



Thank you to everyone who came to our Tableau workshop! For those who couldn't attend, or would like to review what we covered, we have summarized the whole workshop in this document for you!

What is Tableau?

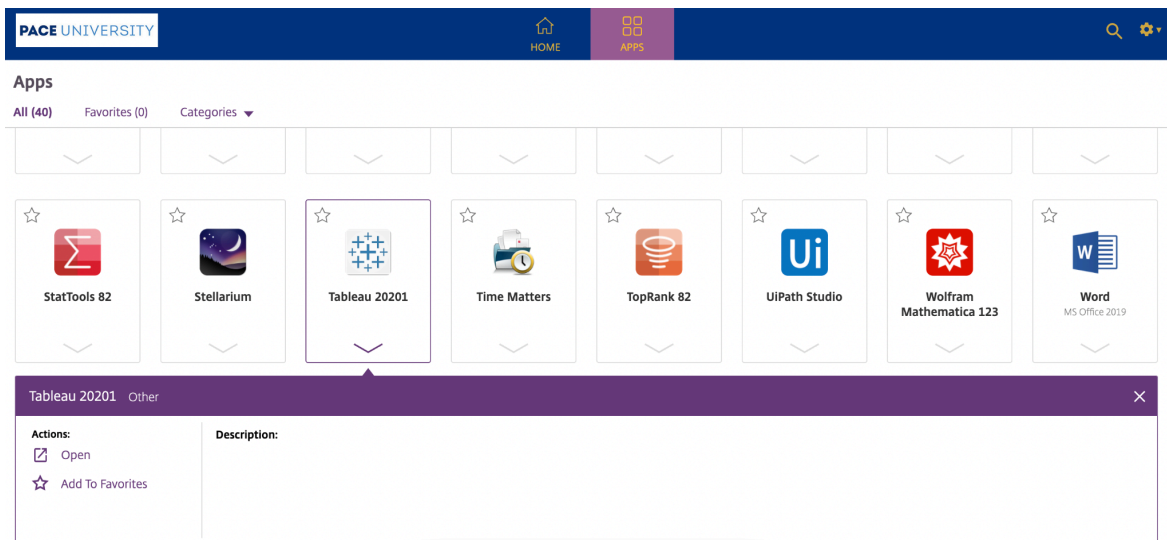
Tableau is a data visualization software used for data analysis and business intelligence. Users create dashboards, which visualize data and make it easier for non-technical analysts and end-users to convert data into understandable, interactive graphics.

How do I access Tableau?

Pace students can gain free access to the Tableau app through Citrix Workspace at "https://virtuallab.pace.edu/Citrix/PaceWeb/", or click [here](#), and sign in with Pace credentials. This will NOT download the actual software, but will open a free, full-featured version of Tableau in your desktop browser as another tab.

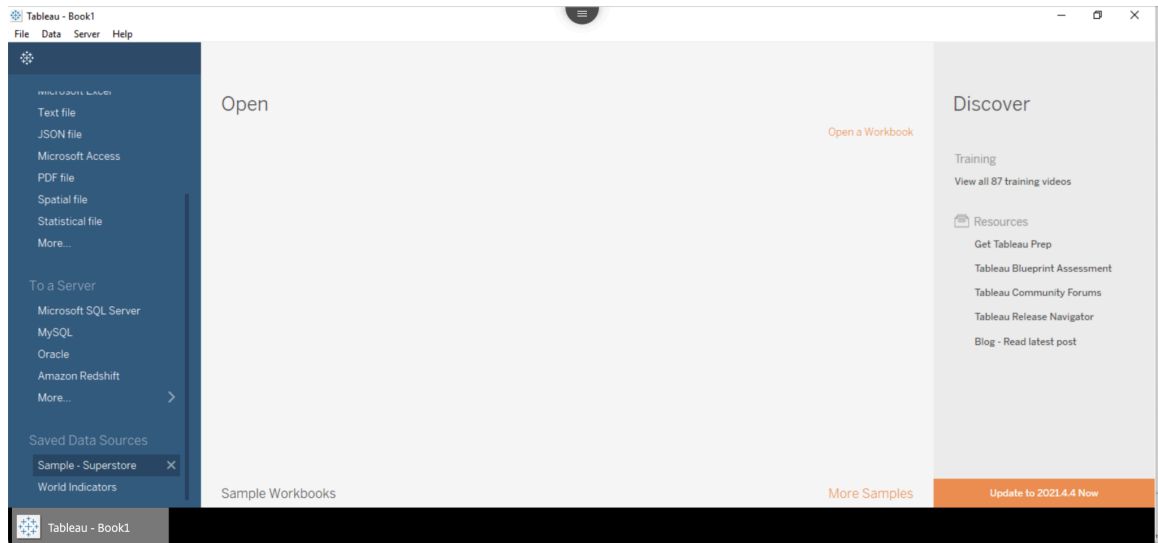
Getting Started on Tableau

Firstly, open Tableau using the link here, and log on with Pace credentials. Once you do the two-step verification with Duo, you should be opened to a page like this. Scroll down until you see a page like this:

