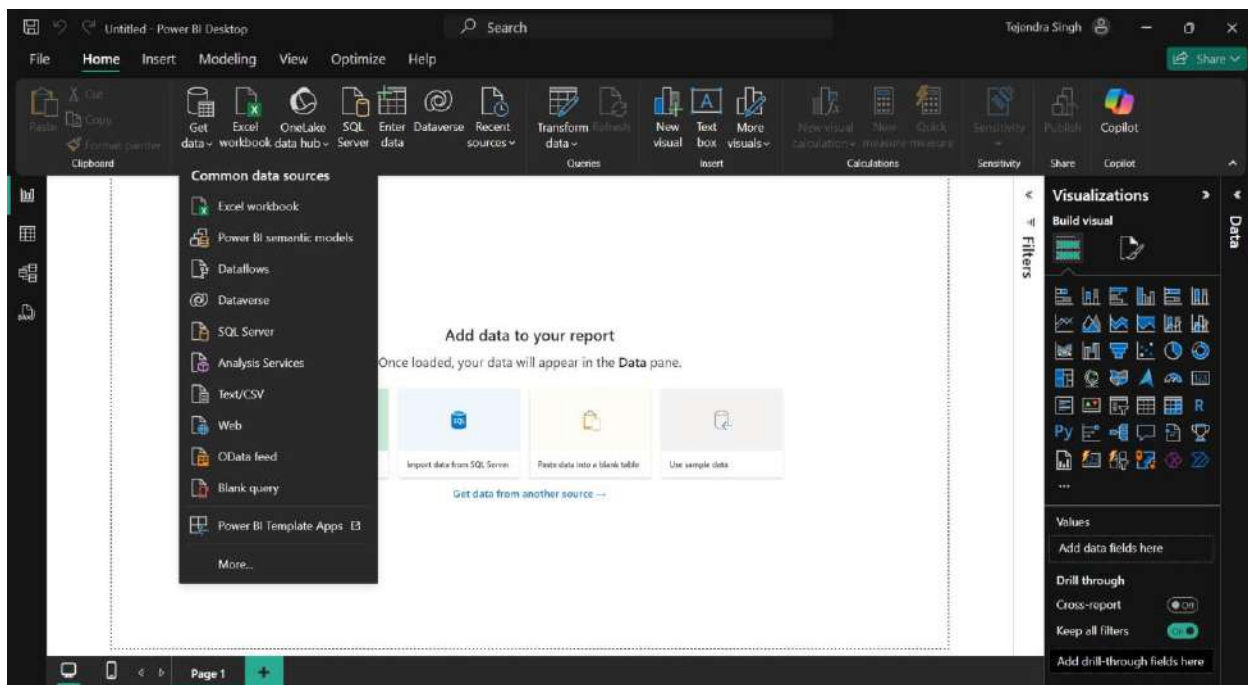


**Business Intelligence Tools:-** These tools allow us to connect to a data to clean and transform it, to model it and lastly create visualization that ultimately helps to grow business. One of the tool is PowerBI which is very similar to excel and have various libraries that helps us to analyze data. “**extension for powerbi file is .pbyx**”

**DataConnectors in Power BI:-** Whenever you have to bring data into power bi for analysis and creation of report data connectors are used. For example :- mySql , Azure etc...



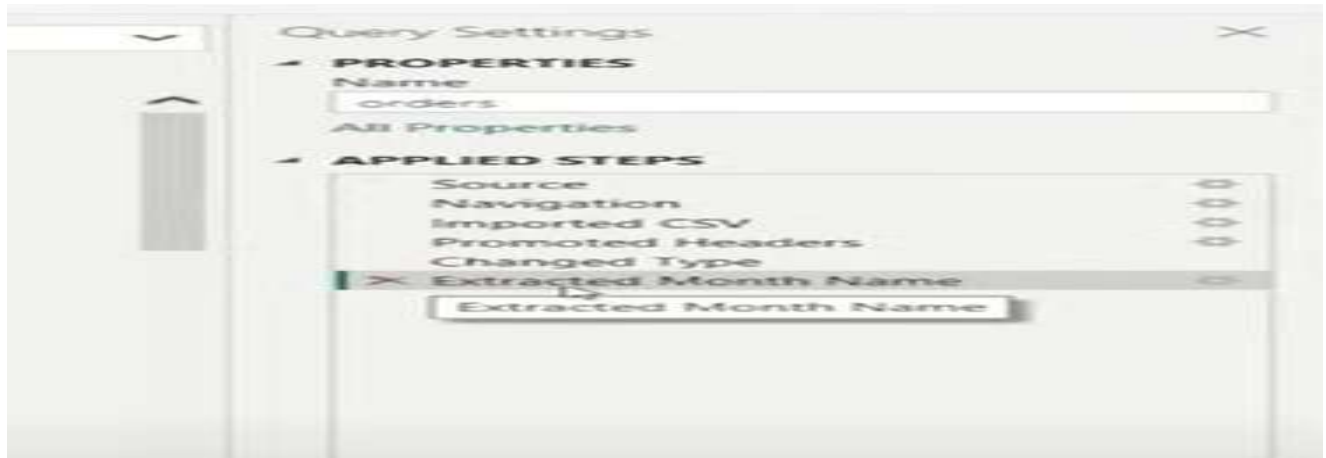
**Data Transformation (Cleaning):-** It is another word for data mining i.e extracting hidden insights from a data or identifying useful information. In PowerBI we have **power query editor** by using it we can easily transform data and can find hidden insights.

