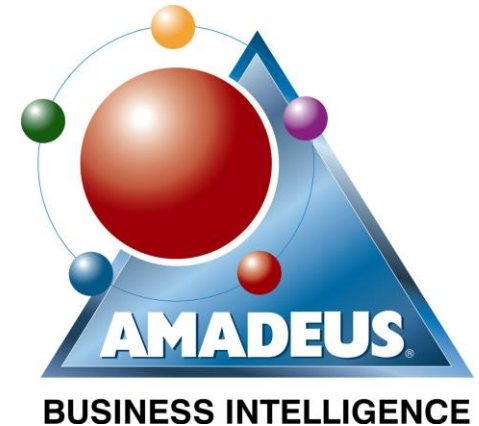




Annotating SAS Graphs

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VIEWS Conference
May 20th 2003





Simple Graphs

- Plots

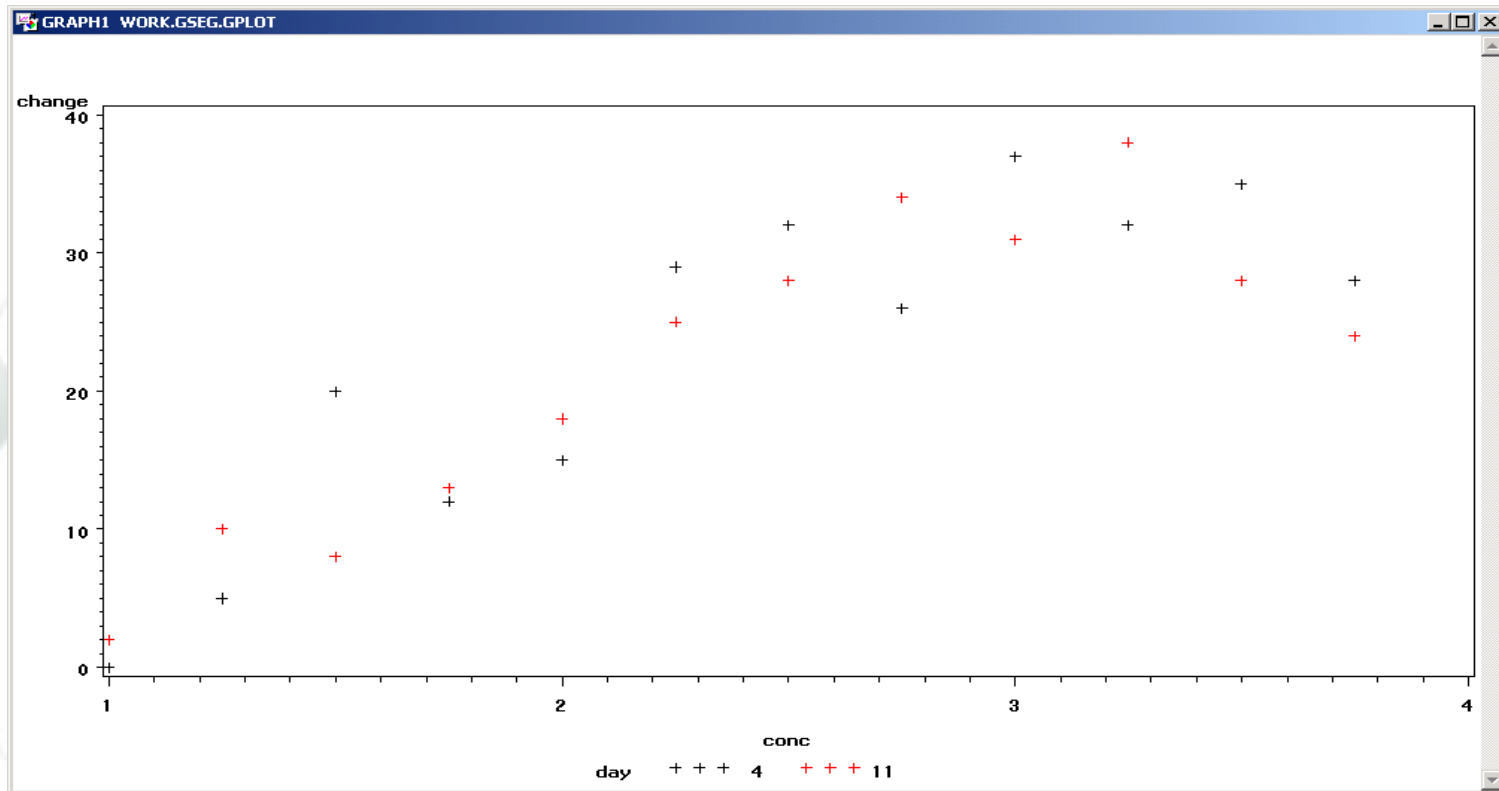
```
simple plot.sas

1proc gplot data=views.plot ;
2  plot change*conc=day ;
3run;
4quit;
```



Simple Graphs

- Plots





Simple Graphs

- Charts

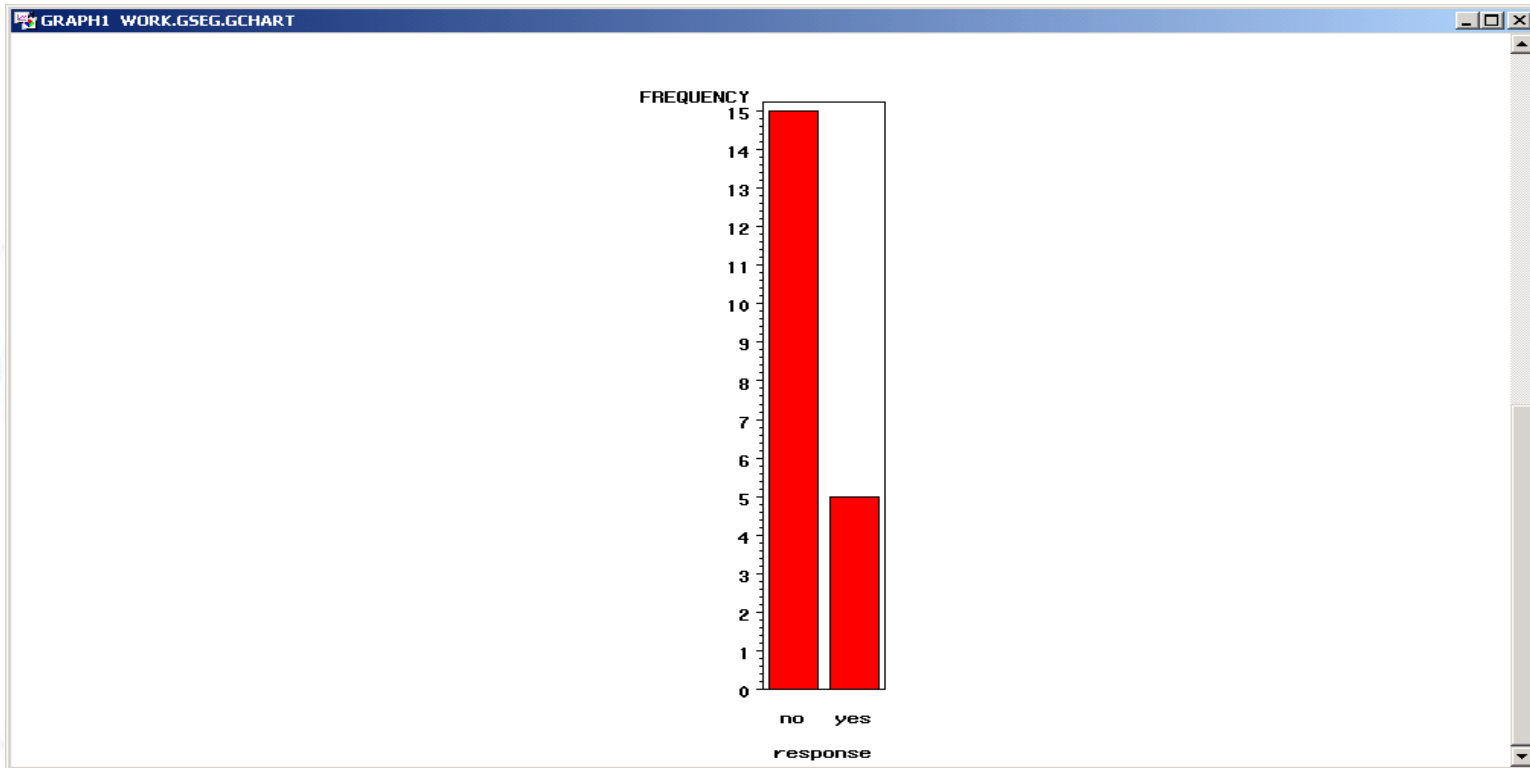
```
simple chart.sas

1proc gchart data=views.response ;
2  vbar response / discrete ;
3run;
4quit;
```



