

HEWLETT-PACKARD

IHP-67 IHP-97

Users' Library Solutions
Games of Chance



INTRODUCTION

In an effort to provide continued value to its customers, Hewlett-Packard is introducing a unique service for the HP fully programmable calculator user. This service is designed to save you time and programming effort. As users are aware, Programmable Calculators are capable of delivering tremendous problem solving potential in terms of power and flexibility, but the real genie in the bottle is program solutions. HP's introduction of the first handheld programmable calculator in 1974 immediately led to a request for program **solutions** — hence the beginning of the HP-65 Users' Library. In order to save HP calculator customers time, users wrote their own programs and sent them to the Library for the benefit of other program users. In a short period of time over 5,000 programs were accepted and made available. This overwhelming response indicated the value of the program library and a Users' Library was then established for the HP-67/97 users.

To extend the value of the Users' Library, Hewlett-Packard is introducing a unique service—a service designed to save you time and money. The Users' Library has collected the best programs in the most popular categories from the HP-67/97 and HP-65 Libraries. These programs have been packaged into a series of low-cost books, resulting in substantial savings for our valued HP-67/97 users.

We feel this new software service will extend the capabilities of our programmable calculators and provide a great benefit to our HP-67/97 users.

A WORD ABOUT PROGRAM USAGE

Each program contained herein is reproduced on the standard forms used by the Users' Library. Magnetic cards are not included. The Program Description I page gives a basic description of the program. The Program Description II page provides a sample problem and the keystrokes used to solve it. The User Instructions page contains a description of the keystrokes used to solve problems in general and the options which are available to the user. The Program Listing I and Program Listing II pages list the program steps necessary to operate the calculator. The comments, listed next to the steps, describe the reason for a step or group of steps. Other pertinent information about data register contents, uses of labels and flags and the initial calculator status mode is also found on these pages. Following the directions in your HP-67 or HP-97 **Owners' Handbook and Programming Guide**, "Loading a Program" (page 134, HP-67; page 119, HP-97), key in the program from the Program Listing I and Program Listing II pages. A number at the top of the Program Listing indicates on which calculator the program was written (HP-67 or HP-97). If the calculator indicated differs from the calculator you will be using, consult Appendix E of your **Owner's Handbook** for the corresponding keycodes and keystrokes converting HP-67 to HP-97 keycodes and vice versa. No program conversion is necessary. The HP-67 and HP-97 are totally compatible, but some differences do occur in the keycodes used to represent some of the functions.

A program loaded into the HP-67 or HP-97 is not permanent—once the calculator is turned off, the program will not be retained. You can, however, permanently save any program by recording it on a blank magnetic card, several of which were provided in the Standard Pac that was shipped with your calculator. Consult your **Owner's Handbook** for full instructions. A few points to remember:

The Set Status section indicates the status of flags, angular mode, and display setting. After keying in your program, review the status section and set the conditions as indicated before using or permanently recording the program.

REMEMBER! To save the program permanently, **clip** the corners of the magnetic card once you have recorded the program. This simple step will protect the magnetic card and keep the program from being inadvertently erased.

As a part of HP's continuing effort to provide value to our customers, we hope you will enjoy our newest concept.

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Use this program to count cards for determining a betting strategy.	

Program Description I

Program Title CRAPS

Contributor's Name JOHN RAUSCH

Address 402 VIRGINIA AVE

City FRANKLIN

State OHIO

Zip Code 45005

Program Description, Equations, Variables THE CALCULATOR PLAYS THE PART OF A CASINO OPERATOR IN A GAME OF CRAPS WITH YOU. FOR THOSE WHO DON'T KNOW, CRAPS IS PLAYED AS FOLLOWS: FIRST, YOU PLACE A BET. THEN YOU ROLL TWO DICE. IF THEY TOTAL 7 OR 11 ON THE FIRST ROLL, YOU WIN. IF THEY TOTAL 2, 3, OR 12 ON THE FIRST ROLL, YOU LOSE. ANY OTHER TOTAL ON THE FIRST ROLL BECOMES YOUR "POINT". YOU CONTINUE TO ROLL THE DICE UNTIL YOU EITHER ROLL YOUR POINT (YOU WIN) OR YOU "CRAP OUT" AND ROLL A 7 (YOU LOSE). ONCE YOU PLACE A BET BY ENTERING AN AMOUNT AND PRESSING , YOUR BET WILL REMAIN THE SAME UNTIL YOU CHANGE IT. YOU CAN DISPLAY YOUR TOTAL AMOUNT WON (OR LOST) BY PRESSING AT ANY TIME. IF YOU ARE PLAYING IN THE NONPRINT MODE AND FORGET YOUR POINT, IT CAN BE DISPLAYED BY PRESSING . WHEN YOU EXECUTE THE CLEAR FUNCTION () THE TOTAL AMOUNT WON IS SET TO ZERO AND ANY GAME IN PROGRESS IS TERMINATED.

Operating Limits and Warnings

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

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Program Description II

Sketch(es) WHEN YOU ROLL THE DICE, THEY ARE DISPLAYED IN THE FORMAT SHOWN HERE. THE TOTAL OF THE TWO DICE IS IN THE EXPONENT OF THE DISPLAY

PRINT MODE ---
 $\frac{4.2}{\text{DICE}} - \frac{06}{\text{TOTAL}} \leftarrow \text{PRINTED}$

NONPRINT MODE --
 $\frac{4.2}{\text{DICE}} \quad \frac{06}{\text{TOTAL}} \leftarrow \text{DISPLAY}$

Sample Problem(s) IN ORDER THAT THIS SAMPLE CAN BE DUPLICATED, A RANDOM NUMBER SEED WILL NOT BE GENERATED. TO INSURE DUPLICATION, TURN THE CALCULATOR OFF, THEN ON BEFORE LOADING THE PROGRAM. SAMPLE RUNS IN THE NONPRINT (DEFAULT) MODE.

Solution(s) 1) BET \$5.00: 5 \boxed{B} \rightarrow 5.00
 2) ROLL: $\boxed{A} \rightarrow 6.1 \dots 07$, 5.00 YOU WIN
 3) ROLL: $\boxed{A} \rightarrow 3.6 \dots 09$ YOUR POINT IS 9
 4) ROLL: $\boxed{A} \rightarrow 5.5 \dots 10$ ROLL AGAIN
 5) ROLL: $\boxed{A} \rightarrow 2.2 \dots 04$ "
 6) ROLL: $\boxed{A} \rightarrow 3.8 \dots 08$ "
 7) ROLL: $\boxed{A} \rightarrow 6.3 \dots 09$, 500 YOU WIN
 8) SEE AMOUNT WON: $\boxed{C} \rightarrow 10.00$

Reference(s) DISPLAY TECHNIQUE FROM A PROGRAM FOR THE HP-65 BY FRANK VOSE IN 65 NOTES, PUBLISHED BY THE HP-65 USERS CLUB, 2541 WEST CAMDEN PLACE, SANTA ANA, CALIFORNIA 92704. SEE VOL 2 NO 3 (MARCH-APRIL 1975).

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[illegible]

67 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	* LBL A	2111	ROLL. GENERATES TWO DICE. SETS UP DISPLAY AND PUTS TOTAL IN O.		* LBL 1	2101	CHECK FOR WIN OR LOSE ON SECOND AND SUBSEQUENT ROLLS.
	SCI	-12			7	07	
	DSP 1	-6301			f X=Y	16-33	
	f STF 2	16 2102		060	GTO 3	2203	
	GSB O	2300			CLX	-51	
	STO 1	3501			RCL 3	3603	
	* LBL O	2100			f X=Y	16-33	
	RCL F	3615			GTO 2	2202	
	f π	16-24			RCL 6	3606	
010	+	-55			f F? O	16 2300	
	X ²	53			PRINTX	-14	
	f FRAC	16 44			RTN	24	
	STO F	3515		* LBL 2	2102		PLAYER WINS.
	6	06		070	RCL 6	3606	
	X	-35			PRINTX	-14	
	1	01			RCL 4	3604	
	+	-55			GTO 4	2204	PLAYER LOSES.
	f INT	16 34		* LBL 3	2103		
	f F? 2	16 2302			RCL 6	3606	
020	RTN	24			PRINTX	-14	
	STO 2	3502			RCL 4	3604	END OF GAME.
	+				CHS	-22	
	STO O	3500		* LBL 4	2104		
	f 10 ^x	16 33		080	FIX	-11	
	f F? O	16 2300			DSP 2	-6302	
	1/x	52			f CLF 1	16 2201	
	RCL 1	3601			STO+5	35-5505	
	RCL 2	3602			f F? O	16 2300	
	1	01			PRINTX	-14	
030	0	00			f SPACE	16-11	
	÷	-24			RTN	24	
	+	-55		* LBL B	2112		BET.
	X	-35			f F? 1	16 2301	
	STO 6	3506		090	GTO f a	22 16 11	
	RCL O	3600			f X>O	16-44	
	f F? 1	16 2301			f X=O	16-43	
	GTO 1	2201			GTO f a	22 16 11	
	STO 3	3503			STO 4	3504	
	4	04			GTO 5	2205	
040	f X>Y	16-34	CHECK FOR WIN OR LOSE ON FIRST ROLL.	* LBL C	2113		DISPLAY WINNINGS
	GTO 3	2203			RCL 5	3605	
	CLX	-51		* LBL 5	2105		
	7	07			FIX	-11	
	f X=Y	16-33		100	DSP 2	-6302	
	GTO 2	2202		* LBL 6	2106		DISPLAY POINT
	4	04			f F? O	16 2300	
	+	-55			PRINTX	-14	
	f X=Y	16-33			f SPACE	16-11	
	GTO 2	2202			RTN	24	
050	f X<Y	16-35		* LBL D	2114		
	GTO 3	2203			FIX	-11	
	f STF 1	16 2101			DSP O	-6300	
	RCL 6	3606			RCL 3	3603	
	f F? O	16 2300		110	GTO 6	2206	
	PRINTX	-14		* LBL E	2115		INITIALIZE. INFINITE LOOP FOR RN SEED.
	RTN	24			f π	16-24	

REGISTERS

0 ROLL TOTAL	1 DIE #1	2 DIE #2	3 POINT	4 BET	5 WINNINGS	6 ROLL FORMATTED FOR DIS.	7	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9
A		B		C		D		E RANDOM NUMBER SEED	

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[illegible]

Program Description I

Program Title Twenty-six and Thirty-six

Contributor's Name Matthew A. Bishop

Address 327 Forbes Avenue

City San Rafael **State** CA **Zip Code** 94901

Program Description, Equations, Variables

RULES:

Twenty-six: Choose a number from 1 to 6. Roll 10 dice 13 times and count the number of times your chosen number is rolled. If it appears 11 times or less, you win \$1.00; exactly 13 times, you win \$0.50; 33 or more time, you win \$2.00; 26 or more time, you win \$1.00

Each game cost \$0.25, which is automatically deducted from your account.

Thirty-six: Place a bet (deducted from your account). Player continues to roll dice until he decides to stop or the sum or all numbers rolled exceeds 36 (in the latter case, 1-1E or it loses). When the first player is done, if his total is 36 or less, the second rolls, following the same procedure. If the second player stops before his or its total exceeds 36, the totals are compared. Whoever comes closes to 36, wins. On a tie, you get your bet back.

The calculator will match your bet (winner gets total bet by both players); it uses a simple strategy to decide when to stop rolling dice.

Operating Limits and Warnings

If you try to change the calculator's rolls in thirty-six (or press any key during the display of the calculator's rolling), you will automatically lose.

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

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Program Description II

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Sketch(es)

Sample Problem(s) Use .231659 as the seed.

Play "Twenty-six." Use 4 as your number

Calculate rolls: 1) 6144412142 5) 6533163612 10) 6363131626
2) 4455163443 6) 2533616115 11) 6351665453
3) 5655442523 7) 2554325666 12) 6322124643
4) 4223642136 8) 5261254245 13) 1634213363
9) 6131342352

And your number appeared 20 times. You therefore won \$0.00, and overall you won -\$0.25 (i.e., lost \$0.25 - the \$0.00 won and \$0.25 for the game).

See next page for samples of "Thirty-six".

Solution(s)

.231659 [E] -----> 0.23
4[A] -----> 6144412142.,4455163443.,5655442523.,4223642136.,
6533163612.,2533616115.,2554325666.,5261254245.,
6131342352.,6363131626.,6351665453.,6322124643.,
1634213363., (rolls)
-----> 20.00 (4 appeared 20 times)
0.00 (you won \$0.)
-0.25 (you owe \$0.25)

Reference(s)

Program Description II

Sketch(es)

Sample Problem(s)

Use 0.384691 as the seed.

Play "Thirty-six."

1) Bet \$10.00. You go first. You roll 4, then again for a sum of 6, and so on (sums only are displayed), to get 8,12,15,21,27,29,35. Stop here.

Now machine rolls. Again, the sum of the rolls is displayed: 1,5,9,14,17,19,22,23,29,30,31,37. As machine went over 36, it loses.

Display shows 20.00, which was twice what you bet. You won this.

