# Exercise 5: D) and E) Analyzing Data Using SAS® Visual Analytics

To Login to SAS: https://vle.sas.com/vfl

### 3.3 Creating Data Items and Applying Filters

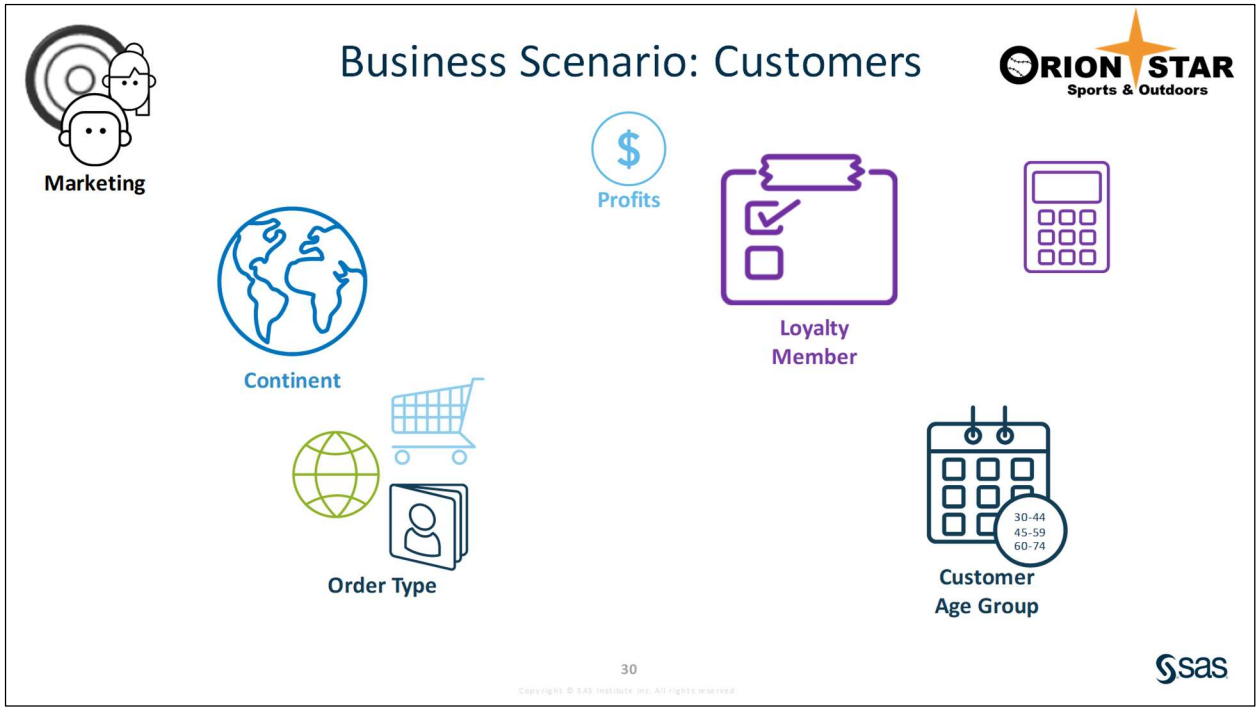
Demonstartion: Creating Data Items

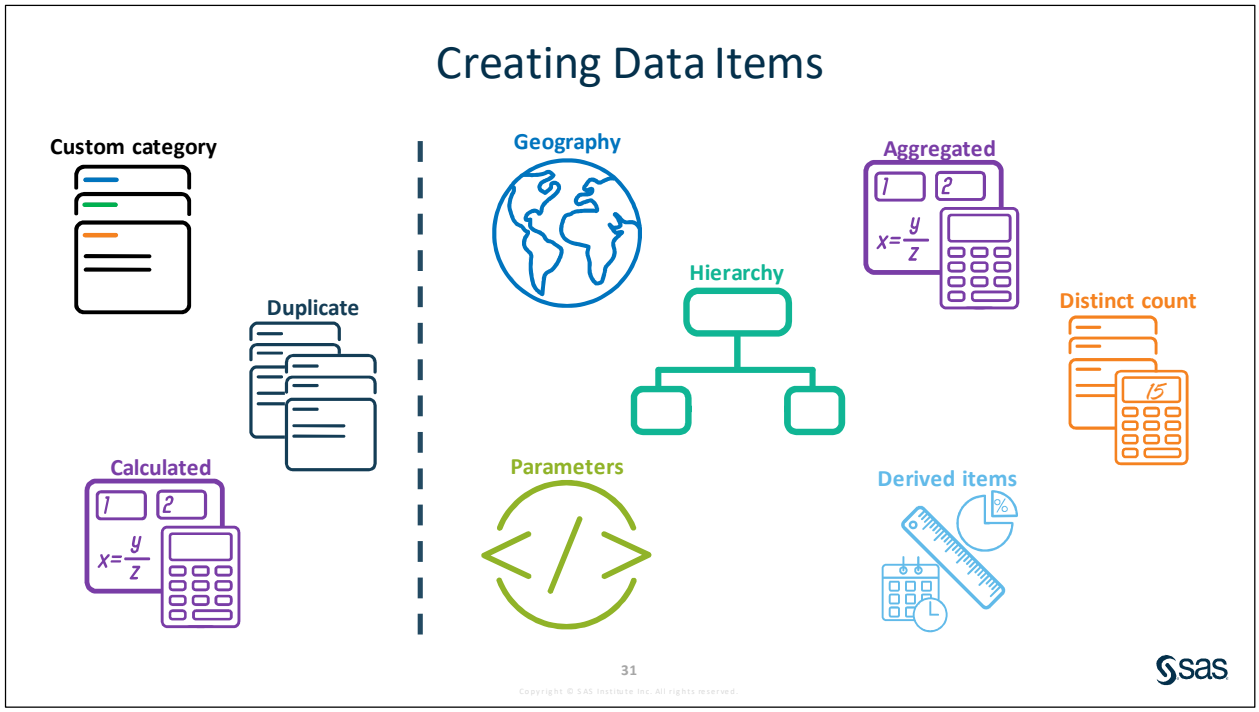
Exercise 3D

Demonstartion: Applying Filters

Exercise 3E

# 3.1 Creating Data Items and Applying Filters



The following types of data items can be created in SAS Visual Analytics, using code, or in SAS Data Studio or SAS Enterprise Guide:

| | |
|---|---|
| **Custom category** | A custom category creates labels for groups of values of category or measure data items. When you create a custom category from a measure data item, you can use intervals or distinct values to group the data. For more information about custom categories, see “Working with Custom Categories in a Report” in the *SAS Visual Analytics: Working with Report Data* documentation. |
| **Duplicate** | Both measures and categories can be duplicated (copied) in Visual Analytics. Duplicating measures enables you to compare the data using different aggregations in a table or graph or change the classification to a category for grouping other values in tables or graphs. Duplicating datetime values enables you to apply different formats to the values for use in tables or graphs. Duplicating calculated items enables you to make variations to a calculation. For more information about duplicating data items, see “Working with Data Items in a Report” in the *SAS Visual Analytics: Working with Report Data* documentation. |
| **Calculated item** | Calculated items are created by performing mathematical calculations on numeric values, or by performing operations on datetime data items or categories. All calculations are performed on unaggregated data. That is, the expression is evaluated for each row in the data source. For more information about creating calculated data items, see “Working with Calculated Items in a Report” in the *SAS Visual Analytics: Working with Report Data* documentation. For more information about operators, see “Reference: Operators for Data Expressions” in the *SAS Visual Analytics: Working with Report Data* documentation. |

The following types of data items need to be created in Visual Analytics:

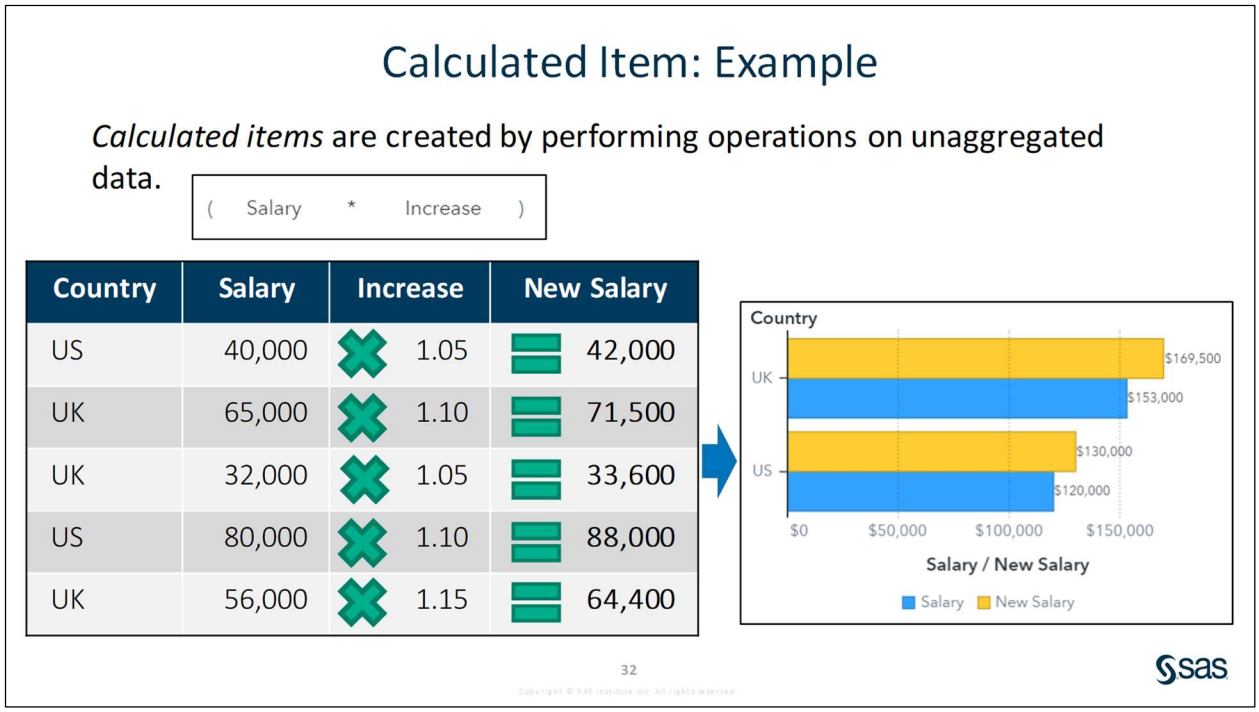
| | |
|---|---|
| **Geography** | A geography data item is a category whose values are mapped to geographical locations or regions. Geography data items can be used with geo maps and other report objects. Geography data items can be created using predefined roles (for example, country names), by associating latitude and longitude coordinates with the values (custom), or by associating polygon data from a separate data source with map regions (custom). For more information about creating geography data items, see “Working with Geography Data Items” in the *SAS Visual Analytics: Working with Report Data* documentation. |
| **Aggregated measure** | Aggregated measures enable you to calculate new data items using aggregated values. This means that the calculation changes depending on the other data items available in the graph. For example, you can see the profit margin for each region or by each store. For more information about creating calculated data items, see “Working with Calculated Items in a Report” in the *SAS Visual Analytics: Working with Report Data* documentation. |

<table>
<tr><td>Hierarchy</td><td>A hierarchy is a defined arrangement of category data items based on a parent-child relationship. In many cases, the levels of the hierarchy are arranged with the more general information at the top (for example, year) and the more specific information at the bottom (for example, month). Hierarchies enable you to add drill-down functionality to graphs and tables. Hierarchies that consist of all geographic data items are considered geographic hierarchies and can be used in geo maps.<br><br>Note: You can create a date hierarchy from a date data item. The date hierarchy, by default, has levels for year, quarter, month, and day. A date hierarchy created from a datetime data item has levels, by default, for year, quarter, month, day, hour, minute, and second.<br><br>For more information about hierarchies, see “Working with Hierarchies in a Report” in the SAS Visual Analytics: Working with Report Data documentation.</td></tr>
<tr><td>Distinct count</td><td>A distinct count counts the number of distinct values of a category data item as an aggregated measure. This means that the calculation changes depending on the other data items available in the graph. For example, you can see the number of orders placed for each age group or the number of orders placed for each country by creating a distinct count from Order ID. For more information about creating distinct counts, see “Working with Data Items in a Report” in the SAS Visual Analytics: Working with Report Data documentation.<br><br>Note: If the category contains missing values, the distinct count is increased by one. A configuration setting can modify this behavior.</td></tr>
<tr><td>Parameter</td><td>A parameter is a variable whose value can be changed and that can be referenced by other report objects. Parameters can be used in control objects in Visual Analytics. When the value of the control changes, the parameter is updated with that value, and any report objects that reference that parameter are updated as well. Parameters can be used in calculations, display rules, filters, ranks, URLs, and text objects. For more information about parameters, see “Working with Parameters in Reports” in the SAS Visual Analytics: Working with Report Data documentation.</td></tr>
<tr><td>Derived item</td><td>Derived data items are aggregated measures that display values for the measure and the formula type on which the derived item is based.<br><br>The following types of derived items can be created from category data items:<br><br>Distinct count — Displays the number of distinct values for the selected category. For more information, see the distinct count row above.<br><br>Count — Displays the number of nonmissing values for the selected category.<br><br>Number missing — Displays the number of missing values for the selected category.<br><br>The following types of derived data items can be created from measure data items:<br><br>Cumulative total — Displays a running total of all the values for the measure on which it is based.</td></tr>
</table>

| | | |
|---|---|---|
| | **Data suppression** | Obscures aggregated data if individual data values could easily be inferred. Data suppression replaces all values for the measure on which it is based with an asterisk (*) unless a value represents the aggregation of a specified minimum number of values. For more information, see “Reference: Operators for Data Expressions” in the *SAS Visual Analytics 8.3: Working with Report Data* documentation. |
| | **Difference from previous period** | Displays the difference between the value for the current time period and the value for the previous time period. |
| | **Difference from previous parallel period** | Displays the difference between the value for the current time period and the value for the previous parallel time period within a longer time interval. |
| | **Moving average** | Displays a moving average (rolling average) for the measure on which it is based. The moving average calculates the average for each value with the specified number of preceding values. |
| | **Percent difference from previous period** | Displays the percentage difference between the value for the current time period and the value for the previous time period. |
| | **Percent difference from previous parallel period** | Displays the percentage difference between the value for the current time period and the value for the previous parallel time period within a longer time interval. |
| | **Percent of subtotals** | Displays the percentage of the subtotal value for the measure on which it is based. You can create a percentage of subtotal only when the source data item has an aggregation of Sum or Count.<br>**Note:** The Percent of subtotals derived item is available only for use in crosstabs.<br>**Note:** The Percent of subtotals derived item is relative to the subset of data that is selected by your filters and ranks. |
| | **Percent of total - sum** | Displays the percentage of the total value for the measure on which it is based. You can create a percentage of total only when the source data item has an aggregation of Sum or Count.<br>**Note:** The Percent of total – sum derived item is relative to the subset of data that is selected by your filters and ranks. |
| | **Period to date** | Displays the aggregated value for the current time period and all of the previous time periods within a larger time interval. |

| | | |
|---|---|---|
| | **Year to date** | Displays the aggregated value for the current time period and all of the previous time periods within the year. The year-to-date calculation subsets the data for each year using today's date (where today is evaluated each time you view the report). |
| | **Year to date growth** | Displays the percentage difference between the year-to-date value for the current time period and the year-to-date value for the same time period of the previous year. The year-to-date calculation subsets the data for each year using today's date (where today is evaluated each time you view the report). |
| | **Year over year growth** | Displays the percentage difference between the current time period and an equivalent time period from the previous year. The year-over-year calculation subsets the data for each year using today's date (where today is evaluated each time you view the report). |
| | For more information about derived items, see "Working with Data Items in a Report" in the *SAS Visual Analytics: Working with Report Data* documentation. | |

**Note:** Creating calculated items and aggregated measures is discussed in more detail in the SAS Visual Analytics 2 for SAS Viya: Advanced course.



