

Practical 3

Data Exploration, Visualisation Using Tableau





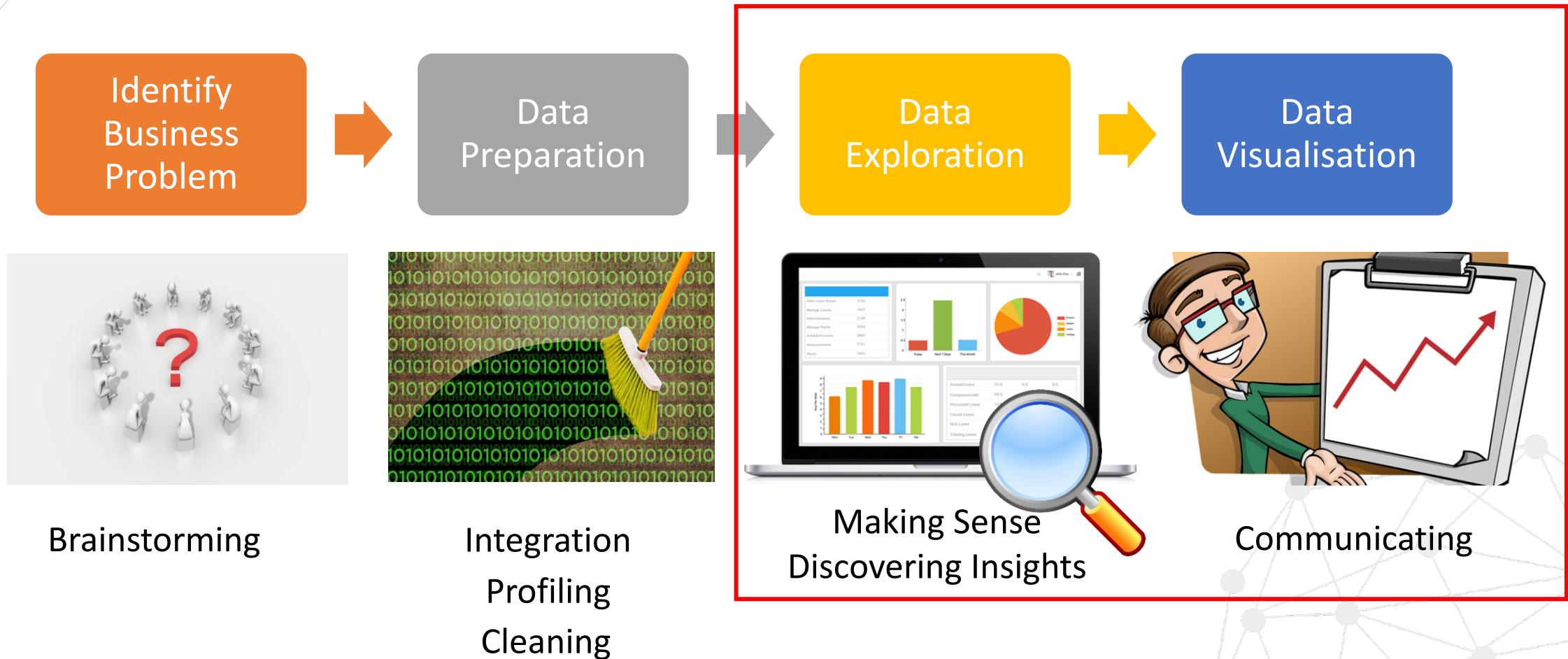
Practical 3



<u>Before Class</u>	Concepts	Visual and analytical techniques for understanding and representing data patterns and relationships
<u>During Class</u>	Hands-on	Recap Data Exploration Data Visualisation Best Practices
<u>After Class</u>	Hands-on	<i>Revise today's class with LMS: Apr/Oct – Week X (...)</i> <i>Go through Additional Resources slides</i> <ul style="list-style-type: none">- <i>Read the common questions for EDA</i>- <i>Explore further on trend lines, forecast lines in Tableau</i>- <i>Pick up recurring words in exemplar examples</i>- <i>Watch video on Science of Data Visualisation (7min)</i>



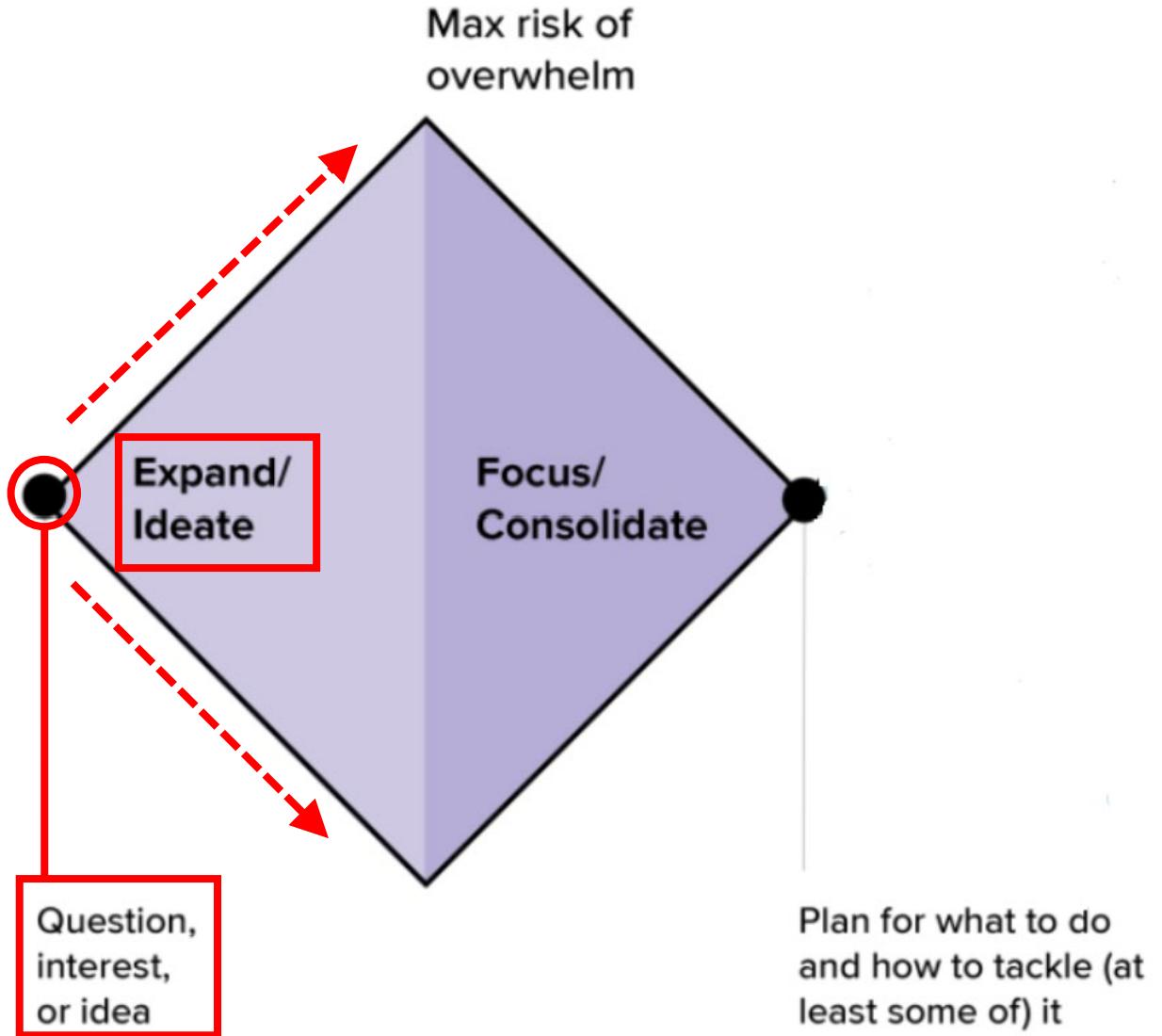
How To Do Data Visualisation?



What is Data Exploration and Visualisation



Data Exploration



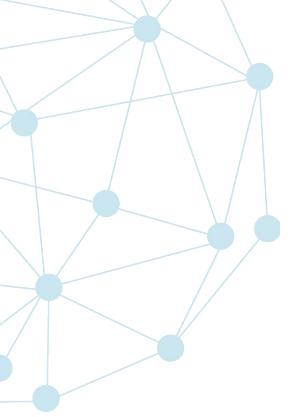
Two Stages in Data Exploration

1. Exploratory Data Analysis (EDA)

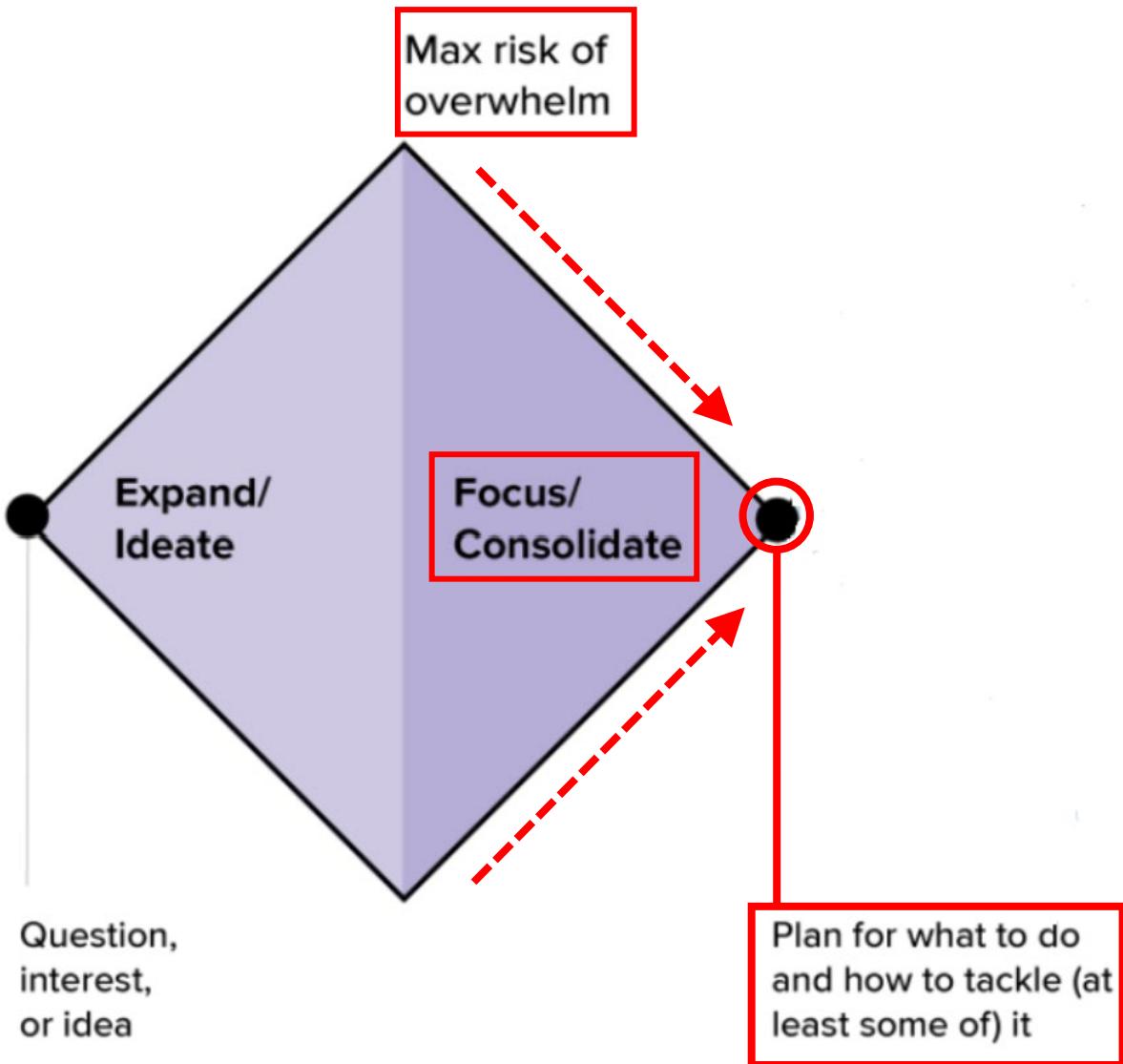
- extension of Data Profiling
- using charts

2. Data Analysis

- Deeper analysis
- Find answer to problem



Data Visualisation



Data Exploration - Explore





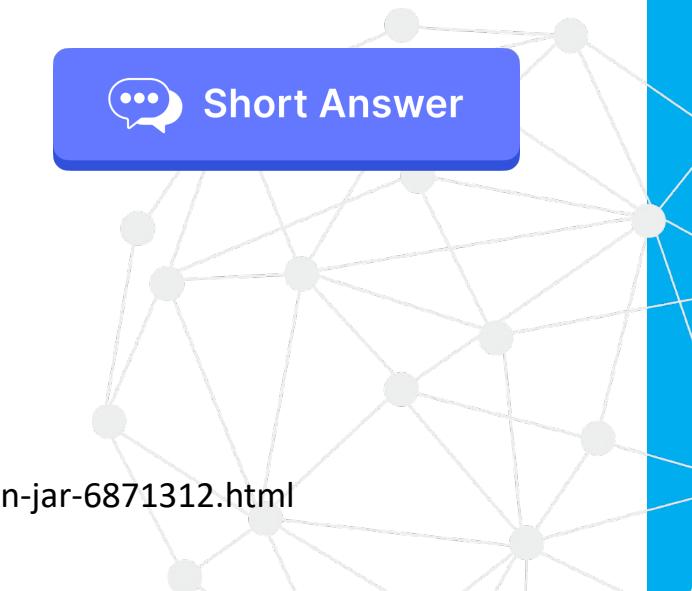
How many jellybeans are there in this jar?

Rule : You cannot take them out to count them. However, you are allowed to touch the bottle and look at it from different angles.

What would be your strategy to come up with the number of jellybeans?



What questions would you ask yourself?



 Short Answer



Takeaway

This is what Data Exploration is about:

- An initial assessment of the dataset by looking from different angles and getting a preliminary analysis of your variables.
- This exploration can subsequently be expanded and may lead to a deeper understanding of your data and its variables.
- But guess what? All these evolved as a result of the questions you asked yourself at the start.
- **Asking question is therefore crucial for the success of Data Exploration.**

Reference : <https://mode.com/blog/what-is-data-exploration>



Data Exploration - Explain





What is Data Exploration?

Data Exploration is the stage where we **ideate and expand** and asking the right questions is key to this stage.

There are **2 stages** involved in Data Exploration :

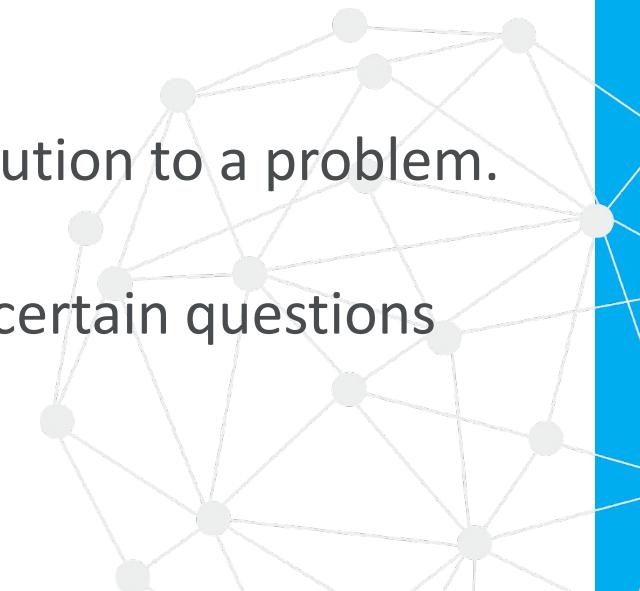
- 1. Exploratory Data Analysis (EDA) -**

This is an extension of data profiling where **initial analysis** is done to familiarize with the data and perhaps even find some interesting insights.

- 2. Data Analysis -**

This is the stage for **deeper analysis**.

The goal is to answer a question of interest or find the solution to a problem.



