INTRODUCTION

The GCHART and G PLOT procedures in SAS/GRAPH software currently do not produce 3-dimensional bar charts, line plots, or area plots. We have developed a pair of SAS macros that can be used to produce these types of graphs with SAS/GRAPH software.

The VBAR3D macro (which produces 3-dimensional vertical bar charts) and the PLOT3D macro (which produces 3-dimensional line and area plots) both use the SAS/GRAPH Annotate facility to produce output. The user supplies all required information through a series of macro parameters, and the macros use Annotate functions to produce graphics.

Users have control over a number of parameters, including bar and line color, background color, fill patterns, axis and tickmark labels, bar and line spacing, and title and legend information. Sample graphs produced by the two macros are illustrated in Figures 1 and 2 below.

VBAR3D MACRO PARAMETER LIST

Below is a list of parameters that can be passed to the VBAR3D macro to specify variables and data sets to be used to produce the graph, and to control the appearance of the graph. The DS, MIDPOINT, RESPONSE, GROUP, VMAX, VMIN, and VINC parameters are required; the rest of the parameters are optional. If optional parameters are not specified, the macro will use default values.

%MACRO VBAR3D(
DS, /* data set name (REQUIRED) */
MIDPOINT, /* midpoint variable (REQUIRED) */
RESPONSE, /* response variable (REQUIRED) */
GROUP, /* group variable (REQUIRED) */
VMAX, /* vert axis max value (REQUIRED) */
VMIN, /* vert axis min value (REQUIRED) */
VINC, /* by increment for vert axis (REQ) */
HEIGHT, /* height of graphics area, inches */
LENGTH, /* length of all axes, (% of graph area) */
BARWIDTH, /* width of vertical bars */
FILL1, /* fill pattern for group 1 */
FILL2, /* fill pattern for group 2 */
FILL3, /* fill pattern for group 3 */
FILL4, /* fill pattern for group 4 */
CFILL1, /* fill color for group 1 */
CFILL2, /* fill color for group 2 */
);
**PLOT3D MACRO PARAMETER LIST**

Below is a list of parameters that can be passed to the PLOT3D macro to specify variables and data sets to be used to produce the graph, and to control the appearance of the graph. The DS, X, and Y_A parameters are required; the rest of the parameters are optional. If optional parameters are not specified, the macro will use default values.

```
%MACRO PLOT3D(
  DS, /* input data set (REQUIRED) */
  X,  /* horiz axis variable (REQUIRED) */
  Y_A, /* first Y variable (REQUIRED) */
  Y_B, /* second Y variable */
  Y_C, /* third Y variable */
  Z,  /* BY variable */
  XOFFSET, /* origin of axes in % of graph area in X direction */
  YOFFSET, /* origin of axes in % of graph area in Y direction */
  XPERMAX, /* maximum length of X axis in % of graph area */
  YPERMAX, /* maximum length of Y axis in % of graph area */
  XVALMIN, /* minimum value for X */
  YVALMIN, /* minimum value for Y */
  XVALMAX, /* maximum value for X */
  YVALMAX, /* maximum value for Y */
  XBYVAL, /* axis interval for X */
  YBYVAL, /* axis interval for Y */
  BARWIDTH, /* width of plot line-- % of graph area */
  LNCOLOR1, /* color of 1st area under curve */
  LNCOLOR2, /* color of 2nd area under curve */
  LNCOLOR3, /* color of 3rd area under curve */
  AREAPAT1, /* pattern of 1st area under curve */
  AREAPAT2, /* pattern of 2nd area under curve */
  AREAPAT3, /* pattern of 3rd area under curve */
  TPCOLOR1, /* color of 1st plot line */
  TPCOLOR2, /* color of 2nd plot line */
  TPCOLOR3, /* color of 3rd plot line */
  TOPPAT1, /* pattern of 1st plot line */
  TOPPAT2, /* pattern of 2nd plot line */
  TOPPAT3, /* pattern of 3rd plot line */
  TITLEONE, /* text of first title */
  TITLETWO, /* text of second title */
  LEGEND, /* display a legend? (yes/no) */
  LEGLABEL, /* text of legend label */
  LEGVAL1, /* first legend value */
  LEGVAL2, /* second legend value */
  LEGVAL3, /* third legend value */
  VAXLABEL, /* vertical axis label */
  HAXLABEL, /* horizontal axis label */
  AREA, /* fill areas under the curves? (yes/no) */
  GRIDLINE, /* grid line style (1-44) */
  GRIDCOLR, /* grid line color */
  AREALNCL, /* color of lines in the area fill */
  LEFTCOLR, /* color of the left panel */
  BACKCOLR, /* color of the back panel */
  BOTMCOLR, /* color of the bottom panel */
  LEFTFILL, /* pattern fill of the left panel */
  BACKFILL, /* pattern fill of the back panel */
  BOTMFILL, /* pattern fill of the bottom panel */
  TITCOLR, /* title color */
  AXISCOLR, /* axis color */
  LEGNCOLR, /* legend color */
  TITLFONT, /* title font */
  AXISFNT, /* axis value font */
  LEGNFONT, /* legend font */
  LEGHORG, /* origin of legend in % of graph area in X direction */
  LEGVORG, /* origin of legend in % of graph area in Y direction */
  XFORMAT, /* format for horizontal axis variable */
  YFORMAT, /* format for vertical axis variable */
  LIBREF, /* libref for output catalog */
  CATALOG, /* output catalog */
  ENTRY; /* output catalog entry */
```

