0035 1C

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*** THE WIZARD OF PINBALL ***

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IMPORTANT NOTICE

DUE TO THE METHOD BY WHICH THE 41C LOCATES LABELS WHEN AN "XEQ" OR "GTO" IS PERFORMED, THIS PROGRAM WILL RUN SLOWER DURING THE FIRST GAME. AFTER THE 41C HAS LOCATED THE POSITION OF THE LABELS, HOWEVER, SPEED WILL INCREASE TO THAT OF THE NORMAL PLAYING SPEED.

(THERE IS A GOOD CHANCE THAT YOU WILL NOTICE THE INCREASE SPEED DURING THE PLAY OF THE FIRST BALL OR TWO).

DO NOT LET THE INITIAL REDUCED SPEED WORRY YOU!

Program Title *** THE WIZARD OF PINBALL ***

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Program Description, Equations, Variables This program is based upon the original 67/97 version "Pinball Wizzard" program (Library number 00321D). It is not merely a converson of the original prgm., made to run in the 41C, but is entirely new, having been written to take advantage of the 41C's features. New functions over the 67/97 version include multi-player (from 1 to 4 can play at once), sounds, full alpha displays, improved "tilt" option, kick out hole score advance, 2X, 3X and 5X out bonus advance, match digit for free game, 3 high score/free game thresholds (user adjustable), Free game on passing Hi-Score To Date, (which is automatically adjusted and updated when passed, and maintained in the 41C's continous memory. Continous memory is also used to hold the total amount of cash spent and the random seed.

SYSTEM REQUIREMENTS:

The 'Wizard of Pinball' has been written to operate in an HP-41C system consisting of a minimum of 3 memory modules. Two modules and the internal 41C memory are used for program storage, while the last is used for the data (both ALPHA and NUMERIC) storage. Although not required, the 41C card reader would be a nice option for storing the game and data on cards.

If a card reader is used, the program will take up 9 tracks (5-mag-cards) and the data will take up 4 tracks (two mag-cards).

Necessary Accessories See above: "SYSTEM REQUIREMENTS"

Operating Limits and Warnings

Reference(s) Experience in playing games by Bally, Williams, Gotlieb and Sterns Manufacturing; "PINBALL WIZZARD", 67/97 program # 00321D.

INTRODUCTION: 00361C

Welcome to the new WIZARD OF PINBALL game. This program simulates, as closely as possible, the actual play in a genuine pinball machine. In order to play this game, your system must have 3 memory modules in ports 1 through 3 (and, although not required, a card reader would be of some aid, plugged into its port, #4). The 41C's internal memory and 2 modules are used for program storage (with some 50 registers or so free) while the last module is designated for data storage (both ALPHA and NUMERIC).

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. With this version, failing to hit the correct flipper will still give 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 is 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".

For full instructions, read on, and best of luck.

GAME INITIALIZATION:

INITIAL LOADING:

1. Make sure 3 memory modules are in ports 1 through 3.
2. Execute the SIZE function: XEQ, "SIZE", 064
   (This sets the last module for data storage, registers R00 to R63)
3. If you are loading in the program for the first time, or have no card reader, key in the PROGRAM steps as indicated following these initialization steps and directions for play.
4. Likewise, now load in the DATA register contents which follow the program listing.

RECORDING THE PROGRAM AND DATA ON CARDS:

1. If a card reader is available, you can record and, later, reload THE WIZARD OF FINBALL with magnetic cards. To store all the data and program, you will need a total of seven (7) mag-cards. The proceedure is as follows:
2. Position the 41C to the beginning of the program (LBL "WIZARD") by any method (i.e.--GTO "WIZARD"; CAT 1, R/S; etc.)
3. Switch the calculator over to the "PRGM" mode.
4. Insert side one of card one into the reader. The card should pass through and the display should read: "RDY 02 OF 09".
5. Continue to alternately feed in the 1st and 2nd sides of the cards (the even number tracks going on side 2 of the cards) until all 9 tracks have been recorded. (NOTICE: Side 2 of the fifth card is not recorded on).
6. SWITCH THE 41C BACK *OUT* OF THE "PRGM" MODE AND INTO THE "NORMAL" OR RUN MODE BEFORE ATTEMPTING TO RECORD THE DATA CARDS!
7. With the data registers loaded, and the 41C in the "NORMAL" mode, Execute the WDTA command: XEQ, "WDTA"
8. The display should read: "RDY 01 OF 04".
9. Begin by feeding in side one of card one of the DATA CARDS. (BE CAREFUL NOT TO ACCIDENTLY FEED IN ANY OF THE PREVIOUSLY RECORDED PROGRAM CARDS!).
10. Continue recording until both sides of 2 cards have been recorded.
11. At this point, the entire program and all the data have been recorded onto the cards. It is best to label these cards if you have not already done so. It might also be a good idea to XEQ the "VER" command to confirm that the 9 program and 4 data tracks have been successfully recorded. See the card-reader manual for instruction on use of the "VER" command.

LOADING PROGRAM AND DATA FROM CARDS:

1. Once the program and data is recorded onto mag-cards, all the information may be reloaded at any time from these cards. To do so, begin by feeding in all the DATA or PROGRAM cards first and then the remaining cards. The 41C will handle where everything goes without any further user commands.

NOTE: Never attempt to mix the DATA or PROGRAM cards during a load. Always complete the load in progress before continuing to the next set of cards.

INITIALIZATION WITH A NEW SEED:

1. Input a new seed number (`n') such that 0 < n < 1.
2. If not already in the program XEQ "WIZARD".

- or -

2. If already in the program, just press RTN, R/S
3. Go to step 4.

INITIALIZATION USING A PREVIOUSLY STORED SEED:

1. Recall R63: RCL 63
2. XEQ "WIZARD" if not already in the program.

- or -

2. If in the program, just press RTN, R/S
3. Go to step 4.

INITIALIZATION IF PRINTER IS PLUGGED IN:

If a printer is plugged into port 4, either unplug the printer and then continue with either of the initialization steps above, or, enter the program (GTO "WIZARD") and press: shift, a. This will clear flag 21. You can now proceed to either set of instructions above.