Simple Graphs

- Charts





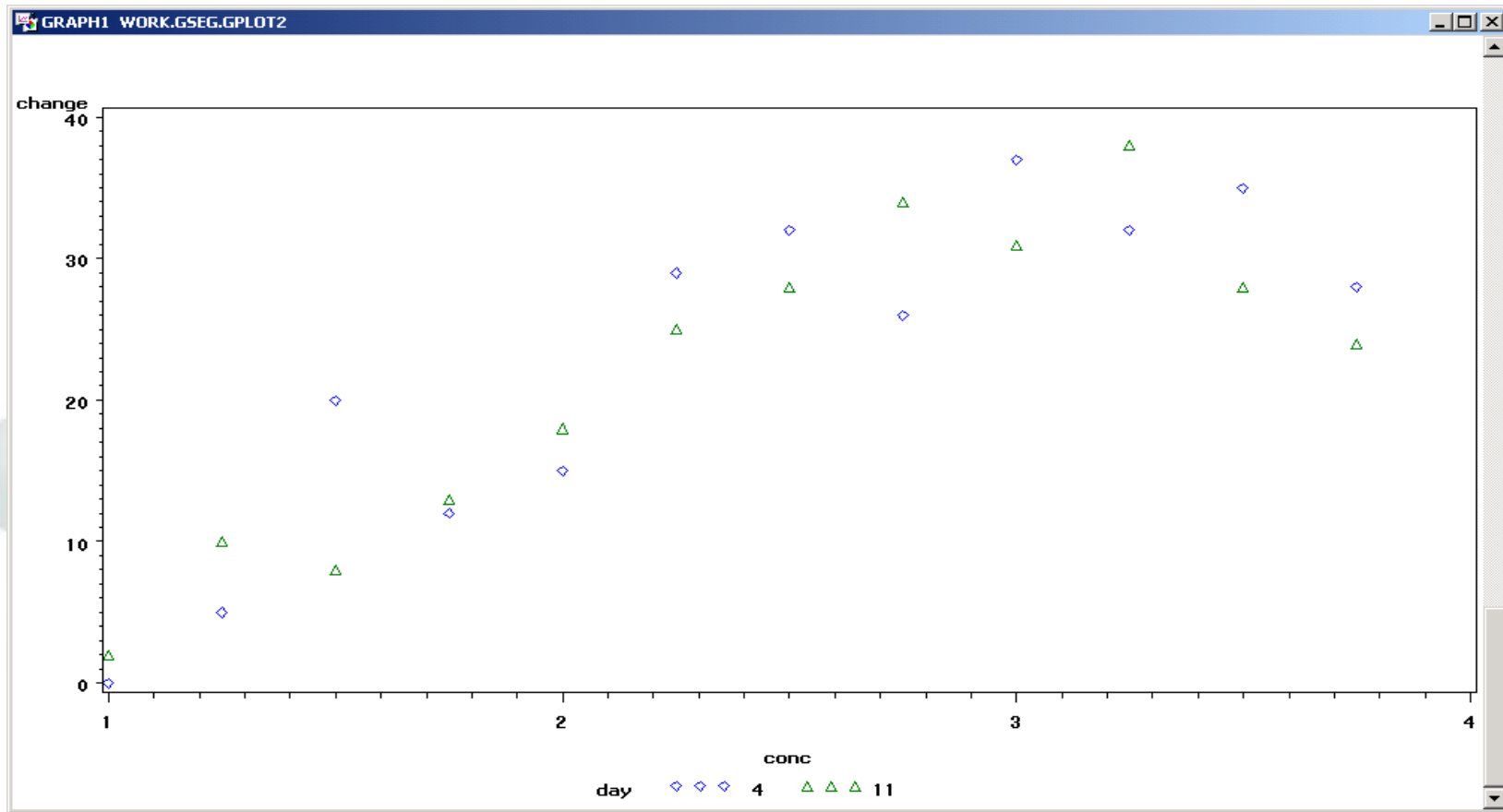
Symbol Statements

- Additional statements to alter the default symbols applied to graphics

```
symbol.sas
1symbol1 c=blue v=diamond ;
2symbol2 c=green v=triangle;
3proc gplot data=views.plot ;
4  plot change*conc=day ;
5run;
6quit;
```



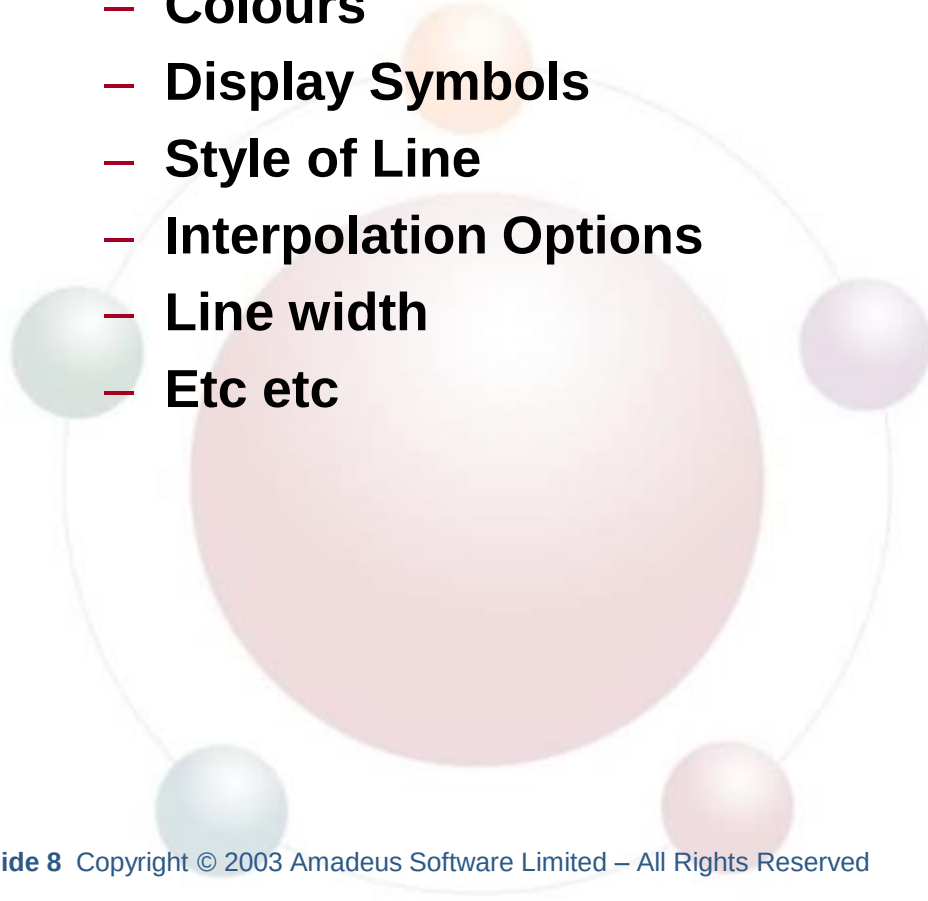
Symbol Statements





Symbol Statements

- **Available attributes:**
 - Colours
 - Display Symbols
 - Style of Line
 - Interpolation Options
 - Line width
 - Etc etc





Pattern Statements

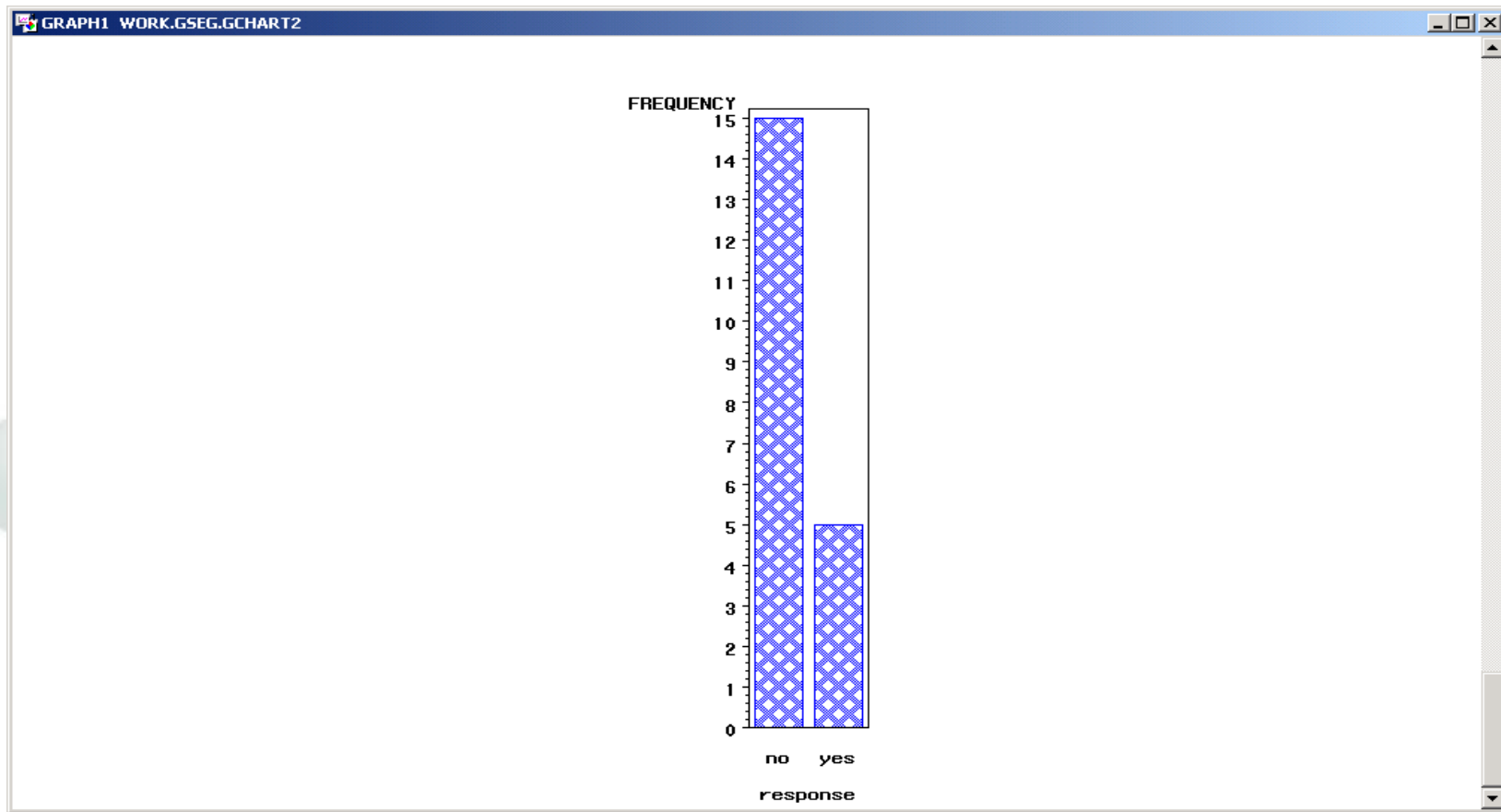
- Additional statements to alter the default patterns applied to graphics

```
pattern.sas

1pattern1 c=blue v=x4;
2proc gchart data=views.response ;
3  vbar response / discrete ;
4run;
5quit;
```



