Top Award and First Place
Most Creative Use of Software
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Australia

Hindmarsh Electoral Division
Analysis of persons aged 65 and over
Entry in SUGI 18 SAS Graphics Competition

This graph analyses population of pension age, (ie. aged 65 and over) in Hindmarsh, one of 147 Electoral Divisions in Australia. Each Electoral Division elects one Member to Australia’s House of Representatives.

Each component of the chart (ie, the Choropleth map, Bar chart, Line Chart and the Population Tree) was produced separately, and stored in a GREPLAY Catalogue. The components were then assembled in accordance with pre defined Templates using PROC GREPLAY.

The colour shading effects were achieved using the ANNOTATE facility with the help of a special MACRO which fills a designated area with colours ranging from a specified start and finish colour. The required colours are specified to the MACRO as per cent of Red , Green and Blue and then converted by the MACRO into SAS CX user defined colour standards.

The final Chart forms a useful poster which can be displayed in the Member of Parliament Electoral Office, etc. The SAS code has been written in such a way as to be easily adapted to display data for any of Australia’s 147 Electoral Divisions.

The graph was drawn on a Tektronix Phaser III Colour Postscript printer. The SAS code was executed on a Digital VAXstation 3100.
HINDMARSH ELECTORAL DIVISION

Analysis of persons aged 65 and over

Hindmarsh Electoral Division
Causes of death by Cemetery District
Persons aged 65 years and over (per cent)
LIBNAME MAPS 'USER1:[ANDREW.MAPS.V6]';
LIBNAME ANDREW 'USER1:[ANDREW.SUGI]';
LIBNAME GDEVICEO 'USER1:[ANDREW.SAS.V6]';
FILENAME PHASER 'PHASER.GSF';
GOPTIONS NODI SPLAY GSFMODE=REPLACE GSFNAME=PHASER DEVICE=PHIIIA4
ROTATE=PORTRAIT GSFLEN=80;

DATA CENSUS;
INFILE 'USER1:[ANDREW.MAPS]hind91C.DAT';
INPUT STATE CD AGE50PL ITALY GREECE TENANT VIETNAM AGE65PL HIDENS;

PATTERN1 V=S C=CXFFFFB3;
PATTERN2 V=S C=CX99FF99;
PATTERN3 V=S C=CX80E6FF;
PATTERN4 V=S C=CX9999E6;
PATTERN5 V=S C=CXE64DB3;

TITLE1 F=HWPSL023 H=2.3 'Hindmarsh Electoral Division';
TITLE2 F=HWPSL025 H=1.8 'Census 1986 By Collection District';

LEGEND1 SHAPE=BAR(8,2) ACROSS=l
VALUE=(F=HWPSL023 H=1.2 C=BLACK)
LABEL=(F=HWPSL023 H=1.2 C=BLACK 'LEGEND');

DELETE PREVIOUS MAP FROM THE REPLAY CATALOGUE */
PROC GREPLAY NOFS;
IGOUT ANDREW.REPLCOMP
DELETE MAP93;

TITLE3 F=HWPSL025 H=1.8 'Persons aged 65 years and over (per cent)';
PROC FORMAT;
VALUE CENFMTG
0.0-11.9 = 'UNDER 12.0%'
12.0-15.9 = '12.0% TO 15.9%'
16.0-19.9 = '16.0% TO 19.9%'
20.0-23.9 = '20.0% TO 23.9%'
24.0-HIGH = '24.0% AND OVER';
RUN;

STORE THE NEW MAP IN THE REPLAY CATALOGUE */
PROC GMAP DATA=CENSUS MAP=MAPS.HIND91 GOUT = ANDREW.REPLCOMP ;
ID CD;
FORMAT AGE65PL CENFMTG.;
CHORO AGE65PL / DISCRETE
CTEXT=BLACK
COUTLINE=BLACK
NAME = 'MAP93'
DES = 'CHORO MAP FOR SUGI18 COMPETITION'
LEGEND=LEGEND1;
RUN;
LIBNAME ANDREW 'USER1:[ANDREW.SUGI]';
LIBNAME GDEVICEO 'USER1:[ANDREW.SAS.V6]';
FILENAME PHASER 'PHASER.GSF';
GOPTIONS NODISPLAY GSFMODE=REPLACE GSFNAME=PHASER DEVICE=PHIIIA4
ROTATE=LANDSCAPE GSFLEN=80;

