



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.

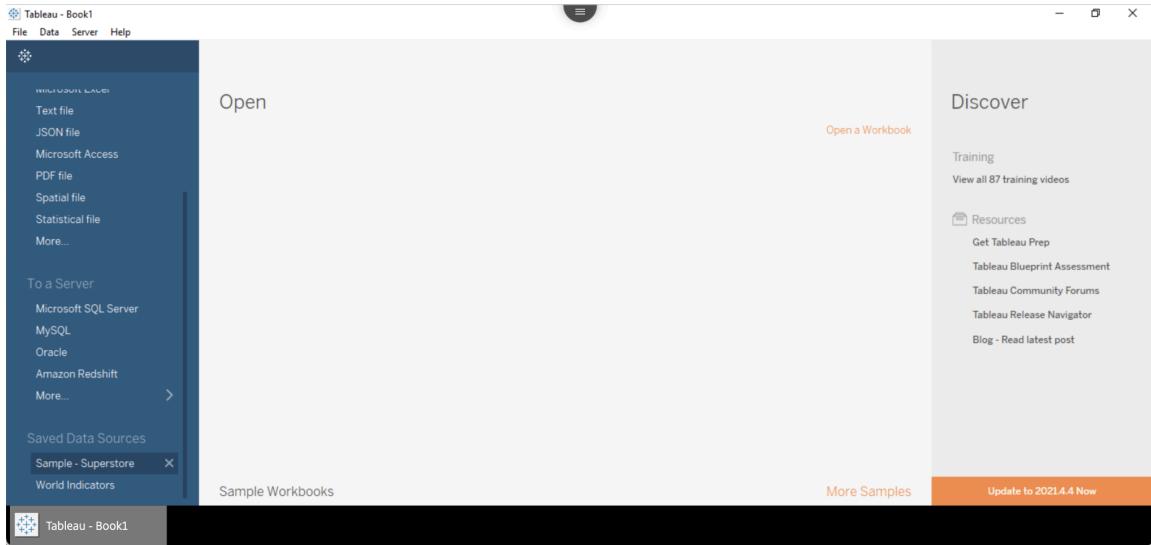
Getting Started on Tableau

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:

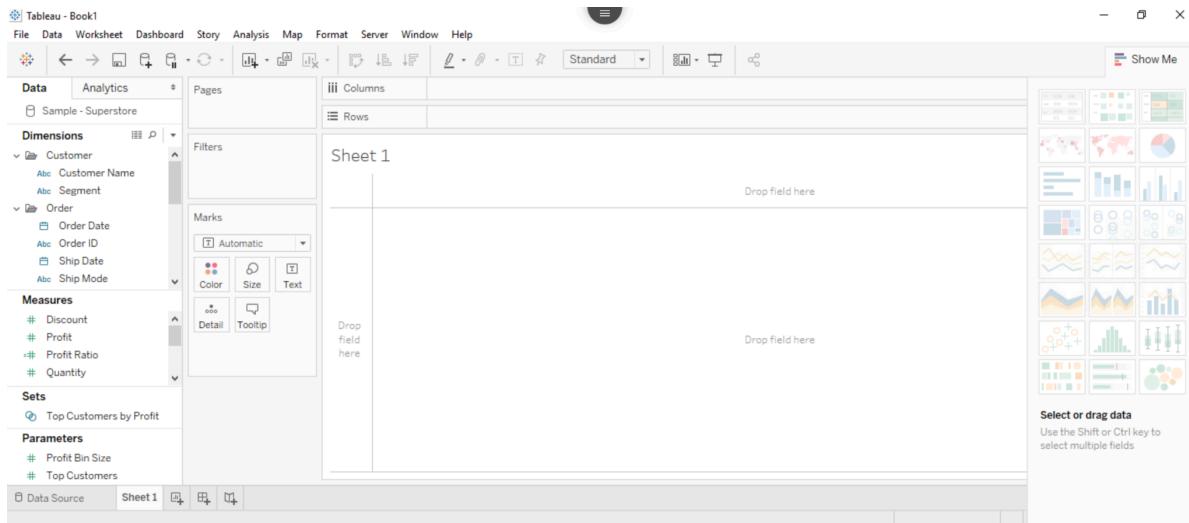
The screenshot shows the Pace University Citrix Workspace Apps interface. At the top, there's a dark blue header with the "PACE UNIVERSITY" logo, a "HOME" button, an "APPS" button, and a search bar. Below the header, there's a grid of application icons. One icon, "Tableau 20201", is highlighted with a purple border and a downward arrow pointing to a modal window. The modal window has a purple header bar with "Tableau 20201 Other" and a close "X" button. It contains two sections: "Actions:" and "Description:". Under "Actions:", there are two options: "Open" (with a checkbox) and "Add To Favorites". The "Description:" section is empty. The rest of the grid contains other application icons like StatTools 82, Stellarium, Time Matters, TopRank 82, UiPath Studio, Wolfram Mathematica 123, and Word MS Office 2019.

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.