AFTER INITIALIZATION:

4. Once the initialization steps have been performed, the display will read "CAP-PINBALL" and the "PRGM" annunciator will be on. When this annunciator goes out, the program has completed initialization and you may proceed to the play instructions.

5 IF AN ERROR DISPLAY RESULTED, CHECK TO BE SURE YOUR SEED WAS A FRACTIONAL NUMBER. IF IT WAS, REENTER THE SEED, PRESS THE ENTER KEY, AND ATTEMPT TO INITIALIZE AGAIN. (The program checks for an incorrect seed and displays the error "DATA ERROR" if the seed has no fractional part. If an "ALPHA DATA" error occures, it may mean that some non-numeric data was in the `Y' register durins initialization).

NOTE: IN ORDER TO SAVE AND RESTORE THE VARIABLES OF THE GAME, A SPECIAL PROGRAM (WHICH WILL FIT INTO A 3 MEMORY MODULE 41C ALONG WITH `THE WIZARD OF PINBALL') IS SUPPLIED IN THE APPENDIX OF THIS BOOKLET. THE USER REQUIRES ONE (1) ADDITIONAL CARD IN ORDER TO SAVE THE REQUIRED VARIABLES THAT ALLOW STARTING THE GAME UP, EVEN AFTER MEMORY IS CLEARED.

DIRECTIONS FOR PLAY:

THE KEYS:

The top row of keys on the 41C now have the following uses:

A: Start game.
B: Ring up players (Credit Button)
C: Insert Coin.
D: Recall credits
E: Display money spent.

E: Pressing the 'E' key will recall the amount of 'money' accumulated during the play of the game. The display will show: "$ 0.00", or some value.

D: Pressing the 'D' key will recall the total accumulated credits (number of games) to the display. The display will read: "x. CREDITS" where 'x' is the number of credits in the machine.

C: Pressing this key will deposit $ .25 into the machine and ring up one credit. As with real machines, there is an upper limit on the number of credits...in "WIZARD" that limit is 40. Continuing to press 'C' after the limit is reached WILL continue to take your money, but will go no higher than 40. (Just like on the real thing, sans)!

B: This key will deduct one credit from the credit register and add an active game to the machine. Initially, the players' count is reset to '1'. Subsequent pressings increase the number of players up to a maximum of 4 players. Attempting to press 'B' after all 4 players are rung up, results in a "PLAYERS = 4" display, and no credits are deducted. Attempting to press 'B' when there are no credits remaining results in a "0 CREDITS" display.
During normal use, when 'B' is pressed, the display is paused, reading: "x CREDITS", showing that there are 'x' credits remaining. The display then stops on "PLAYERS = x" where 'x' now shows the total number of players rung up so far.

A: This key begins the game with the number of players rung up on the 'B' key. Once play has begun, no further players can be added. If the program is stopped at this point and the Credit Button is pressed, the number of players is returned to '1' as on real pinball machines. Attempting to hit key 'A' without first ringing up some games with the Credit Button will result in a "0" display.

REMEMBER THAT YOU MUST BE IN THE "USER" MODE FOR THESE KEYS TO OPERATE!

THE DEVICES:

In "WIZARD", there are several different scoring devices and ways of building a score. These 'devices' are listed below, starting with the format the device name is displayed on the 41C's Liquid Crystal Display. The full name of the device is listed in '( )' after the formatted name, then a brief description of what this device is and how it scores in THE WIZARD OF PINBALL.

"*STAR-50" (Star Rollovers)--These are star-like buttons on the play field. Each time the ball 'rolls' over one of these buttons, the user hears 5 "TONE 5"s sound, and receives 50 points

added to his or her score. Each Star Rollover also advances the OUT BONUS by 1000 points. (All devices that advance the OUT BONUS by 1000 points are preceeded with '*'. More about 'OUT BONUS' later)!

"*LANE-300" (Lane Rollovers)--Lane rollovers are special paths the ball travels throush and scores an immediate 300 points for the player, who hears 3 "TONE 6"s. In addition, the Out Bonus is advanced by 1000 points.

"THUMP-x00" (Thumper-Bumpers)--Sometimes called 'Jet or Pop Bumpers', the Thumper Bumpers on this same score 100 points each time the ball strikes them. At any given time, the ball can bounce from 1 to 10 times, scorins 100 to 1000 points. When this display comes up, the value of 'x00' is the amount of points scored where 'x' is the number of 'bumps' the ball made. The user hears 'x' number of "TONE 6"s.

"SPIN-xy0" (Spinner Gate)--Spinner sates on pinball machines are the devices that spin on a horizontal axis as the ball passes under them. In "WIZARD", the SPINner sate can spin up to 25 times, scorins 10 points for each spin, and showins the actual points made, while soundins a "TONE 5" for each spin. IN ADDITION, for each five (5) spins of the sate, the Out Bonus is advanced by 1000 points. Thus, as an example, if the sate spun 19 times, the display would read: "SPIN-190", the player would receive an immediate 190 points, and the Out Bonus will advance 3 times (3000 points). NOTE: Since the Spinner Gate can turn LESS than 5 spins, and therefore NOT advance the Out Bonus, this is the only device name that can affect the Bonus, that is NOT preceeded with '*'.

"KICK-x000" (Kick Out Hole)--Kick out holes (or saucers as they are sometimes called) are those devices that the ball drops in, scores some points and is kicked back out into play. On "WIZARD", the points for the kick out hole besin at 2000 and advance by 2000 each time the ball drops in one, until a point value of 10000 is reached and held for all additional hits of the holes. Displayed is the point value received and a "TONE 7" is heard for each 1000 points scored.

"SLING-10" (Slins shot kickers)--The slins shot kickers are devices that just propell the ball away when struck, and score 10 points. The user hears a "TONE 5".