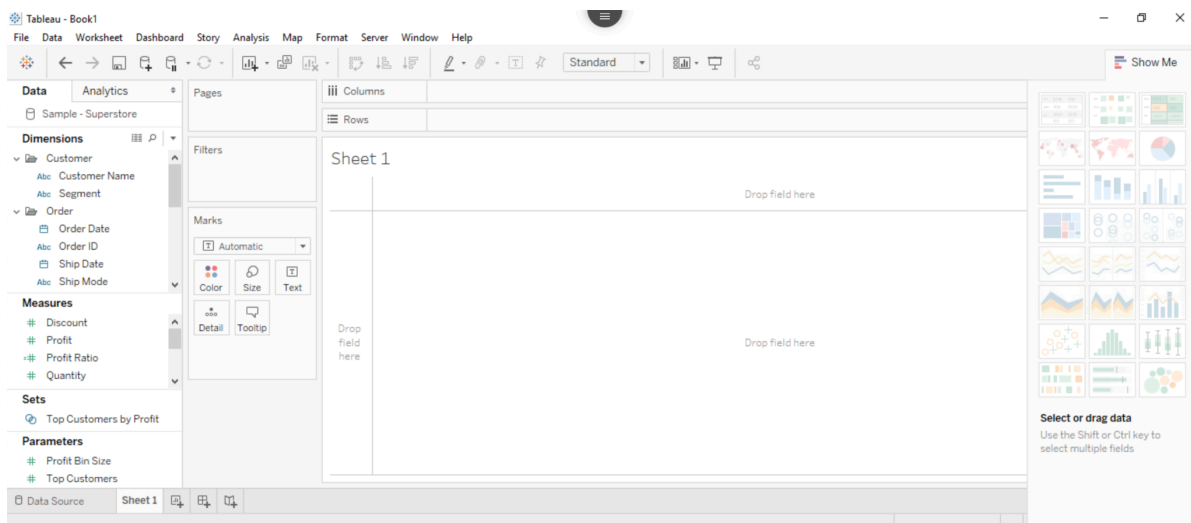


Click on Open under the Actions tab. From there, it will load Tableau in another tab on your browser.

Once Tableau is loaded in a new tab, scroll down on the blue, left side menu called 'Connect'. Under 'Saved Data Sources', click on 'Sample - Superstore'.



Once you click on 'Sample - Superstore', it will load the dashboard (the workspace in Tableau). In the dashboard a workbook (a file that contains sheets) and a sheet (a single view of data you will create a chart within). It should look like the picture below.

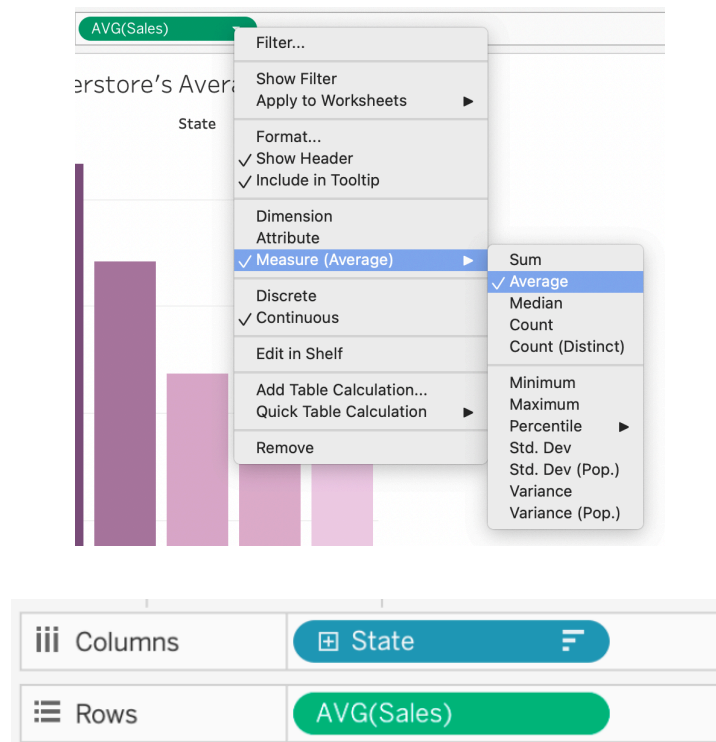


What we just did was load a sample, generic data set of superstore information. We will work with this sample data source's information for the rest of this workshop.

