

# **EXPERIMENT-1**

## **Aim:**

**Understanding Data, What is data, where to find data, Foundations for building Data Visualizations, Creating Your First visualization?**

## **Solution:**

### **What is Data?**

Data refers to raw facts, statistics, or information collected or stored in a structured or unstructured form. Data can take various forms, such as text, numbers, images, videos, and more. It is the foundation of all information and knowledge and is used in various fields for analysis, decision-making, and understanding trends and patterns.

### **Data can be categorized into two main types:**

- **Structured Data:** This type of data is organized into a specific format, such as tables or databases, and is easily searchable and analyzable. Examples include spreadsheets, relational databases, and CSV files.
- **Unstructured Data:** Unstructured data lacks a specific format and can include text documents, social media posts, images, audio recordings, and more. Analyzing unstructured data often requires advanced techniques like natural language processing and image recognition.

### **Where to Find Data?**

You can find data from various sources, depending on your specific needs:

- **Open Data Portals:** Many governments and organizations provide free access to a wide range of data through open data portals. Examples include Data.gov (United States) and data.gov.uk (United Kingdom).
- **Data Repositories:** Academic institutions, research organizations, and data enthusiasts often share datasets on platforms like Kaggle, GitHub, and the UCI Machine Learning Repository.
- **APIs (Application Programming Interfaces):** Some websites and services offer APIs that allow you to programmatically access and retrieve data. Examples include Twitter API, Google Maps API, and financial market APIs.
- **Web Scraping:** You can extract data from websites using web scraping tools and libraries like BeautifulSoup and Scrapy. However, be mindful of the website's terms of use and legal restrictions.
- **Surveys and Surveys:** You can conduct your own surveys or collect data through questionnaires and interviews.

- **IoT Devices:** Internet of Things (IoT) devices generate vast amounts of data that can be used for various purposes.
- **Commercial Data Providers:** Some companies specialize in selling datasets for specific industries, such as market research, finance, and healthcare.

## Foundations for Building Data Visualizations:

Creating effective data visualizations requires a strong foundation in several key areas:

- **Data Analysis:** Before creating visualizations, you should thoroughly analyze your data to understand its structure, relationships, and any patterns or trends. Exploratory data analysis (EDA) techniques can help with this.
- **Statistical Knowledge:** Understanding basic statistics is essential for making meaningful interpretations of data. Concepts like mean, median, standard deviation, and correlation are commonly used in data visualization.
- **Domain Knowledge:** Having knowledge of the specific domain or subject matter related to your data is crucial for creating contextually relevant visualizations. It helps you ask the right questions and provide valuable insights.
- **Visualization Tools:** Familiarize yourself with data visualization tools and libraries such as matplotlib, Seaborn, ggplot2, D3.js, and Tableau. Each tool has its strengths and can be used for different types of visualizations.
- **Design Principles:** Study design principles, including color theory, typography, and visual hierarchy, to create visually appealing and effective visualizations. Avoid common pitfalls like misleading visualizations.
- **Interactivity:** Learn how to add interactive elements to your visualizations to engage users and allow them to explore the data. This can be achieved using tools like JavaScript, Python libraries, or dedicated visualization software.

## Creating Your First Visualization:

To create your first data visualization, follow these general steps:

- **Select Your Data:** Choose a dataset that aligns with your goals and interests. Ensure that the data is clean and well-structured.
- **Define Your Objective:** Clearly define what you want to communicate or explore with your visualization. Are you looking to show trends, comparisons, or distributions?
- **Choose the Right Visualization Type:** Select a visualization type that suits your data and objectives. Common types include bar charts, line charts, scatter plots, histograms, and pie charts.
- **Prepare and Transform Data:** Preprocess your data as needed. This may involve aggregating, filtering, or transforming the data to fit the chosen visualization.
- **Create the Visualization:** Use a suitable tool or library to create your visualization. Customize it with labels, colors, and other design elements.

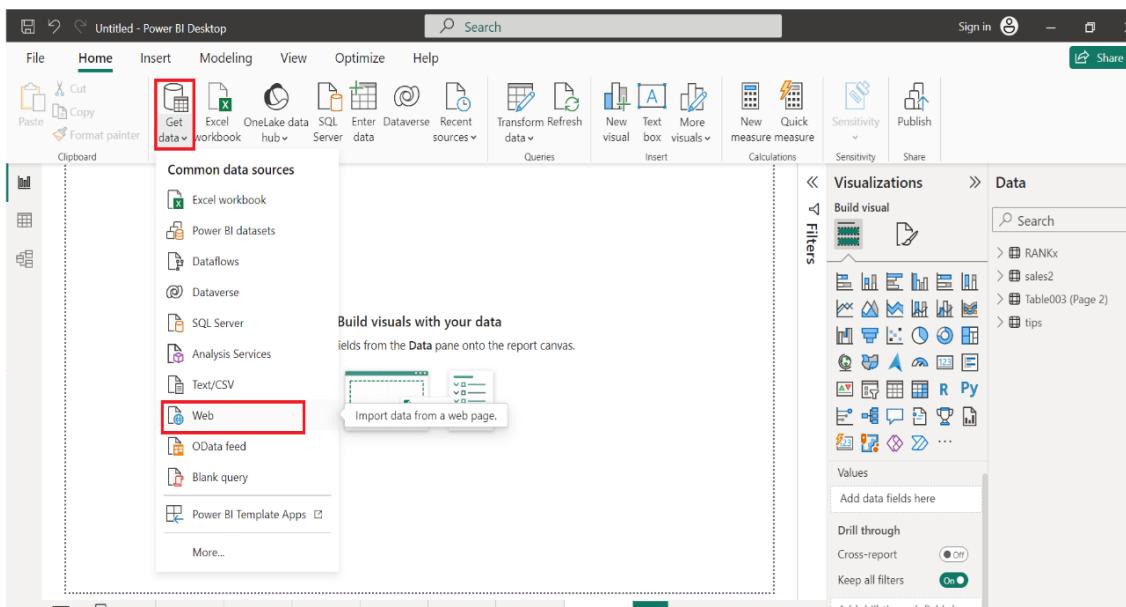
- **Interactivity (Optional):** If appropriate, add interactive features to your visualization to allow users to interact with the data.
- **Test and Iterate:** Review your visualization for accuracy and clarity. Seek feedback from others and make improvements as necessary.
- **Publish or Share:** Once you are satisfied with your visualization, publish it on a platform, embed it in a report, or share it with your intended audience.
- **Document and Explain:** Provide context and explanations for your visualization. Clearly communicate what the viewer should take away from it.
- **Maintain and Update:** If the data changes or new insights emerge, update your visualization accordingly.

## Example

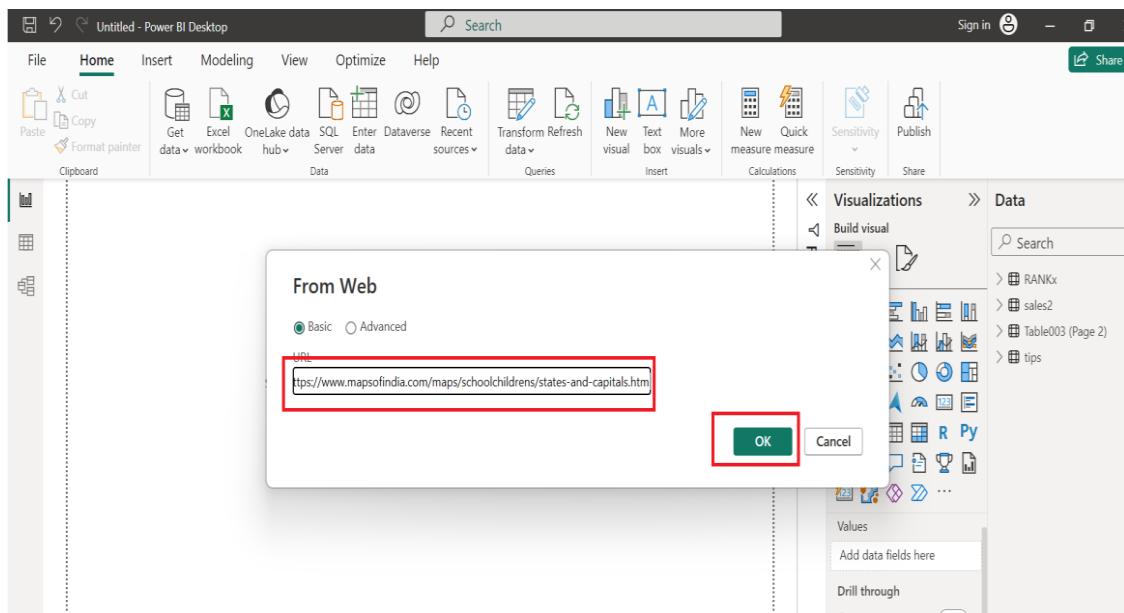
### 1. Create your first visualization on list of UTS, States and Capitals of India.

#### Solution:

1. Open power BI.



2. Open Google download the link for map of India UTS, states and Capitals and past in PowerBI URL



### 3. Select Table 6

The screenshot shows the Power BI Desktop interface with the 'Home' tab selected. The 'Navigator' pane on the left lists various tables, with 'Table 6' selected and highlighted with a red box. The main area displays a preview of 'Table 6' in 'Table View'. The data shows two columns: 'Column1' (List of States and Capitals of India) and 'Column2' (List of States and Capitals of India). The 'Transform Data' button at the bottom right of the preview area is highlighted with a red box.

### 4. Transform the data and made the changes necessary and load data

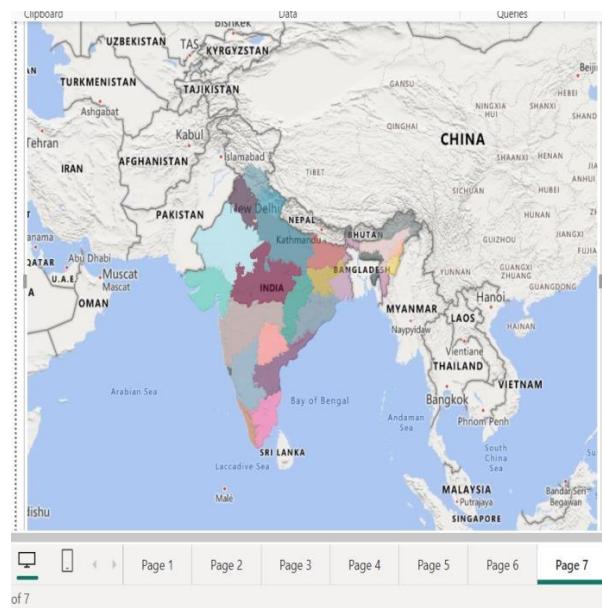
2 COLUMNS, 28 ROWS Column profiling based on top 1000 rows

PREVIEW DOWNLOADED AT 12:02 29-10-2023

## 5. Select the format you want to visualization.

## 6. Visualize your First Creation

## Output:



# EXPERIMENT-2

## Aim:

**Getting started with power BI Software using Data file formats, connecting your Data to power BI, creating basic charts (line, bar charts, Tree maps), Using the Navigation panel.**

## Solution:

Getting started with powerBI software is a great way to create data visualizations quickly and efficiently. Here are the steps to get started, including connecting your data to powerbi, creating basic charts like line charts, bar charts, and tree maps, and using the Show Me panel:

### 1. Download and Install PowerBI:

First,you'll need to download and install **PowerBI Desktop** Follow the installation instructions provided.

### 2. Prepare Your Data:

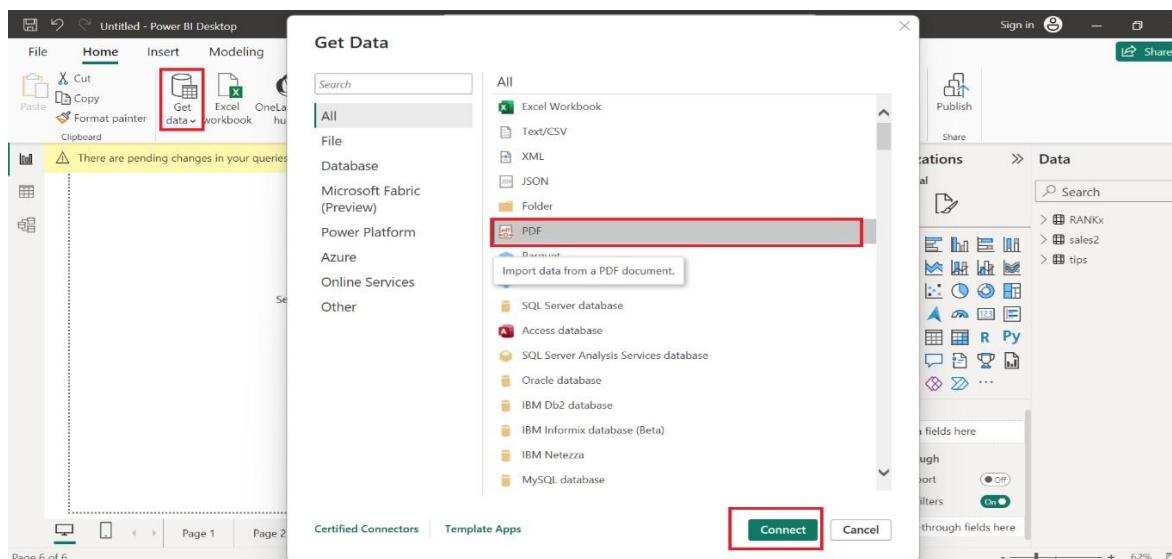
Before connecting your data to PowerBI, ensure that your data is in a suitable format. Common data file formats that PowerBI supports include **Excel (.xlsx)**, **CSV (.csv)**, and **pdf text files (.txt)**. Make sure your data is organized with headers for each column.

### 3. Connect Your Data to PowerBI:

#### 2.1 Launch PowerBI Desktop.

#### 2.2 Click on Get Data

#### 2.3 Choose the data source type (e.g., Excel, CSV, text file,pdf) and Select the data file(pdfsample) and click "Connect".



## 2.4 Select Table 3

The screenshot shows the Power BI Navigator interface. On the left, there's a tree view of data sources: 'pdfsample.pdf [6]' which contains 'Table001 (Page 1)', 'Table002 (Page 1)', and 'Table003 (Page 2)' (which is highlighted with a red box). Below these are 'Table004 (Page 2)', 'Page001', and 'Page002'. On the right, a preview of 'Table003 (Page 2)' is shown with the following data:

Speed (mph)	Driver	Car	Engine	Date
407.447	Craig Breedlove	Spirit of America	GE J47	8/5/
413.199	Tom Green	Wingfoot Express	WE J46	10/2
434.22	Art Arfons	Green Monster	GE J79	10/5
468.719	Craig Breedlove	Spirit of America	GE J79	10/1
526.277	Craig Breedlove	Spirit of America	GE J79	10/1
536.712	Art Arfons	Green Monster	GE J79	10/2
555.127	Craig Breedlove	Spirit of America, Sonic 1	GE J79	11/2
576.553	Art Arfons	Green Monster	GE J79	11/7
600.601	Craig Breedlove	Spirit of America, Sonic 1	GE J79	11/1
622.407	Gary Gabelich	Blue Flame	Rocket	10/2
633.468	Richard Nobil	Thrust 2	RR RG 146	10/4
763.035	Andy Green	Thrust SSC	RR Spey	10/1

At the bottom right of the preview area, there are 'Load', 'Transform Data', and 'Cancel' buttons. The 'Load' button is highlighted with a red box.

## 2.5 Transform Data and Load data into PowerBI

### 4. Data Source Pane:

Once your data is connected, the Data Source Pane will appear on the left-hand side of the PowerBI interface. Here, you can see a preview of your data and perform data transformations.

The screenshot shows the Power BI Desktop interface. The top navigation bar includes 'File', 'Home' (selected), 'Insert', 'Modeling', 'View', 'Optimize', 'Help', and 'Share'. The main workspace is titled 'Untitled - Power BI Desktop' and contains a message 'Build visuals with your data' and a placeholder for dragging fields onto the report canvas. To the right, the 'Data' pane is open, showing a list of data sources and their fields. 'Table003 (Page 2)' is selected (indicated by a checkmark) and its fields ('Car', 'Date', 'Driver', 'Engine', and 'Σ Speed (mph)') are listed under 'Selected fields'. Other data sources like 'RANKx', 'sales2', and 'tips' are also listed.

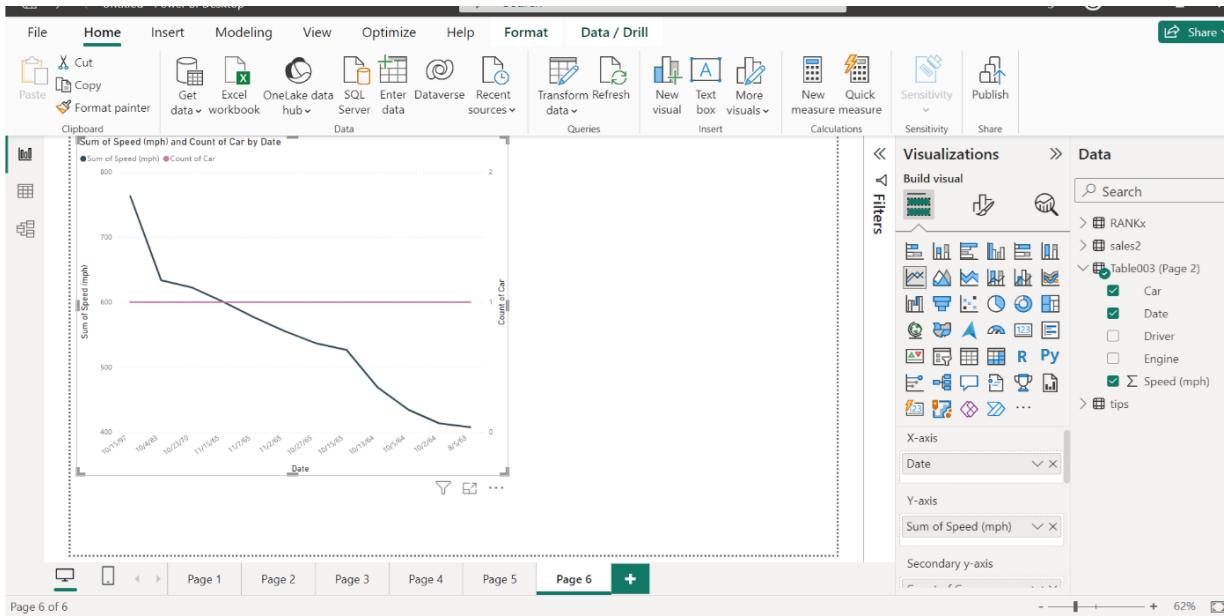
## 5. Creating Basic Charts:

Now, let's create some basic charts using PowerBI:

### A. Line Chart:

1. From the "**Data Source pane**", Select the columns and select Line chart
2. Then **PowerBI** will automatically create a line chart. You can customize it by adding labels, titles, and formatting.

