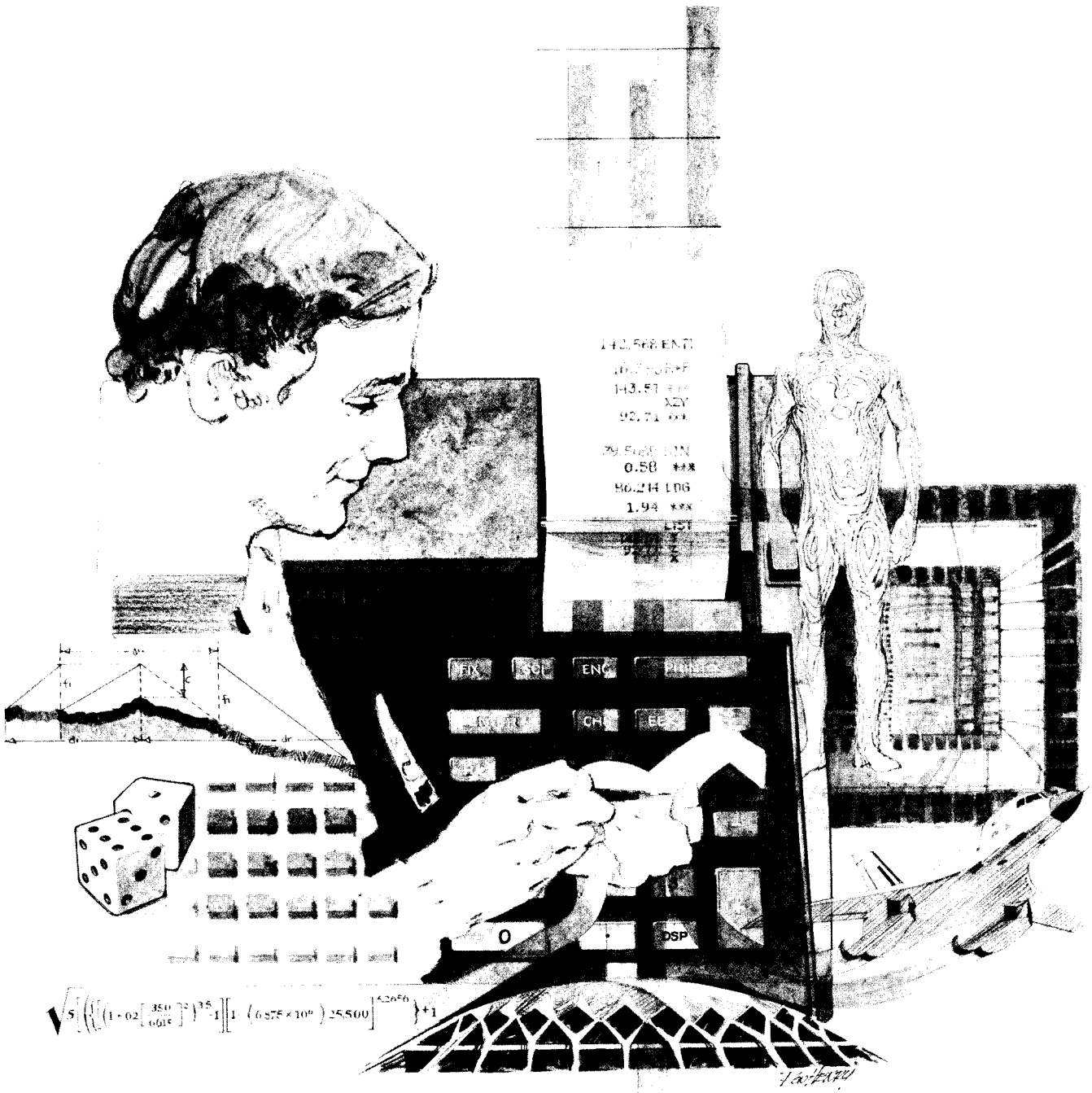
HEWLETT-PACKARD

HP-67 HP-97

Users' Library Solutions

Games of Chance



INTRODUCTION

In an effort to provide continued value to it's 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.

TABLE OF CONTENTS

Program Description I

Program Title CRAPS

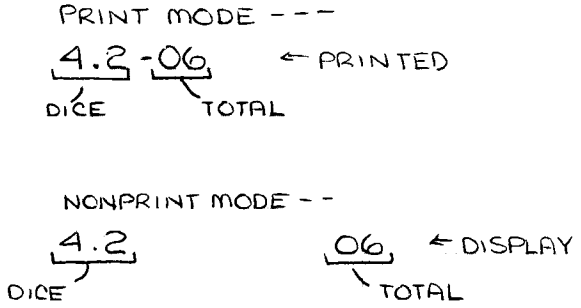
Contributor's Name JOHN RAUSCH
Address 402 VIRGINIA AVE
City FRANKLIN **State** OHIO **Zip Code** 45005

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 [B], YOUR BET WILL REMAIN THE SAME UNTIL YOU CHANGE IT. YOU CAN DISPLAY YOUR TOTAL AMOUNT WON (OR LOST) BY PRESSING [C] AT ANY TIME. IF YOU ARE PLAYING IN THE NONPRINT MODE AND FORGET YOUR POINT, IT CAN BE DISPLAYED BY PRESSING [D]. WHEN YOU EXECUTE THE CLEAR FUNCTION ([f] [D]) THE TOTAL AMOUNT WON IS SET TO ZERO AND ANY GAME IN PROGRESS IS TERMINATED.

Operating Limits and Warnings

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

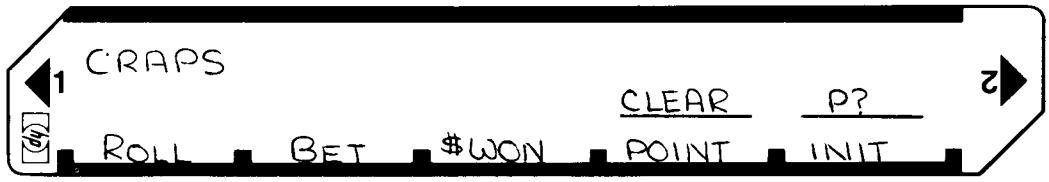


Sample Problem(s) IN ORDER THAT THIS SAMPLE CAN BE DUPLICATED, A RANDOM NUMBER SEED WILL NOT BE GENERATED. TO INSURE DUPLICATION, TURN THE CALCULATOR OFF, THEN ON BEFORE LOADING THE PROGRAM. SAMPLE RUNS IN THE NONPRINT (DEFAULT) MODE.

Solution(s) 1) BET $5.00: 5 [B] → 5.00
2) ROLL: [A] → 6.1....07, 5.00 YOU WIN
3) ROLL: [A] → 3.6.. 09 YOUR POINT IS 9
4) ROLL: [A] → 5.5....10 ROLL AGAIN
5) ROLL: [A] → 2.2....04 "
6) ROLL: [A] → 3.5....08 "
7) ROLL: [A] → 6.3....09, 5.00 YOU WIN
8) SEE AMOUNT WON: [C] → 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).

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS		OUTPUT DATA/UNITS
1	LOAD SIDE 1 AND SIDE 2				
2	INITIALIZE. AFTER PRESSING [E], PROGRAM SHOULD RUN FOR A FEW SECONDS. THEN PRESS [R/S]. THIS GENERATES A SEED FOR THE RANDOM NUMBER ROUTINE. YOU MAY OPTIONALLY STORE ANY NUMBER IN REGISTER E.	n	E -OR- STO	R/S E	? n
3	OPTIONAL: SELECT PRINT MODE. DEFAULT IS NONPRINT. REPEATED, WILL ALTENATE FROM PRINT TO NONPRINT		f	E	1-PRINT 0-NONPRINT
4	BET. IF DISPLAY SHOWS "error" ONE OF THE FOLLOWING "NO-NO'S" HAS TAKEN PLACE: 1) A GAME HAS NOT BE FINISHED. 2) BET IS ZERO 3) BET IS LESS THAN ZERO	Bet	B		Bet
5	ROLL DICE. IF GAME IS OVER, DISPLAY OF DICE WILL BE FOLLOWED BY AMOUNT WON OR LOST ON THIS GAME. REPEAT STEP 5 UNTIL GAME IS OVER. THEN GO TO STEP 4 TO CHANGE BET, STEP 6 TO DISPLAY WINNINGS, OR REPEAT STEP 5 FOR NEXT GAME.		A		ROLL
6	DISPLAY AMOUNT WON.		C		$WON/LOST
7	DISPLAY POINT		D		POINT
8	CLEAR.		f	D	0.00

67 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001 *	LBL A	2111	ROLL. GENERATES TWO
	SCI	-12	DICE. SETS UP DISPLAY
	DSP 1	-6301	AND PUTS TOTAL IN 0.
	f STF 2	162102	
	GSB 0	2300	
	STO 1	3501	
*	LBL 0	2100	
	RCL E	3615	
	f π	16-24	
010	+	-55	
	X^2	53	
	f FRAC	1644	
	STO E	3515	
	6	06	
	X	-35	
	1	01	
	+	-55	
	f INT	1634	
	f F? 2	162302	
020	RTN	24	
	STO 2	3502	
	+		
	STO 0	3500	
	f 10^x	1633	
	f F? 0	162300	
	$1/x$	52	
	RCL 1	3601	
	RCL 2	3602	
	1	01	
030	0	00	
	÷	-24	
	+	-55	
	X	-35	
	STO 6	3506	
	RCL 0	3600	
	f F? 1	162301	
	GTO 1	2201	
	STO 3	3503	
	4	04	CHECK FOR WIN OR
040	f X>Y	16-34	LOSE ON FIRST ROLL.
	GTO 3	2203	
	CLX	-51	
	7	07	
	f X=Y	16-33	
	GTO 2	2202	
	4	04	
	+	-55	
	f X=Y	16-33	
	GTO 2	2202	
050	f X≤Y	16-35	
	GTO 3	2203	
	f STF 1	162101	
	RCL 6	3606	
	f F? 0	162300	
	PRINT X	-14	
	RTN	24	