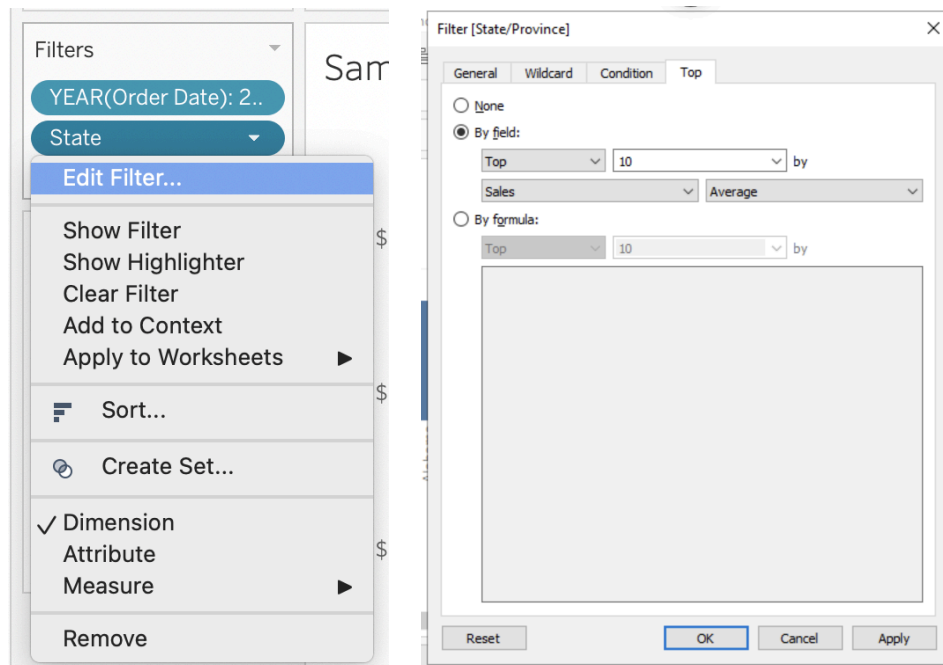
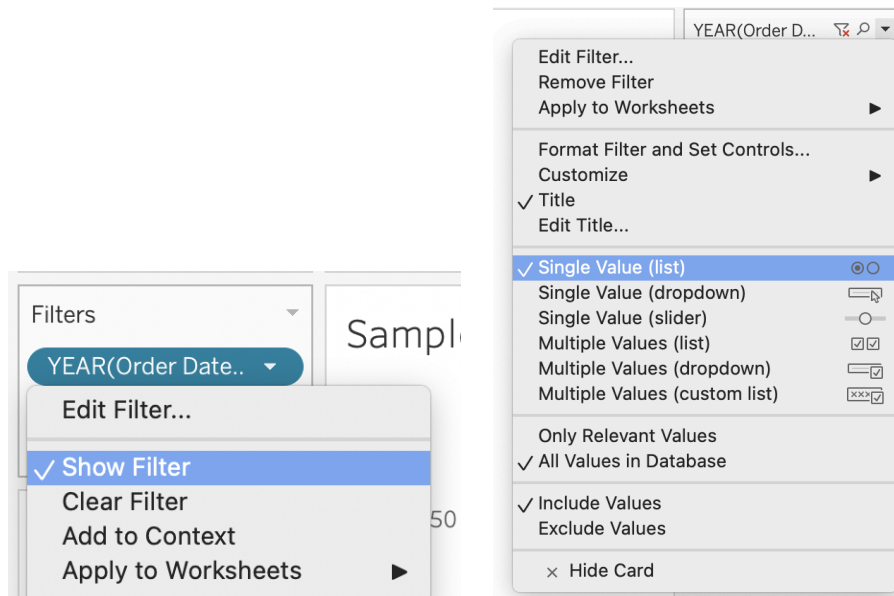
Bar Chart 1

The first chart we will create in Tableau is a bar chart to visualize a superstore's Sales in 2022 within the top 10 best performing states.