DATA AGE;
  INFILE 'COMP93_BAR.DAT';
  INPUT YEAR-$4. AREA $8. PERCENT ;
%INCLUDE '[andrew.sas]BSHAD_MACRO.SAS';
/* ANNOTATE DATA SET FOR BACKGROUND SHADING */
DATA ANN02 ;
  %BSHAD('3',100,85,15,40,85,40);
  %BSHAD('1',40,85,40,100,85,15);
/* DELETE THE PREVIOUS BAR CHART FROM THE REPLAY CATALOGUE */
PROC GREPLAY NOPRINT ;
  IGOUT ANDREW.REPLCOMP ;
  DELETE BAR93 ;
/* STORE THE NEW BAR CHART IN THE REPLAY CATALOGUE */
PROC GCHART DATA = AGE ANNO = ANN02 GOUT = ANDREW.REPLCOMP ;
  VBAR YEAR /
  SUMVAR = PERCENT
  GROUP = AREA
  WIDTH = 7.5
  GSPACE = 3.4
  SPACE = 2.2
  FRAME
  PATTERNID = GROUP
  COUTLINE = BLACK
  RAXIS = AXIS1 REF 0 TO 20 BY 5
  MAXIS = AXIS2
  GAXIS = AXIS3
  NAME = 'BAR93'
  DES = 'BAR CHART FOR SUGI 18'
  AXIS1 LABEL = ( C = BLACK A = 90 F = HWPSL023 H = 1.6
    'Per cent' )
  VALUE = ( C = BLACK F = HWPSL023 H = 1.5 )
  MINOR = NONE
  MAJOR = ( C = BLACK )
  COLOR = BLACK
  OFFSET = ( 0 , 0 )
  ORDER = ( 0 TO 20 BY 5 )
  ;
  AXIS2 LABEL = NONE
  VALUE = ( C = BLACK F = HWPSL023 H = 1.2 )
  COLOR = BLACK
  ORDER = '1976' '1981' '1986'
  ;
  AXIS3 LABEL = NONE
  VALUE = ( C = BLACK F = HWPSL023 H = 1.5
    t = 1 "Hindmarsh"
    t = 2 "South Australia"
    t = 3 "Australia" )
  COLOR = BLACK
  ;
  PATTERN1 VALUE = S C = CXFFFFFB2 ;
  PATTERN2 VALUE = S C = CX99FF99 ;
1433
PATTERN3 VALUE = S C = CXE64DB3;

TITLE1 H = 4.1 PCT COLOR = BLACK F = HWPSL023
'Persons aged 65 and over';
TITLE2 H = 3.0 PCT COLOR = BLACK F = hwps1025
'Hindmarsh, South Australia and Australia';
TITLE3 H = 3.0 PCT COLOR = BLACK F = hwps1025
'Censuses 1976 to 1986';
run;

/* === SUGI 18 GRAPHICS COMPETITION ENTRY BY ANDREW KOPRAS
SAS CODE FOR LINE GRAPH === */

LIBNAME ANDREW 'USER1:[ANDREW.SUGI]';
LIBNAME GDEVICEO 'USER1:[ANDREW.SAS.V6]';
FILENAME PHASER 'PHASER.GSF';
GOPTIONS NODI SPLAY GSFMODE=REPLACE GSFNAME=PHASER DEVICE=phiiia4
ROTATE=LANDSCAPE GSFLEN=80;
%INCLUDE '[andrew.sas]BSHAD_MACRO.SAS';

