

# oms i

**software development group**

**OMSI NO.**

4.29

**TITLE**

PS/8 FOCAL PROGRAMS  
PUBLIC LIBRARY Vol. 1

**AUTHOR**

**DESCRIPTION**

Listings of "free" PS/8 FOCAL Programs

**DATE**

**HARDWARE REQUIRED**

8K PDP-8\* with 64K disk or DECTape\*

**SOFTWARE REQUIRED**

PS/8 programming system from Digital Equipment Corp.

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SINCE NO GUARANTEE OF THE PERFORMANCE OF THESE PROGRAMS IS MADE, USERS SHOULD TREAT THEM AS 'DEMONSTRATIONS' TO AID IN THE PREPARATION OF THEIR OWN PROGRAMS.

#### PS/8 FOCAL, 1971 PROGRAMS --- PUBLIC LIBRARY CATALOG

GROUP 1 OF EACH PROGRAM CONTAINS RUNNING INSTRUCTIONS UNLESS THE PROGRAM IS SELF-DOCUMENTING WHEN RUN.

PROGRAM -----	SUBJECT -----
HELP	ON-LINE FOCAL REVIEW
INTRST	DETERMINES LOAN PAYMENTS
CHISQR	CHI-SQUARE MATRIX TEST
STAT1	1 OR 2 GROUP SAMPLE STATISTICS
STAT2	EXTENSION OF STAT1
ADDEX	ADDITION EXERCISER
BARON	LAND MANAGEMENT GAME
TRIANG	RIGHT TRIANGLE SOLVER
CALNDR	PERPETUAL CALENDAR
HANGMN	HANGMAN GAME
HANOI	TOWERS OF HANOI SOLVER
PLOTER	EUCLIDEAN GRAPH PLOTTER

THE FOLLOWING REQUIRE A TEKTRONIX T-4002 GRAPHIC TERMINAL:

POLAR	POLAR CO-ORDINATE GRAPH PLOTTER
GRAPH	EUCLIDEAN GRAPH PLOTTER
HARMON	SIMULATES HARMONOGRAPH MOTION
WEB	DRAWS SPIDER WEB
BTLSPH	PLAYS BATTLESHIP GAME
LISTAL.FD	THE DIRECT COMMAND 'O I LISTAL' WILL OUTPUT LISTINGS OF ALL ABOVE PROGRAMS

THE MATERIAL IN THIS PUBLICATION HAS BEEN ADAPTED IN PART FROM PUBLICATIONS OF DIGITAL EQUIPMET CORPORATION; ALL MATERIALS SO PUBLISHED HEREIN SHALL BE THE SOLE RESPONSIBILITY OF THE OREGON MUSEUM OF SCIENCE AND INDUSTRY.

CATLOG

01.01 C CATLOG  
 01.05 T !"PS/8 FOCAL,1971 PROGRAMS --- PUBLIC LIBRARY CATALOG"!!!  
 01.10 T "GROUP 1 OF EACH PROGRAM CONTAINS RUNNING INSTRUCTIONS"!!!  
 01.15 T !:5, "PROGRAM", :20, "SUBJECT", !  
 01.17 T :5, "-----", :20, "-----", !!  
 01.20 T :5, "HELP", :20, "ON-LINE FOCAL REVIEW PACKAGE"!  
 01.21 T :5, "INTRST", :20, "DETERMINES LOAN PAYMENTS", !  
 01.22 T :5, "CHISQR", :20, "CHI-SQUARE MATRIX TEST", !  
 01.24 T :5, "STAT1", :20, "1 OR 2 GROUP SAMPLE STATISTICS", !  
 01.26 T :5, "STAT2", :20, "EXTENSION OF STAT1", !  
 01.28 T :5, "ADDEX", :20, "ADDITION EXCERSIZER", !  
 01.30 T :5, "BARON", :20, "LAND MANAGEMENT GAME", !  
 01.32 T :5, "TRIANG", :20, "RIGHT TRIANGLE SOLVER", !  
 01.34 T :5, "CALNDR", :20, "PERPETUAL CALENDAR", !  
 01.36 T :5, "HANGMN", :20, "HANGMAN GAME", !  
 01.38 T :5, "HANOI", :20, "TOWERS OF HANOI SOLVER", !  
 01.40 T :5, "PLOTER", :20, "EUCLIDEAN GRAPH PLOTTER"!  
 01.42 T :5, "FACTOR", :20, "PRIME FACTOR PROGRAM", !!  
 01.50 T !"THE FOLLOWING REQUIRE A TEKTRONIX T-4002 GRAPHIC TERMINAL:"!!  
 01.54 T :5, "POLAR", :20, "POLAR CO-ORDINATE GRAPH PLOTTER", !  
 01.56 T :5, "GRAPH", :20, "EUCLIDEAN GRAPH PLOTTER", !  
 01.58 T :5, "HARMON", :20, "SIMULATES HARMONOGRAPH MOTION", !  
 01.60 T :5, "WEB", :20, "DRAWS SPIDER WEB", !  
 01.62 T :5, "BTLSHP", :20, "PLAYS BATTLESHIP GAME", !!!  
 01.80 T :5, "LISTAL.FD", :20, "THE DIRECT COMMAND 'O I LISTAL' WILL"!  
 01.82 T :20, "OUTPUT LISTINGS OF ALL ABOVE PROGRAMS"!!!

HELP

01.01 C "HELP" 8/15/71 BY H. WHITNEY OF OMSI  
 01.05 I ((#/?)-FTR(#/?)), 2. 1: T !"HELP REQUIRES USE OF FILES!" "RE-ENTER "  
 01.06 T "FOCAL AND ANSWER 'YES' OR '5' TO INITIAL DIALOGUE."!!!  
 01.10 L G HELPER. RE 4  
 01.36 G 4. 7  
 01.50 S C(I)=0  
  
 02.05 T " ?U"  
 02.10 T !!"WHAT "  
 02.13 T "DO YOU WANT TO REVIEW (OR TYPE 'HELP')? " ) E  
 02.20 S Z=FIN() I (FABS(Z-149)), 2. 05: I (FABS(Z-141)), 1. 1  
 02.23 I (FABS(Z-160)), 2. 2, 2. 3  
 02.25 S Z=FIN()  
 02.30 I (FABS(Z-149)), 2. 05: I (FABS(Z-141)), 3. 1: I (30-I)2. 25  
 02.40 S I=I+1: S G(I)=Z  
 02.50 G 2. 25

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03.10 D 2.4;T !!!
03.20 S C(1)=G(1);S C(2)=G(2);S 0=C(1)
03.30 I [(0-204)*(0-207)]3.41;3.32;3.41
03.32 I (C(2)-160)3.36;3.34;3.36
03.34 S C(3)=G(3);G 3.9
03.36 S I=2
03.37 S I=I+1;I (12-I)3.38;I [(G(I)-160)*(G(I)-141)]3.37;3.38;3.37
03.38 S C(3)=G(I+1);S C(4)=G(I+2);G 3.9
03.41 I (-FABS(0-195))3.42;S A=2;S B=2;G 3.8
03.42 I (-FABS(0-211))3.44;S A=0;S B=4;G 3.8
03.44 I (-FABS(0-210))3.46;S A=4;S B=4;G 3.8
03.46 I (-FABS(0-197))3.8;S A=0;S B=7;G 3.8
03.80 S C(3)=G(3+A);S C(4)=G(4+B)
03.90 F I=1.4;I [FABS((C(I)-141)*(C(I)-160))]1.1.5

04.05 I (FABS(C(1)-206)+FABS(C(2)-207)),5.1;
04.06 I (FABS(C(1)-211)+FABS(C(2)-212)+FABS(C(3)-207)),5.1;
04.07 I (FABS(C(1)-201)+FABS(C(2)-206)+FABS(C(3)-196)+FABS(C(4)-197)),8.4
04.08 I (FABS(C(1)-200)+FABS(C(2)-197)),1.1
04.09 I (FABS(C(1)-0)),1.1
04.12 I ((FABS(C(1)-205.5))-12.6)4.14;O I SDIREC.RD;G 4.25
04.14 I (200-C(1))4.16;O I DIRECH.RD;G 4.25
04.16 I (209-C(1))4.18;O I DIRECL.RD;G 4.25
04.18 O I DIRECR.RD
04.25 A X,A,B,C,D
04.28 I (((10000)*FITR(X/(1000)))-FABS(A-C(1)))4.25.4.4;O I TTY:,E
04.30 T !;S L=0
04.31 S L=L+1;I (FABS(G(L)-141)),4.32;S U=FOUT(G(L));I (L-30)4.31
04.32 T " -- NOT AVAILABLE; RETRY OR TYPE 'HELP' "!!
04.33 G 4.7
04.40 I [FABS(B-C(2))+FABS(C-C(3))+FABS(D-C(4))]4.25.4.5.4.25
04.50 O I TTY:,E
04.55 S Y=(FITR(X))/10;S Z=.091+100*(X-FITR(X))
04.56 I (Y-7)4.6.4.6.4.65
04.60 G Y
04.65 D Y
04.70 T "WHAT ELSE DO YOU WANT ? "E
04.75 G 2.2

05.10 T 26.04;"HELP DONE."!!!;E
05.15 S "=0
05.20 L C FOCAL.TM
05.30 S 0=.2;L R MISCL1.RE 1.2
05.40 S 0=.31;L R COMMA1.RE 1.2
05.50 S 0=.32;L R COMMA1.RE 1.2
05.60 S 0=.33;L R LIBRAR.RE 1.3
05.70 S 0=.34;L R HFILE1.RE 1.2
05.80 S 0=.35;L R COMMA1.RE 1.4
05.90 S 0=.41;L R SYMB01.RE 1.2

06.10 S 0=.42;L R SYMB01.RE 1.2
06.20 S 0=.43;L R SYMB01.RE 1.3
06.30 S 0=.51;L R FUNCT1.RE 1.2
06.40 S 0=.61;L R MISCL1.RE 1.2
06.50 S 0=.81;L R INTRO1.RE 1.2

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07.10 L G COMM1. RE Z  
 07.20 L G COMM2. RE Z  
 07.30 L G COMM3. RE Z  
 07.40 L G LIBRAR. RE Z  
 07.50 L G HFILE1. RE Z  
 07.60 L G HFILE2. RE Z  
 07.70 L G SYMB01. RE Z  
 07.80 L G SYMB02. RE Z  
 07.90 S Z1=3. 2; L G FUNCT1. RE Z

08.10 L G MISCL1. RE Z  
 08.20 L G MISCL2. RE Z  
 08.30 L G MISCL3. RE Z  
 08.40 L G INDEX. RE  
 08.50 G 2. 1  
 08.60 S Z1=1. 99; L G FUNCT1. RE Z  
 08.70 L G FUNCT2. RE Z  
 08.80 L G HERROR. RE Z  
 08.90 L G SUMCOM. RE Z

THE 'HELP' PACKAGE INCLUDES MANY PROGRAM AND DATA FILES OF WHICH THIS IS ONLY THE 'EXECUTIVE'. ALL OTHER 'HELP' FILES HAVE A '.RE' OR '.RD' NAME EXTENSION SIGNIFYING PROGRAM OR DATA.

