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This form should be completed and submitted with the program package to the SHARE Program Library Agency at the address shown above. Standards and instructions for submitting programs are in the "SHARE Reference Manual".

(1) Program Number (to be filled in by SPLA)..... 360D-08.7.006

(2) System Type (machine).....IBM 360/370

(3) Search Key.....

(4) Programming Systems/Languages.....FORTRAN, ASSEMBLER

(5) Author's Name and Address.....DR. DANIEL ASHLER
9 ASBURY AVENUE
MELROSE PARK, PA. 19126

(6) Direct Technical Inquiries to Name & Address
(if different than Author)

(7) Title of Program..... SPLØT (Version 5) subroutines

(8) Submitter's Installation Membership Code.....

(9) Submitter's Own Program Identification and Suffix(Optional)..

(10) Primary Subject Code..... OUTPUT (PLOTTING) 08.6

(11) Minimum System Requirements

(12) New or Revision Code (if revision, show prior Program Number in Item 1) 360D-08.7.006

(13) Year Completed..... 1971

(14) Date of Submittal..... 31 March 1977

(15) Documentation (number of original pages submitted)..... 12

(16) Abstract (should contain sufficient information for a reader to determine the value of the program). Listed on the reverse side of this form are subjects which may serve as a guide for a descriptive abstract.

SHARE PROGRAM LIBRARY SUBMITTAL FORM

Subject Guide:

a. Purpose
b. Programming Language used
c. Version and modification level or release number
d. Field of application
e. Type of routine (main program, subroutine, etc.)
f. Specific description of machine requirements

ABSTRACT

Subroutine SPLØT (Version 5) constructs and prints one-page graphs or pictorial displays on a 132-character line printer. Assuming six lines per inch, the size of a graph may be set at either 8 1/2 by 10 inches or 10 by 10 inches. Multiple entry points are used to provide maximum flexibility. A minimum of three calls are required to produce a graph: (1) one call to establish the horizontal and vertical scales and clear the "raster" array, (2) one or more calls to load the raster array with printable characters, and (3) a final call to output the contents of the raster array to the printed page, with or without descriptive labels. Calls are provided that optionally set up axes or complete grids, insert text, generate circles, rectangles, triangles, or trapezoids, fill in areas, invoke overprinting to insure good print density, and expand the horizontal or vertical scales as needed to give their end points convenient values. Graphs of several functions may be superimposed, each plotted using a different printing character.

(Please attach additional pages if necessary).....Total pages attached

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(17) Signature of Submitter and Date Daniel Fylstra

(18) Signature of Installation Addressee

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April 1, 1977

SPLOT has had much use over the years at the University of Pennsylvania, where it was developed, and, later, at Uni-Coll Corporation, which took over the operations and facilities of the U. of P. Computer Center. To enhance its usefulness, Eric Tappert adapted it for use with the Calcomp plotter (as Version 2), and I later added many new features to Version 1, thus developing the Version 5 that I am sending you. We coordinated our work so that a user could debug by first plotting graphs on the printer, and then, by a change of JCL, plot final output on the more expensive Calcomp plotter. Therefore Version 5 contains the dummy entry points FACTOR, GRID, SCALE, FLINE, SYMBOL, PLOT, PLOTS, and AXIS, these being names of routines in the Calcomp software library. Thus when Version 5 is accessed, the Calcomp routines are not. Users who are not concerned with using Version 2 may therefore wish to delete cards SPLOT501 through SPLOT508 from the source deck, to avoid possible conflicts with other entries in their program libraries.

Users should also note that the deck supplied to you employs a letter "I" in place of a vertical stroke, to accomodate installations that use a print chain or train lacking the stroke (hex 4F, card punch 12-7-8). If a properly equipped train or chain is in use, then card SPLØT490 may be replaced by the comment card following it, with the "C" in column 1 blanked out, to produce the better looking axes and grid lines that result from use of the vertical stroke.

360D-08.7.006

Tape Key

4-12-77

Tape: No label, DCB=(RECFM=FB,LRECL=80,BLKSIZE=4000)

