direction	472 ST- Z	
423 ISG Y	until outflanking	473 +	
426 HUFF	disc or vacant	474 OCT	NOPS to reduce

475 DEC	scrolling rate	524 XEQ 03	.601
476 136 2 477 CTO 06		526 X<>1	Dud countou in V
478 "⊢B"	format the display	527 1	Rha counter in X
479 FIX 0	color	528 X>Y?	Were there 2
480 CF 29	COTOT	529 CLX	'no plays' in
481 ARCL Y		530 -	succession?
482 "⊢,W"		531 +	
483 CHS		532 XEQ 02	.590
484 - 405 TONE 7		533 HRUL IND	
483 IUNE 7 402 VEO 52		574 PCL 04	
400 AEQ 30 487 LOSTX	.604	535 XEQ 03	Mach's last play
488 FS2C 04	Differential disc	536 ADV	.601
489 PRX	count	537 PSE	
490 ADV	Is printer on?	538+LBL 01	 
491 <b>•</b> LBL 07		539 XEQ 55	From .515 Check printer
492 CF 12	Postono standand	540 FIX 0	status
493 FC? 55	conditions	541 CF 29	Status
494 CF 21	conditions.	542 11.018	Ptr for IND RCI
495 SF 29		543 510 03 544 1 000	of board reg's
496 DEG 407 EIV 0		545 CTO 05	Count rows
477 FIA 2 499 STAP		546 " "	
499 GTN 07	'Final' stop	547+LBL 08	
500+LBL B		548 ARCL X	
501 RCL 02	Initialize to	549 ISG X	Generate column
502 STO 00	resume game	550 GTO 08	numbers
503 GRAD	after a mid-	551 FS? 04	
504 GTO IND	game tally	552 PRA	Degin maine lass
×	10.285	553+LBL 09	Begin major loop
505+LBL 04	Auto Soo Rd &/or	554 " " 555 0001 05	Current row no
506 H#V F07 CDOD	end dame	556 HRUL 00	current row no.
500 CE 21	end game	557+LBL 11	Begin minor loop
509 AVIEW		558 RCL IND	Recode the discs
510 PSE	Pause to view last	03	(by color) and
511 PSE	play	559 FRC	vacant squares
512 FC? 01	Not Auto See Bd	560 X<0?	in the row for
513 GTO 05	To .453	561 "+*"	the alpha reg.
514+LBL C	From .170	562 X=0?	
515 FS? 04	Prtr ON, last rnd?	363 "F-" 564 V\Q2	
515 GIU 01 517 DC1 01	10.53/	565 "HO"	
518 RCI 04	Poassomble dice	566 ISG 03	
519 -	count and the	567 GTO 11	
520 XEQ 55	last round of	568 TONE 7	
521 ARCL IND	plays for review	569 AVIEW	
92	Prayo for ferren	570 2.01	Update pointer
522 RCL 07	Your last play	571 ST+ 03	for IND RCL of
523 TONE 7		572 ISG 05	next row

573 GTO 09		
574+LBL B	To about coo Rd	
575 ADV	TO abort see bu	
576 CLD		
577 CLST		
578+1 BI D		
579 CTO IND	Prevents a 2nd	
00	xeq'n of .161	
	To .283, .453,	
JOUVLEL JJ	or .490	
581 LF 04	Check printer	
582 SF 12	status and	
583 SF 21	other house-	
584 SF 25	keeping	
585 SF 27	Error ignore flag	
586 CLA	Uson mode flag	
587 ACA	NOD if mutual	
588 CLD	NUP, IT prtr. is	
589 FS?C 25		
590 SF 04	Prevent right	
591+LBL 02	scroll if error	
592 CLA	Printer ON?	
593 FIX Ø	From .531, .343	
594 SF 29		
595 RCL 10	10	
596 X<>Y		
597 X <y?< th=""><th>Is X a 1-digit</th><th></th></y?<>	Is X a 1-digit	
598 " "	number?	
599 ARCI X		
600 FIX 2		
601 RTN		
602+LBL 03	From 523 534	
603 X=0?		
604 "-	From .485, .111	
605+LBL 56	,	
606 ORCI X		
607 FS2 04	printer ON?	
608 PR0		
609+1 BL 57	From 334 458	
610 CE 21	, 1011 . 334, . 430	
611 OVIEW	View no stop	
612 SE 21	view, no scop	
012 01 21		
613 END.		
010 .2.00.		

#### **PROGRAM DESCRIPTION**

#### CODE CRACK

Given a fractional number the program uses a simple random number generator to create a "secret" code which you must guess (in as few guesses as possible). You must specify the length of the hidden code, and the highest number to be used in that code. Lengths may vary from 4 to 6 elements and allowable highest numbers are 6 through 9.

Each guess you make is compared to the calculator's hidden code. The number of correct characters in the correct position, and the number of guess characters found in the hidden code but in the wrong position is calculated. The resulting display shows your guess along with an "\*" for a "perfect" element and a "+" for each one which is right, but in the wrong place. The order of the "+"s and "\*"s is irrelevant.

A couple of notes: Numbers may be repeated in a given code. Entering the same "seed" (fractional number) will cause the calculator to generate the same sequence of codes (unless the other options are different).

STATUS	
SIZE:	024
FIX:	0
USER MODE:	ON/OFF
TOTAL PROGRAM BYTES:	269

DATA REGISTE	ERS
00	Guess
01	
02	Code Element
03	Inventory List
04 🖌	
05	
06	Helps calculate +'s
07	
08	
09	
10	Seed
11	Highest code number
12	Number of code digits
13	PSE looping
14	Number of guesses
15	Scratch
16	MSD
17 <b>]</b>	
18	Hidden code by element
19 🕇	
20	
21	
22	Number of *'s
23	Number of +'s

FLAGS USED		
5	Set:	Re-initializing inventory list
	clear:	Laiculating +'s
21	Set:	Printer Enable
	Clear:	Printer disabled
27	Set:	Set User mode
	Clear:	Clears User mode
29	Set:	Digit grouping commas
29	Clear:	No comma
	ciear.	

1. The first game is played with the least difficult options selected.

a) Number of digits in hidden sequence	:	4
b) Highest digit allowed in sequence	:	6
c) Seed	:	.5284163

2. This game uses the same conditions as #1.

DISPLAY	INPUT	FUNCTION	COMMENTS
	Load Program		
	Set Size 024		Start Program
		[XEQ] "CC"	-
No. Digits?	4	[R/S]	
No. in Code?	6	[R/S]	
Seed?	.5284163	[R/S]	
Guess 4	3366	[R/S]	
3366	1212	[R/S]	
1212 **	4512	[R/S]	
4512 ++++	1245	[R/S]	
OK, 4 Tries			
Play another game	- Same condit	ions.	
		[XEQ] "C"	
Guess 4	2235	[R/S]	
2235 ++	1466	[R/S]	
1466 +	3623	[R/S]	
3623 ++	6552	[R/S]	
OK, 4 Tries			

				SIZE: 024
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
1	Enter the program		[GTO]	PACKING
2	Set size 024			
3	Execute program		[XEQ] "CC"	NO. DIGITS?
4	Enter number of digits in hidden code			
	(must be 4, 5 or 6)	n	[R/S]	NO. IN CODE?
5	Enter highest number allowed in code	m	[R/S]	SEED?
	(6 ≤ M ≤ 9)			
6	Enter a seed. May be any fractional number	seed	[R/S]	GUESS N
7	Enter first guess - N digits	guess	[R/S]	guess [ ]
	In the display [ ] may contain nothing or			
	+(s) and/or *(s).			
8	Enter next guess	guess	[R/S]	guess []
9	Repeat step #8 until display shows:			OK, X guesses
	Where X is number of guesses			-
10	To play another game with the same			
	conditions.		[XEQ] "C"	GUESS N
11	To play another game with different			
	conditions.		[XEQ] "CC"	NO. DIGITS?

