



UNSW Business School/  
Information Systems and Technology Management

# **SAS Viya for Learners – SAS Visual Analytics Workbook 2**

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**Designing Reports with SAS®  
Visual Analytics**

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**SAS Visual Analytics Workbook:**

Compiled/Modified By	Date	SAS Visual Analytics
Jacky Mo	Sep. 2021	SAS Viya for Learners

All the SAS Visual Analytics Workbooks will help the students to learn and gain experience and skills in data preparation; data exploration; creating reports; and constructing dashboard.

**Reference:**

This learning material is extracted from SAS® Academic Hub (LWYVA185) with the permission from SAS Australia to use and publish for teaching purpose at the University of New South Wales.

**File Name:**

SAS Viya for Learners – SAS Visual Analytics Workbook 2

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# Lesson 4 Designing Reports with SAS® Visual Analytics

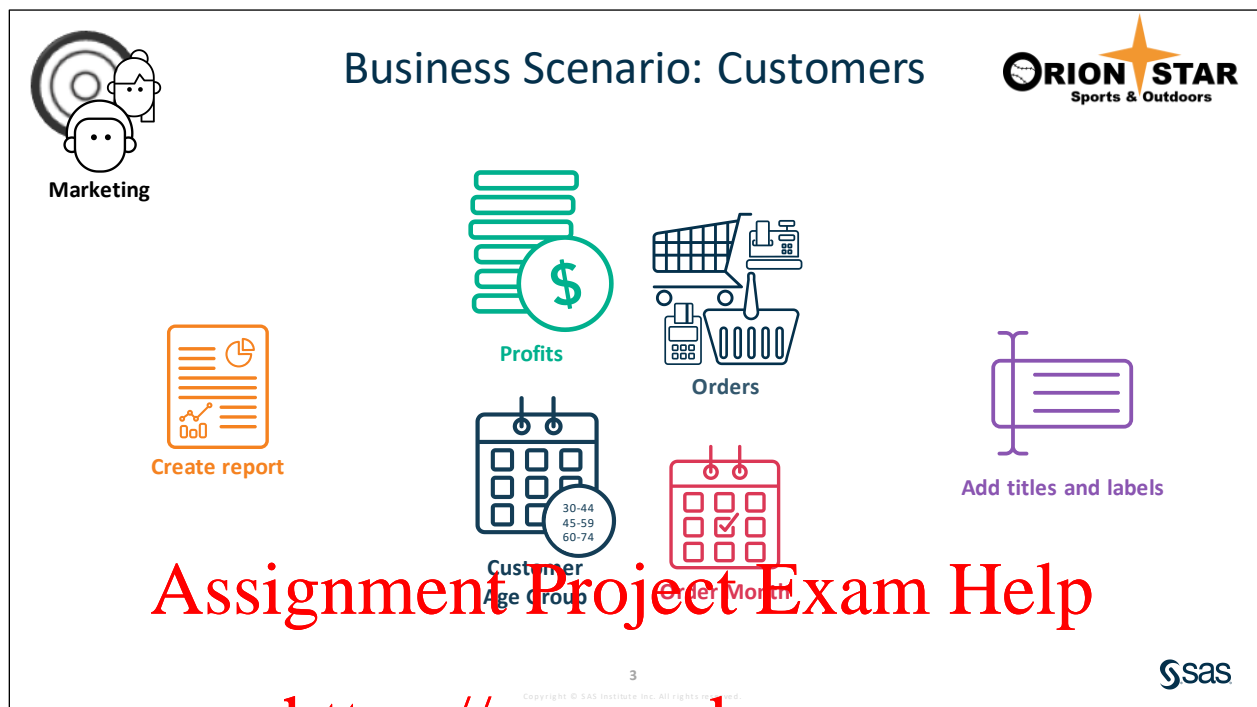
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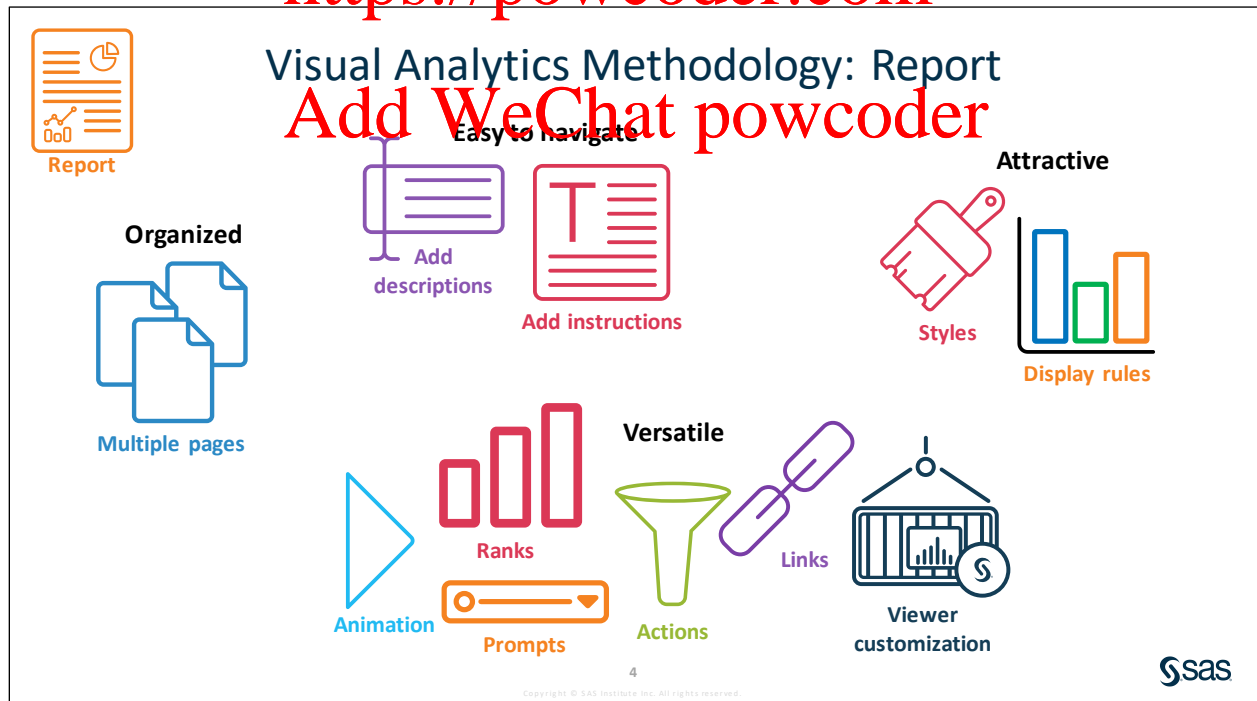
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## 4.1 Creating a Simple Report



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## 4.01 Activity

Sign in to SAS Viya.

Open **Ugly Report** (located in the **Courses/YVA185/Basics** folder).

What are your first impressions of this report?

Do you think it can be improved? If so, how?



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### Tips

for Designing Reports

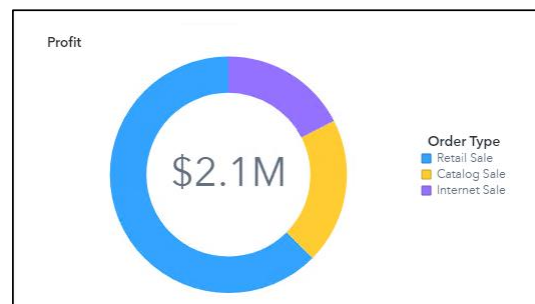
- Understand the audience.
- Make accessible to all.
- Tell a single data story.
- Use visually appealing, easy to understand objects.
- Use the simplest graph.
- Use consistent fonts.
- Limit the number of objects.
- Limit the number of pages.

For more information about how to create effective reports, see [www.sas.com/beautifulreports](https://www.sas.com/beautifulreports).

## Objects: Graphs (Reporting)



Use a *word cloud* to show summary information in an appealing fashion.



Use a *donut chart (pie chart)* to compare a few groups whose values vary greatly.

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### Pie chart

A pie chart displays a part-to-whole relationship of a measure data item in a circle divided into multiple slices for each value of a category data item. Each slice in the pie chart represents the relative contribution of each part to the whole. A pie chart will not show a slice with a zero or negative response.

**Note:** It is very difficult to compare the relative sizes of slices in a pie chart, so pie charts should be used sparingly and only in special circumstances (for example, to highlight large differences in categories).

**Note:** In Visual Analytics, the default pie chart is a donut chart (a pie chart with a hole in the center). Donut charts are more effective in comparing relative sizes because they make the viewer focus on reading lengths of arcs rather than proportions of slices.

### Word cloud

A word cloud analyzes each value in a category data item as a single text string, where the size of each word in the cloud can indicate either the frequency of that word or the value of a measure and the color of the word can indicate the value of another measure.

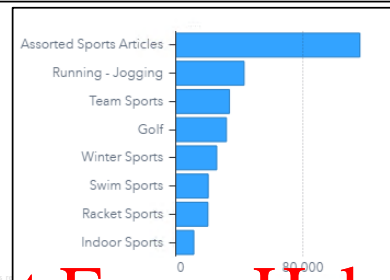
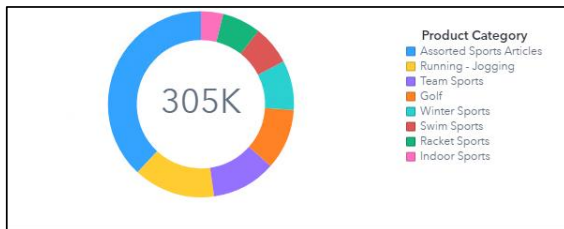
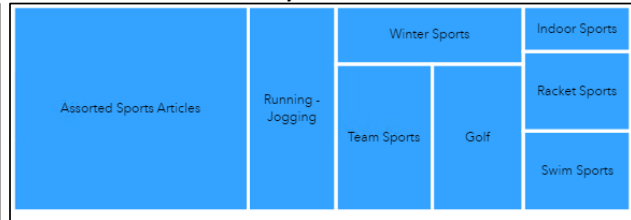
**Note:** Word clouds should not be used when analytical accuracy is desired because it is very difficult to compare the relative sizes of different words.

- Words that have more letters seem larger than words that have fewer letters.
- Words that contain large letters (like o, m, and w) receive more attention than words that contain smaller letters (like l, i, and f).
- Words whose letters contain ascenders (the part of a lowercase letter that projects above the body of the letter: b, d, h) or descenders (the part of a lowercase letter that projects below the body of the letter: g, p, q) receive more attention than words that do not.

For these reasons, word clouds are mostly used for aesthetic reasons.

## 4.02 Activity

Each graph below shows the number of orders for each product category. Does Golf or Team Sports have more orders? Which chart did you use?



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## 4.03 Multiple Choice Question

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What type of chart would you use to show profit information by continent?

- bubble plot
- pie chart
- bar chart
- treemap

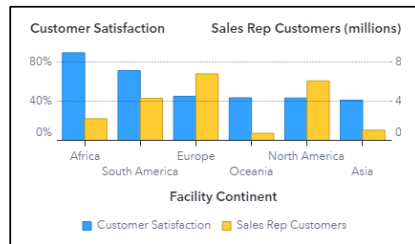
Continent	Profit
Africa	(\$127.68)
Asia	\$15,503.70
Europe	\$5,659,450.59
North America	\$2,121,645.57
Oceania	\$462,934.63

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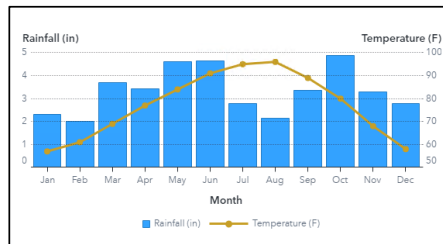
## Objects: Graphs (Dual Axis)

Use *dual axis* charts and plots to compare two series with different ranges.

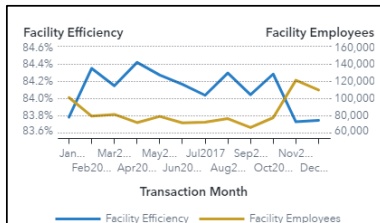
Dual axis bar chart



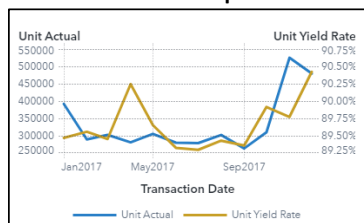
Dual axis bar-line chart



Dual axis line chart



Dual axis time series plot



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### Dual axis bar chart

A dual axis bar chart displays two bar charts with a shared category axis and separate response axes. Use a dual axis bar chart when the value for both measures does not depend on the prior value. For example, in the chart above, the values of **Customer Satisfaction** and **Sales Rep Customers** for South America are not impacted by the values for Africa.

### Dual axis bar-line chart

A dual axis bar-line chart combines a bar chart and a line chart on a shared category axis. The bar chart and the line chart have separate response axes. For the bar, use a measure whose value does not depend on the prior value. For the line, use a measure whose value does depend on the prior value. For example, in the chart above, the value of **Temperature** for February depends on the value for January. However, the value of **Rainfall** for February does not depend on the value for January.

### Dual axis line chart

A dual axis line chart displays data by using two lines that connect the data values for a shared category axis on separate response axes. Use a dual axis line chart when the value for both measures depends on the prior value. For example, in the chart above, the values of **Facility Efficiency** and **Facility Employees** in February are impacted by the values for January.

### Dual axis time series plot


A dual axis time series plot displays two time series with a common time axis on separate response axes.

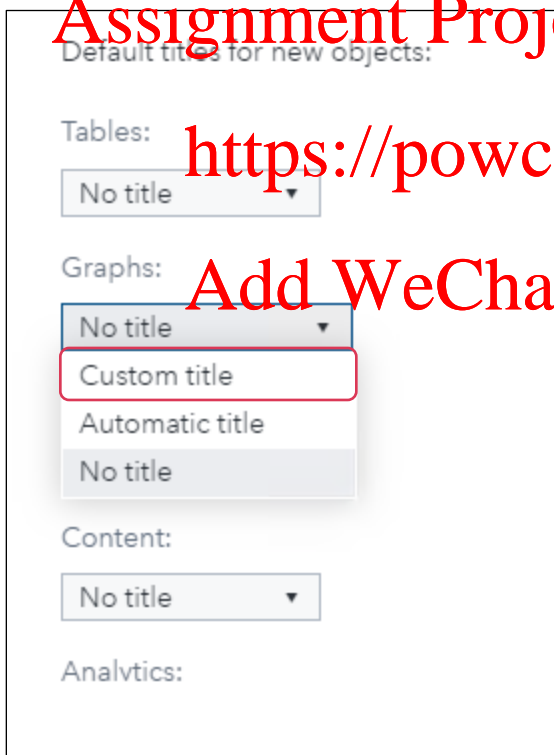






## Creating a Simple Report

This demonstration illustrates how to create a simple report in Visual Analytics.

1. From the browser window, sign in to SAS Viya.
2. In the upper left corner, click  (**Show list of applications**) and select **Explore and Visualize**. SAS Visual Analytics appears.
3. Click **All Reports**.
  - a. Navigate to the **Courses/YVA185/Basics/Demos (Marketing)** folder.
  - b. Double-click the **VA1- Demo4.1** report to open it.
4. Change the settings to add custom titles for all graph objects.
  - a. In the upper right corner, select **<user name> ⇒ Settings**.
  - b. On the left side of the window, select **General** under **SAS Visual Analytics**.
  - c. Scroll down to **Default titles for new objects**.
  - d. For **Graphs**, change **No title** to **Custom title**.



- e. Click **Close**.
5. Hide data items.
  - a. In the left pane, click **Data**.
  - b. In the upper right corner of the Data pane, click  (**Actions**) and select **Show or hide data items**.