Since the goals of the above 2 stages are different, there are certain questions that data scientist and analyst tend to ask at each stage.

How do you use questions to guide EDA?

These are the charts commonly used to address the questions above:

Typical
Values?
Variations?
Outliers

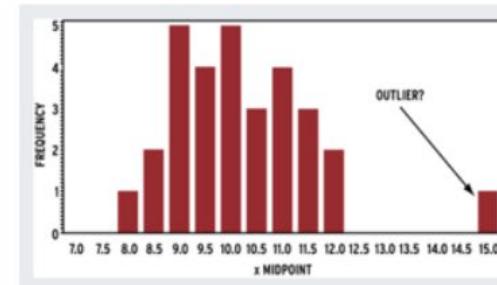
How To Detect Typical Values, Variations in Values, Outliers

- For Categorical Data - Frequency Table or Bar Chart

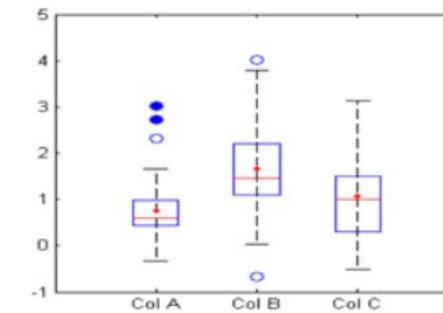
REGION	SALES
North	\$29034
South	\$56728
Soth	\$12000
East	\$27000
West	\$89092



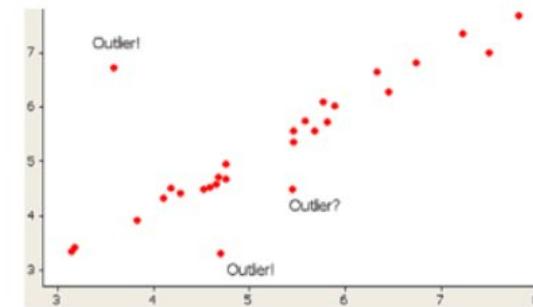
- For Numeric Data - Histogram, Box Plot, Scatter Plot



<https://cxl.com/blog/outliers/>



<https://wiki.eigenvalue.com/index.php?title=Boxplot>



<https://apandre.files.wordpress.com/2011/08/outlier2a.jpg>

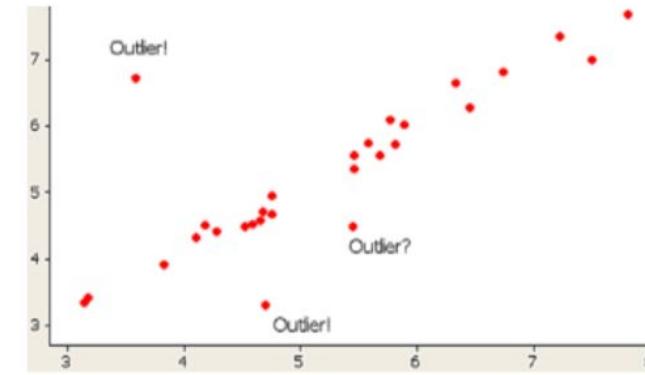
How do you use questions to guide EDA?

These are the charts commonly used to address the questions above:

Correlation?

How To Detect Correlation

- For Categorical Data
 - Not called Correlation, but the appropriate term is Association.
 - This is done using Chi-Square or other statistical tests (beyond the scope of this course).
- For Numeric Data - Scatter Plot, Correlation Matrix



<https://apandre.files.wordpress.com/2011/08/outlier2a.jpg>

Petal.Width	0.82	-0.37	0.96	1
Petal.Length	0.87	-0.43	1	0.96
Sepal.Width	-0.12	1	-0.43	-0.37
Sepal.Length	1	-0.12	0.87	0.82

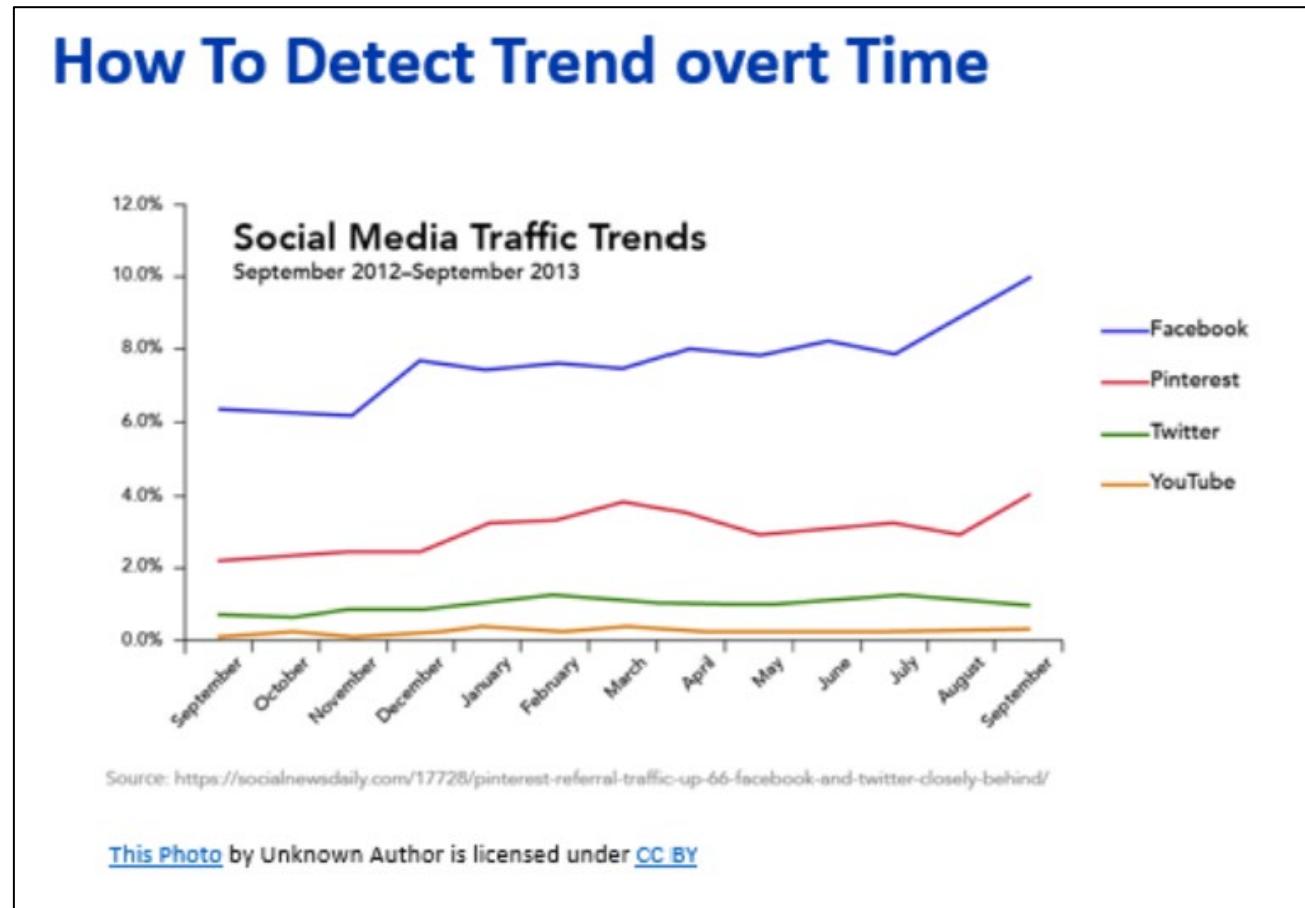
[This Photo](#) by Unknown Author is licensed under [CC BY-SA](#)



How do you use questions to guide EDA?

These are the charts commonly used to address the questions above:

Trends
over
Time?





Note

We have attempted to use these questions in our DAVA Practical Sessions to do the Exploratory Data Analysis already. There are also many software tools that augment/self-discover this part based on the questions above.

Therefore, we will not go into details on this subject. Instead, we will focus our time on the next sub-section on **Data Analysis**.





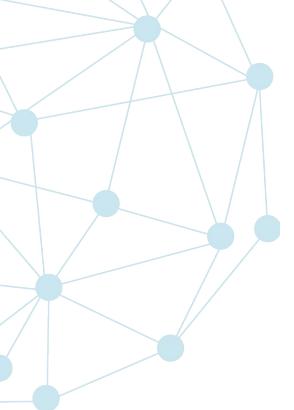
Hands On

Data Exploration



P03a - Data Exploration: Hands-on

- On LMS, head to “Activity 1: Data Exploration & Visualisation” > “Practical Questions”. Download practical sheets and datasets.
 - We will learn to do using the above-mentioned approach:
 - Start with a hypothetical question.
 - Explore using appropriate charts to answer your hypothetical question.
 - Based on what is revealed in the chart, ask more questions.
 - Explore further by drilling in or supplement with more charts.
 - Keep going until some insights are found.
- 



Data Exploration – Approach

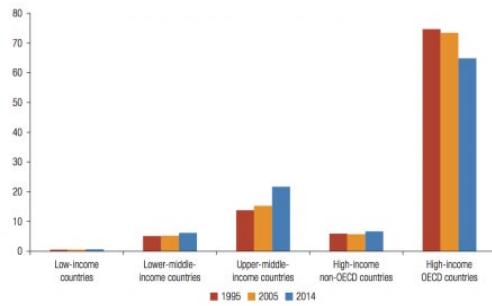
We begin by asking a hypothetical question and proceed to use an appropriate chart to explore the data.



Hypothesis/Question/Problem



FIGURE ES.1 Shares of Global Wealth, by Income Group, 1995, 2005, and 2014



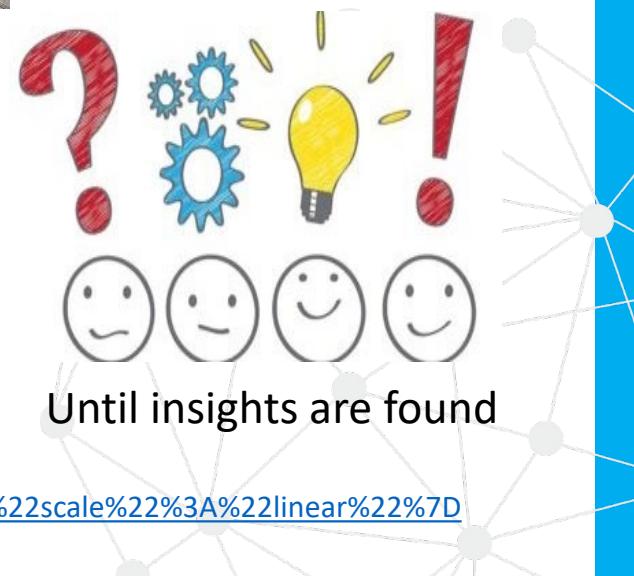
Explore with charts



Ask more questions



Explore further



Until insights are found

Import Data

- Launch Tableau.
- Click on **Microsoft Excel → DV_Superstore_Tidy.xlsx**
 - Drag **Orders** table to “Drag Tables Here” area → Click on **Sheet** (bottom left)
 - You will see the data fields and an empty canvas for your charts

The screenshot shows the Tableau Data Source interface. On the left, under 'Connections', 'DV_Superstore_Tidy' is selected. Under 'Sheets', 'Orders' is selected. A preview of the 'Orders' table is shown with columns: Row ID, Order ID, Order Date, Ship Date, Ship Mode, Customer ID, Customer Name, Segment, Country, City, and Postal Code. A blue arrow points from the 'Orders' sheet in the Data Source to the 'Tables' shelf in the next screenshot.

The screenshot shows the Tableau Worksheet interface. On the left, the 'Tables' shelf is open, displaying various data fields: Category, City, Country, Customer ID, Customer Name, Order Date, Order ID, Postal Code, Product ID, Product Name, Region, Row ID, Segment, Ship Date, Ship Mode, State, Sub-Category, Measure Names, Cost, Discount, and Profit. A red box highlights the 'Tables' shelf. To the right is an empty canvas with a large red box highlighting it, labeled 'Drop field here'. The top navigation bar shows 'File', 'Data', 'Worksheet', 'Dashboard', 'Story', 'Analysis', 'Map', 'Format', 'Server', 'Window', and 'Help'.

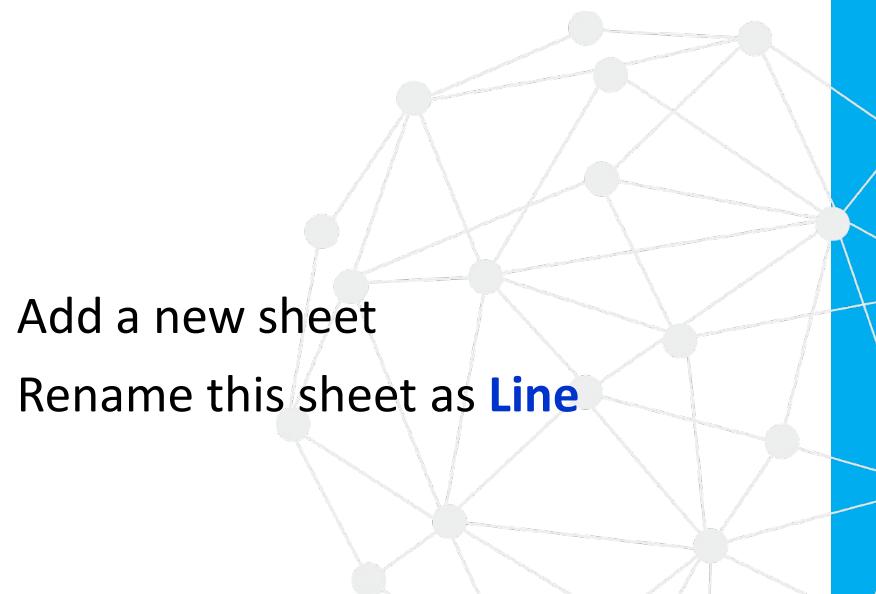
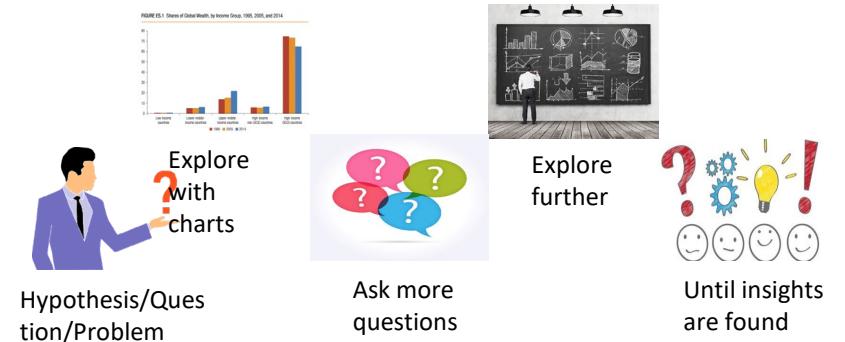


Exploration 1

- Start with a hypothetical question :

How is the year-on-year increase in profits by category?

- How can you find the answer?
 - Since the question has something to do with timeline, we will use a **line chart**
 - Then analyze to get the answer.



Add a new sheet
Rename this sheet as **Line**

Exploration 1 : Line Chart

Question : How is the year on year increase in profits by category?