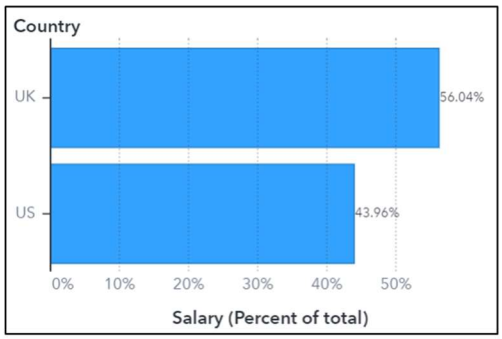
## Aggregated Measure: Example

*Aggregated measures* are created by aggregating first and then performing the operation.

( Sum _ByGroup_ ( Salary ) / Sum _ForAll_ ( Salary ) )

| Country | Salary |
|---|---|
| US | 40,000 |
| UK | 65,000 |
| UK | 32,000 |
| US | 80,000 |
| UK | 56,000 |

| Country | Salary |
|---|---|
| US | 120,000 |
| UK | 153,000 |
| TOTAL | 273,000 |

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**Note:** Distinct counts and derived data items are special types of aggregated measure.

## 3.03 Activity

Match each new data item with the type of calculation.

___ Gross Profit Margin (Total Profit/ Total Revenue)

___ Date (from month, day, year)

___ Hemisphere (from continents)

___ GDP Growth (year-over-year)

___ Number of Employees (distinct count)

___ State Abbreviations (uppercase)

A. calculated item

B. aggregated measure

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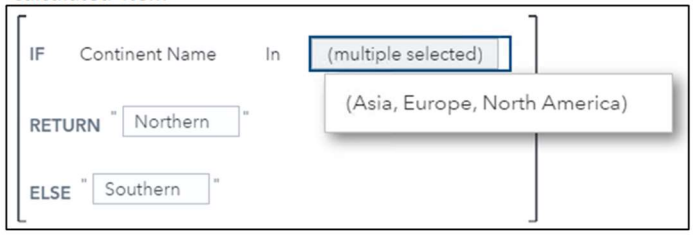
# Custom Category: Example

*Custom categories* create labels for groups of category or measure data items.

**Custom category**


**Calculated item**




This calculated item and custom category produce equivalent results.

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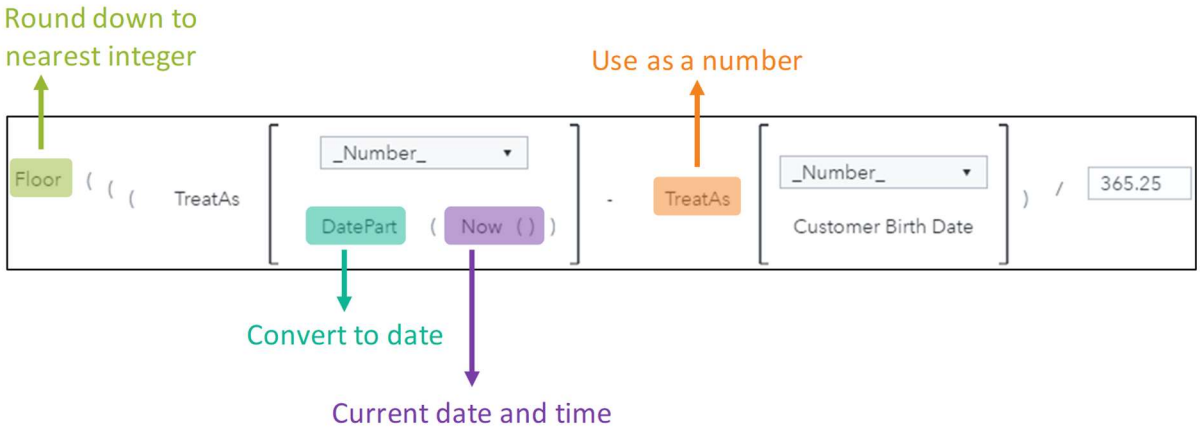
# Calculated Columns: Customer Age

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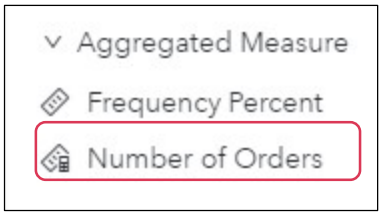
**Note:** SAS Visual Analytics treats datetime values as character data. To use numeric operators with datetime values, the TreatAs operator is required.

# Creating Data Items

This demonstration illustrates how to create new data items (distinct counts, custom categories) in Visual Analytics.

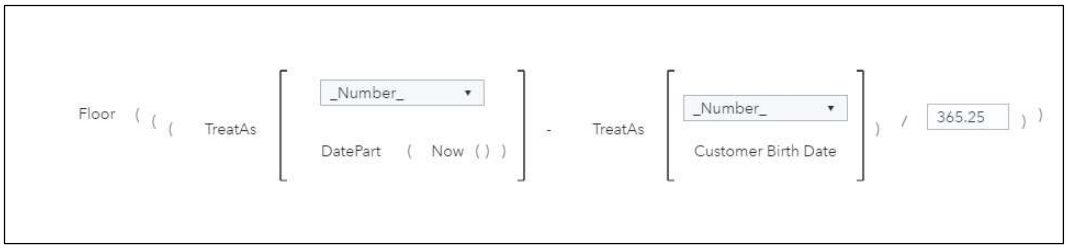
1. From the browser window, sign in to SAS Viya.
2. In the upper left corner, click ☰ (**Show list of applications**) and select **Explore and Visualize**.

   SAS Visual Analytics appears.
3. Click **All Reports**.
   a. Navigate to the **Courses/YVA185/Basics/Demos (Marketing)** folder.
   b. Double-click the **VA1- Demo3.3a** report to open it.
4. In the upper left corner of the report, click the **Page 3** tab.
5. View new calculated items (**Number of Orders**, **Customer Age**, and **Customer Age Group**).
   a. In the left pane, click **Data**.
   b. In the Aggregated Measure group, Right Click on **Number of Orders** (new derived data item) and select Edit.



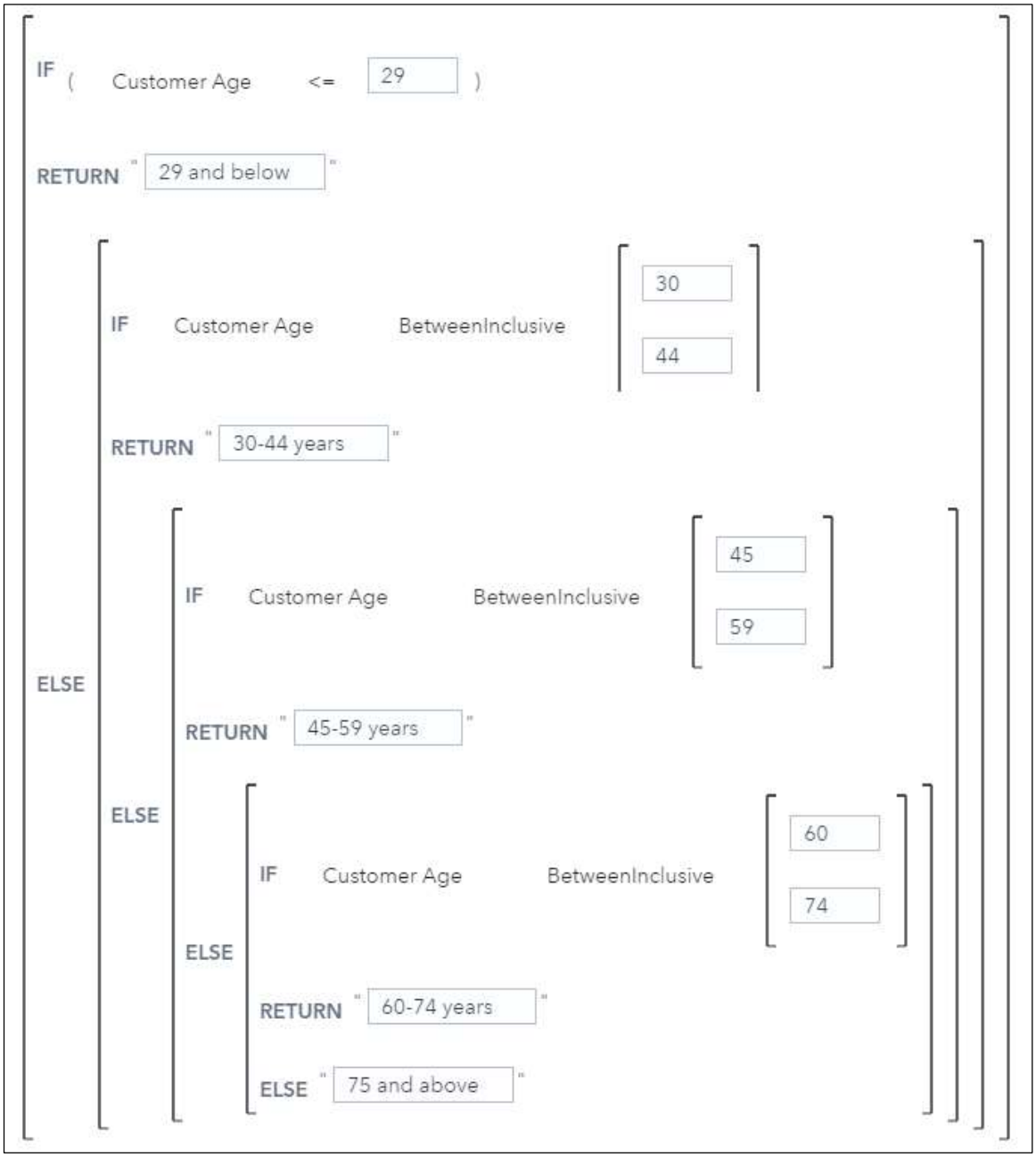

   You will see this in the **"Edit Calculated Item"** window. Then close the window.


   c. In the Measure group, view **Customer Age** (new calculated data item) the same way (right click on **Customer Age** and select **Edit**.



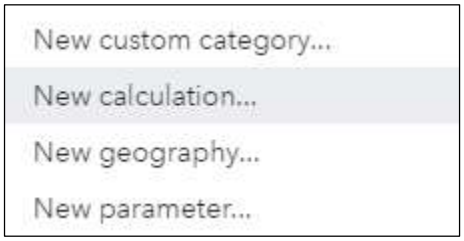

d. In the Category group, right-click **Customer Age Group** and select **Edit**.

The expression should resemble the following:

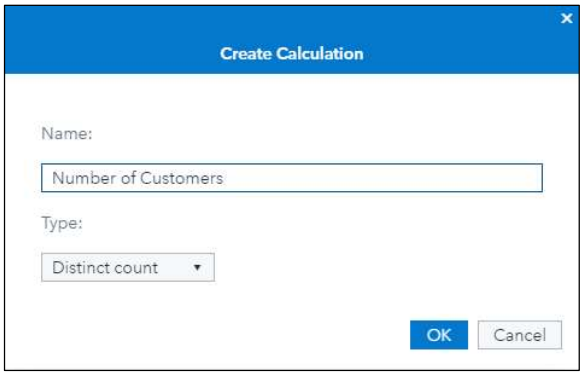



e. Click **Cancel** to close the Edit Calculated Item window.

6. Create new distinct count data items.
   a. In the Category group, right-click **Customer ID** and select **New calculation**.

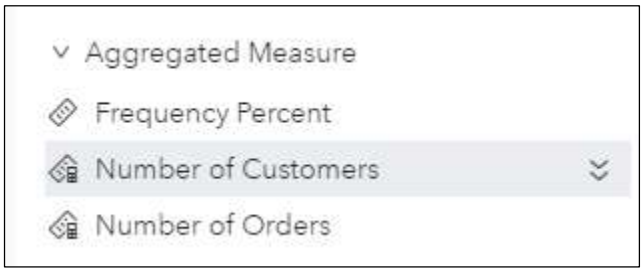



   b. In the **Name** field, enter **Number of Customers**.
   c. For the **Type** field, verify that **Distinct count** is selected.




   d. Click **OK**.