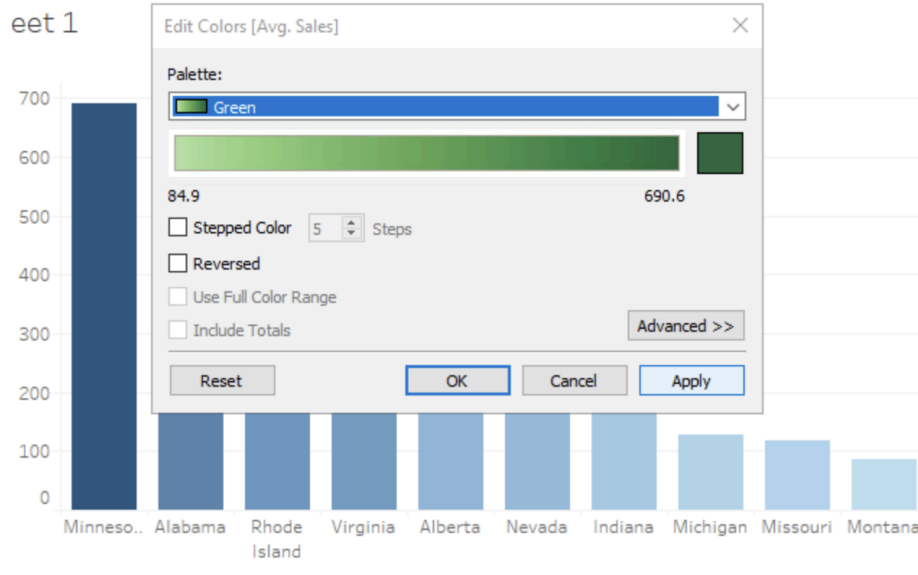
First, from the left-side column, under the 'Measures' menu, click and drag the 'State' variable to the top area and place it under the 'Columns' shelf. You should have a green pill-shaped circle that says "State" on that shelf. Similarly, we will do the same steps again but for the 'Rows' shelf. Navigate to the left-side column once more, and under the 'Dimensions' menu, click and drag the 'SUM(Sales)' variable to the top area and place it under the 'Rows' shelf. Next you will right click on the 'SUM(Sales)' and scroll down to the Measure row and click on it. This will lead you to the 'Average' arrow where you will click on this. You should now have a green pill-shaped circle that says "AVG(Sales)" on that shelf. You will then click and drag 'Order Date' and 'State' and place them both in the filters box. Your screen should look like the picture below by this point.



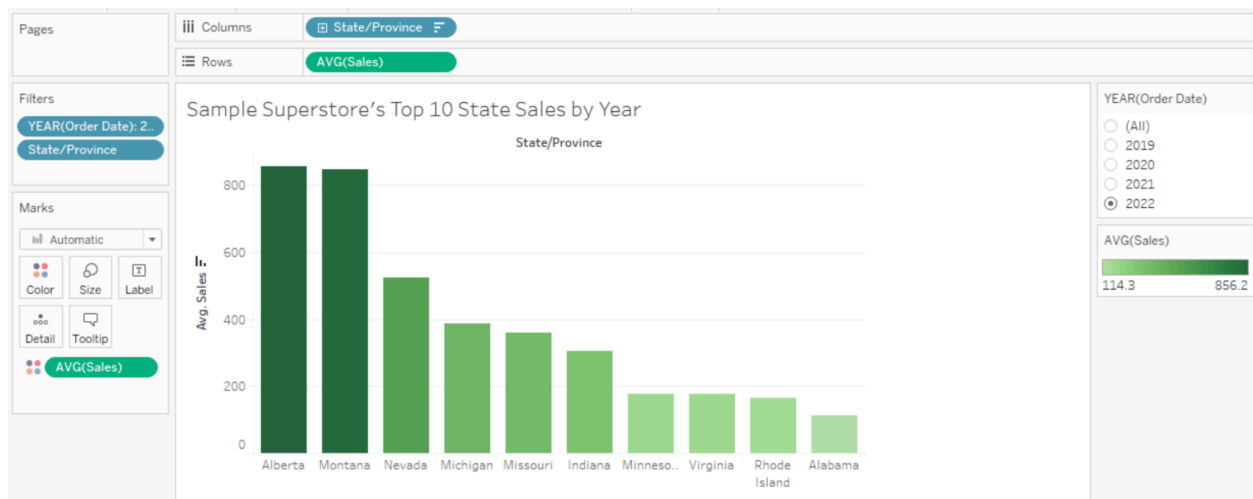
After this you want to be able to filter the average sales by year via a toggle screen. To do this right click on the year pill within filters and click on show filters. This will allow you to see and filter the years on the right side of your screen. We will also add another filter using State in order to find the Top 10 states sales (based on their average sales).



After these steps we will take 'Sales' and click and drag it over the Color box in Marks. From here we can right click and click on the pill and change it to AVERAGE, then click on the Color box under Marks and click Edit Colors, where you can click the dropdown box to select a color. Here we did green to represent sales (a solid/single color option). It will color the sales based on each state's average sales.



Once you follow the above steps, and rename your chart to match the one below (double click the sheet titled "Sheet 1" on the bottom row), you have your final product.



How to Interpret this Chart: This chart describes Sample Superstore's average sales in the states New York, California, Vermont, Utah, and Texas in descending order. We filtered this data to describe only 2022's average sales from each state, and have color coded the bars to have the darkest shade represent the highest sales and the lighter shades the lower sales. Click the different years, and you will see that the Top 10 states vary by year to year!

