

# Tableau

## Introduction

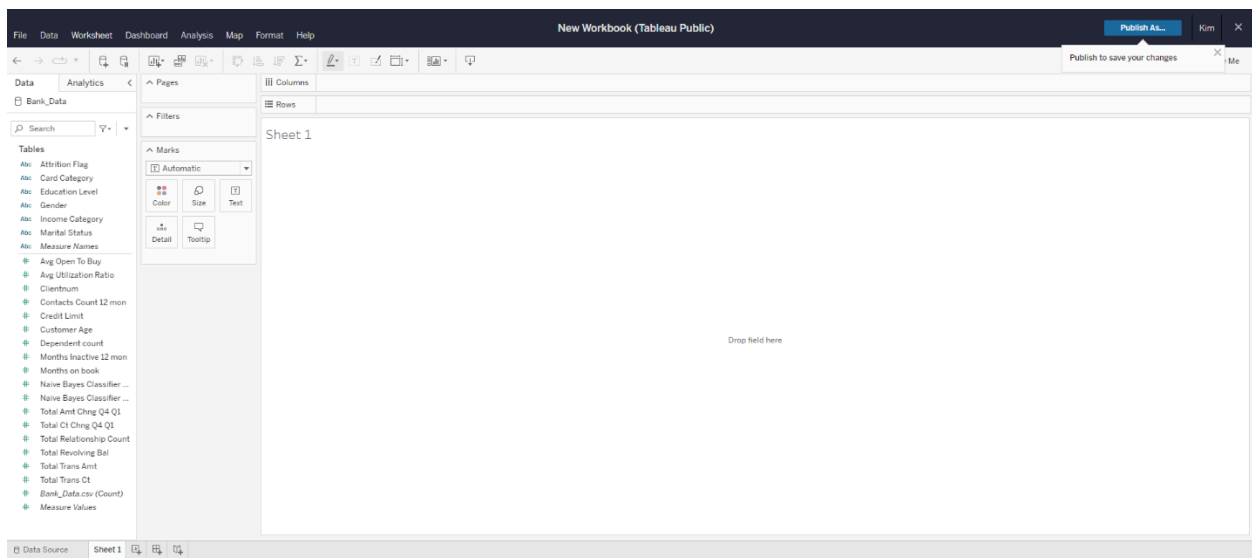
For creating data visualizations, Tableau is one of the most popular platforms. This is because Tableau lets you quickly create beautiful and professional charts and graphs. It's ideal for creating interactive visualizations that can be changed and updated in real time. Tableau is also capable of connecting to large datasets.

But Tableau is one of the more expensive data visualization tools available, starting at \$85 per month. So, it's typically used by working professionals whose companies pay for these licenses. Fortunately, Tableau also offers a free version of its software, called Tableau Public. That's the version that you'll use in this course.

Tableau Public is a free platform that lets you create and publicly share data visualizations online. You can sign up for this platform by following the steps below.

## Connecting to a data source

*Using Bank Data dataset to practice connecting to a data source in Tableau.*



Each tab in Tableau lets you create a new visualization or dashboard. Now that we're connected to a data source, choosing *sheet1* tab in the bottom left corner will give a worksheet to build visualizations in.

The **Tableau ribbon** is the collection of tools in the top toolbar. This includes File, Data, Worksheet, Dashboard, Analysis, Map, Format, and Help.

On the left side of the screen is the **Data pane**. This pane shows all fields that are contained in your data. As you build your visualizations, field names are dragged from this Data pane over to various parts of the worksheet, such as the Columns and Rows shelves, depending on how you want your visualization to look. The Data pane also organizes the data field names by dimension or measure, which you'll learn more about in the next lesson.

Next to the Data pane is the **Analytics pane**. This window contains analytics items that can be added to visualizations. For example, you could use it to add a line that shows averages. These can be helpful for highlighting particular trends in your visualization.

The **Columns** and **Rows** shelves are located above the main view area. You can use these shelves by dragging fields from the Data pane over to the Columns shelf or the Rows shelf to create visualizations. The placement of each field in either the Columns shelf or Rows shelf determines its role in the visualization.

The **Show Me** button, located on the top-right corner of the screen, shows you the available data visualizations according to the fields used in the **Columns** and **Rows** shelf.

The **Pages** card lets you break out your visualization by a specific field, into a series of pages. This can be helpful because it allows you to see how a particular field affects the rest of the data.

The **Filters** card is where you drag fields that you want to filter by. This card can take multiple fields and is a good way to narrow the scope of a visualization.

The **Marks** card lets you add or customize details in your visualizations. With this card, you can adjust details such as colors, labels, sizes, and mark types.

You can use the **Publish As** button to save changes that you make to your workbook.

## Dimensions and measures

The difference between a dimension and measure:

### Qualitative field

A descriptive field used to describe or categorize something.

### Quantitative field

A numeric field used to measure the amount of something.

## Dimensions

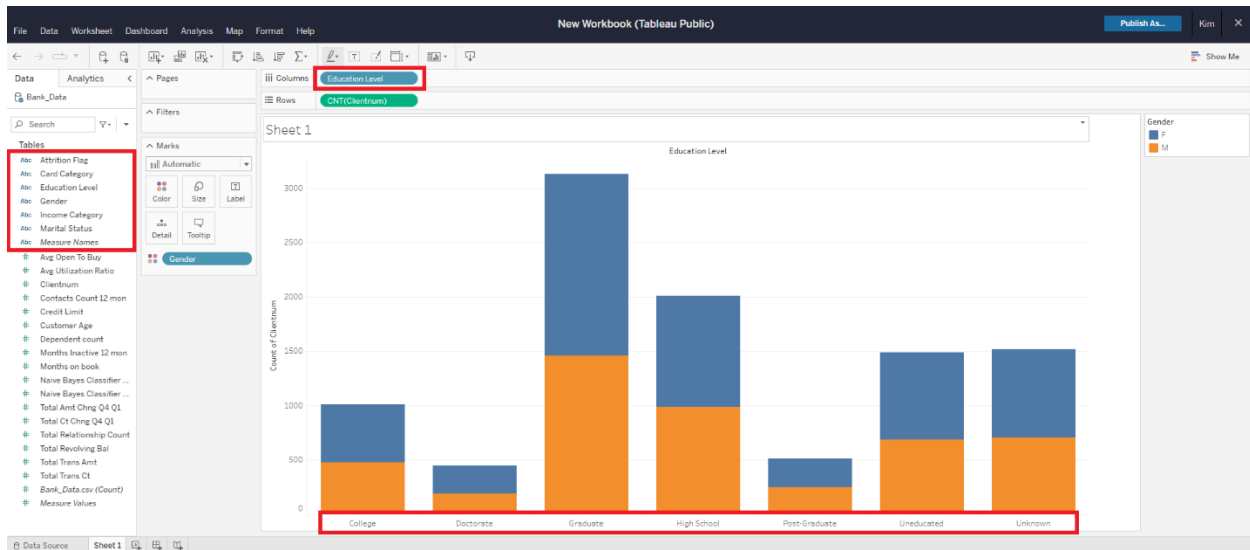
Tableau makes it easy to create clean and professional data visualizations. To build a visualization in Tableau, you need to drag fields to either the Columns shelf or the Rows shelf. But to know where to drag a field, you first need to know whether it's a **dimension** or a **measure**. Dimensions and measures are the basis of every visualization created in Tableau.

A dimension is a field that is qualitative. A qualitative field is a non-numerical field that is used as a category or descriptive trait.