<https://www.kaggle.com/datasets/nextmillionaire/pizza-sales-dataset?resource=download> (dataset used) “import pizzasales.csv in powerbi from get data option and click on transform data.. right click on dataset and select add query option”

-> You can perform various types of transformations such as:-

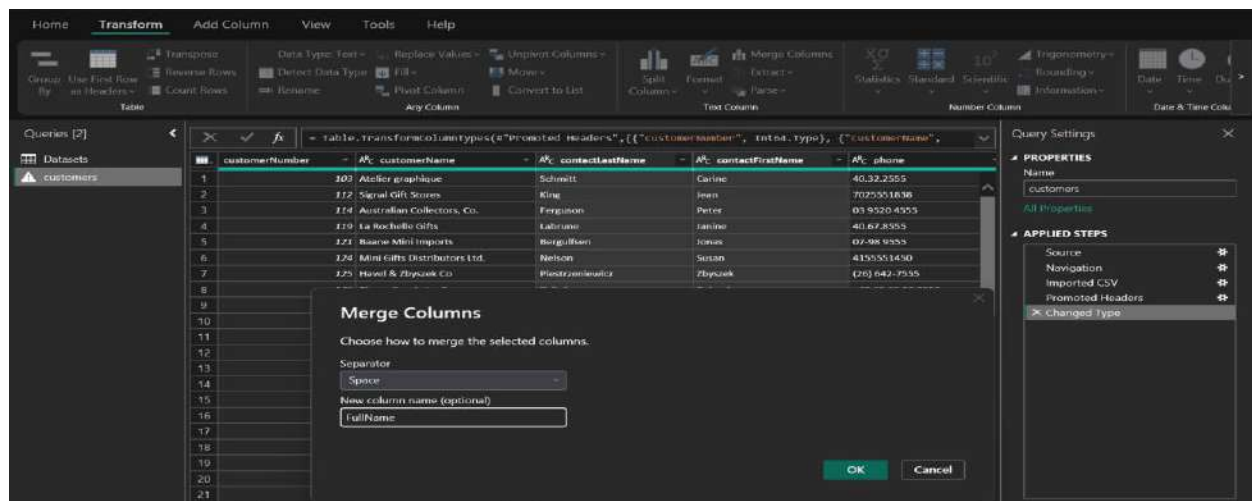
- Extracting out year from date section of a column to find out in which year the sale is high .
- Transforming dates into name of months.
- **Transform column** means updating existing column and **add column** means creating new column from existing one.

You can also reverse the property using Applied Steps section:-



## Using Text tools inside text column to Transform or clean data

- For example if we have two columns named contactFirstname and contactLastname we can easily combine them into single column using text tool “merge column”.



-Another example is removing white spaces You can go to **Format text** tool and select trim option.

-Another example is splitting a column data on the basis of spaces you can use **split column** option and then select the splitting parameter.

-Another example is extracting characters that are before @ symbol in an email and adding them into a new column named password. You can select the column and select **add column** and then select **Extract option** and then select the criteria.

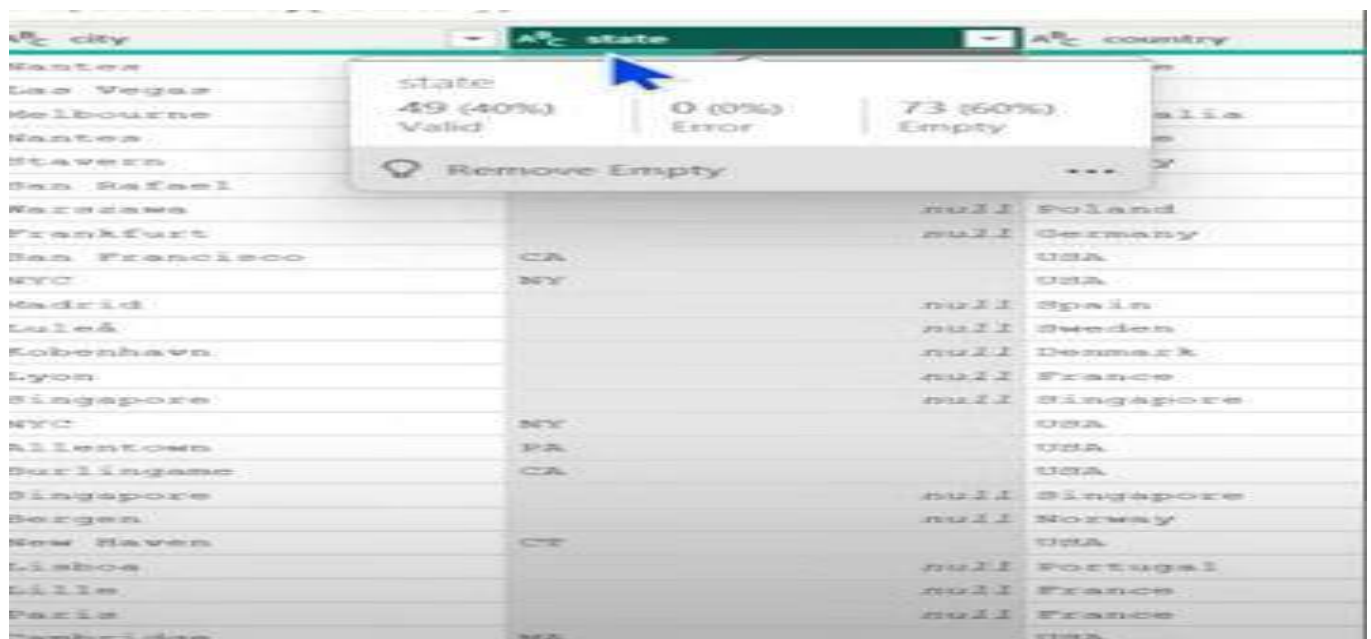
-Another example is setting first row as header.