"DROP-x" (Drop Tarsets)--Drop tarsets are scorins devices that fall away when struck, and score some value in the process. They are reset with each new ball, or when all are knocked down, in which case, they senerally score somethins special. In this same, there are three (3) drop tarsets. Hittins the first and the second result in an immediate 10 points, a "TONE 5", and a display of "DROP-1" and "DROP-2", showins the number knocked down. When the third is hit, however, the user hears 2 "TONE 8"s, receives 100 points and is awarded with another ball. The display reads: "SHOOT AGAIN". Although the tarsets are then reset, and can be knocked down again, with the "SHOOT AGAIN" display showins, the user can only receive ONE extra ball, per ball in play. However, each ball in play (whether it is the resular shot, or a free ball, can score another free ball).

As the ball exits, the same player is up as play does NOT advance to the next player. Display flag annunciator '3' is switched on when the player has an extra ball.

"*A-" to "*F-" (Alpha Targets)--These are stationary targets, that award the player with an immediate 500 points, playing 5 "TONE 6"s each time then are struck. (Example display: "*C-500"). In addition, each target hit advances the Out Bonus by 1000 points. Further more, the alpha targets have another use. During the play of any one ball, the 41C remembers the targets dropped (in any order) and provides for hisher Out Bonus scoring as follows:

Hitting 'A' & 'B' display "BONUS x 2", and will cause the player to receive TWICE the Out Bonus when the ball exits.

Getting 'A', 'B', 'C', & 'D' displayes "BONUS x 3", with resulting TRIPLE Out Bonus Score.

If all 6 targets are hit in one turn (A, B, C, D, E, and F), then the display reads "BONUS x 5" and the Out Bonus is QUINTUPLED! Thus, a maximum of 145,000 points on Out Bonus are possible!

(NOTE: Once a "BONUS x" display is shown, subsequent hitting of ANY alpha targets, whether the bonus multiplier is increased or not, will again display the current "BONUS x" display to remind the player of the status).

OUT BONUS: When the ball exits the OUT HOLE, the user then collects all the Out Bonus points that were accumulated during a game. In keeping with standard machines, the maximum limit on out bonus points is 29,000. This value is then multiplied by the "BONUS x" factor (if any). If a full 29,000 had been accumulated during the play of ball, and all the alpha targets were hit resulting in a "BONUS x 5", then the user can set up to 145,000 points once the ball exits. The display shows the total out bonus points and decrements this count by 1000, addins 1000 points to the player's score each time. For each 1000 points, a "TONE 6" is heard. Only after all the Out Bonus points have been run down will the play move onward.

FLIPPERS, TILTING AND OUT:

When the ball reaches the left or right flippers, the display will show: "LEFT-1" for the left flipper &
"RGHT-3" for the right flipper.
At this point, the player has one second (approximately) to press either the '1' key (for LEFT) or the '3' key (for RIGHT) in order to put the ball back in play. Failure to hit the correct flipper, or Just failure to hit ANY flipper will result in the ball exitins throush the Out Hole.

When the ball enters the Out Hole, (whether due to a missed flipper play, or on its own), the display shows "OUT" for one second. During this time, the user has the option of 'TILTING' the machine, in a last attempt to put the ball back in play. Tiltins is accomplished by pressins the disit '2' during the display of "OUT". The chances are 4 out of 5 that the ball will be placed back in play. However, USE TILT CAUTIOUSLY! If that one in five chance comes up, the display will read "*TILT*" and a decendins tune will be played. The machine has been tilted, and all Out Bonus points ARE LOST. Also, any FREE BALL sained during that turn is ALSO LOST! The player's score is immediately displayed and the play moves on!

END OF GAME:

When the end of the same is reached, & the last player's score is reviewed, "WIZARD" then selects a random number as the MATCH DIGIT. This number is always from 00 to 90, (multiples of 10) and is compared against the last 2 digits of all the players scores. If any player had a match, (their score's last two digits equal the MATCH DIGIT) a "TONE 9" is heard and a FREE GAME is awarded. The display will then read "MATCH-xO" showing the digit selected by "WIZARD". During this time, if any player's score has passed the High Score To Date, the old "HISCR-" is changed; otherwise it remains the same. The display then show this High Score in the form of: "HISCR-xxx,xxO". If any or all players score(s) passed the HISCR, a CREDIT is awarded.

Finally, all the players' scores are reviewed one 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 to the machine. (Each free game won produces a "TONE 9"). Finally, the display reads "GAME OVER" and a "BEEP" is heard.

USER INSTRUCTIONS:

STEP	INSTRUCTIONS	INPUT	FUNCTION	DISPLAY
1.	INIITIALIZE GAME AS SHOWN ON PAGE 4.			
2.	INSERT COINS TO RING UP CREDITS (AND PAY $ .25 EACH). (Repeat step 2 up to 40 times, as desired).		C	"x CREDITS"
3.	RING UP NUMBER OF PLAYERS: (Repeat step 3 from 1 to 4 players).		B	"x CREDITS" "PLAYERS = y"
4.	BEGIN GAME: (HEAR MELODY PLAYED, THEN SEE:).....		A	"PLAYER NO. x" "BALL 1" (flashing)
5.	SHOOT BALL:	0 thru 9		
6.	PLAY BEGINS. IF NO SCORE IS MADE, THE MESSAGE "NO SCORE-SHOOT AGAIN" WILL BE DISPLAYED AND THE BALL IS RETURNED TO THE SAME PLAYER TO BE RESHOT. WAIT UNTIL THE STANDARD "PLAYER NO. x" & "BALL x" DISPLAYS ARE SHOWN AGAIN, BEFORE RESHOOTING.			
7.	-OPTIONAL- REVIEW MONEY SPENT TO DATE:		E	"$ 0.00"
	-OPTIONAL- REVIEW TOTAL CREDITS RUNG UP:		D	"x CREDITS"
9.	FOR ANOTHER GAME (OR ROUNDS OF GAMES) GO TO STEPS 2, 3, OR 4, DEPENDING ON THE CURRENT NUMBER OF CREDITS IN THE MACHINE.			

