

Hong Kong Baptist University

Department of Computer Science

COMP 7990 Principles and Practices of data analytics (2022-23)

Lab 3b: Data Visualization using Tableau

Introduction

What is data visualization?

Data Visualization is one of the most important part of data analysis. You can present the data in an understandable and visually appealing format. E.g. pictorial forms: graphs, bars or diagrams.

What is Tableau?

Tableau is one of the most powerful data visualizations tool which is focused on business intelligence. Many organizations use Tableau to get more value from their data and make better decisions. We can query relational databases, OLAP cubes, cloud databases, and spreadsheets and then generates different graphs or charts by using Tableau. It is fast and easy, and it can work with hundreds of data sources. It provides interactive data visualizations and dashboards to the users. (A dashboard is a visual display of the most important information needed to achieve one or more objectives)

Why Tableau?

It is considered as one of the 10 technical skills with explosive growth in job demand.

Technical Skills With The Biggest Increases In Demand:

1. Big Data (Information Technology): 3,977%
2. Node.js (Design): 2,493%
3. Tableau (Research and Analysis): 1,581%
4. NoSQL (Information Technology): 1,002%
5. Apache Hadoop (Information Technology): 704%
6. HTML5 (Information Technology): 612%
7. Python (Research and Analysis): 456%
8. Oracle (Sales): 382%
9. JSON (Information Technology): 318%
10. Salesforce CRM (Sales): 292%

(Source: <https://www.forbes.com/sites/jeffkauflin/2017/01/08/the-10-technical-skills-with-explosive-growth-in-job-demand/#75584d754f5c>)

Tableau Family



1. **Tableau Desktop:** It offers all the full features of software and allows you to connect to different file types, create extracts of the data sources and save your Tableau workbooks locally.
2. **Tableau Public:** It is a free version of Tableau visualization software. You can create visualizations and connect to CSVs, Text and Excel documents. However, you are *not allowed* to save your workbooks locally. Everyone can see your data as it is saved on cloud.
3. **Tableau Reader:** It is a free desktop application that allows you to read the Tableau file types. You can open the data visualizations built in Tableau Desktop. You can filter, drill down data but you cannot edit or perform other kind of interactions.
4. **Tableau Server:** It allows users to save workbooks securely across the organization using a secure server. It is browser-based and mobile-based. You can publish dashboards with Tableau Desktop and share them with web-based Tableau server.
5. **Tableau Online:** It is a hosted version of Tableau server which helps make business intelligence faster and easier than before.

Advantages of Tableau

1. Tableau is capable of analyzing hundreds of millions of rows and give answer in seconds.
2. It is easy to use because of its drag and drop feature.
3. The dashboard of tableau gives dynamic and interactive results.
4. Data access is easy. You can get data from spreadsheet to Hadoop.

5. The dashboard can be published and shared on web or mobile devices so that you can get the results quickly.

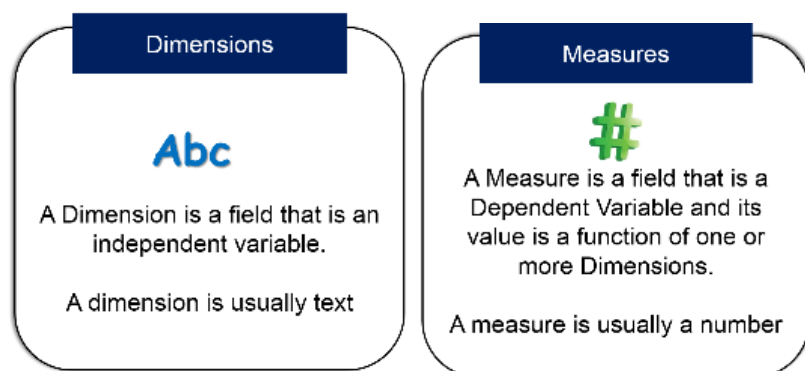
Measures and Dimension

Tableau divides the data in two main types: **dimensions** and **measures**.

Measures are the fields that can be measured, aggregated, or used for mathematical operations. Generally, it contains numeric value.

Dimensions are usually those fields that cannot be aggregated, they are the fields by which you want to summarize. E.g. Category, Country, City etc

Suppose you want to calculate the sum of order amount by country. Order amount will be the measure and country will be a dimension.

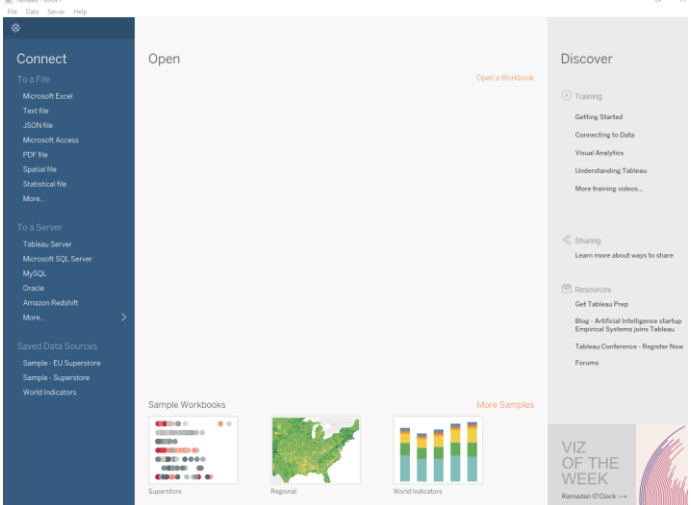
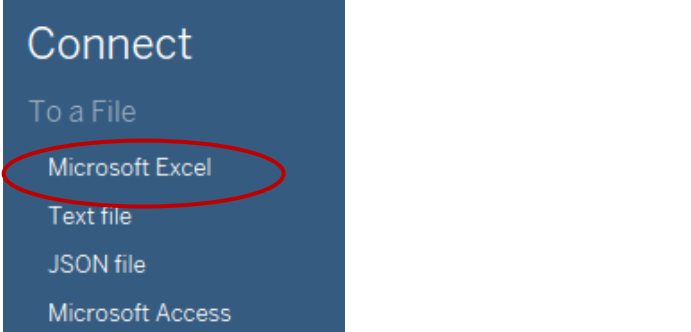
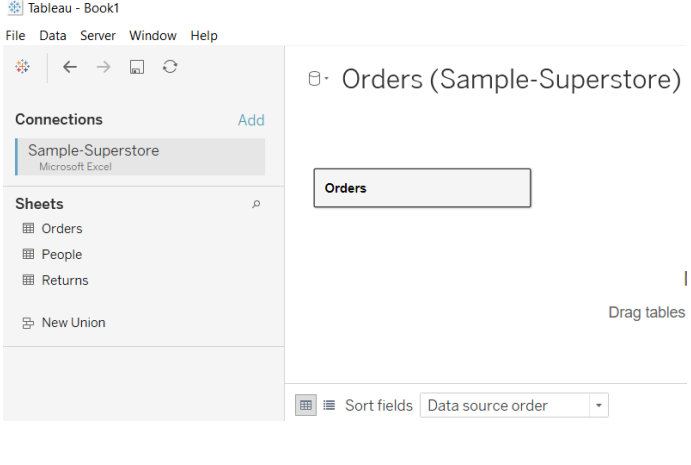


Learning Outcome

1. How to connect to the data?
2. Understand Tableau Family and the advantages of Tableau
3. Data visualization by building bar chart, column chart, pie chart, line chart etc
4. Create calculated field

I. Data Connections

The first thing to do in Tableau is to connect to your data. Tableau easily connects to nearly any data source, be it corporate Data Warehouse, Microsoft Excel or web-based data.

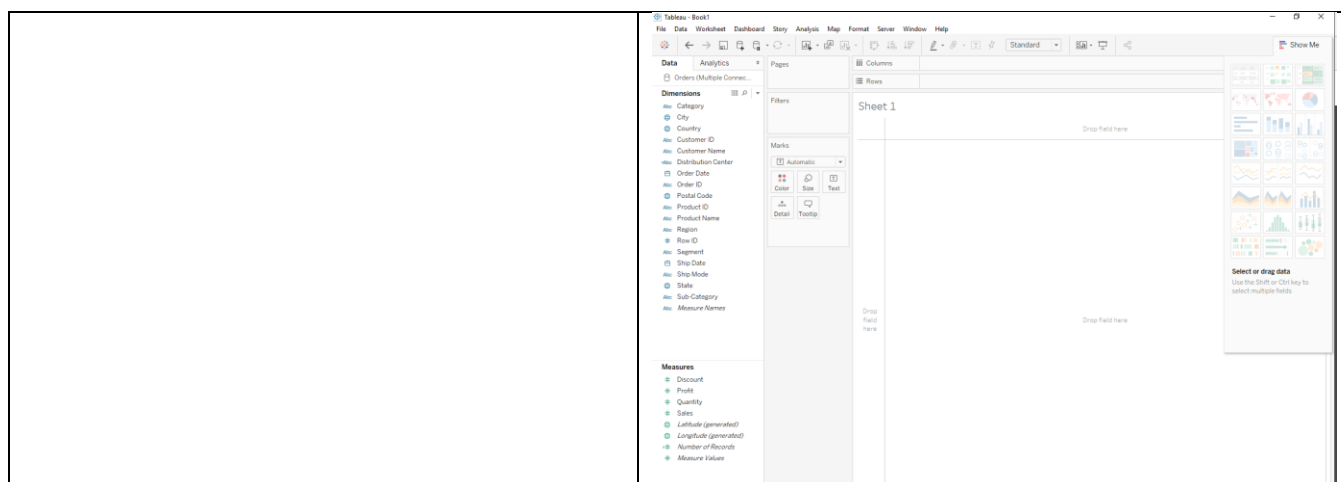
| | |
|--|--|
| <p>1. Open the software Tableau Desktop. You can see the Start screen. You can connect to new data or open recently used workbooks.</p> |  <p>The screenshot shows the Tableau Desktop start screen. On the left is a 'Connect' pane with options like 'To a File' (Microsoft Excel, Text file, JSON file, etc.) and 'To a Server'. The main area is titled 'Open' and shows 'Sample Workbooks' like 'Superstore', 'Regional', and 'World Indicators'. On the right is a 'Discover' pane with links to training, sharing, and resources.</p> |
| <p>2. Under the Connect Pane, select Microsoft Excel.</p> |  <p>This screenshot is a close-up of the 'Connect' pane. The 'To a File' section is expanded, and 'Microsoft Excel' is circled in red, indicating it is the selected option.</p> |
| <p>3. Download Lab3b-Tableau.zip. Unzip and open the file Sample-Superstore.xlsx. This data set contains transactions of customers purchasing specific products.</p> <p>4. On the Data Source Page, you can choose which sheets or tables you would like to use. Drag the sheet Orders to the canvas on the right.</p> <p>5. You can add or remove other sheets. Or add other connections (in csv). Tableau can create join automatically.</p> |  <p>The screenshot shows the 'Data Source' page in Tableau. The 'Connections' pane on the left lists 'Sample-Superstore' as a Microsoft Excel connection. Below it, the 'Sheets' pane lists 'Orders', 'People', and 'Returns'. The 'Orders' sheet has been dragged to the main canvas, which is titled 'Orders (Sample-Superstore)'. A 'Drag tables' instruction is visible at the bottom right of the canvas.</p> |

6. You can split a certain field (Order ID) by using **Custom Split**. Type hyphen (-) as separator and get the first string. **Rename** the new column to **Distribution Center**.