Drag Order Date to Columns (x-axis)
→ By default, it will be aggregated by Year

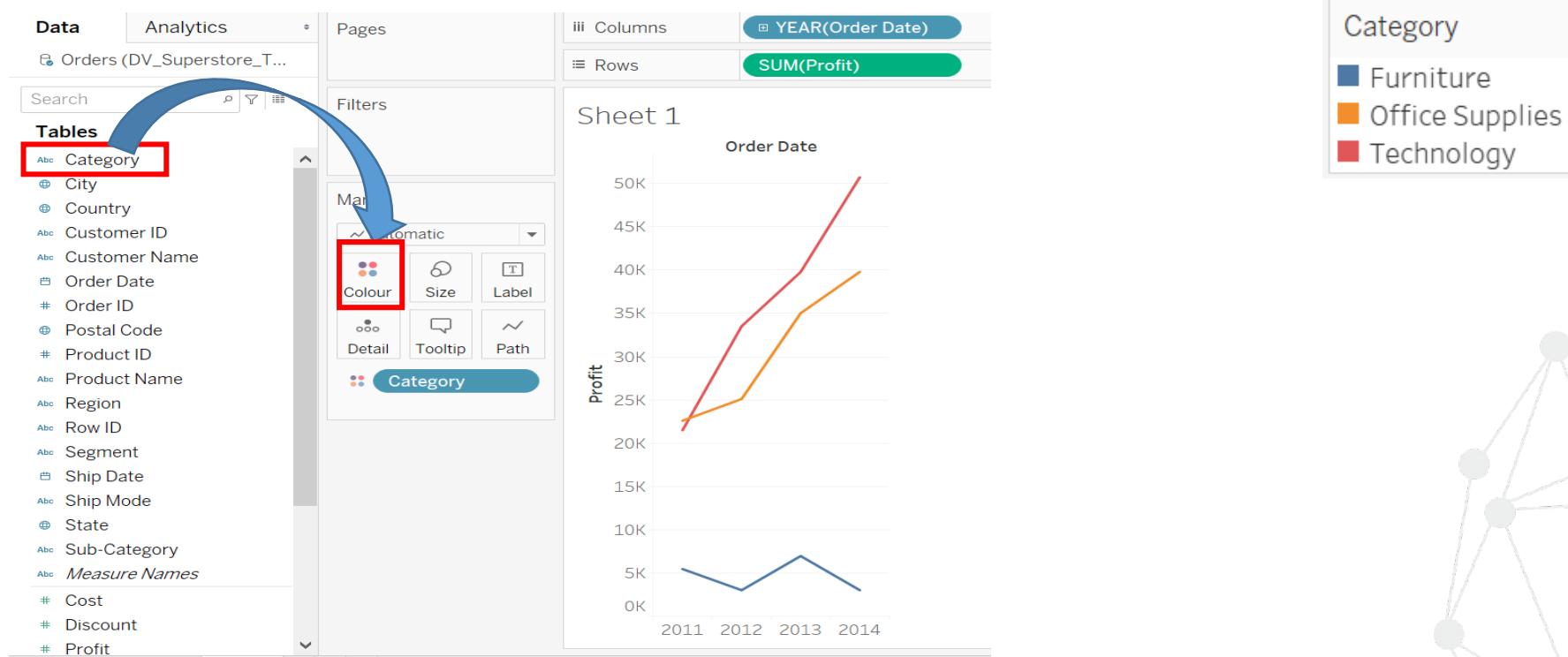
If you need to change to Quarter, Month, Week, Day
→ click on the ▾ next to YEAR(Order Date)
→ We will leave as the default for now

The screenshot shows the Tableau software interface. On the left, the 'Data' pane lists various dimensions and measures, including 'Category', 'City', 'Country', 'Customer ID', 'Customer Name', 'Order Date' (which is highlighted with a red box), 'Order ID', 'Postal Code', 'Product ID', and 'Product Name'. In the center, there's a small preview of a line chart titled 'Sheet 1' with four data points corresponding to the years 2011, 2012, 2013, and 2014. A large blue curved arrow points from the 'Order Date' entry in the Data pane towards the 'YEAR(Order Date)' dropdown in the top toolbar. The 'YEAR(Order Date)' dropdown is also highlighted with a red box. A tooltip 'Year of Order Date' is visible near the dropdown.

Exploration 1 : Line Chart

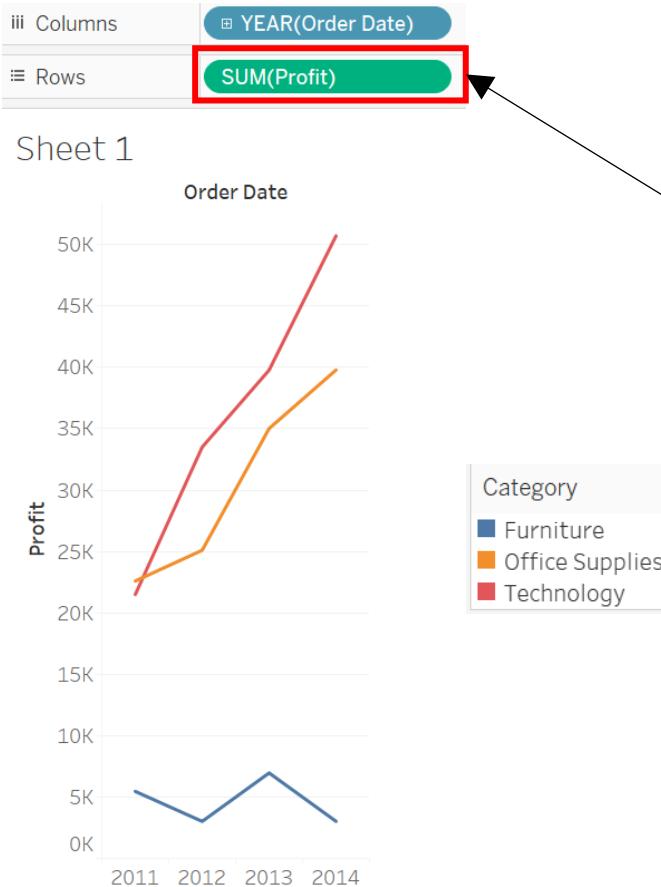
Question : How is the year on year increase in profits by category?

- Drag **Profit** to **Rows (y-axis)** → By default, it will be aggregated by **Sum** (not average)
- Drag **Category** to **Colour Marks Card** → This will split into 3 lines by category



Exploration 1 : Line Chart

Question : How is the year-on-year increase in profits by category?



Pause to think : What is the trend?

Pause to think : Should the aggregation method be sum or average?



Data Exploration – Approach

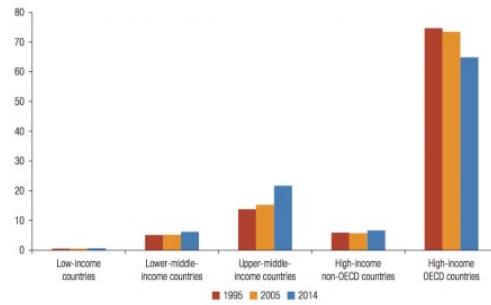
Now that we have found the problem area, let's dig further.



Hypothesis/Question/Problem



FIGURE ES.1 Shares of Global Wealth, by Income Group, 1995, 2005, and 2014



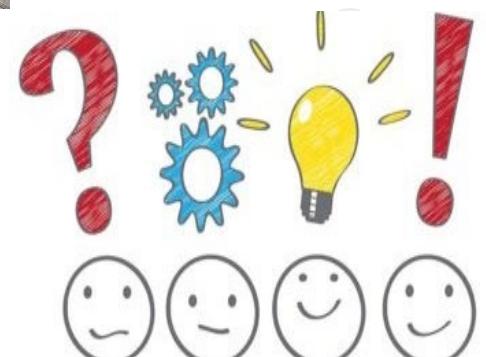
Explore with charts



Ask more questions



Explore further



Until insights are found



Filter...

Show Filter

Show Highlighter

Sort...

Format...

Show Header

Include in Tooltip

Show Missing Values

Standard Gregorian

ISO-8601 Week-Based

• Year 2015

Quarter Q2

Month May

Day 8

More ▾

Year 2015

Quarter Q2 2015

Month May 2015

Week Number Week 5, 2015

Day 8th May, 2015

More ▾

Exact Date

Attribute

Measure

• Discrete

Continuous

Edit in Shelf

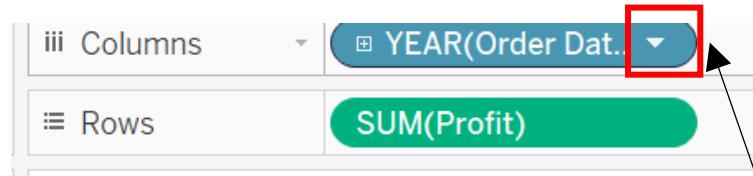
Remove

Exploration 1 : Line Chart

Probe further : Is furniture really flat?

Is Technology and Office Supplies always increasing?

Click on the ▼ next to
YEAR(Order Date)



What is the difference? Try both to
see the difference.

Should the aggregation method by
Sum or Average for each case?

Filter...

Show Filter

Show Highlighter

F Sort...

Format...

✓ Show Header

✓ Include in Tooltip

Show Missing Values

✓ Standard Gregorian

ISO-8601 Week-Based

• Year

2015

Quarter

Q2

Month

May

Day

8

More

Year

2015

Quarter

Q2 2015

Month

May 2015

Week Number

Week 5, 2015

Day

8th May, 2015

More

Exact Date

Attribute

Measure

• Discrete

Continuous

Edit in Shelf

Remove

Exploration 1 : Line Chart

Probe further : Is furniture really flat?

Is Technology and Office Supplies always increasing?

Change Columns to **Month**
(continuous) to drill down by
month of each year

iii Columns □ YEAR(Order Dat... ▼

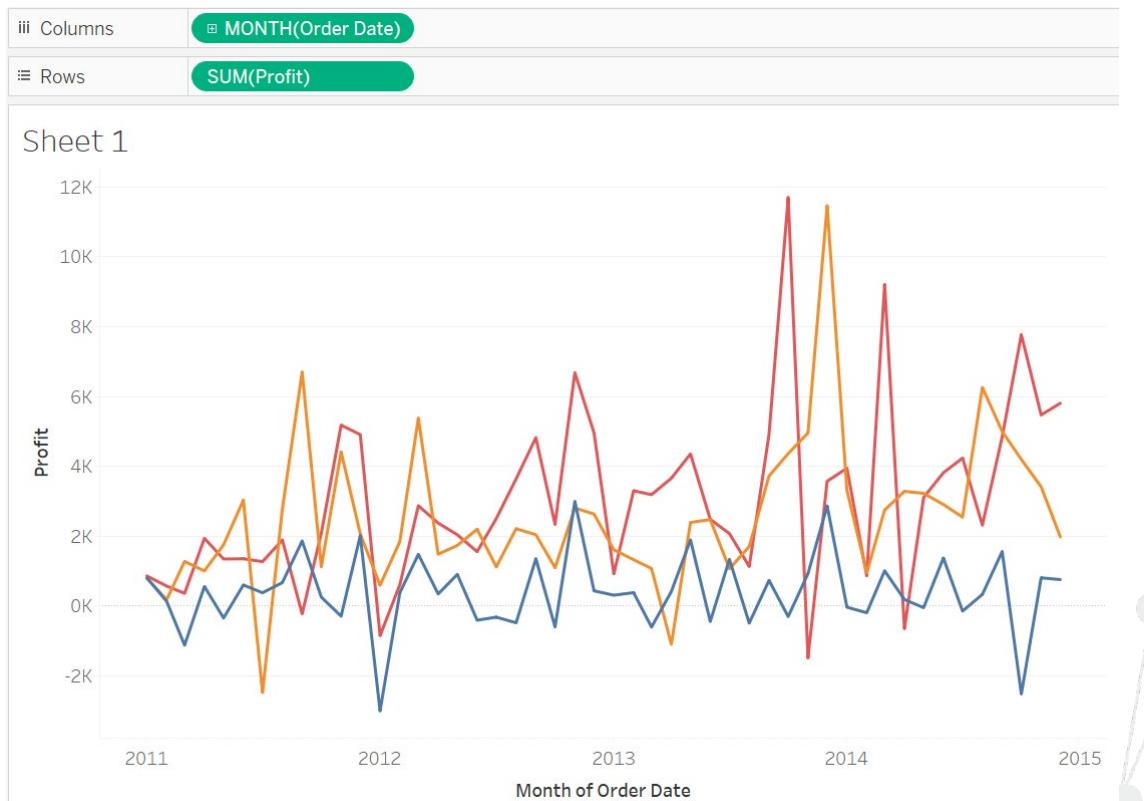
≡ Rows SUM(Profit)

When is the peak ?

Technology -?

Furniture -?

Office Supplies -?

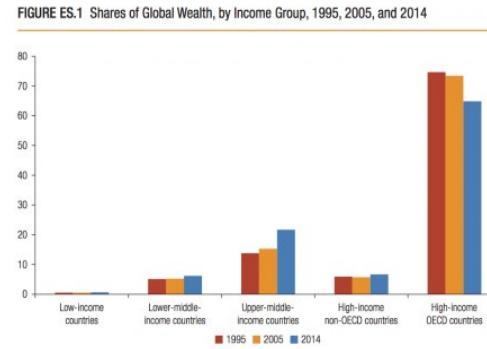


Data Exploration – Approach

Now let's analyze further
to get more insights.



Hypothesis/Question/Problem



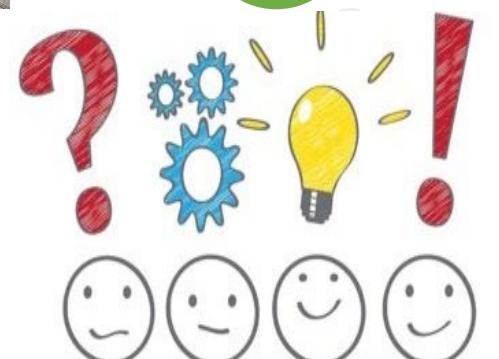
Explore with charts



Ask more questions



Explore further



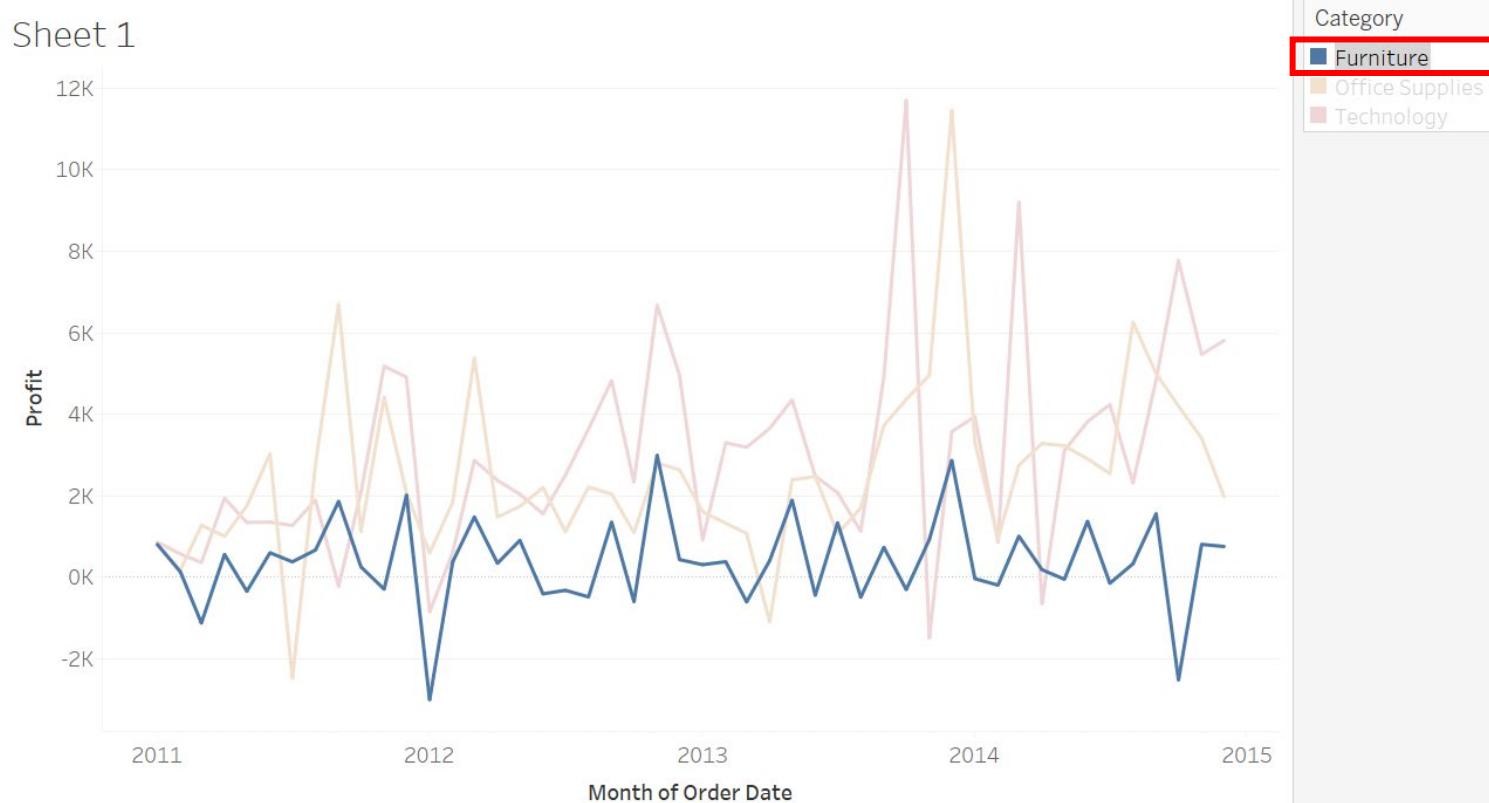
Until insights are found

Exploration 1 : Line Chart – Further Analysis

Probe further : Is furniture really flat?