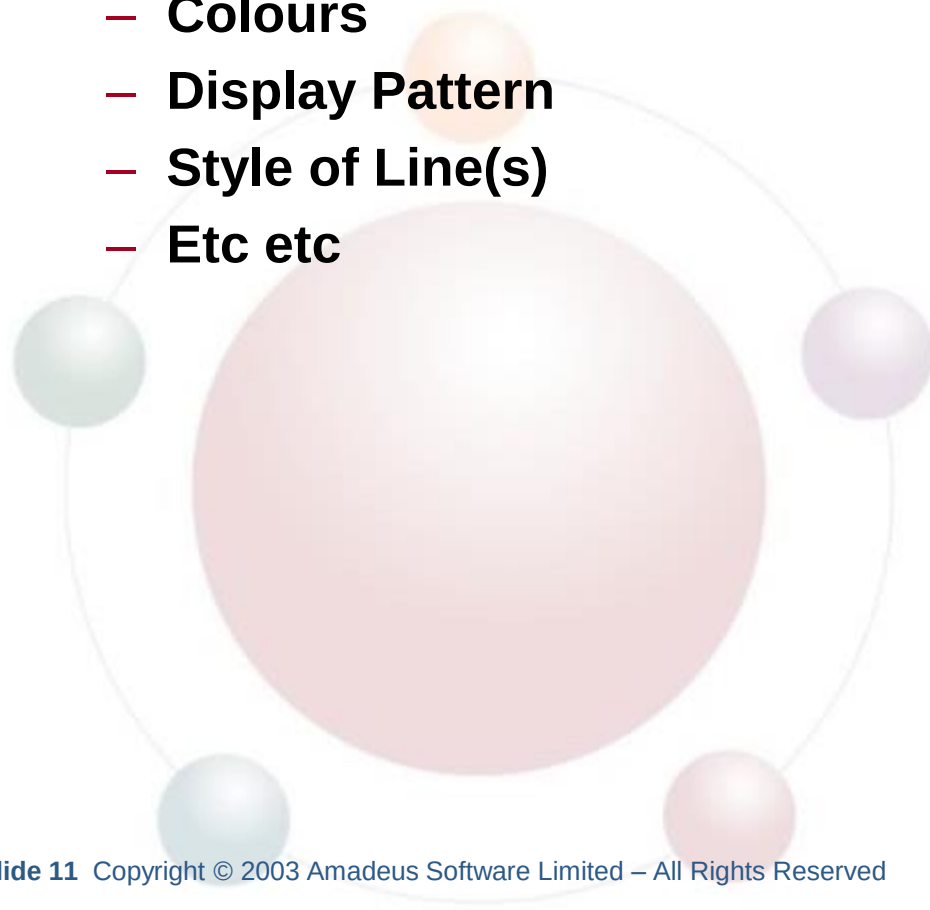
Pattern Statements





Pattern Statements

- **Available attributes:**
 - Colours
 - Display Pattern
 - Style of Line(s)
 - Etc etc





Axis Statements

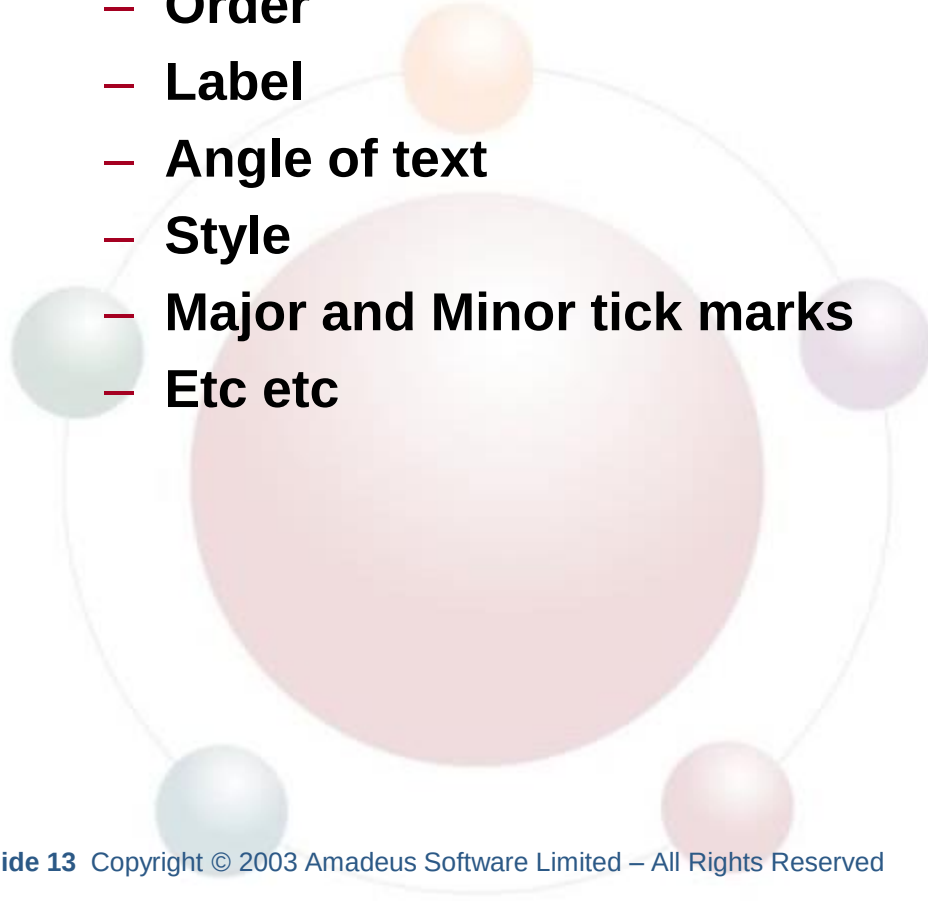
- Control the appearance of the axes

```
axis.sas
1 axis1 order=-10 to 50 by 10
2   label=(a=90 'Mean Change from Baseline');
3 axis2 order=0 to 4 by 0.5
4   label=(a=0 'Concentration (ng/ml)');
5
6 symbol1 c=blue v=diamond ;
7 symbol2 c=green v=triangle;
8 proc gplot data=views.plot ;
9   plot change*conc=day / vaxis=axis1 haxis=axis2;
10 run;
11 quit;
```



