FOCAL

lets you tame a computer

LEARN TO USE A COMPUTER AS A SOPHISTICATED CALCULATOR IN MINUTES

In a few minutes you can learn to use a full-scale computer for sophisticated calculations. Without learning to program, you can do triangulation problems, least squares fit, eigenvalues, exponential curve fitting, and even do compound interest and commission rates. FOCAL makes using the computer as simple as using a desk calculator.

LEARN TO WRITE COMPUTER PROGRAMS IN A FEW HOURS

In addition, FOCAL is very flexible. It is the ideal way to begin learning to program a computer. FOCAL allows the student or computer novice to learn to write programs using straight-forward commands. FOCAL allows him to check his program as he prepares it—adding, changing, or deleting. FOCAL will even tell him where and how he went wrong if he makes an error.

FOCAL programs will perform more complex calculations and repeat tedious problems easily. They will instruct the computer to automatically make decisions and perform tasks based on user input. Plotting, calculating, comparing, and printing-out—easily written FOCAL programs can even monitor data and control experiments.

AS A DESK CALCULATOR

Sitting at the teletype, simply type:

FOR THE SINE OF 274:
USER: TYPE FSIN(274)
FOCAL: = - 0.6299

FOR THE COSINE OF 37:
USER: TYPE FCOS(37)
FOCAL: = + 0.7654

FOR ADDITION AND SUBTRACTION:
USER: TYPE 25.3827 + 529.753 - 162.774
FOCAL: = + 392.3620

FOR THE SQUARE ROOT OF 825.25:
USER: TYPE FSQT(825.25)
FOCAL: = + 28.7272

FOR MULTIPLICATION AND DIVISION:
("*" = Multiply and "/" = Divide)
USER: TYPE 23.44*73.92/4.5339
FOCAL: = + 382.1620

FOR EXPONENTIATION:
(6 squared)
USER: TYPE 6↑2
FOCAL: = + 36.00

FOR SOLVING EQUATIONS:
USER: TYPE 4.167*(FSIN(89)/FSQT(37))
FOCAL: = + 0.5892

It's that easy, FOCAL prints out the answers instantly—no programming, no complicated symbols, no waiting. FOCAL leaves the user with a detailed print out of all his work.

TO LEARN PROGRAMMING

Writing programs is an easy step by step process with FOCAL. The user numbers each step or text line from 1.01 to 15.99. The computer then follows the numbered commands after it is given "GO" from the user. That's all, programs can be basic or complicated. They can all do complex operations and be stored on paper tape.

SOLVING A RIGHT TRIANGLE GIVEN A SIDE AND AN ANGLE:

```
*W
C-FOCAL.; 1968

01.10 ASK "SIDE S1 EQUALS "  ,S1
01.20 ASK "ADJACENT ANGLE A2 EQUALS ",A2; TYPE "DEGREES"!!
01.30 SET RATIO=3.141529/180;SET  A1=90-A2
01.40 SET HYP=S1/FSIN(A1*RATIO);SET  S2=FSQT(HYP↑2-S1↑2)
01.50 TYPE "SIDE S2", S2 ,!,"HYPOTENUSE", HYP,!
01.60 TYPE "ANGLE A1", A1, !
*
*C  USER TYPES "GO" AND FOCAL ASKS FOR VARIABLES
*GO
SIDE S1 EQUALS :4 ADJACENT ANGLE A2 EQUALS :30 DEGREES

SIDE S2=+   2.3095
HYPOTENUSE=+    4.6189
ANGLE A1=+  60.0000
*
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DESIGNING DIGITAL FILTERS WITH FOCAL:

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  W
C-FOCAL.; 1968

01.01 FOR I=0,4; SET E(I) =0
01.02 SET R=0; SET E=1
01.03 ASK "SAMPLE TIME" T, " DELAY ",D
01.04 SET N=E-R; SET P=E+R
01.05 SET E(1)=(E(1)- .1072*N*T)/D
01.06 SET E(2)=(E(2)-(10*E(1)+.5360*P)*T)/D
01.07 SET E(3) = (E(3)-(10*E(2)+1.200*N)*T)/D
01.08 SET E(4)=(E(4)-(10*E(3)+1.355*P)*T)/D
01.09 SET R=10*E(4)+E(0)
01.12 FOR J=0,30*R+12; TYPE "*"
01.13 TYPE " " %4.03, R(0) , !
01.14 SET COUNT=COUNT+1; IF (COUNT-50) 1.04; RETURN
01.98 C THIS PROGRAM IS A DEMONSTRATION OF DIGITAL
01.99 C FILTER DESIGN USING 'FOCAL'
*C USER TYPES "GO" AND FOCAL WILL ASK FOR TIME AND DELAY
*
*GO
SAMPLE TIME:.05  DELAY :1
****************************** =+0.562
**** =-0.280
** =-0.353
******* =-0.172
************* =+0.016
***************** =+0.124
******************* =+0.146
***************** =+0.110
************** =+0.051
************ =-0.002
************ =-0.032
************ =-0.031
************** =+0.000
***************** =+0.059
******************* =+0.136
********************* =+0.225
************************ =+0.320
*************************** =+0.414
******************************* =+0.503
********************************** =+0.586
********************************** =+0.660
************************************ =+0.725
************************************* =+0.781
************************************** =+0.828
*************************************** =+0.867
*************************************** =+0.899
**************************************** =+0.925
**************************************** =+0.946
**************************************** =+0.963
***************************************** =+0.975
***************************************** =+0.985
***************************************** =+0.992
***************************************** =+0.998
****************************************** =+1.001
****************************************** =+1.004
****************************************** =+1.005
****************************************** =+1.006
****************************************** =+1.007
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FOCAL

a new conversational language developed by Digital Equipment Corporation for its PDP-8 family of small computers

USES INCLUDE:

Triangulation problems.
Least squares fit
Compound interest
Eigenvalues
Exponential curve fitting
Data monitoring
Experimental control
Many others

FUNCTIONS INCLUDE:

Trigonometric—sine, cosine, and arctangent

Logarithmic—Naperian or natural log, and inverse log

Device controls—scope and plotter output, and A/D input

Other—sign part, integer part, absolute value, square root, and random number.

OPERATIONS AND THEIR SYMBOLS INCLUDE:

Exponentiation (↑)

Multiplication (*)

Division (/)

Addition (+)

Subtraction (-)

Up to two alphanumeric letters are accepted as variable names and all may be subscripted. Any of the following parenthetical pairs may be used: (),[ ], and <>.

digital

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