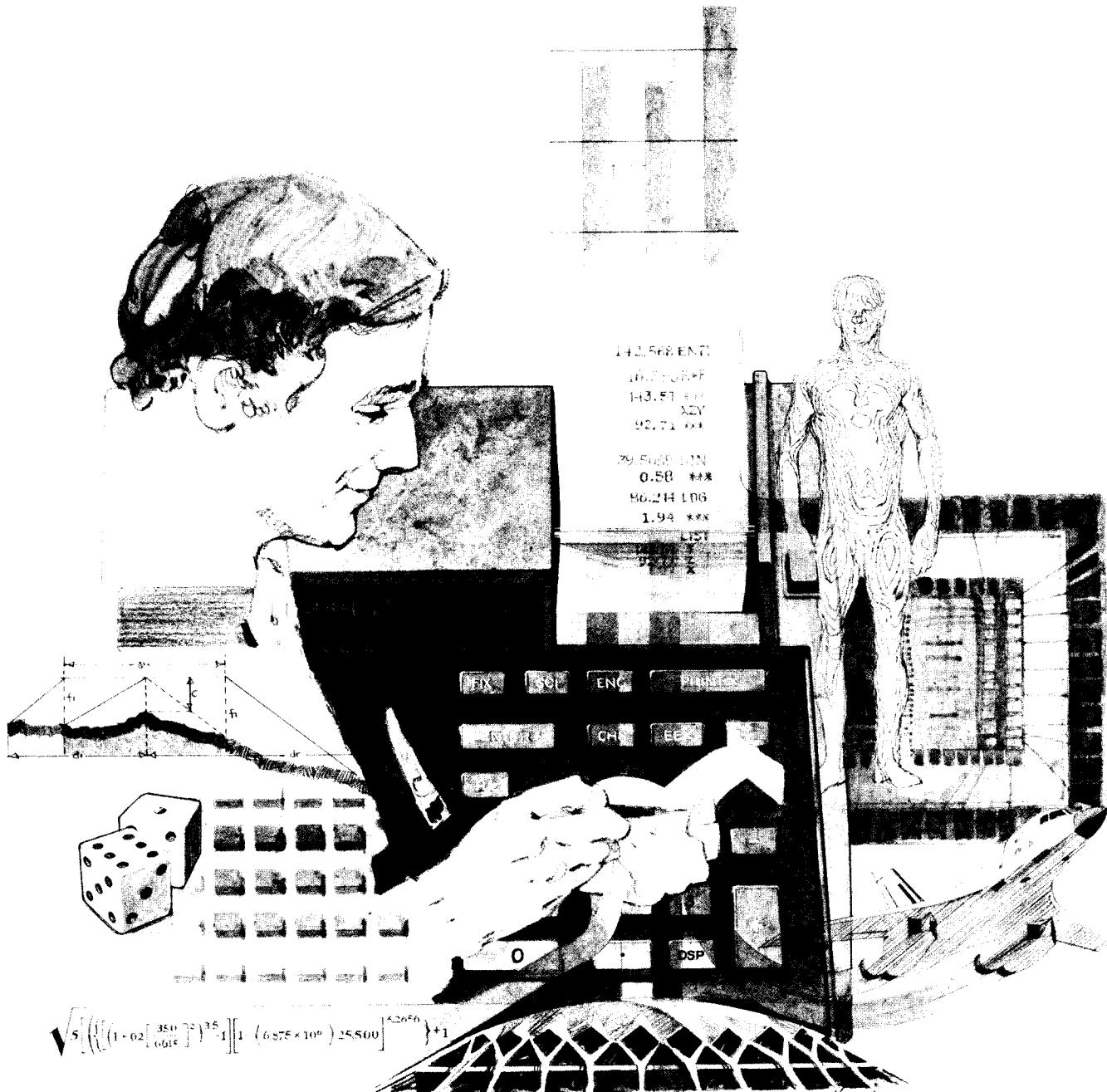


HEWLETT-PACKARD

HIP-67 HIP-97

Users' Library Solutions

Games of Chance



$$\sqrt{5} \left\{ \left[\left(1 + 0.2 \left[\frac{350}{6615} \right]^{12} \right)^{3.5} - 1 \right] \left[1 - \left(6.575 \times 10^6 \right) 25,500 \right]^{1.62656} \right\} +$$

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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1

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 (**E D**) 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.

NEITHER HP NOR THE CONTRIBUTOR MAKES ANY EXPRESS OR IMPLIED WARRANTY OF ANY KIND WITH REGARD TO THIS PROGRAM MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NEITHER HP NOR THE CONTRIBUTOR SHALL BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE FURNISHING, USE OR PERFORMANCE OF THIS PROGRAM MATERIAL.

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 ---

4.2 -06 ← PRINTED
DICE TOTAL

NONPRINT MODE --

4.2 ← DISPLAY
DICE TOTAL

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 NON PRINT (DEFAULT) MODE.

Solution(s)

- 1) BET \$5.00: $5 \rightarrow 5.00$
- 2) ROLL: $A \rightarrow 6.1 \dots 07, 5.00$ YOU WIN
- 3) ROLL: $A \rightarrow 3.6 \dots 09$ YOUR POINT IS 9
- 4) ROLL: $A \rightarrow 5.5 \dots 10$ ROLL AGAIN
- 5) ROLL: $A \rightarrow 2.2 \dots 04$ "
- 6) ROLL: $A \rightarrow 3.5 \dots 08$ "
- 7) ROLL: $A \rightarrow 6.3 \dots 09, 5.00$ YOU WIN
- 8) SEE AMOUNT WON: $C \rightarrow 10.00$

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).

User Instructions



67 Program Listing I

| STEP | KEY ENTRY | KEY CODE | COMMENTS | STEP | KEY ENTRY | KEY CODE | COMMENTS |
|-------------------|-----------|----------|--|---------|-----------|----------|---|
| 001 | * LBL A | 2111 | | | * LBL1 | 2101 | |
| | SCI | -12 | | | 7 | 07 | |
| | DSP 1 | -6301 | ROLL. GENERATES TWO DICE. SETS UP DISPLAY AND PUTS TOTAL IN 0. | | f X=Y | 16-33 | CHECK FOR WIN OR LOSE ON SECOND AND SUBSEQUENT ROLLS. |
| | f STF2 | 162102 | | 060 | GTO3 | 2203 | |
| | GSBO | 2300 | | | CLX | -51 | |
| | STO 1 | 3501 | | | RCL3 | 3603 | |
| * LBL0 | 2100 | | | | f X=Y | 16-33 | |
| RCL E | 3615 | | | | GTO2 | 2202 | |
| f π | 16-24 | | | | RCL6 | 3606 | |
| 010 | + | -55 | | | f F? 0 | 162300 | |
| X ² | 53 | | | | PRINTX | -14 | |
| f FRAC | 1644 | | | | RTN | 24 | |
| STO E | 3515 | | | * LBL2 | 2102 | | PLAYER WINS. |
| 6 | 06 | | | 070 | RCL6 | 3606 | |
| X | -35 | | | | PRINTX | -14 | |
| I | 01 | | | | RCL4 | 3604 | |
| + | -55 | | | | GTO4 | 2204 | |
| f INT | 1634 | | | * LBL3 | 2103 | | PLAYER LOSES. |
| f F? 2 | 162302 | | | | RCL6 | 3606 | |
| 020 | RTN | 24 | | | PRINTX | -14 | |
| STO 2 | 3502 | | | | RCL4 | 3604 | |
| + | | | | | CHS | -22 | |
| STO 0 | 3500 | | | * LBL4 | 2104 | | END OF GAME. |
| f 10 ^x | 1633 | | | 080 | FIX | -11 | |
| f F? 0 | 162300 | | | | DSP2 | -6302 | |
| 1/X | 52 | | | | f CLF1 | 162201 | |
| RCL 1 | 3601 | | | | STO+5 | 35-5505 | |
| RCL 2 | 3602 | | | | f F? 0 | 162300 | |
| I | 01 | | | | PRINTX | -14 | |
| 030 | 0 | 00 | | | f SPACE | 16-11 | |
| ÷ | -24 | | | | RTN | 24 | |
| + | -55 | | | * LBL B | 2112 | | BET. |
| X | -35 | | | | f F? 1 | 162301 | |
| STO 6 | 3506 | | | 090 | GTO f 2 | 221611 | |
| RCL 0 | 3600 | | | | f X>0 | 16-44 | |
| f F? 1 | 162301 | | | | f X=0 | 16-43 | |
| GTO 1 | 2201 | | | | GTO f 2 | 221611 | |
| STO 3 | 3503 | | | | STO 4 | 3504 | |
| 4 | 04 | | CHECK FOR WIN OR LOSE ON FIRST ROLL. | | GTO 5 | 2205 | |
| f X>Y | 16-34 | | | * LBL C | 2113 | | DISPLAY Winnings |
| GTO3 | 2203 | | | | RCL5 | 3605 | |
| CLX | -51 | | | * LBL5 | 2105 | | |
| 7 | 07 | | | | FIX | -11 | |
| f X=Y | 16-33 | | | 100 | DSP2 | -6302 | |
| GTO2 | 2202 | | | * LBL6 | 2106 | | |
| 4 | 04 | | | | f F? 0 | 162300 | |
| + | -55 | | | | PRINTX | -14 | |
| f X=Y | 16-33 | | | | f SPACE | 16-11 | |
| GTO2 | 2202 | | | | RTN | 24 | |
| 050 | f X≤Y | 16-35 | | * LBL D | 2114 | | DISPLAY POINT |
| GTO3 | 2203 | | | | FIX | -11 | |
| f STF 1 | 162101 | | | | DSPO | -6300 | |
| RCL6 | 3606 | | | | RCL3 | 3603 | |
| f F? 0 | 162300 | | | 110 | GTO6 | 2206 | |
| PRINTX | -14 | | | * LBL E | 2115 | | INITIALIZE. INFINITE |
| RTN | 24 | | | | f π | 16-24 | LOOP FOR RTN 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 | STEP | KEY ENTRY | KEY CODE | COMMENTS |
|------|-----------|----------|-----------------|------|-----------|----------|----------|
| | + | -55 | | | | | |
| | STO F | 3515 | | 170 | | | |
| | GTO F | 2215 | | | | | |
| * | LBL f d | 2116 14 | CLEAR. | | | | |
| | f CLF 1 | 162201 | | | | | |
| | CLX | -51 | | | | | |
| | STO5 | 3505 | | | | | |
| 120 | GTO5 | 2205 | | | | | |
| * | LBL f e | 2116 15 | ALTERNATE PRINT | | | | |
| | I | 01 | MODE SWITCH. | | | | |
| | f F? 0 | 162300 | | 180 | | | |
| | CLX | -51 | | | | | |
| | f STF 0 | 162100 | | | | | |
| | f X=0 | 16-43 | | | | | |
| | f CLF 0 | 162200 | | | | | |
| | RTN | 24 | | | | | |
| 130 | | | | 190 | | | |
| 140 | | | | 200 | | | |
| 150 | | | | 210 | | | |
| 160 | | | | 220 | | | |