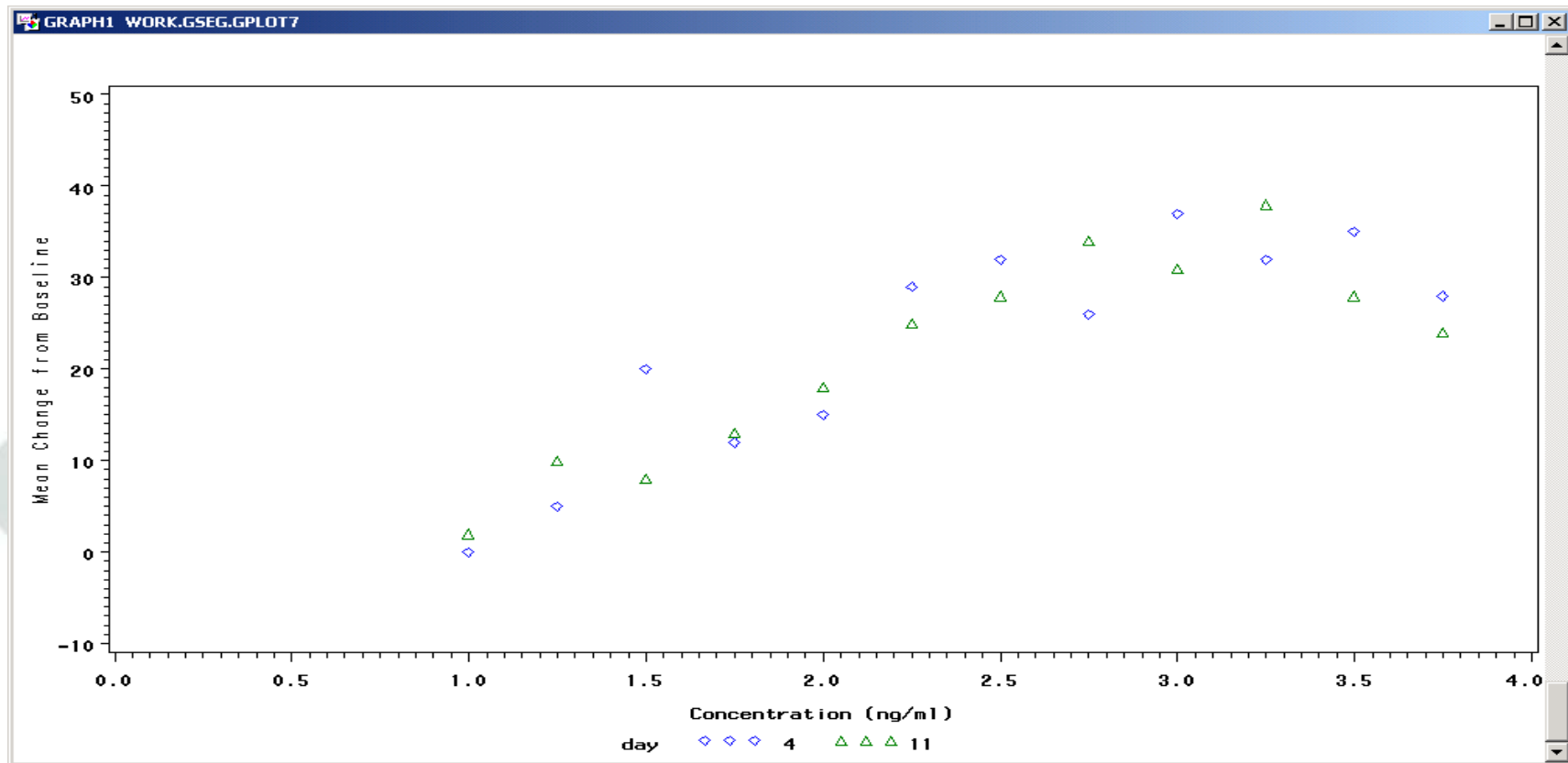
Axis Statements

- **Available Attributes:**
 - Order
 - Label
 - Angle of text
 - Style
 - Major and Minor tick marks
 - Etc etc





Axis Statements





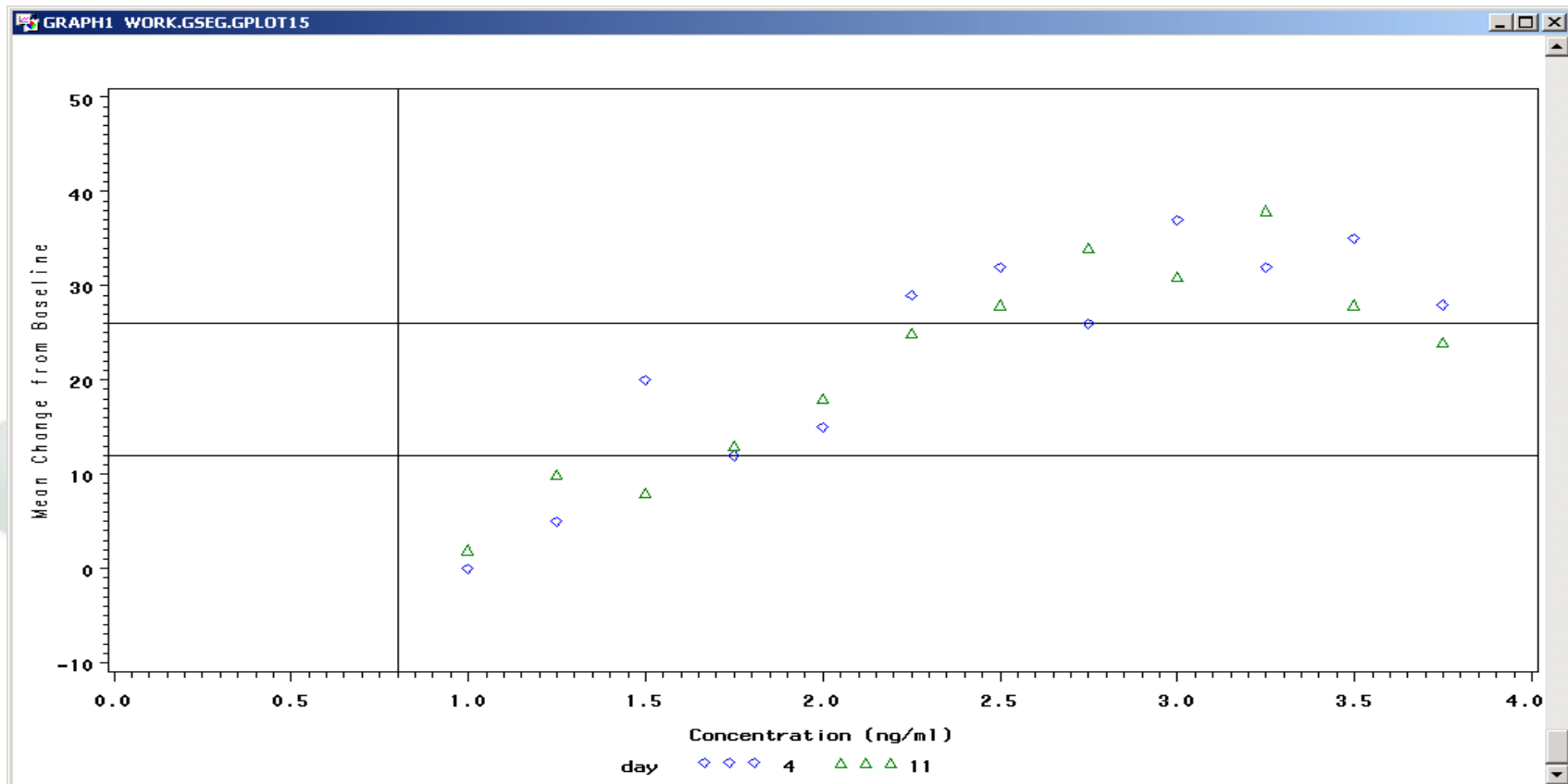
Reference Lines

- Lines to bring attention to specific areas within the graphic

```
reference lines.sas
1 axis1 order=-10 to 50 by 10
2   label=(a=90 'Mean Change from Baseline');
3 axis2 order=0 to 4 by 0.5
4   label=(a=0 'Concentration (ng/ml)');
5
6 symbol1 c=blue v=diamond ;
7 symbol2 c=green v=triangle;
8 proc gplot data=views.plot ;
9   plot change*conc=day / vref=12 26 href=0.8 vaxis=axis1 haxis=axis2;
10 run;
11 quit;
```