## INTRST

01.01 C INTRST FROM 'FOCAL PROGRAMMING MANUAL' PDP-15 SYSTEMS  
 01.02 C COPYRIGHT 1970 BY DIGITAL EQUIPMENT CORP.  
 01.03 C REPRINTED BY PERMISSION OF DIGITAL EQUIPMENT CORP.  
 01.04 C LAST CHANGE: 8/9/71  
 01.05  
 01.06 C THIS PROGRAM WILL COMPUTE MONTHLY PAYMENTS AND THE  
 01.07 C CONTRIBUTION OF EACH PAYMENT TO INTEREST AND PRINCIPAL.  
 01.08 C YOU WILL BE ASKED THE AMOUNT OF THE PRINCIPAL, THE RATE  
 01.09 C OF THE INTEREST, AND THE TERM OF THE LOAN, WHICH IS IN  
 01.10 C MONTHS. THE PROGRAM WILL THEN OUTPUT A TABLE SHOWING  
 01.11 C THE PROGRESSION OF THE LOAN.  
 01.12  
 01.33 E  
 01.34 A "PRINCIPAL: ", PR, !"INTEREST RATE: ", IN  
 01.35 A !"TERM (IN MONTHS): ", TE, !!  
 01.40 S D=1+((IN/12)\*.01)  
 01.41 F A=1, TE; D 15. 99  
 01.42 S C=PR/B  
 01.50 S BA=PR  
 05.02 T "PRINCIPAL: ", 27. 02, PR, : 30 "PAYMENTS", C, !!!  
 05.05 T : 5, "PAYMENT", : 17, "INTEREST", : 32, "PRINCIPAL", : 50, "BALANCE", !

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06.01 F M=1, TERM; D ?
06.02 T (!!!); :20, "TOTAL INTEREST", %6.02, T0, (!!!); G 1.33

07.01 S CI=BA*(IN/12)*.01
07.02 S T0=T0+CI
07.03 S CP=C-CI; S BA=BA-CP; T %7, M, %14.02, CI, CP, BA;

15.99 S B=B+(1/D)*A)

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## CHISQR

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01.01 C FROM CHISQR BY M. J. MC KEOWN (DECUS: FOCAL8-40)
01.02 C MODIFIED BY JOHN HUISMAN
01.03 C OMSI SOFTWARE DEVELOPMENT GROUP
01.04 C LAST CHANGE: 9/9/71
01.05
01.06 C THE PROGRAM WILL PRINT THE DATA MATRIX WITH TWO
01.07 C VALUES IN EACH CELL. ONE IS THE OBSERVED VALUE AND
01.08 C THE OTHER IS THE EXPECTED VALUE AS CALCULATED. YOU MAY HAVE UP TO
01.09 C 10 DIGIT PRECISION, BUT IT IS VARIABLE. YOU ENTER A
01.10 C MATRIX NO LARGER THAN 25 ELEMENTS. THE WIDTH THAT THE MATRIX
01.11 C MAY BE DEPENDS ON THE PRECISION YOU CHOOSE, AND THE WIDTH
01.12 C OF YOUR OUTPUT DEVICE.
01.13
01.14 C ** RS IS THE ROW SUM.
01.15 C ** CS IS THE COLUMN SUM.
01.16 E
01.17 I (FITR(#/30)-(#/30)) 1.18, 1.3, 1.18
01.18 T "YOU DO NOT HAVE ENOUGH FEATURES."
01.19 T "RESTART FOCAL WITH FEATURES 2 AND 3."
01.20
01.30 S X=FOUT(24)+FOUT(1); F K=1, 100; E
01.31 T "HOW MANY PLACES ACCURATE?" A AC; S X1=(100+AC+3)/100; T %2(X1)
01.32 A "ROWS:" R; "COLUMNS:" C; S DF=(R-1)*(C-1); S L=R*C
01.33 S K=0; F I=1, R; S RS(I-1)=RP; S RP=0; D 1.4
01.34 S RS(I-1)=RP
01.35 T %2(X1); ! "NO MORE INPUT!" ; G 2.01
01.40 F J=1, C; D 1.41
01.41 S K=K+1; D 11; T ! "SAMPLE" I, %1, ", " J, " : " ; G 1.42
01.42 A N(K); I (10*AC-N(K)) 1.43, 1.43; S RP=RP+N(K); S CS(J)=CS(J)+N(K)
01.43 T "TOO MANY DIGITS - INPUT AGAIN OR INCREASE ACCURACY" %1, "?" ; G 1.42

02.01 F J=1, 1, R; S T=T+RS(J)
02.02 S J=1; S I=1; S K=1
02.03 S E(K)=(RS(I)/T)*CS(J); S J=J+1; S K=K+1
02.04 I (C-J) 2.05, 2.03, 2.03
02.05 S J=1; S I=I+1
02.06 I (R-I) 3.01, 2.03, 2.03

03.01 F K=1, 1, L; S %2=%2+((N(K)-E(K))^2)/E(K)

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04.01 T (!) S K=1; S Y=1; S N=1; S I=1; D 10; D 8.0; T !
04.02 F J=1, 1, 0; D 6.0
04.03 T "*", !, "*"; F J=1, 0; D 5; T "*"
04.04 T " * ", "RS:"RS(N); S N=N+1; T !
04.05 F J=1, 1, 0; D 7.0
04.06 T "*" T !; D 8.0; T !; S I=I+1; I (R-I)4.07, 4.02, 4.02
04.07 T !; F J=1, 1, 0; D 9.0
04.08 T %, " TOTAL:"T, !, "CHI-SQUARED:"X2
04.09 T %(X1), " DEGREES OF FREEDOM:"DF, !
04.10 A "MORE?"Z; I (Z-0YES) 4.11, 1.3, 4.11
04.11 0

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05.01 T :(1+J*(9+AC))
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```
06.01 T " * 0:"N(K); D 5.01; S K=K+1
```

