Introduction to SAS ODS Graphics Designer

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Overview

- Features of ODS Graphics Designer
- Accessing ODS Graphics Designer
- How to Build a Simple Graph
- How to Build a Multi-Cell Graph
- How to View the GTL Code
- Building Complex Graphic Templates in GTL

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ODS Graphics Designer

- Drag & drop, point & click version of graphics
  - Wide array of plot types
  - Produces sophisticated graphs
- ODS Graphics Designer writes the code for you
  - Save template for re-use
  - Can save graphic as image file
  - Can customize appearance to meet publication standards

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Structural Anatomy of Graphs

1. Graph
2. Cell
3. Title
4. Plot
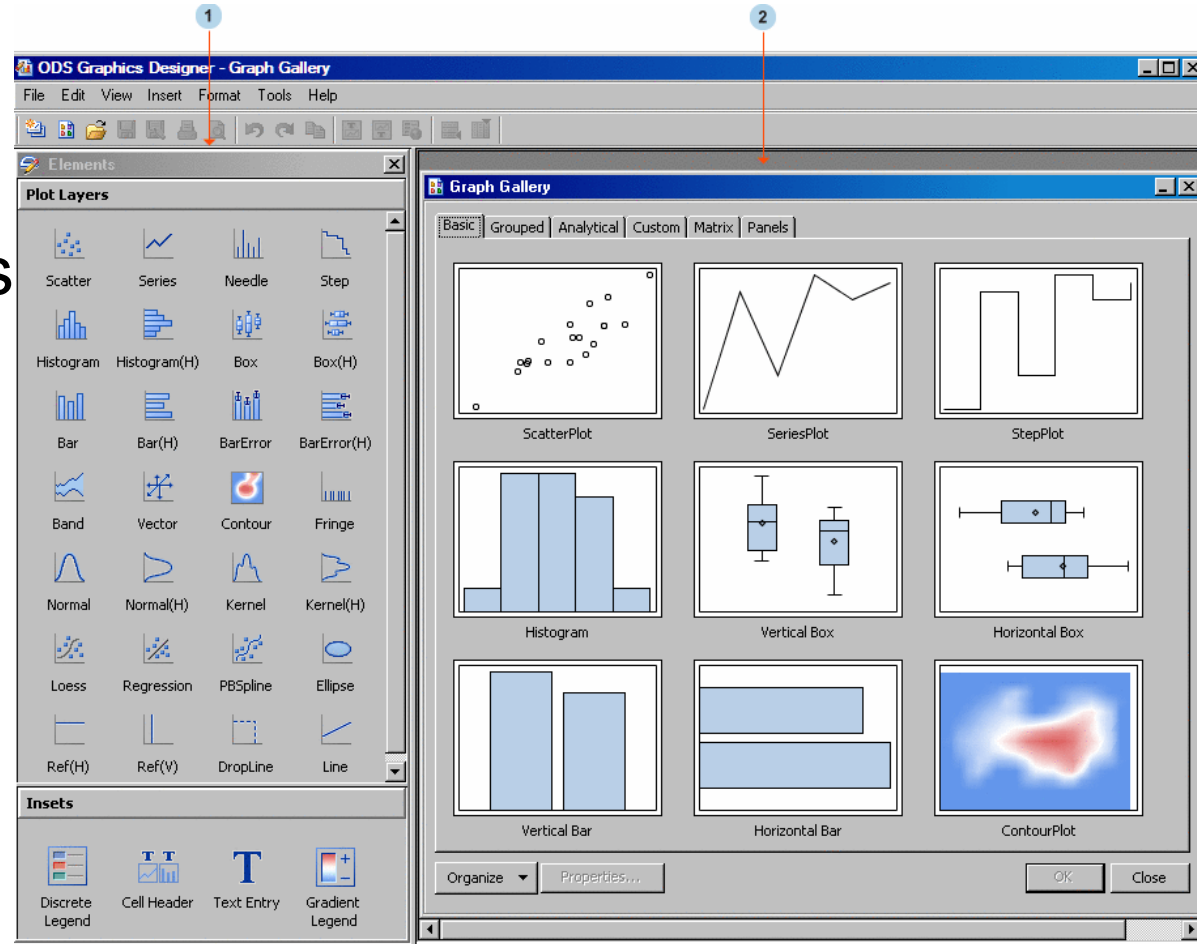5. Legend
6. Axis
7. Footnote
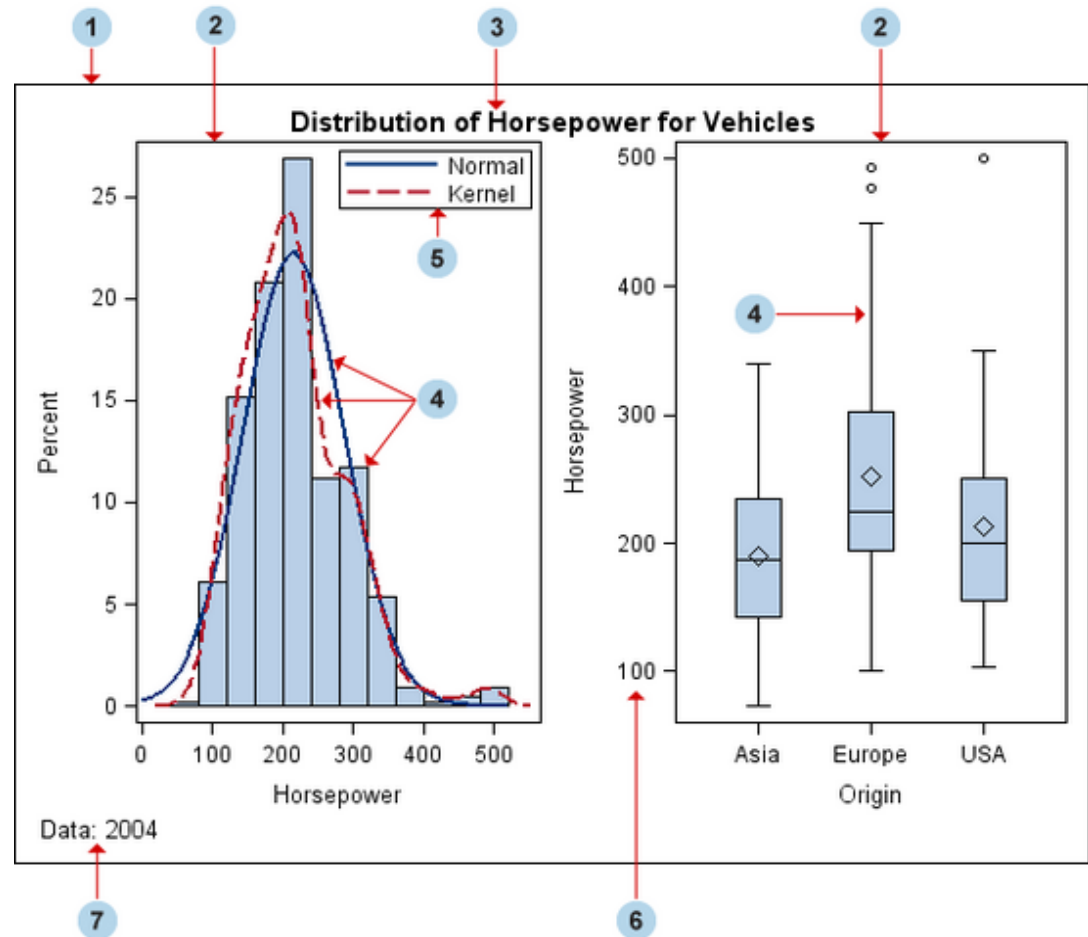
Accessing ODS Graphics Designer