95

01+LBL "CC" ap siv a		47 1 40 CT/ 14	
02 FIA 0 03 CF 29		40 017 14 49 0	# of guesses
04 SF 21		50 STO 22	Initializo # of
05 "NO. DIG	Promots for and	51 STO 23	correct elements
ITS?"	stores # of	52+LBL 10	correct crements
06 PROMPT	digits in code	53 RCL 00	
07 STU 12	Highest code #	54 STO 15	
08 "NU. IN CODE2"	and seed	55 XEW 06	
09 PROMPT		57 RCL 15	Process guess
10 STO 11		58 10	
11 "SEED?"		59 2	
12 PROMPT		60 FRC	
13 STO 10		61 LASTX	
14 <b>*</b> LBL () 15 cc 07		62 INT	
10 UF 27 16 9		63 SIU 15 24 DTN	
17 ENTER†		65 10	
18 0	Zeros # of	66 *	
19 STO 14	guesses	67 1	01 01 0
20+LBL 00		68 FC? 05	Clear flag?
21 STO IND	Zeros R9-RI	69 ST- IND	list for (+)
i oo nee v			elements
23 GTO 00		70 FS? 03 71 ST+ IND	Set flag?
24 XEQ 06		Y Y	Change to evaluate
25+LBL 01	Changes Value in	72 FS? 05	next guess
26 RCL 10	RIO (seed)	73 GTO 11	
27 997	Random number	74 RDN	
20 M 29 ERA	generator	75 RUL IND	CHECK TOR
30 STO 10		13 76 X=V2	correct elements
31 RCL 11		77 XEQ 03	
32 *	Store by element	78+LBL 11	Loop for each
33 INT	R16-R21	79 DSE 13	element of
34 l 75 :	Ctope UInventer	80 GTO 02	guess
30 T Ra sto ind	Store "Inventory	81 FS7 05	
13	LISU KJ-KI	82 GIU 12 97 PCL 12	
37 1		84 RCL 22	
38 ST+ IND		85 X=Y?	Is guess
Y		86 GTO 04	'perfect'
39 DSE 13 40 cto 01		87 9	
40 GIU 01 41 "CHF99"		88 STO 13	
42 ARC1 12	Prompt for 1ct	90 PCI TND	llood modified
43 AVIEW	Game	13	inventory to
44 <b>•</b> LBL 14	Evaluate Guess	91 X>0?	calculate +
45 CF 05	Clear-modify	92 ST+ 23	quesses
46 STO 00	inventory R9-R1	93 DSE 13	J

94 GTO 05	
95 RCL 12	
96 RCL 23	
97 -	
98 RCL 22	
99 -	
100 STO 23	
100 010 20 101 CE 05	
101 00 00	
103¥LDL 03	Score 1 for each
104 1	totally correct
105 51+ 22	element
106 RTN	
107 <b>+</b> LBL 06	Help set up loops
108 RCL 12	
109 15.01501	
110 +	
111 STO 13	
112 RTN	
113 <b>+</b> LBL 04	Course of the second
114 SF 27	correct guess
115 "OK, "	
116 ARCL 14	
117 "H TRIFS	
118 AVIEW	
119 PTN	
12041 RI 12	
	Build output
121 CLA 100 ODCL 00	of *'s and +'s.
122 HRUL 00	
123 °F °	
124 RUL 22	
125 8=07	
126 GIU 07	
127+LBL 08	
128 "+*"	
129 DSE X	
130 GTO 08	
131 <b>+</b> LBL 07	
132 RCL 23	i
133 X=0?	
134 GTO 13	
135+LBL 09	
136 "++"	
137 DSE X	
138 GTO 09	
139 <b>+</b> LBL 13	
140 AVIEW	Display
141 GTO 14	Go to process
142 .END.	next guess.

#### **PROGRAM DESCRIPTION**

#### ADVENTURE

By Layne K. Johnson

This adventure takes place at an automated dam (which is currently being held by terrorists) located high in the Alps. The object of the game is to get past the security systems of the dam and shut off the computer without being detected by the terrorists. The player must use intuition and guesswork to determine which command(s) to use in any given situation. The commands to be used in this adventure are listed on page 100-101.

The adventure exists solely in the HP-41's data storage registers. With guidance from the program (which provides verb and noun input routines as well as outputs results) any number of adventures can be created. An adventure is limited only by your imagination.

CREATING YOUR OWN ADVENTURE

The purpose of the program is to provide the interface between the user and the adventure data. To be able to write an adventure of your own you must understand how the program works. You should also go through the program listing and comments (very thoroughly) before writing an adventure. If you wish to play an adventure first, skip the following section and go to the example adventure.

To understand the verb routines, you must understand the manner in which the items are encoded. Each item is contained in two or more registers. One register contains the name of the item, and the other register(s) contain any numerical code(s) for the item. The encoding is done as follows: (RO9 & R10 are used as an example)

- RO9 (sign) x.fgghhiijj Ekk
- R10 Name of the item

Sign: if positive, RO9 references an item. If negative, RO9 tells the program to search for an auxiliary routine starting with the Interpreter.

x: If x is greater than 1, an item from the inventory is needed to complete the action of the verb. The program will ask "WHAT?" on the verbs "FEED" and "GIVE".

f: If f is 5, item HH must not exist or the verb will not work. If f is 6, item HH must exist or the verb will not work. If f is 7, the player must be in room HH or the verb will not work. If f is 8, and an improper verb has been used, the program will search the list five registers back. This allows multiple verbs to work on an item. If f is 9, "GET" can not be used on this item.

gg: This value is the verb number that will work on this item.

hh: This is the necessary item (or room) needed (to be in) to complete the action of the verb.

kk: This is the number of the register that contains the item's name. (In this example, this is R10.)

ii: The event that will occur if the right verb is used and the f condition is met. The event list follows:

- 00: Return and complete the action of the verb.
- 01: Add item jj to the room the play is in.
- 02: There is a passage to room jj. "GO IN?" is displayed.
- 03: Move the player to room jj.
- 04: Change this item's code to the code contained in register jj.
- 05: Remove item jj from the inventory.