STEP	KEY ENTRY	KEY CODE	COMMENTS
*	LBL 1	2101	CHECK FOR WIN OR
	7	07	LOSE ON SECOND AND
	f X=Y	16-33	SUBSEQUENT ROLLS.
060	GTO 3	2203	
	CLX	-51	
	RCL 3	3603	
	f X=Y	16-33	
	GTO 2	2202	
	RCL 6	3606	
	f F? 0	162300	
	PRINT X	-14	
	RTN	24	
*	LBL 2	2102	PLAYER WINS.
070	RCL 6	3606	
	PRINT X	-14	
	RCL 4	3604	
	GTO 4	2204	
*	LBL 3	2103	PLAYER LOSES.
	RCL 6	3606	
	PRINT X	-14	
	RCL 4	3604	
	CHS	-22	
*	LBL 4	2104	END OF GAME.
080	FIX	-11	
	DSP 2	-6302	
	f CLF 1	162201	
	STO+5	35-5505	
	f F? 0	162300	
	PRINT X	-14	
	f SPACE	16-11	
	RTN	24	
*	LBL B	2112	BET.
	f F? 1	162301	
090	GTO f a	221611	
	f X>0	16-44	
	f X=0	16-43	
	GTO f a	221611	
	STO 4	3504	
	GTO 5	2205	
*	LBL C	2113	DISPLAY WINNINGS
	RCL 5	3605	
*	LBL 5	2105	
	FIX	-11	
100	DSP 2	-6302	
*	LBL 6	2106	
	f F? 0	162300	
	PRINT X	-14	
	f SPACE	16-11	
	RTN	24	
*	LBL D	2114	DISPLAY POINT
	FIX	-11	
	DSP 0	-6300	
	RCL 3	3603	
110	GTO 6	2206	
*	LBL E	2115	INITIALIZE. INFINITE
	f π	16-24	LOOP FOR RN SEED.

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	I

67 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS
	+	-55	
	STO E	35 15	
	GTO E	22 15	
*	LBL f d	21 16 14	CLEAR.
	f CLF 1	16 22 01	
	CLX	-51	
	STO 5	35 05	
120	GTO 5	22 05	
*	LBL f e	21 16 15	ALTERNATE PRINT
	1	01	MODE SWITCH.
	f F? 0	16 23 00	
	CLX	-51	
	f STF 0	16 21 00	
	f X=0	16-43	
	f CLF 0	16 22 00	
	RTN	24	
130			
140			
150			
160			
170			
180			
190			
200			
210			
220			

LABELS					FLAGS	SET STATUS		
A ROLL	B BET	C $WON	D POINT	E INIT	0 ON=PRINT	FLAGS	TRIG	DISP
a "error"	b	c	d CLEAR	e P?	1 ON=GAME IN PROGRESS	ON OFF 0 ☐ ☒	DEG ☒	FIX ☒
0 GENERATE DIE	1 SECOND AND † ROLLS	2 WIN	3 LOSE	4 END OF GAME	2 USED	1 ☐ ☒ 2 ☐ ☒	GRAD ☐ RAD ☐	SCI ☐ ENG ☐
5 DISPLAY 2 DECIMALS	6 DISPLAY OR PRINT X	7	8	9	3	3 ☐ ☒		n 2

Program Description 1

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.

Program Description II

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 11

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 asum 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

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

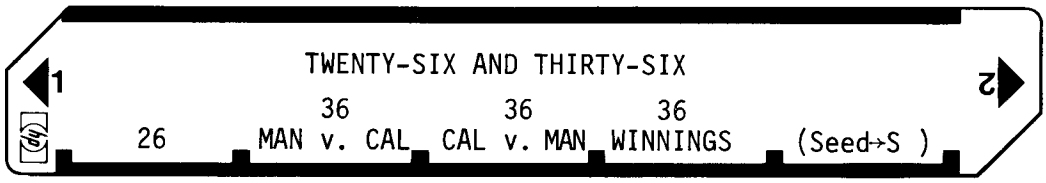
[CHS]---------------> 16.00 [CHS] ----------->-10.00 You Lose

[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			
2.	Enter seed S (any number can be used if 0<S<1)	S	E	S
3.	Play "26": Enter point number p	p	A	
	(calculator rolls 10 dice and displays them			
	as one number. This step is repeated 13			
	times. (DSP 0 Format)			abcdefghij.
	Number of times p was rolled (DSP 2)			x.00
	format from here on)			
	Winnings this round			W
	Overall winnings			ΣW
	OR play "36"			
	Either you play first	(bet)	B	
	OR Machine (cal) plays first	(bet)	C	
	(The following applies in either case):			
	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:			
	a. To roll again		CHS	
	b. To stop at this sum when cal is		CLX	
	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.			
	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).			
	1. Man loses			-(bet)
	2. Cal loses			2(bet)
	3. Tie:			(bet)
	Then			TOT WINNINGS
	in 1 or 2, to display total winnings, you must			
	press		D	TOT WINNINGS
4.	For a new game, go to 3			

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBLA	21 11	Play "26"
002	STOA	35 11	Store point number
003	.	-62	Initialize
004	2	02	
005	5	05	
006	ST-0	35-45 00	
007	0	00	
008	STOI	35 01	
009	1	01	
010	3	03	
011	STOB	35 12	
012	*LBLd	21 16 14	This is secondary
013	1	01	Loop. initialize
014	0	00	For throw of 10
015	STOI	35 46	dice
016	0	00	
017	ENT↑	-21	
018	*LBL0	21 00	Throw 10 dice and
019	1	01	display as one
020	0	00	number
021	x	-35	
022	GSBe	23 16 15	
023	RCLA	36 11	
024	X=Y?	16-33	
025	GSB1	23 01	
026	CLX	-51	
027	+	-55	
028	+	-55	
029	DSZI	16 25 46	
030	GTO0	22 00	
031	PRTX	-14	display number
032	RCLB	36 12	Repeat this loop
033	1	01	13 times
034	-	-45	
035	STOB	35 12	
036	X≠0?	16-42	
037	GTOd	22 16 14	
038	1	01	Initialize for
039	STOI	35 46	payoff
040	RCL1	36 01	Payoff
041	3	03	
042	3	03	
043	X≤Y?	16-35	
044	ISZI	16 26 46	
045	7	07	
046	-	-45	
047	X≤Y?	16-35	
048	ISZI	16 26 46	
049	2	02	
050	÷	-24	
051	X=Y?	16-33	
052	GSB2	23 02	
053	2	02	
054	-	-45	
055	X≷Y	-41	
056	X≤Y?	16-35	
057	ISZI	16 26 46	
058	1	01	
059	RCLI	36 46	
060	X=Y?	16-33	
061	0	00	
062	ST+0	35-55 00	
063	RCL1	36 01	Display number of
064	PSE	16 51	times point number
065	X≷Y	-41	was rolled
066	PSE	16 51	Display money won
067	RCL0	36 00	this round
068	RTN	24	Display total in
069	*LBL1	21 01	kitty
070	1	01	Add 1 to R., drop
071	ST+1	35-55 01	stack.
072	CLX	-51	
073	+	-55	
074	RTN	24	
075	*LBL2	21 02	Put .5 in R_1 and
076	.	-62	drop stack
077	5	05	
078	STOI	35 46	
079	CLX	-51	
080	+	-55	
081	RTN	24	
082	*LBLB	21 12	Play "36", man
083	SF1	16 21 01	goes first
084	STO5	35 05	Initialize
085	ST-2	35-45 02	
086	0	00	
087	STO3	35 03	
088	STO4	35 04	
089	GSBa	23 16 11	Man goes, tot. is Tm
090	GSBb	23 16 12	Cal goes, tot. is Tc
091	*LBLc	21 16 13	Compare totals
092	DSP2	-63 02	
093	RCL4	36 04	
094	RCL3	36 03	
095	X>Y?	16-34	Man wins if Tc<Tm
096	GTO9	22 09	
097	X≷Y	-41	Cal wins if Tm<Tc
098	X>Y?	16-34	
099	GTO4	22 04	
100	RCL5	36 05	If a tie, man loses
101	ST+2	35-55 02	nothing.
102	PSE	16 51	Display bet
103	RCL2	36 02	Display total won
104	RTN	24	so far
105	*LBLC	21 13	Paly "36", cal goes
106	CF1	16 22 01	first
107	STO5	35 05	
108	ST-2	35-45 02	Initialize
109	0	00	
110	STO3	35 03	
111	STO4	35 04	Cal goes, tot. is Tm
112	GSBb	23 16 12	

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	B	C	D	E	I
Point	Loop Count				Used

97 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS
113	GSBa	23 16 11	Man goes;tot is Tm
114	GTOc	22 16 13	Go to display rout.
115	*LBLD	21 14	Recall total won
116	RCL2	36 02	so far at "36"
117	RTN	24	
118	*LBLE	21 15	Store seed "S"
119	STOE	35 15	
120	RTN	24	
121	*LBLa	21 16 11	Man rolls
122	DSP2	-63 02	Initialize
123	*LBL5	21 05	
124	GSBe	23 16 15	Roll dice, add
125	ST+3	35-55 03	roll to total
126	*LBL3	21 03	Display loop
127	3	03	If sum is more than
128	6	06	36, you lose
129	RCL3	36 03	
130	X>Y?	16-34	
131	GTO4	22 04	
132	PSE	16 51	Display total
133	X>0?	16-44	If nothing done,
134	GTO3	22 03	cont. to display tot
135	X<0?	16-45	If [CHS] pressed,
136	GTO5	22 05	roll again
137	RTN	24	If [CLX] pressed,
138	*LBL4	21 04	end
139	DSP2	-63 02	Man loses
140	RCL5	36 05	
141	CHS	-22	
142	R/S	51	
143	*LBLb	21 16 12	Cal rolls
144	DSP0	-63 00	Initialize
145	*LBL6	21 06	
146	GSBe	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	GTO4	22 04	
155	X>Y?	16-34	
156	GTO9	22 09	
157	F1?	16 23 01	If man went first,
158	GTO7	22 07	use a different
159	*LBL8	21 08	strategy
160	3	03	
161	3	03	
162	X≤Y?	16-35	
163	RTN	24	
164	GTO6	22 06	Strategies: does
165	*LBL7	21 07	cal roll again?
166	RCL3	36 03	
167	X≷Y	-41	
168	X=Y?	16-33	
169	GTO8	22 08	
170	X≤Y?	16-35	
171	GTO6	22 06	
172	RTN	24	
173	*LBL9	21 09	Man wins
174	DSP2	-63 02	Payoff
175	RCL5	36 05	
176	2	02	
177	x	-35	
178	ST+2	35-55 02	
179	R/S	51	
180	*LBLe	21 16 15	Roll dice
181	RCLE	36 15	
182	9	09	
183	9	09	
184	7	07	
185	x	-35	
186	FRC	16 44	
187	STOE	35 15	
188	6	06	
189	x	-35	
190	1	01	
191	+	-55	
192	INT	16 34	
193	RTN	24	