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SAMPLE APPLICATIONS USING THE VBAR3D MACRO

The following program produces the 3-D bar chart shown in Figure 1 on the first page. This example illustrates use of all the macro parameters to fully customize the chart.

data init;
    input @1 stooge $ @10 pop 2. @14 grp $;
    cards;
    Curly 20 West
    CurlyJoe 10 West
    Joe 10 West
    Larry 40 West
    Moe 10 West
    Shemp 10 West
    Curly 10 South
    CurlyJoe 10 South
    Joe 5 South
    Larry 15 South
    Moe 20 South
    Shemp 20 South
    Curly 30 North
    CurlyJoe 5 North
    Joe 10 North
    Larry 20 North
    Moe 20 North
    Shemp 15 North
    Curly 20 East
    CurlyJoe 20 East
    Larry 20 East
    Moe 20 East
    Shemp 20 East
;
%VBAR3D(
    DS=init,
    MIDPOINT=stooge,
    RESPONSE=pop,
    GROUP=grp,
    VMAX=100,
    VMIN=0,
    VINC=10,
    HEIGHT=7,
    LENGTH=65,
    BARWIDTH=6,
    FILL1=solid,
    FILL2=solid,
    FILL3=solid,
    FILL4=solid,
    CFILL1=gray3c,
    CFILL2=gray9c,
    CFILL3=gray60,
    CFILL4=gray9a,
    CAXIS=gray5c,
    TITLE=My Favorite Stooges,
    FITITLE=swissb,
    CTITLE=black,
    HTITLE=2,
    MIDLABEL=STOOGES,
    RESLABEL=PCT,
    GRPLABEL=REGION,
    DISPGRA=Y,
    DISRESBG=Y,
    CMIDLAB=black,
    CRELAB=black,
    CGRPLAB=black,
    CTICKVAL=black,
    LEGLABEL=LEGEND,
    FLEGLAB=swissb,
    HLEGLAB=1.5,
    CLEGLAB=black,
    FLEVENT=swissb,
    DISPLEG=Y,
    CSIDEGR=gray5c,
    CBCARKGR=gray5c,
    CBCANC=white,
    CBCANSG=graydc,
    CBACBG=graydc,
    LINESG=2,
    LINEBG=2,
    SIZESG=2,
    SIZEBG=2,
    SPACER=1.5,
    LINESP=30,
    AMIDVAL=45,
    HAXLAB=1.5,
    HAXINV=30,
    VORIGIN=20,
    HSPACE=1.5,
    LIBREF=work,
    CATALOG=comedy,
    ENTRY=stooge3d);

The next program produces the output in Figure 3. This program uses the minimum number of parameters required by the VBAR3D macro; the graph is generated using default values for the remainder of the parameters.

data init;
    input @1 stooge $ @10 pop 2. @14 grp $char13.;
    cards;
    Curly 10 Single Women
    CurlyJoe 5 Single Women
    Joe 10 Single Women
    Larry 60 Single Women
    Moe 5 Single Women
    Shemp 10 Single Women

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SAMPLE APPLICATIONS USING THE PLOT3D MACRO

The following program produces the 3-D plot shown in Figure 2 on the first page. This example illustrates use of all the macro parameters to fully customize the chart.