The screenshot illustrates the process of splitting the 'Order ID' field in Tableau. The top part shows the 'Custom Split' dialog box with the separator set to a hyphen (-) and the 'Split off' option set to 'First' column. The bottom part shows the resulting worksheet with a new column named 'Distribution Center' (circled in red) containing the first part of the 'Order ID' string (e.g., 'US'). The 'Data Source' pane at the bottom shows 'Sheet 1' selected (circled in red).

| Row ID | Order ID | Distribution Center |
|--------|----------------|---------------------|
| 685 | US-2017-168116 | US |
| 684 | US-2017-168116 | US |
| 133 | US-2017-164147 | US |
| 132 | US-2017-164147 | US |
| 131 | US-2017-164147 | US |
| 24 | US-2017-156909 | US |
| 838 | US-2017-156083 | US |
| 262 | US-2017-155299 | US |
| 304 | US-2017-152380 | US |
| 177 | US-2017-152366 | US |
| 270 | US-2017-145366 | US |

7. Click on the sheet tab **Sheet 1** at the bottom.
8. In the worksheet, the columns from your data source are shown as fields on the left side in the Data pane
9. Choose **File ➔ Save** to save the workbook with the name **lab3b-inclass-ans1.twbx**.



II. Building Bar chart and Column chart


Bar charts and column charts are used to compare data across categories. **Bar** mark type is used to compare measures across categories, or to break data down into stacked bars.


1. **Double click Category** under **Dimensions** Area and **double click Sales** under **Measures** Area. It shows the sum of sales for different categories.
(Measures are usually continuous; they are the fields you want to analyze, which are in green color)


The screenshot shows the Tableau interface. In the Dimensions shelf, 'Category' is selected. In the Measures shelf, 'Sales' is selected. The Marks card shows 'SUM(Sales)'. The Rows shelf is empty, and the Columns shelf contains 'Category'. The Marks card is set to 'Automatic'.

2. Drag the measure **Sales** from **Marks card** to **Columns** shelf, now you get a bar chart.

The screenshot shows the Tableau interface after dragging 'Sales' to the Columns shelf. The Columns shelf now contains 'SUM(Sales)'. The Rows shelf still contains 'Category'. The Marks card is still 'SUM(Sales)'. The view shows a bar chart with three bars for Furniture, Office Supplies, and Technology. A callout box points to the 'Automatic' mark type, and another callout box points to the resulting bar chart.

3. Select the button  to swap fields in **Rows** shelf and **Columns** shelf. It changes to a **column chart**.

4. **Sort** the Sum of Sales in **descending** order by clicking  near the y axis label **Sales**.

5. Show the mark labels (data labels) by clicking **Show Mark Labels** .

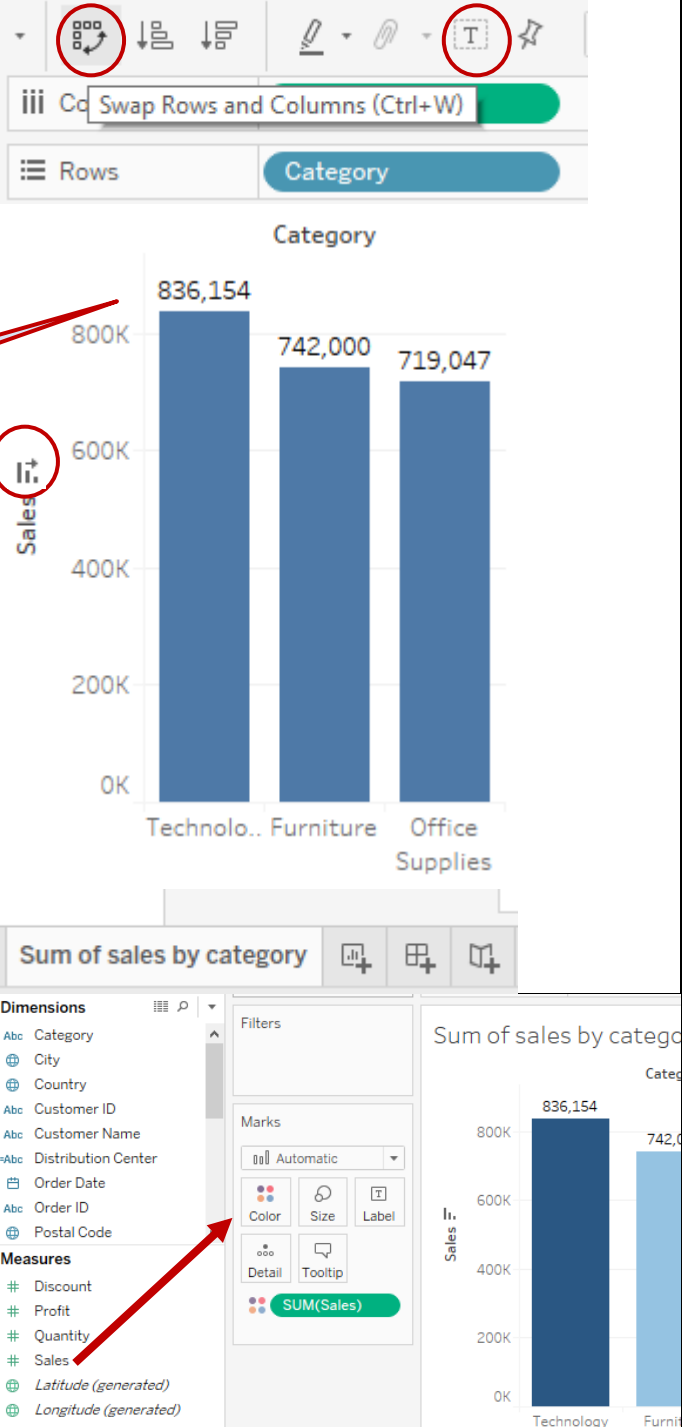
Column chart with data labels

6. Select **Entire View** to increase the column width.

Entire View ▾
 Standard
 Fit Width
 Fit Height
 Entire View

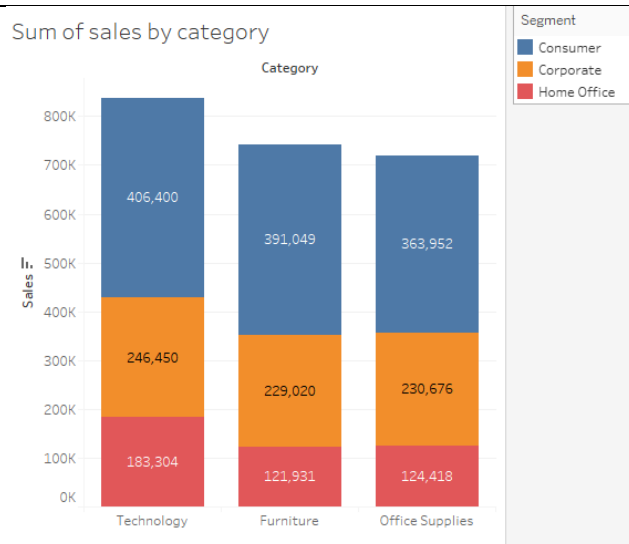
7. **Rename** the worksheet to **Sum of sales by category**. The chart title is changed as well.

8. Highlight the largest sales by using darker color, just drag the **Sales** measure to **Color**.

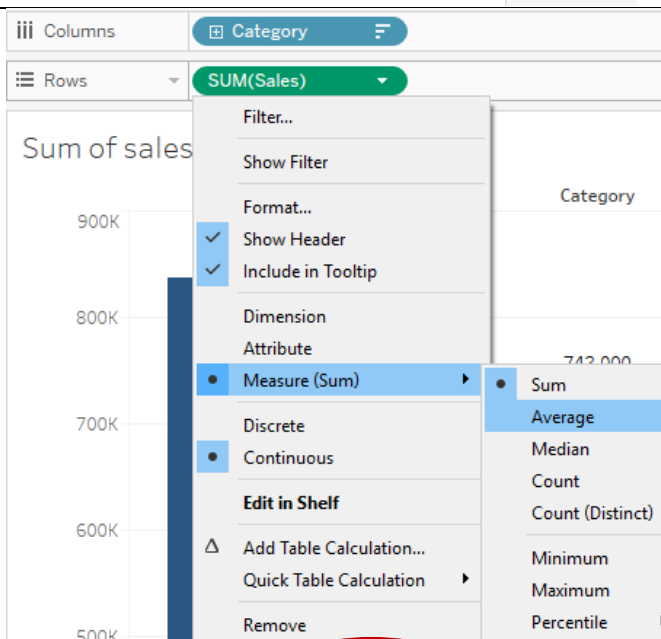


The screenshot shows the Tableau interface with a column chart titled "Sum of sales by category". The chart displays three bars representing sales by category: Technology (836,154), Furniture (742,000), and Office Supplies (719,047). The y-axis is labeled "Sales" and ranges from 0K to 800K. The x-axis is labeled "Category". The chart is a column chart with data labels. The "Columns" shelf contains "Category" and the "Rows" shelf contains "SUM(Sales)". The "Marks" shelf is set to "Automatic". The "Color" property is set to "SUM(Sales)". The "Show Mark Labels" button is circled in red. A red arrow points from the "Entire View" button to the chart. Another red arrow points from the "Color" property to the "SUM(Sales)" measure in the Marks shelf.