EXAMPLE GAME:

```
Input seed:  .2510637948
Initialize:  XEQ, "WIZARD"                                  "CAP-PINBALL"
Display credits:  D                                         "0. CREDITS"
Display cash spent:  E                                      "$ 0.00"

Spend a quarter:  C     (TONE heard)                        "1. CREDIT"
Ring up one player:  B                                      "0. CREDITS"
                                                            "PLAYERS = 1."

Start game:  A  (Hear melody)                               "PLAYER NO. 1."
                                                            "BALL 1."  (flashed)
Shoot ball:  `1'
                        (1 drop target hit!)                "DROP-1."
                        (oops...ball heading out!)          "OUT"
Let's try to tilt it back in play:  `2'
                        (made it!  A kick-out hole)         "KICK-2,000"
                        (target E is hit, bonus adv.)       " E-500"
                                                            "KICK-4,000"
                        (star rollover & bonus adv.)        "STAR-50"
                        (ball heading out...let it go)      "OUT"

                        (see bonus collected):              3,000
                                                            2,000
                                                            1,000
Now we see the score review:          "PLAYER 1.-SCORE-9,560"

Ready for next ball:                                        "PLAYER NO. 1"
                                                            "BALL 2."  (flashed)

Etc.
```

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PROGRAM LISTING

☐ 67 ☐ 97 ☒ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
	01♦LBL "WIZARD"		
	02 FRC		
	03 1/X		
	04 LASTX		
	05 STO 63		
	06 FIX 0		
	07 " CAP-PINBALL"		
	08 AVIEW		
	09♦LBL a		
	10 .021		
	11♦LBL 10		
	12 CF IND X		
	13 ISG X		
	14 GTO 10		
	15 SF 01		
	16 RTN		
	17♦LBL E		
	18 FIX 2		
	19 "$ "		
	20 ARCL 52		
	21 FIX 0		
	22 AVIEW		
	23 RTN		
	24♦LBL C		
	25 39		
	26 RCL 53		
	27 X>Y?		
	28 GTO D		
	29 .25		
	30 ST+ 52		
	31 TONE 4		
	32 ISG 53		
	33♦LBL D		
	34 CLA		
	35 ARCL 53		
	36 "⊢ "		
	37 ARCL 28		
	38 RCL 53		
	39 1		
	40 X≠Y?		
	41 "⊢S"		
	42 AVIEW		
	43 RTN		
	44♦LBL B		
	45 RCL 53		
	46 X=0?		
	47 GTO D		
	48 0		
	49 FS?C 01		
	50 STO 45		
	51 RCL 45		
	52 4		
	53 X=Y?		
	54 GTO 11		
	55 1		
	56 ST+ 45		
	57 ST- 53		
	58 TONE 5		
	59 XEQ D		
	60 PSE		
	61♦LBL 11		
	62 CLA		
	63 ARCL 30		
	64 "⊢S ="		
	65 ARCL 45		
	66 AVIEW		
	67 RTN		
	68♦LBL A		
	69 RCL 45		
	70 X=0?		
	71 RTN		
	72 40		
	73 +		
	74 RCL 40		
	75 /		
	76 41		
	77 STO 58		
	78 +		
	79 0		
	80♦LBL 12		
	81 STO IND Y		
	82 ISG Y		
	83 GTO 12		
	84 1		
	85 STO 48		
	86 STO 50		
	87 TONE 9		
	88 TONE 8		
	89 TONE 8		
	90 TONE 8		
	91 TONE 7		
	92 TONE 7		
	93 BEEP		
	94 TONE 8		
	95 TONE 8		
	96 TONE 8		
	97 TONE 9		
	98♦LBL 13		
	99 41		
	100 STO 58		

Note: Refer to "HP-41C OWNER'S HANDBOOK AND PROGRAMMING GUIDE" for specific information on keystrokes. The Function Index is found at the very back of the Handbook. Refer to Appendix E in 67 or 97 "OWNER'S HANDBOOK AND PROGRAMMING GUIDE" for exact keystrokes.

PROGRAM LISTING

☐ 67 ☐ 97 ☒ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
101	1		
102	STO 48		
103	♦LBL 14		
104	1		
105	STO 46		
106	1.003		
107	STO 51		
108	0		
109	STO 47		
110	25		
111	STO 49		
112	XEQ a		
113	SF 01		
114	CF 02		
115	CLA		
116	ARCL 30		
117	"⊢ NO. "		
118	ARCL 48		
119	AVIEW		
120	PSE		
121	CLA		
122	ARCL 15		
123	ARCL 50		
124	CF 22		
125	♦LBL 15		
126	AVIEW		
127	PSE		
128	FC?C 22		
129	GTO 15		
130	♦LBL 16		
131	12		
132	XEQ 09		
133	4		
134	-		
135	X>0?		
136	GTO 17		
137	FS? 02		
138	GTO 18		
139	"NO "		
140	ARCL 25		
141	ARCL 21		
142	ARCL 22		
143	AVIEW		
144	PSE		
145	GTO 14		
146	♦LBL 17		
147	SF 02		
148	CLA		
149	ARCL IND X		
150	GTO IND X		
151	♦LBL 18		
152	-2		
153	X<>Y		
154	X=Y?		
155	0		
156	X<0?		
157	GTO 19		
158	RCL 00		
159	CLD		
160	PSE		
161	FC?C 22		
162	GTO 20		
163	2		
164	X≠Y?		
165	GTO 20		
166	5		
167	XEQ 09		
168	1		
169	X=Y?		
170	GTO 21		
171	GTO 16		
172	♦LBL 20		
173	CLA		
174	ARCL 20		
175	ARCL IND 49		
176	AVIEW		
177	PSE		
178	RCL 46		
179	29		
180	X<Y?		
181	STO 46		
182	RCL 49		
183	24		
184	-		
185	ST* 46		
186	RCL 40		
187	RCL 46		
188	*		
189	ST+ IND 58		
190	FIX 3		
191	CF 28		
192	RCL 46		
193	CLD		
194	♦LBL 22		
195	PSE		
196	TONE 7		
197	DSE X		
198	GTO 22		
199	FIX 0		
200	SF 28		

Note: Refer to "HP-41C OWNER'S HANDBOOK AND PROGRAMMING GUIDE" for specific information on keystrokes. The Function Index is found at the very back of the Handbook. Refer to Appendix E in 67 or 97 "OWNER'S HANDBOOK AND PROGRAMMING GUIDE" for exact keystrokes.