Solution(s) .384691 [E] -----> 0.38

1) 10[B] -----> 4.00 (Think a bit; 4.00 flashes)

[CHS] -----> 6.00

[CHS] -----> 8.00

[CHS] -----> 12.00

[CHS] -----> 15.00

[CHS] -----> 21.00

[CHS] -----> 27.00

[CHS] -----> 29.00

[CHS] -----> 35.00 (Stop Here)

[CLX] -----> 1.,5.,9.,14.,
17.,19.,22.,
23.,29.,30.,
31.,37.,
(Calculates Rolls)

-----> 20.00 You Win

Reference(s)

Program Description II

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Sketch(es)

Sample Problem(s) Use 0.895727 as the seed.

2) Now let the calculator go first. Bet: \$10.00

Calculator rolls dice; the sums of the rolls are 1,6,9,10,15,22,24,25,28,32,36 and stops here.

Now you go. You roll 5,11,15,16,17,19,23,29,33. Being daring you roll again. But your roll is one too many; you lose and -10.00. The display shows what you lost.

3) To see what you won from these two games of thirty-six, press [D]. As 0.00 is displayed, you broke even.

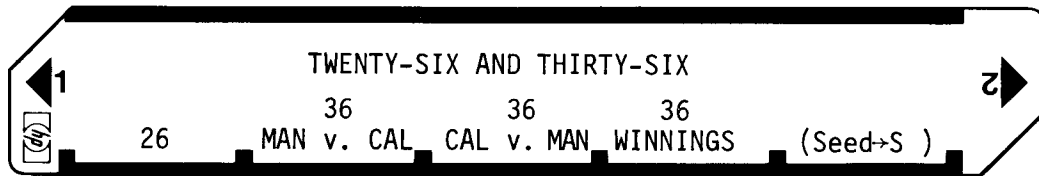
Solution(s) .895727 [E] -----> 0.90

2) 10[C] -----> 1.,6.,9.,10.,15.,16.,22.,24.,25.,28.,32.,36.
(Calculator's rolls)

-----> 5.00 (Your roll)	[CHS] -----> 23.00
[CHS]-----> 11.00	[CHS] -----> 29.00
[CHS]-----> 15.00	[CHS] -----> 33.00
[CHS]-----> 16.00	[CHS] -----> -10.00 You Lose
[CHS]-----> 17.00	
[CHS]-----> 19.00	3) [D] -----> 0.00

Reference(s) Scarne on Dice, John Scarne; Stackpole Books 1962, pp. 353-356,363.

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1.	Enter program		<input type="text"/> <input type="text"/>	
2.	Enter seed S (any number can be used if $0 < S < 1$)	S	E <input type="text"/>	S
3.	Play "26": Enter point number p	p	A <input type="text"/>	
	(calculator rolls 10 dice and displays them as one number. This step is repeated 13 times. (DSP 0 Format)		<input type="text"/> <input type="text"/>	
	Number of times p was rolled (DSP 2) format from here on)		<input type="text"/> <input type="text"/>	abcdefghijkl.
	Winnings this round		<input type="text"/> <input type="text"/>	x.00
	Overall winnings		<input type="text"/> <input type="text"/>	W
	OR play "36"		<input type="text"/> <input type="text"/>	ΣW
	Either you play first	(bet)	B <input type="text"/>	
	OR Machine (cal) plays first	(bet)	C <input type="text"/>	
	(The following applies in either case):		<input type="text"/> <input type="text"/>	
	When human is rolling, total rules is displayed in DSP 2 format. The display will continue flashing the current total and will not roll the dice until one of the following is done:		<input type="text"/> <input type="text"/>	
	a. To roll again		CHS <input type="text"/>	
	b. To stop at this sum when cal is rolling, the total rolled is displayed in DSP 0 format. WARNING: IF ANY KEY IS TOUCHED WHILE TOTAL IS BEING DISPLAYED, THE HUMAN PLAYER FORFIETS THE GAME.		CLX <input type="text"/>	
	If either the man or cal. exceed 36, the player rolling (cal or man) loses. There are three possible display endings (all in DSP 2 format).		<input type="text"/> <input type="text"/>	
	1. Man loses		<input type="text"/> <input type="text"/>	-(bet)
	2. Cal loses		<input type="text"/> <input type="text"/>	2(bet)
	3. Tie:		<input type="text"/> <input type="text"/>	(bet)
	Then		<input type="text"/> <input type="text"/>	TOT WINNINGS
	in 1 or 2, to display total winnings, you must press		D <input type="text"/>	TOT WINNINGS
4.	For a new game, go to 3		<input type="text"/> <input type="text"/>	

97 Program Listing I

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STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBLA	21 11	Play "26"	057	ISZI	16 26 46	
002	STOA	35 11	Store point number	058	1	01	
003	.	-62	Initialize	059	RCLI	36 46	
004	2	02		060	X=Y?	16-33	
005	5	03		061	0	00	
006	ST-0	35-45 00		062	ST+0	35-55 00	
007	0	00		063	RCL1	36 01	Display number of
008	STO1	35 01		064	PSE	16 51	times point number
009	1	01		065	X*Y	-41	was rolled
010	3	03		066	PSE	16 51	Display money won
011	STOB	35 12		067	RCL0	36 00	this round
012	*LBLd	21 16 14	This is secondary	068	RTN	24	Display total in
013	1	01	Loop. initialize	069	*LBL1	21 01	kitty
014	0	00	For throw of 10	070	1	01	Add 1 to R., drop
015	STOI	35 46	dice	071	ST+1	35-55 01	stack.
016	0	00		072	CLX	-51	
017	ENT+	-21		073	+	-55	
018	*LBL0	21 00	Throw 10 dice and	074	RTN	24	
019	1	01	display as one	075	*LBL2	21 02	Put .5 in R ₁ and
020	0	00	number	076	.	-62	drop stack
021	x	-35		077	5	05	
022	GSBe	23 16 15		078	STOI	35 46	
023	RCLA	36 11		079	CLX	-51	
024	X=Y?	16-33		080	+	-55	
025	GSB1	23 01		081	RTN	24	
026	CLX	-51		082	*LBLB	21 12	Play "36", man
027	+	-55		083	SF1	16 21 01	goes first
028	+	-55		084	STO5	35 05	Initialize
029	DSZI	16 25 46		085	ST-2	35-45 02	
030	GT00	22 00		086	0	00	
031	PRTX	-14		087	STO3	35 03	
032	RCLB	36 12	display number	088	STO4	35 04	
033	1	01	Repeat this loop	089	GSB _a	23 16 11	Man goes, tot. is Tm
034	-	-45	13 times	090	GSB _b	23 16 12	Cal goes, tot. is Tc
035	STOB	35 12		091	*LBLc	21 16 13	Compare totals
036	X#0?	16-42		092	DSP2	-63 02	
037	GT0d	22 16 14		093	RCL4	36 04	
038	1	01	Initialize for	094	RCL3	36 03	
039	STOI	35 46	payoff	095	X>Y?	16-34	Man wins if Tc<Tm
040	RCL1	36 01	Payoff	096	GT09	22 09	
041	3	03		097	X*Y	-41	Cal wins if Tm<Tc
042	3	03		098	X>Y?	16-34	
043	X#Y?	16-35		099	GT04	22 04	
044	ISZI	16 26 46		100	RCL5	36 05	If a tie, man loses
045	7	07		101	ST+2	35-55 02	nothing.
046	-	-45		102	PSE	16 51	Display bet
047	X#Y?	16-35		103	RCL2	36 02	Display total won
048	ISZI	16 26 46		104	RTN	24	so far
049	2	02		105	*LBLC	21 13	Paly "36", cal goes
050	÷	-24		106	CF1	16 22 01	first
051	X=Y?	16-33		107	STO5	35 05	Initialize
052	GSB2	23 02		108	ST-2	35-45 02	
053	2	02		109	0	00	
054	-	-45		110	STO3	35 03	
055	X*Y	-41		111	STO4	35 04	
056	X#Y?	16-35		112	GSB _b	23 16 12	Cal goes, tot. is Tm

REGISTERS

0 TOT (26)	1 #times(26)	2 TOT (26)	3 Your Roll (36)	4 HP's Roll (36)	5 Bet(36)	6	7	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9
A Point	B Loop Count	C	D	E	F	G	H	I Used	

97 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
113	GSSa	23 16 11	Man goes; tot is 1m	169	GT08	22 08	Man wins Payoff
114	GT0c	22 16 13	Go to display rout.	170	X≠Y?	16-35	
115	*LBLD	21 14	Recall total won	171	GT06	22 06	
116	RCL2	36 02	so far at "36"	172	RTN	24	
117	RTN	24		173	*LBL9	21 09	
118	*LBL E	21 15	Store seed "S"	174	DSP2	-63 02	
119	STOE	35 15		175	RCL5	36 05	
120	RTN	24		176	2	02	
121	*LBLa	21 16 11	Man rolls	177	x	-35	
122	DSP2	-63 02	Initialize	178	ST+2	35-55 02	
123	*LBL5	21 05		179	R/S	51	Roll dice
124	GSSb	23 16 15	Roll dice, add	180	*LBL e	21 16 15	
125	ST+3	35-55 03	roll to total	181	RCL e	36 15	
126	*LBL3	21 03	Display loop	182	9	09	
127	3	03	If sum is more than	183	9	09	
128	6	06	36, you lose	184	7	07	
129	RCL3	36 03		185	x	-35	
130	X>Y?	16-34		186	FRC	16 44	
131	GT04	22 04	Display total	187	STOE	35 15	
132	PSE	16 51	If nothing done,	188	6	06	
133	X>0?	16-44	cont. to display tot	189	x	-35	
134	GT03	22 03	If [CHS] pressed,	190	1	01	
135	X<0?	16-45	roll again	191	+	-55	
136	GT05	22 05	If [CLX] pressed,	192	INT	16 34	
137	RTN	24	end	193	RTN	24	
138	*LBL4	21 04	Man loses				
139	DSP2	-63 02					
140	RCL5	36 05					
141	CHS	-22					
142	R/S	51					
143	*LBLb	21 16 12	Cal rolls				
144	DSP0	-63 00	Initialize	200			
145	*LBL6	21 06					
146	GSSb	23 16 15	Roll dice and add				
147	ST+4	35-55 04	to total				
148	3	03	If total is more				
149	6	06	than 36, cal loses				
150	RCL4	36 04					
151	CF3	16 22 03	Display total				
152	PSE	16 51	Rolled, if changed				
153	F3?	16 23 03	cal wins				
154	GT04	22 04		210			
155	X>Y?	16-34					
156	GT09	22 09					
157	F1?	16 23 01	If man went first,				
158	GT07	22 07	use a different				
159	*LBL8	21 08	strategy				
160	3	03					
161	3	03					
162	X≠Y?	16-35					
163	RTN	24	Strategies: does				
164	GT06	22 06	cal roll again?	220			
165	*LBL7	21 07					
166	RCL3	36 03					
167	X≠Y	-41					
168	X=Y?	16-33					

LABELS

FLAGS

SET STATUS

A 26	B 36	C 36	D WINNINGS	E (Seed→)	0	FLAGS	TRIG	DISP
Man vs HP	HP vs. Man	Man	WINNINGS	(Seed→)	0	ON OFF		
Man rolls	HP rolls	Display	Loop 2	Roller	1 Man Roll?	0 <input type="checkbox"/> <input checked="" type="checkbox"/>	DEG <input checked="" type="checkbox"/>	FIX <input checked="" type="checkbox"/>
Loop 1	Used	Used	Display	Man loses	2	1 <input type="checkbox"/> <input checked="" type="checkbox"/>	GRAD <input type="checkbox"/>	SCI <input type="checkbox"/>
Man's dice	HP's dice	Strategy	Strategy	HP loses	3	2 <input type="checkbox"/> <input checked="" type="checkbox"/>	RAD <input type="checkbox"/>	ENG <input type="checkbox"/>
						3 <input type="checkbox"/> <input checked="" type="checkbox"/>		n <u>2</u>

Program Description I

Program Title CHUCK-A-LOCK DICE GAME
Contributor's Name JOHN RAUSCH
Address 402 VIRGINIA AVE
City FRANKLIN **State** OHIO **Zip Code** 45005

Program Description, Equations, Variables THE CALCULATOR PLAYS THE PART OF A CASINO OPERATOR IN A GAME OF CHUCK-A-LOCK. THE PLAYER PLACES A BET BY ENTERING A INTEGER AMOUNT AND PRESSING **[B]**. THE SAME BET AMOUNT WILL BE USED UNTIL IT IS CHANGED. THE PLAYER THEN SELECTS A NUMBER FROM 1 TO 6 AND PRESSES **[A]**. THE CALCULATOR THEN ROLLS 3 DICE AND THE PLAYER IS PAID OFF 1:1 IF THE NUMBER APPEARS ON 1 OF THE DICE, 2:1 IF IT APPEARS ON 2, OR 3:1 IF IT APPEARS ON ALL 3. AT ANY TIME THE PLAYER CAN DISPLAY THE TOTAL WINNINGS BY PRESSING **[C]**.

Operating Limits and Warnings

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Program Description II

Sketch(es) AFTER EACH ROLL, THE DISPLAY SHOWS THE 3 DICE AS WELL AS THE AMOUNT WON OR LOST. THE AMOUNT IS TO THE LEFT OF THE DECIMAL POINT AND THE DICE ARE TO THE RIGHT.