Is Technology and Office Supplies always increasing?

Click on the **Filters** → filter one category at a time





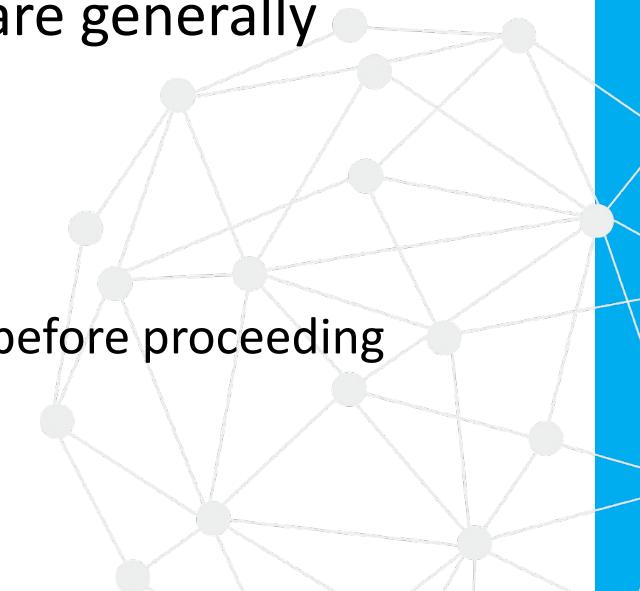
Further Analysis

This last step has been disguised as a mini self-test. Note that in real-life analysis, you would have to discover your own insights.

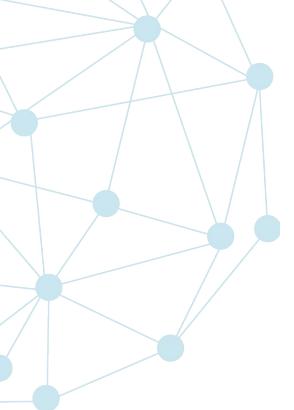
Please do the following and record your answers.

1. For Technology category, if there is a spike in profit in any one month, then there is usually a dip in profit shortly after.
 - a. True
 - b. False

2. For Furniture category, the profits over the years/months are generally stable except for 2 minor spikes and 1 minor dip.
 - a. True
 - b. False



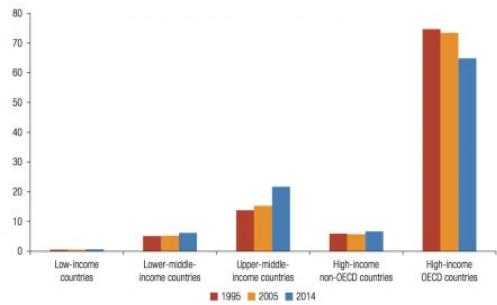
Remove all filters before proceeding



Data Exploration

And there you have it – our navigation approach ☺

FIGURE ES.1 Shares of Global Wealth, by Income Group, 1995, 2005, and 2014



Explore with charts



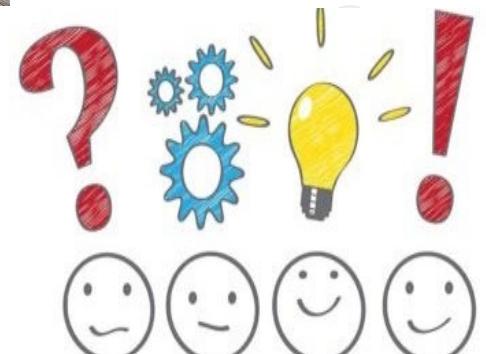
Hypothesis/Question/Problem



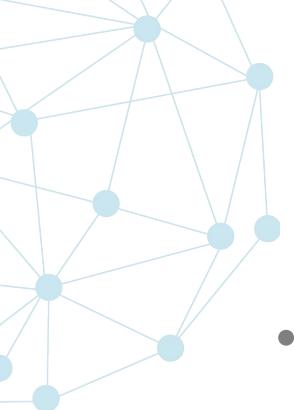
Ask more questions



Explore further



Until insights are found



Exploration 2

- Start with a hypothetical question :

What is the year-on-year change in profits by sub-category?

- How can you find the answer?
 - Since this involves many sub-categories and spans across a few years, we will use a **horizontal bar chart**
 - Then analyze to get the answer.



Add a sheet
Rename this sheet as **Bar**

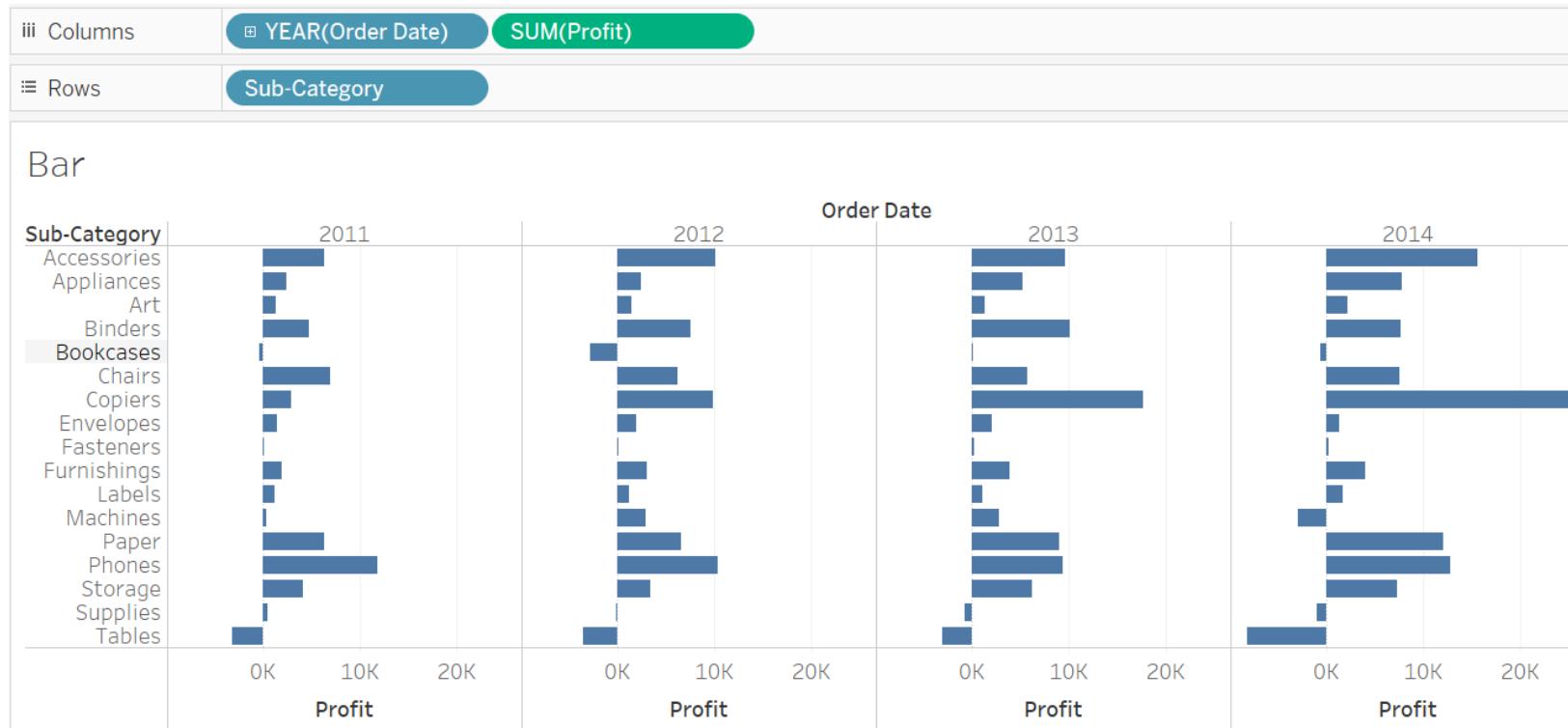
Exploration 2 : Horizontal Bar Chart

Question : What is the year-on-year change in profits by sub-category?

Drag **Sub-Category** to **Rows (y-axis)**

→ Drag **Profit** to **Columns (x-axis)**

→ To further segregate by years → Drag **Order Date** to **Columns (x-axis)**



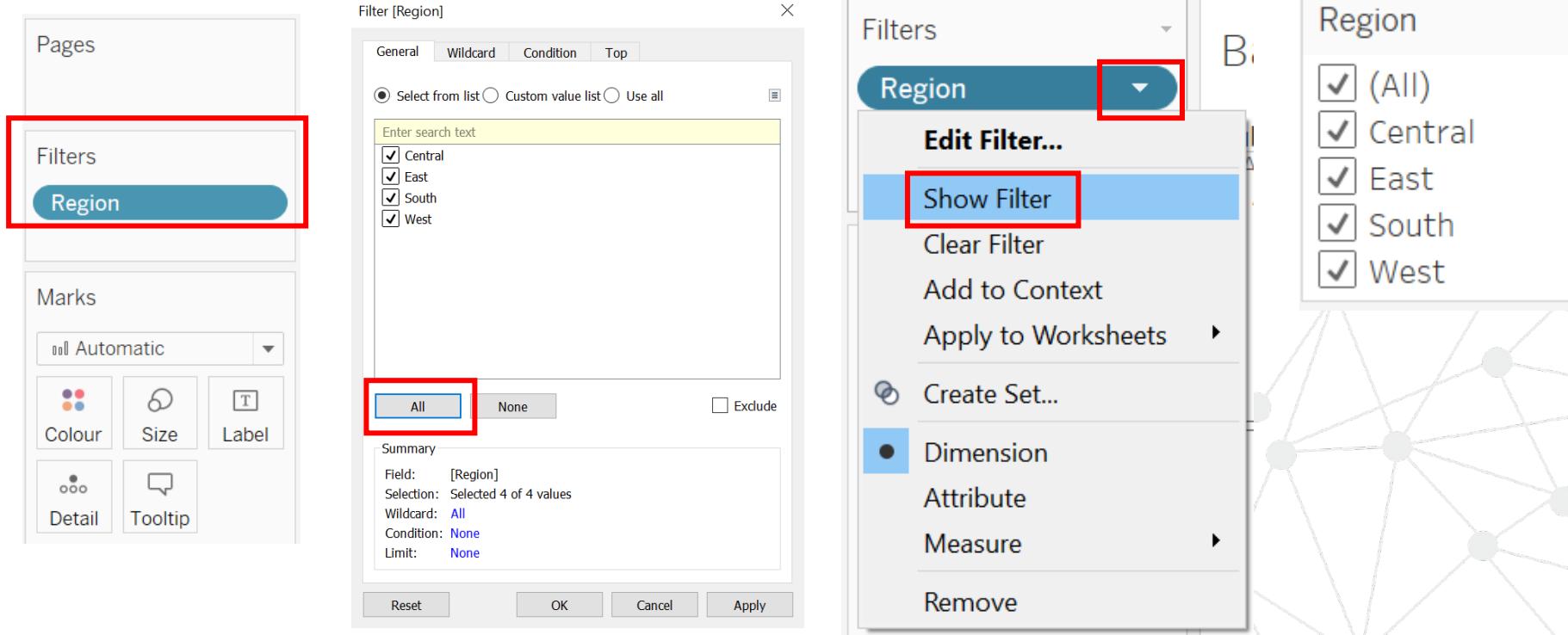
Exploration 2 : Horizontal Bar Chart

Question : What is the year-on-year change in profits by sub-category?

Drag and drop **Region** to **Filters** → Click **All** to select all regions → **OK**

Click on ▾ next to **Region** in **Filters** → Select **Show Filter**

You should see the filter on the right side.



Exploration 2 : Horizontal Bar Chart

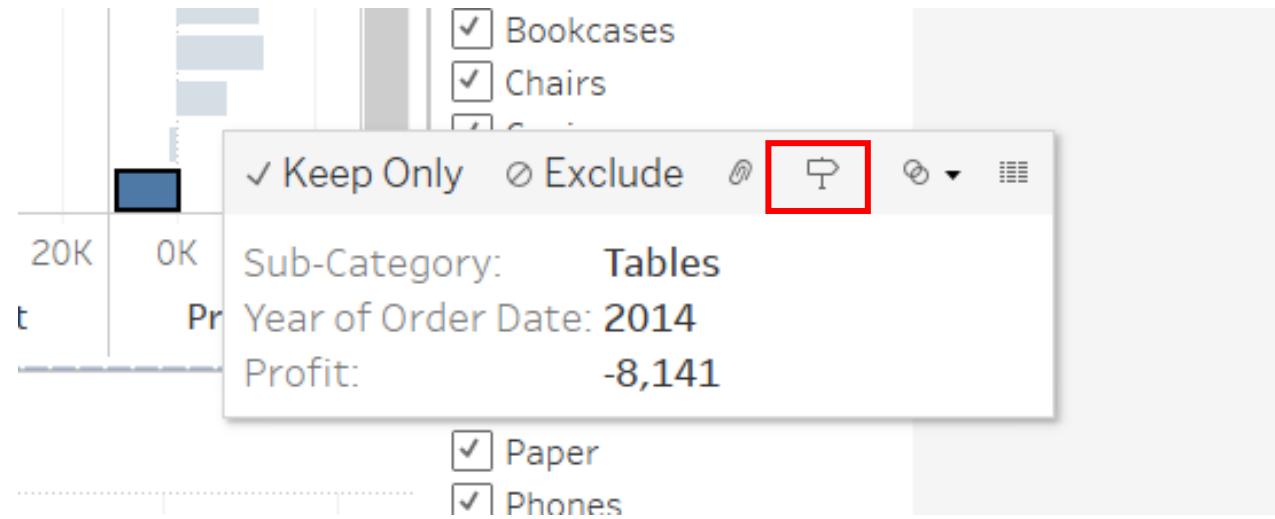
Question : What is the year-on-year change in profits by sub-category?

Create another filter for Sub-Category in similar fashion.
You can now use the filters for analysis.



Exploration 2 : Horizontal Bar Chart

Probe further : Why is there a drop in profit for Tables?



Right-click on the bar for Tables in 2014 → Select **Data Guide**

Explanations

Explore underlying values for Tables, 2014

Low Sum of Profit -8,141
Sum of Profit

Other things to explore

What is unique about Tables, 2014?

Select **Explanations** → sum of profits → extreme values



Analysis

Please do the following and record your answers.

