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Chapter 1  SAS® Workshop: SAS® Visual Analytics

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1.1 SAS Workshop: SAS Visual Analytics

Use these demonstration steps to follow along with the instructor. Please do not move ahead of the instructor, and do not deviate from the instructions. Thank you.

Accessing the SAS Visual Analytics Demonstration Environment

In this demonstration, you connect to the SAS Visual Analytics demonstration environment.

1. Access Internet Explorer.
   a. Select Internet Explorer from the Windows taskbar or Start menu.
   b. Navigate to the following URL: http://www.sas.com/va.

   a. Click Try it yourself.
   b. Click Get Full Access.

   If a chat window appears at any point, click No Thanks in the bottom left corner to close the window.
c. If prompted, enter the requested information and click **Try It Now**.

3. **Click Launch SAS® Visual Analytics**.

   The demonstration environment opens in SAS Visual Analytics Explorer. A data source is already loaded and one visualization is displayed.
Using SAS Visual Analytics Explorer

In this demonstration, you use SAS Visual Analytics Explorer to explore a data source and create several visualizations.

1. Interact with the existing visualization.

The gross margin ratio and order total for each country is displayed using a geographical map.

![Geographical Map Visualization](image)

Each country value in the data source is displayed as a colored bubble on the map. The color is based on the gross margin ratio: colors close to magenta have a lower gross margin ratio, whereas colors closer to green have a higher gross margin ratio. The bubble size is based on the order total: the larger the bubble, the greater the sum of the order total.

How information is displayed for each visualization depends on your resolution, window size, and panel state (collapsed or expanded). What you see on your workshop machine might not be exactly the same as what you see in this handout.

a. Position the mouse pointer on the US bubble to display a data tip with additional information.
b. Right-click in the map background and select **Show Details**.

The visualization displays a table of values at the bottom so that you can easily view the order total and gross margin ratio for each country.

c. Click **(Minimize)** on the visualization header to minimize the visualization to the Dock pane at the bottom of the workspace.

2. Create a new visualization to analyze product sale by the product hierarchy.
a. Hold down the Ctrl key and click to select the following data items (in the order specified) from the Data pane on the left:
   - **Product hierarchy**
   - **Order Total**

   You need to scroll down to find the data items in the Hierarchy and Measure groups.

b. Drag the selected items onto the workspace.

The automatic chart functionality determines the best way to display the selected items.

3. Add a visualization filter to display only the transaction years between 2008 and 2013.
a. Right-click **Transaction Year** in the Data pane and select **Add as Filter on Visualization**.
b. Using the Filters tab in the right pane, move the left slider until the year 2008 is displayed.

![Filters tab screenshot](image)

The gauge at the bottom of the window indicates that 30% of the data is returned based on the filter.

4. Change the visualization type and modify the role assignments.

a. Click **Roles** (the **Roles** tab) in the right pane to select it.
b. Click **Use Bar Chart** at the top of the Roles pane to change the visualization type.

![Roles tab screenshot](image)

In most cases, additional roles are available when you change from the automatic chart visualization to another type of visualization.
c. Click (Edit selection) next to the Group role and select Transaction Year.

The bar chart is updated to reflect the change:

5. Navigate through the hierarchy.
   a. Double-click one of the bars in the Novelty group.
b. Double-click one of the bars in the Gift group.

The bar chart is updated to display the different levels of the hierarchy.

c. Move your mouse pointer to the **Novelty** icon in the navigation area above the bar chart.

d. Click the arrow and select **Toy**.

The bar chart is updated.
6. Change the visualization properties.
   a. Click ☰ (the Properties tab) in the right pane to select it.
   b. Type Product Sales by Product Hierarchy in the Name field and press Enter.
   c. Select Horizontal for the Bar direction field.
   d. Select Stack for the Grouping style field.

   The bar chart is updated:

7. Click ☰ (Minimize) on the visualization header to minimize the visualization to the Dock pane at the bottom of the workspace.

8. Create a new visualization based on four measures.
   a. Hold down the Ctrl key and click to select the following data items (in the order specified):
      - Market Penetration
      - Sales Rep Rating
      - Vendor Rating
      - Vendor Satisfaction
   b. Drag the selected data items to the workspace.
The automatic chart functionality determines the best way to display the selected data items. In this case, a visualization that shows the correlation of the measures is created.