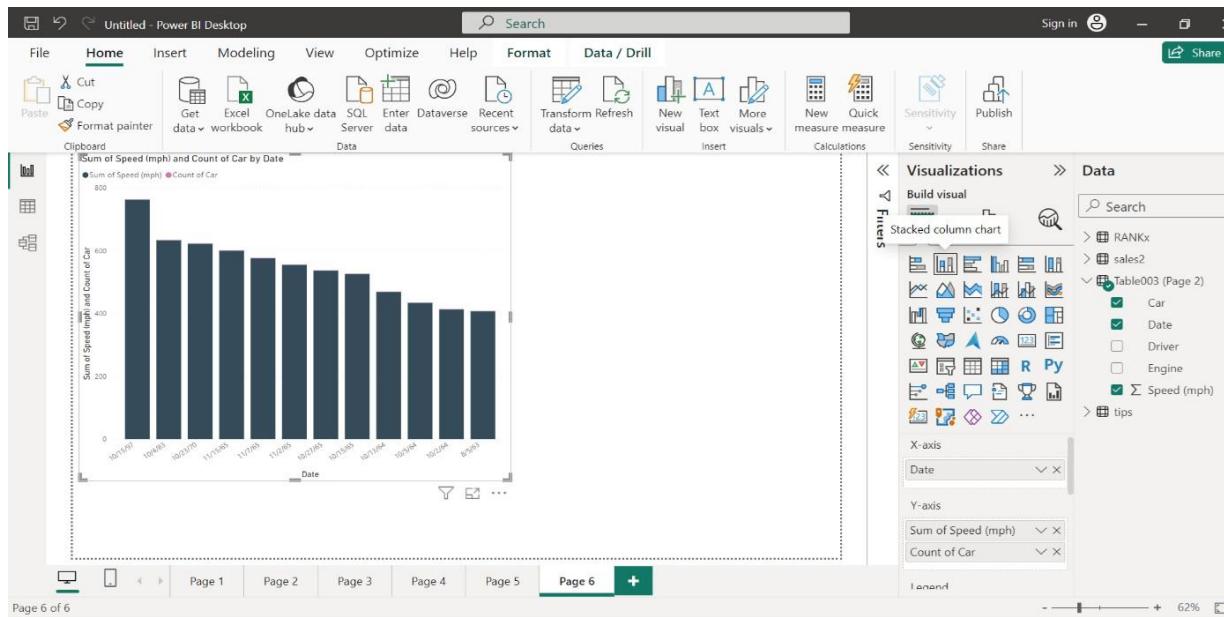
### Output:



### B. Bar Chart:

1. From the "**Data Source pane**", Select the columns and select bar chart
2. Then **PowerBI** will automatically create a bar chart. You can customize it by adding labels, titles, and formatting.

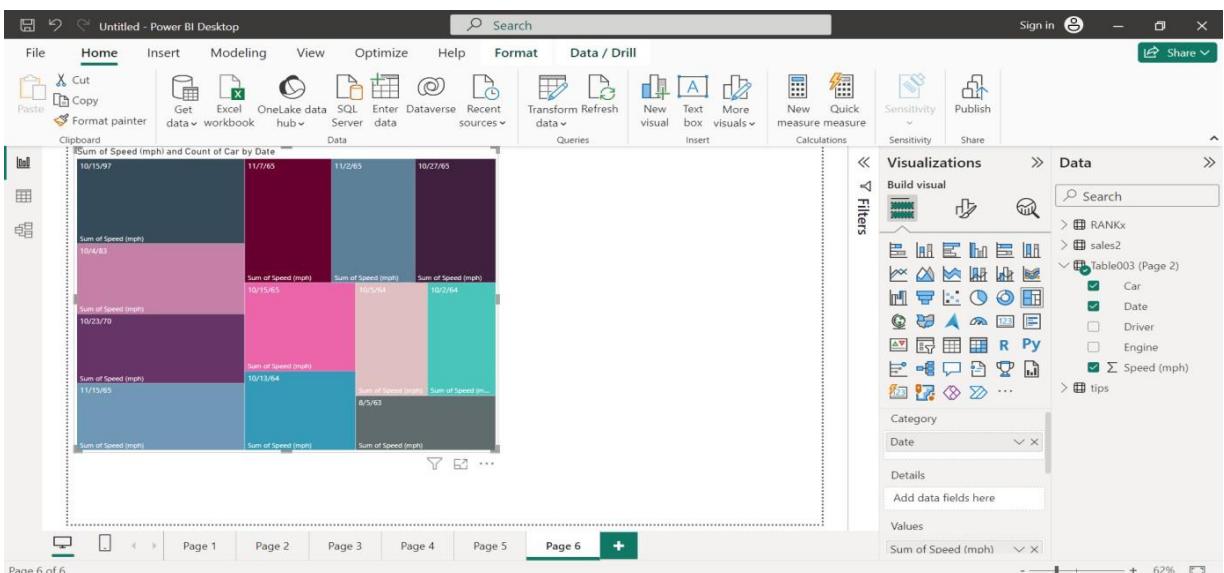
## Output:



## C. Tree map:

1. Get the data from textfile
2. Select Tree map
3. PowerBI will create tree map visualization. You can further customize it

## Output:



## 6. Using the Navigation Panel:

The Navigation Panel in PowerBI helps you explore various chart types based on your data and the fields you select. Here's how to use it:

1. After adding fields to the Rows and Columns shelves, click on the "Navigation" panel located on the left

side of the PowerBI interface.

2. In the Navigation panel, you'll see a variety of chart options that PowerBI recommends based on your data. Click on a chart type to create it.

3. PowerBI will automatically generate the selected chart type with your data. You can further customize it as needed.

# EXPERIMENT-3

## Aim:

### PowerBI Calculations, Overview of SUM, AVR, and Aggregate features, Creating custom calculations and fields

## Solution:

According to the Microsoft Power BI documentation, the CALCULATE function forms part of the filter function category and is defined as "evaluating an expression in a modified filter context." An expression is essentially a measure and includes functions such as SUM, AVERAGE, and COUNT. This expression is evaluated in the context of one or more filters.

As you may know, filters can also be applied to a Power BI report simply by adding slicers without creating a measure using the CALCULATE function at all. However, there are many use cases where the CALCULATE function is more appropriate. It is especially useful to use it as a component of another function. We will see how this works in the example below for calculating the percentage of a total.

## 1. PowerBI Calculations

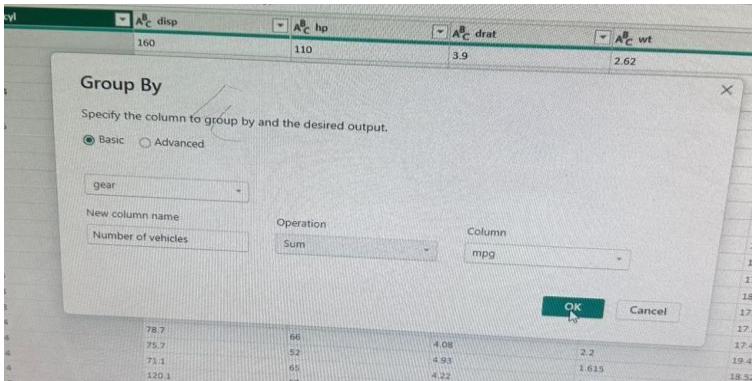
1.1 Launch PowerBI Desktop.

1.2 Click on Get Data

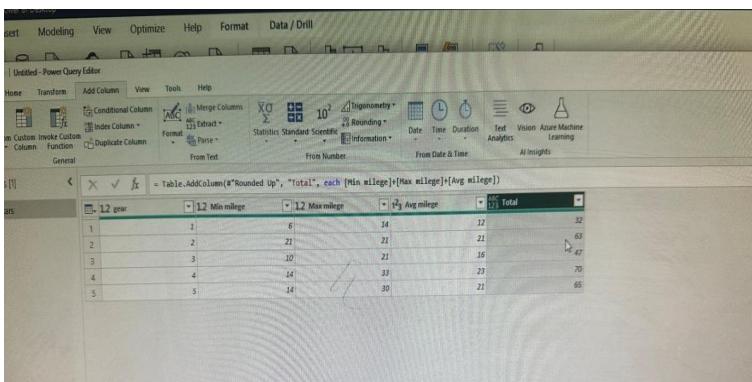
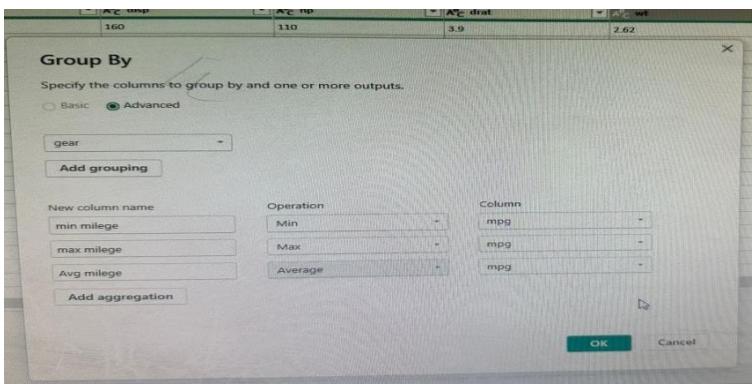
1.3 Choose the data source type (e.g., Excel, CSV, text file, pdf) and Select the data file(Motorcars data) and click "Connect".

1.4 Transform Data

1.5 In Power Query Editor select Group By for basic calculations

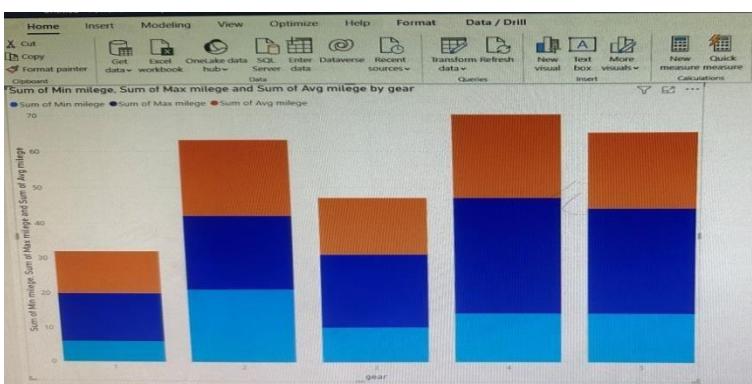


## 1.6 Next do advanced calculations in Group by Like Min Max and Avg Calculations



## 1.7 Create a Column chart

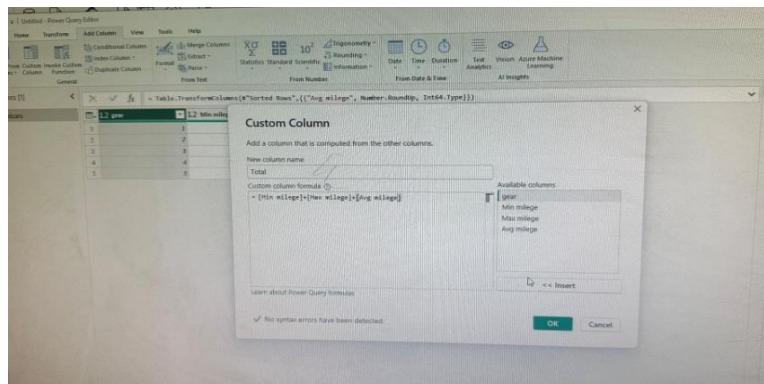
## Output:



## 2. Creating custom calculations and fields

### 2.1 Go to transform data

### 2.2 Add columns select Custom Column



### 2.3 Create a new column and do custom calculations

#### Output:

	12 gear	12 Min mileage	12 Max mileage	12 Avg mileage	Total
1	1	6	14	12	32
2	2	21	21	21	63
3	3	10	21	16	47
4	4	14	33	23	70
5	5	14	30	21	65

## EXPERIMENT-4

### Aim:

**Applying new data calculations to your visualizations, Formatting Visualizations, Formatting Tools and Menus, Formatting specific parts of the view.**

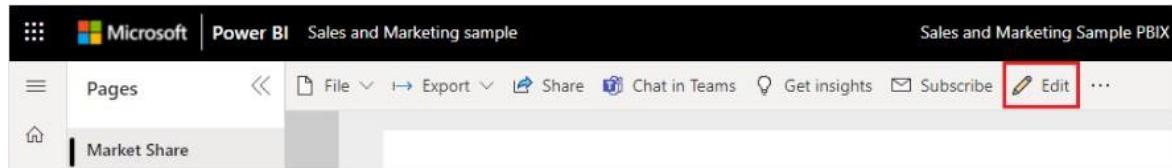
### Solution:

Formatting Tools and Menus

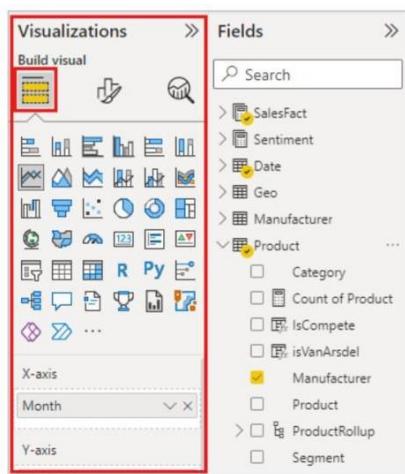
#### Getting started with the formatting pane

If you have edit permissions for a report, there are numerous formatting options available. In Power BI reports, you can change the color of data series, data points, and even the background of visualizations. You can change how the x-axis and y-axis are presented. You can even format the font properties of visualizations, shapes, and titles. Power BI provides you with full control over how your reports appear.

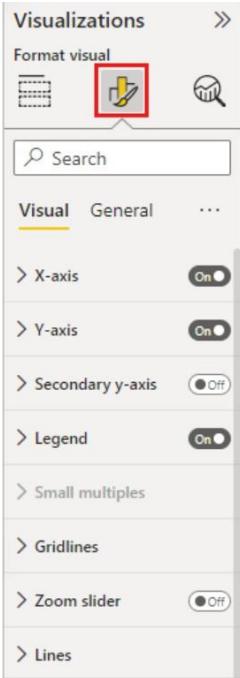
To get started, open a report in Power BI Desktop or the Power BI service. Both provide almost identical formatting options. When you open a report in the Power BI service, be sure to select **Edit** from the menu bar.



When you're editing a report and you have a visualization selected, the **Visualizations** pane appears. Use this pane to change visualizations. Directly below the **Visualizations** pane, there are three icons: the **Fields** icon (a stack of bars), the **Format** icon (a paint brush), and the **Analytics** icon (a magnifying glass). In the image below, the **Fields** icon is selected, indicated by a yellow bar below the icon.



When you select **Format**, the area below the icon displays the customizations available for the currently selected visualization.



You can customize many elements of each visualization. The options available depend on the visual selected. Some of those options are:

- Legend
- X-axis
- Y-axis
- Data colors
- Data labels
- Total labels
- Shapes
- Plot area
- Title
- Background
- Lock aspect
- Border
- Shadow
- Tooltip
- Visual header
- Shapes
- Position
- Zoom

# EXPERIMENT-5

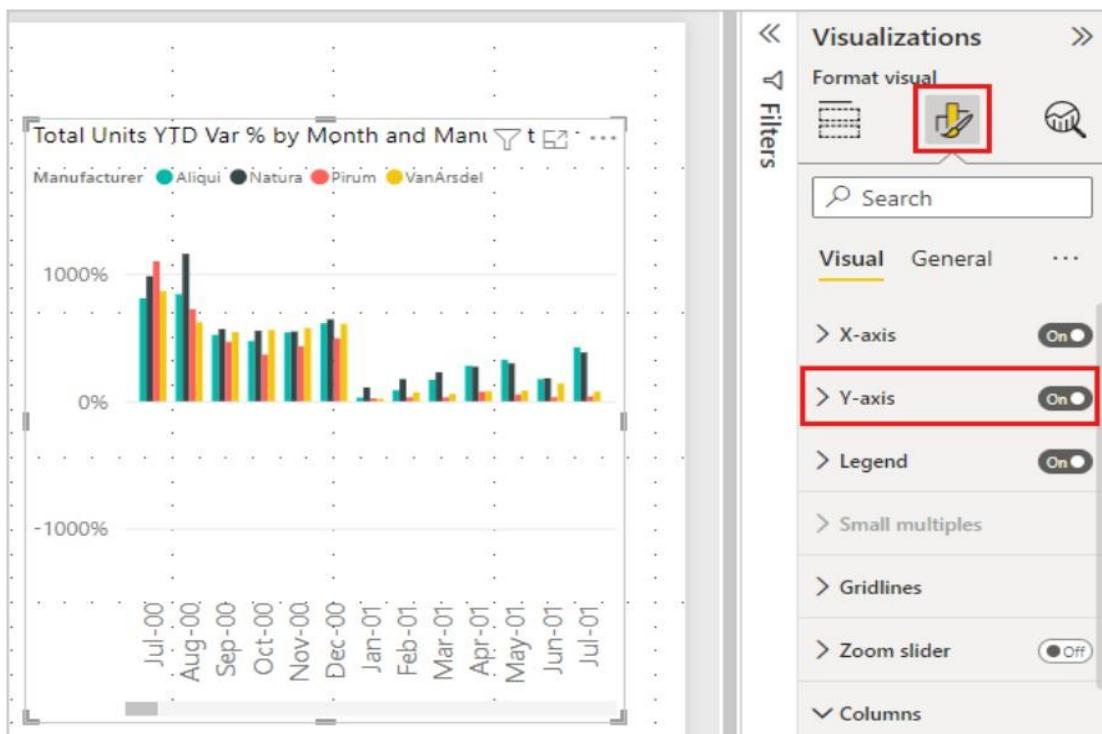
## Aim:

Editing and Formatting Axes, Manipulating Data in PowerBI Pivoting PowerBI data.

## Solution:

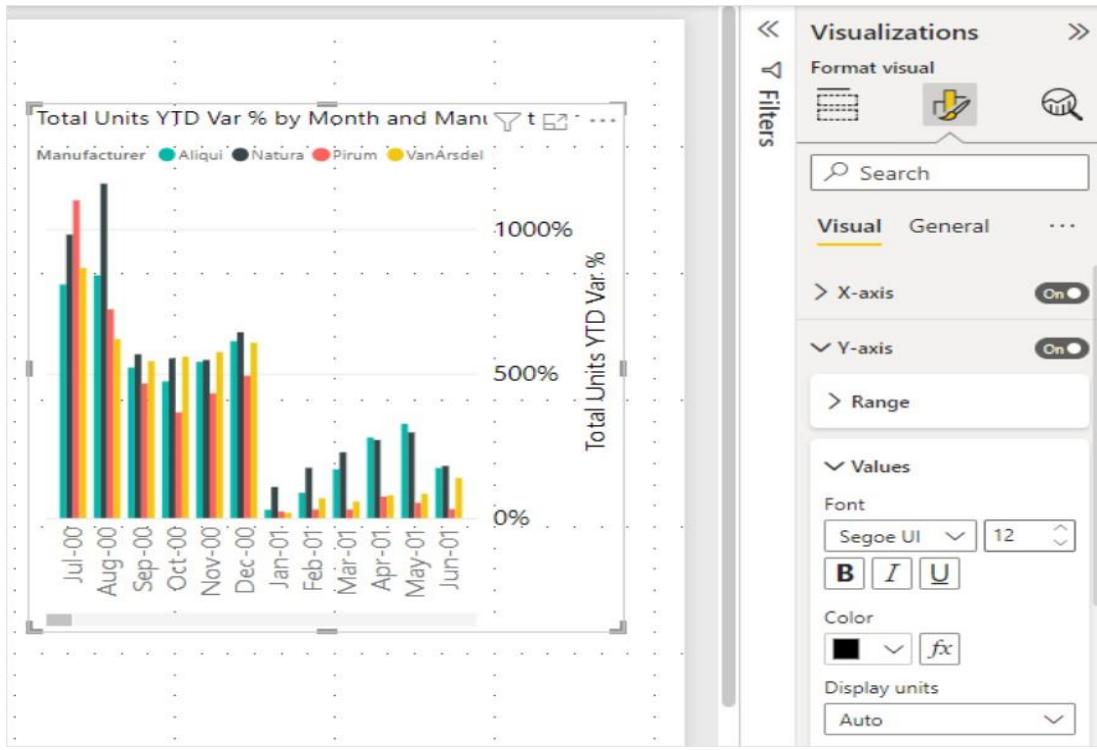
### Editing and formatting axis properties

It's often useful to modify the X-axis or the Y-axis. Similar to working with colors, you can modify an axis by selecting the down-arrow icon to the left of the axis you want to change, as shown in the following image.