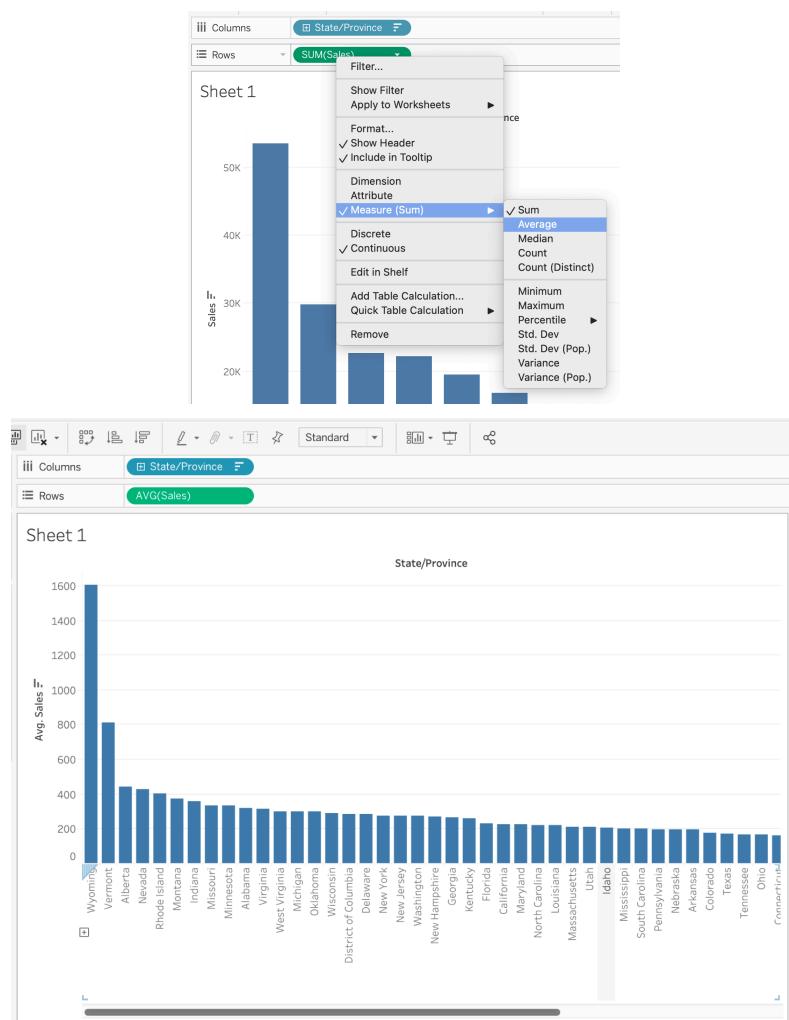
What we just did was load a sample, generic data set of superstore information. We will work with this sample data source’s information for the rest of this workshop.

Bar Chart 1

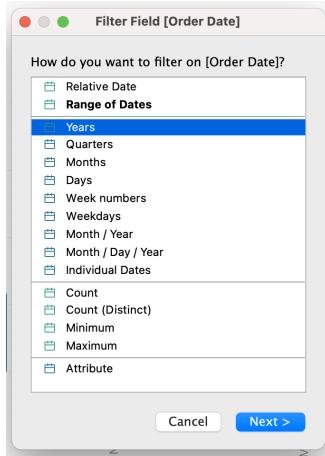
The first chart we will create in Tableau is a bar chart to visualize a superstore's Sales within the top 10 state performers of Sample Superstore in 2019.

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/Province" on that shelf.

Similarly, we will do the same steps again but for the 'Rows' shelf. Navigate to the left-side column, and under the 'Dimensions' menu, click and drag the 'SUM(Sales)' and place it under the 'Rows' shelf. Next you will right click on the 'SUM(Sales)' and scroll down to the Measure setting and click Average to change the pill to "AVG(Sales)". Your graph should look like this:



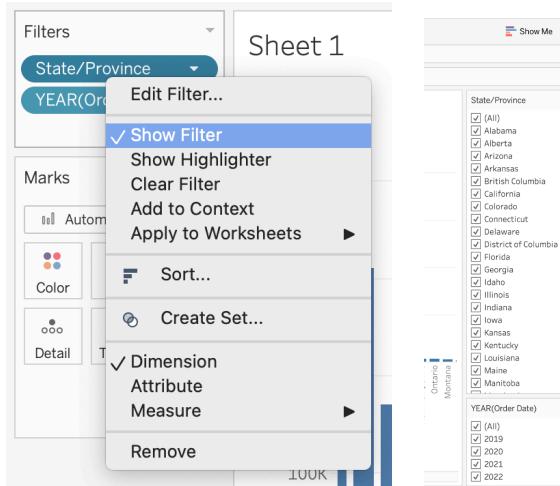
Next, drag and drop the “State/Province” to the Filters section, and click “Ok.” Do the same for “Order Date” select the “Years” in blue, not green, like the picture below.