File 1:	Assembler Routines RANNOS, KMVCKCLC, NARGS	103 Records.
File 2:	Fortran Test Programs and Subroutine PLOTTER	334 Records.
File 3:	SPLOT Fortran source	1003 Records.

```
0001            SUBROUTINE SPLOT                                                SPLOT  1
C                                                                               SPLOT  2
C*****************************************************************************SPLOT  3
C     GENERAL PURPOSE PLOTTING SUBROUTINE WRITTEN BY DAN ASHLER AND             SPLOT  4
C     ALLAN GELLERT, UNIVERSITY OF PENNSYLVANIA, JANUARY, 1968, AND             SPLOT  5
C     REVISED MAY, 1971, BY DAN ASHLER.                                         SPLOT  6
C*****************************************************************************SPLOT  7
C                                                                               SPLOT  8
C                                                                               SPLOT  9
C                                                                               SPLOT 10
C                          VERSION 5 MODIFICATION 0                             SPLOT 11
C                                                                               SPLOT 12
C-------------------------------------------------------------------------------SPLOT 13
C                                                                               SPLOT 14
C   PURPOSE                                                                     SPLOT 15
C                                                                               SPLOT 16
C         SUBROUTINE SPLOT CONSTRUCTS AND PRINTS A ONE-PAGE GRAPH ON            SPLOT 17
C     A PRINTER, E.G., IBM 1403, THAT IS NORMALLY SET UP TO PRINT TEN           SPLOT 18
C     CHARACTERS PER INCH HORIZONTALLY, 132 CHARACTERS PER LINE, AT A           SPLOT 19
C     VERTICAL LINE SPACING OF SIX LINES PER INCH.                              SPLOT 20
C         A CALCOMP PLOTTER VERSION OF THIS PROGRAM, VERSION 2, IS              SPLOT 21
C     AVAILABLE BY A CHANGE OF JOB CONTROL CARDS.  HOWEVER, OF THE ENTRY        SPLOT 22
C     POINTS DESCRIBED BELOW, VERSION 2 CONTAINS ONLY SCALER, SQUARE,           SPLOT 23
C     GRIDD, AXES, BOX, PLOTEM, DPLOTM, AND GRAPH.                              SPLOT 24
C                                                                               SPLOT 25
C                                                                               SPLOT 26
C   VERSION 5 MODIFICATION 0                                                    SPLOT 27
C                                                                               SPLOT 28
C         LIKE VERSIONS 1 AND 3, VERSION 4 WAS DESIGNED FOR PRINTER             SPLOT 29
C     OUTPUT.  ITS MOST IMPORTANT NEW FEATURES WERE0                            SPLOT 30
C        (1)  SPREADING CALLS, WHICH ASSURED  ROUND  NUMBERS AT THE             SPLOT 31
C             INTERVAL BOUNDARIES ALONG THE EDGES OF A GRID OR BOX              SPLOT 32
C        (2)  A DARK CALL, WHICH, BY OVERPRINTING, ASSURED DARKER OUTPUT        SPLOT 33
C        (3)  SOLID-MASS CALLS, WHICH MADE IT EASY TO FILL AN AREA IN           SPLOT 34
C             SOLIDLY.                                                          SPLOT 35
C     IN ADDITION TO THE VERSION 1 ENTRY POINTS SCALER,SQUARE,GRIDD,            SPLOT 36
C     AXES,BOX,PLOTEM,DPLOTM, AND GRAPH, VERSION 4 HAD NEW ENTRY POINTS         SPLOT 37
C     XSPRED,YSPRED,SPRED,DARK,BLOCK,DISC,TRAPEZ, AND TRIGON DESCRIBED          SPLOT 38
C     BELOW, AND ALSO DUMMY ENTRY POINTS FACTOR, GRID, SCALE, FLINE,            SPLOT 39
C     SYMBOL, PLOT, PLOTS, AND AXIS FOR CALCOMP PLOTTER COMPATIBILITY.          SPLOT 40
C     PREVIOUS VERSIONS CALLED ON SUBPROGRAM NARGS  VERSION 4 CALLED ON         SPLOT 41
C     KMVC AS WELL.  NOTE THAT THIS IS NOT THE KMVC ON THE U. OF P.             SPLOT 42
C     SYSTEM LIBRARY, BUT THE DAVID B. COLE VERSION OF KMVC.                    SPLOT 43
C                                                                               SPLOT 44
C         MODIFICATION 0 OF VERSION 4 CONSISTED OF A SINGLE SUBROUTINE          SPLOT 45
C     WITH ALL THE ENTRY POINTS MENTIONED.  MODIFICATION 1 CONSISTED OF         SPLOT 46
C     FOUR FORTRAN SUBROUTINES0  SPLOT, SPREDD, SOLIDS, AND TRIGON.             SPLOT 47
C     TOGETHER THEY FUNCTIONED EXACTLY LIKE MODIFICATION 0, I. E., THE          SPLOT 48
C     DIFFERENCE WAS TRANSPARENT TO THE USER.  HOWEVER, MODIFICATION 1          SPLOT 49
C     WAS MORE SUITABLE FOR INCLUSION IN A LIBRARY, SINCE THEN THE              SPLOT 50
C     LOADER OR LINKAGE EDITOR WOULD TAKE FROM THE LIBRARY ONLY THOSE           SPLOT 51
C     CONTROL SECTIONS ACTUALLY NEEDED FOR A RUN, CONSERVING CORE.              SPLOT 52
C                                                                               SPLOT 53
C                                                                               SPLOT 54
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C        VERSION 5 ADDS ENTRY POINTS UNDER AND DUNDER FOR FILLING IN SPLOT 55
C     SOLIDLY THE AREA UNDER A CURVE  ALSO CHARPL FOR PLACING AN      SPLOT 56
C     ARBITRARY SET OF CHARACTERS INTO ARBITRARY LOCATIONS.  OTHERWISE, SPLOT 57
C     VERSION 5 MODIFICATION 0 IS IDENTICAL WITH VERSION 4 MOD. 1.    SPLOT 58
C                                                                     SPLOT 59
C   USAGE                                                             SPLOT 60
C                                                                     SPLOT 61
C        MULTIPLE ENTRIES ARE USED TO PROVIDE MAXIMUM FLEXIBILITY.    SPLOT 62
C     TO PRODUCE A GRAPH, AT LEAST THREE CALLS ARE REQUIREDO          SPLOT 63
