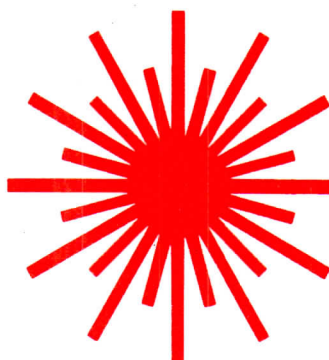




oms i

software development group

OMSI NO.

4.29

TITLE

PS/8 FOCAL PROGRAMS
PUBLIC LIBRARY Vol. 2

AUTHOR

DESCRIPTION

Listings of "free" PS/8 FOCAL programs

DATE

July 10, 1972

HARDWARE REQUIRED

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

SOFTWARE REQUIRED

July 10, 1972 version of PS/8 FOCAL from OMSI.

PS/8 or OS/8 * programming system from Digital Equipment Corporation.

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STUDENT RESEARCH CENTER

Oregon Museum of Science and Industry

Portland, Oregon 97221

503 224-9500

This software meets development phase standards listed below which are indicated by the letter in its OMSI Number. This designation has been approved by the Software Development Group Standards Committee of the Student Research Center, Oregon Museum of Science and Industry (OMSI), Portland, Oregon.

- 'A' phase ----- Embryo software; undergoing preliminary design
- 'B' phase ----- Experimental software; undergoing preliminary tests
- 'C' phase ----- Field test software
- 'D' phase ----- Extensively tested software; program and documentation approved for general release

Release of any but 'D' phase software is limited to persons approved by the Standards Committee for testing purposes.

Although this program has been tested by its author, no warranty, express or implied, is made by the author, the Software Development Group, the Student Research Center or the Oregon Museum of Science and Industry as to the accuracy or functioning of the program or related program material, and no responsibility is assumed by these parties in connection therewith.

The Oregon Museum of Science and Industry (OMSI) is a private, non-profit organization devoted to developing and applying new techniques in science and engineering education.

Portland area high school students make up the membership of the Student Research Center which is housed in Museum laboratories but utilizes advisors and equipment from the local and national community of scientists and engineers. Student projects have included work in the earth sciences, reporting on archaeological and paleontological work conducted at Museum excavations, chemistry, biology, physics, mathematics, engineering and computer science.

The expenses of this program have been supported by the Hill Family Foundation, National Science Foundation, Tektronix Foundation, Millicent Foundation, Skyline Foundation, Union Pacific Foundation, Tektronix Incorporated, Digital Equipment Corporation, General Electric Company, ESCO Corporation, Electro Scientific Industries, other local and national industrial and private patrons of the Museum, program participants, their families, teachers, and school districts.

PS/8 FOCAL PUBLIC LIBRARY, VOL. 2

'PAGER' OUTPUTS PAGINATED TEXT FROM ASCII FILE AND OPTIONALLY
RIGHT ADJUSTS (SLOW!) - SEE GROUP 8 OF 'PAGER2' FOR
OPTIONAL HEADING INSERTION. DELETE FORMFEEDS FROM
TEXT --- INSERT SEVEN CONSECUTIVE CARRIAGE RETURN/
LINE FEEDS TO FORCE A PAGE BREAK. ENTER 'HELP' IN
RESPONSE TO 'PAGER'S' QUESTIONS FOR MORE INFORMATION.
REQUIRES 'FIND()' FUNCTION OF 7/10/72 VERSION OF PFOCAL.

'FINDER' OUTPUTS SELECTED MAILING LABELS FROM LIST MAINTAINED
WITH EDITOR OR TECO. IGNORES FORMFEEDS. SEE GROUP 11
FOR FILE AND RECORD FORMAT. REQUIRES 'FIND()' FUNCTION
OF 7/10/72 VERSION OF PFOCAL.

'BCCORD' CALCULATES POSITIONS FOR LOCATION OF CIRCULAR BOLT
ARRAYS.

'ANGLES' SOLVES ANY TRIANGLE --- RIGHT OR OBLIQUE.

