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DECUS NO.	FOCAL8-71A
TITLE	FOCAL GOLF PROGRAM FOR THE PDP-8 (8K) COMPUTER
AUTHOR	Gilbert S. Fair
COMPANY	Digital Equipment Corporation Northbrook, Illinois
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SOURCE LANGUAGE	FOCAL

Source Language: FOCAL

Abstract: This is a FOCAL program, written for an 8K system, which simulates the playing of golf, including the shot selection options of club, power, and direction together with numerous random variations of these selections to more closely resemble the actual experiences of the golfer "on the links".

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I. DESCRIPTION

The FOCAL program, written for an 8K system with sine and cosine functions retained, is an attempt to simulate the playing of a round of golf "in the comfort and convenience of your computer lab". Although no great physical exertion is required (nothing more than pushing teletype buttons -- ah, this grand modern age of ours), still to score well the participant must think as if he were "on the links". He must consider his power abilities, normal direction of flight of his shots, club selection, compensation for wind direction and strength, the layout of the holes with sand, trees, rough, water, fairway, and green, not to mention pin position and out-of-bounds.

Well-hidden but painfully present are numerous random number-dependent variations imposed by the computer over and above the problems mentioned previously. This includes such malicious acts by the computer as modifying (slightly) the participant-selected club, power, and direction. Thus, just as on a real golf course, the shots will occasionally not travel exactly as selected. You might also encounter the circumstance of being in a sand trap, selecting a shot, and then having the computer tell you that swung and missed the ball (sound familiar?).

II. OPERATING INSTRUCTIONS

- A. FOCAL (You must have an 8K PDP-8 computer.)
1. Input RIM loader.
 2. Use RIM loader to input BIN loader (placing BIN into the upper 4K).
 3. Use BIN loader to load 4K FOCAL into lower core.
 4. Start FOCAL (at 200_g) and answer the two questions "NO" and "YES", i.e., save SINE and COSINE functions.
 5. Stop FOCAL and use BIN loader to load 8K overlay into lower core.
 6. Restart FOCAL (at 200_g).
- B. GOLF DEMO
1. Load in papertape #1 (source version of GOLF control program) through FOCAL via low speed or high speed reader.
 2. Start the program by typing G ↓ (where ↓ is carriage return key).
 3. Answer initial dialog and read printed instructions (and, of course, follow them).
 4. Place papertape #2 (9 holes of golf) in the reader (low speed) and input per the typed instructions.

III. DISCUSSION ON OPERATION PHILOSOPHY OF PROGRAM

The initial dialogue with the program is designed to fulfill two purposes: explain how to use the program and characterize your particular golf game. You will be asked how powerful a hitter you are, how straight a hitter you are, and how good a putter you are. The remainder of this initial printout is a comprehensive discussion on how to use the program.

Please note this warning. When you have completed 9 holes of golf, simply watch the teletype until it instructs you to continue. Also note that at the conclusion of 18 holes, the program will display its evaluation of your performance as a golfer.

The general operating method in playing a round of golf involves this process:

1. Read in one hole of golf (i.e., 1/9 of the tape).
Turn on LSR, read in 1/9 of the tape (from 1 large blank space to the next), turn off LSR.
2. Start the FOCAL program via G✓3.05 for complete description of the hole to be played.
3. Play the hole by responding continually to the 3-question shot selection (club, power, and direction).
4. Once you have landed on the green, the earlier classification of your putting abilities will automatically determine the number of putts required based on distance from the pin.
5. Your score for the hole, total running score, and present position relative to par are then printed as are instructions on how to continue (see 1. above).

III. CONTINUED

Since papertape #2 contains only 9 holes, it is necessary to read it back through the reader to play the back 9. Thus hole 1 and hole 10 are identical.

IV. HOW TO ADD HOLES

Since the papertape provided (#2) contains only 9 holes, it might be desirable to write your own back 9 or even generate a complete 18-hole tape. To construct holes, you must satisfy the following requirements:

1. On the papertape each hole should begin with the direct (no line number) command `E✓10`.

2. The last logical statement in your hole description algorithm must be `D 12; R`.

3. You must define the following items:

a. NO - Number of sections for the hole. One section is 10 yards wide and 30 yards long. NO must be divisible by 5. NO should be 100 or less although larger values are possible if storage permits.

b. SA (I) - The status of each section where I = 1, NO.

The status codes are these:

0 = Green

1 = Fairway

2 = Sand

3 = Water

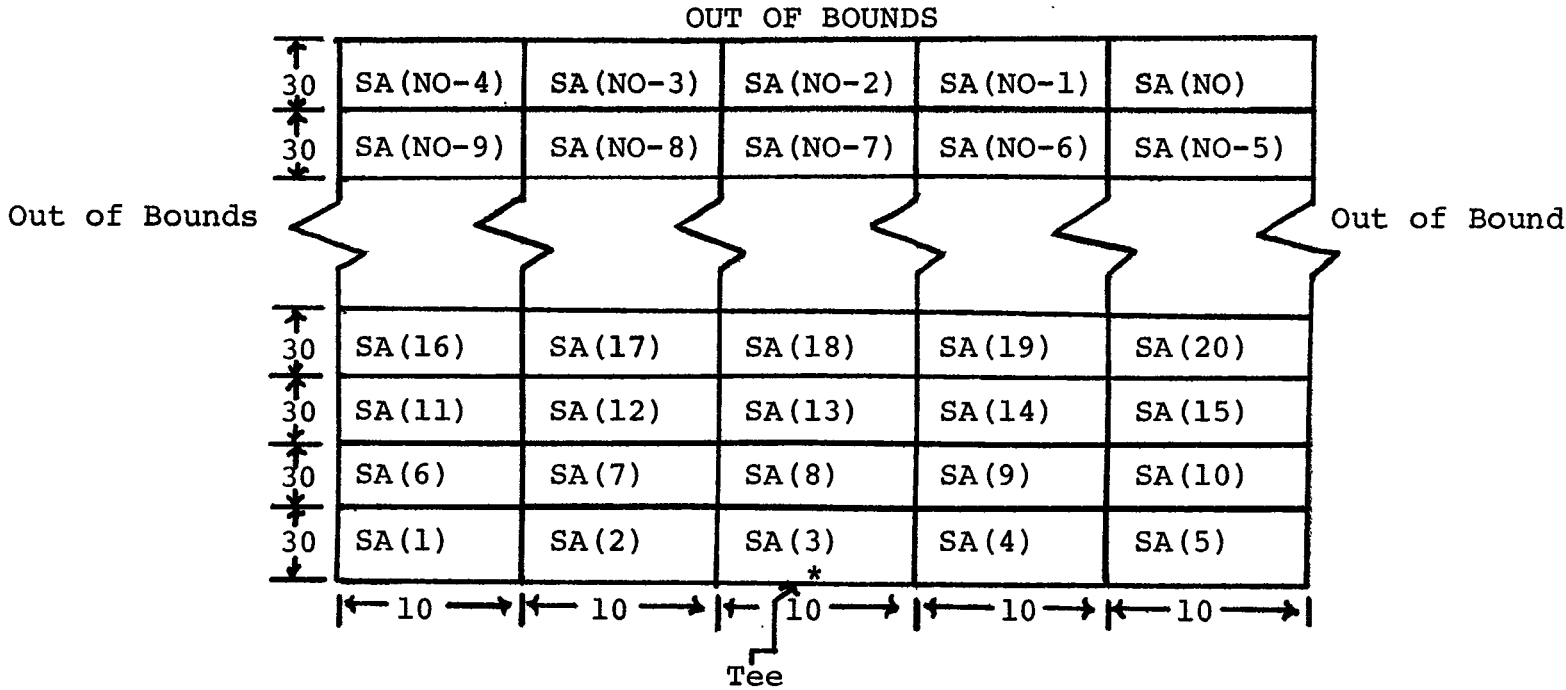
4 = Trees

5 = Rough

Note that the sections are numbered from left to right and from tee to green (bottom to top). Thus the section describing the middle 10 yards of the hole, 30 to 60 yards from the tee, is number 8.

IV. CONTINUED

Note the following diagram.



c. PX - Horizontal (left and right) position of the pin in yards.

d. PY - Vertical (up) position of the pin in yards.

e. PA - Par value for the hole (3, 4 or 5).

As a guide you might use this table:

<u>Yardage from tee to pin</u>	<u>Par value</u>
0 -- 250	3
250 -- 450	4
450 -- ∞	5

Note that the position of the tee for each hole is assumed to be at (0,0), i.e. bottom of the printout and in the middle of the paper.

IV. CONTINUED

4. It is necessary that you use statement labels starting logically with the 10 group, i.e., 10.XX. Note that the code already uses statement groups 1, 2, 3, 4, 5, 6, 7, 8, 12, 13, 20, 30, and 31. It also expects that each hole description will begin with a statement in group 10. Hence, the E✓10 on the tape is recommended to delete all traces of the previous hole. If you find it necessary to use more than group 10 statements to describe your golf holes, be sure to delete all the hole definition groups at the beginning of each hole on the papertape (e.g., E✓10).

V. LISTING

Below is a listing of the golf control program (tape #1) followed by a separate listing of the 9-hole tape (tape #2). The listing for the control program is in 3 basic sections:

1. Statements 1.40 - 2.67; Initial dialogue section
2. Statements 3.05 - 8.22; Main control and calculation section
3. Statements 12.01 - 31.07; Hole printout algorithm

The listing for the 9-hole tape is in 9 similar sections, where each section contains E✓10 followed by the hole description which uses statements in the 10.XX category.

C-8K FOCAL Ø1969

Ø1.4Ø T !!! "THIS IS THE PDP-2/3 MEMORIAL GOLF COURSE"
 Ø1.41 T ! "PAY YOUR GREEN FEES AND REMEMBER"
 01.48 T ! "KEEP YOUR LEFT ARM STRAIGHT"!;G 2.Ø5
 Ø1.5Ø T ! "THANK YOU"
 Ø1.51 T ! "YOU LIE THROUGH YOUR TEETH"!;G 2.24
 Ø1.52 T ! "AH, COME ON. NO ONE HITS A 5-IRON THAT HARD";G 2.14
 Ø1.53 D 1.5;G 2.2
 Ø1.54 T ! "FIBBER! YOU CAN'T HIT THE BALL PERFECTLY STRAIGHT";G 2.2