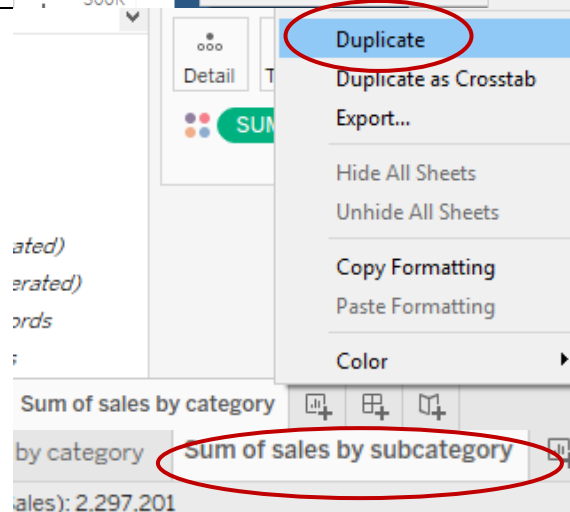
9. Drag the **Segment** dimension to **Color** to break data down into *stacked column*. Undo the action by pressing **Ctrl+Z**.



10. Click on **SUM (Sales)** measure in **Rows** shelf, choose **Measure (Sum) → Average** to display average sales. [Sum of sales/Number of records] **Undo** the action by pressing **Ctrl+Z**.

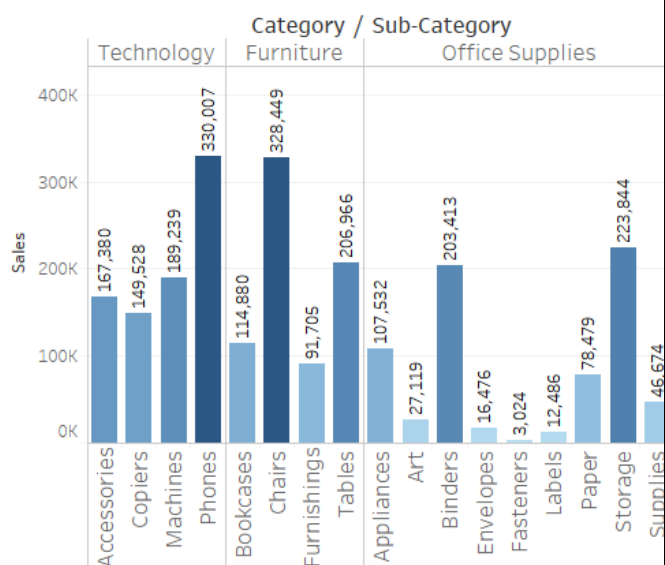



11. **Duplicate** the worksheet and rename the new worksheet to **Sum of sales by subcategory**.



12. **Double click Sub-Category** dimension. The result will be similar to this one.

Sum of sales by subcategory



13. **Clear** the worksheet by clicking , create a hierarchy by dragging **Sub-Category** to **Category**. **Rename** the hierarchy to **Product hierarchy**. Press **OK**.

Create Hierarchy

Name:

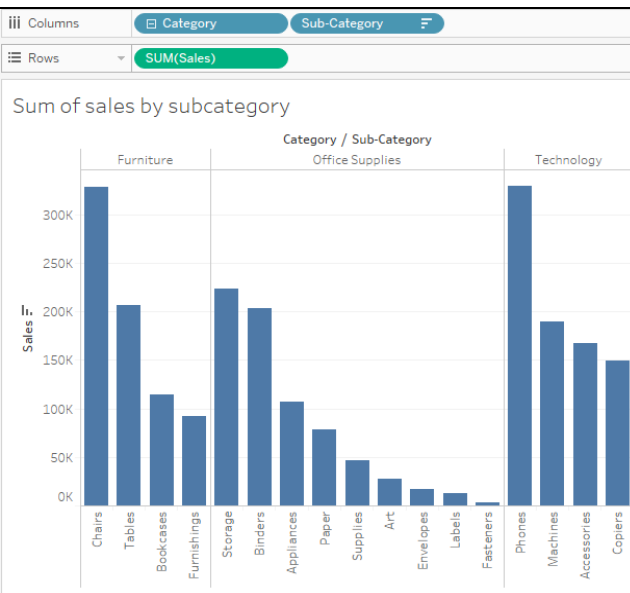
OK

Cancel

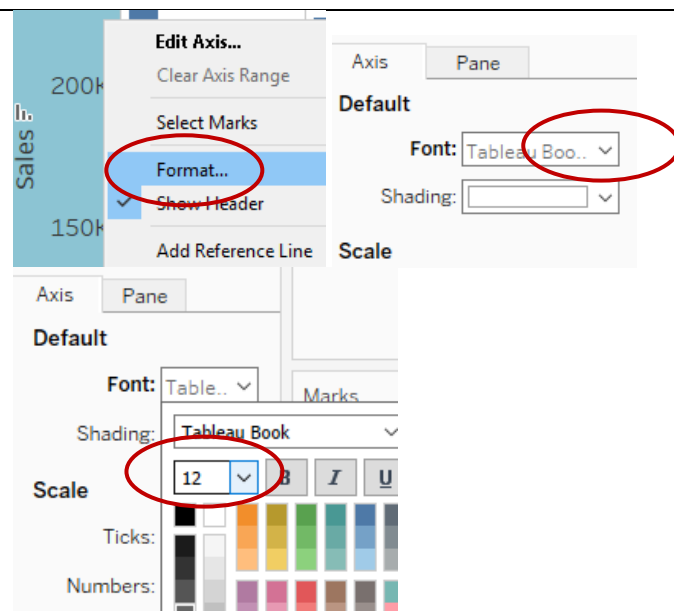
14. Drag the **Product hierarchy** to **Columns** shelf, and drag the **Sales** measure to **Rows** shelf. Click on **+** sign to expand the product hierarchy to show subcategory sales.

15. **Sort** the **sum of sales** in **descending** order within each category.

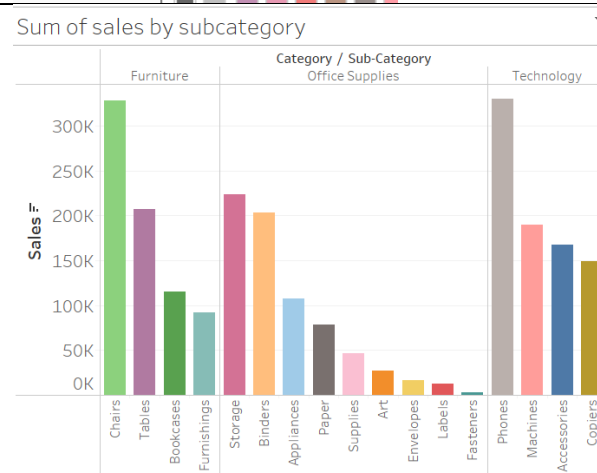
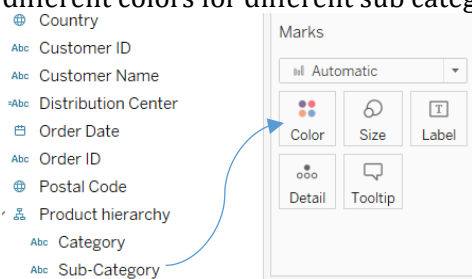
16. **Size** property in **Marks card** allows you to make the columns wider or narrower.



17. **Right click** the **y axis**, choose **Format**, and **Increase the font size to 12** for y axis labels.
18. Close the **Format** pane.



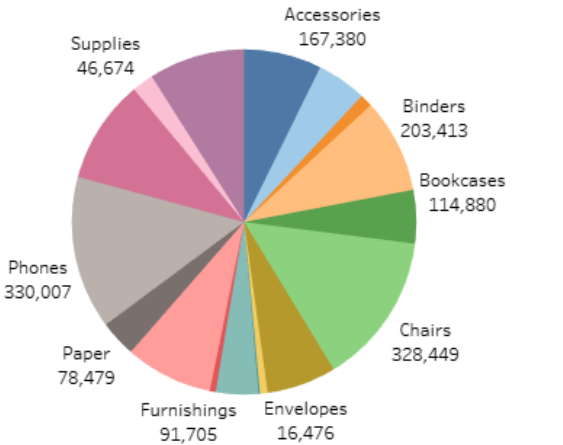
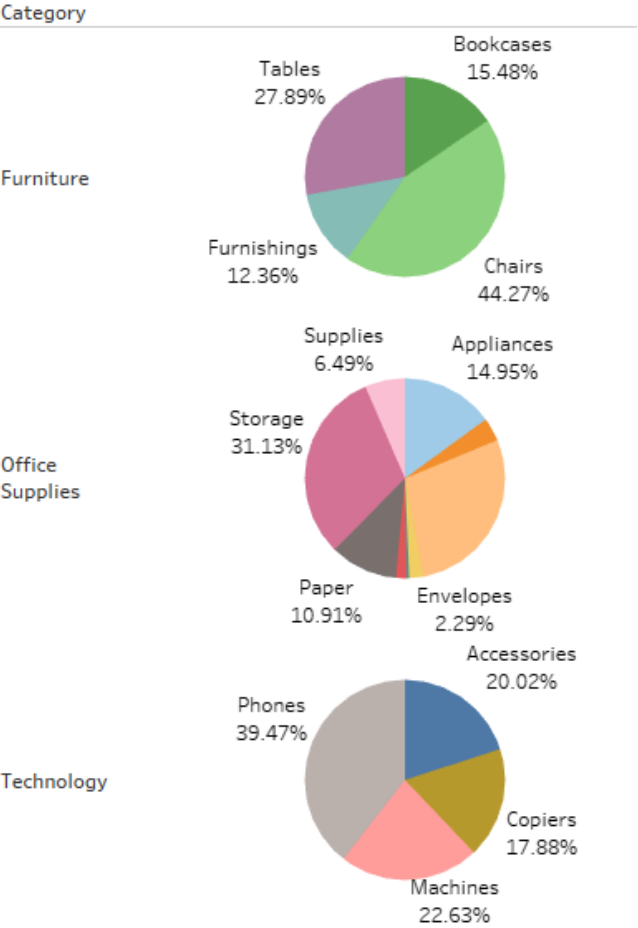
19. Drag the **Sub-Category** dimension from **Data Pane** to **Color** in **Marks card** to generate different colors for different sub categories.