O6: Display the message starting at register jj. Do NOT complete the action of the verb. This option allows the adventure to tell the player why an action cannot be performed.

07: Exchange the player's inventory with room jj's item list.

08: Exchange the room's exits with room jj"s exit list.

09: End the adventure. Display "THE END".

10: Display the message which starts at register jj.

11: The player is dead. Display the message starting at register jj, then display "YOU DIED".

12: Change item jj's code list to the contents of this item's register location minus five. This allows action taken on one item to affect another item.

13: Exchange the room's item list with room jj's item list.

14: Ask the question starting at this item's register minus one. The answer for the primary event is in register jj. Events are stored as follows: O. primary Secondary as O.iijjiijj in the register just after the question.

If ii is greater than 14 then 14 is subtracted from ii and the HP-41 will execute event 10 starting at the item's code register minus one. This allows the adventure to describe what happened when the player worked with the item.

The action of the verbs "GET" and "ATTACK" can NOT be event 02. If the register that contains what room the player is in has changed and the program cannot complete the verb, that item will not be removed from the room. The same is true for happening 03.

On multiple verbs (f = 8), the verbs "GET", "THROW", "GOTO", and "EXAMINE", will not get to the alternate item code.

#### Verb/Name/Number List:

GET	-	01	PRESS	-	08	INVentory	-	Not applicable
OPEN	-	02	READ	-	09	DROP	-	Not applicable
THROW	-	03	GIVE	-	10	Look	-	Not applicable
FEED	-	04	MOVE	-	11	?	-	Not applicable
EXAMINE	-	05	LIFT	-	12	^ N	-	Not applicable
GOTO	-	05	PULL	-	13	^ S	-	Not applicable
WORK	-	06	ATTACK	-	14	^ E	-	Not applicable
CLIMB	-	07				^ W	-	Not applicable

#### SPECIFIC VERB ROUTINES

Lines 151-176 contain the "PUSH", "PRESS", "OPEN", "WORK", "READ", "MOVE", and "LIFT" verb routines. Since these verbs do not physically change the adventure data (except by the happening routines) they all use the same entrance and exit from the processing routines. Since each verb only needs to be represented by a label, its name, and an ID number, this part of the program is very flexible. Verbs can be added, deleted, or even have their names changes.

Lines 187-197 contain the "FEED" and "GIVE" routines. If one of these is the verb called for, the processing routine will ask "WHAT?" item the play is feeding or giving away. If it is the right item, that item is then removed from the game.

Lines 232-258 contain a utility routine. Each verb, after its completion, passes through this routine. The number of the room the player is in is checked and if it is over 90 the routine subtracts 90 and prompts the player to read in the appropriate card set. Since registers available for the adventure data are 03-95, the programmer can create from one to ten different parts for the same adventure. Since reading in a new card set causes the loss of the items in the inventory, the adventure created should be of the "accomplish-a-goal" type, or the "escape" type rather than an adventure based on finding treasure.

GENERAL NOTES (for working your way through an adventure):

The following verbs are available for your use in accomplishing the adventure's goals:

Verbs that work on items "YOU SEE" ... (Input verb [R/S], Item name [R/S])

GET	PRESS
OPEN	READ
THROW	GIVE
FEED	MOVE
EXAMINE	LIFT
GOTO	PULL
WORK	АТТАСК
CLIMB	DROP (out of the player's inventory)

Information verbs (Input verb [R/S])

- INV Inventory of items carried
- L Look at room again
- ? Look at room exits again

Movement verbs (Input verb [R/S])

- ^N Go north
- ^S Go south
- ^E Go east
- ^W Go west

Other notes:

-At times when the player asks the program to do something and the HP-41 replies "I CAN'T", the player can ask to try again with something in the inventory.

Example:

"OPEN DOOR"	[R/S]	"I CAN'T"
TRY	[R/S]	"TRY?"
KEY (and the DOOR opens)	[R/S]	"OK"

This can only be tried once after the "I CAN'T" or "HA" displays. If this does not complete the actions, the action must be entered again before the player can try another item from the inventory.

-When the player "FEED"'s or "GIVE"'s an item from the inventory to an item in the adventure (and if one of these is the verb called for), then the program will ask the player "WHAT?" item is to be fed or given away.

Example:

"GIVE"	[R/S]	"GIVE?"
"DROID"	[R/S]	"WHAT?"
"TOOLS"	[R/S]	"OK"
(Item now remove	d from game)	

-The player should never attempt to carry more than four items and never add more than five items to a room (things will start disappearing).

-The player can not "READ", "OPEN", "FEED", "EXAMINE", or "WORK" on an item in the inventory.

-To go through a "GO IN?" display, the player must either press [R/S] or key in another command.

-If the "HUH?" display is shown, the player has either given the HP-41 a command it does not know, or misspelled the verb or the item's name.

-Be aware that this program uses flags 05 through 19. It is therefore suggested that the user not use a printer with this program. Also, before using a peripheral, the user may want to check the status of the appropriate flag(s).

<u>STATU</u> S	
SIZE:	096
FIX:	0
USER MODE:	OFF
TOTAL PROGRAM BYTES:	1116

DATA REGISTERS			
00	Inventory - contains the register numbers of the codes fo the items you're carrying.		
01	Scratchpad		
02	Room pointer - the beginning of the description of the room you're in.		
03-95	Adventure data		
Each room of th only as example	e adventure is set up as follows. Registers 03-08 are used		
03	ООМ		
04	UARE R		
05	S A SQ		
06	THIS I		
07	AA.BBCCDDEE		
08	Register numbers of codes for items in room		
In reg 07			
AA - Regist	er with room's name		
BB - Regist	er which starts data for room to the North (optional)		
CC - As BB	- for room to South		
DD - As in	BB - for room to East		
EE - As in	BB - for room to West		
(If BB - EE are	non-zero,then that direction is an exit direction)		
	DATA REGISTERS 00 01 02 03-95 Each room of the only as example 03 04 05 06 07 08 In reg 07 AA - Registe BB - Registe CC - As BB - DD - As in H EE - As in H (If BB - EE are		

FLAGS USED		
05	Set:	You can't have item HH, to complete verb processing.
06	Set:	You have to have item HH to complete verb processing.
07	Set:	You have to be in room HH to complete verb processing. /Utility.
08	Set:	Wrong verb used? Try item code list five registers back.
09	Set:	You can not GET this item.
10	Set:	You need an item from the inventory to complete the verb, ask WHAT? item (for the GIVE and FEED verbs), or use the "I CAN'T/TRY" routine for the rest.
11	Set:	The DROP routine becomes the THROW routine when this flag is set.
12	Set:	Bypass the verb completion barriors, but not the happening barriors.
13	Set:	The FEED and GIVE routines set this flag, it get the WHAT? routine rather than the "I CAN'T/TRY" routine.
14	Set:	Display message <u>after</u> the completion of the happening. /Utility.
15	Set:	Set if the player can TRY to input (use) some item from the inventory, otherwise the TRY input is ignored.
16	Set:	When done with the happening go through the Look routine.
17	Set:	Do the "SO?" display rather than the "OK" display.
18	Set:	Utility.
19	Set:	Do the "HA" display rather than the "I CAN'T" display.
21	Set:	Printer enabled.
	Clear:	Printer disabled.
23	Set:	Alpha data entered.
	Clear:	No data entered.
25	Set:	Ignore 1 error.
	Clear:	Don't ignore errors.