```
07.01 T " * E:"E(Y); D 5.01; S Y=Y+1
```

```
08.01 F M=1, (C*(AC+9)+1); T "*"
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09.01 T " CS:"CS(J), " "
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10.01 T "E = EXPECTED VALUE      O = OBSERVED VALUE", !
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11.10 S ZF=1+FITR(FLOG(I)/FLOG(10)); T %(ZF); R
```

## STAT1

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01.01 C FROM STAT1 BY M. J. MC KEOWN (DECUS: FOCAL8-16)
01.02 C MODIFIED BY JOHN HUISMAN
01.03 C OMSI SOFTWARE DEVELOPMENT GROUP
01.04 C LAST CHANGE: 9/9/71
01.05
01.06 C THIS PROGRAM DETERMINES VARIOUS STATISTICS FROM A
01.07 C MAXIMUM OF TWO SAMPLE GROUPS. IT WILL ASK YOU FOR THE
01.08 C NUMBER OF GROUPS, AND THEN FOR THE NUMBER OF SAMPLES
01.09 C IN THE FIRST GROUP. WHEN THAT HAS BEEN ENTERED, IT
01.10 C WILL HAVE YOU INPUT THAT MANY SAMPLES, AND FIGURE
01.11 C CERTAIN STATISTICS FOR THAT GROUP. THEN IT WILL ASK FOR
01.12 C THE NUMBER OF SAMPLES IN THE OTHER GROUP IF YOU ASKED FOR
01.13 C TWO GROUPS, FIGURE ITS STATISTICS, AND THEN TWO-GROUP
01.14 C STATISTICS.
01.15 E
01.26 I (FITR(#/5)-(#/5)) 1.27, 1.3
01.27 T "YOU DO NOT HAVE ENOUGH FEATURES. "
01.28 T "RESTART FOCAL WITH FEATURE 3. (!) 0
01.29
01.30 S X=FOUT(1); F K=0.25; S X=FOUT(24)
01.31 T !!!X10.04; A "NUMBER OF GROUPS:"G; S L=0; I (G-2) 1.32, 1.32, 4.1
01.32 S S=0; T X1.00, "HOW MANY SAMPLES IN GROUP", L+1; A X10.04, "? ", N
01.33 F C=1, N; A "SAMPLE:"X(C); S S=S+X(C)
01.34 T !!!"NO MORE INPUT:!!!

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01. 36 S K=N-1; S I=1; S J=I+1; D 7
01. 37 S M=S/N; S SZ=0; F I=1, N; D 4
01. 38 S SZ=SZ/(N-1); S SO=FSQT(SZ); S DF=(N-1)
01. 39 S SE=FSQT(SZ/N); S ST=M/SE; S R=X(N)-X(1); T !! "MAX": 30, X(N) !!
01. 40 T "MIN": 30, X(1) !! "RANGE": 30, R, !! "MEAN": 30, M, !! "VARIANCE": 30, SZ, !!
01. 41 T "STANDARD DEVIATION": 30, SO, !! "STANDARD ERROR": 30, SE, !!
01. 42 T "T-STATISTIC": 30, ST, !! "DEGREES OF FREEDOM": 30, DF, !!
01. 43 S L=L+1; I (SZ) 1. 44, 1. 45, 1. 44
01. 44 I (G-2) 8. 01, 2. 01, 8. 01
01. 45 T "VARIANCE OF 0" !! G 8. 01

02. 01 S MM(L)=M; S NN(L)=N; S SS(L)=SZ; S SX(L)=SE
02. 02 I (L-2) 1. 32, 2. 03
02. 03 S DM=MM(1)-MM(2)
02. 04 S PC=((NN(1)-1)*SS(1)+(NN(2)-1)*SS(2))/(NN(1)+NN(2)-2)
02. 05 S PD=(1/NN(1)+1/NN(2))
02. 06 S PE=FSQT(PC*PD); S TT=DM/PE; S DO=NN(1)+NN(2)-2
02. 07 I (SS(1)-SS(2)) 2. 08, 2. 09, 2. 09
02. 08 S VR=SS(1)/SS(2); G 2. 10
02. 09 S VR=SS(2)/SS(1)
02. 10 T !! "DIFFERENCE BETWEEN MEANS": 30, DM, !! "POOLED STANDARD ERROR": 30, PE, !!
02. 11 T "TWO GROUP T-STATISTIC": 30, TT, !! "VARIANCE RATIO": 30, VR, !!
02. 12 T "DEGREES OF FREEDOM": 30, MF, !!; I (SS(1)) 2. 13, 4. 1, 2. 13
02. 13 I (SS(2)) 3. 01, 8. 01, 3. 01

03. 01 S AC=FSQT(SS(1)/NN(1)+SS(2)/NN(2))
03. 02 S X1=(MM(1)-MM(2))/AC
03. 03 S RS=(SS(1)/NN(1)+SS(2)/NN(2))^2
03. 04 S L=(SS(1)/NN(1))^2/(NN(1)-1)+(SS(2)/NN(2))^2/(NN(2)-1)
03. 05 T !! "WELCH STATISTICS": "!!!
03. 06 S K=RS/L; T "T-STATISTIC": 30, X1, !! "DEGREES OF FREEDOM": 30, K, !!
03. 07 T "UNPOOLED STANDARD ERROR": 30, AC, !!; G 8. 01

04. 01 S SZ=SZ+(X(I)-M)^2
04. 02 R
04. 10 T "TOO MANY GROUPS"; G 8. 01

07. 01 I (X(I)-X(J)) 7. 03, 7. 03, 7. 02
07. 02 S TX=X(I); S X(I)=X(J); S X(J)=TX
07. 03 S J=J+1; I (J-N) 7. 01, 7. 01, 7. 04
07. 04 S I=I+1; I (I-K) 7. 05, 7. 05, 7. 06
07. 05 S J=I+1; G 7. 01
07. 06 R

08. 01 A !! "AGAIN?" , AN; I (AN=0YES) 8. 03, 1. 29, 8. 03
08. 03 0

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## STAT2

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01. 01 C FROM STAT2 BY M. J. MC KEOWN (DECUS: FOCAL8-16)
01. 02 C MODIFIED BY JOHN HUISMAN
01. 03 C OMSI SOFTWARE DEVELOPMENT GROUP
01. 04 C LAST CHANGE: 9/9/71
01. 05
01. 06 C THIS PROGRAM REQUIRES THAT YOU KNOW THE MEANS
01. 07 C AND VARIANCES OF THE GROUPS YOU WISH TO WORK ON. TO
01. 08 C GET THIS INFORMATION, SIMPLY RUN 'STAT1'.
01. 09
01. 10 C THE PROGRAM USES THE FOLLOWING ABBREVIATIONS:
01. 11
01. 12 C ** SSB - SUM OF SQUARES BETWEEN GROUPS
01. 13 C ** DFB - DEGREES OF FREEDOM BETWEEN GROUPS
01. 14 C ** MSB - MEAN SQUARE DIFFERENCE BETWEEN GROUPS
01. 15 C ** SSW - SUM OF SQUARES WITHIN GROUPS
01. 16 C ** DFW - DEGREES OF FREEDOM WITHIN GROUPS
01. 17 C ** MSW - MEAN SQUARE DIFFERENCE WITHIN GROUPS
01. 18 C USING THE POOLED VARIANCE
01. 19 C ** SCT - SO-CALLED TOTAL SUM OF SQUARES
01. 20 C ** SCF - SO-CALLED TOTAL DEGREES OF FREEDOM
01. 21 C ** SSG - GRAND MEAN SUM OF SQUARES
01. 22 C ** ODF - OVERALL DEGREES OF FREEDOM
01. 23 C ** SST - TOTAL SUM OF DEGREES
01. 24 C ** DFT - TOTAL DEGREES OF FREEDOM
01. 25 C ** FR - F-RATIO (F-STATISTIC)
01. 26 E
01. 27 I (FTR(#/5)-(#/5)) 1. 28, 1. 31, 1. 28
01. 28 T "YOU DO NOT HAVE ENOUGH FEATURES. "
01. 29 T "RESTART FOCAL WITH FEATURE 3. " (!) 0
01. 31 S X=FOOT(1); F K=1, 25; S X=FOOT(24)
01. 32 T %1. 0 (!) A "NUMBER OF GROUPS:" G; S S=0
01. 33 F J=1, G; T "NUMBER IN GROUP", J, " "; A N(J); S S=S+N(J)
01. 35 S X=0
01. 36 F J=1, G; T "MEAN OF GROUP", J, " "; A M(J); S X=X+(N(J)*M(J))/S
01. 39 S SG=S*(X)^2

02. 01 S SB=0; S J=1
02. 02 F J=1, G; S SB=SB+N(J)*(M(J)-X)^2
02. 03
02. 04
02. 05 S SW=0
02. 06 F J=1, G; T "VARIANCE OF GROUP", J, " "; A V(J); S SW=SW+(N(J)-1)*V(J)
02. 07
02. 08
02. 09 S CT=SB+SW; S ST=CT+SG; S XB=G-1; S MB=SB/XB

03. 01 S XW=0; S J=1
03. 02 S XW=XW+(N(J)-1)
03. 03 I (G-J) 3. 05, 3. 05, 3. 04
03. 04 S J=J+1; G 3. 02
03. 05 S MW=SW/XW; S XR=MB/MW; S BW=XB+XW; S TT=BW+1; T , ! ! ! ! !

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04.01 T %6.04 "SSB":6,SB,!"DFB":6,XB,!"MSB":6,MB,!
04.02 T "SSW":6,SW,!"DFW":6,XW,!"MSW":6,MW,!
04.03 T "SCT":6,CT,!"SCF":6,BW,!
04.04 T "SSG":6,SG,!"ODF":6,1,!"SST":6,ST,!
04.05 T "DFT":6,TT,!)T "FR":6,XR,!!!
04.06 A "MORE?"AN;I (AN-0YES)4.07,1,31,4.07
04.07 T "GOODBYE"!!!;0

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07.01 I (X(I)-X(J))7.03,7.03,7.02
07.02 S TX=X(I);S X(I)=X(J);S X(J)=TX
07.03 S J=J+1;I (J-N)7.01,7.01,7.04
07.04 S I=I+1;I (I-K)7.05,7.05,7.06
07.05 S J=I+1;G 7.01
07.06 R

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08.01 A "M?"E;I (E-2)8.03,1,31,1,31
08.02 T "E2",!!!;G 8.01
08.03 0

```

## ADDEX

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01.01 C      ADDEX FROM 'PROGRAMMING LANGUAGES'
01.02 C      COPYRIGHT 1970 BY DIGITAL EQUIPMENT CORP.
01.03 C      LAST CHANGE: 9/10/71
01.04
01.05 C      THIS IS AN EDUCATIONAL ROUTINE DESIGNED FOR CHILDREN IN
01.06 C ELEMENTARY SCHOOL.  THE PURPOSE IS TO ALLOW THE STUDENTS TO
01.07 C USE THE COMPUTER AND TO AID THEM IN PRACTICING ADDITION.
01.09 E
01.10 T "HELLO, PLEASE ADD THE FOLLOWING 20 SETS OF NUMBERS."!)G 1.4
01.15 T "NOW THIS:"!
01.20 S A=FABS(FITR(100*FRAN()));S B=FABS(FITR(99*FRAN()))
01.30 T %2, :4, A, !"+", :4, B, !"-----", !!
01.40 A "=  ",REPLY, !
01.50 I (RE-A-B) 2.1,1.8,2.1
01.60 S WRONG=0;T "CORRECT"!
01.70 S CORRECT=CO+1;I (CO-19) 1.35,1.35,4.1

02.10 S WR=WR+1;I (WR-2) 2.2,2.2,3.1
02.20 T "SORRY, TRY AGAIN."!)G 1.5

03.10 T "IF YOU ARE HAVING TROUBLE, ASK YOUR TEACHER FOR HELP."!)
03.20 T "THE CORRECT ANSWER IS ",%3,A+B,!!!
03.30 G 1.35