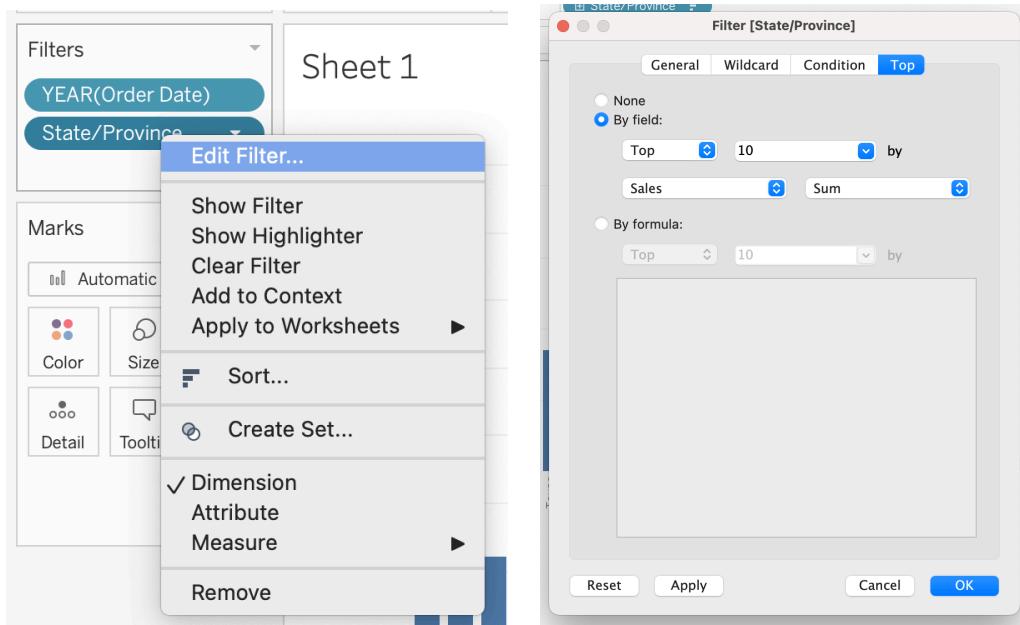
Your filters in the left hand slide should now have these two pills.



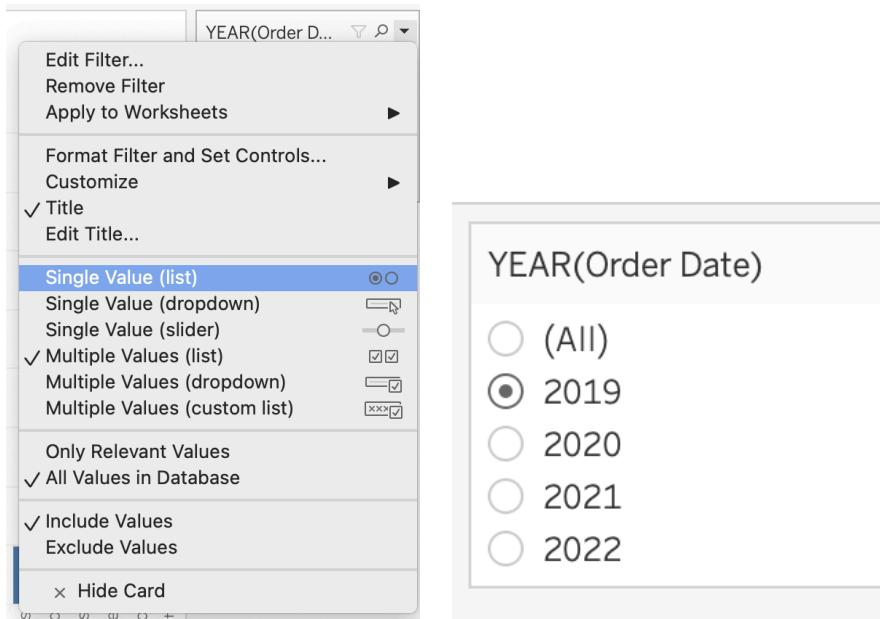
After this you want to be able to see and interact with the filters on the right side of your screen, to do this right click on the “Year” and “State/Province” pill within filters and click on “Show Filters.” This will allow you to see the years and states on the right side of your screen.



From there, right-click on the “State/Province” pill under the Filter section. Go to the “Edit filter” and select the section “Top” on the far right side. Select “By Field” and choose Top 10 by Sales Average. Press Ok to confirm.

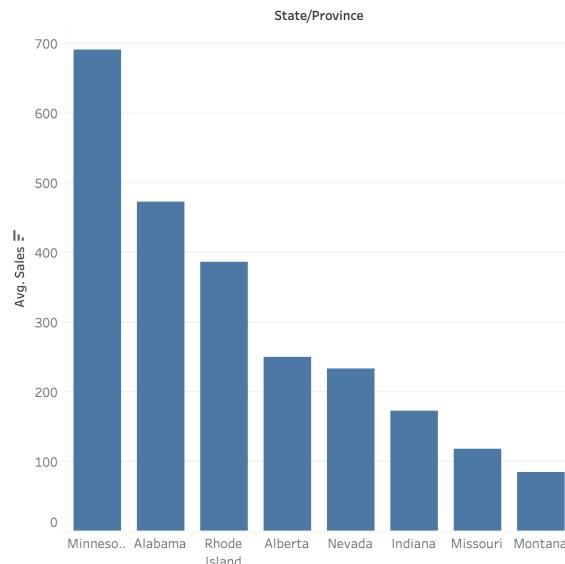


For the “Years,” the menu should already be on the right side of the screen. To make it interactive, click on a single value list. On YEAR (Order Date) select 2019.