*Examples of this are gender, region, country, and names.*

Because a Tableau dimension is qualitative, it can be used to create groups in your visualization. Dimensions typically create headers when they're dragged to the Columns or Rows shelves.

When you connect to a data source, Tableau is smart enough to recognize which fields are qualitative—or dimensions—and it lists these first in the Data pane.



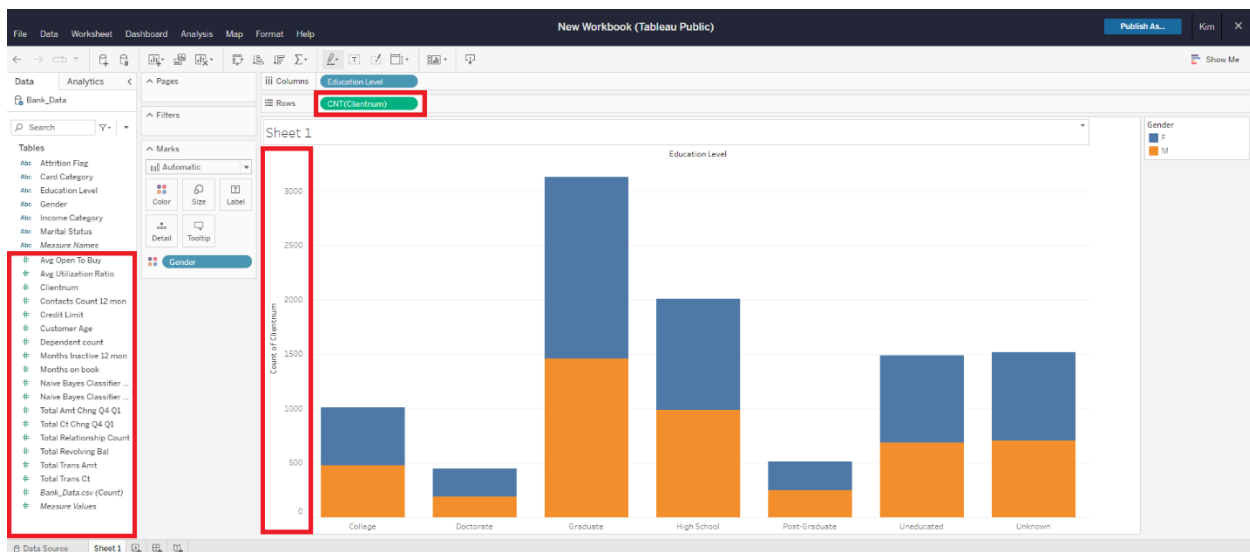
## Measures

A **measure** is a field that is quantitative. A quantitative field is a numerical field used to measure the amount of something.

*Examples of this are price, quantity, revenue, and charges.*

Because a Tableau measure is quantitative, it's used to measure a particular field. Measures can be dragged to the Columns or Rows shelves, and they represent amounts.

When you connect to a data source, Tableau recognizes which fields are quantitative—or measures—and it lists these after dimensions in the Data pane.



Knowing the difference between dimensions and measures is important because it can help you predict how a visualization might look, depending on where you drag various dimensions and measures. As you get used to this, creating visualizations becomes easier and less of a trial-and-error process.

## **Tableau Visualizations**

### **Tableau bar charts**

This lesson covers how to create several types of bar charts in Tableau. Horizontal bar charts, stacked bar charts, and clustered bar charts in Tableau.

bar charts are used to show categories along with their amounts, represented by the height or length of the bars. Tableau has a few different types of bar charts that you can choose between, depending on how you want to present your data.

### **Project: Tableau**

#### ***“Bar Charts with Bank Data”***

To get started, we download this Bank data dataset. Then sign in to your Tableau Public account. We select Create a Viz (Beta) and then click Upload from computer to select this data file.

Part 1:

### **Vertical and horizontal bar charts**

Open a new worksheet by clicking Sheet 1 in the bottom-left corner of the screen.

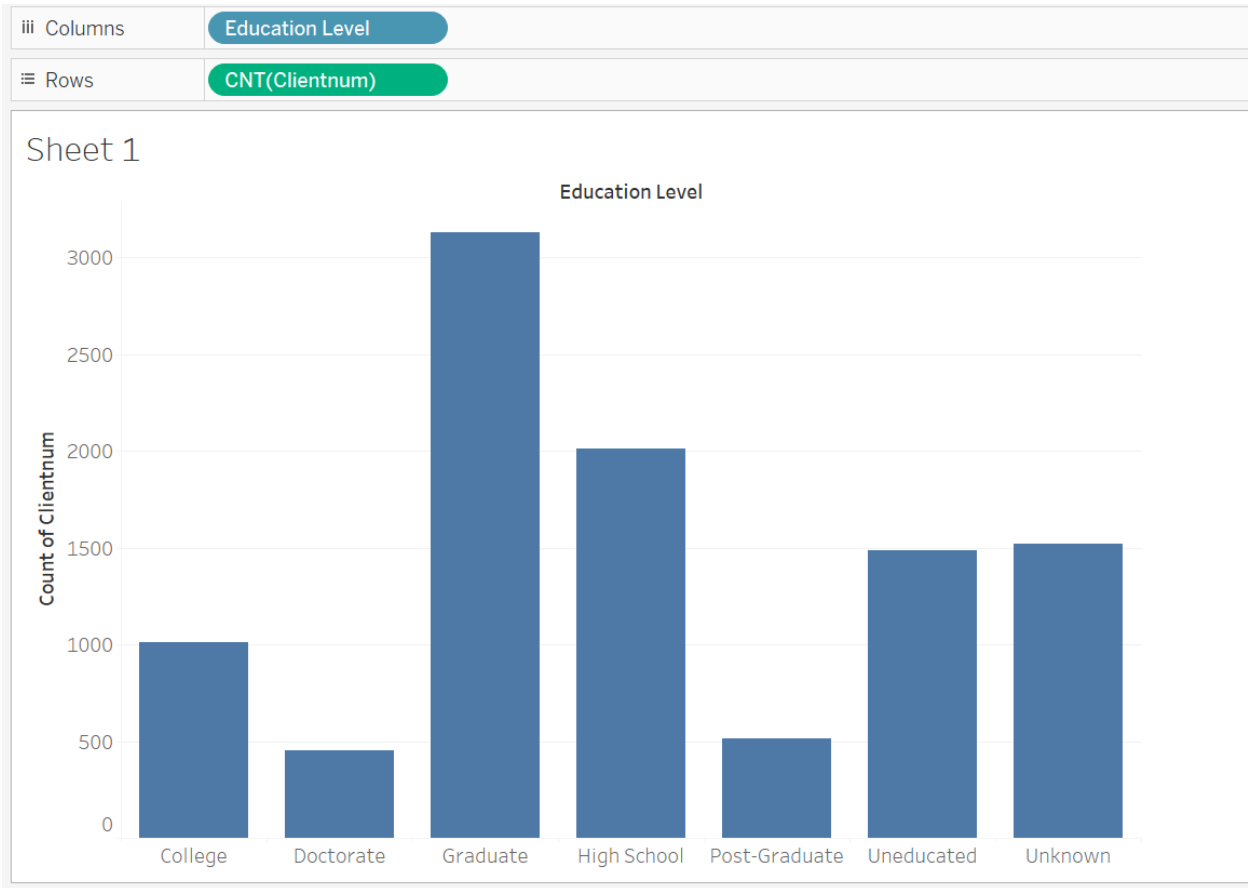
To create a vertical bar chart in Tableau, you need to drag a dimension field to the Columns shelf and a measure field to the Rows shelf.