C-PS/8 FOCAL, 1971

```
01.05 E;C 'PAGER' 7/1/72 BY WHITNEY OF OMSI
01.10 I (<#-7>)1.2,1.3
01.20 T !"REENTER FOCAL; RETAIN FEATURE 4"!;Q
01.30 D 24;S Z=154;S Q=10.25;S Q(G)=10.5;S H=160;S Q(H)=10.4;S BR=45
01.40 S M=10.9;S C6=10.6;S CG=10.7;S C8=10.8;S C9=50;S C3=1E-3
01.50 S Q1=10.3;S ZE=0

02.05 C SET UP INPUT/OUTPUT FILES USING EXECUTABLE DATA FILE
02.08 T !"*** PAGER"!
02.10 T !"WAIT"!!!;C IF FILES ARE ON DISK, 'WAIT' WILL BE SHORT
02.20 O O P.TM;T "3.7 O I ";O O TTY:
02.30 T "PAGINATE WHICH FILE? "
02.40 S RT=2.6;S HE=2.5;G 27.1
02.50 T !"EXAMPLES: 'DTA7:MANUAL.PA' 'DTA2:TEXT'!!!"AGAIN: "
02.55 G 2.4
02.60 O R O;D 25.7;T !"3.8";O O TTY:
02.70 T "OUTPUT ON TERMINAL? ";D 28;S OU=X;I (OU),2.8,2.75
02.75 O R O;G 3.3
02.80 T "OUTPUT DEVICE:FILE? "
02.90 S RT=3.2;S HE=3.1;G 27.1

03.10 D 2.5;G 2.9
03.20 O R O;T " O O ";S I=L;D 25.7
03.30 T !"G 3.9"!
03.40 O C;G 4.1

04.05 C OUTPUT FORMAT
04.10 A "LINES OF TEXT/PAGE? ",LP;I (LP-0HELP)4.2
04.15 T " 55-57 IS NORMAL"!;G 4.1
04.20 A "FIRST PAGE? ",PF;S PN=PF-1;I (0HELP-PF)4.25,4.25
04.22 I (PF)4.26,4.5,4.5
04.25 T " ENTER THE PAGE NUMBER OF THE FIRST PAGE TO BE OUTPUT"!;G 4.2
04.26 T " NEGATIVE PAGE NUMBERS AREN'T LEGAL"!;G 4.2
04.50 T "OUTPUT FORMFEEDS AT END-OF-PAGE? ";D 28;S CF=X
04.70 A "RIGHT MARGIN? ",X;I (X-0HELP)4.8
04.75 T " 72 IS THE BEST MARGIN FOR MOST TERMINALS"!;G 4.7
04.80 S RM=X+1;S VA=FITR(RM/5)
04.85 T "ALIGN RIGHT MARGIN (SLOW!!)? ";D 28;S MA=X

05.10 D 2.1;L R PAGER2 3.1;C CHAIN TO SECOND PART OF PROGRAM

24.05 C VARIABLES REQUIRED BY LINE INPUT ROUTINE
24.10 S P3=25.3;S P=25.3;S P5=25.5;S V=1;S P4=25.4;S B=223;S R=141
24.20 S O=255;S U=149;S G=138;S P(R)=25.9;S P(B)=25.2;S P(O)=25.6
24.30 S P(U)=25.1;S P(G)=25.68
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25.05 C LINE INPUT ROUTINE; ENTER BY GOTO 25.2; RETURNS TO LINE RL.
25.06 C INPUTS AND EDITS LINE OF TEXT THROUGH CARRIAGE RETURN.
25.07 C RECOGNIZES RUBOUT, BACKARROW, CU, AND LINEFEED.
25.10 T "CU"!
25.20 S I=0; S L=0; G P4
25.30 S I=I+1; S L(I)=X
25.40 S X=FIN()
25.50 I [(X-R)*(X-B)*(X-U)*(X-G)*(O-X)]P, P(X), P
25.60 S I=I-FSGN(I); T "\"; G P4
25.68 T !
25.70 I (I), 25.72; F K=V, I; S X=FOUT(L(K))
25.72 C
25.80 G P4
25.90 S L=I; G RL

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```

26.05 C STRING COMPARE --- STRING L WITH STRING C
26.10 S K=200; S SC=1
26.20 F K=V, L; I (L(K)-C(K))26.1, 26.1
26.30 I (K-201); S SC=0; C COMPARE FAILS
26.40 C WHEN COMPARE FAILS, LINE 26.1 IS REFERENCED BUMPING
26.50 C K TO 200 PERMITTING ESCAPE FROM 'FOR' LOOP.

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27.05 C INPUT LINE AND COMPARE WITH 'HELP'
27.06 C ENTER BY GOTO 27.1; RETURNS TO LINE RT OR HE.
27.10 S RL=27.2; G 25.2
27.20 S C(1)=200; S C(2)=197; S C(3)=204; S C(4)=208; D 26
27.30 I (SC), RT, HELP

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28.05 C 'YES' OR 'NO'?
28.10 A X; I (X-0YES)28.2, 28.3, 28.2
28.20 I (X-0NO)28.5, 28.4, 28.5
28.30 S X=1; R
28.40 S X=0; R
28.50 T !"YES OR NO? "; G 28.1

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C-PS/8 FOCAL, 1971

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01.05 C 'PAGER2' 7/1/72 BY WHINTEY OF OMSI
01.06 C ENTER ONLY FROM 'PAGER' AT LINE 3.1
01.07 L R PAGER

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03.05 C OBTAINS INPUT/OUTPUT FILES FROM DATA FILE 'P.TM'
03.10 O I P.TM; Q
03.20 C FOCAL IS NOW IN IMMEDIATE MODE AND WILL ACCEPT NEW LINES OF
03.30 C PROGRAM AND COMMANDS FROM FILE 'P.TM' UNTIL CONTROL IS
03.40 C RETURNED TO THIS PROGRAM WHEN 'G 3.9', THE LAST LINE OF THE
03.50 C DATA FILE, IS EXECUTED.
03.70 O I TEST.PA
03.80 O O LPT:
03.90 O I TTY:, E; C THIS TURNS OFF INPUT FROM THE DATA FILE, 'P.TM'

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05.05 C PASS 1; SCAN TEXT TO DETERMINE PAGE BREAKS; IGNORES FORMFEEDS.
05.06 C FORMFEEDS SHOULD BE DELETED FROM TEXT AND MAY BE REPLACE
05.07 C WITH 7 CONSECUTIVE CARRIAGE RETURN/LINEFEEDS IF NEEDED.
05.10 D 3.7; T !!! "PAGE NUMBERS DURING PASS 1: !!!"; S P=5.8; S P(Z)=7.1
05.12 S G5=5.5; S G7=5.7; S P(R)=G7; S P(G)=5.8; S G9=5.9