EXAMPLE: IF 6 DOLLARS WERE BET ON NUMBER 2 AND THE ROLL WERE 2, 4, AND 2 THE DISPLAY WOULD BE AS SHOWN TO THE RIGHT.

12.242
 ↗ AMOUNT WON ↖ ROLL

Sample Problem(s) IN ORDER TO DUPLICATE THIS SAMPLE, A RANDOM NUMBER SEED WILL NOT BE GENERATED.

Solution(s) 1) 5 [B]: BET 5 DOLLARS	SEE 5.
2) 1 [A]: PICK 1 AND ROLL	SEE 5.316
3) 2 [A]: " 2 " "	SEE -5.556
4) 2 [A]: " 2 " "	SEE 10.322
5) 5 [A]: " 5 " "	SEE 5.365
6) 1 [A]: " 1 " "	SEE -5.632
7) 3 [A]: " 3 " "	SEE -5.614
8) 1 [A]: " 1 " "	SEE 10.121
9) [C] DISPLAY WINNINGS	SEE 15.

Reference(s)

15

1

CHUCK-A-LUCK DICE GAME

2

1-6 ROLL

BET

WINNING

CLEAR

GEN SEED

[illegible]

67 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	* LBL A	2111	VALIDATE NUMBER		RTN	24	
	DSP O	-6300	AND ROLL DIE 3		* LBL B	2112	VALIDATE BET
	f INT	1634	TIMES. THEN DISPLAY		DSP O	-6300	
	f LASTX	16-63	RESULT	060	f INT	1634	
	f X≠Y	16-32			f LASTX	16-63	
	GTO fe	221615			f X≠Y	16-32	
	DSP 3	-6303			GTO e	221615	
	STO O	3500			STO I	3501	
	I	01			RTN	24	
010	f X>Y	16-34			* LBL D	2114	CLEAR WINNINGS
	GTO fe	221615			CLX	-51	
	CLX	-51			STO 4	3504	
	I	07			* LBL C	2113	DISPLAY WINNINGS
	f X≤Y	16-35		070	DSP O	-6300	
	GTO e	221615			RCL 4	3504	
	CLX	-51			RTN	24	
	STO I	3546			* LBL E	2115	GENERATE RANDOM
	STO 3	3503			f π	16-24	NUMBER SEED
	GSB 1	2301			+	-55	
020	GSB 1	2301			STO 5	3505	
	GSB 1	2301			GTO F	2215	
	RCL T	3646					
	f X=O	16-43					
	GTO O	2200		080			
	RCL 1	3601					
	X	-35					
	STO+4	35-5504					
	RCL 3	3603					
	+	-55					
030	RTN	24					
	* LBL O	2100					
	RCL 1	3601					
	STO -4	35-4504					
	RCL 3	3603		090			
	+	-55					
	CHS	-22					
	RTN	24					
	* LBL I	2101	ROLL DIE AND ADD				
	RCL O	3600	TO WINNINGS FOR				
040	RCL 5	3605	MATCH. BUILD DICE				
	f π	16-24	DISPLAY.				
	+	-55					
	X ²	53					
	f FRAC	1644		100			
	STO 5	3505					
	G	06					
	X	-35					
	I	01					
	+	-55					
050	f INT	1634					
	f X=Y	16-33					
	f ISZ I	162646					
	STO+3	35-5503					
	I	01					
	O	00					
	STO÷3	35-2403					

FLAGS	SET STATUS		
0	FLAGS	TRIG	DISP
1	ON OFF	DEG <input checked="" type="checkbox"/>	FIX <input checked="" type="checkbox"/>
2	0 <input type="checkbox"/> <input checked="" type="checkbox"/>	GRAD <input type="checkbox"/>	SCI <input type="checkbox"/>
3	1 <input type="checkbox"/> <input checked="" type="checkbox"/>	RAD <input type="checkbox"/>	ENG <input type="checkbox"/>
	2 <input type="checkbox"/> <input checked="" type="checkbox"/>		n <u>0</u>
	3 <input type="checkbox"/> <input checked="" type="checkbox"/>		

LABELS				
A 1-6 ROLL	B BET	C DISWINNINGS	D CLEAR	E GEN SEED
a	b	c	d	e "error"
0 LOSE	1 ROLL 1 DIE	2	3	4
5	6	7	8	9

REGISTERS									
0 NUMBER BET ON	1 BET	2	3 DICE	4 WINNINGS	5 RANDOM NUMBER SEED	6	7	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9
A	B	C	D	E	I USED				

Program Description I

Program Title Parapar

Contributor's Name Matthew A. Bishop

Address 327 Forbes Avenue

City San Rafael

State

CA

Zip Code 94901

Program Description, Equations, Variables

In Parapar, the gambler puts up a stake. The calculator rolls five dice, and can save as many dice as it wants. It must, however, save at least one. When the calculator can roll no more, it totals the numbers saved.

If this total is under 24, the gambler wins. The amount won is the product of the stake and the difference of 24 and the total rolled.

If the total is exactly 24, the bet is off. Neither the man nor the calculator wins.

If the total is more than 24, the gambler loses. To determine how much he loses, find the difference of the total rolled and 24. This is the "Point". A die is rolled 5 times, and the amount lost is the product of the stake, the point, and the number of times the point appeared in the five rolls.

A simple strategy for determining which dice to put aside and when to stop rolling is written into the program.

Parapar is based loosely on the game "Par".

Operating Limits and Warnings

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Program Description II

Sketch(es)

Sample Problem(s)

First time: Calculator rolls 5 dice, getting 2,2,6,4,3. (It saves the highest roll, in this case 6.)

Second time: Calculator rolls 5 dice, getting 1,4,1,1. (Again, it saves the highest roll, in this case 4.)

Third Time: Calculator rolls 3 dice, getting 2,1,4 (saves the 4).

Fourth Time: Calculator rolls 2 dice, getting 2,6 (saves the 6)

Fifth Time: Calculator rolls 1 die, getting 2

Total of dice saved: $6+4+4+6+2 = 22$

As $22 < 24$, gambler wins. This is indicated by a positive number; he won \$20.00

As he bet \$10, he has a grand total of \$10.00.

Solution(s)

.3682715 [C] -----> 0.37

10.00 [A] -----> 22643.

1411.

214.

26.

2.

22.00

20.00

10.00

First Roll

Second Roll

Third Roll

Fourth Roll

Fifth Roll

Total Saved

Amount Won This Round

Total Won so Far

Reference(s)

Program Description II

19

Sketch(es)

Sample Problem(s) Play again; use 0.248250 as seed.

Bet \$10. again.

First time: The calculator rolls 5 dice, getting 4,5,1,1,6

Second time: The calculator rolls 3 dice, getting 3,5,5

Third time: The calculator rolls 1 die, getting 6

Total of dice saved: $5+6+5+5+6 = 27$

Point number is 3.

Calculator rolls 1 die 5 times, getting 3,1,2,4, and 4.

Hence gambler lost \$30.00

Leaving a grand total of -\$30.00

Solution(s)	.248250 [C] -----	0.25
	10.00 [A] -----	45116. First Roll
		355. Second Roll
		6. Third Roll
		27.00 Total Rolled
		3. Point Numbered
		-3.,-1.,-2.,-4.,-4. Dice Rolls
		-30.00 Total Lost This Round
		-30.00 Money Lost Overall

Reference(s) Scarne on Dice, John Scarne, Stackpole Books, 1962, pp. 368

97 Program Listing I

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STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBLA	21 11	Play "Parapar"	057	CLX	-51	Initialize
002	STO9	35 09	Store bet, deduct	058	ENT↑	-21	registers
003	ST-8	35-45 08	from gambler's Acct.	059	*LBL3	21 03	Loop for
004	GSBB	23 12	Dice Control	060	1	01	rolling dice
005	DSP2	-63 02	Display tot. rolled	061	0	00	Prepare for display
006	PRTX	-14		062	x	-35	
007	STOD	35 14	Diff. between tot.	063	GSBe	23 16 15	Roll dice
008	2	02	and 24	064	STOI	35 45	Store roll
009	4	04		065	+	-55	Add to display
010	-	-45		066	DSZI	16 25 46	
011	X=0?	16-43	If tot. is 24, no-	067	GT03	22 03	
012	SF1	16 21 01	one wins	068	DSP0	-63 00	Display as one no.
013	X>0?	16-44	If tot. is more	069	PRTX	-14	
014	GSB7	23 07	than 24, find no.	070	RCLC	36 13	Arrange the nos.
015	RCL9	36 09	of times Pt.no.	071	*LBL2	21 02	rolled in order in
016	x	-35	occurs (see 7)	072	STOB	35 12	the registers
017	CHS	-22	Multiply by amt.	073	STOA	35 11	
018	DSP2	-63 02	bet, display	074	STOI	35 46	
019	PSE	16 51		075	RCLi	36 45	
020	F1?	16 23 01	If tot. is 24, resto	076	*LBL0	21 00	
021	CLX	-51	amt bet to gambler's	077	RCLi	36 45	
022	ST+8	35-55 08	acct.	078	X>Y?	16-34	
023	RCL8	36 08	Display tot. amt.	079	GSB1	23 01	
024	CF1	16 22 01		080	X*Y	-41	
025	RTN	24		081	DSZI	16 25 46	
026	*LBL7	21 07	If tot. is more than	082	GT00	22 00	
027	DSP0	-63 00	24, display pt.	083	RCLB	36 12	
028	STOD	35 14	number	084	STOI	35 46	
029	PSE	16 51		085	CLX	-51	
030	5	05	Int. for rolling	086	+	-55	
031	STOI	35 46		087	RCLi	36 45	
032	0	00		088	X*Y	-41	
033	STO7	35 07		089	STOI	35 45	
034	*LBL8	21 08	Roll dice	090	CLX	-51	
035	GSBe	23 16 15		091	+	-55	
036	CHS	-22	Display roll	092	RCLA	36 11	
037	PRTX	-14		093	STOI	35 46	
038	CHS	-22	If the roll is equal	094	X*Y	-41	
039	RCLD	36 14	to the pt. no., add	095	STOI	35 45	
040	X=Y?	16-33	it to R ₇	096	RCLB	36 12	
041	GSBS	23 09		097	1	01	
042	DSZI	16 25 46	Go back until 5 dice	098	-	-45	
043	GT08	22 08	have been thrown	099	X#0?	16-42	
044	RCL7	36 07	No. of times pt. no.	100	GT02	22 02	
045	RCLD	36 14	appears times pt.	101	RCLC	36 13	
046	x	-35	no.	102	STOI	35 46	
047	RTN	24	Add 1 to R ₇	103	DSZI	16 25 46	
048	*LBL9	21 09		104	GT05	22 05	
049	1	01		105	GT0E	22 15	
050	ST+7	35-55 07		106	*LBL5	21 05	
051	RTN	24	Roll dice	107	RCLi	36 45	
052	*LBL6	21 12	Initialize for 1st	108	5	05	
053	5	05	roll	109	X#Y?	16-35	
054	STOC	35 13		110	GT06	22 06	
055	*LBL4	21 04	Int for next roll	111	RCLi	36 46	
056	STOI	35 46		112	STOC	35 13	

REGISTERS

0	Die#1 roll	2	Die#2 roll	3	Die#3 roll	4	Die#4 roll	5	Die#5 roll	6		7	How many times was	8	Tot won so far	9	Bet
S0	S1	S2	S3	S4	S5	S6						pt. no. rolled	S8		S9		
A	Used	B	Used	C	Loop control	D	Total rolled, Point number	E	Seed	F	Used						

97 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
113	X=0?	16-43		169	RTN	24	Store seed in R _E
114	GTOE	22 15		170	*LBLC	21 13	
115	GSBE	23 15		171	STOE	35 15	
116	2	02		172	RTN	24	
117	4	04					
118	X≠Y	-41					
119	X>Y?	16-34					
120	GTOE	22 15					
121	X=Y?	16-33					
122	GTOd	22 16 14					
123	RCLC	36 13	Total number rolled	180			
124	GTO4	22 04					
125	*LBL6	21 06					
126	DSZI	16 25 46					
127	GTO5	22 05					
128	*LBL5	21 15					
129	RCL5	36 05					
130	RCL4	36 04					
131	+	-55					
132	RCL3	36 03		190			
133	+	-55	More strategy				
134	RCL2	36 02					
135	+	-55					
136	RCL1	36 01					
137	+	-55					
138	RTN	24					
139	*LBLd	21 16 14					
140	F2?	16 23 02					
141	GTOE	22 15					
142	RCL1	36 01					
143	4	04	Prepare to transfer: Note register loca- tion of largest no.	200			
144	X≠Y?	16-35					
145	GTOE	22 15					
146	1	01					
147	SF2	16 21 02					
148	GTO4	22 04					
149	*LBL1	21 01					
150	RCL1	36 46					
151	STOA	35 11					
152	CLX	-51					
153	+	-55	Dice roller	210			
154	X≠Y	-41					
155	RTN	24					
156	*LBL5	21 16 15					
157	RCL5	36 15					
158	9	09					
159	9	09					
160	7	07					
161	X	-35					
162	FRC	16 44					
163	STOE	35 15		220			
164	6	06					
165	4	-35					
166	1	01					
167	+	-55					
168	INT	16 34					

LABELS					FLAGS	SET STATUS		
^A Your Bet	^B Roll Dice	^C (Seed→)	^D	^E Dice Sum	⁰	FLAGS	TRIG	DISP
^a	^b	^c	^d Strategy	^e Roll	¹ TOT=24	ON OFF		
⁰ Sort	¹ Pointer	² Sort	³ Roll	⁴ Control	² Strategy	0 <input type="checkbox"/> <input checked="" type="checkbox"/>	DEG <input checked="" type="checkbox"/>	FIX <input checked="" type="checkbox"/>
⁵ Strategy	⁶ Strategy	⁷ Total>24	⁸ Used	⁹ Used	³	1 <input type="checkbox"/> <input checked="" type="checkbox"/>	GRAD <input type="checkbox"/>	SCI <input type="checkbox"/>
						2 <input type="checkbox"/> <input checked="" type="checkbox"/>	RAD <input type="checkbox"/>	ENG <input type="checkbox"/>
						3 <input type="checkbox"/> <input checked="" type="checkbox"/>		n <u>2</u>

Program Description I

23

Program Title	P I G		
Contributor's Name	Moshe M Breiner		
Address	2-904 Peabody Terrace		
City	Cambridge	State	MA
		Zip Code	02138

Program Description, Equations, Variables

Pig is a game of dice. Any number of players may play, but this program accepts no more than 22 players.