- c. Click  (**Remove all**) to move all data items to the Available items list.
- d. Double-click the following data items to add them to the Selected items list:

**Customer Age Group**

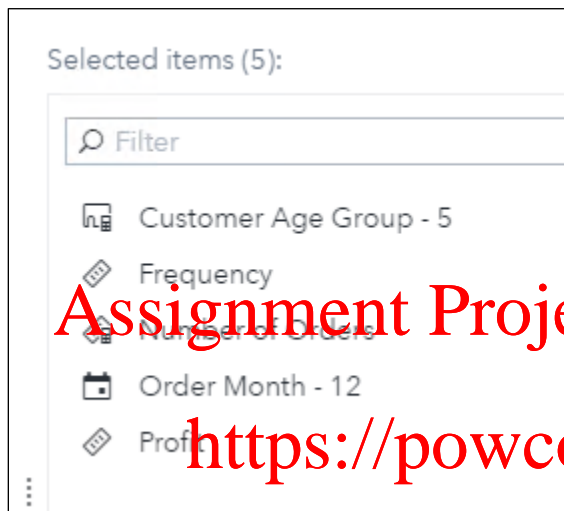
**Frequency**

**Number of Orders**

**Order Month**

**Profit**

The Selected items list should resemble the following:



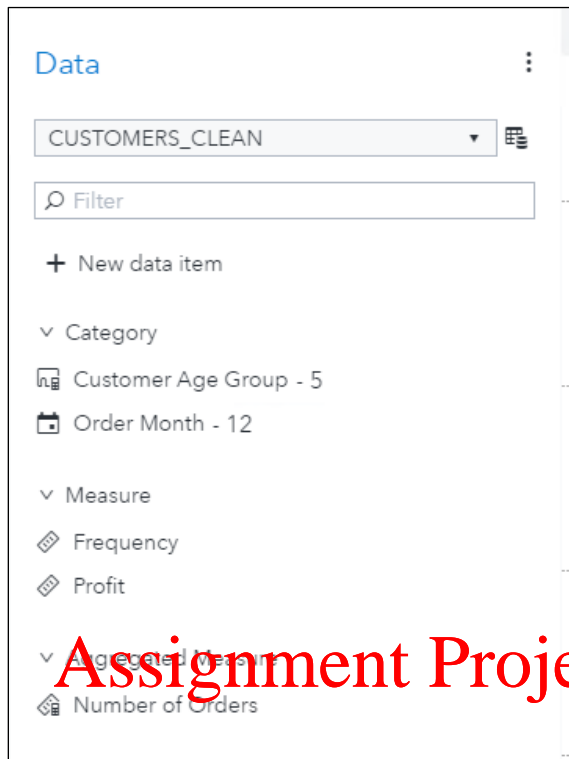
- e. Click **OK**.

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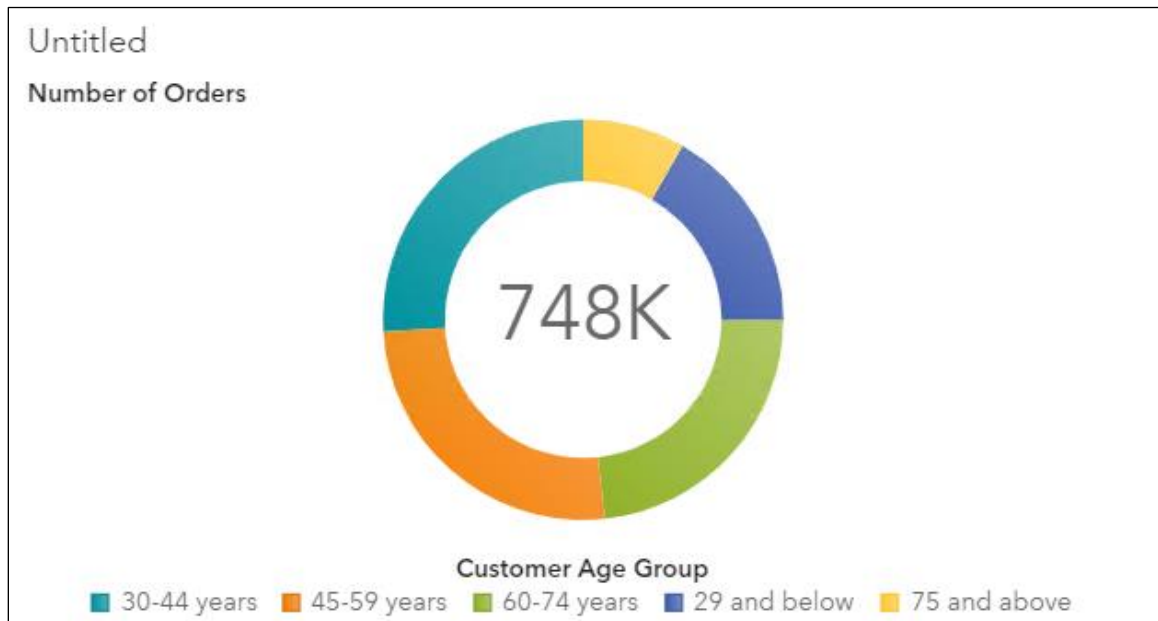
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The Data pane should resemble the following:



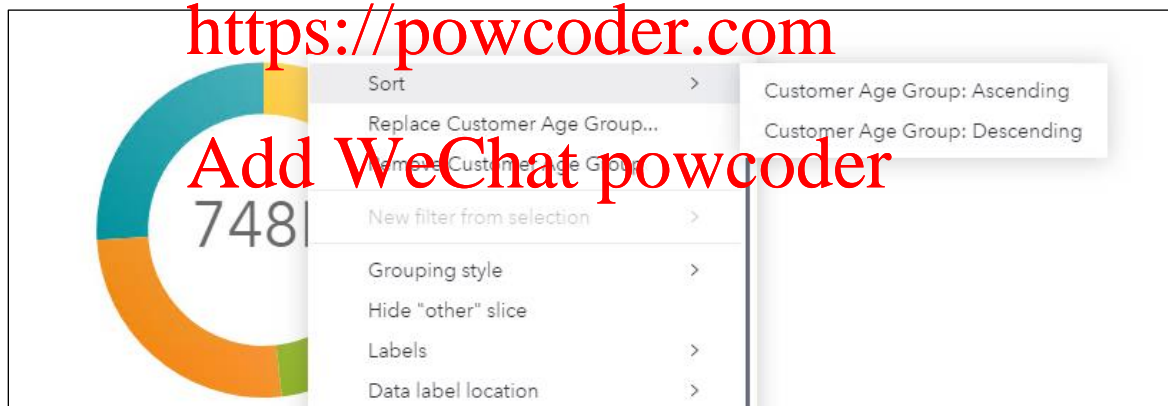
6. Create a pie chart.
  - a. In the left pane, click **Objects**.
  - b. Drag the **Pie chart** object, from the Graphs group, to the top of the canvas.
  - c. In the right pane, click **Roles**.
  - d. For the **Category** role, select **Add** ⇒ **Customer Age Group**.
  - e. For the **Measure** role, select **Frequency** ⇒ **Number of Orders**.

The pie chart should resemble the following:



By default, the slices in a pie chart are sorted by the measure in descending order.

- f. Below the pie chart, right-click **Customer Age Group** and select **Sort** ⇒ **Customer Age Group: Ascending**.



The updated pie chart should resemble the following:

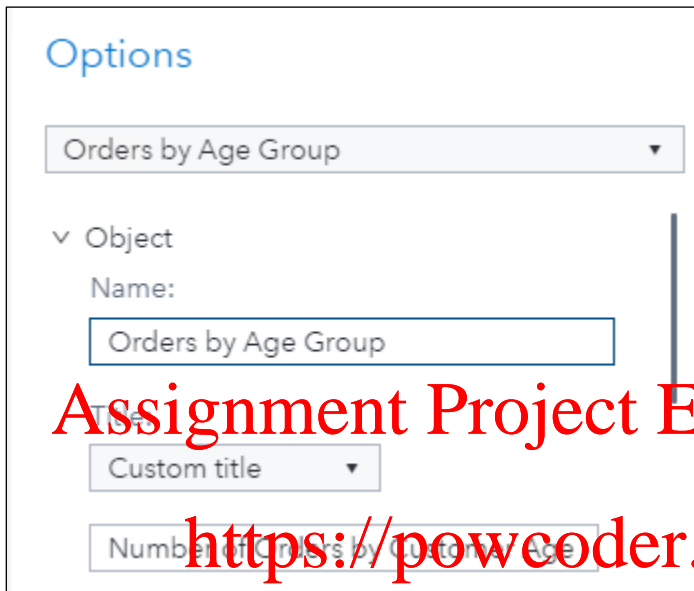


- g. Double-click the title, **Untitled**.

A font formatting tool appears that you can use to format the title.



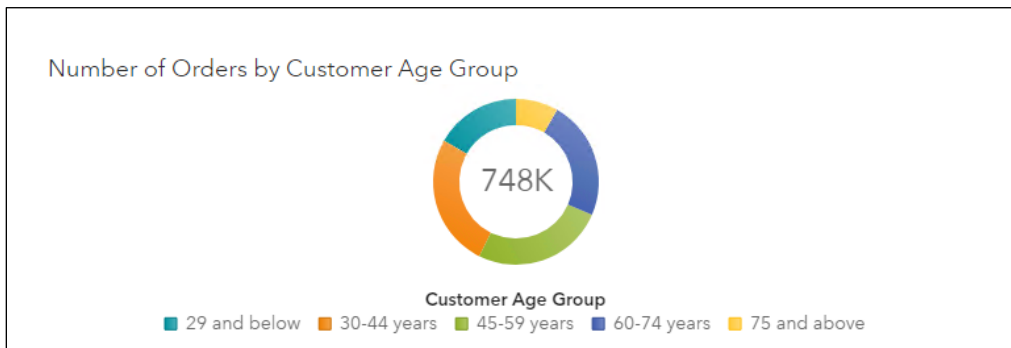
- h. Enter **Number of Orders by Customer Age Group** as the title.
- i. In the right pane, click **Options**.
- j. In the Object group, for the **Name** field, enter **Orders by Age Group**.



- k. In the Pie group, clear “**Other**” slice.

- l. Clear **Pie label**.

The updated pie chart should resemble the following:



7. Create a bar chart.
  - a. In the left pane, click the **Objects** tab.
  - b. Drag the **Bar chart** object, from the Graphs group, to the drop zone on the right side of the pie chart.
  - c. In the right pane, click **Roles**.
  - d. For the **Category** role, select **Add** ⇨ **Order Month**.
  - e. For the **Measure** role, select **Frequency** ⇨ **Profit**.

- f. For the **Measure** role, select **Add** ⇒ **Number of Orders** and click **OK**.

The bar chart should resemble the following:



Because **Profit** and **Number of Orders** have different ranges, they are displayed in different bar charts. You can change to a dual axis bar chart to display both measures together.

- g. Right-click the bar chart and select **Change Bar chart to** ⇒ **Dual axis bar chart**.

**Note:** This option is not available if the object is maximized.

- h. In the dual axis bar chart, on the horizontal axis, right-click **Order Month** and select **Sort** ⇒ **Order Month: Ascending**.

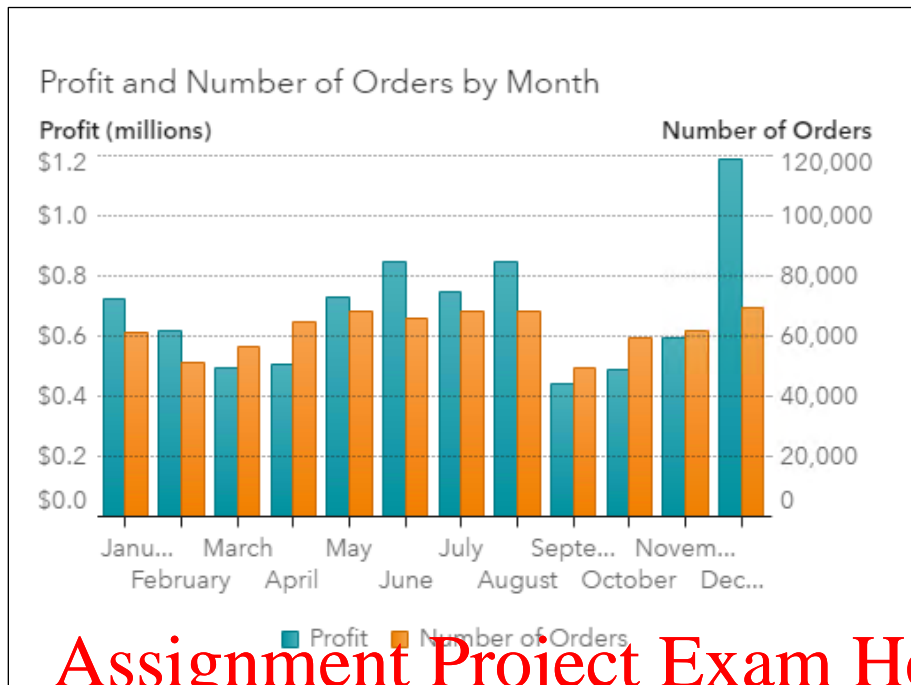
- i. In the right pane, click **Options**.

- j. In the Object group, for the **Name** field, enter **Profit and Orders**.

- k. For the **Title** field, enter **Profit and Number of Orders by Month**.

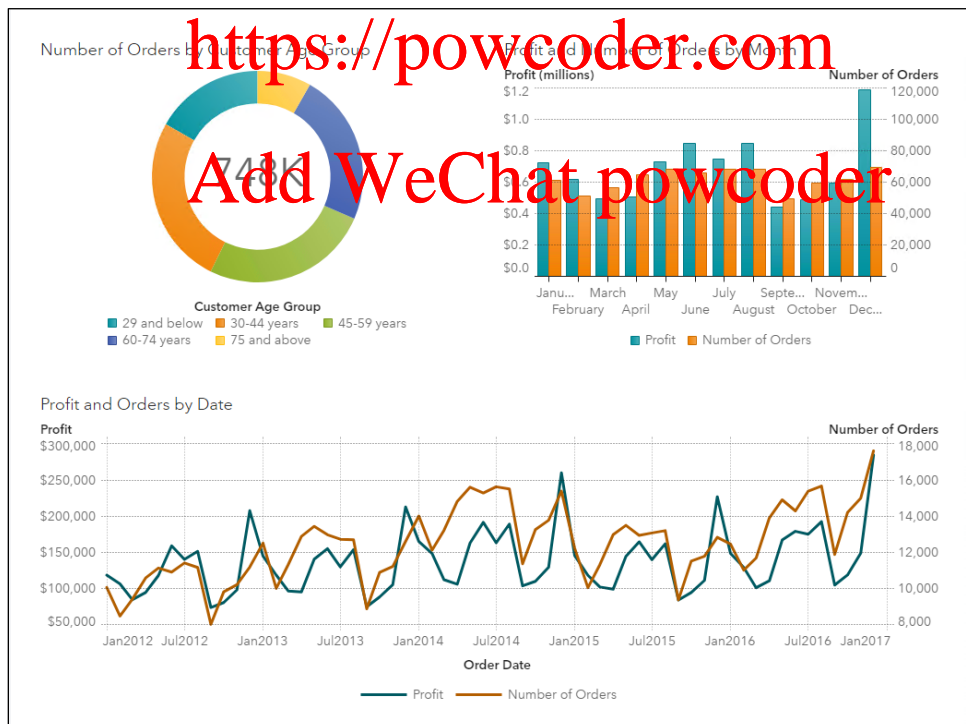
- l. In the X Axis Options group, clear **Axis label**.

The updated dual axis bar chart should resemble the following:



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The report should resemble the following:



8. Save the report.

End of Demonstration



The image shows a dashboard layout for a 'Practice Scenario: Employees'. At the top left is an icon of two people with a speech bubble, labeled 'Human Resources'. At the top right is the 'ORION STAR Sports & Outdoors' logo. The dashboard contains several data visualization components: 'Number of employees' (represented by an icon of three people), 'Profits' (represented by a stack of coins with a dollar sign), 'Location' (represented by a globe icon), 'Anniversary Month' (represented by a calendar icon), 'Create report' (represented by a document icon with a pie chart and bar chart), and 'Add titles and labels' (represented by a document icon with a title bar). The SAS logo is in the bottom right corner. A small number '14' is visible in the center of the dashboard area.