In the example below, we've formatted the Y axis by:

- Moving the labels to the right side of the visualization
- Changing the starting value to zero.
- Changing the label font color to black
- Increasing label font size to 12
- Adding a Y-axis title

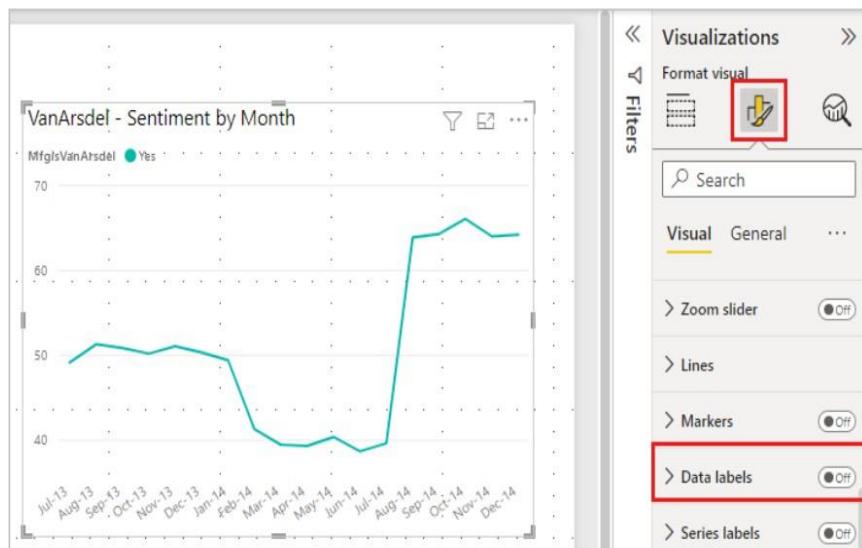


You can remove the axis labels entirely, by toggling the radio button beside **X-Axis** or **Y-Axis**. You can also choose whether to turn axis titles on or off by selecting the radio button next to **Title**.

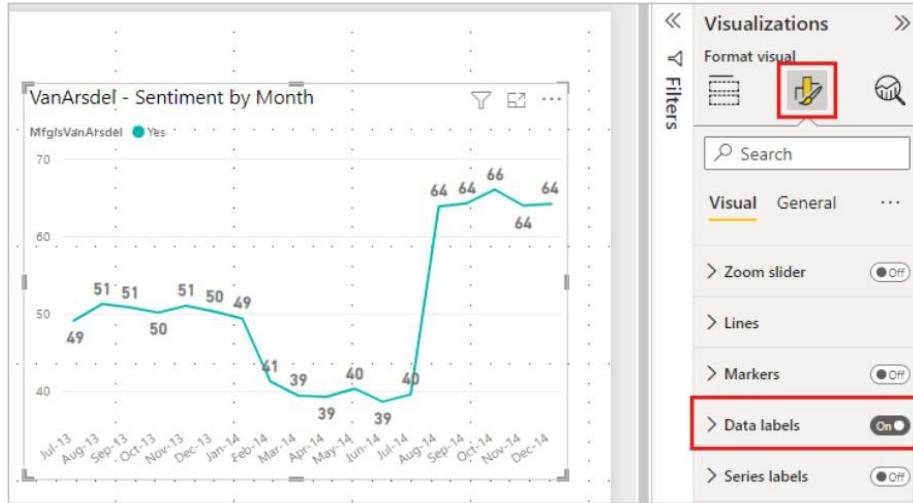
## Adding data labels

Let's add data labels to an area chart.

Here is the *before* picture.



And, here is the *after* picture.



We selected the visualization to make it active and opened the Formatting tab. We selected **Data labels** and turned them on.

## MANUPLATING DATA

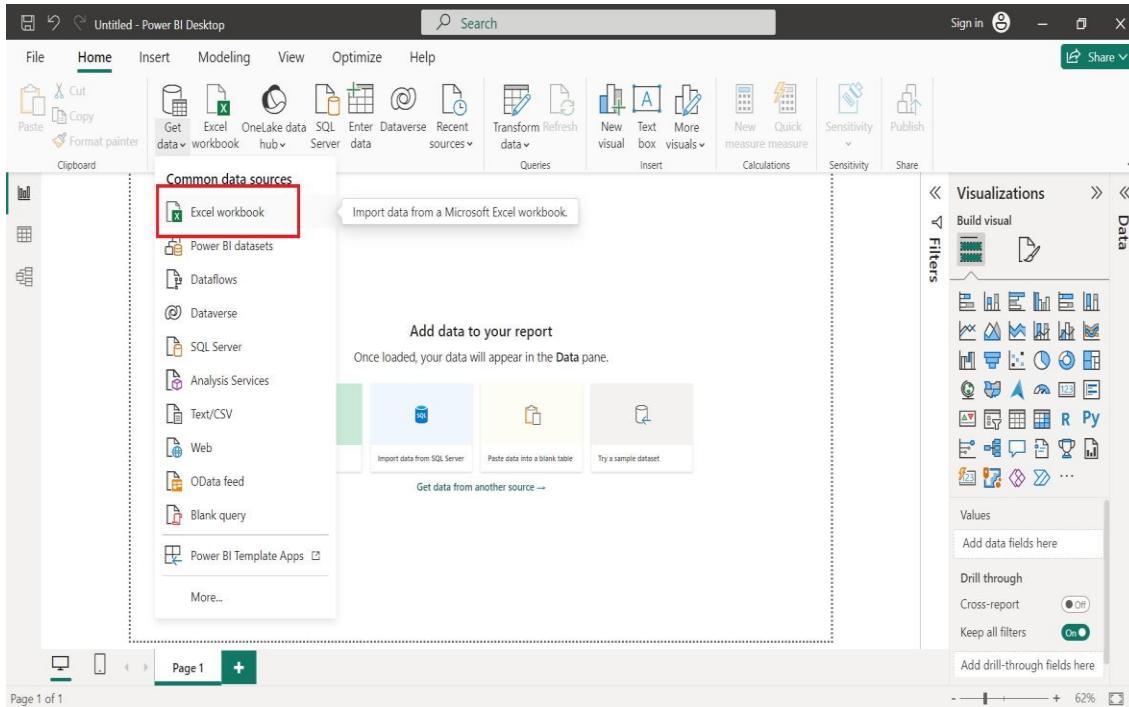
An important part in preparing data for business intelligence is manipulating the data into usable standard formats. In PowerBI, data can be manipulated both as it's being brought into your report as well as after you're bringing the data into Power BI. Let's take a look at some of these common data manipulations that are built in PowerBI.

## PREPARATION

1. Here is the sample data set we will use to explore some basic data manipulations.

	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Order ID	Order Date	Ship Date	Ship Mode	Customer ID	Customer Name	Segment	Country/Region	City	State	Postal Code	Region	Product ID
2	CA-2018-18216	06-01-2018	11-11-2018	Second Class	CD-12520	Clarie Gute	Consumer	United States	Henderson	Montgomery	42620	South	FUR-BD-100
3	CA-2018-18215	06-01-2018	11-11-2018	Second Class	CD-12520	Clarie Gute	Consumer	United States	Henderson	Montgomery	42620	South	FUR-BD-100
4	CA-2018-13985	12-06-2018	16-06-2018	Second Class	DI-13045	Darin Van Hull	Corporate	United States	Los Angeles	California	90036	West	OFF-LA-100
5	US-2017-10986	11-10-2017	18-10-2017	Standard Class	SI-20335	Sean O'Donnell	Consumer	United States	Fort Lauderdale	Florida	33311	South	FUR-TA-100
6	US-2017-10987	09-10-2017	18-10-2017	Standard Class	SI-20335	Sean O'Donnell	Consumer	United States	Fort Lauderdale	Florida	33311	South	FUR-TA-100
7	CA-2016-11581	04-06-2016	14-06-2016	Standard Class	BH-11710	Brosna Hoffman	Consumer	United States	Los Angeles	California	90032	West	FUR-LA-100
8	CA-2016-11581	04-06-2016	14-06-2016	Standard Class	BH-11710	Brosna Hoffman	Consumer	United States	Los Angeles	California	90032	West	OFF-AP-100
9	CA-2016-11581	04-06-2016	14-06-2016	Standard Class	BH-11710	Brosna Hoffman	Consumer	United States	Los Angeles	California	90032	West	TEC-PH-100
10	CA-2016-11581	04-06-2016	14-06-2016	Standard Class	BH-11710	Brosna Hoffman	Consumer	United States	Los Angeles	California	90032	West	TEC-PH-100
11	CA-2016-11581	04-06-2016	14-06-2016	Standard Class	BH-11710	Brosna Hoffman	Consumer	United States	Los Angeles	California	90032	West	OFF-AP-100
12	CA-2016-11581	04-06-2016	14-06-2016	Standard Class	BH-11710	Brosna Hoffman	Consumer	United States	Los Angeles	California	90032	West	FUR-TA-100
13	CA-2016-11441	09-04-2016	15-04-2016	Standard Class	AA-10480	Andrew Allen	Consumer	United States	Concord	North Carolina	28027	South	OFF-PA-100
14	CA-2019-11441	15-04-2019	20-04-2019	Standard Class	AA-10480	Andrew Allen	Consumer	United States	Concord	North Carolina	28027	South	OFF-PA-100
15	CA-2018-16136	05-12-2018	10-12-2018	Standard Class	IM-15070	Irene Maddox	Consumer	United States	Seattle	Washington	98103	West	OFF-BI-1000
16	US-2017-11588	07-11-2017	26-11-2017	Standard Class	HP-14815	Harold Paullan	Home Office	United States	For Worth	Texas	76106	Central	OFF-BI-1000
17	US-2017-11588	07-11-2017	26-11-2017	Standard Class	HP-14815	Pete Kitz	Consumer	United States	Madison	Wisconsin	53711	Central	OFF-ST-100
18	CA-2016-10568	11-11-2016	18-11-2016	Standard Class	PK-19075	Alejandro Gonzalez	Consumer	United States	Violinland	California	94109	West	OFF-ST-100
19	CA-2016-14332	07-28-2016	15-09-2016	Standard Class	ZD-21925	Zuschus Donald Consumer	Consumer	United States	San Francisco	California	94109	West	TEC-PH-100
20	CA-2016-14332	07-28-2016	15-09-2016	Standard Class	ZD-21925	Zuschus Donald Consumer	Consumer	United States	San Francisco	California	94109	West	TEC-PH-100
21	CA-2016-14332	07-28-2016	01-09-2016	Second Class	ZD-21925	Zuschus Donald Consumer	Consumer	United States	San Francisco	California	94109	West	TEC-PH-100
22	CA-2018-13732	08-12-2018	13-12-2018	Standard Class	SP-16985	Ken Black	Corporate	United States	San Francisco	California	94109	West	TEC-PH-100
23	CA-2018-13732	08-12-2018	13-12-2018	Standard Class	SP-16985	Ken Black	Corporate	United States	Fremont	Nebraska	68025	Central	OFF-AP-100
24	CA-2018-13732	09-12-2018	13-12-2018	Standard Class	SP-16985	Ken Black	Corporate	United States	Fremont	Nebraska	68025	Central	OFF-AP-100
25	US-2019-16660	16-07-2019	18-07-2019	Second Class	SP-20065	Sandra Flanagan	Consumer	United States	Philadelphia	Pennsylvania	19140	East	FUR-CH-100

2. From PowerBI Desktop, click on the “Get Data” button on the Home tab. Then select ‘Excel’ and select your file.(Sample superstore)



3. Click on the checkbox next to the sheet containing the data. The “Transform data” button gives you a chance to manipulate your data prior to importing.

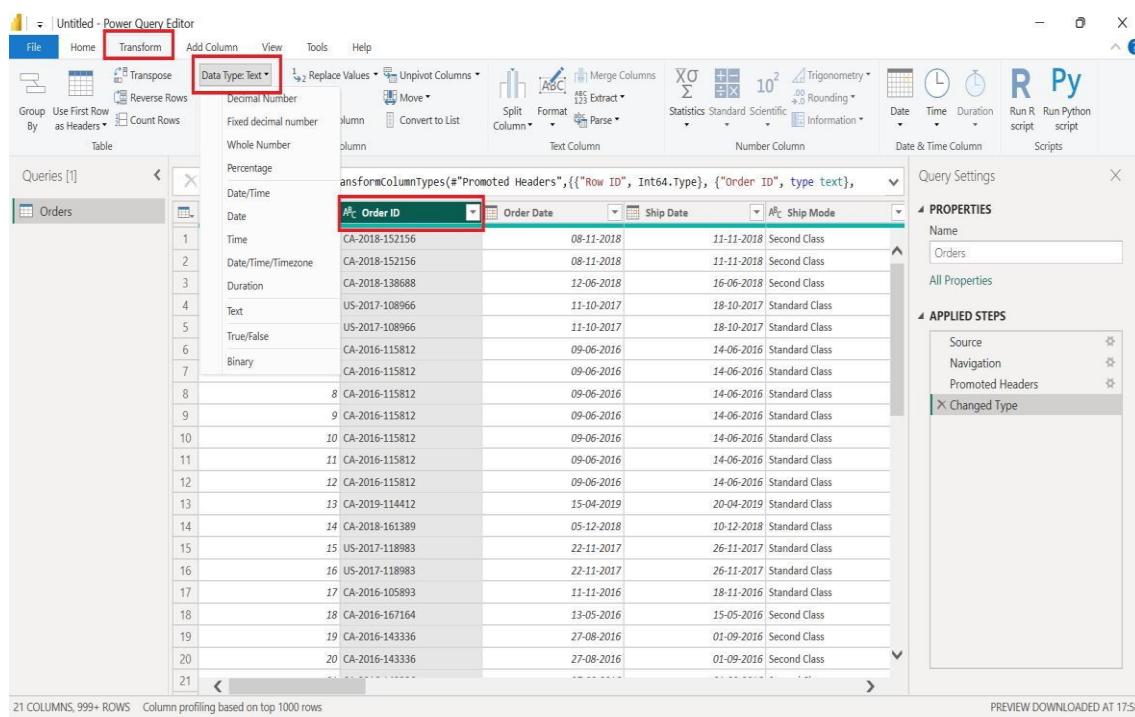
Row ID	Order ID	Order Date	Ship Date	Ship Mode	Cus
1	CA-2018-152156	08-11-2018	11-11-2018	Second Class	
2	CA-2018-152156	08-11-2018	11-11-2018	Second Class	
3	CA-2018-138688	12-06-2018	16-06-2018	Second Class	
4	US-2017-108966	11-10-2017	18-10-2017	Standard Class	
5	US-2017-108966	11-10-2017	18-10-2017	Standard Class	
6	CA-2016-115812	09-06-2016	14-06-2016	Standard Class	
7	CA-2016-115812	09-06-2016	14-06-2016	Standard Class	
8	CA-2016-115812	09-06-2016	14-06-2016	Standard Class	
9	CA-2016-115812	09-06-2016	14-06-2016	Standard Class	
10	CA-2016-115812	09-06-2016	14-06-2016	Standard Class	
11	CA-2016-115812	09-06-2016	14-06-2016	Standard Class	
12	CA-2016-115812	09-06-2016	14-06-2016	Standard Class	
13	CA-2019-114412	15-04-2019	20-04-2019	Standard Class	
14	CA-2018-161389	05-12-2018	10-12-2018	Standard Class	
15	US-2017-118983	22-11-2017	26-11-2017	Standard Class	
16	US-2017-118983	22-11-2017	26-11-2017	Standard Class	
17	CA-2016-105893	11-11-2016	18-11-2016	Standard Class	
18	CA-2016-167164	13-05-2016	15-05-2016	Second Class	
19	CA-2016-143336	27-08-2016	01-09-2016	Second Class	
20	CA-2016-143336	27-08-2016	01-09-2016	Second Class	
21	CA-2016-143336	27-08-2016	01-09-2016	Second Class	
22	CA-2018-137330	09-12-2018	13-12-2018	Standard Class	

#### 4. Detecting Data Types

Click on the “OrderID” column header to select that column. Notice that the Data Type has not been determined. Click on the “Detect Data Type” button.

## 5. Changing a Column's Data Type

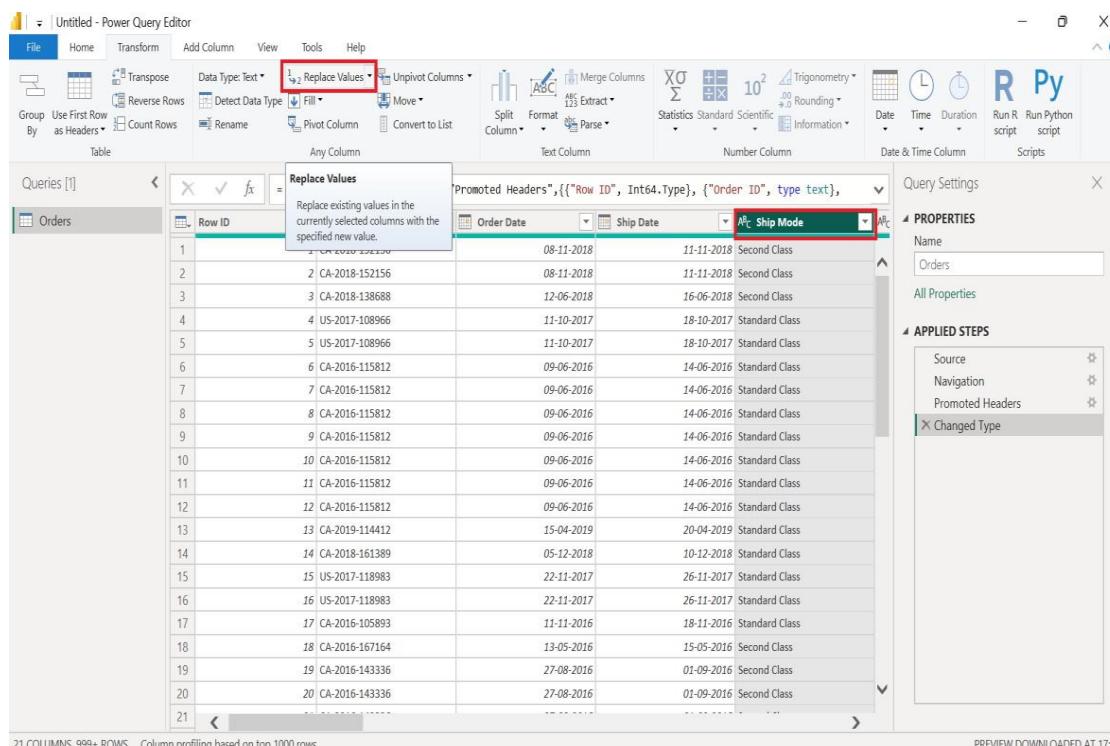
If you click on the “Data Type” button, you can change the data type of the column.



