UNSW Business School/
Information Systems and Technology Management

Solutions to SAS VA Workbook 1 Practices and Activities

SAS Visual Analytics Workbook:

Compiled/Modified By	Date	SAS Visual Analytics
Jacky Mo	Mar. 2022	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:
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File Name:
SAS Viya for Learners – Solutions to SAS VA Workbook 1 Practices and Activities

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Solutions to Lesson 3

Solutions to Practices

1. **Working with Data Items**

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

   b. Open the **VA1- Practice3.1** 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) In the Open window, navigate to the **Courses/YVA185/Basics/Practices (HR)** folder.

      b) Double-click the **VA1- Practice3.1** report to open it.

   c. View the items in the Data pane.

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

   2) Answer the questions.

      What is the classification of **Employee ID**? **Manager at 1. level**?

      Answer: **Employee ID has a classification of category.**

Manager at 1. level has a classification of measure.

What does the **Frequency** data item represent?

Answer: **Because there is one row per employee in the EMPLOYEES_CLEAN data source, Frequency represents the number of employees.**

d. Change the classification for **Manager at 1. level** to **Category**.

1) In the Measure group, next to **Manager at 1. level**, click (**Edit properties**).
2) For the **Classification** field, select **Category**.

   Manager at 1. level should now appear in the Category group.

e. Change the format for **Annual Salary** to **Dollar13.2**.

1) In the Measure group, next to **Annual Salary**, click (**Edit properties**).
2) For the **Format** field, click (**Edit**).
   a) In the Format window, for the **Width** field, verify that **13** is specified.
   b) For the **Decimals** field, enter **2**.
   c) Click **OK**.

f. Rename data items.

1) In the Category group, next to **Employee ID**, click (**Edit properties**).
2) In the **Name** field, enter **ID** and press Enter.
3) In the Category group, next to **Employee Name**, click (**Edit properties**).
4) In the **Name** field, enter **Name** and press Enter.
5) In the Category group, next to **Manager at 1. level**, click (**Edit properties**).
6) In the **Name** field, enter **Manager ID** and press Enter.
7) In the Measure group, next to **Frequency**, click (**Edit properties**).
8) In the **Name** field, enter **Number of Employees** and press Enter.
9) Click (**Actions**) and select **Refresh EMPLOYEES_CLEAN** at the top of the Data pane to collapse the data item properties.

g. Save the report.

2. Exploring Data: Part 1

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

b. Open the **VA1- Practice3.2a** 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- Practice3.2a** report to open it.

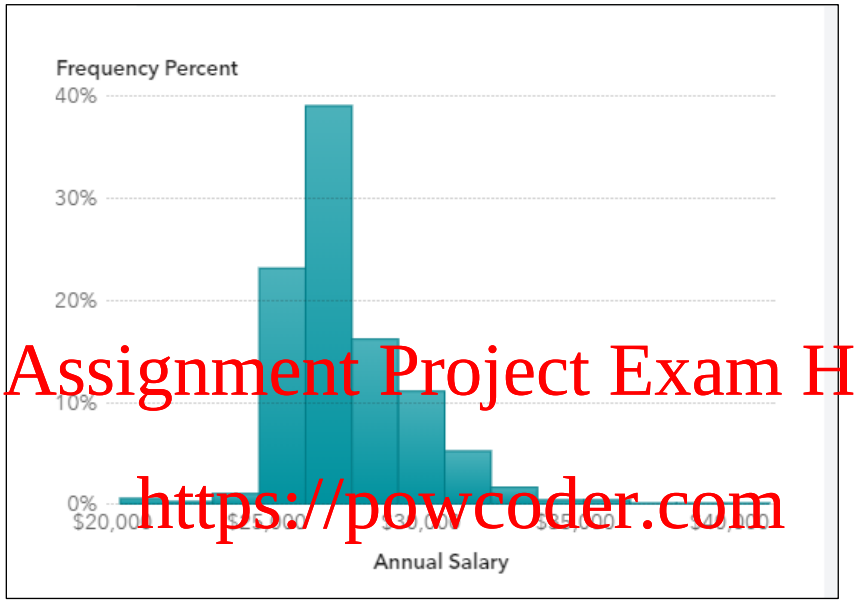
c. Create an automatic chart.

1) In the left pane, click **Data**.
2) Click the following data items to select them:

   Annual Salary

   Frequency Percent
3) Drag the data items to the canvas.

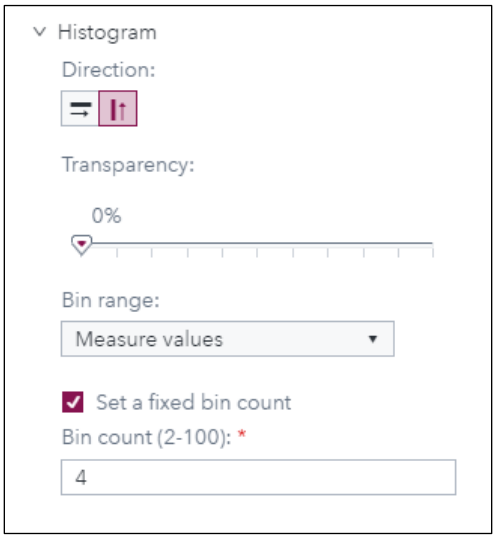
   The automatic chart functionality determines the best way to display the selected data.



d. Modify the options for the automatic chart.

1) In the right pane, click **Options**.
2) In the Object group, for the **Name** field, enter **Distribution of Salary**.
3) In the Histogram group, for the **Bin range** field, select **Measure values**.
4) Select **Set a fixed bin count**.

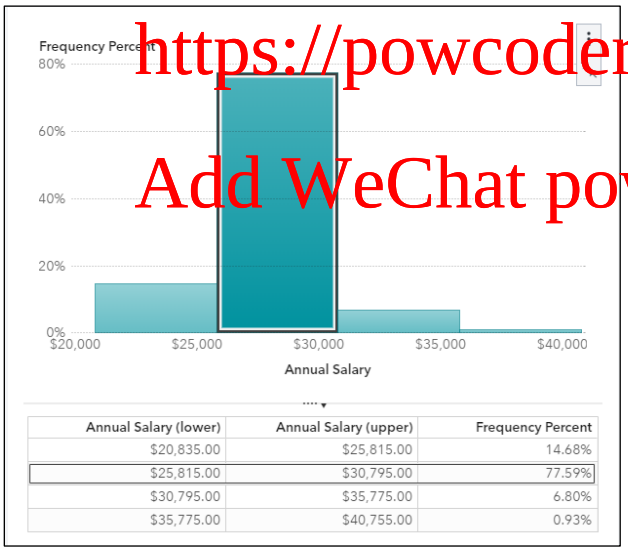
5) In the **Bin count** field, enter **4** and press Enter.



e. Maximize the histogram and answer the question.

1) In the upper right corner of the chart, click (**Maximize**) to view additional details. A detail table is displayed at the bottom of the chart.

2) Click the highest bar in the graph.



Annual Salary (lower)	Annual Salary (upper)	Frequency Percent
$20,835.00	$25,815.00	14.68%
$25,815.00	$30,795.00	77.59%
$30,795.00	$35,775.00	6.80%
$35,775.00	$40,755.00	0.93%

3) Answer the question.

Into which range do the majority of salaries fall?

Answer: More than 75% of salaries fall within the $25K to $30K range.

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

f. Create a bar chart on the right of the automatic chart.

1) In the left pane, click **Objects**.
2) Drag the **Bar chart** object, from the Graphs group, to the right side of the canvas.

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

4) For the **Category** role, select **Add** ⇨ **Job Title**.