| LABELS | | | | | FLAGS | SET STATUS | | |
|----------------------|----------------------|---------|---------|---------------|-----------------------|--|------|------|
| A ROLL | B BET | C \$WON | D POINT | E INIT | F | FLAGS | TRIG | DISP |
| "ERROR" | b | c | d CLEAR | e P? | 1 ON=GAME IN PROGRESS | ON OFF | DEG | FIX |
| GENERATE DIE | 1 SECOND AND + ROLLS | 2 WIN | 3 LOSE | 4 END OF GAME | 2 USED | 0 <input type="checkbox"/> <input checked="" type="checkbox"/> | GRAD | SCI |
| 5 DISPLAY 2 DECIMALS | 6 DISPLAY OR PRINT X | 7 | 8 | 9 | 3 | 1 <input type="checkbox"/> <input checked="" type="checkbox"/> | RAD | ENG |
| | | | | | | 2 <input type="checkbox"/> <input checked="" type="checkbox"/> | | n 2 |
| | | | | | | 3 <input type="checkbox"/> <input checked="" type="checkbox"/> | | |

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 of 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 closest 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

7

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

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

1 TWENTY-SIX AND THIRTY-SIX 2
36 36 36
26 MAN v. CAL CAL v. MAN Winnings (Seed→S)

97 Program Listing I

11

| STEP | KEY ENTRY | KEY CODE | COMMENTS | STEP | KEY ENTRY | KEY CODE | COMMENTS |
|------|-------------|----------|--------------------|------|-------------|----------|------------------------------|
| 001 | *LBLA | 21 11 | Play "26" | 057 | ISZI | 16 26 46 | |
| 002 | ST0A | 35 11 | Store point number | 058 | | 01 | |
| 003 | . | -62 | Initialize | 059 | RCLI | 36 46 | |
| 004 | 2 | 02 | | 060 | X=Y? | 16-33 | |
| 005 | 5 | 05 | | 061 | | 00 | |
| 006 | ST-0 | 35-45 00 | | 062 | ST+0 | 35-55 00 | |
| 007 | 0 | 00 | | 063 | RCL1 | 36 01 | Display number of |
| 008 | ST01 | 35 01 | | 064 | PSE | 16 51 | times point number |
| 009 | 1 | 01 | | 065 | X \neq Y | -41 | was rolled |
| 010 | 3 | 03 | | 066 | PSE | 16 51 | Display money won |
| 011 | ST0B | 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 | | 01 | Add 1 to R., drop |
| 015 | ST0I | 35 46 | dice | 071 | ST+1 | 35-55 01 | stack. |
| 016 | 0 | 00 | | 072 | CLX | -51 | |
| 017 | ENT1 | -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 | ST0I | 35 46 | |
| 023 | RCLA | 36 11 | | 079 | CLX | -51 | |
| 024 | X=Y? | 16-33 | | 080 | + | -55 | |
| 025 | GSB1 | 23 01 | | 081 | RTN | 24 | Play "36", man |
| 026 | CLX | -51 | | 082 | *LBLB | 21 12 | goes first |
| 027 | + | -55 | | 083 | SF1 | 16 21 01 | Initialize |
| 028 | + | -55 | | 084 | ST05 | 35 05 | |
| 029 | DSZI | 16 25 46 | | 085 | ST-2 | 35-45 02 | |
| 030 | GT00 | 22 00 | | 086 | 0 | 00 | |
| 031 | PRTX | -14 | display number | 087 | ST03 | 35 03 | |
| 032 | RCLB | 36 12 | Repeat this loop | 088 | ST04 | 35 04 | Man goes, tot. is Tm |
| 033 | 1 | 01 | 13 times | 089 | GSBe | 23 16 11 | |
| 034 | - | -45 | | 090 | GSBb | 23 16 12 | Cal goes, tot. is Tc |
| 035 | ST0B | 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 | ST0I | 35 46 | payoff | 095 | X \neq Y? | 16-34 | Man wins if Tc < Tm |
| 040 | RCL1 | 36 01 | Payoff | 096 | GT09 | 22 09 | |
| 041 | 3 | 03 | | 097 | X \neq Y | -41 | |
| 042 | 3 | 03 | | 098 | X \neq Y? | 16-34 | Cal wins if Tm < Tc |
| 043 | X \neq Y? | 16-35 | | 099 | GT04 | 22 04 | |
| 044 | ISZI | 16 26 46 | | 100 | RCL5 | 36 05 | |
| 045 | 7 | 07 | | 101 | ST+2 | 35-55 02 | If a tie, man loses |
| 046 | - | -45 | | 102 | PSE | 16 51 | nothing. |
| 047 | X \neq Y? | 16-35 | | 103 | RCL2 | 36 02 | Display bet |
| 048 | ISZI | 16 26 46 | | 104 | RTN | 24 | Display total won |
| 049 | 2 | 02 | | 105 | *LBLc | 21 13 | so far |
| 050 | \div | -24 | | 106 | CF1 | 16 22 01 | Play "36", cal goes |
| 051 | X=Y? | 16-33 | | 107 | ST05 | 35 05 | first |
| 052 | GSB2 | 23 02 | | 108 | ST-2 | 35-45 02 | Initialize |
| 053 | 2 | 02 | | 109 | 0 | 00 | |
| 054 | - | -45 | | 110 | ST03 | 35 03 | |
| 055 | X \neq Y | -41 | | 111 | ST04 | 35 04 | |
| 056 | X \neq Y? | 16-35 | | 112 | GSBb | 23 16 12 | Cal goes, tot. is Tm |