C           1.  CALL SCALER, SPRED, XSPRED, OR YSPRED TO INITIALIZE   SPLOT 64
C        ARRAYS AND ESTABLISH SCALING.  ONLY ONE OF THESE SHOULD BE   SPLOT 65
C        USED.                                                        SPLOT 66
C           2.  CALL PLOTEN OR DPLOTN ONE OR MORE TIMES TO POSITION   SPLOT 67
C        THE DESIRED SYMBOLS IN THE DISPLAY AREA.                     SPLOT 68
C           3.  CALL GRAPH TO PRINT THE RESULTING DISPLAY.            SPLOT 69
C                                                                     SPLOT 70
C        IN ADDITION TO THESE,  OTHER CALLS, DESCRIBED BELOW, MAY BE  SPLOT 71
C     MADE TO OBTAIN VARIOUS OPTIONAL FEATURES.                       SPLOT 72
C                                                                     SPLOT 73
C                                                                     SPLOT 74
C     CALL SCALER(XMAX,XMIN,YMAX,YMIN)                                SPLOT 75
C     --------------------------------                                SPLOT 76
C        THIS IS THE USUAL WAY TO INITIALIZE SCALING AND ERASE        SPLOT 77
C     PREVIOUS ENTRIES.  ALL FOUR ARGUMENTS SHOULD BE REAL*4 OR REAL*8. SPLOT 78
C           XMAX - MAXIMUM VALUE OF ABSCISSA TO BE PLOTTED            SPLOT 79
C           XMIN - MINIMUM VALUE OF ABSCISSA TO BE PLOTTED            SPLOT 80
C           YMAX - MAXIMUM VALUE OF ORDINATE TO BE PLOTTED            SPLOT 81
C           YMIN - MINIMUM VALUE OF ORDINATE TO BE PLOTTED            SPLOT 82
C     IF XMAX IS LESS THAN XMIN, SPLOT WILL INTERCHANGE THEM  YMAX AND SPLOT 83
C     YMIN WILL BE TREATED SIMILARLY.  NO POINT WILL BE PLOTTED IF ITS SPLOT 84
C     ABSCISSA IS GREATER THAN XMAX OR LESS THAN XMIN, NOR IF ITS     SPLOT 85
C     ORDINATE IS GREATER THAN YMAX OR LESS THAN YMIN.  IN THE CASE OF SPLOT 86
C     EQUALITY THE POINT WILL BE PLOTTED ON THE EDGE OF THE GRAPH (IF ITSPLOT 87
C     IS PLOTTED AT ALL).                                             SPLOT 88
C                                                                     SPLOT 89
C        DO NOT CALL SCALER IF YOU CALL SPRED, XSPRED, OR YSPRED      SPLOT 90
C     (DESCRIBED BELOW).                                              SPLOT 91
C                                                                     SPLOT 92
C     CALL SPRED(A,B,C,D)                                             SPLOT 93
C     -------------------                                             SPLOT 94
C        THE ARGUMENTS A, B, C, D CORRESPOND RESPECTIVELY TO ARGU-    SPLOT 95
C     MENTS XMAX, XMIN, YMAX, YMIN IN THE CALL TO SCALER.  SPRED WILL SPLOT 96
C      ROUND  THESE VALUES IF NECESSARY, AS EXPLAINED BELOW, AND      SPLOT 97
C     SUBSTITUTE THEM FOR XMAX, XMIN, YMAX, AND YMIN.  IT WILL THEN   SPLOT 98
C     CALL SCALER WITH THESE ARGUMENTS                                SPLOT 99
C        IF YOU CALL SCALER AND YOUR PROGRAM COMPUTES XMAX, XMIN,     SPLOT100
C     YMAX, OR YMIN, THEN IT MAY NOT TURN OUT TO BE A  ROUND  NUMBER, SPLOT101
C     I.E., A SMALL INTEGER TIMES SOME POWER OF TEN.  IF YOU SHOULD USE SPLOT102
C     THE BOX OR GRIDO OPTION, DESCRIBED BELOW, THEN YOUR HORIZONTAL ANDSPLOT103
C     VERTICAL RANGES WILL BE SUBDIVIDED INTO TEN EQUAL PARTS AND THE SPLOT104
C     INTERVAL BOUNDARY VALUES WILL BE PRINTED.  TO FORCE ALL THE     SPLOT105
C     BOUNDARY VALUES TO BE  ROUND  NUMBERS, YOU SHOULD CALL SPRED    SPLOT106
C     INSTEAD OF SCALER.  XMAX WILL THEN BE COMPUTED AS A VALUE EQUAL TOSPLOT107
C     OR GREATER THAN A, XMIN AS A VALUE EQUAL TO OR LESS THAN B, YMAX SPLOT108
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C     AS A VALUE EQUAL TO OR GREATER THAN C, AND YMIN AS A VALUE EQUAL  SPLOT109
C     TO OR LESS THAN D, AS NEEDED TO PRODUCE ONLY  ROUND  VALUES IN THESPLOT110
C     FINAL PRINTOUT.                                                   SPLOT111
C          DO NOT CALL SCALER IF YOU DECIDE TO USE SPRED.               SPLOT112
C                                                                       SPLOT113
C                                                                       SPLOT114
C     CALL XSPRED(A,B,YMAX,YMIN)                                        SPLOT115
C     --------------------------                                        SPLOT116
C          SEE DESCRIPTIONS OF SCALER AND SPRED ABOVE.  XSPRED COMPUTESSPLOT117
C     XMAX AND XMIN BY  ROUNDING  A AND B AS NEEDED.  YMAX AND YMIN ARE SPLOT118
C     NOT AFFECTED.  XSPRED THEN CALLS SCALER WITH THESE ARGUMENTS.     SPLOT119
C                                                                       SPLOT120
C     CALL YSPRED(XMAX,XMIN,C,D)                                        SPLOT121
C     --------------------------                                        SPLOT122
C          SEE DESCRIPTION OF SCALER AND SPRED ABOVE.  YSPRED COMPUTES  SPLOT123
C     YMAX AND YMIN BY ROUNDING C AND D AS NEEDED.  XMAX AND XMIN ARE   SPLOT124
C     NOT AFFECTED.  YSPRED THEN CALLS SCALER WITH THESE ARGUMENTS.     SPLOT125
C                                                                       SPLOT126
C     CALL SQUARE                                                       SPLOT127
C     -----------                                                       SPLOT128
C          THIS CALL IS OPTIONAL.  IF USED, THE GRAPH WILL BE PRINTED   SPLOT129
C     IN AN AREA 101 SPACES WIDE BY 61 LINES HIGH  THAT IS, AN AREA TEN SPLOT130
C     INCHES SQUARE.  HOWEVER, IT MAY BE NECESSARY TO ADJUST THE SETTINGSPLOT131
C     OF THE 1403 PRINTER TO ALLOW ALL OF THE GRAPH TO FIT ON ONE PAGE. SPLOT132
C     IF THIS CALL IS OMITTED, THE GRAPH WILL BE PRINTED IN AN AREA 101 SPLOT133
C     SPACES WIDE BY 51 LINES HIGH  THAT IS, IN AN AREA TEN INCHES WIDE SPLOT134
C     BY 8.5 INCHES HIGH.                                               SPLOT135