You initialize entering the number N of players and if you wish, any player can contribute to the initial seed for the pseypo random die generator.

The order of play is usually selected by throwing a die (function [C])

Lowest plays first, highest plays last, tights are split.

The first player throws the die, adding the points of the upper face to his total. He can throw as many times as he wishes, but if he gets an ace he loses all the points of this turn and passes the die to next player, or he can elect to pass the die, in which case he keeps all his points.

The first player to reach 100 wins.

Operating Limits and Warnings

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Program Description II

Sketch(es)

Sample Problem(s) Example of a game: 3 players participate in the game
 3 [fe] 1*. HP ready for player #1. One player wants to enter a seed, say 5
 5 [E] 1*. HP still ready. In order to decide the turn they throw a die
 [C] 5* [C]2* [C]6*

Now the game begins with player #1 (the one who threw 2).

1[A] 3*** 0*** 3*** 1* (Die shows 3, total of previous turns 0,
 big total 3, player #1 plays) he elects to hit

[A] 3*** 0*** 6*** 1* (Die shows 3, total of previous turns 0,
 big total 6, player #1 plays) he elects to hit

[A] 5*** 0*** 11*** 1* He hits again

[A] 2*** 0*** 13*** 1* Now he elects to pass

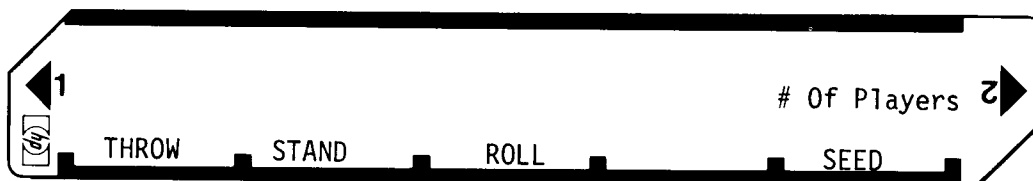
[B] 13.01*** 2* (13.01 means 13 points for player #1. 2 means that now
 player #2 plays).

Solution(s)

Reference(s)

User Instructions

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STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS		OUTPUT DATA/UNITS
1.	Load program				
2.	Enter # of players	N	f	e	1*
	The computer is now ready				
3.	(Faculative) any player can modify the seed	any number		E	1*
4.	(Facultative) if you wish to decide the order rolling dice, each player presses			C	Upperface***
5.	Now the game starts. Each player on his turn, executes steps 6-7-8-9				
6.	Be sure the number corresponding to the players is on display. If this is not the case, enter his number	# of players			
7.	If the player decides to pass, go to step 9				
8.	If he elects to throw			A	(A) or (B)
9.	In order to pass			B	(B)
10.	Next player starts from step 6				
11.	For a new game go to step 2				
	Output of type (A) appears if the player rolls a point different from 1: Point***, total previous turns***, Big total***, number of this player*				
	Output of type (B) appears if the player rolls an ace or if he elects to pass: xx.yy*** (xx= Total, yy=# of this player)				
	Number of next player*				
	In any case the last output correspond to the active player				

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS			
001	*LBL 21	16 15	Enter # of players Check it is legal i.e., 1<N<23	057	EEX	-23	Construct pseudo random # 1<#<6			
002	ABS	16 31		058	2	02				
003	INT	16 34		059	÷	-24				
004	X=0?	16-43		060	+	-55				
005	GT09	22 09		061	PRTX	-14				
006	RCL 16	36 15		062	DSP0	-63 00				
007	CLRG	16-53		063	CLX	-51				
008	P2S	16-51		064	ST00	35 00				
009	CLRG	16-53		065	SPC	16-11				
010	X2Y	-41		066	SPC	16-11				
011	2	02	Modify Seed	067	ISZ1	16 26 46	Seed sterile? Yes Get a new one			
012	3	03		068	RCLD	36 14				
013	X2Y?	16-35		069	RCLI	36 46				
014	GT09	22 09		070	X>Y?	16-34				
015	R4	-31		071	1	01				
016	ST0D	35 14		072	RTN	24				
017	R4	-31		073	*LBLC	21 13				
018	FRC	16 44		074	RCL 16	36 15				
019	*LBL 21	15		075	9	09				
020	DSP0	-63 00		076	9	09				
021	ABS	16 31	077	7	07	New Seed				
022	2	02	078	X	-35					
023	+	-55	079	FRC	16 44					
024	LN	32	080	X=0?	16-43					
025	2	02	081	GSB2	23 02					
026	X2Y	-41	082	ST0E	35 15					
027	X>Y?	16-34	083	6	06					
028	GT0E	22 15	084	X	-35					
029	RCL 16	36 15	085	INT	16 34					
030	+	-55	086	1	01					
031	ST0E	35 15	087	+	-55					
032	F3? 16	23 03	088	PRTX	-14					
033	GT0E	22 15	089	RTN	24					
034	1	01	090	*LBL2	21 02					
035	RTN	24	091	.	-62					
036	*LBLA	21 11	092	5	05					
037	ST0I	35 46	093	2	02					
038	1	01	094	8	08					
039	GSBC	23 13	095	4	04					
040	X=Y?	16-33	096	1	01					
041	GT01	22 01	097	6	06					
042	ST+0	35-55 00	098	3	03					
043	RCL 16	36 45	099	RTN	24					
044	PRTX	-14								
045	RCL0	36 00								
046	+	-55								
047	PRTX	-14								
048	RCLI	36 46								
049	RTN	24								
050	*LBLB	21 12	Add total of this turn to previous total display out- put of type (B)							
051	RCL0	36 00								
052	ST+i	35-55 45								
053	*LBL1	21 01								
054	DSP2	-63 02								
055	RCL 16	36 45								
056	RCLI	36 46								
REGISTERS ALL USED										
0 Total of turn	1	2		3	4	5	6	7	8	9
S0	S1	S2		S3	S4	S5	S6	S7	S8	S9
A	B	C	D # of players		E Seed		I Used			

97 Program Listing II

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[illegible]

Program Description I

Program Title Big Six
Contributor's Name Matthew A. Bishop
Address 327 Forbes Avenue
City San Rafael **State** CA **Zip Code** 94901

Program Description, Equations, Variables In Big Six, a wheel is divided into 54 parts by lines drawn from the center to the rim. In each compartment are surfaces of three dice (e.g., in the first compartment, two dice are shown with the 1-side, and the third with the 4-side). An indicator is positioned at the top of the wheel. The wheel is spun, and when it stops the compartment it is pointing to contains the winning combination.

The winnings are computed as follows. You can bet \$1.00 on any combination, any single number, or all of 1,2,3,4,5,6. If a number you bet on shows up once, you win \$1.00, and you get the \$1.00 you bet on back; if it shows up twice in the combination, you win \$2.00, and get your \$1.00 bet back. If it shows up three times, you win \$3.00 and get your \$1.00 bet back.

For instance, if you bet on 1,2,3, and 5, and the combination 1-3-3 appears, you lose the \$1.00 you bet on 2 and the \$1.00 you bet on 5 (as they did not appear), but as 1 appeared once you win \$1.00 and as the 3 appeared twice you win \$2.00. (You also get your bets back, which cancels the money bet on them). Thus, you win $-\$1 -\$1 +\$1 +\$2 = \$1.00$.

Operating Limits and Warnings

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

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Program Description I

Program Title

Contributor's Name

Address

City

State

Zip Code

Program Description, Equations, Variables

One wheel is given below. You can use a data card to load it and preserve it; you can also make your own. Note that the combinations for 3 compartments are stored in each register.

$R_0 = 114266133$	$R_6 = 455156113$	$R_{52} = 256556334$
$R_1 = 246155146$	$R_7 = 356233144$	$R_{53} = 112135336$
$R_2 = 666116123$	$R_8 = 222344345$	$R_{54} = 1364444226$
$R_3 = 244335134$	$R_9 = 115224236$	$R_{55} = 145166245$
$R_4 = 445225111$	$R_{50} = 446124223$	$R_{56} = 366235122$
$R_5 = 566234355$	$R_{51} = 255333466$	$R_{57} = 346555126$

(On your data card, you must store 10 in R_0 for the program to work)

Thus, the first combination is 1-1-4. The second 2-6-6, the third 1-3-3, the fourth 2-4-6, and so on.

Operating Limits and Warnings

Never press [f] [CLREG] or you will erase the wheel. Also, bet only on 1,2,3,4,5, or 6. When entering numbers to be bet on, never enter a 0 - that will prevent the bet from being tabulated.

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Program Description II

Sketch(es)

Sample Problem(s) Load .3657891 as seed

- 1) Bet \$1.00 on each of 2,4,6. Machine spins wheel, winning combination is 3-3-4, so you have - \$1.00 in your kitty.
- 2) Bet \$1.00 on each of 1,4. The winning combination is 2-5-6. You have won so far an overall total of -\$3.00. (-\$3.00 in kitty).
- 3) Bet \$1.00 on each of 2,3,5. The winning combination is 2-3-6. You have won an overall total of -\$2.00.
- 4) Bet \$1.00 on each of 3,6. The winning combination is 2-2-6. You have won an overall total of -\$2.00.

Solution(s) .3657891 [E] ----- 3.657891000-01

- | | | | | |
|----|---------|-------|-------|----------------|
| 1) | 246 [A] | ----- | 334 | (combination) |
| | | ----- | -1.00 | (total so far) |
| 2) | 14[A] | ----- | 256 | (combination) |
| | | ----- | -3.00 | (total so far) |
| 3) | 235 [A] | ----- | 236 | (combination) |
| | | ----- | -2.00 | (total so far) |
| 4) | 36 [A] | ----- | 226 | (combination) |
| | | ----- | -2.00 | (total so far) |

Reference(s)

Scarne on Dice, John Scarne, Stackpole Books, 1962, pp. 345-348.

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BIG SIX

YOUR NUMBER?
SPIN

-(SEED $S \rightarrow$)

[illegible]

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBLA	21 11	Play "Big Six"	057	DSZI	16 25 46	Deduct bet
002	STOC	35 13	Store number bet on	058	RCLI	36 46	Compute winnings
003	RCLC	36 15	Choose proper	059	RCLB	36 12	
004	9	09	Triplet	060	+	-55	
005	9	09		061	STOB	35 12	Go back for another
006	7	07		062	GT06	22 06	number
007	X	-35		063	*LBL3	21 03	Split up triplet
008	FRC	16 44		064	INT	16 34	and store first
009	STOE	35 15		065	STOI	35 45	number in proper
010	5	05		066	LSTX	16-63	register
011	5	05		067	FRC	16 44	
012	X	-35		068	RCLD	36 14	
013	INT	16 34		069	X	-35	
014	3	03		070	ISZI	16 26 46	
015	÷	-24		071	RTN	24	
016	STOI	35 46		072	*LBL0	21 00	Choose first triplet
017	FRC	16 44		073	EEX	-23	
018	RCLI	36 45		074	6	06	
019	XZY	-41		075	÷	-24	
020	3	03		076	RTN	24	
021	X	-35		077	*LBL1	21 01	Choose second
022	DSP0	-63 00		078	GSB0	23 00	triplet
023	RND	16 24		079	FRC	16 44	
024	STOI	35 46		080	EEX	-23	
025	R4	-31		081	3	03	
026	GSB1	23 45		082	X	-35	
027	INT	16 34		083	RTN	24	
028	PSE	16 51	Display it	084	*LBL2	21 02	Choose third triplet
029	8	08		085	EEX	-23	
030	STOI	35 46		086	3	03	
031	P2S	16-51		087	÷	-24	
032	R4	-31		088	FRC	16 44	
033	EEX	-23		089	EEX	-23	
034	2	02		090	3	03	
035	÷	-24		091	X	-35	
036	GSB3	23 03		092	RTN	24	
037	GSB3	23 03		093	*LBL5	21 05	Recall numbers
038	STOA	35 11		094	RCLC	36 13	bet on
039	*LBL6	21 06	Load for Computing	095	X=0?	16-43	If no more, end
040	0	00	innings	096	GT04	22 04	
041	STOI	35 46	Initialize	097	RCLD	36 14	Choose the next one
042	GSB5	23 05	Number bet on	098	÷	-24	and store the re-
043	RCLB	36 06	How much won on	099	ENT↑	-21	mainder of the
044	X=Y?	16-33	this number?	100	INT	16 34	numbers
045	ISZI	16 26 46		101	STOC	35 13	
046	XZY	-41		102	-	-45	
047	RCL9	36 09		103	RCLD	36 14	
048	X=Y?	16-33		104	X	-35	
049	ISZI	16 26 46		105	RTN	24	
050	XZY	-41		106	*LBL4	21 04	Store seed
051	RCLA	36 11		107	STOE	35 15	
052	X=Y?	16-33		108	RTN	24	
053	ISZI	16 26 46		109	*LBL4	21 04	Display total won
054	RCLI	36 46		110	DSP2	-63 02	so far.
055	X=0?	16-42	Repay amt bet if	111	P2S	16-51	
056	ISZI	16 26 46	anything won	112	RCLB	36 12	

REGISTERS										MEM													
0	Wheel	1	Wheel	2	Wheel	3	Wheel	4	Wheel	5	Wheel	6	Wheel	7	Wheel	8	Wheel	9	Wheel				
S ₀	Wheel	S ₁	Wheel	S ₂	Wheel	S ₃	Wheel	S ₄	Wheel	S ₅	Wheel	S ₆	Wheel	S ₇	Wheel	S ₈	k	S ₉	l				
A		m		B		Total won		C		r ₁ ...r _k , Used		D		10		E		Seed		I		Used	

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[illegible]

Program Description I

Program Title Roulette Game

Contributor's Name John Nelson

Address 1226 E. University Ave.