PROGRAM LISTING

☐ 67 ☐ 97 ☒ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
201	♦LBL b		
202	CLA		
203	ARCL 30		
204	"├ "		
205	ARCL 48		
206	"├-"		
207	ARCL 25		
208	ARCL IND 58		
209	AVIEW		
210	FS? 03		
211	GTO 14		
212	RCL 45		
213	RCL 48		
214	X=Y?		
215	GTO 25		
216	1		
217	ST+ 48		
218	ST+ 58		
219	GTO 14		
220	♦LBL 25		
221	5		
222	RCL 50		
223	X=Y?		
224	GTO 26		
225	1		
226	ST+ 50		
227	GTO 13		
228	♦LBL 26		
229	10		
230	XEQ 09		
231	1		
232	-		
233	10		
234	*		
235	STO 35		
236	RCL 45		
237	40		
238	+		
239	RCL 40		
240	/		
241	41		
242	+		
243	STO 57		
244	♦LBL 27		
245	RCL 36		
246	RCL IND 57		
247	X>Y?		
248	STO 36		
249	X>Y?		
250	SF 00		
251	RCL 39		
252	/		
253	FRC		
254	RCL 39		
255	*		
256	RCL 35		
257	X=Y?		
258	XEQ 24		
259	ISG 57		
260	GTO 27		
261	CLA		
262	ARCL 23		
263	ARCL 35		
264	AVIEW		
265	PSE		
266	CLA		
267	ARCL 24		
268	ARCL 36		
269	AVIEW		
270	FS?C 00		
271	XEQ 24		
272	PSE		
273	RCL 45		
274	40		
275	+		
276	RCL 40		
277	/		
278	41		
279	+		
280	STO 57		
281	♦LBL 28		
282	CLA		
283	ARCL 30		
284	"├ "		
285	RCL 57		
286	INT		
287	40		
288	-		
289	ARCL X		
290	"├ - "		
291	ARCL IND 57		
292	AVIEW		
293	54.056		
294	RCL IND 57		
295	ENTER↑		
296	♦LBL 23		
297	CLX		
298	RCL IND Z		
299	X<=Y?		
300	XEQ 24		

Note: Refer to "HP-41C OWNER'S HANDBOOK AND PROGRAMMING GUIDE" for specific information on keystrokes. The Function Index is found at the very back of the Handbook. Refer to Appendix E in 67 or 97 "OWNER'S HANDBOOK AND PROGRAMMING GUIDE" for exact keystrokes.

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PROGRAM LISTING

☐ 67 ☐ 97 ☒ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
301	ISG Z		
302	GTO 23		
303	ISG 57		
304	GTO 28		
305	CLA		
306	ARCL 18		
307	ARCL 19		
308	AVIEW		
309	0		
310	STO 45		
311	BEEP		
312	RTN		
313	♦LBL 09		
314	RCL 63		
315	9821		
316	*		
317	.211327		
318	+		
319	FRC		
320	STO 63		
321	*		
322	1		
323	+		
324	INT		
325	RTN		
326	♦LBL 21		
327	CF 03		
328	CLA		
329	ARCL 31		
330	AVIEW		
331	TONE 4		
332	TONE 3		
333	TONE 2		
334	TONE 1		
335	TONE 0		
336	PSE		
337	GTO b		
338	♦LBL 19		
339	ENTER↑		
340	ABS		
341	X<>Y		
342	17		
343	+		
344	X<>Y		
345	CLA		
346	ARCL IND Y		
347	AVIEW		
348	PSE		
349	FC?C 22		
350	GTO 29		
351	X=Y?		
352	GTO 16		
353	♦LBL 29		
354	0		
355	GTO 18		
356	♦LBL 24		
357	CLX		
358	1		
359	ST+ 53		
360	CLX		
361	RCL 53		
362	40		
363	X<=Y?		
364	STO 53		
365	RDN		
366	TONE 9		
367	RTN		
368	♦LBL 01		
369	1		
370	ST+ 46		
371	RCL 38		
372	ST+ IND 58		
373	ARCL X		
374	AVIEW		
375	TONE 5		
376	TONE 5		
377	TONE 5		
378	TONE 5		
379	TONE 5		
380	GTO 16		
381	♦LBL 02		
382	1		
383	ST+ 46		
384	300		
385	ST+ IND 58		
386	ARCL X		
387	AVIEW		
388	TONE 6		
389	TONE 6		
390	TONE 6		
391	GTO 16		
392	♦LBL 03		
393	RCL 39		
394	STO 62		
395	6		
396	ENTER↑		
397	10		
398	♦LBL 30		
399	XEQ 09		
400	X<> 62		

Note: Refer to "HP-41C OWNER'S HANDBOOK AND PROGRAMMING GUIDE" for specific information on keystrokes. The Function Index is found at the very back of the Handbook. Refer to Appendix E in 67 or 97 "OWNER'S HANDBOOK AND PROGRAMMING GUIDE" for exact keystrokes.