- Method 1:
  - Open SAS
  - Tools\ODS Graphics Designer
- Method 2:
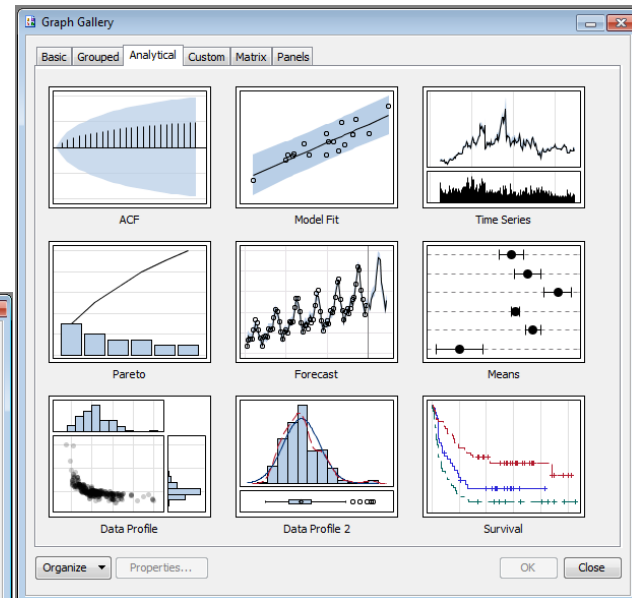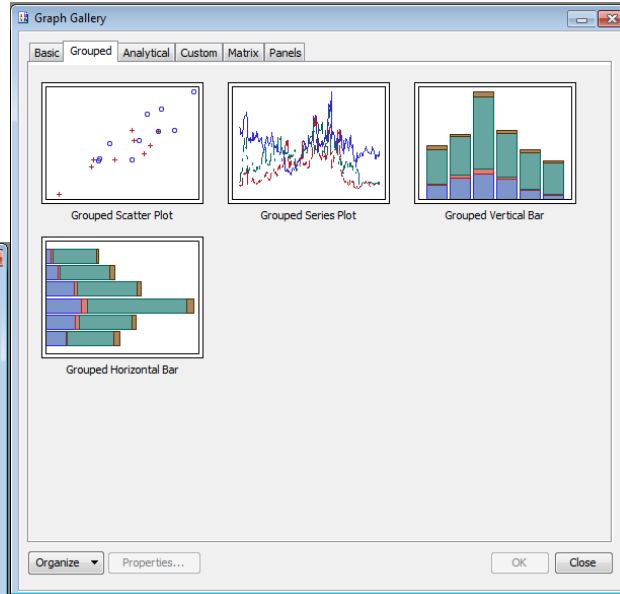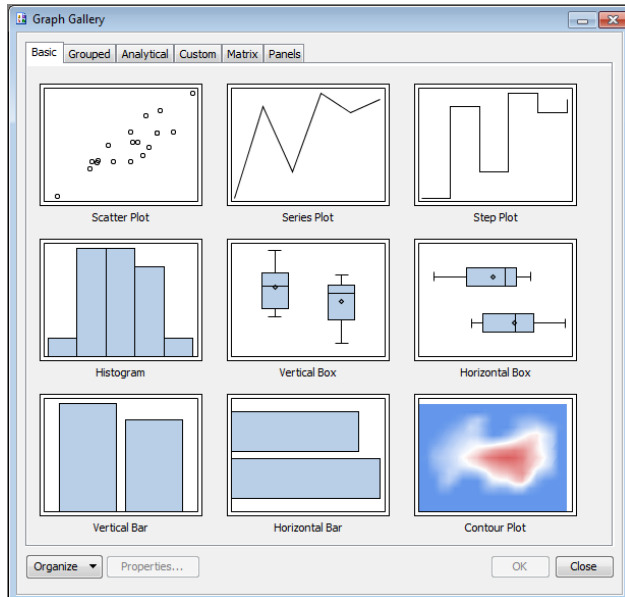 - Type %sgdesign; in the SAS Editor and run

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User Interface

1. **Element Panel:** Contains plot layers and insets Click & drag to the graph area