City Des Moines

State Iowa

Zip Code 50316

Program Description, Equations, Variables Program generates an integer number between zero and thirty-six, stores it and checks the players bet. If the player wins, the program pays off at the odds previously calculated and adds the winnings to that players account. If the player loses, the program subtracts the bet from the players account.

Bets are allowed on single numbers, ranges such as 1 thru 12, 13 thru 24 or any range the player wishes, and bets on odd or even.

Odds are calculated at the following rates :

Single number - 35 to 1

Range numbers - from the formula : $36 / (\text{HIGH} - \text{LOW} + 1)$ to 1.

Odd or Even - 1 to 1

You can also run the spin-wheel routine and the bet checking routine separately and even have the calculator tell you whether you are high or low before you make your bet.

Operating Limits and Warnings

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Program Description II

Sketch(es)

Sample Problem(s)

Note - Use a seed of .3148216 for this sample.

A player deposits 150.00 to his account(# 1)

1-He then places a bet of \$20. on numbers 1 thru 12.

The wheel is spun and he loses his \$20. when 24 comes up.

2-He then places a bet of \$15. on numbers 13 thru 24.

The wheel is spun and he wins \$30. when the number 15 comes up.

IMPORTANT - READ THIS CAREFULLY. The program expects user to enter the players account number during a two second pause in the program. You can identify this place as follows - After pressing C the program will pause the actual # spun, then print or flash the win/loss. Then your win/loss will be paused for two seconds. This is when the acct. number must be entered.

Solution(s) keystrokes- .3148216 fA 150 ENTER 1 fD gives 150.

1) 20ENTER 1.12B gives 0. Then press C gives "24"; "-20."; "-20."

Now give account number 1 gives 130. (new balance)

2) 15 ENTER 13.24 B	0.	C	"15" number paused
			"30." winning flashed/printed
			"30." paused for acct #
1			160. new balance

Reference(s)

User Instructions

1
2

Roulette

Spin wheel
Bet
Check Bet
Deposit Total
Hi-Low

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS		OUTPUT DATA/UNITS
1	Load Program				
2	Store a seed	seed	f	A	seed
3	Enter a deposit to your account	Amount	↑		
		Acct #	f	D	
4	Place a bet				
	a. Bet amount	Bet Amt	↑		
	b. Number or Code as follows ;				
	number between 1 and 36	n			
	or 1.12 for nbrs between 1 & 12				
	or 13.24 for nbrs between 13 & 24				
	or 25.36 for nbrs between 25 & 36				
	or any other range in the format				
	low.high	l.h			
	or 0. for odd numbers				
	or .2 for even numbers				
5	Enter Bet for processing odds etc.		B		0.
6	Spin and see if you win		C		"number"
	C will both spin the wheel and check				:win/loss:
	the bet for win or lose. You could				
	do this separately by pressing A				
	then pressing f c.				
7	Enter your account number while the				
	win/loss is being paused. The pause				
	immediately follows a flashing or				
	printing of the win/loss amount.				
8	To display your account balance at any				
	time,	Acct. #	D		
9	To deposit more money into your acct	Amount	↑		
		Acct. #	f	D	
10	To get an advantage (i.e. to cheat)				
	you may play with the A key and f c				
	instead of just C and check the bet				
	for high or low before betting. To do				
	this :				
	a. Spin the wheel		A		
	b. enter a guess number	guess	E		0.7 or
	Read display upside-down				14.
	0.7 = Low 14. = High				
	Flashing Zero = Right On!				

67 Program Listing I

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STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	\$ LBL A	31 25 11			h RTN	35 22	
	RCL 0	34 00			\$ LBL 0	31 25 00	
	h π	35 73			1	01	
	+	61		060	STO 4	33 04	
	5	05			CLX	44	
	h y^x	35 63			h RTN	35 22	
	g FRAC	32 83			\$ LBL 1	31 25 01	
	STO 0	33 00			3	03	
	EEX	43			5	05	
010	3	03			STO 4	33 04	
	x	71			CLX	44	
	f INT	31 83			h RTN	35 22	
	3	03			\$ LBL C	31 25 13	
	7	07		070	f GSDA	31 22 11	
	-	81			g LBL c	32 25 13	
	g FRAC	32 83			DSP 0	23 00	
	3	03			RCL 4	34 04	
	7	07			3	03	
	x	71			5	05	
020	f INT	31 83			g $x=y$	32 51	
	STO 3	33 03			GTO 2	22 02	
	CLX	44			RCL 1	34 01	
	h RTN	35 22			f INT	31 83	
	\$ LBL B	31 25 12		080	f $x=0$	31 51	
	STO 1	33 01			GTO 3	22 03	
	h R4	35 53			RCL 3	34 03	
	STO 2	33 02			h $x \geq y$	35 52	
	RCL 1	34 01			g $x \leq y$	32 71	
	f $x=0$	31 51			GTO 4	22 04	
030	GTO 0	22 00			\$ LBL 9	31 25 09	
	1	01			RCL 3	34 03	
	g $x > y$	32 81			h PAUSE	35 72	
	GTO 0	22 00			RCL 2	34 02	
	h R4	35 53		090	CHS	42	
	g FRAC	32 83			f -x-	31 84	
	f $x=0$	31 51			h PAUSE	35 72	
	GTO 1	22 01			h PAUSE	35 72	
	h LSTX	35 82			1	01	
	f INT	31 83			0	00	
040	h $x \geq y$	35 52			+	61	
	EEX	43			h STI	35 33	
	2	02			RCL 2	34 02	
	x	71			STO -(i)	33 51 24	
	-	51		100	h RCI	35 34	
	h ABS	35 64			h LSTX	35 82	
	1	01			-	51	
	+	61			GTO D	22 14	
	3	03			\$ LBL 2	31 25 02	
	6	06			RCL 3	34 03	
050	h $x \geq y$	35 52			RCL 1	34 01	
	÷	81			g $x=y$	32 51	
	f INT	31 83			GTO 8	22 08	
	1	01			GTO 9	22 09	
	-	51		110	\$ LBL 3	31 25 03	
	STO 4	33 04			h LSTX	35 82	
	CLX	44			.	83	

REGISTERS

0 seed	1 Bet nbr	2 Bet Amount	3 number from wheel	4 Odds	5	6	7	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9
A	B	C	D	E	I				

67 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
	2	02			1	01	
	h x=y	35 52		170	0	00	
	g x=y	32 61			+	61	
	GTO 0	22 00			h STI	35 33	
	f GSB 7	31 22 07			RCL (i)	34 24	
	h F? 0	35 71 00			h RTN	35 22	
	GTD 9	22 09			f LBL E	31 25 15	
120	f LBL 8	31 25 08			RCL 3	34 03	
	RCL 2	34 02			g x>y	32 81	
	RCL 4	34 04			GTO 7	22 07	
	x	71			g x=y	32 51	
	STO 2	33 02		180	GTO 0	22 00	
	RCL 3	34 03			1	01	
	h PAUSE	35 72			4	04	
	RCL 2	34 02			h RTN	35 22	
	f-x-	31 84			f LBL 7	31 25 07	
	h PAUSE	35 72			.	83	
130	h PAUSE	35 72			7	07	
	1	01			DSP I	23 01	
	0	00			h RTN	35 22	
	+	61			f LBL 0	31 25 00	
	h STI	35 33		190	CLX	44	
	RCL 2	34 02			f-x-	31 84	
	STO+(i)	33 61 24			h RTN	35 22	
	h RCI	35 34			g LBL d	32 25 14	
	h LSTx	35 82			1	01	
	-	51			0	00	
140	GTO D	22 14			+	61	
	f LBL 4	31 25 04			h STI	35 33	
	RCL 1	34 01			h R+	35 53	
	g FRAC	32 83			STO+(i)	33 61 24	
	EEX	43		200	h RTN	35 22	
	2	02			g LBL a	32 25 11	
	x	71			STO 0	33 00	
	RCL 3	34 03			h RTN	35 22	
	g x≤y	32 71					
	GTO 8	22 08					
150	GTO 9	22 09					
	f LBL 0	31 25 00					
	f GSB 7	31 22 07					
	f F? 0	31 71 00					
	GTO 8	22 08					
	GTO 9	22 09					
	f LBL 7	31 25 07					
	RCL 3	34 03					
	2	02					
	÷	81					
160	g FRAC	32 83					
	f x=0	31 51					
	GTO 4	22 04					
	h SF 0	35 51 00					
	h RTN	35 22					
	f LBL 4	31 25 04					
	h CF 0	35 61 00					
	h RTN	35 22					
	f LBL D	31 25 14					

LABELS					FLAGS	SET STATUS		
A Spin Wheel	B Bet	C Spin & Check Bet	D Display Balance	E Check for Hi-Low	0 Off=even On=Odd	FLAGS	TRIG	DISP
a store seed	b	c Check Bet Only	d Deposit to Account	e	1	ON OFF		
0	1	2	3	4	2	0 <input type="checkbox"/> <input checked="" type="checkbox"/>	DEG <input checked="" type="checkbox"/>	FIX <input checked="" type="checkbox"/>
						1 <input type="checkbox"/> <input checked="" type="checkbox"/>	GRAD <input type="checkbox"/>	SCI <input type="checkbox"/>
						2 <input type="checkbox"/> <input checked="" type="checkbox"/>	RAD <input type="checkbox"/>	ENG <input type="checkbox"/>
5	6	7	8	9	3	3 <input type="checkbox"/> <input checked="" type="checkbox"/>		n <input checked="" type="checkbox"/>

Program Description I

39

Program Title Dog Races

Contributor's Name Donald L. Miller

Address 505 Papaya Drive

City Tampa

State Florida

Zip Code 33619

Program Description, Equations, Variables Although the wording is in terms of dog races the same parimutuel betting system is used for horse races. For tickets you can just write your bets down on paper. All tickets cost \$2.00 except for \$3.00 perfectas. [WIN] = Picking first dog. [PLACE] = either first or second. [SHOW] = first, second or third. [QUINIELA] = Two dogs in first and second in either order. [PERFECTA] = Two dogs in first and second in exact order. [TRIFECTA] = Three dogs in first, second and third in exact order. [DAILY DOUBLE] = Picking winners in first and second race on the same ticket. (Tickets are normally bought before first race at the track but for this program run CARD #1 for odds and tips and make choices for first race on Daily Double Tickets. Any winning tickets from this race are then exchanged free for choices in the second race after odds and tips have been show.) [BIG Q] = Picking winning quiniela in next to last race and again in the last race. To bet Big Q, do the same as Daily Double above only this is last two races. [CLASS FACTOR AND ODDS] Random number generator sells tickets on eight dogs. Like at the tract, the people overall are very accurate and the best dogs will show up on the odds board, so the number of tickets sold on a dog, we'll say, is their class factor (the more tickets, the lower the odds.) An average of one out of five will be a scratch race (less than 8 dogs) and odds will show 0.0. [CONDITION FACTOR AND TIPS] The tips you get after the odds have been shown is a very good indication of how the dogs will do in a race. A 1 means below average condition, 2 means average, and 3 means he is in top condition. The top condition dogs are of two types. Above average and super top condition as explained later. If two dogs have the same tip value, say a 2, then the lower odds dog will usually benefit. (There can be an overlapping). Remember, class is the most important factor. Depending on the difference of odds, a low odds dog that is below average (1) may still be able to beat a high odds dog in good condition (3). Although not likely to happen, here is another tip. Registers one