20. Save the workbook **lab3b-inclass-ans1.twbx**.

III. Building Pie chart

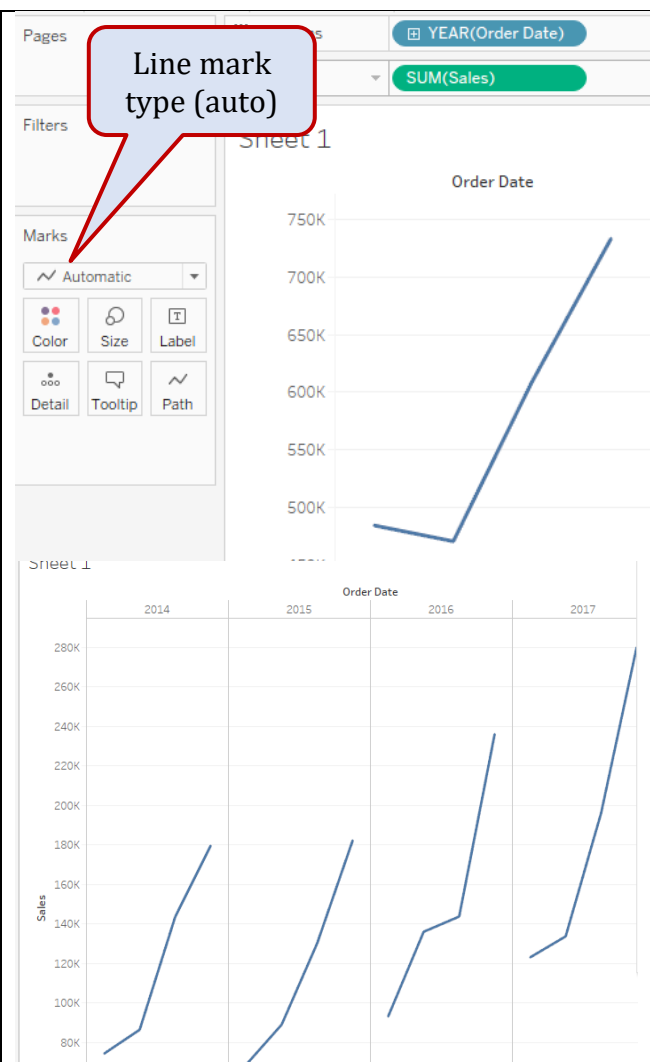
Pie charts are used to show proportions of a whole. Pie mark is used to show proportions.

| <ol style="list-style-type: none"> 1. Create a new worksheet named Pie chart. 2. Drag the Sales measure to Columns, drag the Sub-Category dimension to Rows. 3. Click Show Me on the toolbar and select pie chart type. Select Entire View to make the chart bigger. 4. Drag the Sub-Category dimension to Label on the Marks card. Drag Sales measure to Label too. |  | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|--------------|------------|--------|--------|-----------|--------|--------|--------|-------------|--------|--------------|------------|---------|--------|----------|-------|------------|--------|-------|--------|-----------|-------|--------------|------------|--------|--------|-------------|--------|---------|--------|----------|--------|
| <ol style="list-style-type: none"> 5. Select Analysis tab → choose Percentage Of → Table to show percentage as a whole. 6. Adjust the size of the chart by using Size property in Marks card. 7. Drag the Category dimension to Rows to display a pie chart showing percentage of sales for different subcategories, one for each category. Change the percentage so as to show the distribution of each sub-category within each category. (as shown here) 8. Save the file lab3b-inclass-ans1.twbx |  <p>Furniture</p> <table border="1"> <thead> <tr> <th>Sub-Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Tables</td> <td>27.89%</td> </tr> <tr> <td>Bookcases</td> <td>15.48%</td> </tr> <tr> <td>Chairs</td> <td>44.27%</td> </tr> <tr> <td>Furnishings</td> <td>12.36%</td> </tr> </tbody> </table> <p>Office Supplies</p> <table border="1"> <thead> <tr> <th>Sub-Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Storage</td> <td>31.13%</td> </tr> <tr> <td>Supplies</td> <td>6.49%</td> </tr> <tr> <td>Appliances</td> <td>14.95%</td> </tr> <tr> <td>Paper</td> <td>10.91%</td> </tr> <tr> <td>Envelopes</td> <td>2.29%</td> </tr> </tbody> </table> <p>Technology</p> <table border="1"> <thead> <tr> <th>Sub-Category</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Phones</td> <td>39.47%</td> </tr> <tr> <td>Accessories</td> <td>20.02%</td> </tr> <tr> <td>Copiers</td> <td>17.88%</td> </tr> <tr> <td>Machines</td> <td>22.63%</td> </tr> </tbody> </table> | Sub-Category | Percentage | Tables | 27.89% | Bookcases | 15.48% | Chairs | 44.27% | Furnishings | 12.36% | Sub-Category | Percentage | Storage | 31.13% | Supplies | 6.49% | Appliances | 14.95% | Paper | 10.91% | Envelopes | 2.29% | Sub-Category | Percentage | Phones | 39.47% | Accessories | 20.02% | Copiers | 17.88% | Machines | 22.63% |
| Sub-Category | Percentage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Tables | 27.89% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Bookcases | 15.48% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Chairs | 44.27% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Furnishings | 12.36% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sub-Category | Percentage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Storage | 31.13% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Supplies | 6.49% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Appliances | 14.95% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Paper | 10.91% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Envelopes | 2.29% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Sub-Category | Percentage | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Phones | 39.47% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| Machines | 22.63% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

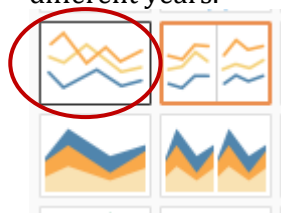
IV. Building Line chart

Line charts are used to visualize a sequence of values and they are useful when you want to see trends over time, or to forecast future values. The line mark type is useful when you want to see trends in data over time, your data are ordered, or interpolation makes sense.

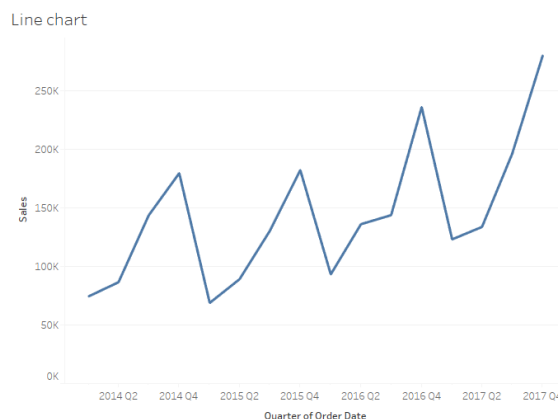
1. Create a new worksheet named **Line chart**.
2. Drag the **Order Date** dimension to **Columns**, drag the **Sales** measure to **Rows** to show the sum of sales for different years. [default date level is YEAR]
3. Click the **plus sign** on the left side of the field **YEAR(Order Date)** field to show quarter sales. The new dimension divides the view into separate panes for each year. It is a nested table because it displays multiple headers.



4. Change the chart type to **Continuous line** chart by clicking **Show Me**. The line becomes continuous across different quarters in different years.

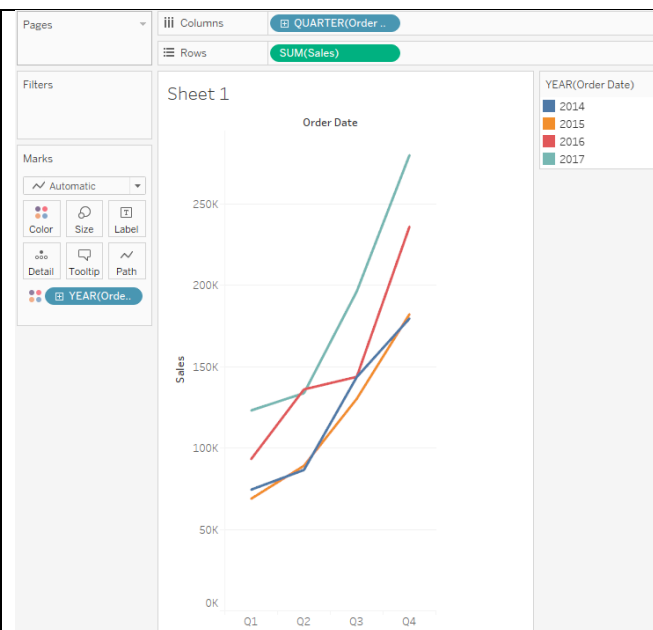
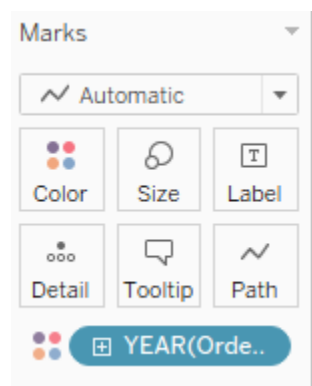


5. **Undo** the action and change the chart type to **discrete line** chart.

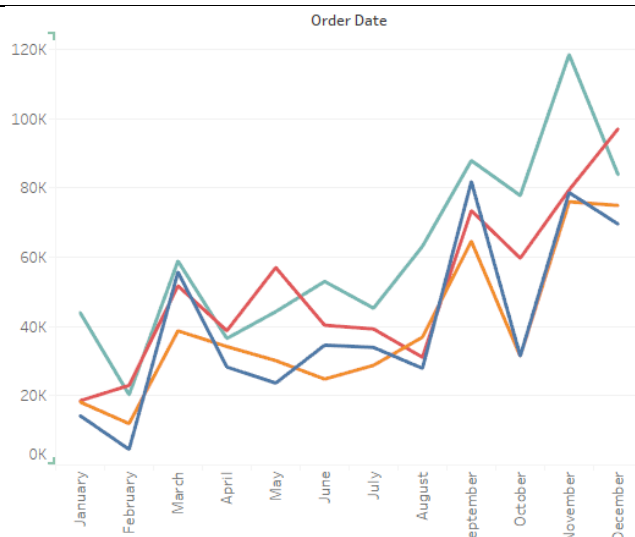
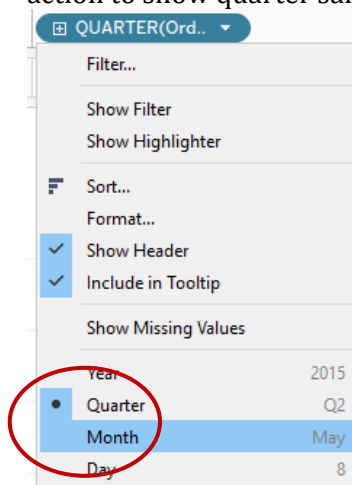


6. Compare the growth by quarter across the years. Move the **Year** field to **Color**.

[Quarter 4 shows more sales for every year.]