200		
210		
220		

LABELS

A 26	B 36 Man vs HP	C 36 HP vs. Man	D WINNINGS	E (Seed→)	0
a Mann rolls	b HP rolls	c Display	d Loop 2	e Roller	1 Man Roll?
0 Loop 1	1 Used	2 Used	3 Display	4 Man loses	2
5 Man's dice	6 HP's dice	7 Strategy	8 Strategy	9 HP loses	3

FLAGS

	ON	OFF
0	☐	☒
1	☐	☒
2	☐	☒
3	☐	☒

SET STATUS

TRIG		DISP	
DEG	☒	FIX	☒
GRAD	☐	SCI	☐
RAD	☐	ENG	☐
		n	2

Program Description I

Program Title CHUCK-A-LUCK DICE GAME

Contributor's Name JOHN RAUSCH
Address 402 VIRGINIA AVE
City FRANKLIN **State** OHIO **Zip Code** 45005

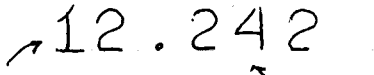
Program Description, Equations, Variables THE CALCULATOR PLAYS THE PART OF A CASINO OPERATOR IN A GAME OF CHUCK-A-LUCK. THE PLAYER PLACES A BET BY ENTERING A INTEGER AMOUNT AND PRESSING [B]. THE SAME BET AMOUNT WILL BE USED UNTIL IT IS CHANGED. THE PLAYER THEN SELECTS A NUMBER FROM 1 TO 6 AND PRESSES [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

Program Description 11

Sketch(es) AFTER EACH ROLL, THE DISPLAY SHOWS THE 3 DICE AS WELL AS THE AMOUNT WON OR LOST. THE AMOUT 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.



Sample Problem(s) INORDER 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)

User Instructions

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS		OUTPUT DATA/UNITS
1	LOAD SIDE 1				
2	GENERATE RANDOM NUMBER SEED. PRESS [E] THEN LET PROGRAM RUN A FEW SECONDS. THEN PRESS [R/S]. OR OPTIONALLY STORE ANY NUMBER IN REGISTER 5.	n	E -OR- STO	R/S 5	n
3	CLEAR WINNINGS.		D		0.
4	PLACE BET (ANY INTEGER AMOUNT) IF DISPLAY SHOWS "error" YOU HAVE MADE A NONINTEGER BET.	BET	B		BET
5	ENTER NUMBER YOU ARE BETTING ON (1 TO 6). IF DISPLAY SHOWS "error", YOU HAVE NOT ENTERED A NUMBER FROM 1-6. YOU CAN REPEAT STEP 5 OR GO TO ANY OTHER STEP.	1-6	A		AMT, DICE
6	DISPLAY WINNINGS		C		WINNINGS

67 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001 *	LBL A	21 11	VALIDATE NUMBER AND ROLL DIE 3 TIMES. THEN DISPLAY RESULT
	DSP 0	-63 00	
	f INT	16 34	
	f LASTX	16-63	
	f X≠Y	16-32	
	GTO fe	22 16 15	
	DSP 3	-63 03	
	STO 0	35 00	
	1	01	
010	f X>Y	16-34	
	GTO fe	22 16 15	
	CLX	-51	
	7	07	
	f X≤Y	16-35	
	GTO e	22 16 15	
	CLX	-51	
	STO I	35 46	
	STO 3	35 03	
	GSB 1	23 01	
020	GSB 1	23 01	
	GSB 1	23 01	
	RCL I	36 46	
	f X=0	16-43	
	GTO 0	22 00	
	RCL 1	36 01	
	X	-35	
	STO+4	35-55 04	
	RCL 3	36 03	
	+	-55	
030	RTN	24	
*	LBL 0	21 00	
	RCL 1	36 01	
	STO-4	35-45 04	
	RCL 3	36 03	
	+	-55	
	CHS	-22	
	RTN	24	
*	LBL 1	21 01	ROLL DIE AND ADD TO WINNINGS FOR MATCH. BUILD DICE DISPLAY.
	RCL 0	36 00	
040	RCL 5	36 05	
	f π	16-24	
	+	-55	
	x^2	53	
	f FRAC	16 44	
	STO 5	35 05	
	6	06	
	X	-35	
	1	01	
	+	-55	
050	f INT	16 34	
	f X=Y	16-33	
	f ISZ I	16 26 46	
	STO+3	35-55 03	
	1	01	
	0	00	
	STO÷3	35-24 03	

STEP	KEY ENTRY	KEY CODE	COMMENTS
	RTN	24	
*	LBL B	21 12	VALIDATE BET
	DSP 0	-63 00	
060	f INT	16 34	
	f LASTX	16-63	
	f X≠Y	16-32	
	GTO e	22 16 15	
	STO 1	35 01	
	RTN	24	
*	LBL D	21 14	CLEAR WINNINGS
	CLX	-51	
	STO 4	35 04	
*	LBL C	21 13	DISPLAY WINNINGS
070	DSP 0	-63 00	
	RCL 4	35 04	
	RTN	24	
*	LBL E	21 15	GENERATE RANDOM NUMBER SEED
	f π	16-24	
	+	-55	
	STO 5	35 05	
	GTO E	22 15	
080			
090			
100			

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

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

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.	First Roll
	1411.	Second Roll
	214.	Third Roll
	26.	Fourth Roll
	2.	Fifth Roll
	22.00	Total Saved
	20.00	Amount Won This Round
	10.00	Total Won so Far

Reference(s)

Program Description II

Sketch(es)

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

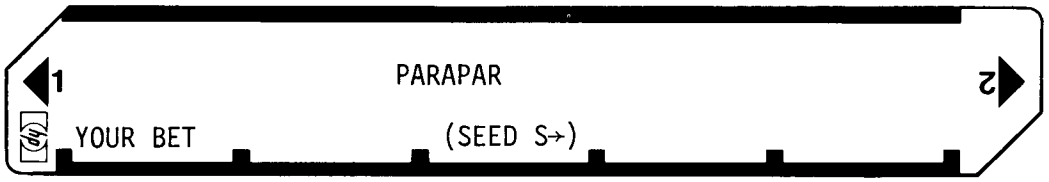
Bet $10. again.
First time: The calculator rolls 5 dice, getting 4,5,1,1,6
Second time: The calculator rolls 3 dice, getting 3,5,5
Third time: The calculator rolls 1 die, getting 6
Total of dice saved: 5+6+5+5+6 = 27
Point number is 3.
Calculator rolls 1 die 5 times, getting 3,1,2,4, and 4.
Hence gambler 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

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1.	Load Program			
2.	Enter seed S (any number can be used, of 0<S<1)	S	C	S
3.	To play, enter bet	(Bet)	A	
	Calculator rolls 5 dice and displays values			abcde.
	as one number. It continues rolling, always displaying only rolled dice in this (DSP 0,f-x-Printx) format.			
	Total rolled T(DSP 2,. Blinks)			-T.00
	There are three possible display endings: a) If T<24, display shows:			
	Amount won			(Won)
	Total Winnings			Σ(Won)
	b) If T = 24, display shows:			
	Amount won			0.00
	Total Winnings			Σ(Won)
	c) If T>24, display shows:			
	In DSP 0 format, the point number Pt. does not blink)			P.
	Die roll R_E (This display is repeated Five times, once for each die rolled)			-R.
	(.Blinks)			
	Amount lost (won) (DSP 2 format)			(Won)
	Total Winnings			Σ(Won)
4.	For another game, go to 3			
	NOTE: a,b,c,d,e are dice values, i.e., integers between 1 and 6 inclusive.			
	*Note that in this case (won) is negative.			