REGIS₁REGIS₂REGIS₃REGIS₄REGIS₅REGIS₆REGIS₇REGIS₈REGIS₉

| | | | | | | | | | |
|-----------------------|--------------------------|-----------------------|-----------------------------|-----------------------------|----------------------|--------------|--------------|--------------|--------------|
| 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 | GSBa | 23 16 11 | Man goes; tot is Tm | 169 | GT08 | 22 08 | |
| 114 | GT0c | 22 16 13 | Go to display rout. | 170 | X \leq 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 | Man wins |
| 118 | *LBL E | 21 15 | Store seed "S" | 174 | DSP2 | -63 02 | Payoff |
| 119 | STOE | 35 15 | | 175 | RCL5 | 36 05 | |
| 120 | RTN | 24 | | 176 | | 2 02 | |
| 121 | *LBL a | 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 | |
| 124 | GSBe | 23 16 15 | Roll dice, add | 180 | *LBL E | 21 16 15 | Roll dice |
| 125 | ST+3 | 35-55 03 | roll to total | 181 | RCLE | 36 15 | |
| 126 | *LBL3 | 21 03 | | 182 | | 9 09 | |
| 127 | 3 | 03 | Display loop | 183 | | 9 09 | |
| 128 | 6 | 06 | If sum is more than | 184 | | 7 07 | |
| 129 | RCL3 | 36 03 | 36, you lose | 185 | x | -35 | |
| 130 | X \geq Y? | 16-34 | | 186 | FRC | 16 44 | |
| 131 | GT04 | 22 04 | | 187 | STOE | 35 15 | |
| 132 | PSE | 16 51 | Display total | 188 | | 6 06 | |
| 133 | X \geq 0? | 16-44 | If nothing done, | 189 | x | -35 | |
| 134 | GT03 | 22 03 | cont. to display tot | 190 | | 1 01 | |
| 135 | X \geq 0? | 16-45 | If [CHS] pressed, | 191 | + | -55 | |
| 136 | GT05 | 22 05 | roll again | 192 | INT | 16 34 | |
| 137 | RTN | 24 | If [CLX] pressed, | 193 | RTN | 24 | |
| 138 | *LBL4 | 21 04 | end | | | | |
| 139 | DSP2 | -63 02 | Man loses | | | | |
| 140 | RCL5 | 36 05 | | | | | |
| 141 | CHS | -22 | | | | | |
| 142 | R/S | 51 | | | | | |
| 143 | *LBL6 | 21 16 12 | Cal rolls | | | | |
| 144 | DSP0 | -63 00 | Initialize | 200 | | | |
| 145 | *LBL6 | 21 06 | | | | | |
| 146 | GSBe | 23 16 15 | | | | | |
| 147 | ST+4 | 35-55 04 | Roll dice and add | | | | |
| 148 | 3 | 03 | to total | | | | |
| 149 | 6 | 06 | If total is more | | | | |
| 150 | RCL4 | 36 04 | than 36, cal loses | | | | |
| 151 | CF3 | 16 22 03 | | | | | |
| 152 | PSE | 16 51 | Display total | | | | |
| 153 | F3? | 16 23 03 | Rolled, if changed | | | | |
| 154 | GT04 | 22 04 | cal wins | | | | |
| 155 | X \geq Y? | 16-34 | | 210 | | | |
| 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 \leq 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 \geq 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 | |
| ^a Mann rolls | ^b HP rolls | ^c Display | ^d Loop 2 | ^e Roller | ¹ Man Roll? | 0 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | ON | OFF | DEG | <input checked="" type="checkbox"/> | FIX | <input checked="" type="checkbox"/> |
| ⁰ Loop 1 | ¹ Used | ² Used | ³ Display | ⁴ Man loses | ² | 1 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | GRAD | <input type="checkbox"/> | SCI | <input type="checkbox"/> | ENG | <input type="checkbox"/> |
| ⁵ Man's dice | ⁶ HP's dice | ⁷ Strategy | ⁸ Strategy | ⁹ HP Loses | ³ | 2 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | RAD | <input type="checkbox"/> | n | <u>2</u> | | |
| | | | | | | 3 | <input type="checkbox"/> | <input checked="" type="checkbox"/> | | | | | | |

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

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) 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 <input type="checkbox"/> B: BET 5 DOLLARS | SEE | 5. |
| | 2) 1 <input type="checkbox"/> A: PICK 1 AND ROLL | SEE | 5.316 |
| | 3) 2 <input type="checkbox"/> A: " 2 " " | SEE | -5.556 |
| | 4) 2 <input type="checkbox"/> A: " 2 " " | SEE | 10.322 |
| | 5) 5 <input type="checkbox"/> A: " 5 " " | SEE | 5.365 |
| | 6) 1 <input type="checkbox"/> A: " 1 " " | SEE | -5.632 |
| | 7) 3 <input type="checkbox"/> A: " 3 " " | SEE | -5.614 |
| | 8) 1 <input type="checkbox"/> A: " 1 " " | SEE | 10.121 |
| | 9) <input type="checkbox"/> S DISPLAY WinnINGS | SEE | 15. |

Reference(s)

User Instructions

CHUCK-A-LUCK DICE GAME

14

1-6 ROLL BET WINNING CLEAR GEN SEED

2

67 Program Listing I

| STEP | KEY ENTRY | KEY CODE | COMMENTS | STEP | KEY ENTRY | KEY CODE | COMMENTS | |
|------|----------------|----------|---------------------|------------------|-----------|----------|--------------|------------------|
| 001 | * | LBL A | 2111 | | RTN | 24 | | |
| | DSP 0 | -6300 | VALIDATE NUMBER | | * | LBL B | 2112 | |
| | F INT | 1634 | AND ROLL DIE 3 | | DSP 0 | -6300 | VALIDATE BET | |
| | F LAST X | 16-63 | TIMES. THEN DISPLAY | 060 | F INT | 1634 | | |
| | F X ≠ Y | 16-32 | RESULT | | F LAST X | 16-63 | | |
| | GTO F e | 221615 | | | F X ≠ Y | 16-32 | | |
| | DSP 3 | -6303 | | | GTO e | 221615 | | |
| | STO 0 | 3500 | | | STO I | 3501 | | |
| | 1 | 01 | | | RTN | 24 | | |
| 010 | f X > Y | 16-34 | | | * | LBL D | 2114 | CLEAR Winnings |
| | GTO F e | 221615 | | | CLX | -51 | | |
| | CLX | -51 | | | STO 4 | 3504 | | |
| | ? | 07 | | 070 | * | LBL C | 2113 | DISPLAY Winnings |
| | f X ≤ Y | 16-35 | | | DSP 0 | -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 e | 2215 | | |
| | RCL T | 3646 | | 080 | | | | |
| | f X = 0 | 16-43 | | | | | | |
| | GTO 0 | 2200 | | | | | | |
| | RCL 1 | 3601 | | | | | | |
| | X | -35 | | | | | | |
| | STO + 4 | 35-5504 | | | | | | |
| | RCL 3 | 3603 | | | | | | |
| | + | -55 | | | | | | |
| 030 | RTN | 24 | | | | | | |
| | * | LBL 0 | 2100 | | | | | |
| | RCL 1 | 3601 | | | | | | |
| | STO - 4 | 35-4504 | | | | | | |
| | RCL 3 | 3603 | | | | | | |
| | + | -55 | | | | | | |
| | CHS | -22 | | | | | | |
| | RTN | 24 | | | | | | |
| | * | LBL 1 | 2101 | ROLL DIE AND ADD | | | | |
| | RCL 0 | 3600 | TO Winnings FOR | | | | | |
| 040 | RCL 5 | 3605 | MATCH. BUILD DICE | | | | | |
| | f π | 16-24 | DISPLAY. | | | | | |
| | + | -55 | | | | | | |
| | X ² | 53 | | | | | | |
| | f FRAC | 1644 | | | | | | |
| | STO 5 | 3505 | | | | | | |
| | 6 | 06 | | | | | | |
| | X | -35 | | | | | | |
| | 1 | 01 | | | | | | |
| | + | -55 | | | | | | |
| 050 | f INT | 1634 | | | | | | |
| | f X = Y | 16-33 | | | | | | |
| | f ISZ I | 162646 | | | | | | |
| | STO + 3 | 35-5503 | | | | | | |
| | 1 | 01 | | | | | | |
| | 0 | 00 | | | | | | |
| | STO + 3 | 35-2403 | | | | | | |

| FLAGS | | SET STATUS | | |
|-------|--|--|---|---|
| 0 | | FLAGS | TRIG | DISP |
| 1 | | ON OFF | | |
| | | 0 <input type="checkbox"/> <input checked="" type="checkbox"/> | DEG <input checked="" type="checkbox"/> | FIX <input checked="" type="checkbox"/> |
| 2 | | 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 | | 3 <input type="checkbox"/> <input checked="" type="checkbox"/> | | n <input checked="" type="checkbox"/> |

| LABELS | | | | |
|------------|--------------|--------------|---------|------------|
| A 1-6 ROLL | B BET | C DISWINNING | 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

| 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

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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

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)
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