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## Practice

### 1. Creating a Simple Report

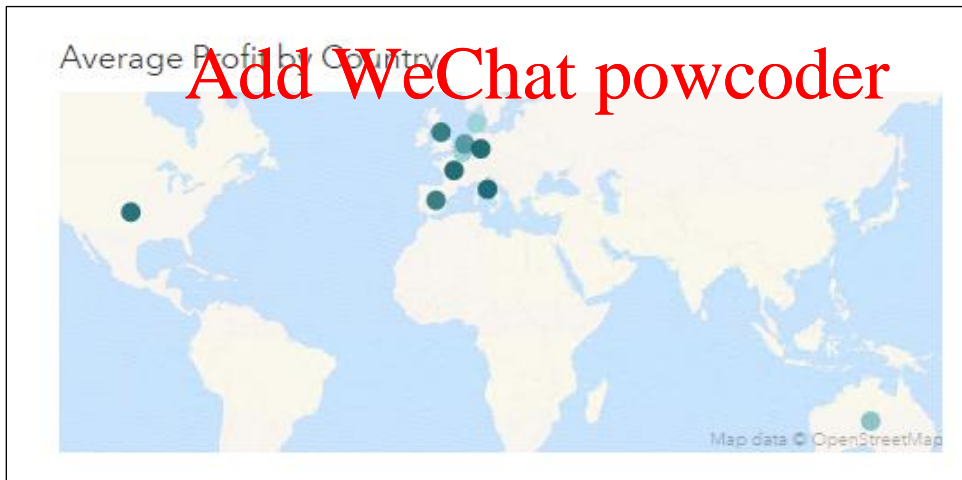
- Open the browser and sign in to SAS Viya.
- Open the **VA1- Practice4.1** report from the **Courses/YVA185/Basics/Practices (HR)** folder.
- Create a geo coordinate map to the left of the bar chart.
- Modify the following options for the geo map:

<b>Object: Name</b>	Average Profit by Country
<b>Object: Custom Title</b>	Average Profit by Country
<b>Object</b>	Geo Coordinate
<b>Legend: Visibility</b>	Off

- Assign the following data items to the specified roles:

<b>Geography</b>	Employee Country
<b>Color</b>	Average Profit
<b>Data tip values</b>	Number of Employees

The geo map should resemble the following:



- Maximize the geo map and answer the following questions:

Which country has the highest average profit? The lowest?

**Answer:** \_\_\_\_\_

Which country has the highest number of employees? The lowest?

**Answer:** \_\_\_\_\_

- g. Create a dual axis bar-line chart at the bottom of the canvas. Assign the following data items to the specified roles:

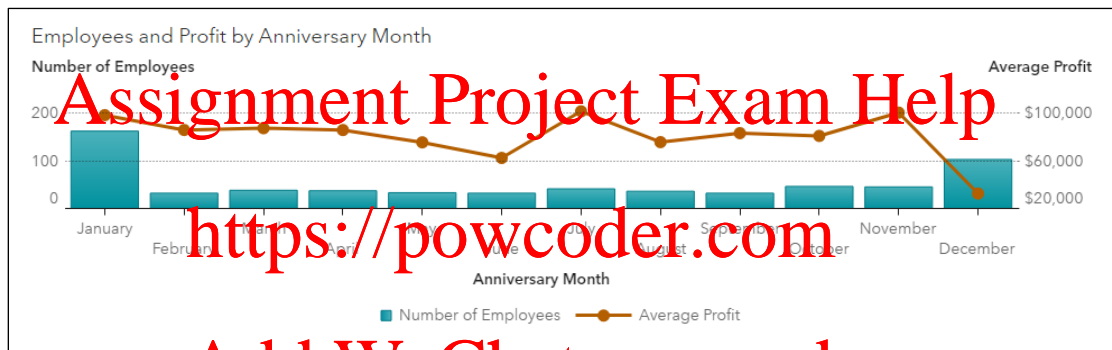
<b>Category</b>	<b>Anniversary Month</b>
<b>Measure (bar)</b>	<b>Number of Employees</b>
<b>Measure (line)</b>	<b>Average Profit</b>

- h. Modify the following options for the dual axis bar-line chart:

<b>Object: Name</b>	Employees and Profit by Anniversary Month
<b>Object: Custom Title</b>	Employees and Profit by Anniversary Month
<b>Line: Markers</b>	<selected>

- i. Sort the bars by **Anniversary Month** in ascending order.

The dual axis bar-line chart should resemble the following:



- j. Maximize the dual-axis bar-line chart and answer the following questions:

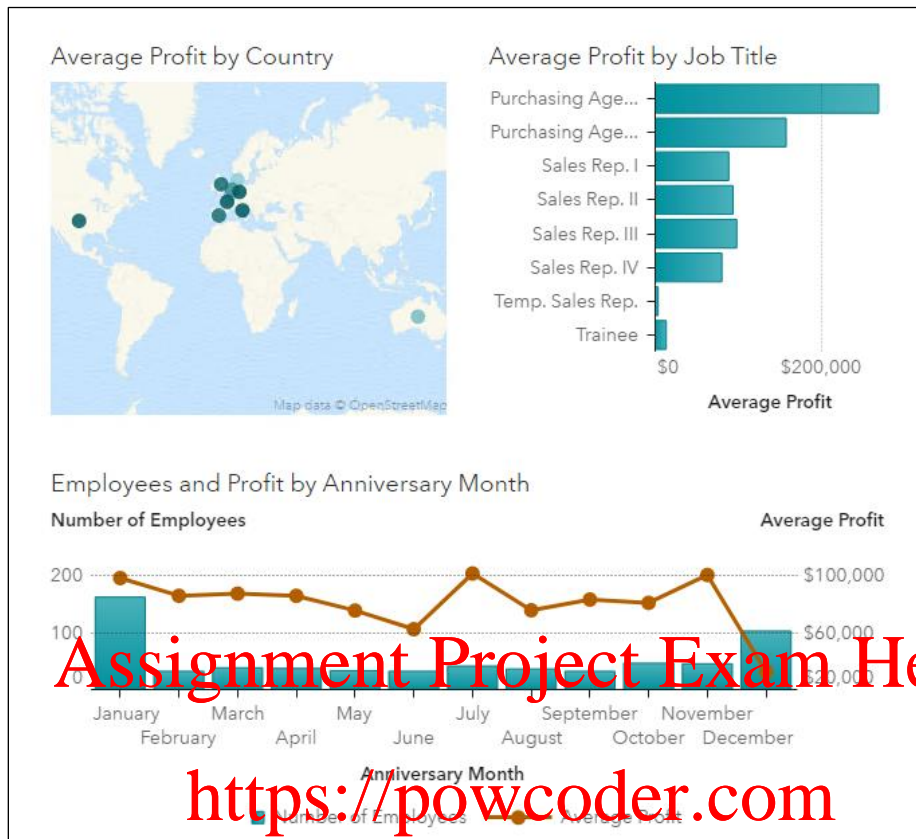
In which month were the most employees hired?

**Answer:** \_\_\_\_\_

Which anniversary month contains employees that generate the highest average profit?

**Answer:** \_\_\_\_\_

The report should resemble the following:

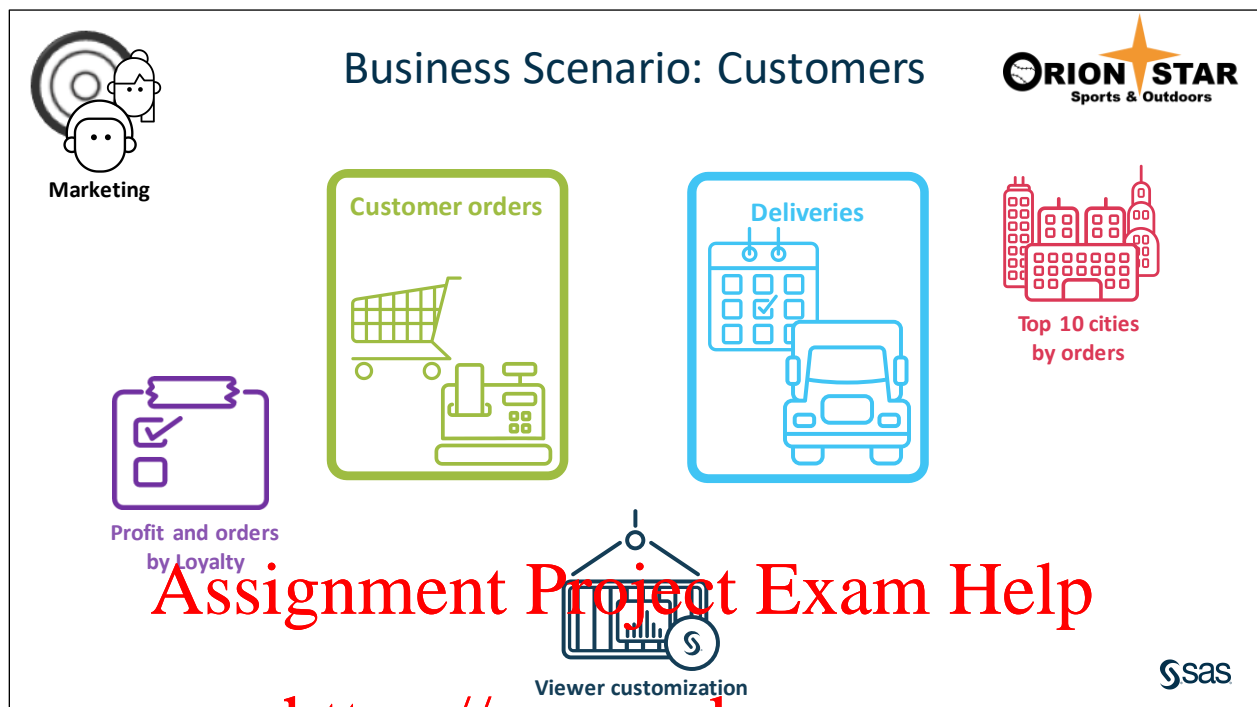


k. Save the report.

End of Practices

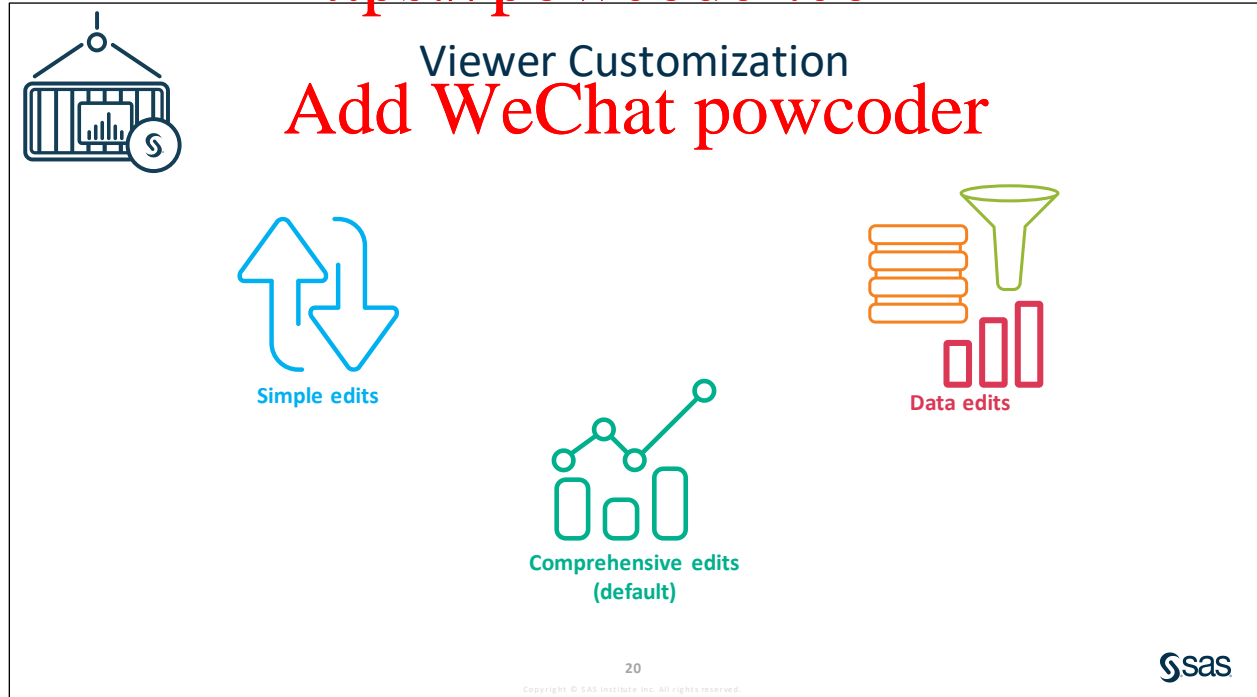
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## 4.2 Creating Interactive Reports



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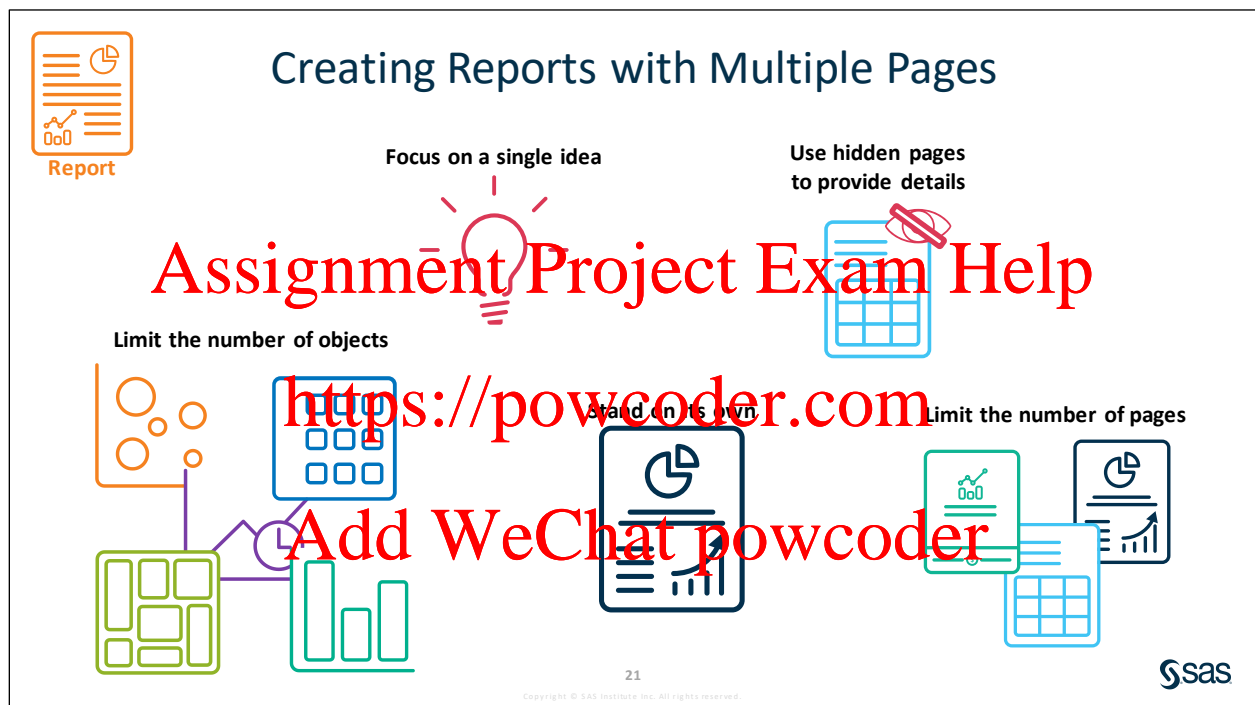
<https://powcoder.com>



Beginning in SAS Visual Analytics 8.4, the types of changes a report viewer can make to a report can be set using the Viewer Customization option at the report level.

The available levels of permissions are as follows:

<b>Simple edits</b>	Enables report viewers to make changes that do not change the original intent for the report content. For example, report viewers can change how the data is sorted or change legends and value labels.
<b>Comprehensive edits (default)</b>	Enables report viewers to make changes that might alter the original intent of the report. For example, report viewers can change object types.
<b>Data edits</b>	Enables report viewers to change the data for objects in the report. For example, report viewers can change data assignments, filters, and ranks.