05.15 S GC=6; S H1=6.1; S H3=6.3; S H4=6.4; S H5=6.5; S &=140; S P(&)=G7
05.20 S BS=0; S SL=0; S LL=0; D H1
05.30 S PN=PN+1; T %3.0,PN; I (PN-10*(FITR(PN/10)))5.5,5.4,5.5
05.40 T !
05.50 I (-C)G7; S P(G)=G7; S P=5.6; G G7
05.60 S P(G)=H4; S P=5.8; G P
05.70 S X=FIN(); I [(X-G)*(X-Z)*(X-&)*(R-X)]P,P(X),P
05.80 S X=FIND(G); S C=C+V; I (S-SL)G9; S LL=CL; S SL=S
05.90 I (S-GC)H1,H5,H5

06.10 S S=0; S CL=C
06.20 I (C-LP)H3,H3,H5
06.30 I (-BS)G7; I (C-BR)G7; S BS=V; S LL=C; S SL=0; G G7
06.40 S C=C+V; S S=S+V; G G7
06.50 S PA(PN)=LL; S C=C-LL-SL; G 5.2

07.05 C PASS 2; OUTPUT PAGES
07.10 S PA(PN)=C; S PA=PN; T !!!; D 3.7; D 3.8; S P=9.3; S P(G)=9.2
07.20 S P(R)=9.2; S I=PF-V; S J=60; G 11.1

08.05 C PAGE HEADING
08.10 I (PA-I),11.4; S I=I+V
08.20 G INSERT A PAGE HEADING IN A 'TYPE' COMMAND ON THIS LINE (OPTIONAL)
08.30 T :RM-8,"PAGE",%3.0,I,!!!

09.05 C OUTPUT LINES; DECIDE WHETHER OR NOT TO RIGHT ALIGN
09.10 O R I
09.20 S X=FIN(); I [(X-G)*(R-X)]P,P(X),P
09.30 I (-MA)9.6; S X=FOUT(X); O R I,E
09.40 F J=1,PA(I); S X=FIND(G)
09.50 G 11.1
09.60 D 10; I (2-PA(I))9.7; S J=2; G 11.1
09.70 F J=2,PA(I); S X=FIN(); D 10
09.80 G 11.1

10.05 C RIGHT ALIGNER
10.10 I (FABS(207.5-X)-46.7)10.2
10.15 O R I,E; S X=FOUT(X)+FIND(G); O R I;R
10.20 S L=0; S S=0; S D=0
10.25 S N=0
10.30 I (RM-L-V)10.45; S L=L+V; S L(L)=X; S X=FIN(); I [(X-G)*(H-X)]Q,Q(X),Q
10.40 S S=S+V; S N=N+1; I (N-3)Q1
10.45 D 10.7; G 10.15
10.50 S Y=RM-L; I [-(Y+FABS(Y))*(VA-Y+FABS(VA-Y))*S]JC6; S D=0; G CG
10.60 S E=FITR(Y/S-C3); S D=C8+E/C9; S Y=Y-(E*S); S Y=S-Y
10.62 I (E-3)10.65; S D=ZE; G 10.7
10.65 I (-Y)10.7; S D=D-.01
10.70 F B=1,L; I (H-FOUT(L(B))),D,
10.75 R
10.79 T " "
10.80 S Y=Y-V; I (Y),M,
10.81 T " "

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10.82 T " "; D 10.8
10.83 T " "
10.84 T " "; D 10.8
10.90 S D=D-.01

11.05 C END-OF-PAGE
11.10 I (CF), 11.2; S X=FOUT(140)
11.12 G 8.1
11.20 F J=J,60; T !
11.25 T "----"!!!; G 8.1
11.40 O I TTY:,E; O C; L D P, TM; T %6.04, !!!!!! "DONE"!; Q

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C-PS/8 FOCAL, 1971

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01.10 E; C 'FINDER' 7/1/72 BY H WHITNEY OF OMSI
01.20 C PRINTS MAILING LABELS FOR SELECTED RECORDS; SEE GROUP 11
01.30 S N=5.3; S G=6.2; S Z=154; S L=138; S Q=220; S C=0
01.40 S J=6.3; S X=0; S K=6.4; S X=0; S U=0; S V=1; S P=8.3; S B=9.15; S R=141
01.50 S T=90; S P1=89; S P2=10.2; S P3=9.35; S P4=9.3; S P5=9.6; S P6=6; S P7=5.2
01.60 S ID=-1; S P8=9.27; S P9=26; S Q1=9.5; S XF=140; S J(XF)=9.5; S J(Q)=P5

02.10 C SETUP INPUT FILE USING DIRECT COMMANDS EXECUTED FROM DATA FILES
02.20 O O FIND, TM; T "2.9 O I "; O O TTY:
02.30 T "FILE TO BE READ? "; O R O, E
02.40 S D=FOUT(FIND(141))
02.50 O R O
02.60 T "G 2.9"; O C
02.80 O I FIND, TM; Q
02.90 O I TEST
02.95 O I TTY:,E

03.10 C SEARCH PARAMETERS?
03.20 T !!! "ENTER RECORD DESCRIPTORS FOLLOWED BY SPACES FOR LABELS THAT"!
03.30 T "ARE TO BE PRINTED. ENTER '0' WHEN FINISHED: "; !!!; S
03.40 S I=I+1; A D(I); I (D(I))3.4,3.5,3.4
03.50 S D(Q)=I-1
03.60 A !!! "WANT ID NUMBERS ON LABEL? "; A; I (A-0ND)3.7,4.2,3.7
03.70 S ID=0

04.10 C OUTPUT DEVICE?
04.20 A !!! "PRINT LABELS ON LINE PRINTER? "; A; !!!; I (A-0YES)4.5,4.3,4.5
04.30 O O LPT:
04.50 T "TOP OF LABEL"!!! "3 TESTS"!!! "ADJUST LABELS"!!! "TEST"!!! "BOTTOM OF LABEL"!!!
04.60 D 4.5; D 4.5; T !!!!!! "DESCRIPTORS SOUGHT: "; !!!
04.80 F I=1, D(Q); T %6.04, D(I)
04.90 T %5.01, !!!

05.10 C GET START-OF-RECORD
05.20 O R I; S X=FIN(); I (X-0)N, G
05.30 O C; O I TTY:,E
05.40 T "END OF FILE AFTER RECORD", E(1), !!!
05.50 T %5.0, NU, " LABELS PRINTED"!!!; %6.04; Q

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06.10 C READ DESCRIPTORS
06.20 S I=U
06.30 S I=I+V; A E(I); I (E(I))J, K, J
06.40 S E(U)=I-V

07.10 C USER TEST OF DESCRIPTORS; HITS GOTO 9.15; MISSES GOTO 10.2

08.10 C TEST DESCRIPTORS
08.20 I (D(U)), B
08.30 S H=T; S I=T
08.40 F H=V, D(U); F I=V, E(U); I (D(H)-E(I)), P,;
08.50 I (H-P1)P2

09.10 C PRINT LABEL; IGNORE FORMFEEDS
09.15 S X=FIN(); S X=FIN(); S NU=NU+1; I (FABS(X-XF)), 9.2; S X=FOUT(X)