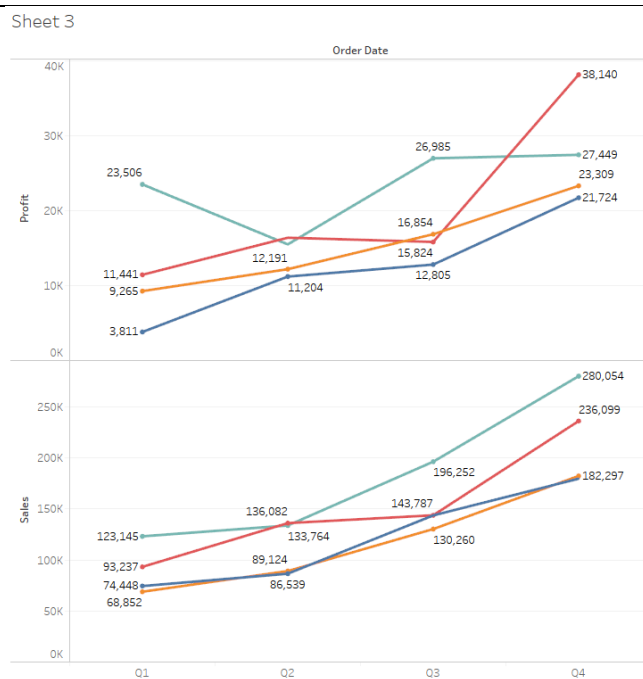
7. Click on **Quarter** in **Columns** shelf → select **Month** option as shown below to show monthly sales for different years. **Undo** the action to show quarter sales again.



8. Drag the **Profit** measure to **Rows** shelf to display sum of profit. Place it before the Sum of Sales. **SUM(Sales)**



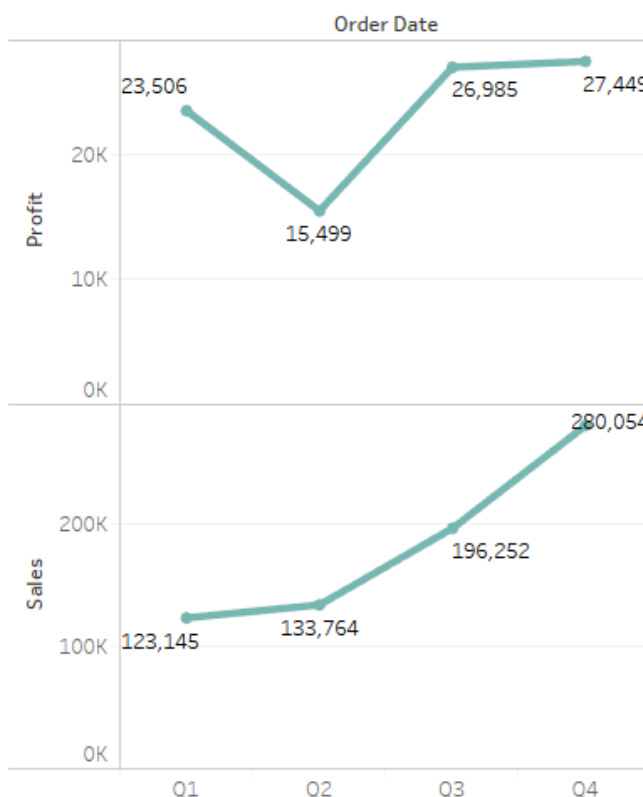
9. **Show the data labels** to view the details. Select **Entire View** to enlarge the chart.



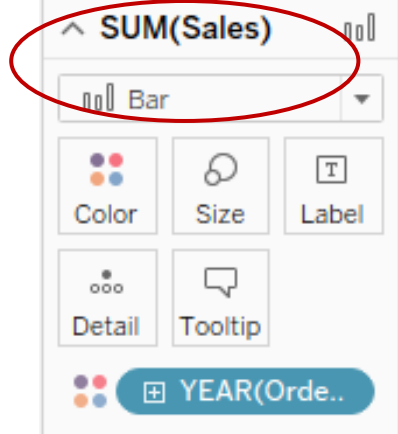
10. Drag the **Order Date** measure to **Filters** shelf, select **Years**, click **Next**. Select only **2017**. Then press **OK**.

The screenshot shows the 'Filter Field [Order Date]' dialog box. Under 'How do you want to filter on [Order Date]?', the 'Range of Dates' option is selected. In the list of date ranges, 'Years' is selected. Below the list, the 'Select from list' radio button is selected. In the 'Enter search text' field, the year '2017' is selected with a checkmark, which is circled in red.

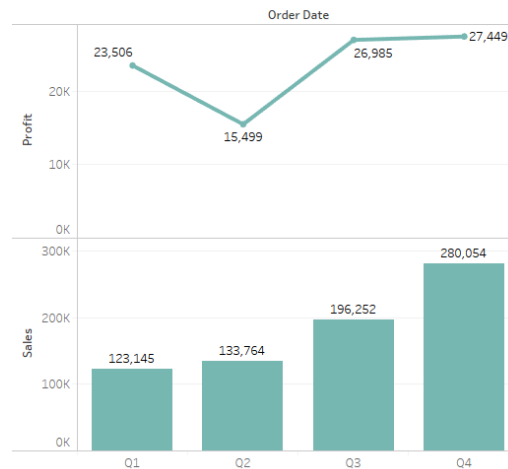
11. Adjust the **Size** property in **Marks** card to make the lines thicker.



12. For the second chart **SUM(Sales)**, change the **Mark type to Bar**.

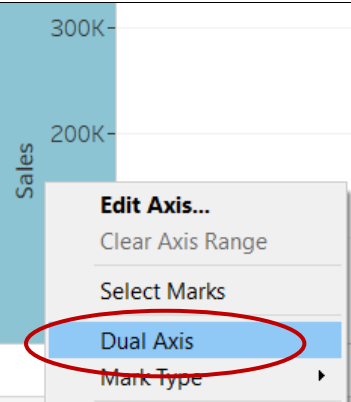


Line chart

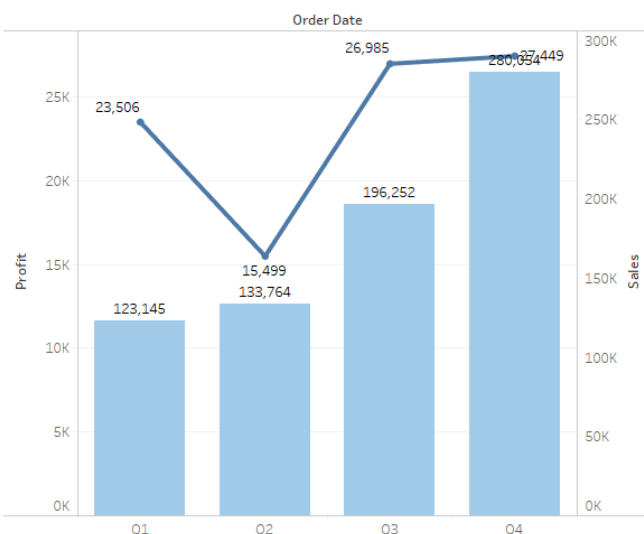


13. **Right click y-axis** for the column chart. Select **Dual axis**. It combines sales and profit by using dual axis and show both measures in one chart.

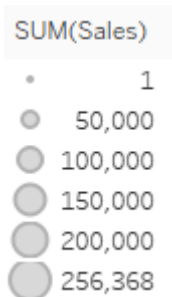
14. Save the file **lab3b-inclass-ans1.twbx**



Line chart

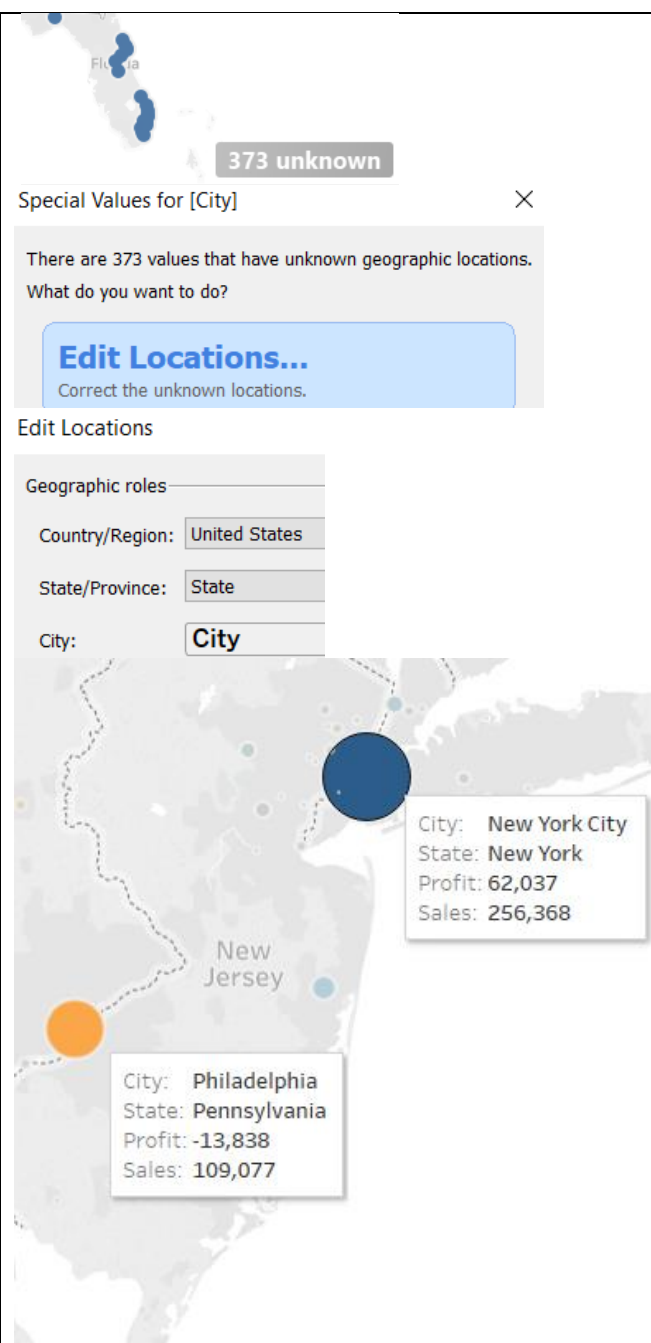


V. Geographic Data Analysis

1. Create a new worksheet named **Map**.
2. **Double click City** dimension. It shows a map of United States. Click **373 unknown** at the bottom right corner and choose **Edit Locations**. Change the **State/Province** option to **State** and change **Country/Region** option to **United States**. Then press **OK**.
3. Drag **Sales** measure to **Size** in **Marks card** to show which city has sales. The bigger the size of the bubbles, the larger the sales. You may adjust the **Size**.