      The new data item, **Number of Customers**, is added to the Aggregated Measure group.



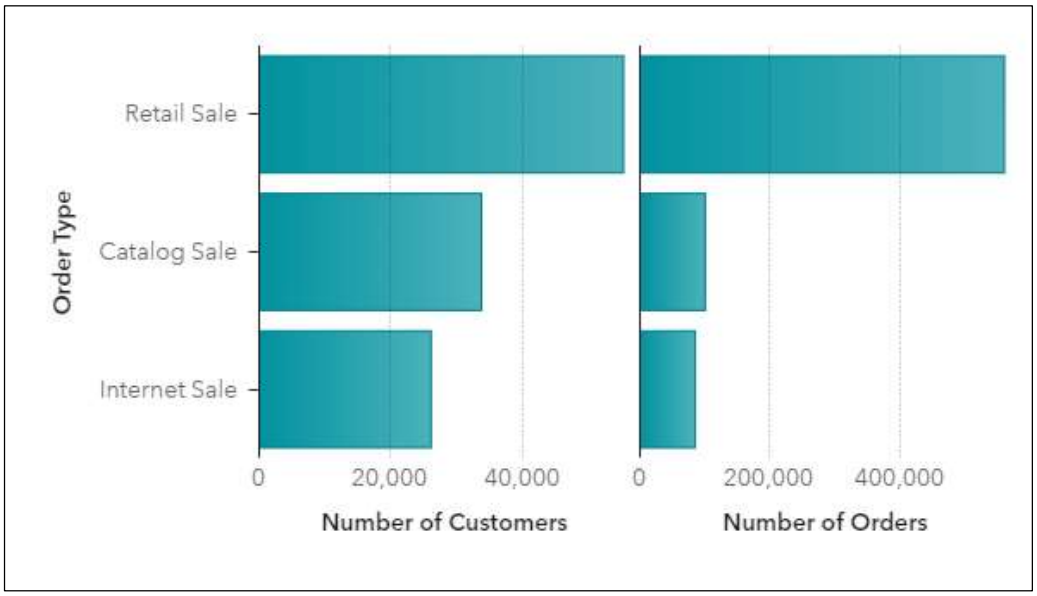

7. Create an automatic chart.
   a. In the Data pane, select the following data items: Press ctrl and click below items

      **Number of Orders** (under Aggregated Measure)

      **Order Type** (under Category Group)

      **Note:** **Number of Customers** should already be selected.
   b. Drag the items to the left side of the canvas.

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




Total profit is lower in the internet and catalog channels because there are fewer customers that place orders through those channels. There are also significantly lower orders placed through those channels.

c. In the right pane, click **Options**.

d. In the Object group, for the **Name** field, enter **Customers and Orders by Order Type**.

8. Duplicate a data item and modify data item properties.

   a. In the left pane, click **Data**.

   b. In the Measure group, right-click **Profit** and select **Duplicate**.

   c. Next to the new data item, **Profit (1)**, click (**Edit properties**).

   d. For the **Aggregation** field, select **Average**.

   e. In the **Name** field, enter **Average Profit** and press Enter.

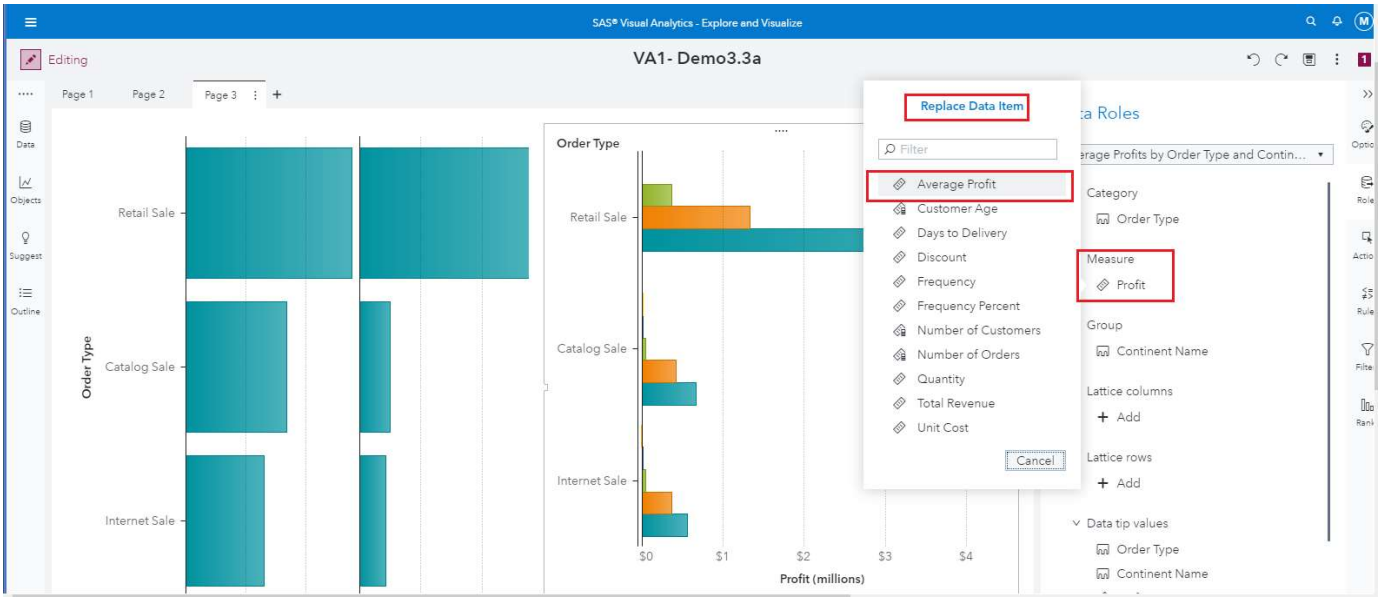
9. Modify the **Average Profits by Order Type and Continent** bar chart.

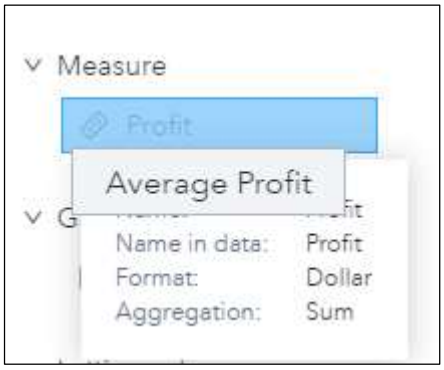
   a. In the canvas, click the **Average Profit by Order Type and Continent** bar chart to make it active.

   b. In the right pane, click **Roles**.

   ~~c. In the left pane, click **Data**.~~

d. Click on **Profit** under the Measure and select **Average profit, illustrated as below:**

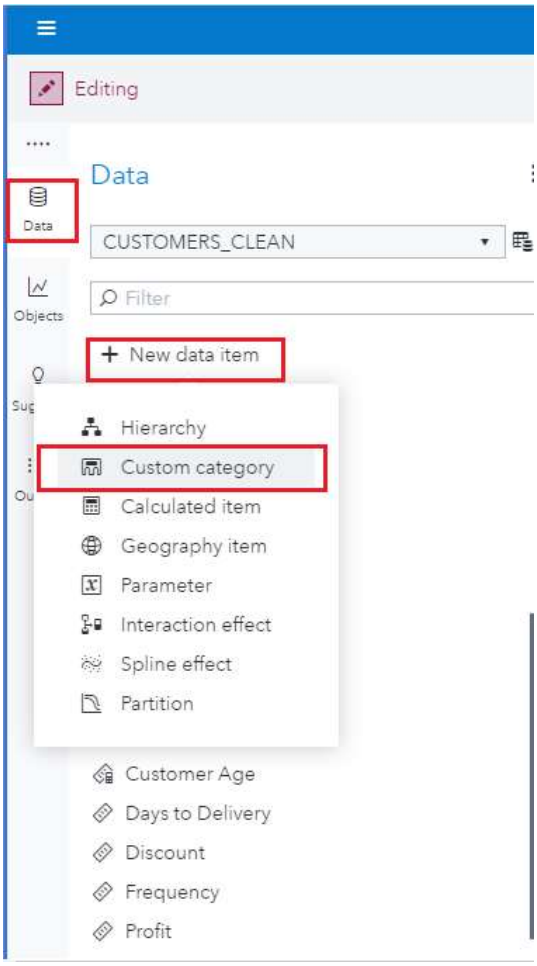



The bar chart should resemble the following:

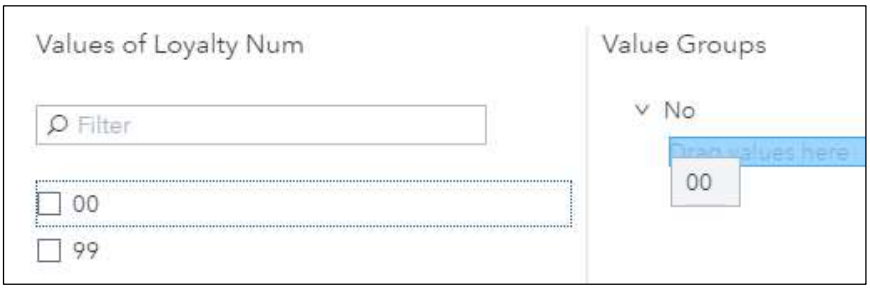

Ideally, we would want to increase orders placed for existing customers that produce the highest average profit. In this example, that would be Asian customers who order through the catalog. However, because corporate headquarters is located in North America, management has decided that the initial marketing strategy should focus on increasing sales among North American customers who order through the catalog and internet. Then, if the marketing strategy is successful, it is implemented in other locations.

10. Create a new custom category, **Loyalty Member**.
    a. In the Data pane, select + **New data item** ⇨ **Custom category**. Refer to the below screenshot showing steps.

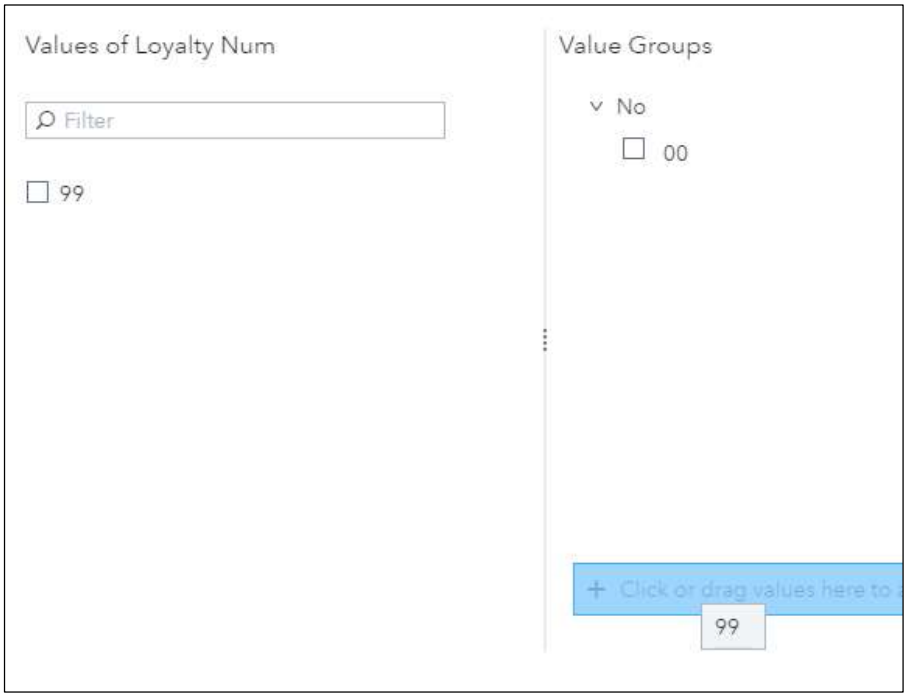



b. In the New Custom Category window, in the **Name** field, enter **Loyalty Member**.
c. For the **Based on** field, select **Loyalty Num**.
d. Select **Value Group 1** to edit the group name.
    1) Type **No** and press Enter.

2) In the left pane, click **00** and drag to the **Drag values here** area on the right.



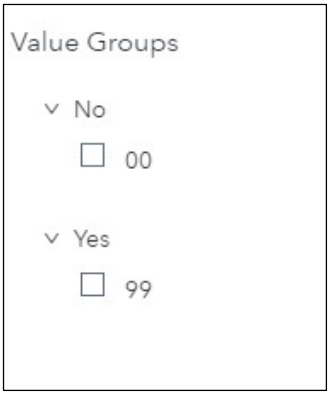

e. Drag **99** to the **Click or drag values here to add a value group** area.




1) Select **Value Group 1**.

2) Type **Yes** and press Enter.

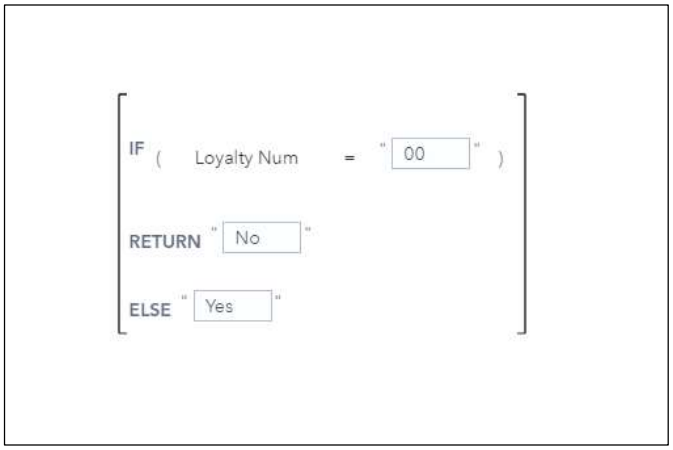
The Value Groups area should resemble the following:




f. In the Remaining Values area (scroll down the **New Custom Category** Window) for the **Group as** field, verify that **Other** is specified.


g. Click **OK** to create the new custom category.