5) For the **Measure** role, select **Number of Employees** ⇨ **Annual Salary**.

6) For the **Group** role, select **Add** ⇨ **Department**.

The bar chart should resemble the following:

g. Modify the name of the bar chart.

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

2) In the Object group, for the **Name** field, enter **Total Salary by Job and Department**.

h. Answer the questions.

In which department are a majority of our salary costs spent? For which job title?

Answer: **Most of our salary costs are spent in the Sales Department, with a majority going toward the Sales Rep. I job title.**

What could be some reasons why salary costs are so much higher for this group?

Answer: **Salary costs could be higher for this group either because this job title pays more or there are more employees with this job title. Because the Sales Rep. I job title is the lowest level of all sales reps, there are probably more employees with this job title.**

i. Save the report.

3. Exploring Data: Part 2

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

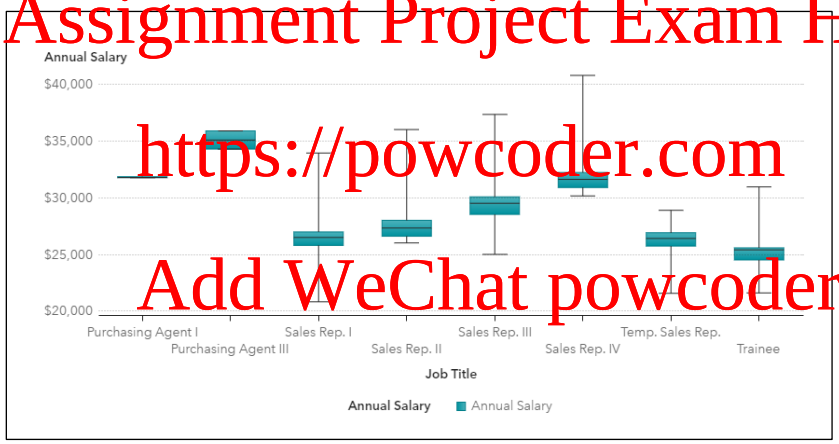
b. Open the **VA1- Practice3.2b** report from the **Courses/YVA185/Basics/Practices (HR)** folder.

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- Practice3.2b** report to open it.

c. On Page 2, create a box plot.

1) In the upper left corner of the report, click the **Page 2** tab.
2) In the left pane, click **Objects**.
3) Drag the **Box plot** 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 **Measures** role, select **Add** ⇨ **Annual Salary** and click **OK**.

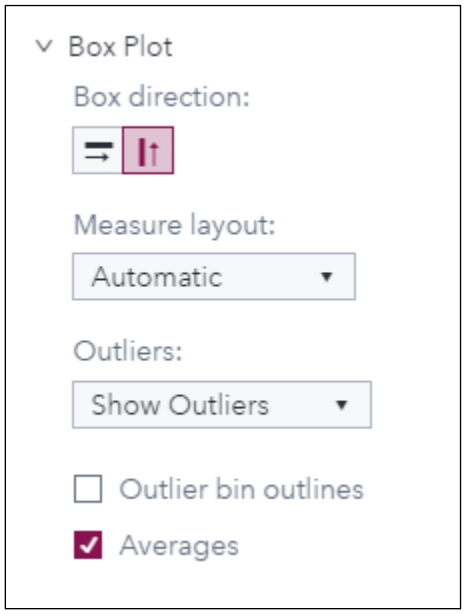
The box plot should resemble the following:



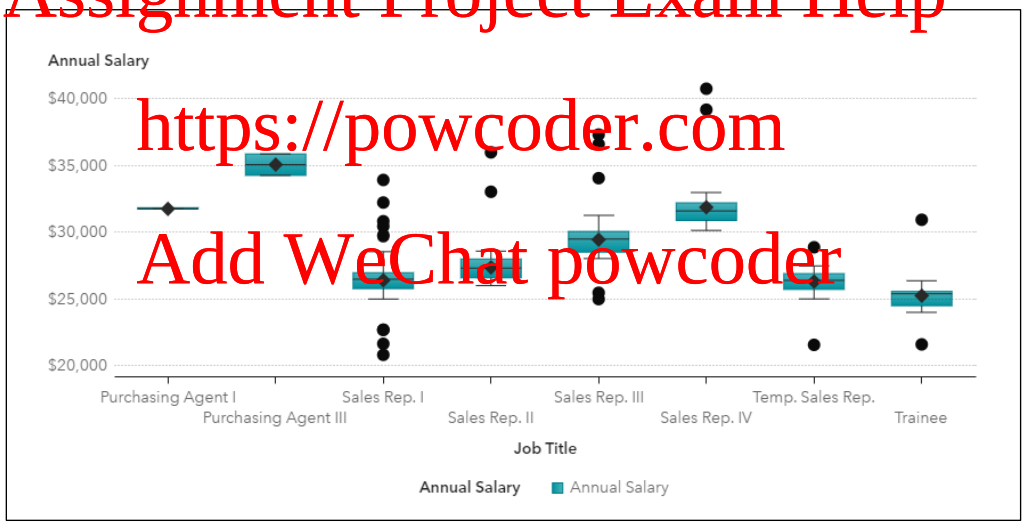
d. Modify the options for the box plot.

1) In the right pane, click **Options**.
2) In the Object group, for the **Name** field, enter **Salary Analysis by Job Title**.
3) In the Box Plot group, for the **Outliers** field, select **Show Outliers**.
4) Select **Averages**.

The Options pane should resemble the following:



The box plot should resemble the following:



e. Maximize the box plot 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 **Average** twice to sort by that column in descending order.

Job Title	Minimum	Lower Whisker	First Quartile	Average ▼	Median	Third
Purchasing Agent III	$34,270.00	$34,270.00	$34,270.00	$35,070.00	$35,070.00	$3
Sales Rep. IV	$30,150.00	$30,150.00	$30,890.00	$31,880.51	$31,605.00	$3
Purchasing Agent I	$31,760.00	$31,760.00	$31,760.00	$31,760.00	$31,760.00	$3
Sales Rep. III	$25,005.00	$28,040.00	$28,525.00	$29,457.35	$29,500.00	$3
Sales Rep. II	$26,015.00	$26,015.00	$26,600.00	$27,373.58	$27,325.00	$2
Sales Rep. I	$20,835.00	$25,010.00	$25,795.00	$26,417.79	$26,495.00	$2
Temp. Sales Rep.	$21,580.00	$25,020.00	$25,735.00	$26,317.43	$26,407.50	$2
Trainee	$21,615.00	$24,015.00	$24,515.00	$25,260.80	$25,405.00	$2

Which job title has the highest average salary? The lowest?

Answer: Purchasing Agent III has the highest average salary ($35,070.00). Trainee has the lowest average salary ($25,260.80).

Which job title has the largest number of outliers?

Answer: Sales Rep. I has more outliers than other job titles.

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

f. Save the report.

4. 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.