The situation: An automated dam located high in the Alps controls the yearly flooding of this time of year. Downstream a U.N. meeting on nuclear disarmament is being secretly held on an island in a tributary to the Rhone. Ninety percent of the world governments have representatives present and there is a problem. Terrorists bent on destroying the U.N. meeting have taken control of the dam's computer and have set it to open the locks, releasing the flood waters. Officials of the U.N. do not want to interrupt the meeting in fear that it will be impossible to again get the world governments together for this meeting. Your mission is then to get past the security systems of dam and shut down the computer without activating the terrorist's program. Good luck.

You have been flown to the dam and start in the helicopter hangar.

If you get in a situation from which there is no egress, load the data set for that section of the Adventure and start it over.

DISPLAY	INPUT	FUNCTION	COMMENTS	
	Load Program			
	Set Size 096			
	Load data set	(1) of ADV "TERRO	RIST DAM" #1	
	Begin the Adventure	[XEQ] "ADV"		
"YOURE IN A HANGAR"				
"WITH"				
"ELEVATOR DOOR HERE"				
"YOU SEE:"				
"DOOR"	OPEN	[R/S]		
"OPEN?"	DOOR	[R/S]		
"ALARM"				
"YOURE IN A CELL"				
	Well since thi	s got us nowhere,	let us try again	
	Load data set (1) of ADV "TERRORIST DAM" #1			
	Begin the Adventure	[XEQ] "ADV"		
DISPLAY	INPUT	FUNCTION	COMMENTS	
-------------------------	--------------------------	-------------------------	-------------------------	
"YOURE IN A 'HANGAR"				
etc.	EXAMINE	[R/S]		
"EXAMINE?"	DOOR	[R/S]		
"YOURE IN A HANGAR"				
"WITH"				
"ELEVATOR DOOR HERE"				
"YOU SEE:"				
"LATCH"				
"DOOR"	PULL	[R/S]		
"PULL?"	LATCH	[R/S]		
"GO IN?"		[R/S]		
"DOOR CLOSES"				
"YOURE IN A VATOR"				
"YOU SEE:"				
"LEVER 1"				
"LEVER 2"	Well you have n here.	made it to the elevator	r, you can take it from	
	Good Luck!			

RR00 - 0		RR48 - "LOSES"	
RR01 - 0		RR49 - "DOOR C"	
RRO2 - 9		RR50 - 2.90499 *E57	(SLOT)
RRO395.	I (CELL)	RR51 - 2.904701628*E57	(SLOT)
RRO4 - 0	Ι	RR52 - "ALARM"	
RRO5 - "R HERE"	I (HANGER)	RR53 - 1.902001604*E18	( DOOR )
RRO6 - "OR DOO"	Ι	RR54 - " ON"	
RRO7 – "ELAVAT"	I	RR55 - "SENSOR"	
RRO8 - 94.	I	RR56 - 1.906002650*E55	(SENSOR)
RRO992	I	RR57 - "SLOT"	
RR1077.	I (VATOR)	RR58 - 1.805000150*E18	(DOOR)
RR11798385	I	RR59 - "OFFICE"	
RR12 - "ARRAY"	I (LOUNGE)	RR60 – "MURAL"	
RR13 - "OF DIS"	I	RR61 - "DIME"	
RR14 - "SIGNS"	I	RR62 - "CHAIRS"	
RR15 - 74.2211	I	RR63 - "ID"	
RR16736968	I	RR64 - "LOCKER"	
RR17 – " AHEAD"	I (OFFICE)	RR65 - 1.601 *E61	(DIME)
RR18 - "DOOR"	Ι	RR66 - "O SAFE"	
RR19 - "RITY"	Ι	RR67 - "NOPE N"	
RR20 - "A SECU"	Ι	RR68 - 1.911001067*E60	(MURAL)
RR21 - 59.0016	Ι	RR69 - 1.905000165*E62	(CHAIRS)
RR225856	Ι	RR70 - 1.601 *E63	(ID)
RR23 - "ABOVE"	I (GEN RM)	RR71 - 1.905000170*E64	(LOCKER)
RR24 - "CE UP"	Ι	RR72 – "HMM"	
RR25 - "L OFFI"	Ι	RR73 - 1.902001871*E64	(LOCKER)
RR26 - "CONTRO"	I	RR74 - "LOUNGE"	
RR27 - 45.	Ι	RR75 - "LEVER 1"	
RR28474736	I	RR76 - "LEVER 2"	
RR29 - " HERE"	I (OFFICE)	RR77 – "VATOR"	
RR30 - "L DESK"	I	RR78 - 1.902000316*E18	(DOOR)
RR31 - "CONTRO"	Ι	RR79 - 1.9 *E18	(DOOR)
RR32 - 59.	Ι	RR80 - 1.908002679*E75	(LEVER 1)
		RR81 – "MOVES"	

ADVENTURE DATA SET 1 - TERRORIST DAM

ADVENTURE DATA SET 1 - TERRORIST DAM

RR33	-	.344337	7	Ι	
RR34	-	1.9	*E93		(DESK)
RR35	-	"STAIRS"			
RR36	-	1.907000	)333*E35		(STAIRS)
RR37	-	1.907000	)328*E35		(STAIRS)
RR38	-	1.911000	)392*E44		(PHONE)
RR39	-	"ARM-"			
RR40	-	"CH -AL"			
RR41	-	"CE MAT"			
RR42	-	"NO VOI"			
RR43	-	2.806651	L704*E44		(PHONE)
RR <b>44</b>	-	"PHONE"			
RR45	-	"GEN RM"			
RR46	-	"GEN"			
RR <b>47</b>	-	1.9	*E46		(GEN)

RR82	-	"VATOR"	
RR83	-	1.908002704*E75	(LEVER 1)
RR84	-	"KLUNK"	
RR85	-	1.913002683*E76	(LEVER 2)
RR86	-	"ALARM"	
RR87	-	1.902001704*E18	(DOOR)
RR88	-	"LOSES"	
RR89	-	"DOOR C"	
RR90	-	1.913001611*E91	(LATCH)
RR91	-	"LATCH"	
RR92	-	1.805000190*E18	(DOOR)
RR93	-	"DESK"	
RR <b>94</b>	-	"HANGER"	
RR95	-	"CELL"	

