METRO COLLEGE
OF TECHNOLOGY

Business Intelligence Using Tableau/Power BI – Day 1

Class Objectives

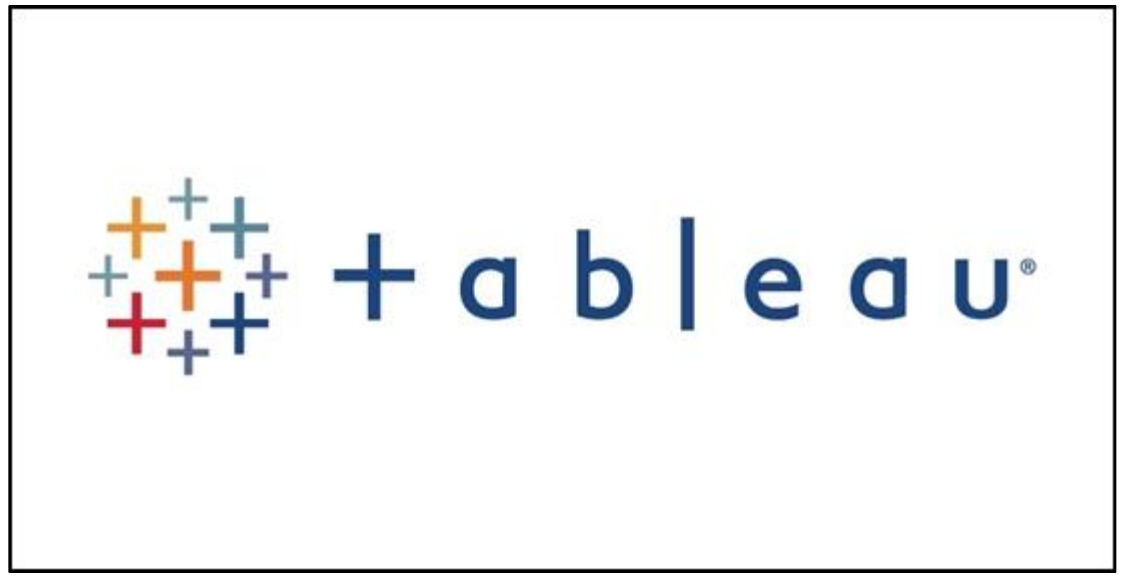
By the end of this lesson, you will be able to:

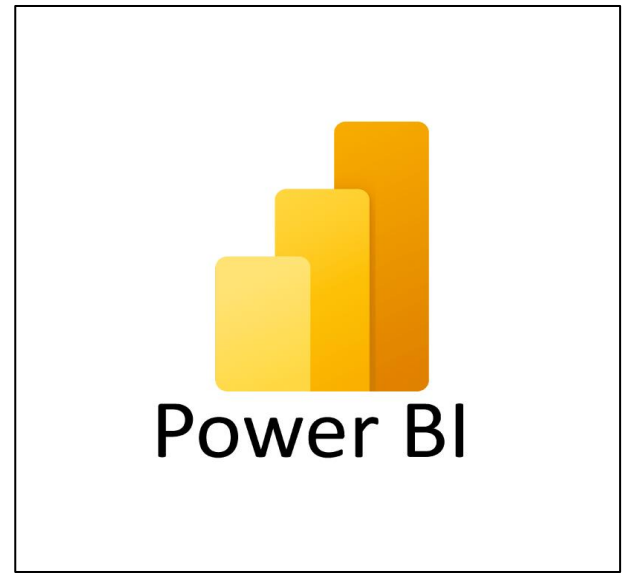
Exploring the Tableau Desktop Interface

Connecting to various data source

Import and join data within Tableau

Create and style worksheets and stories in Power BI





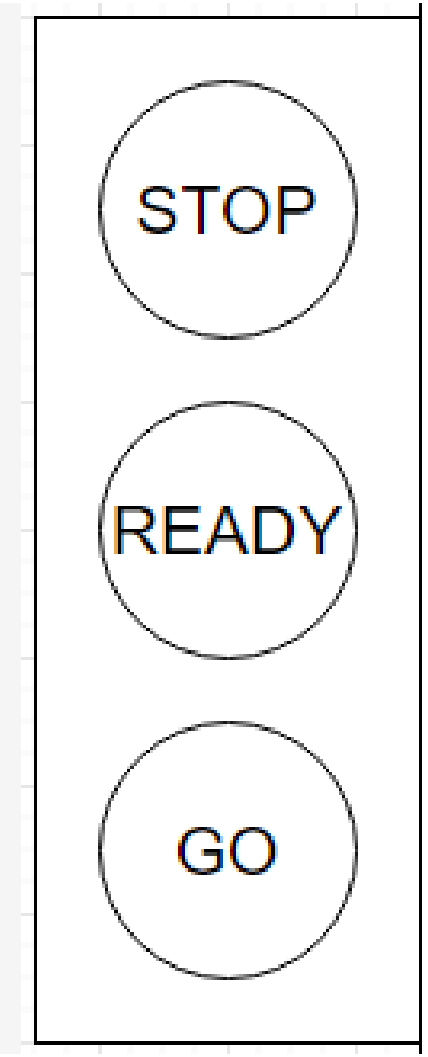
Method of Evaluation

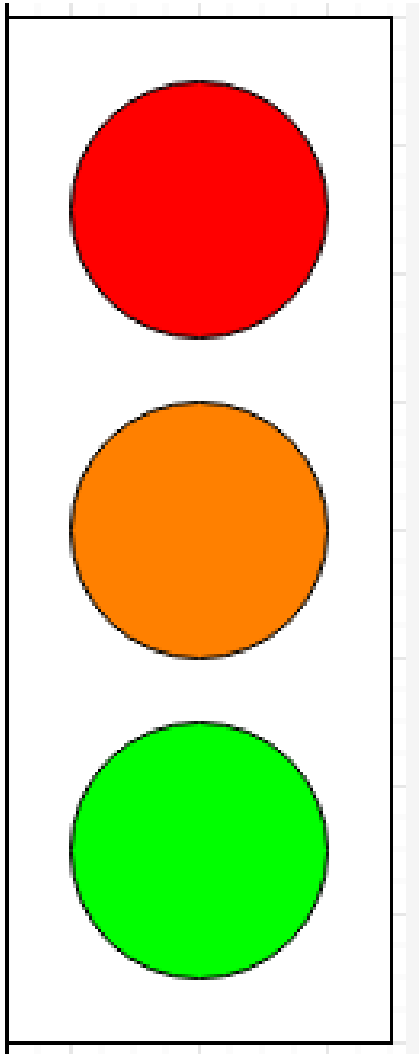
(e.g., graded homework, quizzes, projects, final examination, et cetera; the type, number, and % value of each)

Type	Number	% Value	Type	Number	% Value
Quiz	1	25	Project Presentation	1	25
Project Report	1	50			

A good data visualization:

1. It meets the audience’s needs.
2. It communicates clearly and simply.(H.R. having several simple graphs is better to have one complex graph)
3. It provides a gradual learning curve.
4. It adds value to the data.
5. It tells the truth.





Data as Storytelling

U.S. Debt as Percentage of Gross Domestic Product, 1790–2011

1790	29,6%	1835	0.0	1880	18.4	1925	21.6		1970	28.0
1791	29.2	1836	0,0	1881	16.8	1926	19.0		1971	28.1
1792	28.0	1837	0.2	1882	14.3	1927	18.0		1972	27.4
1793	24.4	1838	0.6	1883	13.5	1928	17.0		1973	26.0
1794	21.8	1839	0.2	1884	13.3	1929	14.9		1974	23.9
1795	18.7	1840	0.3	1885	13.2	1930	16.5		1975	25.3
1796	16.4	1841	0.8	1886	12.4	1931	22.3		1976	27.5
1797	16.5	1842	1.2	1887	11.2	1932	34.5		1977	27.8
1798	16.0	1843	1.5	1888	10.2	1933	39.1		1978	27.4
1799	15.8	1844	1.0	1889	8.6	1934	44.0		1979	25.6
1800	15.1	1845	0.7	1890	7.8	1935	42.9		1980	26.1
1801	13.3	1846	1.2	1891	7.0	1936	43.0		1981	25.8
1802	13.9	1847	1.7	1892	6.6	1937	40.1		1982	28.7
1803	14.1	1848	2.2	1893	6.8	1938	42.8		1983	33.1
1804	13.2	1849	2.5	1894	7.9	1939	43.0		1984	34.0
1805	10.9	1850	2.3	1895	7.9	1940	42.7		1985	26.4
1806	10.0	1851	2.4	1896	8.5	1941	43.3		1986	38.5

Data: Congressional Budget Office

Data as Storytelling

U.S. Debt as Percentage of Gross Domestic Product, 1790–2011

1790	29,6%	1835	0.0	1880	18.4	1925	21.6		1970	28.0	
1791	29.2	1836	0,0	1881	16.8	1926	19.0		1971	28.1	
1792	28.0	1837	0.2	1882	14.3	1927	18.0		1972	27.4	
1793	24.4	1838	0.6	1883	13.5	1928	17.0		1973	26.0	
1794	21.8	1839	0.2	1884	13.3	1929	14.9		1974	23.9	
1795	18.7	1840	0.3	1885	13.2	1930	16.5		1975	25.3	
1796	16.4	1841	0.8	1886	12.4	1931	22.3		1976	27.5	
1797	16.5	1842	1.2	1887	11.2	1932	34.5		1977	27.8	
1798	16.0	1843	1.5	1888	10.2	1933	39.1		1978	27.4	
1799	15.8	1844	1.0	1889	8.6	1934	44.0		1979	25.6	
1800	15.1	1845	0.7	1890	7.8	1935	42.9		1980	26.1	
1801	13.3	1846	1.2	1891	7.0	1936	43.0		1981	25.8	
1802	13.9	1847	1.7	1892	6.6	1937	40.1		1982	28.7	
1803	14.1	1848	2.2	1893	6.8	1938	42.8		1983	33.1	
1804	13.2	1849	2.5	1894	7.9	1939	43.0		1984	34.0	
1805	10.9	1850	2.3	1895	7.9	1940	42.7		1985	26.4	
1806	10.0	1851	2.4	1896	8.5	1941	43.3		1986	38.5	