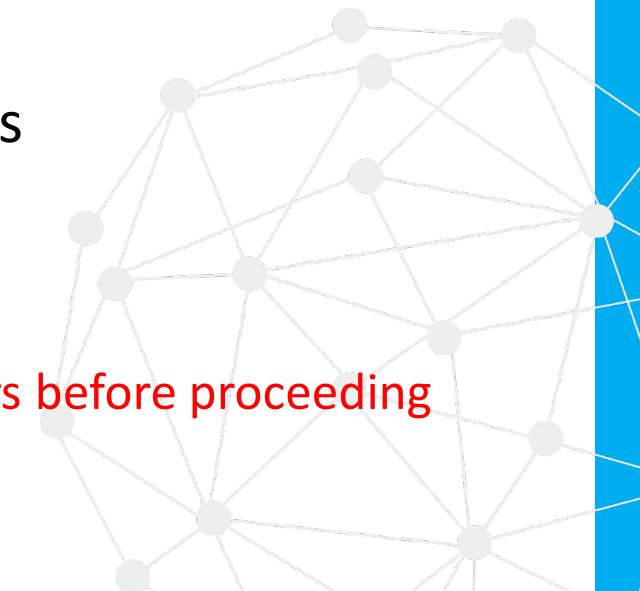


3. Which sub-category has a steady **increase** in profit over the years?

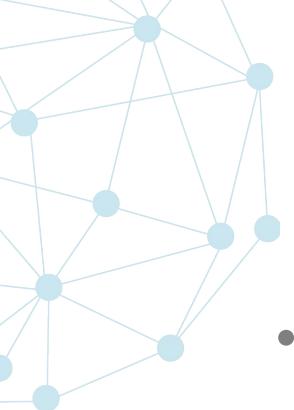
- a. Bookcases b. Tables c. Copiers d. Binders

4. Which sub-category has a steady **decrease** in profit over the years?

- a. Bookcases b. Tables c. Copiers d. Binders



Remove all filters before proceeding



Exploration 3

- Start with a hypothetical question :
Which is the best/worst performing state/region?
- How can you find the answer?
 - Since this involves a geographical feature, we will use a **map**
 - Then analyze to get the answer.

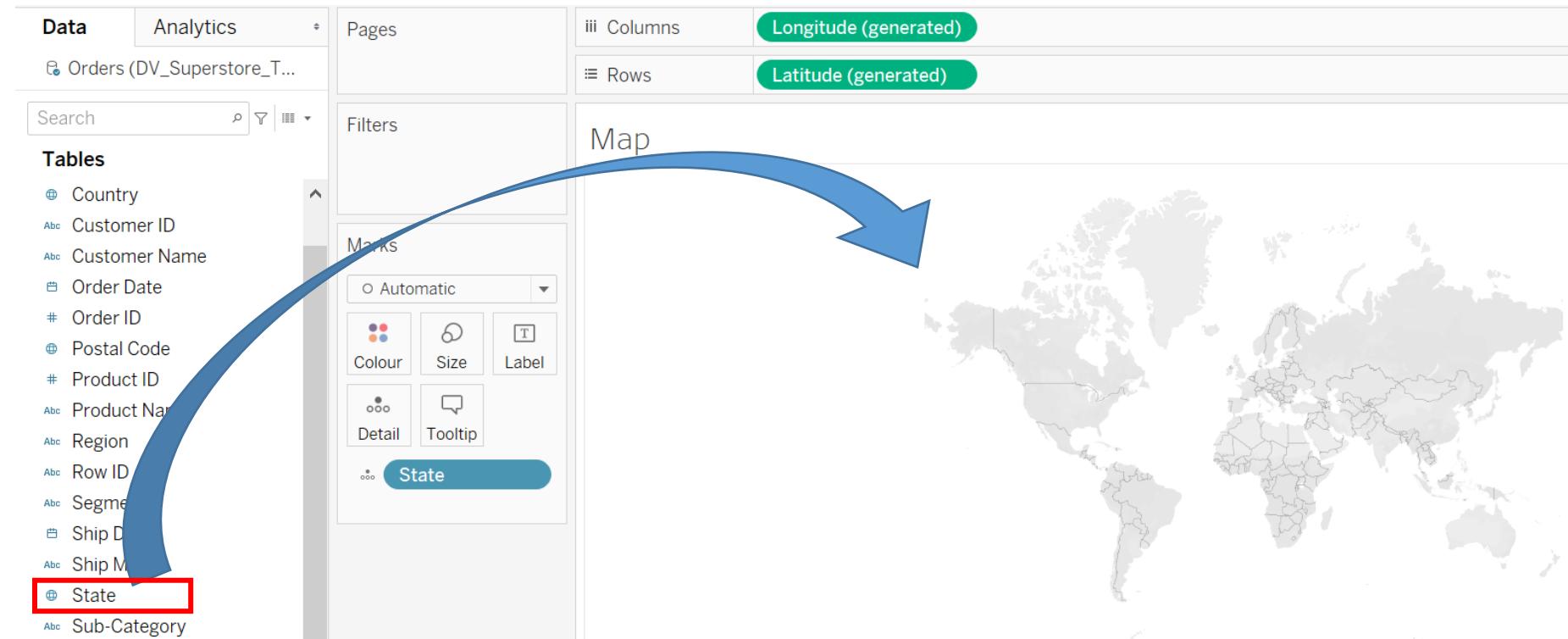


Add a new sheet
Rename this sheet as **Map**

Exploration 3 : Map

Question : Which is the best/worst performing state/region?

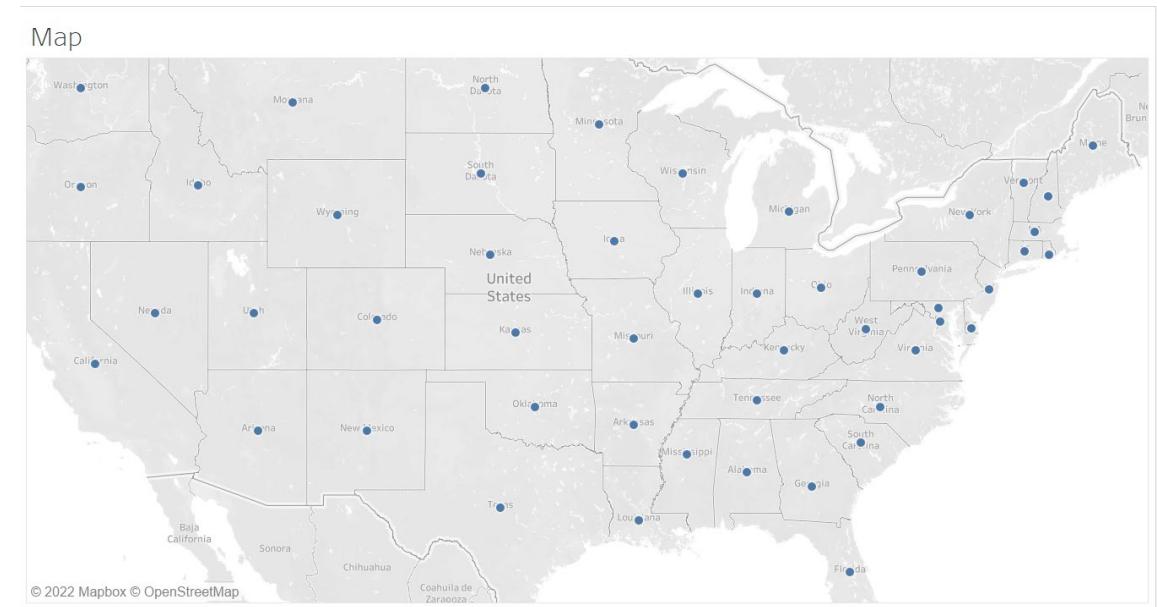
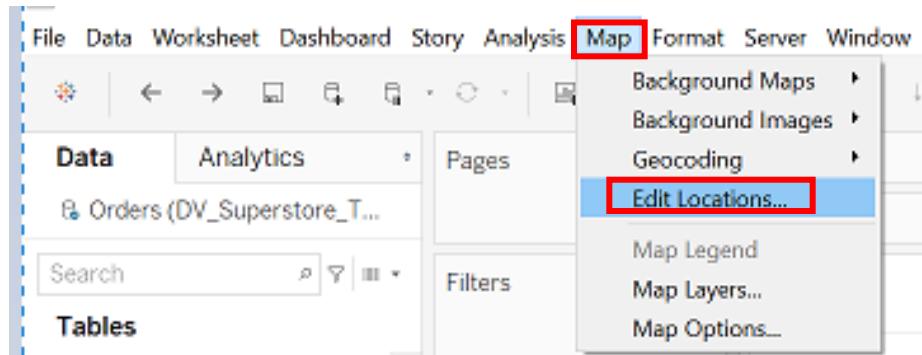
Click **State** in the **Field** panel on the right → A **Map** will automatically be created



Exploration 3 : Map

Question : Which is the best/worst performing state/region?

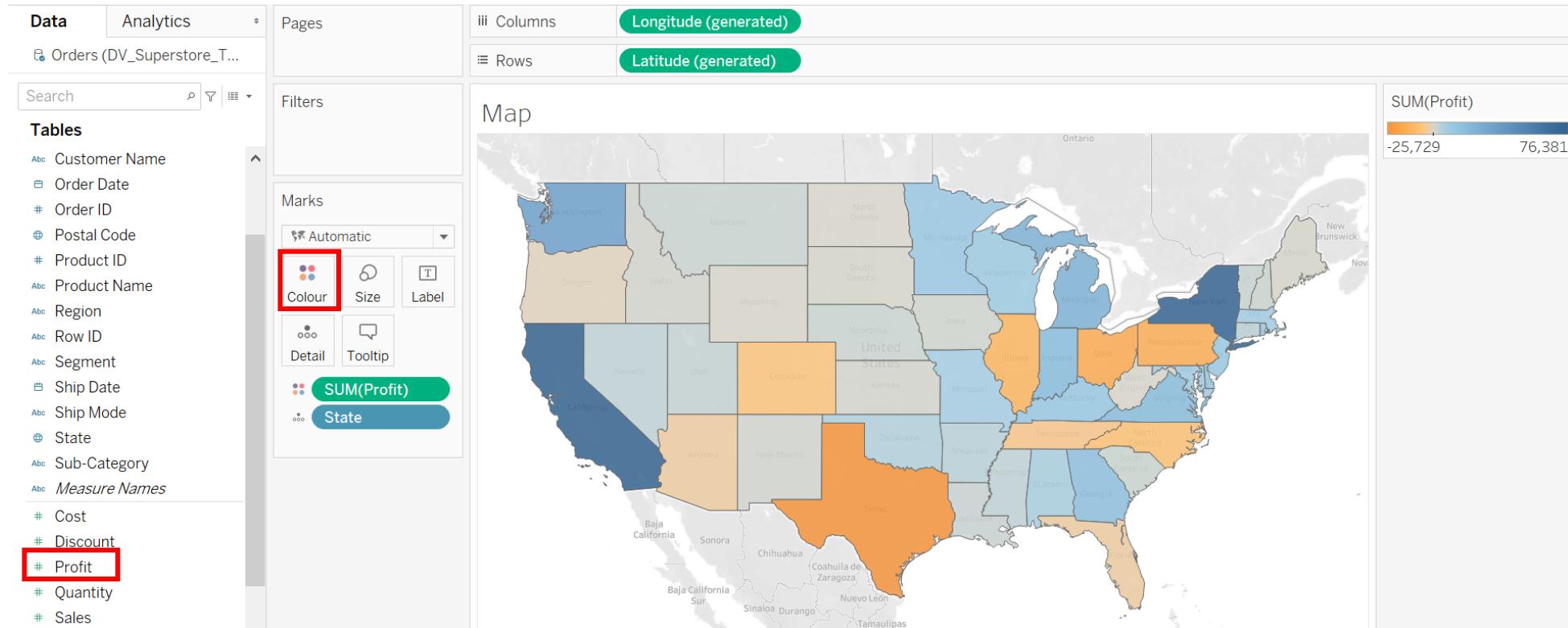
Click **Map** (tab at the top) → Select Edit Locations → Select USA → the map will zoom in to USA



Exploration 3 : Map

Question : Which is the best/worst performing state/region?

Drag Profit to Colour Marks Card → Hover over each state to see the tooltips





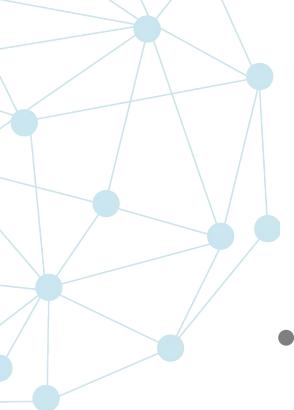
Analysis



Please do the following and record your answers.

5. Which are the **top 2** states by profit?
 - a. California and Washington
 - b. California and New York
 - c. Texas and Ohio
 - d. Texas and Illinois

 6. Which are the **bottom 2** states by profit?
 - a. California and Washington
 - b. California and New York
 - c. Texas and Ohio
 - d. Texas and Illinois
- 

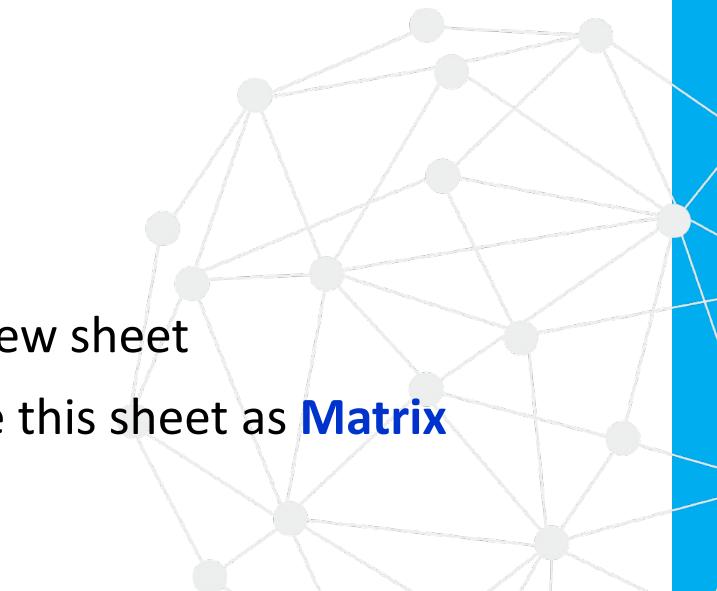


Exploration 4

- Start with a hypothetical question :

For each region, is there any difference in performance by sub-category?

- How can you find the answer?
 - Since this involves 2 categorical data, we will use a **Matrix** (similar to CrossTab node in KNIME)
 - Then analyze to get the answer.

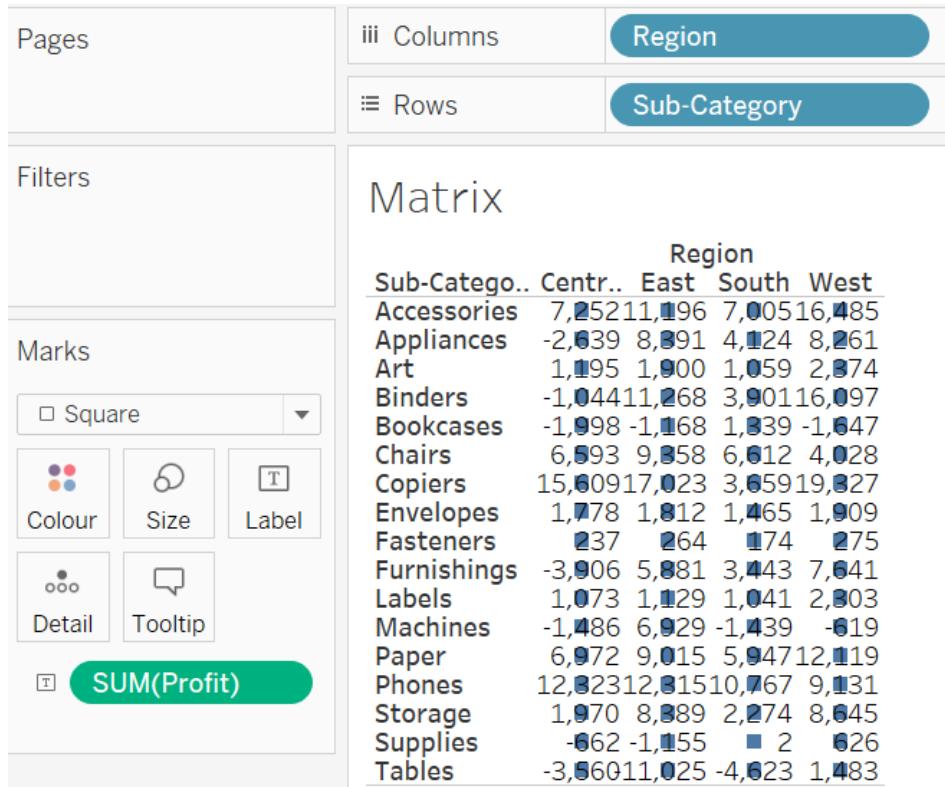


Add a new sheet
Rename this sheet as **Matrix**

Exploration 4 : Matrix

Question : For each region, is there any difference in performance by sub-category?