09.20 O R I, E; S X=FIND(R); S W=V; O R I; S X=FIN()
09.25 I (ID)P8; T :P9, E(1)
09.27 T !; G Q1
09.30 S X=FOUT(C)
09.35 O R I, E
09.40 S X=FIND(L); S W=W+V; O R I
09.50 S C=FIN(); I [(Q-C)*(XF-C)]P4, J(C), P4
09.60 T !; S W=W+V; I (FTR(W/P6)-(W/P6))P5, P7

10.10 C SKIP TO NEXT RECORD
10.20 S X=FIND(Q); G P7

11.10 SAMPLE 'FINDER' DATA FILE TO BE PREPARED IN EDITOR OR TECO:
11.15
11.20 \101, -4. 2. 7. 1. 0
11.22 MARY SMITH
11.24 CARLETON HALL
11.26 117 18TH ST., NW
11.28 PORTLAND, OREGON 97221
11.30 \102, 4. 22. 7. 1. 0
11.32 CARL JOHNSTON
11.34 PHYSICS DEPARTMENT
11.36 LEEDS COLLEGE
11.38 BOX 394
11.40 PORTLAND, OREGON 97213
11.42 \102. 1. 4. 22. 7. 1. 9. 1. 0
11.44 JOHN JACOB ASTOR
11.46 BIOLOGY DEPT
11.48 LEEDS COLLEGE
11.50 BOX 394
11.52 PORTLAND, OREGON 97213
11.54 \
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C-PS/8 FOCAL, 1971

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01.01 C 'BCCORD' BY H. KNOX OF THE G. A. GRAY COMPANY
01.10 C THIS PROGRAM IS TO FIND BOLT CIRCLE COORDINATES ON EITHER
01.12 C EVENLY SPACED HOLE PATTERNS OR FOR PATTERNS WHICH HAVE
01.14 C VARYING DEGREES OF ANGULAR HOLE LOCATION.
01.16 C THE X & Y LOCATION OF CENTER OF PATTERN MAY BE X=0, Y=0
01.18 C OR X=ANY VALUE, Y= ANY VALUE. 2/2/71 AHR & HK
01.30 T !!)A "EVENLY SPACED HOLES ? ANSWER YES OR NO : "W, !
01.35 I (FABS(W-0YES)), 6.1; I (FABS(W-0NO)), 4.1
01.40 T "TYPE G 5.01 FOR EVENLY SPACED HOLE INSTRUCTIONS", !!
01.45 T "TYPE G 3.01 FOR INCREMENTAL HOLE INSTRUCTIONS", !!
01.50 Q

03.01 T " (INCREMENTAL HOLE SPACING). CALCULATES CENTERS OF POINTS", !
03.02 T " ON A CIRCLE STARTING AT 3 O'CLOCK. THE ANGLE TO NEXT POINT", !
03.03 T " MUST BE ENTERED AFTER EACH CALCULATION. ACCUMALATIVE ANGLES", !
03.04 T " WILL BE TYPED OUT UNTIL 360 DEGREES IS REACHED OR EXCEEDED.", !
03.05 T " VERSION OF JUNE 4, 1971. A. H. R. ", !
03.06 Q

04.10 E
04.15 S PI=3.14159265
04.20 T !!)A "RADIUS ? : " R; T !
04.30 A "COORDINATES OF CENTER OF PATTERN? X = "X; A " Y = "Y; T !!
04.40 A "ANGLE C. C. W. IN DEG. ? : "A; T !
04.50 S A(1)=A(1)+A; S X(1)=X+R*FCOS(A(1)*PI/180)
04.60 S Y(1)=Y+R*FSIN(A(1)*PI/180)
04.70 T %7.04:6, " ANGLE = "A(1), " DEG. ", " X = "X(1), " Y = "Y(1), !!
04.80 I (360-A(1))4.9, 4.9, 4.4
04.90 Q

05.01 T " (EVENLY SPACED HOLES). PROGRAM CALCULATES CENTERS OF POINTS ", !
05.02 T " ON A CIRCLE WITH CENTER OF THE CIRCLE AT POINT X,Y IF VALUES", !
05.03 T " ARE ENTERED FOR X & Y, OTHERWISE THE CENTER IS AT ZERO.", !
05.04 T " THE STARTING ANGLE CAN BE PLUS OR MINUS EXPRESSED IN", !
05.05 T " DEGREES OR DEGREES AND MINUTES. WRITTEN 5/5/71 A. H. R. ", !
05.06 Q

06.10 E
06.15 S PI=3.14159265
06.20 T !!)A "RADIUS ? : "R; !
06.30 A "STARTING ANGLE IN DEGREES & MINUTES ? : "A A; T, 48; A M; T !!
06.40 S A(1)=(A+M/60)*PI/180
06.50 A "NUMBER OF HOLES ? : " N; T !
06.55 A "COORDINATES OF CENTER OF HOLE PATTERN ? : X =? "X, " Y, =? "Y; T !!
06.60 F A(2)=A(1), 2*PI/N, (2*PI*(1-1/N)-.001+A(1)); D 7

07.10 S H=H+1
07.20 T %3.00, "H" H; T %6.04, " X = "X+ R*FCOS(A(2))
07.30 T " Y = "Y+R*FSIN(A(2)), !

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C-PS/8 FOCAL, 1971

01.10 C
01.11 E
01.12 T " ANGLES 1/31/72 H. KNOX", !!!
01.13 C OF THE G. A. GRAY COMPANY, 3611 WOODBURN AVE.
01.14 C CINCINNATI, OHIO 45207
01.15 I (FTR(#/6)-(#/6))1.16,1.25,1.16
01.16 T "RESTART PFOCAL & ANSWER 'YES'", !!!
01.18 L G HANGS 10
01.19 G 1.1
01.20 L G ANGLE1 2
01.21 G 1.1
01.25 T !;A "WHICH ? : "W, !;S C=1.25
01.30 I (FABS(W-0SSS)),1.51; I (FABS(W-0SAS)),1.53; I (FABS(W-0SAA)),1.49
01.31 I (FABS(W-0ASA)),1.55; I (FABS(W-0BC)),1.57; I (FABS(W-0SSA)),1.59
01.33 I (FABS(W-0HG)),1.61; I (FABS(W-0HP)),1.63; I (FABS(W-0HB)),1.65
01.34 I (FABS(W-0HE)),1.67; I (FABS(W-0BP)),1.69; I (FABS(W-0BG)),1.71
01.35 I (FABS(W-0BE)),1.73; I (FABS(W-0PG)),1.75; I (FABS(W-0PE)),1.77
01.40 T "TYPE 'G 1.18' FOR RIGHT ANGLE INSTRUCTIONS", !
01.41 T "TYPE 'G 1.20' FOR OBLIQUE ANGLE INSTRUCTIONS", !!!;Q
01.49 L G OBANG2 8
01.50 G 1.25
01.51 L G OBANG1 4
01.52 G C
01.53 L G OBANG1 5
01.54 G 1.25
01.55 L G OBANG1 6