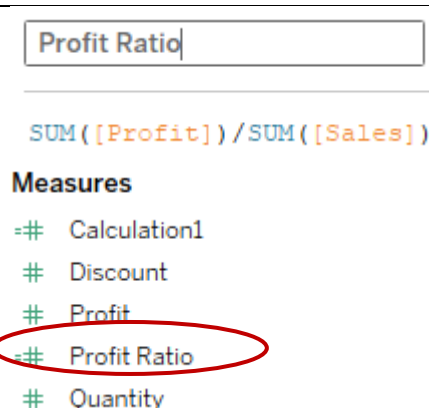
SUM(Sales)

 - 1
 - 50,000
 - 100,000
 - 150,000
 - 200,000
 - 256,368
4. Drag **Profit** to **Color** in **Marks card**. It shows the profit in Philadelphia is low, it is suggested to close the store there. (Profit and Sales in nearby city [NY] is high)
5. Save the file **lab3b-inclass-ans1.twbx**

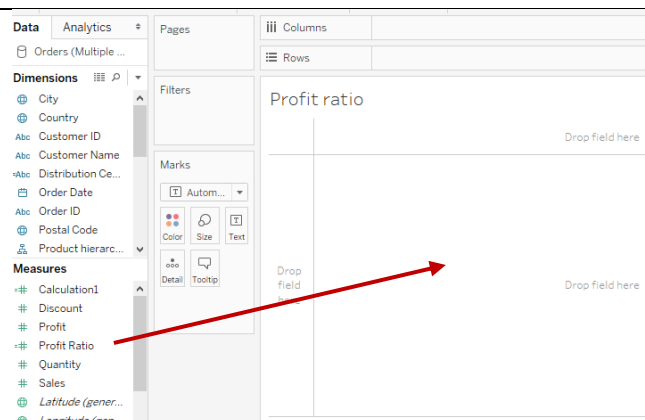


VI. Create the calculated field

1. Create a new worksheet named **Profit Ratio**.
2. Select **Analysis** menu → **Create Calculated Field**, type **Profit Ratio** as calculated field name, enter the formula **SUM([Profit])/SUM([Sales])** then press **OK**.
3. The new calculated field is added to the **Data** pane. If the new field computes quantitative data, it is **added to Measures**. If it computes qualitative data, it is added to Dimensions.



4. Drag the new measure **Profit Ratio** to **Drop field here** area on the right. Then drag the **Product hierarchy** to **Rows**, expand the level to show profit ratio for different sub-categories.
6. **Save** the file **lab3b-inclass-ans1.twbx** and **close** the program **Tableau Desktop**.

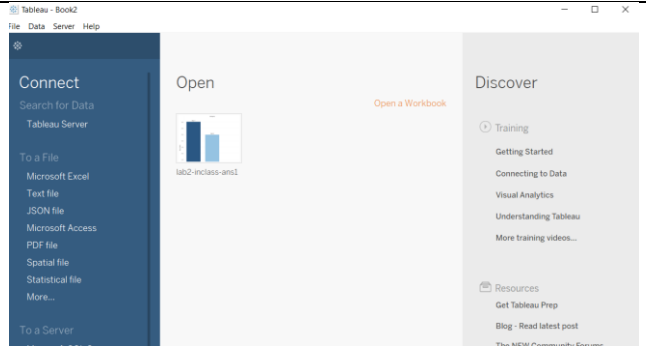
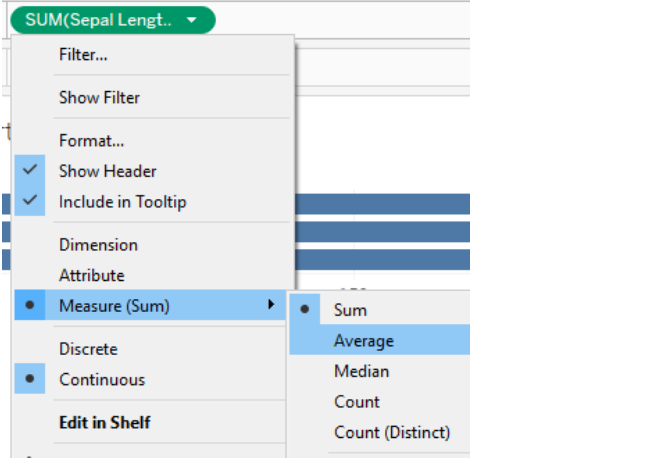
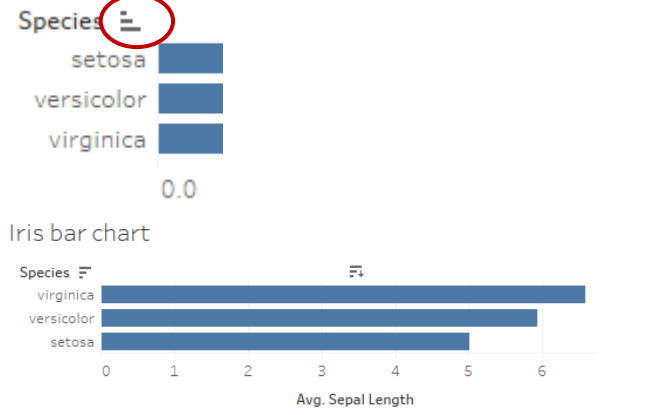
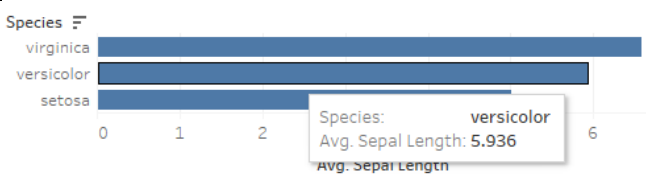


Profit ratio

| Category | Sub-Catego.. | |
|-----------------|--------------|---------|
| Furniture | Bookcases | -0.0302 |
| | Chairs | 0.0810 |
| | Furnishings | 0.1424 |
| | Tables | -0.0856 |
| Office Supplies | Appliances | 0.1687 |
| | Art | 0.2407 |
| | Binders | 0.1486 |
| | Envelopes | 0.4227 |
| | Fasteners | 0.3140 |
| | Labels | 0.4442 |
| | Paper | 0.4339 |
| | Storage | 0.0951 |
| Technology | Supplies | -0.0255 |
| | Accessories | 0.2505 |
| | Copiers | 0.3720 |
| | Machines | 0.0179 |
| | Phones | 0.1349 |

VII. Building bar chart

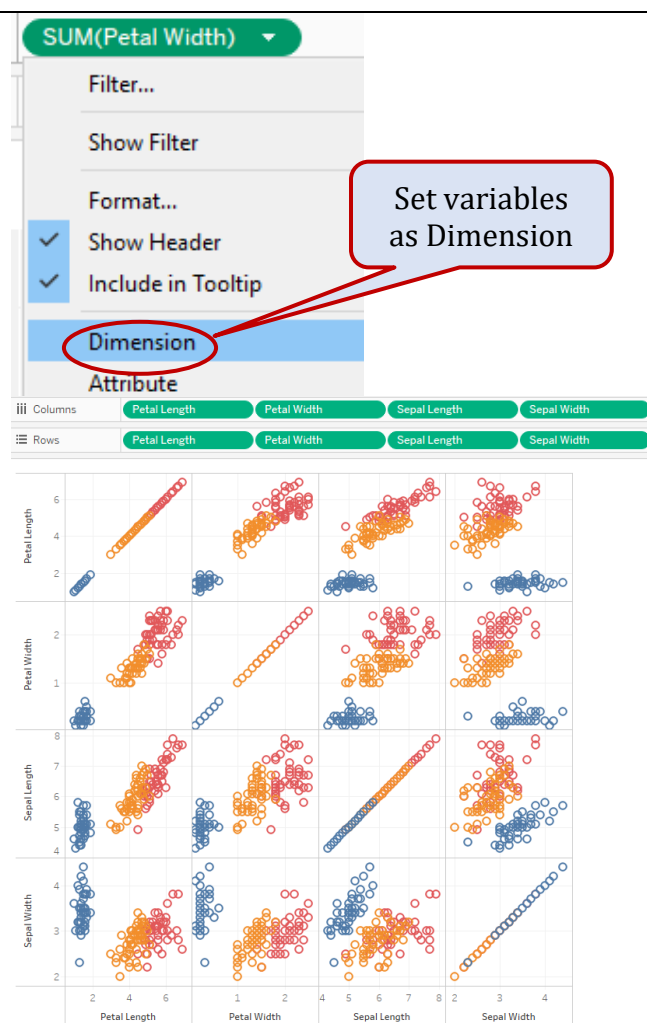
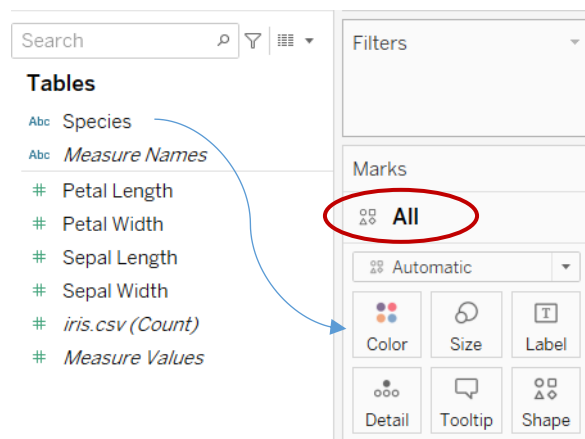
We can use bar charts to compare data across categories.

| | |
|--|--|
| <p>1. Open the program Tableau Desktop. Under the Connect Pane, select Text file. And open the file iris.csv. Save the tableau file with the name lab3b-inclass-ans2.twbx</p> |  |
| <p>2. Rename the worksheet Sheet1 as Iris bar chart</p> <p>3. Drag Species to Rows and Sepal Length to Columns.</p> <p>4. Click on SUM (Sepal Length) measure, choose Measure (Sum) → Average to display average sepal length.</p> |  |
| <p>5. Click on the Sort button (next to Species) to sort the bars by name or by value.</p> |  |
| <p>6. You can highlight the selected elements when you hover your mouse to the element</p> |  |

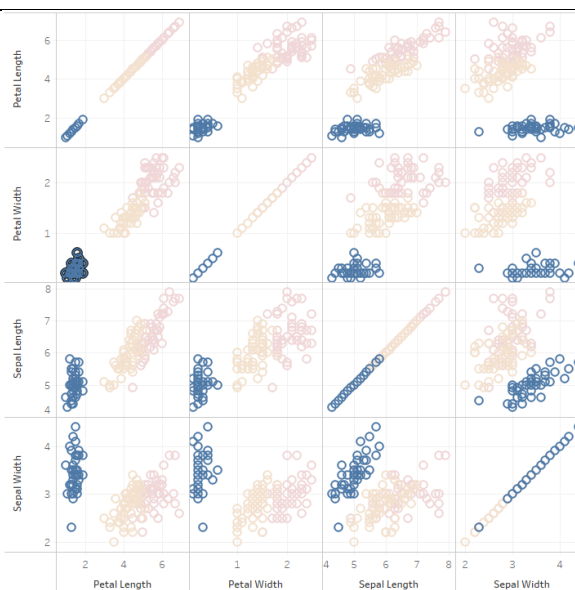
VIII. Building interactive Scatter Plots

Scatter plots are used to visualize relationships between numerical variables. You need to place at least one measure on the **Columns** shelf and at least one measure on the **Rows** shelf. By default, scatter plot uses **shape** mark type, which is useful when you want to clearly see individual data points while also viewing categories associated with those points.