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBLA	21 11	Play "Parapar"
002	STO9	35 09	Store bet, deduct
003	ST-8	35-45 08	from gambler's Acct.
004	GSBB	23 12	Dice Control
005	DSP2	-63 02	Display tot. rolled
006	PRTX	-14	
007	STOD	35 14	Diff. between tot.
008	2	02	and 24
009	4	04	
010	-	-45	
011	X=0?	16-43	If tot. is 24, no-
012	SF1	16 21 01	one wins
013	X>0?	16-44	If tot. is more
014	GSB7	23 07	than 24, find no.
015	RCL9	36 09	of times Pt.no.
016	x	-35	occurs (see 7)
017	CHS	-22	Multiply by amt.
018	DSP2	-63 02	bet, display
019	PSE	16 51	
020	F1?	16 23 01	If tot. is 24, resto
021	CLX	-51	amt bet to gambler's
022	ST+8	35-55 08	acct.
023	RCL8	36 08	Display tot. amt.
024	CF1	16 22 01	
025	RTN	24	
026	*LBL7	21 07	If tot. is more than
027	DSP0	-63 00	24, display pt.
028	STOD	35 14	number
029	PSE	16 51	
030	5	05	Int. for rolling
031	STOI	35 46	
032	0	00	
033	STO7	35 07	
034	*LBL8	21 08	Roll dice
035	GSBe	23 16 15	
036	CHS	-22	Display roll
037	PRTX	-14	
038	CHS	-22	If the roll is equal
039	RCLD	36 14	to the pt. no., add
040	X=Y?	16-33	it to R_7
041	GSB9	23 09	Go back until 5 dice
042	DSZI	16 25 46	have been thrown
043	GTO8	22 08	
044	RCL7	36 07	No. of times pt. no.
045	RCLD	36 14	appears times pt.
046	x	-35	no.
047	RTN	24	
048	*LBL9	21 09	Add 1 to R_7
049	1	01	
050	ST+7	35-55 07	
051	RTN	24	Roll dice
052	*LBLB	21 12	
053	5	05	Initialize for 1st
054	STOC	35 13	roll
055	*LBL4	21 04	
056	STOI	35 46	Int for next roll
057	CLX	-51	Intialize
058	ENT↑	-21	registers
059	*LBL3	21 03	Loop for
060	1	01	rolling dice
061	0	00	Prepare for display
062	x	-35	
063	GSBe	23 16 15	Roll dice
064	STO↓	35 45	Store roll
065	+	-55	Add to display
066	DSZI	16 25 46	
067	GTO3	22 03	
068	DSP0	-63 00	
069	PRTX	-14	Display as one no.
070	RCLC	36 13	Arrange the nos.
071	*LBL2	21 02	rolled in order in
072	STOB	35 12	the registers
073	STOA	35 11	
074	STOI	35 46	
075	RCL↓	36 45	
076	*LBL0	21 00	
077	RCL↓	36 45	
078	X>Y?	16-34	
079	GSB1	23 01	
080	X≷Y	-41	
081	DSZI	16 25 46	
082	GTO0	22 00	
083	RCLB	36 12	
084	STOI	35 46	
085	CLX	-51	
086	+	-55	
087	RCL↓	36 45	
088	X≷Y	-41	
089	STO↓	35 45	
090	CLX	-51	
091	+	-55	
092	RCLA	36 11	
093	STOI	35 46	
094	X≷Y	-41	
095	STO↓	35 45	
096	RCLB	36 12	
097	1	01	
098	-	-45	
099	X≠0?	16-42	
100	GTO2	22 02	
101	RCLC	36 13	Strategy: which
102	STOI	35 46	rolls are to be
103	DSZI	16 25 46	saved, and should
104	GTO5	22 05	cal roll again?
105	GTOE	22 15	
106	*LBL5	21 05	
107	RCL↓	36 45	
108	5	05	
109	X≤Y?	16-35	
110	GTO6	22 06	
111	RCLI	36 46	
112	STOC	35 13	

REGISTERS

0	1 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 pt. no. rolled	8 Tot won so far	9 Bet
S0	S1	S2	S3	S4	S5	S6		S8	S9

A	B	C	D	E	I
Used	Used	Loop control How many dice?	Total rolled, Point number	Seed	Used

97 Program Listing II

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

LABELS

A Your Bet	B Roll Dice	C (Seed→)	D	E Dice Sum	0
a	b	c	d Strategy	e Roll	1 TOT=24
0 Sort	1 Pointer	2 Sort	3 Roll	4 Control	2 Strategy
5 Strategy	6 Strategy	7 Total>24	8 Used	9 Used	3

FLAGS

SET STATUS

FLAGS	ON	OFF
0	☐	☒
1	☐	☒
2	☐	☒
3	☐	☒

TRIG	
DEG	☒
GRAD	☐
RAD	☐

DISP	
FIX	☒
SCI	☐
ENG	☐
n	2

Program Description I

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 pseydo 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

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

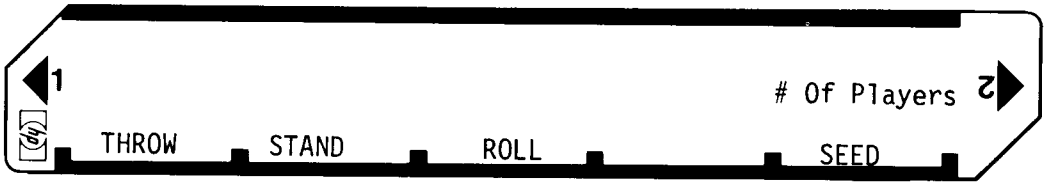
[A] 2*** 0*** 13*** 1* Now he elects to pass

[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



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			
	cae, 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
001	*LBLe	21 16 15	Enter # of players
002	ABS	16 31	
003	INT	16 34	
004	X=0?	16-43	Check it is legal
005	GTO9	22 09	i.e., 1<N<23
006	RCLE	36 15	
007	CLRG	16-53	
008	P≠S	16-51	
009	CLRG	16-53	
010	X≠Y	-41	
011	2	02	
012	3	03	
013	X≤Y?	16-35	
014	GTO9	22 09	
015	R↓	-31	
016	STOD	35 14	
017	R↓	-31	
018	FRC	16 44	
019	*LBLE	21 15	Modify Seed
020	DSP0	-63 00	
021	ABS	16 31	
022	2	02	
023	+	-55	
024	LN	32	
025	2	02	
026	X≠Y	-41	
027	X>Y?	16-34	
028	GTOE	22 15	
029	RCLE	36 15	
030	+	-55	
031	STOE	35 15	
032	F3?	.16 23 03	
033	GTOE	22 15	
034	1	01	
035	RTN	24	Throw
036	*LBLA	21 11	
037	STOI	35 46	
038	1	01	Const. Upper face
039	GSBC	23 13	U.P.=1
040	X=Y?	16-33	Yes GTO 1
041	GTO1	22 01	No: Add
042	ST+0	35-55 00	Display output
043	RCLi	36 45	of type (A)
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
051	RCL0	36 00	turn to previous
052	ST+i	35-55 45	total display out-
053	*LBL1	21 01	put of type (B)
054	DSP2	-63 02	
055	RCLi	36 45	
056	RCLI	36 46	
057	EEX	-23	
058	2	02	
059	÷	-24	
060	+	-55	
061	PRTX	-14	
062	DSP0	-63 00	
063	CLX	-51	
064	STO0	35 00	
065	SPC	16-11	
066	SPC	16-11	
067	ISZI	16 26 46	
068	RCLD	36 14	
069	RCLI	36 46	
070	X>Y?	16-34	
071	1	01	
072	RTN	24	
073	*LBLC	21 13	Construct
074	RCLE	36 15	pseudo random #
075	9	09	1<#<6
076	9	09	
077	7	07	
078	x	-35	
079	FRC	16 44	
080	X=0?	16-43	Seed sterile? Yes
081	GSB2	23 02	Get a new one
082	STOE	35 15	
083	6	06	
084	x	-35	
085	INT	16 34	
086	1	01	
087	+	-55	
088	PRTX	-14	
089	RTN	24	
090	*LBL2	21 02	New Seed
091	.	-62	
092	5	05	
093	2	02	
094	8	08	
095	4	04	
096	1	01	
097	6	06	
098	3	03	
099	RTN	24	
110			

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	E	I
			# of players	Seed	Used

97 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS
120			
130			
140			
150			
160			

STEP	KEY ENTRY	KEY CODE	COMMENTS
170			
180			
190			
200			
210			
220			

LABELS

A Throw	B Stand	C Roll	D	E Mod Seed
a	b	c	d	e Initialize
0	1 Display Output	2 Used	3	4
5	6	7	8	9 Used for Error

FLAGS

0
1
2
3

SET STATUS

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

Program Description 1

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

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_D 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.

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.

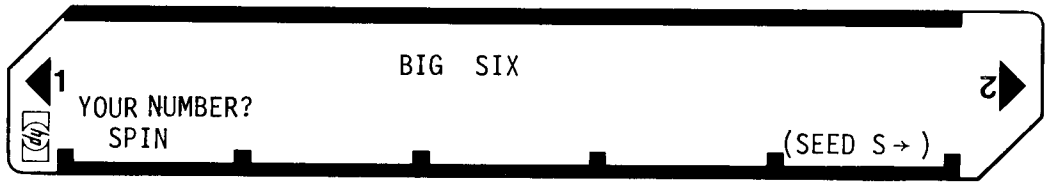
Solution(s) .3657891 [E] ------- 3.657891000-01

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.

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1.	Load program			
2.	Load data card and seed S	S	E	S
3.	The numbers $r_1, r_2, r_3, \ldots, r_k$ you want to bet on (r_i = 1,2,3,4,5,6; if you want to bet more than $1.00 on any number, just enter it twice). Enter these digits as one integer.	$r_1 r_2 r_3 r_4 r_k$	A	
	Triplet; winning combination			klm.
	Payoff: If r_i = k,l, or m, win $1.00			
	r_i = two of k,l,m, win $2.00			
	r_i = k,l, and m, win $3.00			
	In these cases, you get your bet back (i.e., nothing is deducted for the bet).			
	If $r_i \neq$ any of k,l,m, lose $1.00			
	Repeat this procedure for $1 \le i \le k$.			
	Total won so far			Total
4.	For a new spin, go to 3.			