Reference Lines





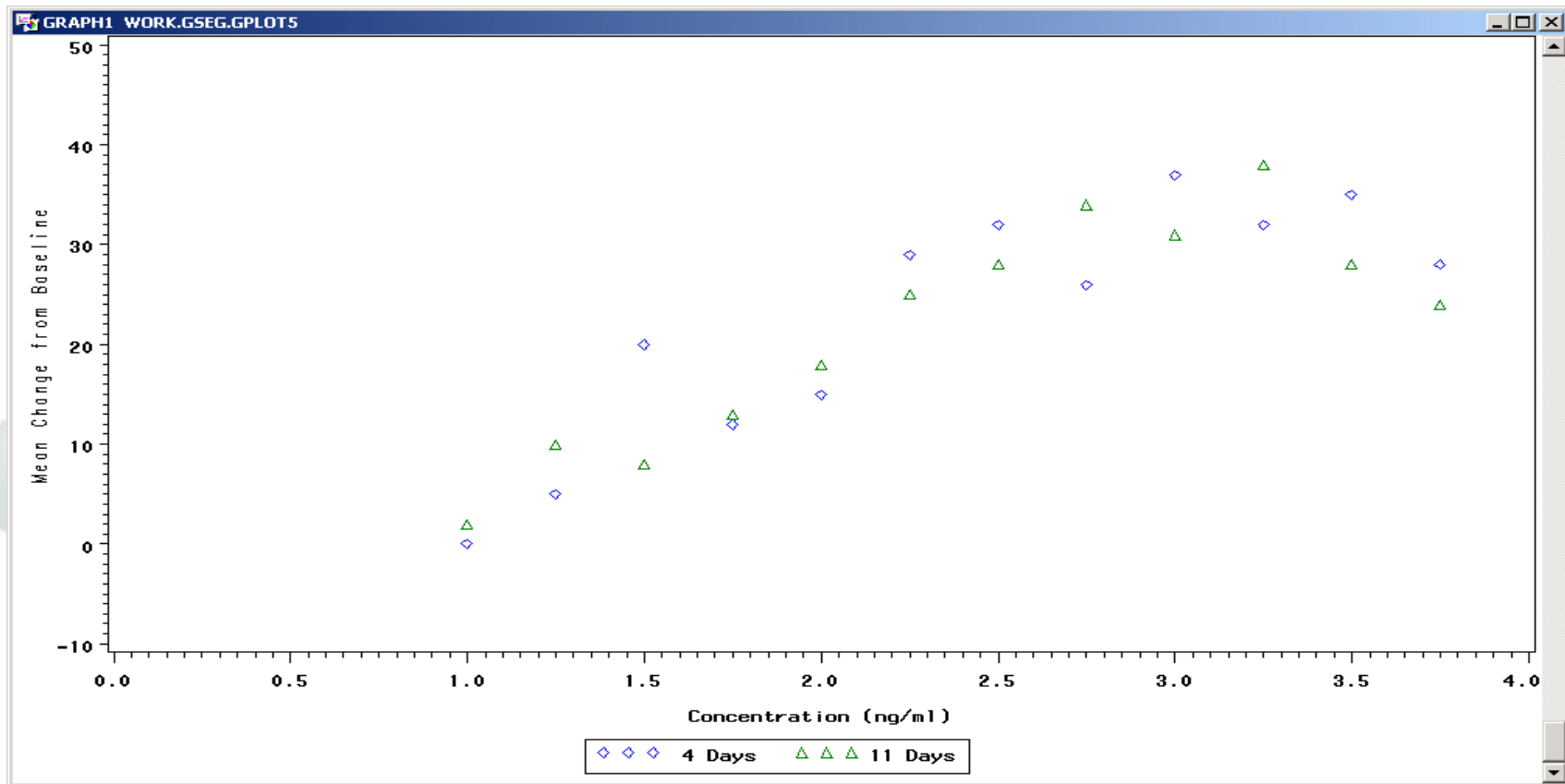
Legends

- **Altering the default Legend that SAS/Graph provides with graphical output**

```
legends.sas
1 legend1 label=none
2       value=(t=1 '4 Days' t=2 '11 Days') frame ;
3 proc gplot data=views.plot ;
4   plot change*conc=day / vaxis=axis1 haxis=axis2 legend=legend1;
5 run;
6 quit;
```



Legends





Graphic Devices

- **Methods to display the graphical information in different formats**
- **Formats are split into:**
 - **Screen**
 - **Printer**
 - **Output File**
- **Proc GDEVICE for all options**

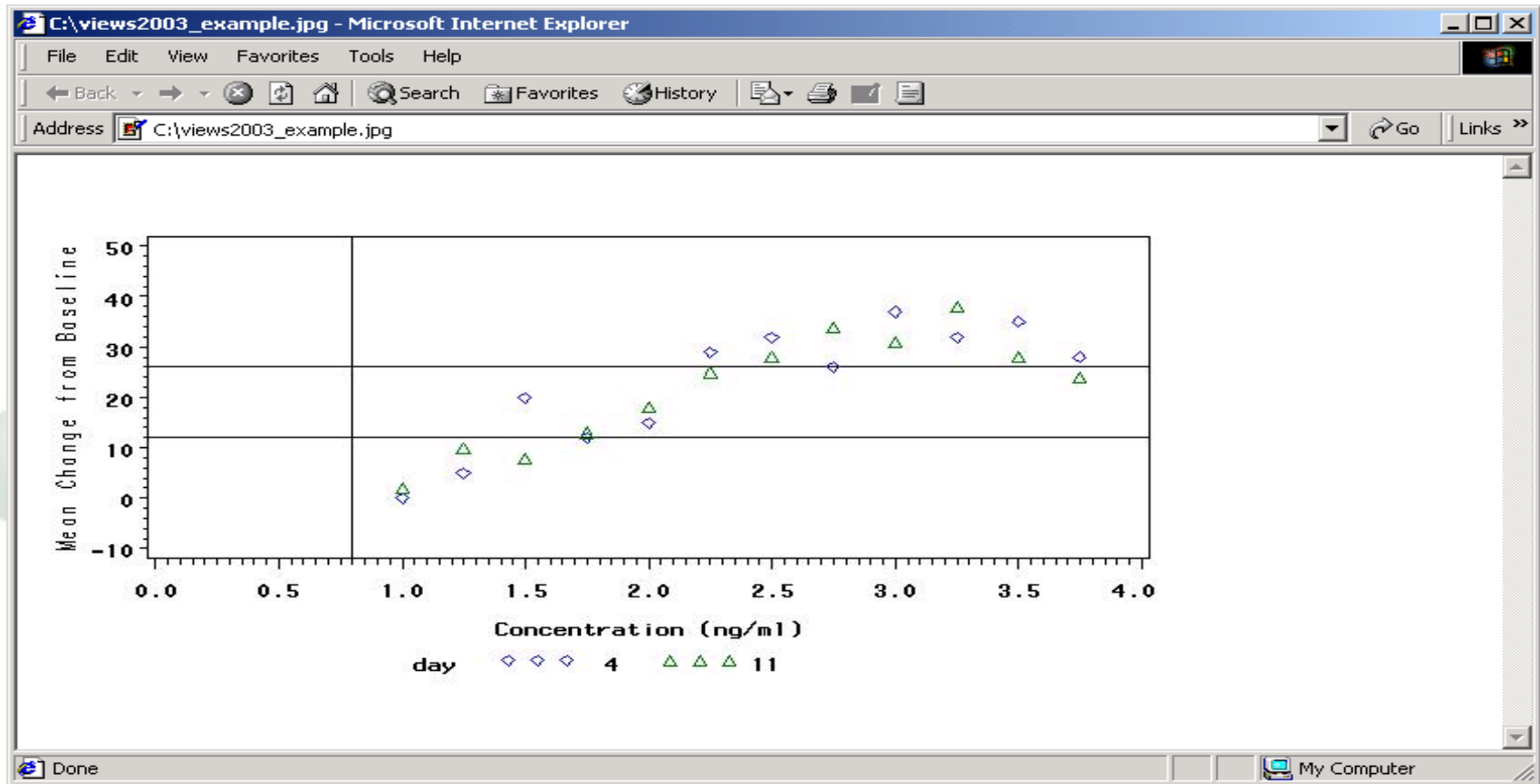


Graphic Devices

```
devices.sas
1 filename outfile 'c:\views2003_example.jpg';
2 goptions device=imgjpeg gsfname=outfile;
3
4 axis1 order=-10 to 50 by 10
5     label=(a=90 'Mean Change from Baseline');
6 axis2 order=0 to 4 by 0.5
7     label=(a=0 'Concentration (ng/ml)');
8
9 symbol1 c=blue v=diamond ;
10 symbol2 c=green v=triangle;
11 proc gplot data=views.plot ;
12     plot change*conc=day / vref=12 26 href=0.8 vaxis=axis1 haxis=axis2;
13 run;
14 quit;
```