Each page in your report can use one or more data sources and can contain one or more report objects. There is no limit to the number of pages that can be added to a report. However, it is a good idea to limit the number of pages in a report to make your report easier to access, easier to navigate, and easier to understand. If you need more than six or seven visible pages to tell your data story, you should consider creating multiple reports and use links between reports to provide additional information.

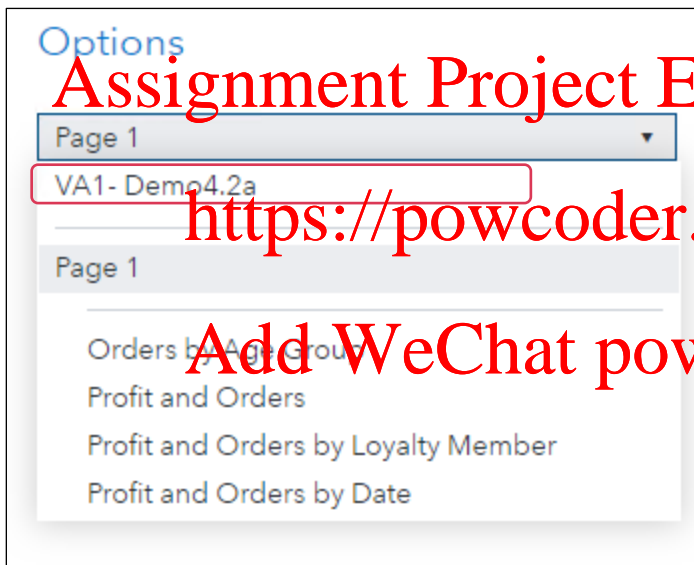
**Note:** Links are discussed in more detail in a later section.



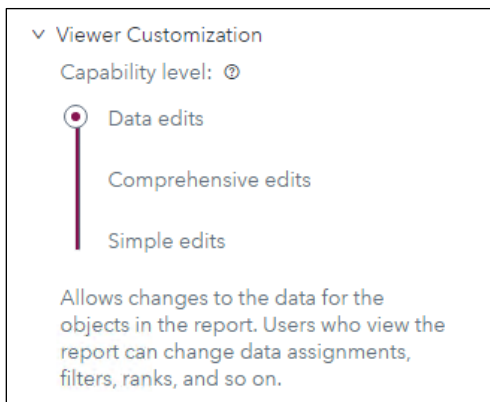
## Working with Pages and Ranks

This demonstration illustrates how to create new pages, how to move graphs between pages, and how to apply ranks to graphs in Visual Analytics.


1. From the browser window, sign in to SAS Viya.
2. In the upper left corner, click  (**Show list of applications**) and select **Explore and Visualize**. SAS Visual Analytics appears.
3. Click **All Reports**.
  - a. Navigate to the **Courses/YVA185/Basics/Demos (Marketing)** folder.
  - b. Double-click the **VA1- Demo4.2a** report to open it.
4. Change the viewer customization level.
  - a. In the right pane, click **Options**.
  - b. Use the drop-down list on the top of the Options pane to select the report.



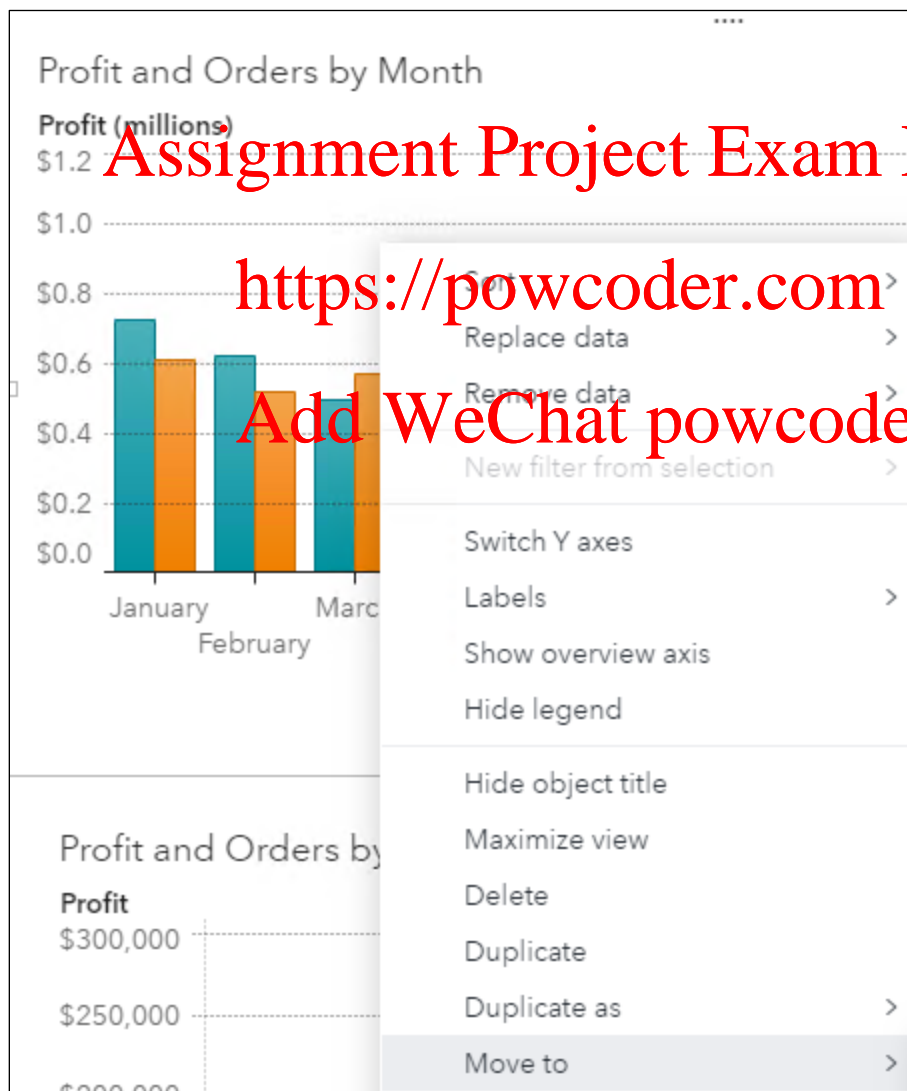
- c. In the Viewer Customization group, select **Data edits**.



This option enables viewers to make changes to the data used in objects, as well as the filters and ranks applied to objects.

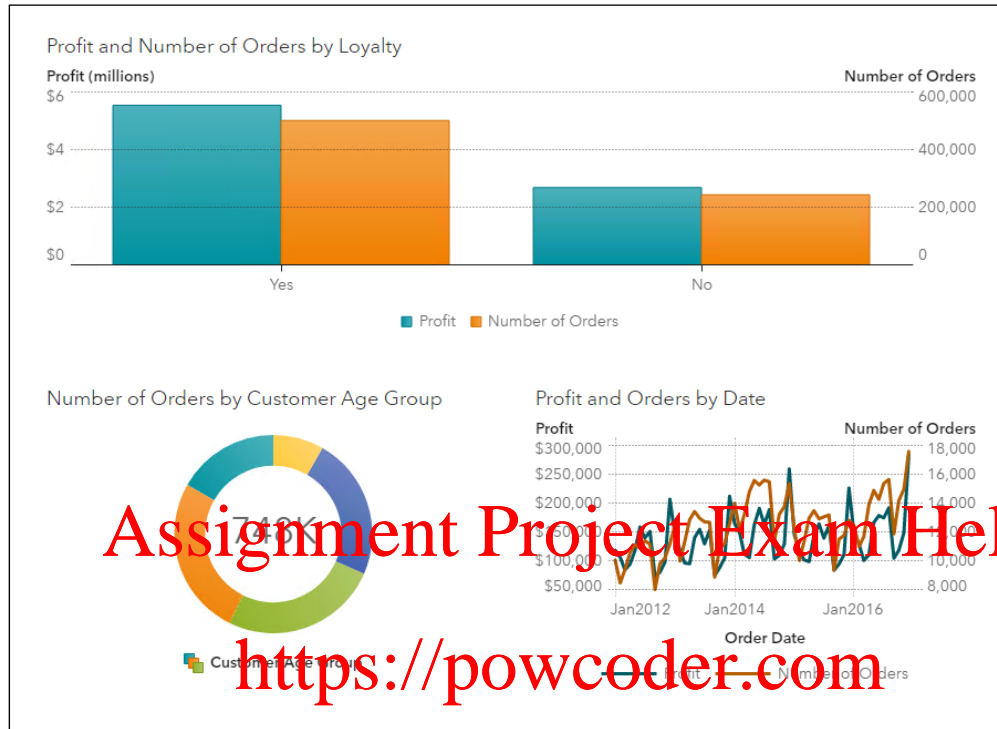
5. Create a new page.
  - a. In the upper left corner of the report, next to **Page 1**, click  (**New page**).
  - b. Double-click the **Page 2** heading to make it editable.
  - c. Enter **Delivery Analysis** and press Enter.
  - d. Click **Page 1** to make it active.
  - e. Right-click **Page 1** and select **Rename page**.
  - f. Enter **Customer Order Analysis** and press Enter.
6. Move the **Profit and Orders by Month** bar chart to the new page.

Right-click the **Profit and Orders by Month** bar chart and select **Move to** ⇒ **Delivery Analysis**.



**Note:** You can also drag an object and drop it onto the new page tab. Alternatively, objects can be moved from one page to another using the Outline pane.

7. Click the **Customer Order Analysis** tab to make it active.
8. Rearrange the graphs on the Customer Order Analysis page so that it resembles the following:



9. Create a bubble plot.
  - a. Click the **Delivery Analysis** tab to make it active.
  - b. In the left pane, click **Objects**.
  - c. Drag the **Bubble plot** object, from the Graphs group, to the left side of the canvas.
  - d. In the right pane, click **Roles**.
  - e. For the **Group** role, select **Add** ⇒ **City Name**.
  - f. For the **X axis** role, select **Add** ⇒ **Days to Delivery**.
  - g. For the **Y axis** role, select **Add** ⇒ **Number of Orders**.
  - h. For the **Size** role, select **Frequency** ⇒ **Profit**.

A warning appears in the lower right corner of the bubble plot.

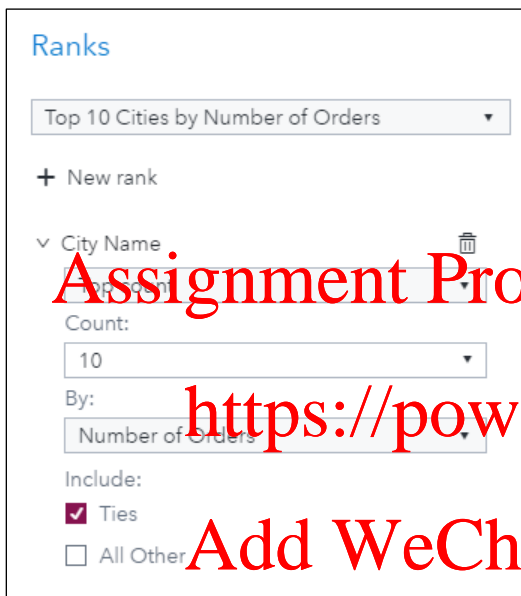
No data appears because too many values were returned from the query. Filter your data to reduce the number of values.

There are too many distinct values of **City Name** to display as bubbles in the plot. Later, you add a rank to reduce the number of bubbles.

- i. For the **Animation** role, select **Add** ⇒ **Order Month**.



- j. In the right pane, click **Options**.
- k. In the Object group, for the **Name** field, enter **Order Information by Month**.
- l. For the **Title** field, enter **Top 10 Cities by Number of Orders**.
- m. In the right pane, click **Ranks**.
- n. In the Ranks pane, select **New rank** ⇒ **City Name**.
- o. Verify that **Top count** is specified.
- p. For the **Count** field, verify that **10** is specified.
- q. For the **By** field, select **Number of Orders**.
- r. Select the box for **Ties**.



Ranks

Top 10 Cities by Number of Orders

+ New rank

City Name

Top count

Count:

10

By:

Number of Orders

Include:

☒ Ties

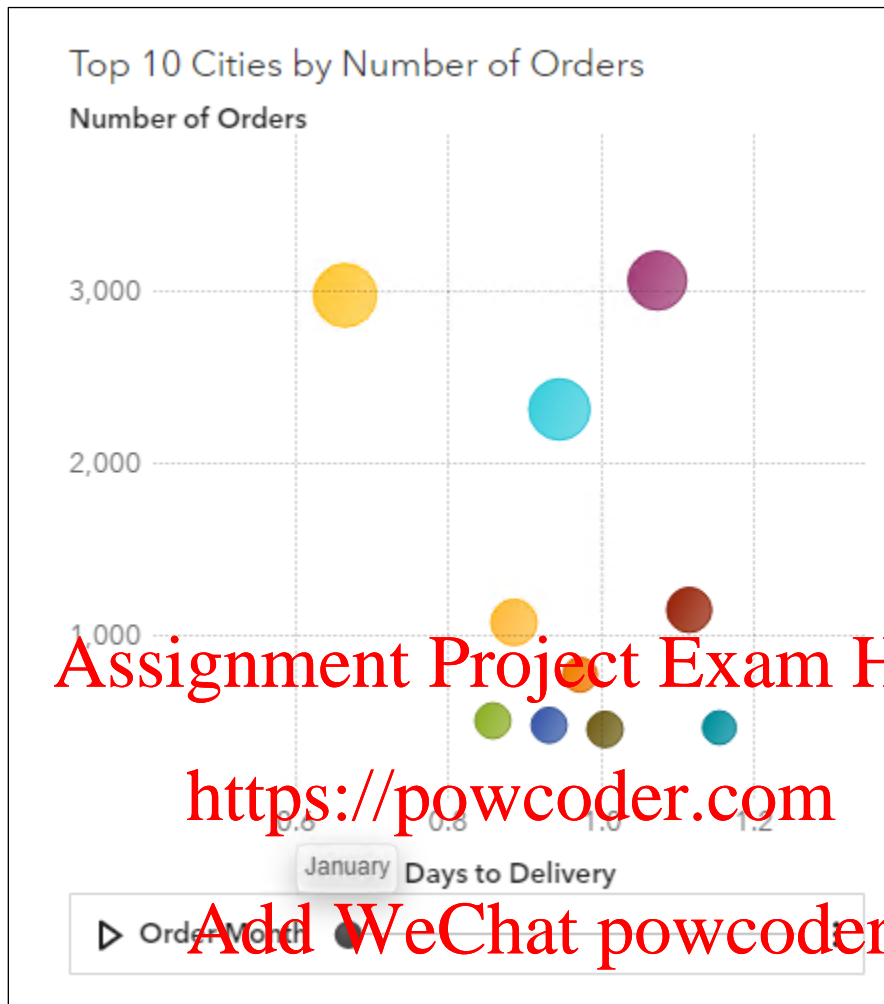
☐ All Other


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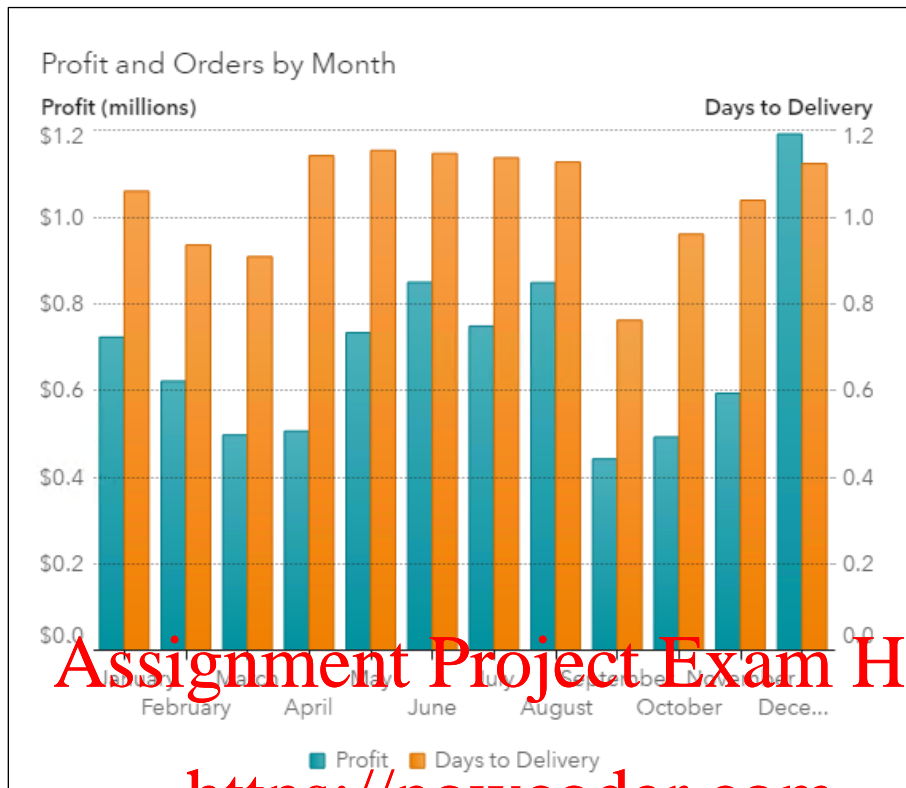
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The bubble plot should resemble the following:



- s. In the lower left corner of the bubble plot, click ▶ to play the animation.
10. Save the report.
11. View the report.
  - a. In the upper left corner, click  (**View report**) to view the report.
  - b. Right-click the dual axis bar chart and select **Replace data** ⇒ **Number of Orders**.
  - c. Select **Days to Delivery**.
  - d. Right-click the dual axis bar chart and select **Sort** ⇒ **Order Month: Ascending**.