## Dealing with unwanted and Null values:-

->Searching for unwanted columns that have no use. Select the column for example phone, address, postalcode column from customer table **right click** and select **remove option**.

->Removing **duplicate** data you can check for duplicate value by arranging column data in ascending order. Eg.. deleting duplicate customerid.

->Removing **Null values** or **Filling Null values**. Remember “null” is considered to be a null value you can transform “NULL” to “null” by Going to **transform column** and select **Replace Values option**. You can also view percentage of data that is filled and empty.



The screenshot shows a data table with columns 'city', 'state', and 'country'. A tooltip is displayed over the 'state' column header, showing a summary of the data: 49 (40%) Valid, 0 (0%) Error, and 73 (60%) Empty. Below the tooltip, the data rows are visible, showing various cities and their corresponding states and countries. Some cells in the 'state' column are null.

city	state	country
Nantes		
Las Vegas		
Melbourne		
Nantes		
Stavern		
San Rafael		
Karlsruhe		Poland
Frankfurt		Germany
San Francisco	CA	USA
NYC	NY	USA
Madrid		Spain
Luleå		Sweden
Kopenhagen		Denmark
Lyon		France
Singapore		Singapore
NYC	NY	USA
Allentown	PA	USA
Burlington	CA	USA
Singapore		Singapore
Bergen		Norway
New Haven	CT	USA
Lisboa		Portugal
Lille		France
Paris		France
Cambridge	MA	USA

->Replacing null values using **fill option** selecting **fill down** means null value will be replaced by the next column value.

->You can also **change the type of data** in a column by clicking on small arrow on the column and then selecting the type of data.

->Remember **sometimes null values are important** for example a sales representative can report to someone but president doesn't reports to anyone another example is suppose if the order is not shipped then it will show null in the ship date column so we can create new column representing data not shipped.

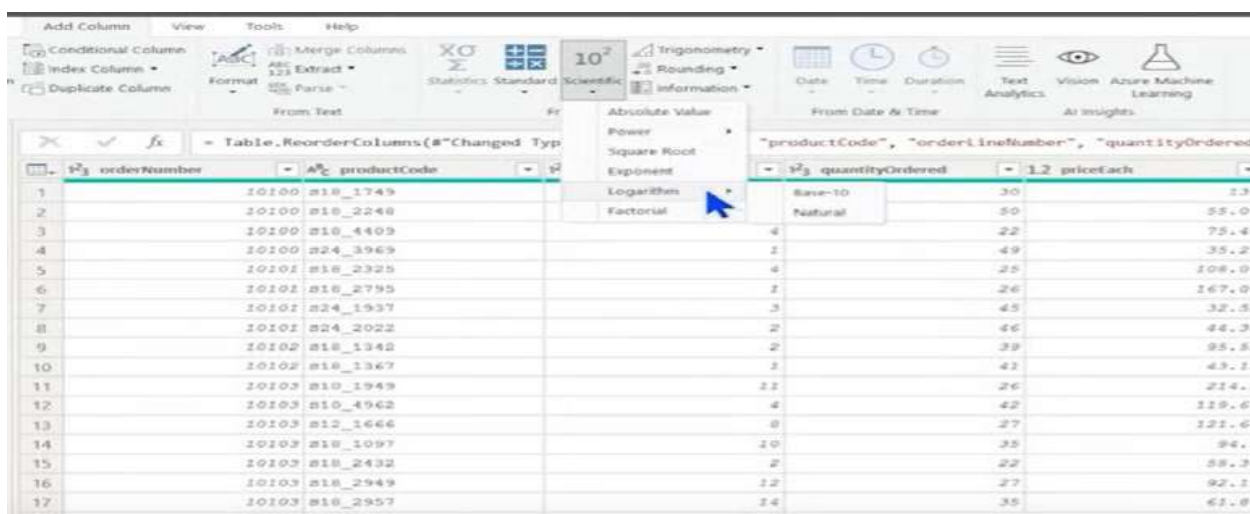
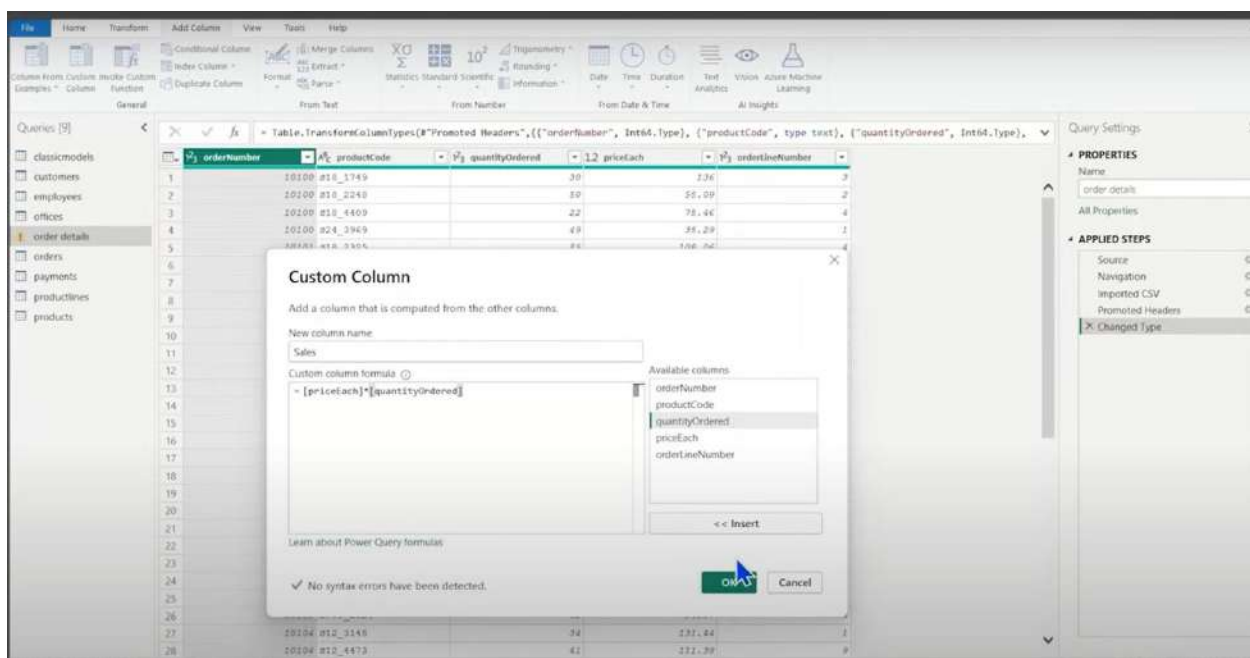
->We can also use **remove blank rows** option in **remove rows** option.