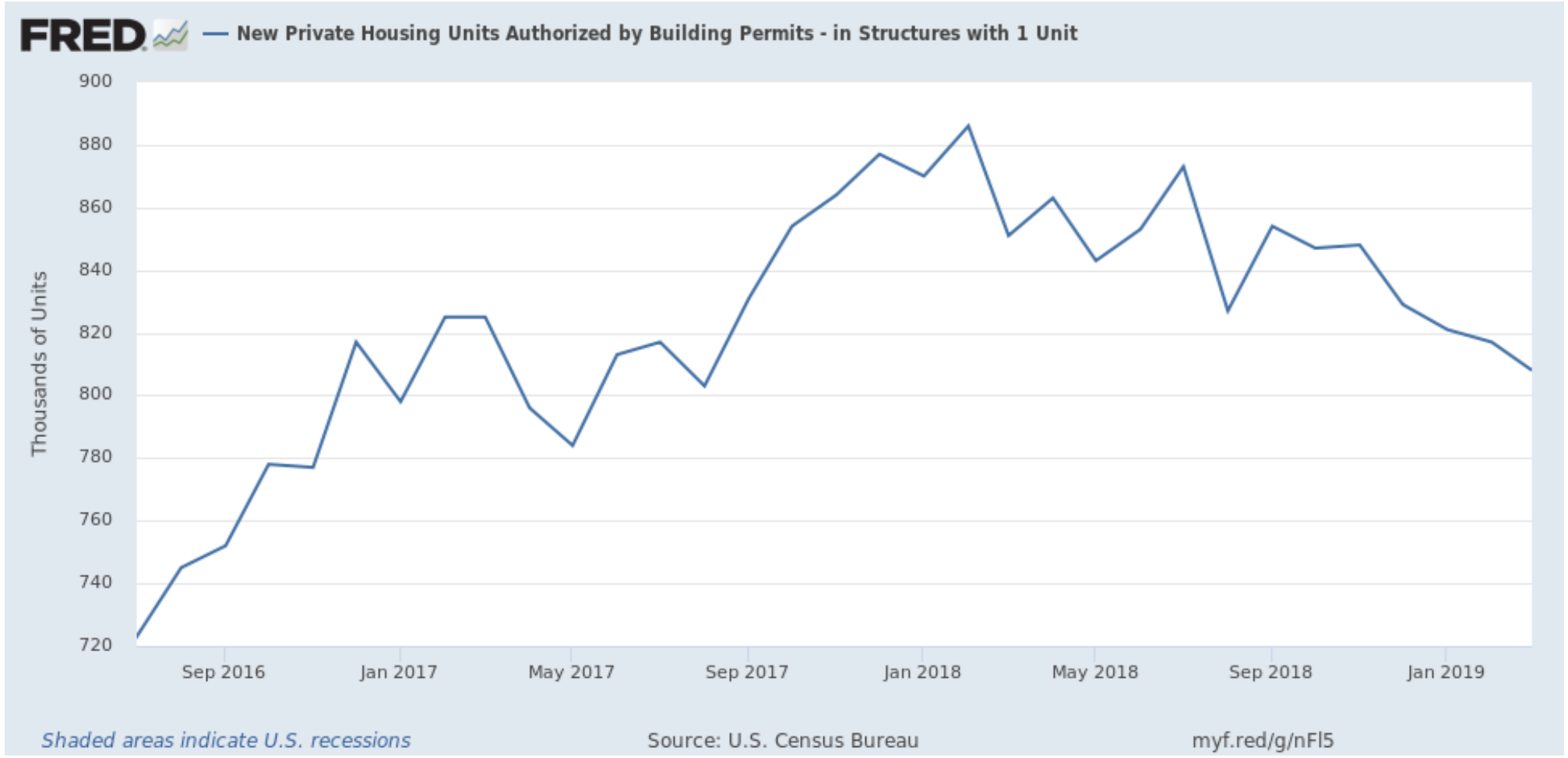
The Great Depression & World War II

Reagan Tax Cuts

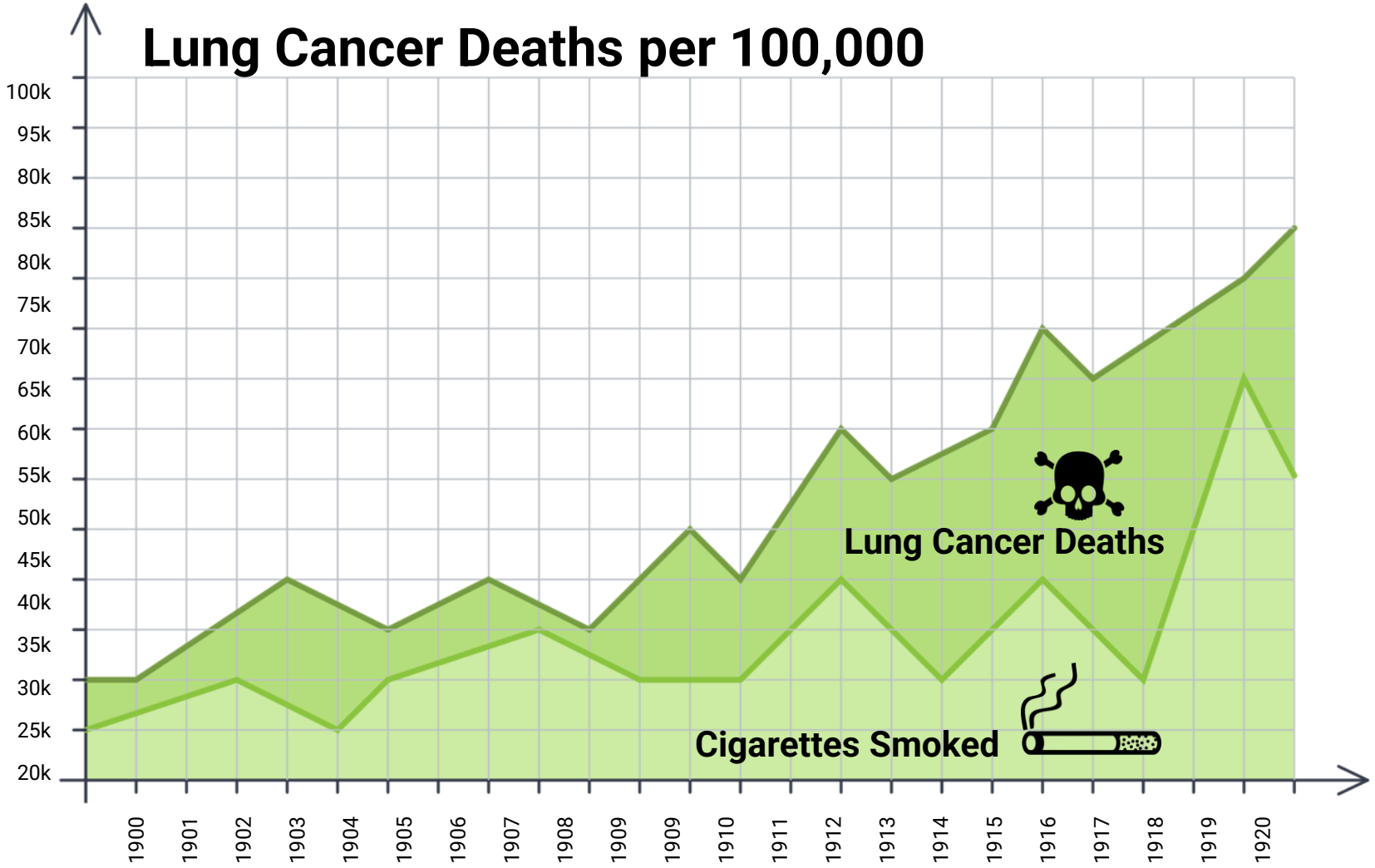
Data: Congressional Budget Office

Data = Drama

New Housing Construction: Making A Bottom, At Close To Recessionary Levels



https://seekingalpha.com



Data as Truth-Telling

Unearthing Relationships

Exposure to Extreme Drought Is Increasing

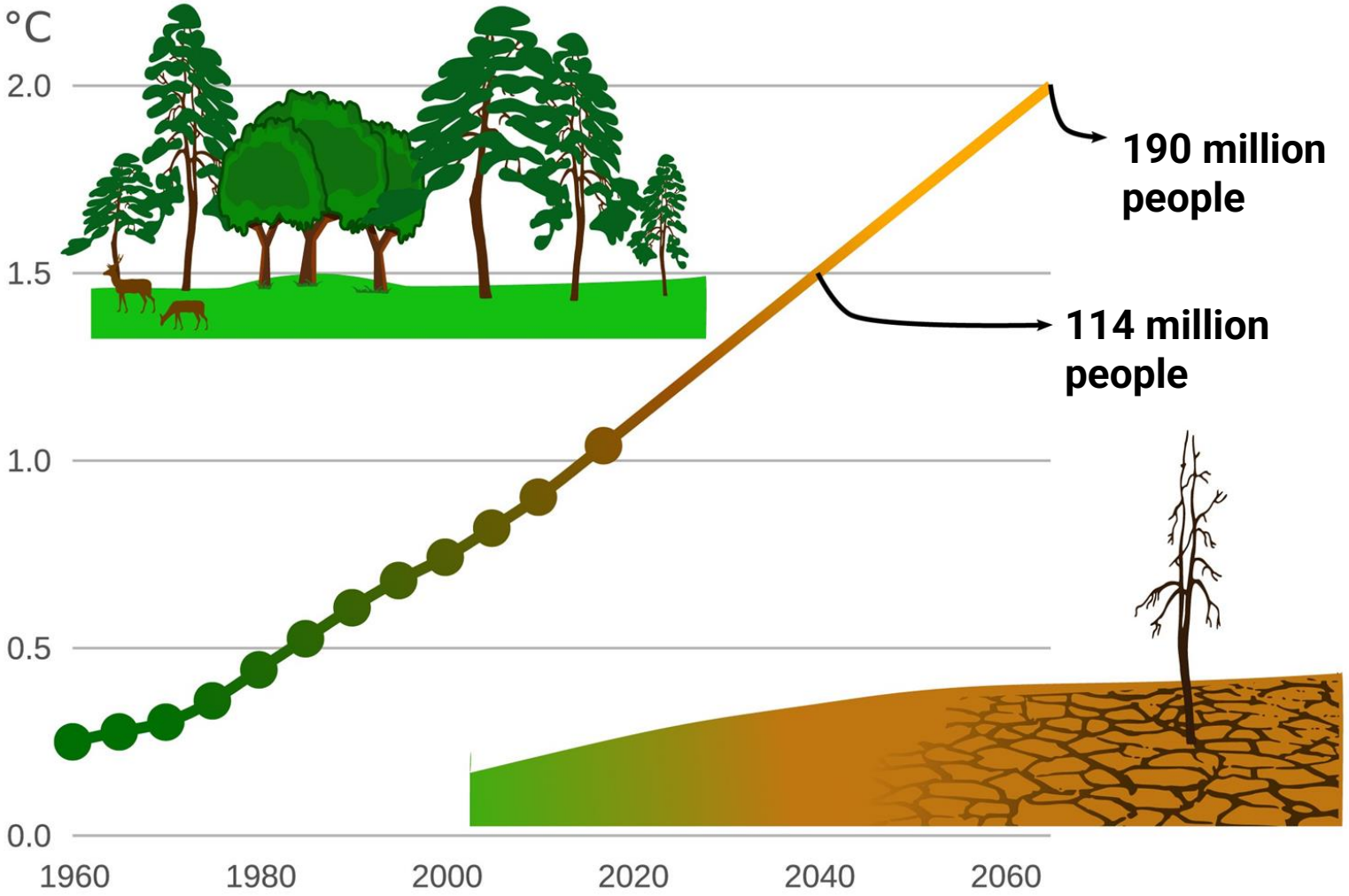


Image Source: Exposure to Extreme Drought is Increasing

Data as Truth-Telling

Stating Significance

Course Plan

Lecture

BUSINESS INTELLIGENCE CONCEPTS, TABLEAU DESKTOP , CONCEPTS AND OPTIONS WHEN CONNECTING TO DATA IN TABLEAU

ANALYZE DATA USING TABLEAU , Filtering, sorting, and grouping

BUILDING INTERACTIVE DASHBOARDS AND STORY IN TABLEAU , MICROSOFT POWER BI INTRODUCTION, POWER QUERY FOR DATA TRANSFORMATION

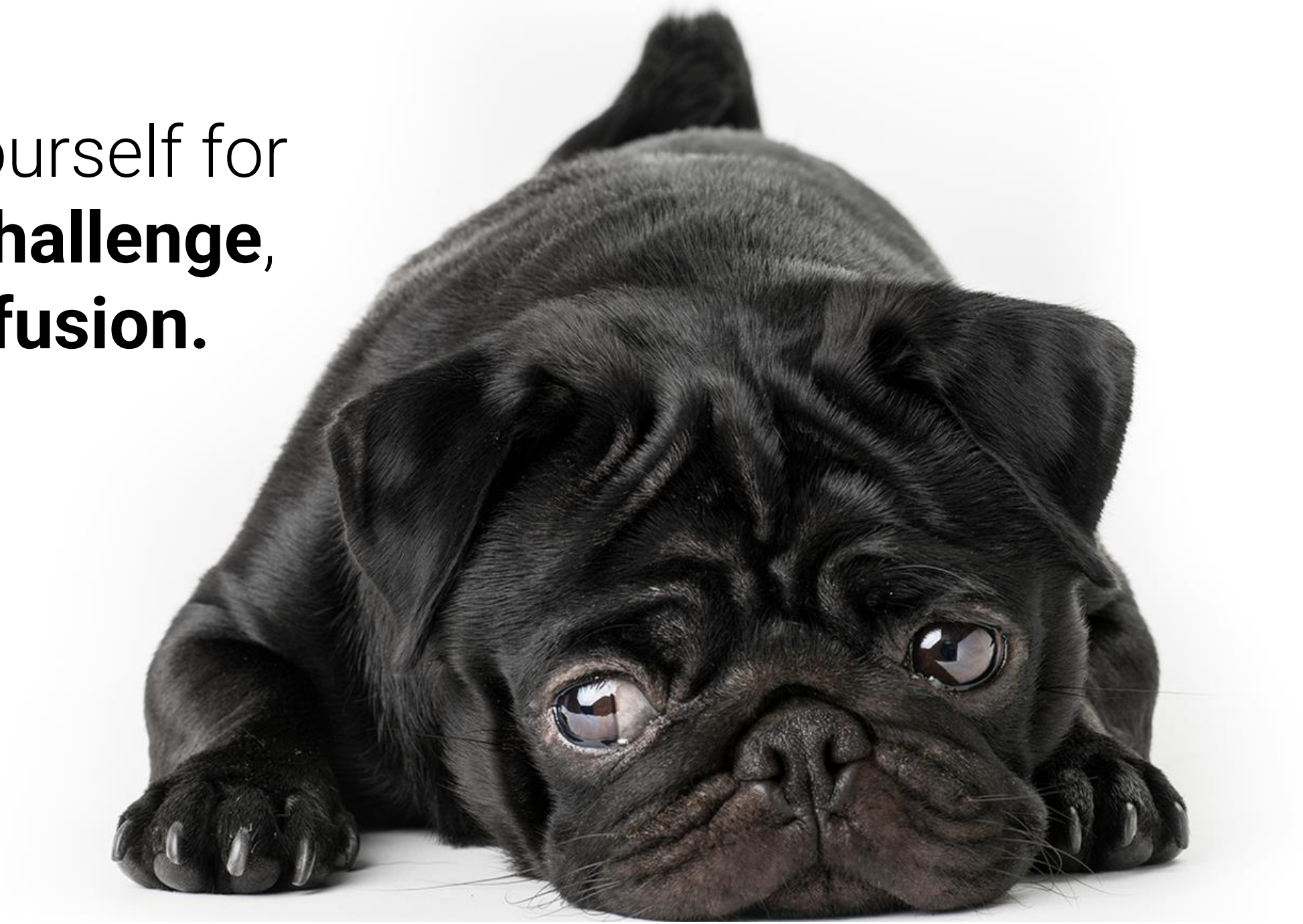
DATA MODELING , REPORTS , VISUALIZATION IN POWER BI

DASHBOARD IN POWER BI, PUBLISHING REPORT

PROJECT PRESENTATION


Embrace your
inner toddler.

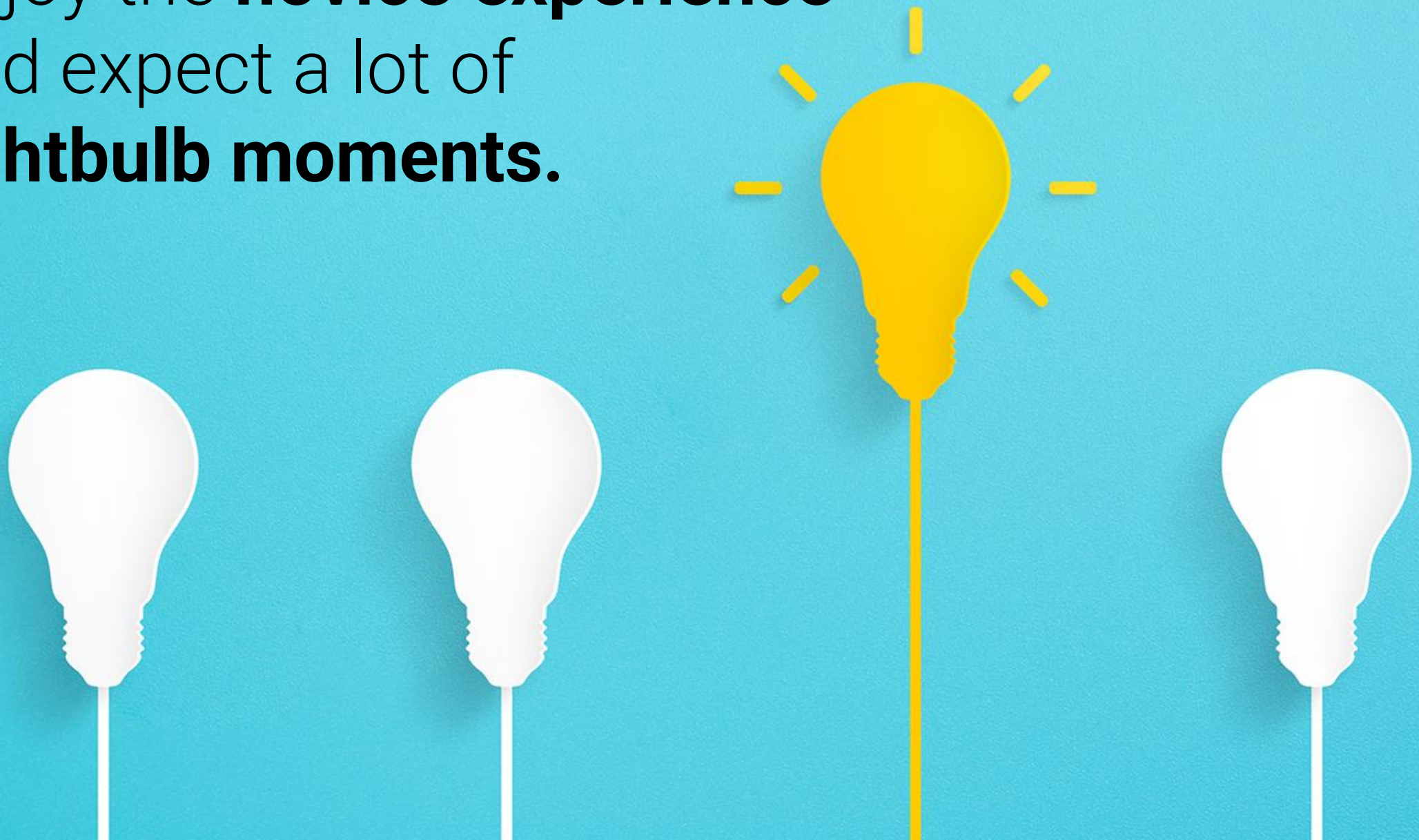
Brace yourself for **doubt**, **challenge**, and **confusion.**



There is no shortcut.
You've got to **put in the hours!**


Form a community
with your classmates.

Enjoy the **novice experience** and expect a lot of **lightbulb moments.**



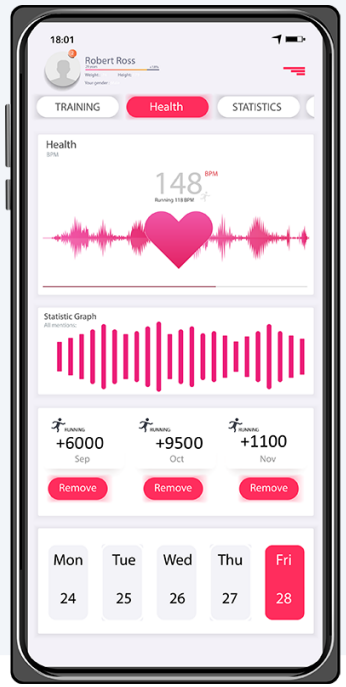

Celebrate your successes!

Choosing a Project Track

This project gives you the ability to focus your efforts within a specific industry. Here are the specializations:

Finance

Healthcare



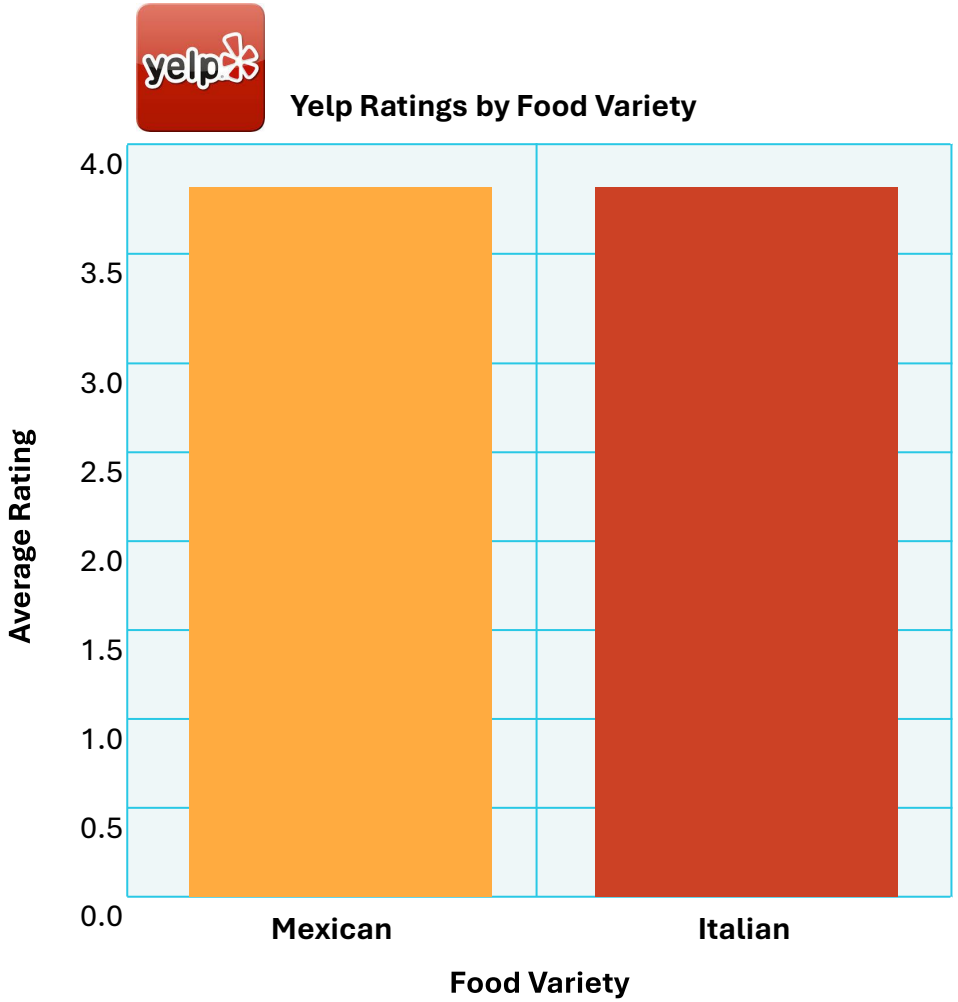
Custom

Group Activity: The Great Debate

Which food do Americans prefer:
Italian or Mexican food?