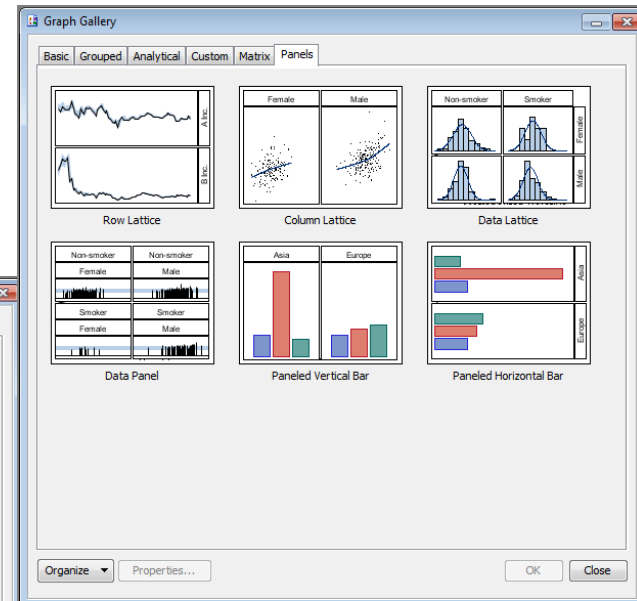2. **Graph Gallery:** Contains graphs you design
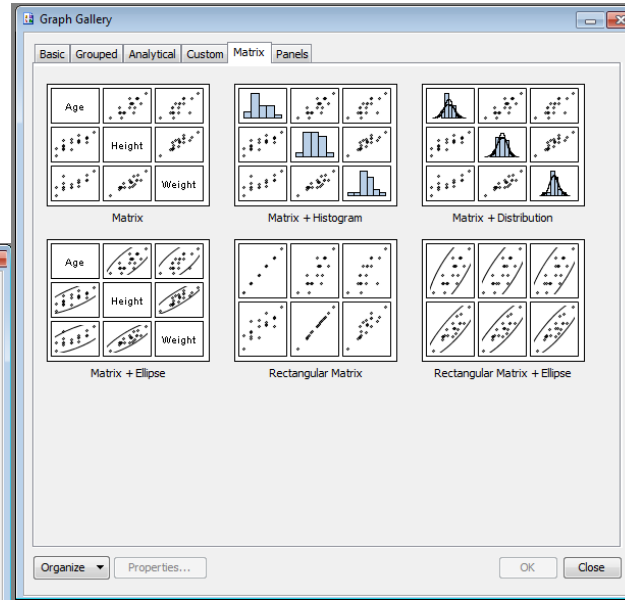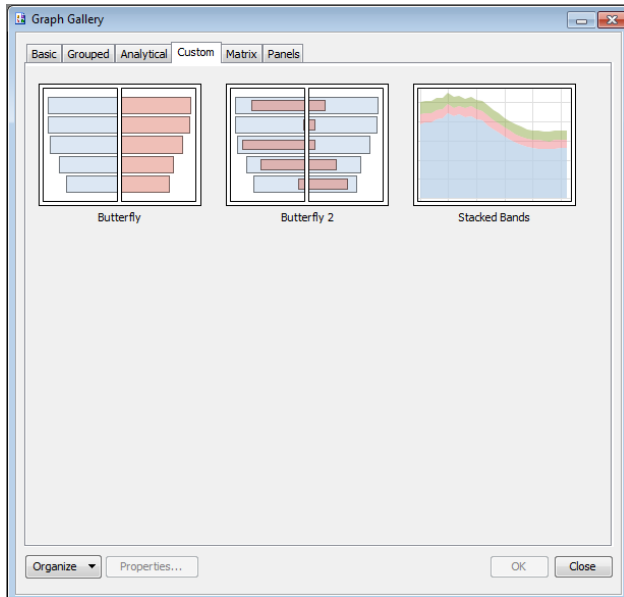

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Graph Gallery

- Basic
- Grouped
- Analytical

Graph Gallery
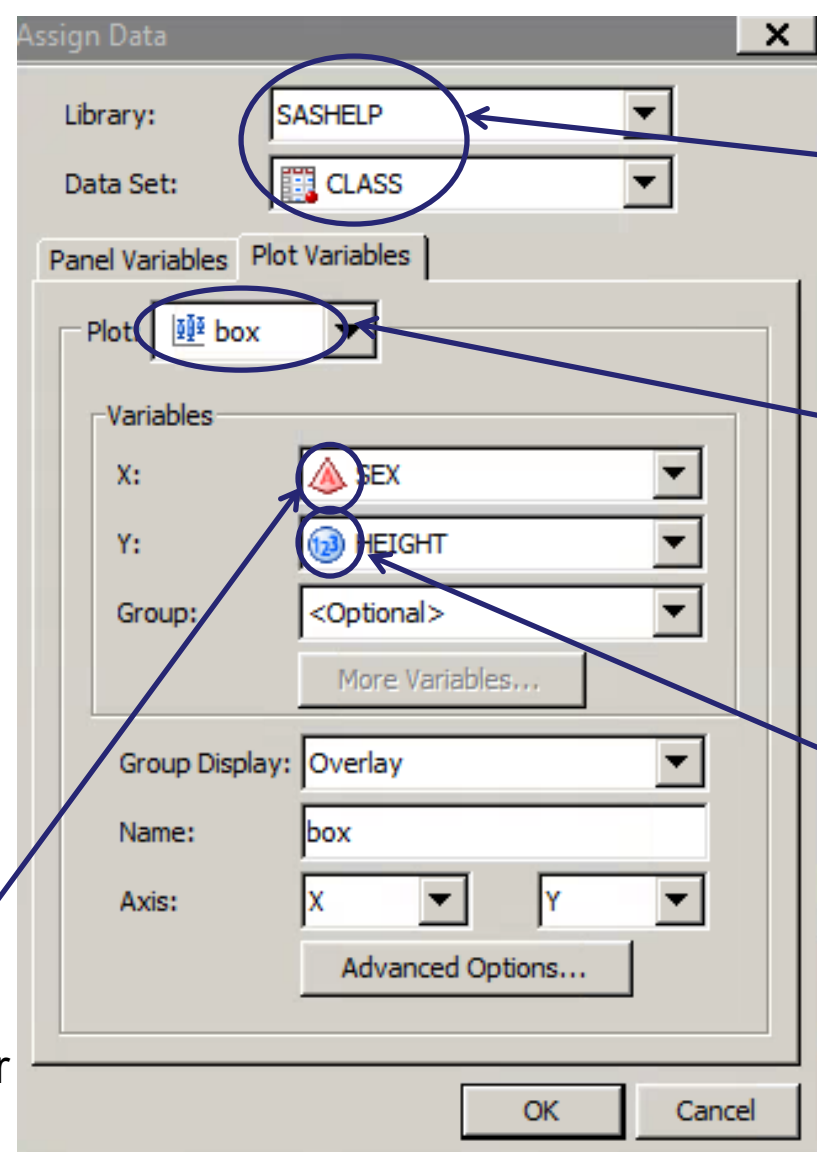
- Custom
- Matrix
- Panels