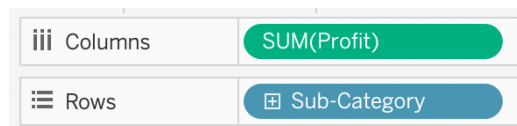
Bar Chart 2

First, create another sheet by going to the bottom row, and pressing the ‘New Worksheet’ button.  This will create a new Worksheet called “Sheet 2”.

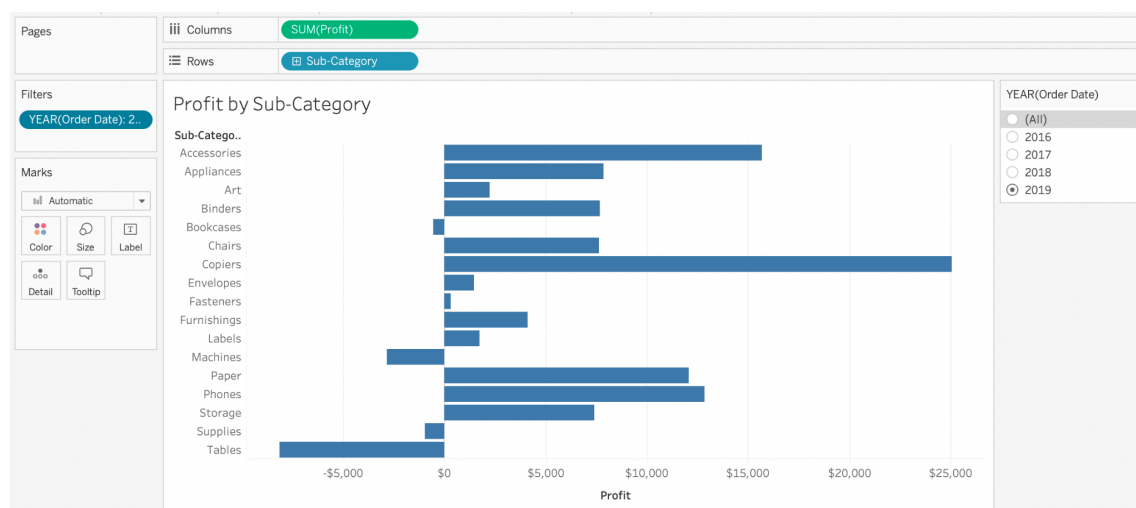
This next chart we will create will be visualizing the profits (not sales) of all Sample Superstore locations in each sub-category of products they sell. We will use the concepts learned from the previous graph to make and create the new chart we want!

To start we will click and drag ‘Profit’ into the columns bar. You should have a green pill-shaped circle that says “Sum(Profit)” on that shelf. We are keeping it as a sum, since we want to see all the profits for each year as a grand total, in order to see the highest profiting locations.

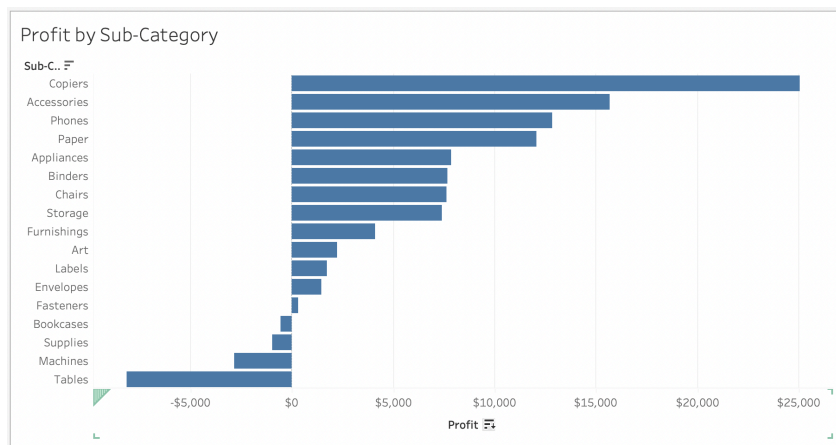
Then click and drag ‘Sub-Category’ into the Rows bar, you should have a blue pill-shaped circle that says “Sub-Category” on that shelf. This is shown in the image below.