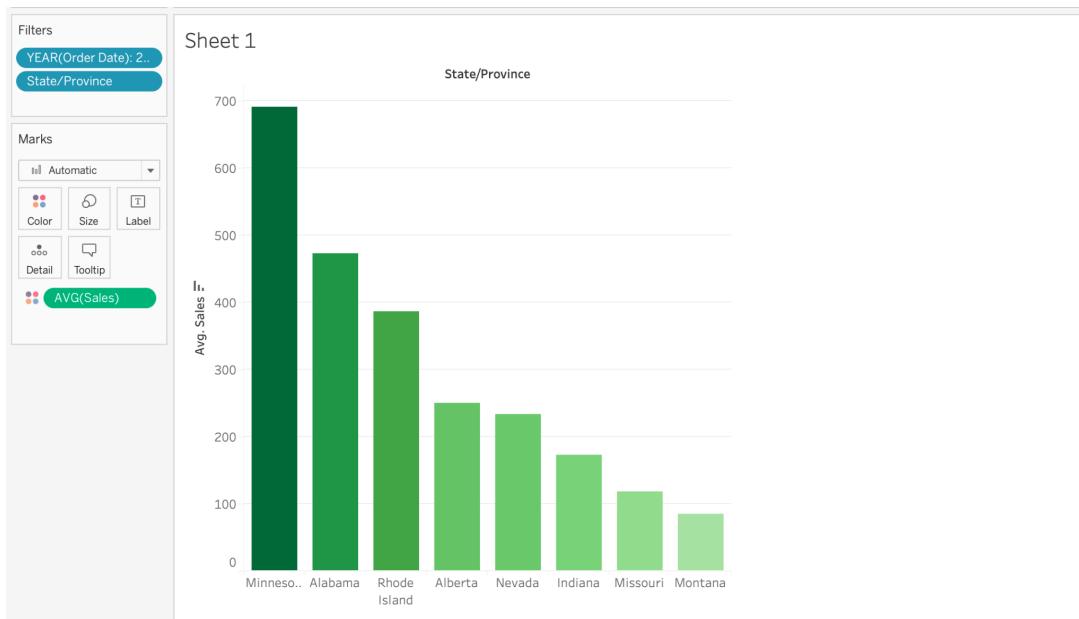


Your chart should now be showing 2019 Avg. Sales on the Y-axis and States on the X-axis shown below.

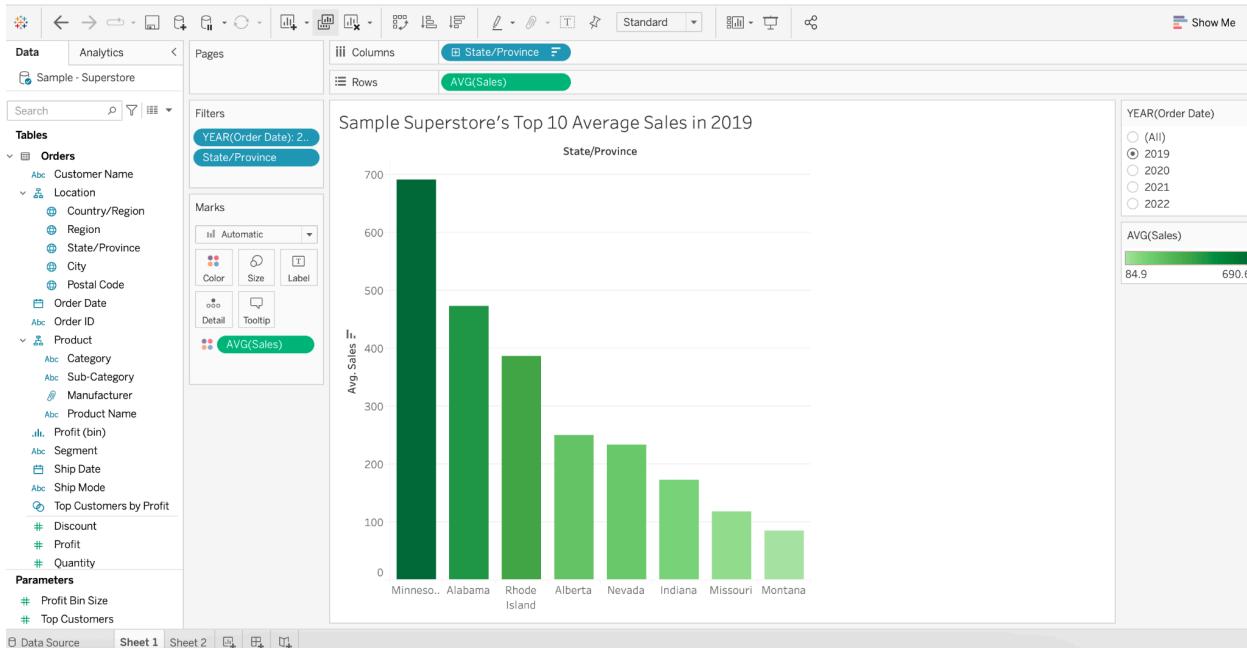
Sheet 1



After these steps we will take 'Sales' and click and drag it over the Color box in Marks to create a color gradient. From here we can right click and click on the pill and change it to AVERAGE, then right click and select edit colors where you can click the arrow next to Automatic and select any color you choose, here we did green.



Once you follow the above steps, and double click the title to rename your chart to “Sample Superstore’s Top 10 Average Sales in 2019,” you have your final graph.



How to Interpret this Chart: This chart describes Sample Superstore’s average sales in the USA’s top 10 performing states in descending order. We filtered this data to describe only 2019’s worth of average sales, and have color coded the bars to have the darkest shade represent the highest sales and the lighter shades the lower sales.