- The color of the boxes indicates whether there is a weak correlation (lighter color) or a strong correlation (darker color) between the specified measures.

- Click (About these correlation results) in the bottom right corner of the visualization to display additional information.

Details are displayed beneath the visualization, including information about the analysis.
d. Double-click the box that displays the correlation of **Vendor Satisfaction** and **Sales Rep Rating**. An additional visualization is created to show the frequency of **Unit Reliability** and **Product Quality**.

![Correlation of selected measures](image1)

![Frequency of Sales Rep Rating and Vendor Satisfaction](image2)

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>What does this mean?</td>
<td>Correlation is a measure of association between two variables. The strength of the relationship is indicated by the color scale.</td>
</tr>
</tbody>
</table>

e. Click **(Minimize)** on the visualization header to minimize both visualizations to the Dock pane.

9. Create another visualization to analyze product material cost by month.
   a. Hold down the Ctrl key and click to select the following data items (in the order specified):
      - **Transaction Month and Year**
      - **Sales Rep Rating**
   b. Drag the selected items to the workspace.

   The automatic chart displays the information using a line chart and includes an overview axis.
c. Copy the previously created visualization filter.

1) In the Dock pane, click (Manage visualizations) and select Product Sales by Product Hierarchy to display that visualization.

2) Click (the Filters tab) in the right pane to select it.

3) In the Visualization area, click (Options) next to Transaction Year and select Copy Filter to Visualization 3.
4) Click (Minimize) on the Product Sales by Product Hierarchy visualization heading to minimize the visualization to the Dock pane.

5) Notice that the filter was copied to Visualization 3 and has been applied.

d. Right-click in the background of the line chart and select Show Forecast.

The line chart now displays predicted values based on the historical information:

e. Click (About these forecast results) at the bottom of the visualization to display additional information.
f. Click next to **Sales Rep Rating** to expand the analysis information.

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>What does this mean?</td>
<td>The forecast shows the predicted values of the measure based on the historical values. The bands around the forecast represent the 95% confidence interval for the forecast.</td>
</tr>
<tr>
<td>▼ Sales Rep Rating</td>
<td>“Sales Rep Rating” is forecast using the “Winters Method (Additive)” algorithm.</td>
</tr>
</tbody>
</table>

10. Add a new visualization and set the type to crosstab.

a. Click (Minimize) on the visualization heading to minimize the visualization to the Dock pane.

b. Click (Crosstab) in the toolbar to create a new crosstab visualization.

c. Hold down the Ctrl key and click to select the following data items (in the order listed):
   - **Product hierarchy**
   - **Order Product Cost**
   - **Order Total**
   - **Gross Margin ratio**

   You have to scroll to the bottom of the Data pane to find **Gross Margin ratio**, which is in the Aggregated Measures group.

d. Drag the selected data items to the visualization.

The crosstab visualization should resemble the following:

<table>
<thead>
<tr>
<th>Product Brand</th>
<th>Order Product Cost</th>
<th>Order Total</th>
<th>Gross Margin ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novelty</td>
<td>129,505,102</td>
<td>306,136,406</td>
<td>59.7%</td>
</tr>
<tr>
<td>Toy</td>
<td>158,551,308</td>
<td>379,719,372</td>
<td>58.2%</td>
</tr>
</tbody>
</table>

e. Click (Expand) next to **Novelty**.

The crosstab is updated:

<table>
<thead>
<tr>
<th>Product Brand</th>
<th>Product Line</th>
<th>Order Product Cost</th>
<th>Order Total</th>
<th>Gross Margin ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Novelty</td>
<td>Beach</td>
<td>27,336,593</td>
<td>65,701,245</td>
<td>59.5%</td>
</tr>
<tr>
<td></td>
<td>Bead</td>
<td>52,336,032</td>
<td>126,269,000</td>
<td>50.6%</td>
</tr>
<tr>
<td></td>
<td>Gift</td>
<td>26,901,923</td>
<td>70,474,951</td>
<td>59.0%</td>
</tr>
<tr>
<td></td>
<td>Promo</td>
<td>14,971,842</td>
<td>36,259,453</td>
<td>59.7%</td>
</tr>
<tr>
<td></td>
<td>Thrill</td>
<td>2,950,831</td>
<td>7,310,963</td>
<td>59.5%</td>
</tr>
<tr>
<td>Toy</td>
<td></td>
<td>158,551,308</td>
<td>379,719,372</td>
<td>59.2%</td>
</tr>
</tbody>
</table>
Using SAS Visual Analytics Designer

In this demonstration, you use SAS Visual Analytics Designer to create an interactive report with two sections and several report objects.