01.56 G 1.25
01.57 L G OBANG2 7
01.58 G 1.25
01.59 L G OBANG2 9
01.60 G 1.25
01.61 L G HANGS 11
01.62 G 1.25
01.63 L G HANGS 12
01.64 G 1.25
01.65 L G HANGS 13
01.66 G 1.25
01.67 L G HANGS 14
01.68 G 1.25
01.69 L G BANGP 15
01.70 G 1.25
01.71 L G BANGP 16
01.72 G 1.25
01.73 L G BANGP 17
01.74 G 1.25
01.75 L G BANGP 18
01.76 G 1.25
01.77 L G BANGP 19
01.78 G 1.25

C-PS/8 FOCAL, 1971

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01. 01 C 'ANGLE1'

02. 01 T !"TO START THIS PROGRAM, 'L R ANGLES'!"
02. 02 T "TYPE 'G 1.2' TO PRINT THIS SHEET",!E
02. 03 T !!!T :18, "OBLIQUE TRIANGLES          1/28/72   H. KNOX",!!!
02. 04 T :18, "*",!
02. 05 T :17, "* *",!
02. 06 T :16, "* G *",!
02. 07 T :15, "*      *",!
02. 08 T :14, "*      *",!
02. 09 T :10, "L      *      * R",!
02. 10 T :12, "*      *",!
02. 11 T :11, "*      *",!
02. 12 T :10, "*      *",!
02. 13 T :9, "* D      E *",!
02. 14 T :8, "* * * * * * * * * *",!
02. 15 T :18, "B",!!!
02. 20 T "ABOVE TRIANGLE IS SYMBOLIC OF ANY TRIANGLE.",!!
02. 22 T "THE SIDES ARE LABELED 'B' FOR BASE SIDE",!
02. 23 T :22, "'L' FOR LEFT SIDE &",!
02. 24 T :22, "'R' FOR THE RIGHT SIDE",!!
02. 26 T "THE ANGLES ARE LABELED 'D E G'",!!
02. 30 T "THERE ARE (5) PROGRAMMED SOLUTIONS FOR OBLIQUE TRIANGLES",!
02. 32 T "EACH OF WHICH, WHEN THE (3) KNOWN PARTS ARE TYPED TO THE QUESTIONS",!
02. 34 T "ASKED, WILL PRODUCE THE (3) UNKNOWN PARTS OF THE TRIANGLE.",!!
02. 36 T "ANSWER THE QUESTION 'WHICH' BY TYPING ONE OF THE FOLLOWING:",!!
02. 38 T "SSS FOR THE (3) KNOWN SIDES.",!
02. 40 T "ASA FOR (2) KNOWN ANGLES & THE INCLUDED SIDE.",!
02. 42 T "SAS FOR (2) KNOWN SIDES & THE INCLUDED ANGLE.",!
02. 44 T "SSA FOR (2) KNOWN SIDES & AN ANGLE OPPOSITE ONE OF THE SIDES.",!
02. 46 T "SAA FOR (2) KNOWN ANGLES & A KNOWN SIDE OPPOSITE AN ANGLE.",!!
02. 48 T "BC WILL CALL A PROGRAM TO COMPUTE THE CHORD DISTANCE BETWEEN",!
02. 50 T "      HOLES ON A BOLT CIRCLE (HANDY FOR BENCH LAY-OFF WORK).",!!!
02. 52 T " YOU MAY HAVE TO ORIENT YOUR PROBLEM TO SUIT THE LABELED",!
02. 54 T " NOMENCLATURE OF THE ILLUSTRATED TRIANGLE ABOVE. CAREFULLY",!
02. 56 T " READ THE DESCRIPTIVE HEADING ON EACH PROGRAM TO ASCERTAIN",!
02. 58 T " THE PROPER LABELS FOR THE KNOWN PARTS. FOR INSTANCE, THE HEADING",!
02. 60 T " FOR SSS IS FOLLOWED BY '(BLR)' WHICH INDICATES THAT",!
02. 62 T " THE KNOWN PARTS ARE (1), THE BASE; (2), THE LEFT SIDE; & (3),",!
02. 64 T " THE RIGHT SIDE.",!!
02. 66 T " THE KNOWN CALL 'WHICH' SYMBOLS USE THE ENCLOSED ( ) AS A LABEL TO",!
02. 67 T " IDENTIFY THE KNOWN PARTS. KNOWNNS & ( ) ARE LISTED BELOW.",!!
02. 68 T "SSS (BLR)",!
02. 70 T "SAS (BLD)",!
02. 72 T "ASA (DBE)",!
02. 74 T "SAA (BDG)",!
02. 76 T "SSA (LBE)",!!
02. 78 L R ANGLES

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04.10 C THIS PROGRAM IS OBANG1
04.11 E
04.12 T "OBLIQUE TRI. WHERE 3 SIDES ARE KNOWN. SSS (BLR)",!!
04.15 E
04.16 T %8.04; D 14.6
04.20 A "LENGTH OF BASE SIDE B (LONGEST SIDE) ? : "B.!"
04.30 D 14.7; D 14.71
04.33 S  $G(1) = (L^2 + R^2 - B^2) / (2 * L * R)$ ; I  $G(1) > 4.43, 4.35, 4.43$ 
04.35 T "THIS IS A 90 DEG TRIANGLE. COMPUTER CALLED UP PROGRAM (HB).!"
04.37 T "ENTER ABOVE B & L VALUES FOR H & B WHEN ASKED."; T !
04.38 S  $C = 1.65$ 
04.39 R
04.43 S  $G(2) = FSQT(1 - G(1)^2) / G(1)$ 
04.44 S  $GG = FATN(G(2))$ ; I  $(-GG) > 4.45, 4.45$ ; S  $GG = GG + PI$ 
04.45 S  $G = GG * 180 / PI$ 
04.46 S  $E(1) = L * FSIN(GG) / B$ ; S  $E(2) = E(1) / FSQT(1 - E(1)^2)$ 
04.48 S  $EE = FATN(E(2))$ ; S  $E = EE * 180 / PI$ 
04.50 S  $D(1) = R * FSIN(GG) / B$ ; S  $D(2) = D(1) / FSQT(1 - D(1)^2)$ 
04.52 S  $DD = FATN(D(2))$ ; S  $D = DD * 180 / PI$ ; S  $P = D + E + G$ 
04.57 D 15; D 11; D 13; D 12
04.80 I  $(FTR(P * 1E3 + .5) / 1E3 - 180) > 4.81, 4.85, 4.83$ 
04.81 T "SUM OF ANGLES < 180 DEG. --CHECK INPUT "; T %9.06, P, !!; G 4.85
04.83 T "SUM OF ANGLES > 180 DEG. --CHECK INPUT "; T %9.06, P, !!
04.85 L R ANGLES

05.10 C
05.12 T "OBLIQUE TRI. - 2 SIDES & INCLUDED ANGLE SAS (BLD) ",!!
05.15 E
05.16 D 14.6; T %6.04; D 14.72
05.21 D 14.7; D 14.50; D 14.53