For this example, say you want to know how many customers there are in each education level.

We start by dragging the dimension field, Education Level, to the Columns shelf. Then drag the measure field, Clientnum, to the Rows shelf.

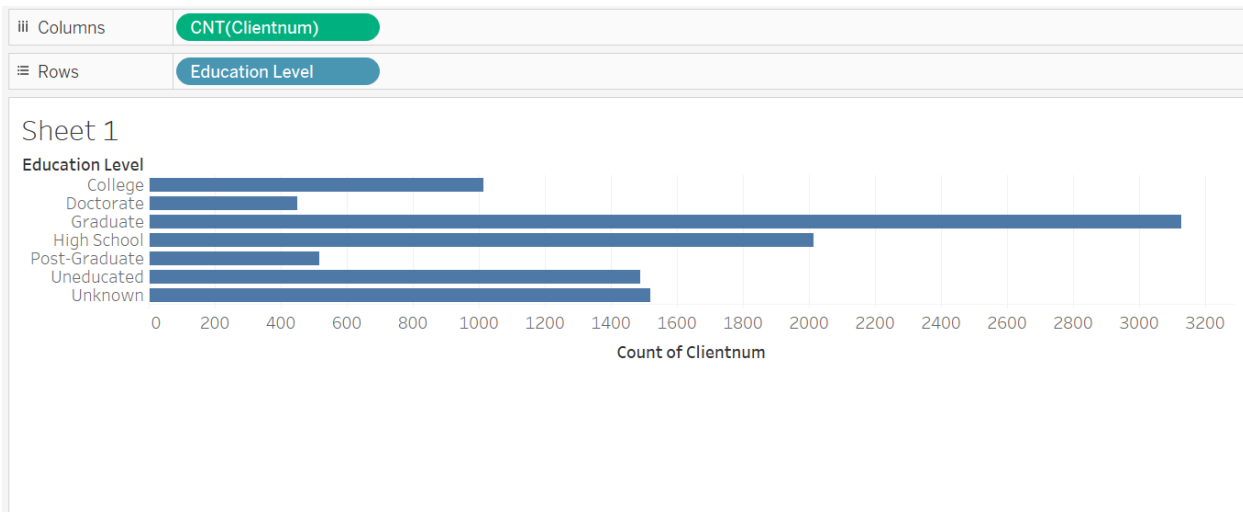
We found that by default, Tableau takes the sum of Clientnum, meaning that all ID numbers are added together.

But this isn't what we want—an ID number is an identifier, not a value. Instead, you want to see the number of customers, or the count of Clientnum. To do this, click SUM(Clientnum) and select Measure > Count, as shown below.



You now have a vertical bar chart!

If you want to change the orientation of this chart so that it's a horizontal bar chart, move the dimension field, Education Level, to the Rows shelf, and the measure field, CNT(Clientnum), to the Columns shelf.



See Public Tableau Sheet 1 and 2.

Part 2:

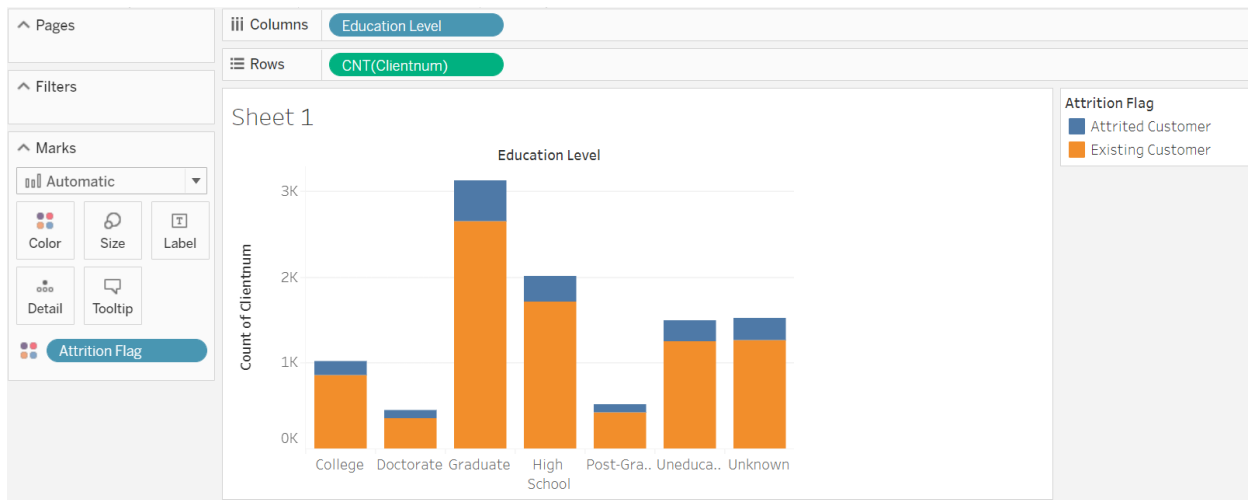
### Stacked bar charts

A stacked bar chart shows an additional breakdown of a dimension field, using colors to show the breakdown.

Say you now want to know how many customers there are in each education level, by attrition status (whether a customer has remained or left).

We create the basic bar chart as we did before, using Education Level and CNT(Clientnum).

Then we drag Attrition Flag to Color on the Marks card.



*You now have a stacked bar chart that uses distinct colors to show attrition status. Tableau automatically adds a legend for Attrition Flag; this legend specifies which color represents customers who have left and which color represents existing customers.*

*See sheet 3 in Tableau Public.*

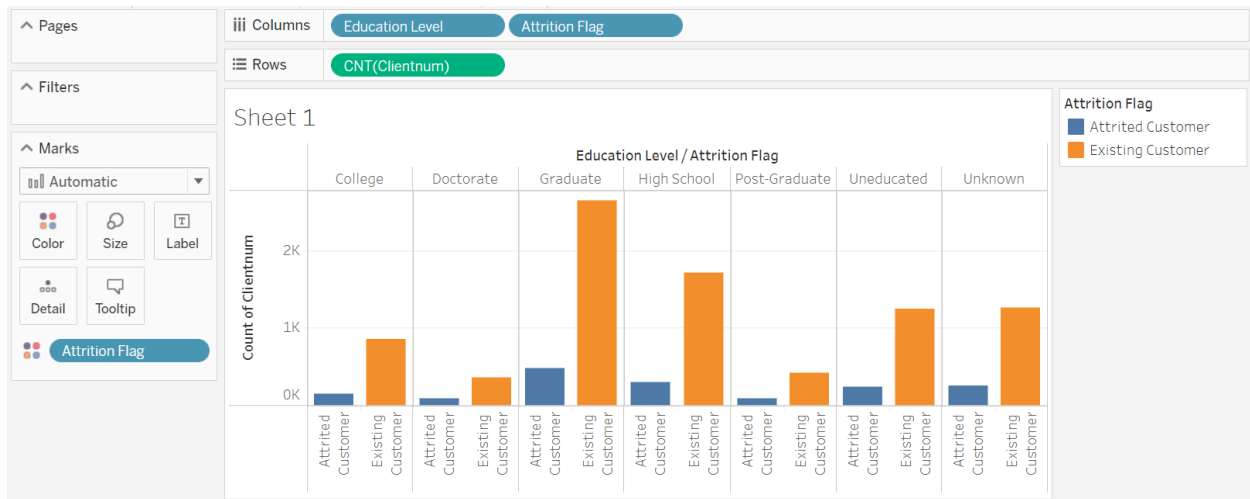
Part 3:

### Clustered bar charts

Now, say you want to see how many customers there are in each education level by attrition status, as you did above. But this time, you want to see the attrition status side by side rather than stacked.