1. Click (Home Page) in the upper left corner to view the SAS Visual Analytics Home Page.

2. From the Home Page, click Create Report in the Create Content area.

SAS Visual Analytics Designer appears.

3. Open a data source.
   a. Click the Data tab in the left pane to make it active.
   b. Click Select a data source at the top of the Data tab.
c. Double-click **Insight Toy Company** in the Add Data Source window.

The data source is loaded and the data items are displayed on the Data tab in the left pane.

4. Change data item properties.
a. Select **Order Product Cost** on the Data tab in the left pane.

1) At the bottom of the Data pane, click **Comma** in the right column of the **Format** property to display the format selector.

2) Select **Dollar** as the format type. Accept the default values for the **Width** and **Decimals** fields.

3) Click **OK**.

b. Select **Order Total** on the Data tab.

1) Click **Comma** in the right column of the **Format** property to display the format selector.

2) Select **Dollar** as the format type. Accept the default values for the **Width** and **Decimals** fields.

3) Click **OK**.

5. Create a new data item.

a. Click **(Options)** at the top of the Data tab in the left pane.

b. Select **New Calculated Item**. The New Calculated Item window appears.
c. Enter **Profit** in the **Name** field.

d. Double-click **Numeric (simple)** in the Operators section to expand it.

e. Double-click **x-y**.

f. Double-click **Numeric** in the Data Items section to expand it.

g. Double-click **Order Total**.

h. Double-click **Order Product Cost**.

The New Calculated Item window should resemble the following:

i. Click **OK**
j. If necessary, select Profit on the Data tab in the left pane.
   1) At the bottom of the Data pane, click Comma in the right column of the Format property to display the format selector.
   2) Select Dollar as the format type.
   3) Accept the default values for the Width field.
   4) Select 0 for the Decimals field.
   5) Click OK.

6. Add a data source filter to limit the data used in the report.
   a. Click (Options) at the top of the Data tab in the left pane.
   b. Select New Data Source Filter.
   c. Double-click Date in the Data Items section to expand it.
   d. Select Transaction Date.
   e. In the Column Templates list, double-click Transaction Date >= 'x'; to add the condition to the expression.
   f. Click to specify the date for the condition.
   g. In the Choose a Date window, select January 1, 2005.
      1) Click to select January.
      2) Click the bottom portion of the button to select 2005.
      3) Click 1 to select the date.
h. Click **OK** to close the window and apply the data source filter.

7. Add a pie chart to the report canvas.
   a. Click the **Objects** tab in the left pane to make it active.
   b. Drag the **Pie Chart** object from the Objects tab in the left pane to the report canvas.

   A representation of the pie chart is displayed. The icon in the bottom right corner indicates that the required roles have not been assigned a data item.
c. Click the **Data** tab in the left pane to make it active.

d. Drag **Product Brand** from the Data tab onto the pie chart.

The pie chart is updated to show a slice for each value of **Product Brand**. The size of the slice is based on the frequency count.

\[\text{Frequency}\]

![Pie Chart Example](image)

When no measure is selected, the sizes of the pie slices are based on frequency.

e. Drag **Profit** from the Data tab onto the pie chart.

The pie chart is updated:

\[\text{Profit}\]

![Pie Chart with Profit](image)

8. Add a bar chart to the report canvas to the right of the pie chart.
a. Click the **Objects** tab in the left pane to make it active.

b. Drag the **Bar Chart** object from the Objects tab in the left pane to the right of the pie chart on the report canvas.

c. Click the **Data** tab in the left pane to make it active.

d. Hold down the Ctrl key and select **Product Line** and **Profit** from the Data tab and drag them onto the bar chart.