The dual axis bar chart should resemble the following:




Because the Viewer Customization level for the report was set to **Data edits**, users can change the data used in each report object while viewing the report.

## 12. Save a copy of the report

- In the upper right corner, click  (**Menu**) and select **Save a copy**.

When anyone saves a copy of a report while viewing it, that user cannot choose a name or a location for the saved report.

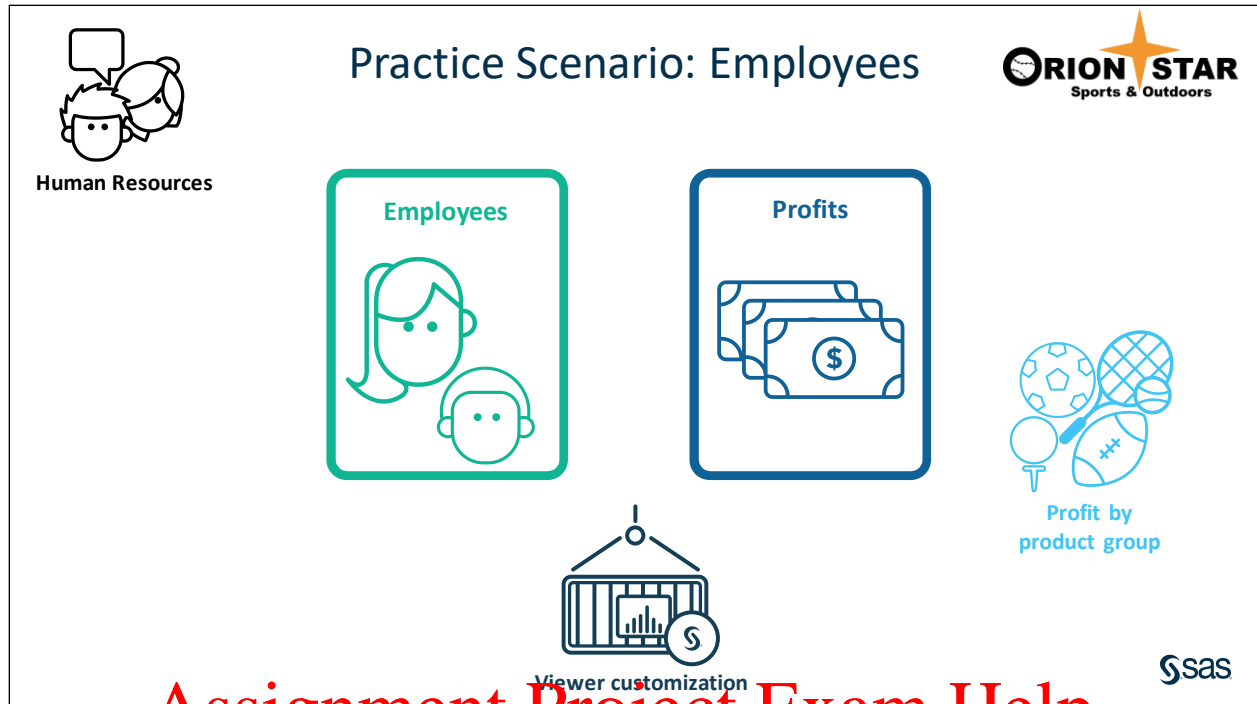
The following message appears:

"VA1- Demo4.2a updated 12/26/2019 3:56:11 PM" saved to My Folder. [View](#) 

The report is saved to My Folder with a name that includes the date and time at which the copy was created. This copy can then be shared with other users.

- In the upper right corner, click  (**Menu**) and select **Close** to close the report.

**End of Demonstration**



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## Practice

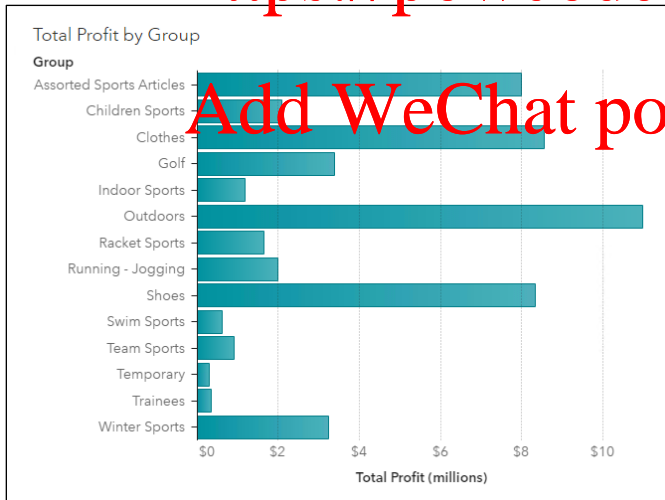
### 2. Working with Pages

- Open the browser and sign in to SAS Viya.
- Open the **VA1- Practice4.2a** report from the **Courses/YVA185/Basics/Practices (HR)** folder.
- Set the Viewer Customization level so that users cannot change the data or the type of chart used in the report.
- Add a new page to the report.
  - Change the name of the new page to **Profit Analysis**.
  - Change the name of **Page 1** to **Employee Analysis**.
- Create a bar chart on the Profit Analysis page by assigning the following data items to the specified roles:

Category	Group
Measure	Total Profit

- Specify **Total Profit by Group** as the name and title of the bar chart.
- Sort the bars by **Group** in ascending order.

The Profit Analysis page should resemble the following:



- Maximize the bar chart and answer the following questions:

Which group produces the highest total profit?

**Answer:** \_\_\_\_\_

Which group produces the lowest total profit?

**Answer:** \_\_\_\_\_

- Save the report.
- View the report.

- k. On the Profit Analysis page, sort the bars by **Total Profit** in descending order and show data labels.
- l. Close the report.

End of Practices

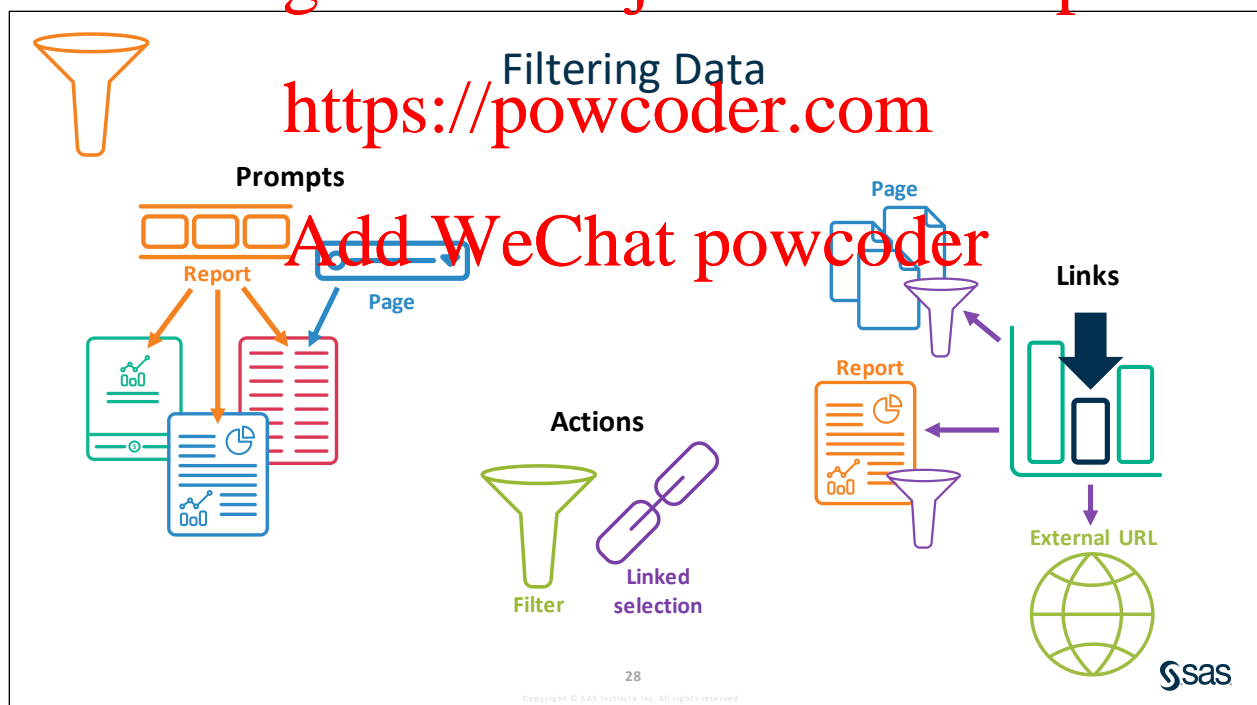
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The following types of filters can be modified by report viewers:

<b>Report prompt</b>	Automatically subsets the data for all objects in the report if the report object uses the same data source as the prompt. *
<b>Page prompt</b>	Automatically subsets the data for all objects on the page if the report object uses the same data source as the prompt. *
<b>Filter action</b>	Subsets the data in the target object based on selections in a source object.
<b>Linked selection action</b>	Highlights the data in the target object based on selections in a source object.
<b>Links</b>	Subsets the report, page, or an external URL based on the selections in a source object. Links pass a value to filter the target object (report or page) when the source and target are based on the same data source.

\* For all prompts and actions, if the report objects use different data sources, automatic mappings are applied. You can modify the data source mappings by right-clicking the control and selecting **Edit data source mappings**. For more information about mapping data sources, see “Map Data Sources for Actions and Links” in the *SAS Visual Analytics: Working with Report Data* documentation.

For more information about prompts, see “Working with Controls” in the *SAS Visual Analytics: Working with Report Content* documentation.

For more information about actions and links, see “Working with Report Actions and Links” in the *SAS Visual Analytics: Working with Report Data* documentation.

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**Objects: Controls**

- ☐ Assorted Sports Articles
- ☐ Children Sports
- ☐ Clothes
- ☐ Golf
- ☐ Indoor Sports
- ☐ Outdoors
- ☐ Racket Sports
- ☐ Running - Jogging
- ☐ Shoes
- ☐ Swim Sports
- ☐ Team Sports
- ☐ Winter Sports

Use a *list control* to enable viewers to select multiple values.

01Jan2012 to 30Dec2016

01Jan2012

●

●

30Dec2016

Use a *slider control* to enable viewers to select a range of values.

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A control is a report object that filters or narrows the scope of the data viewed in the report. Controls provide a way for report viewers to focus on specific areas of interest.

**Note:** When multiple control objects are used to filter values, the AND operator is used for the filter.



<b>List</b>	<p>A list control enables a viewer to select one or more category values from a list.</p> <p><b>Note:</b> List controls can be used as a report prompt or page prompt only if it is located inside a prompt container or if the report or page control placement option is set to left or right.</p>
<b>Slider</b>	<p>A slider control enables a viewer to move a selector horizontally or vertically to select a single value or a range of values. A slider control accepts only date time or measure data items.</p> <p><b>Note:</b> When a parameter is used with a slider control, the control is converted to a single-point slider.</p>

### Objects: Controls

The diagram illustrates three types of interactive controls:

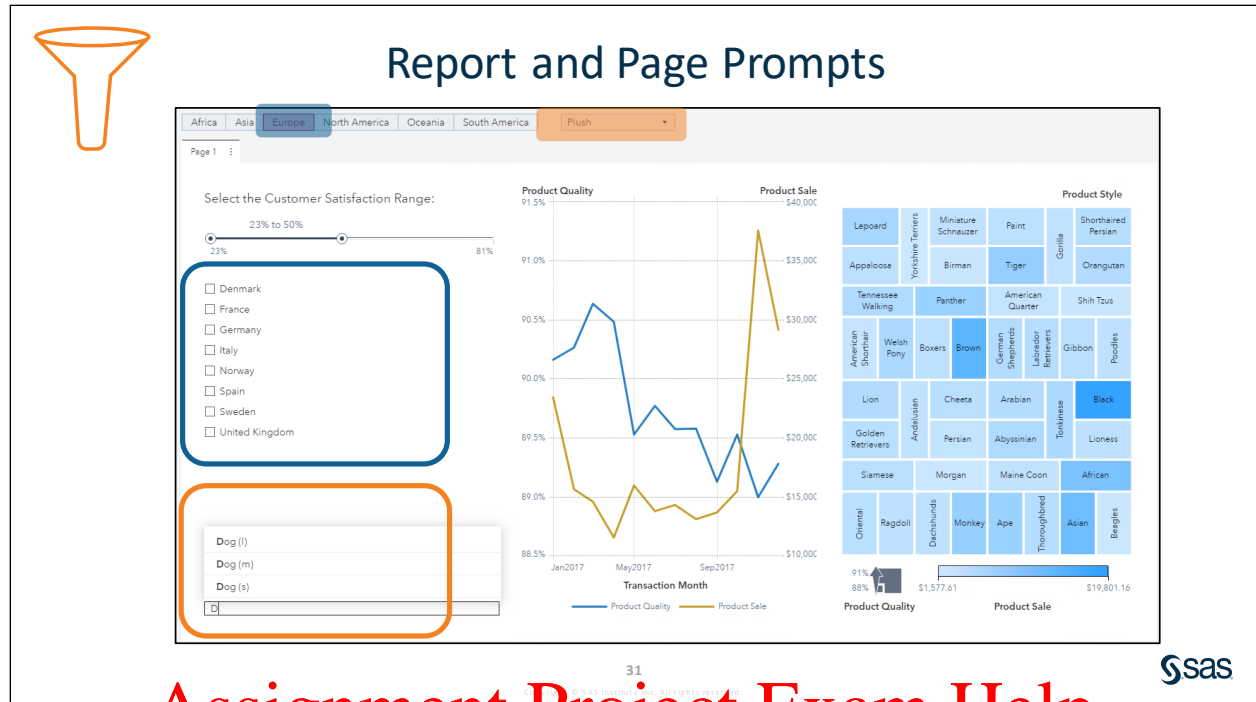
- Button bar:** A horizontal bar with buttons for 'Children', 'Clothes & Shoes', 'Outdoors', and 'Sports'. A callout box states: "On a *button bar*, use a category with few distinct values."
- Drop-down list:** A list titled 'Product Category' with a search filter and a scrollable list of categories including 'Assorted Sports Article', 'Child Sports', 'Clothes', 'Golf', 'Indoor Sports', 'Outdoors', 'Racket Sports', 'Running - Jogging', 'Shoes', 'Swim Sports', 'Team Sports', and 'Winter Sports'. A callout box states: "In a *drop-down list*, use a category with a moderate number of distinct values."
- Text input:** A text field with the letter 'W' entered, showing a list of suggestions: 'Winter Sports', 'Knitwear', 'Street Wear', and 'Twain'. A callout box states: "In a *text input*, use a category with a lot of distinct values."