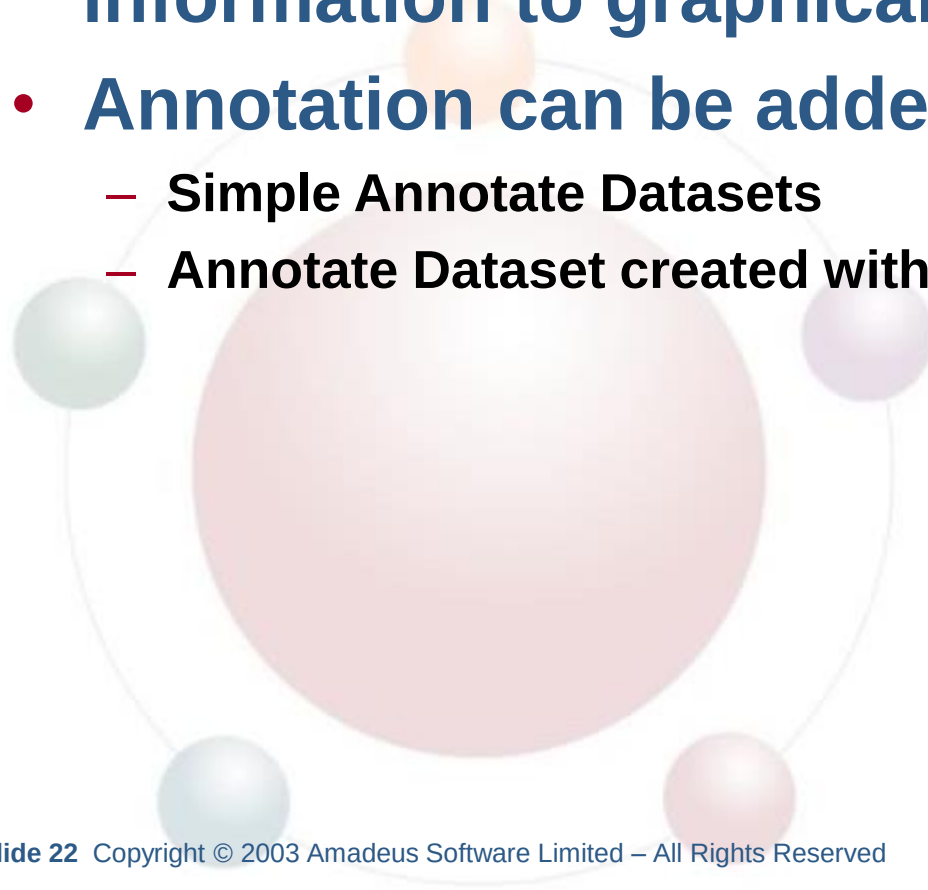
Graphic Devices





Annotating Graphics

- **Annotation allows programmers to add information to graphical output**
- **Annotation can be added via:**
 - **Simple Annotate Datasets**
 - **Annotate Dataset created with SAS provided Annotate macros**





Annotating Graphics

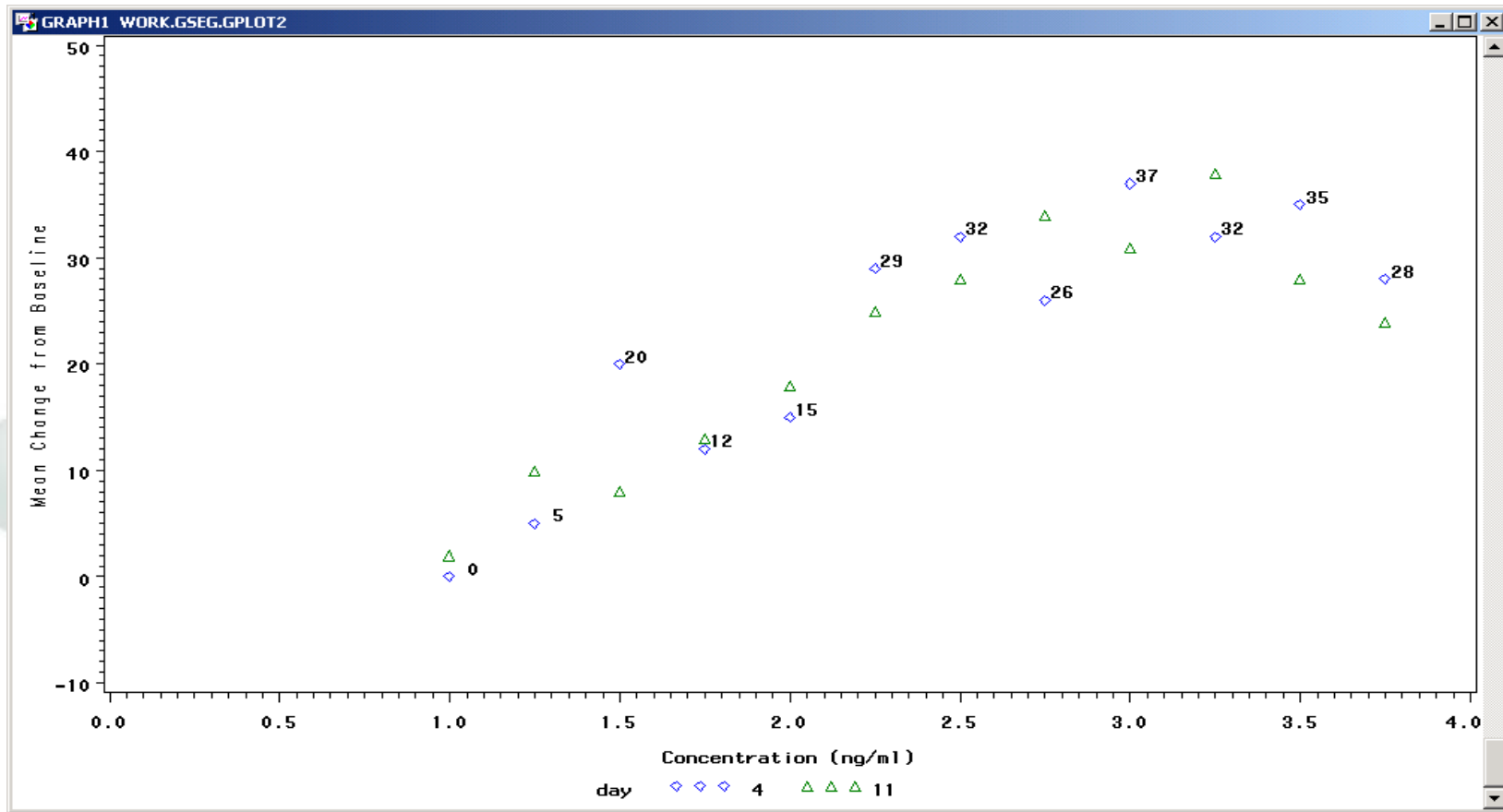
- Dataset

```
annotat1.sas

1 data anno_ds ;
2   set views.plot (rename=(conc=x change=y)
3                   where=(day=4)) ;
4   retain xsys '2' ysys '2' ;
5   text=put(y,$5.) ;
6   y=y+1;
7 run;
8
9 proc gplot data=views.plot anno=anno_ds;
10  plot change*conc=day / vaxis=axis1 haxis=axis2;
11 run;
12 quit;
```