Create the basic bar chart as you did before, using Education Level and CNT(Clientnum).

Then drag the Attrition Flag field to the Columns shelf. Lastly, drag Attrition Flag from the Data pane to Color on the Marks card.



Now you have a chart that shows the same information as the stacked bar chart that you created earlier, but now it's in a clustered format.

*See Sheet 4 in Tableau Public Profile.*

## Tableau scatter plots and graphs

This lesson covers how to create line graphs, area graphs, and scatter plots in Tableau.

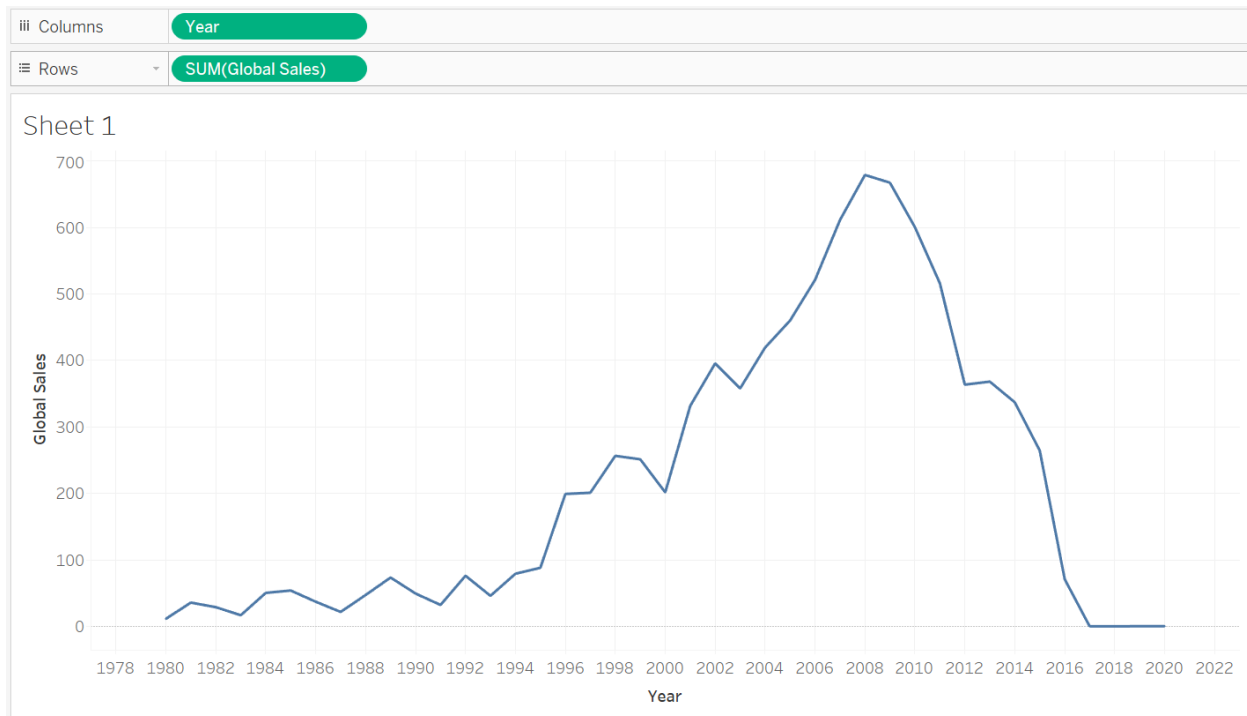
Tableau has a variety of options for the visualizations that you can create. Scatter plots, line graphs, and area graphs are closely related to one another; they all show similar information in slightly different styles.

We are going to use the Video Game Sales dataset for this lesson.

### Line graph

Say that you want to see global sales by year, as a line graph.

In Sheet 1, drag the measure field Global Sales to Rows. Then, drag the dimension field Year to Columns. When you use a date in the Columns shelf, Tableau automatically creates a line graph for you. So, you now have a line graph showing global sales for video games by year.



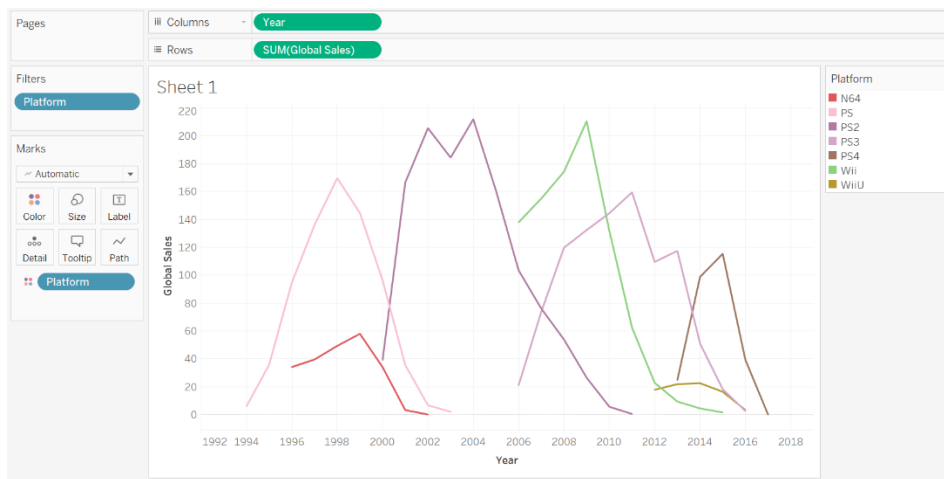
See *Line Graph of Global Sales* in Tableau Public Profile.



You can create a stacked line graph to see multiple line graphs on the same graph.

Say you want to see how the global sales look for each of the platforms N64, Wii, WiiU, PS, PS2, PS3, and PS4, all together in the same graph.

Drag the dimension Platform to Colors on the Marks card, then move your cursor over it and click the drop-down arrow. Select Filter and check the boxes for the desired platforms from the list. Then press OK.

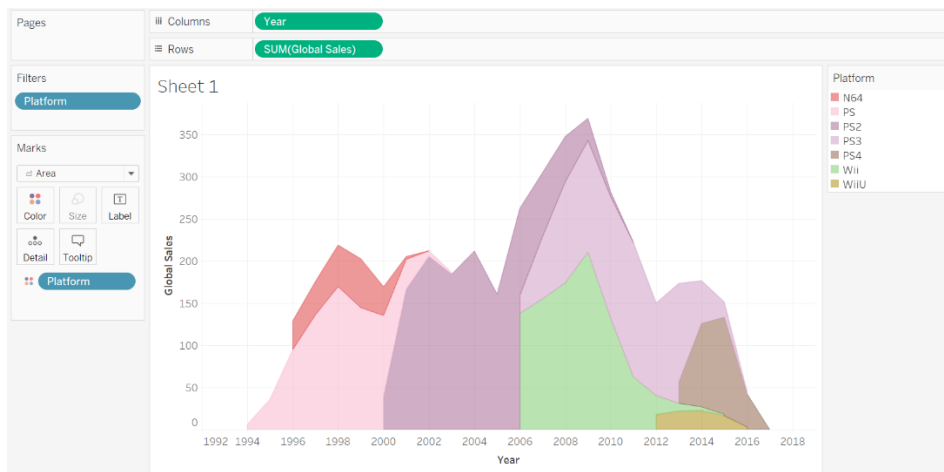


Now you have a stacked line graph that shows separate lines, in different colors, for each of the platforms that you selected. With this graph, you can visually compare global sales for each platform.