DATA ANN01;
  %BSHAD('3',40,85,40,100,85,40);
  %BSHAD('1',100,85,15,40,85,40);
  XSYS='3'; YSYS='3';
  WHEN='A';
  FUNCTION='LABEL';
    COLOR='BLACK';
  STYLE='HWPSL023';
  POSITION='5';
  X=50; Y=97;
  SIZE=3.0;
  TEXT='Commonwealth Electoral Divisions';
  OUTPUT;
  XSYS='2'; YSYS='2';
  X=72.5; Y=7;
  POSITION='8';
  SIZE=1.5;
  COLOR='BLACK';
  TEXT='Australian';
  OUTPUT;
  Y=6.5;
  TEXT='average';
  OUTPUT;
  X=89.5; Y=8.2;
  TEXT='South Australian';
  OUTPUT;
  Y=7.7;
  TEXT='average';
  OUTPUT;
  X=145; Y=14.2;
  TEXT='Hindmarsh';
  OUTPUT;
  X=72.5; Y=6.8;
  FUNCTION='MOVE'; OUTPUT;
  Y=10.55;
  SIZE=0.6;
  LINE = 1;
  FUNCTION='DRAW'; OUTPUT;
  X=89.5; Y=8;
  FUNCTION='MOVE'; OUTPUT;
  Y=11.57;
FUNCTION='DRAW'; OUTPUT;
X=145; Y=14;
FUNCTION='MOVE'; OUTPUT;
Y=17.9;
FUNCTION='DRAW'; OUTPUT;

/* DATA FOR THE GRAPH */
DATA rankvar ;
INFILE 'CED91_AGE65P.DAT';
INPUT RANK AGE65P;

/* DELETE PREVIOUS GRAPH LINE FROM THE REPLAY CATALOGUE */
PROC GREPLAY NOFS ;
IGOUT ANDREW.REPLCOMP ;
DELETE LINE93 ;

/* DRAW THE LINE GRAPH AND STORE IN REPLAY CATALOGUE */
PROC GPLOT DATA = RANKVAR ANNO = ANNO1 GOUT = ANDREW.REPLCOMP ;
PLOT AGE65P * RANK / FRAME
NAME = 'LINE93'
DES = 'LINE GRAPH FOR SUGI18 COMPETITION'
VAXIS = AXIS1 CVREF = BLACK VREF = 0 TO 20 BY 5
HAXIS = AXIS2 CHREF = BLACK HREF = 20 to 140 by 20
AXIS1 LABEL = ( H = 1.6 F = HWPSL023 A = 90
'Per cent' C = BLACK)
VALUE = ( H = 1.5 F = HWPSL023 C = BLACK )
OFFSET = ( 0 )
COLOR = BLACK
ORDER = ( 0 TO 20 BY 5 )
MINOR = NONE
;
AXIS2 LABEL = ( H = 2.0 F = HWPSL023 'Rank' )
VALUE = ( H = 1.5 F = HWPSL023 tick=1 'TICK=2 '20' TICK=3 '40'
TICK=4 '60' TICK=5 '80' TICK=6 '100' TICK=7 '120'
TICK=8 '140' TICK=9 '9' )
OFFSET = ( 0 )
COLOR = BLACK
MINOR = NONE
ORDER = (0 TO 160 BY 20)
;
AXIS3 LABEL = NONE
VALUE = NONE
MAJOR = ( N = 9 )
OFFSET = ( 0 )
COLOR = BLACK
ORDER = ( 0 TO 20 BY 5 )
MINOR = NONE
;
SYMBOL1 W = 15 V = NONE L = 1 I = SPLINE C = RED ;

TITLE1 H = 5.5 PCT F = HWPSL005 ' ' ;
TITLE3 H = 3.1 PCT F = HWPSL025 C = BLACK
'Ranked by the proportion of';
TITLE4 H = 3.1 PCT F = HWPSL025 C = BLACK
'population aged 65 and over' ;
RUN ;
LIBNAME ANDREW 'USER1:[ANDREW.SUGI]';
LIBNAME GDEVICE0 'USER1:[ANDREW.SAS.V6]';
FILENAME Phaser 'PHASER.GSF';
GOPTIONS NODISPLAY GSFMODE=REPLACE GSFNAME=PHASER DEVICE=phiiia4
ROTATE=LANDSCAPE GSFLEN=80;

%INCLUDE '[andrew.sas]BSHAD_MACRO.SAS';