The screenshot shows the Power Query Editor interface. The 'Transform' tab is selected. In the ribbon, the 'Data Type' button is highlighted with a red box. Below it, a dropdown menu shows various data types: Decimal Number, Fixed decimal number, Whole Number, Percentage, Date/Time, Date, Time, Date/Time/Timezone, Duration, Text, True/False, and Binary. The 'Text' option is currently selected. The main preview area shows a table with columns: Order ID, Order Date, Ship Date, and Ship Mode. The 'Ship Mode' column is highlighted with a red box. The 'APPLIED STEPS' pane on the right shows a step named 'Changed Type'.

## 6. Replacing Data Values

Highlight the “Shipping mode” column and click on the “Replace Values” button.



The screenshot shows the Power Query Editor interface. The 'Transform' tab is selected. In the ribbon, the 'Replace Values' button is highlighted with a red box. A 'Replace Values' dialog box is open, showing the instruction: 'Replace existing values in the currently selected columns with the specified new value.' The 'Ship Mode' column is highlighted with a red box in the preview area. The 'APPLIED STEPS' pane on the right shows a step named 'Changed Type'.

## 7. Fill the Replace values Columns and click ok

The screenshot shows the Power Query Editor interface. A 'Replace Values' dialog box is open over a table preview. The dialog has fields for 'Value To Find' (set to 'Standard Class') and 'Replace With' (set to 'Special Class'). Below these fields is a link to 'Advanced options'. At the bottom are 'OK' and 'Cancel' buttons. To the right of the dialog is a 'Query Settings' pane with 'PROPERTIES' and 'APPLIED STEPS' sections. The 'APPLIED STEPS' section lists 'Source', 'Navigation', 'Promoted Headers', and 'Changed Type' (which is currently selected). The main table preview shows columns for Row ID, Order ID, Order Date, Ship Date, and Ship Mode. The 'Ship Mode' column contains values like 'Standard Class' and 'Second Class'.

## 8. Notice the values have been changed

### Output:

The screenshot shows the Power Query Editor interface with the same table as before, but the 'Ship Mode' column now displays 'Special Class' for all rows. A red box highlights the first few rows of the 'Ship Mode' column. The 'APPLIED STEPS' pane on the right shows the step 'Replaced Value'.

## 9. Extracting

Extract order years from order id

Highlight Order ID In transform Click on “Extract”button select text between Delimiters

The screenshot shows the Power Query Editor interface with the 'Transform' tab selected. A red box highlights the 'Extract' button in the ribbon. The 'Order ID' column is selected, and a context menu is open with 'Text Between Delimiters' highlighted. The 'Replacer.ReplaceText' step is visible in the Applied Steps pane.

## 10. Enter the Delimiters

The screenshot shows the Power Query Editor interface with the 'Transform' tab selected. A red box highlights the 'Text Between Delimiters' dialog box. The 'Start delimiter' and 'End delimiter' fields are highlighted with a red box. The dialog box contains instructions: 'Enter the delimiters that mark the beginning and end of what you would like to extract.'

11. Notice that OrderID column Changed in to Years and change the column name  
**Output:**

The screenshot shows the Power Query Editor interface with a table named 'Orders'. The table has columns: Row ID, Order Year, Order Date, Ship Date, and Ship Mode. The 'Order Year' column is highlighted with a red border. The 'Order Year' column contains values like '1 2018', '2 2018', etc. The 'Order Date' column contains dates like '08-11-2018', '11-11-2018', etc. The 'Ship Date' column contains dates like '12-06-2018', '16-06-2018', etc. The 'Ship Mode' column contains values like 'Second Class', 'Special Class', etc. The 'Query Settings' pane on the right shows the steps taken: 'Replaced Value' and 'Extracted Text Between Delimiters'.

12. Formatting Columns  
 Change the subcategory column into Uppercase  
 Select subcategory column

The screenshot shows the Power Query Editor interface with a table named 'Orders'. The table has columns: Product ID, Category, Sub-Category, and Product Name. The 'Sub-Category' column is highlighted with a red border. The 'Product ID' column contains values like 'FUR-BO-10001798', 'FUR-CH-10000454', etc. The 'Category' column contains values like 'Furniture', 'Office Supplies', etc. The 'Sub-Category' column contains values like 'Bookcases', 'Chairs', etc. The 'Product Name' column contains descriptions of products. The 'Query Settings' pane on the right shows the steps taken: 'Renamed Columns'.

12. Rightclick Transform Select Uppercase

Untitled - Power Query Editor

**Queries [1]**

Orders

Product ID	Category	Sub-Category	Product Name
FUR-BO-10001798	Furniture	Bookcases	Bush Somerset Collection Bookcase
FUR-CH-10000454	Furniture	Chairs	Elon Deluxe Fabric Upholstered Stacking Chair
OFF-LA-10000240	Office Supplies	Labels	Self-Adhesive Address Labels for Typing
FUR-TA-10000577	Furniture	Tables	Gretford CR4500 Series Slim Rectangular Table
OFF-ST-10000760	Office Supplies	Storage	Eldon Fold 'N Roll Cart System
FUR-FU-10001487	Furniture	Furnishings	Eldon Expressions Wood and Plastic Storage Unit
OFF-AR-10002833	Office Supplies	Art	Kewell 322
TEC-PH-10002275	Technology	Phones	Mitel 5320 IP Phone VoIP phone
OFF-BI-10003910	Office Supplies	Binders	DXL Angle-View Binders with Locking
OFF-AP-10002892	Office Supplies	Appliances	Belkin F5C206VTEL 6 Outlet Surge Protector
FUR-TA-10001539	Furniture	Tables	Chromcraft Rectangular Conference Table
TEC-PH-10002033	Technology	Phones	Confel 250 Conference phone - Charcoal
OFF-PA-10002365	Office Supplies	Paper	Xerox 1967
OFF-BI-10003656	Office Supplies	Binders	Fellowes PB200 Plastic Comb Binding
OFF-AP-10002311	Office Supplies	Appliances	Holmes Replacement Filter for HEPA
OFF-BI-10000756	Office Supplies	Binders	Storex DuraTech Recycled Plastic File Box
OFF-ST-10004186	Office Supplies	Storage	Stur-D-Stor Shelving, Vertical 5-Shelf
OFF-ST-10000107	Office Supplies	Storage	Fellowes Super Stor/Drawer
OFF-AR-10003056	Office Supplies	Art	Newell 341
TEC-PH-10001949	Technology	Phones	Cisco SPA 501G IP Phone

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**PROPERTIES**

Name: Orders

**APPLIED STEPS**

- Source
- Navigation
- Promoted Headers
- Transform
- UPPERCASE
- Capitalize Each Word
- Trim
- Clean
- Length
- JSON
- XML
- Replace Values...
- Replace Errors...
- Split Column
- Group By...
- Fill
- Unpivot Columns
- Unpivot Other Columns
- Unpivot Only Selected Columns
- Rename...
- Move
- Drill Down
- Add as New Query

### 13. Notice that Column changed to “Uppercase”

#### Output:

Untitled - Power Query Editor

**Queries [1]**

Orders

Product ID	Category	Sub-Category	Product Name
FUR-BO-10001798	Furniture	BOOKCASES	Bush Somerset Collection Bookcase
FUR-CH-10000454	Furniture	CHAIRS	Elon Deluxe Fabric Upholstered Stacking Chair
OFF-LA-10000240	Office Supplies	LABELS	Self-Adhesive Address Labels for Typing
FUR-TA-10000577	Furniture	TABLES	Gretford CR4500 Series Slim Rectangular Table
OFF-ST-10000760	Office Supplies	STORAGE	Eldon Fold 'N Roll Cart System
FUR-FU-10001487	Furniture	FURNISHINGS	Eldon Expressions Wood and Plastic Storage Unit
OFF-AR-10002833	Office Supplies	ART	Kewell 322
TEC-PH-10002275	Technology	PHONES	Mitel 5320 IP Phone VoIP phone
OFF-BI-10003910	Office Supplies	BINDERS	DXL Angle-View Binders with Locking
OFF-AP-10002892	Office Supplies	APPLIANCES	Belkin F5C206VTEL 6 Outlet Surge Protector
FUR-TA-10001539	Furniture	TABLES	Chromcraft Rectangular Conference Table
TEC-PH-10002033	Technology	PHONES	Confel 250 Conference phone - Charcoal
OFF-PA-10002365	Office Supplies	PAPER	Xerox 1967
OFF-BI-10003656	Office Supplies	BINDERS	Fellowes PB200 Plastic Comb Binding
OFF-AP-10002311	Office Supplies	APPLIANCES	Holmes Replacement Filter for HEPA
OFF-BI-10000756	Office Supplies	BINDERS	Storex DuraTech Recycled Plastic File Box
OFF-ST-10004186	Office Supplies	STORAGE	Stur-D-Stor Shelving, Vertical 5-Shelf
OFF-ST-10000107	Office Supplies	STORAGE	Fellowes Super Stor/Drawer
OFF-AR-10003056	Office Supplies	ART	Newell 341
TEC-PH-10001949	Technology	PHONES	Cisco SPA 501G IP Phone

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**PROPERTIES**

Name: CHAIRS

**APPLIED STEPS**

- Source
- Navigation
- Promoted Headers
- Changed Type
- Replaced Value
- Extracted Text Between Delim...
- Renamed Columns
- Uppercased Text

### 14. Change Customer name into Lower case and Capitalize each word

Highlight Customer name Column

Untitled - Power Query Editor

**File Home Transform Add Column View Tools Help**

**Transform ribbon:**

- Transpose
- Data Type: Text
- Replace Values
- Unpivot Columns
- Merge Columns
- Split Column
- Format
- Parse
- Statistics
- Standard
- Scientific
- Trigonometry
- Date
- Time
- Duration
- Run R script
- Run Python script

**Queries [1]**

**Orders**

	Customer Name	Segment	Country/Region	City	State
1	Claire Gute	Consumer	United States	Henderson	Kentucky
2	Claire Gute	Consumer	United States	Henderson	Kentucky
3	Darrin Van Huff	Corporate	United States	Los Angeles	California
4	Sean O'Donnell	Consumer	United States	Fort Lauderdale	Florida
5	Sean O'Donnell	Consumer	United States	Fort Lauderdale	Florida
6	Brosina Hoffman	Consumer	United States	Los Angeles	California
7	Brosina Hoffman	Consumer	United States	Los Angeles	California
8	Brosina Hoffman	Consumer	United States	Los Angeles	California
9	Brosina Hoffman	Consumer	United States	Los Angeles	California
10	Brosina Hoffman	Consumer	United States	Los Angeles	California
11	Brosina Hoffman	Consumer	United States	Los Angeles	California
12	Brosina Hoffman	Consumer	United States	Los Angeles	California
13	Andrew Allen	Consumer	United States	Concord	North Carolina
14	Ivana Markova	Consumer	United States	Castro	Washington

**Query Settings**

**PROPERTIES**

Name: Orders

All Properties

**APPLIED STEPS**

- Source
- Navigation
- Promoted Headers
- Changed Type
- Replaced Value
- Extracted Text Between Delim...
- Renamed Columns
- Uppercased Text**

### 15. Right click transform select lowercase and then capitalize each word

Untitled - Power Query Editor

**File Home Transform Add Column View Tools Help**

**Transform ribbon:**

- Transpose
- Data Type: Text
- Replace Values
- Unpivot Columns
- Merge Columns
- Split Column
- Format
- Parse
- Statistics
- Standard
- Scientific
- Trigonometry
- Date
- Time
- Duration
- Run R script
- Run Python script

**Queries [1]**

**Orders**

	Customer Name	Segment	Country/Region	City	State
1	Claire Gute	Consumer	United States	Henderson	Kentucky
2	Claire Gute	Consumer	United States	Henderson	Kentucky
3	Darrin Van Huff	Corporate	United States	Los Angeles	California
4	Sean O'Donnell	Consumer	United States	Fort Lauderdale	Florida
5	Sean O'Donnell	Consumer	United States	Fort Lauderdale	Florida
6	Brosina Hoffman	Consumer	United States	Los Angeles	California
7	Brosina Hoffman	Consumer	United States	Los Angeles	California
8	Brosina Hoffman	Consumer	United States	Los Angeles	California
9	Brosina Hoffman	Consumer	United States	Los Angeles	California
10	Brosina Hoffman	Consumer	United States	Los Angeles	California
11	Brosina Hoffman	Consumer	United States	Los Angeles	California
12	Brosina Hoffman	Consumer	United States	Los Angeles	California
13	Andrew Allen	Consumer	United States	Concord	North Carolina
14	Ivana Markova	Consumer	United States	Castro	Washington

**Query Settings**

**PROPERTIES**

Name: Orders

All Properties

**APPLIED STEPS**

- Source
- Navigation
- Promoted Headers
- Changed Type
- Replaced Value
- Extracted Text Between Delim...
- Renamed Columns
- Uppercased Text**

21 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows PREVIEW DOWNLOADED AT 17:58

### 16. Notice that column has changed

## Output:

Untitled - Power Query Editor

Queries [1]

Orders

	Customer Name	Segment	Country/Region	City	State
1	Claire Gute	Consumer	United States	Henderson	Kentucky
2	Claire Gute	Consumer	United States	Henderson	Kentucky
3	Darrin Van Huff	Corporate	United States	Los Angeles	California
4	Sean O'Donnell	Consumer	United States	Fort Lauderdale	Florida
5	Sean O'Donnell	Consumer	United States	Fort Lauderdale	Florida
6	Brosina Hoffman	Consumer	United States	Los Angeles	California
7	Brosina Hoffman	Consumer	United States	Los Angeles	California
8	Brosina Hoffman	Consumer	United States	Los Angeles	California
9	Brosina Hoffman	Consumer	United States	Los Angeles	California
10	Brosina Hoffman	Consumer	United States	Los Angeles	California
11	Brosina Hoffman	Consumer	United States	Los Angeles	California
12	Brosina Hoffman	Consumer	United States	Los Angeles	California
13	Andrew Allen	Consumer	United States	Concord	North Carolina
14	Irene Maddox	Consumer	United States	Seattle	Washington
15	Harold Pawlan	Home Office	United States	Fort Worth	Texas
16	Harold Pawlan	Home Office	United States	Fort Worth	Texas
17	Pete Kriz	Consumer	United States	Madison	Wisconsin
18	Alejandro Grove	Consumer	United States	West Jordan	Utah
19	Zuschuss Donatelli	Consumer	United States	San Francisco	California
20	Zuschuss Donatelli	Consumer	United States	San Francisco	California
21	Zuschuss Donatelli	Consumer	United States	San Francisco	California

21 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows

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## 17. Standard calculations

### Adding to Quantity

#### Highlight Quantity column

Untitled - Power Query Editor

Queries [1]

Orders

	Sales	Quantity	Discount	Profit
1	261.96	2	0	41.9136
2	731.94	3	0	219.582
3	14.62	2	0	6.8714
4	957.5775	5	0.45	-383.031
5	22.368	2	0.2	2.5164
6	48.86	7	0	14.1694
7	7.28	4	0	1.9656
8	907.152	6	0.2	90.7152
9	18.504	3	0.2	5.7825
10	114.9	5	0	34.47
11	1706.184	9	0.2	85.3092
12	911.424	4	0.2	68.3568
13	15.552	3	0.2	5.4432
14	407.976	3	0.2	132.5922
15	68.81	5	0.8	-123.858
16	2.544	3	0.8	-3.816
17	665.88	6	0	13.3176
18	55.5	2	0	9.99
19	8.56	2	0	2.4824
20	213.48	3	0.2	16.011
21	--	--	--	--

22 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows

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## 18. Transform Select Standard and Add

Untitled - Power Query Editor

**Transform**

File Home Transform Add Column View Tools Help

Queries [1] Orders

1.2 Sales 1.2 Quantity 1.2 Discount 1.2 Profit

	1.2 Sales	1.2 Quantity	1.2 Discount	1.2 Profit
1	261.96	2	0	41.9136
2	731.94	3	0	219.582
3	14.62	2	0.2	6.8714
4	957.5775	5	0.4	-383.031
5	22.368	2	0.2	2.5164
6	48.86	7	0	14.1694
7	7.28	4	0	1.9656
8	907.152	6	0.2	90.7152
9	18.504	3	0.2	5.7825
10	114.9	5	0	34.47
11	1706.184	9	0.2	85.3092
12	911.424	4	0.2	68.3568
13	15.552	3	0.2	5.4432
14	407.976	3	0.2	132.5922
15	68.81	5	0.8	-123.858
16	2.544	3	0.8	-3.816
17	665.88	6	0	13.3176
18	55.5	2	0	9.99
19	8.56	2	0	2.4824
20	213.48	3	0.2	16.011
21	---	.	.	.

22 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows PREVIEW DOWNLOADED AT 17:58

**APPLIED STEPS**

- Source
- Navigation
- Promoted Headers
- Changed Type
- Replaced Value
- Extracted Text Between Delim...
- Renamed Columns
- Uppercased Text
- Lowercased Text
- Capitalized Each Word
- Split Column by Character Tra...
- Renamed Columns1

## 19. Enter the value to add

Untitled - Power Query Editor

**Transform**

File Home Transform Add Column View Tools Help

Queries [1] Orders

1.2 Sales 1.2 Quantity 1.2 Discount 1.2 Profit

	1.2 Sales	1.2 Quantity	1.2 Discount	1.2 Profit
1	261.96	2	0	41.9136
2	731.94	3	0	219.582
3	14.62	2	0.2	6.8714
4	957.5775	5	0.4	-383.031
5	22.368	2	0.2	2.5164
6	48.86	7	0	14.1694
7	7.28	4	0	1.9656
8	907.152	6	0.2	90.7152
9	18.504	3	0.2	5.7825
10	114.9	5	0	34.47
11	1706.184	9	0.2	85.3092
12	911.424	4	0.2	68.3568
13	15.552	3	0.2	5.4432
14	407.976	3	0.2	132.5922
15	68.81	5	0.8	-123.858
16	2.544	3	0.8	-3.816
17	665.88	6	0	13.3176
18	55.5	2	0	9.99
19	8.56	2	0	2.4824
20	213.48	3	0.2	16.011
21	---	.	.	.

Add

Enter a number to add to each value in the column.