05.40 S  $E(2) = L * FSIN(DD) / (B - (L * FCOS(DD)))$ ; S  $EE = FATN(E(2))$ 
05.42 I  $(-EE) > 5.45, 5.45$ ; S  $EE = EE + PI$ 
05.45 S  $E = EE * 180 / PI$ 
05.50 S  $G = 180 - (D + E)$ ; S  $GG = G * PI / 180$ ; I  $(-GG) > 5.55, 5.55$ ; S  $GG = GG + PI$ 
05.55 S  $R = L * FSIN(DD) / FSIN(EE)$ ; S  $RR = (B * FCOS(EE)) + (L * FCOS(GG))$ 
05.75 D 15; D 11; D 13; D 12; T !
05.80 I  $(FTR((R - RR) * 1E3) / 1E3) > 5.82, 5.85, 5.83$ 
05.82 T "SIDE R IS SHORT -- CHECK--"!!!; %9.06, "R= ", R, !, "RR= ", RR, !!!; G
05.83 T "SIDE R IS LONG -- CHECK--"!!!; %9.06, "R= ", R, !, "RR= ", RR, !!!
05.85 T !!!; L R ANGLES

06.10 C
06.12 T "OBLIQUE TRI. ASA (DBE)",!!
06.15 E
06.16 D 14.6; T %6.04
06.20 D 14.72; D 14.5; D 14.53; D 14.55; D 14.56
06.22 S  $DD = D * PI / 180$ ; S  $EE = E * PI / 180$ 
06.25 S  $G = 180 - (D + E)$ ; S  $GG = G * PI / 180$ ; I  $(-GG) > 6.3, 6.3$ ; S  $GG = GG + PI$ 
06.30 S  $R = B * FSIN(DD) / FSIN(GG)$ ; S  $L = B * FSIN(EE) / FSIN(GG)$ 
06.40 S  $RR = (B * FCOS(EE)) + (L * FCOS(GG))$ 
06.50 D 15; D 11; D 13; D 12; T !
06.60 I  $(FTR((R - RR) * 1E3) / 1E3) > 6.65, 6.7, 6.66$ 
06.65 T "SIDE R IS SHORT - CHECK -"!!!; %9.06, "R= ", R, !, "RR= ", RR, !!!; G 6.7
06.66 T "SIDE R IS LONG -CHECK--", !!!; T %9.06; T "R= ", R, !; T "RR= ", RR, !!!
06.70 L R ANGLES

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11.10 S G(3)=G-FITR(G); S G(4)=G(3)*60; S G(5)=G(4)-FITR(G(4))
11.20 S G(6)=G(5)*60
11.30 D 14.86; T %6.03; T G; T %3; D 14.87; T FITR(G); D 14.88; T FITR(G(4))
11.40 D 14.89; T G(6); D 14.9; T !

12.10 S D(3)=D-FITR(D); S D(4)=D(3)*60; S D(5)=D(4)-FITR(D(4))
12.20 S D(6)=D(5)*60
12.30 D 14.91; T %6.03; T D; T %3; D 14.87; T FITR(D); D 14.88; T FITR(D(4))
12.40 D 14.89; T D(6); D 14.9; T !

13.10 S E(3)=E-FITR(E); S E(4)=E(3)*60; S E(5)=E(4)-FITR(E(4))
13.20 S E(6)=E(5)*60
13.30 D 14.92; T %6.03; T E; T %3; D 14.87; T FITR(E); D 14.88; T FITR(E(4))
13.40 D 14.89; T E(6); D 14.9; T !

14.50 A "ANGLE 'D' IS : DEG. = ? "DE,": MIN. = ? "MI,": SEC. = ? "SE,!!
14.53 S M=MI/60; S S=SE/3600; S D=DE+M+S; S DD=D*PI/180
14.55 A "ANGLE 'E' IS : DEG. = ? "DI,": MIN. = ? "ME,": SEC. = ? "SS,!!
14.56 S M(1)=ME/60; S S(1)=SS/3600; S E=DI+M(1)+S(1); S EE=E*PI/180
14.60 S PI=3.1415927
14.70 A "LENGTH OF LEFT SIDE L ? : "L, !
14.71 A "LENGTH OF RIGHT SIDE R ? : "R,!!
14.72 T !!; A "LENGTH OF BASE SIDE B ? : "B, !
14.86 T " ANGLE G = "
14.87 T " DEG OR "
14.88 T " DEGREES "
14.89 T " MIN. "
14.90 T " SEC. "
14.91 T " ANGLE D = "
14.92 T " ANGLE E = "

15.10 T " SIDE B = ",B, !
15.20 T " SIDE L = ",L, !
15.30 T " SIDE R = ",R,!!

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07.10 C THIS PROGRAM IS OBANG2
07.11 E
07.12 C THIS PROGRAM CALCULATES CHORD DISTANCE BETWEEN HOLES
07.13 C ON A BOLT CIRCLE. 12/21/71. HK
07.14 C
07.15 C YOU MUST KNOW THE NUMBER OF HOLES AND THE
07.16 C DIAMETER OR THE RADIUS OF THE BOLT CIRCLE.
07.20 T "OBLIQUE TRIANGLE - 2 EQUAL SIDES & INCLUDED ANGLE (BC)",!!
07.22 E
07.24 T % 8.05
07.28 A "NUMBER OF HOLES? " N, !
07.30 S PI=3.1415927
07.33 S D=(360/N); T "DEGREES= ",D,!!
07.35 A "IS BOLT CIRCLE DIM. GIVEN AS DIA. OR RAD. ? "W, !
07.40 I (FABS(W-0DIA)), 7.45; I (FABS(W-0RAD)), 7.55
07.45 A "BOLT CIRCLE DIAMETER? "BC, !
07.50 S B=BC/2; T "BC RADIUS= ",B,!!; G 7.65, !

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07.55 A "BOLT CIRCLE RADIUS? " B, !
07.65 S C=FSQT(B^2+B^2-(2*B*B*FCOS(D*PI/180))); T %8.04
07.70 T "CHORD DISTANCE BETWEEN HOLES IS = ", C, !!
07.75 A "MORE ? ANS. YES OR NO : "W, !
07.80 I (FABS(W-0YES)), 7.22; I (FABS(W-0NO)), 7.85
07.85 L R ANGLES

08.10 C
08.12 T !!, "OBLIQUE TRIANGLE. SSA (BDG)". !!
08.15 E
08.16 D 14.6; T %8.04
08.20 D 14.72; D 14.5; D 14.53; D 14.57; D 14.58
08.25 S DD=D*PI/180; S GG=G*PI/180
08.30 S E=180-(D+G); S EE=E*PI/180; I (-EE)8.35, 8.35; S EE=EE+PI
08.35 S R=B*FSIN(DD)/FSIN(GG); S L=B*FSIN(EE)/FSIN(GG)
08.40 S RR=(B*FCOS(EE))+(L*FCOS(GG))
08.45 D 15; D 11; D 13; D 12; T !
08.50 I (FTR((R-RR)*1E3)/1E3)8.55, 8.7, 8.55
08.55 D 14.59
08.70 L R ANGLES

09.10 C
09.11 E
09.12 T "OBLIQUE TRIANGLE SSA (LBE)". !!