->you can also remove data having error using **Remove error** option.

## Numerical tools in PowerBI:-

Numeric tools are mostly used outside the power query editor.

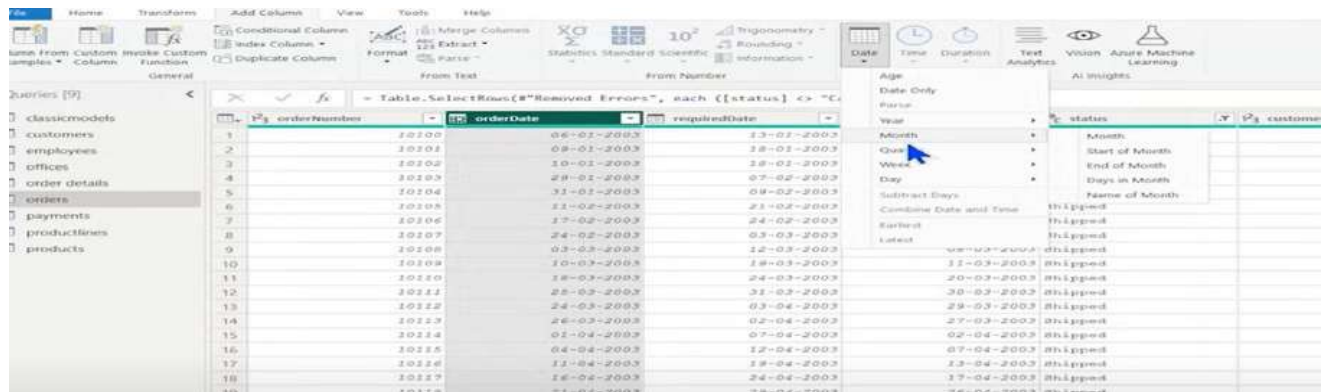
For example selecting a column with numeric type of data and then calculating average , sum , median , adding two columns etc...



## Date and time Tools in PowerBI:-

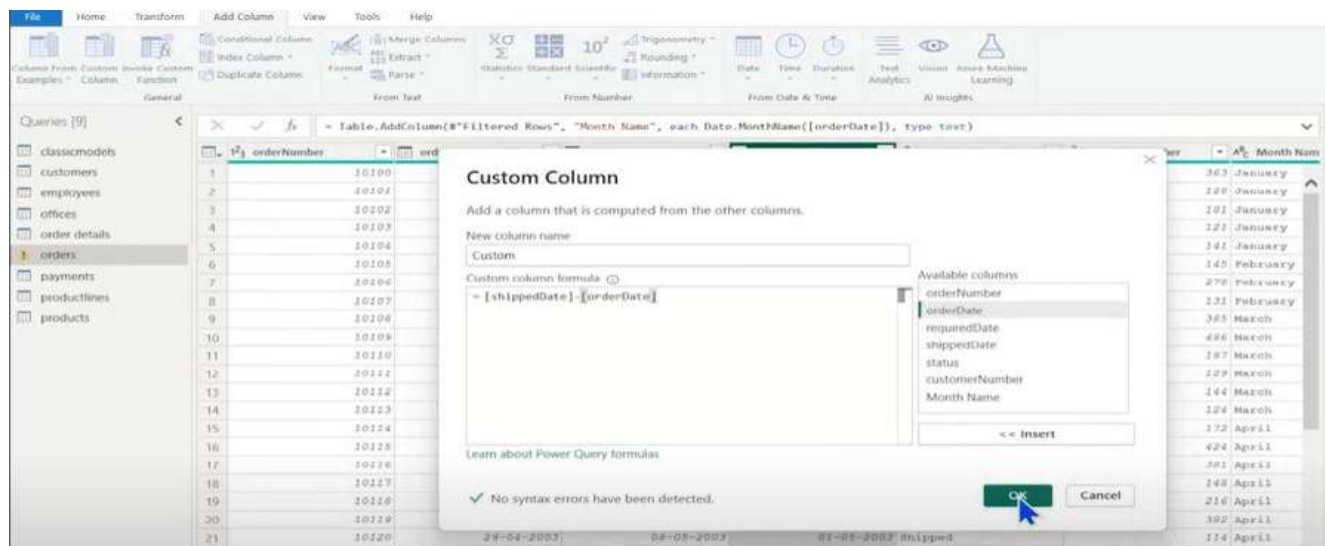
If you own a business keeping track of date and time becomes essential such as keeping track of order and on the basis of these date and time we can easily figure out various insights that can help our business to grow. For example by knowing the date we can calculate weeks or months in which maximum orders are received.