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Program Description II

through eight hold the numbers for each dog that decides how they will finish in the race. Each register is divided into three parts, (e.g.) [3405.261358]. The integer part is derived from class, condition and random numbers and the highest number wins, etc. down. If this should be tied then the second part is the number of tickets sold on that dog and the most tickets (or lower odds dog) will benefit. The third

part is the box number. By using the combinations of odds and tips you should be an expert but it's not that easy at the track so we'll add a few small problems. An average of only six tips are given in each race so there will be some you don't know about. These will show as a 0 in the tips. Also, you couldn't blame anyone for telling you a dog was below average (1) when he knew it was in exceptional top condition so as not to bring the odds down on his bet, right? Right! So you can expect an average of one dog out of six that is in exceptional top condition that shows up as a false tip of 1, unless no tip is given on him. The program will show the tips for ten seconds then start a countdown and you have to have your selections made before the betting windows close. (0) The countdown time can be changed on CARD #1, steps 201 and 202 but don't make it too easy. If ready before countdown is finished you may press R/S key to stop it without affecting the race. As shown in the sample race, there are nine payoffs give, starting with win and ending on trifecta, (e.g.) the third is the show payoff for the first dog, the seventh is the quiniela, etc. After the ninth (or trifecta) payoff is shown and before the finish order has been recalled, an average of one out of three races will display a single positive digit from 1 to 9. If you bought a ticket, or tickets, on that number readout, you lost them, can't find them and don't get to collect. Also, an average of one out of six races will show a negative number from -2.00 to -18.00. This is where you just found

out you forgot your change at the betting window and was in such a hurry you don't know which one it was so you are out that amount of money. (You're on Honor System, naturally). [THE RACE] is shown in four steps (Break, second turn, stretch and finish). If there is a change in the four leading dogs from stretch to finish, an average of about two thirds of these will be a photo finish and you'll have to wait through the countdown while the photo is being developed. [PAYOFFS] are to nearest dime. (There is no breakage (keeping the extra pennies)). [WIN] is two times the

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Program Description III

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odds shown plus your \$2.00 back. [PLACE] track first takes percent from pool (HP-67 doesn't, unless you want) then subtracts the ticket money bet on the two dogs, then divides the remainder by two for each dog. This is distributed evenly between all ticket holders on each dog and their \$2.00 is then added back on. [SHOW] same as place except for three dogs. All payoffs depend on the proportion of tickets sold

on each dog. [TAKING PERCENT OUT] If you want to try your luck with a percent taken out like at the track you can put it in Register A. (e.g.) [17.5] means 17 1/2% will be taken out of odds and payoffs. (Otherwise keep register A clear). To find what percent is missing from your track, take the final win odds from the result charts in a program book and run the small program below. Press [A] for each of the win odds, then [B] to show what percent is missing. You could average a few because they vary slightly. Beside the program below is a race from our track for a sample. Ever wonder why you seem to be hitting good at the track but just can't seem to get ahead? Run the same race twice (starting with the same number in register E both times) but on the second time through, put your percent in register A and compare the odds and payoffs, You've got more to beat than just the races. So why not go for the big payoffs and get what you can? Here, when you get a payoff of over \$600.00 on a ticket, they take 20 percent out when you go to cash it in which has already had 18 percent taken out which makes more than 33 percent taken out and of course it goes on your income to be hit again at the end of the year. So stick with the smaller payoffs, 18 percent isn't too much. Well, say you bet every race and hit what is expected in the long run, which would be 18 percent out of the money you put in. (e.g.) you put in \$100.00 and get a payoff of \$82.00 then put that back in and win 18 percent minus that, etc. What happens to your \$100.00 in an evening of 12 races

with just 18 percent out? You end up with less than \$10.00 (More than 90 percent out) There are all kinds of ways too look at it but none of them look very good for the average person. It takes an awful good system to overcome this.

* Get some friends together, use Monopoly money and poker chips for change. Run a set number of races and the richest wins.

* Random Number Generator is good for 62,500 before repeating.

FLBLA	h1/x	3.90
ENT	1	12.90
1	-	7.40
+	EEX	2.60
h1/x	2	2.30
STO+1	x	16.20
R/S	STO 1	9.00
FLBLB	h↓	10.30
RCL	R/S	-18.2%

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

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Program Description III

Sketch(es)								(A)	(B)	(D)	(WIN)	(PLACE)	(SHOW)	(F)	
12-16								1	5.10	2	⑧	29.40	11.90	8.10	
13-30	23-21							2	2.90	3	②		4.60	3.60	
14-26	24-19	34-44						3	14.40	1	⑦			10.50	
15-19	25-15	35-26	45-24					4	9.90	3	②8	Quiniela		42.70	
16-25	26-18	36-39	46-34	56-22				5	4.20	1	⑧2	Perfecta		128.10	
17-32	27-22	37-60	47-49	57-28	67-43			6	8.00	3	⑧27	Trifecta		668.90	
18-29	28-20	38-52	48-43	58-26	68-38	78-59		7	19.40	0		Daily Double		0.0	
								8	13.70	1		Big Q		0.0	

Sample Problem(s) Make sure all registers are clear and enter CARD #1. Starting with a seven digit fractional number ending with 1,3,7 or 9 (Don't forget decimal point) [.1236987] [STO] [E]. Press [A] and countup lets you know tickets are sold on all eight dogs and odds are ready to be shown. One second box number [1111111111.] is followed by five second pause to show win odds to \$1.00 for all dog's as shown under A and B above. Quiniela odds to \$1.00 are then shown in fractional part with box numbers in integer part as under C above. Another countdown then tips are shown for 10 seconds (in fractional part of display) as under D above, then a countdown while you decide on your bets before the betting windows close.

Enter CARD #2, Press [A] and race is shown in four steps as shown under E below. There is a one second pause (3,2,1) before each position to let you know display is ready. We have a photofinish so we have to wait for photo to be developed before final positions are shown. When program stops, Press [B] for payoffs in left to right, top to bottom order as shown under F above, (Possible lost ticket or forgot change after

trifecta payoff is shown, in other races) then the finish order is recalled. Pressing C and D shows 0.0 because these payoffs depend on a previous race being run. Check the odds and tips under B and D. Boxes 2,4 and 6 are all in top condition (3). With the same tip value, the lower odds dog will usually benefit, but the tip values are approximate and can overlap as with 4 and 6. Box 1 is average (2) but with lower odds he did beat out box 6. Boxes 3 and

Break	2nd Turn	Stretch	Finish
2	2	2	8
4	4	8	2
1	1	4	7
6	8	7	4
3	6	1	1
8	7	6	6
5	3	5	5
7	5	3	3

5 are below average (1) and finished last. Box 7 is the long shot in the race and we got no tip on him but he had to be in top condition to finish in the money. And there is no doubt now that we dot a false tip on box 8. For another race go to STEP 3 on Users Instruction page.