04.10 T "CONGRATULATIONS! YOU ARE FINISHED."!!!!;0

```

## BARON

```

01.01 C BARON FROM 'PROGRAMMING LANGUAGES' COPYRIGHT 1970
01.02 C BY DIGITAL EQUIPMENT CORP. MODIFIED BY TOM KLOOS
01.03 C OMSI SOFTWARE DEVELOPMENT GROUP
01.04 C LAST CHANGE: 9/9/71
01.05
01.06 C THIS PROGRAM ALLOWS YOU TO BE THE BARON OF A SMALL TOWN
01.07 C WHERE EVERYONE IS DEPENDENT ON YOU. HOW YOU MANAGE YOUR
01.08 C LAND WILL DEPEND ON HOW YOU ANSWER THE QUESTIONS IN THE
01.09 C PROGRAM, AND ON THOSE ANSWERS WILL DEPEND YOUR FATE AS WELL.
01.10 C ** YOU CAN ONLY PLANT 10 ACRES PER PERSON
01.11 C ** YOU MUST HAVE AT LEAST ONE BUSHEL FOR FOOD.
01.12 C ** TO PREVENT STARVATION, EACH PERSON NEEDS 20 BUSHELS.
01.13 C ** YOU ARE PROMOTED WHEN YOU GET A POPULATION GREATER THAN 250.
01.14 E
01.19 I ((#/3)-FITR(#/3)) 1.2,1.9,1.2
01.20 T !"YOU DO NOT HAVE ENOUGH FEATURES.",!
01.30 T "RESTART FOCAL WITH FEATURE 2.",!;0
01.40
01.90 S P=95;S S=2000;S H=3000;S E=200;S Y=3;S A=1000;S I=5;S Q=1

02.01 S 0=0
02.05 S ZZ=FOUT(1)+FOUT(24);F ZZ=1,100;
02.20 D 6;S 0=D;D 10;T !!!"LAST YEAR"!D," STARVED,
02.25 S 0=I;D 10;T !I," ARRIVED,";S P=P+I;I (250-P)9.2;I (-Q)2.3
02.27 S P=FITR(P/2);T !"***PLAGUE***"!
02.30 S 0=P;D 10;T !"POPULATION IS"P,!!"THE CITY OWNS
02.35 S 0=A;D 10;T A," ACRES."!;I (H-1)2.5;T "WE HARVESTED
02.40 D 3.2
02.50 S 0=E;D 10;T !" RATS ATE"E," BUSHELS, YOU NOW HAVE
02.60 S 0=S;D 10;T !S," BUSHELS IN STORE."!

03.10 D 6;S Y=FITR(8+FRAN())+17;T "LAND IS TRADING AT
03.20 S 0=Y;D 10;T Y," BUSHELS PER ACRE);S C=1
03.30 D 4.3;A " BUY?"Q;I (-Q)3.4,3.8;D 7.2;G 3.3
03.40 I (Y*Q-S)3.9,3.6;D 4.6;T !"YOU MAY BUY AT MOST"
03.45 D 10;T S/Y-1,!;G 3.3
03.50 D 4.5;D 4.3;G 3.8
03.60 D 3.9;G 4.8
03.70 S A=A+Q;S S=S-Y*Q;S C=0
03.80 A !"SELL?"Q;I (Q)3.85,3.9;S Q=-Q;I (A+Q)3.5;G 3.9
03.85 D 7.2;D 4.3;G 3.8
03.90 S A=A+Q;S S=S-Y*Q;S C=0

```

```
04.10 T !"BUSHELS TO USE
04.11 A " AS FOOD?"Q; I (Q)4.12,9.1; I (Q-S)4.2,4.7; D 4.6; G 4.1
04.12 D 7.2; G 4.1
04.20 S S=S-Q; S C=1
04.30 A !"HOW MANY ACRES OF LAND DO YOU WISH TO
04.35 A !"PLANT WITH SEED? "D
04.40 I (D)4.42; I (A-D)4.45; I (FITR(Q/2)-S-1)4.65; D 4.6; G 4.3
04.42 D 7.2; G 4.3
04.45 D 4.5; G 4.3
04.50 D 7; S D=A; D 10; T A, " ACRES. "
04.60 D 7; D 2.6
04.65 I (D-10*P-1)5.1; D 7; S D=P; D 10; T P, " PEOPLE. " ; G 4.3
04.70 D 4.2
04.80 D 6; T "YOU HAVE NO GRAIN LEFT AS SEED !!!" ; S D=0
04.90 FOR ZZ=1,450;

05.10 S S=S-FITR(D/2); D 8; S Y=C; S H=D*Y
05.20 D 8; S E=0; I (FITR(C/2)-C/2)5.3; S E=FABS(S/C)
05.30 S S=S-E+H; D 8; S I=FITR(C*(20*A+S)/P/100+1); S C=FITR(Q/20)
05.40 S Q=FITR(10*FABS(FRAN())); I (P-C)2.01; S D=P-C; S P=C
05.60 G 2.05

06.10 T !"LORD BARON: "

07.10 D 6; T "BUT YOU HAVE ONLY"; R
07.20 T "PLEASE. "; D 6; T "I AM NOT IN A MOOD FOR JESTING. "; R

08.10 S C=FITR(5*FABS(FRAN()))+1

09.10 T "REVOLUTION!!!"!!!; Q
09.20 T !, :10, "YOU HAVE BEEN PROMOTED TO PRIME MINISTER OF BIRTH"
09.25 T " CONTROL!" ; Q

10.10 S ZF=1+FITR(FLOG(D+1)/FLOG(10)); T Z(ZF); R
```

## TRIANG

```

01.01 C FROM TRIANG IN "PROGRAMMING LANGUAGES" COPYRIGHT 1970
01.02 C BY DIGITAL EQUIPMENT CORP. REWRITTEN BY JOHN HUISMAN
01.03 C OMSI SOFTWARE DEVELOPMENT GROUP
01.04 C LAST CHANGE: 9/9/71
01.05
01.06 C GIVEN THREE PIECES OF INFORMATION
01.07 C ABOUT THE TRIANGLE SHOWN AT THE RIGHT
01.08 C THIS PROGRAM WILL DETERMINE THE OTHER
01.09 C THREE PIECES. HOWEVER, YOU MUST HAVE
01.10 C THE INPUT IN THE RIGHT ORDER. THERE-
01.11 C FORE, WHEN ASKED "TYPE", RESPOND WITH
01.12 C "ASA" TO INPUT ANGLE-SIDE-ANGLE DATA,
01.13 C OR "SAS" FOR SIDE-ANGLE-SIDE INPUT OR
01.14 C "SSS" IF YOU KNOW THE SIDE LENGTHS.
01.15 C ** THIS MUST BE A RIGHT TRIANGLE.
01.16 C ** BECAUSE OF THE ARCTANGENT FUNCTION,
01.17 C LENGTHS MUST BE LESS THAN ONE MILLION UNITS.
01.18 E
01.26 I (FTR(#/6)-(#/6)) 1.27,1.3,1.27
01.27 T "YOU DO NOT HAVE ENOUGH FEATURES. "
01.28 T "RESTART FOCAL WITH FEATURE 2. ";0
01.29
01.30 A "TYPE: ",TY;S A3=3.14159/2;I (FABS(TY-0ASA)) ,2.1
01.40 I (FABS(TY-0SAS)) ,3.1;I (FABS(TY-0SSS)) ,4.1
01.50 T "LIST GROUP 1 FOR INSTRUCTIONS",!!;0
01.60

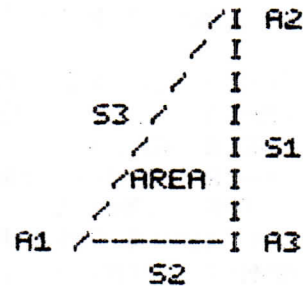
02.10 D 6;A "A1: ",A1,"S2: ",S2,
02.20 I (FABS(S2)) ,2.3;S A1=A1*3.14159/180;S A2=3.14159/2-A1
02.30 S S3=S2/FCOS(A1);S S1=FSQT(S3*S3-S2*S2)
02.40 T !!,%5.05,:10,"RADIANS",:26,"DEGREES",!
02.50 T !,"A1:",:7,A1,:24,A1*57.2958
02.55 T !,"A2:",:7,A2,:24,A2*57.2958
02.60 T !,"A3:",:7,A3,:24,A3*57.2958
02.65 T !! "S1:",S1
02.70 T !! "S2:",S2
02.80 T !! "S3:",S3
02.90 T !! "AREA =",%4.02,S1*S2/2,!!;G 1.29

03.10 A "S1: ",S1,"S2: ",S2
03.20 S S3=FSQT(S1*S1+S2*S2);S A1=FATN(S1/S2)
03.30 S A2=A3-A1;G 2.4

04.10 A !! "S1: ",S1,"S2: ",S2,"S3: ",S3,!
04.20 S A1=FATN(S1/S2);S A2=A3-A1;G 2.4

05.10 A "ARE YOUR ANGLES IN DEGREES? ",ANSWER
05.20 I (-FABS(AN-0YES)) 6.3;S DSWITCH=1;R
05.30 I (-FABS(AN-0NO)) 6.4;S DSWITCH=0;R
05.40 T "YES OR NO.",!!;G 6.1

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## CALNDR

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01.01 C CALNDR FROM 'PROGRAMMING LANGUAGES' COPYRIGHT 1970
01.02 C BY DIGITAL EQUIPMENT CORPORATION
01.03 C LAST CHANGE: 8/30/71
01.04
01.05 C GIVEN THE MONTH/DATE/YEAR, THE "PERPETUAL
01.06 C CALENDAR" WILL TYPE THE DAY OF THE WEEK.
01.07
01.30 A "WHAT IS THE DATE? (MM/DD/YYYY) ",M,K,C, !
01.32 I (M-13) 1.35; T "IN ORDER TO MAKE ROOM FOR THE MONTHS, THERE "
01.33 T "WERE NO DAYS!" !!; G 1.3
01.35 I (K-32) 1.4; T "MONTHS WITH",%3,K, " DAYS DON'T EXIST IN",%4
01.36 T " THE YEAR",C, "!" !!; G 1.3
01.40 S C=C/100; S D=FITR(.1+100*(C-FITR(C))); S C=FITR(C)
01.50 S M=M-2; I (M) 5.4,5.4; G 5.5

05.40 S M=M+12; S D=D-1; I (-D) 5.5,5.5; S D=99; S C=C-1
05.50 S X=FITR(FITR(2.6*M-.2J+K+D+FITR(D/4J+FITR(C/4))-2*C)
05.60 I (X-6) 5.7,5.7; S X=X-7; G 5.6
05.70 T !"THE DAY IS "; D 6.1
05.90 T !!; G 1.3

06.10 I (X) 6.26,6.2; I (X-2) 6.21,6.22,6.15
06.15 I (X-4) 6.23,6.24; I (X-6) 6.25,6.26
06.20 T "SUNDAY
06.21 T "MONDAY
06.22 T "TUESDAY
06.23 T "WEDNESDAY
06.24 T "THURSDAY
06.25 T "FRIDAY"; I (FABS(K-13)),6.3;
06.26 T "SATURDAY
06.30 T " THE 13TH!!"