**Note:** As an alternative, you can also create a calculated data item with the following expression:




The new data item, **Loyalty Member**, should appear in the Category group.


11. Duplicate the **Average Profits by Order Type and Continent** bar chart.
    a. In the canvas area, right-click the **Average Profits by Order Type and Continent** bar chart and select **Duplicate** to copy the bar chart.
    b. Click **** above the new bar chart and drag to the drop zone to the bottom of the **Average Profits by Order Type and Continent** bar chart.
    c. In the right pane, click **Roles**.
    d. For the **Category** role, select **Order Type** ⇨ **Loyalty Member**.
    e. For the **Group** role, select **Continent Name** ⇨ **Customer Age Group**.
    f. In the right pane, click **Options**.
    g. And from the Object group, for the **Name** field, enter **Average Profits by Loyalty Membership and Age Group**.

h. Then scroll down and from the Bar group, for the **Direction** field, click (**Vertical**).

The bar chart should resemble the following:


Average profits are similar across loyalty members and non-loyalty members. Average profits are slightly higher for loyalty members in the 75 and above age group.

12. **Save** the report.

**End of Demonstration**

## Exercise 3D: Provide answers to questions. Support each answer with a relevant screenshot (s).

### Creating Data Items

**a.** Open the browser and sign in to SAS Viya. SAS Drive is displayed by default.

**b.** Open the **VA1- Practice3.3a** report from **Courses/YVA185/Basics/Practices (HR)** folder.

1) In the upper left corner, click ☰ (**Show list of applications**) and select **Explore and Visualize**. SAS Visual Analytics appears.
2) Click **All Reports**.
   a) Navigate to the **Courses/YVA185/Basics/Practices (HR)** folder.
   b) Double-click the **VA1- Practice3.3a** report to open it.

**c.** Create a new data item, **Employee Status**.

1) In the left pane, click **Data**.
2) In the Data pane, select **New data item** ⇨ **Custom category**.
   a) In the New Custom Category window, in the **Name** field, enter **Employee Status**.
   b) For the **Based on** field, select **Employee Termination Date**.
   c) Select **Value Group 1**.
   d) Enter **Active** and press Enter.
   e) Drag . (missing value) from the left pane to **Drag values here** on the right.
   f) In the Remaining Values area, for the **Group as** field, enter **Retired**.
   g) Click **OK** to create the new custom category.

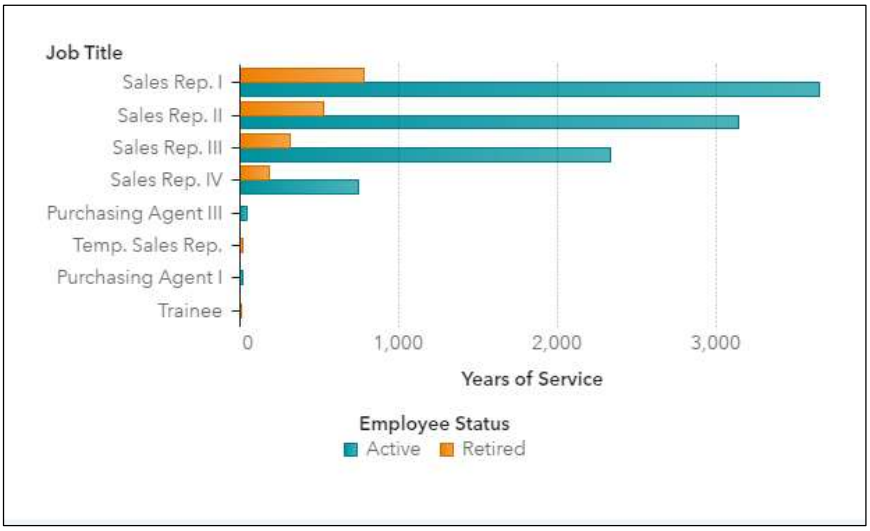
   The new calculated item, **Employee Status**, appears in the Category group.


**Note:** As an alternative, you can also create a calculated data item with the following expression:


**d.** On Page 3, create a bar chart.

1) In the upper left corner of the report, click the **Page 3** tab.
2) In the left pane, click **Objects**.
3) Drag the **Bar chart** object, from the Graphs group, to the canvas.
4) In the right pane, click **Roles**.
5) For the **Category** role, select **Add** ⇨ **Job Title**.
6) For the **Measure** role, select **Number of Employees** ⇨ **Years of Service**.
7) For the **Group** role, select **Add** ⇨ **Employee Status**.

The bar chart should resemble the following:



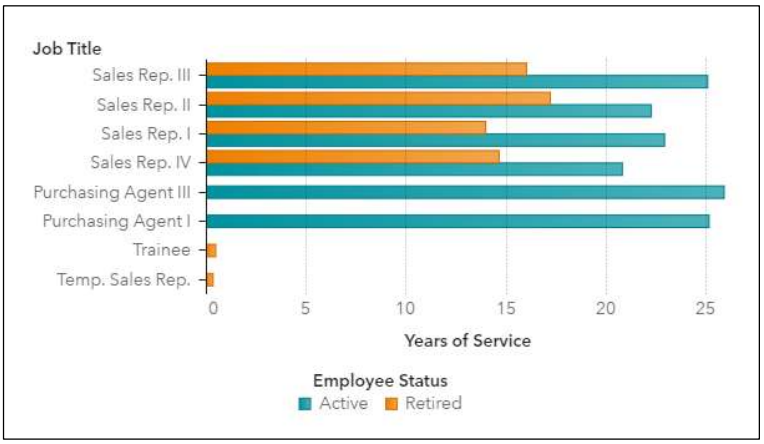

**e.** Specify **Years of Service by Job Title and Status** as the name of the bar chart.

1) In the right pane, click **Options**.
2) In the Object group, for the **Name** field, enter **Years of Service by Job Title and Status**.

**f.** Change the aggregation for **Years of Service** to **Average**.

1) In the left pane, click **Data**.
2) Next to **Years of Service**, click (**Edit properties**).
3) For the **Aggregation** field, select **Average**.

The updated bar chart should resemble the following:




**g.** Answer the following questions:

I) Which job title has the highest average years of service among active employees? Among retired employees?

**Answer 1:**

**SS1:**

**h.** Save the report.

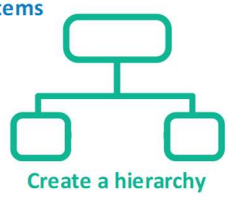

# Business Scenario: Customers

ORION STAR Sports & Outdoors







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# Filtering Data

Report Designer

**Detail report filters**




**Summary report filters**


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The following types of filters can be created and modified only by the report designer:

| | |
|---|---|
| **Data source filter** | Subsets the data for the entire report and is applied to every report object that uses that data source. The data source filter acts as a pre-filter, by filtering the data before it is brought into Visual Analytics. This can be seen by the updated cardinality values in the Data pane after the filter has been applied. |
| **Basic report filter** | Subsets the data for individual report objects by using a single data item. |
| **Advanced report filter** | Subsets the data for individual report objects by using any number of data items and operators in the same expression. |
| **Post-aggregate report filter** | Subsets the data for individual report objects by using aggregated values, not summarized values. Post-aggregate report filters are available only for measure data items. |

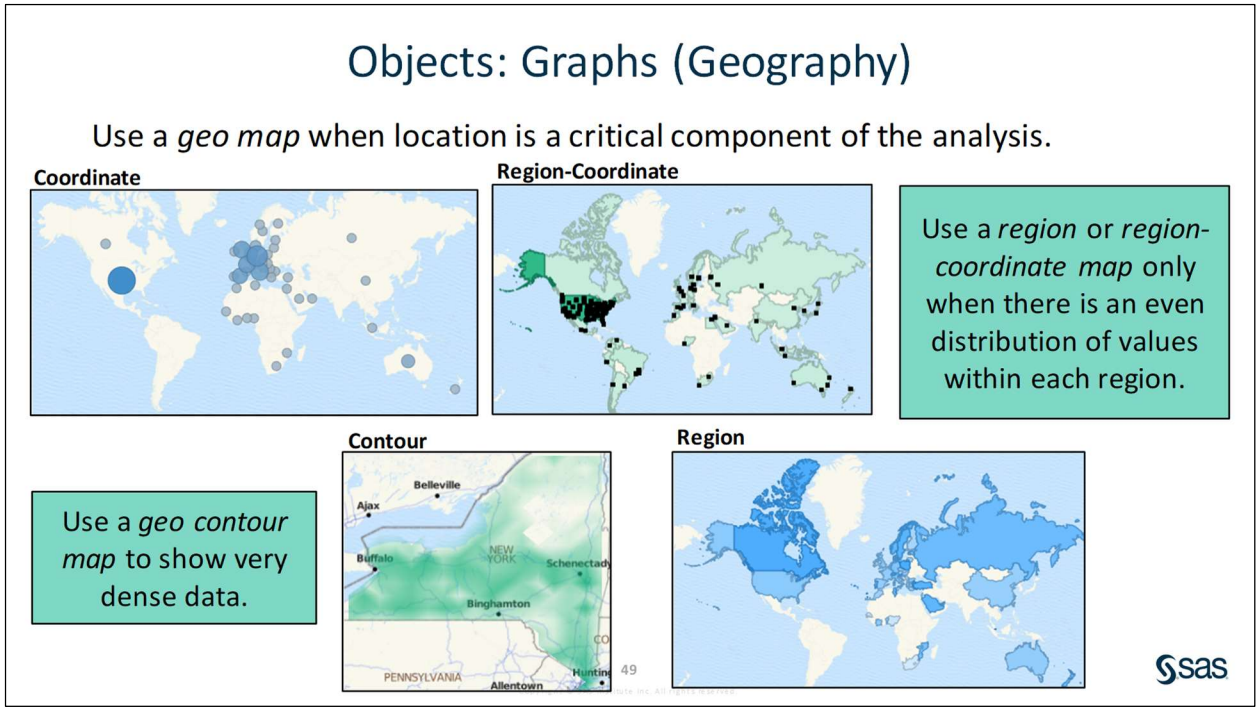
For more information about filters that can be created and modified by the report designer, see "Working with Report Filters" in the *SAS Visual Analytics: Working with Report Data* documentation.

Filters that can be modified by report viewers are discussed in more detail in a later section.

Filters are applied in the following order:

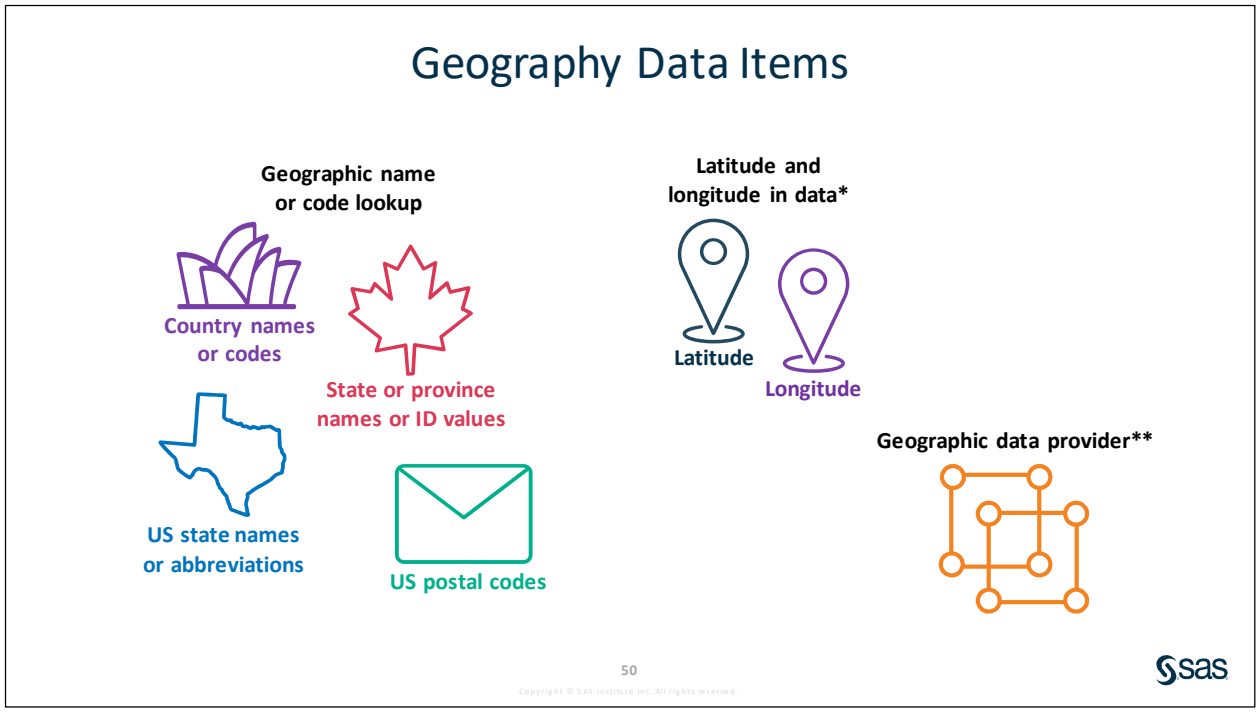
- data source filter (or filters)
- basic or advanced report filter/ post-aggregate report filter
- prompts and actions