->Extracting months using orderdate



	orderNumber	orderDate	requiredDate
1	10100	05-01-2003	13-01-2003
2	10101	09-01-2003	18-01-2003
3	10102	10-01-2003	18-01-2003
4	10103	29-01-2003	07-02-2003
5	10104	31-01-2003	09-02-2003
6	10105	11-02-2003	21-02-2003
7	10106	17-02-2003	24-02-2003
8	10107	24-02-2003	03-03-2003
9	10108	03-03-2003	12-03-2003
10	10109	10-03-2003	18-03-2003
11	10110	18-03-2003	24-03-2003
12	10111	23-03-2003	31-03-2003
13	10112	24-03-2003	03-04-2003
14	10113	26-03-2003	02-04-2003
15	10114	01-04-2003	07-04-2003
16	10115	04-04-2003	12-04-2003
17	10116	11-04-2003	18-04-2003
18	10117	14-04-2003	24-04-2003
19	10118	21-04-2003	28-04-2003

->calculating number of shipping days



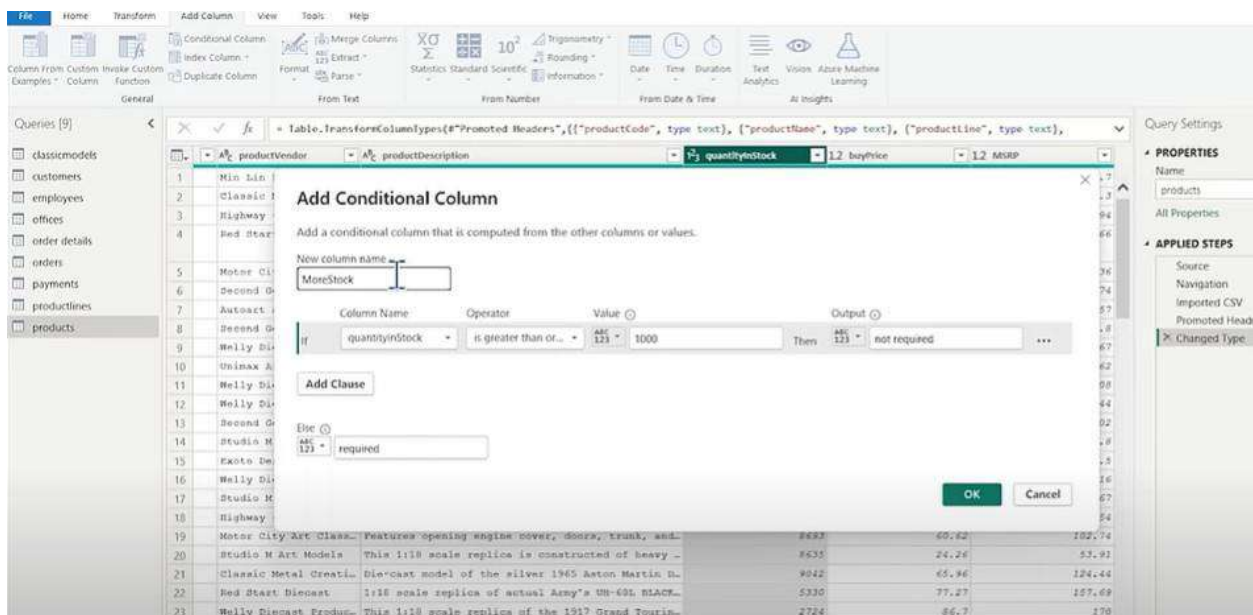
	orderNumber	orderDate	requiredDate
1	10100	05-01-2003	13-01-2003
2	10101	09-01-2003	18-01-2003
3	10102	10-01-2003	18-01-2003
4	10103	29-01-2003	07-02-2003
5	10104	31-01-2003	09-02-2003
6	10105	11-02-2003	21-02-2003
7	10106	17-02-2003	24-02-2003
8	10107	24-02-2003	03-03-2003
9	10108	03-03-2003	12-03-2003
10	10109	10-03-2003	18-03-2003
11	10110	18-03-2003	24-03-2003
12	10111	23-03-2003	31-03-2003
13	10112	24-03-2003	03-04-2003
14	10113	26-03-2003	02-04-2003
15	10114	01-04-2003	07-04-2003
16	10115	04-04-2003	12-04-2003
17	10116	11-04-2003	18-04-2003
18	10117	14-04-2003	24-04-2003
19	10118	21-04-2003	28-04-2003



## Adding Conditional Columns to Power BI:-

Let us consider a dataset containing various products having a column named quantityInStock and we need to create two columns named needmoreStock and notRequired.

->Go to add column and select conditional column.



->Another example is suppose you have given a column showing shipping days than you can derive a conditional column showing if shipping days are > 5 then show improvement required.