RR00 -	0			RR48 ·	-	"DOOR"	
RR01 -	0			RR <b>49</b> ·	-	1.913000230*E53	(LATCH)
RR02 -	9.			RR50 ·	-	"LOOR"	
RR03 -	-95.	Ι	(CELL)	RR51 ·	-	" 3RD F"	
RR04 -	0	Ι		RR52 ·	-	1.906002646*E70	(LIFT)
RR05 -	" HERE"	Ι	(OFFICE)	RR53 ·	-	"LATCH"	
RR06 -	"L DESK"	Ι		RR54 ·	-	"SHAFT"	
RR07 -	"CONTRO"	Ι		RR55 ·	-	1.911000224*E59	(PANEL)
RR08 -	94.	Ι		RR56 ·	-	"HIDES"	
RR09 -	.92883684	Ι		RR57 ·	-	"DROID"	
RR10 -	"ABOVE"	Ι	(GEN RM)	RR58 ·	-	1.902002715*E62	(DROID)
RR11 -	"CE UP"	Ι		RR59 ·	-	"PANEL"	
RR12 -	"L OFFI"	Ι		RR60 ·	-	"TO A"	
RR13 -	"CONTRO"	Ι		RR61 ·	-	"MOVES"	
RR14 -	83.	Ι		RR62 ·	-	"DROID"	
RR15 -	.818180	Ι		RR63 ·	-	1.805001555*E62	(DROID)
RR16 -	"D HERE"	Ι	(GEN RM)	RR <b>64</b> ·	-	1.911002684*E79	(KNOB 1)
RR17 -	"E DROI"	Ι		RR65 ·	-	"ALARM"	
RR18 -	"SERVIC"	Ι		RR66 ·	-	1.911001704*E77	(KNOB 3)
RR19 -	83.	Ι		RR67 ·	-	"OFF"	
RR20 -	.63818180	Ι		RR68 ·	-	"GEN 2"	
RR21 -	"E LIFT"	Ι	(SHAFT)	RR69 ·	-	1.911002676*E78	(KNOB 2)
RR22 -	"SERVIC"	Ι		RR70 ·	-	"LIFT"	
RR23 -	54.	Ι		RR71 ·	-	1.907000320*E85	(STAIRS)
RR24 -	.4652	Ι		RR72 ·	-	"ALERT"	
RR25 -	"RS"	Ι	(ROOM)	RR73 -	-	"DROID"	
RR26 -	"LOCKE"	Ι		RR74 ·	-	"N OFF,"	
RR27 -	"TORAGE"	I		RR75 -	-	"ALL GE"	
RR28 -	TOOL S"	Ι		RR76 ·	-	1.911001389*E79	(KNOB 1)
RR29 -	45.35000024	Ι		RR77 ·	-	"KNOB 3"	
RR30 -	.4040	Ι		RR78 -	-	"KNOB 2"	
RR31 -	"R HERE"	Ι	(HALL)	RR79 -	-	"KNOB 1"	
RR32 -	"TY DOO"	Ι		RR80 -	-	1.907000309*E85	(STAIRS)

ADVENTURE DATA SET 2 - TERRORIST DAM

ADVENTURE DATA SET 2 - TERRORIST DAM

RR33 -	"SECURI"	Ι		RR81	-	1.705201315	5*E82	(GEN)
RR34 -	86.0030	Ι		RR82	-	"GEN"		
RR35 -	.43	I		RR83	-	"GEN RM"		
RR36 -	1.9	*E87	(PHONE)	RR84	-	1.907000315	5*E85	(STAIRS)
RR37 -	"ALARM"			RR85	-	"STAIRS"		
RR38 -	1.9020016	04*E48	(DOOR)	RR86	-	"HALL"		
RR39 -	"LOCKED"			RR87	-	"PHONE"		
RR40 -	1.9020010	39*E44	(LOCKER)	RR88	-	1.9	*E91	(DESK)
RR41 -	"BOARD"			RR89	-	.887669668	34	
RR42 -	"INPUT"			RR90	-	"ON"		
RR43 -	1.8050017	93*E48	(DOOR)	RR91	-	"DESK"		
RR44 -	"LOCKER"			RR92	-	1.908002789	9*E93	(SWITCH)
RR45 -	"R00M"			RR93	-	"SWITCH"		
RR <b>46</b> -	1.9110002	20*E59	(PANEL)	RR94	-	"OFFICE"		
RR47 -	1.9050001	<b>49*</b> E48	(DOOR)	RR95	-	"CELL"		

RR00 -	-	0			RR48	-	"MEMORY"		
RR01 -	-	0			RR49	-	"PLUG"		
RR02 -	-	9.			RR50	-	1.6	*E38	(KEY)
RR03 -	-	-95.	Ι	(CELL)	RR51	-	.5253546464		
RR04 -	-	0.	Ι		RR52	-	1.6	*E55	(PLIERS)
RR05 -	-	"R HERE"	Ι	(HALL)	RR53	-	1.6	<b>*</b> E56	(S DRVR)
RR06 -	-	"TY DOO"	Ι		RR54	-	1.6	*E57	(WRENCH)
RR07 -	-	"SECURI"	Ι		RR55	-	"PLIERS"		
RR08 -	-	94.0015	Ι		RR56	-	"S DRVR"		
RR09 -	-	.89888766	Ι		RR57	-	"WRENCH"		
RR10 -	-	"RS"	Ι	(ROOM)	RR58	-	1.913000215	*E59	(LATCH)
RR11 -	-	"LOCKE"	Ι		RR59	-	"LATCH"		
RR12 -	-	"TORAGE"	Ι		RR60	-	1.702090893	*E81	(DOOR)
RR13 -	-	"TOOL S"	Ι		RR61	-	"SHAFT"		
RR14 -	-	63.09000017	Ι		RR62	-	"LOCKER"		
RR15 -	-	.6464	I		RR63	-	"ROOM"		
RR16 -	-	-61.	Ι	(SHAFT)	RR64	-	2.902501351	*E62	(LOCKER)
RR17 -	-	.5860	Ι		RR65	-	"ALARM"		
RR18 -	-	"PUTER"	Ι	(ROOM)	RR66	-	1.902001604	*E81	(DOOR)
RR19 -	-	"ТҮ СОМ"	Ι		RR67	-	.60		
RR20 -	-	"SECURI"	Ι		RR68	-	.777666		
RR21 -	-	63.000927	Ι		RR69	-	.797866		
RR22 -	•	.3529	Ι		RR70	-	1.908000204	*E90	(KEY C)
RR23 -	-	"UTER"	Ι	(ROOM)	RR71	-	1.908000204	*E91	(KEY B)
RR24 -	-	"L COMP"	Ι		RR72	-	1.908000204	*E92	(KEY A)
RR25 -	•	"CONTRO"	Ι		RR73	-	.7066		
RR26 -	-	63.0000022	Ι		RR74	-	.7166		
RR27 -	-	.394537	Ι		RR75	-	.7266		
RR28 -	-	"ALARM"			RR76	-	1.908001375	*E91	(KEY B)
RR29 -	-	1.913001704 *E49	(P	LUG)	RR77	-	1.908001374	*E92	(KEY A)