**Note:** More advanced filtering techniques are discussed in the SAS Visual Analytics 2 for SAS Viya: Advanced course.

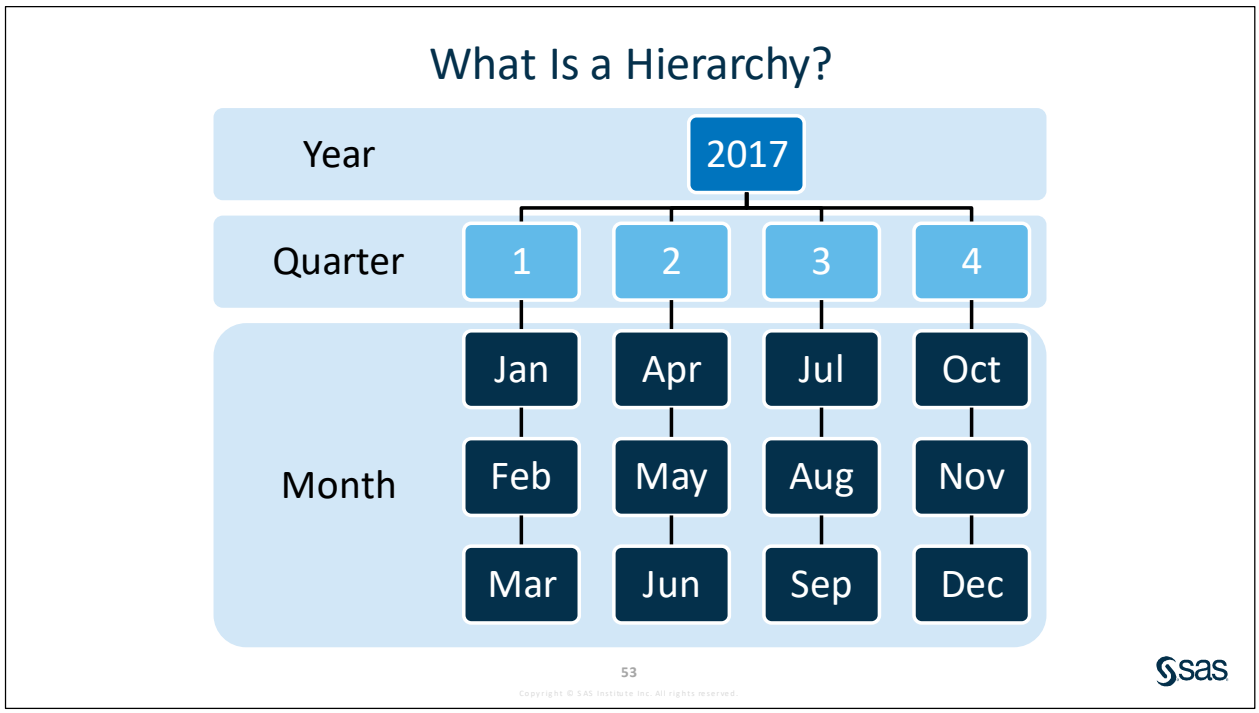


| | | |
|---|---|---|
| **Geo map** | A geo map overlays data on a geographic map. Data can be displayed using colored regions, coordinates, or regions and coordinates, as a contour plot, or as a network. In order to display data on a geo map, at least one category data item must have values that are mapped to geographical locations or regions. | |
| | **Region** | A regions geo map (also known as a *choropleth map*) uses colors to show variations by location. However, larger regions appear more emphasized than smaller ones, which can affect perceptions of colors. |
| | **Coordinate** | A coordinates geo map (also known as a *dot distribution map* or a *dot density map*) displays a map with either a scatter plot or a bubble plot of coordinates. This type of map helps with detecting spatial patterns and understanding the distribution of data over a geographical region, which can help reveal patterns using clustered points. For a bubble plot, the bubble size helps with comparing proportions over regions without the size of the region causing distortions, but the size of the bubble can overlap with other bubbles and regions making the chart difficult to read. |
| | **Region-Coordinate** | A region-coordinate geo map displays a map using both colored regions and either a scatter plot or bubble plot of coordinates. This type of map is great for comparing two levels of data with the region colors representing more general information (like countries) and the coordinates representing more specific information (like customer locations). |
| | **Contour** | A contour geo map displays shaded regions over a geographical region. Contour maps are best used to show very dense data. |
| | **Network** | A network geo map displays a network diagram overlaid on a map. Network maps are helpful for understanding how location affects the relationships in the network. Network geo maps are discussed in more detail in a later lesson. |

For more information about creating geography data items, see “Working with Geography Data Items” in the *SAS Visual Analytics: Working with Report Data* documentation.




**Note:** By default, Visual Analytics supports country- and state-level polygons for regional overlays in geo maps. An administrator can define a custom polygon provider to create regional overlays for other types of data. For more information about how to define a custom polygon provider, see "Loading Geographic Polygon Data as a CAS Table" in *SAS Visual Analytics: Administration Guide.*



A *hierarchy* is a defined arrangement of categorical data items based on parent-child relationships.

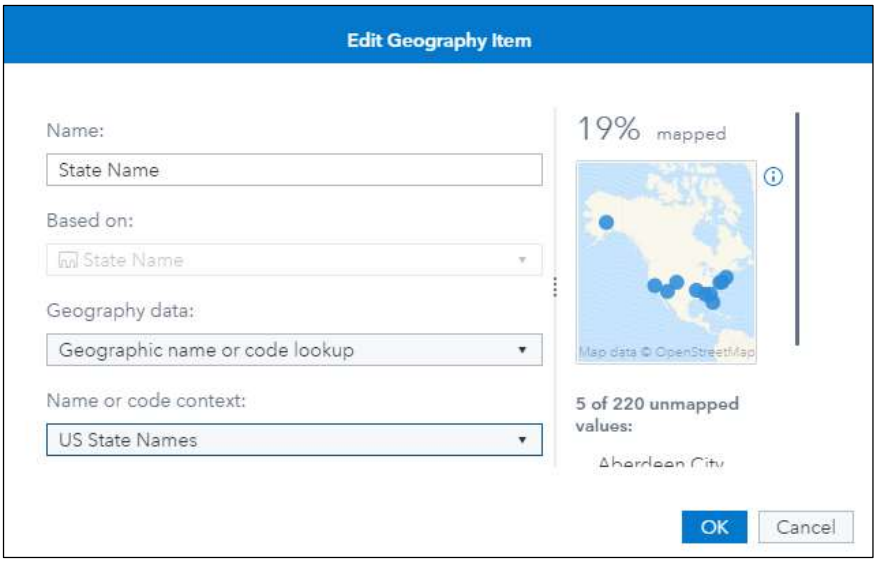
Applying Filters

This demonstration illustrates how to create new data items (geographic data items, hierarchies) and apply filters 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- Demo3.3b** report to open it.
4. In the upper left corner of the report, click the **Page 4** tab.
5. Create new data items.
   a. In the left pane, click **Data**.
   b. In the Category group, next to **State Name**, click ⌄⌄ (**Edit properties**).
   c. For the **Classification** field, select **Geography**.
      1) For the **Geography data** field, verify that **Geographic name or code lookup** is selected.
      2) For the **Name or code context** field, select **US State Names**.

         The map on the right shows that 19% of state names are mapped.



3) View the list of unmapped values.


These values represent states and provinces in other countries. Later, we add a data source filter to focus on the United States.

4) Click **OK**.

A new group, **Geography**, is added to the Data pane.


d. In the Data pane, next to **Postal code** (under Category Group), click (**Edit properties**).

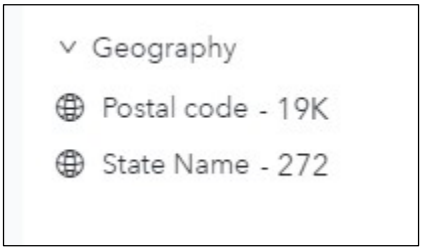
e. For the **Classification** field, select **Geography**.

1) For the **Geography data** field, verify that **Geographic name or code lookup** is selected.

2) For the **Name or code context** field, select **US ZIP Codes**.

3) Click **OK**.

The **Geography** group should resemble the following:




f. In the Data pane, select **+ New data item** ⇨ **Hierarchy**.

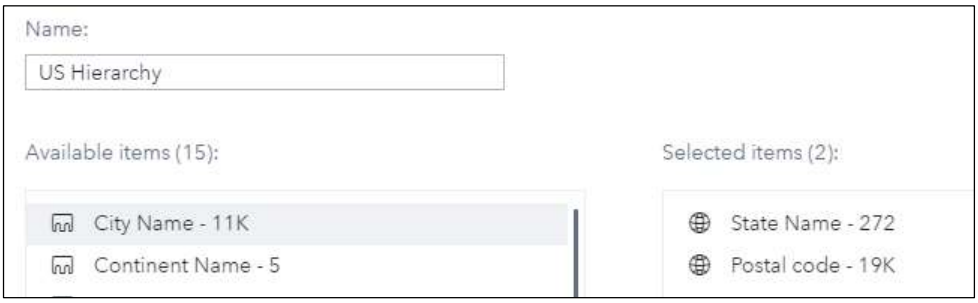
1) In the **New Hierarchy window**, for the **Name** field, enter/type **US Hierarchy**.

2) Double-click the following data items in the **Available items list**, in the specified order, to move them to the Selected items list:

**State Name**

**Postal code**

The New Hierarchy window should resemble the following:




3) Click **OK**.

A new group, **Hierarchy**, is added to the Data pane.


6. Add a data source filter.

   a. In the Data pane, click  (**Actions**) and select **Apply data filter**.

      **Note:** Because the new geography data items cover only the United States, a data source filter is added to include only the data for products ordered in the United States.

   b. On the left, verify that **Data Items** is selected.

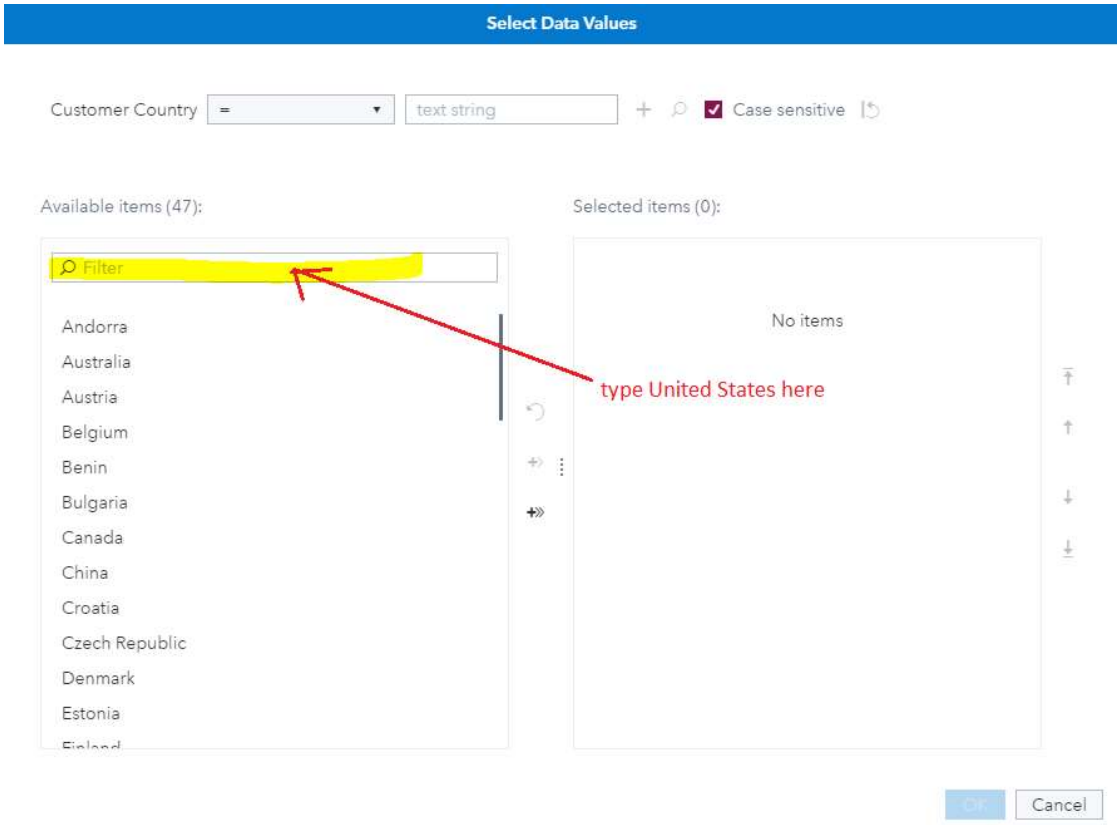
   c. Expand the **Character** group.

   d. Select **Customer Country**.

   e. In the Conditions area, double-click **Customer Country In (x)** to add it to the expression area. Note: if you can not see the full names, hover the mouse on the names.


   f. In the expression area (in the middle of the **Apply Data Filter** window), click **(none selected)**.

      Below window you will see:




g. In the **Select Data Values** window, double-click **United States** to move it from the Available items list to the Selected items list.


h. Click **OK**.

The expression should resemble the following:


The bottom of the Apply Data Filter window should resemble the following:


**Note:** 232,258 observations have a value of *United States* for **Customer Country**.

i. Click **OK** to apply the data source filter.