How to Build a Simple Graph

Step 1. After select graph type, Assign Data dialog box opens

Step 2. Select data, plot, and variables via drop-downs

Identify Dataset

Identify Plot Type

Numeric Variable

Character Variable

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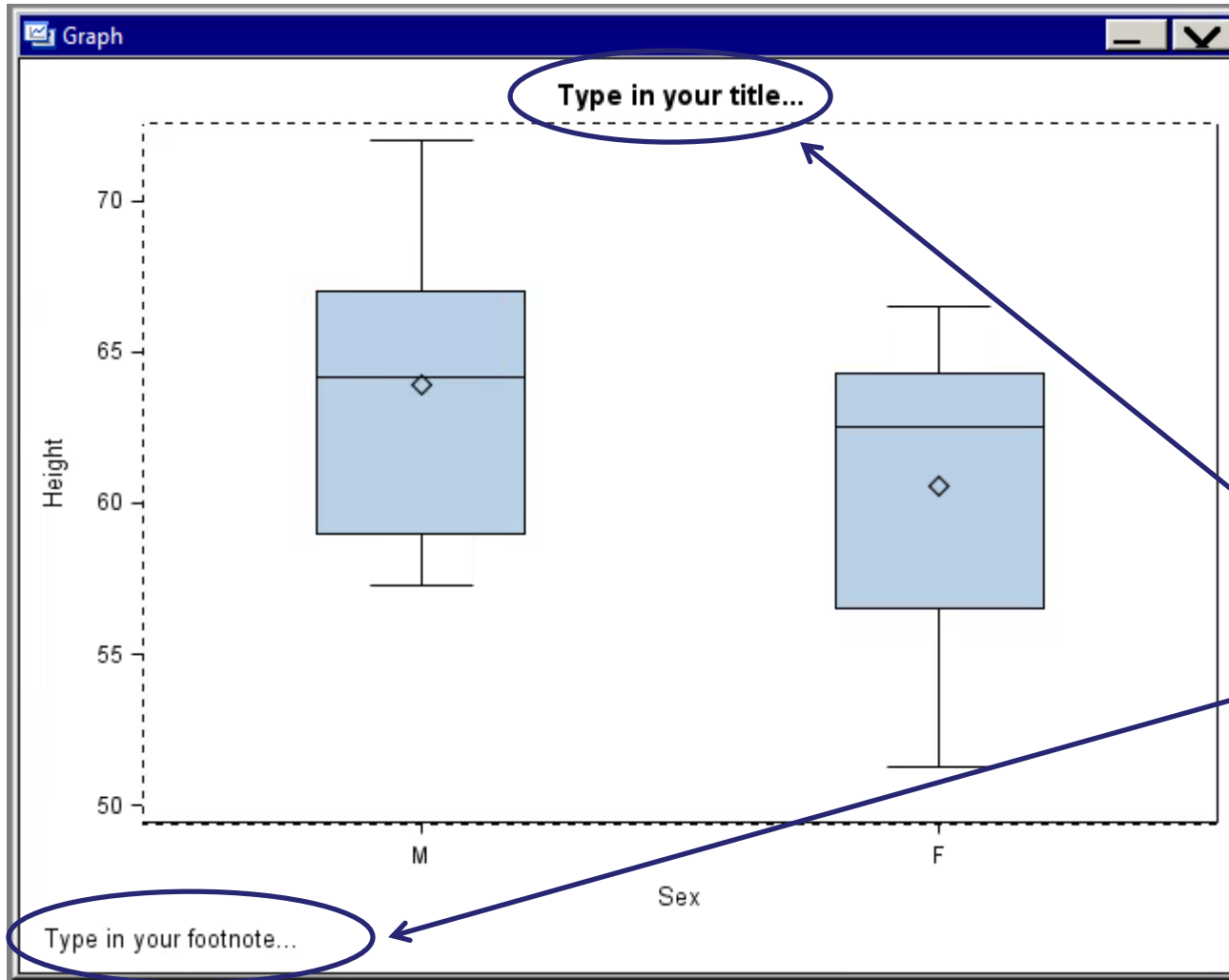
Boxplot of Height by Sex

Can change these defaults by double clicking on the text

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Add a Plot
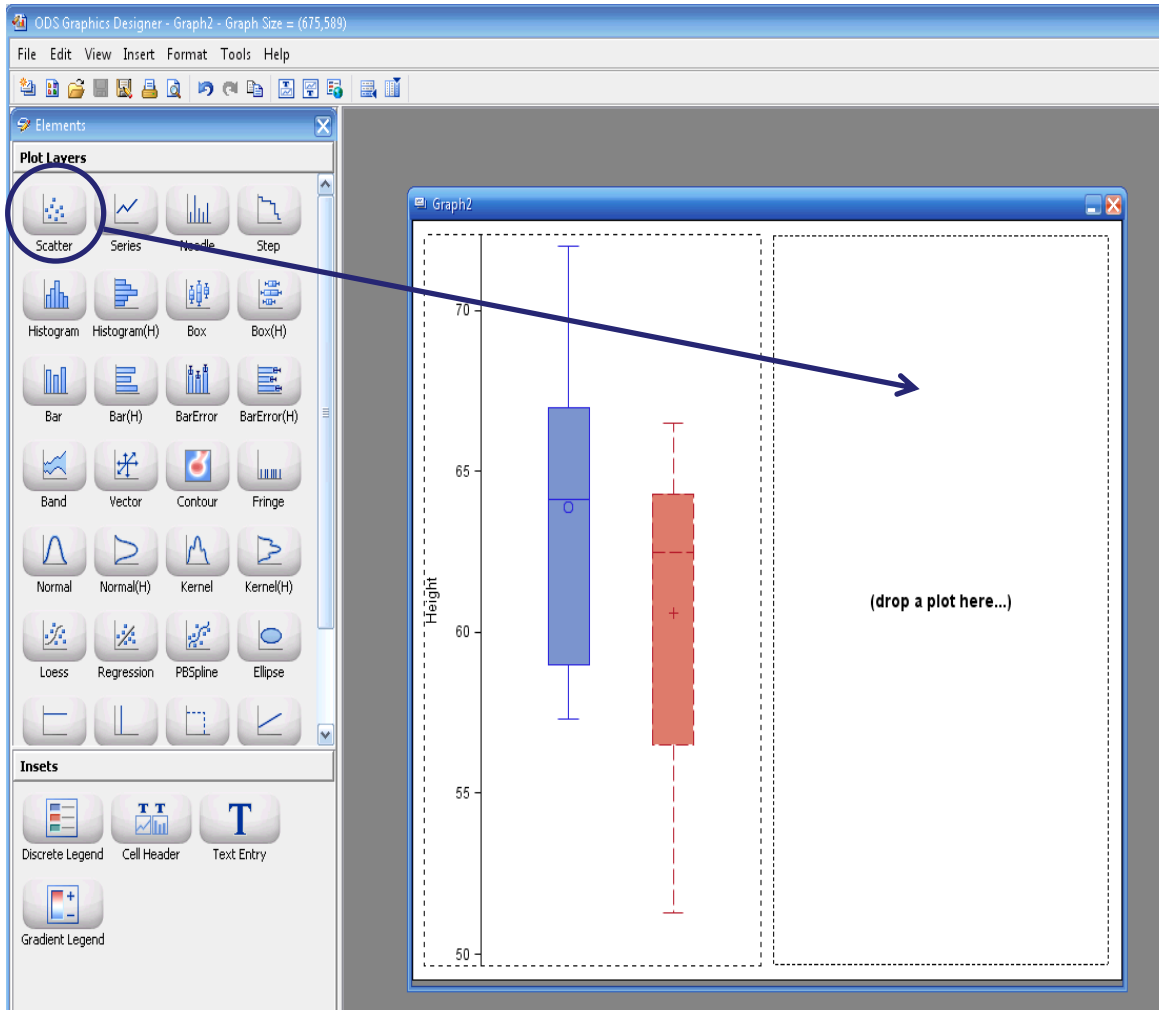
- Right-mouse click on chart and select Add Column