Analyze for Trends (Ratings)

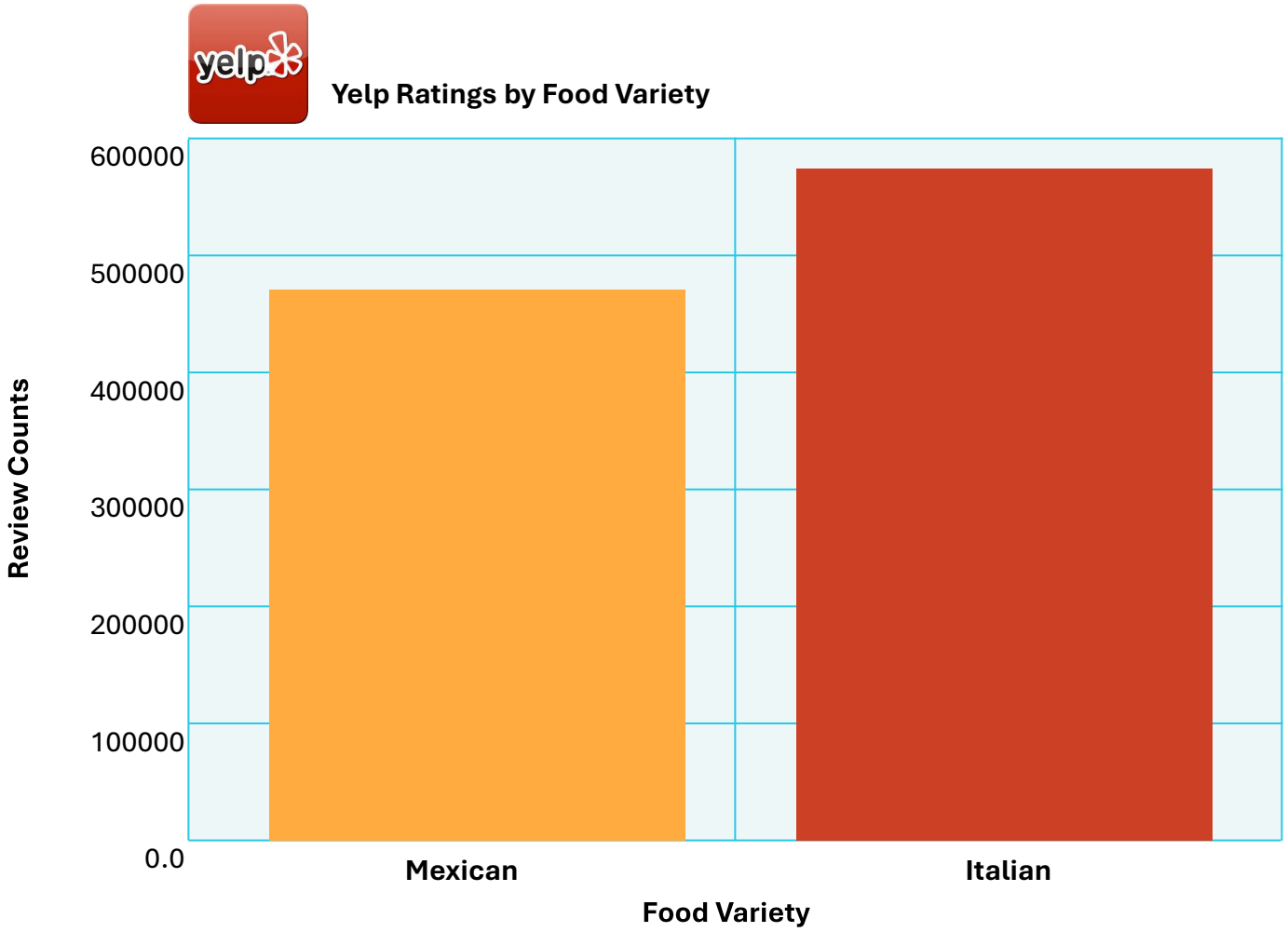
Yelpers rate Italian and Mexican relatively **equally**.



www.yelp.com

Analyze for Trends (Ratings)

Yelpers seem to **review significantly more Italian** restaurants.



Analyze for Trends (Statistical Analysis)

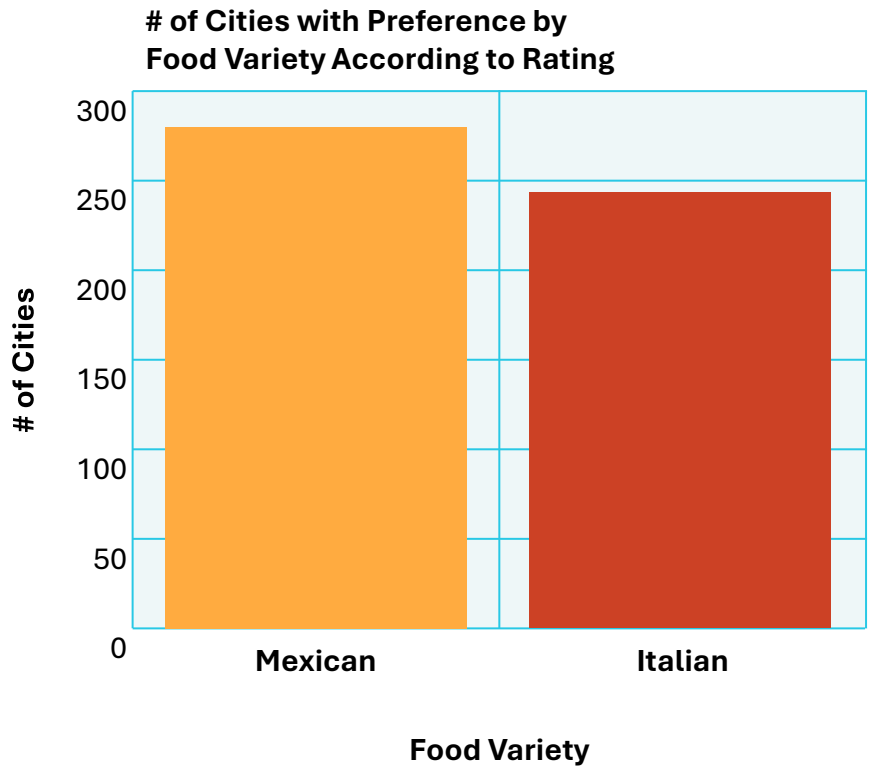
We have an intuitive sense that the numbers are close, but to quantify our intuition, we use a Student's t-test. After performing the t-test, we can quantifiably state that the differences are not statistically significant

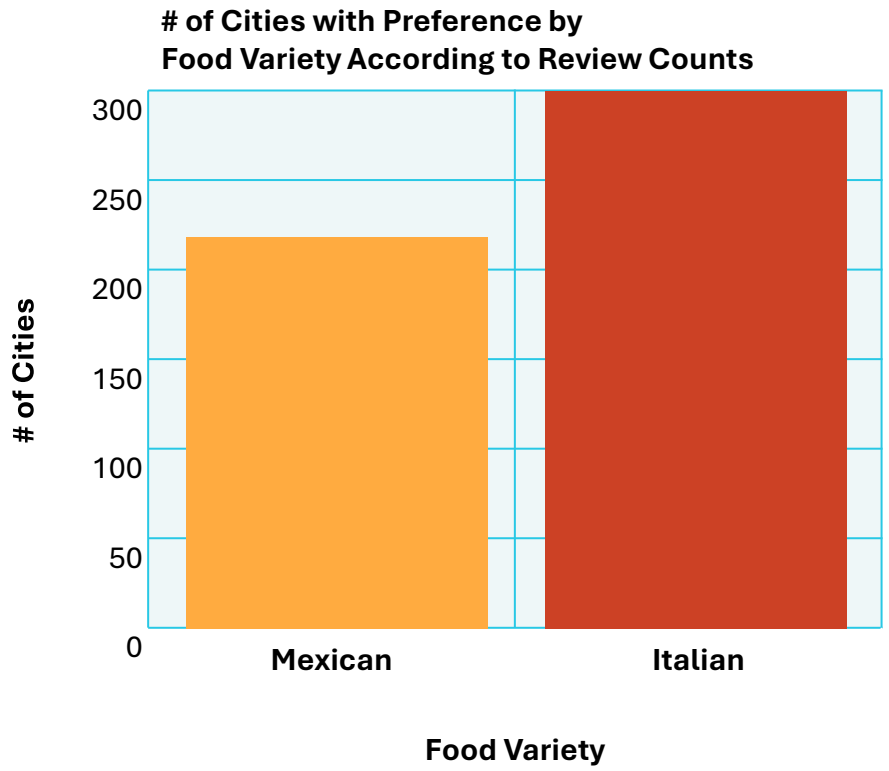
Metric	Italian	Mexican	p-value (t-test)
Average Rating	3.806	3.826	0.284
Review Counts	573k	476k	0.057

The difference in review counts is **not statistically significant**.

Analyze for Trends (Winner Take All)

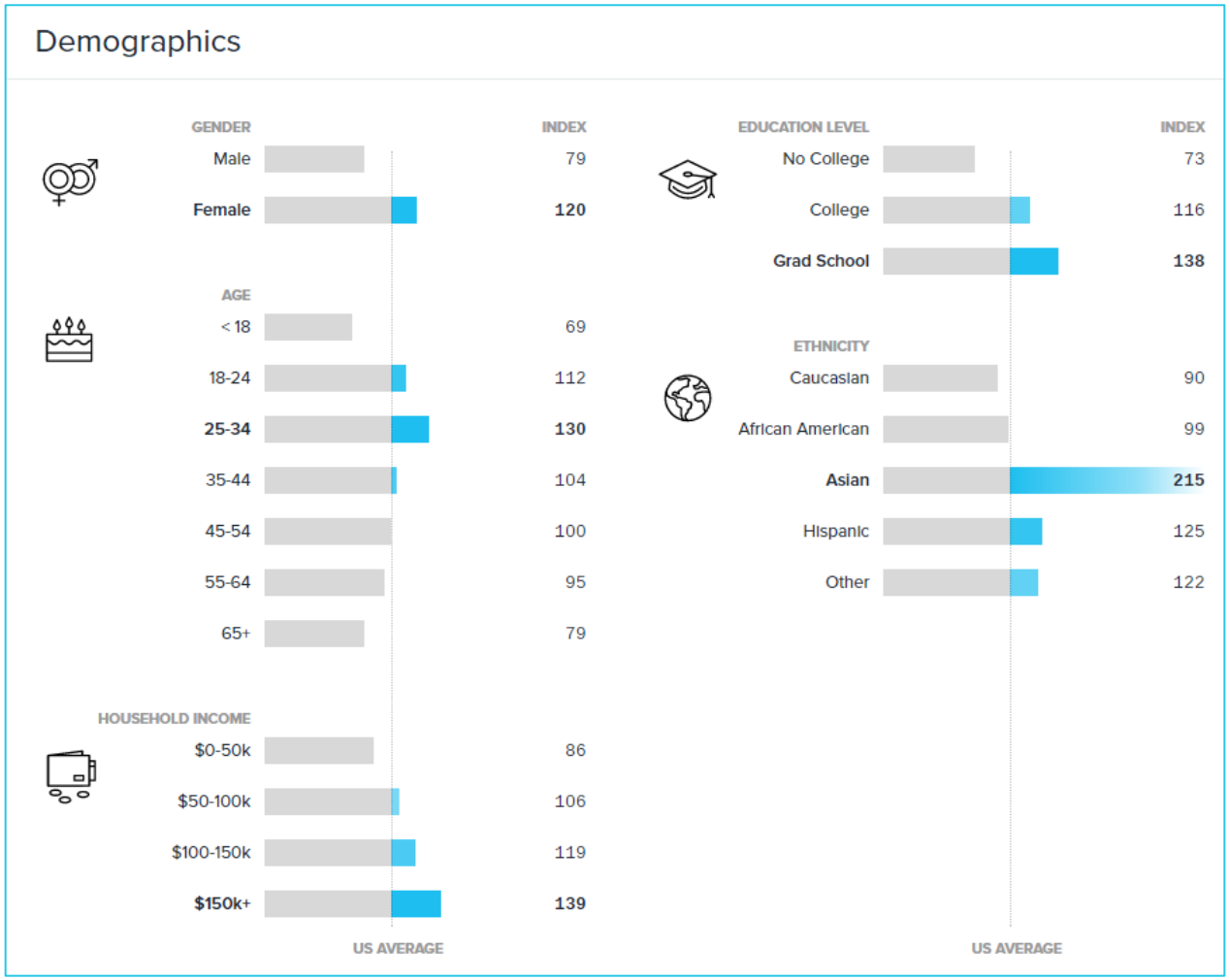
Just for fun, let's throw in an analysis that aggregates the data from all cities using a winner-take-all approach.
It's sort of a wash.





Limitations of Analysis

Yelp demographics may not match the American demographic.



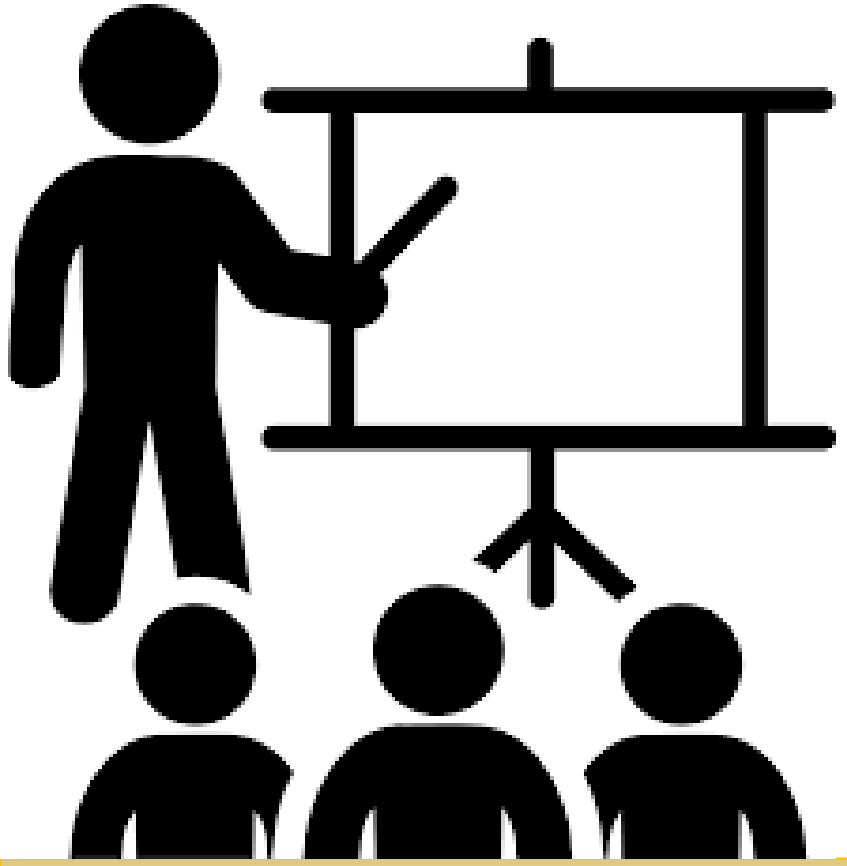
www.yelp.com

Limitations of Analysis

Restaurant experiences do not equate to home-cooked meals.

Limitations of Analysis

Fine-dining effect?



Instructor Demonstration: Tableau Exploration

Suggested Time:

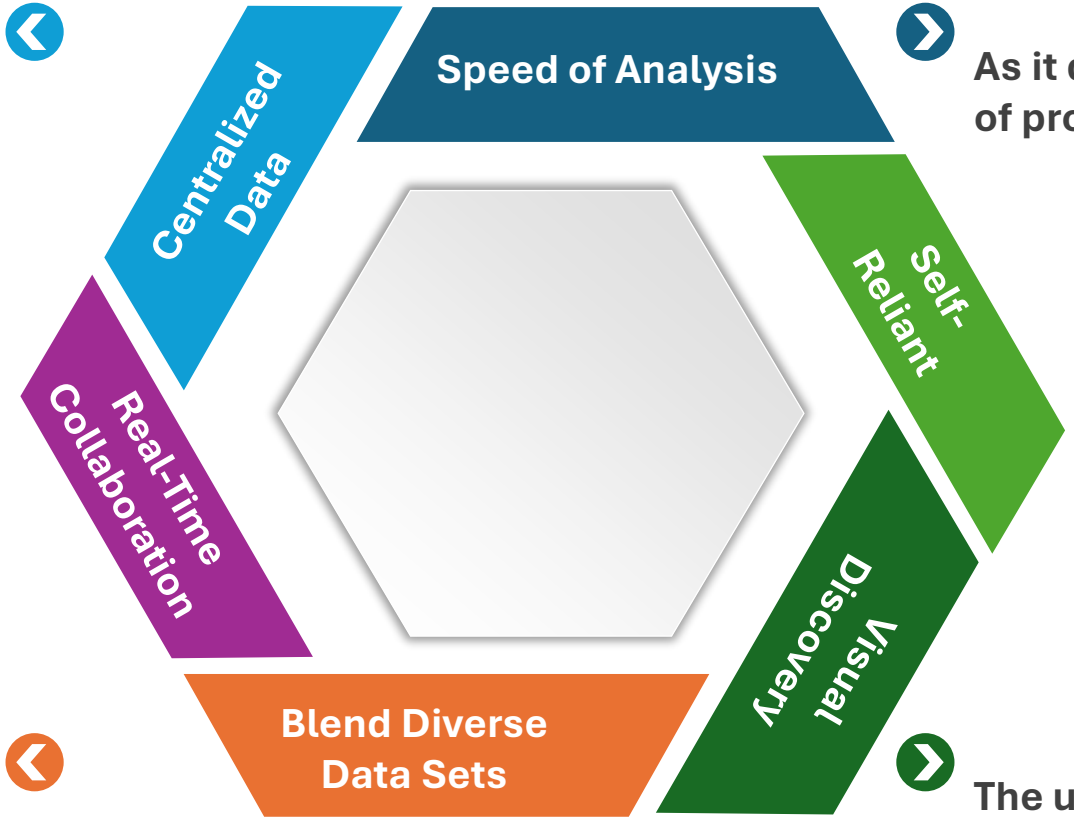
5 minutes

Tableau Features

tableau server provides a centralized location to manage all of the organization's published data sources.