The bar chart is updated:

9. Add a treemap to the bottom of the report.
a. Click the **Objects** tab to make it active.

b. Drag the **Treemap** object from the Objects tab to the report canvas and drop it in the drop zone at the bottom of the report.

c. Click the **Data** tab to make it active.

d. Hold down the Ctrl key and select **Product Line** and **Order Product Cost** from the Data tab and drag them onto the treemap.

The treemap should resemble the following:

10. Create a report-level display rule.

a. Click the **Display Rules** tab in the right pane.

b. Select **Report 1** from the list at the top of the Display Rules tab.

c. Click **New**.
d. Enter **Toy** as the value.
   
   As you type, you see values from the data that begin with the characters that you have entered.

e. Click the color selector [ ].

f. Select a green color.

g. Click $+$ to add another value.

h. Enter **Game** as the value.

i. Select the same green color.

   Recently used colors appear at the bottom of the window.

j. Click $+$ to add another value.

k. Enter **Figure** as the value.

l. Select the same green color.

m. Click $+$ to add another value.

n. Enter **Plush** as the value.

o. Select the same green color.

p. Click the **Other** check box.

q. Select a blue color.
Click **OK** to close the window and apply the display rule. The report objects are updated.

11. Modify report object properties.
   a. Click the **Properties** tab in the right pane.
   b. Select **Treemap 1** in the list at the top of the window.
c. Type **Order Product Cost** in the **Title** field and press Enter.
d. Select **Pie Chart 1** in the selection list at the top of the right pane.
e. Click **Show category labels**.
f. Clear the **Show legend** check box.

g. Click the **Styles** tab.
1. Click Text Styling to expand it.

1) For the Value field, click B (Bold).

2) For the Value field, click (Select a font color) and select white.

12. Create a data item for transaction year.

a. If necessary, click the Data tab to make it active.

b. Right-click Transaction Date and select Duplicate Data Item.

c. Verify that Transaction Date (1) is selected in the list of data items.

d. At the bottom of the Data pane, click in the right column of the Name property.

e. Type Transaction Year and press Enter.

f. Click in the right column of the Format property to display the format selector.

g. Select Year as the format type.

h. Click OK to apply the format.

13. Add a control to enable the selection of one or more years to filter the report.

a. Click the Objects tab to make it active.

b. Drag a List control from the Objects tab to the left of the pie chart on the report canvas.

c. Click the Data tab to make it active.

d. Drag Transaction Year from the Data tab to the list control.
The list control should resemble the following:

```
<table>
<thead>
<tr>
<th>Year</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>68,880</td>
</tr>
<tr>
<td>2006</td>
<td>67,094</td>
</tr>
<tr>
<td>2007</td>
<td>65,789</td>
</tr>
<tr>
<td>2008</td>
<td>72,276</td>
</tr>
<tr>
<td>2009</td>
<td>68,402</td>
</tr>
<tr>
<td>2010</td>
<td>74,867</td>
</tr>
<tr>
<td>2011</td>
<td>77,793</td>
</tr>
<tr>
<td>2012</td>
<td>73,209</td>
</tr>
<tr>
<td>2013</td>
<td>62,148</td>
</tr>
</tbody>
</table>
```

e. Click the check boxes for 2011, 2012, and 2012.

At this point you are selecting item only in the list control. No interactions have been established, so the other report objects remain unchanged.

f. Select Roles in the right pane.

g. Verify that List 1 is the selected item.

h. Select (Edit selection) next to the Frequency field.

i. Select Remove Frequency.

j. Click Yes when prompted to remove the data assignment.
k. Use the handle icons (****) to resize the report objects to resemble the following:

14. Establish interactions between the objects in the report.

   a. Select View ⇒ Show Interactions.
b. Move the mouse pointer over **List 1** and drag the pencil icon to **Pie Chart 1** to establish a filter interaction.

c. Move the mouse pointer over **Pie Chart 1** and drag the pencil icon to **Bar Chart 1** to establish a filter interaction.

d. Move the mouse pointer over **Pie Chart 1** and drag the pencil icon to **Treemap 1** to establish a filter interaction.

e. Move the mouse pointer over **Treemap 1** and drag the pencil icon to **Bar Chart 1** to establish a filter interaction.

f. Right-click the new filter icon between Treemap 1 and Bar Chart 1 and select **Interaction Type** → **Brush**.