- Can also choose Add Row

- Drag and Drop the desired chart type from the Plot Layers onto the new plot space

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Customize Appearance

Select component & right-mouse click.

- Includes axis labels, chart title, footnotes, etc.

- If applicable, may select common row/column axis for multiple charts

- You can change properties including line thickness, markers, colors, etc.
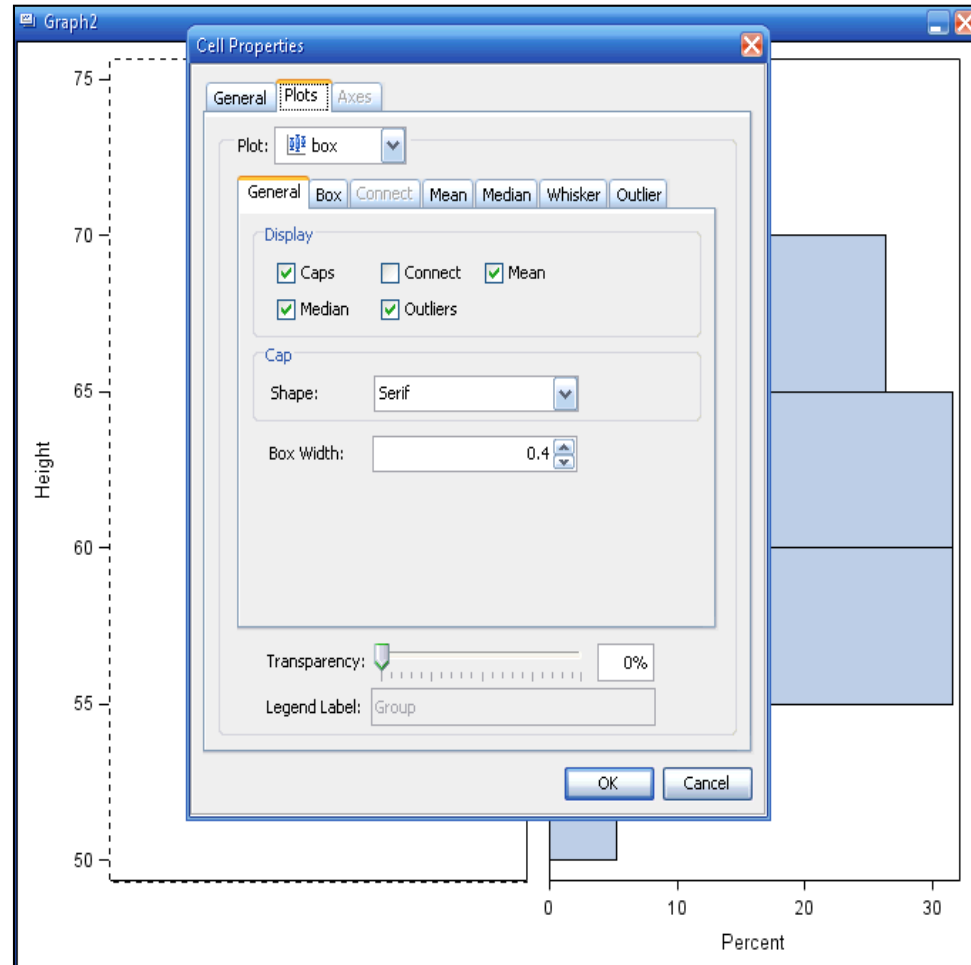
Label/Axis Changes

The Axis tab allows you to change color, font type, and font size for axes and labels.