Value

OK Cancel

22 COLUMNS, 999+ ROWS Column profiling based on top 1000 rows PREVIEW DOWNLOADED AT 17:58

**APPLIED STEPS**

- Source
- Navigation
- Promoted Headers
- Changed Type
- Replaced Value
- Extracted Text Between Delim...
- Renamed Columns
- Uppercased Text
- Lowercased Text
- Capitalized Each Word
- Split Column by Character Tra...
- Renamed Columns1

## 20. Notice the value changes

## Output:

The screenshot shows the Power Query Editor interface with the following details:

- File**: Untitled - Power Query Editor
- Home**: Selected tab.
- Transform**: Tab visible.
- Add Column**, **View**, **Tools**, **Help**: Standard menu items.
- Toolbars**: Data Type, Replace Values, Unpivot Columns, Merge Columns, Statistics, Trigonometry, Date & Time Column, Run R script, Run Python script.
- Queries [1]**: Orders
- Table View**: Shows a table with columns: 1.2 Sales, 1.2 Quantity, 1.2 Discount, 1.2 Profit. A red box highlights the '1.2 Quantity' column.
- Formula Bar**: = Table.TransformColumns(#"Renamed Columns1", {"Quantity", each \_ + 10, type number})
- Query Settings**: Name: Orders, All Properties.
- Applied Steps**: A list of transformation steps including:
  - Source
  - Navigation
  - Promoted Headers
  - Changed Type
  - Replaced Value
  - Extracted Text Between Delim...
  - Renamed Columns
  - Uppercased Text
  - Lowercased Text
  - Capitalized Each Word
  - Split Column by Character Tra...
  - Renamed Columns1
  - Added to Column
- Bottom Status**: 22 COLUMNS, 999+ ROWS, Column profiling based on top 1000 rows, PREVIEW DOWNLOADED AT 17:58.

## EXPERIMENT-6

**Aim:**

**Structuring your data, Sorting and filtering powerBI data, Pivoting PowerBI data**

**Solution:**

**Sorting data**

1. Load sales2.csv into powerBI
2. From SKU COLUMN sort SKU id
3. Select SKU column Split by column /select byNon-digit to digit.

The screenshot shows the Power BI desktop interface with the 'sales2' query selected. The 'sku' column is currently selected. A context menu is open over the 'sku' column, with the 'Split Column' option highlighted. A sub-menu under 'Split Column' shows several options: 'By Number of Characters', 'By Positions', 'By Lowercase to Uppercase', 'By Uppercase to Lowercase', and 'By Digit to Non-Digit'. The 'By Non-Digit to Digit' option is selected and highlighted with a red box. The 'APPLIED STEPS' pane on the right shows the 'Changed Type' step applied to the 'Source'.

4. Notice the Column has sorted

**Output:**

The screenshot shows the Power BI desktop interface with the 'sales2' query selected. The 'sku' column has been split into two columns: 'sku.1' and 'sku.2'. The 'sku.1' column contains non-digit characters (e.g., QN-, MI-, AS-), and the 'sku.2' column contains numeric values (e.g., 82852, 21460, 93055). The 'category' column remains the same. The 'APPLIED STEPS' pane on the right shows the 'Split Column by Character Transition' step applied to the 'Source'.

# EXPERIMENT-7

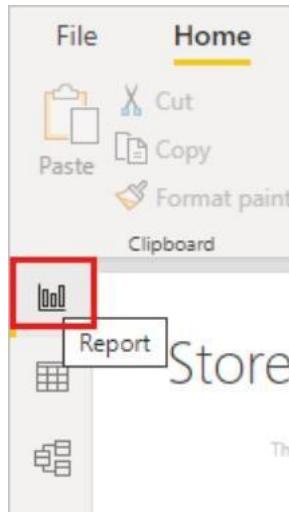
## Aim:

**Advanced Visualization Tools: Using Filters, Using the Detail panel, using the Size panels, customizing filters, Using and Customizing tool tips, Formatting your data with colors**  
**Solution:**

## Add a filter to a visual

Visuals have two different kinds of filters. The fields that are in a visual are automatically filters for that visual. As the report designer, you can identify a field that isn't already the visual, and add that field directly to the **Visual level filters** bucket.

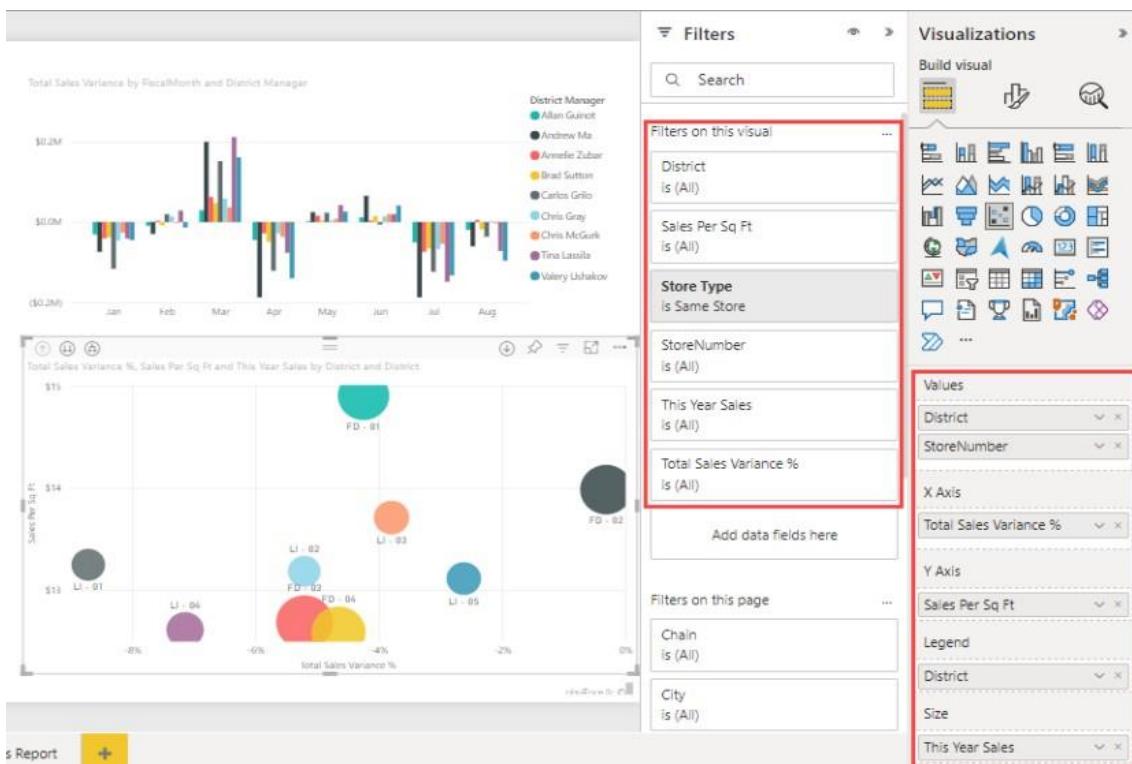
1. In Power BI Desktop, select the Report icon.



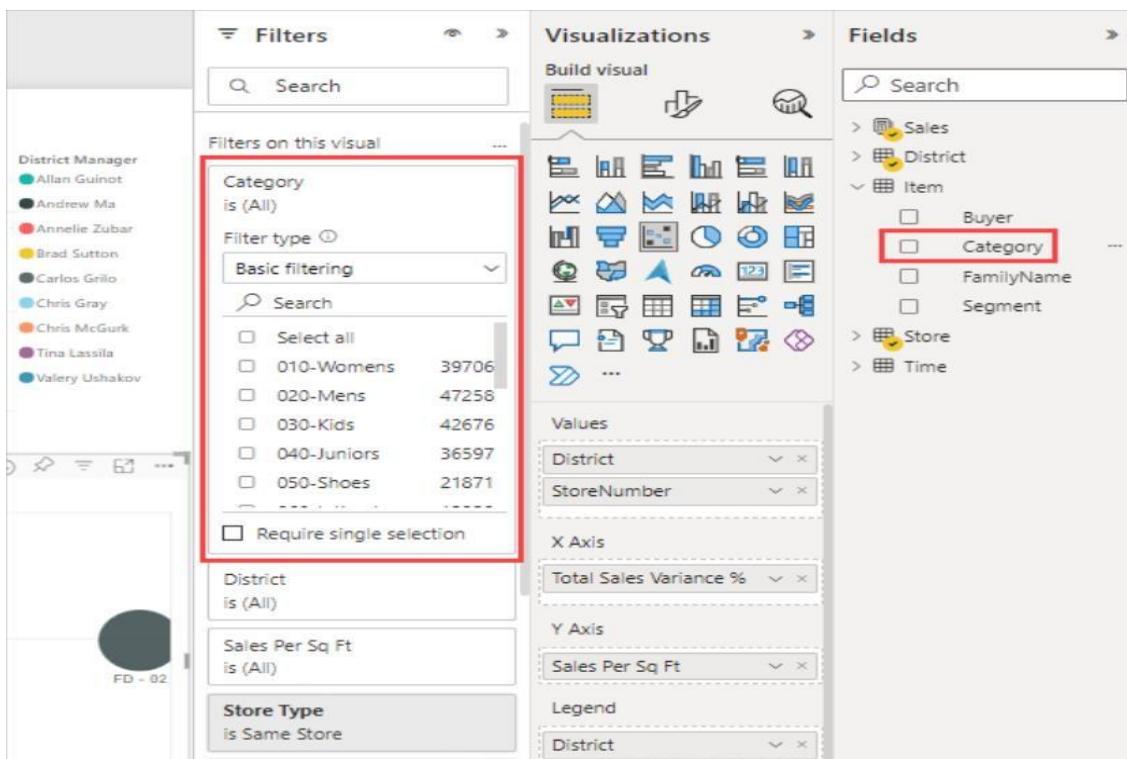
2. Open the Visualizations, Filters, and Fields panes, if they're not already open

A screenshot of the Microsoft Power BI Desktop interface. On the left, there are four visualizations: a pie chart titled 'This Year Sales by Store Type', a bar chart titled 'Total Sales Overview', a map of the United States titled 'This Year Sales by Postal Code and Store Type', and a bubble chart titled 'Total Sales Variance by District and Chain'. On the right, the 'Filters' pane is open, showing filter settings for the visualizations. The pane includes sections for 'Filters on this page' (District, Sales Per Sq Ft, Total Sales Variance %), 'Add data filters here', and 'Filters on other pages' (Chain, City). The entire 'Filters' pane is highlighted with a red box.

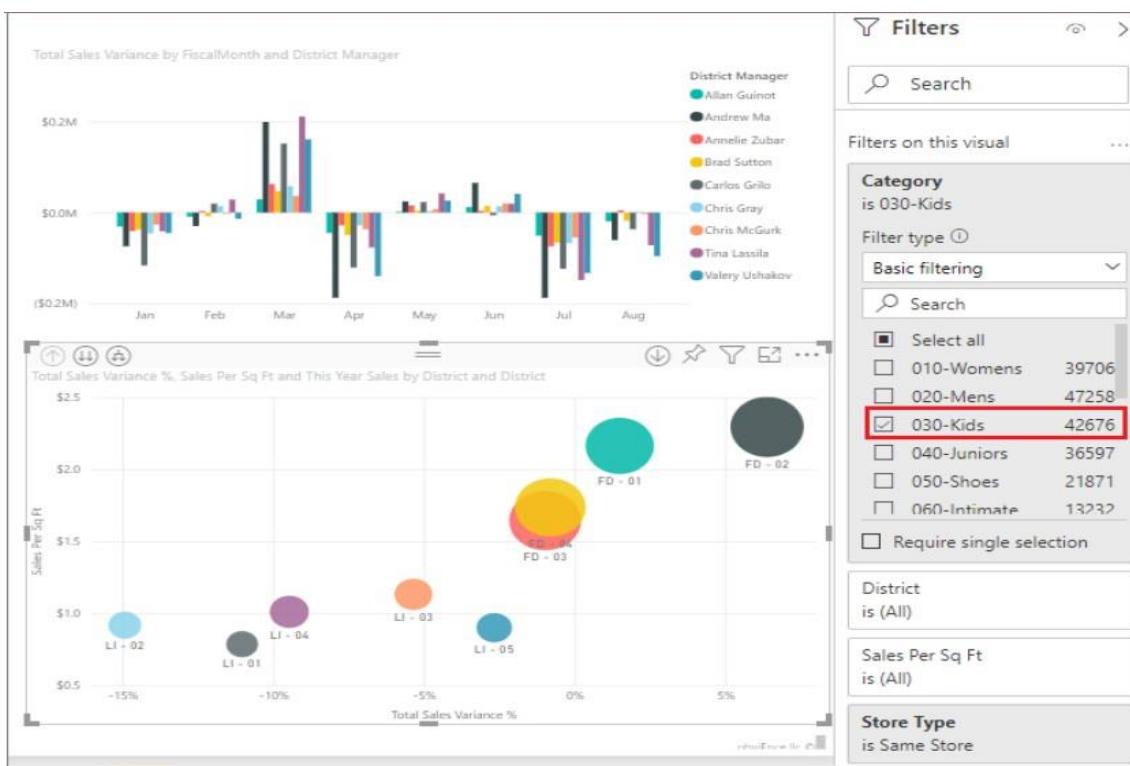
3. Select a visual to make it active. In this case, it's the scatter chart on the Overview page. All the fields in the visual are in the **Visualizations** pane. They're also listed in the **Filters** pane, under the **Filters on this visual** heading.



4. From the Fields pane, select the field you want to add as a new visual-level filter, and drag it into the **Filters on this visual** area. In this example, we drag **Category** to **Add data fields here**.



- Notice **Category** is *not* added to the visualization itself.
- Select **Kids**. The scatter chart is filtered, but the other visuals stay the same.

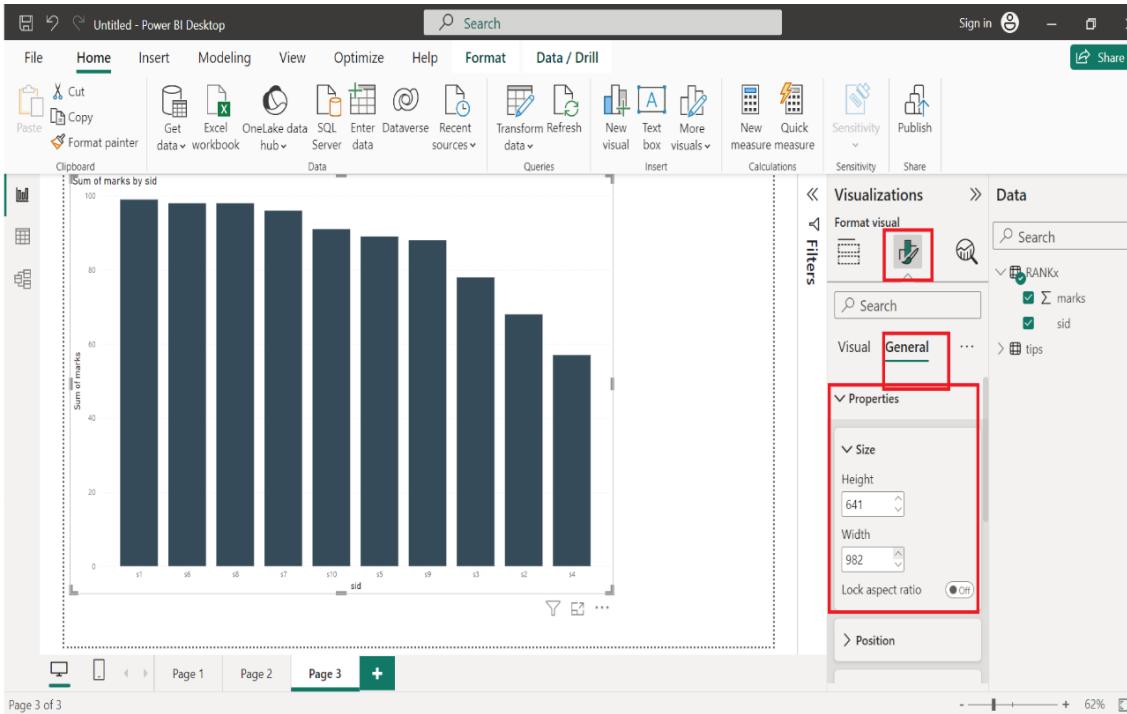


- If you save your report with this filter, report readers can interact with the **Category** filter in Reading view, selecting or clearing values.

If you drag a *numeric column* to the filter pane to create a visual-level filter, the filter is applied to the *underlying rows of data*.

## Using the Size panels

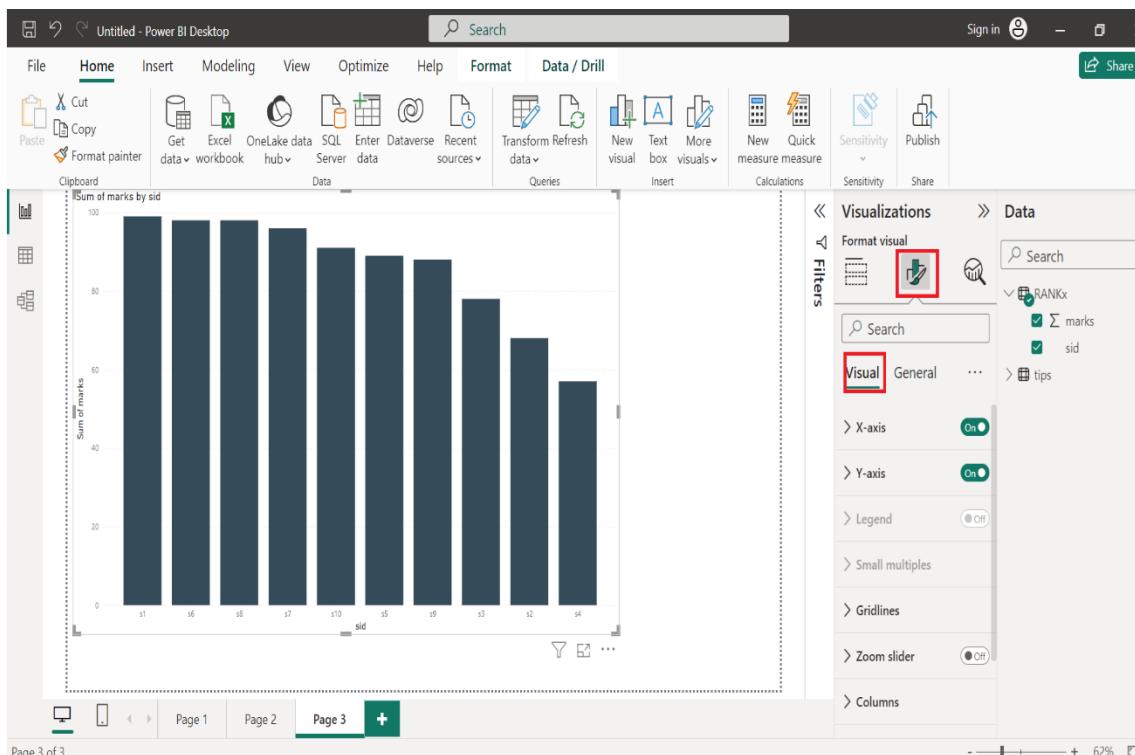
- Load data (Ranks data) into PowerBI
- Create visualization
- In format Visuals use size panel



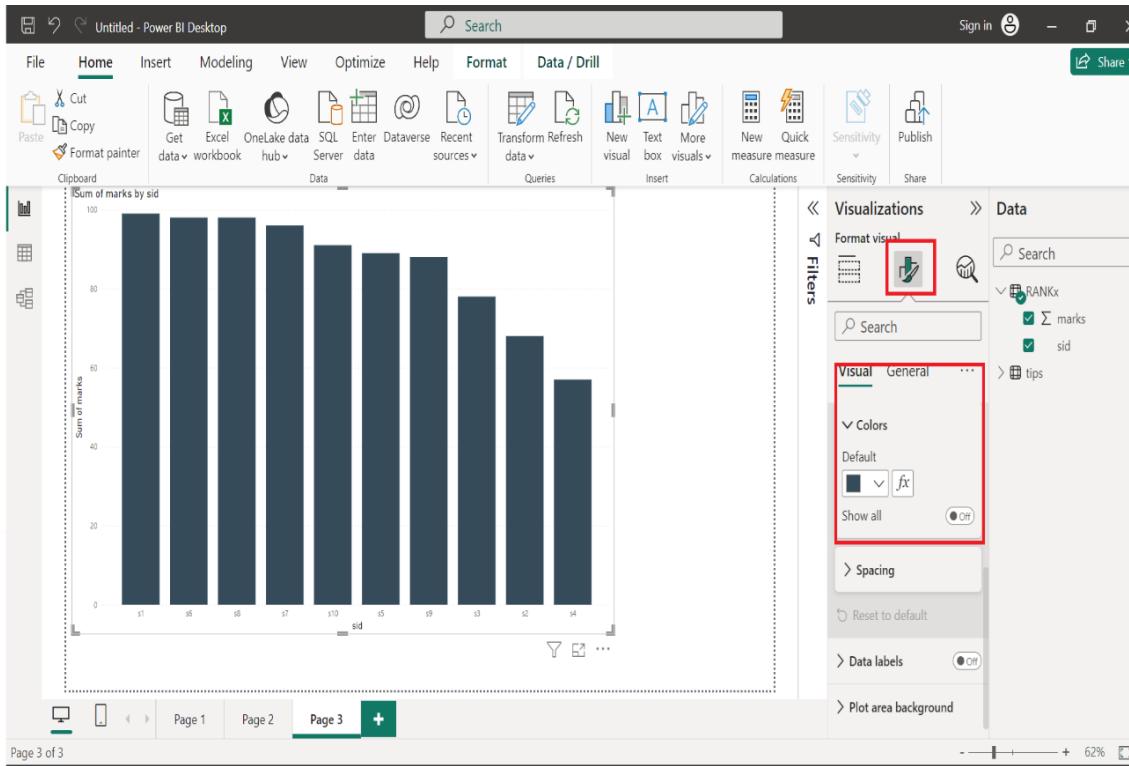
## Formatting Your data with colors

Let's walk through the steps necessary to customize colors on a visualization.