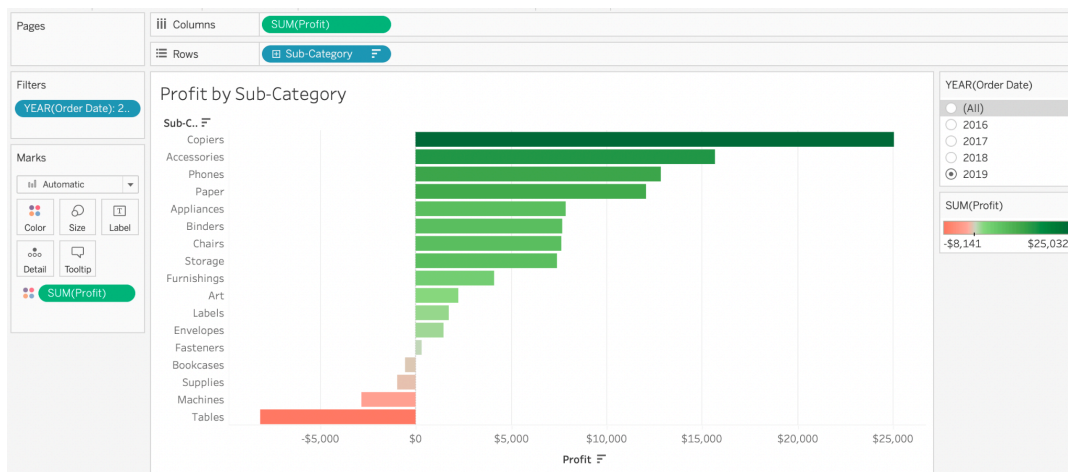
Then we click and drag ‘Order Date’ into the Filters box which is the same as we did in the previous graph. Right click the YEAR(Order Date) to show the filter on the right, and make sure to display it as a Single Value list. On the filter, select the year 2022.



Then we click on the icon next to Profit on the X-Axis where it will change the graph to be displayed in descending order.



Then we will click and drag the Profit from the left and place on top of the Color box in Marks, this should automatically set to the green red diverging colors as shown below. If it does not, right click on the green pill in the Marks box, where you can edit the colors to the diverging color range. Since there are positive and negative values we are working with, make sure you chose a color palette that says “diverging”. We chose the red-green diverging palette to represent the negative (red) and positive (green) profits. Lastly, rename the sheet to match the chart below.

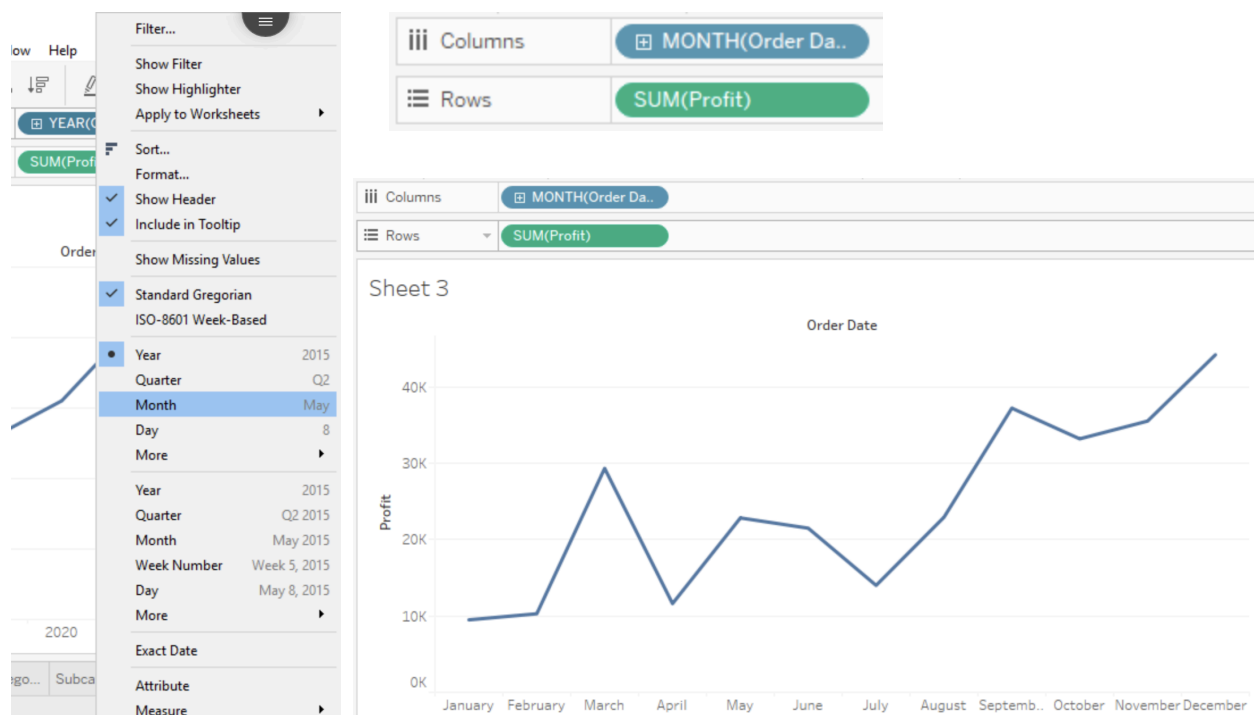


How to Interpret this Chart: Compared to the last chart, we measured profits instead of sales to show which product subcategories that Sample Superstore should or shouldn't continue to invest in. By displaying the profits in descending order, in addition to coloring the positive profits in green and negative profits in red, it differentiates the subcategories diverging from one another in a visual/colorful manner. The year filter allows us to focus on one year at a time for profits, seeing how each category has evolved over the years.