DATA ANN01;
RETAIN XSYS '3' YSYS '3' YLEVEL 5;
DROP AGELAB HUE MS6 FS6 MS1 FS1 YLEVEL;

INFILE 'COMP93_TREE.DAT';
INPUT AGELAB $10. HUE $S. MS6 FS6 MS1 FS1;
YLEVEL = YLEVEL + 10;
LINE=0;
FUNCTION='MOVE ';
X=72; Y=YLEVEL; OUTPUT;
FUNCTION='BAR';
X=X-(MS6 * 1.7); Y=YLEVEL+8;
COLOR=HUE;
STYLE='SOLID ';
FUNCTION='MOVE ';
X=78; Y=YLEVEL; OUTPUT;
FUNCTION='BAR';
X=X+(FS6 * 1.7); Y=YLEVEL+8;
COLOR=HUE;
STYLE='SOLID ';
FUNCTION='MOVE ';
X=72; Y=YLEVEL; OUTPUT;
FUNCTION='BAR';
X=X-(MS6 * 1.7); Y=YLEVEL+8;
COLOR='BLACK';
STYLE='EMPTY';
FUNCTION='MOVE ';
X=78; Y=YLEVEL; OUTPUT;
FUNCTION='BAR';
X=X+(FS6 * 1.7); Y=YLEVEL+8;
COLOR='BLACK';
STYLE='EMPTY ';
FUNCTION='LABEL';
COLOR='BLACK';
STYLE='HWPSL022';
TEXT=AGELAB;
X=75; Y=YLEVEL+4;
POSITION='5';
SIZE=1.1; OUTPUT;

FUNCTION='MOVE ';
X=22; Y=YLEVEL; OUTPUT;
FUNCTION='BAR';
X=X-(MS1 * 1.7); Y=YLEVEL+8;
COLOR=HUE;
STYLE='SOLID ';
FUNCTION='MOVE ';
X=28; Y=YLEVEL; OUTPUT;
FUNCTION='BAR';
X=X+(FS1 * 1.7); Y=YLEVEL+8;
COLOR=HUE;
STYLE='SOLID ';
FUNCTION='LABEL';
COLOR='BLACK';
STYLE='HWPSL022';
TEXT=AGELAB;
X=75; Y=YLEVEL+4;
POSITION='5';
SIZE=1.1; OUTPUT;
DATA ANN03;
  SET ANN02 ANN01;
  /* DELETE PREVIOUS POPULATION TREE FROM THE REPLY CATALOGUE */

  PROC GREPLAY NOFS ;
    IGOUT ANDREW.REPLCOMP ;
    DELETE TREE93 ;
  /* PUT NEW POPULATION TREE GRAPH IN THE REPLY CATALOGUE */

  PROC GANNO ANNO = ANN03
    GOUT = ANDREW.REPLCOMP
    NAME = 'TREE93'
    DES = 'AGE TREE FOR SUGI 18 COMPETITION' ;

  RUN ;
/* === SUGI 18 GRAPHICS COMPETITION ENTRY BY ANDREW KOPRAS
SAS CODE FOR MAIN TITLE AND BACKGROUND === */

LIBNAME ANDREW 'USER1:[ANDREW.SUGIJ';
LIBNAME GDEVICEO 'USER1:[ANDREW.SAS.V6J';
FILENAME PHASER 'PHASER.GSF';
GOPTIONS NODISPLAY GSFMODE=NONE DEVICE=PHIIIa3
ROTATE=LANDSCAPE GSFLEN=132 CBACK=H0B4A2FF;

DATA ANNO4 ;
LENGTH TEXT $70. FUNCTION COLOR STYLE $8. ;
RETAIN XSYS '3' YSYS '3' ;
WHEN='A' ;
FUNCTION=' LABEL , ';
COLOR = 'GRAY3A' ;
X = 50 ;
Y = 97 ;
TEXT = 'HINDMARSH ELECTORAL DIVISION ' ;
SIZE = 3.0 ;
POSITION = '5' ;
STYLE = 'CENTB' ; OUTPUT ;
X = X - 0.1 ;
Y = Y - 0.1 ;
COLOR = 'h0648eff' ; OUTPUT ;
X = 50 ;
Y = 93 ;
TEXT = 'Analysis of persons aged 65 and over' ;
SIZE = 2.6 ;
POSITION = '5' ;
STYLE = 'CENTBI' ; OUTPUT ;