C          TO OBTAIN AN UNDISTORTED GRAPH THE X-AXIS AND Y-AXIS SHOULD  SPLOT136
C     BE GIVEN THE SAME SCALING AND 'SQUARE' SHOULD BE CALLED JUST AFTERSPLOT137
C     'SCALER'.  OTHERWISE CIRCLES WILL BE DISTORTED INTO ELLIPSES, ETC.SPLOT138
C                                                                       SPLOT139
C                                                                       SPLOT140
C     CALL GRIDD                                                        SPLOT141
C     ----------                                                        SPLOT142
C          THIS CALL IS OPTIONAL.  IF USED, HORIZONTAL AND VERTICAL     SPLOT143
C     GRID LINES WILL BE PRINTED.  ALONG THE LEFT EDGE AND BOTTOM OF THESPLOT144
C     GRAPH EACH GRID LINE WILL BE LABELLED WITH ITS X OR Y VALUE.      SPLOT145
C          THERE WILL BE ELEVEN VERTICAL AND ELEVEN HORIZONTAL LINES.   SPLOT146
C     THEREFORE THE GRAPH AREA WILL BE DIVIDED INTO 100 BLOCKS - TEN    SPLOT147
C     ACROSS BY TEN DOWN.  IF SQUARE HAS BEEN CALLED THE BLOCKS WILL BE SPLOT148
C     ONE INCH SQUARE.                                                  SPLOT149
C          IF 'CALL GRIDD' IS OMITTED, NO GRID LINES NOR X NOR Y VALUESSPLOT150
C     WILL BE PRINTED.                                                  SPLOT151
C                                                                       SPLOT152
C     CALL AXES                                                         SPLOT153
C     ---------                                                         SPLOT154
C          THIS CALL IS OPTIONAL.  IF USED, A PAIR OF AXES WILL APPEAR  SPLOT155
C     CENTERED IN THE PLOTTING AREA.  THIS CALL SHOULD NOT BE USED IF   SPLOT156
C     'GRIDD' IS CALLED  HOWEVER, IT IS PERMISSIBLE TO USE BOTH 'AXES'  SPLOT157
C     AND 'BOX'.                                                        SPLOT158
C                                                                       SPLOT159
C     CALL BOX                                                          SPLOT160
C     --------                                                          SPLOT161
C          THIS CALL IS OPTIONAL.  IF USED, THE PLOTTING AREA WILL BE   SPLOT162
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C     OUTLINED BUT NO GRID LINES WILL BE PRINTED WITHIN IT.  ELEVEN X    SPLOT163
C     VALUES WILL BE PRINTED ALONG ITS LEFT EDGE AND ELEVEN Y VALUES     SPLOT164
C     ALONG THE BOTTOM, JUST AS WHEN 'GRIDD' IS CALLED.  'BOX' AND       SPLOT165
C     'GRIDD' ARE MUTUALLY EXCLUSIVE  DO NOT USE BOTH TO PRODUCE THE     SPLOT166
C     SAME GRAPH.                                                        SPLOT167
C                                                                        SPLOT168
C                                                                        SPLOT169
C     CALL PLOTEM(CHAR,X,Y,N)                                            SPLOT170
C     -----------------------                                            SPLOT171
C           ARGUMENTSO                                                   SPLOT172
C             CHAR - ANY EBCDIC CHARACTER ENCLOSED IN APOSTROPHES        SPLOT173
C             X    - A REAL*4 ARRAY OF X VALUES, OR A SINGLE VALUE       SPLOT174
C             Y    - A CORRESPONDING ARRAY OF Y VALUES, OR SINGLE VALUE  SPLOT175
C             N    - AN INTEGER*4 CONSTANT OR VARIABLE WHICH SPECIFIES   SPLOT176
C                    THE LENGTH OF THE X AND Y ARRAYS.  N MAY BE 1.      SPLOT177
C           THIS CALL POSITIONS THE CHARACTER SPECIFIED BY CHAR AT EACH   SPLOT178
C     OF THE N POINTS WHOSE ABSCISSA(S) AND ORDINATE(S) ARE GIVEN BY X   SPLOT179
C     AND Y.  'PLOTEM' MAY BE CALLED REPEATEDLY BEFORE 'GRAPH' IS CALLEDSPLOT180
C                                                                        SPLOT181
C     CALL DPLOTM(CHAR,XX,YY,N)                                          SPLOT182
C     -------------------------                                          SPLOT183
C           THIS CALL WORKS EXACTLY LIKE 'PLOTEM' EXCEPT THAT THE ARGU-  SPLOT184
C     MENTS XX AND YY ARE ASSUMED REAL*8.                                SPLOT185
C                                                                        SPLOT186
C                                                                        SPLOT187
C     CALL LABEL(CHAR,X,Y,N)                                             SPLOT188
C     ----------------------                                             SPLOT189
C           ARGUMENTSO                                                   SPLOT190
C             CHAR - A LOGICAL*1 ARRAY OF EBCDIC CHARACTERS, OR ANY      SPLOT191
C                    CHARACTER STRING STORED IN CONTIGUOUS BYTES OF      SPLOT192
C                    MEMORY                                              SPLOT193
C             X    - A SINGLE REAL VALUE                                 SPLOT194
C             Y    - A SINGLE REAL VALUE                                 SPLOT195
C             N    - AN INTEGER*4 CONSTANT OR VARIABLE WHICH SPECIFIES   SPLOT196
C                    THE LENGTH OF THE CHAR ARRAY.  N MAY BE 1.          SPLOT197
C           THIS CALL POSITIONS THE SUCCESSIVE CHARACTERS IN ARRAY CHAR   SPLOT198
C     BEGINNING AT THE LOCATION SPECIFIED BY X AND Y AND CONTINUING      SPLOT199
C     HORIZONTALLY TO THE RIGHT TO CREATE A READABLE LABEL.  LIKE        SPLOT200
C     PLOTEM, LABEL MAY BE CALLED REPEATEDLY BEFORE GRAPH IS CALLED.     SPLOT201
C                                                                        SPLOT202
C                                                                        SPLOT203
C     CALL CHARPL(CHAR,X,Y,N)                                            SPLOT204
C     -----------------------                                            SPLOT205