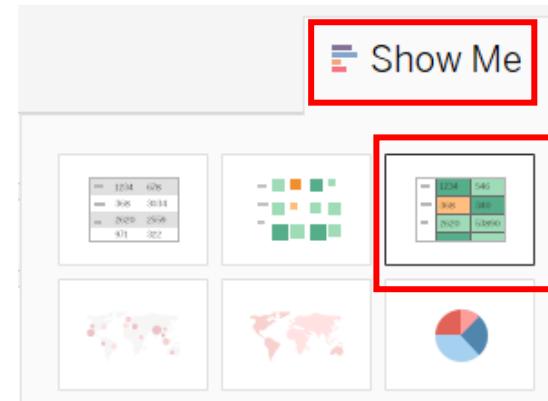
- Drag **Region** to **Columns** and **Sub-Category** to **Rows**
- Drag **Profits** to **Label**



Exploration 4 : Matrix

Question : For each region, is there any difference in performance by sub-category?

Click on **Show Me** > Select **Highlight Table**
→ The table will become short and wide.

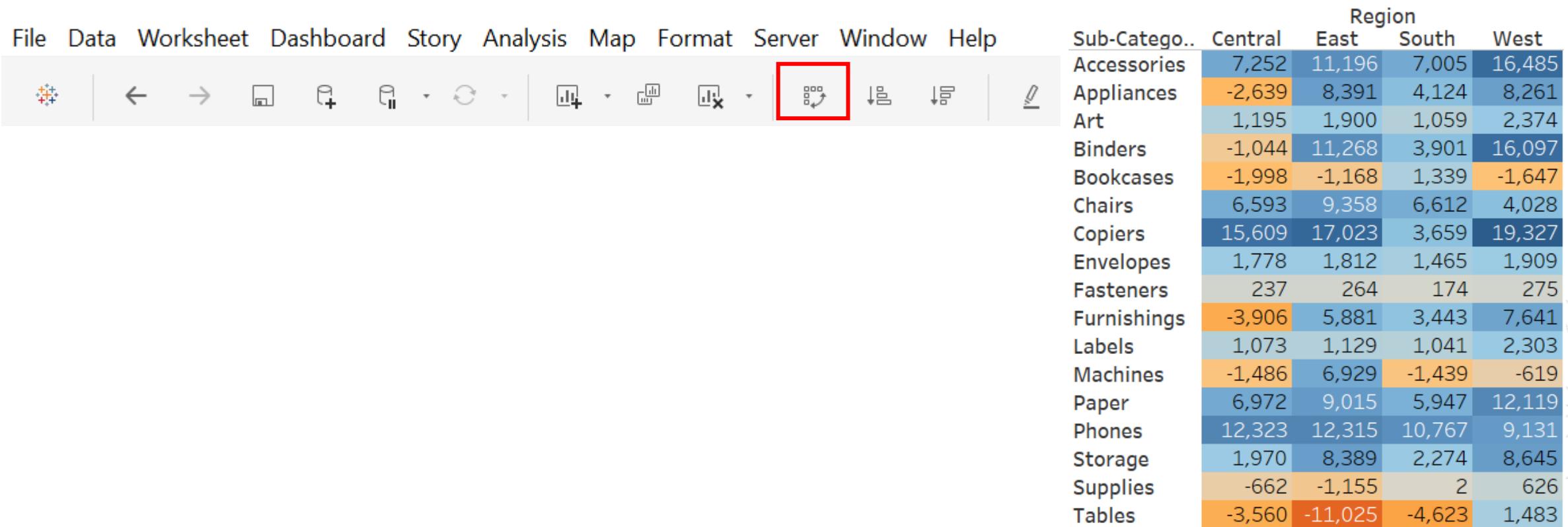


Region	Sub-Category															
	Accesso..	Applian..	Art	Binders	Bookca..	Chairs	Copiers	Envelop..	Fastene..	Furnish..	Labels	Machin..	Paper	Phones	Storage	Supp..
Central	7,252	-2,639	1,195	-1,044	-1,998	6,593	15,609	1,778	237	-3,906	1,073	-1,486	6,972	12,323	1,970	-1,000
East	11,196	8,391	1,900	11,268	-1,168	9,358	17,023	1,812	264	5,881	1,129	6,929	9,015	12,315	8,389	-1,000
South	7,005	4,124	1,059	3,901	1,339	6,612	3,659	1,465	174	3,443	1,041	-1,439	5,947	10,767	2,274	-1,000
West	16,485	8,261	2,374	16,097	-1,647	4,028	19,327	1,909	275	7,641	2,303	-619	12,119	9,131	8,645	-1,000

Exploration 4 : Matrix

Question : For each region, is there any difference in performance by sub-category?

Click on the **Swap** Columns and Rows if needed (found to the left of sort ↗ and sort ↘ icons).



The screenshot shows a software interface with a menu bar (File, Data, Worksheet, Dashboard, Story, Analysis, Map, Format, Server, Window, Help) and a toolbar with various icons. A red box highlights the 'Swap' icon (a 2x2 grid with arrows) located between two sort icons (↗ and ↘). To the right is a matrix table titled 'Region' with columns for Central, East, South, and West. The rows represent different sub-categories: Accessories, Appliances, Art, Binders, Bookcases, Chairs, Copiers, Envelopes, Fasteners, Furnishings, Labels, Machines, Paper, Phones, Storage, Supplies, and Tables. Each cell contains a numerical value.

Sub-Catego..	Central	East	South	West
Accessories	7,252	11,196	7,005	16,485
Appliances	-2,639	8,391	4,124	8,261
Art	1,195	1,900	1,059	2,374
Binders	-1,044	11,268	3,901	16,097
Bookcases	-1,998	-1,168	1,339	-1,647
Chairs	6,593	9,358	6,612	4,028
Copiers	15,609	17,023	3,659	19,327
Envelopes	1,778	1,812	1,465	1,909
Fasteners	237	264	174	275
Furnishings	-3,906	5,881	3,443	7,641
Labels	1,073	1,129	1,041	2,303
Machines	-1,486	6,929	-1,439	-619
Paper	6,972	9,015	5,947	12,119
Phones	12,323	12,315	10,767	9,131
Storage	1,970	8,389	2,274	8,645
Supplies	-662	-1,155	2	626
Tables	-3,560	-11,025	-4,623	1,483



Analysis

Please do the following and record your answers.



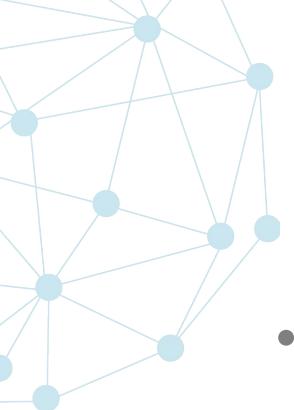
7. Which is the **best** performing by sub-category and region?

- a. Fasteners in the South
- b. Copiers in the West
- c. Machines in the Central
- d. Tables in the East

8. Which is the **worst** performing by sub-category and region?

- a. Fasteners in the South
- b. Copiers in the West
- c. Machines in the Central
- d. Tables in the East

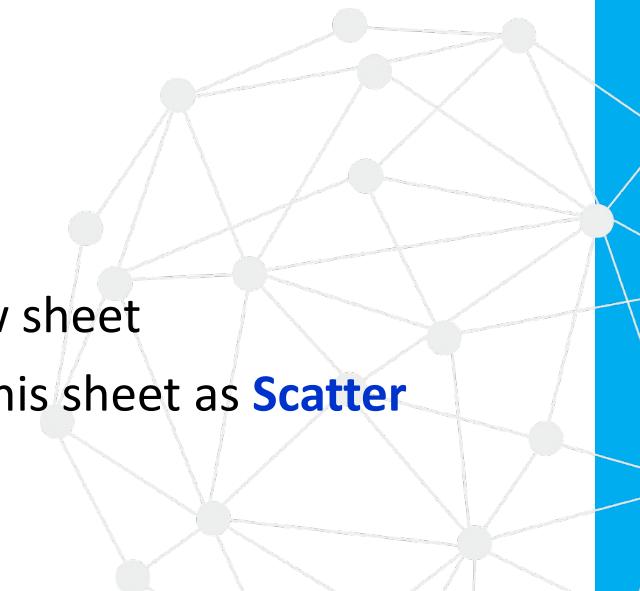




Exploration 5

- Start with a hypothetical question :
Are there any sub-categories with high sales but low profits?

- How can you find the answer?
 - Since this involves 2 numeric variables, we will use a **scatter chart**
 - Then analyze to get the answer.

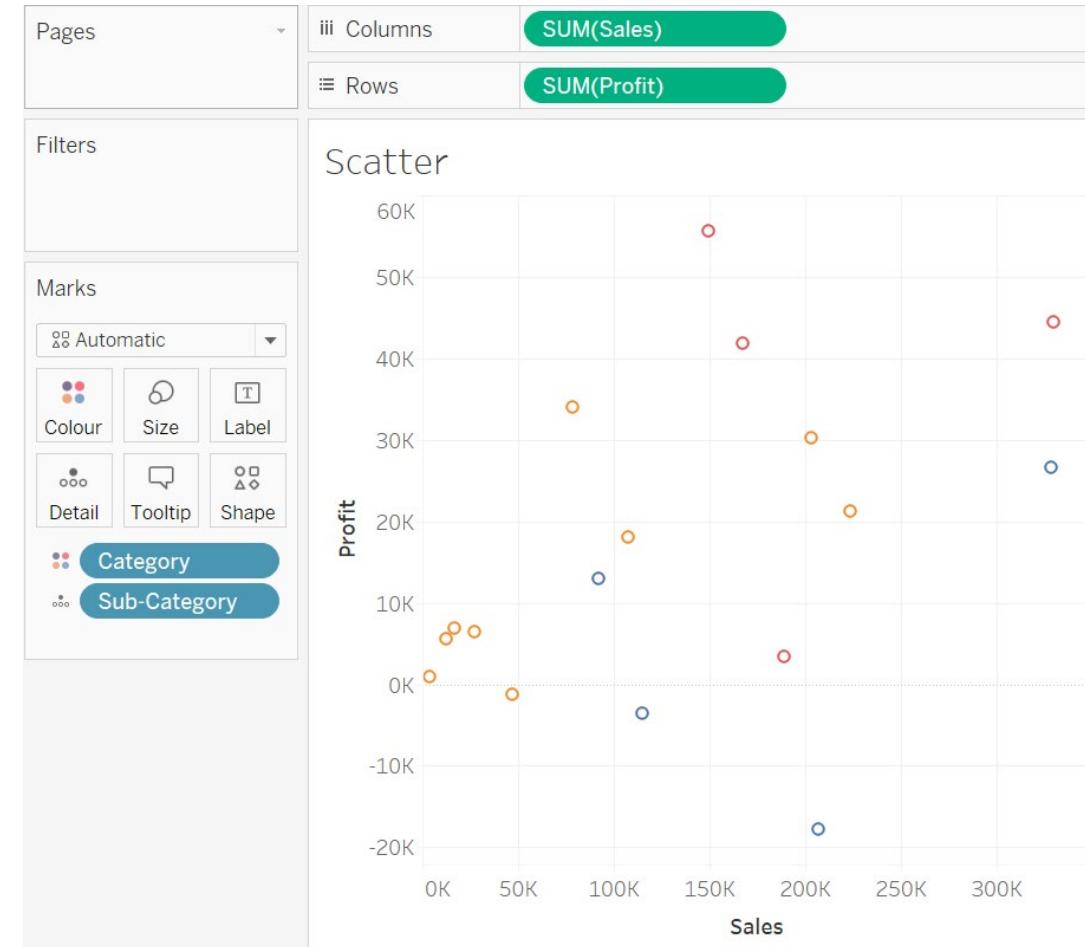


Add a new sheet
Rename this sheet as **Scatter**

Exploration 5 : Scatter Chart

Question : Are there any sub-categories with high sales but low profits?

Drag **Sales** to **Columns (x-axis)**
→ Drag **Profit** to **Rows (y-axis)**
→ Drag **Sub-Category** to **Details**
→ Drag **Category** to **Colours**





Analysis



Please do the following and record your answers.

9. Which sub-category has **high sales** but **low profit**?

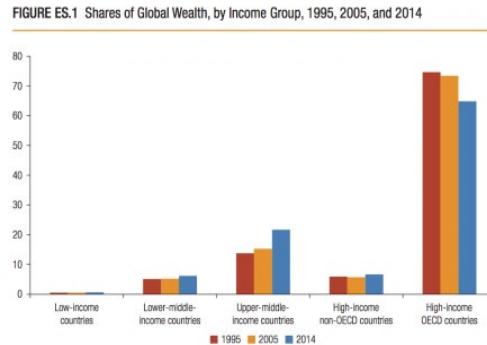
- a. Fasteners
- b. Copiers
- c. Tables
- d. Bookcases

10. Which sub-category has **mid-level sales** but **high profit**?

- a. Fasteners
- b. Copiers
- c. Tables
- d. Bookcases

Data Exploration

This is the approach we took:



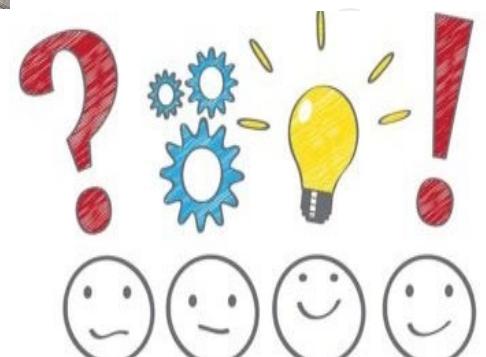
Explore with charts



Ask more questions



Explore further



Until insights are found

You have come to the end of this exercise.

Congrats for successfully using the navigation approach and finding some really good insights for the dataset.

Continue to practice using this approach until it becomes second nature to you.



What else can we do for Data Exploration?

We did not cover the Exploratory Data Analysis stage, where we do the **initial analysis** to **familiarize** ourselves with the data. Common questions to ask revolves around the typical values and their variation or outliers, searching for correlation and trends over time.

We have attempted to do Exploratory Data Analysis in our **DAVA Practical Sessions** already. There are also many **software tools** that **augment**/**self-discover** this part based on the questions above.

You should definitely look into this initial stage when dealing other datasets.



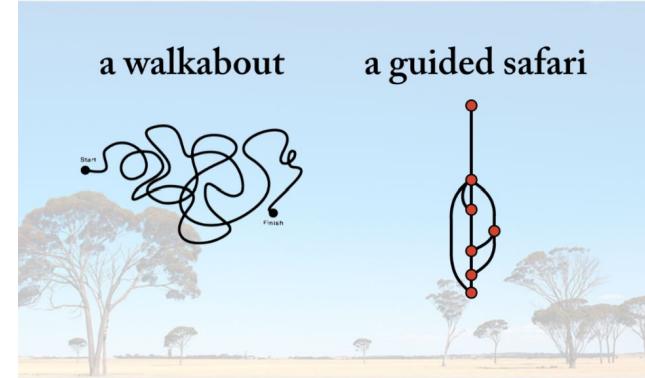
Data Visualisation - Explore



P03a - Data Visualisation: Explore

Read this article :

<https://www.juiceanalytics.com/writing/5-differences-between-data-exploration-and-data-presentation>



Summarize the **6 differences** between Data Exploration and Data Visualisation in terms of the:

1. Audience - who is the data for?
2. Message - what do you want to say?
3. Explanation - what does the data mean?
4. Visualisation - how do you show the data?
5. Goal — What should I do about the insights?
6. Interactions — How are data insights created and shared?