*See Global Sales over Time for N64 vs. PS in Tableau Public Profile.*

## Area graphs

Creating an area graph is just as simple. Follow the same steps as above to create a stacked (or single) line graph. Then, select Area from the drop-down menu on the Marks card.

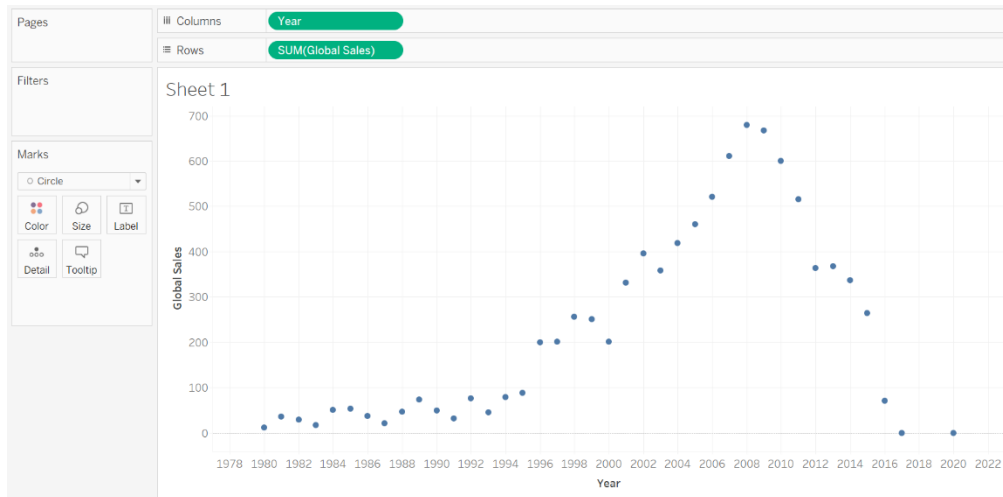


*See Area Chart Global Sales over Time N64 vs. PS in Tableau Public Profile.*

## Scatter plots

Finally, to create a scatter plot, drag one dimension to the Columns shelf and one measure to the Rows shelf. Then select Circle from the drop-down menu on the Marks card.

The following scatter plot shows global sales per year for video games.



You can change the shape from a circle to another shape by selecting Shape from the drop-down on the Marks card.

Similarly, you can adjust the size of the shapes by clicking the Size button on the Marks card.

*See Scatter Plot Global Sales over Time.*

## Tableau pie charts, heat maps, and tables

This lesson covers how to create pie charts, heat maps, and tables in Tableau.

Tableau has a variety of illustrative visualizations that don't involve graphing or plotting points.

### Pie charts

Say that you want to see a summary of the number of customers who made purchases in each product category. Specifically, you want to see this information in a pie chart format, with each product category represented by a different color, and the number of customers represented by the size of the pie slice.

First, select Pie from the drop-down menu on the Marks card.

Then, drag the dimension field, Product Category, to Color on the Marks card.

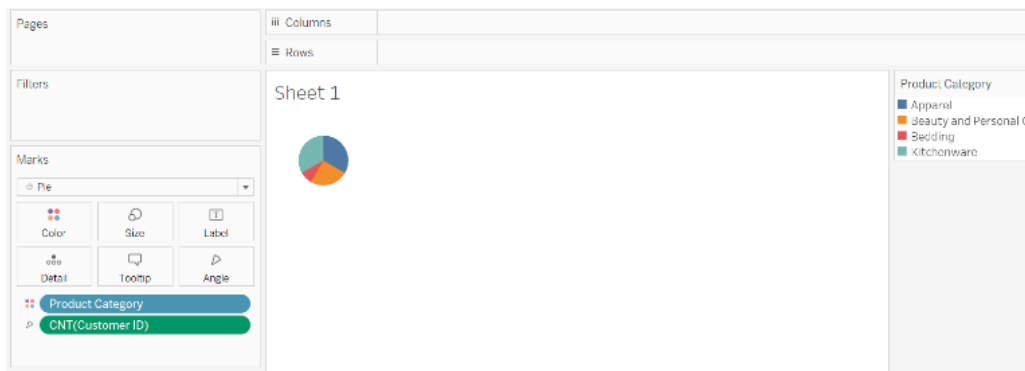
Similarly, drag the field Customer ID to Angle.

Click this Customer ID field in Angle, and select Measure then Count.

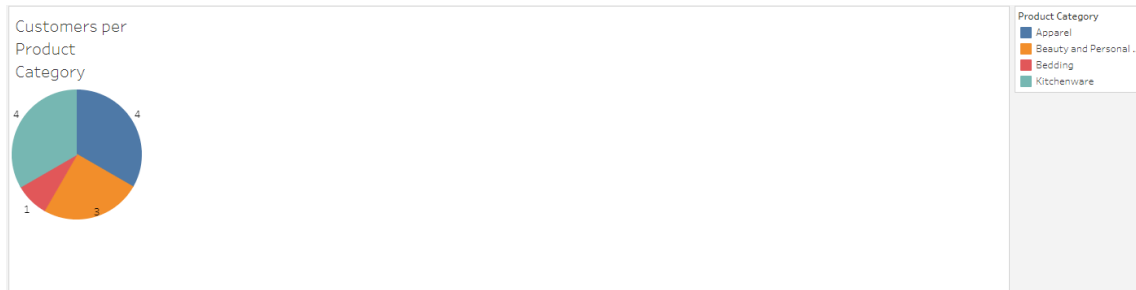
*Note: There's rarely a field in a dataset that counts the number of people in a dataset. So, whenever you want to use the number of people contained in a dataset, first identify a field that has one entry per person. In this example, the field Customer ID can be used because there must be one ID per person.*

Drag the field to your desired location, and then click the field name to select Measure, then Count. This will count the number of entries of that field in the dataset, which can be used to represent the number of people in the dataset.

Now the pie chart will look like the one below.



Because this pie chart is small, you can use the Size option on the Marks card to increase the size. Also, you can add some data labels to show the number of customers in each pie section. To add data labels, click Label on the Marks card, and then select the Show mark labels checkbox, as shown below.



## Heat maps

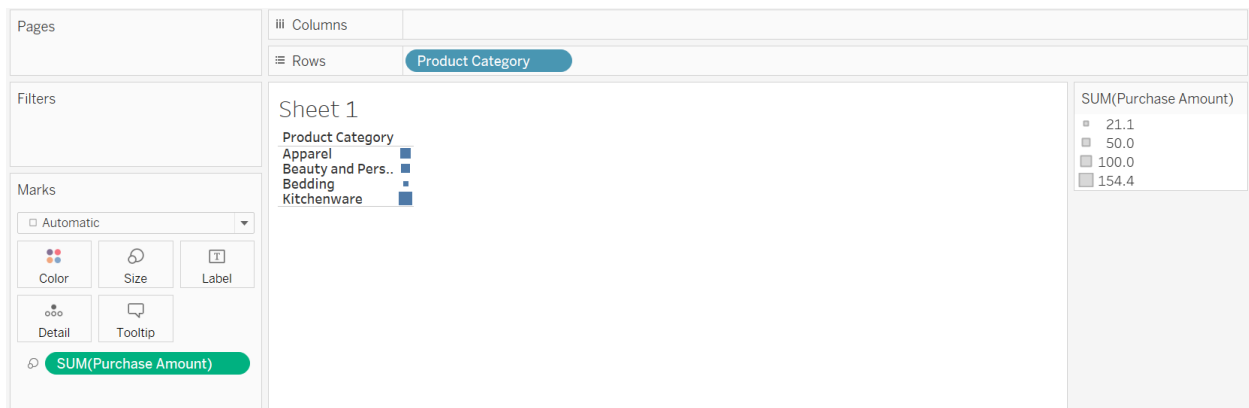
Say you want to create a heat map that shows which product categories have the highest purchase amounts.