09.15 E
09.16 D 14.6; T %8.04; D 14.72; D 14.7; D 14.55; D 14.56
09.20 S EE=E*PI/180; S G(1)=B*FSIN(EE)/L; S G(2)=G(1)/(FSQT(1-G(1)^2))
09.25 S GG=FATN(G(2)); I (-GG)9.3, 9.3; S GG=GG+PI
09.30 S G=GG+180/PI
09.35 S D=180-(G+E); S DD=D*PI/180; I (-DD)9.4, 9.4; S DD=DD+PI
09.40 S R=L*FSIN(DD)/FSIN(EE)
09.45 S RR=(B*FCOS(EE))+(L*FCOS(GG))
09.50 D 15; D 11; D 13; D 12; T !
09.60 I (FTR(R-RR)*1E3)/1E3)9.65, 9.7, 9.65
09.65 D 14.59
09.70 L R ANGLES

11.10 S G(3)=G-FTR(G); S G(4)=G(3)*60; S G(5)=G(4)-FTR(G(4))
11.20 S G(6)=G(5)*60
11.30 D 14.86; T %6.03; T G; T %3; D 14.87; T FTR(G); D 14.88; T FTR(G(4))
11.40 D 14.89; T G(6); D 14.9; T !

12.10 S D(3)=D-FTR(D); S D(4)=D(3)*60; S D(5)=D(4)-FTR(D(4))
12.20 S D(6)=D(5)*60
12.30 D 14.91; T %6.03; T D; T %3; D 14.87; T FTR(D); D 14.88; T FTR(D(4))
12.40 D 14.89; T D(6); D 14.9; T !

13.10 S E(3)=E-FTR(E); S E(4)=E(3)*60; S E(5)=E(4)-FTR(E(4))
13.20 S E(6)=E(5)*60
13.30 D 14.92; T %6.03; T E; T %3; D 14.87; T FTR(E); D 14.88; T FTR(E(4))
13.40 D 14.89; T E(6); D 14.9; T !

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14.50 A "ANGLE 'D' IS : DEG = ? "DE," : MIN. = ? "MI," : SEC. = ? "SE,!!
14.53 S M=MI/60; S S=SE/3600; S D=DE+M+S; S DD=D*PI/180
14.55 A "ANGLE 'E' IS : DEG. = ? "DI," : MIN. = ? "ME," : SEC. = ? "SS,!!
14.56 S M(1)=ME/60; S S(1)=SS/3600; S E=DI+M(1)+S(1); S EE=E*PI/180
14.57 A "ANGLE 'G' IS : DEG. = ? "DG," : MIN. = ? "MG," : SEC. = ? "SG,!!
14.58 S M(2)=MG/60; S S(2)=SG/3600; S G=DG+M(2)+S(2)
14.59 T "SIDE R IS WRONG.",!!; T X9.06; T "R= ",R,!!; T "RR= ",RR,!!
14.60 S PI=3.1415927
14.70 A "LENGTH OF LEFT SIDE L ? : "L,!!
14.71 A "LENGTH OF RIGHT SIDE R ? : "R,!!
14.72 T !!; A "LENGTH OF BASE SIDE B ? : "B,!!
14.86 T " ANGLE G = "
14.87 T " DEG. OR "
14.88 T " DEGREES "
14.89 T " MIN. "
14.90 T " SEC. "
14.91 T " ANGLE D = "
14.92 T " ANGLE E, = "

15.10 T " SIDE B = ",B,!!
15.20 T " SIDE L = ",L,!!
15.30 T " SIDE R = ",R,!!

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10.01 C THIS PROGRAM IS 'HANGS'
10.02 T !!;"TO START PROGRAM, L R ANGLES. TYPE G 1.18 TO PRINT THIS SHEET",!!
10.04 T :18,"RIGHT ANGLES ONLY 1/14/72 H.KNOX",!!;E
10.05 T :8,"*",!!
10.06 T :8,"* *",!!
10.07 T :8,"*G *",!!
10.08 T :8,"* *",!!
10.09 T :8,"* *",!!
10.10 T :5," P * * H",!!
10.11 T :8,"* *",!!
10.12 T :8,"* *",!!
10.13 T :8,"* *",!!
10.14 T :8,"* D * E *",!!
10.15 T :8,"* * * * *",!!
10.16 T :13,"E",!!!
10.20 T "SEE ABOVE TRIANGLE FOR SYMBOL ORIENTATION SIDES ARE",!
10.22 T "P B H: ANGLES ARE 'D E G'.",!!
10.25 T "ANSWER QUESTION 'WHICH ?' BY TYPING SYMBOLS OF THE TWO",!
10.26 T "KNOWN PARTS OF THE TRIANGLE (OTHER THAN THE 90 DEGREE",!
10.27 T "ANGLE 'D'). ALWAYS TYPE KNOWN SIDE SYMBOL BEFORE",!
10.28 T "THE KNOWN ANGLE SYMBOL. SYMBOLS MUST BE TYPED IN MANNER",!
10.29 T "SHOWN BELOW.",!!
10.30 T "LEGAL SYMBOLS WHERE 'H' IS KNOWN ARE:",!!
10.31 T :5,"HG"; T :15,"HP"; T :25,"HB"; T :35,"HE",!!!
10.32 T "LEGAL SYMBOLS WHERE 'B' IS KNOWN ARE:",!!
10.33 T :5,"BP"; T :15,"BE"; T :25,"BG",!!!
10.35 T "LEGAL SYMBOLS WHERE 'P' IS KNOWN ARE:",!!
10.36 T :5,"PG"; T :15,"PE",!!!

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11.10 C          1/12/72
11.11 E
11.15 T "RIGHT ANGLE TRI. WITH HYP & ANGLE G GIVEN ( HG ) ",!!
11.20 D 24;A "LENGTH OF HYPOTENUSE ? H : "H,!
11.25 T "ANGLE G IS:";D 20;S G=AA
11.30 S E=90-G;S B=H*FSIN(G*PI/180)
11.35 S P=H*FCOS(G*PI/180);T %7.04
11.40 D 28;D 27;D 21;D 25;
11.45 D 26;D 22;D 12.8;D 23
11.92 T !!! L R ANGLES

12.10 C
12.11 E
12.15 T !;T "RIGHT ANG TRI WITH HYP & ADJ SIDE GIVEN ( HP )",!!
12.20 D 24;A "LENGTH OF HYPOTENUSE H ? : "H,!
12.25 A "LENGTH OF ADJACENT SIDE P ? : "P,!
12.30 S B=FSQT(H^2-P^2)
12.35 S E(1)=P/H
12.37 S E=FATN((E(1))/FSQT(1-E(1)^2))*180/PI
12.40 S G=90-E;T %7.04
12.45 D 28;D 27;S A(1)=G;D 12.8;D 22;D 23
12.50 D 25;D 26;D 12.8;D 22;D 23;L R ANGLES
12.80 T " DEG. OR "

13.10 C
13.11 E
13.15 T !;T "RIGHT ANG TRI WITH HYP & BASE SIDE GIVEN ( HB )",!!
13.20 D 24;A "LENGTH OF HYPOTENUSE H ? : "H,!
13.25 A "LENGTH OF BASE SIDE B ? : "B,!
13.30 S P=FSQT(H^2-B^2)