Tableau can filter, sort, and discuss data on the fly and embed a live dashboard

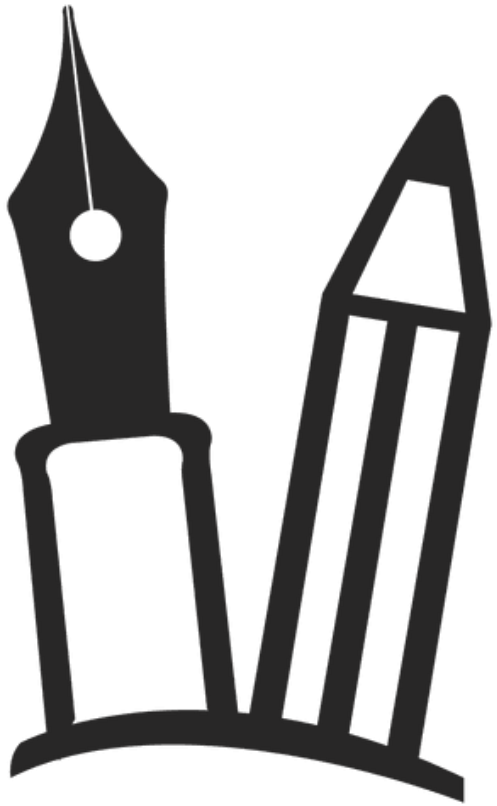
Tableau allows you to blend different



As it does not require high level of programming expertise

Tableau does not need a complex software setup.

The user explores and analyzes the data by using visual tools like colors

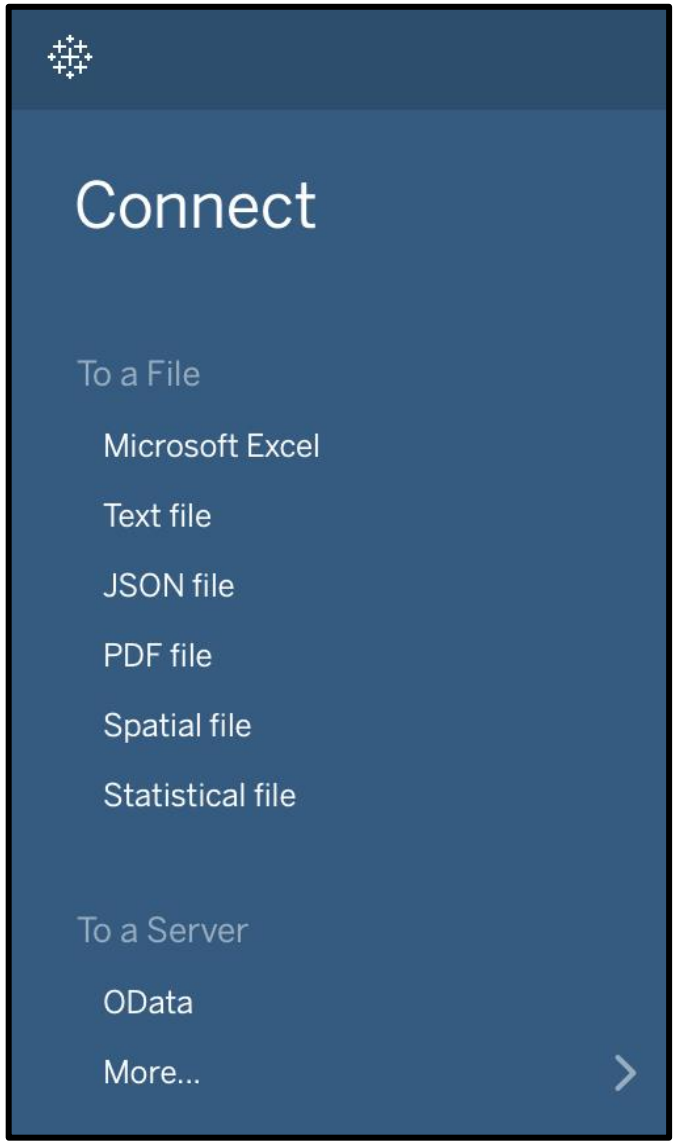


Everyone Do: Tableau Installation

In this activity, everyone will install Tableau Desktop.

Suggested Time:

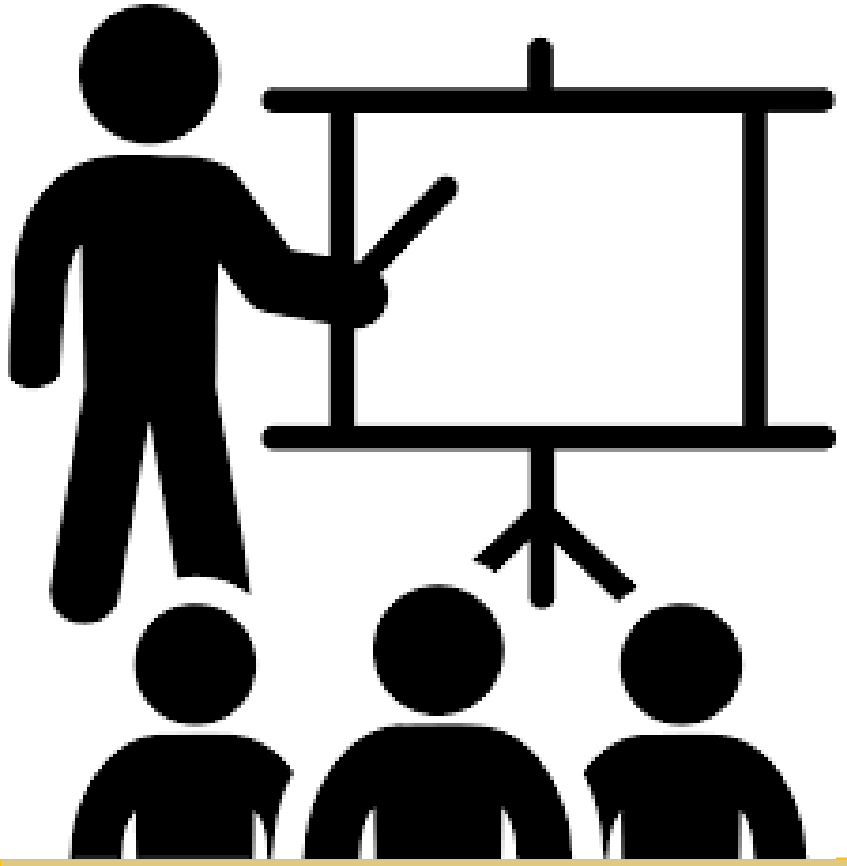
10 minutes



- Not only can Tableau connect to many types of data files, like **CSV, XLS, and JSON**, it can also connect to a multitude of servers, such as **MySQL, MongoDB, and Google Cloud**.

- Tableau allows users to mix and match data from vastly different sources **without the need to translate the data** into something like a Pandas DataFrame. The loading, exploration, and manipulation of data are all *built-in*.

Note: Hadoop can only be connected in Tableau Desktop, not Public



Instructor Demonstration: Loading Data

Suggested Time:

5 minutes

File Data Server Window Help

Connections Add

GlobalRentals
Microsoft Excel

Sheets

Use Data Interpreter

Data Interpreter might be able to clean your Microsoft Excel workbook.

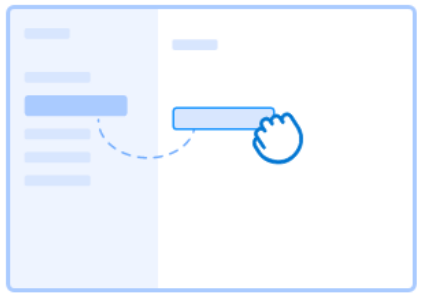
names

rentals

New Union

New Table Extension

GlobalRentals



Drag tables here to create a data m

Learn more

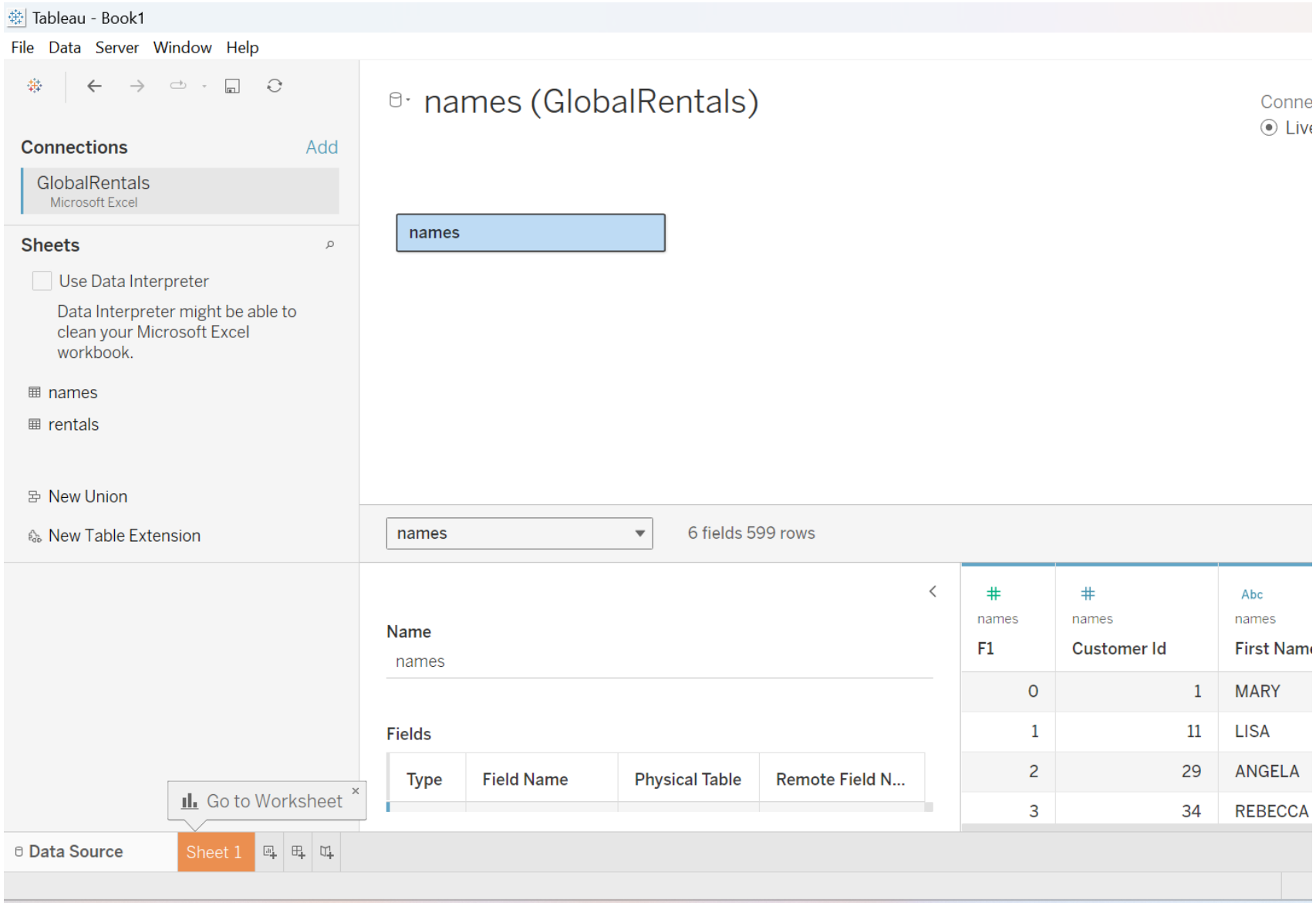


Tableau - Book1
File Data Server Window Help
Connections Add
GlobalRentals
Microsoft Excel
Sheets
Use Data Interpreter
Data Interpreter might be able to clean your Microsoft Excel workbook.
names
rentals
New Union
New Table Extension
names (GlobalRentals)
Conne
Live
names
names
6 fields 599 rows
Name
names
Fields
Type
Field Name
Physical Table
Remote Field N...
Go to Worksheet
names
F1
names
Customer Id
Abc
names
First Nam
0
1
MARY
1
11
LISA
2
29
ANGELA
3
34
REBECCA
Data Source
Sheet 1

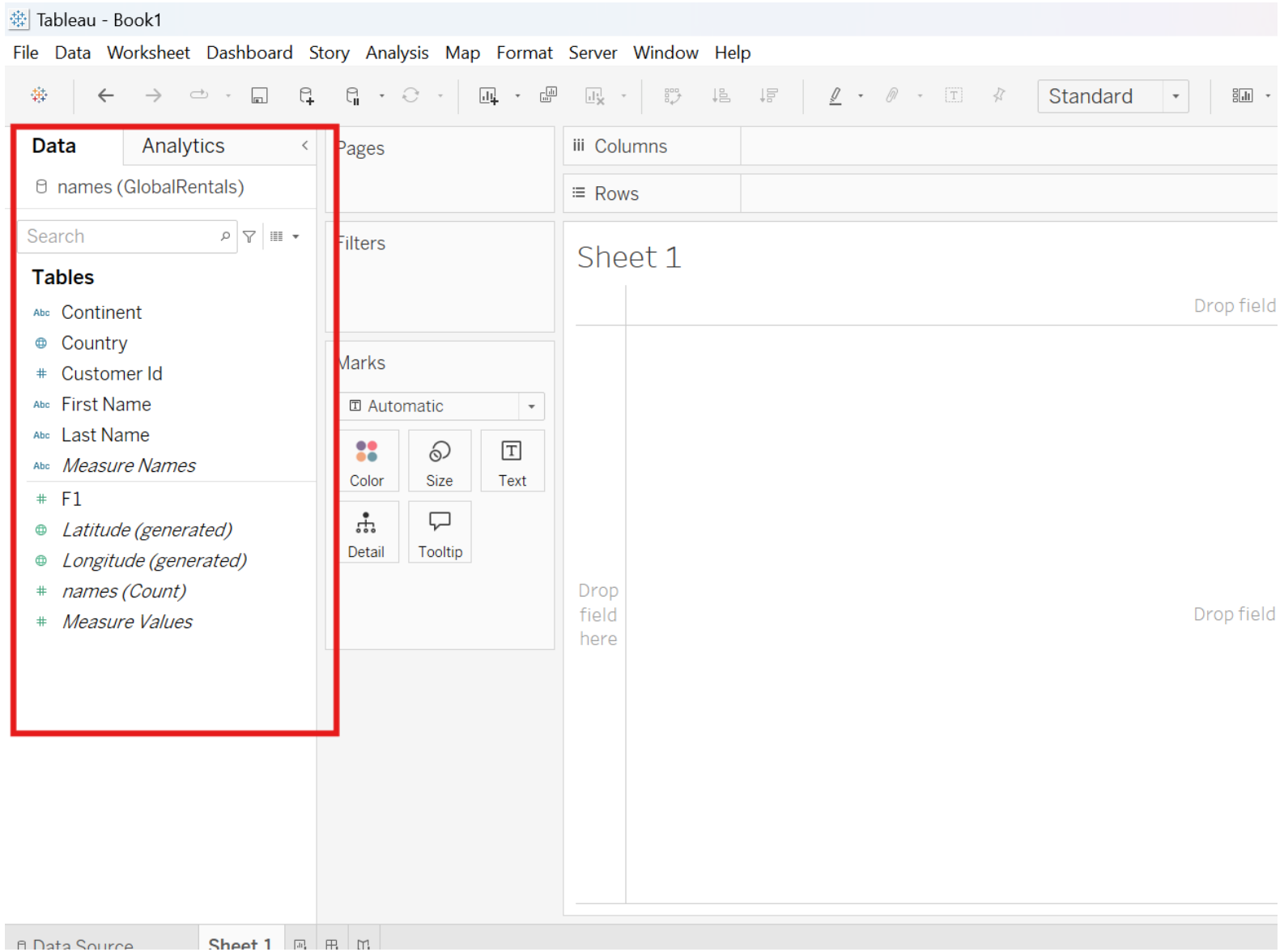


Tableau - Book1
File Data Worksheet Dashboard Story Analysis Map Format Server Window Help
Standard
Data
Analytics
names (GlobalRentals)
Search
Tables
Continent
Country
Customer Id
First Name
Last Name
Measure Names
F1
Latitude (generated)
Longitude (generated)
names (Count)
Measure Values
Pages
Filters
Marks
Automatic
Color
Size
Text
Detail
Tooltip
Columns
Rows
Sheet 1
Drop field
Drop field here
Drop field
Data Source
Sheet 1