User Instructions

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NOTE:
FOR CARD
2 SEE
BELOW

1

2

DOG RACE # 1

ODDS
TIPS

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1.	Make sure all registers are clear before first race.		<input type="text"/> <input type="text"/>	
2.	Input a seven digit fractional number, ending with 1,3,7 or 9. (Don't forget decimal point)	1,3,7or9 .xxxxxxx	<input type="text"/> <input type="text"/> STO E	
3.	Enter card #1 (both sides)		<input type="text"/> <input type="text"/>	
	~~~~~ OPTIONAL ~~~~~		<input type="text"/> <input type="text"/>	
4.	* If percent is to be taken out, put it in Register A. * If Quiniela odds are <u>not</u> wanted, insert [GT0] [4] after program step 083 on card #1.		<input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>	
5.	For countup,* box numbers win odds, Quiniela odds, countdown, tips and countdown before betting windows close.		A <input type="text"/>	
6.	Enter card #2 (both sides)		<input type="text"/> <input type="text"/>	
7.	To run race (possible photofinish countdown)		A <input type="text"/>	
8.	Pay offs (possible lost ticket or forgot change)		B <input type="text"/>	
9.	Daily double payoff (first two races)		C <input type="text"/>	
10.	Big Q payoff (last two races)		D <input type="text"/>	
11.	For another race go to step 3		<input type="text"/> <input type="text"/>	
*	(It's possible the countup in step 5 may repeat. If a dog has been scratched it will skip that number.)		<input type="text"/> <input type="text"/>	
	All tickets cost \$2.00 [except] \$3.00 Perfecta		<input type="text"/> <input type="text"/>	

1

2

DOG RACE #(2)

RUN  
RACE

PAYOFFS

D.D.

BIG O

## 67 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBLA	21 11		057	1	01	
002	0	00		058	0	00	
003	STOI	35 46	Ready for odds	059	X	-35	
004	STOB	35 00		060	RCLI	36 46	
005	1	01		061	X	-35	
006	STOB	35 09		062	DSP0	-63 00	
007	*LBL0	21 00		063	PSE	16 51	
008	ISZI	16 26 46	Next dog	064	RCLi	36 45	Is dog scratched?
009	4	04		065	X=0?	16-43	Yes
010	0	00	Maximum odds	066	GTOD	22 14	Chance on dog.
011	1/X	52	or	067	1/X	52	
012	GSBE	23 15	Scratch Dog?	068	RCLA	36 11	Percent taken out?
013	X≠Y?	16-35		069	%	55	
014	GT07	22 07		070	-	-45	
015	RCL9	36 09		071	1	01	
016	2	02		072	-	-45	Display win odds
017	÷	-24	Sets number of total	073	*LBLD	21 14	
018	R↑	16-31	tickets sold	074	DSP1	-63 01	
019	X>Y?	16-34		075	PRTX	-14	
020	GT0A	22 11	FOR 97:	076	RCLI	36 46	More odds to display?
021	R↓	-31	Delete steps 034	077	8	08	
022	*LBL0	21 16 11	194 and 200.	078	X≠Y?	16-32	Yes
023	X	-35	207 optional R/S	079	GT01	22 01	Ready for Quinielas
024	X>Y?	16-34	Change steps 063 and	080	STOB	35 00	
025	GT06	22 16 12	119 to f-x-	081	*LBL2	21 02	
026	2	02		082	1	01	
027	GT0A	22 16 11	Running total of tick	083	ST+9	35-55 09	Quiniela counter
028	*LBL6	21 16 12	Number of tickets	084	RCL9	36 09	
029	ST-9	35-45 09	sold on dog	085	STOI	35 46	Any more quinielas?
030	DSP5	-63 05	Countup before odds	086	8	08	No
031	RND	16 24	are shown	087	X=Y?	16-33	
032	RCLI	36 46	Loads tickets and	088	GT04	22 04	Quiniela counter
033	DSP0	-63 00	box number in	089	R↓	-31	
034	PSE	16 51	fractional part of	090	3	03	
035	EEX	-23	Reg (1)	091	+	-55	
036	6	06		092	ST+0	35-55 00	Hold (1) tickets
037	÷	-24		093	RCLi	36 45	
038	+	-55		094	STOB	35 12	Next dog
039	*LBL8	21 08	Any more dogs?	095	ISZI	16 26 46	Are either of these
040	STOI	35 45		096	*LBL3	21 03	dogs scratched?
041	RCLI	36 46	Yes	097	RCLB	36 12	Yes
042	8	08		098	X=0?	16-43	Yes
043	X≠Y?	16-32	Sells any remaining	099	GT09	22 09	Quiniela chance
044	GT00	22 00	tickets	100	RCLi	36 45	
045	RCL9	36 09		101	X=0?	16-43	
046	DSP5	-63 05		102	GT09	22 09	
047	RND	16 24		103	+	-55	
048	ST+i	35-55 45		104	1/X	52	Percent taken out?
049	0	00		105	7	07	
050	STOI	35 46	Set to display odds	106	X	-35	
051	STOB	35 09		107	RCLA	36 11	Quiniela odds
052	*LBL1	21 01		108	%	55	
053	ISZI	16 26 46	Display box numbers	109	-	-45	
054	9	09		110	1	01	
055	1/X	52		111	-	-45	
056	EEX	-23		112	EEX	-23	

## REGISTERS

0 Used	1 Used	2 Used	3 Used	4 Used	5 Used	6 Used	7 Used	8 Used	9 Used
S0	S1 Used	S2	S3 Used	S4	S5	S6	S7	S8	S9
A Percent	B Used	C Used	D Used	E RNDX	I Used				

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
113	3	03	Quiniela count in	169	-	-45	
114	=	-24	Integer part and	170	CHS	-22	
115	*LBL9	21 09	odds to \$1.00 in	171	3	03	Determine what tip
116	RCL0	36 00	fractional part	172	1/X	52	value to give to
117	+	-55		173	=	-24	this dog
118	DSP3	-63 03		174	1	01	
119	PSE	16 51	Display Quiniela	175	+	-55	
120	RCL1	36 46	odds	176	3	03	
121	8	08	Next dog?	177	.	-62	
122	X=Y?	16-33		178	8	08	
123	GT02	22 02	Yes	179	3	03	
124	ISZ1	16 26 46		180	X*Y	-41	
125	1	01	Next Quiniela?	181	X>Y?	16-34	False tip
126	ST+0	35-55 00		182	1	01	
127	GT03	22 03		183	*LBL6	21 06	
128	*LBL4	21 04	Yes	184	INT	16 34	
129	0	00		185	RCLB	36 12	
130	ST00	35 00	Set up for tips	186	1	01	Hold tips till
131	EEX	-23		187	0	00	ready to display
132	9	09		188	x	-35	
133	CHS	-22		189	ST0B	35 12	
134	ST0B	35 12		190	x	-35	
135	*LBL5	21 05		191	ST+0	35-55 00	
136	GSBE	23 15		192	RCL1	36 46	Countdown before
137	GSBE	23 15	Condition factor	193	DSP0	-63 00	tips are shown
138	+	-55		194	PSE	16 51	
139	RCL1	36 45		195	DSZ1	16 25 46	More tips?
140	X=0?	16-43	Scratch	196	GT05	22 05	Yes
141	GT06	22 06		197	RCL0	36 00	
142	1/X	52	Yes	198	DSP8	-63 00	
143	ENT↑	-21		199	PRTX	-14	Display tips
144	R↓	-31	Uses condition	200	PRTX	-14	
145	x	-35	factor and tickets	201	1	01	Adjust countdown
146	R↑	16-31	sold on dog to	202	2	02	time here.
147	-	-45	determine how dog	203	ST01	35 46	
148	ABS	16 31	will do in race	204	*LBLc	21 16 13	Countdown before
149	ST09	35 09		205	RCL1	36 46	betting windows
150	5	05		206	DSP0	-63 00	close. Set your
151	0	00		207	PRTX	-14	own time
152	-	-45		208	DSZ1	16 25 46	
153	ABS	16 31		209	GT0c	22 16 13	
154	EEX	-23		210	0	00	Betting windows
155	2	02		211	R/S	51	closed
156	x	-35		212	*LBL7	21 07	
157	INT	16 34		213	0	00	Scratch dog
158	ST+; 35-55 45			214	GT08	22 08	No tickets sold
159	R↑	16-31		215	*LBLc	21 15	
160	4	04	Give a tip on this	216	RCLc	36 15	
161	1/X	52	dog	217	9	09	Random number
162	GSBE	23 15		218	9	09	generator.
163	X≤Y?	16-35		219	7	07	
164	GT06	22 06	No	220	x	-35	
165	RCL9	36 09		221	FRC	16 44	
166	R↑	16-31		222	ST0E	35 15	
167	=	-24		223	RTN	24	
168	1	01		224	R/S	51	

LABELS						FLAGS	SET STATUS		
A	B	C	D	E			FLAGS	TRIG	DISP
X			X	X	0		ON OFF		
a	X	X	d	e	1		0 <input type="checkbox"/> <input type="checkbox"/>	DEG <input type="checkbox"/>	FIX <input type="checkbox"/>
0	X	1	X	3	X	2	1 <input type="checkbox"/> <input type="checkbox"/>	GRAD <input type="checkbox"/>	SCI <input type="checkbox"/>
5	X	6	X	8	X	3	2 <input type="checkbox"/> <input type="checkbox"/>	RAD <input type="checkbox"/>	ENG <input type="checkbox"/>
							3 <input type="checkbox"/> <input type="checkbox"/>		n_____



## 67 Program Listing III

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBL0	21 11		057	PSE	16 51	Partial race
002	4	04	Ready for race	058	RCL0	36 00	
003	ST09	35 09		059	ST0D	35 14	Display dogs
004	0	00		060	DSP4	-63 04	positions in race
005	ST0I	35 46		061	PRTX	-14	
006	*LBL8	21 08		062	GT08	22 08	Next step of race
007	ISZI	16 26 46		063	*LBL3	21 03	
008	RCLi	36 45	Sorting operation	064	RCLD	36 14	If stretch and finish
009	ISZI	16 26 46	moves highest number	065	INT	16 34	positions are the
010	RCLi	36 45	to register one, etc.	066	RCL0	36 00	same then display
011	X=Y?	16-35	down to register	067	INT	16 34	finish.
012	X*Y	-41	eight in four steps.	068	X=Y?	16-33	
013	DSZI	16 25 46		069	GT02	22 02	
014	ST0i	35 45		070	RCL0	36 15	Decides on photo
015	ISZI	16 26 46		071	Pi	16-24	finish. The lower
016	X*Y	-41		072	x	-35	the digit in step
017	ST0i	35 45		073	FRC	16 44	75, the less photos.
018	7	07	HP-97:	074	.	-62	
019	RCLi	36 46	Delete step 057	075	7	07	
020	X=Y?	16-33	Insert f-x-after	076	X=Y?	16-35	No photo finish
021	GT00	22 00	step 092	077	GT02	22 02	
022	8	08		078	2	02	Sets photo finish
023	X*Y?	16-32		079	0	00	countdown time
024	GT08	22 08		080	ST0I	35 46	
025	1	01		081	*LBL4	21 04	Photo finish
026	ST0I	35 46		082	RCLi	36 46	countdown
027	GT08	22 08		083	DSP0	-63 00	
028	*LBL0	21 00		084	PSE	16 51	
029	0	00	Ready to display	085	DSZI	16 25 46	When 0, display
030	ST00	35 00	race	086	GT04	22 04	finish
031	EEX	-23		087	*LBL2	21 02	
032	4	04		088	RCL0	36 00	Display finish
033	CHS	-22		089	EEX	-23	
034	ST0B	35 12		090	4	04	
035	ISZI	16 26 46		091	x	-35	
036	*LBL1	21 01		092	DSP0	-63 00	
037	RCLi	36 45		093	R/S	51	
038	EEX	-23		094	*LBLB	21 12	
039	5	05	Holds race position	095	1	01	Percent out of pay-
040	x	-35	in register zero	096	ST0I	35 46	offs?
041	FRC	16 44	for later display	097	GSB7	23 07	
042	RCLB	36 12		098	ST04	35 04	
043	1	01		099	RCL1	36 01	
044	0	00		100	FRC	16 44	
045	x	-35		101	ST0I	35 01	Win payoff
046	ST0B	35 12		102	ST-4	35-45 04	
047	x	-35		103	1/X	52	
048	ST+0	35-55 00		104	GSB5	23 05	
049	DSZI	16 25 46		105	RCLD	36 14	Hold win chance for
050	GT01	22 01		106	ST0C	35 13	daily double.
051	1	01		107	RCL2	36 02	
052	ST-9	35-45 09	Race finished?	108	FRC	16 44	
053	RCL9	36 09		109	ST02	35 02	First dog place
054	X=0?	16-43		110	ST-4	35-45 04	payoff
055	GT03	22 03	Yes	111	RCL4	36 04	
056	DSP0	-63 00	Pause before	112	GSB6	23 06	

## REGISTERS

0 Used	1 Used	2 Used	3 Used	4 Used	5 Used	6 Used	7 Used	8 Used	9 Used
S0	S1 Used	S2	S3 Used	S4	S5	S6	S7	S8	S9
A Percent	B Used	C Daily Double	D Big Q	E RND X	I Used				

# 67 Program Listing IIII

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CARD #2

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
113	RCL4	36 04		169	GT02	22 02	No
114	RCL3	36 03		170	R↑	16-31	Yes
115	FRC	16 44		171	PRTX	-14	
116	ST03	35 03	First dog show	172	GT02	22 02	Display finish
117	-	-45	payoff	173	*LBL e	21 16 15	
118	ST05	35 05		174	R↓	-31	
119	1	01		175	R↓	-31	Display forgot
120	.	-62		176	2	02	change
121	5	05		177	x	-35	
122	÷	-24		178	CHS	-22	
123	ST06	35 06		179	DSP2	-63 02	
124	GSB6	23 06		180	PRTX	-14	
125	ISZ1	16 26 46	Second dog place	181	GT02	22 02	Display finish
126	RCL4	36 04	payoff	182	*LBL C	21 13	Daily Double
127	GSB6	23 06		183	RCLC	36 13	payoff
128	RCL6	36 06	Second dog show	184	GT09	22 09	
129	GSB6	23 06	payoff	185	*LBL D	21 14	
130	ISZ1	16 26 46	Third dog show	186	RCLD	36 14	Big Q
131	RCL6	36 06	payoff	187	*LBL 9	21 09	
132	GSB6	23 06		188	2	02	
133	RCL1	36 01		189	x	-35	
134	RCL2	36 02		190	*LBL 7	21 07	
135	+	-55	Quiniela payoff	191	RCL A	36 11	
136	ST07	35 07		192	%	55	Percent out?
137	1/X	52		193	-	-45	
138	7	07		194	DSP1	-63 01	
139	x	-35		195	RTN	24	
140	GSB5	23 05		196	*LBL 6	21 06	
141	3	03	Perfecta payoff	197	RCL i	36 45	Calculate and dis-
142	x	-35		198	÷	-24	play place and
143	PRTX	-14		199	2	02	show payoffs.
144	2	02		200	+	-55	
145	5	05		201	2	02	Minimum \$2.10
146	2	02	Trifecta payoff	202	.	-62	payoff
147	RCL7	36 07		203	1	01	
148	RCL3	36 03		204	X*Y	-41	
149	+	-55		205	X≤Y?	16-35	
150	÷	-24		206	R↓	-31	
151	GSB7	23 07		207	PRTX	-14	
152	PRTX	-14		208	RTN	24	
153	DSP0	-63 00	Random number	209	*LBL 5	21 05	
154	FRC	16 44	for lost ticket	210	ENT↑	-21	Keep win and
155	RCL E	36 15	or forgot change	211	ENT↑	-21	quiniela chance
156	9	09		212	P*5	16-51	for next race or
157	x	-35		213	RCL i	36 45	recall for this race
158	1	01		214	X*Y	-41	
159	+	-55		215	ST0 i	35 45	
160	INT	16 34		216	P*5	16-51	
161	X*Y	-41		217	x	-35	
162	6	06		218	ST0 D	35 14	
163	1/X	52	Forgot change?	219	R↓	-31	
164	X>Y?	16-34		220	GSB7	23 07	Display win and
165	GT0 e	22 16 15	Yes	221	2	02	Quiniela payoffs
166	3	03	Lost tickets?	222	x	-35	
167	x	-35		223	PRTX	-14	
168	X≤Y?	16-35		224	RTN	24	

LABELS						FLAGS	SET STATUS		
A	B	C	D	E		0	FLAGS	TRIG	DISP
X	X	X	X	X		1	ON OFF		
a	b	c	d	e	X	2	0 <input type="checkbox"/> <input type="checkbox"/>	DEG <input type="checkbox"/>	FIX <input type="checkbox"/>
X	X	X	X	X		3	1 <input type="checkbox"/> <input type="checkbox"/>	GRAD <input type="checkbox"/>	SCI <input type="checkbox"/>