C           ARGUMENTSO                                                   SPLOT206
C             CHAR - A LOGICAL*1 ARRAY OF EBCDIC CHARACTERS, OR ANY      SPLOT207
C                    CHARACTER STRING STORED IN CONTIGUOUS BYTES OF      SPLOT208
C                    MEMORY                                              SPLOT209
C             X    - A REAL*4 ARRAY OF X VALUES                          SPLOT210
C             Y    - A CORRESPONDING ARRAY OF Y VALUES                   SPLOT211
C             N    - AN INTEGER*4 CONSTANT OR VARIABLE WHICH SPECIFIES   SPLOT212
C                    THE LENGTH OF THE CHAR, X, AND Y ARRAYS.  N MAY     SPLOT213
C                    BE 1.                                               SPLOT214
C           THIS CALL POSITIONS THE SUCCESSIVE CHARACTERS IN ARRAY CHAR   SPLOT215
C     AT THE SUCCESSIVE LOCATIONS WHOSE ABSCISSAS AND ORDINATES ARE      SPLOT216
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C     GIVEN BY THE VALUES OF X AND Y.  LIKE PLOTEM, CHARPL MAY BE CALLEDSPLOT217
C     REPEATEDLY BEFORE GRAPH IS CALLED.                                SPLOT218
C                                                                       SPLOT219
C     CALL UNDER(CHAR,XX,YY,N)                                          SPLOT220
C     ------------------------                                          SPLOT221
C           THIS CALL FUNCTIONS EXACTLY LIKE PLOTEM EXCEPT THAT THE     SPLOT222
C     SPECIFIED CHARACTER IS PLACED AT THE SPECIFIED POSITION AND ALSO  SPLOT223
C     AT ALL POSITIONS OF THE GRAPH DIRECTLY BELOW THE SPECIFIED        SPLOT224
C     POSITION.  THUS THIS CALL IS USEFUL FOR FILLING IN THE AREA       SPLOT225
C     UNDER A CURVE.                                                    SPLOT226
C                                                                       SPLOT227
C                                                                       SPLOT228
C     CALL DUNDER(CHAR,XXX,YYY,N)                                       SPLOT229
C     ---------------------------                                       SPLOT230
C           DUNDER IS TO UNDER AS DPLOTM IS TO PLOTEM.  USE IT IF THE   SPLOT231
C     X AND Y ARRAYS ARE DOUBLE-PRECISION.                              SPLOT232
C                                                                       SPLOT233
C     CALL BLOCK(CHAR,XLEFT,XRIGHT,YBOT,YTOP)                           SPLOT234
C     ---------------------------------------                           SPLOT235
C           THIS CALL IS OPTIONAL. IF USED, A RECTANGULAR REGION OF THE SPLOT236
C     GRAPH WILL BE FILLED IN SOLIDLY WITH THE CHARACTER SPECIFIED BY   SPLOT237
C     CHAR.  THE REGION WILL BE BOUNDED BY THE ORDINATES AT XLEFT AND   SPLOT238
C     XRIGHT AND THE ABSCISSAS AT YBOT AND YTOP.  IF XLEFT EXCEEDS      SPLOT239
C     XRIGHT OR YBOT EXCEEDS YTOP, THE CALL TO BLOCK WILL BE IGNORED.   SPLOT240
C           THE  CALL BLOCK  FEATURE IS NOT AVAILABLE IN THE CALCOMP    SPLOT241
C     VERSION OF SPLOT (VERSION 2).                                     SPLOT242
C                                                                       SPLOT243
C                                                                       SPLOT244
C     CALL DISC(CHAR,XCENTER,YCENTER,RADIUS)                            SPLOT245
C     --------------------------------------                            SPLOT246
C                                                                       SPLOT247
C     NOTE THE SPELLING OF DISC.  THIS CALL IS OPTIONAL.  IF USED, A    SPLOT248
C     CIRCULAR REGION OF THE GRAPH WILL BE FILLED IN SOLIDLY WITH THE   SPLOT249
C     CHARACTER SPECIFIED BY CHAR.  THE CIRCLE WILL BE CENTERED AT THE  SPLOT250
C     COORDINATES SPECIFIED BY XCENTER AND YCENTER AND WILL HAVE RADIUS SPLOT251
C     SPECIFIED BY THE LAST ARGUMENT.                                   SPLOT252
C           THE  CALL DISC  FEATURE IS NOT AVAILABLE IN THE CALCOMP     SPLOT253
C     VERSION OF SPLOT (VERSION 2).                                     SPLOT254
C                                                                       SPLOT255
C     CALL TRAPEZ(CHAR,XLL,XUL,XLR,XUR,YBOT,YTOP)                       SPLOT256
C     -------------------------------------------                       SPLOT257
C           THIS CALL IS OPTIONAL.  IF USED, A TRAPEZOIDAL REGION OF THESPLOT258
C     GRAPH WILL BE FILLED IN SOLIDLY WITH THE CHARACTER SPECIFIED BY   SPLOT259
C     CHAR.  THE BASES OF THE TRAPEZOID WILL BE HORIZONRTAL, THE LOWER  SPLOT260
C     BASE AT THE LEVEL SPECIFIED BY YBOT, THE UPPER AT THE LEVEL       SPLOT261
C     SPECIFIED BY YTOP.  XLL, XUL, XLR, AND XUR SPECIFY RESPECTIVELY   SPLOT262
C     THE ABSCISSAL VALUES OF THE LOWER LEFT, UPPER LEFT, LOWER RIGHT,  SPLOT263
C     AND UPPER RIGHT CORNERS.  XLL, XUL, AND YBOT SHOULD NOT EXCEED    SPLOT264
C     XLR, XUR, AND YTOP RESPECTIVELY.  ALL NUMERIC ARGUMENTS ARE REAL*4SPLOT265
C     OR REAL*8.                                                        SPLOT266
C           THE  CALL TRAPEZ  FEATURE IS NOT AVAILABLE IN THE CALCOMP   SPLOT267
C     VERSION OF SPLOT (VERSION 2).                                     SPLOT268
C                                                                       SPLOT269
C                                                                       SPLOT270
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C     CALL TRIGON(CHAR,XLIST,YLIST)                                      SPLOT271
C     -----------------------------                                      SPLOT272
C           THIS CALL IS OPTIONAL.  IF USED, A TRIANGLULAR REGION OF THESPLOT273
C     GRAPH WILL BE FILLED IN SOLIDLY WITH THE CHARACTER SPECIFIED BY    SPLOT274