First, drag the dimension field Product Category to the Rows shelf.

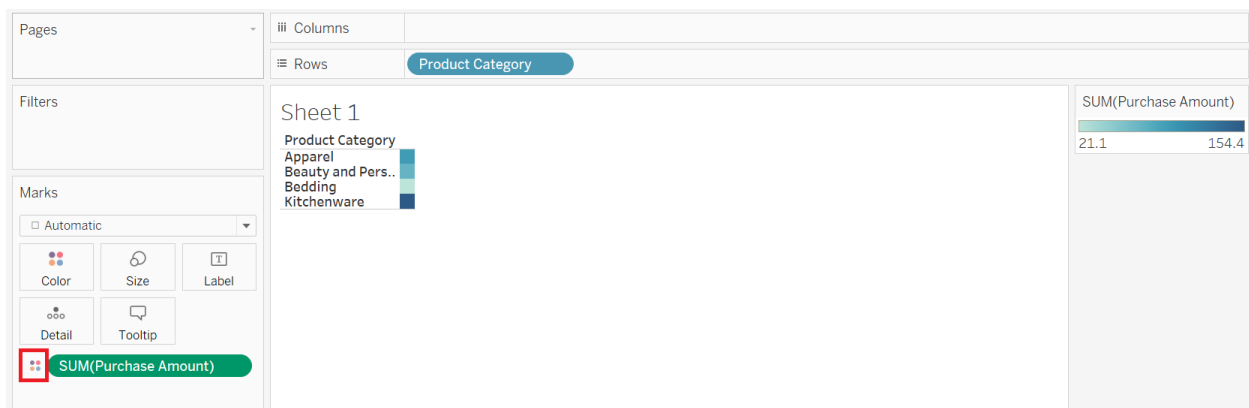
Then, drag the measure Purchase Amount to the Size section on the Marks card.

Finally, select the Heat map option from the Show Me section.

Your heat map now uses different-sized squares to represent the magnitude of the purchase amounts.



To use variation in color instead of size to represent purchase amounts, click the symbol to the left of SUM(Purchase Amount) and select Color.





## Tables

There are numerous types of tables that you can create in Tableau, depending on how you want to summarize your data. To show the same information as the heat map above, but in table format, click the Text tables option in the Show Me section.

## Tableau enhancements

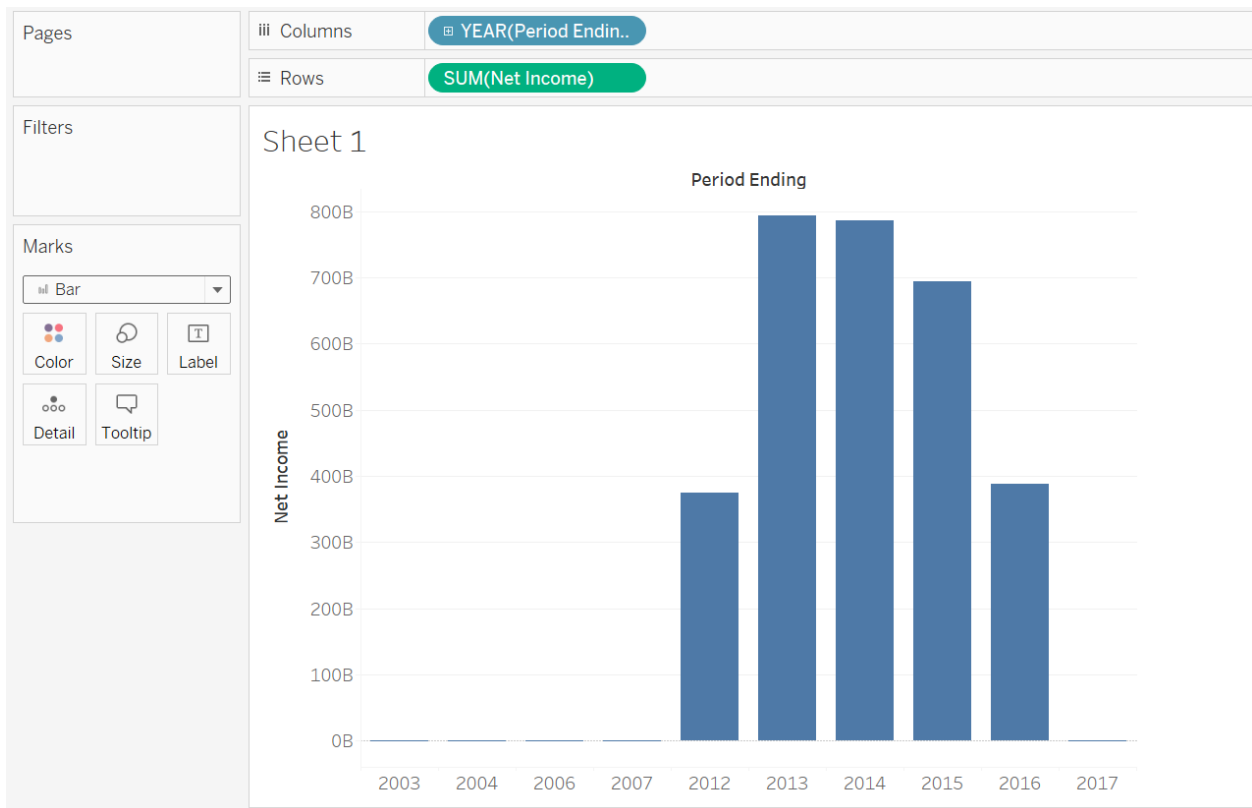
This lesson is about how to enhance your Tableau visualizations using filters, calculated fields, and formatting.

In Tableau, we're able to add enhancements to bring clarity, style, and extra functionality to them.

### Filters

To add detail and narrow the scope of a visualization, you can add filters. To filter by a particular field, simply drag the field to the Filters card.

To see this in action, start by creating a bar chart showing Net Income by Year(Period Ending).