 Ø2.Ø5 T !! "PLEASE INDICATE THE CALIBER OF GOLFER THAT YOU ARE"
 Ø2.Ø6 T ! "BY ANSWERING THE FOLLOWING 3 QUESTIONS"
 Ø2.Ø7 T !! "TYPE POWER WITH 5-IRON FROM THIS TABLE"
 Ø2.Ø8 T ! "DISTANCE IN YARDS YOUR RESPONSE"! " 11Ø 1.0"
 Ø2.Ø9 T ! " 13Ø 2.Ø"! " 15Ø 3.Ø"
 Ø2.1Ø T ! " 17Ø 4.Ø"! " 19Ø 5.Ø"
 Ø2.11 T !! "THUS TYPE ANY DECIMAL NUMBER BETWEEN 1.Ø AND 5.Ø"
 Ø2.12 A P;I (P-1)2.11;I (5-P)2.11;I (4.1-P)1.52;D 1.5
 Ø2.14 T !!! "TYPE NORMAL DIRECTION OF SHOTS FROM THIS TABLE"
 Ø2.15 T ! "DIRECTION YOUR RESPONSE"! " HOOK -2.Ø"
 Ø2.16 T ! " DRAW -1.Ø"! "STRAIGHT Ø.Ø"! " FADE +1.Ø"
 Ø2.17 T ! " SLICE +2.Ø"
 Ø2.18 T !! "THUS TYPE ANY DECIMAL NUMBER BETWEEN -2.Ø AND +2.Ø"
 Ø2.19 A D;I (D+2)2.18;I (2-D)2.18;I (D)1.53, 1.54, 1.53
 Ø2.2Ø T !! "TYPE AVERAGE NO. PUTTS PER ROUND (18 HOLES)";A PR
 Ø2.22 I (PR-18)2.2;I (PR-3Ø)1.51;D 1.5
 Ø2.24 T !! "NOTE:(+) OFF CENTER IS TO THE RIGHT;(-) IS TO THE LEFT"
 Ø2.25 S M=Ø;S TS=Ø;S PT=Ø
 Ø2.26 T ! "AND EACH HOLE IS 5Ø YARDS WIDE, 25 TO THE LEFT"
 02.27 T ! "AND 25 TO THE RIGHT WITH OUT OF BOUNDS BEYOND THAT"
 Ø2.3Ø T !! "THE FOLLOWING TABLE IS USED FOR HOLE CONFIGURATION:"
 Ø2.31 T !!!! "SYMBOL TYPED MEANING"
 Ø2.32 T ! " 0 GREEN"
 Ø2.33 T ! " FAIRWAY"
 Ø2.34 T ! " . SAND"
 Ø2.35 T ! " W WATER"
 Ø2.36 T ! " T TREES"
 Ø2.37 T ! " , ROUGH"
 Ø2.38 T ! " * BALL"
 Ø2.39 T ! " + HOLE (PIN)!"
 Ø2.4Ø G 2.5
 Ø2.5Ø T !! "AS YOU PLAY, YOU WILL BE ASKED A SERIES OF 3 QUESTIONS"
 Ø2.51 T ! "FOR EACH SHOT: WHICH CLUB, HOW HARD, AND WHAT DIRECTION."
 Ø2.52 T !!! "FOR THE FIRST QUESTION (CLUB), ALWAYS TYPE A"
 Ø2.53 T ! "NUMBER (INTEGER) FROM Ø TO 11"
 Ø2.54 T ! "Ø=DRIVER, 1=1-IRON OR 2-WOOD, 2=2-IRON OR 3-WOOD"
 Ø2.55 T ! "..... 9=9-IRON, 1Ø=PITCH (5Ø-1ØØ YARDS), 11=CHIP (Ø-5Ø YARDS)"
 Ø2.56 T !!! "FOR THE SECOND QUESTION (SPEED), TYPE A DECIMAL NUMBER"

02.57 T ! "BETWEEN 1.0 (FOR VERY SOFT) AND 5.0 (FOR VERY HARD)"
 02.58 T !!! "FOR THE THIRD QUESTION (DIRECTION), YOU MUST RESPOND"
 02.59 T ! "WITH A SIGNED DECIMAL OR SIGNED INTEGER NUMBER"
 02.60 T ! "A MINUS (-) SIGN INDICATES DIRECTION TO THE LEFT"
 02.61 T ! "A POSITIVE (+) SIGN [OR NO SIGN] INDICATES TO THE RIGHT AND"
 02.62 T ! "THE MAGNITUDE OF THE NUMBER INDICATES THE AMOUNT TO"
 02.63 T ! "THE LEFT OR TO THE RIGHT"! "AS A HINT "
 02.64 T ! "-31 IS APPROXIMATELY STRAIGHT LEFT AND +31 STRAIGHT RIGHT"
 02.65 T ! "NOW TO BEGIN PLAY, READ IN THE FIRST HOLE FROM THE"
 02.66 T ! "HOLES TAPE AND TYPE (RE-TURN), G 3.05, (RE-TURN)"
 02.67 T ! "GOOD LUCK, ARNIE"!;Q