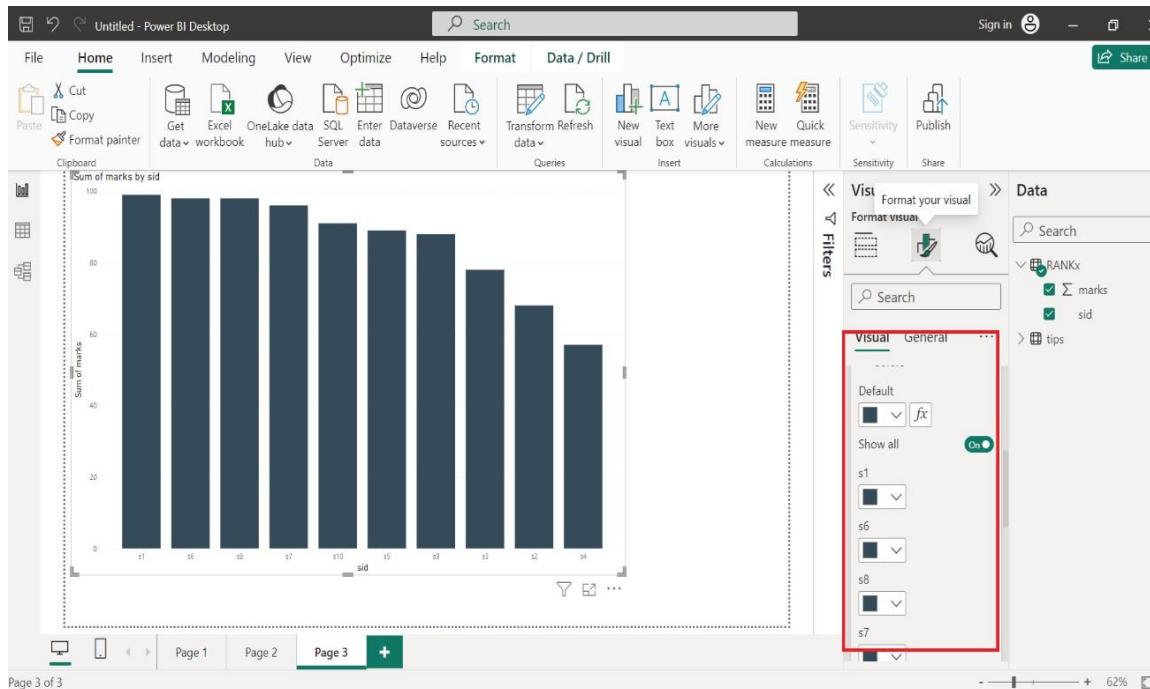
1. Select a visualization to make it active.
2. Select the paint brush icon to open the Formatting tab. The Formatting tab displays all the formatting elements available for the selected visual.



3. Select Colors to expand its available customizations.

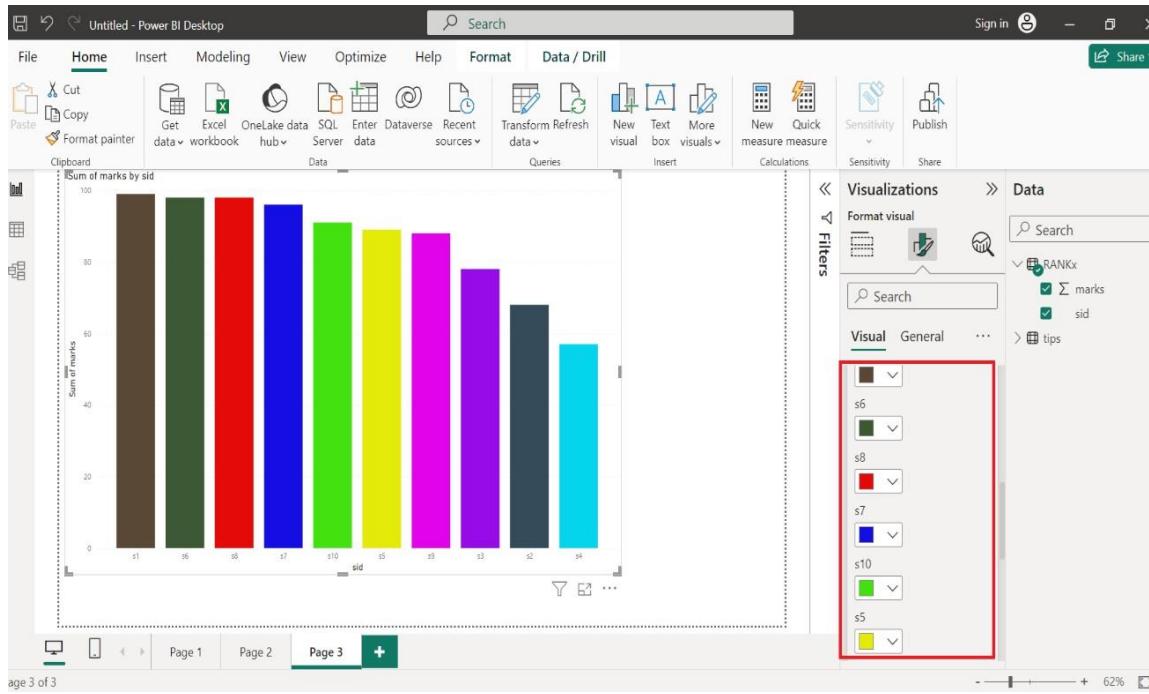


4. Change Show all to On, and select different colors for columns, rows, lines -- depending on the visual type.



5. Notice that Bar colors has changed

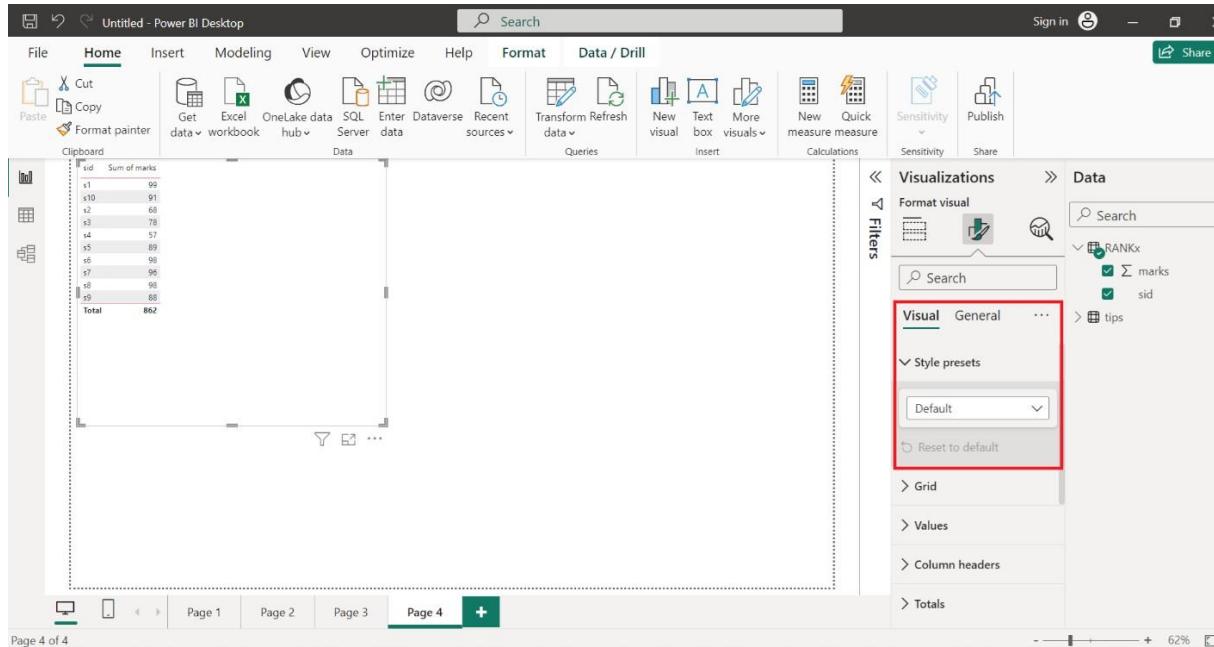
## Output:



## Applying a style to a table

Some Power BI visualizations have a **Style** option. One click applies a full set of formatting options to your visualization, all at once.

1. Select a table or matrix to make it active.
2. Open the Formatting tab and select **Style presets**.



3. Select a style from the dropdown.

## Output:

The screenshot shows the Power BI Desktop interface. On the left, there is a table visualization titled "Sum of marks" with the following data:

sid	Sum of marks
s1	99
s10	91
s2	68
s3	78
s4	57
s5	89
s6	98
s7	96
s8	98
s9	89
Total	862

The "Format" ribbon is open on the top right, specifically the "Visualizations" tab. A red box highlights the "Style presets" dropdown menu, which contains options like "Bold header flashy r..." and "Reset to default".

4. Even after you apply a Style, you can continue formatting properties, including color, for that visualization.

# EXPERIMENT-8

## Aim:

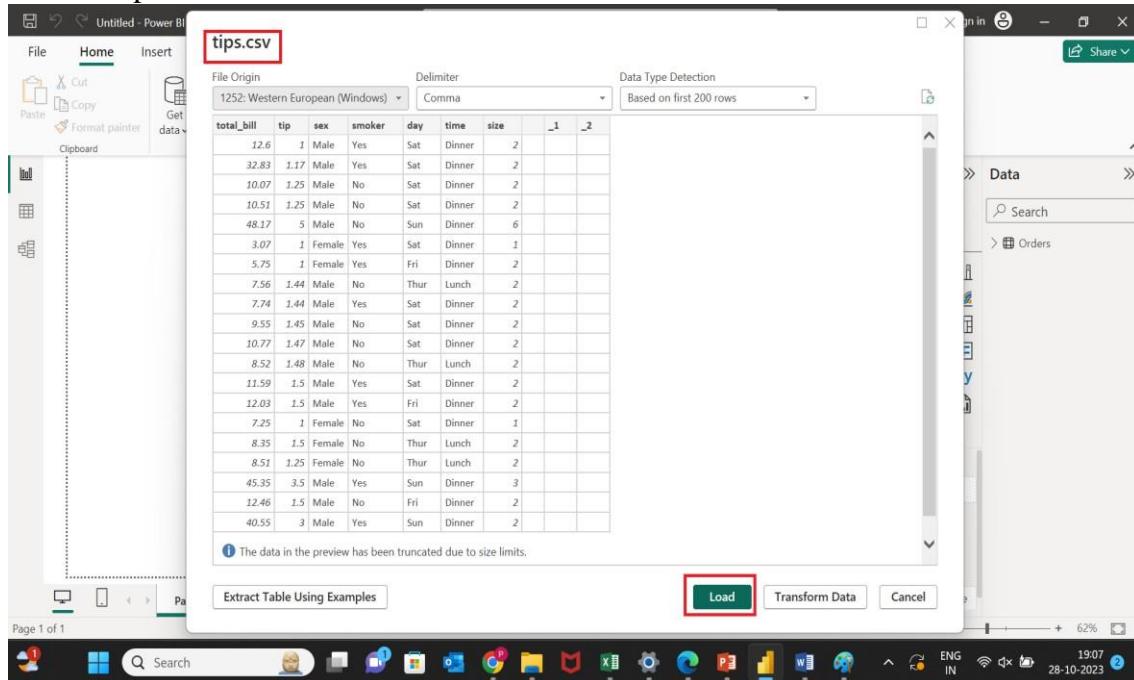
**Creating Dash boards & Storytelling, creating your first dash board and Story, Design for different displays, adding interactivity to your Dash board, Distributing & Publishing your Visualization.**

## Solution:

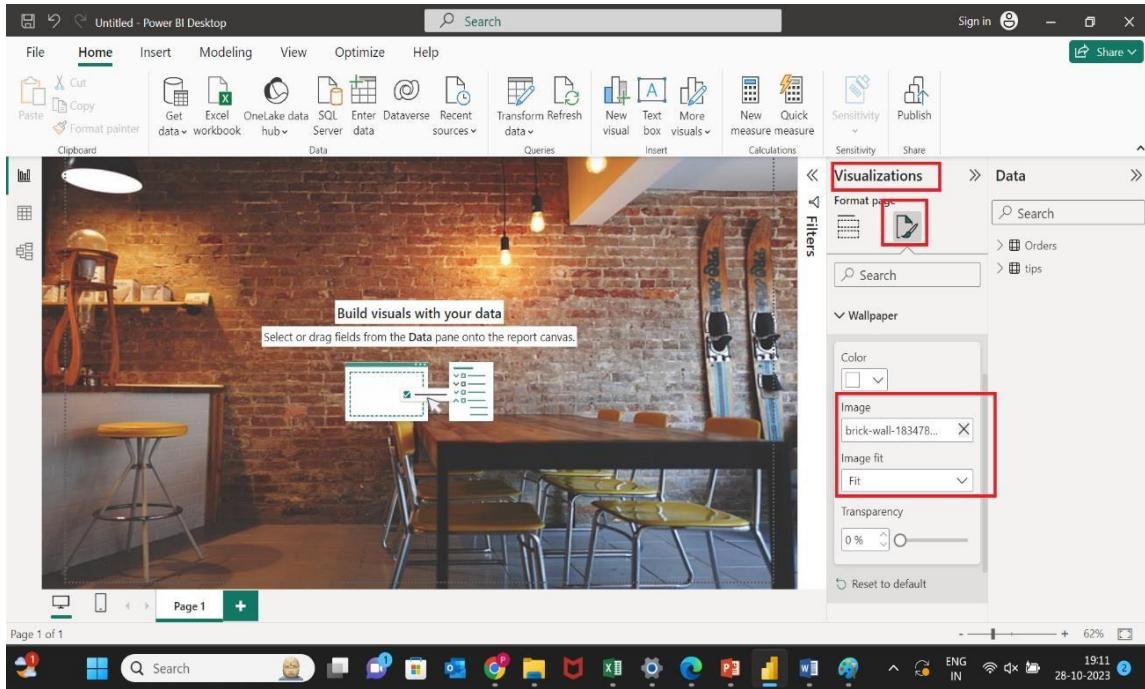
### Creating Dashboards

Create a dashboard for restaurant

1. Load Tips data into PowerBI



2. Download any restaurant image from google and load it in powerbi



### 3. Find number of males

No. of Males = COUNTROWS(FILTER(tips,tips[sex]="Male"))

### 4. Find number of Females

No. of Females = COUNTROWS(FILTER(tips,tips[sex]="Female"))

### 5. Calculate total bill

sum of Total\_Bill = SUM(tips[total\_bill])

### 5. Compute male smokers

Male smokers = COUNTROWS(FILTER(tips,tips[sex]="Male" && tips[smoker]="yes"))