![Diagram showing interactions between List 1, Pie Chart 1, Treemap 1, and Bar Chart 1]

- The dashed lines indicate derived interactions and are added automatically.

g. Select **View** → **Show Layout**.

h. Test the interactions.

1) Click the check box for **2010**. The other report objects should update to reflect additional values.

2) Click the pie slice for **Toy** in the pie chart. The bar chart and treemap should update to display only the product lines for the Toy product brand.

3) Click the bar for **Figure** in the bar chart. The corresponding tile in the treemap should be selected.

4) Click the tile for **Game** in the treemap. The corresponding bar in the bar chart should be selected.
15. Add another section to the report.

Select **Insert ➔ New Section**.

16. Add a crosstab to Section 2.

   a. Click the **Objects** tab to make it active.

   b. Drag the **Crosstab** object from the Objects tab to the report canvas.

   c. Click the **Data** tab to make it active.

   d. Hold down the Ctrl key and select the following data items (in the order specified):
      - **Product Brand**
      - **Product Line**
      - **Profit**
      - **Order Distribution Cost**
      - **Order Marketing Cost**

   e. Drag the selected items onto the crosstab.
17. Link Section 1 to Section 2.
   
   a. Click the **Section 1** tab to make it the active section.
   
   b. Select **View ⇒ Show Interactions**.
   
   c. Click **Pie Chart 1** and drag the pencil icon to the **Section 2** section.
      
      A filter interaction is established between the two report objects.

   d. Select **View ⇒ Show Layout**.
   
   e. Test the interactions.
      
      1) Double-click the slice for **Novelty** in the pie chart.
Section 2 is displayed.

The crosstab objects is filtered by the value selected in the pie chart (Novelty) as well as the values selected in the list control (2010, 2011, 2012, and 2013).

2) Click (Back to Section 1).

Section 1 is displayed.

18. Change Section 2 to an info window.

a. Click the Section 2 tab to make it the active section.

b. Click on the Section 2 tab and select Display as Info Window.

Notice the tab name changes to Info Window 1.

19. Test the interactions.

⚠️ You cannot test the Info Window functionality when editing the report.

a. Select File ⇒ Save As to save the report.
b. Verify that My Folder is selected as the folder.

c. Accept the default name of Report 1 and click Save.


The report appears in SAS Visual Analytics Viewer:

![Report View](image)

e. Click the pie slice for Toy in the pie chart. The bar chart and treemap should update to display only the product lines for the Toy product brand.

f. Click the bar for Game in the bar chart. The corresponding tile in the treemap should be selected.

g. Double-click the slice for Novelty in the pie chart.

The info window is displayed, and it shows information for only the Novelty product brand.
You can move and resize the info window.

h. Click **Close** to close the info window.

i. Double-click the slice for **Toy** in the pie chart.

The info window is displayed, and it shows information for only the Toy product brand.

<table>
<thead>
<tr>
<th>Product Brand</th>
<th>Product Line</th>
<th>Profit</th>
<th>Order Distribution Cost</th>
<th>Order Marketing Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Toy</td>
<td>Figure</td>
<td>$22,053,387</td>
<td>363,162.49</td>
<td>1,920,125.08</td>
</tr>
<tr>
<td></td>
<td>Game</td>
<td>$22,688,075</td>
<td>353,766.86</td>
<td>1,995,275.44</td>
</tr>
<tr>
<td></td>
<td>Flush</td>
<td>$2,107,113</td>
<td>102,600.11</td>
<td>148,471.90</td>
</tr>
</tbody>
</table>

j. Click **Close** to close the info window.

k. Click ![](icon.png) on the far side of the window to expand the right pane.

The Properties tab of the right pane displays the selected object name as well as information about display rules and incoming filters.

20. Click ![Home Page](icon.png) in the upper left corner to view the SAS Visual Analytics Home Page

**Please do not log off or shut down the workshop computer.**