ADVENTURE DATA SET 3 - TERRORIST DAM

ADVENTURE DATA SET 3 - TERRORIST DAM

RR30 -	2.902520140 *E48	(MEMORY)	RR78 - 1.908001374 *E90 (KEY C
RR31 -	"BYE UN"		RR79 - 1.908001373 *E91 (KEY B
RR32 -	"OPEN"		RR80 - "OPEN"
RR33 -	"LOCKS"		RR81 - "DOOR"
RR34 -	2.902530136 *E44	(COMP)	RR82 - 1.908002767 *E92 (KEY A
RR35 -	2.914001237 *E44	(COMP)	RR838266
RR36 -	2.901001033 *E47	(MICRO)	RR84 - 1.908001383 *E90 (KEY C
RR37 -	1.905000150 *E48	(MEMORY)	RR85 - 1.908001373 *E91 (KEY B
RR38 -	"KEY"		RR86858466
RR39 -	1.806001033 *E44	(COMP)	RR87 - 1.908001368 *E90 (KEY C
RR40 -	1.913001044 *E46	(DISKS)	RR88 - 1.908001386 *E91 (KEY B
RR41 -	"SAFE"		RR89 - 1.908001369 *E92 (KEY A
RR42 -	"FF, UN"		RR90 - "KEY C"
RR43 -	"UTER O"		RR91 - "KEY B"
RR44 -	"COMP"		RR92 - "KEY A"
RR45 -	1.913001044 *E49	(PLUG)	RR9394.2215
RR46 -	"DISKS"		RR94 - "HALL"
RR47 -	"MICRO"		RR95 - "CELL"

# USER INSTRUCTIONS

Thi	SIZE: 096			
STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
1	Load the program and pack		[GTO]	PACKING
2	Set size 096			
3	Load data set (1) or "Terriost Dam"			
4	Begin the Adventure		[XEQ] "ADV"	You're in a
				etc.
5	When program annunciator goes off, enter			
	your action. Use verbs given in the	Verb	[R/S]	
	program description.			
6	After the calculator gives its response			
	enter your next action, etc.	Verb	[R/S]	
7	When the program calls for it, load			READ 2.
	data set 2 (or 3). Continue adventure			(or 3.)

112

01+LBL "ADV		44 1 E2	
	Some program	45 S!U 01 46 ±	
02 FIX 0	comments are	40 A 47 V\V0	
03 CF 21	contained within	47 AZT: 40 "EN"	
04 RON	the program	40 FM 49 FPC	
05+LBL "L"	description	50 PCL 01	
06 RCL 02		50 KCE 6% 51 *	
07 1		52 8882	
08		57 "49"	
. NA KUT IND		54 FRC	
Х 10 «УОНБЕ Т		55 RCL 01	
IO TOURE I		56 *	
	LOOK ROUTINE:	57 X>Y?	
V HRULIAN	(begins at	58 "⊢E"	
0 12 OVIEN	line 4)	59 FRC	
17 PSF	5-II displays	60 X≠0?	
14 8/02	the room's name.	61 "⊢W"	
15 GTO 00	If RO7 is	62 CLD	
16 " WITH"	positive; the	63+LBL 30	
17 AVIEW	optional room	64 STOP	
18 CLA	description is	65+LBL 16	VERD ENTRY:
19 RDN	displayed.	66 RCL 00	
20 1		67 FRC	
21 -			
22 XEQ 10		59 J.019 70-1 DL 30	
23 PSE		(U▼LDL 20 71 CE IND V	Clear flags 05
24+LBL 00		$72 \text{ for } MD \alpha$	through 19.
25 RCL 02		72 130 A 77 CTO 28	en eugn is.
26 RCL IND		74 ASTO X	
×		75 ASTO Y	
27 X=0?		76 ASHE	
28 GIU "?" 20 #YOU CEE	Display items in	77 ASTO L	Get and set up
29 "YUU SEE	the room.	78 " "	verb entry.
		79 ARCL X	
30 MVIEW 71 CE 13		80 ASTO X	
31 37 14 73 VEN 31		81 " "	
37 <b>*</b>   8  "2"		82 ARCL X	
34 RCI 02		83 ASHF	
35 1		84 ASTO X	
36 -		85 CLA	Get first two
37 LASTX		86 ARCL Y	letters of the
38 RCL IND		87 HRUL L	verb.
Y		88 SF 23	
39 FRC			
40 ABS			
41 X=0?		90 GIU 23 91#18! "CF"	
42 GTO 30	Dianlay ++	92 SF 12	GET KUUTINE:
43 "EXITS A	Display the room	93 1	
RF: "	EXITS.		

94 XEQ 27		141 XEO 05	End of Drop
95 E976 A9	If an itam is not	142 5020 11	routine
	II an Item IS not		routine
96 GIU 20	specifically	143 610 11	
97 RCL 00	protected against	144 3	(Throw routine
98 INT	boing nickod up	145 STO 01	processes the
99 XEO 19	being picked up.	146 05 10	yorb then goes
100 DCV 00	GEI WIII remove	140 OF 12	verb chen goes
100 RUL 00	it from the room	147 RUL IND	to the "DROP"
101 INT	and add to the	02	routine.)
102 1 E2		148 1 E2	•
103 ST/ 00	prayers	1/9 4	
103 010 00	inventory list.		
104 KDM		150 XEQ 22	
105 ST+ 00		151 GTO 11	PUSH ROUTINE:
106 GTO 11		152+LBL "PU"	nage of text
107♦LBI "TN"	THUCHTODY DOUTTNE	157 17	puge of text
100 010	INVENIORY ROULINE	154 070 00	
100 CLA 100 DCL 00		134 610 00	PRESS ROUTINE:
109 RUL 00		155 <b>+</b> LBL "PR"	
110 FRC		156 8	
111 CLD		157 GTO 00	ODEN DOUTINE .
112+LBI 21	Subroutine.	1594LPL "0P"	UPEN RUUTINE:
117 1 50	Gives the names	150+252 01	
113 1 62	of the items	159 2	
114 *	contained in the	160 GTO 00	WORK BOUTINE.
115 X=0?	contained in the	161 <b>+</b> LBL "WO"	NORK ROOTINE.
116 GTO 00	inventory.	162 6	
117 RCL IND	(i.e., what is	147 010 00	
O NOL IND	being carried.)		CLIMB ROUTINE:
<u>^</u>	being carried.	164+LBL "UL"	
118 X<0?		165 7	
119 GTO "S"		166 GTO 00	
120 LOG		167.41 BL "RE"	READ ROULINE:
121 VIEW IND		160 0	
U TICH IND			:
· · · · · · · · · · · · · · · · · · ·		169 GIU 00	MOVE DOUTINE.
122 RDN		170+LBL "MO"	HOVE ROOTINE.
123 FRC		171 11	
124 GTO 21		172 GTO 99	
125+1 BL 00			LIFT ROUTINE:
1207000 00		ITSTLDL LI	
126 637 14		174 12	Subsquiting
127 RTN		175+LBL 00	subrout me.
128 STOP		176 XEQ 27	Gives entrance to
129 GTO 16		177 GTO 11	verb processing
170 AL DI "TH"		170 AL DL #07 "	ATTACK ROUTINE
1304606 10	THOON POLITINE.	I/8+LBL "HI"	ATTACK ROOTINE
131 SF 11	THROW ROOTINE.	179 SF 19	1
132 <b>+</b> LBL "DR"		180 14	
133 CLX		181 XEQ 27	Unly if an item
134 XEO 15	DROP ROUTINE:	182 RCI 00	can be Attacked
175 PA		107 THT	will processing
100 N. 177 TUT		103 101	raturn to thic
136 181		184 XEQ 18	
137 ST+ IND		185 "DESTROY	routine. The item
02		ED"	is destroyed and
138 1 E2	Add item Thrown	186 OVIEW	removed from the
179 ST/ IND	on Dropped to	107 670 44	name
107 017 1HD 00	of propped to	107 610 11	
02	the room the	188 <b>+</b> LBL "FE"	FEED ROUTINE:
<u>140 X&lt;&gt;Y</u>	plaver is in	189 4	page 100 of text