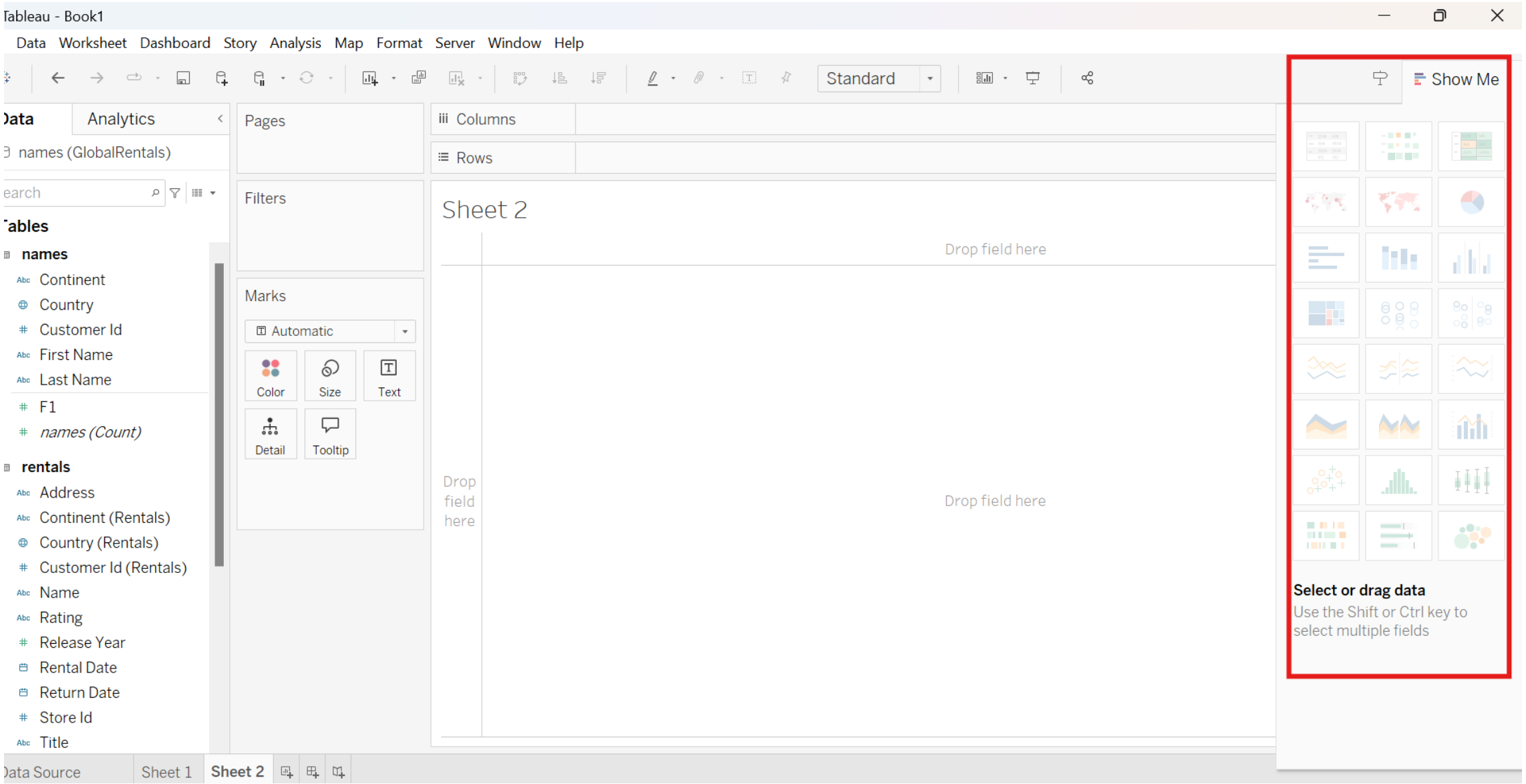
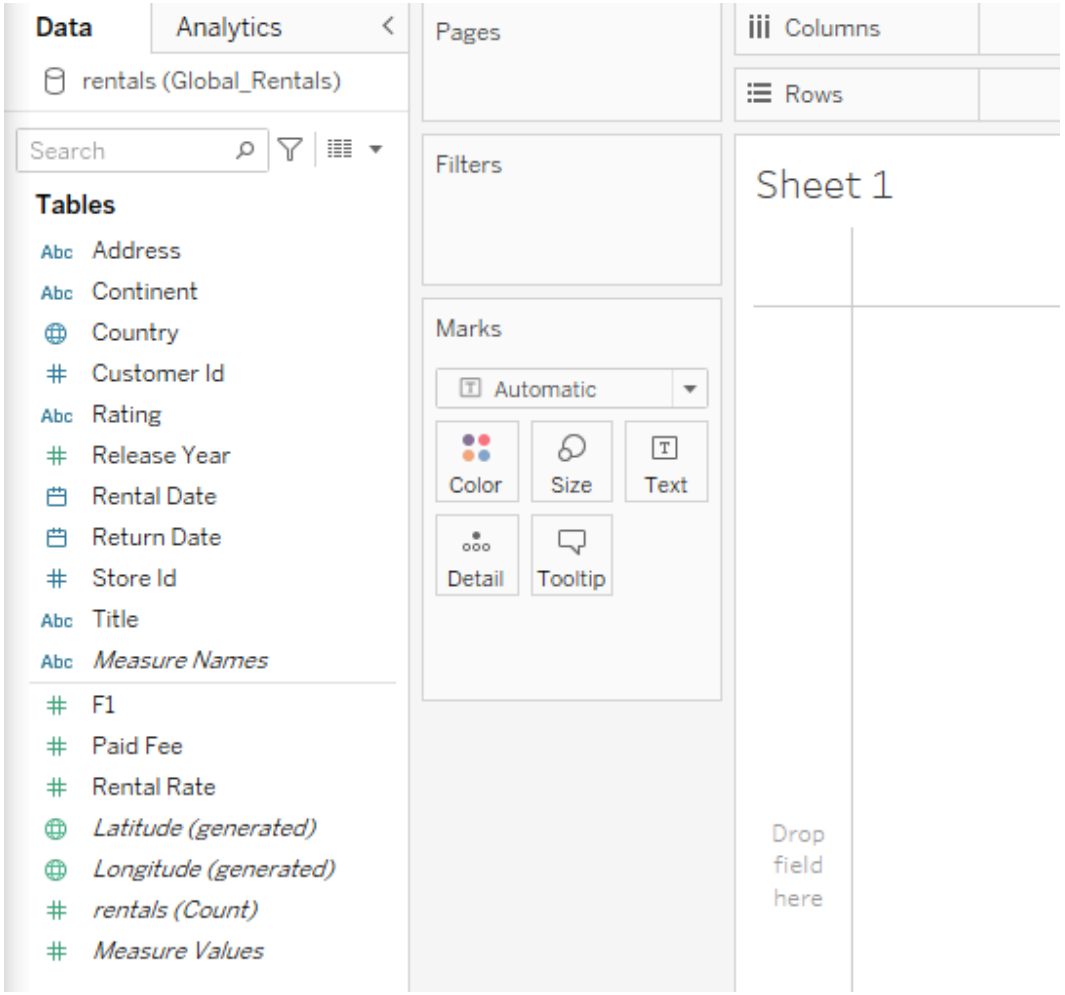


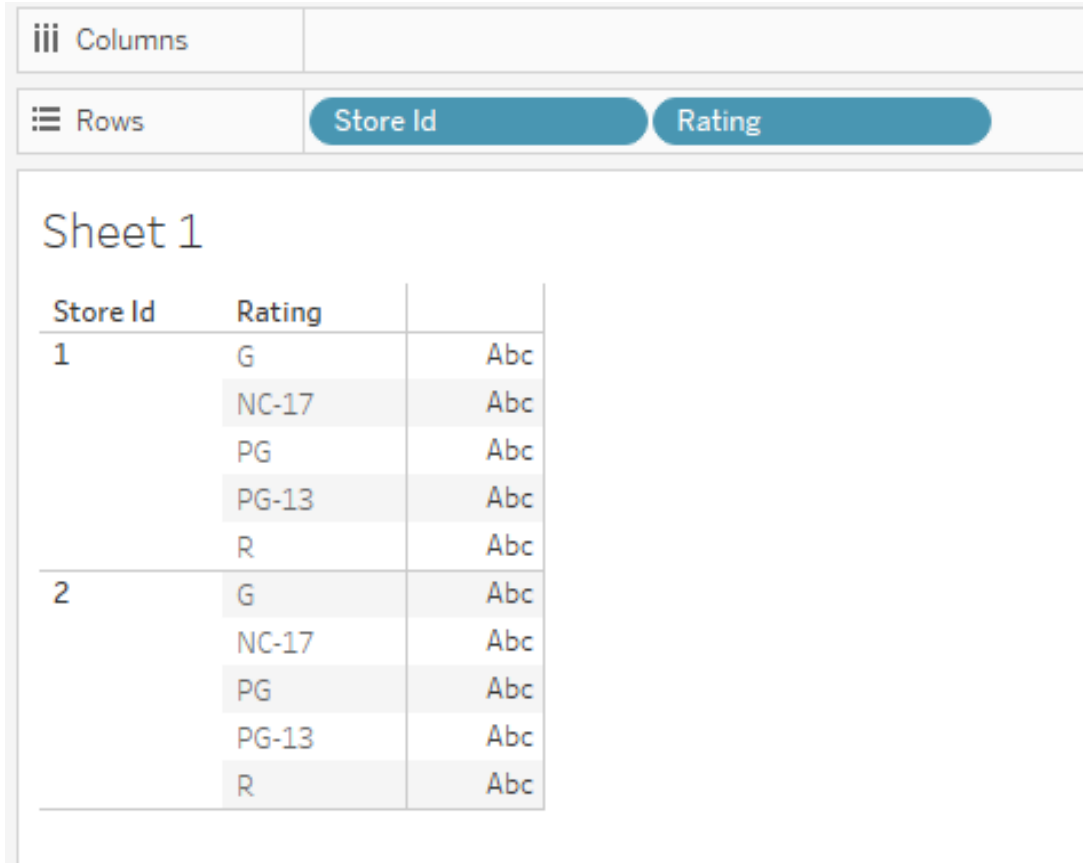
Tableau - Book1
Data Worksheet Dashboard Story Analysis Map Format Server Window Help
Standard
Show Me
Data
Analytics
names (GlobalRentals)
Search
Tables
names
Continent
Country
Customer Id
First Name
Last Name
F1
names (Count)
rentals
Address
Continent (Rentals)
Country (Rentals)
Customer Id (Rentals)
Name
Rating
Release Year
Rental Date
Return Date
Store Id
Title
Pages
Filters
Marks
Automatic
Color
Size
Text
Detail
Tooltip
Columns
Rows
Sheet 2
Drop field here
Drop field here
Drop field here
Select or drag data
Use the Shift or Ctrl key to select multiple fields
Data Source
Sheet 1
Sheet 2



- Creating visualizations in Tableau is nearly identical to creating pivot tables in Excel. Users **click and drag** the headers of their original dataset into specific fields—Columns, Rows, Filters, etc.—to create a chart

- **Vocabulary:** *Dimensions* are categorical fields that can be used to split up data. *Measures* are the metrics or numbers that users would like to analyze.

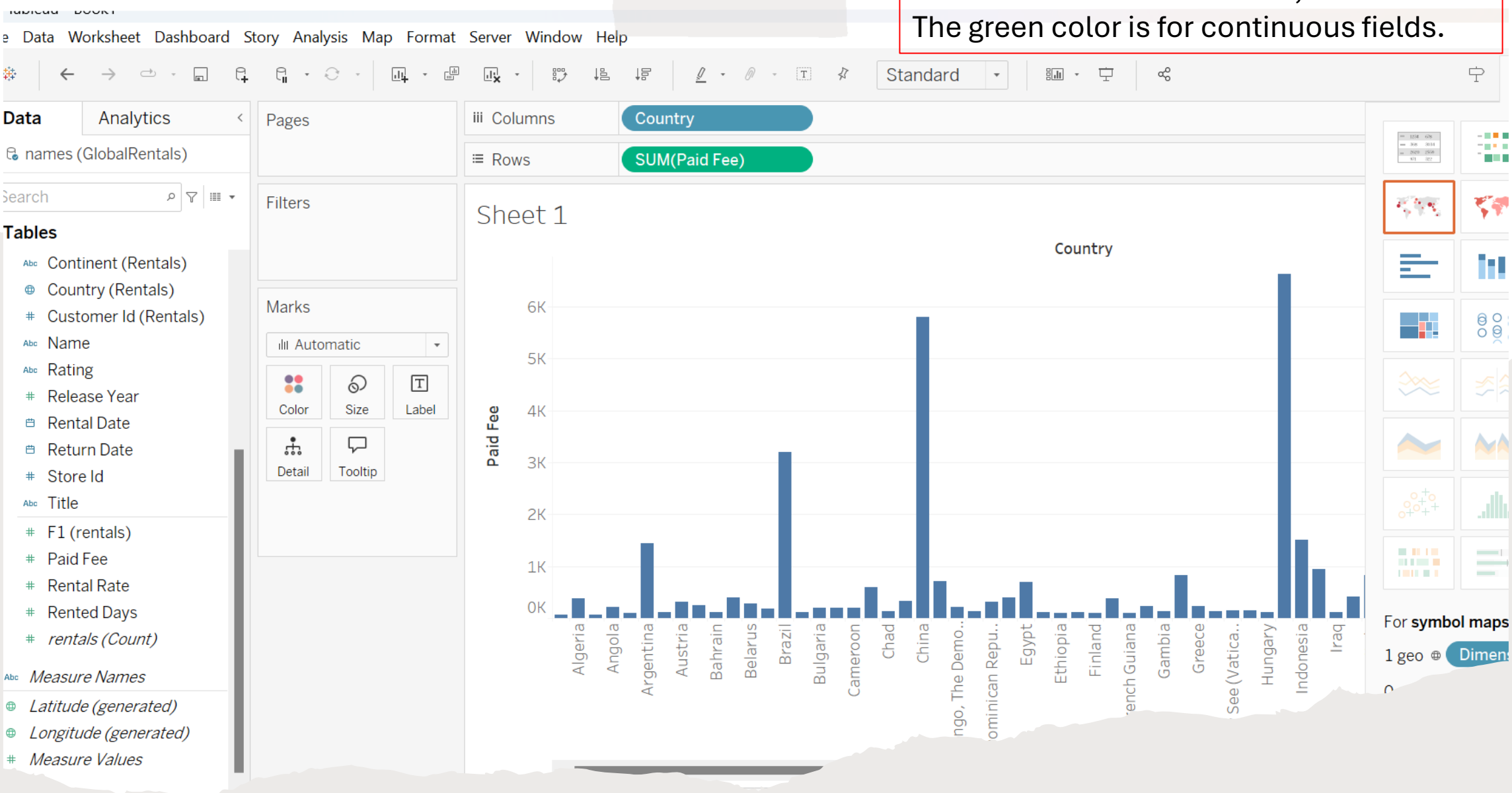
Instructor Do: Building Basic Visuals

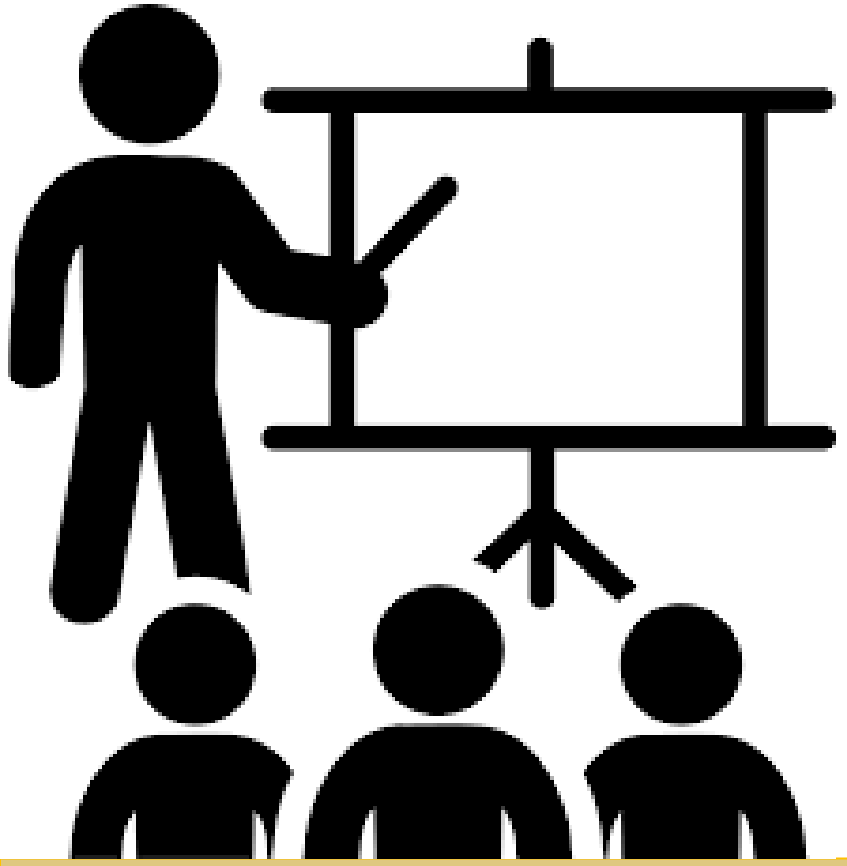


- Drag the Store Id pill from the Dimensions panel into Rows. This creates a small table with the two store ids from the dataset.

- By dragging Rating into Rows and placing it after the Store Id pill, the table is made slightly more complex. Now, each store id within the visualization has been split into five distinct parts

The blue color is for discrete, and
The green color is for continuous fields.