Annotating Graphics





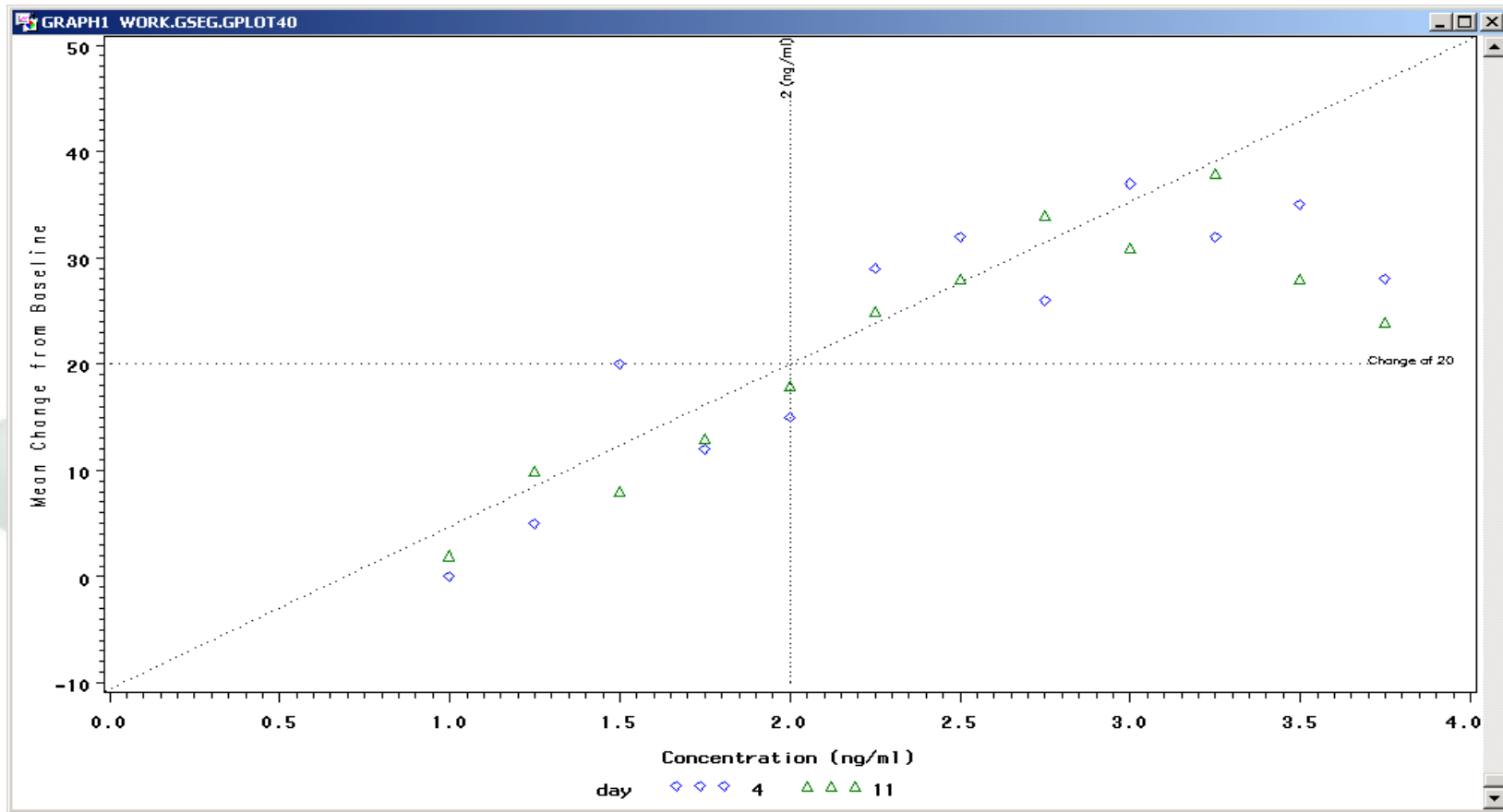
Annotating Graphics

- Macros

```
annotate2.sas
1 %annomac;
2 data anno_ds ;
3   %system(1,1,1);
4   %line(0,0,100,100,black,33,0.1); * Diagonal Line ;
5   %system(2,2,1);
6   %label(3.7,20,'Change of 20',black,0,0,2,simplex,C);
7   %line(0,20,3.7,20,black,33,0.1); * Diagonal Line ;
8   %system(2,2,1);
9   %label(2,45,'2 (ng/ml)',black,90,0,2,simplex,C);
10  %line(2,-10,2,45,black,33,0.1); * Diagonal Line ;
11 run;
12
13 proc gplot data=views.plot anno=anno_ds;
14   plot change*conc=day / vaxis=axis1 haxis=axis2;
15 run;
16 quit;
```



Annotating Graphics





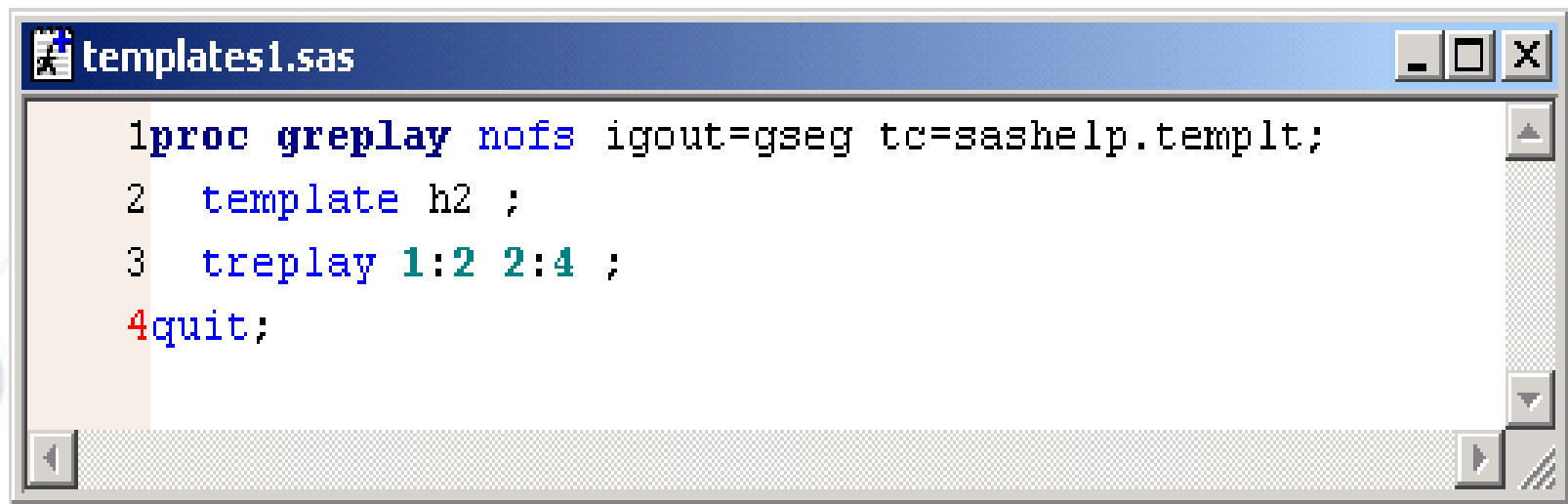
Templates

- **Allow the programmer to use pre-defined templates when producing graphical information**
- **SAS defined**
 - `sashelp.templt`
- **User defined**
 - `proc greplay`



Templates

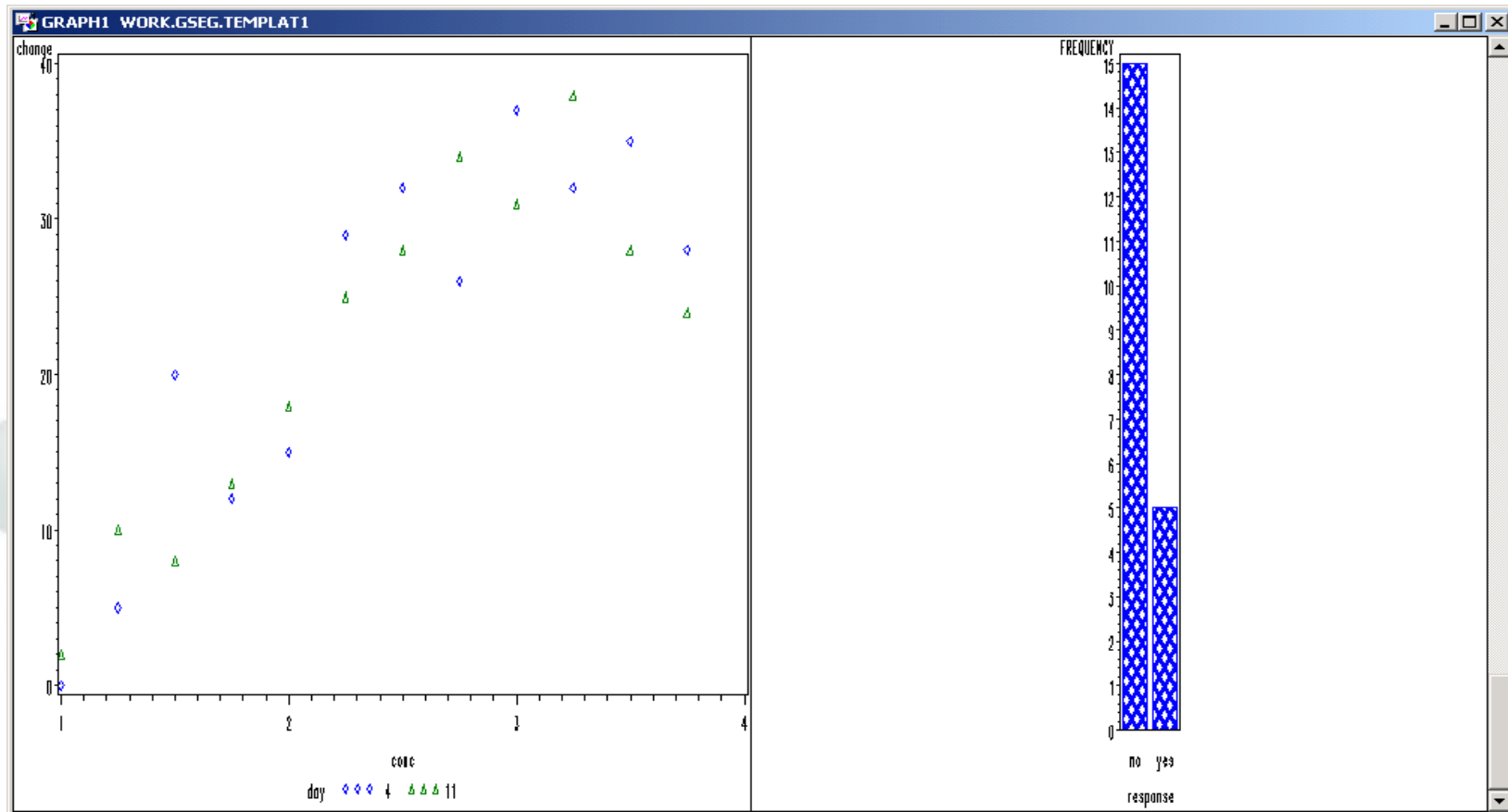
- SAS defined



```
1proc greplay nofs igout=gseg tc=sashelp.templt;  
2  template h2 ;  
3  treplay 1:2 2:4 ;  
4quit;
```