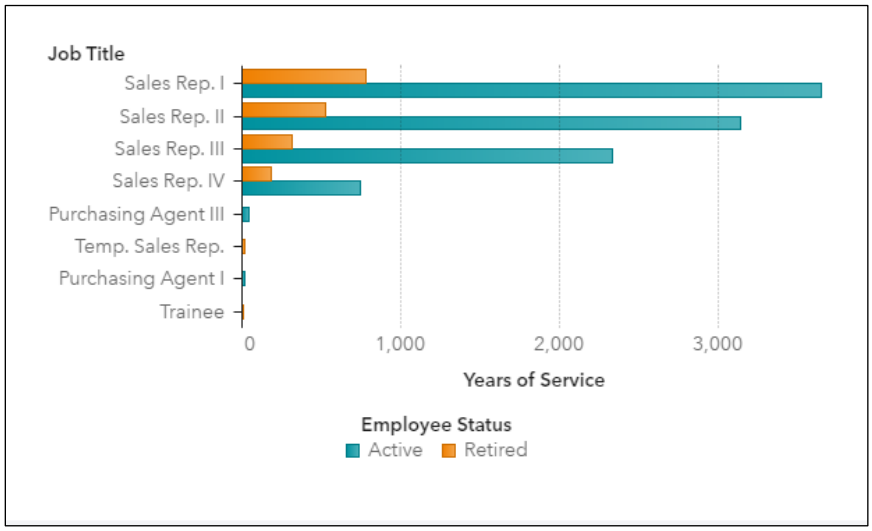
The new calculated item, **Employee Status**, appears in the Category group.

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:



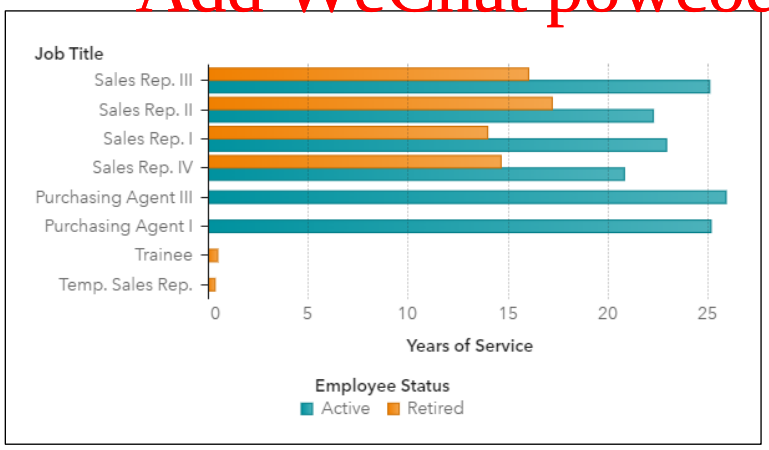
e. Specify **Years of Service by Job Title and Status** as the name of the bar chart.

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:

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

Answer: **Purchasing Agent III has the highest average years of service among active employees. Sales Rep. II has the highest average years of service among retired employees.**

h. Save the report.

5. **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.

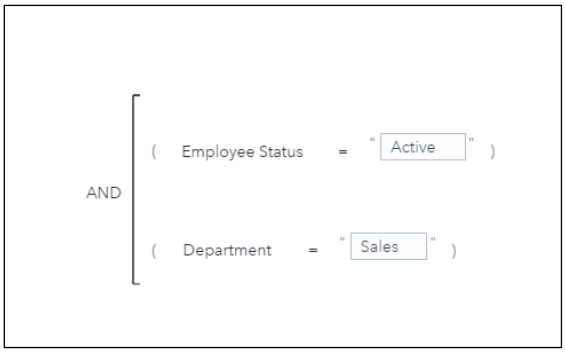
h) Enter **Active** as the string for the first condition.

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

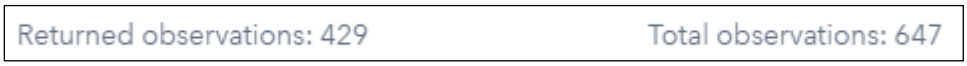
j) In the Conditions area, double-click **Department = 'x'** to add it to the second condition in the expression area.

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

The expression should resemble the following:

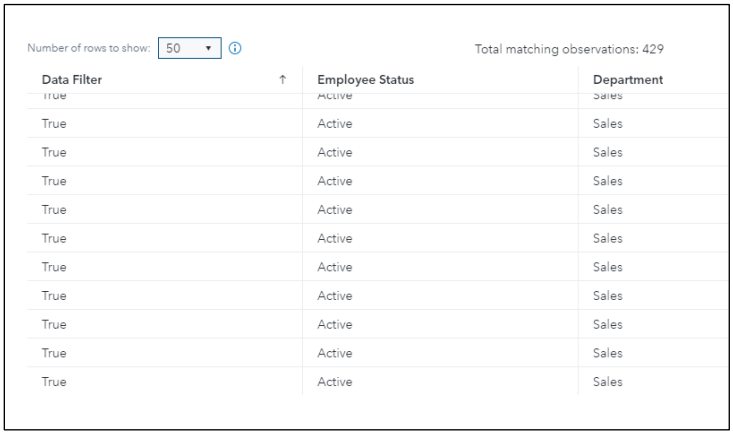


The bottom of the Apply Data Filter window should resemble the following:



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

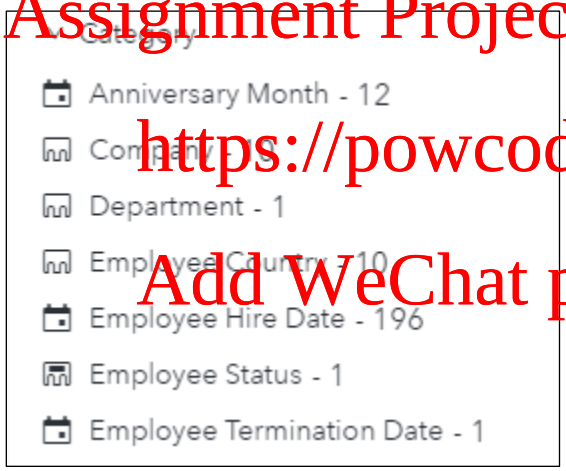
m) Scroll down to the bottom of the list.



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**.

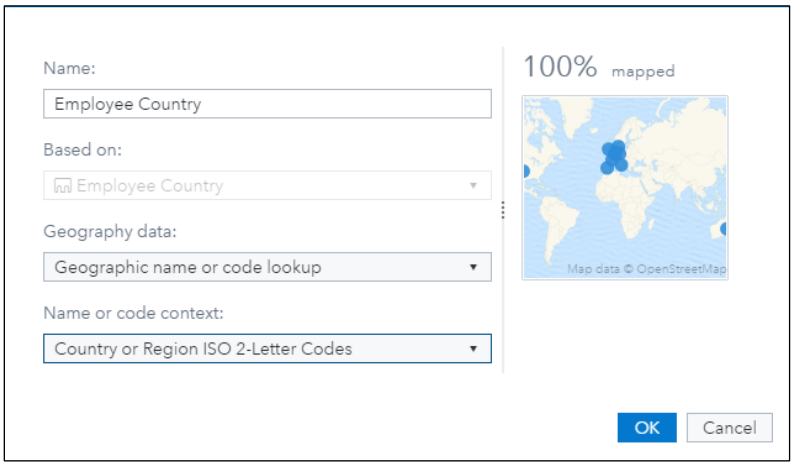
1) In the left pane, click **Data**.

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.