data a;
  input year 1-6 coastal 8-9 piedmont 11-12
            mountain 14-15 z 17-19;
  cards:
    1985  15  30  40  1
    1986  18  37  49  1
    1987  20  22  37  1
    1988  21  30  35  1
    1989  24  39  43  1
    1990  36  44  51  1
    1991  20  32  47  1
    1992  15  28  32  1
    1993  28  33  45  1
    1994  35  39  50  1
    1995  33  35  45  1
run;

%PLOT3D(ds=a, /* input data set */
  x=year, /* xaxis variable */
  y_a=coastal /* first Y variable */
  y_b=piedmont, /* second Y variable */
  y_c=mountain, /* third Y variable */
  z=z, /* BY variable */
  xoffset=17, /* X origin of the axis in % */
  yoffset=28, /* Y origin of the axis in % */
  xpermax=50, /* length of X-axis in % */
  ypermax=40, /* length of Y-axis in % */
  xvalmin=1985, /* minimum value for X */
  yvalmin=0, /* minimum value for Y */
  xvalmax=1995, /* maximum value for X */
  yvalmax=60, /* maximum value for Y */
  xbyval=1, /* axis interval for X */
  ybyval=10, /* axis interval for Y */
  barwidth=2, /* width of the bar in % */
  incolor1=graydd, /* color of 1st area under the curve */
  incolor2=grayaa, /* color of 2nd area under the curve */
  incolor3=gray77, /* color of 3rd area under the curve */
  areapat1=solid, /* pattern of the 1st area under the curve */
  areapat2=solid, /* pattern of the 2nd area under the curve */
  areapat3=solid, /* pattern of the 3rd area under the curve */
  tpcolor1=graydd, /* color of 1st plot line */
  tpcolor2=grayaa, /* color of 2nd plot line */
  tpcolor3=gray77, /* color of 3rd plot line */
  toppat1=solid, /* pattern of 1st plot line */
  toppat2=solid, /* pattern of 2nd plot line */
  toppat3=solid, /* pattern of 3rd plot line */
  titleone=Annual Precipitation, /* text of first title */
  *
);

Figure 3: Graph Produced Using the VBAR3D Macro With Minimum Parameters
The next program produces the output in Figure 4. This program uses relatively few parameters; the graph is generated using default values for the remainder of the parameters.

```sas
data a;
  input year 1-6 coastal 8-9 piedmont 11-12 mountain 14-15;
cards;
  1985 15 30 40
  1986 18 37 49
  1987 20 22 37
  1988 21 30 35
  1989 24 39 43
  1990 36 44 51
  1991 20 32 47
  1992 15 28 32
  1993 28 33 45
  1994 35 39 50
  1995 33 35 45
run;
```

```
%PLOT3D(ds=a,
  x=year,
  y_a=coastal,
  y_b=piedmont,
  y_c=mountain );
```

**Figure 4:** Graph Produced Using the PLOT3D Macro With Minimum Parameters

**HOW TO OBTAIN THE MACROS**

You can obtain copies of the VBAR3D and PLOT3D macros through one of the following methods:

- **Diskettes containing the macros are available at the Graphics problem-solving station in the SUGI 21 demo area.**

- If you have a PC and a modem, you can download the macros from the SAS Institute Bulletin Board Service (SIBBS). To access SIBBS, dial (919) 677-8155. After connecting, you can immediately set up an account by responding to SIBBS prompts. Once your account has been set up, you can use SIBBS menus to download the files. From the main menu, select (D) DOWNLOAD, and then (V) GRAPHICS. The files VBAR3D.SAS and PLOT3D.SAS contain the macros.

- You can obtain the macros through anonymous FTP. To use this method, connect to the Institute's FTP server at ftp.sas.com. When you are connected, enter the following responses:

  ```
  Name (ftp.sas.com:userid): anonymous 
  Password: your-E-mail-address 
  ```

When logged in, change to the directory download/sibbs/graph. The files VBAR3D.SAS and PLOT3D.SAS contain the macros.
• You can obtain the macros from the Institute's World Wide Web site. To use this method, connect to HTTP://WWW.SAS.COM. From the main menu, select Support Services, then Technical Support, then SAS Institute Bulletin Board System. From this screen, you can select FTP Server to download the files.

• If you are unable to obtain the macros through the above methods, contact our Technical Support Division at (919) 677-8008.

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