Bar Chart 2

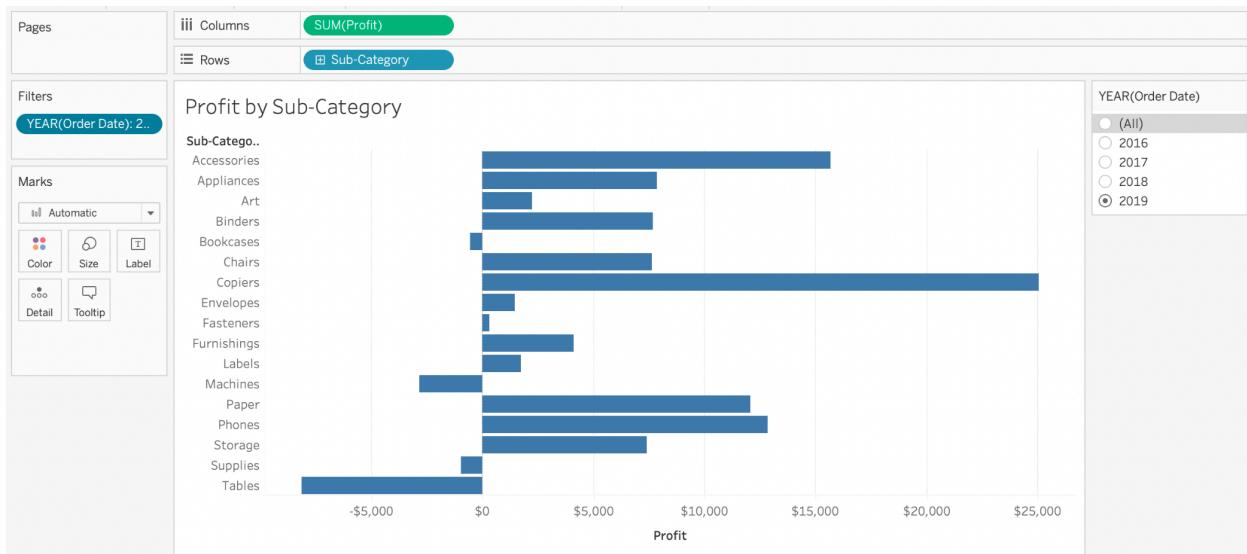
First, create another sheet by going to the bottom row, and pressing the ‘New Worksheet’ button. This will create a new Worksheet called “Sheet 2”.

This next chart we will create will visualize the profits 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!

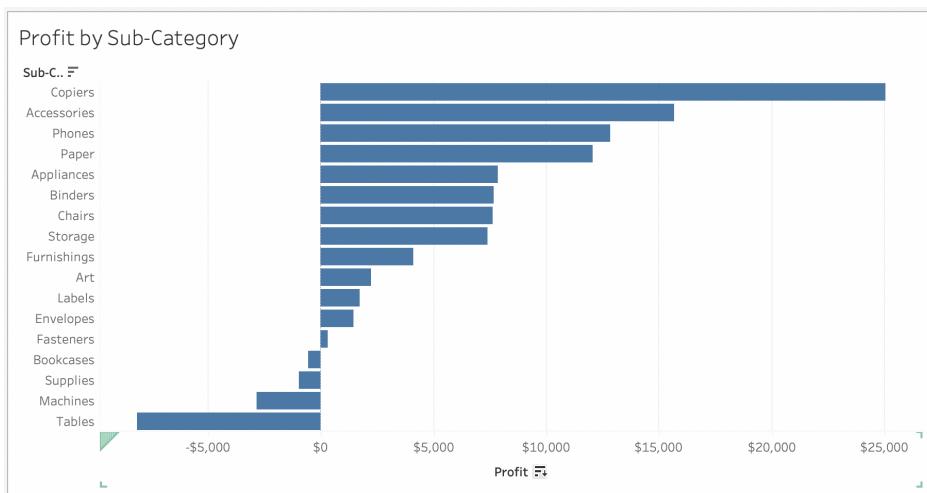
To start we will click and drag ‘Profit’ into the columns bar. You should have a green pill-shaped circle that says “Sum(Profit)” on that shelf. Then click and drag ‘Sub-Category’ into the Rows bar, you should have a blue pill-shaped circle that says “Sub-Category” on that shelf. This is shown in the 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 2019.

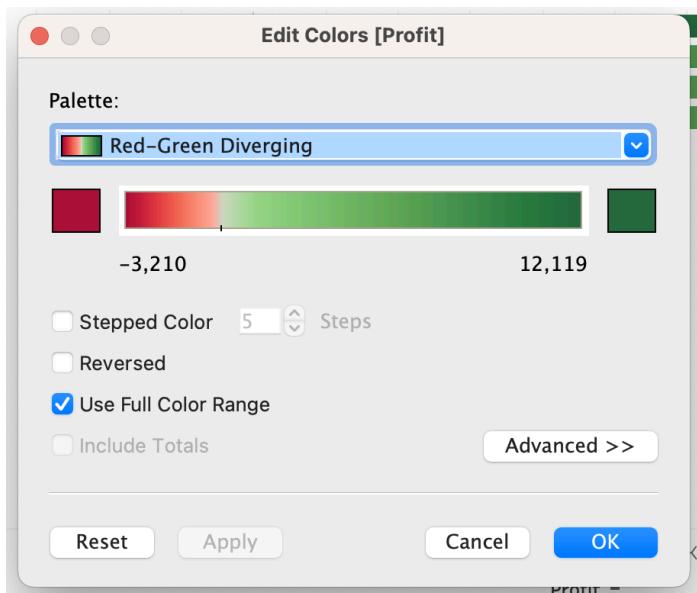


Then we click on the icon next to Profit on the X-Axis where it will change the graph to be displayed in descending order.