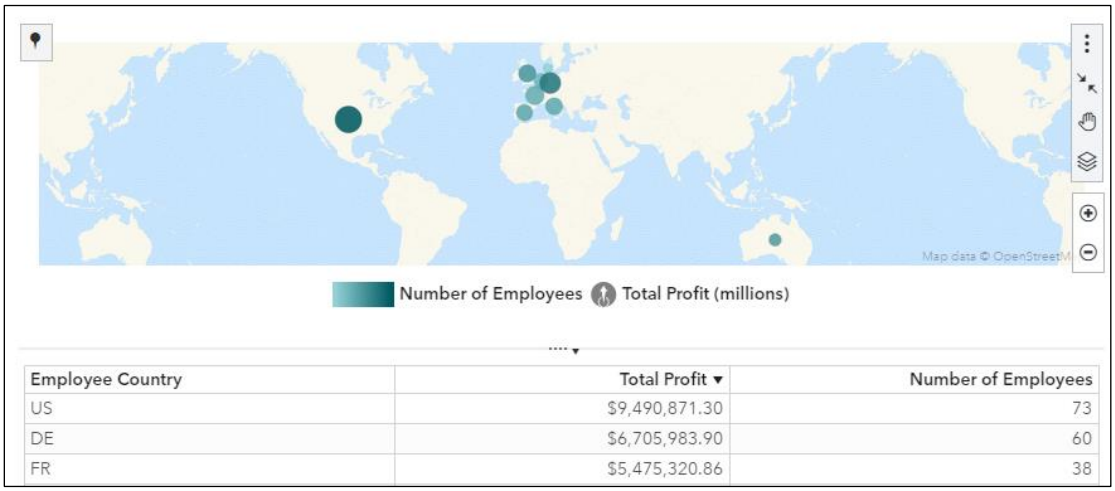
e. On Page 4, create a geo map.

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.

Management has decided that one possible criterion for promotion is profit generated. Which two countries generate the highest profit? Why do they have such high profits?

Answer: United States ($9,490,871.30) and Germany ($6,705,983.90) generate the highest total profit. These countries have more employees than other countries, which could explain the higher profits.

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.

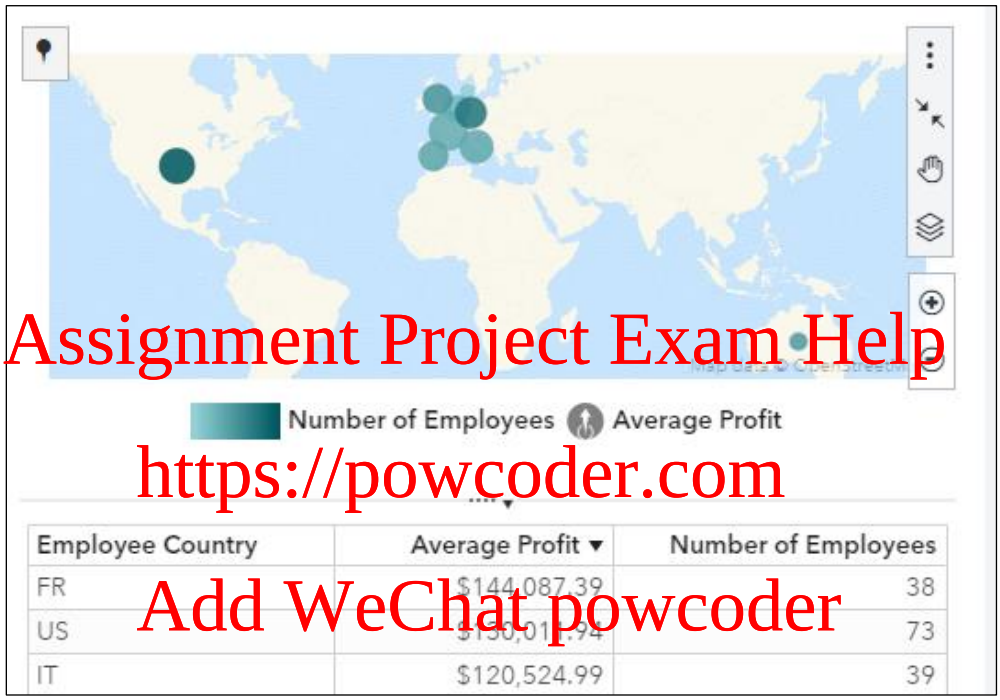
1) In the right pane, click **Options**.

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	$130,01[illegible].94	73
IT	$120,524.99	39

3) Answer the question.

Which country has the highest average profit? Highest number of employees?

Answer: **France has the highest average profit ($144,087.39). United States has the highest number of employees (73).**

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

j. Save the report.

6. Analyzing Data

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

b. Open the **VA1- Practice3.4a** 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**.

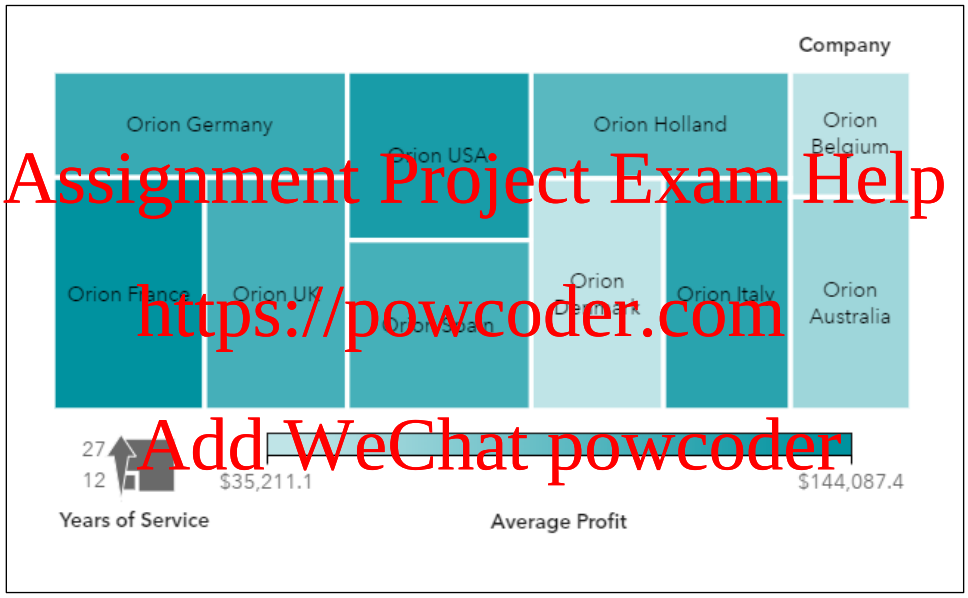
a) Navigate to the **Courses/YVA185/Basics/Practices (HR)** folder.

b) Double-click the **VA1- Practice3.4a** report to open it.

c. On Page 5, create a treemap.

1) In the upper left corner of the report, click the **Page 5** tab.
2) In the left pane, click **Objects**.
3) Drag the **Treemap** object, from the Graphs group, to the canvas.
4) In the right pane, click **Roles**.
5) For the **Tile** role, select **Add** ⇨ **Company**.
6) For the **Size** role, select **Number of Employees** ⇨ **Years of Service**.
7) For the **Color** role, select **Add** ⇨ **Average Profit**.
8) For the **Data tip values** role, select **Add** ⇨ **Number of Employees** and click **OK**.

The treemap should resemble the following:



d. Create a new hierarchy (**Employee Hierarchy**).

1) In the left pane, click **Data**.
2) In the Data pane, select **New data item** ⇨ **Hierarchy.**
   a) In the New Hierarchy window, in the **Name** field, enter **Employee Hierarchy**.
   b) Double-click the following data items, in the specified order, in the Available items list to move them to the Selected items list:

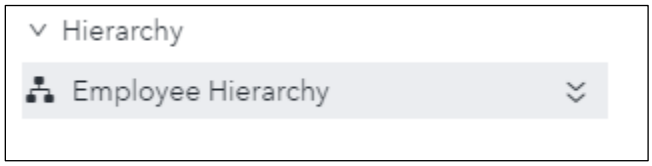
      Company

      Job Title

      Group

   c) Click **OK** to create the hierarchy.

The Hierarchy group in the Data pane should resemble the following:



e. In the treemap, specify **Employee Hierarchy** for the **Tile** role, and then answer the questions.

1) If necessary, select the treemap.
2) In the right pane, click **Roles**.
3) For the **Tile** role, select **Company** ⇨ **Employee Hierarchy**.
4) Answer the questions.