190 010 00		240 010	
191 <b>•</b> LBL "GT"	GIVE BOUTINE:	241 XEQ 10	
192 10	dive Rootine.	242 +1 RL 00	
193+LBL 00		2424EBE 00 247 RCL 02	
194 SE 17	FED on GIVE	243 NOL 32	
195 VEO 27	REED OF GIVE,	244 20	Nood to wood yout
196 PCI 01	fellove the Itell	240 - 246 27-82	Need to read next
190 KUL 01 197 VEN 05	fed or given away	240 61-02	data set?
197 AEW UJ 100 CTO 11	from the game.	247 GIU 00 240 - DEOD -	1
170 GIU II 10041 DI #CO#		248 KEHD	YES? prompt for
177¥LDL GU	GOIO ROUTINE:	249 HRUL A	and read the data.
200+LBL "EA"	EXAMINE ROUTINE:	200 HVIEW	
201 SF 12		201 RDIH	1
202 55 17		252 SF 16	
203 5		253+LBL 00	Return to LOOK
204 XEQ 27		254 FS?C 16	routine?
205 GIU 11	GO NORTH	255 GIU "L"	
206+LBL "TN"		256 " SO?"	Else give proper
207 2		257 FC?C 17	response.
208 GTO 60	GO SOUTH	258 " OK"	
209+LBL "↑S"		259 GTO 30	VERB PROCESSING
210 4		260+LBL 27	ROUTINE :
211 GTO 00	GO FAST	261 STO 01	
212 <b>+</b> LBL "↑E"		262 RCL 02	
213 6		263 XEQ 15	
214 GTO 00	GO WEST	264 R↑	
215 <b>+</b> LBL "↑₩"	do WEST	265+LBL 22	
216 8		266 INT	
217+LBL 00		267 ST+ 00	1
218 10†X		268 2	
219 RCL 02		269 RCL IND	
220 1	ROUTINES	00	1
221 -		270 ENTER1	
222 X<>Y		271 LOG	
223 RCL IND		272 INT	
Ŷ		273 10↑X	Cat itam anda
224 ABS		274 /	$l_{ic+} \times 12$
225 *		275 X>Y?	1150 = 12
226 INT		276 SF 10	ASK WHAT: NOT THE
227 1 E2		277 FRC	I CANI/IRY routine.
228 MOD		278 10	
229 X=0?	This exit	279 *	
230 GTO 23	possible	280 SF IND X	Set flag = $F$
231 STO 02	NO? go to HUH?	281 FRC	(see page 98 )
232 SF 16	routine	282 1 E2	
233+LBL 11	UTILITY ROUTINE:	283 *	1
234 FC?C 14	page100 of text	284 INT	
235 GTO 00		285 RCL 01	
236 RCL 00		286 X≠Y?	
237 1		287 GTO 02	Wrong Verb?
238 -		288 LASTX	YES? go to O2
239 INT		289 FRC	

290 1 E2		341 R↑	
291 *		342 INT	
202 TNT		747 PCI 01	Wrong item?
207 5020 07	Nood to be in the	744 V4V0	VES2 go to I CANT
273 FU:U 07	need to be in the	344 A≠1:	TES: YO LO I CANT
294 GIU 00	right room?	345 GIU 25	display.
295 RCL 02	(see page 3)	346 <b>+</b> LBL 01	
296 X=Y?	NO? go to 00	347 RCL IND	
297 GTO 01	Right room? go	00	
298+LBL 02	$t_0 01$	348 ENTERT	
299 ES2C 12	Possible to	749 LOC	
700 DTN	POSSIBLE LO	750 INT	-
300 KIN 701 DCL 00	override verb	330 184	
301 RCL 00	completion	351 107%	
302 INI	barriors?	352 /	
303 ST- 00	YES? then return.	353 1 E7	
304 5		354 *	
305 -	Try yerb used	355+LBL 29	Break item code
<b>306 E</b> S?C 08	with work needed	356 1 E2	into happoning#
307 GTO 22	wich verb needed	357 MOD	inco nappening#
700 CTO 25	in register 5	750 TMT	and the happening
300 GTU 20	back?	3J0 IN1 750 / 00TV	data.
309+LBL 00	YES? do so, else	309 LHSIX	
310 X=0?	go to I CANT	360 FRC	
311 GTO 01	display	361 1 E2	
312 FS?C 10		362 *	
313 GTO 00	do to WHAT:	363 INT	
314 RCL 00	routine: res: go	364 X<>Y	
315 ERC	to UU.	365 14	
716+1 BI 24		766 8/82	
717 1 52	Routine to check	767 CE 14	Does a message
317 I EZ 710 m	if F = 5 or 6	307 3F 14 770 1700	need to be shown?
310 *	conditions are	368 8417	YES? set flag 14.
319 INI	met (see nage 3)	369 SI- Y	
320 X=Y?	meet. (See page 5)	370 RDN	
321 SF 18		371 X<>Y	
322 RDN		372 CLA	
323 LASTX		373 GTO IND	Go to happening.
324 FRC		Y	II=00 ROULINE:
325 X≠02		374+IBI 00	page 99 of text
326 GTO 24	Conditions met?	375 RTN	II-01 ROUTINE:
727 5020 84	NO? go to the	776ALDI 01	page 99 of text
321 F3(U 00 730 Ecor 40	I CANT display	3707LDL 81 777 ct, tur	Add the item to
328 F3/U 18	1 of 41 op 1 ag 1	377 51+ IND	the room and
329 FS/C 18		02	change this itemic
330 GTO 25		378 1 E2	change chis item s
331 GTO 01		379 ST⁄ IND	code so it can't
332 <b>+</b> LBL 00	'WHAI?' routine.	02	add another item.
333 "WHAT"		380 RCL IND	
334 SF 15		00	
335 FC?C 13	Ask WHAT? item	381 SCI 5	
336 GTO 25	the player is	792 PND	
77741 PL 20	aging to use from	707 ETV A	
3317LDE 20 770 eto 04	their inventory	303 FIA 8 704 eto 197	
330 310 01		384 310 IND 99	
339 ULX	to complete the	<u>00</u>	
<u>340 XEQ 15</u>	verb.	<u> </u>	