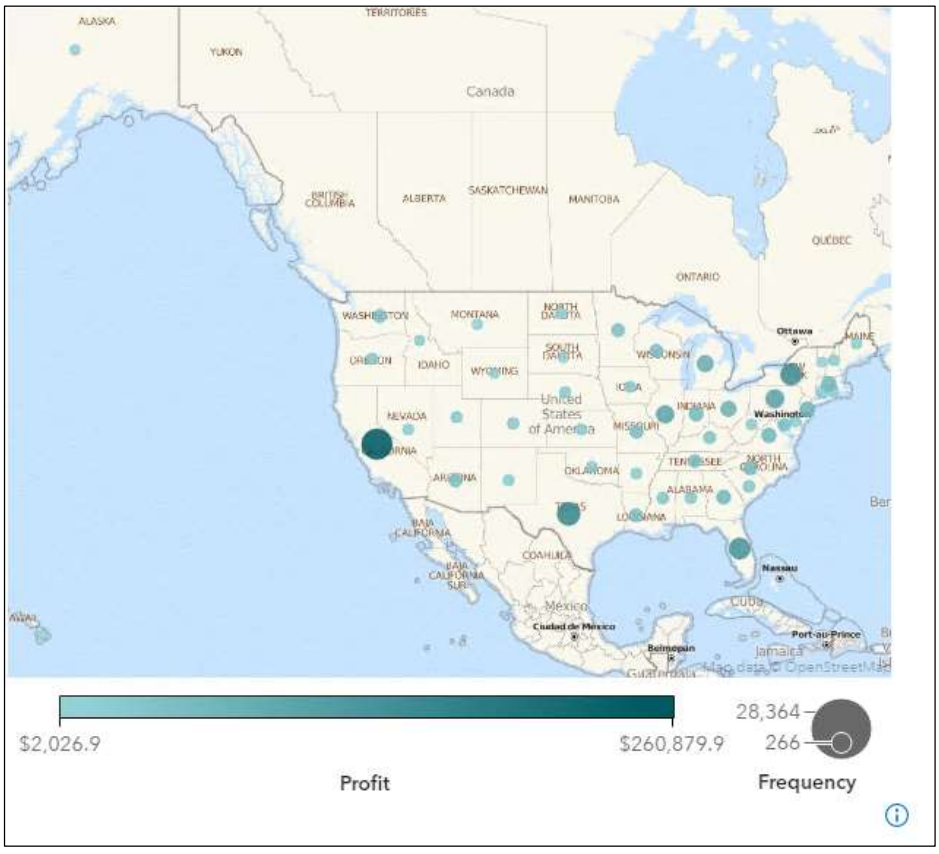
The Data pane should resemble the following:


The data source filter updates the cardinality values that appear in the Data pane and is applied to every report object that uses this data source.

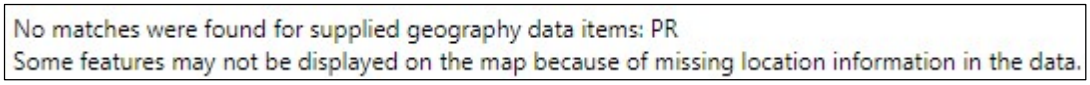
7. Create a geo map.
   a. In the left pane, click **Objects**.
   b. Drag the **Geo coordinate** object, from the **Geo maps** group, to the canvas.
   c. In the right pane, click **Roles**.
   d. For the **Geography** role, select **Add** ⇨ **US Hierarchy**.
   e. For the **Size** role, **Add** ⇨ **Frequency**.
   f. For the **Color** role, select **Add** ⇨ **Profit**.

The Roles pane should resemble the following:


The geo coordinate map requires a geography data item for the Geography role. A measure data item can be added to the Color role to color the coordinates based on the measure. The geo map should resemble the following:



g. Place your cursor over ⓘ in the lower right corner of the geo map to view the warning.




**Note:** *PR* is not found in the US State Names predefined geographic role. You can filter this value out if you do not want to see the warning.

h. In the right pane, click **Options**.

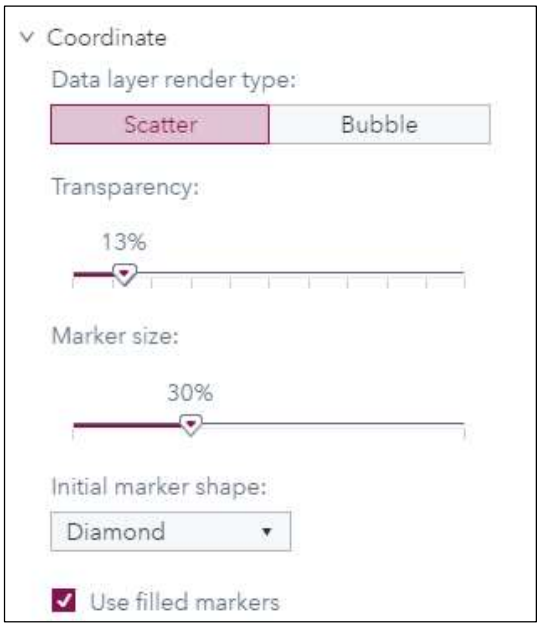
i. In the Object group, for the **Name** field, enter **Profit by Location**.

j. In the Coordinate-US Hierarchy group, verify that **Scatter** is selected for the **Data layer render type** field.

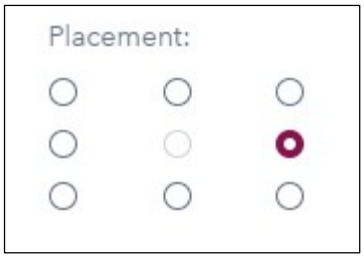
k. For the **Initial marker shape** field, select **Diamond**.

l. For the **Marker size** field, select **30%**.

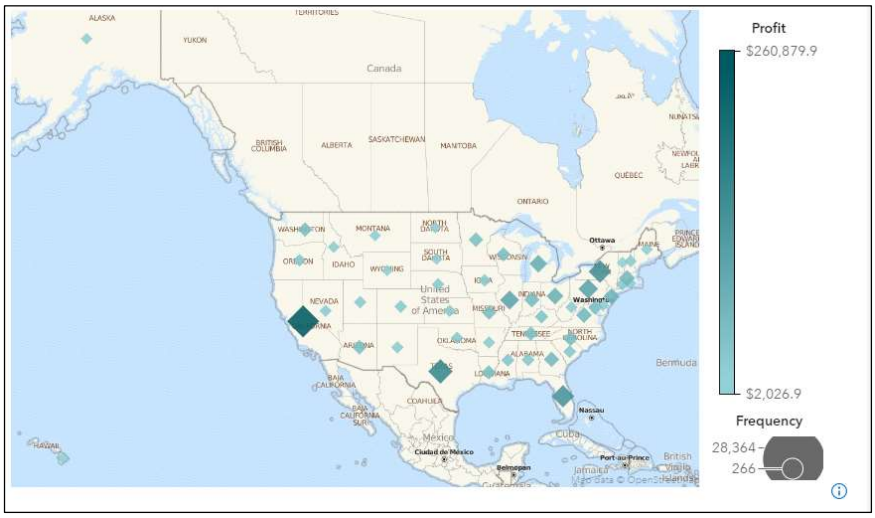
The Options pane should resemble the following:




m. In the Legend group, for the **Placement** field, choose the middle on the right side.

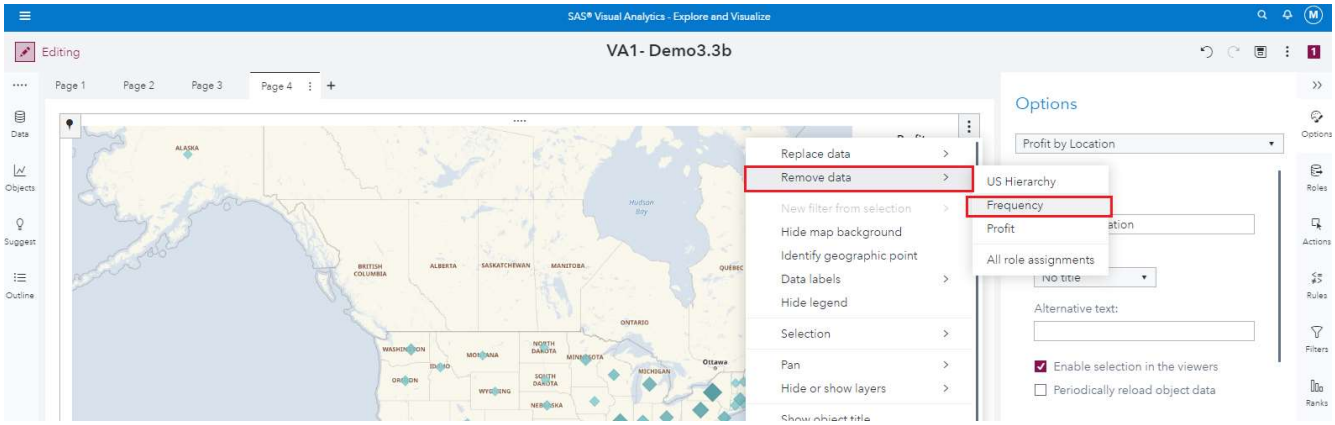


The updated geo map should resemble the following:

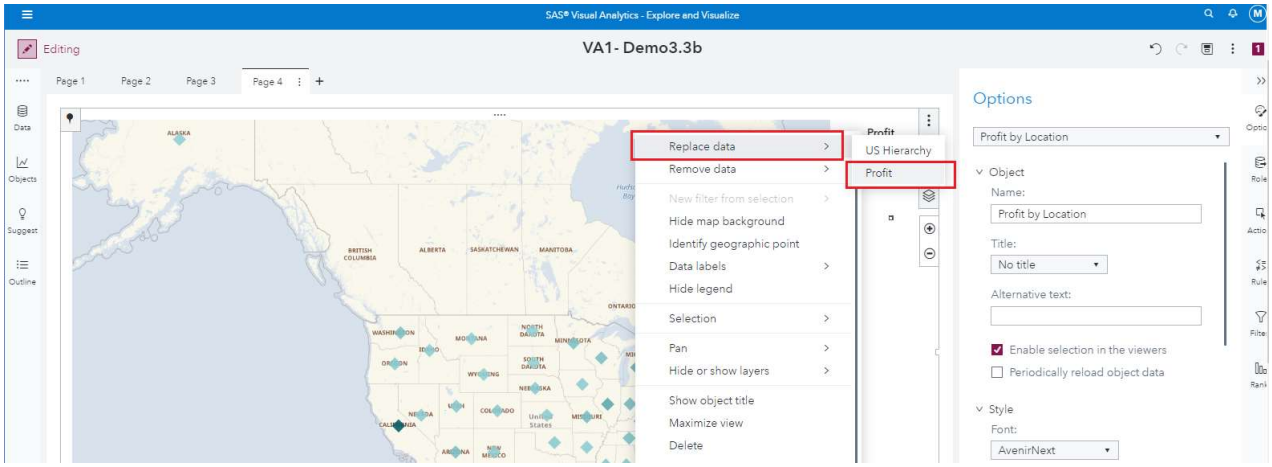



Highest total profits seem to be in larger states (California, Texas, and Florida), most likely because there are more customers and more orders placed in those states. Looking at average profits by location can give greater insight into orders placed in the United States.

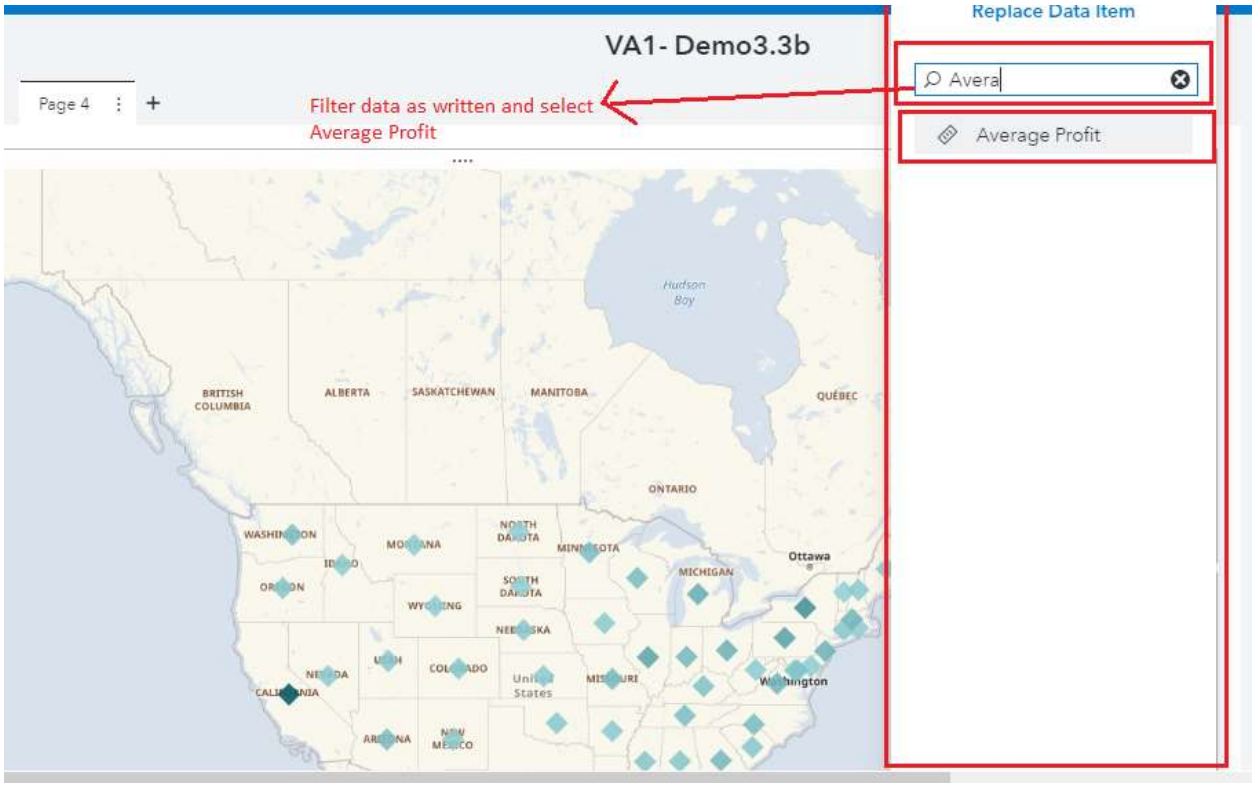
n. Right-click the **Geo coordinate map** object and select **Remove data** ⇨ **Frequency**




o. Right-click the **Geo coordinate map** object and select **Replace data** ⇨ **Profit**.



p. Then select **Average Profit**.