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<b>Button bar</b>	A button bar control displays buttons, which represent a narrowed scope of data, in a horizontal or vertical layout. A report viewer can select a button to filter a list of category values.
<b>Drop-down list</b>	A drop-down list control enables a viewer to select an item from a list of category values.
<b>Text input</b>	A text input control enables a viewer to enter text in a field to filter the list of category values.

**Note:** The button bar, drop-down list, and text input controls can be used to populate the value of a parameter. For more information about parameters, see “Working with Parameters in Reports” in the *SAS Visual Analytics: Working with Report Data* documentation.



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In the display capture above, page controls are placed on the left side of the page. Beginning in SAS Visual Analytics 8.4, report designers can change the position of report and page controls. The **Placement** option enables you to place the controls at the top, bottom, left, or right. If you want reports that you create to have the same placement for controls, you can use the **Default report controls placement** and **Default page control placement** settings for Visual Analytics. If the report or page controls are placed on the left or right, you can add a list control to the prompt area (as seen above).

**Note:** Report and page prompt areas are not displayed by default when editing a report.

**Note:** Auto controls can be created by dragging data items to the report or page prompt area.

Data Items	Control Type
Category with 1–4 distinct values	Button bar
Category with 5–40 distinct values	Drop-down list
Category with more than 40 distinct values	Text input
Datetime	Slider
Measure	Slider

## 4.04 Activity

Given the distinct values, which control object would you use to filter for each category displayed below?

Product Category - 12
Product Group - 57
Product Line - 4
Product Name - 3.2K

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Actions


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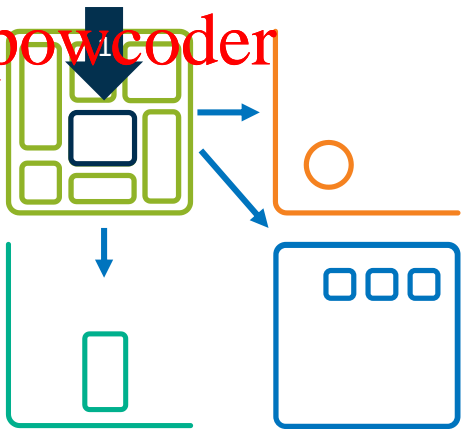


Report

**Linked selection**




**Filter**



34

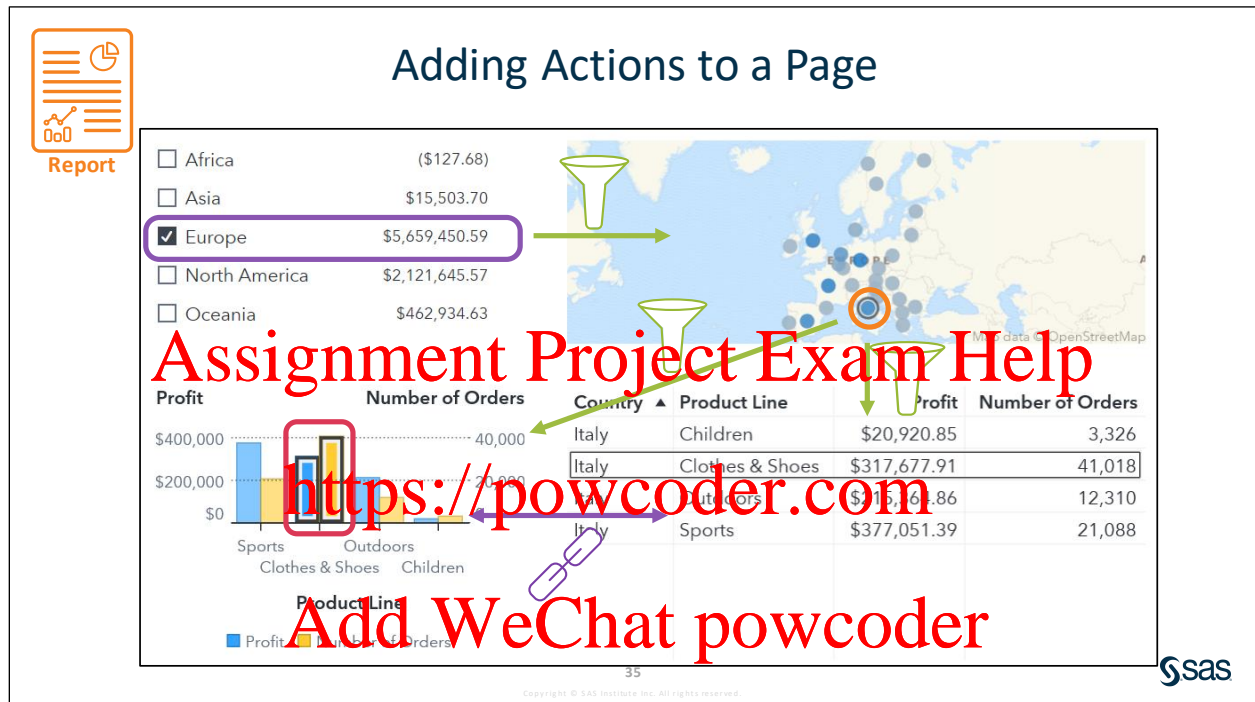
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Actions are used to direct a report viewer's attention to specific results in a report.

The following actions are available:



<b>Linked selection</b>	A linked selection action enables you to show the same data highlighted simultaneously in two or more tables, graphs, or controls on the same page. The data for the linked selection action has the same appearance in each object, which makes the data easily apparent to report viewers.
<b>Filter</b>	A filter action enables you to restrict the data displayed in other objects on the page. A viewer can select a subset of data in the source object and see the restricted data for any target objects.

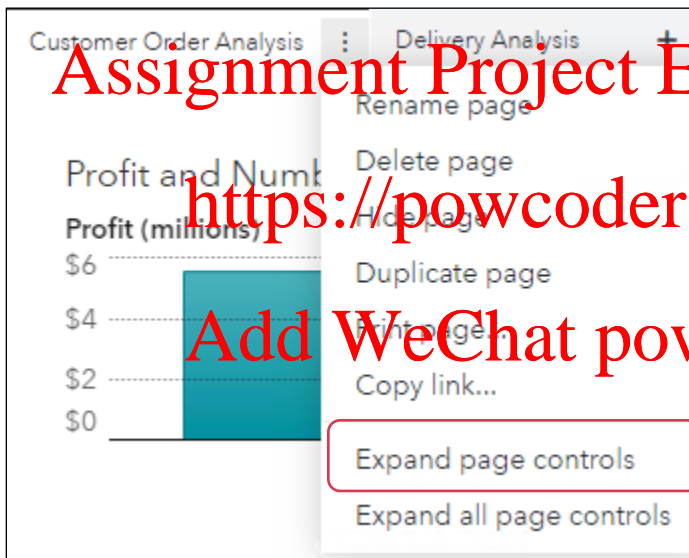




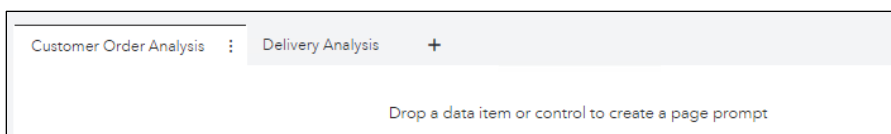
## Working with Prompts and Actions



This demonstration illustrates how to add page prompts and actions to create interactive reports in Visual Analytics.

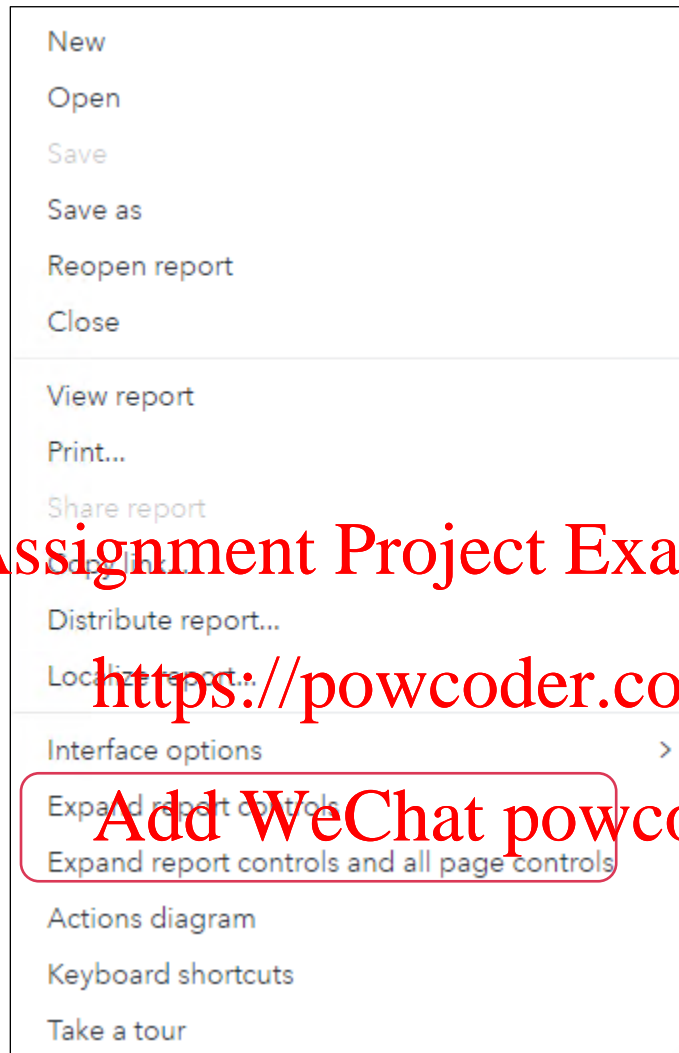
1. From the browser window, sign in to SAS Viya.
2. In the upper left corner, click  (**Show list of applications**) and select **Explore and Visualize**. SAS Visual Analytics appears.
3. Click **All Reports**.
  - a. Navigate to the **Courses/YVA185/Basics/Demos (Marketing)** folder.
  - b. Double-click the **VA1- Demo4.2b** report to open it.
4. Add a page prompt to Customer Order Analysis.
  - a. If necessary, click the **Customer Order Analysis** page to make it active.
  - b. On the Customer Order Analysis tab, click  (**Options**) and select **Expand page controls**.



The page prompt area is shown on the page:



**Note:** You can also display report controls and all page controls for the report. To display the report controls, click  (**Menu**) and select **Expand report controls**. To display both report and page controls, click  (**Menu**) and select **Expand report controls and all page controls**.



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**Note:** In the general settings for Visual Analytics, you can specify whether to expand report and page controls by default for new pages.

Action mode for new pages:

Manual

Default report controls placement:

☐ Expand report controls by default

Default page controls placement:

☐ Expand page controls by default

- c. In the left pane, click **Data**.
- d. Drag **Order Type**, from the Category group, to the **Drop a data item or control to create a page prompt** area.

An auto control determines the best control object to use for the selected data.

Catalog Sale Internet Sale Retail Sale

- e. In the right pane, click **Options**.
- f. In the Object group, for the **Name** field, enter **Order Type Selector**.
- g. For the **Title** field, select **Custom title**.
- h. For the **Title** field, enter **Select an order type:**.

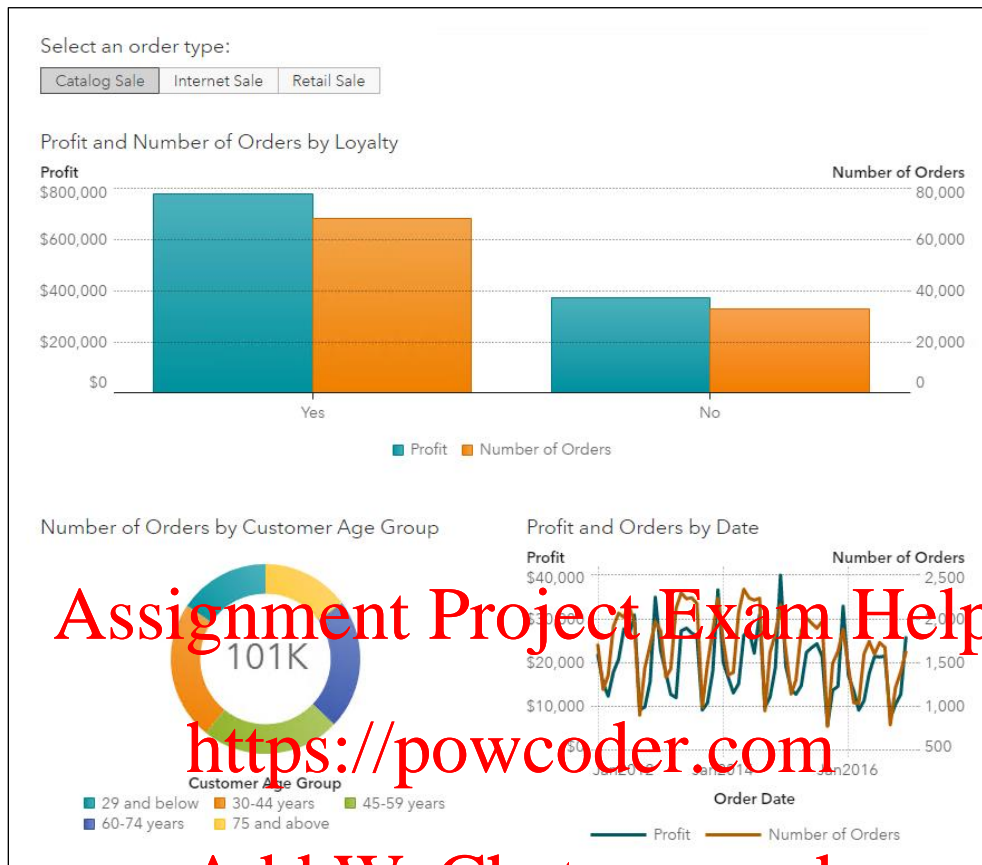
The auto control should resemble the following:



Select an order type:

Catalog Sale Internet Sale Retail Sale

- i. For the control, click **Catalog Sale** to filter the objects on the page.

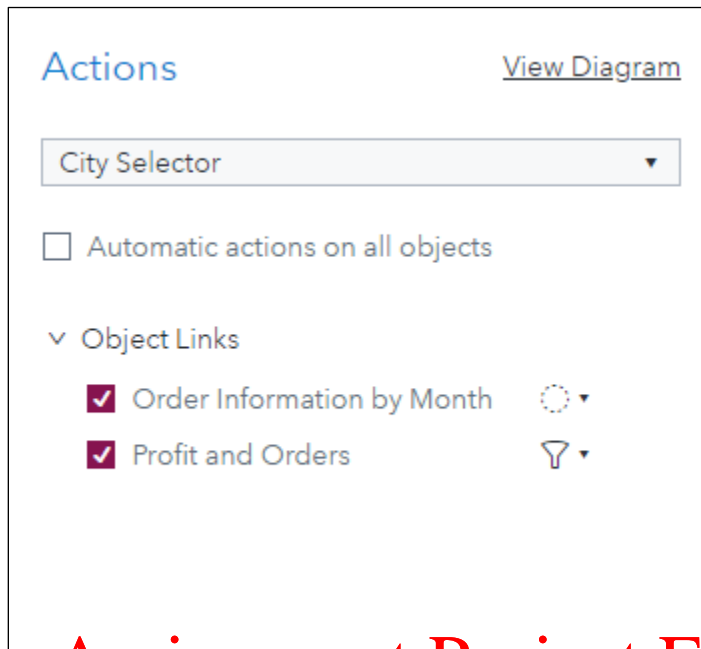
The Customer Order Analysis section should resemble the following:



- j. For the control, click **Catalog Sale** to deselect it.
5. Add actions between objects on the Delivery Analysis page.
- Click the **Delivery Analysis** page to make it active.
  - In the canvas, click the drop-down list control to select it.
  - In the right pane, click **Actions**.
  - In the Object Links group, select **Profit and Orders** (the dual axis bar chart).
  - Verify that  (**Filter**) is selected.
  - Select **Order Information by Month** (the bubble plot).
  - Click  (**Filter**) and select **Linked selection**.