 03.05 S M=M+1;S S=0;S XT=0;S YT=0;T %2,!!! "YOU HAVE ARRIVED AT HOLE"M;D .10
 03.10 S WS=FITR(10*FRAN());S A=FRAN();I (A-.75)3.15,3.15,3.20
 03.15 S WD=WS;T ! "WIND FROM LEFT";C 3.25
 03.20 S WD=-1.0*WS;T ! "WIND FROM RIGHT"
 03.25 T " AT "WS, " YDS/(100 YARDS)"!
 03.30 S ST=1.;S PT=PT+PA
 03.35 T ! "READY FOR SHOT SELECTION"
 03.36 T ! "S ELECT CLUB";A C;I (11-C)3.36;I (C)3.35
 03.40 T " SPEED";A SS;I (5-SS)3.4;I (SS-1)3.4
 03.45 T ' DIRECTION";A DS
 03.50 S P=10*FRAN()-5.;I (B-4.)3.8,3.8
 03.55 I (P-6.)3.5,3.8,3.8
 03.60 I (B-5.)3.7,3.7
 03.65 S DS=DS+1;G 3.8
 03.70 S DS=DS-1
 03.80 S SS=SS-3;I (P-2)3.85,3.9,3.95
 03.85 S A=(9-C)*5+90+2.5*SS;G 4.2
 03.90 S A=(9-C)*7.5+100+3.75*SS;G 4.2
 03.95 I (P-4)4.05,4.10,4.15

 04.05 S A=(9-C)*10+110+5*SS;G 4.2
 04.10 S A=(9-C)*15+110+7.5*SS;G 4.2
 04.15 S A=(9-C)*20+110+10*SS
 04.20 I (C-10)4.23,4.22
 04.21 S A=(SS+3)*10+(P-3)*3;G 4.23
 04.22 S A=50+(SS+3)*10+(P-3)*4
 04.23 S Z=A*WD/100;I (ST-2)4.55,4.25,4.3
 04.25 S A=.6*A;S Z=.6*Z;G 4.4
 04.30 I (ST-4)4.55,4.4,4.5
 04.40 S AA=FRAN();I (AA-.6)4.45,4.45,4.55
 04.45 S A=0;S Z=0;T ! "ITS A SWING AND A MISS";G 4.55
 04.50 S A=.8*A;S Z=.8*Z
 04.55 S YS=.05*(DS+D);S YD=A*FCOS(YS);S XD=A*FSIN(YS)+Z
 04.60 S XT=XT+XD;S YT=YT+YD
 04.65 I (FABS(XT)-25.)4.8,4.8
 04.70 S S=S+2;S XA=XT;S YA=YT;S XT=XT-XD;S YT=YT-YD
 04.75 T !!! " OUT OF BOUNDS (2 PENALTY STROKES)"

04.76 T %6.02,!! "YOU LANDED ("YA, " AHEAD, "XA, " OFF LINE) TRY AGAIN";G 35
 04.80 S S=S+1;T !! "YOU HAVE JUST LANDED"
 04.81 I (YT-(NO/5)*30)4.85,4.85
 04.82 S S=S-1;G 4.7
 04.85 S RW=FITR((YT/30.0)+.01;S CL=FITR((XT-5.)/10.+5)+3
 04.90 S ST=SA(RW*5+CL);I (ST-1)4.95,5.05, 5.1
 04.95 T %3,! "ON THE GREEN, AT ("YT,XT, "), HOLE IS ("PY,PX, ")";G 6.05

 05.05 T ! "IN THE FAIRWAY";G 5.3
 05.10 I (ST-3)5.15,5.20,5.25
 05.15 T ! "IN A TRAP";G 5.3
 05.20 T ! "IN THE WATER (1PENALTY STROKE)";S S=S+1;G 5.3
 05.25 T ! "IN THE ROUGH"
 05.30 S TG=FSQT((XT-PX)²+(YT-PY)²)
 05.35 T %3,! "YOU ARE "TG," YARDS FROM PIN", XT, " YARDS OFF CENTER"
 05.41 T %3,! "AND "YT, " YARDS FROM TEE"
 05.42 T ! "DO YOU WISH TO SEE HOLE AGAIN?(TYPE Y OR N)";A BB
 05.43 I (BB-0N)5.44,3.35
 05.44 D 13;G 3.35

06.05 S TG=FSQT((XT-PX)↑2+(YT-PY)↑2)
 06.10 T %3,! "YOU ARE "3*TG, " FEET FROM THE HOLE"
 06.11 I (PR-28)6.13;I (PR-35)6.14
 06.12 S U1=20;S U2=7;S U3=1;G 6.15
 06.13 S U1=40;S U2=15;S U3=6;G 6.15
 06.14 S U1=30;S U2=10;S U3=3
 06.15 I (U1-TG)6.4
 06.20 I U2-TG)6.45
 06.25 I (U3-TG)6.5
 06.30 S PP=1;G 7.8
 06.40 S PP=4;G 7.8
 06.45 S PP=3;G 7.8
 06.50 S PP=2