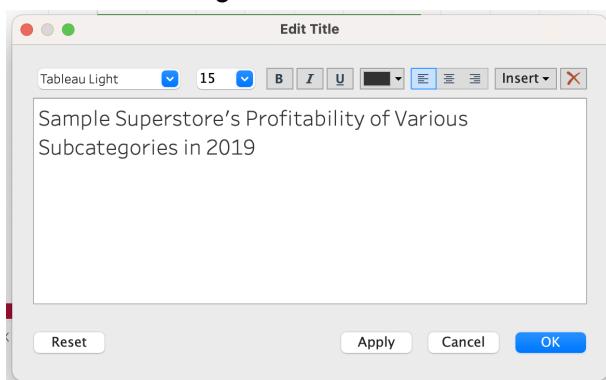


Then we will click and drag the Profit from the left and place on top of the Color box in Marks. This should automatically be set to the green red diverging colors as shown below. If it does not,

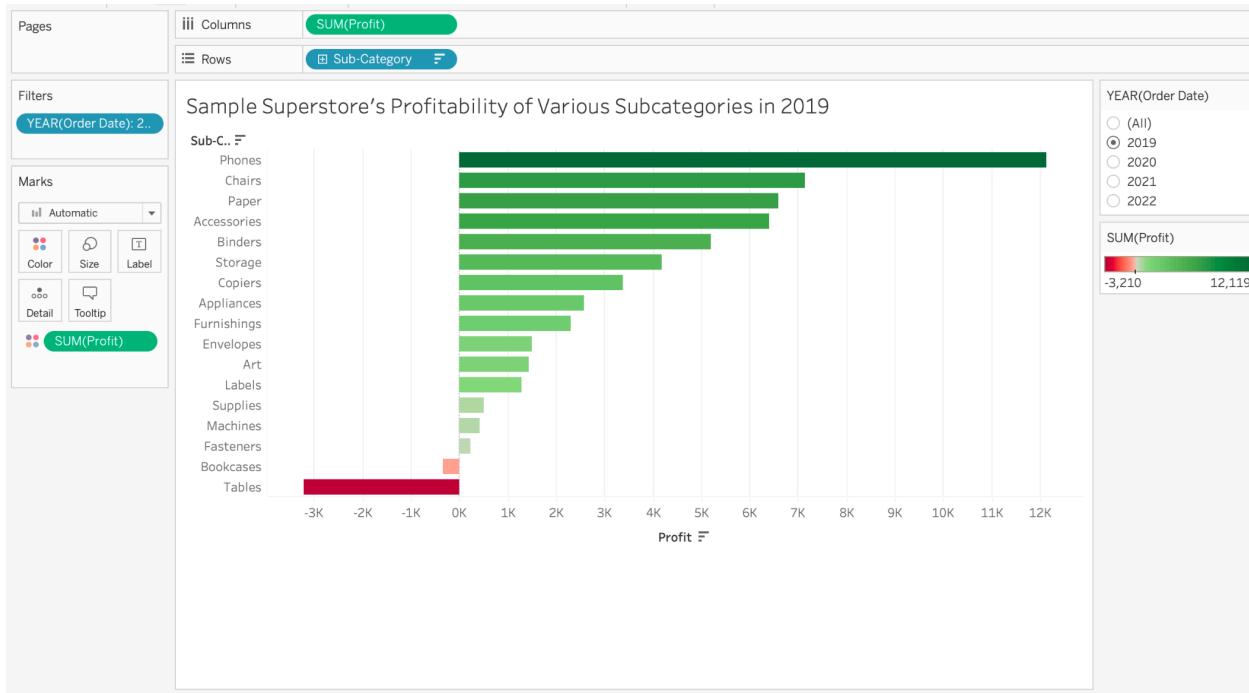
right click on the green pill in the Marks box where you can edit the colors to the diverging color range. We will also check the “Use Full Color Range” settings to make sure the colors are as clear as possible with our data.



Next double-click on the title, press edit and rename it to “Sample Superstore’s Profitability of Various Subcategories in 2019.”



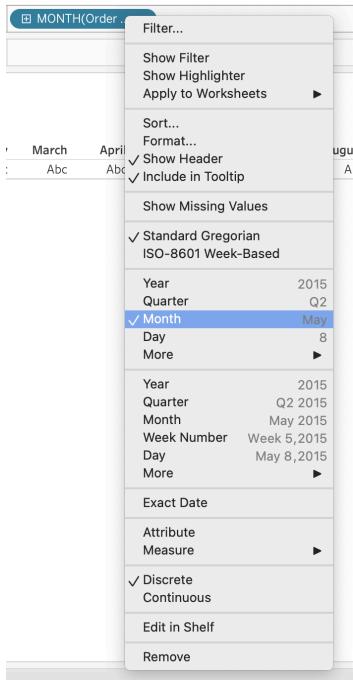
The final data table should be as shown below:



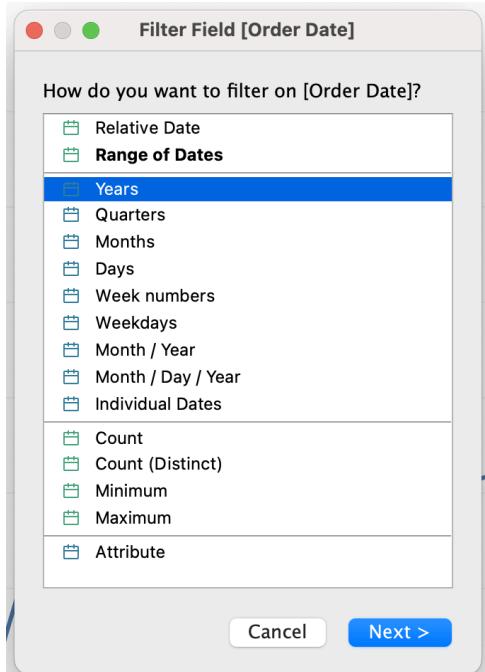
How to Interpret this Chart: Compared to the last chart, we measured profits instead of sales to show which product subcategories that Sample Superstore should or shouldn't continue to invest in. By displaying the profits in descending order, in addition to coloring the positive profits in green and negative profits in red, it visualizes the subcategories diverging from one another in a colorful manner.

Line Graph 1

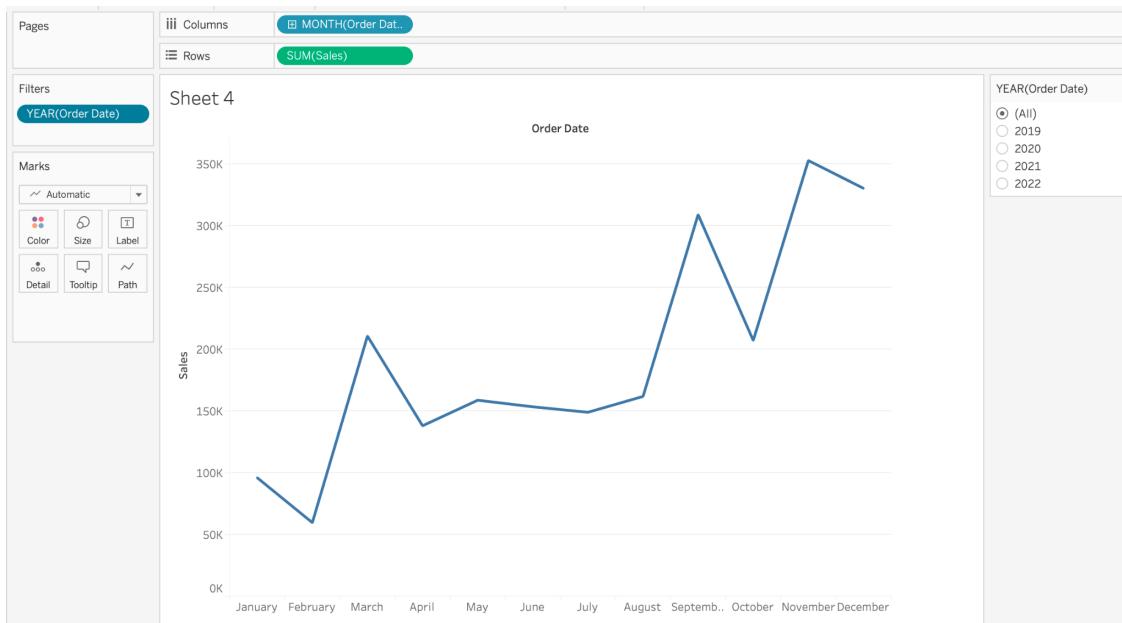
First, create another sheet by going to the bottom row, and pressing the ‘New Worksheet’ button. This will create a new Worksheet called “Sheet 3”. Rename this Worksheet to “Sample Super Store’s Annual Sales.”



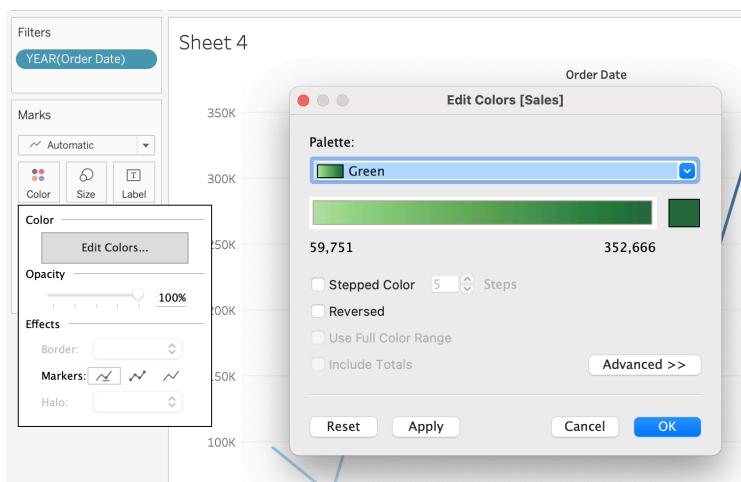
Next, insert the Order Date pill into the columns section above the graph and insert Sales into the Rows sections. Once you insert the two variables right click on the Order Date to change it from Years to Months display.



Drag Order Date into the filter section and select Years. Then, click Ok. Afterwards, right click on the Year Pill and click the show filter. From there, on the right side of the screen, click on the drop down menu of the filter and select the Single Value (list) setting. Select (All) for the year's display.