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## HANGMN

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01.01 C HANGMN BY TOM KLOOS
01.02 C OMSI SOFTWARE DEVELOPMENT GROUP
01.03 C LAST CHANGE: 9/9/71
01.04 C
01.05 C THIS PROGRAM PLAYS THE GAME OF HANGMAN ON AN ORDINARY
01.06 C TELETYPE. IT WILL CHOOSE A WORD AUTOMATICALLY AND AT
01.07 C RANDOM AND ASK YOU TO GUESS LETTERS. YOU GET ONLY 7 WRONG
01.08 C GUESSES AND THEN YOUR MAN IS HUNG. NO PICTURE IS DRAWN BY
01.09 C THIS PROGRAM.
01.10
01.11 I ((#/7)-FITR(#/7)) 1.12,2.05,1.12
01.12 T !"YOU DO NOT HAVE ENOUGH FEATURES.",!
01.13 T "RESTART FOCAL WITH FEATURE 4." !!; G

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```
02.05 T !"PLEASE WAIT AS THE COMPUTER DECIDES ON A WORD. "!!!
02.10 O I HANGWD;T !;E
02.15 S R=FIR(FRAN()*80+1)
02.20 S Y=FIN();I (160-Y)2.2,2.25,2.2
02.25 S B=B+1;I (B-A)2.2
02.27 S C=C+1
02.30 S D(C)=FIN()
02.35 I (D(C)-160)2.37,2.5
02.37 I (D(C)-187)2.4,2.5
02.40 I (D(C)-141)2.45,2.3
02.45 I (D(C)-138)2.27,2.3,2.27
02.50 I (B-A)2.25
02.55 S C=C-1;O I TTY;E
02.65 F Z=1,C;S E(2)=173
02.80 T "THE WORD HAS ", %3,C," LETTERS. "!!!
02.85 S G=0

03.10 S G=G+1
03.15 T !, "WHAT IS GUESS #",G," ? "
03.20 S H=FIN();I (H-141)3.25,3.15
03.25 S Z=FIN();IF (Z-141)3.3,3.4
03.30 I (Z-223)3.35,3.2
03.35 I (Z-255)3.25;T "\";G 3.2
03.40 I (218-H)3.45;I (193-H)3.5,3.5
03.45 T !"*ILLEGAL INPUT"!!;G 3.15
03.50 T !;S I=0
03.55 F Z=1,C;D 5
03.57 I (K-C)3.6,3.83,3.6
03.60 I (I-2)3.65,3.7
03.65 I (I)3.65,3.75,4.1
03.70 T "YOU HAVE ALREADY GUESSED THAT LETTER. "!!;G 3.15
03.75 T "WRONG!"!!;S J=J+1;S T(J)=H;I (J-7)4.1,4.1
03.80 T !!"YOU HAVE HUNG YOUR MAN! "!!
03.81 T "THE WORD WAS: ";D 8;T !!!;G 10.1
03.83 I (-J) 3.86;T !!"FANTASTIC!! NOT ONE WRONG. "
03.84 T "YOU HAVE EASILY SAVED"!!;G 3.87
03.86 T !!"CONGRATULATIONS!! YOU HAVE GUESSED THE WORD AND SAVED"!
03.87 T "YOUR MAN FROM THE GALLONS. "!!
03.88 T "AS YOU KNOW THE WORD WAS: ";D 8
03.90 T !!!;G 10.1

04.10 T !" ";D 6
04.15 I (J),4.25;T "WRONG GUESSES: ";D 7;G 3.1
04.25 T "NO WRONG GUESSES";!!;G 3.1

05.10 I (H-D(Z))5.15,5.2
05.15 R
05.20 I (E(Z)-D(Z))5.25,5.3,5.25
05.25 S E(Z)=D(Z);S I=1;S K=K+1
05.26 R
05.30 S I=2;R
```

06. 10 F Z=1, C; S Y=FOUT(E(Z))

06. 15 R

07. 10 F Z=1, J; S Y=FOUT(160); S Y=FOUT(T(Z))

07. 15 R

08. 10 F Z=1, C; S Y=FOUT(D(Z))

08. 15 R

10. 10 Q

## HANOI

01. 01 C HANOI BY DEC

01. 02 C FROM 'PROGRAMMING LANGUAGES'

01. 03 C LAST CHANGE: 8/7/71

01. 04

01. 05 C THIS PROGRAM WORKS WITH THE TOWERS OF HANOI PROBLEM.

01. 06 C YOU ARE GIVEN THREE TOWERS WITH VARIOUS SIZED DISCS ON

01. 07 C ONE OF THEM. THE OBJECT IS TO PLACE ALL THE DISCS ON

01. 08 C ANOTHER TOWER ON AT A TIME, WITH THE STIPULATION THAT A

01. 09 C LARGER DISC MAY NEVER BE ON TOP OF A SMALLER ONE. THIS

01. 10 C PROGRAM IS GOOD FOR ANY NUMBER OF DISCS AND CAN BE RUN

01. 11 C EITHER IN MANUAL (YOU TELL IT WHERE TO MOVE) OR AUTOMATIC

01. 12 C MODE. IT WILL ALSO EXPLAIN ITS MOVES OR DRAW THE FOR YOU,

01. 13 C DEPENDING ON HOW YOU ANSWER THE 'MOVES OR PLOTS' QUESTION.

01. 14 C \*\* OUT DISC IS THE DISC (1 ON TOP) THAT YOU WANT TO MOVE

01. 15 C \*\* IN DISC IS THE POSITION (1 ON TOP) WHERE YOU MOVE TO

01. 16 C \*\* OUT TOWER IS THE TOWER (1 ON LEFT) FROM WHICH YOU MOVE

01. 17 C \*\* IN TOWER IS THE TOWER (3 ON RIGHT) YOU MOVE TO

01. 18 C THIS PROGRAM ASSUMES NO CHEATING, AND DOES NOT CHECK FOR IT.

01. 19

01. 29 E

01. 30 A "NO. OF DISKS? "N, !

01. 40 F I=1, N; S SS(I)=I

01. 50 S SO=1; S SI=3

01. 60 S NO=N; S NI=N; S I=0

01. 70 A "MOVES OR PLOTS? ", MOVE, !

01. 80 I (FABS(NO-0MOVES)), 1, 85; D 23

01. 85 A "AUTO OR MANUAL? ", A, !

01. 90 I (FABS(A-0MANUAL)), 5, 1; D 2; T !! "DONE (!", !!); Q

02. 20 I [(SS<(SO-1)\*N+NO-1)IER, 2, 95

02. 30 S I=I+1; S NO(I)=NO; S SO(I)=SO; S SI(I)=SI

02. 50 S SI=6-SO-SI; S NO=NO-1; D 3; S TE(I)=NI; D 2

02. 60 S SI=SI(I); S NO=NO+1; D 3; D 6

02. 70 S SO=6-SO-SI; S NO=TE(I); D 3; D 2

02. 80 S SI=SI(I); S SO=SO(I); S NO=NO(I); S I=I-1

02. 90 R

02. 95 D 3; D 6; R

```

03. 10 S NI=N
03. 20 I [SS((SI-1)*N+NI) JER, 3. 3; S NI=NI-1; G 3. 2
03. 30 R

05. 10 A "OUT-DISC: ", NO, "TOWER: ", SO
05. 20 A !"IN-DISC: ", NI, "TOWER: ", SI, !! D 6
05. 30 S A=0
05. 40 F I=1, N+2; S A=A+SS(I)
05. 50 I (-A) 5. 1; T !"WELL DONE!" !! Q

06. 10 S DO=(SO-1)*N+NO
06. 20 S DI=(SI-1)*N+NI
06. 30 S SS(DI)=SS(DO)
06. 40 S SS(DO)=0
06. 50 I (MOVE)ER, 6. 7; D 23; R
06. 70 T !%2, ?SO, NO, !SI, NI, ?!