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBLA	21 11	Play "Big Six"
002	STOC	35 13	Store number bet on
003	RCLE	36 15	Choose proper
004	9	09	Triplet
005	9	09	
006	7	07	
007	x	-35	
008	FRC	16 44	
009	STOE	35 15	
010	5	05	
011	5	05	
012	x	-35	
013	INT	16 34	
014	3	03	
015	÷	-24	
016	STOI	35 46	
017	FRC	16 44	
018	RCLi	36 45	
019	X≠Y	-41	
020	3	03	
021	x	-35	
022	DSP0	-63 00	
023	RND	16 24	
024	STOI	35 46	
025	R↓	-31	
026	GSBi	23 45	
027	INT	16 34	
028	PSE	16 51	Display it
029	8	08	
030	STOI	35 46	
031	P≠S	16-51	
032	R↓	-31	
033	EEX	-23	
034	2	02	
035	÷	-24	
036	GSB3	23 03	
037	GSB3	23 03	
038	STOA	35 11	
039	*LBL6	21 06	Load for Computing
040	0	00	innings
041	STOI	35 46	Initialize
042	GSB5	23 05	Number bet on
043	RCL8	36 08	How much won on
044	X=Y?	16-33	this number?
045	ISZI	16 26 46	
046	X≠Y	-41	
047	RCL9	36 09	
048	X=Y?	16-33	
049	ISZI	16 26 46	
050	X≠Y	-41	
051	RCLA	36 11	
052	X=Y?	16-33	
053	ISZI	16 26 46	
054	RCLI	36 46	
055	X≠0?	16-42	Repay amt bet if
056	ISZI	16 26 46	anything won
057	DSZI	16 25 46	Deduct bet
058	RCLI	36 46	Compute winnings
059	RCLB	36 12	
060	+	-55	
061	STOB	35 12	
062	GTO6	22 06	Go back for another
063	*LBL3	21 03	number
064	INT	16 34	Split up triplet
065	STOi	35 45	and store first
066	LSTX	16-63	number in proper
067	FRC	16 44	register
068	RCLD	36 14	
069	x	-35	
070	ISZI	16 26 46	
071	RTN	24	
072	*LBL0	21 00	Choose first triplet
073	EEX	-23	
074	6	06	
075	÷	-24	
076	RTN	24	
077	*LBL1	21 01	Choose second
078	GSB0	23 00	triplet
079	FRC	16 44	
080	EEX	-23	
081	3	03	
082	x	-35	
083	RTN	24	
084	*LBL2	21 02	Choose third triplet
085	EEX	-23	
086	3	03	
087	÷	-24	
088	FRC	16 44	
089	EEX	-23	
090	3	03	
091	x	-35	
092	RTN	24	
093	*LBL5	21 05	Recall numbers
094	RCLC	36 13	bet on
095	X=0?	16-43	If no more, end
096	GTO4	22 04	
097	RCLD	36 14	Choose the next one
098	÷	-24	and store the re-
099	ENT↑	-21	mainder of the
100	INT	16 34	numbers
101	STOC	35 13	
102	-	-45	
103	RCLD	36 14	
104	x	-35	
105	RTN	24	
106	*LBLE	21 15	Store seed
107	STOE	35 15	
108	RTN	24	
109	*LBL4	21 04	Display total won
110	DSP2	-63 02	so far.
111	P≠S	16-51	
112	RCLB	36 12	

REGISTERS

0 Wheel	1 Wheel	2 Wheel	3 Wheel	4 Wheel	5 Wheel	6 Wheel	7 Wheel	8 Wheel	9 Wheel
S0 Wheel	S1 Wheel	S2 Wheel	S3 Wheel	S4 Wheel	S5 Wheel	S6 Wheel	S7 Wheel	S8 k	S9 l
A m	B Total won	C $r_l \ldots r_k$, Used	D 10	E Seed	I Used				

97 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS
113	R/S	51	
120			
130			
140			
150			
160			
170			
180			
190			
200			
210			
220			

LABELS

A Your # Spin	B	C	D	E (Seed S→)	
a	b	c	d	e	
0 Choose 1st Triplet	1 Choose 2nd Triplet	2 Choose 3rd Triplet	3 Split up Triplet	4 Ending Sequence	
5 Pick 1 # bet on	6 How much did bettor win?	7	8	9	

FLAGS

0
1
2
3

SET STATUS

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

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/(HIGH - 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

Program Description II

Sketch(es)

Sample Problem(s) Note - Use a seed of .3148216 for this sample.

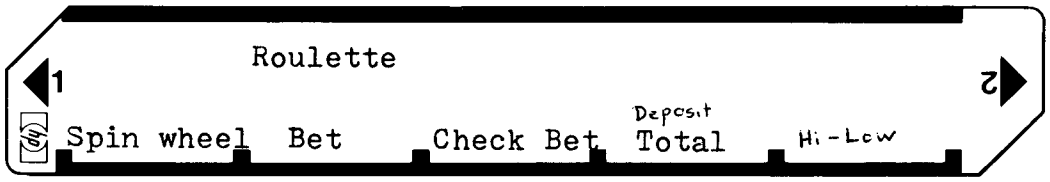
A player deposits 150.00 to his account(# 1)
1-He then places a bet of $20. on numbers 1 thru 12.
The wheel is spun and he loses his $20. when 24 comes up.
2-He then places a bet of $15. on numbers 13 thru 24.
The wheel is spun and he wins $30. when the number 15 comes up.

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



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

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	f LBL A	31 25 11	
	RCL Ø	34 00	
	h π	35 73	
	+	61	
	5	05	
	h y^x	35 63	
	g FRAC	32 83	
	STO Ø	33 00	
	EEX	43	
010	3	03	
	x	71	
	f INT	31 83	
	3	03	
	7	07	
	÷	81	
	g FRAC	32 83	
	3	03	
	7	07	
	x	71	
020	f INT	31 83	
	STO 3	33 03	
	CLx	44	
	h RTN	35 22	
	f LBL B	31 25 12	
	STO 1	33 01	
	h R↓	35 53	
	STO 2	33 02	
	RCL 1	34 01	
	f x=Ø	31 51	
030	GTO Ø	22 00	
	1	01	
	g x>y	32 81	
	GTO Ø	22 00	
	h R↓	35 53	
	g FRAC	32 83	
	f x=Ø	31 51	
	GTO 1	22 01	
	h LSTx	35 82	
	f INT	31 83	
040	h x⇄y	35 52	
	EEX	43	
	2	02	
	x	71	
	-	51	
	h ABS	35 64	
	1	01	
	+	61	
	3	03	
	6	06	
050	h x⇄y	35 52	
	÷	81	
	f INT	31 83	
	1	01	
	-	51	
	STO 4	33 04	
	CLx	44	

STEP	KEY ENTRY	KEY CODE	COMMENTS
	h RTN	35 22	
	f LBL Ø	31 25 00	
	1	01	
060	STO 4	33 04	
	CLx	44	
	h RTN	35 22	
	f LBL 1	31 25 01	
	3	03	
	5	05	
	STO 4	33 04	
	CLx	44	
	h RTN	35 22	
	f LBL C	31 25 13	
070	f GSB A	31 22 11	
	g LBL c	32 25 13	
	DSP Ø	23 00	
	RCL 4	34 04	
	3	03	
	5	05	
	g x=y	32 51	
	GTO 2	22 02	
	RCL 1	34 01	
	f INT	31 83	
080	f x=Ø	31 51	
	GTO 3	22 03	
	RCL 3	34 03	
	h x⇄y	35 52	
	g x≤y	32 71	
	GTO 4	22 04	
	f LBL 9	31 25 09	
	RCL 3	34 03	
	h PAUSE	35 72	
	RCL 2	34 02	
090	CHS	42	
	f -x-	31 84	
	h PAUSE	35 72	
	h PAUSE	35 72	
	1	01	
	Ø	00	
	+	61	
	h STI	35 33	
	RCL 2	34 02	
	STO - (i)	33 51 24	
100	h RCI	35 34	
	h LSTx	35 82	
	-	51	
	GTO D	22 14	
	f LBL 2	31 25 02	
	RCL 3	34 03	
	RCL 1	34 01	
	g x=y	32 51	
	GTO 8	22 08	
	GTO 9	22 09	
110	f LBL 3	31 25 03	
	h LSTx	35 82	
	.	83	

REGISTERS

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

A	B	C	D	E	I

67 Program Listing 11

STEP	KEY ENTRY	KEY CODE	COMMENTS
	2	02	
	h x≥y	35 52	
	g x≠y	32 61	
	GTO ∅	22 00	
	f GSB 7	31 22 07	
	h F? ∅	35 71 00	
	GTO 9	22 09	
120	f LBL 8	31 25 08	
	RCL 2	34 02	
	RCL 4	34 04	
	x	71	
	STO 2	33 02	
	RCL 3	34 03	
	h PAUSE	35 72	
	RCL 2	34 02	
	f -x-	31 84	
	h PAUSE	35 72	
130	h PAUSE	35 72	
	1	01	
	∅	00	
	+	61	
	h ST I	35 33	
	RCL 2	34 02	
	STO + (i)	33 61 24	
	h RC I	35 34	
	h LST x	35 82	
	-	51	
140	GTO D	22 14	
	f LBL 4	31 25 04	
	RCL 1	34 01	
	g FRAC	32 83	
	EEX	43	
	2	02	
	x	71	
	RCL 3	34 03	
	g x≤y	32 71	
	GTO 8	22 08	
150	GTO 9	22 09	
	f LBL ∅	31 25 00	
	f GSB 7	31 22 07	
	f F? ∅	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=∅	31 51	
	GTO 4	22 04	
	h SF ∅	35 51 00	
	h RTN	35 22	
	f LBL 4	31 25 04	
	h CF ∅	35 61 00	
	h RTN	35 22	
	f LBL D	31 25 14	

STEP	KEY ENTRY	KEY CODE	COMMENTS
	1	01	
170	∅	00	
	+	61	
	h ST I	35 33	
	RCL (i)	34 24	
	h RTN	35 22	
	f LBL E	31 25 15	
	RCL 3	34 03	
	g x>y	32 81	
	GTO 7	22 07	
	g x=y	32 51	
180	GTO ∅	22 00	
	1	01	
	4	04	
	h RTN	35 22	
	f LBL 7	31 25 07	
	.	83	
	7	07	
	DSP 1	23 01	
	h RTN	35 22	
	f LBL ∅	31 25 00	
190	CL x	44	
	f -x-	31 84	
	h RTN	35 22	
	g LBL d	32 25 14	
	1	01	
	∅	00	
	+	61	
	h ST 1	35 33	
	h R↓	35 53	
	STO + (i)	33 61 24	
200	h RTN	35 22	
	g LBL a	32 25 11	
	STO ∅	33 00	
	h RTN	35 22	
210			
220			

LABELS

A Spin Wheel	B Bet	C Spin & Check Bet	D Display Balance	E Check for Hi-Low
a store seed	b	c Check Bet Only	d Deposit to Account	e
0	1	2	3	4
5	6	7	8	9