C     CHAR.  XLIST IS A REAL*4 VECTOR OF THREE X VALUES.  YLIST IS A     SPLOT275
C     REAL*4 VECTOR OF THREE Y VALUES.  THE CORNERS OF THE TRIANGLE ARE  SPLOT276
C     AT  X(J), Y(J)  FOR  J=1,2,3.                                      SPLOT277
C           THE  CALL TRIGON  FEATURE IS NOT AVAILABLE IN THE CALCOMP    SPLOT278
C     VERSION OF SPLOT (VERSION 2).                                      SPLOT279
C                                                                        SPLOT280
C     CALL DARK                                                          SPLOT281
C     ---------                                                          SPLOT282
C                                                                        SPLOT283
C           THIS CALL IS OPTIONAL.  IF USED, SPLOT WILL OVERPRINT EACH   SPLOT284
C     LINE OF ITS OUTPUT SO AS TO PRODUCE A HEAVIER IMPRINT, WHICH MAY   SPLOT285
C     BE EASIER TO REPRODUCE PHOTOGRAPHICALLY.  THIS CALL IS NOT AVAIL-  SPLOT286
C     ABLE IN THE CALCOMP VERSION OF SPLOT (VERSION 2).                  SPLOT287
C                                                                        SPLOT288
C                                                                        SPLOT289
C     CALL GRAPH(DUMMY)                                                  SPLOT290
C     -----------------                                                  SPLOT291
C     CALL GRAPH(XTITLE,NX)                                              SPLOT292
C     ---------------------                                              SPLOT293
C     CALL GRAPH(XTITLE,NX,YTITLE,NY)                                    SPLOT294
C     -------------------------------                                    SPLOT295
C           ARGUMENTS:                                                   SPLOT296
C             XTITLE - A STRING OF UP TO 131 EBCDIC CHARACTERS ENCLOSED  SPLOT297
C                      IN APOSTROPHES                                    SPLOT298
C             NX     - AN INTEGER*4 CONSTANT OR VARIABLE EQUAL TO THE    SPLOT299
C                      NUMBER OF CHARACTERS IN XTITLE                    SPLOT300
C             YTITLE - A STRING OF UP TO 61 EBCDIC CHARACTERS ENCLOSED   SPLOT301
C                      IN APOSTROPHES                                    SPLOT302
C             NY     - AN INTEGER*4 CONSTANT OR VARIABLE EQUAL TO THE    SPLOT303
C                      NUMBER OF CHARACTERS IN YTITLE                    SPLOT304
C           'GRAPH' PRINTS OUT THE MATERIAL THAT WAS SPECIFIED IN THE    SPLOT305
C     PRECEDING CALLS.  ALL OF THE CALLS SHOWN ABOVE ARE VALID.  IF      SPLOT306
C     'GRAPH' IS CALLED WITH A SINGLE (DUMMY) ARGUMENT, ONLY THE GRAPH   SPLOT307
C     IS PRINTED.  THE DUMMY ARGUMENT IS NEITHER USED NOR AFFECTED IN    SPLOT308
C     ANY WAY.  IF 'GRAPH' IS CALLED WITH TWO ARGUMENTS, THE LEGEND      SPLOT309
C     SPECIFIED BY XTITLE WILL BE PRINTED BELOW THE GRAPH, SOMEWHAT      SPLOT310
C     RIGHT OF CENTER.  IF CALLED WITH FOUR ARGUMENTS, THEN IN ADDITION  SPLOT311
C     TO THE LEGEND AT THE BOTTOM OF THE PAGE, THE LEGEND SPECIFIED      SPLOT312
C     BY YTITLE WILL APPEAR IN THE UPPER LEFT CORNER, PRINTED VERTI-     SPLOT313
C     CALLY.                                                             SPLOT314
C                                                                        SPLOT315
C                                                                        SPLOT316
C   SUBPROGRAMS REQUIRED                                                 SPLOT317
C                                                                        SPLOT318
C        NARGS                                                           SPLOT319
C        -----                                                           SPLOT320
C     NARGS IS A FUNCTION WRITTEN BY PAUL WOLFGANG WHICH RETURNS AS ITS  SPLOT321
C     VALUE THE NUMBER OF ARGUMENTS IN THE CALL TO THE SUBROUTINE THAT   SPLOT322
C     CALLED NARGS, PROVIDED THERE IS AT LEAST ONE ARGUMENT.             SPLOT323
C                                                                        SPLOT324
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C                                                                       SPLOT325
C        KMVC                                                           SPLOT326
C        ----                                                           SPLOT327
C     KMVC IS AN ASSEMBLY-LANGUAGE PROGRAM BY DAVID B. COLE WHICH       SPLOT328
C     MAKES THE MVC INSTRUCTION AVAILABLE TO FORTRAN PROGRAMMERS.       SPLOT329
C     IT IS USED HERE TO BLANK THE ARRAY  POINTS  WHEN SCALER, XSPRED,  SPLOT330
C     YSPRED, OR SPRED IS CALLED.                                       SPLOT331
C                                                                       SPLOT332
C     NOTE THAT THE VERSION OF KMVC USED HERE IS NOT THE SAME AS THAT   SPLOT333
C     RECORDED IN THE U. OF P. SYSTEM LIBRARY.  THE LATTER CAN MOVE     SPLOT334
C     ONLY A LIMITED NUMBER OF CHARACTERS PER CALL.                     SPLOT335
C                                                                       SPLOT336
C                                                                       SPLOT337
C   EXAMPLES OF USAGE                                                   SPLOT338
C                                                                       SPLOT339
COLS  1      7                                                          SPLOT340
C     C-----THIS PROGRAM GENERATES AND PRINTS A SINE CURVE.             SPLOT341
C           REAL TOOPI/6.2831854/,DT/0.062831854/,T(101),V(101)         SPLOT342
C           CALL SCALER(TOOPI,0.0,1.0,-1.0)                             SPLOT343
C           DO  5 J=1,101                                               SPLOT344
