A Problem Tracking System Developed Using the Graphics Object in FRAME
Samuel Johnson
SAS Institute Inc., Cary, NC

ABSTRACT
SAS software gives you many tools to produce graphics based applications quickly. This particular application provides examples of how some of these tools can be used. The vertical bar charts in the graphics object are used to represent the number of problems, which each employee supports. With this application you can easily subset these problems, subgroup the bars, or change the independent chart variable with the click of a mouse.

OVERVIEW
This application was built using Screen Control Language and the graphics object in FRAME. It uses CGRDEF (described below) as the sample data set.

The first 5 observations:

<table>
<thead>
<tr>
<th>DEFECTID</th>
<th>PRODUCT</th>
<th>COMPONENT</th>
<th>PRIORITY</th>
<th>SUPPORTID</th>
</tr>
</thead>
<tbody>
<tr>
<td>D0040234</td>
<td>WIDGET</td>
<td>STEREO</td>
<td>A</td>
<td>EWING, P.</td>
</tr>
<tr>
<td>D0040426</td>
<td>WIDGET</td>
<td>STEREO</td>
<td>M</td>
<td>EWING, P.</td>
</tr>
<tr>
<td>D0040526</td>
<td>WIDGET</td>
<td>STEREO</td>
<td>H</td>
<td>EWING, P.</td>
</tr>
<tr>
<td>D0040528</td>
<td>WIDGET</td>
<td>STEREO</td>
<td>M</td>
<td>EWING, P.</td>
</tr>
<tr>
<td>D0040850</td>
<td>WIDGET</td>
<td>STEREO</td>
<td>L</td>
<td>EWING, P.</td>
</tr>
</tbody>
</table>

REPTDATE | REPTID | ST | MODEL
---------|--------|----|-----
20DEC93  | SNAIL  | S. | APPROVE 1994
21DEC93  | SWINK  | H. | OPEN 1994
04JAN94  | JONES  | B. | APPROVE 1994
04JAN94  | JONES  | B. | OPEN 1994
12JAN94  | GRANT  | U. | REQUEST 1994

TITLE
CD PLAYER SKIPS ON 5TH SONG
CASSETTE PLAYER NOISE
SPEAKER CONNECTIONS PROBLEMS
SPEAKER PROBLEMS WHEN WATER APPLIED
CD CHANGER PROBLEMS WITH >10 SONGS

VARIABLE DESCRIPTION
DEFECTID is the problem tag number
PRODUCT is 'WIDGET', 'WHATZIT', or 'THINGY'
COMPONENT is 'TRANS', 'AC', 'CHASSIS', 'FENDERS', 'PAINT', 'SEATS', 'STEREO', 'WHEELS'
TITLE is the problem's short description
PRIORITY is the problem's priority: H=High, M=Medium, L=Low
SUPPORTID is the problems support person
REPTDATE is the date the problem was reported
REPTID is the person who reported the problem
ST the STATUS of the problem
MODEL is the model year which has the problem

Note: This example could easily be customized to use another similar data set and subset on other observations.
To change the MODEL variable you can type in a new value or click on a pull-down object to produce a list of valid choices.

You can also subgroup the bars according to the last status, ST, or the PRIORITY of the problem by simply using the mouse and clicking on the GROUP variable you want.

You can also choose a different independent variable by simply clicking on the new variable.
When you have subset the data, click on a bar of the person or component that you would like to investigate further and a list of those defects will be produced.

SCL Code

CHART.SCL (Produces the chart of outstanding problems)
Note: Refer to figure 1 for screen object names.