X	X	X	X	X		4	2 <input type="checkbox"/> <input type="checkbox"/>	RAD <input type="checkbox"/>	ENG <input type="checkbox"/>
X	X	X	X	X		5	3 <input type="checkbox"/> <input type="checkbox"/>		n _____

# Program Description I

Program Title HORSE RACE

Contributor's Name W.A. BURTON  
business

Address c/o PET BOWL INC. 390 COLUMBUS AVE.

City NEW YORK

State N.Y.

Zip Code 10024

**Program Description, Equations, Variables** A SEED NUMBER IS ENTERED. THE NUMBER OF ENTRIES IS SPECIFIED, AND EACH ENTRY IS WAGERED ON. THE RACE STARTS, AND LASTS FROM 90-120 SECONDS. THE NUMBERS OF THE FIRST THREE HORSES TO CROSS THE FINISH LINE ARE DISPLAYED IN ORDER. THE WIN, PLACE AND SHOW PAYOFFS (FOR EACH \$2.00 BET) ARE COMPUTED AND DISPLAYED. A SPECIAL ROUTINE IN THE PROGRAM UNPREDICTABLY DETERMINES THE LIKELIHOOD OF LONGSHOTS FINISHING 'IN THE MONEY'. DISPLAYED PAYOFFS ARE 'TRACK FORMATTED' (ROUNDED TO NEXT LOWEST \$0.20 AND NEVER LESS THAN \$2.20).

**Operating Limits and Warnings** AT LEAST \$2.00 MUST BE WAGERED ON EACH ENTRY, OR PROGRAM WILL MALFUNCTION. MALFUNCTION WILL ALSO OCCUR IF USER ATTEMPTS TO ENTER MORE THAN EIGHT HORSES IN ANY ONE RACE. PLACE AND SHOW PAYOFFS ARE SYNTHESIZED FROM WIN POOL, AND HAVE NO VALUE UNLESS AT LEAST FOUR HORSES ARE ENTERED. RACES WITH ONE OR TWO HEAVY FAVORITES RUNNING AGAINST EXTREME LONG-SHOTS MAY TAKE SEVERAL MINUTES TO RUN.

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# Program Description II

49

Sketch(es)

NONE

Sample Problem(s) Simulate a race with seven entries given the following arbitrary variables:

$U_0 = .4209675813$

and the following amounts have been wagered on each horse

1. 19432
2. 9220
3. 17629
4. 15800
5. 11690
6. 12430
7. 18680

W(6)	<u>16⁸⁰</u>	<u>11²⁰</u>	<u>3⁸⁰</u>
P(2)		<u>10²⁰</u>	<u>4⁶⁰</u>
S(7)			<u>3⁴⁰</u>

result of race and payoffs determined  
as per keystroke sequence below

Solution(s)

E .4209675813 R/S 7 R/S

19432 R/S 9220 R/S 17629 R/S 15800 R/S 11690 R/S  
12430 R/S 18680 R/S

check odds and handle if desired; see user instructions.

D → 627

B → 10.20, 4.60

A → 16.80, 11.20, 3.80

C → 3.40

Reference(s)

None

[illegible]

# 67 Program Listing I

51

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS		
001	9 LBL 9	32 25 11			RCL A	34 11			
	RCL E	34 15			÷	81			
	TT	35 73			1/x	35 62			
	+	61		060	1	01			
	2	02			—	51			
	9	09			STO (1)	33 24			
	X	71			CHS	42			
	FRAC	32 83			P↔S	31 42			
	STO E	33 15			STO (1)	33 24			
010	RTN	35 22			P↔S	31 42			
	LBL E	31 25 15			DSZ	31 33			
	CFO	35 61 00			GTO 8	22 08			
	CFI	35 61 01			P↔S	31 42			
	DSP O	23 00		070	RCL B	34 12			
	CL REG	31 43			STO O	33 00			
	P↔S	31 42			RCL C	34 13			
	CL REG	31 43			STO 9	33 09			
	1	01			LBL 2	31 25 02	CHECK ODDS 1/100		
	R/S	84			CLX	44	(OPTIONAL)		
020	STO E	33 15	-INPUT SEED		DSP O	23 00			
	2	02			R/S	84			
	R/S	84			h(STI)	35 33			
	STO D	33 14	-INPUT #ENTRIES		P↔S	31 42			
	h(STI)	35 33		080	RCL (1)	34 24			
	LBL 9	31 25 09			DSP 1	23 01			
	a	32 22 11			PSE	35 72			
	DSZ	31 33			P↔S	31 42			
	GTO 9	22 09			GTO 2	22 02			
	1	01			LBL D	31 25 14	-AND THEY'RE OFF		
030	0	00			a	32 22 11			
	X	71			RCL D	34 14			
	1	01			X	71			
	+	61			1	01			
	INT	31 83		090	+	61			
	STO B	33 12			INT	31 83			
	6	06			h(STI)	35 33			
	X	71			RCL (1)	34 24			
	STO C	33 13			TT	35 73			
	1	01			X=y	32 51			
040	h(STI)	35 33			GTO D	22 14			
	LBL 1	31 25 01			R↔	35 53			
	RCL D	34 14			RCL O	34 00			
	h(RCI)	35 34			STO +(1)	33 61 24			
	X>y	32 81		100	RCL (1)	34 24			
	GTO Fe	22 31 15			RCL 9	34 09			
	R/S	84	-INPUT WAGERS (W)		X<y	32 71			
	STO (1)	33 24	W>\$200 FOR		GTO 3	22 03			
	STO + 9	33 61 09	EACH HORSE		GTO D	22 14			
	ISZ	31 34	ENTERED		LBL 3	31 25 03			
050	GTO 1	22 01			FPO	35 71 00			
	9 LBL E	32 25 15			GTO 4	22 04			
	DSZ	31 33			h(RCI)	35 34			
	RCL 9	34 09			STO A	33 11			
	STO A	33 11		110	SFO	35 51 00			
	LBL 8	31 25 08			TT	35 73			
	RCL (1)	34 24			STO (1)	33 24			
REGISTERS									
0 USED	1 USED	2 USED	3 USED	4 USED	5 USED	6 USED	7 USED	8 USED	9 USED
S0	S1 USED	S2 USED	S3 USED	S4 USED	S5 USED	S6 USED	S7 USED	S8 USED	S9
A USED	B USED	C USED	D #HORSES	E SEED	I USED				

# 67 Program Listing II

52

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS	
	GTO D	22 14			d	32 22 14		
	LBL 4	31 25 04		170	STO 0	33 00		
	FP 1	35 71 01			-X-	31 84		
	GTO 5	22 05			RCL C	34 13		
	h(RC1)	35 34			C	32 22 13		
	STOB	33 12			3	03		
	SF1	35 51 01			-	81		
120	TI	35 73			STO+0	33 61 00		
	STO(1)	33 24			RCL 0	34 00		
	GTO D	22 14			3	03		
	LBL 5	31 25 05			-	81		
	h(RC1)	35 34		180	d	32 22 14		
	STOC	33 13			-X-	31 84		
	RCLA	34 11			CLX	44		
	SEX	43			DSP 0	23 00		
	2	02			RTN	35 22		
	X	71			LBL C	31 25 13	SHOW HORSE PAYS	
130	RCL B	34 12			RCL C	34 13	<u>S</u>	
	SEX	43			C	32 22 13		
	I	01			3	03		
	X	71			-	83		
	+	61		190	3	03		
	RCL C	34 13			-	81		
	+	61			d	32 22 14		
	PZS	31 42			-X-	31 84		
	RTN	35 22	Win Place Show		CLX	44		
	LBL A	31 25 11	Winner pays:		DSP 0	23 00		
140	RCLA	34 11	<u>W</u> <u>P</u> <u>S</u>		RTN	35 22		
	C	32 22 13			g LBL C	32 25 13		
	d	32 22 14			h(ST1)	35 33		
	STO 0	33 00			RCL(1)	34 24		
	-X-	31 84		200	2	02		
	RCL B	34 12			X	71		
	C	32 22 13			2	02		
	2	02			+	61		
	-	81			RTN	35 22		
	d	32 22 14			g LBL d	32 25 14	TRACK FORMAT	
150	-X-	31 84			INT	31 83	PAYOFF ROUNDED	
	RCL C	34 13			ENT↑	41	TO NEXT LOWEST	
	C	32 22 13			LST X	35 82	20¢	
	2	02			FRAC	32 83	NO PAYOFF CAN	
	.	83		210	5	05	BE LESS THAN	
	9	09			X	71	8/2.20	
	-	81			INT	31 83		
	d	32 22 14			.	83		
	-X-	31 84			2	02		
	CLX	44			X	71		
160	DSP 0	23 00			+	61		
	RTN	35 22			DSP 2	23 02		
	LBL B	31 25 12	PLACE HORSE PAYS		2	02		
	RCL B	34 12	<u>P</u> <u>S</u>		.	83		
	C	32 22 13		220	2	02		
	2	02			X>Y	32 81		
	.	83			X≥Y	35 52		
	2	02			R↓	35 53		
	-	81			RTN	35 22		
LABELS				FLAGS		SET STATUS		
A W	B P	C S	D START	E U/#ENT	F USED	FLAGS	TRIG	DISP
a RAN#	b	c ODDS↑ 2 X 2 +	d TRACK FORMAT	e ODDS/100	1 USED	ON OFF	DEG <input type="checkbox"/>	FIX <input checked="" type="checkbox"/>
0	1 USED	2 CHK. ODDS	3 WIN	4 PLACE	2	1 <input type="checkbox"/>	GRAD <input type="checkbox"/>	SCI <input type="checkbox"/>
5 SHOW	6	7	8 ODDS/100	9 TRACK COND	3	2 <input type="checkbox"/>	RAD <input type="checkbox"/>	ENG <input type="checkbox"/>
						3 <input type="checkbox"/>		n



# Program Description I

53

Program Title **BLACKJACK BETTING**

Contributor's Name **MICHAEL SEGAL, COLLEGE OF PHYSICIANS AND SURGEONS**

Address **630 W 168th ST**

City **NY**

State **NY**

Zip Code **10032**

**Program Description, Equations, Variables** In casinos, players play blackjack to beat the dealer. The dealer plays according to a fixed strategy, and is at a disadvantage relative to the players when the deck is rich in high cards. The program counts low cards (A, 2, 3, 4, 5, 6), medium cards (7, 8, 9) and high cards (10, J, Q, K), and computes an index which is related to the proportion of high cards remaining in the deck. You use keys  $\Sigma+$ , **A** and **B** to code for cards that are dealt. Press **B** everytime you see a high card, **A** for medium cards, and  $\Sigma+$  for low cards. If a card was collected without your identifying it, don't record it. As far as the effect on the game, it is as if that card is still in the deck. Anytime you need to know the index (for betting or for adjustments in how you play the cards), press **E**. The index is returned followed by a fractional part indicating how many cards are left to be played. A negative index indicates a deck poor in high cards. Bet little or nothing when the index is negative. A positive index indicates a richness in high cards. The higher the index, the more you should bet. For details on betting strategy and card playing see the reference. The key to winning in blackjack is how you play the cards; the index only tells you when you have the best chance of winning. The book is an excellent work on card playing: the odds are computed for each situation and simple charts prepared summarizing what to do when.

**Operating Limits and Warnings** **WARNING** The program must be modified if more than 1000 cards are shuffled together. This is highly unusual. If so, change step 044 from 3 to 4 and put the calculator in DSP 4 mode when recording the program.

**NOTE** The program is designed to minimize the time for recording information, so you can count the cards quickly. This compression is at the expense of having a long calculation loop (taking two seconds) when the index is computed. The routine for recording medium cards is slightly longer than the high and low routines, so be careful to leave  $\frac{1}{2}$  second before pressing **A** again.

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# Program Description II

## Sketch(es)

## Sample Problem(s)

The deck is double - ie 104 cards.

The other player held 3, 5, and an unidentified card.

You held 10 and 5.

Dealer showed 3, 6 and King.

Should you increase your bet for the second round?

Solution(s) Press 1 0 4  $\boxed{D}$  and computer responds with 0.000

KEY PUNCHES  $\boxed{\Sigma+}$   $\boxed{\Sigma+}$   $\boxed{B}$   $\boxed{\Sigma+}$   $\boxed{\Sigma+}$   $\boxed{\Sigma+}$   $\boxed{B}$

Comments 3 5 10 5 3 6 King

Now, compute the index by pressing  $\boxed{E}$  and you get 3.097. This means 97 cards are left unidentified, and the index is +3. The deck is slightly favourable, so bet a bit. Try to avoid betting nothing a times, since this will attract attention to yourself as someone playing a strategy.

## Reference(s)

Edward O Thorpe, Beat the Dealer. NY, Vintage Paperbacks (Random) 1962.

## User Instructions

55

**NOTE:**

CARD TITLE  
IS TO  
CONFUSE  
CASINO  
MANAGERS

1 EFFICIENCY OF SHUFFLE 2

[illegible]

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	F LBL A	31 25 11	COUNTS 7, 8, 9's
	I	01	
	STO + I	33 61 01	
	H RTN	35 22	
	F LBL B	31 25 12	COUNTS 10's, J, Q, K
	F ISZ	31 34	
	H RTN	35 22	
	F LBL D	31 25 14	INITIALIZATION
	STO O	33 00	stores number of cards in deck into register 0
010	CLX	44	
	STO I	33 01	
	H STI	35 33	
	F P = S	31 42	clears registers for card counts:
	STO 9	33 09	1, I, S9.
	F P = S	31 42	
	H RTN	35 22	
	F LBL E	31 25 15	COMPUTING INDEX
	RCL O	34 00	copy original # of cards into 3.
	STO 3	33 03	
020	CLX	44	clear index register
	STO 2	33 02	
	F P = S	31 42	recall low count
	RCL 9	34 09	
	F P = S	31 42	
	STO - 3	33 51 03	subtract low cards from deck and increase the index.
	STO + 2	33 1 02	
	RCL I	34 01	subtract mid cards count from deck.
	STO - 3	33 51 03	
030	H RCI	35 34	subtract high cards from deck and decrease index
	STO - 3	33 51 03	
	STO - 2	33 51 02	
	H CFI	35 61 01	make sure FLAG CLEAR
	RCL 2	34 02	
	RCL 3	34 03	INDEX =
	=	81	$\text{INT} \left[ \frac{\text{RAW INDEX}}{\text{CARDS LEFT}} (100) \right]$
	EEX	43	
	2	02	
	X	71	
	F INT	31 83	
040	F X < 0	31 71	if INDEX IS NEGATIVE, PREPARE FOR SIGN CHANGE FOR FRACTIONAL PART
	H SF I	35 51 01	
	RCL 3	34 03	DIVIDE NUMBER OF CARDS LEFT BY 1000
	EEX	43	
	3	03	
	+	81	IF INDEX IS NEGATIVE, ADJUST SIGN OF CARDS PART.
	H F? I	35 71 01	ADD TO MAKE DISPLAY
	CHS	42	
	+	61	
	H RTN	35 22	
050			

FLAGS				SET STATUS			
				TRIG		DISP	
0				ON	OFF	DEG	FIX
1	INDEX IS NEGATIVE			<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
2				<input type="checkbox"/>	<input checked="" type="checkbox"/>	GRAD	SCI
3				<input type="checkbox"/>	<input checked="" type="checkbox"/>	RAD	ENG
3				<input type="checkbox"/>	<input checked="" type="checkbox"/>	n	3

LABELS				
A 7, 8, 9	B 10, J, Q, K	C	D CARDS	E CALC
a	b	c	d	e
0	1	2	3	4
5	6	7	8	9

REGISTERS									
0 CARDS IN DECK	1 NUMBER OF MID CARDS SEEN	2 RAW INDEX	3 CARDS LEFT	4	5	6	7	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9 NUMBER OF LOW CARDS SEEN
A	B	C	D	E	I NUMBER OF HIGH CARDS SEEN				





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