Note : The term ***Data Presentation*** mentioned in the article is equivalent to ***Data Visualisation*** for our purpose.

Image taken from <https://www.juiceanalytics.com/writing/5-differences-between-data-exploration-and-data-presentation>

Data Visualisation - Explain





What is Data Visualisation?

In the **Data Exploration** stage, you **ideate and expand**.

It can feel like a maze at times but the joy of solving the puzzle and generating the insights can be very empowering.

Now is the time to **focus and consolidate**, and we are ready to talk about **Data Visualisation**.

As we move **from** Data Exploration to Data Visualisation, we **detach from "self"** to **focus** on the needs of **"others"**.



The ultimate aim to **communicate**. So, present your solved data puzzle in a visual form that makes it **simple and intuitive** for your audience to understand.



How to pick the right charts for your visualisation?

It really depends on your objective.

What do you want your audience to get out of the chart?

If used for the right purpose, your chart can drive the message of your data across to your audience effectively.

These are 4 common objectives:

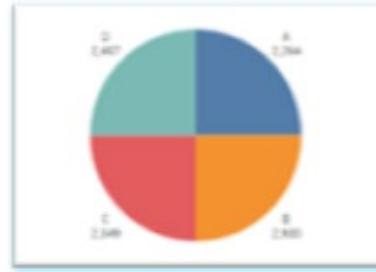
- Comparison
- Composition
- Distribution
- Relationship





How to pick the right charts for your visualisation?

- Consider the following charts and group them in the following categories: Comparison, Composition, Distribution, Relationship



Pie Chart



Line Chart



Stacked Bar



Box Plot



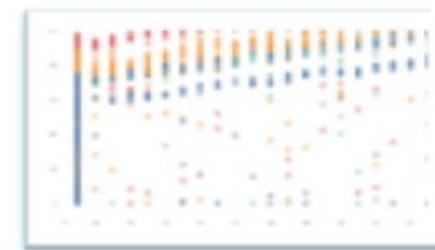
Bar Chart



Bubble Chart



Histogram



Scatter Plot



Summary on picking the right chart

Chart Suggestion

Composition

Comparison

Relationship

Distribution

Please refer to the **Concept** folder of this week to learn more about **Displaying Data** and **How To Choose The Right Chart**.

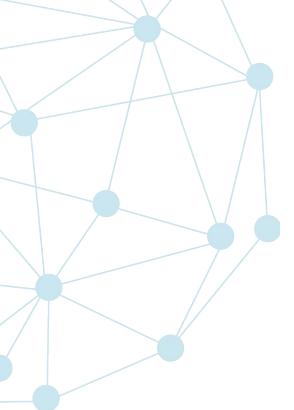


Data Visualisation vs Dashboard

The term Dashboard crops up often in the discussion on Data Visualisation.

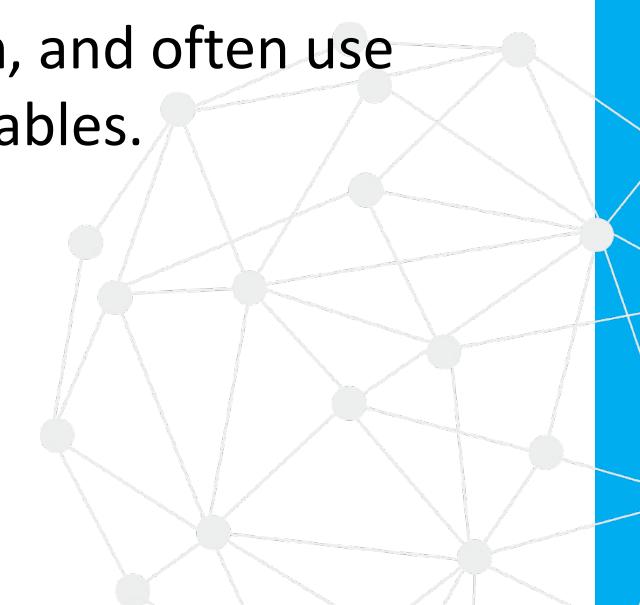
- Is it subset of Data Visualisation?
- How different is it from Data Visualisation?





Data Visualisation vs Dashboard - Similarity

This Tableau website (<https://www.tableau.com/learn/articles/dashboards/what-is> - optional to read) has a simple and neat explanation:

- **Data visualization** is a way of presenting data in a visual form to make it easier to understand and analyze.
 - **Data dashboards** are a **summary of different, but related data sets**, presented in a way that **makes the related information easier to understand**. Dashboards are a **type of data visualization**, and often use common visualization tools such as graphs, charts, and tables.
- 



Data Visualisation vs Dashboard - Difference

This website (<https://poonamrao.medium.com/how-does-a-dashboard-differ-from-a-visualization-e1aaf5cdf9> - optional to read) tells us the difference:

- Dashboards take data visualization to the next level, possibly **adding interactivity** and furthering our understanding of the insights we can gain from the basic visualizations.
 - While there could be static dashboards, the **well-designed** ones are **interactive**, allowing the **audience** to see the **relationships** within data points and **explore** the dataset **themselves**.
- 



Data Visualisation vs Dashboard - Takeaway

- The **key point** here is that dashboard should allow for some form of **interactivity** such as to sort/filter/drill down etc.
- Regardless of whether you are doing a live presentation or allowing your audience to DIY with the dashboard, it should help them to **see relationships and the inter-play between the charts**.
- The ultimate objective is to **elicit curiosity** and **engage them**.

Please refer to the **Concept** folder of this week to learn more about **Types of Dashboards, Design Designs, Analytical Interactions**.





Hands On

Data Visualisation



P03b - Data Visualisation: Hands-on

- On LMS, head to “Activity 2: Data Visualisation” > “Practical Questions”. Download practical sheets and datasets.
- This is the same dataset as the previous section on Data Exploration.
- We will learn to do :
 - Create a dashboard and see the interactivity at play.





Dashboard

It's time to put our visualisations together

- Create a **dashboard**
- Then analyze to get the answer.

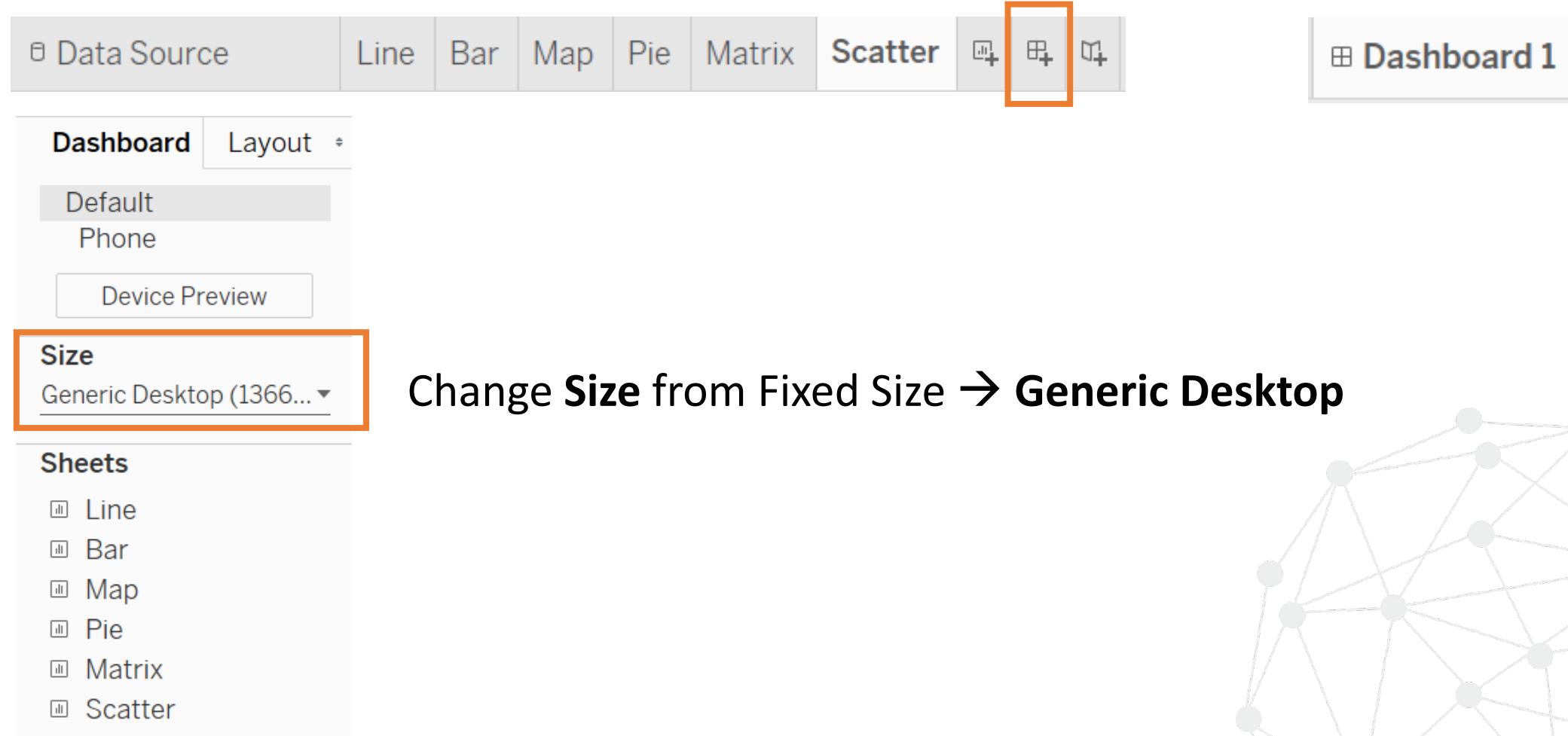


Add a new page to your report
Rename this report page as **Desktop Dashboard**



Dashboard

Click **New Dashboard** > You will see a blank canvas for creating a dashboard



The screenshot shows the dashboard creation interface. At the top, there is a navigation bar with tabs: Data Source, Line, Bar, Map, Pie, Matrix, Scatter, and a New Dashboard button (indicated by a plus sign icon) which is highlighted with an orange box. To the right of the tabs, there is a section titled "Dashboard" with a "Layout" dropdown menu showing "Default" and "Phone" options, and a "Device Preview" button. Below this, there is a "Size" section with a dropdown menu set to "Generic Desktop (1366...)" which is also highlighted with an orange box. On the left, there is a sidebar titled "Sheets" with icons for Line, Bar, Map, Pie, Matrix, and Scatter.

Change Size from Fixed Size → Generic Desktop

Dashboard

Drag and drop Map, Bar, Line and Scatter sheets to the canvas as shown :

Dashboard Layout

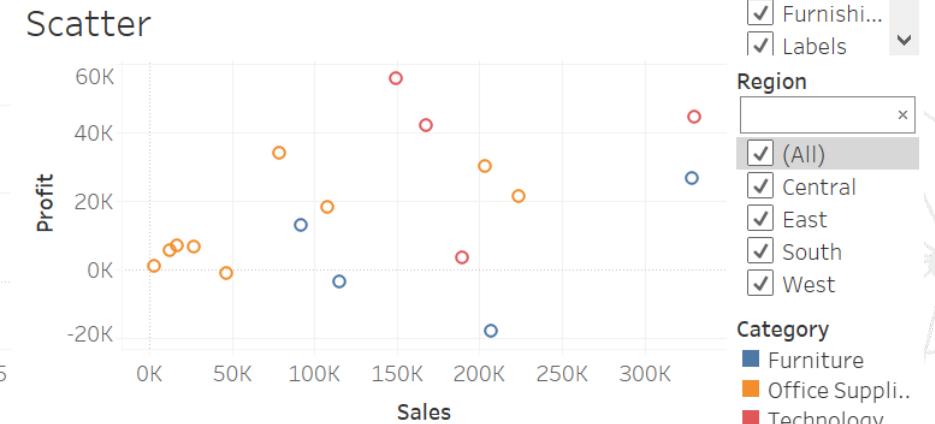
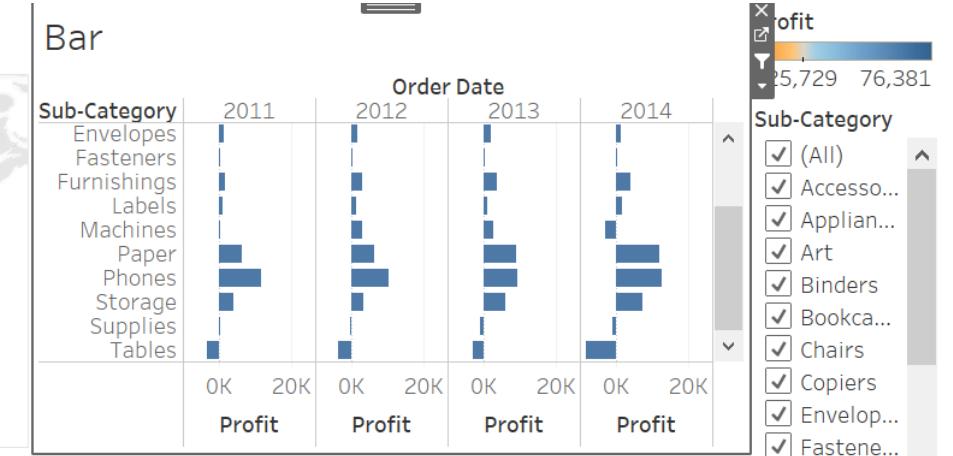
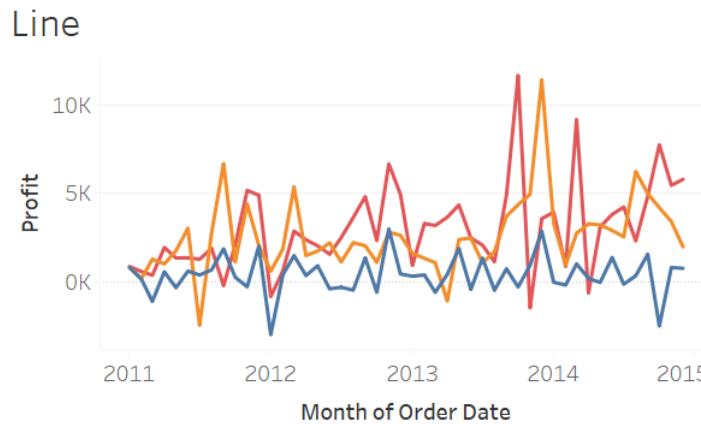
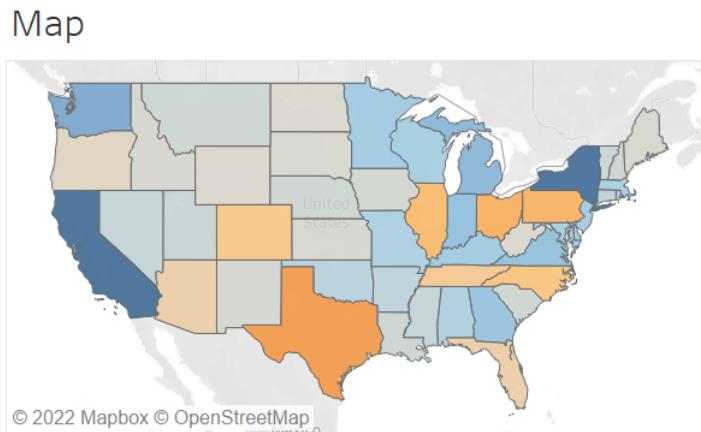
Default Phone

Device Preview

Size Generic Desktop (1366...)