- Each axis has to be changed individually
- Note: Font Size is in unit points
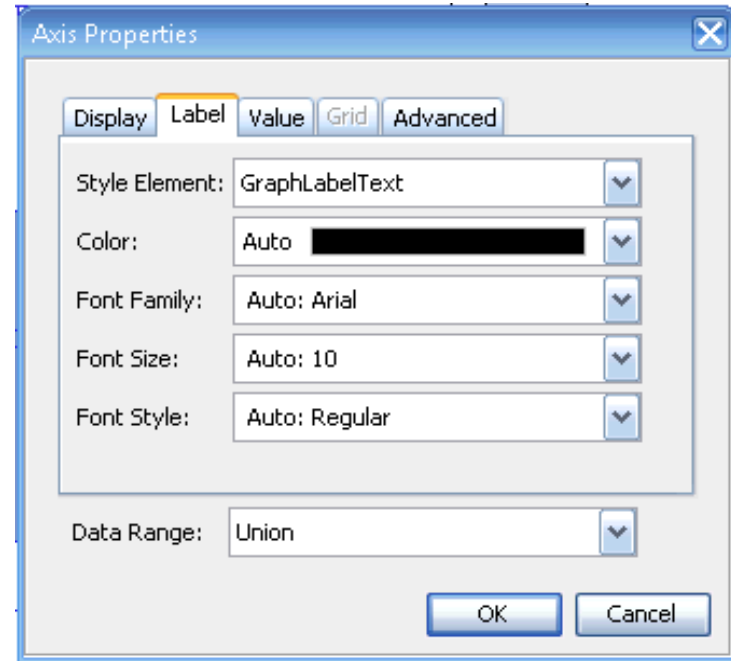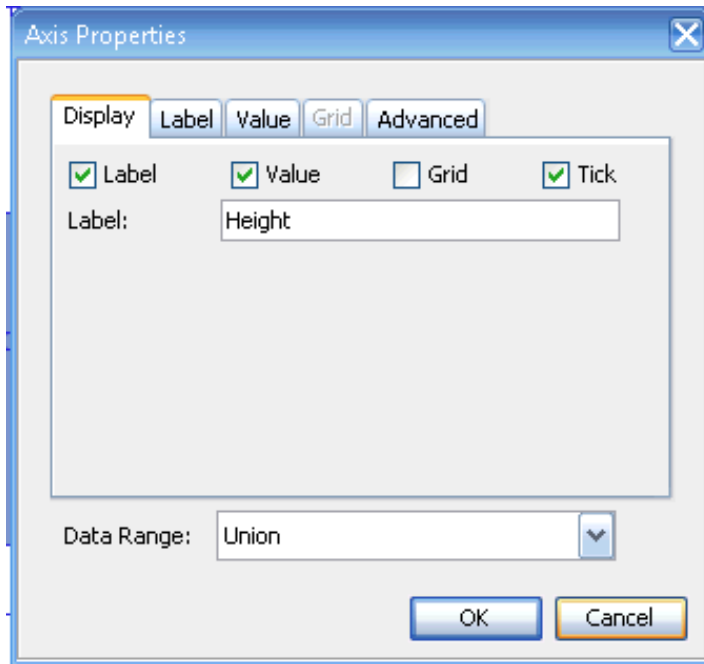
Add a Legend

Simply drag & drop the preferred type to the appropriate chart
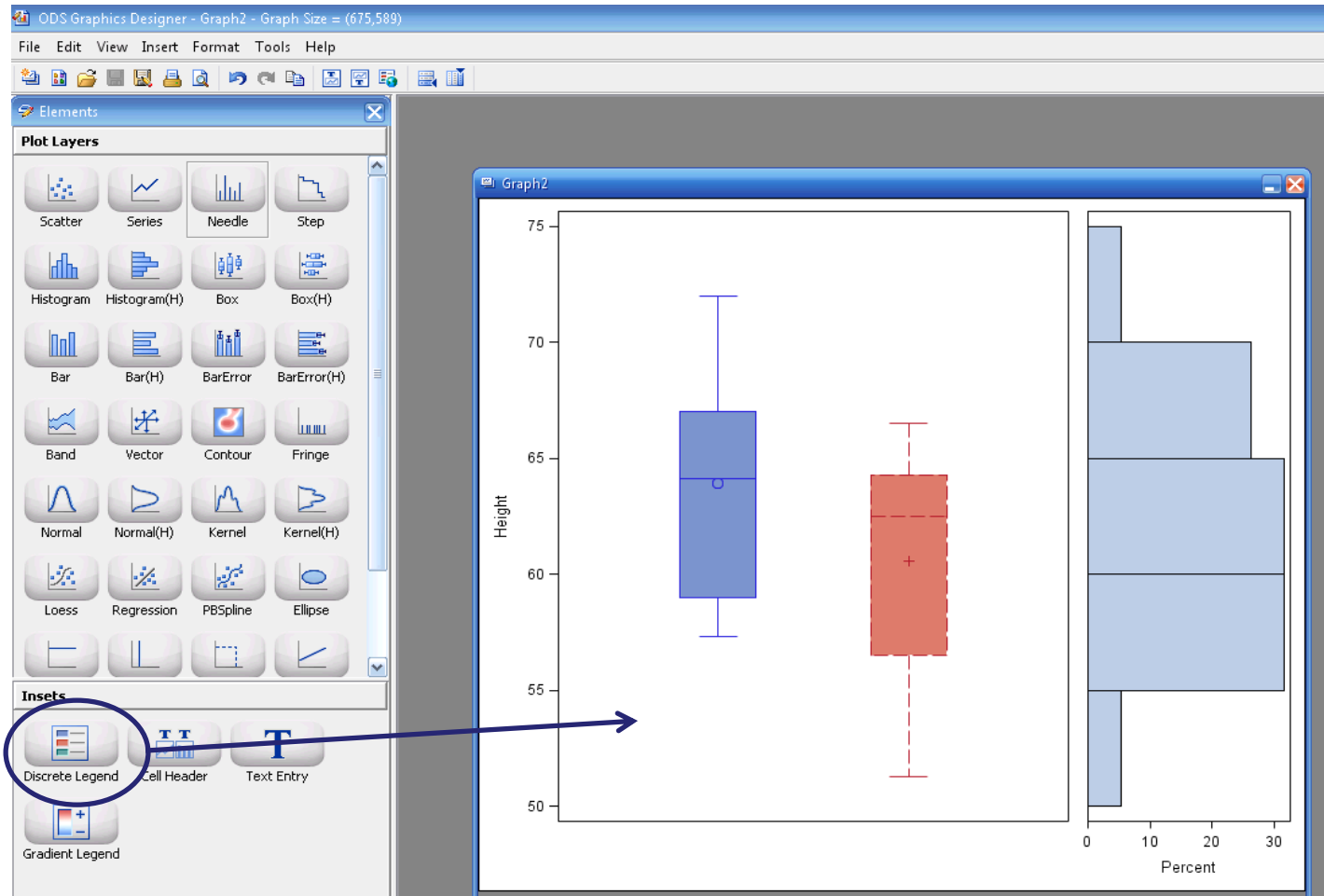
View GTL Code

- From the View Tab – Select Code

- Opens a copy of the graphic template language (GTL) utilized to create the plot

Building Complex Graphic Templates in GTL

- Creating a graph with the Graphic Template Language (GTL) is a two-step process:
  - Step One: The TEMPLATE procedure
    - Defines the structure of the graphic
    - How the template is compiled and saved
    - Does not create the graph by itself
  - Step Two: The SGRENDER procedure
    - Where the data is defined
    - Creates the graph

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Graphic Template Language: Two Steps

Step #1

```
proc template;
   define statgraph template-name;
      begingraph / <options>;
         <gtl statements to define the graph>
      endgraph;
   end;
run;
```

Step #2

```
proc sgrender data=data-set-name
                  template=template-name;
run;
```