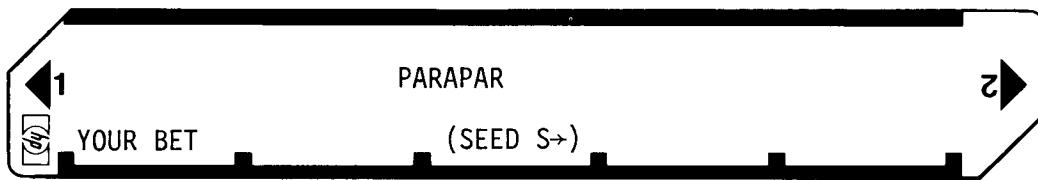
Leaving a grand total of -\$30.00

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



97 Program Listing I

21

| STEP | KEY ENTRY | KEY CODE | COMMENTS | STEP | KEY ENTRY | KEY CODE | COMMENTS |
|------|-----------|----------|-------------------------|------|-----------|----------|---------------------|
| 001 | *LBLA | 21 11 | Play "Parapar" | 057 | CLX | -51 | Initialize |
| 002 | ST09 | 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 | ST0D | 35 14 | Diff. between tot. | 063 | GSBe | 23 16 15 | Roll dice |
| 008 | 2 | 02 | and 24 | 064 | ST01 | 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>? | 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 | ST0B | 35 12 | the registers |
| 017 | CHS | -22 | | 073 | ST0A | 35 11 | |
| 018 | DSP2 | -63 02 | Multiply by amt. | 074 | ST01 | 35 46 | |
| 019 | PSE | 16 51 | bet, display | 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 | ST0D | 35 14 | number | 084 | ST01 | 35 46 | |
| 029 | PSE | 16 51 | | 085 | CLX | -51 | |
| 030 | 5 | 05 | Int. for rolling | 086 | + | -55 | |
| 031 | ST01 | 35 46 | | 087 | RCLI | 36 45 | |
| 032 | 0 | 00 | | 088 | X≥Y | -41 | |
| 033 | ST07 | 35 07 | | 089 | ST01 | 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 | ST01 | 35 46 | |
| 038 | CHS | -22 | If the roll is equal | 094 | X≥Y | -41 | |
| 039 | RCLD | 36 14 | to the pt. no., add | 095 | ST01 | 35 45 | |
| 040 | X=Y? | 16-33 | it to R ₇ | 096 | RCLB | 36 12 | |
| 041 | GSB9 | 23 09 | Go back until 5 dice | 097 | 1 | 01 | |
| 042 | DSZI | 16 25 46 | have been thrown | 098 | - | -45 | |
| 043 | GT08 | 22 08 | | 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 | ST01 | 35 46 | |
| 047 | RTN | 24 | Add 1 to R ₇ | 103 | DSZI | 16 25 46 | |
| 048 | *LBL9 | 21 05 | | 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 | *LBL8 | 21 12 | Initialize for 1st | 108 | 5 | 05 | |
| 053 | 5 | 05 | roll | 109 | X≥Y? | 16-35 | |
| 054 | ST0C | 35 13 | | 110 | GT06 | 22 06 | |
| 055 | *LBL4 | 21 04 | Int for next roll | 111 | RCLI | 36 46 | |
| 056 | ST01 | 35 46 | | 112 | ST0C | 35 13 | |

REGISTERS

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

97 Program Listing II

| STEP | KEY ENTRY | KEY CODE | COMMENTS | STEP | KEY ENTRY | KEY CODE | COMMENTS |
|------|-----------|----------|---|------|-----------|----------|------------------------------|
| 113 | X=0? | 16-43 | | 169 | RTN | 24 | |
| 114 | GTOE | 22 15 | | 170 | *LBLC | 21 13 | Store seed in R _E |
| 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 | | | | | |
| 124 | GTO4 | 22 04 | | 180 | | | |
| 125 | *LBLE | 21 06 | | | | | |
| 126 | DSZI | 16 25 46 | | | | | |
| 127 | GTO5 | 22 05 | Total number rolled | | | | |
| 128 | *LBLE | 21 15 | | | | | |
| 129 | RCL5 | 36 05 | | | | | |
| 130 | RCL4 | 36 04 | | | | | |
| 131 | + | -55 | | | | | |
| 132 | RCL3 | 36 03 | | | | | |
| 133 | + | -55 | | | | | |
| 134 | RCL2 | 36 02 | | 190 | | | |
| 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 | | 200 | | | |
| 145 | GTOE | 22 15 | | | | | |
| 146 | 1 | 01 | | | | | |
| 147 | SF2 | 16 21 02 | | | | | |
| 148 | GTO4 | 22 04 | | | | | |
| 149 | *LBL1 | 21 01 | Prepare to transfer: Note register location of largest no. | | | | |
| 150 | RCLI | 36 46 | | | | | |
| 151 | STOA | 35 11 | | | | | |
| 152 | CLX | -51 | | | | | |
| 153 | + | -55 | | | | | |
| 154 | X#Y | -41 | | 210 | | | |
| 155 | RTN | 24 | | | | | |
| 156 | *LBLe | 21 16 15 | Dice roller | | | | |
| 157 | RCLE | 36 15 | | | | | |
| 158 | 9 | 09 | | | | | |
| 159 | 9 | 09 | | | | | |
| 160 | 7 | 07 | | | | | |
| 161 | X | -35 | | | | | |
| 162 | FRC | 16 44 | | | | | |
| 163 | STOE | 35 15 | | | | | |
| 164 | 6 | 06 | | 220 | | | |
| 165 | X | -35 | | | | | |
| 166 | 1 | 01 | | | | | |
| 167 | + | -55 | | | | | |
| 168 | INT | 16 34 | | | | | |

LABELS

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

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 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

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)

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).

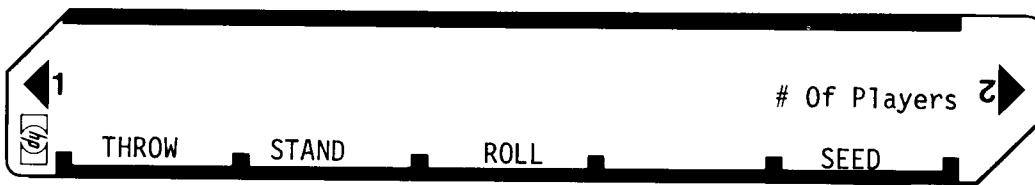
1[A] 3*** 0*** 3*** 1* (Die shows 3, total of previous turns 0,
big total 3, player #1 plays) he elects to hit
[A] 3*** 0*** 6*** 1* (Die shows 3, total of previous turns 0,
big total 6, player #1 plays) he elects to hit
[A] 5*** 0*** 11*** 1* He hits again
[A] 2*** 0*** 13*** 1* Now he elects to pass
[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 The computer is now ready | N | f e | 1* |
| 3. | (Facultative) any player can modify the seed | any number | | E |
| 4. | (Facultative) if you wish to decide the order rolling dice, each player presses | | | C Uppercase*** |
| 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 _E | 21 16 15 | Enter # of players | 057 | EEX | -23 | |
| 002 | ABS | 16 31 | | 058 | 2 | 02 | |
| 003 | INT | 16 34 | | 059 | ÷ | -24 | |
| 004 | X=0? | 16-43 | Check it is legal | 060 | + | -55 | |
| 005 | GTO ₉ | 22 09 | i.e., 1<N<23 | 061 | PRTX | -14 | |
| 006 | RCL _E | 36 15 | | 062 | DSP ₀ | -63 00 | |
| 007 | CLRG | 16-53 | | 063 | CLX | -51 | |
| 008 | P _± S | 16-51 | | 064 | STO ₀ | 35 00 | |
| 009 | CLRG | 16-53 | | 065 | SPC | 16-11 | |
| 010 | X _± Y | -41 | | 066 | SPC | 16-11 | |
| 011 | Z | 02 | | 067 | ISZI | 16 26 46 | |
| 012 | 3 | 03 | | 068 | RCLD | 36 14 | |
| 013 | X _≤ Y? | 16-35 | | 069 | RCLI | 36 46 | |
| 014 | GTO ₉ | 22 09 | | 070 | X _{>} Y? | 16-34 | |
| 015 | R↓ | -31 | | 071 | 1 | 01 | |
| 016 | STO _D | 35 14 | | 072 | RTN | 24 | |
| 017 | R↓ | -31 | | 073 | *LBL _C | 21 13 | Construct |
| 018 | FRC | 16 44 | | 074 | RCL _E | 36 15 | pseudo random # |
| 019 | *LBL _E | 21 15 | Modify Seed | 075 | 9 | 09 | 1<#<6 |
| 020 | DSP ₀ | -63 00 | | 076 | 9 | 09 | |
| 021 | ABS | 16 31 | | 077 | 7 | 07 | |
| 022 | 2 | 02 | | 078 | X | -35 | |
| 023 | + | -55 | | 079 | FRC | 16 44 | |
| 024 | LH | 32 | | 080 | X=0? | 16-43 | Seed sterile? Yes |
| 025 | 2 | 02 | | 081 | GSB ₂ | 23 02 | Get a new one |
| 026 | X _± Y | -41 | | 082 | STO _E | 35 15 | |
| 027 | X _{>} Y? | 16-34 | | 083 | 6 | 06 | |
| 028 | GTO _E | 22 15 | | 084 | X | -35 | |
| 029 | RCL _E | 36 15 | | 085 | INT | 16 34 | |
| 030 | + | -55 | | 086 | 1 | 01 | |
| 031 | STO _E | 35 15 | | 087 | + | -55 | |
| 032 | F3? | .16 23 03 | | 088 | PRTX | -14 | |
| 033 | GTO _E | 22 15 | | 089 | RTN | 24 | |
| 034 | 1 | 01 | | 090 | *LBL ₂ | 21 02 | New Seed |
| 035 | RTN | 24 | Throw | 091 | . | -62 | |
| 036 | *LBL _A | 21 11 | | 092 | 5 | 05 | |
| 037 | STO _I | 35 46 | | 093 | 2 | 02 | |
| 038 | 1 | 01 | Const. Upper face | 094 | 8 | 06 | |
| 039 | GSB _C | 23 13 | J.P.=1 | 095 | 4 | 04 | |
| 040 | X=Y? | 16-33 | Yes GTO 1 | 096 | 1 | 01 | |
| 041 | GTO ₁ | 22 01 | No: Add | 097 | 6 | 06 | |
| 042 | ST+ _i | 35-55 00 | Display output | 098 | 3 | 03 | |
| 043 | RCL _I | 36 45 | of type (A) | 099 | RTN | 24 | |
| 044 | PRTX | -14 | | ... | | | |
| 045 | RCL ₀ | 36 00 | | | | | |
| 046 | + | -55 | | | | | |
| 047 | PRTX | -14 | | | | | |
| 048 | RCL _I | 36 46 | | | | | |
| 049 | RTN | 24 | | | | | |
| 050 | *LBL _B | 21 12 | Add total of this | | | | |
| 051 | RCL ₀ | 36 00 | turn to previous | | | | |
| 052 | ST+ _i | 35-55 45 | total display out- | | | | |
| 053 | *LBL ₁ | 21 01 | put of type (B) | | | | |
| 054 | DSP ₂ | -63 02 | | 110 | | | |
| 055 | RCL _I | 36 45 | | | | | |
| 056 | RCL _I | 36 46 | | | | | |
| REGISTERS ALL USED | | | | | | | |
| 0 Total of turn | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| S0 | S1 | S2 | S3 | S4 | S5 | S6 | S7 |
| A | B | C | D # of players | E Seed | I Used | | |