23. 10 F J=1, N; T !; F K=0, 70; D 23. 3
23. 20 T !!!!!; R
23. 30 I [K-15+SS(J)*2]23. 6; I (-K+15+SS(J)*2)23. 6; T "*"
23. 60 I [K-35+SS(J+N)*2] 23. 7; I (-K+35+SS(J+N)*2) 23. 7; T "*"
23. 70 I [K-55+SS(J+N+N)*2] 23. 8; I (-K+55+SS(J+N+N)*2)23. 77; T "*"
23. 77 S K=100; R
23. 80 T " "

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## PLOTER

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01. 01 C FROM PLOTER IN 'FOCAL PROGRAMMING MANUAL'
01. 02 C PDP-15 SYSTEMS COPYRIGHT 1970 MODIFIED BY JOHN HUISMAN
01. 03 C OMSI SOFTWARE DEVELOPMENT GROUP
01. 04 C LAST CHANGE: 8/9/71
01. 05
01. 06 C THIS PROGRAM WILL SIMULTANEOUSLY PLOT THE EUCLIDEAN
01. 07 C GRAPHS OF ANY THREE FUNCTIONS. REMEMBER THAT YOU ARE IN
01. 08 C FOCAL, SO ANY FUNCTIONS YOU USE LIKE SINE MUST APPEAR AS
01. 09 C 'FSIN'. THE EQUATIONS ARE IN GROUP 10 WHERE THEY MAY BE
01. 10 C MODIFIED. TO PLOT LESS THAN ALL THREE EQUATIONS, JUST
01. 11 C SET ONE OF THE EQUATIONS TO A CONSTANT WHICH WILL BE OFF
01. 12 C YOUR SCALE.
01. 13 C ** Y SCALING FACTOR IS THE NUMBER OF Y-UNITS EACH DOT REPRESENTS
01. 14 C ** UPPER AND LOWER LIMITS ARE THE X-VALUE'S LIMITS
01. 15 C ** INCREMENT REFERS TO THE STEP BY WHICH THE X=VALUES ARE TAKEN
01. 16 C ** THE PLOT ARRANGES YOUR PARAMETERS TO GO THROUGH X=0
01. 17
01. 30 E
01. 33 A "HAVE YOU INPUT THE EQUATIONS YET? ", AN
01. 36 I (AN-0NO) 1. 5, 1. 4, 1. 5
01. 40 T !"HERE ARE THE EQUATIONS. TYPE 'G' TO RESTART. " !!; W 10
01. 45 Q

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01.50 A "LOWER LIMIT ",LL,!"UPPER LIMIT ",UL,!"INCREMENT ",IN,!
01.60 S Y(1)=0;S Y(2)=0;S Y(3)=0
01.70 A "DO YOU WANT A TABLE OF VALUES? ",AN
01.80 I (AN-0YES) 4.05,1.9,4.05
01.90 F X=LL,IN,UL;D 10;D 2

02.10 I (Y(2)-Y(1)) 2.14,2.12,2.14
02.12 T "1 & 2 INTERSECT AT:!"
02.14 I (Y(3)-Y(2)) 2.2,2.16,2.2
02.16 T "2 & 3 INTERSECT AT:!"
02.20 I (Y(1)-Y(3)) 2.3,2.25,2.3
02.25 T "1 & 3 INTERSECT AT:!"
02.30 T "X=",X," Y1=",Y(1)," Y2=",Y(2)," Y3=",Y(3),!

03.10 A "DO YOU WANT A PLOT? ",AN
03.20 I (AN-0YES) 9.1,4.05,9.1

04.05 A !"Y SCALING FACTOR: ",YS,!!
04.07 F A=1,66;S P(A)=160
04.10 F X=IN*FITR(LL/IN),IN,IN*FITR(UL/IN);D 5
04.20 Q

05.05
05.15 S P(33)=174
05.20 I (-FABS(X)) 5.3;S P(1)=217;F A=2,65;S P(A)=174
05.25 S P(66)=217
05.30 D 10;F A=1,3;S Y(A)=Y(A)/YS
05.40 I (33-FABS(Y(1))) 5.5;S P(Y(1)+33)=163
05.50 I (33-FABS(Y(2))) 5.6;S P(Y(2)+33)=170
05.60 I (33-FABS(Y(3))) 5.7;S P(Y(3)+33)=171
05.70 D 6;R

06.02 S M=67
06.04 S M=M-1;I (P(M)-160) 6.1,6.04,6.1
06.10 F A=1,M;S AN=FOUR(P(A));S P(A)=160
06.20 T !

09.10 Q

10.10 S Y(1)=X
10.20 S Y(2)=X*X
10.30 S Y(3)=200

```

## FACTOR

```
01.01 C FACTOR BY STEVE POULSEN & JOHN HUISMAN
01.02 C OMSI SOFTWARE DEVELOPMENT GROUP
01.03 C LAST CHANGE: 9/11/71
01.04
01.05 C THE PRIME FACTORS OF POSITIVE INTEGERS WILL BE
01.06 C OUTPUT. INPUT ZERO, THEN ANOTHER NUMBER AND
01.07 C THE FIRST PRIME NOT LESS THAN THAT NUMBER WILL
01.08 C BE PRINTED.
01.09
01.10 A !! "NUMBER TO BE FACTORED? ",N; I (N)1.1,2.1,1.2
01.20 S C=0; S L=0; S S=FSQT(N); S X=2; G 1.4
01.30 I (2-X)1.35; S X=1
01.35 S X=X+2
01.36 I (N-X)1.8
01.40 I (N/X-FITR(N/X))1.6,1.5,1.6
01.50 S N=N/X; S C=C+1; I (N-1)1.6,1.6; G 1.4
01.60 I (C) 1.7,1.7; T %FITR(FLOG(X)/FLOG(10)+1),X
01.61 I (C-1)1.62,1.62; T " ",%FITR(FLOG(C)/FLOG(10)+1),C
01.62 I (N-1)1.1,1.1; T " *"
01.65 S C=0; S L=L+1; I (L-3)1.7
01.70 I (X-5)1.3
01.80 T %FITR(FLOG(N)/FLOG(10)+1),N; G

02.10 A ! "NUMBER? ",N
02.20 S C=FITR(FSQT(N)); S A=1
02.30 S A=A+1; I (A-C)2.4,2.4,2.5
02.40 I ((FITR(N/A)-(N/A))2.3; S N=N+1; G 2.2
02.50 T %6,!"FIRST PRIME IS",N,!!!
02.60 G 1.1
```

## POLAR

```
01.01 C POLAR BY STEVE POULSEN
01.02 C OMSI SOFTWARE DEVELOPMENT GROUP
01.03 C LAST CHANGE: 8/31/71
01.04 C ***** TEKTRONIX T-4002 GRAPHICS TERMINAL REQUIRED *****
01.05
01.06 C THIS PROGRAM WILL GRAPH ANY TWO-DIMENSIONAL EQUATION ON
01.07 C A POLAR COORDINATE SYSTEM. TYPE ANYTHING BUT YES IF YOU WANT TO
01.08 C TO INPUT AN EQUATION WHEN ASKED IF THE EQUATION IS IN, AND
01.09 C THE COMPUTER WILL INTERRUPT THE PROGRAM AND ALLOW YOU TO
01.10 C MODIFY ITS INPUT EQUATION. TYPE AN '=' AND YOU WILL GET THE
01.11 C FIRST PART OF THE EQUATION SINCE IT IS IN MODIFY MODE. IF
01.12 C YOU CHOOSE NOT TO MODIFY THE EQUATION, THE PROGRAM WILL ASSUME
01.13 C R=T. EQUATION FORMAT IS R(RADIUS) IN TERMS OF T(THETA).
01.14 C ** INITIAL ANGLE IS THE POSITION FROM WHICH R WILL BE ROTATED.
01.15 C ** FINAL ANGLE IS THE POSITION THROUGH WHICH R WILL BE ROTATED.
01.16 C ** ANGLE INCREMENT IS THE STEP WITH WHICH R WILL BE ROTATED.
01.17 C ** RADIUS OF AXES IS THE SCALING FEATURE WHICH SETS THE LENGTH OF
01.18 C THE X AND Y AXES.
01.19 C ** ALL ANGLES ARE IN DEGREES.
01.20
```

```

01. 24 I ((#/3)-FITR(#/3))1. 25. 1. 28. 1. 25
01. 25 T "YOU DO NOT HAVE ENOUGH FEATURES. "
01. 26 T " RESTART FOCAL WITH FEATURE 2. ";0
01. 28 E
01. 29 D 12; A "HAVE YOU ENTERED THE EQUATION? ", AN
01. 30 I (AN-0YES) 1. 4. 2. 1. 1. 4
01. 40 T !"ENTER EQUATION OF R IN TERMS OF THE ANGLE T"!!; M 10. 1

02. 10 A !"INITIAL ANGLE?", A1, !"FINAL ANGLE?", A2, !"ANGLE INCREMENT?", A3
02. 20 A !"RADIUS OF AXES?", R1; S C=3. 1415926/180; S S=380/R1
02. 30 S A1=A1*C; S A2=A2*C; S A3=A3*C; D 12

03. 10 S Q=FDIS(0, 132, 380)+FDIS(1, 892, 380)+FDIS(0, 512, 10)+FDIS(1, 512, 750)
03. 20 S Q7=FOUT(1)

04. 10 F T=A1, A3, A2; D 10; D 5
04. 20 S Q=FOUT(1); A !"AGAIN? ", AG; I (AG-0YES) 20. 1. 1. 2. 20. 1

05. 10 S X=512+R*S*FCOS(T); S Y=380+R*S*FSIN(T); I (FABS(R*S)-380)5. 2; S I=0
05. 20 S Q=FDIS(I, X, Y); I (FABS(R*S)-380)5. 3; R
05. 30 S I=1; R