*----------------------------------------------------*
| TITLE: CHART_SCL 
| NOTES: Module of sugidemo to produce bar chart of problems which the user can subset by product, model and subgroup by model and priority and choose independent variable of supportid or component |
*----------------------------------------------------*

length rc 8 dev $8 suppid $ 20 id $ 20 temp $ 10;

/* arrays hold valid choices for product and model */
array prods$ 9 ('WIDGET', 'WHATZIT', 'THINGY');

INIT:
/* NOTE: libname data must be assigned */
dsid=open('data.cgrdef','i');
/* allow user to use pmenus */
control enter;
/* set up colors of lines to exclude very dark colors */
call notify('chart', '_SET_COLOR_', 'line', 'red',1);
call notify('chart', '_SET_COLOR_', 'line', 'yellow',2);
call notify('chart', '_SET_COLOR_', 'line', 'cyan',3);
call notify('chart', '_SET_COLOR_', 'line', 'blue',4);
call notify('chart', '_SET_COLOR_', 'line', 'magenta',5);
call notify('chart', '_SET_COLOR_', 'line', 'purple',6);
call notify('chart', '_SET_COLOR_', 'line', 'green',7);
/* set graph type 9=horizontal bar, show legend */
call notify('chart', '_SET_TYPE_', 9);
call notify('chart', '_SHOW_LEGEND_',II;
/* set sort type to ascending, stats type to freq */
/* data set to dsid */
call notify('chart', '_SET_SORT_TYPE_', 'ASCENDING');
call notify('chart', '_SET_STATS_','freq');
call notify('chart', '_SET_DSID_',dsidl);
link makegr;
RETURN;

MAIN:
/* command will hold command returned by pmenu */
command=upcase(word(1));
if command='ENDIT' then do;
  _status_='H';
  link term;
end;
call nextcmd();
RETURN;

TERM:
/* close data set before exiting */
rc=close(dsid);
RETURN;

MAKEGR:
/* subset the data before plotting */
link where;
call notify('chart', '_SET_INDEP_VAR_', INDEP);
/* set id var (for stacked bars) */
call notify('chart', '_SET_ID_VAR_', GROUP);

/ if there are defects to chart tell the user */
if msg ~="There are no defects in the requested subset" then do;
call notify('MSG', '_SET_COLOR_NAME_', 'WHITE');
msg="Click on a bar to get more information";
end;
call notify('chart', '_UPDATE_');
RETURN;
WHERE:
/* subset the data according to users choices */
rc=where(dsid, 'product='||prod||'');
rc=where(dsid, 'also model='||model||'');
/* if no problems in subset warn user */
rc=varstat(dsid, 'DEFECTID', 'N', _freq=);
if _freq < 1 then do;
call notify('MSG', '_SET_COLOR_NAME_', 'RED');
msg="There are no defects in the requested subset";
RETURN;
end;
else do;
/ if 1 or more set title to appropriate string */
call notify('chart', '_SET_TITLE_','1','Total '||model||' Defects for '||prod||' developers: '||_freq);";
msg="Click on a bar to get more information";
end;
RETURN;
CHART:
/* find out where the user clicked */
call notify('chart', '_GET_VALUE_','value');
/* if user clicked on invalid area inform them */
if value=0 then do;
msg="You must click on a bar to get more information";
RETURN;
end;
/* find independent variable for bar user clicked */
suppid=getnitemc(value, 'INDVALUE');
/* if user clicked on invalid area inform them */
if suppid=' ' then do;
msg="You must click on a bar to get more information";
RETURN;
end;
/* call dfctlist to display list of defects */
call display('sasuser.sasappl.dfctlist.frame', suppid, prod, model, indep, dsid);
RETURN;
/* new group or indep variable chosen, update graph */
GROUP:
INDEP:

link makegr;
RETURN;
MODEL:
/* if user typed in new model ensure that it's valid */
if modified(model) then do;
i = MODEL in models;
/* if invalid model show user the model list */
if i<1 or i>3 then do;
call wregion(7,17,13,32,'INNERSIZE');
end;
/* if user didn't leave field blank, refresh graph */
if model \="\" then
link makegr;
else
msg="WARNING: No value chosen for MODEL";
end;
RETURN;
MOPOD:
/* place window to display model list to user */
call wregion(7,17,13,32,'INNERSIZE');
/* refresh graph */
link makegr;
RETURN;
PROD:
/* check to see if product typed in is valid */
if modified(prod) then do;
i=prod in prods;
/* if invalid product show user the product list */
if i<1 or i>3 then do;
call wregion(7,17,13,32,'INNERSIZE');
prod=showlist('WIDGET','WHATZIT','THINGY', 'Select a valid product');
end;
/* if user didn't leave field blank, refresh graph */
if prod \="\" then
link makegr;
else
msg="WARNING: No value chosen for PRODUCT";
end;
RETURN;
PRODPD:
/* place window to display product list to user */
call wregion(7,17,13,32,'INNERSIZE');
prod=showlist('WIDGET','WHATZIT','THINGY', 'Select a valid product');
/* refresh graph */
link makegr;
RETURN;
entry suppid $ 20 dvd $ 16 track $ 7 indep $ 8 dsid 8;
length pstring $116;

INIT:

/* subset to the independent variable */
if indep='SUPPRID' then
  rc=where(dsid,'also supprtid='''|suppid||''');
else
  rc=where(dsid,'also exponent='''|suppid||''');

/* inform user of the number of defects to be listed */
rc=varstat(dsid,'defectid','n',supcount);
totall=suppid|''|track|'' Defects: ''|supcount;
RETURN;

MAIN:
command=upcase(word(1));
if command='EDIT' then do;
  _status_='H';
  link term;
end;
call nextcmd();
TERM:
RETURN;

GET1:

/* if no data to put into table end table */
if (fetchobs(dsid,_CURROW_) ne 0) then
call notify('dtable','_NDTABLE_');
else do;

/* get data and form string to print */
string1=getvarc(dsid,varnum(dsid,'DEFECTID'));
string1=str1t r"| substr(getvarc(dsid,varnum(dsid,'MODEL'))),1,10);
string1=string1t r"| getvarc(dsid,varnum(dsid,'PRIORITY'))| 
string1=string1t r"| putc(getvarc(dsid,varnum(dsid,'COMPONENT')),'$9.');
string1=string1t r"| putn(getvar1(dsid,varnum(dsid,'REPDATE')),'date7.');
string1=string1t r"| getvarc(dsid,varnum(dsid,'TITLE'));
linel=string1;
end;
RETURN;

ACKNOWLEDGMENTS

I would like to thank the SAS/GRAPH development and testing staff for their feedback in developing the application.

SAS and SAS/GRAPH are registered trademarks or trademarks of SAS Institute, Inc. in the USA and other countries. * indicates USA registration.

Other brand and product names are registered trademarks or trademarks of their respective companies.
Do SAS Institute employees use the SAS System for applications other than those related to work? Sure we do! This application is one of several that I maintain for personal data. Other simpler applications involve management of personal and family expenses, gas mileage, utility consumption, and music library.

Managing personal applications helps us to better understand what our customers encounter. And these applications can help to find defects in our test systems so that they're never seen by our customers!

The family worksheet

The family worksheet represents the parents and children of a family. If the parent is a blood relative, the page on which he/she is a child appears for cross-referencing. Because all children will be blood relatives, they also can have page numbers for cross-referencing where they are parents. Because multiple marriages with issue can occur, a person can be a parent on multiple pages. If a person had no children, the NI (no issue) indicator states this.

Multiple marriages, each with issue, are supported.

New features planned

MULTI-THREAD RELATIVES: There are many crossovers between blood lines. This is very common in rural America, especially in the 1800s and early 1900s. To ensure that the program recognizes these, I plan to add a feature to tag such individuals. For example, my mother recently remarried, to the widower of her first cousin.

GUI FOR BROWSING: I plan to implement a Graphical User Interface (GUI) to allow for point-and-click connection similar to that now indicated by the page number connection.