13.35 S G(1)=B/H;S G=FATN((G(1))/FSQT(1-G(1)^2))*180/PI
13.40 S E=90-G;T %7.04
13.45 D 28;D 27;S A(1)=G;D 12.8;D 22;D 23
13.50 D 25;D 26;D 12.8;D 22;D 23;L R ANGLES

14.10 C
14.11 E
14.15 T !;T "RIGHT ANG TRI WITH HYP & ANGLE E GIVEN ( HE ) ",!!
14.20 D 24;A "LENGTH OF HYPOTENUSE H ? : "H,!
14.25 T " ANGLE E IS : ";D 20;S E=AA
14.30 S G=90-E;S B=H*FCOS(E*PI/180)
14.35 S P=H*FSIN(E*PI/180);T %7.04
14.40 D 28;;D 27;S A(1)=G;D 12.8;D 22;D 23
14.45 D 25;D 26;D 30
14.70 L R ANGLES

20.10 A "DEGREES = ? "DE."; MINUTES = ? "MI."; SECONDS = ? "SE.!!
20.20 S M=MI/60;S S=SE/3600;S AA=DE+M+S

21.30 T " DEG. OR ";T %3.00;T DE," DEG. ",MI," MIN. ",SE," SEC. ",!

22.10 S A(2)=A(1)-FABS(FITR(A(1)));S MM=A(2)*60
22.20 S M=MM-FABS(FITR(MM));S SE=M*60;T %3.00

23.10 T FITR(A(1))," DEG. ",FITR(MM)," MIN. ",(SE)," SEC. ",!

24.10 T %6.03;S D=90;S PI=3.1415927

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25.10 T " ANGLE D = 90.000 DEGREES ",!
26.10 T %6.03; T " ANGLE E = ",E; S A(1)=E
27.10 T %6.03; T " ANGLE G = ",G
28.10 T " SIDE H = "H,!; T " SIDE B = "B,!; T " SIDE P = "P,!
30.10 S A(2)=A(1)-FABS(FITR(A(1))); S MM=A(2)*60
30.20 S M=MM-FABS(FITR(MM)); S SS=M*60
30.30 T " DEG. OR "; T %3.00; T DE, " DEG. ",MI, " MIN. ",SS, " SEC. ",!

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15.10 C THIS PROGRAM IS 'BANGP'
15.11 E
15.15 T !; T "RIGHT ANG TRI WITH TWO SIDES GIVEN ( BP )",!!
15.20 D 24; A "LENGTH OF BASE SIDE B ? : "B,!
15.30 A "LENGTH OF PERPENDICULAR SIDE P ? : "P,!
15.35 S H=FSQT(B^2+P^2)
15.40 S GG=B/P; S G=FATN(GG)*180/PI
15.45 S E=90-G; T %7.04
15.50 D 28; D 27; S A(1)=G; D 22; D 17.8; D 23
15.55 D 25; D 26; D 29; L R ANGLES

16.10 C
16.11 E
16.15 T !; T "RIGHT ANG TRI WITH BASE SIDE & ANGLE G GIVEN ( BG )",!!
16.20 D 24; A "LENGTH OF BASE SIDE B ? : "B,!
16.30 T " ANGLE G IS : "; D 20; S G=AA
16.35 S E=90-G; S H=B/FSIN(G*PI/180)
16.38 S GG=FCOS(G*PI/180)/FSIN(G*PI/180)
16.40 S P=B*GG; T %7.04; D 28
16.50 D 27; D 21; D 25; D 26; D 22;
16.55 D 17.8; D 23; L R ANGLES

17.10 C
17.11 E
17.15 T !; T "RIGHT ANG TRI WITH BASE SIDE & ANGLE E GIVEN ( BE )",!!
17.20 D 24; A "LENGTH OF BASE SIDE B ? : "B,!
17.30 T " ANGLE E IS : "; D 20; S E=AA
17.35 S G=90-E; S H=B/FCOS(E*PI/180)
17.38 S EE=FSIN(E*PI/180)/FCOS(E*PI/180)
17.40 S P=B*EE; T %7.04; D 28
17.45 D 27; S A(1)=G; D 17.8; D 22; D 23
17.50 D 25; D 26; D 30
17.60 L R ANGLES
17.80 T " DEG. OR "

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18.10 C
18.11 E
18.15 T !;T "RIGHT ANG TRI WITH SIDE P & ANGLE G GIVEN ( PG )",!!
18.20 D 24;A "LENGTH OF PERPENDICULAR SIDE P ? : "P,!
18.25 T " ANGLE G IS : ";D 20;S G=AA
18.30 S E=90-G;S H=P/FCOS(G*PI/180)
18.32 S GG=FSIN(G*PI/180)/FCOS(G*PI/180)
18.35 S B=P*GG;T % 7.04;D 28
18.40 D 27;D 21;D 25;D 26;D 22
18.45 D 17.8;D 23
18.50 L R ANGLES

19.10 C
19.11 E
19.15 T !;T "RIGHT ANG TRI WITH SIDE P & ANGLE E GIVEN ( PE )",!!
19.20 D 24;A "LENGTH OF PERPENDICULAR SIDE P ? : "P,!
19.25 T " ANGLE E IS : ";D 20;S E=AA
19.30 S G=90-E;S H=P/FSIN(E*PI/180)
19.32 S EE=FCOS(E*PI/180)/FSIN(E*PI/180)
19.35 S B=P*EE;T %7.04;D 28
19.40 D 27;S A(1)=G;D 17.8;D 22;D 23
19.45 D 25;D 26;D 30;L R ANGLES

20.10 A "DEGREES = ? "DE,"; MINUTES = ? "MI,"; SECONDS = ? "SE,!!
20.20 S M=MI/60;S S=SE/3600;S AA=DE+M+S

21.30 T " DEG. OR ";T %3.00;T DE," DEG. ",MI," MIN. ",SE," SEC. ",!

22.10 S A(2)=A(1)-FABS(FITR<A(1)>);S MM=A(2)*60
22.20 S M=MM-FABS(FITR<MM>);S SE=M*60;T %3.00

23.10 T FITR<A(1)>," DEG. ",FITR<MM>," MIN. ",(SE)," SEC. ",!

24.10 T %6.03;S D=90;S PI=3.1415927

25.10 T " ANGLE D = 90.000 DEGREES ",!

26.10 T %6.03;T " ANGLE E = ",E;S A(1)=E

27.10 T %6.03;T " ANGLE G = ",G

28.10 T " SIDE H = "H,!;T " SIDE B = ",B,!;T " SIDE P = ",P,!!

29.10 S A(2)=A(1)-FABS(FITR<A(1)>);S MM=A(2)*60
29.20 S M=MM-FABS(FITR<MM>);S SS=M*60;T %3.00
29.30 T " DEG. OR ";T FITR<A(1)>," DEG. ",FITR<MM>," MIN. ",SS," SEC. ",!

30.10 S A(2)=A(1)-FABS(FITR<A(1)>);S MM=A(2)*60
30.20 S M=MM-FABS(FITR<MM>);S SS=M*60
30.30 T " DEG. OR ";T %3.00;T DE," DEG. ",MI," MIN. ",SS," SEC. ",!

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