The Actions pane should resemble the following:



6. In the Actions pane, click **View Diagram**.


The Actions Diagram window appears.



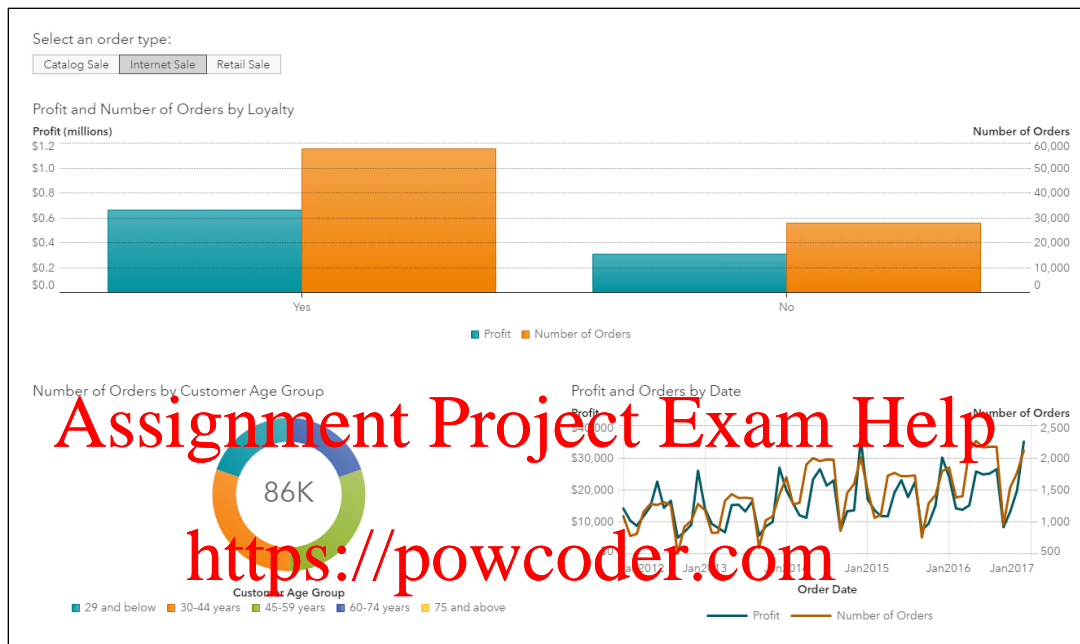
**Note:** The Actions Diagram window can also be used to create actions between objects. Simply click and drag between objects to create the action.

7. Click **Close**.
8. Save the report.

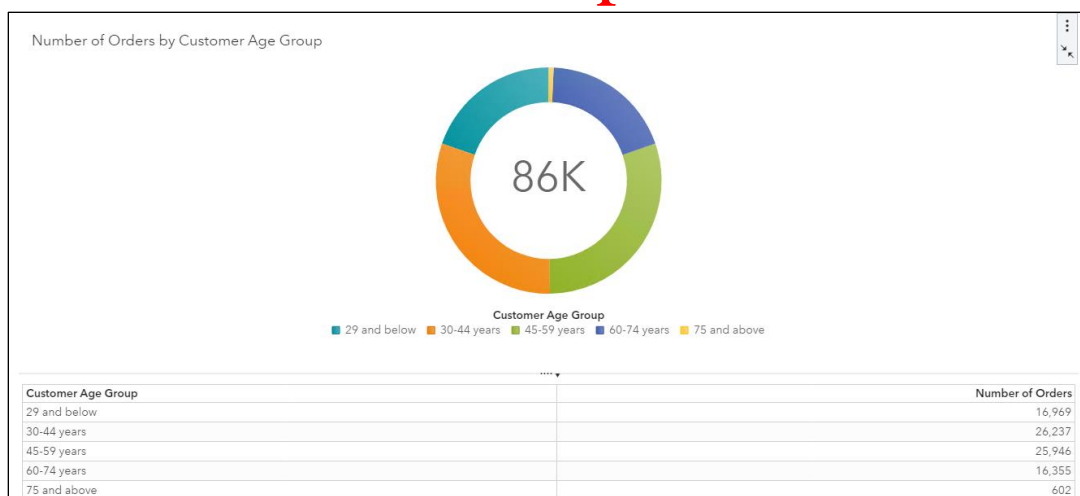
## 9. View the report.

- In the upper left corner, click  (**View report**) to view the report.
- At the top of the report, click the **Customer Order Analysis** tab to make the page active.
- In the button bar, click **Internet Sale**.


The Customer Order Analysis page updates to show information about internet products ordered.



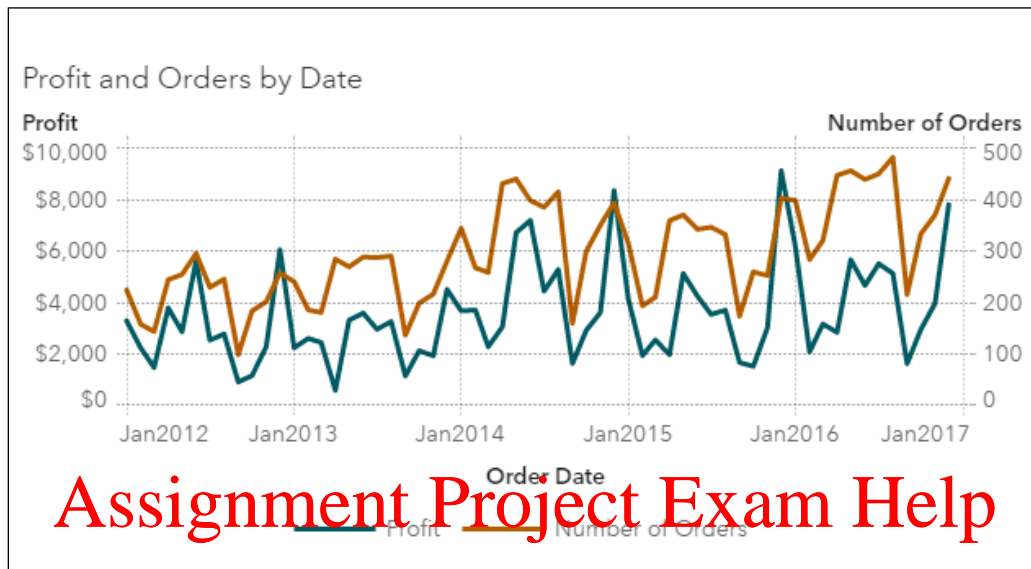
- In the upper right corner of the pie chart, click  (**Maximize**).



A lower percentage of all internet orders is placed by customers in the older age groups (60-75 years and 75 and above) compared to younger age groups. This appears to be a generational difference. How do we plan for this difference in ordering patterns among different age groups? Do we expect this difference to continue over time, or do we expect the difference to eventually get smaller?

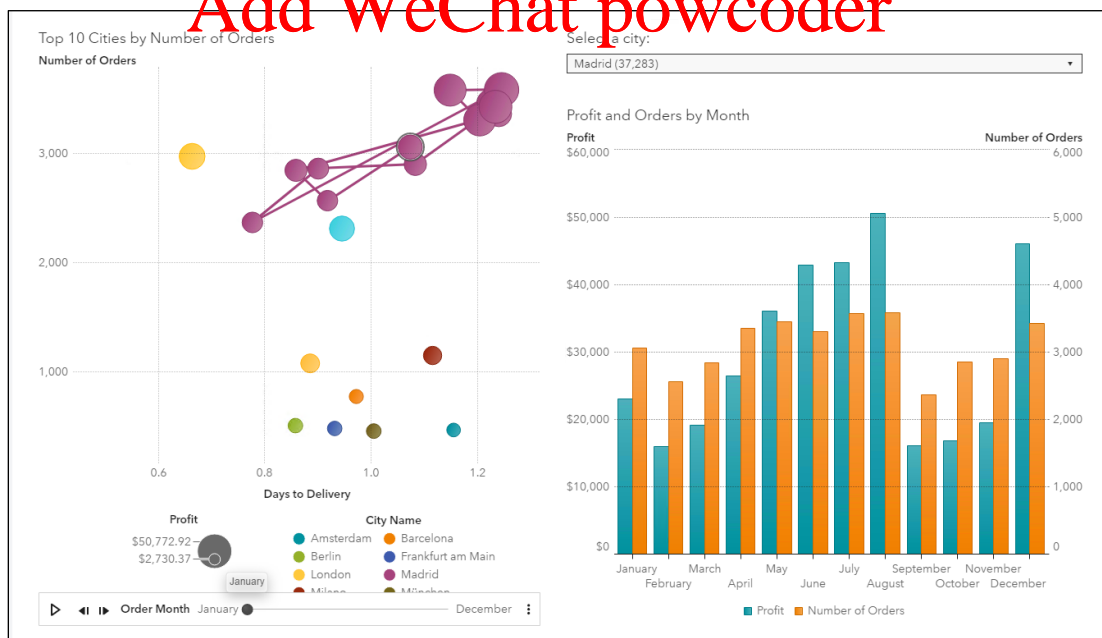
- e. In the upper right corner of the pie chart, click  (**Restore**).
- f. In the dual axis bar chart, click the bars for **Yes**.
- g. In the pie chart, click the slice for **30–44 years** (orange slice).

The dual axis time series plot should resemble the following:



- h. At the top of the report, click the **Delivery Analysis** tab to make the page active.
- i. In the drop-down list control, select **Madrid**.

The bubble for Madrid is highlighted in the bubble plot, and the dual axis bar chart is filtered to show profit and orders by month for Madrid.



Looking at the bubble plot, you can see a positive association between the number of orders and the days to delivery for Madrid. As the number of orders increase, so does the time it takes to receive the delivery. Looking at the dual axis bar chart, you can see that the number

of orders peak around the summer and winter months. This could indicate more interest in buying sports and outdoor products during this time. However, notice that profits spike in August and December. Why are profits so much higher in those specific months?

- j. In the upper right corner, click  (**Menu**) and select **Close** to close the report.

**End of Demonstration**

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## Practice

### 3. Working with Prompts and Actions

- Open the browser and sign in to SAS Viya.
- Open the **VA1- Practice4.2b** report from the **Courses/YVA185/Basics/Practices (HR)** folder.
- Add a report prompt that uses a button bar to select the employee status.
- Modify the following options for the button bar:

<b>Name</b>	Employee Status Selector
<b>Title</b>	Select an employee status:

The button bar should resemble the following:

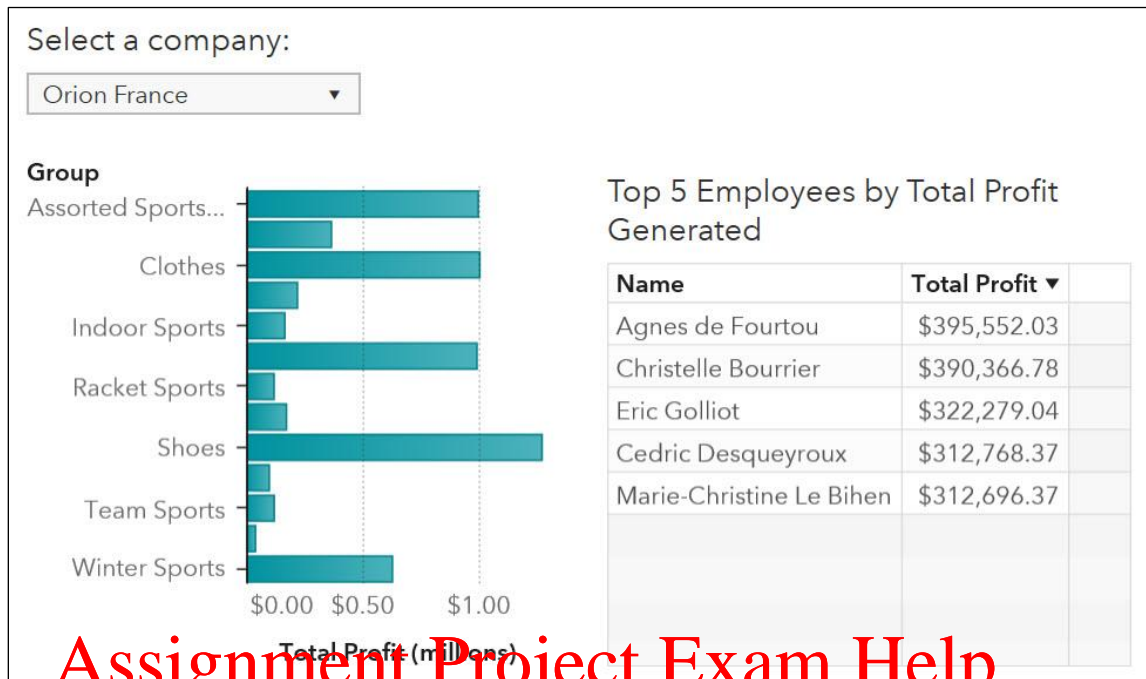
- Add the following actions between objects on the Employee Analysis page:
  - The geo map filters the bar chart and the dual axis bar-line chart.
  - The bar chart highlights the dual axis bar-line chart.
- On the Profit Analysis page, add a rank to the list table to show the top five employees by **Total Profit**.

**Hint:** Add a rank for all visible categories.

The list table should resemble the following:

Name	Total Profit ▼	
Agnes de Fourtou	\$395,552.03	
Christelle Bourrier	\$390,366.78	
Eric Golliot	\$322,279.04	
Cedric Desqueyroux	\$312,768.37	
Marie-Christine Le Bihen	\$312,696.37	

The Profit Analysis page should resemble the following:



- g. Save the report.
- h. View the report and answer the following questions:

Which job title has the highest average profit among active employees in Australia?

**Answer:** \_\_\_\_\_

For Orion USA, which active sales representative had the highest total profit generated for the Indoor Sports group?

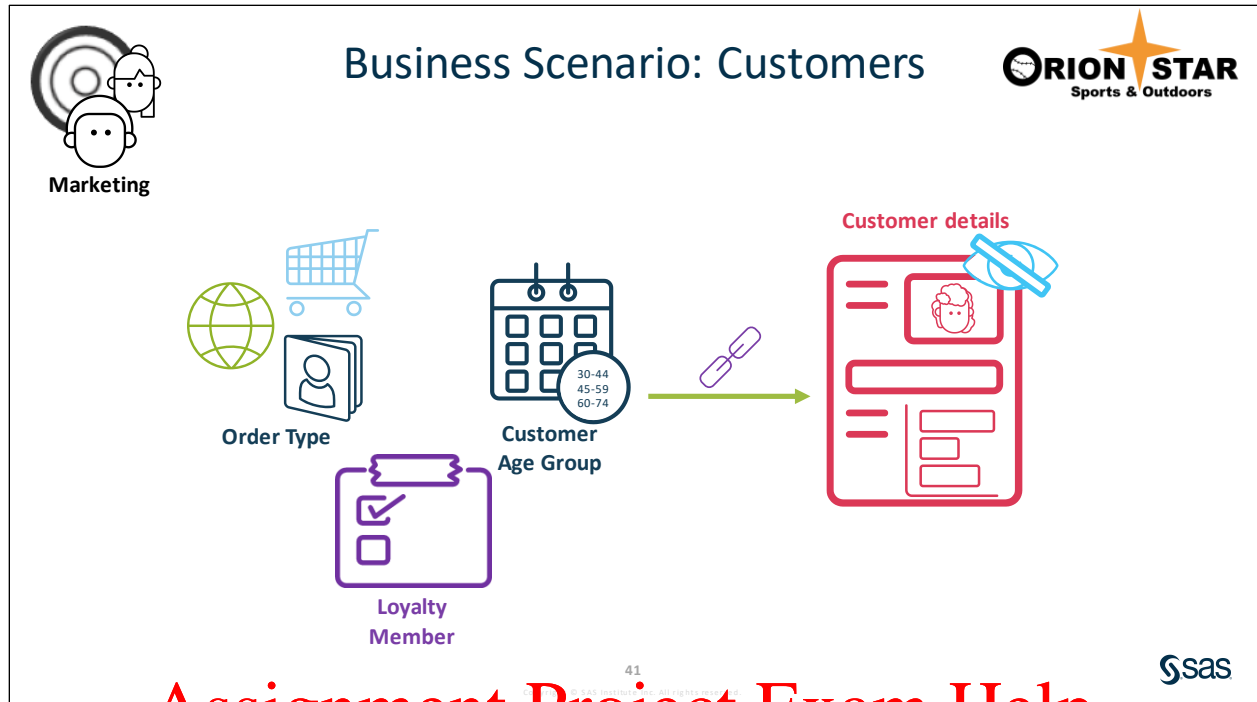
**Answer:** \_\_\_\_\_

For Orion France, how many active sales representatives sold items for the Racket Sports group?