FLAGS

0	Off = even On = Odd
1	
2	
3	

SET STATUS

FLAGS	ON	OFF
0	☐	☒
1	☐	☒
2	☐	☒
3	☐	☒

TRIG	
DEG	☒
GRAD	☐
RAD	☐

DISP	
FIX	☒
SCI	☐
ENG	☐
n	∅

Program Description I

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

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

Program Description III

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%

Program Description III

Sketch(es)

12-16						
13-30	23-21					
14-26	24-19	34-44				
15-19	25-15	35-26	45-24			
16-25	26-18	36-39	46-34	56-22		
17-32	27-22	37-60	47-49	57-28	67-43	
18-29	28-20	38-52	48-43	58-26	68-38	78-59

Ⓒ

Ⓐ	Ⓑ	Ⓓ
1	5.10	2
2	2.90	3
3	14.40	1
4	9.90	3
5	4.20	1
6	8.00	3
7	19.40	0
8	13.70	1

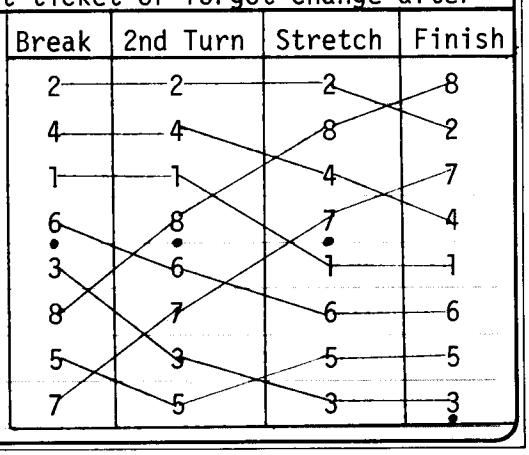
Ⓕ

	WIN	PLACE	SHOW
⑧	29.40	11.90	8.10
②		4.60	3.60
⑦			10.50

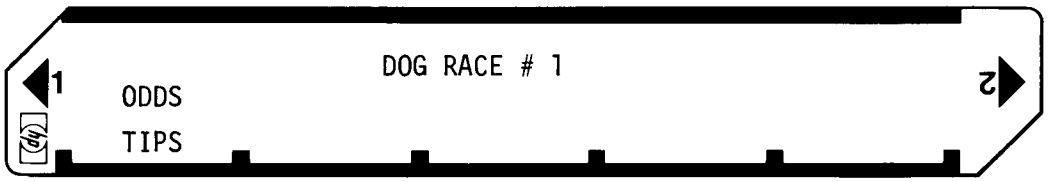
㉘	Quiniela	42.70
㉜	Perfecta	128.10
㉗	Trifecta	668.90
	Daily Double	0.0
	Big Q	0.0

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 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.

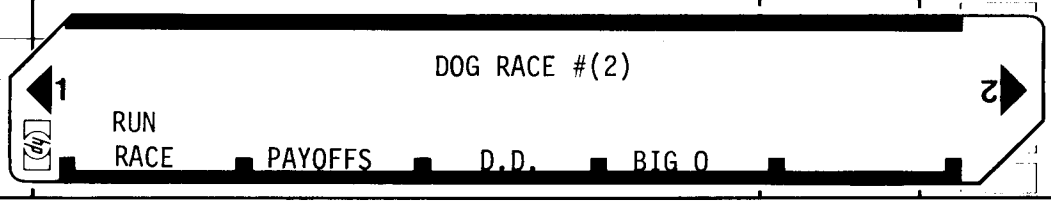


User Instructions



NOTE:
FOR CARD 2 SEE BELOW

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



CARD #1

67 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBLA	21 11	
002	0	00	
003	STOI	35 46	Ready for odds
004	STO0	35 00	
005	1	01	
006	STO9	35 09	
007	*LBL0	21 00	
008	ISZI	16 26 46	Next dog
009	4	04	
010	0	00	Maximum odds
011	1/X	52	
012	GSBE	23 15	or
013	X≤Y?	16-35	Scratch Dog?
014	GTO7	22 07	
015	RCL9	36 09	
016	2	02	
017	÷	-24	
018	R↑	16-31	Sets number of total
019	X>Y?	16-34	tickets sold
020	GTOA	22 11	
021	R↓	-31	FOR 97:
022	*LBLa	21 16 11	Delete steps 034
023	x	-35	194 and 200.
024	X>Y?	16-34	207 optional R/S
025	GTOb	22 16 12	Change steps 063 and
026	2	02	119 to f-x-
027	GTOa	22 16 11	
028	*LBLb	21 16 12	
029	ST-9	35-45 09	Running total of tick
030	DSP5	-63 05	Number of tickets
031	RND	16 24	sold on dog
032	RCLI	36 46	
033	DSP0	-63 00	Countup before odds
034	PSE	16 51	are shown
035	EEX	-23	Loads tickets and
036	6	06	box number in
037	÷	-24	fractional part of
038	+	-55	Reg (1)
039	*LBL8	21 08	
040	STOi	35 45	
041	RCLI	36 46	
042	8	08	Any more dogs?
043	X≠Y?	16-32	
044	GTO0	22 00	Yes
045	RCL9	36 09	
046	DSP5	-63 05	Sells any remaining
047	RND	16 24	tickets
048	ST+i	35-55 45	
049	0	00	
050	STOI	35 46	Set to display odds
051	STO9	35 09	
052	*LBL1	21 01	
053	ISZI	16 26 46	Display box numbers
054	9	09	
055	1/X	52	
056	EEX	-23	
057	1	01	
058	0	00	
059	x	-35	
060	RCLI	36 46	
061	x	-35	
062	DSP0	-63 00	
063	PSE	16 51	
064	RCLi	36 45	Is dog scratched?
065	X=0?	16-43	
066	GTOD	22 14	Yes
067	1/X	52	Chance on dog.
068	RCLA	36 11	
069	%	55	Percent taken out?
070	-	-45	
071	1	01	
072	-	-45	
073	*LBLD	21 14	Display win odds
074	DSP1	-63 01	
075	PRTX	-14	
076	RCLI	36 46	More odds to display?
077	8	08	
078	X≠Y?	16-32	
079	GTO1	22 01	Yes
080	STO0	35 00	
081	*LBL2	21 02	Ready for Quinielas
082	1	01	
083	ST+9	35-55 09	Quiniela counter
084	RCL9	36 09	
085	STOI	35 46	
086	8	08	Any more quinielas?
087	X=Y?	16-33	
088	GTO4	22 04	No
089	R↓	-31	
090	3	03	Quiniela counter
091	+	-55	
092	ST+0	35-55 00	
093	RCLi	36 45	Hold (1) tickets
094	STOB	35 12	
095	ISZI	16 26 46	Next dog
096	*LBL3	21 03	Are either of these
097	RCLB	36 12	dogs scratched?
098	X=0?	16-43	Yes
099	GTO9	22 09	Yes
100	RCLi	36 45	
101	X=0?	16-43	Quiniela chance
102	GTO9	22 09	
103	+	-55	
104	1/X	52	Percent taken out?
105	7	07	
106	x	-35	
107	RCLA	36 11	Quiniela odds
108	%	55	
109	-	-45	
110	1	01	
111	-	-45	
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				

67 Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS
113	3	03	Quiniela count in
114	÷	-24	Integer part and
115	*LBL9	21 09	odds to $1.00 in
116	RCL0	36 00	fractional part
117	+	-55	
118	DSP3	-63 03	
119	PSE	16 51	Display Quiniela
120	RCLI	36 46	odds
121	8	08	
122	X=Y?	16-33	Next dog?
123	GTO2	22 02	Yes
124	ISZI	16 26 46	
125	1	01	
126	ST+0	35-55 00	Next Quiniela?
127	GTO3	22 03	
128	*LBL4	21 04	Yes
129	0	00	
130	STO0	35 00	Set up for tips
131	EEX	-23	
132	9	09	
133	CHS	-22	
134	STOB	35 12	
135	*LBL5	21 05	
136	GSBE	23 15	
137	GSBE	23 15	Condition factor
138	+	-55	
139	RCL↓	36 45	
140	X=0?	16-43	Scratch
141	GTO6	22 06	
142	1/X	52	Yes
143	ENT↑	-21	
144	R↓	-31	Uses condition
145	×	-35	factor and tickets
146	R↑	16-31	sold on dog to
147	-	-45	determine how dog
148	ABS	16 31	will do in race
149	STO9	35 09	
150	5	05	
151	0	00	
152	-	-45	
153	ABS	16 31	
154	EEX	-23	
155	2	02	
156	×	-35	
157	INT	16 34	
158	ST+↓	35-55 45	
159	R↑	16-31	
160	4	04	
161	1/X	52	Give a tip on this
162	GSBE	23 15	dog
163	X≤Y?	16-35	
164	GTO6	22 06	
165	RCL9	36 09	No
166	R↑	16-31	
167	÷	-24	
168	1	01	
169	-	-45	
170	CHS	-22	
171	3	03	Determine what tip
172	1/X	52	value to give to
173	÷	-24	this dog
174	1	01	
175	+	-55	
176	3	03	
177	.	-62	
178	8	08	
179	3	03	
180	X≷Y	-41	
181	X>Y?	16-34	False tip
182	1	01	
183	*LBL6	21 06	
184	INT	16 34	
185	RCLB	36 12	
186	1	01	Hold tips till
187	0	00	ready to display
188	×	-35	
189	STOB	35 12	
190	×	-35	
191	ST+0	35-55 00	
192	RCLI	36 46	Countdown before
193	DSP0	-63 00	tips are shown
194	PSE	16 51	
195	DSZI	16 25 46	More tips?
196	GTO5	22 05	Yes
197	RCL0	36 00	
198	DSP8	-63 08	
199	PRTX	-14	Display tips
200	PRTX	-14	
201	1	01	
202	2	02	Adjust countdown
203	STOI	35 46	time here.
204	*LBLc	21 16 13	
205	RCLI	36 46	Countdown before
206	DSP0	-63 00	betting windows
207	PRTX	-14	close. Set your
208	DSZI	16 25 46	own time
209	GTOc	22 16 13	
210	0	00	
211	R/S	51	Betting windows
212	*LBL7	21 07	closed
213	0	00	
214	GTO8	22 08	Scratch dog
215	*LBLE	21 15	No tickets sold
216	RCLE	36 15	
217	9	09	
218	9	09	Random number
219	7	07	generator.
220	×	-35	
221	FRC	16 44	
222	STOE	35 15	
223	RTN	24	
224	R/S	51	