EGOCENTRICITY ADJUSTMENT: I plan to allow dynamic modification of the egocentric key so that the report can be printed based on any blood relative as the central point, instead of just me.
It's all in the key!

The database is constructed such that all observations have a key. That key indicates the person's relationship to me. Characters include M (mother), F (father), B (brother), S (sister), O (son), and A (daughter). Numbers are also used to ensure proper sequencing and for proper matching. For example, the key MFBIA1 refers to "mother's father's sibling child." Where sibling is a brother and child is a daughter. The use of M/F/B/S/O/A allows me to know the sex of each person (useful in appending married names and allowing for consistency in placing on pedigree charts). With this key mechanism, anyone that is blood-related to me, and knows their relation, can have a key and appear in the database.

The database is constructed such that all observations have a key. That key indicates the person's relationship to me. Characters include M (mother), F (father), B (brother), S (sister), O (son), and A (daughter). Numbers are also used to ensure proper sequencing and for proper matching. For example, the key MFBIA1 refers to "mother's father's sibling child." Where sibling is a brother and child is a daughter. The use of M/F/B/S/O/A allows me to know the sex of each person (useful in appending married names and allowing for consistency in placing on pedigree charts). With this key mechanism, anyone that is blood-related to me, and knows their relation, can have a key and appear in the database.

Index refers to both "Child" and "Parent" pages.

It's all in the key!

The database is constructed such that all observations have a key. That key indicates the person's relationship to me. Characters include M (mother), F (father), B (brother), S (sister), O (son), and A (daughter). Numbers are also used to ensure proper sequencing and for proper matching. For example, the key MFBIA1 refers to "mother's father's sibling child." Where sibling is a brother and child is a daughter. The use of M/F/B/S/O/A allows me to know the sex of each person (useful in appending married names and allowing for consistency in placing on pedigree charts). With this key mechanism, anyone that is blood-related to me, and knows their relation, can have a key and appear in the database.

The database is constructed such that all observations have a key. That key indicates the person's relationship to me. Characters include M (mother), F (father), B (brother), S (sister), O (son), and A (daughter). Numbers are also used to ensure proper sequencing and for proper matching. For example, the key MFBIA1 refers to "mother's father's sibling child." Where sibling is a brother and child is a daughter. The use of M/F/B/S/O/A allows me to know the sex of each person (useful in appending married names and allowing for consistency in placing on pedigree charts). With this key mechanism, anyone that is blood-related to me, and knows their relation, can have a key and appear in the database.

Index refers to both "Child" and "Parent" pages.

It's all in the key!

The database is constructed such that all observations have a key. That key indicates the person's relationship to me. Characters include M (mother), F (father), B (brother), S (sister), O (son), and A (daughter). Numbers are also used to ensure proper sequencing and for proper matching. For example, the key MFBIA1 refers to "mother's father's sibling child." Where sibling is a brother and child is a daughter. The use of M/F/B/S/O/A allows me to know the sex of each person (useful in appending married names and allowing for consistency in placing on pedigree charts). With this key mechanism, anyone that is blood-related to me, and knows their relation, can have a key and appear in the database.

The database is constructed such that all observations have a key. That key indicates the person's relationship to me. Characters include M (mother), F (father), B (brother), S (sister), O (son), and A (daughter). Numbers are also used to ensure proper sequencing and for proper matching. For example, the key MFBIA1 refers to "mother's father's sibling child." Where sibling is a brother and child is a daughter. The use of M/F/B/S/O/A allows me to know the sex of each person (useful in appending married names and allowing for consistency in placing on pedigree charts). With this key mechanism, anyone that is blood-related to me, and knows their relation, can have a key and appear in the database.
EVENT ANNIVERSARY CALENDAR