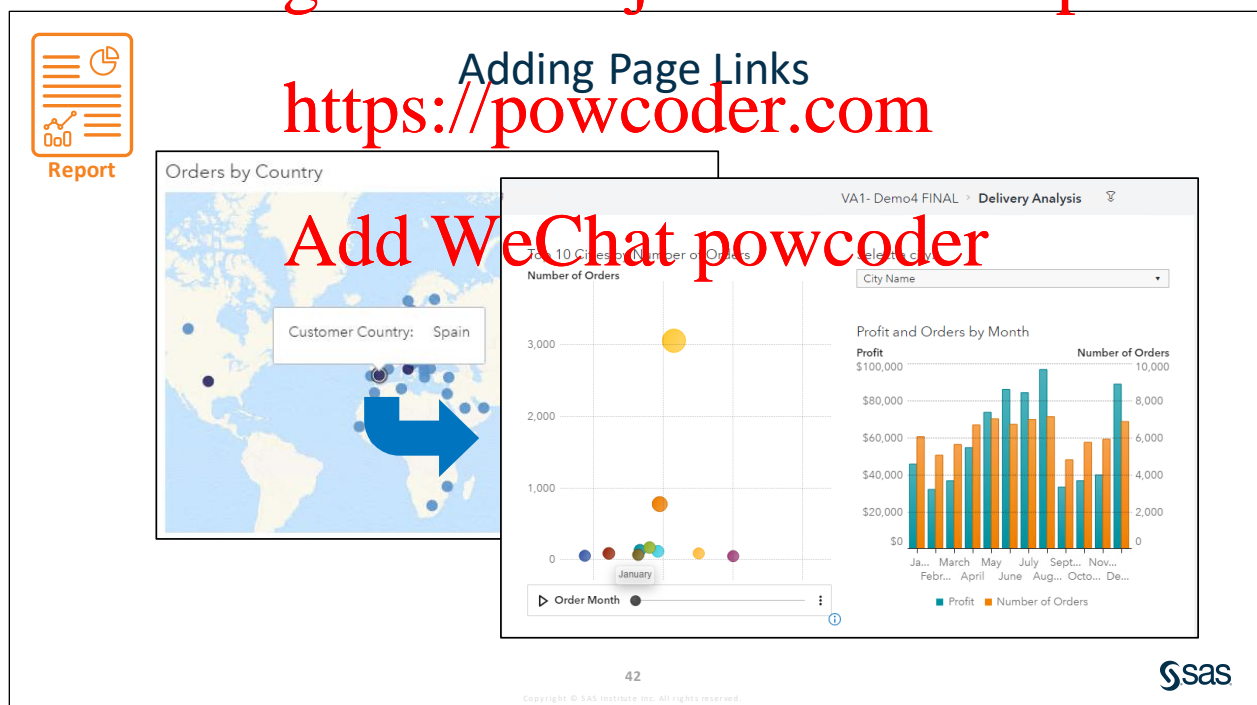
**Answer:** \_\_\_\_\_

- i. Close the report.

**End of Practices**



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Linking has elements of both a filter and an action. A page that is the target of a link is filtered by the values selected in the linked report object.

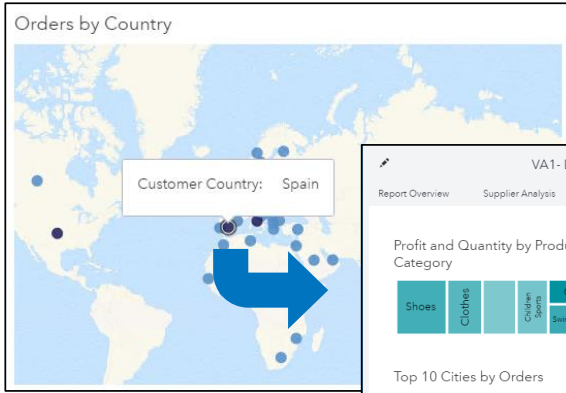
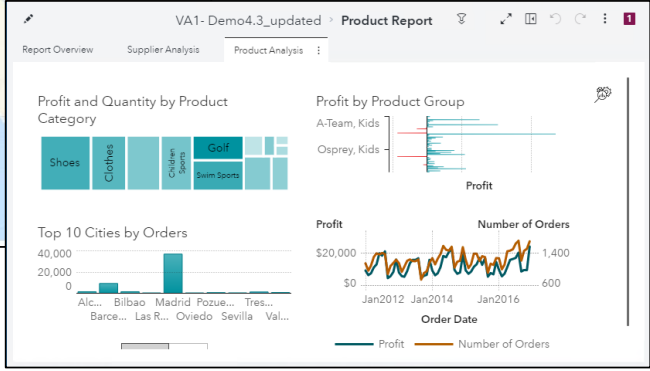
If the source and the target use the same data source, an automatic filter is passed through the link. If the source and the target use different data sources, you have the ability to map data sources, so a filter is passed through the link.



## Adding Report Links



Report

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If the destination report contains multiple pages, then when you define the link, you can choose the initial page of the destination report that opens first.

## Adding URL Links



Report




**Note:** You can specify additional parameters to pass a data item value to the URL.

**Add URL Link Action**

Source:  
Profit by Continent and Order Type

Name:

URL:

Parameters +

	Source:	Target:	
<input checked="" type="checkbox"/> Format	<input type="text" value="Continent Name"/>	<input type="text" value="Continent"/>	
<input checked="" type="checkbox"/> Format	<input type="text" value="Order Type"/>	<input type="text" value="Order"/>	

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## Working with Hidden Pages and Page Links

This demonstration illustrates how to create hidden pages and how to add page links to create interactive reports in Visual Analytics.

1. From the browser window, sign in to SAS Viya.
2. In the upper left corner, click  (**Show list of applications**) and select **Explore and Visualize**. SAS Visual Analytics appears.
3. Click **All Reports**.
  - a. Navigate to the **Courses/YVA185/Basics/Demos (Marketing)** folder.
  - b. Double-click the **VA1- Demo4.2c** report to open it.
4. Change the name of Page 3 and hide the page.
  - a. Click the **Page 3** tab to make the page active.
  - b. Double-click the **Page 3** heading to make it editable.
  - c. Enter **Customer Details** and press Enter.
  - d. Click  (**Options**) and select **Hide page** to make the page hidden.

**Note:** Hidden pages do not appear when viewing the report unless they are linked to.
5. Modify the size of the hidden page.
  - a. In the right pane, click **Options**.
  - b. In the General group, for the **Window width (percentage)** field, enter **75**.
  - c. For the **Window height (percentage)** field, enter **75**.

The Options pane should resemble the following

Options

Customer Details

General

Name: \*

Customer Details

☒ Hide and link to page as pop-up window

Window width (percentage):

75

Window height (percentage):

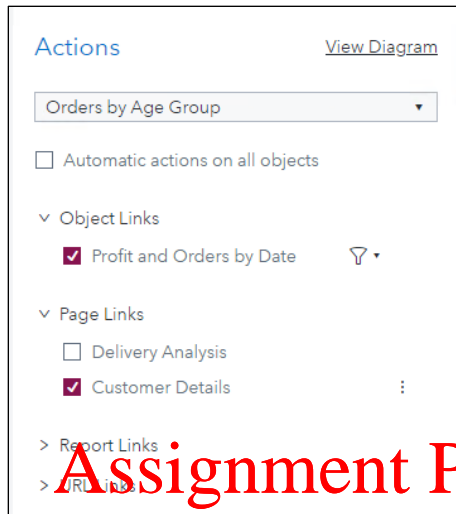
75

☐ Periodically reload page data

6. Add links between objects.
  - a. Click the **Customer Order Analysis** page to make it active.


- b. In the canvas, click the pie chart to make it active.
- c. In the right pane, click **Actions**.
- d. In the Actions pane, expand **Page Links**.
- e. Select **Customer Details**.

The Actions pane should resemble the following:

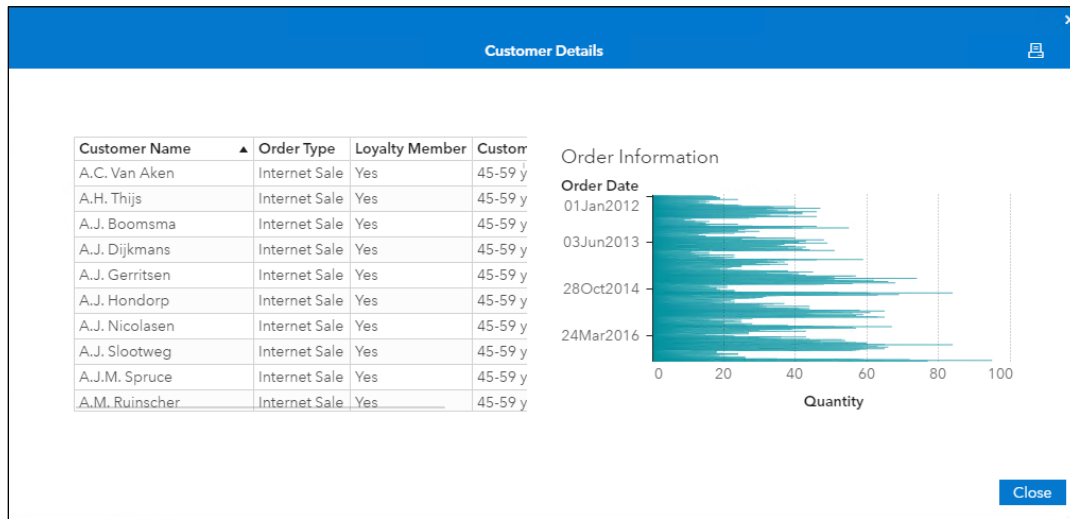


7. Save the report.

8. View the report.

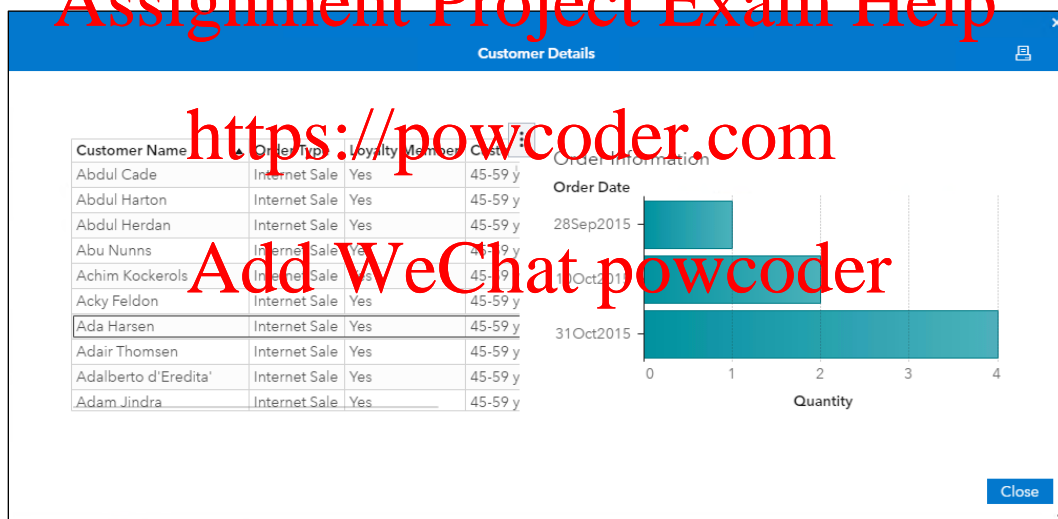
- a. In the upper left corner, click  (**View report**) to view the report.
- b. In the button bar, select **Internet Sales**.
- c. In the dual axis bar chart, select **Yes**.
- d. In the pie chart, double-click the slice for **45–59 years** (green slice).

The Customer Details hidden page appears as a pop-up window and shows details about female customers in the 45-59 age group who placed orders via the internet.




- e. In the list table, select the row for **Ada Harsen**.

The hidden window should resemble the following:



Ada seems to place a lot of orders in the same time frame (fall). Why does she place orders during the same time period? Does her birthday or a friend's birthday fall near this time? If so, we might want to try to offer her discounts at other times of year to increase her orders.

- f. Click **Close** to close the hidden window.
- g. In the upper right corner, click  (**Menu**) and select **Close** to close the report.

**End of Demonstration**



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## Practice

### 4. Working with Hidden Pages and Page Links

- a. Open the browser and sign in to SAS Viya.
- b. Open the **VA1- Practice4.2c** report from the **Courses/YVA185/Basics/Practices (HR)** folder.
- c. Hide **Page 3** and rename the page as **Employee Details**.
- d. Modify the following options for the hidden page, Employee Details:

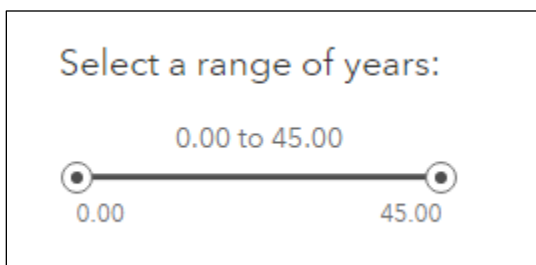
Window width (percentage)	75
Window height (percentage)	75

- e. Add a page prompt to the Employee Details page that uses a slider control to select a range of values for years of service.
- f. Modify the following options for the slider control:

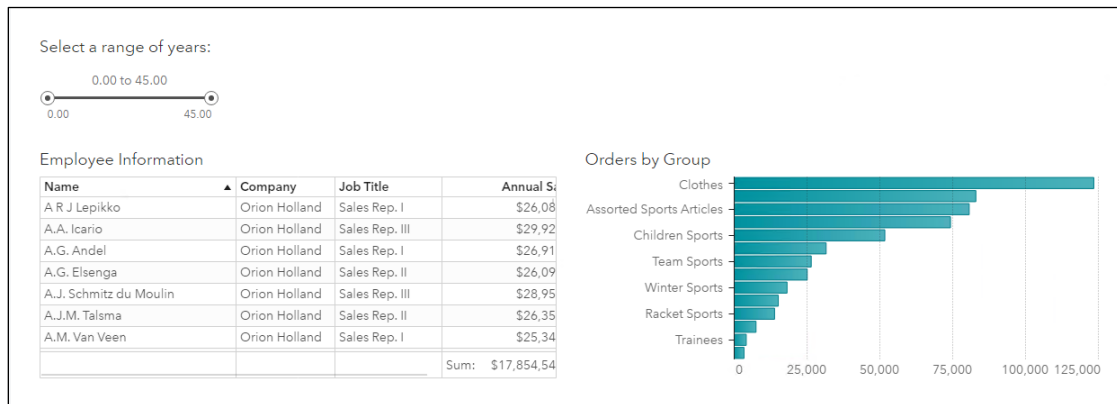
Object: Name	Years of Service Selector
Object: Custom Title	Select a range of years:
Slider: Act on aggregated data in filtered objects	<selected>
Slider: Minimum	0
Slider: Maximum	45

**Hint:** Select the entire range of years for the slider control.

The slider control should resemble the following:



The Employee Details page should resemble the following:



- g. Add a page link from the bar chart on the Employee Analysis page to the Employee Details page.
- h. Save the report.
- i. View the report and answer the following questions:

How many employees retired in Italy with the Sales Rep. III job title?

Answer: \_\_\_\_\_

Management has decided to start promotions with active employees in the United States with the Sales Rep. I job title. Of the active employees with 25 or more years of service, how many generate a total profit more than \$200,000?

Answer: \_\_\_\_\_

- j. Close the report.

**End of Practices**

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