1. Create a new worksheet named **Scatter plot**.
2. Drag the **Petal Length**, **Petal Width**, **Sepal Length** and **Sepal Width** measures to **Columns**.
3. Drag the **Petal Length**, **Petal Width**, **Sepal Length** and **Sepal Width** measures to **Rows**.
4. Click on **SUM (Petal Length)** measure on **Columns**, select **Dimension**. Repeat the step for other measures on Columns and Rows.
5. Drag the **Species** dimension to **Color** on the **Marks card**. (under **All**, as shown below)

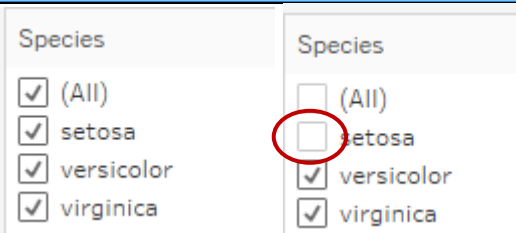
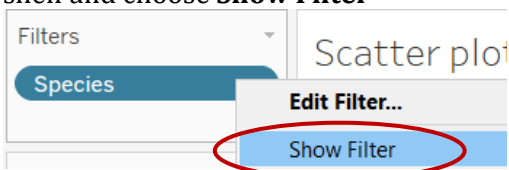


6. Items that interactively selected in one cell in scatterplot matrices are immediately highlighted in other cells.



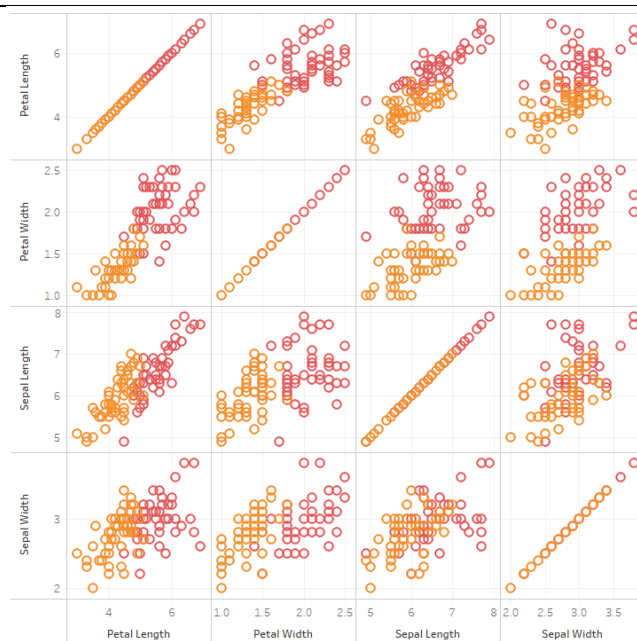
7. Drag the **Species** dimension to **Filters** shelf to filter the data by species name. Press **OK**.

8. Right click on **Species** dimension in **Filters** shelf and choose **Show Filter**



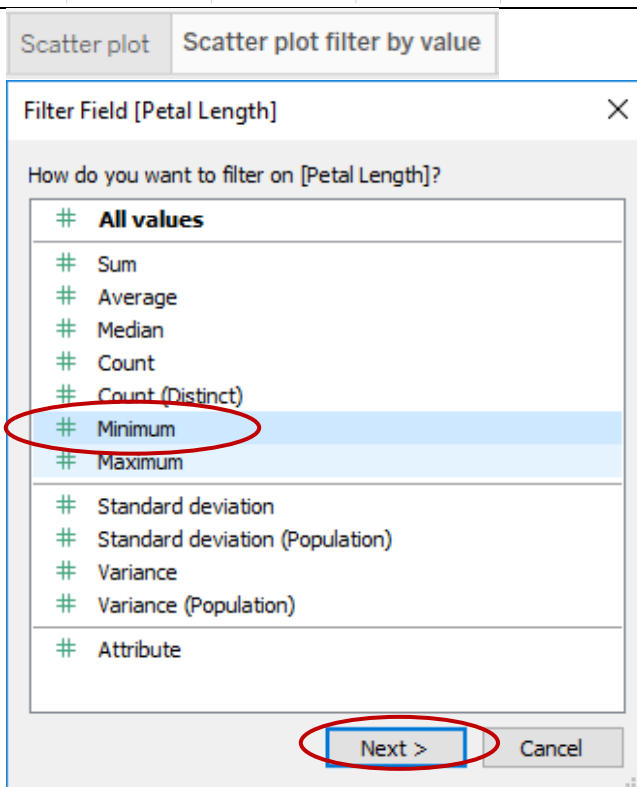
9. A filter is added to your visualization (on the right). Only show the data of 'versicolor' and 'virginica'.

10. Save the workbook **lab3b-inclass-ans2.twbx**

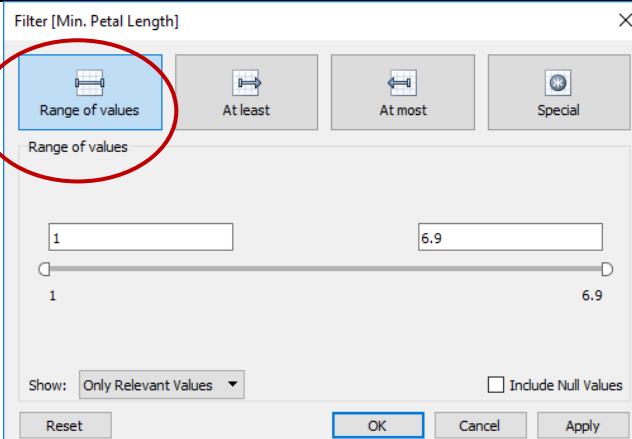


11. Duplicate the worksheet **Scatter plot** and named the new worksheet as **Scatter plot filter by value**.

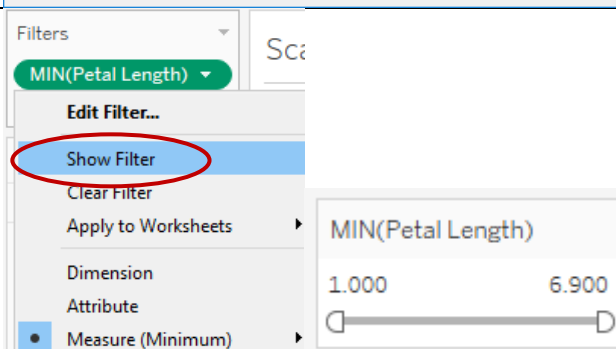
12. Remove the **Species** Dimension in **Filter** shelf. And add **Petal Length** to **Filters**, select **Minimum** and press **Next**