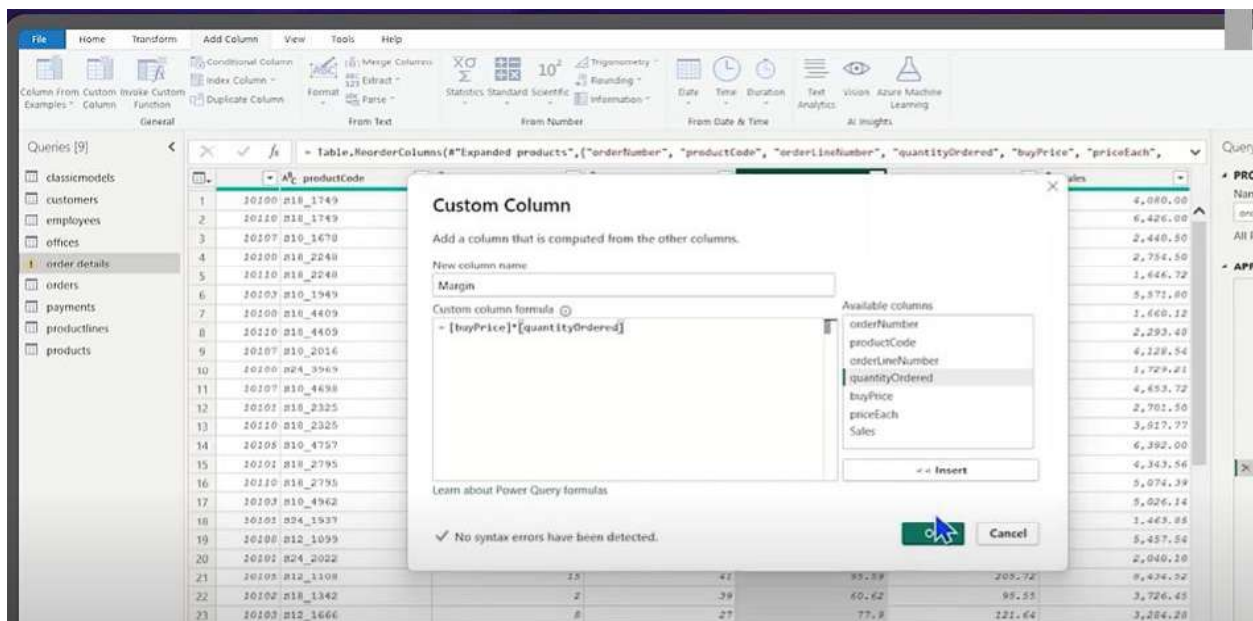
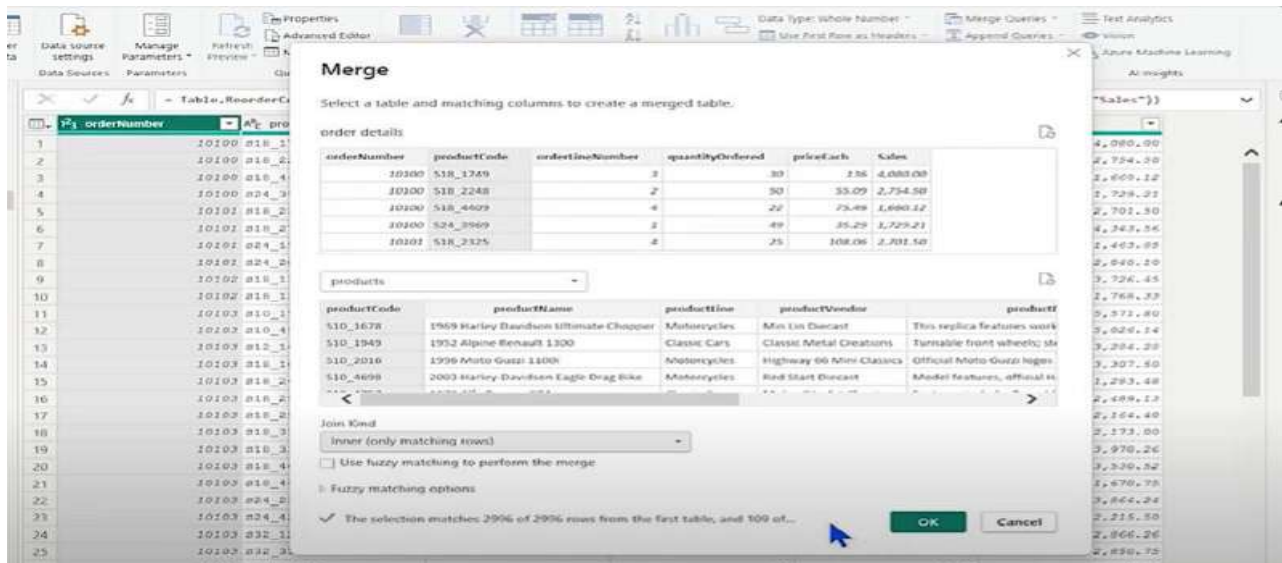
## Merge and Append Queries in PowerBI:-

Merge:- use to merge data of one dataset with another.

->Consider an example in which we have one dataset named orderdetails containg two columns (priceEach,sales) and another dataset products containg column(buyprice) we can bring buyprice into

orderDetails dataset to calculate the profit. Both datasets must contain a common attribute that can be used as **foreign key**. In the above code, suppose product code column is common in both datasets.

-> Click on **merge queries** option and enter required conditions.





Append:- Adding extra data in existing dataset. It is used when we have similar type of dataset having similar columns such as company sales for various months. There is also another way i.e when you are opening query editor instead of choosing transform data you can choose combine option.