Templates





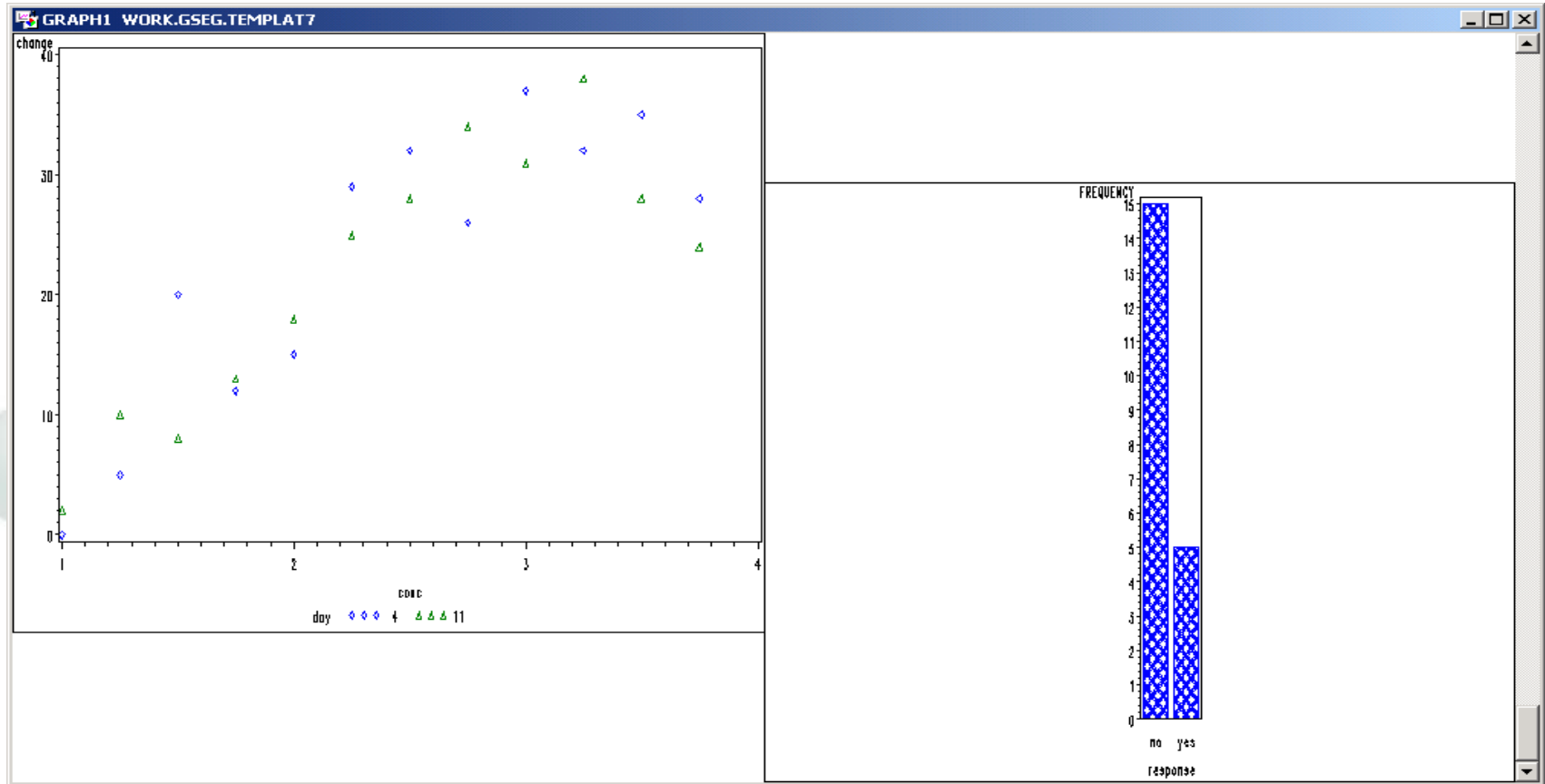
Templates

- User Defined

```
templates2.sas
1 proc greplay nofs igout=gseg tc=views.temps ;
2   tdef t1_br
3     1/ llx=0 lly=20
4       ulx=0 uly=100
5       urx=50 ury=100
6       lrx=50 lry=20
7       color=black;
8   tdef t1_br
9     2/ llx=50 lly=0
10      ulx=50 uly=80
11      urx=100 ury=80
12      lrx=100 lry=0
13      color=black;
14   template t1_br ;
15   treplay 1:2 2:4 ;
16 run;
17 quit;
```



Templates

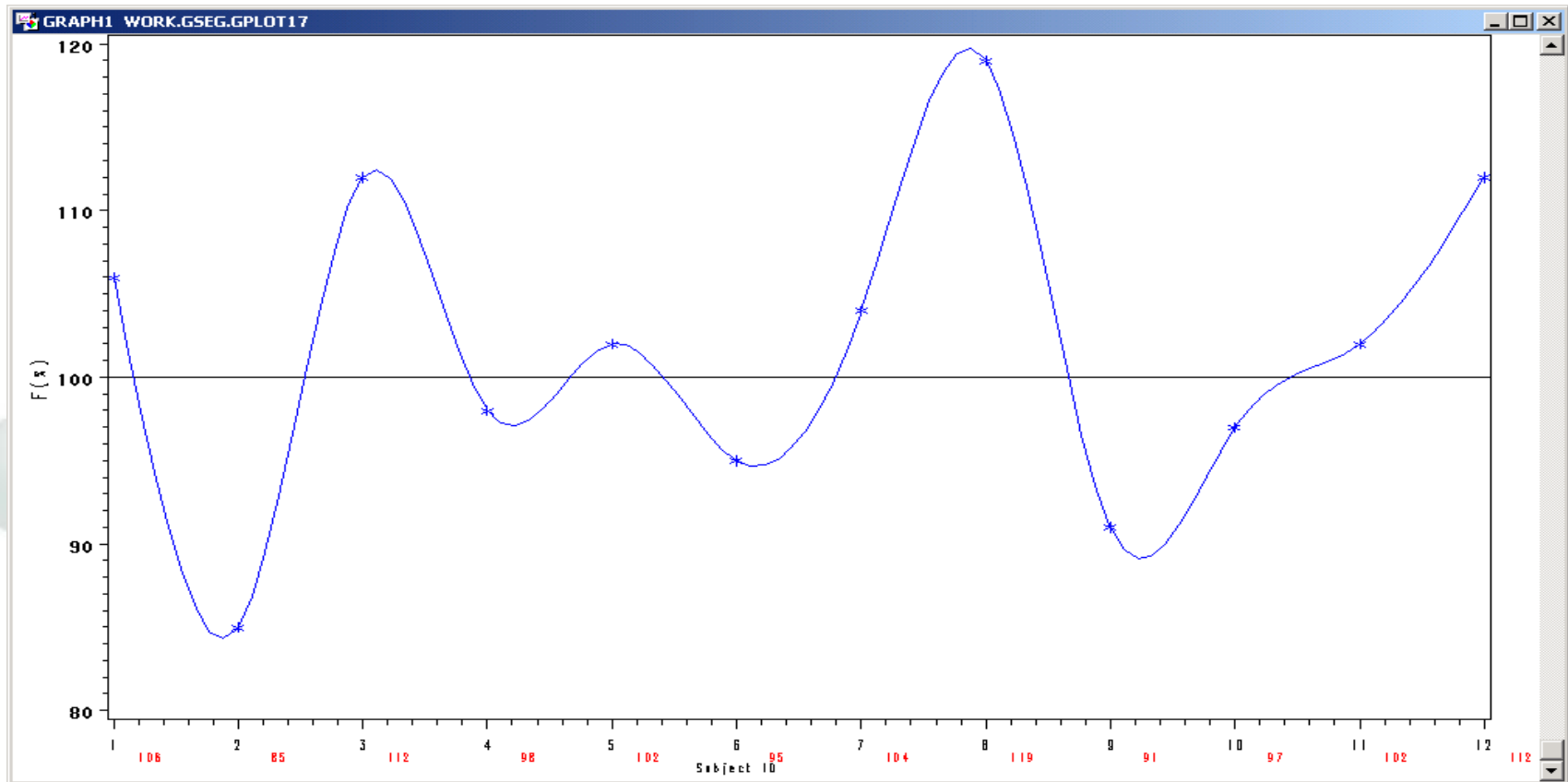


Example - Code

```
many options.sas
1 data _null_;
2   set views.ref ;
3   call symput ('resp'!!put(_n_,z2.),response);
4 run;
5
6 axis1 order=80 to 120 by 10
7       label=(a=90 'F(%)');
8
9 axis2 label=none order=1 to 12 by 1
10      value=(h=0.75
11             t=1 '1' h=0.65 j=c c=red "&resp01"
12             t=2 '2' h=0.65 j=c c=red "&resp02"
13             t=3 '3' h=0.65 j=c c=red "&resp03"
14             t=4 '4' h=0.65 j=c c=red "&resp04"
15             t=5 '5' h=0.65 j=c c=red "&resp05"
16             t=6 '6' h=0.65 j=c c=red "&resp06" c=black j=c "Subject ID"
17             t=7 '7' h=0.65 j=c c=red "&resp07"
18             t=8 '8' h=0.65 j=c c=red "&resp08"
19             t=9 '9' h=0.65 j=c c=red "&resp09"
20             t=10 '10' h=0.65 j=c c=red "&resp10"
21             t=11 '11' h=0.65 j=c c=red "&resp11"
22             t=12 '12' h=0.65 j=c c=red "&resp12");
23
24 symbol1 v=star color=blue i=smooth;
25
26 proc gplot data=views.ref ;
27   plot response*subjid/vref=100 vaxis=axis1 haxis=axis2;
28 run;
29 quit;
```



Example - Output





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- **Any Questions:**