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PROGRAM LISTING

☐ 67 ☐ 97 ☒ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
401	RCL 62		
402	STO 61		
403	*		
404	ST+ IND 58		
405	ARCL X		
406	AVIEW		
407	LBL 31		
408	TONE IND Z		
409	DSE 62		
410	GTO 31		
411	FS?C 04		
412	RTN		
413	GTO 16		
414	LBL 04		
415	RCL 37		
416	STO 62		
417	5		
418	ENTER↑		
419	25		
420	SF 04		
421	XEQ 30		
422	RCL 61		
423	5		
424	/		
425	INT		
426	ST+ 46		
427	GTO 16		
428	LBL 05		
429	8		
430	RCL 47		
431	X>Y?		
432	X<>Y		
433	2		
434	+		
435	STO 47		
436	ENTER↑		
437	ENTER↑		
438	RCL 40		
439	*		
440	ST+ IND 58		
441	ARCL X		
442	AVIEW		
443	LBL 32		
444	TONE 7		
445	DSE Y		
446	GTO 32		
447	GTO 16		
448	LBL 06		
449	10		
450	ST+ IND 58		
451	ARCL X		
452	AVIEW		
453	TONE 5		
454	GTO 16		
455	LBL 07		
456	ISG 51		
457	GTO 33		
458	1.003		
459	STO 51		
460	SF 03		
461	RCL 39		
462	ST+ IND 58		
463	CLA		
464	ARCL 21		
465	ARCL 22		
466	AVIEW		
467	TONE 8		
468	TONE 8		
469	GTO 16		
470	LBL 33		
471	RCL 51		
472	1		
473	-		
474	ARCL X		
475	AVIEW		
476	TONE 5		
477	10		
478	ST+ IND 58		
479	GTO 16		
480	LBL 08		
481	1		
482	ST+ 46		
483	6		
484	XEQ 09		
485	ENTER↑		
486	ENTER↑		
487	4		
488	+		
489	X<>Y		
490	7		
491	+		
492	CLA		
493	ARCL IND X		
494	SF IND Y		
495	500		
496	ST+ IND 58		
497	ARCL X		
498	AVIEW		
499	TONE 6		
500	TONE 6		

Note: Refer to "HP-41C OWNER'S HANDBOOK AND PROGRAMMING GUIDE" for specific information on keystrokes. The Function Index is found at the very back of the Handbook. Refer to Appendix E in 67 or 97 "OWNER'S HANDBOOK AND PROGRAMMING GUIDE" for exact keystrokes.

PROGRAM LISTING

☐ 67 ☐ 97 ☒ 41C

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
	501 TONE 6		
	502 TONE 6		
	503 TONE 6		
	504 FC? 05		
	505 GTO 34		
	506 FC? 06		
	507 GTO 34		
	508 SF 20		
	509 26		
	510 STO 49		
	511 FC? 07		
	512 GTO 34		
	513 FC? 08		
	514 GTO 34		
	515 27		
	516 STO 49		
	517 FC? 09		
	518 GTO 34		
	519 FC? 10		
	520 GTO 34		
	521 TONE 9		
	522 TONE 9		
	523 29		
	524 STO 49		
	525♦LBL 34		
	526 FC? 20		
	527 GTO 16		
	528 CLA		
	529 ARCL 20		
	530 ARCL IND 49		
	531 AVIEW		
	532 PSE		
	533 GTO 16		
	534 END		
40			
50			

STEP/ LINE	KEY ENTRY	KEY CODE (67/97 only)	COMMENTS
51			
60			
70			
80			
90			
00			

Note: Refer to "HP-41C OWNER'S HANDBOOK AND PROGRAMMING GUIDE" for specific information on keystrokes. The Function Index is found at the very back of the Handbook. Refer to Appendix E in 67 or 97 "OWNER'S HANDBOOK AND PROGRAMMING GUIDE" for exact keystrokes.

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REGISTERS, STATUS, FLAGS, ASSIGNMENTS

DATA REGISTERS

R00=	"OUT"	R32=	0.0000
R01=	"*STAR-"	R33=	0.0000
R02=	"*LANE-"	R34=	0.0000
R03=	"THUMP-"	R35=	0.0000
R04=	"SPIN-"	R36=	0.0000
R05=	"KICK-"	R37=	10.0000
R06=	"SLING-"	R38=	50.0000
R07=	"DROP-"	R39=	100.0000
R08=	" *A-"	R40=	1,000.0000
R09=	" *B-"	R41=	0.0000
R10=	" *C-"	R42=	0.0000
R11=	" *D-"	R43=	0.0000
R12=	" *E-"	R44=	0.0000
R13=	" *F-"	R45=	0.0000
R14=	"RGHT-3"	R46=	0.0000
R15=	"BALL "	R47=	0.0000
R16=	"LEFT-1"	R48=	0.0000
R17=	"NUMBER"	R49=	0.0000
R18=	" GAME "	R50=	0.0000
R19=	" OVER"	R51=	0.0000
R20=	"BONUS "	R52=	0.0000
R21=	"SHOOT "	R53=	0.0000
R22=	"AGAIN"	R54=	200,000.0000
R23=	"MATCH-"	R55=	250,000.0000
R24=	"HISCR-"	R56=	290,000.0000
R25=	"SCORE-"	R57=	0.0000
R26=	"X 2"	R58=	0.0000
R27=	"X 3"	R59=	0.0000
R28=	"CREDIT"	R60=	0.0000
R29=	"X 5"	R61=	0.0000
R30=	"PLAYER"	R62=	0.0000
R31=	"*TILT*"	R63=	0.0000

STATUS

SIZE	Ø64	TOT. REG.	Ø64	USER MODE	
ENG		FIX	Ø	SCI	
ON	X	OFF			
DEG	X	RAD		GRAD	

FLAGS

#	INIT S/C	SET INDICATES	CLEAR INDICATES

ALL FLAGS (ØØ) to (21) are controlled by the program and do not require any user setting or clearing.