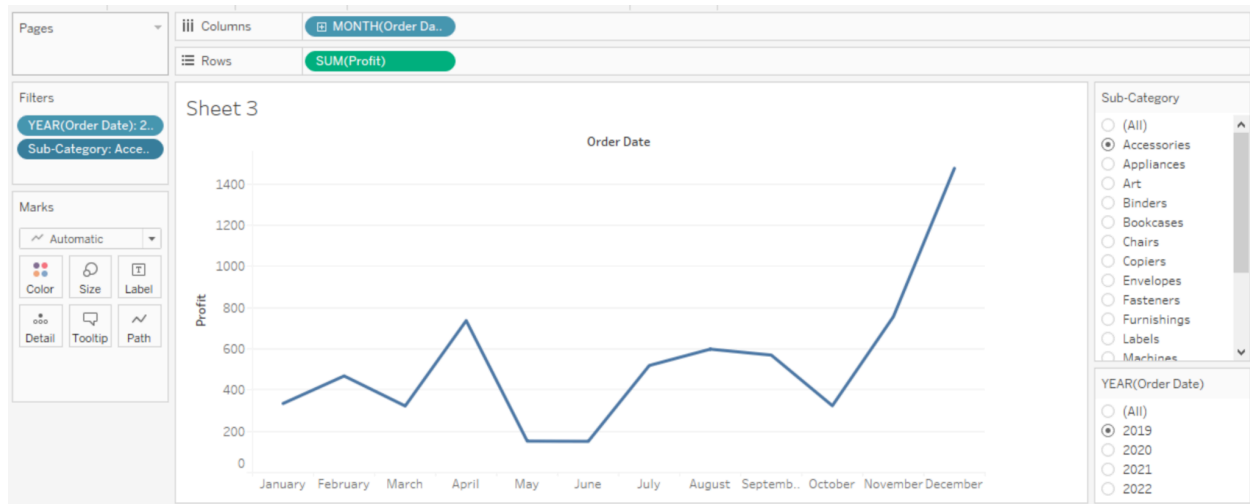
Line Graph 1

First, create another sheet by going to the bottom row, and pressing the 'New Worksheet' button.  This will create a new Worksheet called "Sheet 3".

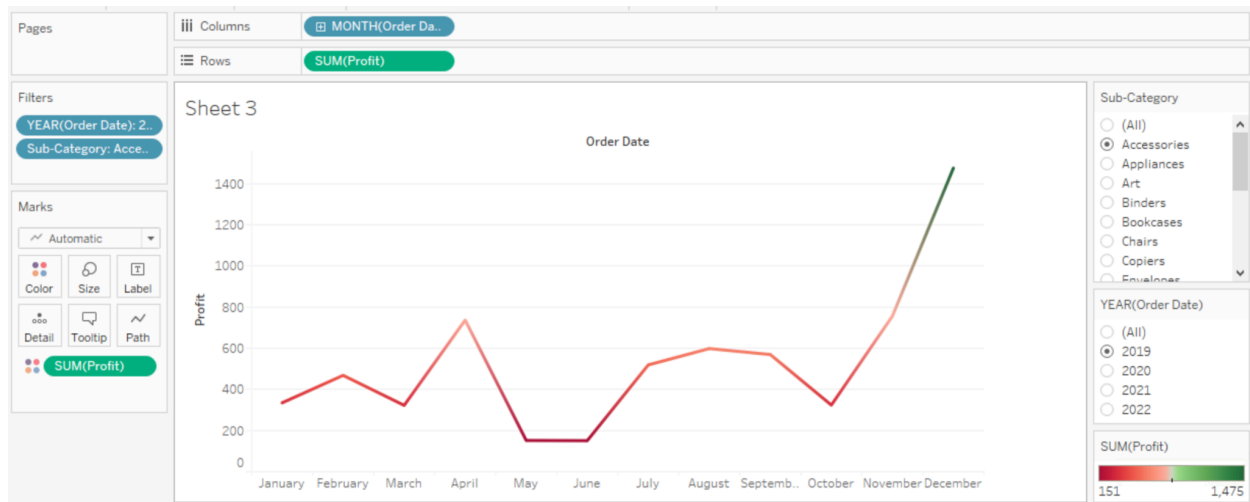
This next chart we will create will be visualizing how the profits of each sub-category have evolved over the years. When looking at each year (via a filter), we also want the graph to show the profits of each month, so we can see within the year which specific months in the year were most profitable. First drag Order Date to columns and Profits to rows. Format the Order Dates to show months (right click it and select Months) and make sure the the sum of profits are displayed (not average). Your graph should look like the one below (for now).