97 Program Listing II

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| STEP | KEY ENTRY | KEY CODE | COMMENTS | STEP | KEY ENTRY | KEY CODE | COMMENTS |
|------|-----------|----------|----------|------|-----------|----------|----------|
| 120 | | | | 170 | | | |
| 130 | | | | 180 | | | |
| 140 | | | | 190 | | | |
| 150 | | | | 200 | | | |
| 160 | | | | 210 | | | |
| 170 | | | | 220 | | | |

| LABELS | | | | | FLAGS | | SET STATUS | | |
|---------|-----------|--------|---|--------------|-------|------------------|--|---|---|
| A Throw | B Stand | C Roll | D | E Mod Seed | 0 | | FLAGS | TRIG | DISP |
| a | b | c | d | e Initialize | 1 | | ON OFF | | |
| 0 | 1 Display | 2 Used | 3 | 4 | 2 | | 0 <input type="checkbox"/> <input checked="" type="checkbox"/> | DEG <input checked="" type="checkbox"/> | FIX <input checked="" type="checkbox"/> |
| 5 | Output | | 6 | 7 | 8 | 9 Used for Error | 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 0 |

Program Description I

| | | | |
|--------------------|-------------------|----------|-------|
| Program Title | Big Six | | |
| Contributor's Name | Matthew A. Bishop | | |
| Address | 327 Forbes Avenue | State | CA |
| City | San Rafael | 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_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.

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)

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.

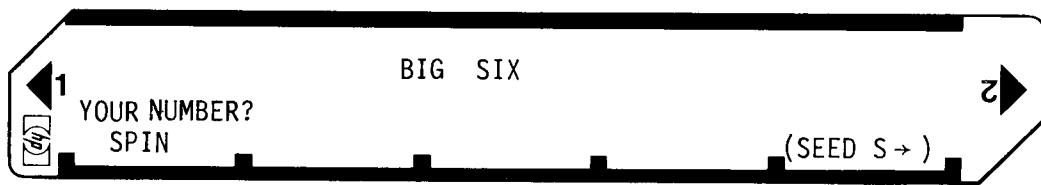
Solution(s) .3657891 [E] ----- 3.657891000-01

- 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



97 Program Listing I

| 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 | X#Y | -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 | P#S | 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 | X#Y | -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 | X#Y | -41 | | 106 | *LBL6 | 21 15 | 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 | | 111 | P#S | 16-51 | |
| 056 | ISZI | 16 26 46 | Repay amt bet if | 112 | RCLB | 36 12 | |
| | | | anything won | | | | |

REGIS, LNS

| | | | | | | | | | |
|----------|-------------|---|----------|----------|----------|----------|----------|---------|---------|
| 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 1 |
| A m | B Total won | C r ₁ ...r _k , Used | D 10 | E Seed | F | Used | | | |

97 Program Listing II

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

| LABELS | | | | | FLAGS | | SET STATUS | | |
|-------------------------|-------------------------------|-------------------------|-----------------------|----------------------|-------|--|--|---|---|
| A Your # Spin | B | C | D | E (Seed S→) | 0 | | FLAGS | TRIG | DISP |
| a | b | c | d | e | 1 | | ON OFF | | |
| 0 Choose 1st Triplet | 1 Choose 2nd Triplet | 2 Choose 3rd Triplet | 3 Split up Triplet | 4 Ending Sequence | 2 | | 0 <input type="checkbox"/> <input checked="" type="checkbox"/> | DEG <input checked="" type="checkbox"/> | FIX <input checked="" type="checkbox"/> |
| 5 Pick 1 # bet on | 6 How much did bettor win? | 7 | 8 | 9 | 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 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 : $36/(\text{HIGH} - \text{LOW} + 1)$ 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

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)

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" :win/loss: |
| | C will both spin the wheel and check | | | |
| | 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 | | D | |
| | time, | Acct. # | | |
| 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 14. |
| | Read display upside-down | | | |
| | 0.7 = Low 14. = High | | | |
| | Flashing Zero = Right On! | | | |

67 Program Listing I

37

| STEP | KEY ENTRY | KEY CODE | COMMENTS | STEP | KEY ENTRY | KEY CODE | COMMENTS |
|------|--------------------|----------|----------|------|--------------------|----------|----------|
| 001 | f LBL A | 31 25 11 | | | h RTN | 35 22 | |
| | RCL 0 | 34 00 | | | f 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 | | | f 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 | | | f LBL C | 31 25 13 | |
| | 7 | 07 | | | f GSBA | 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 | |
| | f LBL B | 31 25 12 | | 080 | f x=0 | 31 51 | |
| | STO 1 | 33 01 | | | GTO 3 | 22 03 | |
| | h RT | 35 53 | | | RCL 3 | 34 03 | |
| | STO 2 | 33 02 | | | h x ² y | 35 52 | |
| | RCL 1 | 34 01 | | | g x≤y | 32 71 | |
| | f x=0 | 31 51 | | | GTO 4 | 22 04 | |
| 030 | GTO 0 | 22 00 | | | f 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 RT | 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 ² 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 | | | f LBL 2 | 31 25 02 | |
| | 6 | 06 | | | RCL 3 | 34 03 | |
| 050 | h x ² y | 35 52 | | | RCL 1 | 34 01 | |
| | ÷ | 81 | | | g x=y | 32 51 | |
| | f INT | 31 83 | | | GTO 9 | 22 08 | |
| | 1 | 01 | | | GTO 9 | 22 09 | |
| | - | 51 | | 110 | f 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 Ø | 22 00 | | | h ST1 | 35 33 | |
| | f GSB 7 | 31 22 07 | | | RCL (i) | 34 24 | |
| | h F? Ø | 35 71 00 | | | h RTN | 35 22 | |
| | GTO 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 | |
| | STD 2 | 33 02 | | 180 | GTO Ø | 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 | | | DSPI | 23 01 | |
| | Ø | 00 | | | h RTN | 35 22 | |
| | + | 61 | | 190 | f LBL Ø | 31 25 00 | |
| | h ST1 | 35 33 | | | 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 | | | Ø | 00 | |
| 140 | GTO D | 22 14 | | | + | 61 | |
| | f LBL 4 | 31 25 04 | | | h ST1 | 35 33 | |
| | RCL 1 | 34 01 | | | h RT | 35 53 | |
| | g FRAC | 32 83 | | 200 | STO +(i) | 33 61 24 | |
| | EEX | 43 | | | h RTN | 35 22 | |
| | 2 | 02 | | | g LBL a | 32 25 11 | |
| | x | 71 | | | g STO Ø | 33 00 | |
| | RCL 3 | 34 03 | | | h RTN | 35 22 | |
| | g x≤y | 32 71 | | | | | |
| | GTO 8 | 22 08 | | 210 | | | |
| 150 | GTO 9 | 22 09 | | | | | |
| | f LBL Ø | 31 25 00 | | | | | |
| | f GSB 7 | 31 22 07 | | | | | |
| | f F? Ø | 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 | | | | | |
| | g f x=Ø | 31 51 | | | | | |
| | GTO 4 | 22 04 | | | | | |
| | h SF Ø | 35 51 00 | | | | | |
| | h RTN | 35 22 | | | | | |
| | f LBL 4 | 31 25 04 | | | | | |
| | h CF Ø | 35 61 00 | | | | | |
| | h RTN | 35 22 | | | | | |
| | f LBL D | 31 25 14 | | | | | |