LABELS

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

FLAGS

SET STATUS

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

CARD #2

67 Program Listing III

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBLA	21 11	
002	4	04	
003	STO9	35 09	Ready for race
004	0	00	
005	STOI	35 46	
006	*LBL8	21 08	
007	ISZI	16 26 46	
008	RCLi	36 45	
009	ISZI	16 26 46	Sorting operation
010	RCLi	36 45	moves highest numbe
011	X≤Y?	16-35	to register one,etc
012	X≷Y	-41	down to register
013	DSZI	16 25 46	eight in four steps
014	STOi	35 45	
015	ISZI	16 26 46	
016	X≷Y	-41	
017	STOi	35 45	
018	7	07	HP-97:
019	RCLI	36 46	Delete step 057
020	X=Y?	16-33	Insert f-x-after
021	GTO0	22 00	step 092
022	8	08	
023	X≠Y?	16-32	
024	GTO8	22 08	
025	1	01	
026	STOI	35 46	
027	GTO8	22 08	
028	*LBL0	21 00	
029	0	00	
030	STO0	35 00	Ready to display
031	EEX	-23	race
032	4	04	
033	CHS	-22	
034	STOB	35 12	
035	ISZI	16 26 46	
036	*LBL1	21 01	
037	RCLi	36 45	
038	EEX	-23	
039	5	05	
040	x	-35	Holds race position
041	FRC	16 44	in register zero
042	RCLB	36 12	for later display
043	1	01	
044	0	00	
045	x	-35	
046	STOB	35 12	
047	x	-35	
048	ST+0	35-55 00	
049	DSZI	16 25 46	
050	GTO1	22 01	
051	1	01	
052	ST-9	35-45 09	Race finished?
053	RCL9	36 09	
054	X=0?	16-43	
055	GTO3	22 03	Yes
056	DSP0	-63 00	Pause before
057	PSE	16 51	Partial race
058	RCL0	36 00	
059	STOD	35 14	Display dogs
060	DSP4	-63 04	positions in race
061	PRTX	-14	
062	GTO8	22 08	Next step of race
063	*LBL3	21 03	
064	RCLD	36 14	If stretch and finish
065	INT	16 34	positions are the
066	RCL0	36 00	same then display
067	INT	16 34	finish.
068	X=Y?	16-33	
069	GTO2	22 02	
070	RCLE	36 15	Decides on photo
071	Pi	16-24	finish. The lower
072	x	-35	the digit in step
073	FRC	16 44	75, the less photos.
074	.	-62	
075	7	07	
076	X≤Y?	16-35	No photo finish
077	GTO2	22 02	
078	2	02	Sets photo finish
079	0	00	countdown time
080	STOI	35 46	
081	*LBL4	21 04	Photo finish
082	RCLI	36 46	countdown
083	DSP0	-63 00	
084	PSE	16 51	
085	DSZI	16 25 46	When 0, display
086	GTO4	22 04	finish
087	*LBL2	21 02	
088	RCL0	36 00	Display finish
089	EEX	-23	
090	4	04	
091	x	-35	
092	DSP0	-63 00	
093	R/S	51	
094	*LBLB	21 12	
095	1	01	Percent out of pay-
096	STOI	35 46	offs?
097	GSB7	23 07	
098	STO4	35 04	
099	RCL1	36 01	
100	FRC	16 44	
101	STO1	35 01	Win payoff
102	ST-4	35-45 04	
103	1/X	52	
104	GSB5	23 05	
105	RCLD	36 14	Hold win chance for
106	STOC	35 13	daily double.
107	RCL2	36 02	
108	FRC	16 44	First dog place
109	STO2	35 02	payoff
110	ST-4	35-45 04	
111	RCL4	36 04	
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

CARD #2

STEP	KEY ENTRY	KEY CODE	COMMENTS
113	RCL4	36 04	
114	RCL3	36 03	
115	FRC	16 44	
116	STO3	35 03	First dog show payoff
117	-	-45	
118	STO5	35 05	
119	1	01	
120	.	-62	
121	5	05	
122	÷	-24	
123	STO6	35 06	
124	GSB6	23 06	
125	ISZI	16 26 46	Second dog place payoff
126	RCL4	36 04	
127	GSB6	23 06	
128	RCL6	36 06	Second dog show payoff
129	GSB6	23 06	
130	ISZI	16 26 46	Third dog show payoff
131	RCL6	36 06	
132	GSB6	23 06	
133	RCL1	36 01	
134	RCL2	36 02	
135	+	-55	Quiniela payoff
136	STO7	35 07	
137	1/X	52	
138	7	07	
139	x	-35	
140	GSB5	23 05	
141	3	03	Perfecta payoff
142	x	-35	
143	PRTX	-14	
144	2	02	
145	5	05	
146	2	02	Trifecta payoff
147	RCL7	36 07	
148	RCL3	36 03	
149	+	-55	
150	÷	-24	
151	GSB7	23 07	
152	PRTX	-14	
153	DSP0	-63 00	Random number for lost ticket or forgot change
154	FRC	16 44	
155	RCLE	36 15	
156	9	09	
157	x	-35	
158	1	01	
159	+	-55	
160	INT	16 34	
161	X≷Y	-41	
162	6	06	
163	1/X	52	Forgot change?
164	X>Y?	16-34	
165	GTOe	22 16 15	Yes
166	3	03	Lost tickets?
167	x	-35	
168	X≤Y?	16-35	
169	GTO2	22 02	No
170	R↑	16-31	Yes
171	PRTX	-14	
172	GTO2	22 02	Display finish
173	*LBLe	21 16 15	
174	R↓	-31	
175	R↓	-31	Display forgot change
176	2	02	
177	x	-35	
178	CHS	-22	
179	DSP2	-63 02	
180	PRTX	-14	
181	GTO2	22 02	Display finish
182	*LBLC	21 13	Daily Double
183	RCLC	36 13	payoff
184	GTO9	22 09	
185	*LBLD	21 14	
186	RCLD	36 14	Big Q
187	*LBL9	21 09	
188	2	02	
189	x	-35	
190	*LBL7	21 07	
191	RCLA	36 11	
192	%	55	Percent out?
193	-	-45	
194	DSP1	-63 01	
195	RTN	24	
196	*LBL6	21 06	
197	RCLi	36 45	Calculate and dis-
198	÷	-24	play place and
199	2	02	show payoffs.
200	+	-55	
201	2	02	Minimum $2.10
202	.	-62	payoff
203	1	01	
204	X≷Y	-41	
205	X≤Y?	16-35	
206	R↓	-31	
207	PRTX	-14	
208	RTN	24	
209	*LBL5	21 05	
210	ENT↑	-21	Keep win and
211	ENT↑	-21	quiniela chance
212	P≷S	16-51	for next race or
213	RCLi	36 45	recall for this race
214	X≷Y	-41	
215	STOi	35 45	
216	P≷S	16-51	
217	x	-35	
218	STOD	35 14	
219	R↓	-31	
220	GSB7	23 07	Display win and
221	2	02	Quiniela payoffs
222	x	-35	
223	PRTX	-14	
224	RTN	24	

LABELS

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

FLAGS

SET STATUS

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

Program Description II

Sketch(es)

NONE

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

Uo=.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)	16.80	11.20	3.80
P(2)		10.20	4.60
S(7)			3.40

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

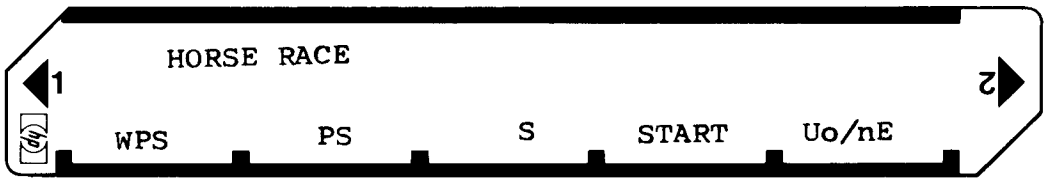
check odds and handle if desired; see user instructions.

D ⟶ 627
A ⟶ 16.80, 11.20, 3.80
B ⟶ 10.20,4.60
C ⟶ 3.40

Reference(s)

None

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS		OUTPUT DATA/UNITS
	Note: BRACKETED NUMBERS IN OUTPUT				
	COLUMN ARE 'PROMPTING DIGITS'. THEY				
	REMIND THE USER WHAT DATA IS REQUIRED				
	IN FOLLOWING STEP.				
1	Initialize			E	[1]
2	Input seed: any decimal no. 1>Uo>0	Uo		R/S	[2]
3	Input number of entries: nE	nE		R/S	[1]
4	Enter total bet on horse #1	$		R/S	[2]
	" " " " " #2	$		R/S	[3]
	Repeat until all horses have been wa-	$			...etc.
	gered on. Every wager must be at least				
	$2.00.				0
5	Optional: Compute total of all wagers		RCL	A	$HANDLE
6	Optional: check odds (to $1) on any or	#of horse		R/S	odds/$1
	all horses (in any order). Odds are				
	displayed in FIX.1 notation. Display				
	resets to zero after 1 sec. pause.				0
7	Start Race: After app. 90-120 seconds			D	W P S
	numbers of win, place and show horses				
	will be displayed in order. i.e. 761.				
	means that # 7 won, #6 placed and				
	# 1 showed.				
8	WPS payoffs for winner (sequentially)			A	$WPS
9	PS payoffs for place horse (sequ.)			B	$ PS
10	S payoff for show horse			C	$S . __
	For new race go to step 1.				