C           T(J)=(J-1)*DT                                               SPLOT345
C         5 V(J)=SIN(T(J))                                              SPLOT346
C           CALL PLOTEM('.',T,V,101)                                    SPLOT347
C           CALL GRAPH(DUMMY)                                           SPLOT348
C           . . .                                                       SPLOT349
C                                                                       SPLOT350
C        THE ABOVE PROGRAM WILL PRODUCE A SINE CURVE WITHOUT LABELS OR  SPLOT351
C     GRID LINES.  IF 'CALL GRIDD' IS INSERTED JUST AFTER 'CALL SCALE', SPLOT352
C     THEN THE CURVE WILL APPEAR SUPERIMPOSED ON A GRID, LABELLED ALONG SPLOT353
C     THE LEFT SIDE AND BOTTOM WITH X OR Y VALUES AT EACH GRID LINE.    SPLOT354
C     THE ENTIRE GRID WILL BE TEN INCHES WIDE BY 8.5 INCHES HIGH.       SPLOT355
C                                                                       SPLOT356
COLS  1      7                                                          SPLOT357
C     C-----THIS PROGRAM PRINTS A SINE CURVE AND A COSINE CURVE.        SPLOT358
C           REAL TWOPI/6.2831854/,DS/0.062831854/,S                     SPLOT359
C           CALL SCALER(TWOPI,0.0,1.0,-1.0)                             SPLOT360
C           DO 10 J=1,101                                               SPLOT361
C           S=(J-1)*DS                                                  SPLOT362
C           CALL PLOTEM('.',S,SIN(S),1)                                 SPLOT363
C           CALL PLOTEM('*',S,COS(S),1)                                 SPLOT364
C        10 CONTINUE                                                    SPLOT365
C           CALL GRAPH('SINE AND COSINE CURVES',22,)                    SPLOT366
C           . . .                                                       SPLOT367
C        IN THE ABOVE EXAMPLE NOTE THAT THE CALLS TO 'PLOT' ARE INSIDE  SPLOT368
C     THE LOOP, THEREFORE ARRAYS OF COORDINATES ARE NOT NEEDED AND SPACE SPLOT369
C     IS SAVED.  HOWEVER, A PENALTY WILL BE PAID IN EXECUTION TIME.     SPLOT370
C                                                                       SPLOT371
C                                                                       SPLOT372
COLS  1      7                                                          SPLOT373
C     C-----THIS PROGRAM PRINTS A CIRCLE TEN INCHES IN DIAMETER, EN-    SPLOT374
C     C-----CLOSED IN A BOX                                             SPLOT375
C           REAL X(202),Y(202)                                          SPLOT376
C           CALL SCALER(5.0,-5.0,5.0,-5.0)                              SPLOT377
C           CALL SQUARE                                                 SPLOT378
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C            CALL BOX                                                    SPLOT379
C            DO 15 J=1,51                                                SPLOT380
C            X(J)=-5.0+(J-1)*0.1                                         SPLOT381
C            X(102-J)=-X(J)                                              SPLOT382
C            Y(J)=SQRT(25.-X(J)**2)                                      SPLOT383
C         15 Y(102-J)=Y(J)                                               SPLOT384
C            DO 20 J=102,202                                             SPLOT385
C            X(J)=X(J-101)                                               SPLOT386
C         20 Y(J)=-Y(J-101)                                              SPLOT387
C            CALL PLOTER('*',X,Y,202)                                    SPLOT388
C            CALL GRAPH('TEN INCH CIRCLE',15)                            SPLOT389
C            . . .                                                       SPLOT390
C         IF 'CALL SQUARE' WERE OMITTED THE CIRCLE WOULD BE DISTORTED    SPLOT391
C      INTO AN ELLIPSE.  IF THE LAST CALL WERE CHANGED TO                 SPLOT392
C                                                                         SPLOT393
C            CALL GRAPH('TEN INCH CIRCLE',15,'ONE INCH SQUARES',16)      SPLOT394
C                                                                         SPLOT395
C      THEN IN ADDITION TO THE LEGEND 'TEN INCH CIRCLE' AT BOTTOM RIGHT   SPLOT396
C      THE WORDS 'ONE INCH SQUARES' WOULD APPEAR WRITTEN VERTICALLY AT    SPLOT397
C      THE UPPER LEFT CORNER OF THE PAGE.                                 SPLOT398
C         IF 'CALL GRIDD' WERE INSERTED AFTER 'CALL SQUARE' THE CIRCLE    SPLOT399
C      WOULD BE PRINTED SUPERIMPOSED ON A TEN-INCH-SQUARE GRID, WITH X &  SPLOT400
C      Y VALUES SHOWN AT EACH GRID LINE ALONG THE LEFT EDGE AND BOTTOM.   SPLOT401
C                                                                         SPLOT402
C                                                                         SPLOT403
C         IF A PLOTTED POINT FALLS ON A GRID LINE, THE PLOT CHARACTER     SPLOT404
C      (E.G., '*' ABOVE) OVERLAYS AND SUPPRESSES THE GRID CHARACTER.      SPLOT405
C                                                                         SPLOT406
COLS  1     7                                                             SPLOT407
C      C-----THIS CONTINUATION OF THE ABOVE PROGRAM SHOWS WHY A CALL TO   SPLOT408
C      C-----'SQUARE' SHOULD PRECEDE CALLS TO 'AXES', 'GRIDD', 'BOX',     SPLOT409
C      C-----'PLOTEM', OR 'DPLOTM'.                                       SPLOT410
C            CALL SCALER(5.,-5.,5.,-5.)                                  SPLOT411
C            CALL GRIDD                                                  SPLOT412
C            CALL SQUARE                                                 SPLOT413
C            CALL PLOTEM('*',X,Y,202)                                    SPLOT414