LABELS

| 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 | DEG | FIX | |
| 0 | 1 | 2 | 3 | 4 | 2 | 0 <input type="checkbox"/> <input checked="" type="checkbox"/> | GRAD | SCI | |
| 5 | 6 | 7 | 8 | 9 | 3 | 1 <input type="checkbox"/> <input checked="" type="checkbox"/> | RAD | ENG | |
| | | | | | | 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 | State | Florida |
| City | Tampa | 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

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% |

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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 | ⑧② | 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 ODDS
TIPS

DOG RACE # 1

2

| 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) | 1,3,7 or 9 .xxxxxxxx | 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 <u>not</u> 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 | | | |

1 RUN
RACE

PAYOUTS

D.D.

BIG Q

DOG RACE #(2)

2

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 | ST00 | 35 00 | | 060 | RCLI | 36 46 | |
| 005 | 1 | 01 | | 061 | X | -35 | |
| 006 | ST09 | 35 09 | | 062 | DSP0 | -63 00 | |
| 007 | *LBLB | 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 | ST0D | 22 14 | Chance on dog. |
| 011 | 1/X | 52 | or | 067 | 1/X | 52 | |
| 012 | GSBE | 23 15 | | 068 | RCLA | 36 11 | Percent taken out? |
| 013 | X≤Y? | 16-35 | Scratch Dog? | 069 | % | 55 | |
| 014 | GT07 | 22 07 | | 070 | - | -45 | |
| 015 | RCL9 | 36 09 | | 071 | 1 | 01 | |
| 016 | 2 | 02 | | 072 | - | -45 | |
| 017 | ÷ | -24 | | 073 | *LBLD | 21 14 | Display win odds |
| 018 | R↑ | 16-31 | Sets number of total | 074 | DSP1 | -63 01 | |
| 019 | X>Y? | 16-34 | tickets sold | 075 | PRTX | -14 | |
| 020 | GT0A | 22 11 | | 076 | RCLI | 36 46 | |
| 021 | R↓ | -31 | FOR 97: | 077 | 8 | 08 | More odds to display? |
| 022 | *LBLc | 21 16 11 | Delete steps 034 | 078 | X≠Y? | 16-32 | |
| 023 | x | -35 | 194 and 200. | 079 | GT01 | 22 01 | Yes |
| 024 | X>Y? | 16-34 | 207 optional R/S | 080 | ST00 | 35 00 | Ready for Quinielas |
| 025 | GT0b | 22 16 12 | Change steps 063 and | 081 | *LBL2 | 21 02 | |
| 026 | 2 | 02 | 119 to f-x- | 082 | 1 | 01 | |
| 027 | GT0a | 22 16 11 | | 083 | ST+9 | 35-55 09 | Quiniela counter |
| 028 | *LBLb | 21 16 12 | | 084 | RCL9 | 36 09 | |
| 029 | ST-9 | 35-45 09 | Running total of tick | 085 | STOI | 35 46 | |
| 030 | DSP5 | -63 05 | Number of tickets | 086 | 8 | 08 | Any more quinielas? |
| 031 | RND | 16 24 | sold on dog | 087 | X=Y? | 16-33 | No |
| 032 | RCLI | 36 46 | Countup before odds | 088 | GT04 | 22 04 | |
| 033 | DSP0 | -63 00 | are shown | 089 | R↓ | -31 | |
| 034 | PSE | 16 51 | | 090 | 3 | 03 | Quiniela counter |
| 035 | EEX | -23 | Loads tickets and | 091 | + | -55 | |
| 036 | 6 | 06 | box number in | 092 | ST+0 | 35-55 00 | Hold (1) tickets |
| 037 | ÷ | -24 | fractional part of | 093 | RCLI | 36 45 | |
| 038 | + | -55 | Reg (1) | 094 | ST0B | 35 12 | |
| 039 | *LBL8 | 21 08 | | 095 | ISZI | 16 26 46 | |
| 040 | STOI | 35 45 | | 096 | *LBL3 | 21 03 | Are either of these |
| 041 | RCLI | 36 46 | Any more dogs? | 097 | RCLB | 36 12 | dogs scratched? |
| 042 | 8 | 08 | | 098 | X=0? | 16-43 | Yes |
| 043 | X≠Y? | 16-32 | Yes | 099 | GT09 | 22 09 | Yes |
| 044 | GT00 | 22 00 | | 100 | RCLI | 36 45 | |
| 045 | RCL9 | 36 09 | | 101 | X=0? | 16-43 | Quiniela chance |
| 046 | DSP5 | -63 05 | Sells any remaining | 102 | GT09 | 22 09 | |
| 047 | RND | 16 24 | tickets | 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 | ST09 | 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 | S2 | S3 | 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 | 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 | RCLI | 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 | ISZI | 16 26 46 | | 180 | X≥Y | -41 | |
| 125 | 1 | 01 | | 181 | X>Y? | 16-34 | False tip |
| 126 | ST+0 | 35-55 00 | Next Quiniela? | 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 | RCLI | 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 | DSZI | 16 25 46 | More tips? |
| 140 | X=0? | 16-43 | | 196 | GT05 | 22 05 | Yes |
| 141 | GT06 | 22 06 | | 197 | RCL0 | 36 00 | |
| 142 | 1/X | 52 | Yes | 198 | DSP8 | -63 08 | |
| 143 | ENT↑ | -21 | | 199 | PRTX | -14 | Display tips |
| 144 | R↓ | -31 | | 200 | PRTX | -14 | |
| 145 | x | -35 | Uses condition | 201 | 1 | 01 | |
| 146 | R↑ | 16-31 | factor and tickets | 202 | 2 | 02 | Adjust countdown |
| 147 | - | -45 | sold on dog to | 203 | ST0I | 35 46 | time here. |
| 148 | ABS | 16 31 | determine how dog | 204 | *LBL6 | 21 16 13 | |
| 149 | ST09 | 35 09 | will do in race | 205 | RCLI | 36 46 | Countdown before |
| 150 | 5 | 05 | | 206 | DSP0 | -63 00 | betting windows |
| 151 | 0 | 00 | | 207 | PRTX | -14 | close. Set your |
| 152 | - | -45 | | 208 | DSZI | 16 25 46 | own time |
| 153 | ABS | 16 31 | | 209 | GT0c | 22 16 13 | |
| 154 | EEX | -23 | | 210 | 0 | 00 | |
| 155 | 2 | 02 | | 211 | R/S | 51 | Betting windows |
| 156 | x | -35 | | 212 | *LBL7 | 21 07 | closed |
| 157 | INT | 16 34 | | 213 | 0 | 00 | |
| 158 | ST+i | 35-55 45 | | 214 | GT08 | 22 08 | Scratch dog |
| 159 | R↑ | 16-31 | | 215 | *LBL6 | 21 15 | No tickets sold |
| 160 | 4 | 04 | | 216 | RCL0 | 36 15 | |
| 161 | 1/X | 52 | Give a tip on this | 217 | 9 | 09 | |
| 162 | GSBE | 23 15 | dog | 218 | 9 | 09 | Random number |
| 163 | X≤Y? | 16-35 | | 219 | 7 | 07 | generator. |
| 164 | GT06 | 22 06 | | 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