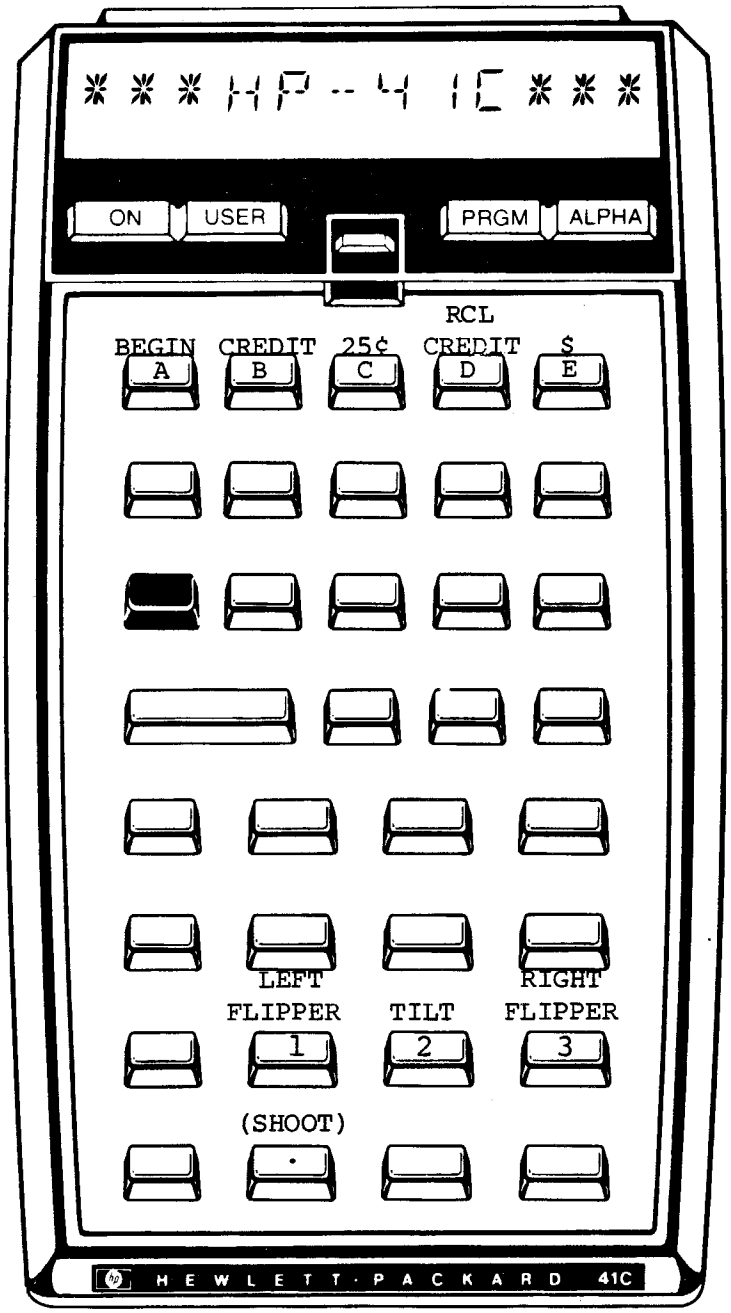
ASSIGNMENTS

FUNCTION	KEY	FUNCTION	KEY

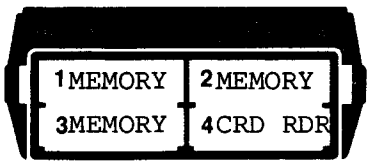
003610

KEYBOARD CARD LABELING

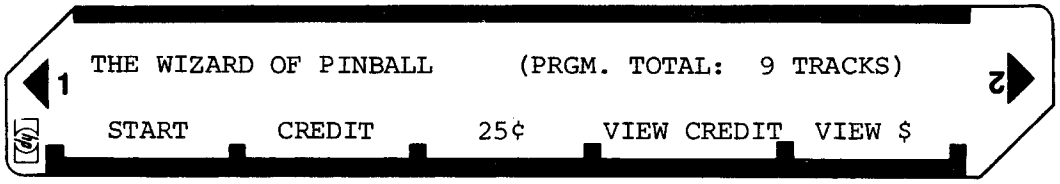
KEYBOARD



SYSTEM CONFIGURATION



CARD



APPENDIX A: DATA REGISTER ALLOCATION--

All data enclosed in quotes (" ") is string (Alpha) data, to be stored as shown. Numeric data is shown without quotes, again to be stored as shown. When a register number is followed by an alpha-string NOT enclosed in quotes, this is merely a description of what the register is used for, in the program.

Examples: R00: "OUT" (Indicates reg. 00 contains the word 'OUT').
R40: 1000 (Incicates reg. 40 contains the NUMBER 1000).
R35: Match Digit (Indicates the program uses reg. 35 to store the Match Digit when generated. The user stores nothing in this register prior to program operation).

R00: "OUT"
R01: "*STAR-"
R02: "*LANE-"
R03: "THUMP-"
R04: "SPIN-"
R05: "KICK-"
R06: "SLING-"
R07: "DROP-"
R08: " *A-"
R09: " *B-"
R10: " *C-"
R11: " *D-"
R12: " *E-"
R13: " *F-"
R14: "RGHT-3"
R15: "BALL "
R16: "LEFT-1"
R17: not used
R18: "GAME "
R19: " OVER"
R20: "BONUS "
R21: "SHOOT "
R22: "AGAIN"
R23: "MATCH-"
R24: "HISCR-"
R25: "SCORE-"
R26: "X 2"
R27: "X 3"
R28: "CREDIT"
R29: "X 5"
R30: "PLAYER"
R31: "*TILT*"
R32: not used
R33: not used
R34: not used
R35: Match Digit
R36: Hi-score to date
R37: 10
R38: 50
R39: 100
R40: 1000
R41: Player 1 score
R42: Player 2 score
R43: Player 3 score
R44: Player 4 score
R45: No. of players in game
R46: Bonus Count
R47: Kick Out Hole score
R48: No. of current player up.
R49: Bonus multiplier
R50: Ball count
R51: Drop Target count
R52: Total cash spent on games
R53: Total CREDITs count
R54: Free game threshold # 1
R55: Free game threshold # 2
R56: Free game threshold # 3
R57: Indirect use register
R58: Player Indirect register
R59: not used
R60: not used
R61: not used
R62: not used
R63: Random seed

APPENDIX B: LABEL ALLOCATION AND USAGE:

LBL "WIZARD" (game initialization)
LBL A: START GAME
LBL B: CREDIT BUTTON
LBL C: COIN INSERT
LBL D: RECALL CREDITS
LBL E: RECALL CASH SPENT
LBL a: Clear flags F00 to F21
LBL b: Last player up test.