## 6. Compute Female smokers

```
Female smokers = COUNTROWS(FILTER(tips,tips[sex]="Female"&&tips[smoker]="yes"))
```

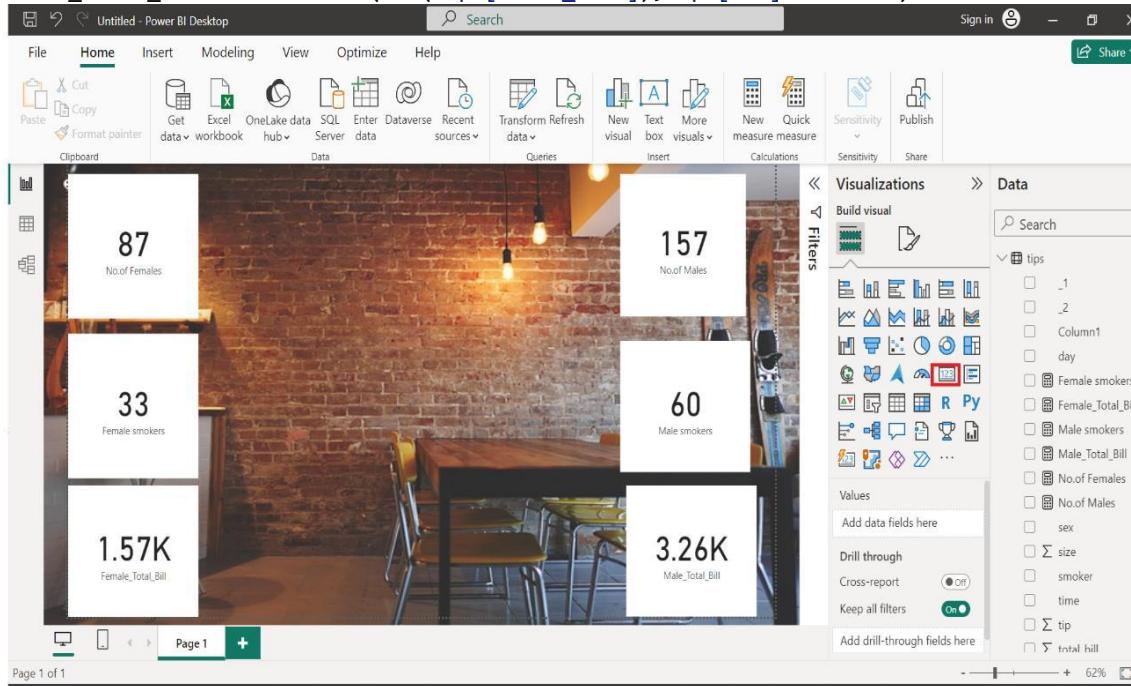
Male Smokers Total tip

## 8. Compute Male smokers tip

```
Male_Total_Bill = CALCULATE(SUM(tips[total_bill]),tips[sex]="Male")
```

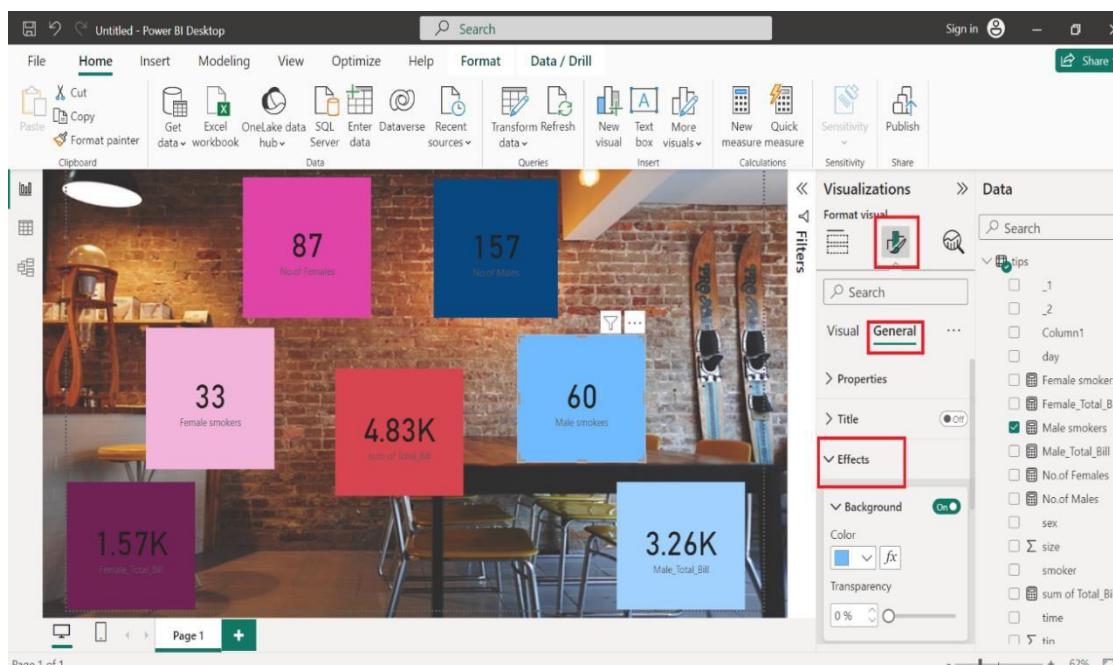
## 9. Compute Female total bill

```
Female_Total_Bill = CALCULATE(SUM(tips[total_bill]),tips[sex]="Female")
```



## 11. Select Graph and Colour them

**Output:**



## **EXPERIMENT-9**

### **Aim:**

**PowerBI file types, publishing to PowerBI Online, Sharing your visualizations, printing, and Exporting.**

### **Solution:**

PowerBI file types,

1. In Power BI, you can connect to or import data and reports from these types of files:

- Microsoft Excel .xlsx and .xlsm files
- Power BI Desktop .pbix report files
- Comma-separated value (CSV) .csv files

### **What it means to get data from a file**

In Power BI, the data you explore comes from a dataset. To have a dataset, you need some data.

To better understand the importance of datasets and how to get data for them, consider an automobile. Sitting in your car and looking at the dashboard is like sitting in front of your computer looking at a dashboard in Power BI. The dashboard shows all the things your car is doing, like how fast the engine is revving, the temperature, what gear you're in, and your speed.

In Power BI, a dataset is like the engine in your car. The dataset provides the data, metrics, and information that's displayed in your Power BI dashboard. Your engine, or dataset, needs fuel, and data is the fuel in Power BI. Your car has a fuel tank that provides gas to the engine. Power BI also needs a fuel tank of data you can feed your dataset. That fuel tank can be a Power BI Desktop file, Excel workbook file, or CSV file.

To take it one step further, a fuel tank in a car has to be filled with gas. The gas for a Power BI Desktop, Excel, or CSV file is data from a data source that you put into the Excel, Power BI Desktop, or CSV file. You can manually enter rows of data into an Excel workbook or CSV file, or you can connect to the external data source to query and load data into your file. After you have a file that contains some data, you can get the file into Power BI as a dataset.

### **Where to save your file**

Where you save your file makes a difference.

- **Local.** If you save your workbook file to a drive on your computer or another location in your organization, you can *import* your file into Power BI. Your file remains on the source drive. When you import the file, Power BI creates a new dataset in your site and loads your data, and in some cases your data model, into the dataset. Any reports in your file appear in **My workspace** as **Reports**.

- **OneDrive for work or school.** If you have OneDrive for work or school, sign in with the same account that you use for Power BI. This method is the most effective way to keep your work in Excel, Power BI Desktop, or CSV files in sync with your Power BI dataset, reports, and dashboards. Both Power BI and OneDrive are in the cloud, and Power BI connects to your file on OneDrive about once an hour. If Power BI finds any changes, it automatically updates your Power BI dataset, reports, and dashboards.

#### Note

You can't upload files from personal OneDrive accounts, but you can upload files from your computer.

- **SharePoint team site.** Saving your Power BI Desktop files to a SharePoint team site is much like saving to OneDrive for work or school. The biggest difference is how you connect to the file from Power BI. You can specify a URL or connect to the root folder.

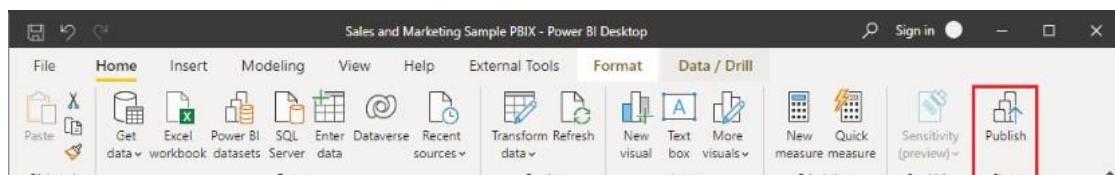
## Publish datasets and reports from Power BI Desktop

When you publish a Power BI Desktop file to the Power BI service, you publish the data in the model to your Power BI workspace. The same is true for any reports you created in **Report** view. You'll see a new dataset with the same name and any reports in your Workspace navigator.

Publishing from Power BI Desktop has the same effect as using **Get Data** in Power BI to connect to and upload a Power BI Desktop file.

### To publish a Power BI Desktop dataset and reports

1. In Power BI Desktop, choose **File > Publish > Publish to Power BI** or select **Publish** on the **Home** ribbon.



2. Sign in to Power BI if you aren't already signed in.

3. Select the destination. You can search your list of available workspaces to find the workspace into which you want to publish. The search box lets you filter your workspaces. Select the workspace, and then click the **Select** button to publish.

## Publish to Power BI

Select a destination

Search

My workspace

360 EH WPE

AMS Demo Team

AO BIM Reports

Azure Decom

Select

Cancel

4. When publishing is complete, you receive a link to your report. Select the link to open the report in your Power BI site.

## Publishing to Power BI

✓ Success!

[Open 'Contoso Product Line.pbix' in Power BI](#)

[Get Quick Insights](#)



### Did you know?

You can create a portrait view of your report tailored for mobile phones, on the **View** tab select **Phone Layout**. [Learn more](#)

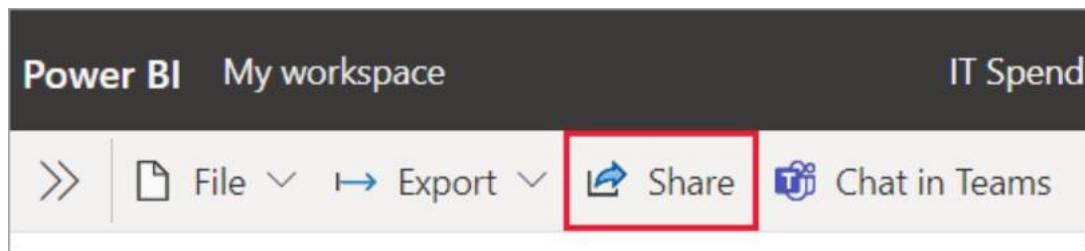
[Got it](#)

## Share Power BI reports

*Sharing* is the easiest way to give people access to your reports and dashboards in the Power BI service. You can share with people inside or outside your organization.

When you share a report or dashboard, the people you share it with can view it and interact with it, but can't edit it. The recipients see the same data that you see in the reports and dashboards. They also get access to the entire underlying dataset, unless row-level security (RLS) is applied to it. The coworkers you share with can reshare with their coworkers if you allow them to.

Some users are unable to share their reports and dashboards with others because they don't have the necessary license or subscription. They can, however, receive reports and dashboards shared by colleagues.



The Power BI service offers other ways to collaborate and distribute reports and dashboards, too. Read [Ways to collaborate and share in Power BI](#) to see which way works best for your circumstances.

## Prerequisites

- You need a Power BI Pro or Premium Per User (PPU) license, whether you share content inside or outside your organization.
- Your recipients also need Power BI Pro or Premium Per User (PPU) licenses, unless the content is in a Premium capacity.
- If you want to allow recipients to edit a shared report, you have to assign the user a workspace role that allows editing. To learn more about role-level permissions and how to assign roles, read [Roles in workspaces](#).

## Where you can share

- You can share reports and dashboards from My Workspace.
- You can share from workspaces other than My Workspace, if you have the Admin or Member role in the workspace. If you have the Contributor or Viewer role, you can share if you have Reshare permissions.
- You can share from the Power BI mobile apps.
- You can share from Power BI Desktop with OneDrive and SharePoint integration.
- to the Power BI service.

## Print a report (Power BI Report Builder)

After you save a report to the Power BI service, you can view and print the report from a browser, the Power BI service web portal, or any application that you use to view an exported report. Before saving a report, you can print it when you preview it.

When you print a report, you can specify the size of the paper to use. The size of the paper determines the number of pages in a report and which report data fits on each page. Paper size affects only reports that are rendered with hard page-break renders: PDF, Image, and Print. Setting the paper size has no effect on other renderers. For more information, see [Rendering Behaviors \(Power BI Report Builder\)](#).

From the report viewer toolbar in the Power BI service web portal or in preview in Power BI Report Builder, you can export a report to a hard page-break renderer or select the Print button to print a copy of the report. You might need to set the paper size or other page setup properties. Use the **Report Properties** dialog box to change page setup properties, including paper size.

You can specify print page margins in two different locations: in design mode and in run mode.

- **Design mode.** When you set page margins in design mode, these settings are saved in the report definition when you save the report.
- **Run mode.** When you set page margins in run mode, this information is not saved in the report definition. The next time you print the report, you will get the settings from the report definition, unless you indicate your print margins again.

## Print a report in Power BI Report Builder

1. Open a report.
2. On the Home tab, select **Run**.
3. (optional) Select **Print Layout** to see how the report will look when it is printed.
4. (optional) Select **Page Setup** to set paper, orientation, and margins
5. Select **Print**.
6. In the **Print** dialog box, select a printer and specify other printing options.

## Print a report from a Web browser application

1. In the Power BI service web portal, navigate to the report that you want to print. Open the report.
2. On the toolbar at the top of the report, select **Print**.
3. In the **Print** dialog box, select a printer, and then select **Print**.

## Print a report from other applications

1. In the Power BI service web portal, navigate to the report that you want to print. Open the report.
2. On the toolbar at the top of the report, select a rendering format, then select **Export**. The report opens in a viewer application that corresponds to the rendering format. For example, if you select PDF, the report opens in Adobe Acrobat Reader.
3. On the **File** menu in that program, select **Print**.

# **EXPERIMENT-10**

## **Aim:**

**Creating custom charts, cyclical data and circular area charts, Dual Axis charts.**

## **Dual Axis charts.**

### **Solution:**

In Power BI, a Dual Axis chart is a single visualization that combines a line chart and a column chart. Combining the two charts into one lets you make a quicker comparison of the data.

Dual Axis charts can have one or two Y axes.

## **When to use a Dual Axis chart**

Dual Axis charts are a great choice:

- When you have a line chart and a column chart with the same X axis.
- To compare multiple measures with different value ranges.
- To illustrate the correlation between two measures in one visualization.
- To check whether one measure meets the target defined by another measure
- To conserve canvas space.

## **How to create a Dual Axis chart**

To follow along below, use the [Retail Analysis sample PBIX file](#).

1. From the upper left section of the menu bar, select **File > Open report**.
2. Find your copy of the **Retail Analysis Sample PBIX file**.
3. Open the **Retail Analysis Sample PBIX file** in report view  .
4. Select  to add a new page.

## **Create a basic single-axis combo chart**

1. Start on a blank report page and create a column chart that displays this year's sales and gross margin by month.
  - a. From the Fields pane, select **Sales > This Year Sales > Value**.
  - b. Select **Sales > Gross Margin This Year** and drag it to the **Y-axis** well.
  - c. Select **Time > FiscalMonth** and drag it to the **X-axis** well.

X-axis

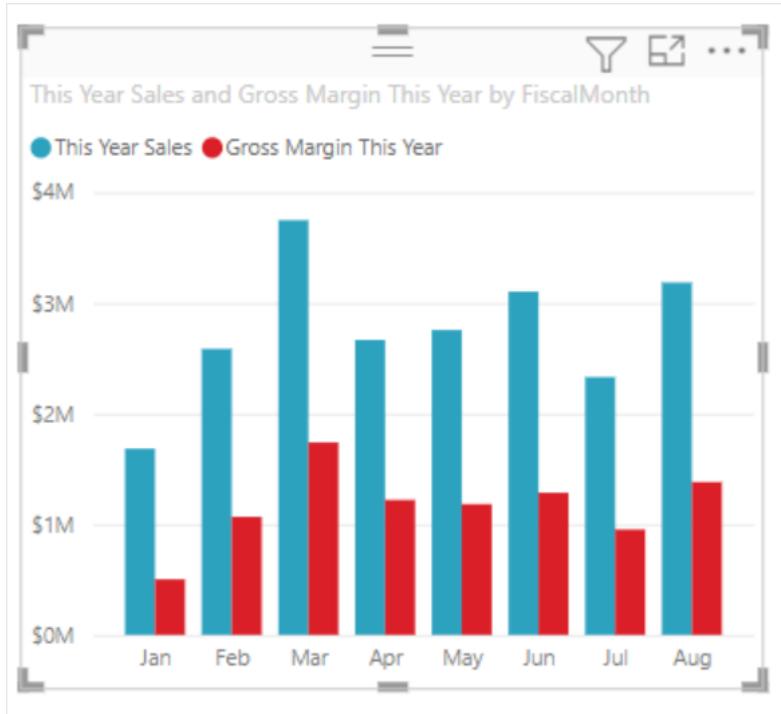
FiscalMonth ▼ X

Y-axis

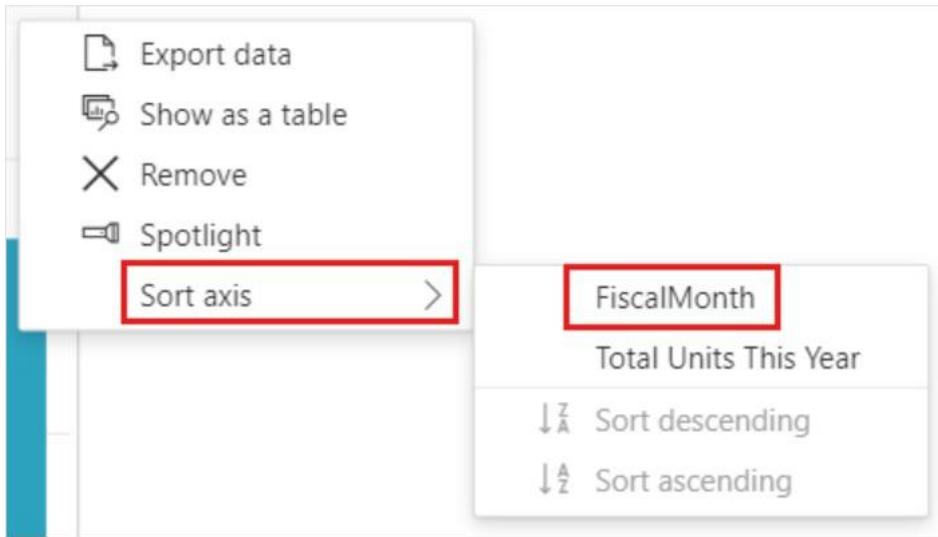
This Year Sales ▼ X

Gross Margin This Year ▼ X

2. The visualization will be similar to this one.

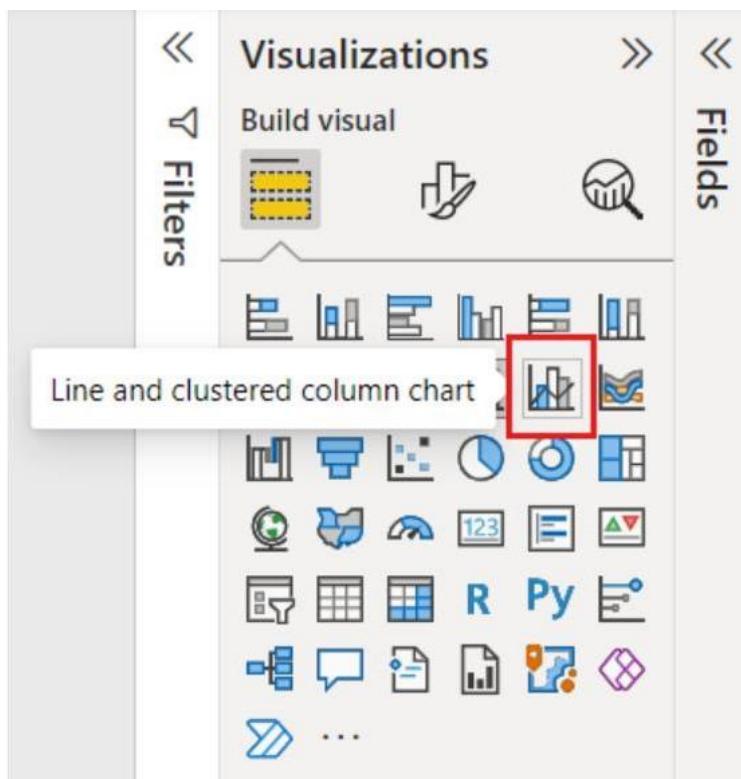


3. In the upper-right corner of the visual, select the **More options** ellipsis (...) and select **Sort axis > FiscalMonth**.



4. Select the ellipsis again and choose **Sort axis > Sort ascending**.

5. Convert the column chart to a combo chart. There are two combo charts available: **Line and stacked column** and **Line and clustered column**. With the column chart selected, from the **Visualizations** pane select the **Line and clustered column chart**.