 07.80 T !%2, "YOU HAD "PP, " PUTT(S)";S S=S+PP
 07.82 S TS=TS+S
 07.85 T %3,! "YOU HAD A "S, " FOR HOLE "M, " , PRESENT TOTAL "TS
 07.90 T %3,! "PAR TOTAL "PT, " , SO YOU ARE"TS-PT, " TO PAR"
 07.91 I (M-9)7.96,7.93;I (M-18)7.96
 07.92 T !! "YOU HAVE COMPLETED 18 HOLES, DUBBER, YOU'RE THROUGH !D 8
 07.93 T !! "YOU'VE FINISHED THE FRONT 9, GO GRAB A DRINK"
 07.94 F WS=1,600;S WD=WD
 07.95 T !! "NOW TO THE BACK 9"
 07.96 T !! "(TO CONTINUE, READ NEXT HOLE THROUGH READER)"
 07.97 T ! "(THEN TYPE (RE-TURN),G 3.05,(RE-TURN))";Q

 08.01 I (PT-TS)8.2,8.1;T %3,! "YOU WERE "PT-TS, " UNDER PAR. GREAT ROUND!";Q
 08.10 T !! "YOU WERE EVEN PAR. NICE SHOOTING!";Q
 08.20 T %3,! "YOU WERE "TS-PT, " OVER PAR. GO PRACTICE"!;
 08.21 I (20-(TS-PT))8.22;Q
 08.22 T !! "ON SECOND THOUGHT, QUIT!";Q

12.01 T %2, ! "PAR "PA
 12.02 T ! "YARDAGE CONFIGURATION"
 12.03 D 13;R

 13.01 S EN=0;S EM=0;D 20

 20.01 F I=1,5,NO;S J=NO-I+1;D 30
 20.02 I (EN)20.07,20.03,20.07
 20.03 T %3, !0, "-<";I (-EN)20.07;F K=1,24;T " "
 20.05 T "*" ;F K=1,25;T " "
 20.06 T ">"
 20.07 S EN=0;S EM=0
 20.09 T !!"0=GREEN, =FAIRWAY, .=SAND, W=WATER, T=TREES, ,=ROUGH"
 20.11 T !"*=BALL, +=HOLE(PIN)"
 20.13 T !"HOLE IS"PY, " YARDS AWAY AND"PX, " YARDS OFF CENTER"!;!;R

 30.01 I (=EN)30.15
 30.02 S DI=((J-5)/5)*30+.001;T %3, !DI+30, "-<"
 30.03 I (PY-DI)30.07;I (-EM)30.07,30.04,30.07
 30.04 F K=-25,25;I (PX-K-1)30.05;T " "
 30.05 T "+ "#, " ";S EM=1;G 30.07
 30.07 I (YT-DI)30.11;I (-EN)30.11,30.08,30.11
 30.08 F K=-25,25;I (XT-K-1)30.09;T " "
 30.09 T "* "#, " ";S EN=1;G 30.11
 30.11 F K=J-4, J;D 31
 30.13 T ">";R
 30.15 I (-EM)30.17,30.02
 30.17 R

 31.01 I (SA(K)-1)31.03,31.04;I (SA(K)-3)31.05,31.06;I (SA(K)-5)31.07
 31.02 T "//////////";R
 31.03 T "0000000000";R
 31.04 T " ";R
 31.05 T ".....";R
 31.06 T "WWWWWWWWWWW";R
 31.07 T "TTTTTTTTTT";R
 *

E 10

C-FOCAL, 1969

10.01 S PA=5
10.05 F I=1, 5, 81; S SA(1)=5; S SA(I+4)=5; F J=I+1, I+3; S SA(J)=1
10.10 F I=77, 79; S SA(1)=0
10.11 F I=72, 74; S SA(1)=0
10.12 S NO=85
10.13 S SA(75)=2; S SA(70)=2; S SA(69)=2; S SA(64)=2; S SA(65)=2
10.14 F I=35, 45; S SA(1)=3
10.15 F I=81, NO; S SA(1)=4
10.20 S PX=2.1; S PY=468.
10.22 D 12; R
*E 10

C-FOCAL, 1969

10.01 S PA=3
10.05 S NO=60; S PX=-2; S PY=215
10.06 F I=1, NO; S SA(1)=5
10.07 S SA(37)=0; S SA(38)=0; S SA(42)=0
10.08 S SA(36)=2; S SA(39)=2; S SA(41)=2; S SA(44)=2
10.09 S SA(24)=3; S SA(29)=3; S SA(32)=3; S SA(33)=3; S SA(34)=3
10.10 F I=46, NO; S SA(1)=4
10.15 S SA(17)=1; S SA(18)=1; S SA(19)=1; S SA(22)=1; S SA(23)=1
10.16 S SA(24)=1; S SA(27)=1; S SA(22)=1
10.20 D 12; R
*E 10

C-FOCAL, 1969

10.01 S PA=4
10.05 S NO=80; S PX=-12; S PY=418
10.06 F I=1, NO; S SA(1)=5
10.07 F I=3, 5, 28; S SA(1)=1
10.08 F I=14, 5, 59; S SA(1)=1
10.10 F I=35, 5, 55; S SA(1)=1
10.11 S SA(32)=2; S SA(33)=2; S SA(64)=2; S SA(69)=2
10.12 F I=70, 5, 80; S SA(1)=4
10.13 S SA(57)=0; S SA(62)=0; S SA(63)=0; S SA(67)=0; S SA(68)=0
10.14 F I=43, 5, 58; S SA(1)=1
10.15 S SA(77)=4; S SA(38)=2
10.20 D 12; R
*E 10