67 Program Listing III

| STEP | KEY ENTRY | KEY CODE | COMMENTS | STEP | KEY ENTRY | KEY CODE | COMMENTS |
|------|-----------|----------|----------|------|-----------|----------|---------------------|
| 001 | *LBLA | 21 11 | | 057 | PSE | 16 51 | Partial race |
| 002 | 4 | 04 | | 058 | RCL0 | 36 00 | |
| 003 | ST09 | 35 09 | | 059 | ST00 | 35 14 | Display dogs |
| 004 | 0 | 00 | | 060 | DSP4 | -63 04 | positions in race |
| 005 | ST01 | 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 | | 064 | RCLD | 36 14 | |
| 009 | ISZI | 16 26 46 | | 065 | INT | 16 34 | |
| 010 | RCLI | 36 45 | | 066 | RCL0 | 36 00 | |
| 011 | X?Y? | 16-35 | | 067 | INT | 16 34 | |
| 012 | X?Y | -41 | | 068 | X=Y? | 16-33 | |
| 013 | DSZI | 16 25 46 | | 069 | GT02 | 22 02 | |
| 014 | ST01 | 35 45 | | 070 | RCLE | 36 15 | |
| 015 | ISZI | 16 26 46 | | 071 | Pi | 16-24 | |
| 016 | X?Y | -41 | | 072 | x | -35 | |
| 017 | ST01 | 35 45 | | 073 | FRC | 16 44 | |
| 018 | 7 | 07 | | 074 | . | -62 | |
| 019 | RCLI | 36 46 | | 075 | 7 | 07 | |
| 020 | X=Y? | 16-33 | | 076 | X?Y? | 16-35 | No photo finish |
| 021 | GT00 | 22 00 | | 077 | GT02 | 22 02 | |
| 022 | 8 | 08 | | 078 | 2 | 02 | |
| 023 | X?Y? | 16-32 | | 079 | 0 | 00 | Sets photo finish |
| 024 | GT08 | 22 08 | | 080 | ST01 | 35 46 | countdown time |
| 025 | 1 | 01 | | 081 | *LBL4 | 21 04 | |
| 026 | ST01 | 35 46 | | 082 | RCLI | 36 46 | Photo finish |
| 027 | GT08 | 22 08 | | 083 | DSP0 | -63 00 | countdown |
| 028 | *LBL0 | 21 00 | | 084 | PSE | 16 51 | |
| 029 | 0 | 00 | | 085 | DSZI | 16 25 46 | |
| 030 | ST00 | 35 00 | | 086 | GT04 | 22 04 | When 0, display |
| 031 | EEX | -23 | | 087 | *LBL2 | 21 02 | finish |
| 032 | 4 | 04 | | 088 | RCL0 | 36 00 | |
| 033 | CHS | -22 | | 089 | EEX | -23 | Display finish |
| 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 | | 095 | 1 | 01 | Percent out of pay- |
| 040 | x | -35 | | 096 | ST01 | 35 46 | offs? |
| 041 | FRC | 16 44 | | 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 | ST01 | 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 | |
| 050 | GT01 | 22 01 | | 106 | STOC | 35 13 | |
| 051 | 1 | 01 | | 107 | RCL2 | 36 02 | |
| 052 | ST-9 | 35-45 09 | | 108 | FRC | 16 44 | |
| 053 | RCL9 | 36 09 | | 109 | ST02 | 35 02 | |
| 054 | X?0? | 16-43 | | 110 | ST-4 | 35-45 04 | |
| 055 | GT03 | 22 03 | | 111 | RCL4 | 36 04 | |
| 056 | DSP0 | -63 00 | | 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 | F | G | H | I Used | J |

67 Program Listing III

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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 | Display finish |
| 116 | ST03 | 35 03 | First dog show payoff | 172 | GT02 | 22 02 | |
| 117 | - | -45 | | 173 | *LBL _e | 21 16 15 | |
| 118 | ST05 | 35 05 | | 174 | R↓ | -31 | |
| 119 | 1 | 01 | | 175 | R↓ | -31 | Display forgot change |
| 120 | . | -62 | | 176 | 2 | 02 | |
| 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 payoff | 181 | GT02 | 22 02 | Display finish |
| 126 | RCL4 | 36 04 | | 182 | *LBL _C | 21 13 | Daily Double payoff |
| 127 | GSB6 | 23 06 | | 183 | RCLC | 36 13 | |
| 128 | RCL6 | 36 06 | Second dog show payoff | 184 | GT09 | 22 09 | |
| 129 | GSB6 | 23 06 | | 185 | *LBL _D | 21 14 | |
| 130 | ISZ1 | 16 26 46 | Third dog show payoff | 186 | RCLD | 36 14 | Big Q |
| 131 | RCL6 | 36 06 | | 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 | RCLA | 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 | Perfecta payoff | 196 | *LBL ₆ | 21 06 | |
| 141 | 3 | 03 | | 197 | RCL _i | 36 45 | Calculate and display place and show payoffs. |
| 142 | x | -35 | | 198 | ÷ | -24 | |
| 143 | PRTX | -14 | | 199 | 2 | 02 | |
| 144 | 2 | 02 | | 200 | + | -55 | Minimum \$2.10 payoff |
| 145 | 5 | 05 | | 201 | 2 | 02 | |
| 146 | 2 | 02 | Trifecta payoff | 202 | . | -62 | |
| 147 | RCL7 | 36 07 | | 203 | 1 | 01 | |
| 148 | RCL3 | 36 03 | | 204 | X \neq Y | -41 | |
| 149 | + | -55 | | 205 | X \leq 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 for lost ticket or forgot change | 209 | *LBL ₅ | 21 05 | |
| 154 | FRC | 16 44 | | 210 | ENT1 | -21 | Keep win and quiniela chance for next race or recall for this race |
| 155 | RCLE | 36 15 | | 211 | ENT ₁ | -21 | |
| 156 | 9 | 09 | | 212 | P \neq S | 16-51 | |
| 157 | x | -35 | | 213 | RCL _i | 36 45 | |
| 158 | 1 | 01 | | 214 | X \neq Y | -41 | |
| 159 | + | -55 | | 215 | ST0 _i | 35 45 | |
| 160 | INT | 16 34 | | 216 | P \neq S | 16-51 | |
| 161 | X \neq Y | -41 | | 217 | x | -35 | |
| 162 | 6 | 06 | | 218 | ST0D | 35 14 | |
| 163 | 1/X | 52 | | 219 | R↓ | -31 | |
| 164 | X \neq Y? | 16-34 | | 220 | GSB7 | 23 07 | Display win and Quiniela payoffs |
| 165 | GT0e | 22 16 15 | | 221 | 2 | 02 | |
| 166 | 3 | 03 | | 222 | x | -35 | |
| 167 | x | -35 | | 223 | PRTX | -14 | |
| 168 | X \leq Y? | 16-35 | | 224 | RTN | 24 | |

LABELS

| LABELS | | | | | | 0 | FLAGS | SET STATUS | | |
|--------|---|---|---|---|---|---|---|-------------------------------|------------------------------|--|
| A | B | C | D | E | X | 0 | FLAGS | TRIG | DISP | |
| a | b | c | d | e | X | 1 | ON OFF | | | |
| 0 | X | 1 | X | 2 | X | 2 | 0 <input type="checkbox"/> <input type="checkbox"/> | DEG <input type="checkbox"/> | FIX <input type="checkbox"/> | |
| 5 | X | 6 | X | 7 | X | 3 | 1 <input type="checkbox"/> <input type="checkbox"/> | GRAD <input type="checkbox"/> | SCI <input type="checkbox"/> | |
| | | | | | | | 2 <input type="checkbox"/> <input type="checkbox"/> | RAD <input type="checkbox"/> | ENG <input type="checkbox"/> | |
| | | | | | | | 3 <input type="checkbox"/> <input type="checkbox"/> | | n _____ | |

Program Description I

Program Title HORSE RACE

Contributor's Name business W.A. BURTON
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.

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.

NEITHER HP NOR THE CONTRIBUTOR MAKES ANY EXPRESS OR IMPLIED WARRANTY OF ANY KIND WITH REGARD TO THIS PROGRAM MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NEITHER HP NOR THE CONTRIBUTOR SHALL BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE FURNISHING, USE OR PERFORMANCE OF THIS PROGRAM MATERIAL.