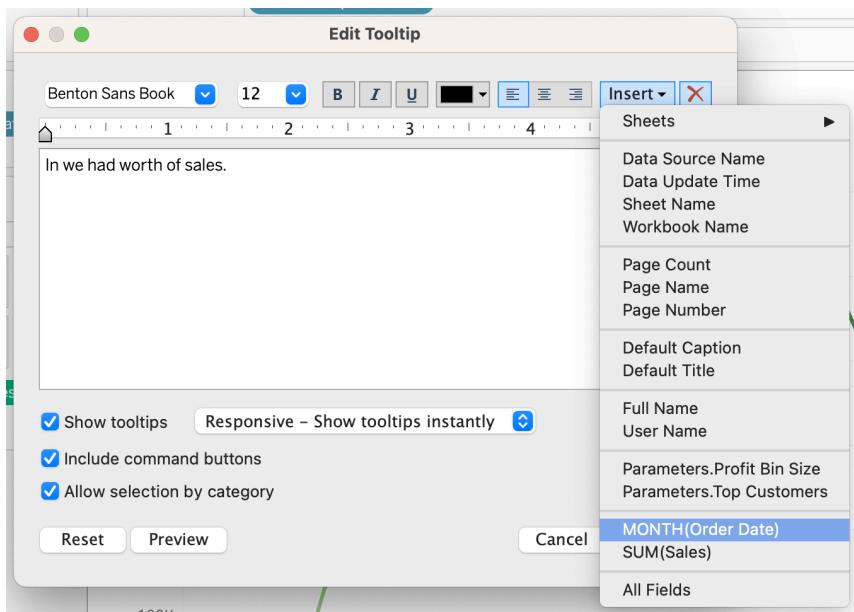


Next drag the Sales Pill over the Mark section into Color. From there click on Colors and Edit Colors. Under Palette select Green and press Ok. We only select the green color palette rather than the Red Green diverging palette since sales are always positive. If dealing with Profits which have negative numbers then diverging palettes are appropriate.

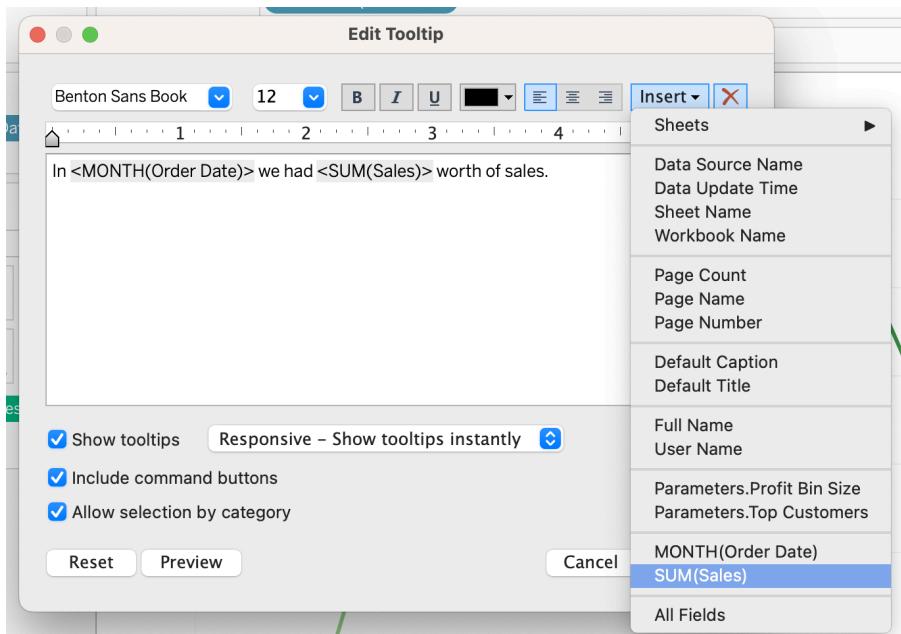


We will now customize the Tooltip for this graph to display details on specific Month and Sales data. First click on Tooltip under marks and the edit Tooltip menu should be displayed. From there, delete all the default text and type “In _____ we had \$ _____ worth of sales.”

Next, click between “In” and “we” and go to the Insert button. From the insert button, select MONTH (Order Date).



Do the same between “had” and “worth” to insert SUM (Sales).



From there, bold both the <MONTH(Order Date)> and \$<SUM(Sales)>. Highlight the <MONTH(Order Date)> and change its color to blue and \$<SUM(Sales)> to green. Then press Ok. Now when you hover over the peaks of the graph, the Tooltip will display detailed information of Sales made in each Month.



Try it Yourself:

Now let's analyze and interpret the line chart we just created!

Question:

Compare the Sales made in February of 2019 and December of 2021. Which time period did the Superstore perform best? How much more did the best performing time period do than the other? What suggestion would you give the manager of the Superstore to increase sales based on historical data?

Want to share your chart on social media? Post on your story and tag us on Instagram (@informs_pace) to enter, and we will announce the winner later on Instagram!



Answer:

December of 2021 performed best.

In December of 2021 had \$97,502 sales, while February had \$4,520 sales. December 2021 made \$92,982 more sales than February 2019.

Possible suggestions for increasing Superstores sales based on historical data:

- Invest in marketing during low sales seasons such as February 2019
 - Create coupons and promotions during the low sales seasons to attract customers
 - During peak seasons promote loyalty programs to increase return customer rates.
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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 next one will be our Python Workshop, taking place Friday, March 24th 12pm-1:10 pm in Room W515 and Zoom. Follow our Instagram @informs_pace for more details. We hope to see you all there!

Best,
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