C-FOCAL, 1969

10.01 S PA=4
 10.05 S NO=75;S PX=12;S PY=380
 10.06 F I=1,75;S SA(1)=1
 10.07 F I=15,5,60;S SA(1)=3
 10.08 F I=19,5,49;S SA(1)=3
 10.09 F I=28,5,53;S SA(1)=3
 10.10 F I=71,75;S SA(1)=5
 10.12 S SA(51)=2;S SA(56)=2;S SA(62)=2;S SA(58)=0;S SA(59)=0
 10.13 S SA(63)=0;S SA(64)=0
 10.20 D 12;R

*E 10

C-FOCAL, 1969

10.01 S PA=3
 10.05 S NO=40;S PX=0;S PY=160
 10.07 F I=1,NO;S SA(1)=1
 10.09 F I=36,40;S SA(1)=4
 10.10 S SA(22)=2;S SA(34)=2;S SA(23)=0;S SA(24)=0;S SA(27)=0
 10.11 S SA(28)=0;S SA(29)=0
 10.20 D 12;R

*E 10

C-FOCAL, 1969 ^

10.01 S PA=5
 10.05 S NO=100;S PX=-20;S PY=540
 10.06 F I=1,NO;S SA(1)=1
 10.07 S SA(81)=2;S SA(86)=0;S SA(87)=0;S SA(91)=0;S SA(92)=0
 10.08 F I=96,NO;S SA(1)=4
 10.09 F I=1,5,76;S SA(1)=5
 10.10 F I=2,5,77;S SA(1)=5
 10.11 S SA(41)=2;S SA(42)=2;S SA(88)=2
 10.20 D 12;R

*E 10

C-FOCAL, 1969

10.01 S PA=4
 10.05 S NO=70;S PX=1;S PY=370
 10.06 F I=1,NO;S SA(1)=1
 10.07 F I=66,NO;S SA(1)=4
 10.08 F I=62,64;S SA(1)=0
 10.09 F I=57,59;S SA(1)=2
 10.10 S SA(39)=2;S SA(40)=2
 10.20 D 12;R

*E 10

C-FOCAL, 1969

10.01 S PA=4
 10.05 S NO=65;S PX=0;S PY=350
 10.06 F I=1, NO;S SA(1)=1
 10.07 F I=4, 5, 49;S SA(1)=4
 10.08 F I=5, 5, 50;S SA(1)=4
 10.09 S SA(52)=2;S SA(53)=2;S SA(54)=2;S SA(57)=2;S SA(58)=0
 10.10 S SA(59)=2;S SA(62)=2;S SA(63)=2;S SA(64)=2
 10.20 D 12;R

*E 10

C-FOCAL, 1969

10.01 S PA=4
 10.05 S NO=75;S PX=19;S PY=440
 10.06 F I=1, NO;S SA(1)=5
 10.07 F I=56, 59;S SA(1)=1
 10.08 F I=61, 64;S SA(1)=1
 10.09 F I=31, 33;S SA(1)=1
 10.10 F I=36, 38;S SA(1)=1
 10.11 F I=42, 43;S SA(1)=1
 10.12 F I=73, 75;S SA(1)=0
 10.13 F I=5, 5, 65;S SA(1)=4
 10.14 F I=66, 70;S SA(1)=3
 10.20 D 12;R