Append

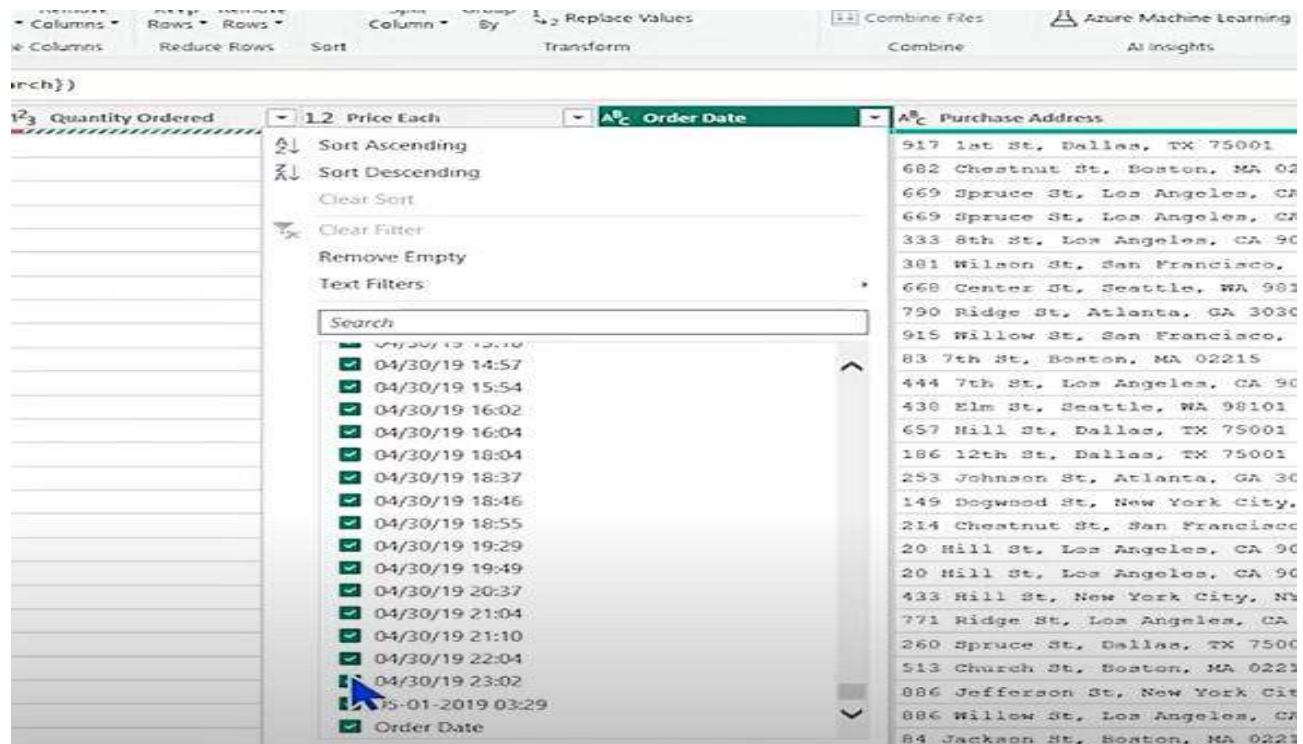
Concatenate rows from two tables into a single table.