In proc template, the template is assigned a name which is called in proc sgrender
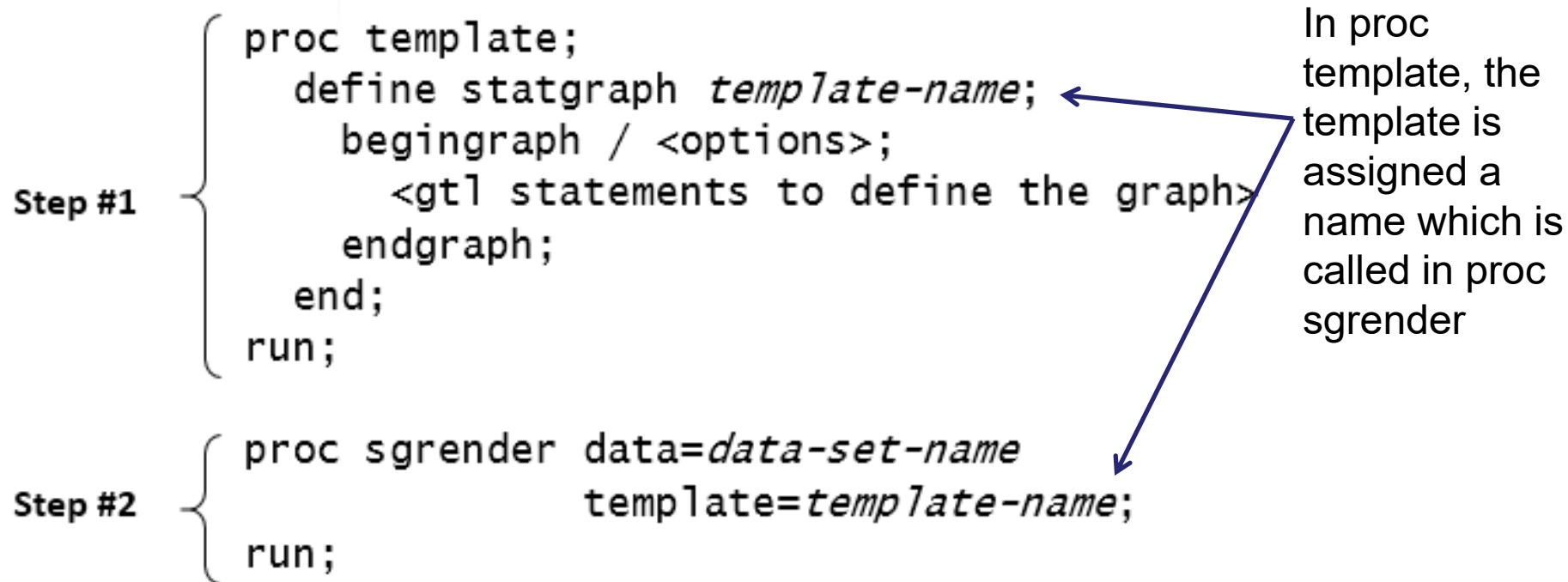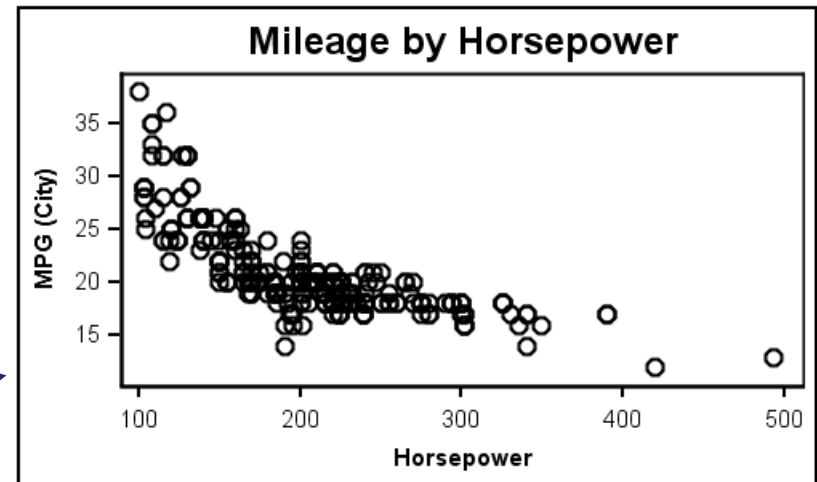
Simple Scatterplot Example

```
/*--Define the template--*/
proc template;
  define statgraph scatter;
    begingraph;
      entrytitle 'Mileage by Horsepower';
      layout overlay;
        scatterplot x=horsepower y=mpg_city;
      endlayout;
    endgraph;
  end;
run;

/*--Render the Graph--*/
proc sgrender data=sedans template=scatter;
run;
```

This code yields this simple scatterplot.

Most of this code is standard. The key component defining the plot is here.
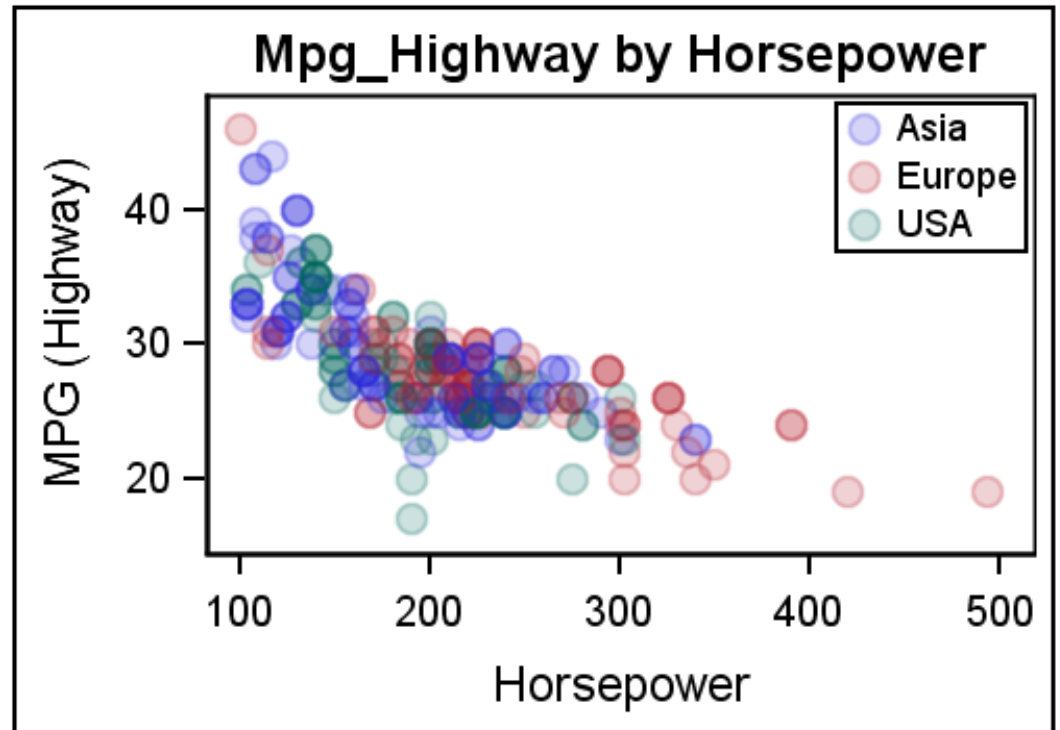
Note: The Layout overlay is the most basic container for single-cell plots.