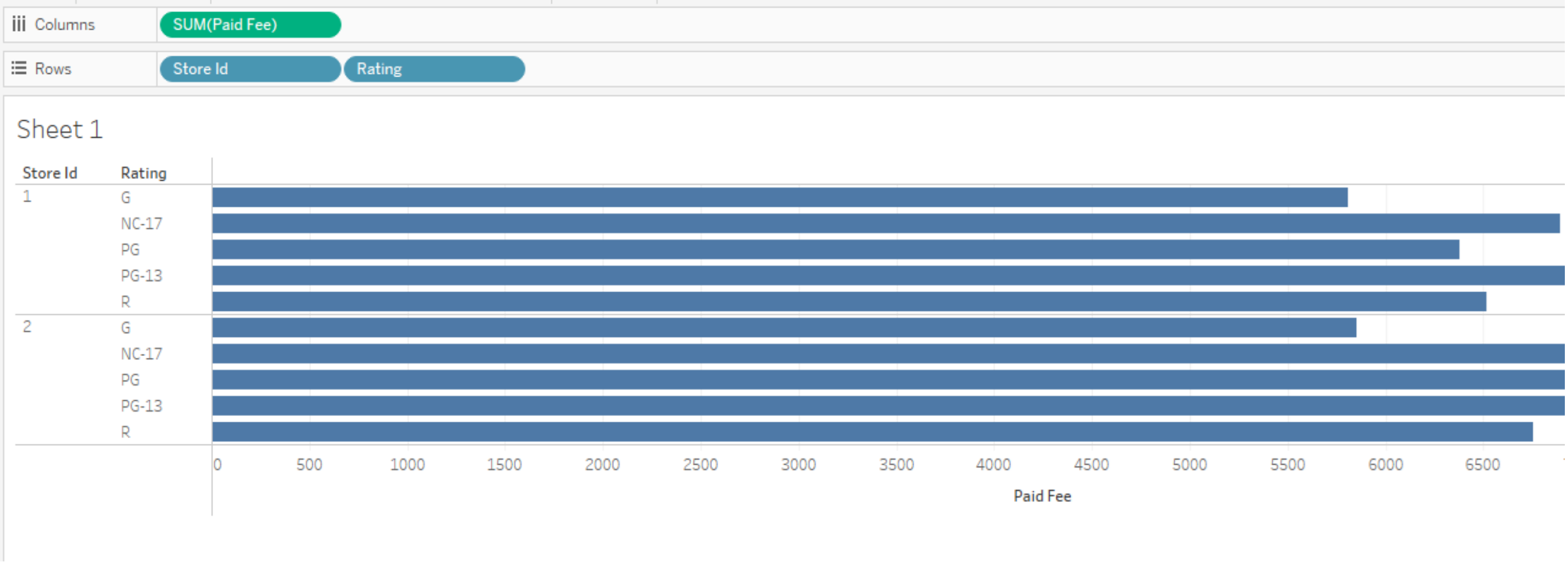
Instructor Demonstration: Simple visualization (Global Rentals)

Suggested Time:

5 minutes

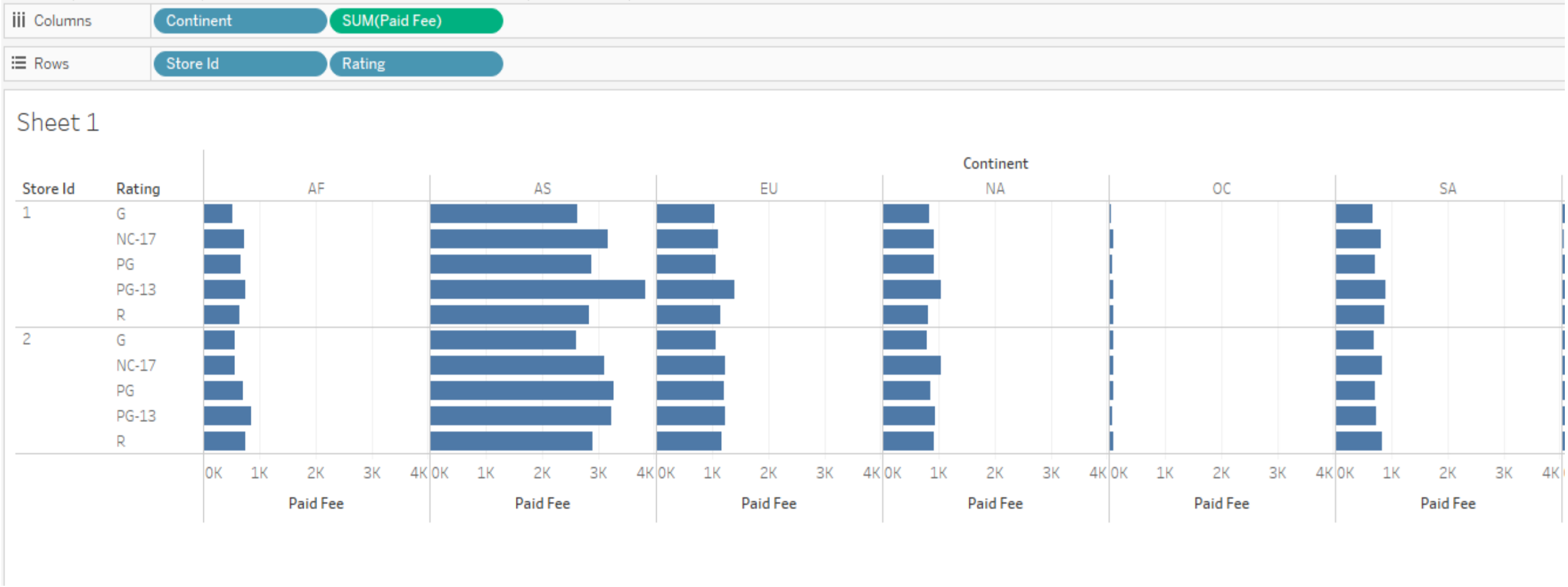
Instructor Do: Building Basic Visuals

Dragging "Paid Fee" from the Measurements panel and placing it within Columns, finally, creates a true visualization: a bar chart showing the total paid rental fees per rating for each store.

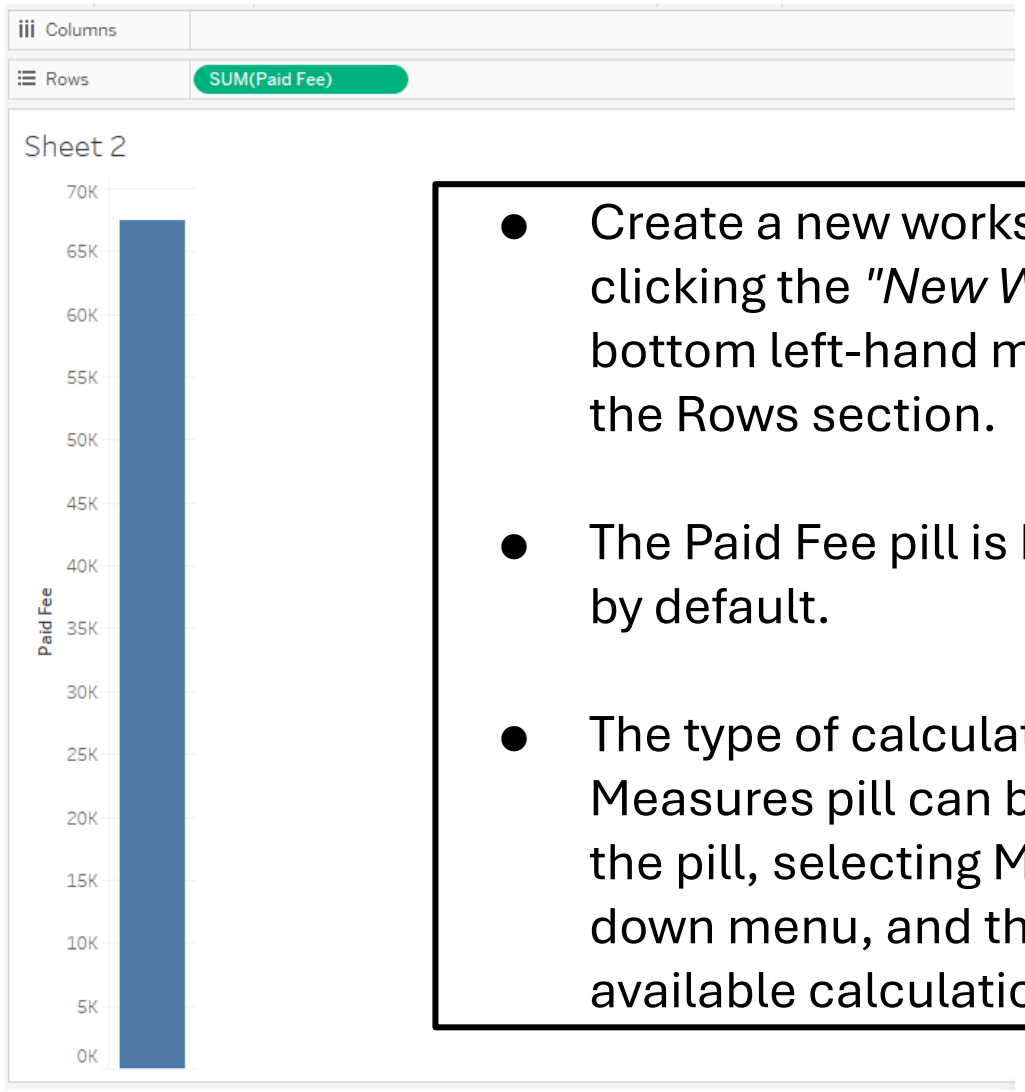


Instructor Do: Building Basic Visuals

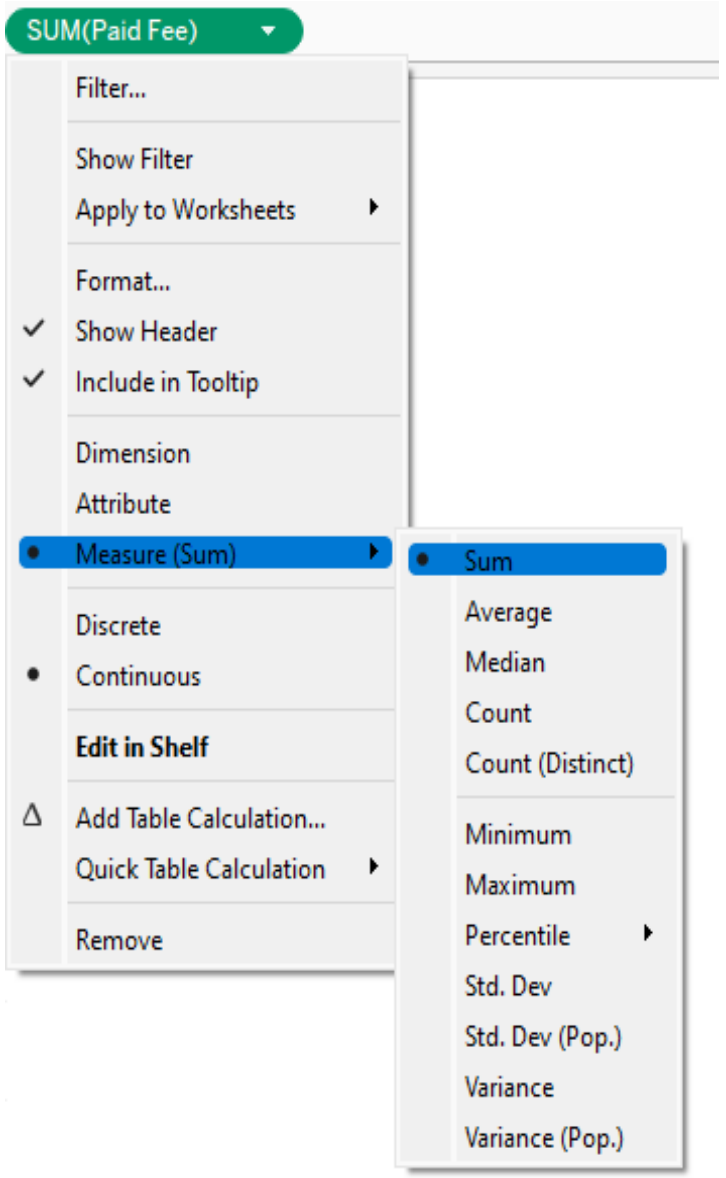
The chart can then be made more detailed by adding more elements. By adding Continent into Columns, for example, multiple charts are created to show the paid rental fees per rating by continent for each store.



Instructor Do: Building Basic Visuals

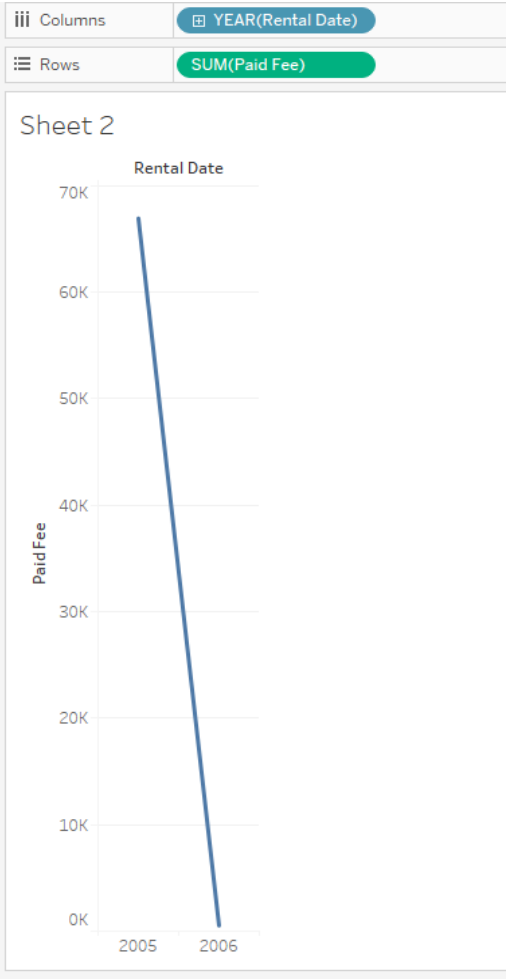


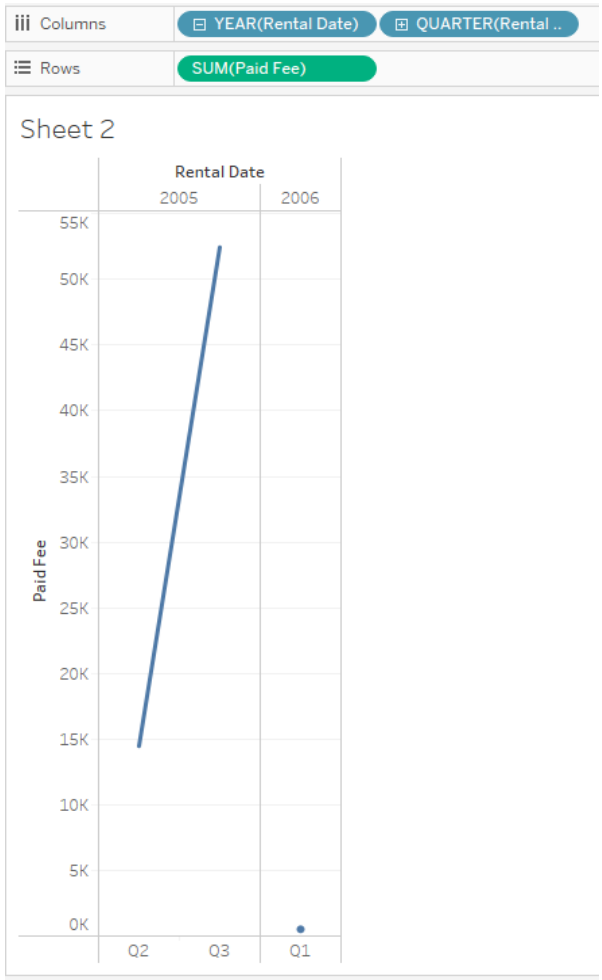
- Create a new worksheet within Tableau by clicking the *"New Worksheet"* button in the bottom left-hand menu. Drag Paid Fee into the Rows section.
- The Paid Fee pill is being measured by its sum by default.
- The type of calculation performed on a Measures pill can be changed by clicking on the pill, selecting Measure from the drop-down menu, and then picking one of the available calculation types.

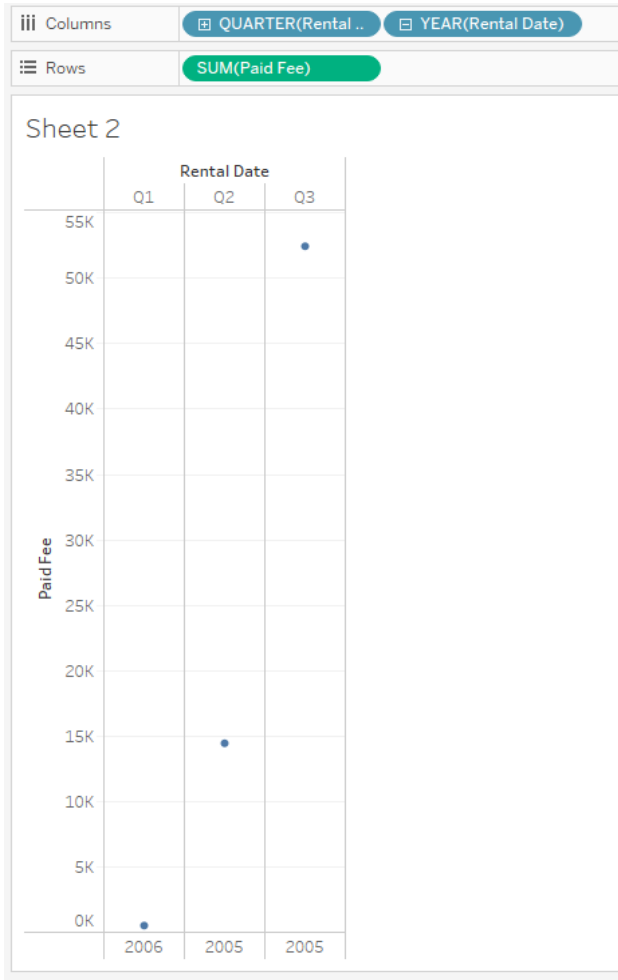


Instructor Do: Building Basic Visuals

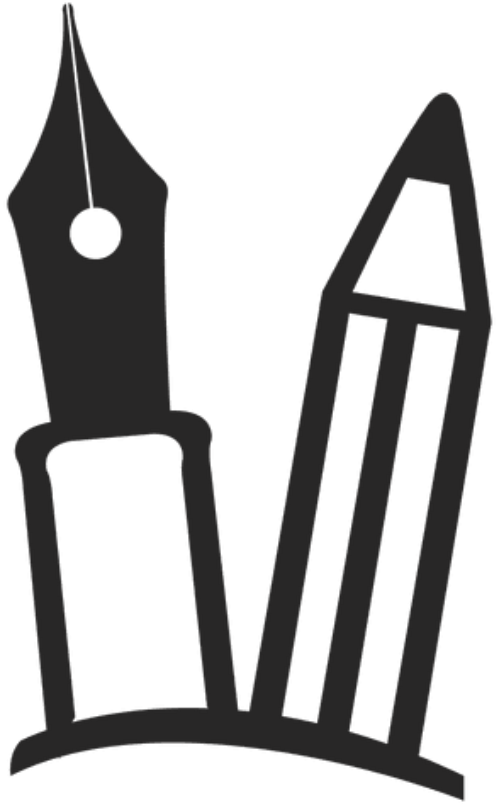
Now, drag "*Rental Date*" into the Columns field to create a line chart. Tableau has aggregated the dates at the year level. To include quarters, simply click the plus symbol within the YEAR pill.