C            CALL GRAPH('GRIDD CALLED BEFORE SQUARE',26,                 SPLOT415
C           * 'ILLUSTRATES WRONG ORDER OF CALLS',32)                     SPLOT416
C              . . .                                                      SPLOT417
C                                                                         SPLOT418
C                                                                         SPLOT419
C         THE ABOVE CODING WILL PRINT A DISTORTED GRID OVERLAID BY AN     SPLOT420
C      UNDISTORTED CIRCLE.                                                SPLOT421
C                                                                         SPLOT422
C                                                                         SPLOT423
C         THE NEXT EXAMPLE SHOWS HOW TO MAKE A  NEGATIVE  PLOT.           SPLOT424
C                                                                         SPLOT425
COLS  1     7                                                             SPLOT426
C      C-----CONTINUING THE ABOVE PROGRAM, WE USE BLANKS TO PLOT A CIRCLE SPLOT427
C      C-----AND NEST SOME SQUARE BLOCKS WITHIN IT.                       SPLOT428
C            CALL SCALER(5.,-5.,5.,-5.)                                  SPLOT429
C            CALL SQUARE                                                 SPLOT430
C            CALL BLOCK('*',-5.,5.,-5.,5.)                               SPLOT431
C            CALL BLOCK(' ',-2.,2.,-2.,2.)                               SPLOT432
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C          CALL BLOCK('.',-1.,1.,-1.,1.)                                    SPLOT433
C          CALL PLOTEM(' ',X,Y,202)                                         SPLOT434
C          CALL GRAPH('THREE CALLS TO BLOCK AND ONE TO PLOTEM',38,          SPLOT435
C         *  'NEGATIVE PLOT',13)                                            SPLOT436
C                                                                           SPLOT437
C       IN THE NEXT EXAMPLE WE ASSUME DATA CARDS FOR N PEOPLE, N)500        SPLOT438
C                                                                           SPLOT439
C       COLS.  1-20   NAME                                                  SPLOT440
C       COLS. 21-25   AGE                          ) PUNCHED                SPLOT441
C       COLS. 26-30   ORAL TEMPERATURE             ) RIGHT-JUSTIFIED        SPLOT442
C       COLS. 31-35   UNDER-ARM TEMPERATURE        ) OR WITH DECIMAL PT.    SPLOT443
C       COLS. 36-40   FINGER TEMPERATURE;          ) SUITABLE FOR READING   SPLOT444
C       COLS. 41-45   TOE TEMPERATURE              ) WITH F5.0 FORMAT       SPLOT445
C                                                                           SPLOT446
C     WE WISH TO PLOT EACH OF THE OTHER NUMERIC VARIABLES AS A FUNCTION     SPLOT447
C     OF AGE, WHICH CAN RANGE FROM 0 TO 100.                                SPLOT448
C                                                                           SPLOT449
C                                                                           SPLOT450
C          REAL*4 DATA(500,5),MAX,MIN                                       SPLOT451
C          LOGICAL*1 CHAR(4)/'*','X','O','.'/                               SPLOT452
C          READ(5,99)((DATA(I,K),K=1,5)                                     SPLOT453
C       99 FORMAT(T21,5F5.0)                                                SPLOT454
C          MIN=AMIN1(DATA(1,2),DATA(1,3),DATA(1,4),DATA(1,5))               SPLOT455
C          MAX=AMAX1(DATA(1,2),DATA(1,3),DATA(1,4),DATA(1,5))               SPLOT456
C       IN THE NEXT EXAMPLE WE ASSUME DATA CARDS FOR N PEOPLE, N)500.       SPLOT457
C          DO 100 J=2,500                                                   SPLOT458
C          READ(5,99,END=200) (DATA(J,K),K=1,5)                             SPLOT459
C          MAX=AMAX1(DATA(J,2),DATA(J,3),DATA(J,4),DATA(J,5))               SPLOT460
C     100  MIN=AMIN1(DATA(J,2),DATA(J,3),DATA(J,4),DATA(J,5))               SPLOT461
C     C-----MAX AND MIN ARE NOW EXTREME VALUES OF THE ORDINATES             SPLOT462
C     200  J=J-1                                                            SPLOT463
C          CALL SCALER(100.,0.,MAX,MIN)                                     SPLOT464
C          CALL GRIDD                                                       SPLOT465
C          DO 300 K = 2,5                                                   SPLOT466
C          CALL PLOTEM(CHAR(K-1),DATA(1,1),DATA(1,K),J)                     SPLOT467
C     300  CONTINUE                                                         SPLOT468
C          CALL GRAPH('* = ORAL, X = UNDER-ARM, O = FINGER, . = TOE',       SPLOT469
C         *  44,'TEMPERATURE AS FUNCTION OF AGE',30)                        SPLOT470
C          . . .                                                            SPLOT471
C                                                                           SPLOT472
C       IN THE PRECEEDING EXAMPLE THE VALUE OF MAX AND MIN ARE NOT          SPLOT473
C     LIKELY TO TURN OUT TO BE  ROUND  NUMBERS, THEREFORE THE ORDINATE      SPLOT474
C     VALUES PRINTED AT THE LEFT OF THE GRAPH AT THE GRID LINES WILL        SPLOT475
C     PROBABLY NOT BE  ROUND .  TO FORCE THEM TO BE  ROUND , CHANGE THE     SPLOT476
C      CALL SCALER  STATEMENT ABOVE TO  CALL YSPRED .                       SPLOT477
C                                                                           SPLOT478
C                                                                           SPLOT479
C*************************************************************************SPLOT480
C                                                                           SPLOT481
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