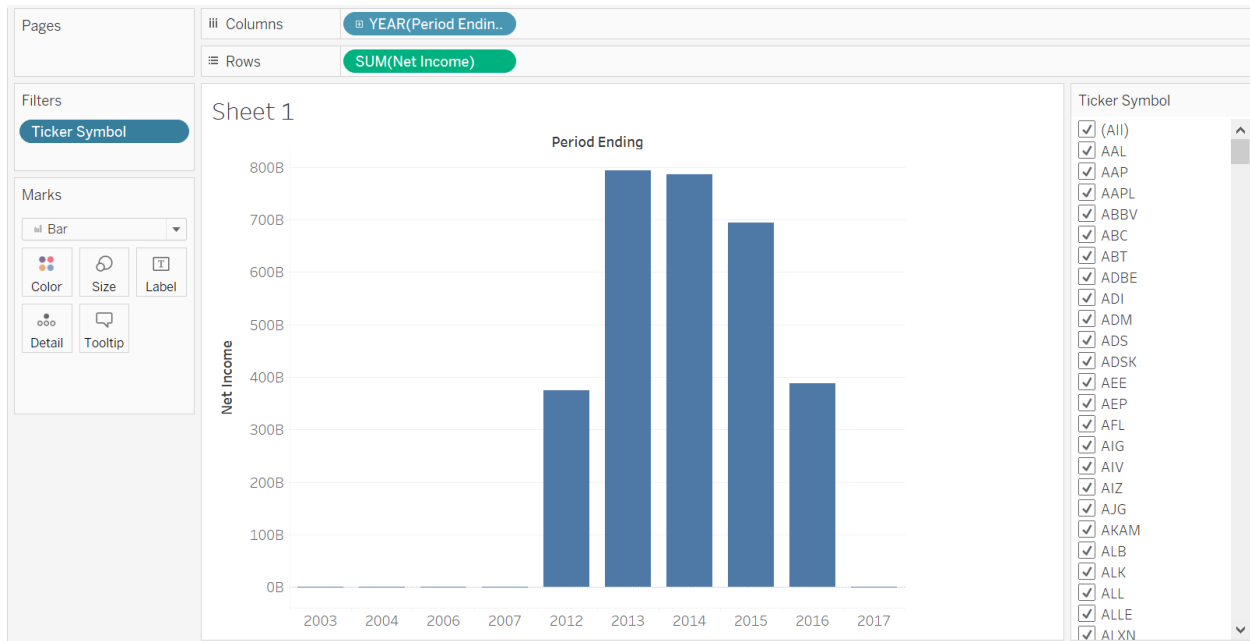
This bar chart shows the total net income for all companies.

Say you want to be able to view net income per year for individual companies. You can do this by adding a filter for the field Ticker Symbol.

Drag the Ticker Symbol field to the Filters card. Press All in the dialog that appears, so that all ticker symbols are included in the visualization. Then click OK.

Next, click Ticker Symbol on the Filters card and select Show Filter so that the filter appears on your sheet, as shown below.

Now you have a visualization that incorporates a filter on Ticker Symbol, and that filter is visible on your sheet. This allows you, or any other user, to quickly filter the visualization by company to get a more detailed understanding of the data.





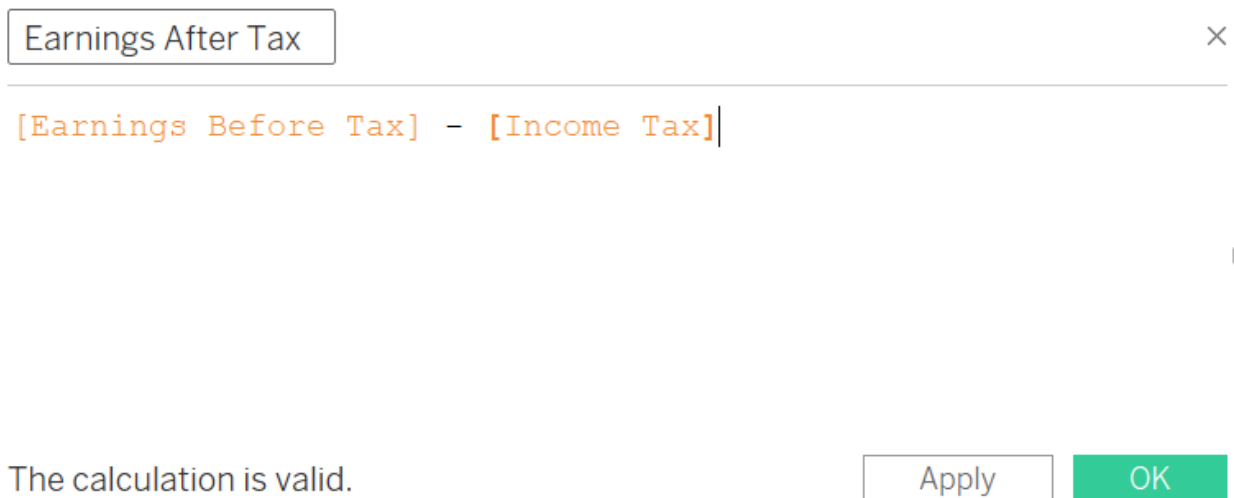
## Calculated fields

At some point, you may need a field that doesn't exist in your dataset. You can create a new field as a calculated field in Tableau.

The Stock\_Data dataset contains a field called Earnings Before Tax and a field called Income Tax. But there's no field for earnings after tax, which would just be Earnings Before Tax minus Income Tax.

So, you can create a field called Earnings After Tax by clicking Analysis in the ribbon and then selecting Create Calculated Field.

*A dialog lets you assign a name to your new field and specify the formula. In this case, the formula you need is Earnings Before Tax minus Income Tax. Whenever you use an existing field in your formula, enclose the field name in square brackets [], as shown below.*



Earnings After Tax

[Earnings Before Tax] - [Income Tax]

The calculation is valid.

Apply OK

The bottom of the dialog tells you if the calculation is valid or if there are errors. Press OK.

Your new field now shows up in the Data pane, and you can use it the same way that you'd use any other field.