Which two companies have the highest average profit generated (one possible criterion for promotion)?

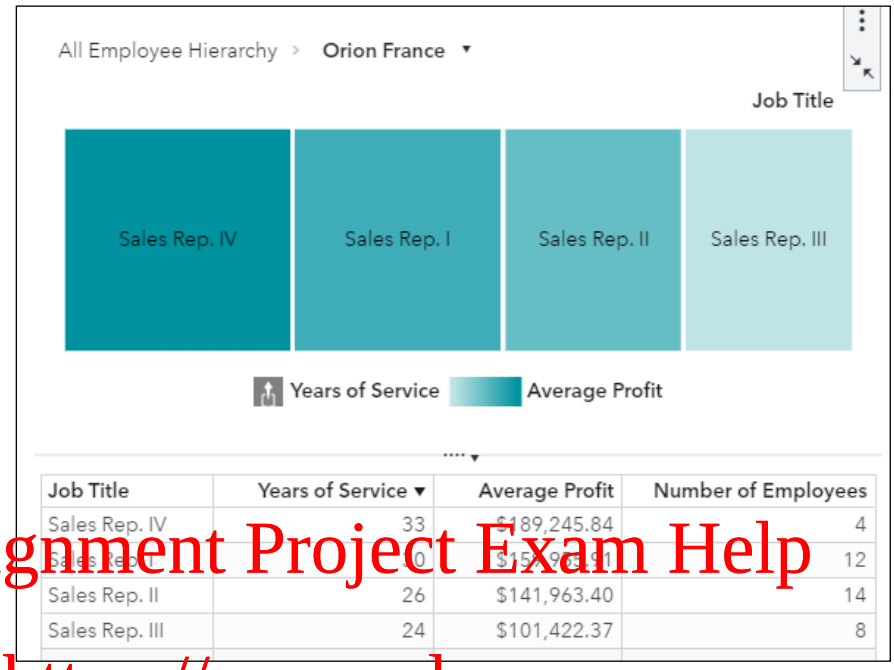
Answer: **Orion France and Orion USA have the highest average profit generated.**

Company	Years of Service	Average Profit ▾	Number of Employees
Orion France	27	$144,087.39	38
Orion USA	24	$141,011.94	73

- **In the upper right corner of the treemap, click (Maximize) to view additional details.**
- **In the details table below the treemap, click Average Profit twice to sort in descending order.**
- **In the upper right corner, click (Restore).**

For these two companies, which job titles have the highest average years of service and average profit generated?

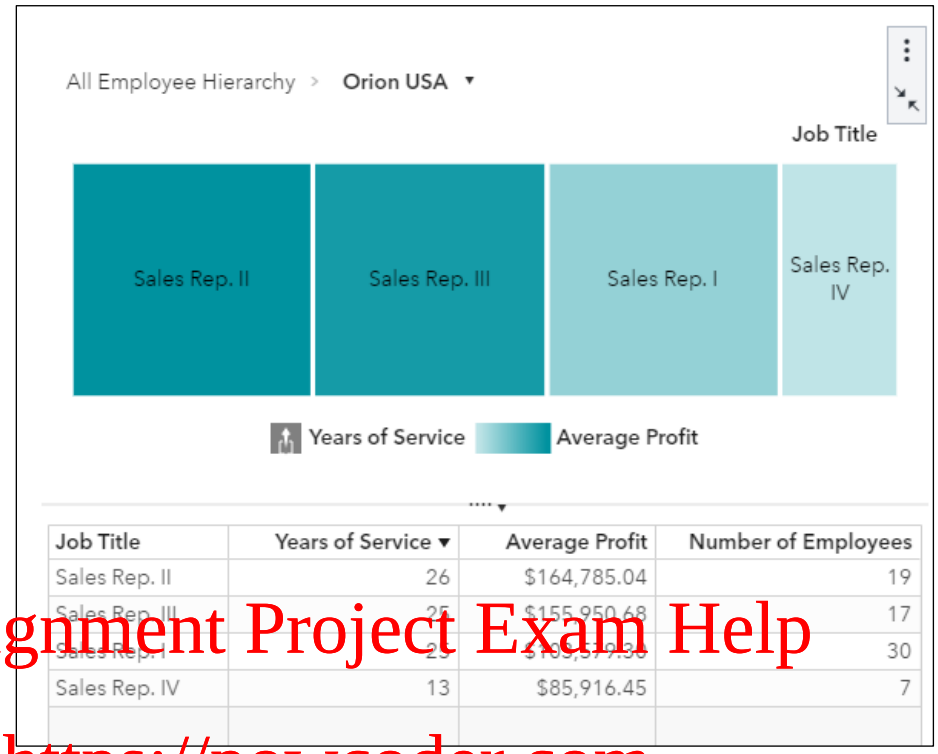
Answer: **For Orion France, the Sales Rep. IV job title has the highest average years of service and highest average profit generated.**



Job Title	Years of Service	Average Profit	Number of Employees
Sales Rep. IV	33	$189,245.84	4
Sales Rep. I	30	$159,981.91	12
Sales Rep. II	26	$141,963.40	14
Sales Rep. III	24	$101,422.37	8

- **In the treemap, double-click Orion France.**
- **In the upper right corner of the treemap, click (Maximize) to view additional details.**
- **In the details table below the treemap, click Years of Service twice to sort in descending order.**
- **In the upper right corner, click (Restore).**

For Orion USA, the Sales Rep. II job title has the highest average years of service and the highest average profit generated.



Job Title	Years of Service	Average Profit	Number of Employees
Sales Rep. II	26	$164,785.04	19
Sales Rep. III	25	$155,950.68	17
Sales Rep. I	23	$148,377.30	30
Sales Rep. IV	13	$85,916.45	7

- **In the treemap, click All Employee Hierarchy to return to the top level of the hierarchy.**
- **Double-click Orion USA.**
- **In the upper right corner of the treemap, click (Maximize) to view additional details.**
- **In the details table below the treemap, click Years of Service twice to sort in descending order.**
- **In the upper right corner, click (Restore).**

f. Save the report.

7. Adding Data Analysis

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

b. Open the **VA1- Practice3.4b** 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- Practice3.4b** report to open it.

c. On Page 6, create a correlation matrix.

1) In the upper left corner of the report, click the **Page 6** tab.

2) In the left pane, click **Objects**.
3) Drag the **Correlation matrix** object, from the Graphs group, to the canvas.
4) In the right pane, click **Roles**.
5) For the **Measures** role, click **Add**.
6) In the Add Data Items window, select the following measures:

   Annual Salary

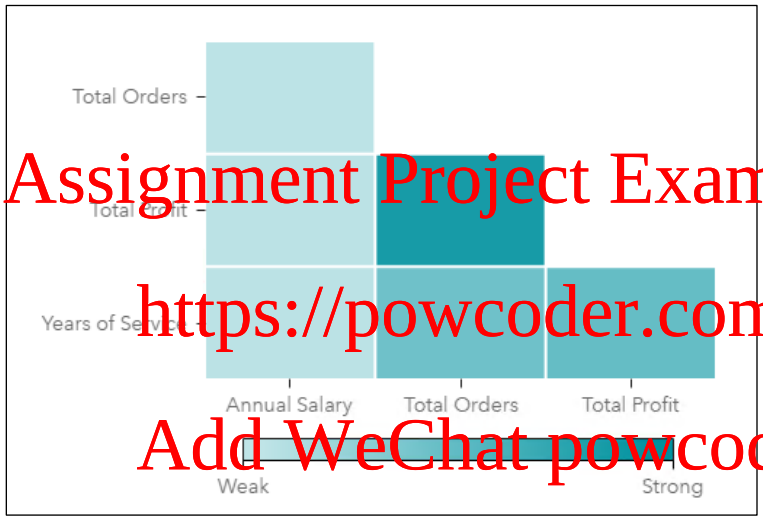
   Total Orders

   Total Profit

   Years of Service

7) Click **OK**.