386 RTN	II=02 ROUTINE	433 RCL IND	Exchange the room
387+LBL 02	page 99 of text	X	exits with room
388 "GO IN?"	Does the player	434 X<> IND	JJ's exits.
389 CF 23	want to enter the	Z	
390 STOP	room?	435 STO IND	
391 FS?C 23	YES? do so.	Y	
392 GTO 16	NO? then return	436 RTN	II=09 ROUTINE
393 SE 16	and process the	437 <b>+</b> LBL 09	page 99 of text
394 STO 02	command.	438 " THE EN	1 3
395 RTN		D "	
396+LBL 03	II=03 ROUTINE	439 STOP	II=10 ROUTINE
397 STO 02	page 99 of text	440+LBL 10	page 99 of text
398 SF 16		441 ARCL IND	page 33 of cent
799 PTN		X	
400+1 BI 04	11-04 ROUTINE	442 DSE X	Display message
400+EDE 04 401 PCL IND	page 99 of text	443 RCL IND	End of moscage?
V V		X	VEC2 diamlaw it
о И <b>ю</b> р ето тыр	Change to new	444 SIGN	YES: display it
402 310 IMD	item code.	445 X≠02	and return.
00 407 DTN		446 AVIEW	NU? get six more
403 KIN 4044 DI 85	II=05_ROUTINE	447 X≠02	characters.
404 <b>+</b> LBL 00	page 99 of text	448 PTN	
405 I E2		449 PTN	
405 517 02		450 CTO 10	
407 RCL 00		450 G10 10 451▲I DI 11	
408 INI	Remove item JJ	451 VEN 10	II-11 ROUTINE
409 STO 01	from the	452 ACM 10 457 "YOU DIE	page 99 of text
410 RCL Z	inventory	403 100 DIE D"	
411 XEQ 18		D AEA DDOMDT	
412 1 E2		434 FRUNE1 45541 DL 10	II=12 ROUTINE
413 ST* 02		400¥LBL 12 454 DC1 00	page 99 of text
414 RCL 01		436 RUL 00 457 5	1
415 ST+ 00		437 3 450	
416 RTN	TT-06 DOUTINE	438 - 450 DOL IVD	
417 <b>+</b> LBL 06	11-00 ROUTINE	459 RUL IND	
418 XEQ 10	page 99 01 LEXL		
419 GTO 25	TI-07 DOUTINE	460 SIU IND	
420+LBL 07	11-07 ROUTINE		TT 12 DOUTINE
421 RCL 00	page 33 01 Lext	461 KIN	$\frac{11-13}{9}$ ROUTINE
422 FRC	<b>Evenera</b>	462+LBL 13	page 55 of lext
423 X<> IND	Exchange	463 RCL IND	Exchange the
Y	inventory with	02	room's item list
424 RCL 00	room JJ's item	464 X<> IND	with room JJ's
425 INT	list.	Y	item list.
426 +		465 STO IND	
427 STO 00		02	
428 RTN		466 SF 16	
429 <b>+</b> LBL 08	II=08 ROUTINE	467 RTN	
430 RCL 02	page 99 of text	468 <b>+</b> LBL 14	II-14 ROULINE
431 1		469 RCL IND	page 99 of text
432 -		X	
		470 RCL 00	

			•
471 INI	Ask question.	518 GTU 16	given command.
472 DSE X	Is the answer the	519 R↑	YES? can player
477 VEO 10	appe as that is	520 EC2C 15	try an itom?
473 AE& 10	same as what is		
474 X<>Y	in register JJ?	521 1	YES? allow IRY
475 +	YES? do happening	522 GTO 20	input
476 STOP		527+1 BL 18	UTTLITY DOUTINE
477 OCTO V	pair: .1100		UTILITY ROUTINE
477 HSTU A	NO? do happening	524 2.90002	
478 X≠Y?	pair 0000ILU	525 X<>Y	
479 1 E6	pull: :00001100	526 RCL IND	
400 V-V0			
480 7-12		02	
481 1 E2		527 FRC	
482 RCL IND		528+LBL 26	
1		520 1 52	
483 *	UTILITY ROUTINE	530 *	Compress room or
484 GTO 29	erierre Roerine	531 INT	invontory itom
485+181 15		572 X=Y2	
400 + 20 - 10			lists so that no
486 "F? "		533 610 01	gaps exist from
487 PROMPT	Cot the itemle	534 RDN	any romoved
488 RCL IND	Get the Item's	535 LOSTX	any removed
0	name and return		items.
A	with what	336 FRL	
489 FRC	nogiston it's	537 ISG Z	
490♦LBL 17	register it s	538 X≠02	
401 1 52	code is in.	570 CTO 20	
471 1 62		539 GIU 26	
492 *		540+LBL 01	
493 RCL IND		541 RCL Z	1
v		540 THT	
		542 183	
494 LOG		543 101X	
495 RCL IND		544 /	
X		545 ST- TND	
		040 01 110	
496 RT		02	
497 ASTO X		546 0	1
498 X=Y2		547 X<> IND	
400 DTN			
477 K.119		02	
500 RT		548 FRC	
501 FRC		549 1 E10	
502 X≠02		550 *	
502 ATO 17			
303 GIU 17		2214FRF 1A	
504+LBL 23	HUH  KUUIINE:	552 1 E2	
505 "HUH?"		553 FC?C 07	
506 CLD		554 CT / TND	
500 CLD E07 ATA 74			
507 GIU 30		62	
508+LBL 25	I CANT/TRY	555 /	
509 RTN	ROUTINE	556 ERC	
510 × TOV*		550 / KC EE7 V_00	1
310 "IKï"		557 X=07	
511 ASTO Y		558 SF 07	1
512 "I CANT"	Give proper	559 ST+ IND	
517 FC2C 19	response.	000 010 IMD	
JIJ FJ(6 17		02	
514 " HA"		560 LASTX	
515 STOP	Did the player	561 INT	
516 <u>0</u> 970 V	input TRY?	562 X±02	
510 H010 A	NO? then process	502 AF0: 527 AF0:40	
<u></u>	Hor then process	0 263 610 19	
		564 .END.	

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Bar Codes

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#### GAMES II

THE CAVES	•••	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	. 1
5 x 5 CHES	s.	•	•	•	•	•	•	•	•		•	•	•	•	•	•	•	•			•		•	•	•		. 9
PINBALL .	• •	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	15
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PROGRAM REGISTERS NEEDED: 244

















#### PROGRAM REGISTERS NEEDED: 139











CHESS (82162A VERSION)

**PROGRAM REGISTERS NEEDED: 12** 



CHESS (82143A VERSION)

**PROGRAM REGISTERS NEEDED: 12** 



**PROGRAM REGISTERS NEEDED: 143** 




















































# NOTES

### NOTES

NOTES

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\*Some books require additional memory modules to accomodate all programs.

# GAMES II

THE CAVES 5 X 5 CHESS PINBALL TRUCK FLIPO CODE CRACK ADVENTURE