10. 10 S R=T

12. 10 F Q7=1, 2, FOUT(24);
12. 20 S Q7=FOUT(1); R

20. 10 Q

```

## GRAPH

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01. 01 C GRAPH BY STEVE POULSEN
01. 02 C OMSI SOFTWARE DEVELOPEMENT GROUP
01. 03 C LAST CHANGE: 8/31/71
01. 04 C ***** TEKTRONIX T-4002 GRAPHICS TERMINAL REQUIRED *****
01. 05
01. 06 C THIS PROGRAM WILL GRAPH ANY TWO DIMENSIONAL EQUATION ON
01. 07 C AN EUCLIDEAN GRAPH. TYPE ANYTHING BUT YES IF YOU WANT TO
01. 08 C INPUT AN EQUATION WHEN ASKED IF THE EQUATION IS IN, AND THE
01. 09 C COMPUTER WILL INTERRUPT THE PROGRAM AND ALLOW YOU TO MODIFY ITS
01. 10 C INPUT EQUATION. IF YOU CHOOSE NOT TO MODIFY THE EQUATION,
01. 11 C THE PROGRAM WILL ASSUME Y=FSIN(X). TYPE AN '=' AFTER THE
01. 12 C CARRIAGE RETURN AND YOU WILL GET THE FIRST PART OF THE EQUATION
01. 13 C SINCE IT IS IN MODIFY MODE. REMEMBER, THE EQUATION MUST BE Y
01. 14 C IN TERMS OF X.
01. 15 C ** X OFFSET IS THE VERTICAL DISPLACEMENT OF THE X AXIS.
01. 16 C ** Y SCALING FACTOR SETS THE VERTICAL PLOT LIMIT OF THE SCREEN.
01. 17 C ** X INCREMENT IS THE STEP. (EX: .001, .1, 1, 2, 10, 100, ETC.)
01. 18 C WHEN INPUTTING YOUR EQUATION, REMEMBER THAT YOU ARE USING MODIFY
01. 19 C IN FOCAL SO SINE AND COSINE (AND ALL OTHERS) MUST BEGIN WITH F.
01. 20 E

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```
01. 21 I ((#/3)-FITR(#/3)) 1. 22, 1. 28, 1. 22
01. 22 T "YOU DO NOT HAVE ENOUGH FEATURES. "
01. 23 T " RESTART FOCAL WITH FEATURE 2. ", !; 0
01. 24
01. 28 A !%6. 03, "HAVE YOU ENTERED THE EQUATION? ", A1; I (A1-0YES) 1. 29, 1. 3;
01. 29 T !"ENTER EQUATION OF Y IN TERMS OF X"!!!; M 30. 1
01. 30 A !"LOWER LIMIT OF X? ", X1, "UPPER LIMIT OF X? ", X2, "X INCREMENT", X3
01. 40 A !"X OFFSET? ", X4, "Y SCALING FACTOR? ", Y1
01. 50 S XS=1000/(X2-X1); S XC=-X1*XS
01. 60 S YS=Y1*XS
01. 70 S YC=380+X4*YS
01. 80 F Q7=0, . 2, FOUT(24);

02. 10 I (XC) 2. 5; I (1020-XC) 2. 5; S Q8=FDIS(0, XC, 0)+FDIS(1, XC, 780)
02. 20 S D1=FITR(FLOG(50/YS)/FLOG(10)); S DV=FEXP(D1*FLOG(10))
02. 25 S Q8=FOUT(1); T "Y UNITS: ", DV
02. 30 F U1=FITR(-YC/(YS+DV))*DV, DV, FITR((760-YC)/(YS+DV))*DV; D 5. 1
02. 50 I (YC) 3. 1; I (780-YC) 3. 1; S Q8=FDIS(0, 0, YC)+FDIS(1, 1020, YC)
02. 60 S D1=FITR(FLOG(50/XS)/FLOG(10)); S DV=FEXP(D1*FLOG(10))
02. 65 S Q8=FOUT(1); T !"X UNITS: ", DV
02. 70 F U1=FITR(-XC/(XS+DV))*DV, DV, FITR((1020-XC)/(XS+DV))*DV; D 5. 2

03. 10 S I=0
03. 20 F X=X1, X3, X2; D 30. 1; D 4
03. 30 S Q8=FOUT(1); T !!!; 0

04. 10 S XP=XC+X*XS; S YP=YC+Y*YS
04. 40 S R=FSQT((510-XP)^2+(510-YP)^2); I (R-510) 4. 5; S I=0
04. 50 S Q9=FDIS(1, XP, YP); I (R-510) 4. 6; R
04. 60 S I=1

05. 10 S Q8=FDIS(0, XC-5, YC+YS+U1)+FDIS(1, XC+5, YC+YS+U1)
05. 20 S Q8=FDIS(0, XC+XS+U1, YC-5)+FDIS(1, XC+XS+U1, YC+5)

30. 10 S Y=FSIN(X)
```

## HARMON

```
01.01 C HARMON BY STEVE POULSEN
01.02 C OMSI SOFTWARE DEVELOPMENT GROUP
01.03 C LAST CHANGE: 8/31/71
01.04 C ***** TEKTRONIX T-4002 GRAPHICS TERMINAL REQUIRED *****
01.05
01.06 C THIS PROGRAM PRODUCES A SIMILAR GRAPH AS A HARMONOGRAPH OR
01.07 C SPIROGRAPH WOULD. THE GRAPH REPRESENTS THE RELATIVE MOTION OF
01.08 C TWO PENDULUMS MOVING WITH RESPECT TO EACH OTHER, OR IN EFFECT, THE
01.09 C PATH OF A AS SEEN BY THE REFERENCE FRAME OF B. YOU CAN SET THE
01.10 C DIFFERENT VARIABLES WHILE UNDER PROGRAM CONTROL.
01.11 C ** PHASE DIFFERENCE IS THE ANGLE OF RELEASE. (0 TO 90)
01.12 C ** SWING COEFFICIENT IS THE MAGNITUDE OF SWING ON A 0 TO 1 SCALE.
01.13 C ** TIME DIFFERENCE IS THE % OF CYCLE A COMPLETED AS B IS RELEASED.
01.14 C ** THE ANGLE BETWEEN IS BETWEEN THE INITIAL PATHS OF A & B.
01.15 C ** PERIOD RATIO IS (ONE CYCLE OF A)/(ONE CYCLE OF B).
01.16 C ** DRAG COEFFICIENT IS AIR RESISTANCE ON 0 TO 1 SCALE.
01.17 E
01.18 I (FITR(#/2)-(#/2)) 1,19,1,28,1,19
01.19 T "YOU DO NOT HAVE ENOUGH FEATURES. RESTART FOCAL WITH FEATURE 1.",1,1
01.20
01.28 S N=200; A !"PHASE DIFFERENCE OF A? ",PA,"PHASE DIFFERENCE OF B? ",PB
01.29 A !"SWING COEFFICIENT OF A? ",S1,"SWING COEFFICIENT OF B? ",S2
01.30 A !"TIME DIFFERENCE? ",T1,"ANGLE BETWEEN A AND B? ",A0;S T1=T1/100
01.40 A !"PERIOD RATIO? ",R,"DRAG COEFFICIENT? ",D1;S D3=1-D1
01.42 S C=3.1415926/180;S P1=PA*C;S P2=PB*C;S A1=A0*C
01.44 S A=190*S1;S B=190*S2;S D1=FCOS(A1);S D2=FSIN(A1)
01.50 F O3=0, .2,FOUT(24);
01.50 F T=0, .15,N*3.1415926;D 2
01.70 S B3=FOUT(1);G 1,1

02.10 S X1=A*FCOS(R*T+P1);S Y1=A*FSIN(R*T)
02.20 S X2=B*FCOS(A1+T+P2);S Y2=B*FSIN(T+A1)
02.30 S XP=X2*D1+Y2*D2;S YP=Y2*D1+X2*D2
02.40 S B6=FDIS(1,500+X1-XP,380+Y1-YP)
02.50 S A=A*D3;S B=B*D3
```

## WEB

01.01 C WEB BY BARRY SMITH  
01.02 C OMSI SOFTWARE DEVELOPMENT GROUP  
01.03 C LAST CHANGE: 7/3/71  
01.04 C \*\*\*\*\* TEKTRONIX T-4002 GRAPHIC TERMINAL REQUIRED \*\*\*\*\*  
01.05  
01.06 C THIS PROGRAM DRAWS A SPIDER AND HER WEB. IT IS NOTHING  
01.07 C MORE THAN A HANDY DEMONSTRATION OF FOCAL'S DISPLAY POWER.

03.10 F A=0, 30, 330; S B=A/57. 295; D 4  
03.20 G 5, 05

04.10 S C=FDISC(0, 300, 400)  
04.20 S C=FDISC(1, 300+FSIN(B)\*100, 400+FCOS(B)\*100)  
04.30 S C=FDISC(1, 300+FSIN(B)\*200, 400+FCOS(B)\*200)  
04.40 S C=FDISC(1, 300+FSIN(B)\*300, 400+FCOS(B)\*300)

05.05 S D=1. 5  
05.10 F A=0, 30, 3500; S B=A/57. 295; D 6

06.10 S C=FDISC(1, 300+FSIN(B)\*0, 400+FCOS(B)\*0)  
06.20 S D=D+2. 5

07.10 S C=FDISC(0, 175, 180)  
07.20 F A=0, 45, 360; S B=A/57. 295; D 8

08.10 S C=FDISC(1, 250+FSIN(B)\*10, 170+FCOS(B)\*15)

09.10 S C=FDISC(1, 220, 210)  
09.20 S C=FDISC(1, 190, 180)  
09.30 S C=FDISC(0, 250, 185)  
09.40 S C=FDISC(1, 235, 220); D 9. 3  
09.50 S C=FDISC(1, 300, 160); D 9. 3  
09.60 S C=FDISC(1, 275, 210)  
09.70 S C=FDISC(1, 300, 190); D 9. 3  
09.75 S C=FDISC(1, 275, 225)  
09.80 S C=FDISC(1, 300, 210); D 9. 3