   The correlation matrix should resemble the following:



d. Answer the following question:

What is the degree of correlation between **Total Orders** and **Total Profit**?

Answer: **Total Orders and Total Profit have a correlation of 0.8783 (strong, positive correlation).**

X Axis:	Total Orders
Y Axis:	Total Profit
Correlation:	0.8783
Relationship:	Strong

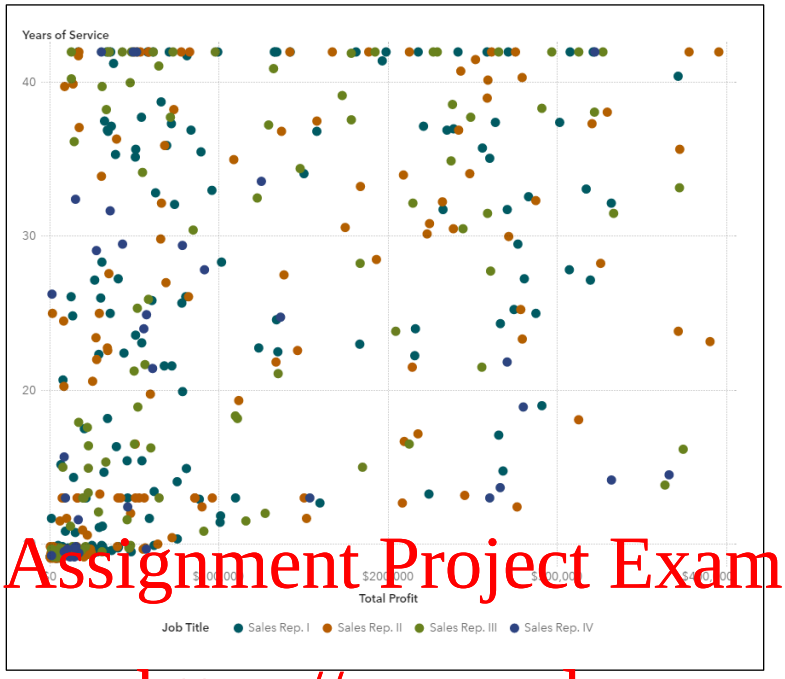
e. Create a scatter plot.

1) In the left pane, click **Objects**.
2) Drag the **Scatter plot** object, from the Graphs group, to the right side of the canvas.
3) In the right pane, click **Roles**.
4) For the **Measures** role, click **Add**.

5) In the Add Data Items window, select **Total Profit** and **Years of Service** and click **OK**.

6) For the **Color** role, select **Add** ⇨ **Job Title**.

The scatter plot should resemble the following:



f. Answer the following question:

Using years of service and profit generated as promotion criteria, do you notice any differences between job titles?

Answer: **Based on the promotion criteria of years of service and profit generated, we want to focus on the employees in the upper right quadrant of the scatter plot. In that area, there seems to be an equal representation of Sales Rep. I, Sales Rep. II, and Sales Rep. III job titles.**

g. Save the report.

End of Solutions

Solutions to Activities and Questions

continued...

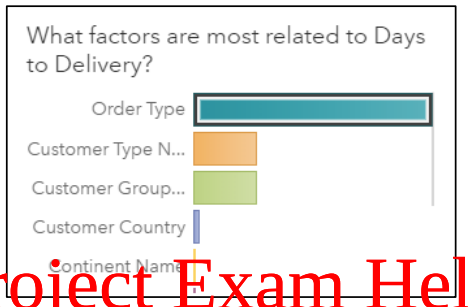
3.01 Activity – Correct Answer

What is the average of **Days to Delivery**? **1.1**

What are the characteristics of Days to Delivery?

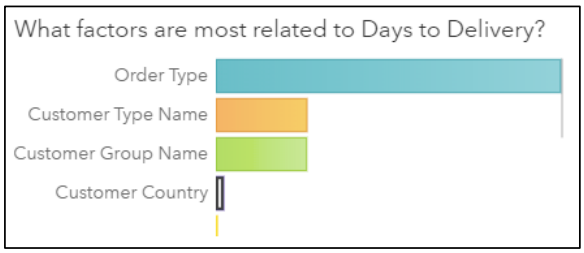
Days to Delivery ranges from 0 to 32. Average Days to Delivery is 1.1. Most cases (761K of 952K) have a Days to Delivery between 0 and 4. Order Type best differentiates the highest (top 10%) and the lowest (bottom 10%) Days to Delivery cases. There are 181K cases that might be outliers, with Days to Delivery above 3.

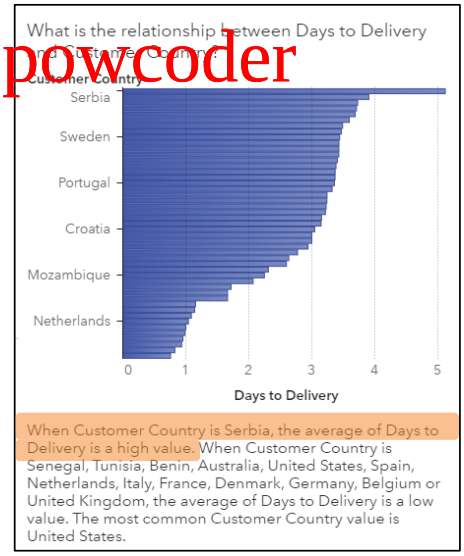
Which factor is the most related to **Days to Delivery**? **Order Type**



3.01 Activity – Correct Answer

Which country has the highest average for **Days to Delivery**? **Serbia**





When Customer Country is Serbia, the average of Days to Delivery is a high value. When Customer Country is Senegal, Tunisia, Benin, Australia, United States, Spain, Netherlands, Italy, France, Denmark, Germany, Belgium or United Kingdom, the average of Days to Delivery is a low value. The most common Customer Country value is United States.

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3.02 Multiple Choice Question – Correct Answer

Which graph would help you determine whether a measure is normally distributed?

a. distribution plot
b. box plot
c. histogram
d. normality plot

18

3.03 Activity – Correct Answer

Match each new data item with the type of calculation.

_B_ Gross Profit Margin (Total Profit/ Total Revenue)

_A_ Date (from month, day, year)

_A_ Hemisphere (from continents)

_B_ GDP Growth (year-over-year)

_B_ Number of Employees (distinct count)

_A_ State Abbreviations (uppercase)

A. calculated item

B. aggregated measure

35

3.04 Activity – Correct Answer

Given the values of **Customer Birth Date** and today's date, how would you calculate **Customer Age**?

In SAS, dates are stored as the number of days since January 1, 1960:

Customer Age = (Today – Customer Birth Date)/365.25

Customer Birth Date
02Jan1983
28May1975
08May2008
19Sep2010
10Oct2017

38

3.05 Activity – Correct Answer

Given the values of **Employee Hire Date** and **Employee Termination Date**, how would you calculate **Years of Service**?

Active employees:

YOS = (Today – Employee Hire Date)/365.25

Retired employees:

YOS= (Employee Termination Date – Employee Hire Date)/365.25

Use the IF… ELSE operator to perform different calculations based on a condition.

Employee Hire Date	Employee Termination Date
01Dec2004	28Feb2007
01Nov2005	. ← Active
25Jan2005	.
01Mar2005	28Feb2010 ← Retired
31May2005	31May2012
11Dec2005	.
01Sep2002	.