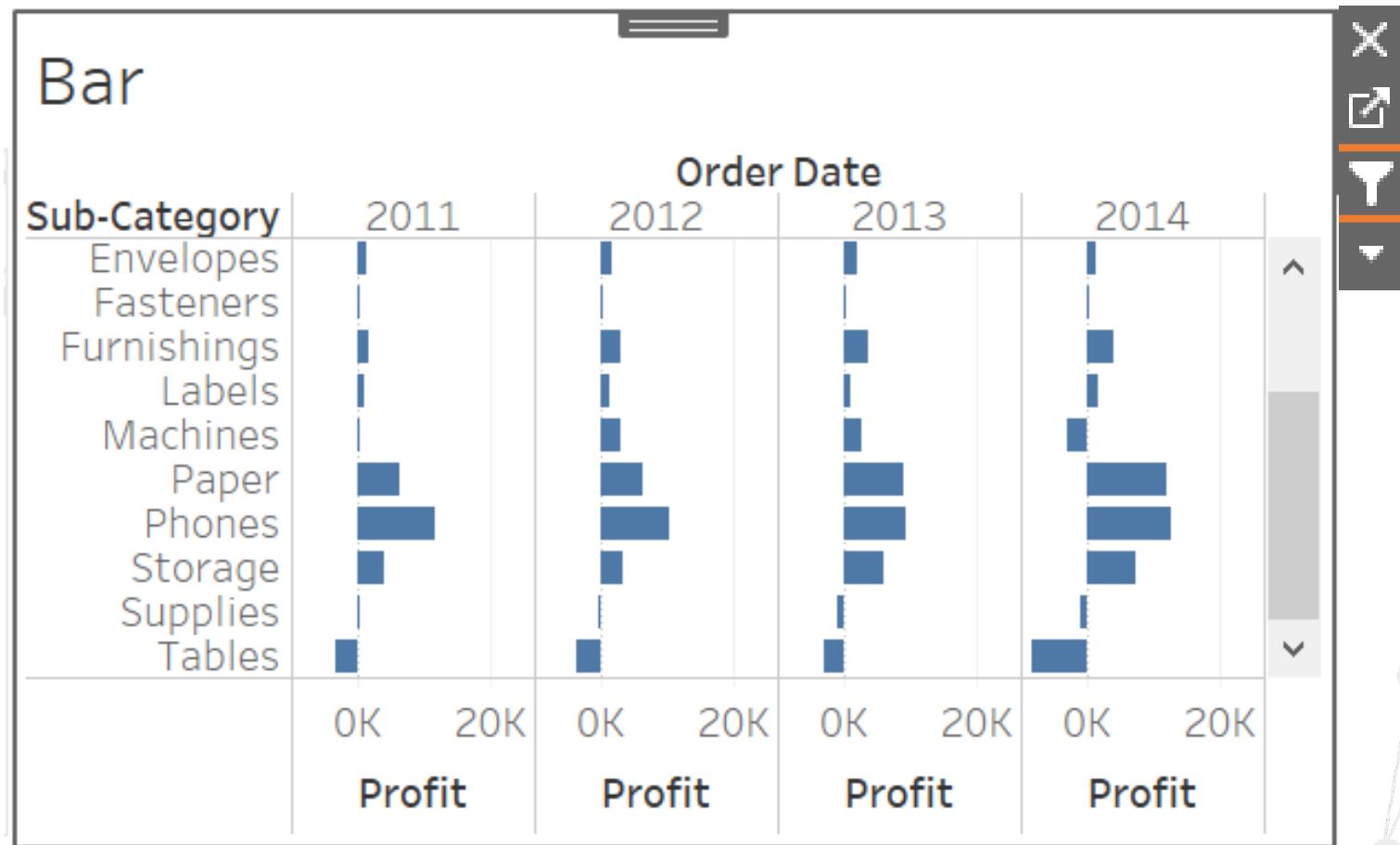
Sheets

- Line
- Bar
- Map
- Pie
- Matrix
- Scatter



Dashboard

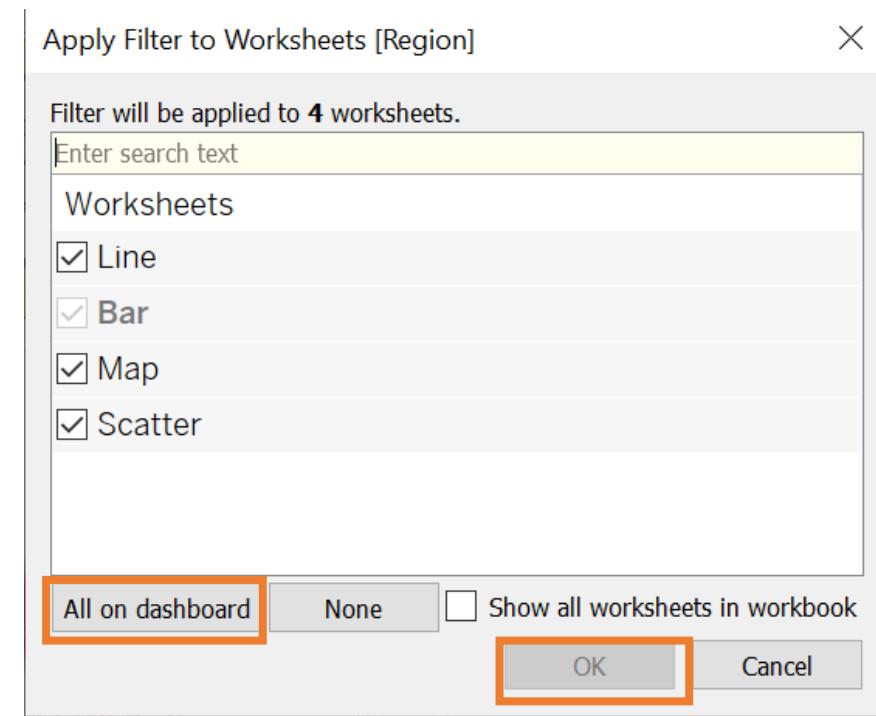
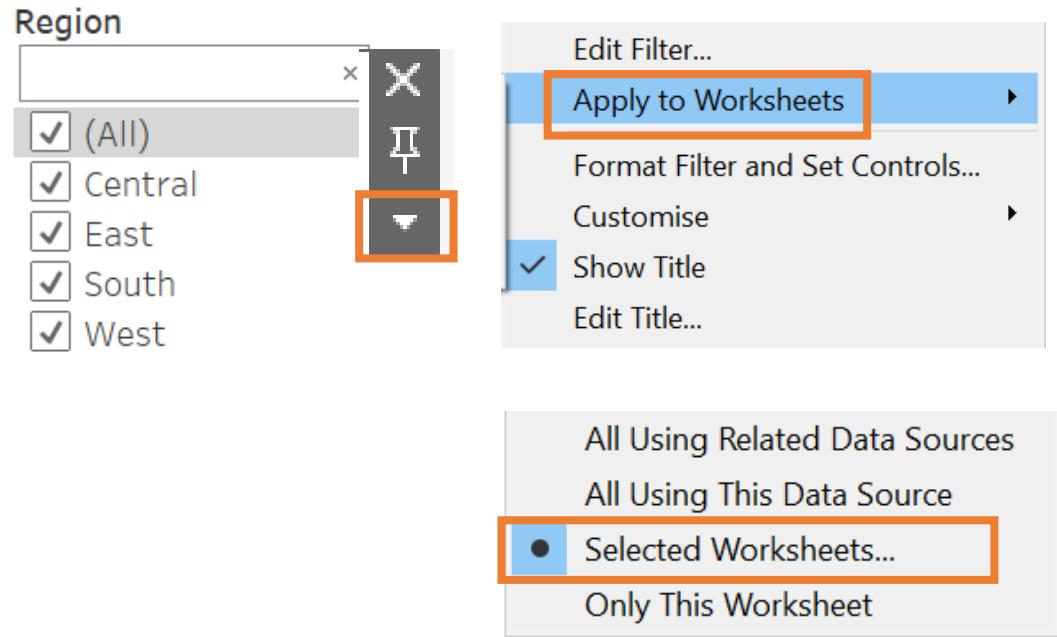
Click on **Use this filter** in the Bar chart to control the other visuals in this dashboard.



Dashboard

Click on ▼ next to **Region** filter → Select **Apply to Worksheets** → Select **Selected Worksheets** → click on All on dashboard → **OK**

This will connect the Region filter to all charts in the dashboard for analysis later.



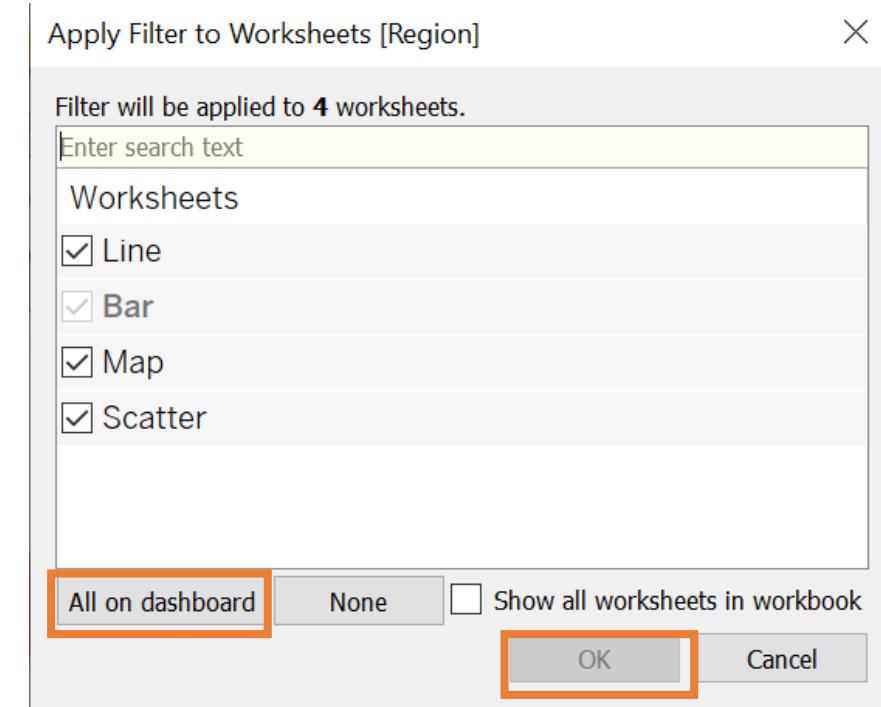
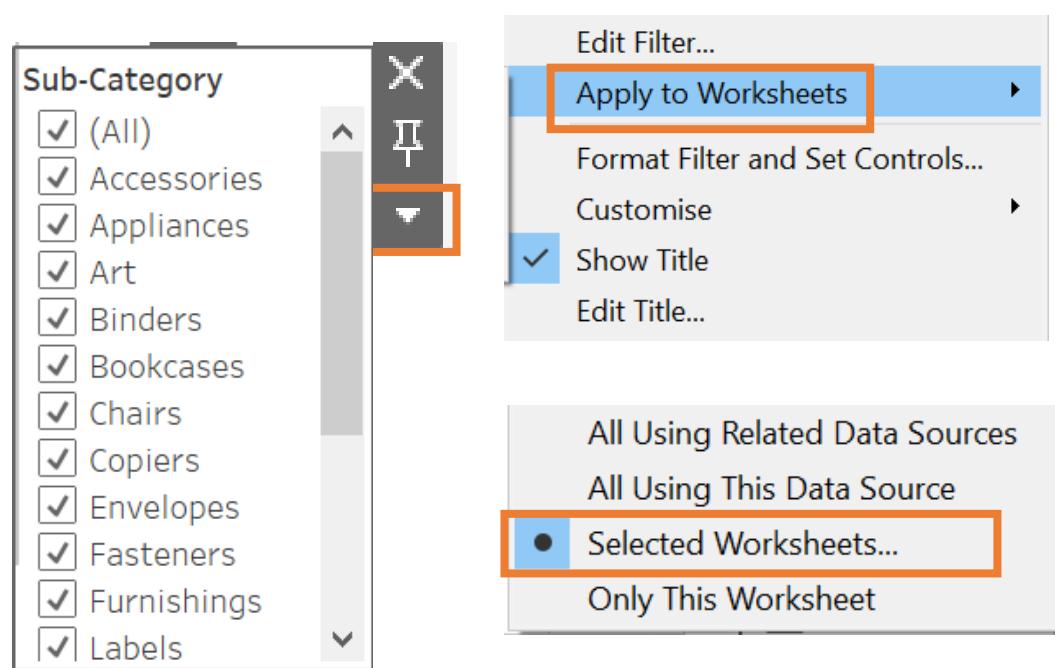
Dashboard

Do the same for the **Sub-Category** filter.

Click on ▼ next to **Sub-Category** filter → Select **Apply to Worksheets** →

Select **Selected Worksheets** → click on All on dashboard → **OK**

This will connect the Sub-Category filter to all charts in dashboard for our analysis later.





Analysis



Please do the following and record your answers.

1. Filter down to the **East** region. Then filter down to **Phones** sub-category.

Which **state** has **negative** profits over the 4 years?

- a. Maine
- b. Vermont
- c. Ohio
- d. New York

2. Filter down to the **Central** region. Then filter down to **Bookcases** sub-category.

Which **state** has **negative** profits over the 4 years?

- a. South Dakota
 - b. Illinois
 - c. Wisconsin
 - d. Michigan
- 



Analysis

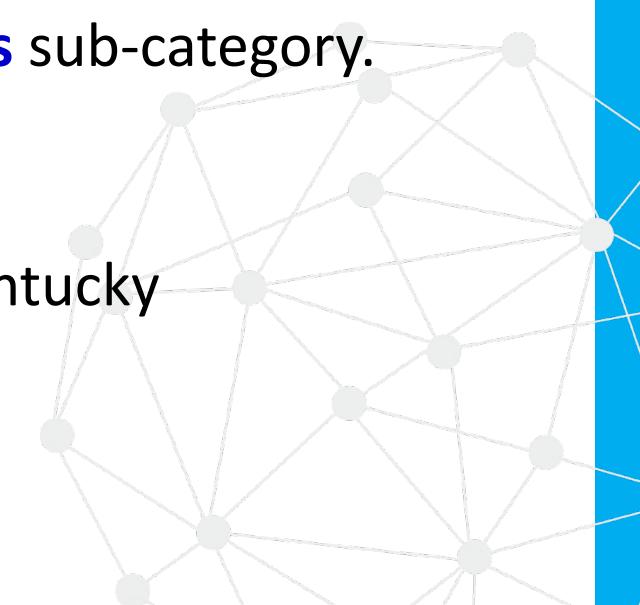


Please do the following and record your answers.

3. Filter down to the **West** region. Then filter down to **Storage** sub-category.
Which **state** has **positive** profits over the 4 years?

a. Oregon b. Montana c. Colorado d. Arizona

 4. Filter down to the **South** region. Then filter down to **Machines** sub-category.
Which **state** has **positive** profits over the 4 years?

a. Maine b. Florida c. North Carolina d. Kentucky
- 



Takeaways: What have we just done for Data Visualisation?

- We have worked on creating a dashboard from our earlier charts. It is a summary of **different, but related charts**, presented in a way that makes the related information easier to understand.
 - The aim is to **communicate** and make it easier for the audience to **take action or make decisions**.
 - By adding in filters to allow for **interactivity**, we have taken Data Visualisation to the next level. This will help audience **see the inter-play between the charts**.
 - The ultimate objective is to **elicit curiosity** and **engage them**.
- 



Takeaways: What else can we do for Data Visualisation?

- When moving from Data Exploration to Data Visualisation, there will be a stage when you need to consolidate and decide on which charts to use to communicate your findings.
 - Take the time to consider the purpose of each chart - **Comparison, Composition, Distribution, Relationship**.
 - If chosen properly, the right charts can drive the message of your data across to your audience more effectively.
 - You should definitely look into these 4 purposes when choosing the charts to use.
- 



Practical 3

<u>Before Class</u>	Concepts	Visual and analytical techniques for understanding and representing data patterns and relationships
<u>During Class</u>	Hands-on	Recap Data Exploration Data Visualisation Best Practices
<u>After Class</u>	Hands-on	<p><i>Revise today's class with LMS: Apr/Oct – Week X (...)</i></p> <p><i>Go through Additional Resources slides</i></p> <ul style="list-style-type: none">- <i>Read the common questions for EDA</i>- <i>Explore further on trend lines, forecast lines in Tableau</i>- <i>Pick up recurring words in exemplar examples</i>- <i>Watch video on Science of Data Visualisation (7min)</i>