Mileage by Horsepower

Complicated Scatterplot Example

In the ODS Graphic Designer, it is a simple task to add components to the scatterplot.

We can also use this code to demonstrate the use of GTL with dynamic features.

GTL with Dynamic Options

```
/*--Dynamic Scatter Plot--*/
proc template;
  define statgraph dyn_scatter;
    dynamic _x _y _grp _valign;
    begingraph;
      entrytitle _y ' by ' _x;
      layout overlay;
        scatterplot x=_x y=_y / group=_grp datatransparency=0.8
                name='a' markerattrs=(symbol=circlefilled size=10);
        if (exists(_grp))
          discretelegend 'a' / location=inside
              valign=_valign halign=right across=1;
        endif;
      endlayout;
    endgraph;
  end;
run;

proc sgrender data=sedans template=dyn_scatter;
dynamic _x='Horsepower' _y='Mpg_Highway' _grp='Origin' _valign='Top';
run;
```

Calling the dynamic feature makes the template more flexible.

The dynamic variables (note the underscore)

Defines use of a filled circle w/ 80% transparency

Defines location and alignment of the legend

Value of dynamic variables defined in SGRENDER.

Why Use Dynamics?

- Allows one to use same template to create multiple graphs
- Simply change variable definitions in SGRENDER
- Example:

  Horsepower by MSRP using Dynamics template
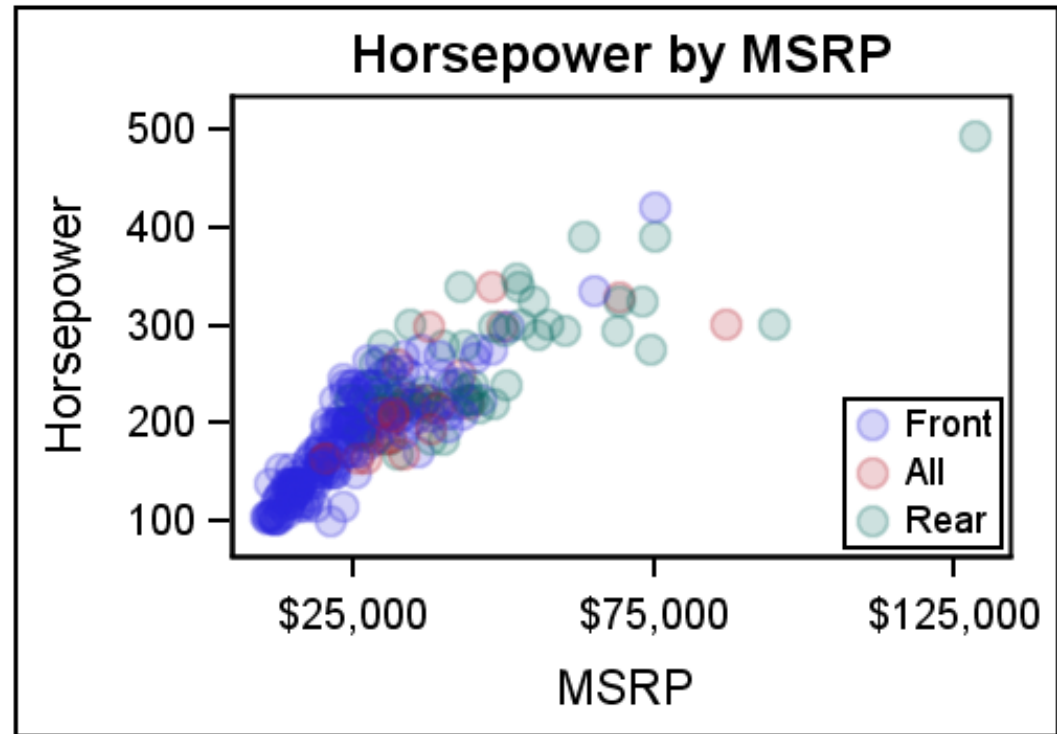

```
proc sgrender data=sedans template=dyn_scatter;
dynamic _x='MSRP' _y='Horsepower' _grp='Drivetrain' _valign='Bottom';
run;
```

Learn More

- **Documentation**

  SAS® 9.4 ODS Graphics Designer: User's Guide, Third Edition

  http://documentation.sas.com/api/docsets/grstatdesignug/9.4/content/grstatdesignug.pdf?locale=en

  SAS® 9.4 ODS Graphics: Getting Started with Business and Statistical Graphs

  https:/support.sas.com/documentation/cdl/en/grsggs/64979/PDF/default/grsggs.pdf

- **Papers**

  Sanjay Matange. *Quick Results with SAS® ODS Graphics Designer.*

  https://support.sas.com/rnd/datavisualization/papers/sgf2012/153-2012.pdf

  Philip R Holland. *Using the ODS Graphics Designer to Create Your Own Templates.*

  https://support.sas.com/resources/papers/proceedings10/034-2010.pdf

- **Presentations**

  Charlotte Baker. *Need a Scientific Journal Ready Graphic? No Problem!*

  http://support.sas.com/resources/papers/proceedings17/1440-2017.pdf

- **Blogs**

  Sanjay Matange. *Graphically Speaking: Data Visualization with a focus on ODS Graphics.*

  https://blogs.sas.com/content/graphicallyspeaking/tag/ods-graphics-designer/

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