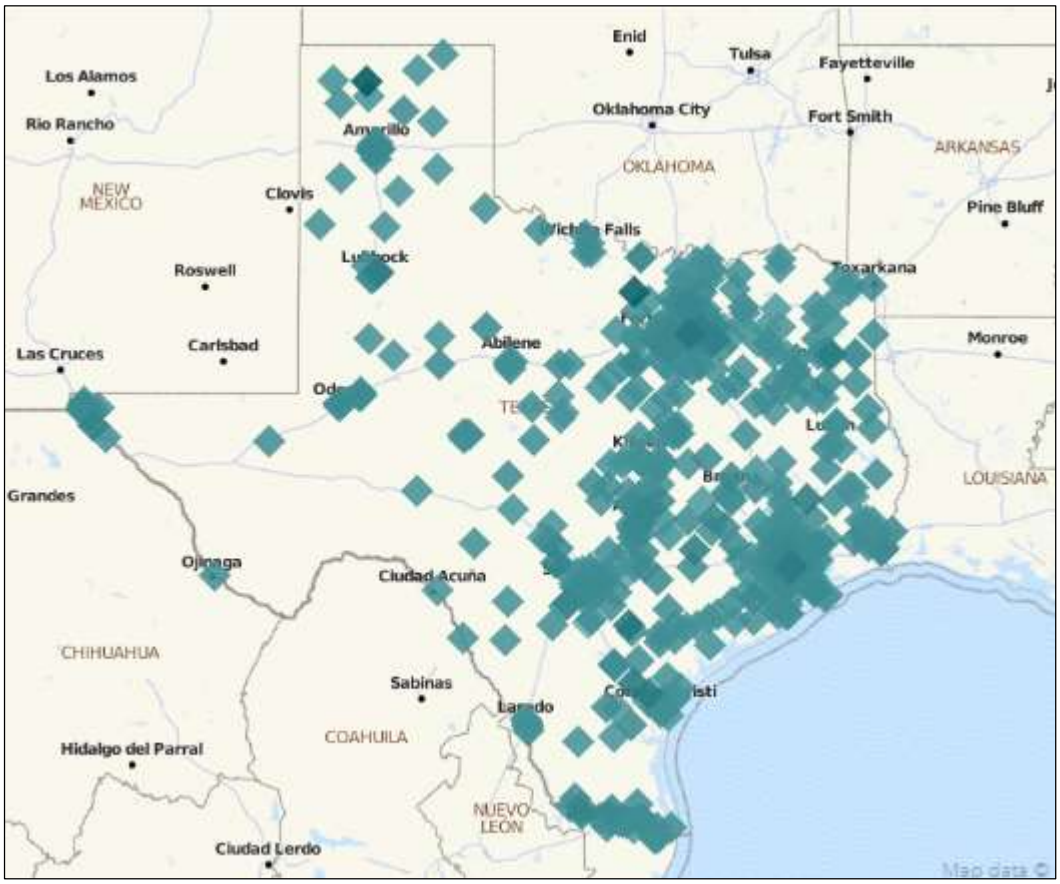



The updated geo map should resemble the following:


When looking at averages, there does not seem to be any clusters of higher average profits in any one location in the United States. High average profits seem to be evenly distributed across the United States.

q. Double-click the marker for **Texas**.

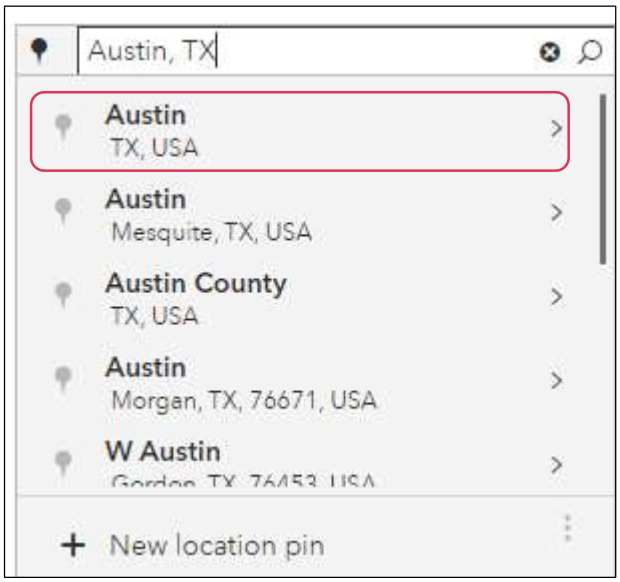
The geo map displays markers for all postal codes in Texas where products were ordered.




r. In the upper left corner, click (**Location**).

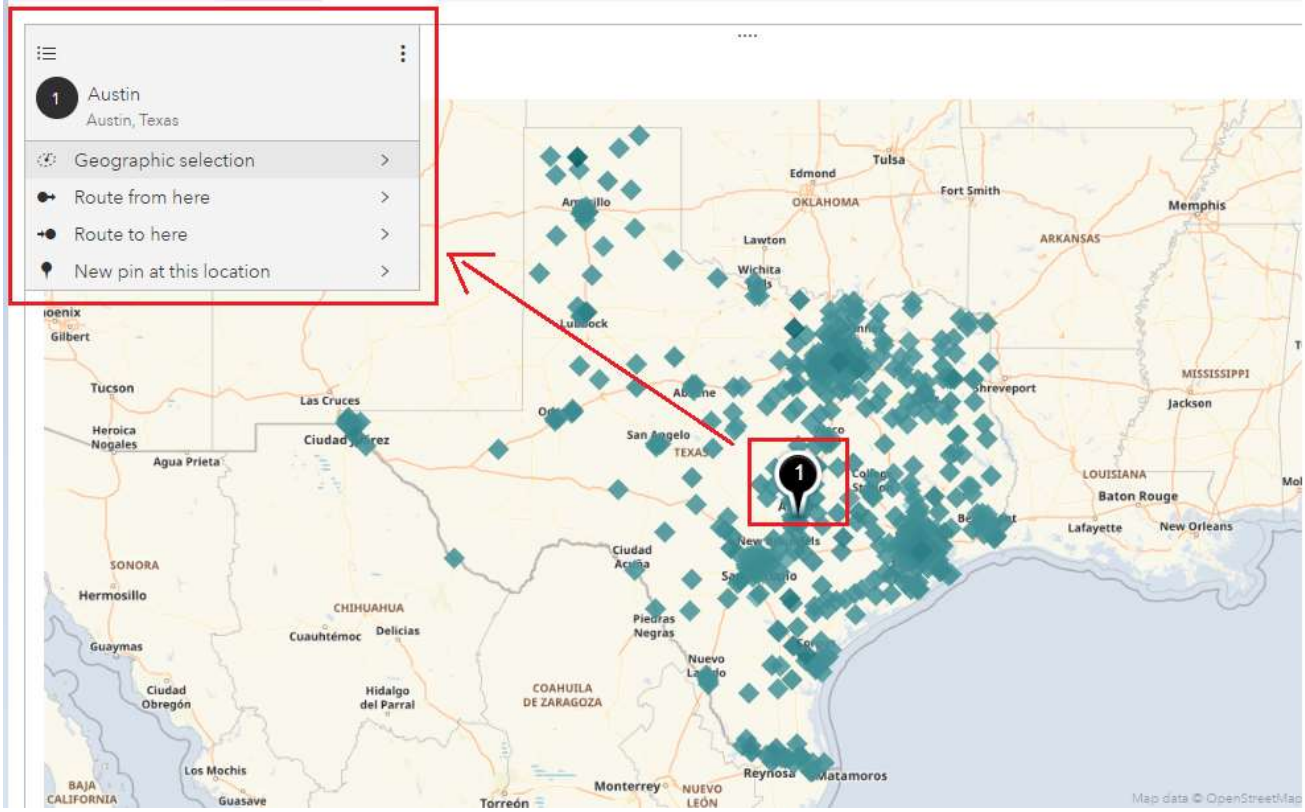
s. In the **Search** field, enter **Austin, TX**.

t. Double-click the first value in the search list, **Austin TX, USA**.

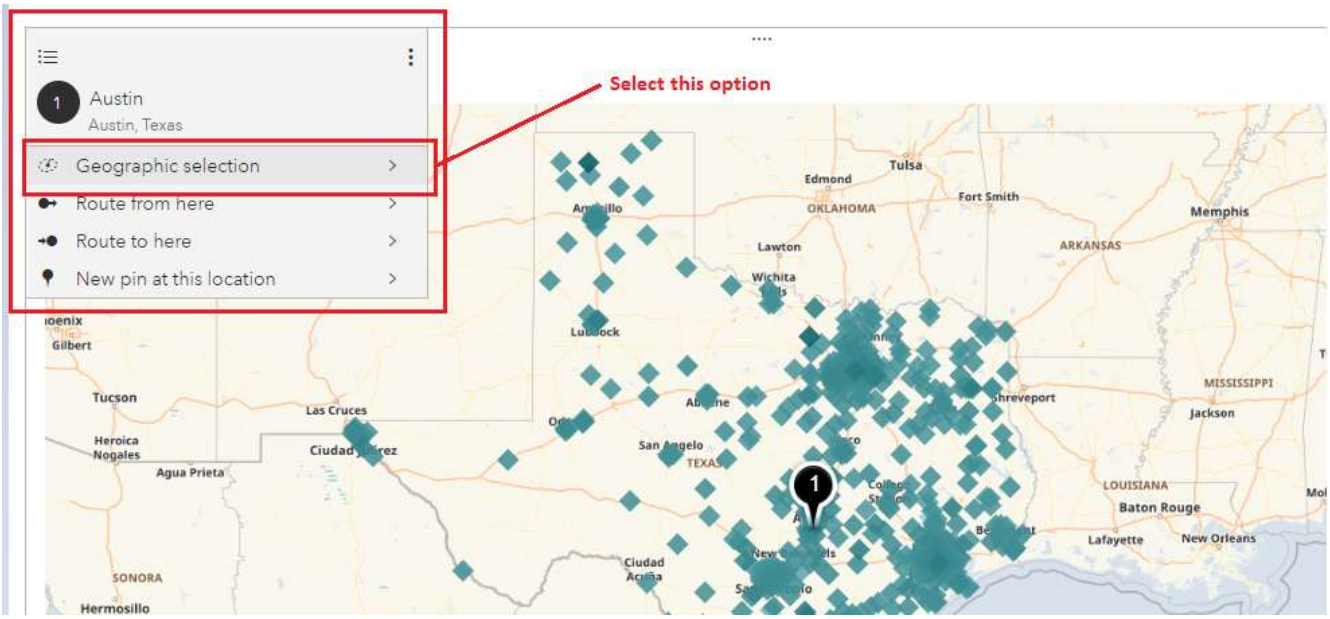


All locations containing combinations of **Austin, TX** are listed in the search. The location of Austin, Texas is marked on the geo map with a 1. .

u. Click on **1** in the geo map to open **Austin, TX.** You will see the below screen once you click on **1.**




v. Select **Geographic selection.**

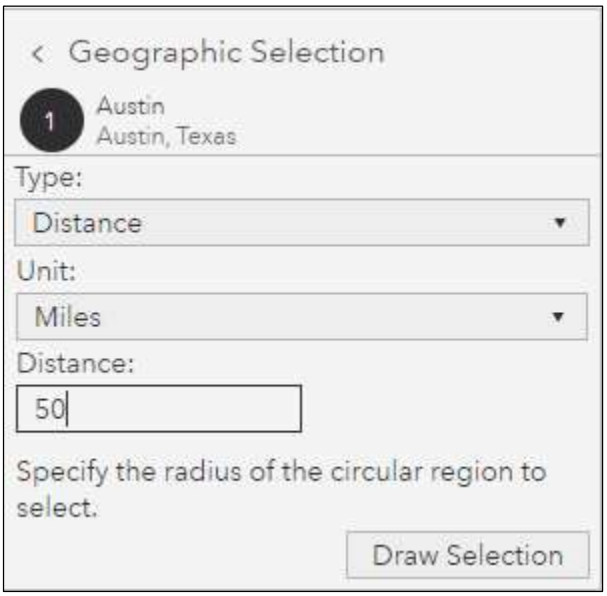


i. For the **Type** field, verify that **Distance** is selected.

ii. For the **Unit** field, verify that **Miles** is selected.

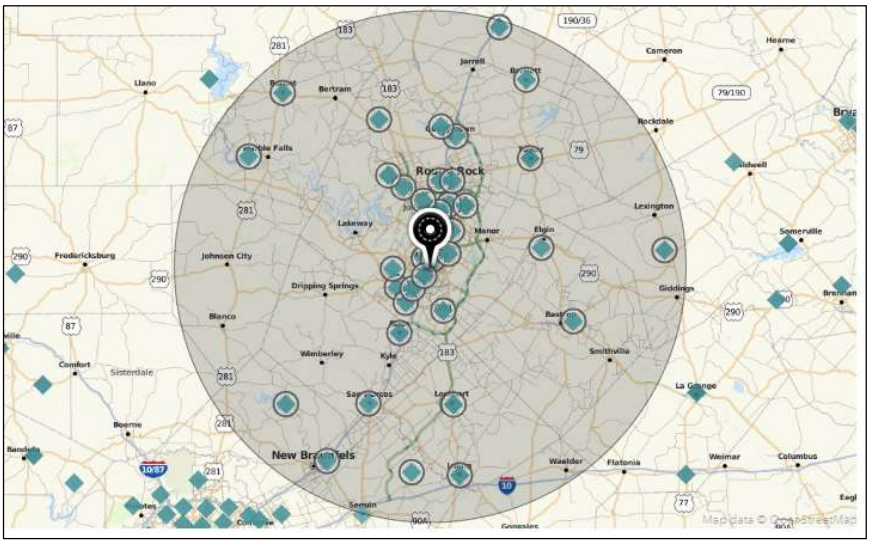
iii. For the **Distance** field, enter **50**.