13. Filter by a **Range of values**. Press **OK**.

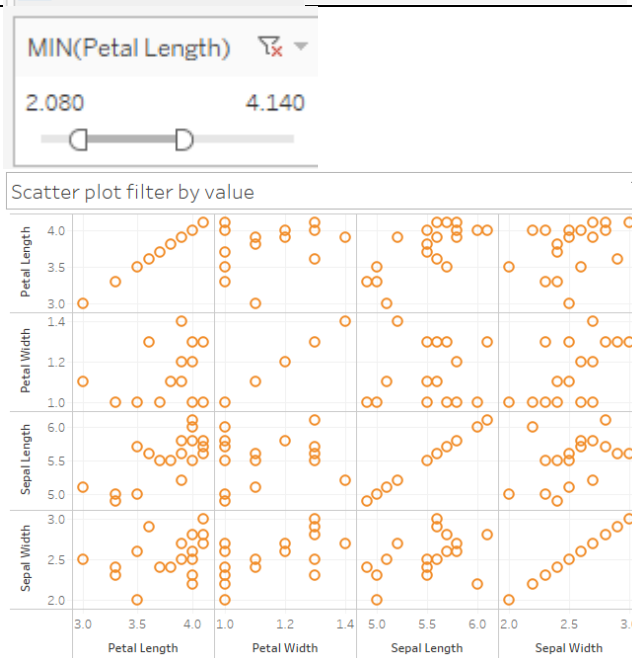


14. Select **Show Filter** in **Filters** shelf. A slider for filtering numeric values is added to your visualization.



15. Only show the data with petal length in the range of **[2.08, 4.14]**

16. **Save** the workbook **lab3b-inclass-ans2.twbx**

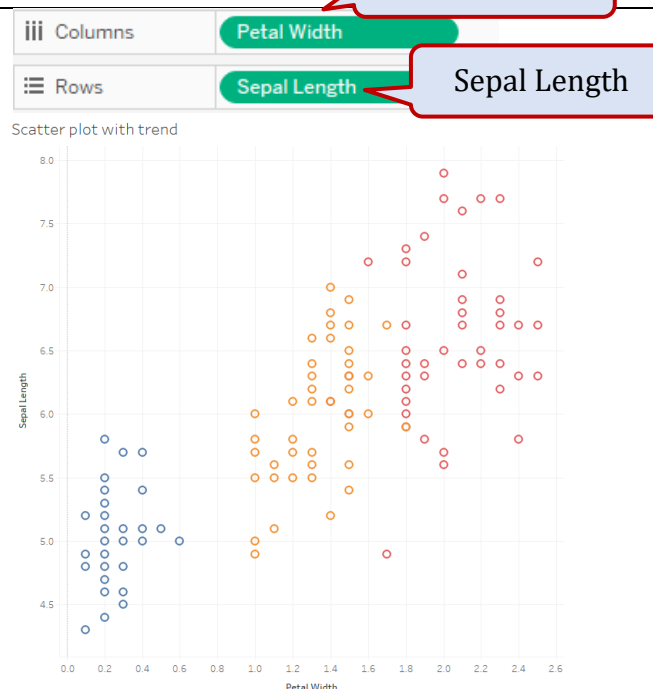


17. Create a new worksheet named **Scatter plot with trend**.

18. Drag the **Petal Width** measure to **Columns**.
Drag the **Sepal Length** measure to **Rows**.

19. Click on **SUM (Petal Width)** measure on **Columns**, select **Dimension**. Repeat the step for **Sepal Length**.

20. Drag the **Species** dimension to **Color** on the **Marks** card.



21. Select all setosa items and **right click**, choose **View Data**

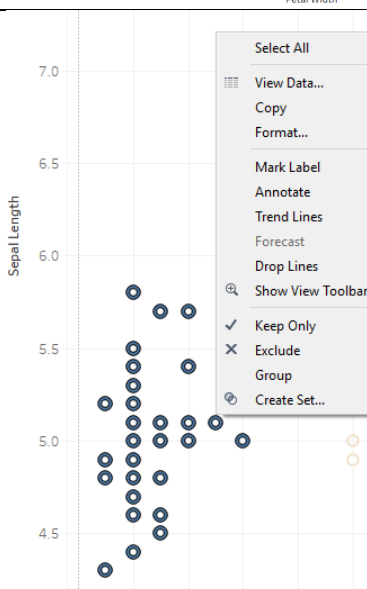
22. Close the dialog box.

View Data: Scatter plot with action

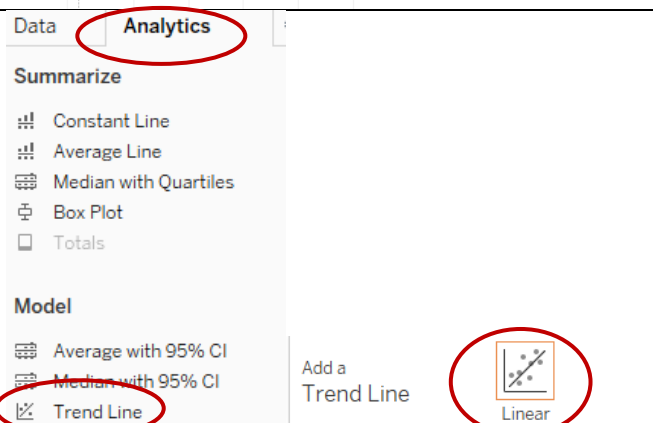
☒ Show aliases

| Petal Width | Sepal Length | Species |
|-------------|--------------|---------|
| 0.600000 | 5.00000 | setosa |
| 0.500000 | 5.10000 | setosa |
| 0.400000 | 5.70000 | setosa |
| 0.400000 | 5.40000 | setosa |
| 0.400000 | 5.10000 | setosa |
| 0.400000 | 5.00000 | setosa |
| 0.300000 | 5.70000 | setosa |
| 0.300000 | 5.10000 | setosa |
| 0.300000 | 5.00000 | setosa |
| 0.300000 | 4.80000 | setosa |
| 0.300000 | 4.60000 | setosa |
| 0.300000 | 4.50000 | setosa |
| 0.200000 | 5.80000 | setosa |
| 0.200000 | 5.50000 | setosa |
| 0.200000 | 5.40000 | setosa |
| 0.200000 | 5.30000 | setosa |
| 0.200000 | 5.20000 | setosa |

Summary Full Data

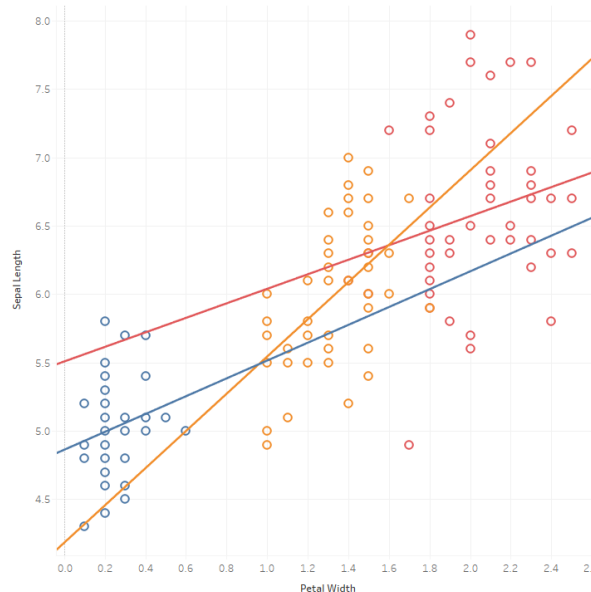


23. Go to the **Analytics** pane, drag and drop the **Trend Line** on the model type **Linear**. A trend line can provide a statistical definition of the relationship between two numerical values. Hover the cursor over the trend lines to see statistical information to create the line.




24. The chart will be similar to this. **Save** the file **lab3b-inclass-ans2.twbx**

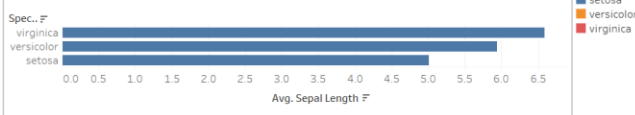
Scatter plot with trend



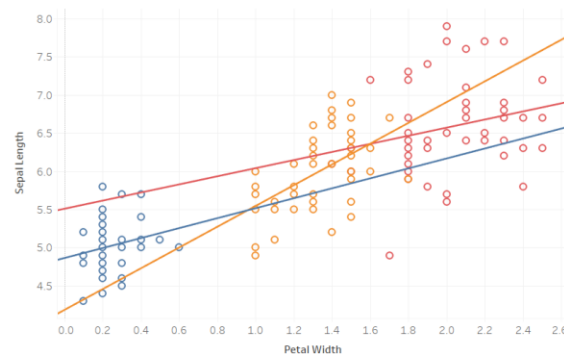
IX. Create Dashboard

1. Create a new **Dashboard** named **Interactive Dashboard** by using 
2. Add two worksheets **Iris bar chart** and **Scatter plot with trend**. The result will be like this:

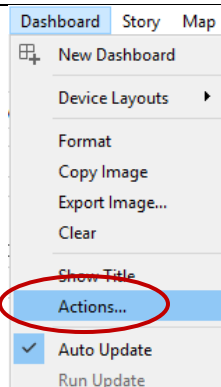
Iris bar chart



Scatter plot with trend



3. Select **Dashboard** menu → **Actions**



| <div>4. Choose Add Action > → Highlight</div> | <div><div>Actions</div><div>Actions let you create interactive relationships between data, dashboard objects, other sheets, and the web.</div><table><thead><tr><th>Name</th><th>Run On</th><th>Source</th><th>Field:</th></tr></thead><tbody><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></tbody></table><div><div>Add Action ></div><div>Filter...</div><div>Highlight...</div><div>Go to URL...</div></div><div><div>Show action</div><div>Edit...</div><div>OK</div></div></div> | Name | Run On | Source | Field: | | | | | | | | | | | | | | | | |
|--|---|--------|--------|--------|--------|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|--|
| Name | Run On | Source | Field: | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | | | | | | | |
| <div>5. There are different options to launch the action:</div> <div><div>• Hover: Rest the pointer over a mark in the view to run the action.</div><div>• Select: Click on a mark in the view to run the action</div><div>• Menu: Right-click a selected mark in the view to run the action.</div></div> <div>6. Select Iris bar chart as Source Sheet. Select Scatter plot with trend as Target Sheet.</div> <div>7. Choose Select under Run action on, press OK and OK</div> | <div><div>Add Highlight Action</div><div><div>Name: Highlight1</div><div>Source Sheets</div><div><div>Interactive Dashboard</div><div><div><input checked="" type="checkbox"/> Iris bar chart</div><div><input type="checkbox"/> Scatter plot with trend</div></div></div></div><div>Run action on:</div><div><div>Hover</div><div>Select</div><div>Menu</div></div><div>Target Sheets</div><div><div>Interactive Dashboard</div><div><div><input type="checkbox"/> Iris bar chart</div><div><input checked="" type="checkbox"/> Scatter plot with trend</div></div></div></div> | | | | | | | | | | | | | | | | | | | | |
| <div>8. Select a species like versicolor in Iris bar chart. Corresponding items in scatter plot with trend will be highlighted.</div> <div>9. Save the file lab3b-inclass-ans2.twbx</div> | <div><div>Iris bar chart</div><div><div>Species F</div><div>virginica</div><div>versicolor</div><div>setosa</div></div><div><div>0.0</div><div>0.5</div><div>1.0</div><div>1.5</div><div>2.0</div><div>2.5</div><div>3.0</div><div>3.5</div><div>4.0</div><div>4.5</div><div>5.0</div><div>5.5</div><div>6.0</div><div>6.5</div></div><div>Avg. Sepal Length</div></div> <div><div>Scatter plot with trend</div><div><div>Sepal Length</div><div>8.0</div><div>7.5</div><div>7.0</div><div>6.5</div><div>6.0</div><div>5.5</div><div>5.0</div><div>4.5</div></div><div><div>Petal Width</div><div>0.0</div><div>0.2</div><div>0.4</div><div>0.6</div><div>0.8</div><div>1.0</div><div>1.2</div><div>1.4</div><div>1.6</div><div>1.8</div><div>2.0</div><div>2.2</div><div>2.4</div><div>2.6</div></div></div> | | | | | | | | | | | | | | | | | | | | |

Take home assignment

Open the files **Financial Sample.xlsx** and **lab3b-assignment-ans.docx** and complete the exercises.

Submission

Submit the following files to buelarning website:

- lab3b-inclass-ans1.twbx, (In-class exercise)
- lab3b-inclass-ans2.twbx, (In-class exercise)
- lab3b-assignment-ans.docx, (Take home assignment)
- lab3b-assignment-ans.twbx (Take home assignment)

References

- [Tableau Tutorial | Step by Step Guide to Learn Tableau | Edureka](#)
- [What is Tableau | Data Visualization Using Tableau | Edureka](#)
- <https://data-flair.training/blogs/tableau-tutorial/>