*

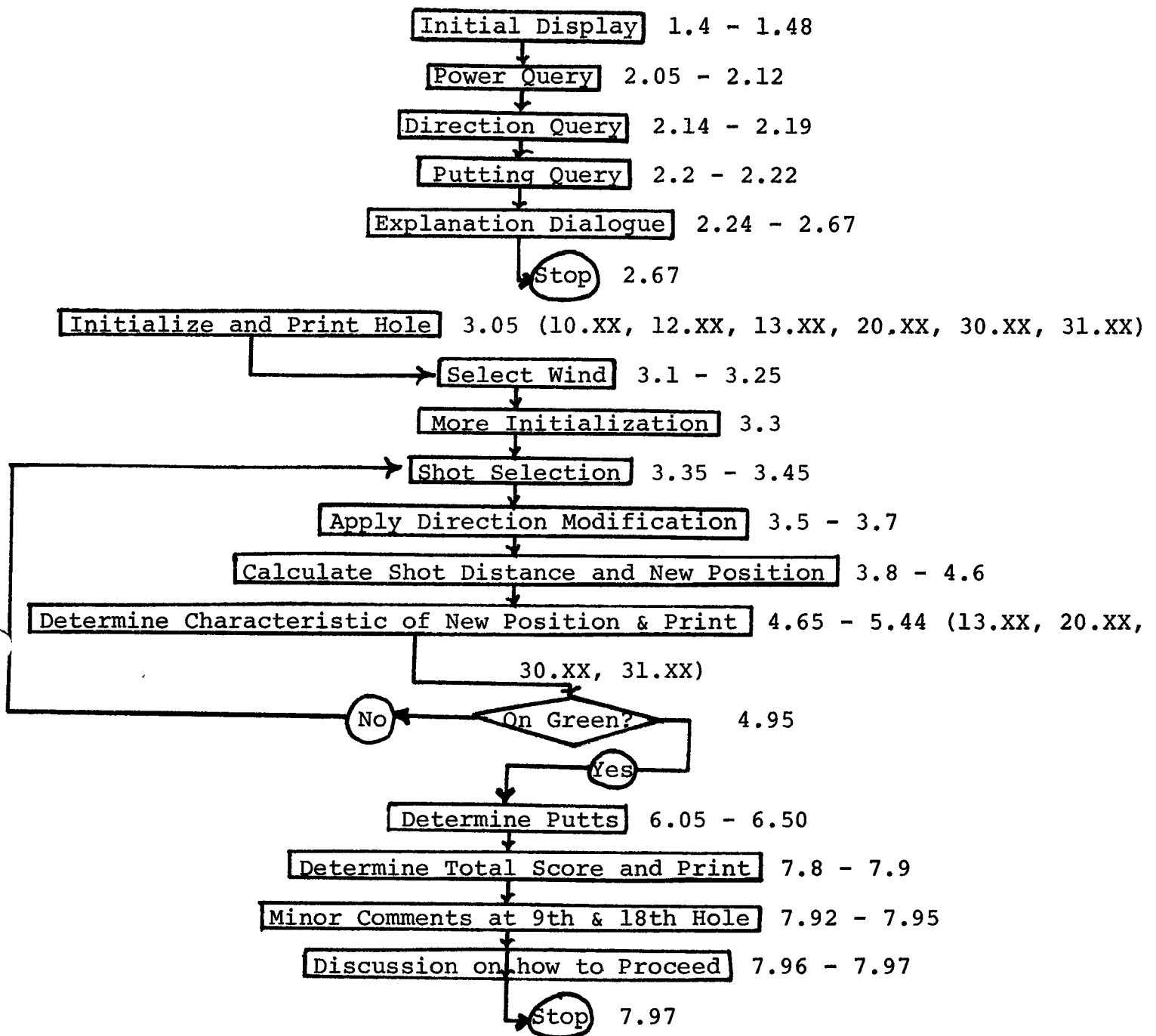
VI. NOMENCLATURE LIST

<u>SYMBOL</u>	<u>DESCRIPTION</u>
P	Personal Power Factor (with 5-iron)
D	Personal Direction Indicator
PR	Average Number of Putts per Round
M	Current Hole Number
S	Score for Present Hole
XT	Horizontal Position of Ball
YT	Vertical Position of Ball
WS	Wind Speed
WD	Wind Speed/Direction
ST	The Status Code of the Section in which the Ball is Positioned
PA	Par Value of Present Hole
PT	Accumulative Par Total
TS	Accumulative Stroke Total
C	Club Selection
SS	Speed (Power) Selection
DS	Direction Selection
A	Dummy Variable/Also Vector Distance of Shot
B	Random Variable for Direction Alteration
Z	Wind Deflection Yardage
YS	Final Angle of Shot
YD	Vertical Distance of Shot
XD	Horizontal Distance of Shot
YA	Reserve Storage for Temporary YT Value
XA	Reserve Storage for Temporary XT Value

VI. CONTINUED

<u>SYMBOL</u>	<u>DESCRIPTION</u>
RW	Row Counter of SA Array in which Ball is Positioned
CL	Column Counter of SA Array in which Ball is Positioned
PY	Vertical Position of Pin
PX	Horizontal Position of Pin
TG	Vector Distance from Ball to Pin
BB	Indicator for Reprint of Hole (Y = yes, N = no)
U1	Distance Over which 4 Putts are Required
U2	Distance Over which 3 Putts are Required
U3	Distance Over which 2 Putts are Required
PP	Number of Putts Required for a Hole
NO	Number of Sections for a Hole
SA(I)	Status of Ith Section
EN	Indicator for Printing Ball Symbol (0 = not yet, -1 = has been)
EM	Indicator for Printing Pin Symbol (0 = not yet, -1 = has been)
I	Loop Counter
J	Loop Counter
K	Loop Counter
DI	Vertical Distance from Tee of Present Printing Section Row

VII. FLOWCHART



VIII. SAMPLE EXECUTION

Below is a sample execution of the GOLF demo program. All user responses are underlined. Additional comments concerning the execution of the code have been added via hand-script writing on appropriate pages. Also note that only 5 holes were played.

LOADED 8K - FOCAL +TAPE 1

G

THIS IS THE PDP-2/3 MEMORIAL GOLF COURSE
PAY YOUR GREEN FEES AND REMEMBER
KEEP YOUR LEFT ARM STRAIGHT

PLEASE INDICATE THE CALIBER OF GOLFER THAT YOU ARE
BY ANSWERING THE FOLLOWING 3 QUESTIONS

TYPE POWER WITH 5-IRON FROM THIS TABLE

DISTANCE IN YARDS	YOUR RESPONSE
11 \emptyset	1. \emptyset
13 \emptyset	2. \emptyset
15 \emptyset	3. \emptyset
17 \emptyset	4. \emptyset
19 \emptyset	5. \emptyset

THUS TYPE ANY DECIMAL NUMBER BETWEEN 1. \emptyset AND 5. \emptyset :3. \emptyset i.e., 15 \emptyset yards

THANK YOU

TYPE NORMAL DIRECTION OF SHOTS FROM THIS TABLE

DIRECTION	YOUR RESPONSE
HOOK	-2. \emptyset
DRAW	-1. \emptyset
STRAIGHT	\emptyset . \emptyset
FADE	+1. \emptyset
SLICE	+2. \emptyset