67 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	g LBL a	32 25 11	
	RCL E	34 15	
	TT	35 73	
	+	61	
	2	02	
	9	09	
	X	71	
	FRAC	32 83	
	STO E	33 15	
010	RTN	35 22	
	LBL E	31 25 15	
	CF 0	35 61 00	
	CF 1	35 61 01	
	DSP 0	23 00	
	CL REG	31 43	
	P≠S	31 42	
	CL REG	31 43	
	1	01	
	R/S	84	
020	STO E	33 15	-INPUT SEED
	2	02	
	R/S	84	
	STO D	33 14	-INPUT #'ENTRIES'
	h (STI)	35 33	
	LBL 9	31 25 09	
	a	32 22 11	
	DSZ	31 33	
	GTO 9	22 09	
	1	01	
030	0	00	
	X	71	
	1	01	
	+	61	
	INT	31 83	
	STO B	33 12	
	6	06	
	X	71	
	STO C	33 13	
	1	01	
040	h (STI)	35 33	
	LBL 1	31 25 01	
	RCL D	34 14	
	h (RCI)	35 34	
	X>Y	32 81	
	GTO f e	22 31 15	
	R/S	84	-INPUT WAGERS (W)
	STO (i)	33 24	W≥$2.00 FOR
	STO+9	33 61 09	EACH HORSE
	ISZ	31 34	ENTERED
050	GTO 1	22 01	
	g LBL e	32 25 15	
	DSZ	31 33	
	RCL 9	34 09	
	STO A	33 11	
	LBL 8	31 25 08	
	RCL (i)	34 24	

STEP	KEY ENTRY	KEY CODE	COMMENTS
	RCL A	34 11	
	÷	81	
	1/x	35 62	
060	1	01	
	—	51	
	STO (i)	33 24	
	CHS	42	
	P≠S	31 42	
	STO (i)	33 24	
	P≠S	31 42	
	DSZ	31 33	
	GTO 8	22 08	
	P≠S	31 42	
070	RCL B	34 12	
	STO 0	33 00	
	RCL C	34 13	
	STO 9	33 09	
	LBL 2	31 25 02	-CHECK ODDS/$1.00
	CLX	44	(OPTIONAL)
	DSP 0	23 00	
	R/S	84	
	h (STI)	35 33	
	P≠S	31 42	
080	RCL (i)	34 24	
	DSP 1	23 01	
	PSE	35 72	
	P≠S	31 42	
	GTO 2	22 02	
	LBL D	31 25 14	-'AND THEY'RE OFF'
	a	32 22 11	
	RCL D	34 14	
	X	71	
	1	01	
090	+	61	
	INT	31 83	
	h (STI)	35 33	
	RCL (i)	34 24	
	TT	35 73	
	X=Y	32 51	
	GTO D	22 14	
	R↓	35 53	
	RCL 0	34 00	
	STO+(i)	33 61 24	
100	RCL (i)	34 24	
	RCL 9	34 09	
	X≤Y	32 71	
	GTO 3	22 03	
	GTO D	22 14	
	LBL 3	31 25 03	
	F? 0	35 71 00	
	GTO 4	22 04	
	h (RCI)	35 34	
	STO A	33 11	
110	SF 0	35 51 00	
	TT	35 73	
	STO (i)	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

STEP	KEY ENTRY	KEY CODE	COMMENTS
	GTO D	22 14	
	LBL 4	31 25 04	
	F? 1	35 71 01	
	GTO 5	22 05	
	h (RCL)	35 34	
	STO B	33 12	
	SF 1	35 51 01	
120	π	35 73	
	STO (i)	33 24	
	GTO D	22 14	
	LBL 5	31 25 05	
	h (RCL)	35 34	
	STO C	33 13	
	RCL A	34 11	
	Σ+ X	43	
	2	02	
	X	71	
130	RCL B	34 12	
	Σ+ X	43	
	1	01	
	X	71	
	+	61	
	RCL C	34 13	
	+	61	
	P≠S	31 42	
	RTN	35 22	— Win Place Show
	LBL A	31 25 11	— Winner pays:
140	RCL A	34 11	W P S
	C	32 22 13	
	d	32 22 14	
	STO 0	33 00	
	−X−	31 84	
	RCL B	34 12	
	C	32 22 13	
	2	02	
	÷	81	
	d	32 22 14	
150	−X−	31 84	
	RCL C	34 13	
	C	32 22 13	
	2	02	
	.	83	
	9	09	
	÷	81	
	d	32 22 14	
	−X−	31 84	
	CLX	44	
160	DSP 0	23 00	
	RTN	35 22	
	LBL B	31 25 12	— PLACE HORSE PAYS
	RCL B	34 12	P S
	C	32 22 13	
	2	02	
	.	83	
	2	02	
	÷	81	

STEP	KEY ENTRY	KEY CODE	COMMENTS
	d	32 22 14	
170	STO 0	33 00	
	−X−	31 84	
	RCL C	34 13	
	C	32 22 13	
	3	03	
	÷	81	
	STO+0	33 61 00	
	RCL 0	34 00	
	3	03	
	÷	81	
180	d	32 22 14	
	−X−	31 84	
	CLX	44	
	DSP 0	23 00	
	RTN	35 22	
	LBL C	31 25 13	— SHOW HORSE PAYS
	RCL C	34 13	S
	C	32 22 13	
	3	03	
	.	83	
190	3	03	
	÷	81	
	d	32 22 14	
	−X−	31 84	
	CLX	44	
	DSP 0	23 00	
	RTN	35 22	
	g LBL c	32 25 13	
	h (STI)	35 33	
	RCL (i)	34 24	
200	2	02	
	X	71	
	2	02	
	+	61	
	RTN	35 22	
	g LBL d	32 25 14	— TRACK FORMAT
	INT	31 83	PAYOFF ROUNDED
	ENT↑	41	TO NEXT LOWEST
	LST X	35 82	20 ¢
	FRAC	32 82	NO PAYOFF CAN
210	5	05	BE LESS THAN
	X	71	$2.20
	INT	31 83	
	.	83	
	2	02	
	X	71	
	+	61	
	DSP 2	23 02	
	2	02	
	.	83	
220	2	02	
	X≷y	32 81	
	x⇄y	35 52	
	R↓	35 53	
	RTN	35 22	

LABELS

A W	B P	C S	D START	E U/# ENT	0 USED
a RAN#	b	c ODDS↑ 2×2+	d TRACK FORMAT	e ODDS/100	1 USED
0	1 USED	2 CHK. ODDS	3 WIN	4 PLACE	2
5 SHOW	6	7	8 ODDS/100	9 TRACK COND.	3

FLAGS

	ON	OFF
0	☐	☒
1	☐	☒
2	☐	☒
3	☐	☒

SET STATUS

TRIG: DEG ☐ GRAD ☐ RAD ☐

DISP: FIX ☒ SCI ☐ ENG ☐ n ____

Program Description I

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 [Σ+], [A] and [B] to code for cards that are dealt. Press [B] everytime you see a high card, [A] for medium cards, and [Σ+] 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 ½ second before pressing [A] again

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 [D] and computer responds with 0.000

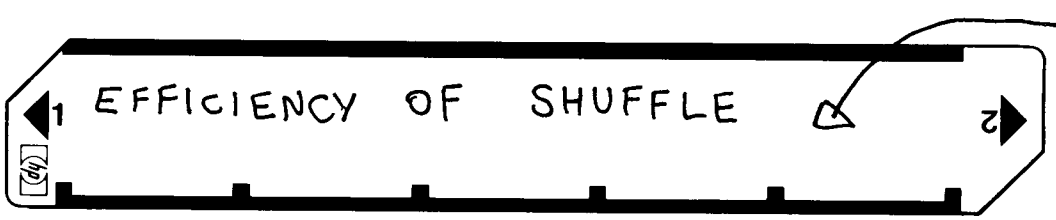
KEY PUNCHES [Σ+] [Σ+] [B] [Σ+] [Σ+] [Σ+] [B]
comments 3 5 10 5 3 6 King

Now, compute the index by pressing [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 stratogy.

Reference(s)

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

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1.	Enter Program			
2.	Enter number of cards in deck	cards	D	0.000
3.	Perform this step for all cards you see			
	low card		Σ+	irrelevant
	OR			
	7, 8, 9		A	irrelevant
	OR			
	10, J, Q, K		B	irrelevant
4.	When desired, calculate INDEX. CARDS LEFT		E	INDEX. CARDS LEFT
	Return to 3 if the deck is kept, or Return to 2 if a new deck is started.			

67 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	f LBL A	31 25 11	counts 7,8,9's
	1	01	
	STO +1	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 0	33 00	stores number of cards in deck into register 0
010	CLX	44	
	STO 1	33 01	clears registers for card counts: 1, I, S9.
	h STI	35 33	
	f P≠S	31 42	
	STO 9	33 09	
	f P≠S	31 42	
	h RTN	35 22	
	f LBL E	31 25 15	COMPUTING INDEX
	RCL 0	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 61 02	
	RCL 1	34 01	subtract mid cards count from deck.
	STO -3	33 51 03	
	h RCI	35 34	subtract high cards from deck and decrease index
030	STO -3	33 51 03	
	STO -2	33 51 02	
	h CF 1	35 61 01	make sure FLAG CLEAR
	RCL 2	34 02	INDEX = INT[(RAW INDEX / CARDS LEFT)(100)]
	RCL 3	34 03	
	÷	81	
	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 1	35 51 01	
	RCL 3	34 03	DIVIDE NUMBER OF CARDS LEFT BY 1000
	EEX	43	
	3	03	
	÷	81	
	h F? 1	35 71 01	IF INDEX IS NEGATIVE, ADJUST SIGN OF CARDS PART.
	CHS	42	
	+	61	ADD TO MAKE DISPLAY
	h RTN	35 22	
050			

STEP	KEY ENTRY	KEY CODE	COMMENTS
060			
070			
080			
090			
100			

FLAGS

0	
1	INDEX IS NEGATIVE
2	
3	

SET STATUS

FLAGS	ON	OFF
0	☐	☑
1	☐	☑
2	☐	☑
3	☐	☑

TRIG	
DEG	☑
GRAD	☐
RAD	☐

DISP	
FIX	☑
SCI	☐
ENG	☐
n	2

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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