Questions ?



Student Do: Global Rentals visualization

In this activity, you will be given visualizations that you will attempt to recreate using Tableau.

Suggested Time:

15 minutes

Activity: Explore Data

- Using GlobalRentals.xlsx, visualize the following data:
  - The customers with the highest amount of paid fees
  - The customers with more than 150 rental days
  - The rental days by continent and rating

- **Bonus:**
  - If you finish early, try experimenting with other possible visualization!

- **Hint:**
  - Don’t forget to save the file once finished.


Time's up!

What is Tableau Prep?

Self-service data preparation

Regardless of your skill level with data preparation, Tableau Prep makes it easier to combine, clean, shape, and share your data. With a visual interface giving a complete picture of the data and smart features to make cleaning, automating and administering easier than ever, Tableau Prep will help your organization role out a complete, self-service data preparation solution.

Tableau Public

- It is a free version of the software.
- It allows you to save your work on the Tableau server.

Tableau Public is:

- Free software, similar to Tableau Corporate,
- A public website where vizzes are saved,
- Semi-private, (You can NOT securely store your company's budget viz on Tableau Public)
- Storage for your public portfolio.

Note: Hadoop can only be connected in Tableau Desktop, not Public

When should you use Tableau Prep?

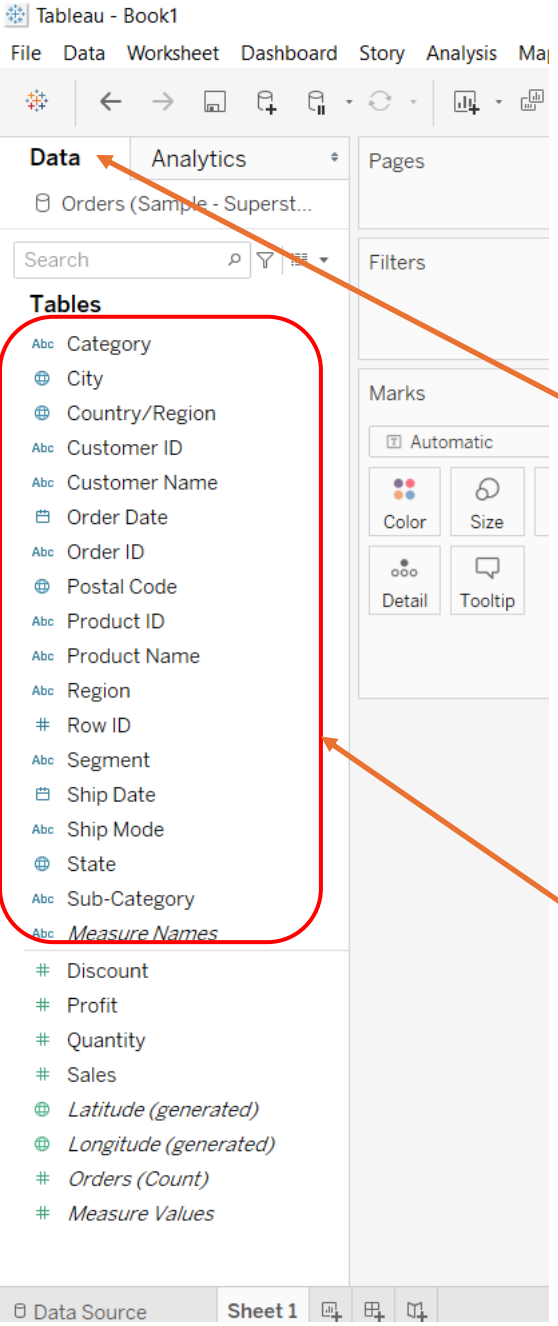
Fundamentally, Tableau Prep helps you explore, clean, integrate, and reshape data. If your **primary** goal is to perform one or more of those tasks, that's a good sign that Tableau Prep is the right solution.
When your **primary** goal isn't to explore, clean, integrate, or reshape data, remember that all the data preparation abilities of Tableau Desktop still exist! If a combination of the data interpreter, a pivot, or joins and unions gets your data into the form you need, use Tableau Desktop.

Want maximum flexibility? Use both!

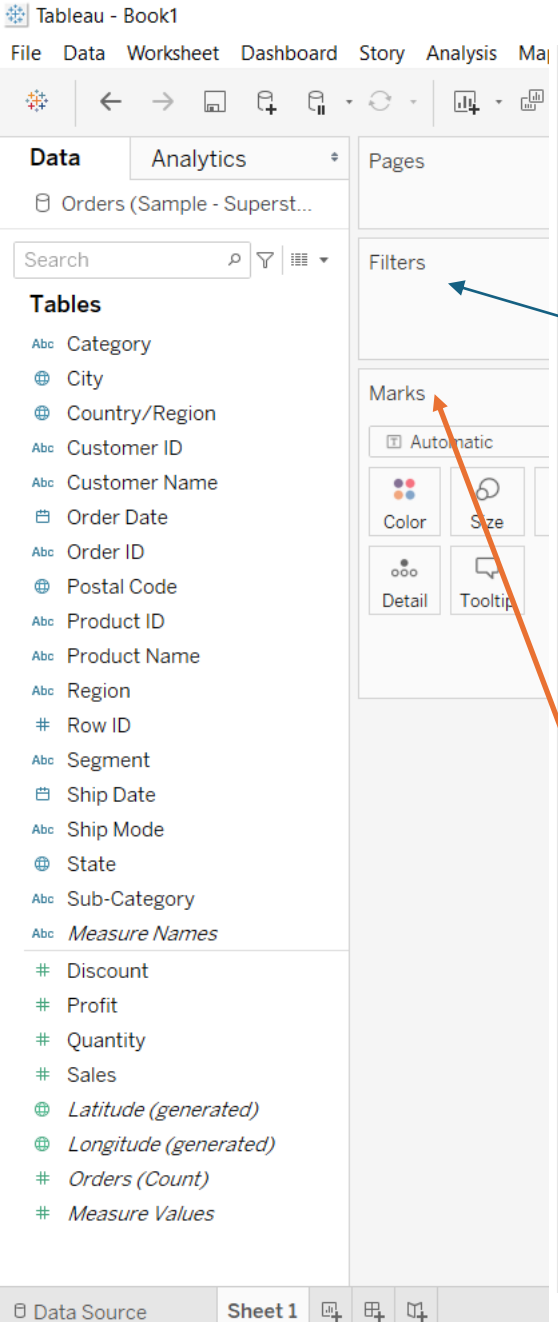
At the end of the day, you never need to use *just* Tableau Prep or just Tableau Desktop. Both are integrated into the Tableau Platform along with Tableau Server and Online. We imagine the dashboard authoring experience as moving seamlessly from data preparation to visual analytics to sharing and collaborating, but in reality, it is an iterative, back-and-forth experience.
An insight in Tableau Desktop sends you to back to Tableau Prep to change your flow, or a data discovery in Prep inspires you to make a quick web edit to your dashboard in Tableau Server. Using multiple pieces of the Tableau Platform can make moving from disparate, messy data to actionable insight fast and easy.

Data Terminology

S.No	Terms & Meaning
1	**Alias** An alternative name that you can assign to a field or to a dimension member.
2	**Bin** A user-defined grouping of measures in the data source.
3	**Bookmark** A **.tbm** file in the Bookmarks folder in the Tableau repository that contains a single worksheet. Much like web browser bookmarks, **.tbm** files are a convenient way to quickly display different analyses.
4	**Calculated Field** A new field that you create by using a formula to modify the existing fields in your data source.
5	**Crosstab** A text table view. Use text tables to display the numbers associated with dimension members.



5	**Crosstab** A text table view. Use text tables to display the numbers associated with dimension members.
6	**Dashboard** A combination of several views arranged on a single page. Use dashboards to compare and monitor a variety of data simultaneously.
7	**Data Pane** A pane on the left side of the workbook that displays the fields of the data sources to which Tableau is connected. The fields are divided into dimensions and measures. The data pane also displays custom fields such as calculations, binned fields, and groups. You build views of your data by dragging fields from the data pane onto the various shelves that are a part of every worksheet.
8	**Data Source Page** A page where you can set up your data source. The data source page generally consists of four main areas – left pane, join area, preview area, and metadata area.
9	**Dimension** A field of categorical data. Dimensions typically hold discrete data such as hierarchies and members that cannot be aggregated. Examples of dimensions include dates, customer names, and customer segments.



10	**Extract** A saved subset of a data source that you can use to improve performance and analyze offline. You can create an extract by defining filters and limits that include the data you want in the extract.
11	**Filters Shelf** A shelf on the left of the workbook that you can use to exclude data from a view by filtering it using measures and dimensions.
12	**Format Pane** A pane that contains formatting settings that control the entire worksheet, as well as individual fields in the view. When open, the Format pane appears on the left side of the workbook.
13	**Level Of Detail (LOD) Expression** A syntax that supports aggregation at dimensionalities other than the view level. With the level of detail expressions, you can attach one or more dimensions to any aggregate expression.
14	**Marks** A part of the view that visually represents one or more rows in a data source. A mark can be, for example, a bar, line, or square. You can control the type, color, and size of marks.

15	**Marks Card** A card to the left of the view, where you can drag fields to control mark properties such as type, color, size, shape, label, tooltip, and detail.
16	**Pages Shelf** A shelf to the left of the view that you can use to split a view into a sequence of pages based on the members and values in a discrete or continuous field. Adding a field to the Pages shelf is like adding a field to the Rows shelf, except that a new page is created for each new row.
17	**Rows Shelf** A shelf at the top of the workbook that you can use to create the rows of a data table. The shelf accepts any number of dimensions and measures. When you place a dimension on the Rows shelf, Tableau creates headers for the members of that dimension. When you place a measure on the Rows shelf, Tableau creates quantitative axes for that measure.
18	**Shelves** Named areas to the left and top of the view. You build views by placing fields onto the shelves. Some shelves are available only when you select certain mark types. For example, the Shape shelf is available only when you select the Shape mark type.
19	**Workbook** A file with a **.twb** extension that contains one or more worksheets (and possibly also dashboards and stories).
20	**Worksheet** A sheet where you build views of your data by dragging fields onto shelves.

Tableau Workspace

Figure 1-7 is worksheet-connected to the Sample-Superstore Sales-Excel data set used to create scatter plots.

These Dimension shelf and Measure shelf are for previous version of Tableau, in new version they are just separated by line

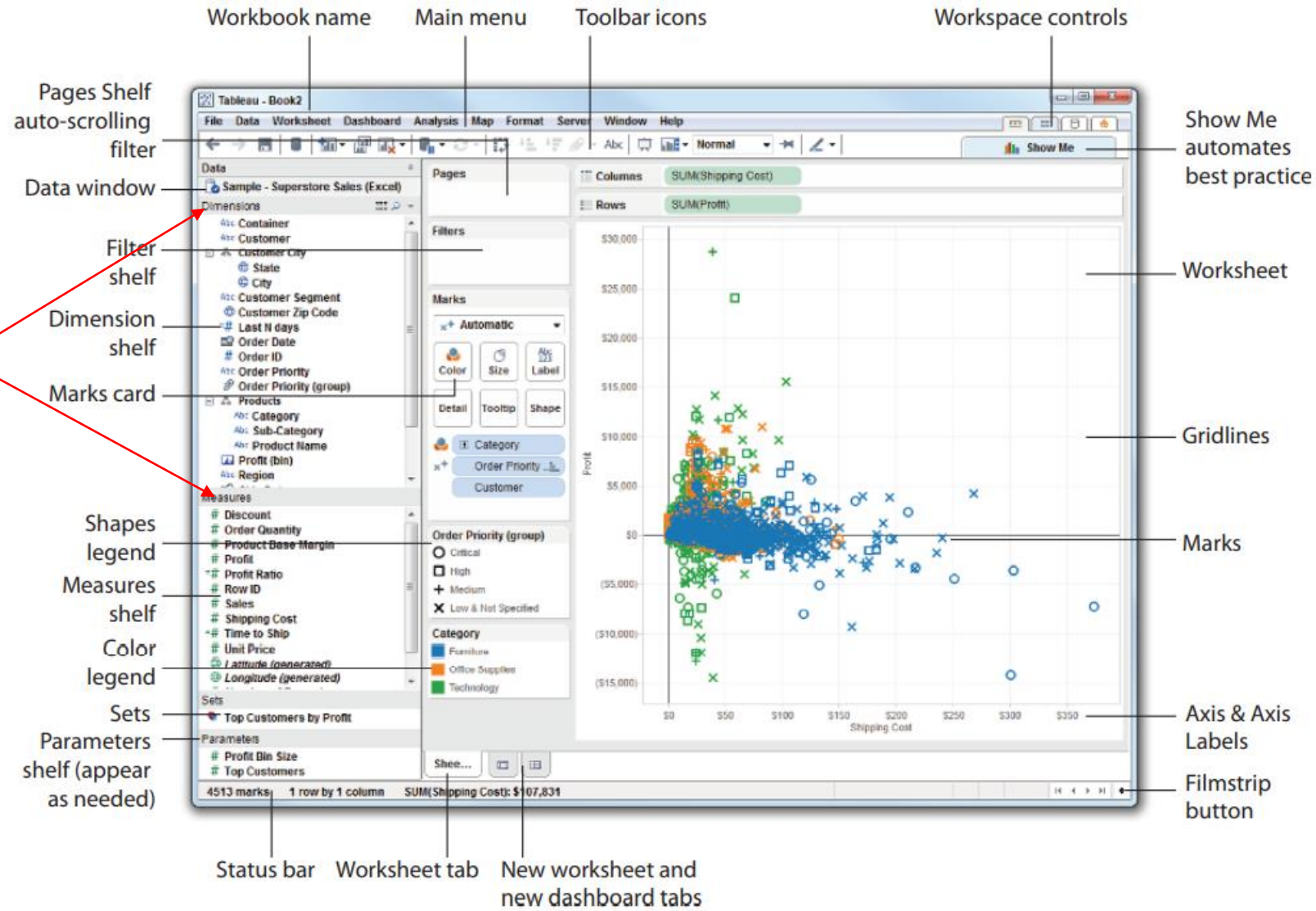


FIGURE 1-7 *Worksheet page*

LEVERAGING TOOLBAR ICONS

The toolbar displayed in Figure 1-9 makes the most commonly needed functions readily accessible.