Now, let's add filters so we can view one sub-category at a time while also viewing it one year at a time. Drag and drop the Order Date and Sub-Category under filters (just like the other graphs). Make sure Order Date is displayed as Years, show the the filter, and make it display as a Single Value List. Do the same for the subcategories filter (show it and display it as Single Values). Your graph and interface should look like this now:



Lastly, let's add some color to it. Click on Color then Edit Colors. Select the red-green diverging palette. Check "Use Full Color Range" to make sure the colors are fully used, relative to the numbers that end up getting displayed (based on the filter). Click Ok to save the changes. But, notice how the line is red at certain parts even though the profits are positive? We will fix that in the next step.



Open the advanced menu in the Color setting and set the Center value to 0. By doing this, you are telling Tableau to make anything equal to 0 the same color as the middle of the color palette. Anything greater than 0 will be green, and anything below 0 is red. Click Ok to save then view your graph. Notice how the line now is green? These colors are now correctly representing our profit values. The color menu should look like the picture below, alongside your finished graph. Now, rename it like the picture below and play around with the filters on the right side!

Edit Colors [Profit] X

Palette:

 Red-Green Diverging

151 1,475

☐ Stepped Color 5 Steps

☐ Reversed

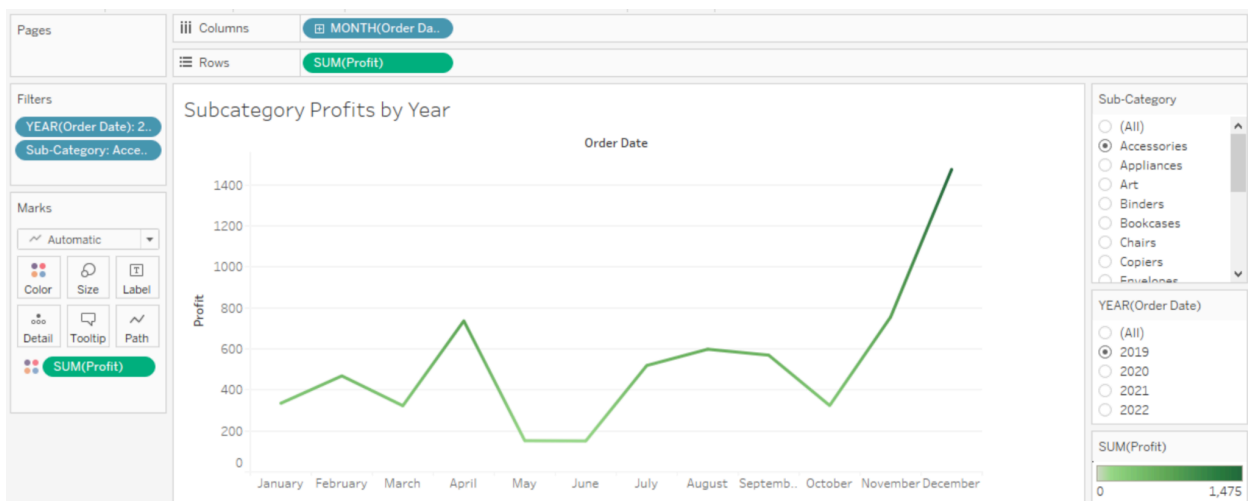
☒ Use Full Color Range

☐ Include Totals << Advanced

☐ Start: 150.5841 ☐ End: 1,475.0141

☒ Center: 0

Reset OK Cancel Apply



How to Interpret this Chart: This graph will show you how much profit each subcategory of item made throughout any given year. It will show how a category's profits evolved as time passed throughout the year. If you were a manager and wanted to see how a specific category of products were doing, this would be a great way to check it's historical performance.



Try it Yourself: Line Graph

Now it's time to test everything you learned!

Question:

[Line Chart 3] In 2022, which months had the best and worst profit for the Appliances category? What were both their profits (in dollars)?

What other variables in this dataset would be helpful to visualize using Tableau to improve profits for the CEO of Sample Superstore, and why?

General Tips

If you would like to zoom in or change the view settings of your graph, navigate towards the top area of the toolbar. There is a dropdown menu, and at default, the setting is set to 'Standard' view. Click on the dropdown menu to change the view to the one you desire (there is standard, fit width, fit height, and entire view).

We hope that you found this workshop informative and we are looking forward to hosting more this semester! Our last one for the Fall will be our Python Workshop, taking place 11/1 at 12:10pm, in-person, in room W511. Follow our Instagram @informs_pace for more details. We hope to see you all there!

Best,
INFORMS

Answer:

April did the worst in profits (\$144) while August did the best in profits (\$1,654).