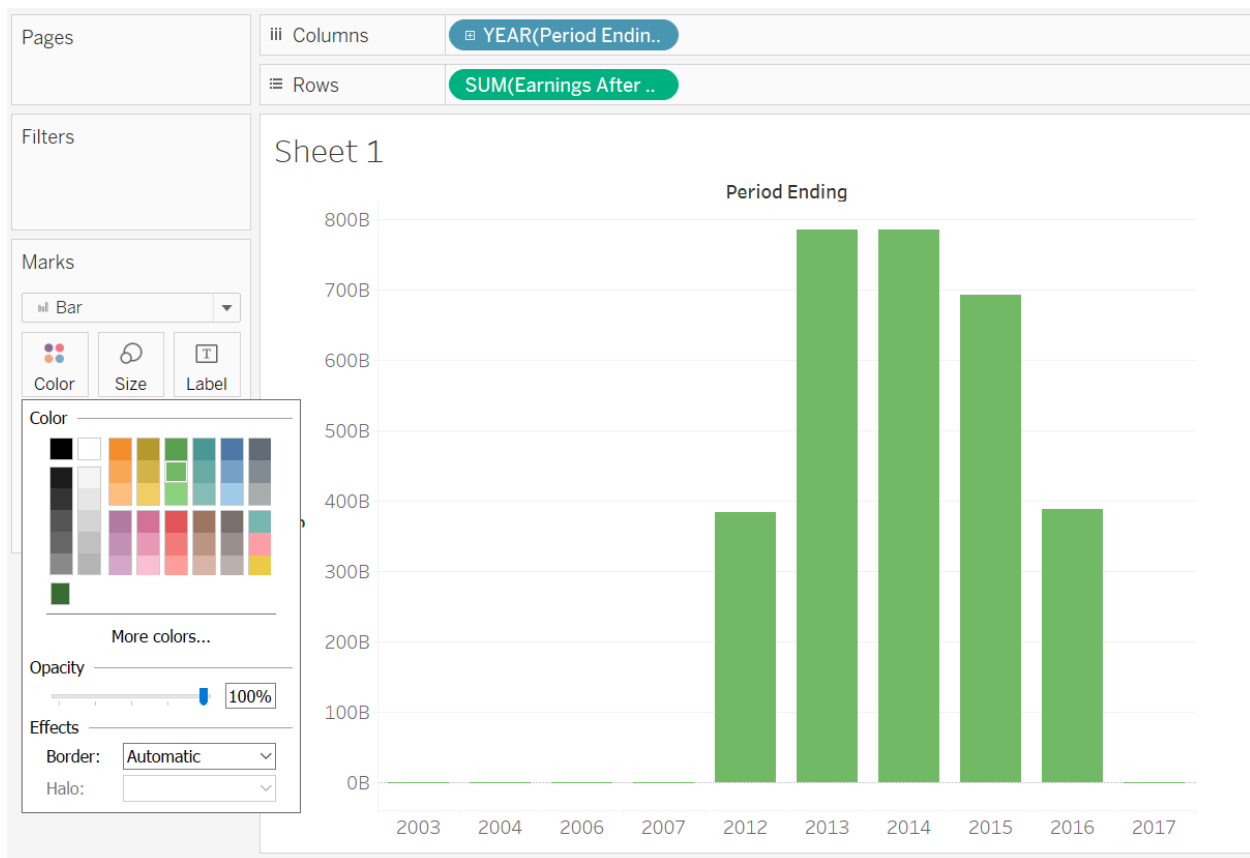
## Formatting

Tableau has lots of formatting options to help you polish your visualizations and bring additional clarity to them. As you'll explore next, you can modify the color, shape, size, labels, and titles of your visualizations.

### Color

Color is an important aspect of visualizations, so it's no surprise that Tableau has lots of color customization options.

When you create a visualization, there are default colors that Tableau applies. If you want to change the default color, you can click the Color option on the Marks card and select the color or color scheme that you like best.



Or you may want to apply color to a specific field so that each value in a field is represented by a different color.

In the example above, say that you want each year to have a different-colored bar.

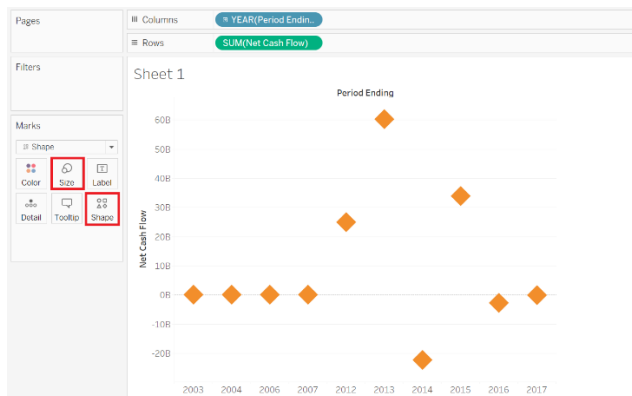
You can drag the field Period Ending to Color on the Marks card. Tableau automatically applies a different color to each value of that field. It also includes a legend that defines what each color represents.



## Shape and size

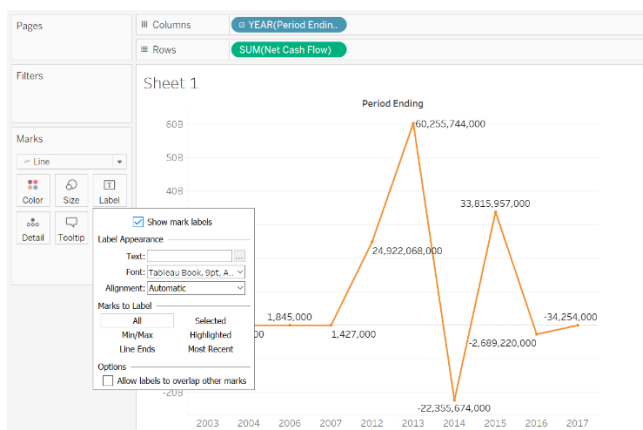
You can adjust the size and shape of the marks on your visualization by clicking those options on the Marks card.

For example, you can customize the size and shape of each plotted point in the scatter plot below. (Note that Net Cash Flow is now on the Rows shelf.)

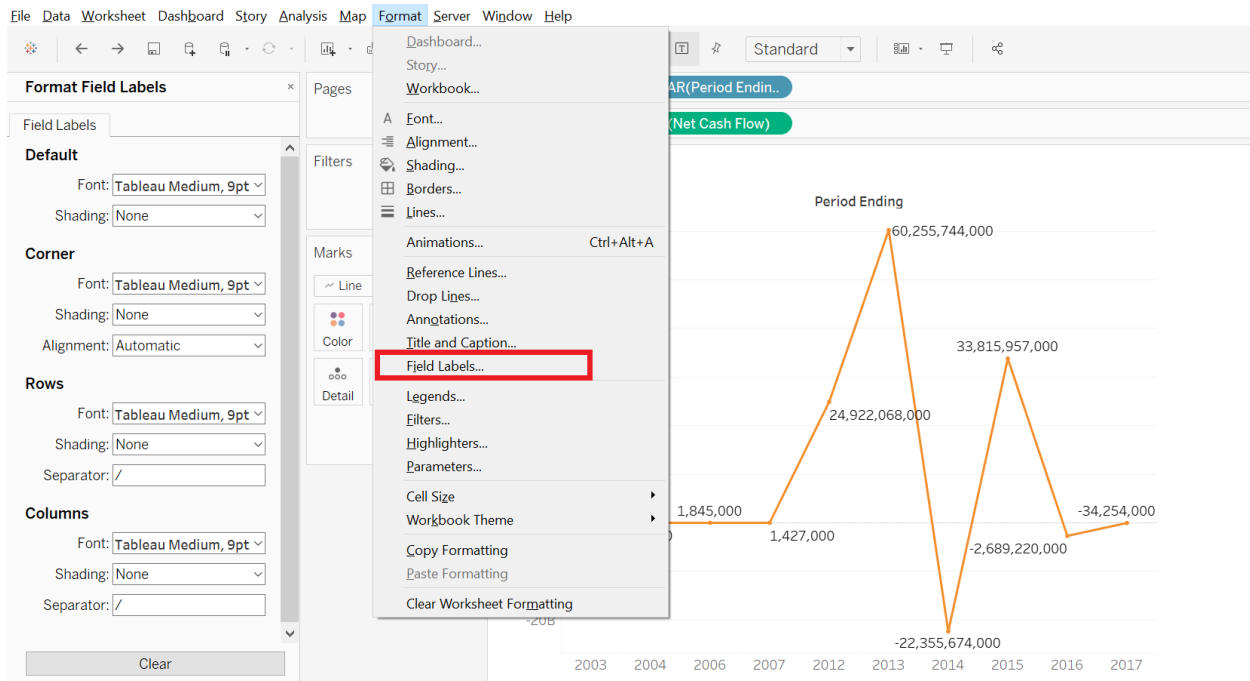


## Labels

To add data labels to your visualization, click Label on the Marks card and select your preferred options.



You can also format field labels by selecting Format in the ribbon. That will open a Format Field Labels pane that shows more detail and controls.



## Titles

Finally, creating a title for your visualizations lets your audience know what they're looking at. To add a title to your visualization, double-click the Sheet 1 title placeholder above the visualization. That will open an Edit Title dialog where you can type in and format your preferred title.

## **Tableau dashboards**

Creating dashboards in Tableau is a straightforward process. In a Tableau dashboard, you can display multiple visualizations together in one place.

When you have multiple visualizations that you want to display together, you can create a dashboard. To create a dashboard in Tableau, click the New Dashboard button, as shown below.