THUS TYPE ANY DECIMAL NUMBER BETWEEN -2. \emptyset AND +2. \emptyset : \emptyset .2 i.e., slight fade

TYPE AVERAGE NO. PUTTS PER ROUND (18 HOLES):32

THANK YOU

NOTE:(+) OFF CENTER IS TO THE RIGHT;(-) IS TO THE LEFT
AND EACH HOLE IS 5 \emptyset YARDS WIDE, 25 TO THE LEFT
AND 25 TO THE RIGHT WITH OUT OF BOUNDS BEYOND THAT

THE FOLLOWING TABLE IS USED FOR HOLE CONFIGURATION:

SYMBOL TYPED	MEANING
0	GREEN
.	FAIRWAY
W	SAND
T	WATER
,	TREES
*	ROUGH
+	BALL
	HOLE(PIN)

AS YOU PLAY, YOU WILL BE ASKED A SERIES OF 3 QUESTIONS FOR EACH SHOT: WHICH CLUB, HOW HARD, AND WHAT DIRECTION.

FOR THE FIRST QUESTION (CLUB), ALWAYS TYPE A NUMBER (INTEGER) FROM 0 TO 11
 0=DRIVER, 1=1-IRON OR 2-WOOD, 2=2-IRON OR 3-WOOD

..... 9=9-IRON, 10=PITCH (50-100 YARDS), 11=CHIP (0-50 YARDS)

FOR THE SECOND QUESTION (SPEED), TYPE A DECIMAL NUMBER BETWEEN 1.0 (FOR VERY SOFT) AND 5.0 (FOR VERY HARD)

FOR THE THIRD QUESTION (DIRECTION), YOU MUST RESPOND WITH A SIGNED DECIMAL OR SIGNED INTEGER NUMBER
 A MINUS (-) SIGN INDICATES DIRECTION TO THE LEFT
 A POSITIVE (+) SIGN [OR NO SIGN] INDICATES TO THE RIGHT AND THE MAGNITUDE OF THE NUMBER INDICATES THE AMOUNT TO THE LEFT OR TO THE RIGHT

AS A HINT

-31 IS APPROXIMATELY STRAIGHT LEFT AND +31 STRAIGHT RIGHT

NOW TO BEGIN PLAY, READ IN THE FIRST HOLE FROM THE

HOLES TAPE AND TYPE (RE-TURN), G 3.05, (RE-TURN)

GOOD LUCK, ARNIE

PROGRAM STOPS SO LOAD IN 1/9 OF TAPE 2

*E 10

*

*C-FOCAL, 1969

*

*10.01 S PA=5

*10.05 F I=1, 5, 81; S SA(1)=5; S SA(I+4)=5; F J=I+1, I+3; S SA(J)=1

*10.10 F I=77, 79; S SA(1)=0

*10.11 F I=72, 74; S SA(1)=0

*10.12 S NO=85

*10.13 S SA(75)=2; S SA(70)=2; S SA(69)=2; S SA(64)=2; S SA(65)=2

*10.14 F I=35, 45; S SA(1)=3

*10.15 F I=81, NO; S SA(1)=4

*10.20 S PY=2.1; S PX=468.

*10.22 D 12; R

**

*G 3.05

YOU HAVE JUST LANDED
ON THE GREEN, AT (= 159= 8), HOLE IS (= 160= 0)
YOU ARE = 24 FEET FROM THE HOLE
YOU HAD = 2 PUTT(S)
YOU HAD A = 3 FOR HOLE = 5 , PRESENT TOTAL = 25
PAR TOTAL= 19 ,SO YOU ARE= 6 TO PAR

(TO CONTINUE, READ NEXT HOLE THROUGH READER)
(THEN TYPE (RE-TURN), G 3.05, (RE-TURN))
THE REMAINDER OF THE HOLES ARE PLAYED SIMILARLY

*

IX. HELPFUL HINTS

If, by mistake, you requested the printout of a hole (i.e., answered "Y") once you have teed off on the hole and wish to stop the printout, type CTRL/C (to return to the FOCAL monitor) and then G✓3.35 (to get to the shot selection portion).

If, after playing the same set of holes many times, you might wish to abort the total printout of a hole before you tee off on that particular hole, do the following. Wait until the word "YARDAGE" has been printed, then type CTRL/C followed by G✓3.1 (which will correctly initialize wind condition before requesting shot selection).

X. IDEAS

The following suggestions concerning future development of the code are offered as food for thought:

1. Author many sets of 9-hole and 18-hole tapes.
2. Author a limited 4K version of the code.
3. Add the capability to better control putting. Perhaps the contour of the green could be added to the hole description section together with a direction and speed opinion for putting.
4. Interface the code with CRT scope machine so that hole description and ball flight paths can be displayed much more quickly, clearly, and imaginatively.
5. Retain Arnold Palmer as a consultant on future development for this code.
6. Augment the segment description logic (SA array) so that sections can be better blended together in order to more closely simulate the desired hole configuration. This includes permitting variable section dimensions as well as non-discreet status codes.
7. After the basic CRT interface is implemented, if ever, consider the addition of a hole display (at ground level) through the golfer's eye in addition to the present top view of the configuration.