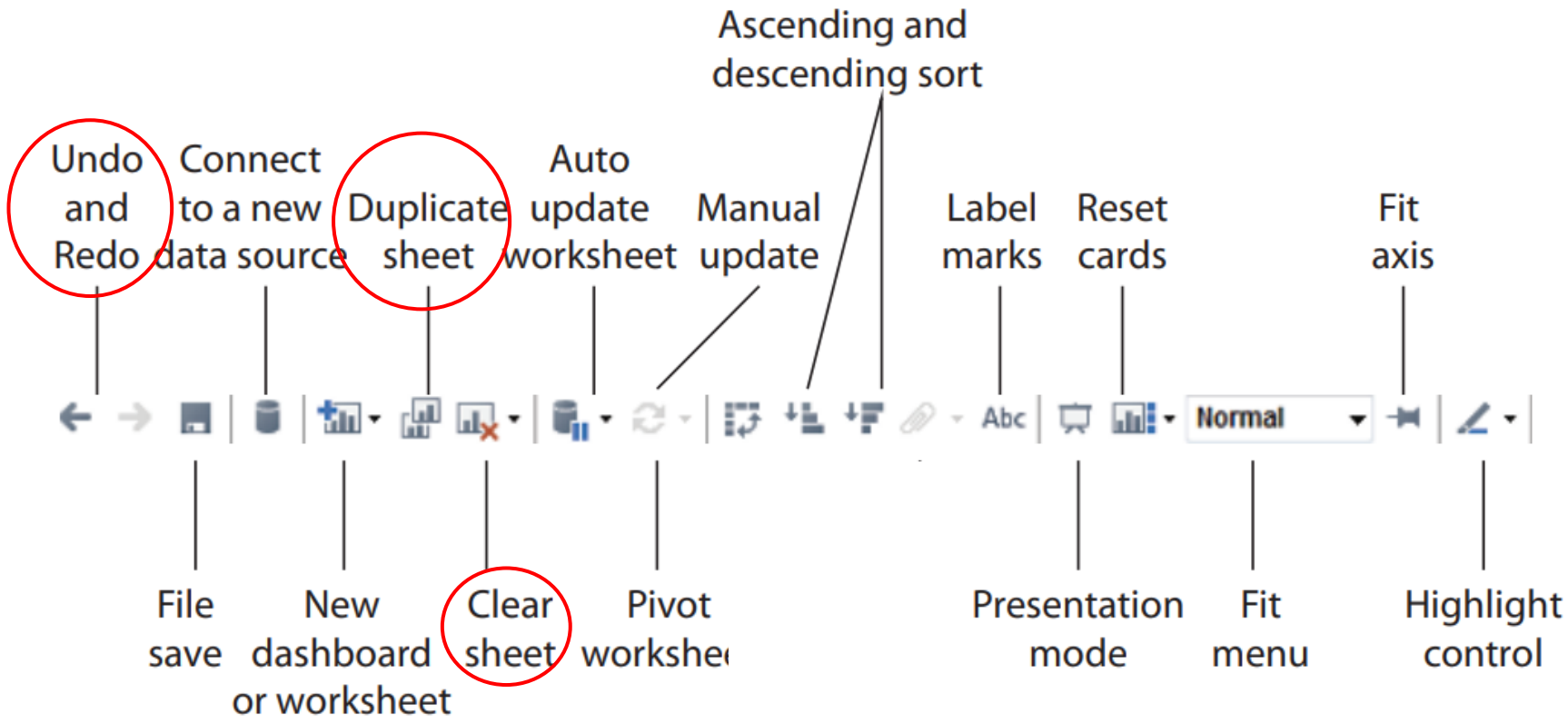
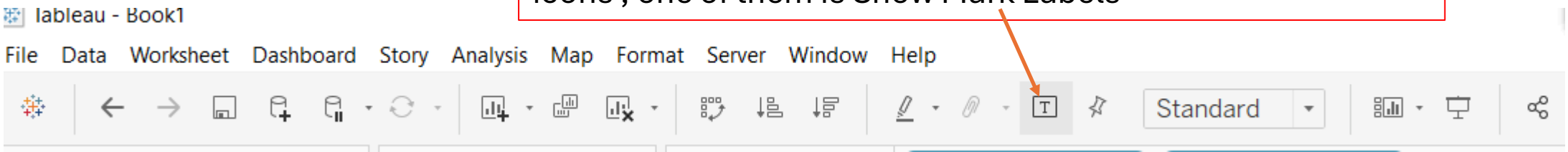
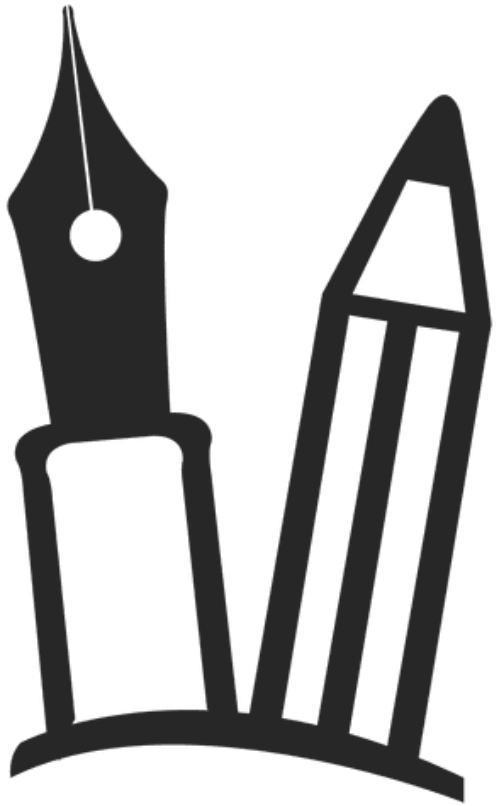


FIGURE 1-9 *Worksheet toolbar*

Note: for new versions of Tableau you may have some more icons , one of them is Show Mark Labels





Student Do: Noshow visualization

In this activity, you will be given visualizations that you will attempt to recreate using Tableau.

Suggested Time:

15 minutes

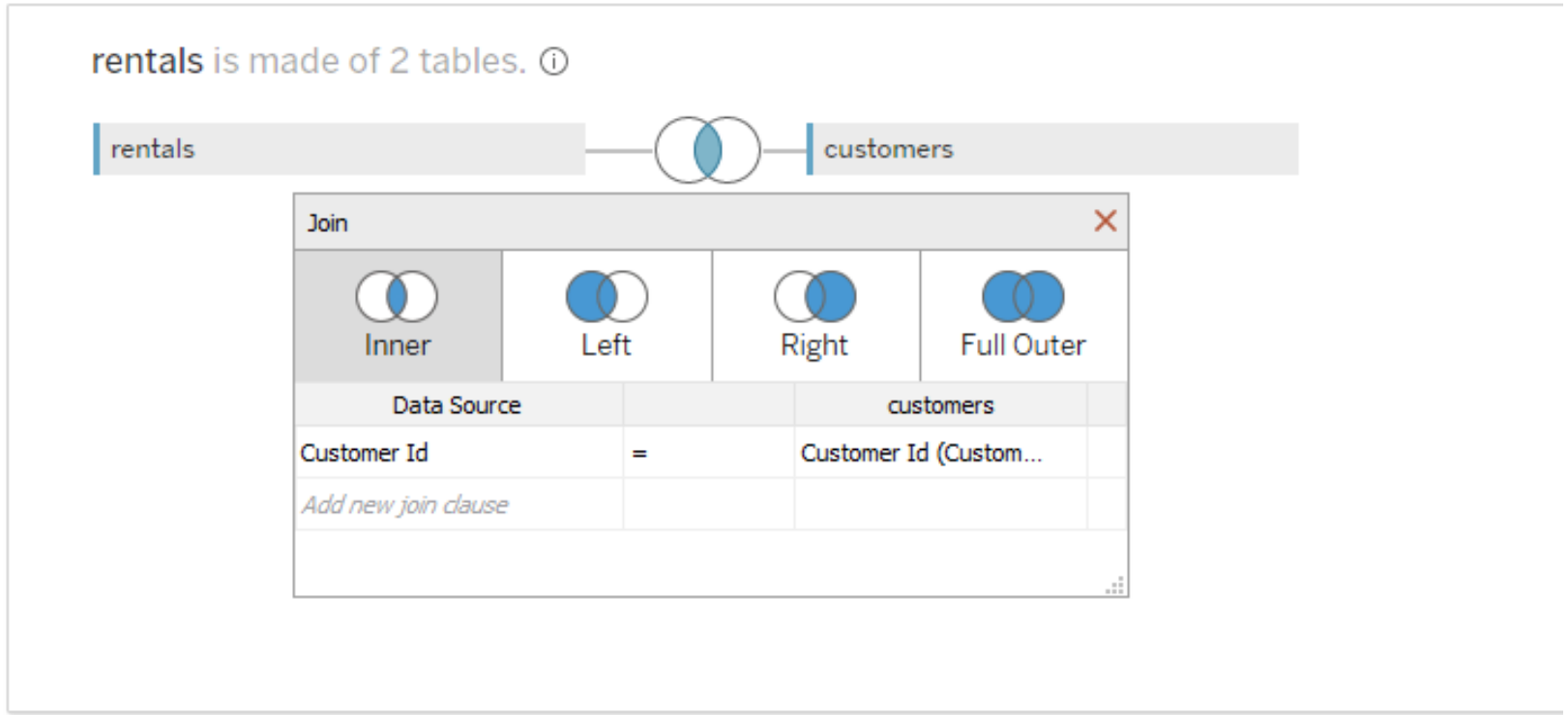
Activity: Explore Data

- Create a line chart that compares the ages of patients against the total number of appointments. Then, split this graph based on scholarship and whether the patient showed up to their appointment.
    - For this first step, you'll need to convert Age from a Measure to a Dimension.
- Create a pair of bar charts that compare how many patients showed up to appointments versus how many were no-shows in different neighborhoods.
- Create a stacked bar chart that compares no-shows to those who made it to their appointment based on the day of the week.
- Create a pair of line graphs to compare age and diabetes in patients who showed up to appointments versus those who were no-shows.
- Create a pair of line graphs to compare age and alcoholism in patients who showed up to appointments versus those who were no-shows.


Time's up!

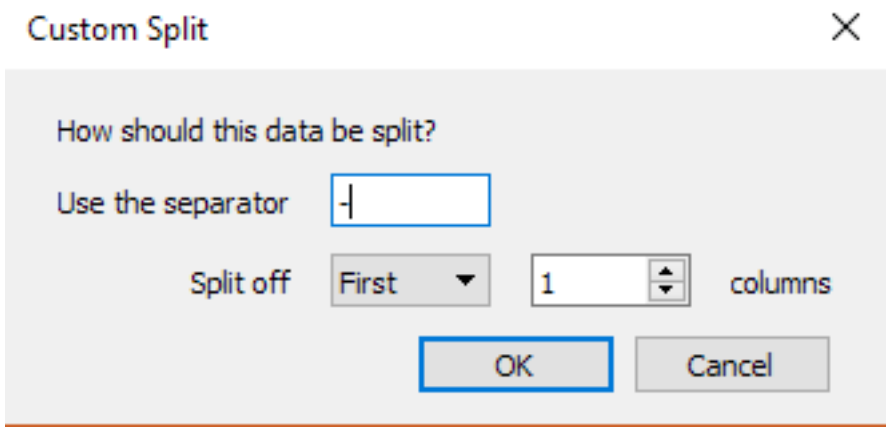
Instructor Do: Joins and Splitting Made Easy

Joins are a constant in data science, and they are often considered tedious and complex. Tableau, however, simplifies joins so much that even complex joins can be performed ir

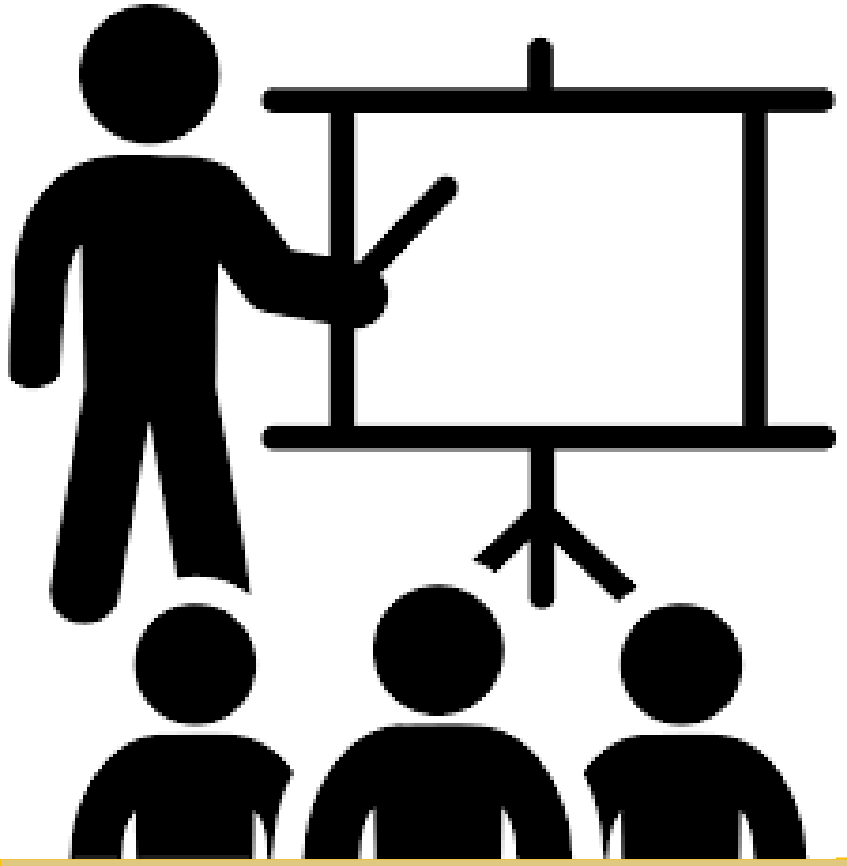


Instructor Do: Joins and Splitting Made Easy

Another interesting feature of Tableau is that columns containing text can be split to extract data



- To do so, navigate to the first sheet and scroll through the data to select the column header whose values should be split, then right-click, and select *"Transform"* then *"Custom Split"* from the drop-down menu.
- Select what character to split the text on, whether to split from the beginning or the end of the string, and then how many times the text should be split.
- Split the *"Rent Code"* column on the first hyphen one time; this will extract the store id in which a movie was rented from the initial string.



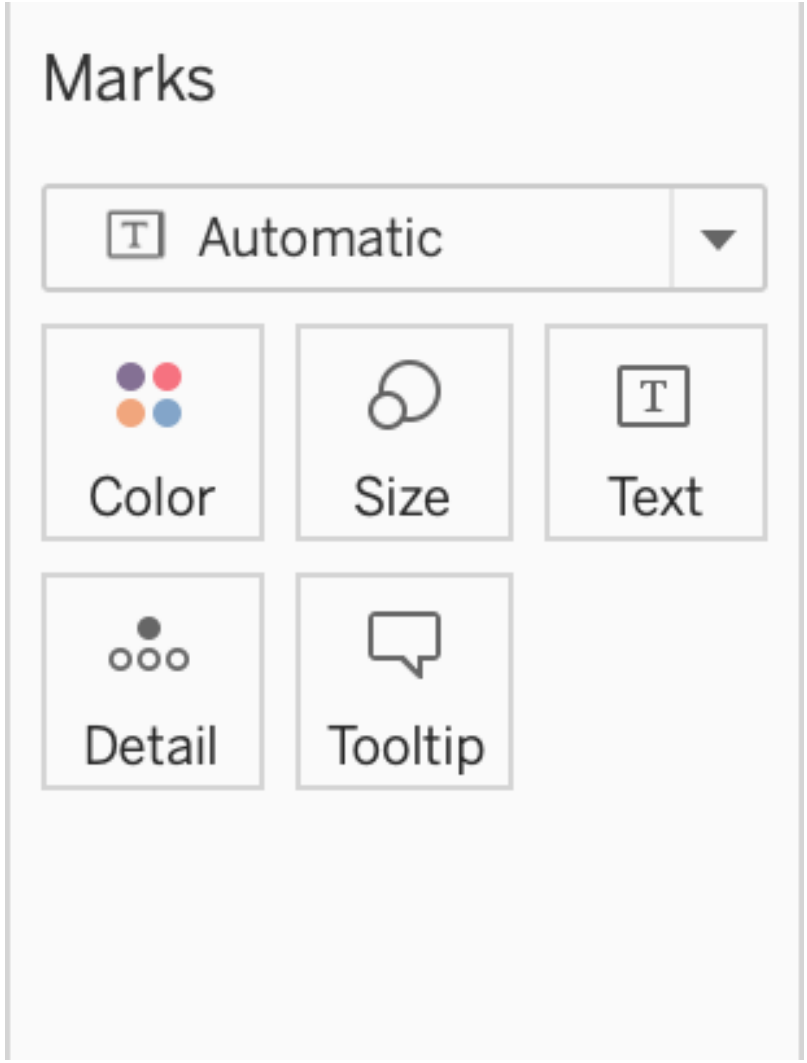
Instructor Demonstration: Easy Join

Suggested Time:

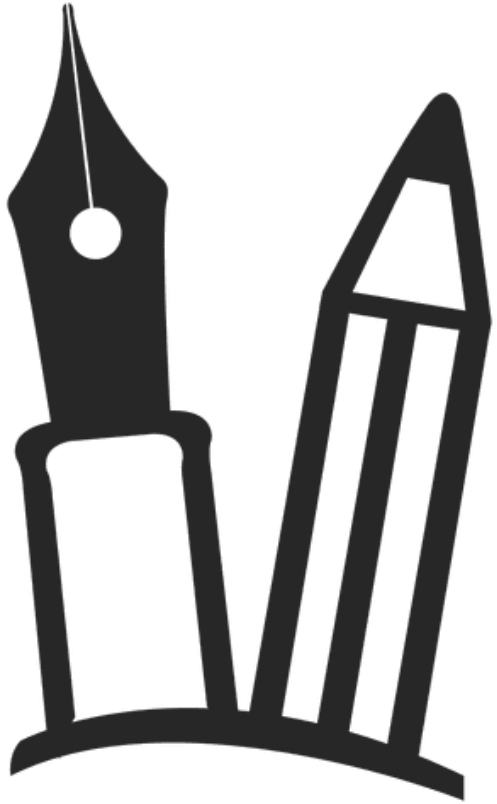
5 minutes

Instructor Do: Sizing, Coloring, and Labels

Marks, on the left side of the workbook, can be used to differentiate or add details



- Color lets users modify the color of chart elements.
- Size lets users modify the size of chart elements.
- Label lets users position text next to points on the chart.
- Detail and Tooltip act like labels but only appear when the cursor hovers over the associated point or element on a chart.
- Pills can be dragged to these marks to create visual effects.



Student Do: UltimateCandy visualization

In this activity, you will be given visualizations that you will attempt to recreate using **Tableau**.

Suggested Time:

15 minutes

Activity: Explore Data

Using UltimateCandy.xlsx, visualize the following data:

- Create a pair of bar graphs that chart the win percentage of each candy.
- Create a scatter plot comparing the sugar percentage against the win percentage

- **Bonus:**
  - If you finish early, try experimenting with other possible visualization!

- **Hint:**

  - Don’t forget to save the file once finished.


Time's up!

THE END