## BTLSHP

```

01.01 C      BTLSHP BY TOM KLOOS
01.02 C      OMSI SOFTWARE DEVELOPMENT GROUP
01.03 C      LAST CHANGE: 8/1/71
01.04 C      ***** TEKTRONIX T-4002 TERMINAL AND JOYSTICK REQUIRED *****
01.05
01.06 C      YOU HAVE 20 SHOTS TO SINK 3 SHIPS.  GUIDE THE CURSOR
01.07 C TO THE SQUARE YOU CHOOSE AND HIT THE SPACE BAR.  TO MAKE ROOM
01.08 C FOR THE PROGRAM, GROUP 1 WILL BE ERASED.
01.11 I ((#/2)-FTR(#/2)) 1.12,1.14,1.12
01.12 T "YOU DO NOT HAVE ENOUGH FEATURES. "
01.13 T "RESTART FOCAL WITH FEATURE 1. ";0
01.14 O I ERASE;E 1

02.05 O I TTY:,E
02.10 S Z=FOUT(1)+FOUT(24);F Z=1,175;
02.20 T "!!!!!!"      W E L C O M E   T O   T H E   G A M E   O F"
02.25 T "  B A T T L E S H I P S"
02.30 T "!!!!!"

03.21 T "!!!!!!"PLEASE WAIT WHILE THE ENEMY SHIPS MOVE INTO POSITION"
03.22 T "      USA";D 15;T !!
03.25 E
03.30 F M=1,36;S M(M)=0
03.35 G 3.45
03.40 S U=(S-1)*6+T;R
03.45 F X=1,3;D 4
03.50 S Q=0
03.55 S J=0;S Q=Q+1
03.60 S J=J+1
03.62 I ((M((Q-1)*6+J)+M((Q-1)*6+J+1)+M(Q*6+J)+M(Q*6+J+1))-4)3.7,3.25
03.70 I (J-5)3.6,3.6;I (Q-5)3.55,3.55;S R=0;G 5.1

04.10 S A=FTR(6*FRAN()+1);S B=FTR(6*FRAN()+1)
04.15 S S=A;S T=B;D 3.4;I (M(U))4.5,4.2,4.1
04.20 S C=FTR(3*FRAN()-1);I (6-(A+C))4.2;I (A+C-1)4.2
04.25 S D=FTR(3*FRAN()-1);I (6-(B+D))4.25;I (B+D-1)4.25
04.30 I (FABS(C)+FABS(D))4.35,4.2,4.35
04.35 S S=A+C;S T=B+D;D 3.4;I (M(U)-1)4.4,4.2
04.40 I (2-X)4.75
04.45 I (6-(A+C+C))4.55;I (A+C+C-1)4.55;I (6-(B+D+D))4.55;I (B+D+D-1)4.55
04.50 S S=A+C+C;S T=B+D+D;D 3.4;I (M(U))4.55,4.7
04.55 I (6-(A-C))4.1;I (A-C-1)4.1;I (6-(B-D))4.1;I (B-D-1)4.1
04.60 S S=A-C;S T=B-D;D 3.4;I (M(U)-1)4.65,4.1
04.65 S M(U)=1;G 4.75
04.70 S S=A+C+C;S T=B+D+D;D 3.4;S M(U)=1
04.75 S S=A+C;S T=B+D;D 3.4;S M(U)=1
04.80 S M((A-1)*6+B)=1
04.85 R

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05.10 S R=0; S H=0; T X3.00; D 2.1; D 7  
05.11 S R=R+1; I (7-H)11.1; I (20-R)10.1  
05.12 S A1=FOOT(1); T !!!!! F A1=1,R; T !  
05.13 T "ROUND #"R  
05.14 S A1=FJOY()  
05.15 I (XJ-300)5.14; I (900-XJ)5.14; I (YJ-100)5.14; I (700-YJ)5.14  
05.20 D 6  
05.25 I (M(V))5.3,5.26,5.3  
05.26 D 8; S M(V)=-2; G 5.11  
05.30 I (M(V))5.11; S M(V)=-1; S H=H+1; D 9; G 5.11  
  
06.10 S V=(FITR(YJ/100)-1)\*6+FITR((XJ-200)/100)  
06.20 S Z=FITR((V-1)/6); S XC=(V-Z\*6)\*100+250; S YC=Z\*100+150  
  
07.10 F XG=300,100,900; S Z=FDIS(0,XG,100)+FDIS(1,XG,700)  
07.15 F YG=100,100,700; S Z=FDIS(0,300,YG)+FDIS(1,900,YG)  
  
08.10 S Z=FDIS(0,XJ-7,YJ-7)+FDIS(1,XJ+7,YJ+7)+FDIS(0,XJ-7,YJ+7)  
08.20 S Z=FDIS(1,XJ+7,YJ-7)  
  
09.20 F X=0,2,3,141592; D 9.4  
09.30 R  
09.40 S Z=FDIS(0,XC+50\*FCOS(X),YC+50\*FSIN(X)); G 9.5  
09.50 S Z=FDIS(1,XC-50\*FCOS(X),YC-50\*FSIN(X))  
  
10.10 D 2.1  
10.20 T !!!!!!!!!!"YOU ARE OUT"!!  
10.21 T " OF"!!  
10.22 T "AMMUNITION"!!  
10.23 T "AND LUCK....."!!  
10.30 T !!!!!"HERE IS HOW THE" HARBOR LOOKS:"; D 12  
10.40 S Z=FOOT(1); F Z=1,30; T !  
10.45 A "WOULD YOU LIKE TO "!"PLAY AGAIN?"Z  
10.50 I (Z-0YES)10.51,10.51  
10.51 Q  
  
11.10 D 2.1  
11.20 T !!!!!!!!!!"YOU DID IT....."!!!  
11.30 T "YOU SANK ALL THE SHIPS!!!"!!!  
11.40 T !!!!!G 10.45  
  
12.10 D 7; F R=1,36; D 13  
  
13.10 I (M(R))13.3,13.2,13.5  
13.20 R  
13.30 S V=R; D 6.2; I (M(R)+1)13.4; S XC=XC-30; S YC=YC-10  
13.32 S Z=FDIS(0,XC,YC)+FOOT(159); T "H I T"  
13.35 R  
13.40 S XC=XC-23; S YC=YC-5; S Z=FDIS(0,XC,YC); T "MISS"  
13.45 R  
13.50 S V=R; D 6.2; S XC=XC-42; S YC=YC-10  
13.52 S Z=FDIS(0,XC,YC)+FOOT(159); T "S H I P"  
13.60 R  
  
15.01 S X=FDIS(1,575,200)  
15.02 S X=FDIS(1,625,150)+FDIS(1,800,150)+FDIS(1,850,200)+FDIS(1,575,200)  
15.03 S X=FDIS(1,775,200)+FDIS(1,775,500)+FDIS(1,625,225)+FDIS(1,775,225)  
15.04 S X=FDIS(1,775,515)+FDIS(1,745,505)+FDIS(1,775,505)

## DATA FILES:

'ERASE.FD' FOR BTLSPH

G

'HANGWD' FOR HANGMAN:

EXPRESSION RELINQUISH MULTIPLIER IMMOBILE EXTINCTION ALCOHOL CYMBAL;  
KNOCK PHOBIA ANXIETY CALL SIX BLIGHT VEHICLE GYMNASIUM POLICY HISTORY;  
WHITE BLACK SKIRMISH GOURMET REQUEST GUERRILLA MAFIA YOUNG NEWS;  
CLOUDY ACTION FUND MAYOR MEDICARE ELITE CURB SIMILAR PROTESTER JOKE;  
DOUBT SLUM CITIES HERO MINIMUM BENEFIT ADVANCE TECHNICAL GUARD;  
MAINTENANCE DEPOSIT NEGOTIABLE INSIPID MONEY ECONOMIC CLASSROOM;  
RESULT DIRECTOR POSSIBILITY COMPOSED POTENTIAL ZERO WELCOME;  
SECURITY DISAPPEARANCE PROGRAM GOVERNOR JOINT PERCENTAGE PASSAGE;  
COMMENDABLE SUPERSONIC PITCHER DECLARATION EDUCATION EMPHASIS;  
ADMINISTRATION YESTERDAY COLLECTIONS APATHETIC PROTOZOA GYPSY AXE;  
TAXI HELP HELP

## LISTAL.FD

COMMENT: 'GIVE 'OPEN INPUT LISTAL.FD' COMMAND FROM COMMAND MODE TO LIST  
 COMMENT: PROGRAMS AND FILES IN THE 'PUBLIC LIBRARY'

```

E
E A
1.1 0 I TTY:,E)A !"DO YOU WISH LINE PRINTER OUTPUT? ",LP,!
1.3 0 R I)I (FABS(LP-0YES)),1.4)0
1.4 0 0 LPT:
G
L C CATLOG
W
T !!! S D=FOUT(140);L C HELP
W
T !!! S D=FOUT(140);L C INTRST
W
T !!! S D=FOUT(140);L C CHISQR
W
T !!! S D=FOUT(140);L C STAT1
W
T !!! S D=FOUT(140);L C STAT2
W
T !!! S D=FOUT(140);L C ADDEX
W
T !!! S D=FOUT(140);L C BARON
W
T !!! S D=FOUT(140);L C TRIANG
W
T !!! S D=FOUT(140);L C CALNDR
W
T !!! S D=FOUT(140);L C HANGMN
W
T !!! S D=FOUT(140);L C HANGDI
W
T !!! S D=FOUT(140);L C PLOTER
W
T !!! S D=FOUT(140);L C FACTOR
W
T !!! S D=FOUT(140);L C POLAR
W
T !!! S D=FOUT(140);L C GRAPH
W
T !!! S D=FOUT(140);L C HARMON
W
T !!! S D=FOUT(140);L C WEB
W
T !!! S D=FOUT(140);L C BTLSPH
W
E
E A
1.1 0 I ERASE;T !!!"DATA FILES:"!!!"ERASE.FD' FOR BTLSPH"!!!
1.5 S P=1.7;S B=1.6;S Z=154;S L=138;S Q=1.55;G 1.6
1.55 S X=FOUT(D)
1.6 S D=FIN();I (Z-D)0,P)I (-FABS(D-L))0,B
1.7 T !!!
1.8 T "'HANGWD' FOR HANGMAN:"!!!0 I HANGWD;S P=2.1;G 1.6
2.1 T !!! S D=FOUT(140);T "'LISTAL.FD' COMMAND DATA FILE:"!!!0 I LISTAL
2.2 S P=2.3;G 1.6
2.3 0 1.7;T !!!0 C;0 I TTY:,E;E A
G

```