6. From the **Fields** pane, drag **Sales > Last Year Sales** to the **Line y-axis** bucket.

X-axis

FiscalMonth ▼ X

Column y-axis

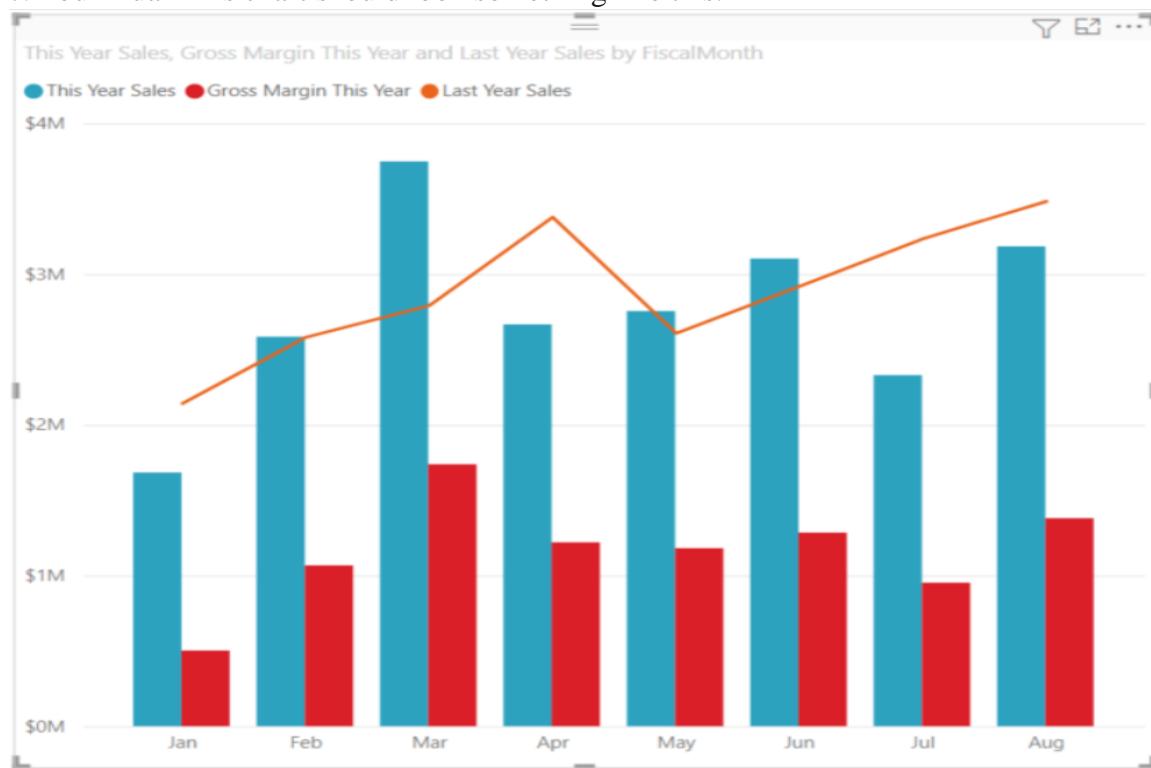
This Year Sales ▼ X

Gross Margin This Year ▼ X

Line y-axis

Last Year Sales ▼ X

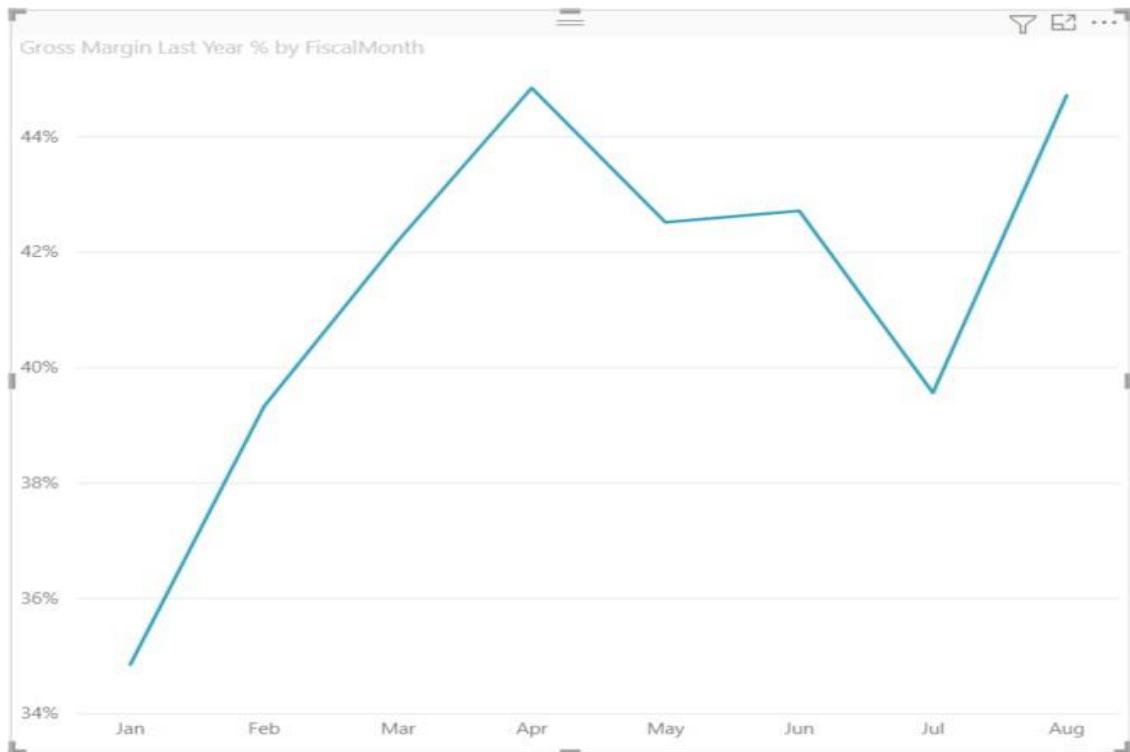
7. Your Dual Axis chart should look something like this:



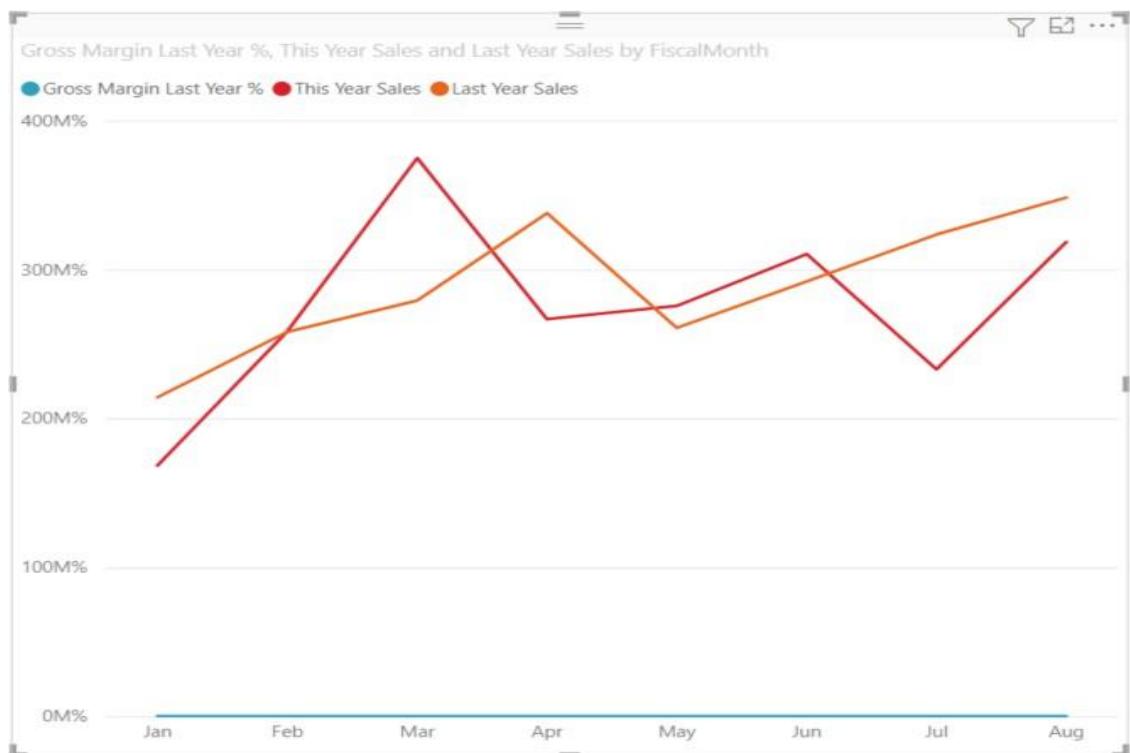
### Create a combo chart with two axes

In this task, we'll compare gross margin and sales.

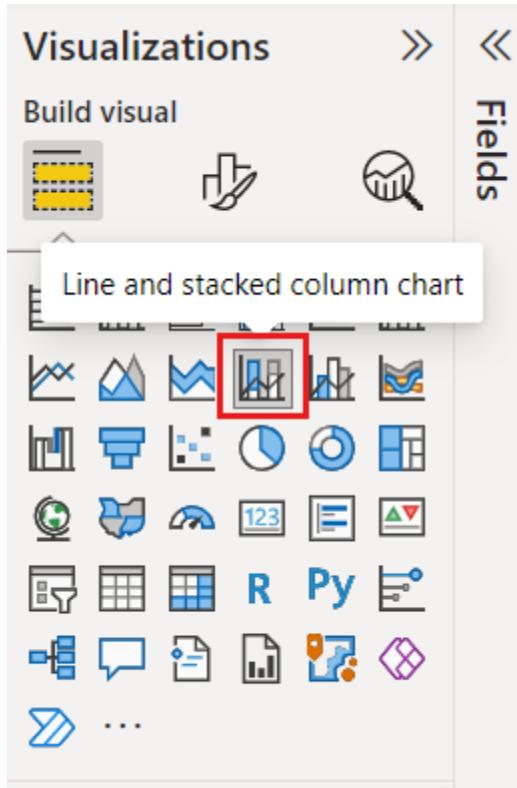
1. Create a new line chart that tracks **Gross Margin Last Year %** by **FiscalMonth**.
2. Select the ellipsis to sort it by **FiscalMonth**, then select the ellipsis again and choose **Sort axis > Sort ascending**.
3. In January GM% was 35%, peaked at 45% in April, dropped in July and peaked again in August. Will we see a similar pattern in sales last year and this year?



- Add **This Year Sales > Value** and **Last Year Sales** to the line chart. The scale of **Gross Margin Last Year %** is much smaller than the scale of **Sales** which makes it difficult to compare.



- To make the visual easier to read and interpret, convert the line chart to a **Line and stacked column chart**.

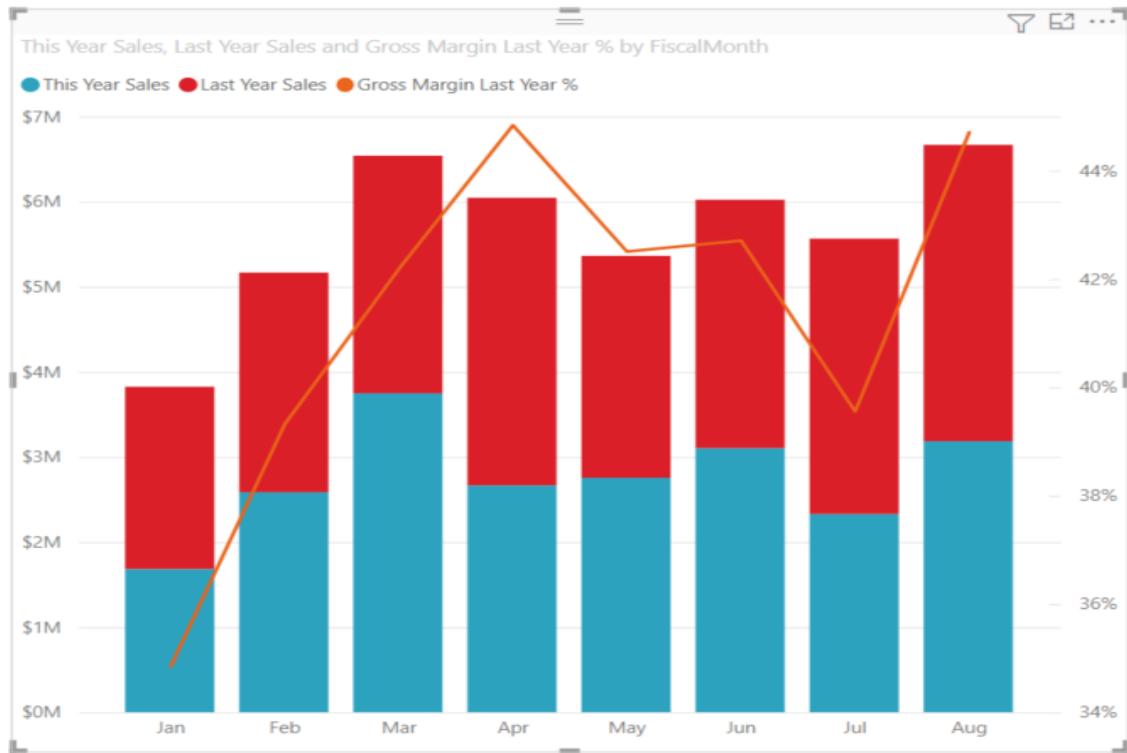


6. Drag **Gross Margin Last Year %** from **Column y-axis** into **Line y-axis**.

The screenshot shows the 'Fields' pane in Power BI. It displays the configuration for a dual-axis chart. The 'X-axis' section contains the field 'FiscalMonth'. The 'Column y-axis' section contains 'This Year Sales' and 'Last Year Sales'. The 'Line y-axis' section contains 'Gross Margin Last Year %'. Each axis section has a '▼' and 'X' button at the bottom right.

7. Power BI creates two axes, thus allowing the datasets to be scaled differently; the left measures sales dollars and the right measures percentage. And we see the answer to our question: yes, we do see a similar pattern.

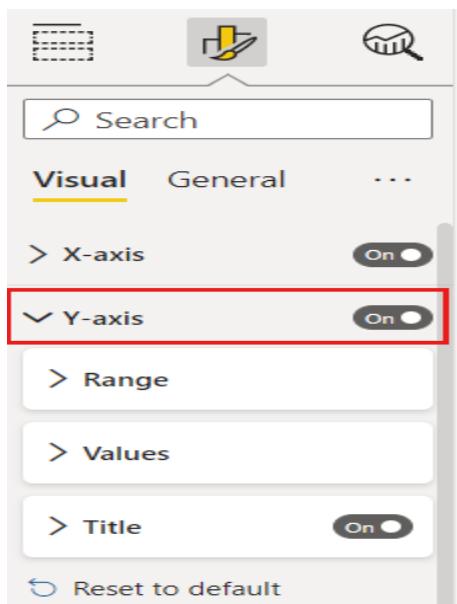
## Output:



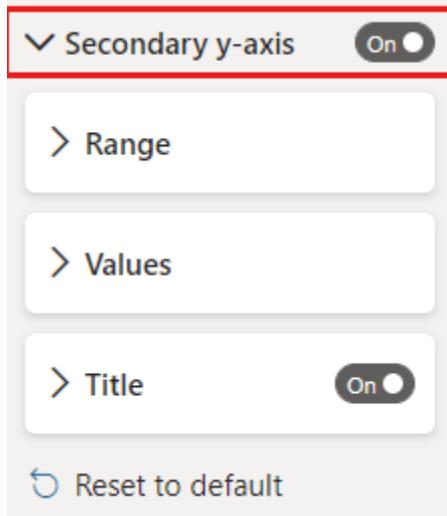
## Add titles to the axes



1. Select the paintbrush icon to open the **Formatting** pane.
2. Set **Y-axis** to **On**, then select the down arrow to expand the **Y-axis** options.
3. Set **Y-axis > Values > Display units** to **Millions**.
4. Set **Y-axis > Title** to **On**, then set **Style** to **Show title only**

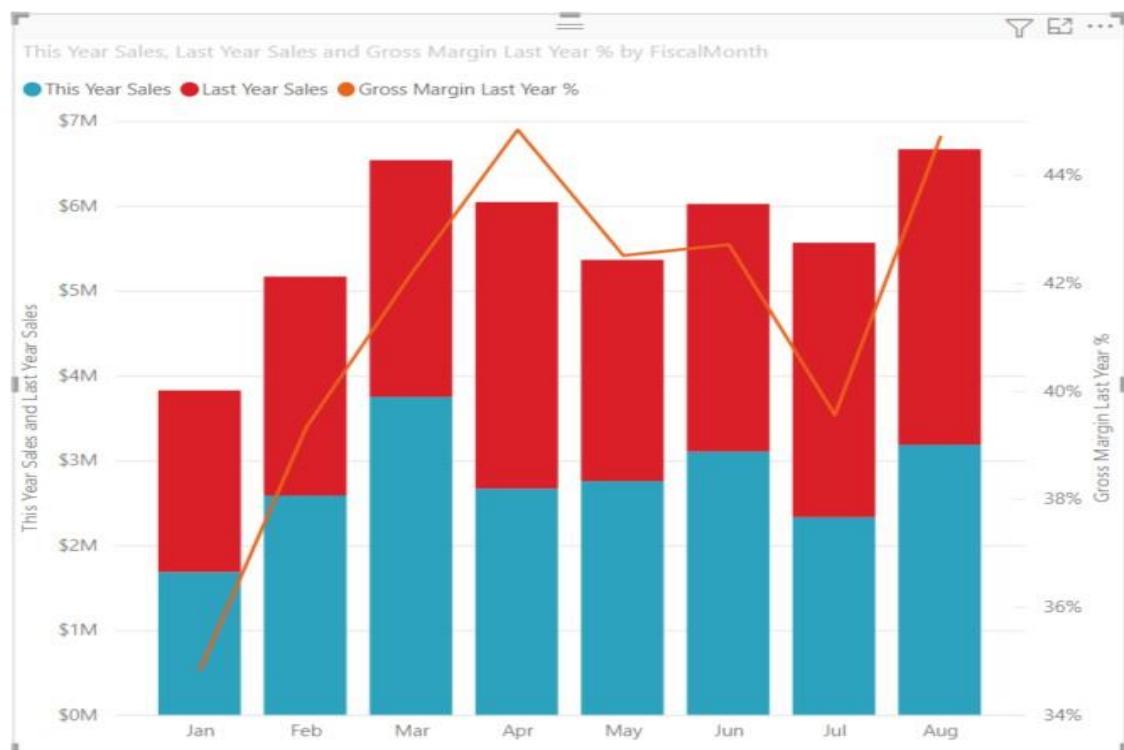


- Set **Secondary y-axis** to **On** to display options for formatting the line chart portion of the combo chart.



- Under **Secondary y-axis**, set **Title** to **On**.

Your combo chart now displays dual axes, both with titles.



- Optionally, modify the text font, size, and color and set other formatting options to improve the display and readability of the chart.

## **REFERENCEBOOKS:**

- a. Microsoft Power BI cookbook, Brett Powell, 2nd edition.
- b. The Art of R Programming by Norman Matloff Cengage Learning India.