Program Description II

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

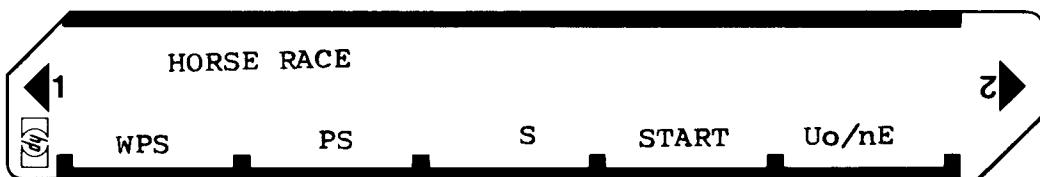
A → 16.80, 11.20, 3.80

C → 3.40

Reference(s)

None

User Instructions



67 Program Listing I

51

| STEP | KEY ENTRY | KEY CODE | COMMENTS | STEP | KEY ENTRY | KEY CODE | COMMENTS |
|------|------------|----------|--------------------------------------|---------|------------|----------|----------------------------------|
| 001 | L8L9 | 32 25 11 | | | RCL A | 34 11 | |
| | RCL E | 34 15 | | | ÷ | 81 | |
| | TT | 35 73 | | 060 | 1/X | 35 62 | |
| | + | 61 | | | 1 | 01 | |
| | 2 | 02 | | | — | 51 | |
| | 9 | 09 | | STD (1) | 33 24 | | |
| | X | 71 | | | CHS | 42 | |
| | FRAC | 32 83 | | | P \neq S | 31 42 | |
| | STO E | 33 15 | | | STD (4) | 33 24 | |
| 010 | RTN | 35 22 | | | P \neq S | 31 42 | |
| | L8L8 | 31 25 15 | | | DSZ | 31 33 | |
| | CFO | 35 61 00 | | | GTO 8 | 22 08 | |
| | CF 1 | 35 61 01 | | | P \neq S | 31 42 | |
| | DSP 0 | 23 00 | | 070 | RCL B | 34 12 | |
| | CL REG | 31 43 | | | STD 0 | 33 00 | |
| | P \neq S | 31 42 | | | RCL C | 34 13 | |
| | CL REG | 31 43 | | | STD 9 | 33 09 | |
| | 1 | 01 | | | LBL 2 | 31 25 02 | - CHECK 000\$//100 (OPTIONAL) |
| | R/S | 84 | | | CLX | 44 | |
| 020 | STO E | 33 15 | - INPUT SEED | | DSP 0 | 23 00 | |
| | 2 | 02 | | | R/S | 84 | |
| | R/S | 84 | | | h(ST1) | 35 33 | |
| | STO D | 33 14 | - INPUT #ENTRIES | | P \neq S | 31 42 | |
| | h(ST1) | 35 33 | | 080 | RCL (1) | 34 24 | |
| | L8L9 | 31 25 09 | | | DSP 1 | 23 01 | |
| | a | 32 22 11 | | | PSE | 35 72 | |
| | DSZ | 31 33 | | | P \neq 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(ST1) | 35 33 | |
| | X | 71 | | | RCL (1) | 34 24 | |
| | STO C | 33 13 | | | TT | 35 73 | |
| | 1 | 01 | | | X=Y | 32 51 | |
| 040 | h(ST1) | 35 33 | | | GTO D | 22 14 | |
| | LBL 1 | 31 25 01 | | | R↓ | 35 53 | |
| | RCL D | 34 14 | | | RCL 0 | 34 00 | |
| | h(RC1) | 35 34 | | | STD+(1) | 33 61 24 | |
| | X>Y | 32 81 | | 100 | RCL (1) | 34 24 | |
| | GTO F e | 22 31 15 | | | RCL 9 | 34 09 | |
| | R/S | 84 | - INPUT WAGERS (W) | | X \leq Y | 32 71 | |
| | STO (1) | 33 24 | W>\$200 FOR EACH HORSE ENTERED | | GTO 3 | 22 03 | |
| | STD+9 | 33 61 09 | | | GTO D | 22 14 | |
| | 1S2 | 31 34 | | | LBL 3 | 31 25 03 | |
| 050 | GTO 1 | 22 01 | | | F \neq 0 | 35 71 00 | |
| | 9 L8L8 | 32 25 15 | | | GTO 4 | 22 04 | |
| | DSZ | 31 33 | | | h(RC1) | 35 34 | |
| | RCL 9 | 34 09 | | | STD A | 33 11 | |
| | STO A | 33 11 | | 110 | SF 0 | 35 51 00 | |
| | L8L8 | 31 25 08 | | | TT | 35 73 | |
| | RCL (1) | 34 24 | | | STD (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 | | F USED | G USED | H 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 | |
| | F 1 | 35 71 01 | | | -X- | 31 84 | |
| | GTO S | 22 05 | | | RCL C | 34 13 | |
| | h (RC1) | 35 34 | | | c | 32 22 13 | |
| | STO B | 33 12 | | | 3 | 03 | |
| | STO 1 | 35 51 01 | | | - | 81 | |
| 120 | TT | 35 73 | | | STO + 0 | 33 61 00 | |
| | STO (1) | 33 24 | | | RCL 0 | 34 00 | |
| | GTO D | 22 14 | | | 3 | 03 | |
| | LBL S | 31 25 05 | | | - | 81 | |
| | h (RC1) | 35 34 | | 180 | d | 32 22 14 | |
| | STO C | 33 13 | | | -X- | 31 84 | |
| | RCL A | 34 11 | | | CLX | 44 | |
| | $\Sigma \Sigma X$ | 43 | | | DSP 0 | 23 00 | |
| | 2 | 02 | | | RTN | 35 22 | |
| | X | 71 | | | LBL C | 31 25 13 | |
| 130 | RCL B | 34 12 | | | RCL C | 34 13 | |
| | $\Sigma \Sigma X$ | 43 | | | c | 32 22 13 | |
| | 1 | 01 | | | 3 | 03 | |
| | X | 71 | | | - | 81 | |
| | + | 61 | | 190 | 3 | 03 | |
| | RCL C | 34 13 | | | d | 32 22 14 | |
| | + | 61 | | | -X- | 31 84 | |
| | P 2 S | 31 42 | | | CLX | 44 | |
| | RTN | 35 22 | | | DSP 0 | 23 00 | |
| | LBL A | 31 25 11 | | | RTN | 35 22 | |
| 140 | RCL A | 34 11 | | | 9 LBL C | 32 25 13 | |
| | c | 32 22 13 | | | h (ST1) | 35 33 | |
| | d | 32 22 14 | | | RCL (1) | 34 24 | |
| | STO 0 | 33 00 | | 200 | 2 | 02 | |
| | -X- | 31 84 | | | X | 71 | |
| | RCL B | 34 12 | | | 2 | 02 | |
| | c | 32 22 13 | | | + | 61 | |
| | 2 | 02 | | | RTN | 35 22 | |
| | - | 81 | | | 9 LBL A | 32 25 14 | |
| | d | 32 22 14 | | | INT | 31 83 | |
| 150 | -X- | 31 84 | | | ENT↑ | 41 | |
| | RCL C | 34 13 | | | LST X | 35 82 | |
| | c | 32 22 13 | | | FRAC | 32 83 | |
| | 2 | 02 | | 210 | 5 | 05 | |
| | . | 83 | | | X | 71 | |
| | 9 | 09 | | | 1 | 83 | |
| | ÷ | 81 | | | INT | 31 83 | |
| | d | 32 22 14 | | | . | 81 | |
| | -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 | | | 2 | 02 | |
| | RCL B | 34 12 | | | . | 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 | |
| | PLACE HORSE PAYS | | | | | | |
| | P | S | | | | | |

LABELS

| LABELS | | | | | FLAGS | SET STATUS | | |
|--------|--------|--------------------------------|-------------------|---------------|--------|---------------------------------------|---------------------------------------|---------------------------------------|
| A | B | C | D | E | 0 USED | FLAGS | TRIG | DISP |
| W | P | S | START | U/E/ENT | 0 USED | ON OFF | DEG | FIX |
| RAN# | b | c ODDS ¹ 2 X 2 + | d TRACK FORMAT | e ODDS/100 | 1 USED | 0 <input checked="" type="checkbox"/> | 1 <input checked="" type="checkbox"/> | 2 <input checked="" type="checkbox"/> |
| 0 | 1 USED | CHK. ODDS | 3 WIN | 4 PLACE | 2 | 2 <input type="checkbox"/> | 3 <input checked="" type="checkbox"/> | 4 <input checked="" type="checkbox"/> |
| SHOW | 6 | 7 | 8 ODDS/100 | 9 TRACK COND. | 3 | 3 <input type="checkbox"/> | 4 <input checked="" type="checkbox"/> | 5 <input type="checkbox"/> |



Program Description I

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Program Title **BLACKJACK BETTING**

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

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State **NY**

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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 $\frac{1}{2}$ second before pressing **[A]** again.

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)

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 **$\Sigma +$** **$\Sigma +$** **B** **$\Sigma +$** **$\Sigma +$** **$\Sigma +$** **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 getting 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

EFFICIENCY OF SHUFFLE

NOTE:
CARD TITLE
IS TO
CONFUSE
CASINO
MANAGERS

67 Program Listing I

Hewlett-Packard Software

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