PROC GREPLAY NOFS ;
IGOUT ANDREW.REPLCOMP ;
DELETE COMPT93B ;

PROC GANNO ANNO = ANNO4 GOUT = ANDREW.REPLCOMP
NAME = 'COMPT93B'
DES = 'HEADING FOR SUGI 18' ;
RUN;
GOPTIONS GSFMODE = REPLACE GSFNAME=PHASER ;

PROC GREPLAY NOFS TC = ANDREW.TEMPLATE ;

/* DEFINE THE TEMPLATES FOR THE FOUR CHARTS AND MAIN TITLE */
TDEF SHOWS18B DES = 'ELECTORATE AGE PROFILE '
1 / LLX=50 LLY=2 ULX=50 ULY=30 URX=97 URY=30 LRX=97 LRY=2
2 / LLX=50 LLY=31 ULX=50 ULY=59 URX=97 URY=59 LRX=97 LRY=31
3 / LLX=50 LLY=60 ULX=50 ULY=88 URX=97 URY=88 LRX=97 LRY=60
4 / LLX=2 LLY=2 ULX=2 ULY=88 URX=45 URY=88 LRX=45 LRY=2
5 / LLX=0 LLY=0 ULX=0 ULY=100 URX=100 URY=100 LRX=100 LRY=0 ;
IGOUT ANDREW.REPLCOMP ;
TC ANDREW.TEMPLATE ;
TEMPLATE SHOWS18B ;

/* OUTPUT THE PREVIOUSLY STORED CHARTS ON TO THE TEMPLATES */
TPLAY 1:TREE93 2:LINE93 3:BAR93 4:MAP93 5:COMPT93B ;
RUN ;
/* SAS MACRO TO BE USED WITH THE ANNOTATE FACILITY TO PRODUCE COLOUR SHADED BACKGROUNDS, EITHER ON THE WHOLE PAGE (SYSVAR = '3') OR ONLY IN THE DATA BOX (SYSVAR = '1'). VARIABLES STR STG AND STB CONTAIN COLOUR DEFINITION AT THE TOP OF THE PAGE, EXPRESSED AS A INTEGER BETWEEN 0 AND 100 SIGNIFYING PER CENT OF RED, GREEN AND BLUE RESPECTIVELY. SIMILARLY, VARIABLES ENR, ENG AND ENB DEFINE COLOUR AT THE BOTTOM OF THE PAGE.

WRITTEN BY ANDREW KOPRAS
STATISTICS GROUP
PARLIAMENTARY LIBRARY
PARLIAMENT HOUSE
CANBERRA
*/

%MACRO BSHAD(SYSVAR,STR,STG,STB,ENR,ENG,ENB);
XSYS = &SYSVAR;
YSYS = &SYSVAR;
STRED = &STR*2.55;
STGRE = &STG*2.55;
STBLU = &STB*2.55;
ENRED = &ENR*2.55;
ENGRE = &ENG*2.55;
ENBLU = &ENB*2.55;
INCRED = (ENRED-STRED)/50.0;
INCGRE = (ENGRE-STGRE)/50.0;
INCBLU = (ENBLU-STBLU)/50.0;
WHEN = 'B';
DO I=1 TO 50;
   LINE = 1;
   STYLE = 'SOLID ';
   COLOR = 'CX' || PUT (STRED,HEX2.) || PUT (STGRE,HEX2.) || PUT (STBLU,HEX2.);
   FUNCTION = 'MOVE ';
   X = 0;
   Y = (51 - I) * 100 / 50;
   OUTPUT;
   LINE = 0;
   FUNCTION = 'BAR ';
   X = 100;
   Y = (50 - I) * 100 / 50;
   OUTPUT;
   STRED = STRED + INCRED;
   STGRE = STGRE + INCGRE;
   STBLU = STBLU + INCBLU;
END;
%MEND;