The Geographic Selection window should resemble the following:

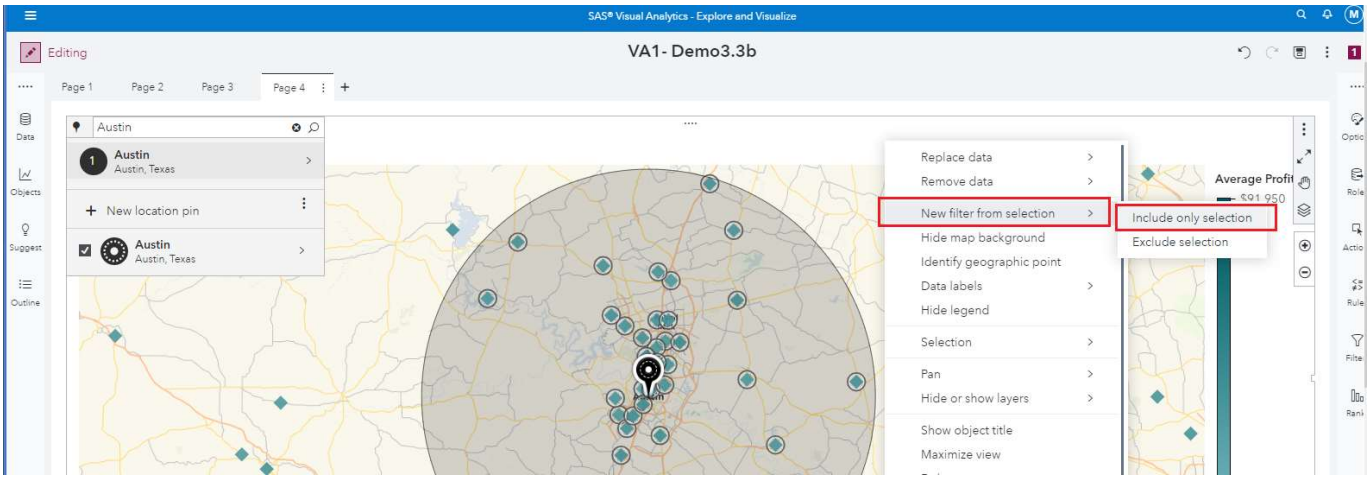



iv. Click **Draw Selection**.

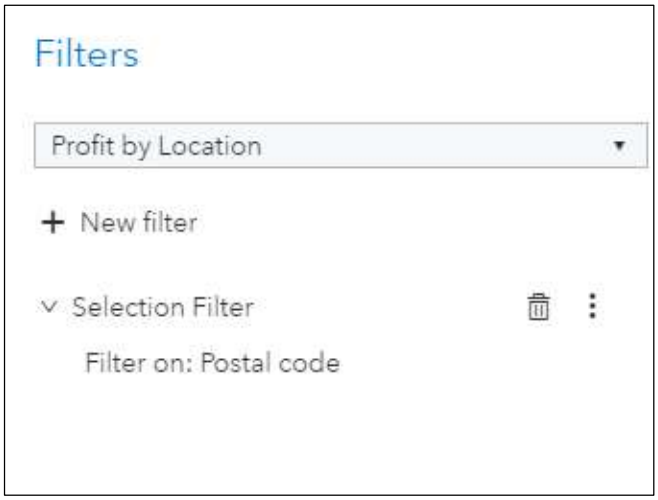
All customers within a 50-mile radius of Austin, TX, are highlighted.



b. Right-click the Geo coordinate map and select **New filter from selection ⇨ Include only selection**.




c. In the right pane, click **Filters** to show the applied filter.




w. Save the report.

**End of Demonstration**

## Exercise 3E: Provide answers to the questions asked. Support your answers with a relevant screenshot (s).

**2. Applying Filters**

**a.** Open the browser and sign in to SAS Viya. SAS Drive is displayed by default.

**b.** Open the **VA1- Practice3.3b** report from the **Courses/YVA185/Basics/Practices (HR)** folder.

1) In the upper left corner, click ☰ (**Show list of applications**) and select **Explore and Visualize**. SAS Visual Analytics appears.

2) Click **All Reports**.

a) Navigate to the **Courses/YVA185/Basics/Practices (HR)** folder.

b) Double-click the **VA1- Practice3.3b** report to open it.

**c.** Add a data source filter to filter for active employees in the Sales Department.

1) In the left pane, click **Data**.

2) In the Data pane, click (**Actions**) and select **Apply data filter**.

a) On the left side of the window, click **Operators**.

b) Expand **Boolean**.

c) Double-click **AND** to add it to the expression.

d) On the left, click **Data Items**.

e) Expand **Character**.

f) Select **Employee Status**.

g) In the Conditions area, double-click **Employee Status = 'x'** to add it to the first condition in the expression area.

h) Enter **Active** as the string for the first condition.

i) In the Character group, select **Department**.

j) In the Conditions area, double-click **Department = 'x'** to add it to the second condition in the expression area.

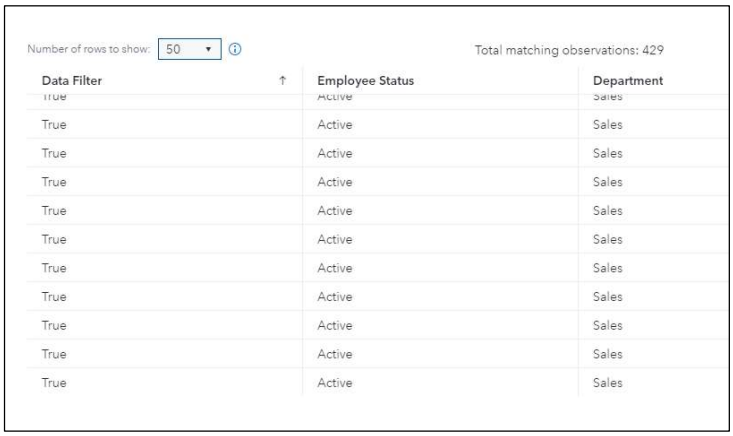
k) Enter **Sales** as the string for the second condition.

The expression should resemble the following:

The bottom of the Apply Data Filter window should resemble the following:


l) In the upper right corner, click (**Preview result**).

m) Scroll down to the bottom of the list.




n) Click **Close** to close the preview.

3) Click **OK** to apply the data source filter.

The Data pane should resemble the following:


**d.** Change the classification for **Employee Country** to **Geography** ⇨ **Country or Region ISO 2-Letter Codes**.

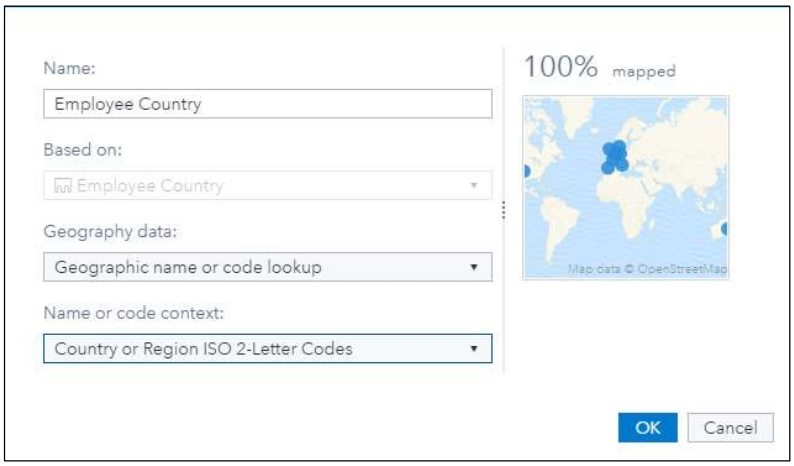
1) In the left pane, click **Data**.

2) Next to **Employee Country**, click (**Edit properties**).

3) For the **Classification** field, select **Geography**.

a) For the **Geography data** field, verify that **Geographic name or code lookup** is selected.

b) For the **Name or code context** field, select **Country or Region ISO 2-Letter Codes**.




Notice that 100% of countries are mapped for the geographic data item.

4) Click **OK**.

A new group, **Geography**, is added to the Data pane.

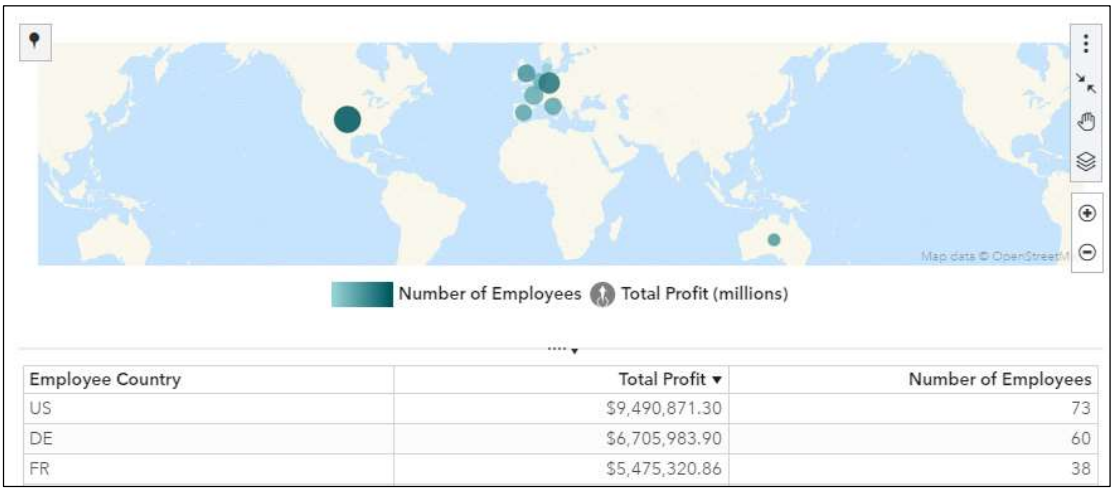

**e.** On Page 4, create a geo map.

1) In the upper left corner of the report, click the **Page 4** tab.
2) In the left pane, click **Objects**.
3) Drag the **Geo coordinate** object, from the Geographic group, to the canvas.
4) In the right pane, click **Roles**.
5) For the **Geography** role, select **Add** ⇨ **Employee Country**.
6) For the **Size** role, select **Add** ⇨ **Total Profit**.
7) For the **Color** role, select **Add** ⇨ **Number of Employees**.

**f.** Maximize the geo map and answer the questions.

1) In the upper right corner of the chart, click (**Maximize**) to view additional details.

2) In the detail table, click **Total Profit** twice to sort by that column in descending order.




| Employee Country | Total Profit ▾ | Number of Employees |
|---|---|---|
| US | $9,490,871.30 | 73 |
| DE | $6,705,983.90 | 60 |
| FR | $5,475,320.86 | 38 |

3) Answer the questions.

1) Management has decided that one possible criterion for promotion is profit generated. Which two countries generate the highest profit?

**Answer 1:**

**SS1:**

2) Why do they have such high profits?

**Answer 2:**

**SS2:**

4) In the upper right corner, click (**Restore**).

**g.** In the geo map, specify **Average Profit** for the **Size** role.

1) Verify that the geo map is selected.

2) In the right pane, click **Roles**.

3) For the **Size** role, select **Total Profit** ⇨ **Average Profit**.

**h.** Specify **Average Profit and Number of Employees by Country** as the name of the geo map.

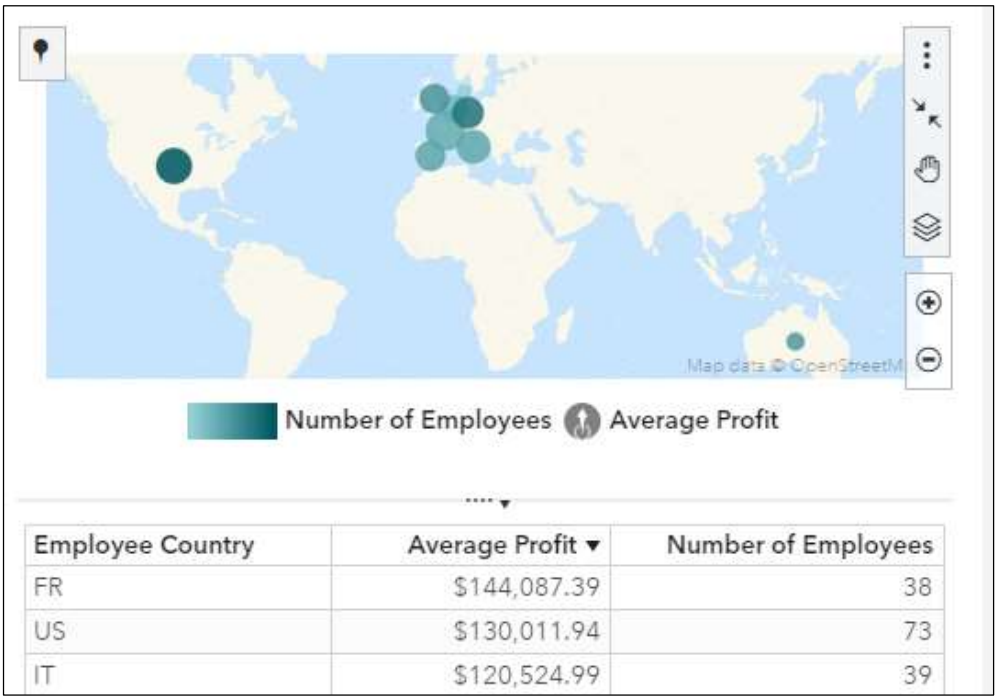
1) In the right pane, click **Options**.

2) In the Object group, for the **Name** field, enter **Average Profit and Number of Employees by Country**.

**i.** Maximize the geo map and answer the question.

1) In the upper right corner of the chart, click (**Maximize**) to view additional details.

2) In the detail table, click **Average Profit** twice to sort by that column in descending order.




| Employee Country | Average Profit ▼ | Number of Employees |
|---|---|---|
| FR | $144,087.39 | 38 |
| US | $130,011.94 | 73 |
| IT | $120,524.99 | 39 |

Answer the question.

3)Which country has the highest average profit?

**Answer 3:**

**SS3:**

3) Highest number of employees?

**Answer 4**

**SS4:**

4) In the upper right corner, click (**Restore**).

Save the report.