DATE       EVENT

07MAR      Elgin Frederick Langston married Helen Brice 1937 (57 years ago)
07MAR      Idella Winnifred Quinn died 1858 (136 years ago)
08MAR      George Allen Quinn died 1890 (104 years ago)
08MAR      Joseph Lewis Williams married Ellen Long 1911 (83 years ago)
09MAR      Ethel Beatrice Scott Herring died 1944 (50 years ago)
09MAR      Paul Augustus Flynn married Hazel Futch 1929 (65 years ago)
10MAR      Beulah May Boney died 1920 (74 years ago)
12MAR      Kevin Scott Henry born 1960 (34 years ago)
12MAR      William Henry Williams born 1882 (112 years ago)
12MAR      William Henry Williams died 1969 (25 years ago)
13MAR      James Travis Lanier born 1970 (24 years ago)
14MAR      Regan Wayne Norris born 1979 (15 years ago)
16MAR      Charles Gesker Williams born 1873 (121 years ago)
17MAR      Augustus Donald Scott married Nancy Boyette 1959 (35 years ago)
17MAR      Deanese Langston born 1917 (77 years ago)
17MAR      Dorothy Langston born 1917 (77 years ago)
17MAR      Thomas E. Williams married Susan Ross 1983 (11 years ago)
18MAR      Jane Winifred Flynn born 1923 (71 years ago)
19MAR      Richard Dean Langston born 1955 (39 years ago)
20MAR      Ivy Christine Flynn born 1953 (41 years ago)
20MAR      James M. Charles died 1844 (150 years ago)
21MAR      David Taylor Blanton born 1984 (10 years ago)
21MAR      Melissa Jane Bell Williams died 1922 (72 years ago)
22MAR      Jay Mack Godwin born 1959 (35 years ago)
25MAR      Elvin Michael Jr. Squires born 1978 (16 years ago)
24MAR      Della Delillion Langston born 1879 (115 years ago)
27MAR      Mark Gilchrist Dawson married Betsy Hawkins 1976 (18 years ago)
28MAR      Alma Langston married Wade Spooner 1942 (52 years ago)
28MAR      Douglas Ralph Flynn born 1942 (52 years ago)
28MAR      George Franklin Whitley born 1924 (70 years ago)
28MAR      William James Flynn died 1910 (84 years ago)
29MAR      Gerald Ross Langston died 1991 (3 years ago)
29MAR      John Henry Quinn born 1859 (135 years ago)
29MAR      Sargent Edward Quinn born 1859 (135 years ago)
30MAR      William Ivy Quinn died 1918 (76 years ago)
31MAR      Franklin Love Bell died 1961 (33 years ago)
31MAR      Susan Marie Kerney married Edward Litton 1990 (4 years ago)
31MAR      William Porter Scott married Annie Merritt 1918 (76 years ago)
01APR      Amy Mitchell born 1975 (19 years ago)
01APR      Bennie George Williams born 1941 (53 years ago)
01APR      Mack Lloyd Nunalee born 1885 (109 years ago)
02APR      Della Delillion Langston Scott died 1940 (54 years ago)
02APR      Della Delillion Langston Thompson died 1940 (54 years ago)
03APR      Blondy Ebert Scott died 1992 (2 years ago)
03APR      Gerald Ross Langston born 1920 (74 years ago)
03APR      Horatia Jane Lilly born 1977 (17 years ago)
04APR      Pearley Boney died 1907 (87 years ago)
04APR      Rutha McDaniel born 1821 (173 years ago)
06APR      Effie Catherine Decker born 1903 (91 years ago)
08APR      Agnes Jane Williams married Livies Edge 1901 (93 years ago)
08APR      Clifton Dale Scott born 1907 (87 years ago)
08APR      Kenneth Everette Henry born 1922 (72 years ago)
08APR      Marie Scott married Grag Horton 1943 (51 years ago)
09APR      Annie Jane Boney died 1882 (102 years ago)
09APR      Benjamin Clarence Boney married Bertha Thompson 1892 (102 years ago)
09APR      Samuel Aubrey Decker married Margaret Mae Brown 1928 (66 years ago)