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3.06 Multiple Answer Question – Correct Answer

Which object can use a data item that has a classification type of geography?

a. crosstab
b. geo map
c. table
d. bar chart

All these graphs can use a data item that has a classification type of geography. The geo map requires it.

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3.07 Activity – Correct Answer

Each report object has a threshold for how much data it can visually display. Many report objects will not display high-cardinality data items with a large number of unique values.

What are some examples of high-cardinality data items?
Examples: Employee ID, Street Address, Customer Name, Birth Date

What are some examples of low-cardinality data items?
Examples: Country Name, Age Group, Job Title, Order Type

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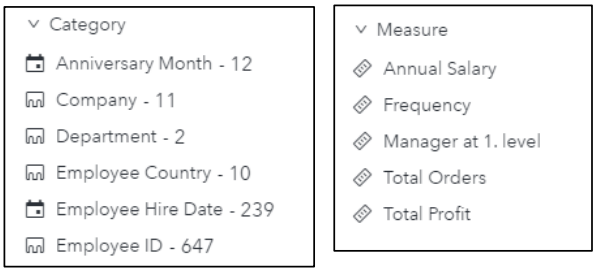
Practice Review

3.1 Working with Data Items – Solution

What is the classification of **Employee_ID**? **Manager at 1. level**?

Employee_ID has a classification of category.

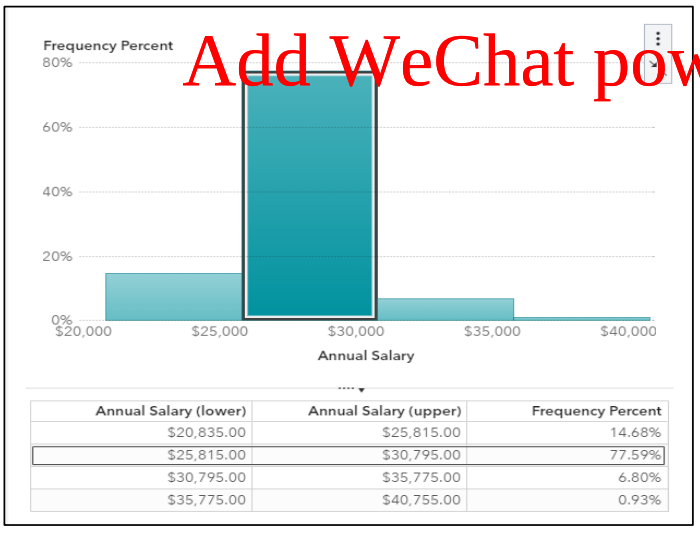
Manager at 1. level has a classification of measure.



What does the **Frequency** data item represent?

Frequency represents the number of employees.

3.2 Exploring Data: Part 1 – Solution



Annual Salary (lower)	Annual Salary (upper)	Frequency Percent
$20,835.00	$25,815.00	14.68%
$25,815.00	$30,795.00	77.59%
$30,795.00	$35,775.00	6.80%
$35,775.00	$40,755.00	0.93%

Into which range do the majority of salaries fall?

More than 75% of salaries fall within the $25K to $30K range.

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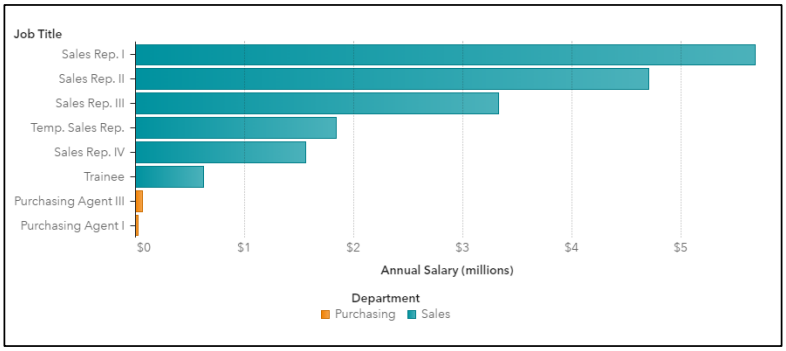
3.2 Exploring Data: Part 1 – Solution

In which department are a majority of our salary costs spent? **Sales**

For which job title? **Sales Rep. I**

What could be some reasons why salary costs are so much higher for this group? **Most likely because there are more employees with this job title.**



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3.3 Exploring Data: Part 2 – Solution

Which job title has the highest average salary?
Purchasing Agent III

Job Title	Minimum	Lower Whisker	First Quartile	Average ▲	Median	Third Quartile
Trainee	$21,615.00	$24,015.00	$24,515.00	$25,260.80	$25,405.00	$25,580.00
Temp. Sales Rep.	$21,580.00	$25,020.00	$25,735.00	$26,317.43	$26,407.50	$26,910.00
Sales Rep. I	$20,135.00	$24,010.00	$25,715.00	$26,211.79	$26,495.00	$26,980.00
Sales Rep. II	$26,015.00	$26,015.00	$26,600.00	$27,373.58	$27,325.00	$28,005.00
Sales Rep. III	$25,005.00	$28,040.00	$28,525.00	$29,457.35	$29,500.00	$30,070.00
Purchasing Agent I	$31,760.00	$31,760.00	$31,760.00	$31,760.00	$31,760.00	$31,760.00
Sales Rep. IV	$30,150.00	$30,150.00	$30,890.00	$31,880.51	$31,605.00	$32,210.00
Purchasing Agent III	$34,270.00	$34,270.00	$34,270.00	$35,070.00	$35,070.00	$35,870.00

The lowest?
Trainee

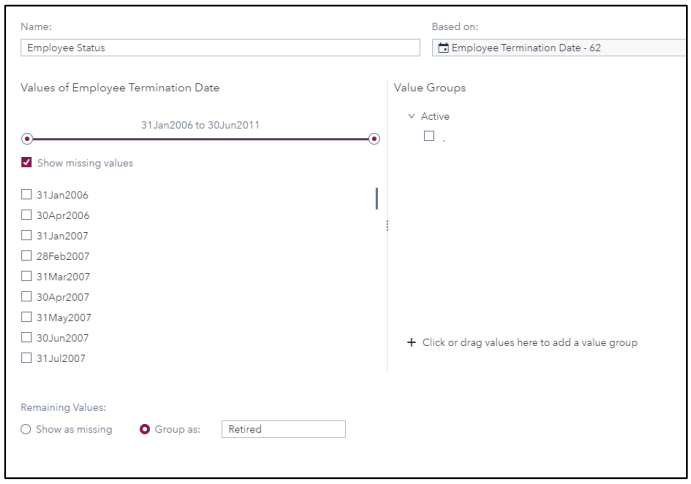
Which job title has the highest number of outliers?

Sales Rep. I

28

3.4 Creating Data Items – Solution

Employee Status – Custom category



Employee Status – Calculated item

45

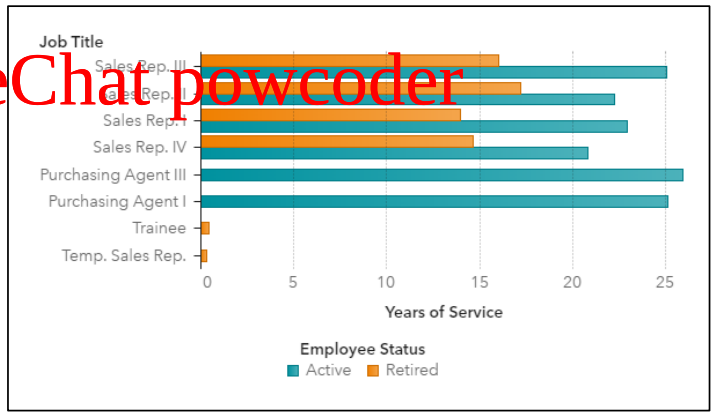
3.4 Creating Data Items – Solution

Which job title has the highest years of service among active employees?