LBL 00: Out
LBL 01: Star Rollovers
LBL 02: Lane Rollovers
LBL 03: Thumper-Bumpers
LBL 04: Spinner Gate
LBL 05: Kickout Hole
LBL 06: Slingshot Kickers
LBL 07: Drop Targets
LBL 08: Alpha-Targets
LBL 09: Random number gen.
LBL 10: Internal loop
LBL 11: Display players
LBL 12: Clr players score loop
LBL 13: New ball; reset players
LBL 14: Same ball; new player
LBL 15: "Wait for shot" loop
LBL 16: Device # gen. loop
LBL 17: Scoring device hit (not Flippers or OUT)
LBL 18: "Ball heading out..."
LBL 19: Flipper handling routine
LBL 20: Skip past "tilt test" routine
LBL 21: "*TILT*" routine
LBL 22: BONUS scoring loop
LBL 23: Free Game test loop
LBL 24: Credit one REPLAY routine
LBL 25: Check for last ball
LBL 26: End of game
LBL 27: Match Digit/Hi-Score loop
LBL 28: Display all scores at game's end
LBL 29: Missed Flipper
LBL 30: Internal routine used with gate& bumpers
LBL 31: Internal loop used in LBL 30 above.
LBL 32: Loop for tones
LBL 33: Award free ball
LBL 34: Used in flag test routine.

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:
WRITE SIDE 1 and WRITE SIDE 2

PROGRAM LISTING:

```
001  LBL "DTXR/W"
002  LBL A
003  36
004  "READ SIDE 1"
005  AVIEW
006  RDTAX
007  52.063
008  "READ SIDE 2"
009  AVIEW
010  RDTAX
011  RTN
012  LBL e
013  "WARNING"
014  AVIEW
015  BEEP
016  36
017  "WRITE SIDE 1"
018  AVIEW
019  WDTAX
020  52.063
021  "WRITE SIDE 2"
022  AVIEW
023  WDTAX
024  END
```

INSTRUCTIONS:

1. Get a blank mag-card ready. (This can be reused over and over).
2. To WRITE data TO the card, press: 'shift', e
   (The 41C 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.

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NOTE: THE USER *MUST* STORE SOME VALUE INTO THE "HI-SCORE TO DATE" REGISTER, OR THE "WIZARD OF PINBALL" WILL ASSUME THE HIGH SCORE IS `0' AND AWARD A FREE GAME NO MATTER HOW LOW A SCORE IS, WHEN THE GAME IS COMPLETED. IF THE USER MAKES A HABIT OF USING THIS ROUTINE TO SAVE AND RESTORE REGISTERS BEFORE CLEARING OUT THE "WIZARD" PROGRAM AND JUST AFTER RELOADING, RESPECTIVELY, THEN ALL DATA HANDLING WILL BE TAKEN CARE O[illegible]

TO ENTER THIS UTILITY ROUTINE, USE EITHER THE "CATALOG" METHOD OR PRESS: GTO, "DTXR/W", THEN THE DESIRED KEY (`A' TO READ, OR `shift, a' TO WRITE).

THIS PROGRAM CAN BE STORED ON SIDE 2 (THE UNUSED SIDE) OF CARD 5 ON WHICH THE MAIN PROGRAM ("THE WIZARD OF PINBALL") IS STORED. IN THIS WAY, THE ENTIRE SET OF CARDS WILL CONSIST OF EIGHT (8) TOTAL. THE MAIN PROGRAM WILL USE UP 4 1/2 CARDS, THE UTILITY 1/2 CARD, THE REGISTERS 2 CARDS AND THE CARD USED FOR STORING DATA, 1 CARD.

ROW 1 (1 : 3)

ROW 2 (3 : 4)

ROW 3 (5 : 8)

ROW 4 (8 : 12)

ROW 5 (12 : 16)

ROW 6 (17 : 17)

ROW 7 (18 : 21)

ROW 8 (21 : 24)

ROW 9 (24 : 24)

PROGRAM REGISTERS NEEDED: 142

ROW 1 (1 : 4)

ROW 2 (5 : 7)

ROW 3 (7 : 12)

ROW 4 (12 : 19)

ROW 5 (19 : 26)

ROW 6 (26 : 32)

ROW 7 (32 : 38)

ROW 8 (39 : 47)

ROW 9 (47 : 54)

ROW 10 (55 : 62)

ROW 11 (63 : 68)

ROW 12 (69 : 77)

ROW 13 (77 : 85)

ROW 14 (86 : 92)

ROW 15 (92 : 99)

ROW 16 (100 : 106)

ROW 17 (106 : 112)

ROW 18 (113 : 117)

ROW 19 (117 : 125)

ROW 20 (125 : 132)

ROW 21 (132 : 138)

ROW 22 (139 : 145)

ROW 23 (145 : 152)

ROW 24 (152 : 161)

ROW 25 (162 : 168)

ROW 26 (169 : 175)

ROW 27 (175 : 183)

ROW 28 (183 : 190)

ROW 29 (191 : 198)

ROW 30 (198 : 204)

ROW 31 (204 : 210)

ROW 32 (211 : 217)

ROW 33 (218 : 224)

ROW 34 (225 : 231)

ROW 35 (232 : 239)

ROW 36 (240 : 247)

ROW 37 (248 : 256)

ROW 38 (256 : 262)

ROW 39 (263 : 271)

ROW 40 (271 : 278)

ROW 41 (279 : 285)

ROW 42 (286 : 291)

ROW 43 (292 : 297)

ROW 44 (298 : 303)

ROW 45 (304 : 311)

ROW 46 (312 : 317)

ROW 47 (317 : 326)

ROW 48 (326 : 333)

ROW 49 (334 : 341)

ROW 50 (342 : 350)

ROW 51 (350 : 356)

ROW 52 (357 : 365)

ROW 53 (366 : 373)

ROW 54 (374 : 380)

ROW 55 (380 : 387)

ROW 56 (388 : 394)

ROW 57 (394 : 401)

ROW 58 (401 : 408)

ROW 59 (409 : 415)

ROW 60 (415 : 422)

ROW 61 (422 : 430)

ROW 62 (431 : 440)

ROW 63 (441 : 447)

ROW 64 (447 : 454)

ROW 65 (454 : 458)

ROW 66 (459 : 465)

ROW 67 (466 : 472)

ROW 68 (473 : 479)

ROW 69 (480 : 489)

ROW 70 (490 : 497)

ROW 71 (497 : 504)

ROW 72 (504 : 509)

ROW 73 (510 : 515)

ROW 74 (515 : 520)

ROW 75 (521 : 527)

ROW 76 (527 : 534)

ROW 77 (534 : 534)