Purchasing Agent III

Among retired employees?

Sales Rep. II



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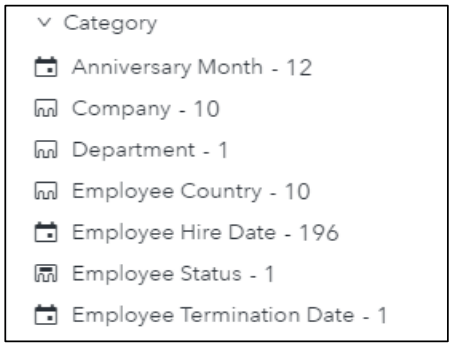
3.5 Applying Filters – Solution

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

Data source filter



57

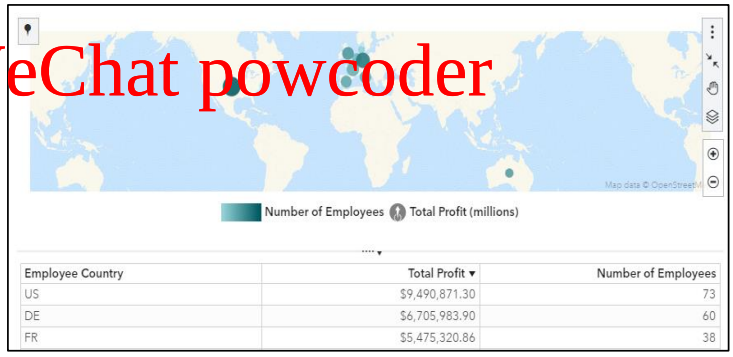
3.5 Applying Filters – Solution

Which two countries generate the highest profit?

United States and Germany

Why do they have such high profits?

These countries have more employees.



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

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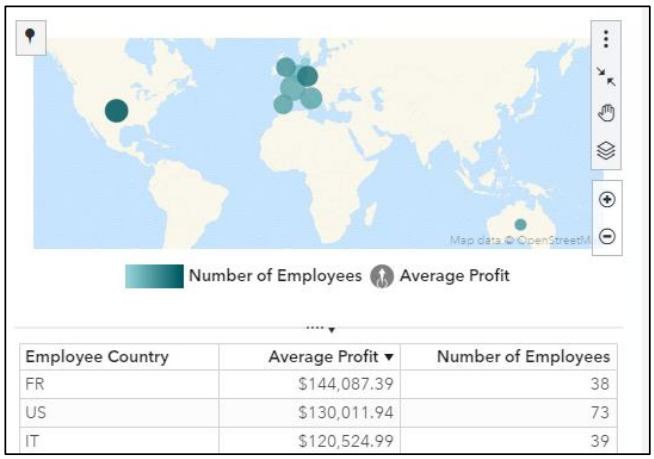
3.5 Applying Filters – Solution

Which country has the highest average profit?
France

Highest number of employees?
United States



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

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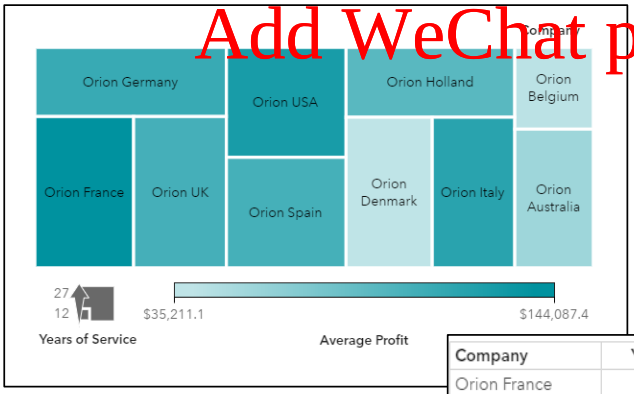
3.6 Analyzing Data – Solution

Which two companies have the highest average profit generated (one possible criterion for promotion)? **Orion France and Orion USA**



Company	Years of Service	Average Profit ▾	Number of Employees
Orion France	27	$144,087.39	38
Orion USA	24	$130,011.94	73

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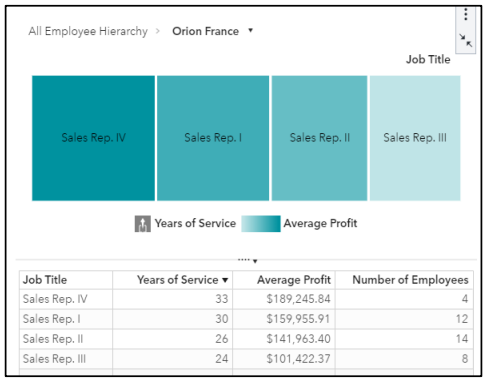
3.6 Analyzing Data – Solution

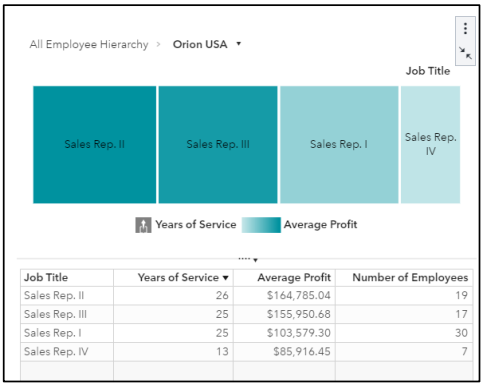
For those two companies, which job titles have the highest years of service and average profit generated?

For Orion France, Sales Rep. IV



Job Title	Years of Service	Average Profit	Number of Employees
Sales Rep. IV	33	$189,245.84	4
Sales Rep. I	30	$159,955.91	12
Sales Rep. II	26	$141,963.40	14
Sales Rep. III	24	$101,422.37	8

For Orion USA, Sales Rep. II



Job Title	Years of Service	Average Profit	Number of Employees
Sales Rep. II	26	$164,785.04	19
Sales Rep. III	25	$155,950.68	17
Sales Rep. I	25	$103,579.30	30
Sales Rep. IV	13	$85,916.45	7

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3.7 Adding Data Analysis – Solution

What is the degree of correlation between **Total Orders** and **Total Profit**?

0.8783 (strong, positive correlation)

X Axis:	Total Orders
Y Axis:	Total Profit
Correlation:	0.8783
Relationship:	Strong

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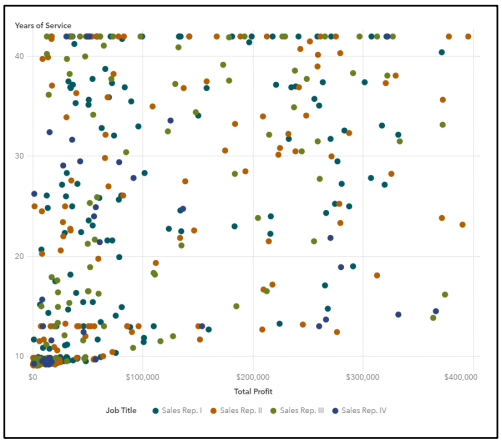
3.7 Adding Data Analysis – Solution

Using years of service and profit generated as promotion criteria, do you notice any differences between job titles?

We want to focus on employees in the upper right quadrant of the scatter plot. In that area, there seems to be an equal representation of Sales Rep. I, Sales Rep. II, and Sales Rep. III.



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