☒ Two tables ☐ Three or more tables

Table to append: march

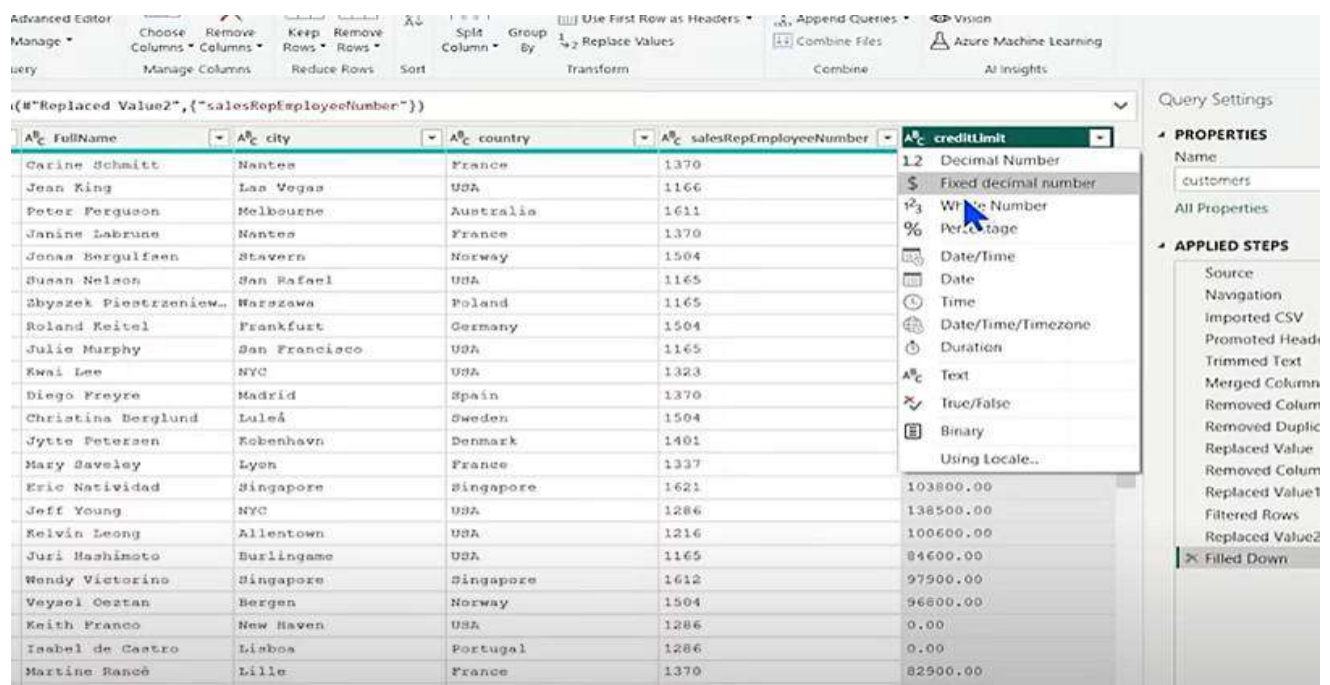
OK Cancel

Order ID	Product	Quantity Ordered	Price Each	Order Date	Purchase Address
1	176558 USB-C Charging Cable	2	11.95	04/19/19 08:46	917 1st St, Dallas, TX 75001
2	176559 Bose SoundSport Head...	1	99.99	04-07-2019 22:30	682 Chestnut St, Boston, MA 021
3	176560 Google Phone	1	600	04-12-2019 14:38	669 Spruce St, Los Angeles, CA
4	176560 Wired Headphones	1	11.99	04-12-2019 14:38	669 Spruce St, Los Angeles, CA
5	176561 Wired				Los Angeles, CA 900
6	176562 USB-C				, San Francisco, C
7	176563 Bose				, Seattle, WA 9810
8	176564 USB-C				Atlanta, GA 30300
9	176565 Macbo				, San Francisco, C
10	176566 Wired				oston, MA 02215
11	176567 Google				Los Angeles, CA 900
12	176568 Light				Seattle, WA 98101
13	176569 27in				Dallas, TX 75001
14	176570 AA Ba				Dallas, TX 75001
15	176571 Light				St, Atlanta, GA 300
16	176572 Apple				St, New York City,
17	176573 USB-C Charging Cable	1	11.95	04/27/19 18:41	214 Chestnut St, San Francisco,
18	176574 Google Phone	1	600	04-03-2019 19:42	20 Hill St, Los Angeles, CA 900
19	176574 USB-C Charging Cable	1	11.95	04-03-2019 19:42	20 Hill St, Los Angeles, CA 900
20	176575 AAA Batteries (4-pac...	1	2.99	04/27/19 00:30	422 Hill St, New York City, NY
21	176576 Apple AirPods Headph...	1	150	04/28/19 11:42	771 Ridge St, Los Angeles, CA 1
22	176577 Apple AirPods Headph...	1	150	04-04-2019 19:25	260 Spruce St, Dallas, TX 75001
23	176578 Apple AirPods Headph...	1	150	04-09-2019 23:35	513 Church St, Boston, MA 02211
24	176579 AA Batteries (4-pack)	1	3.94	04-11-2019 10:23	886 Jefferson St, New York City,

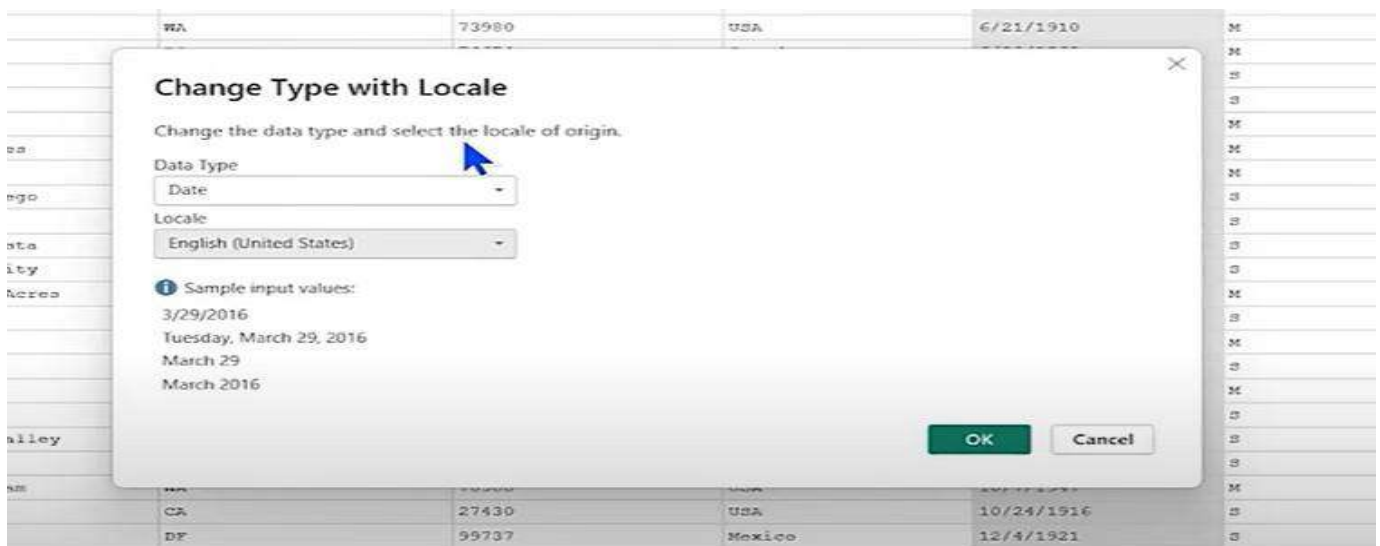
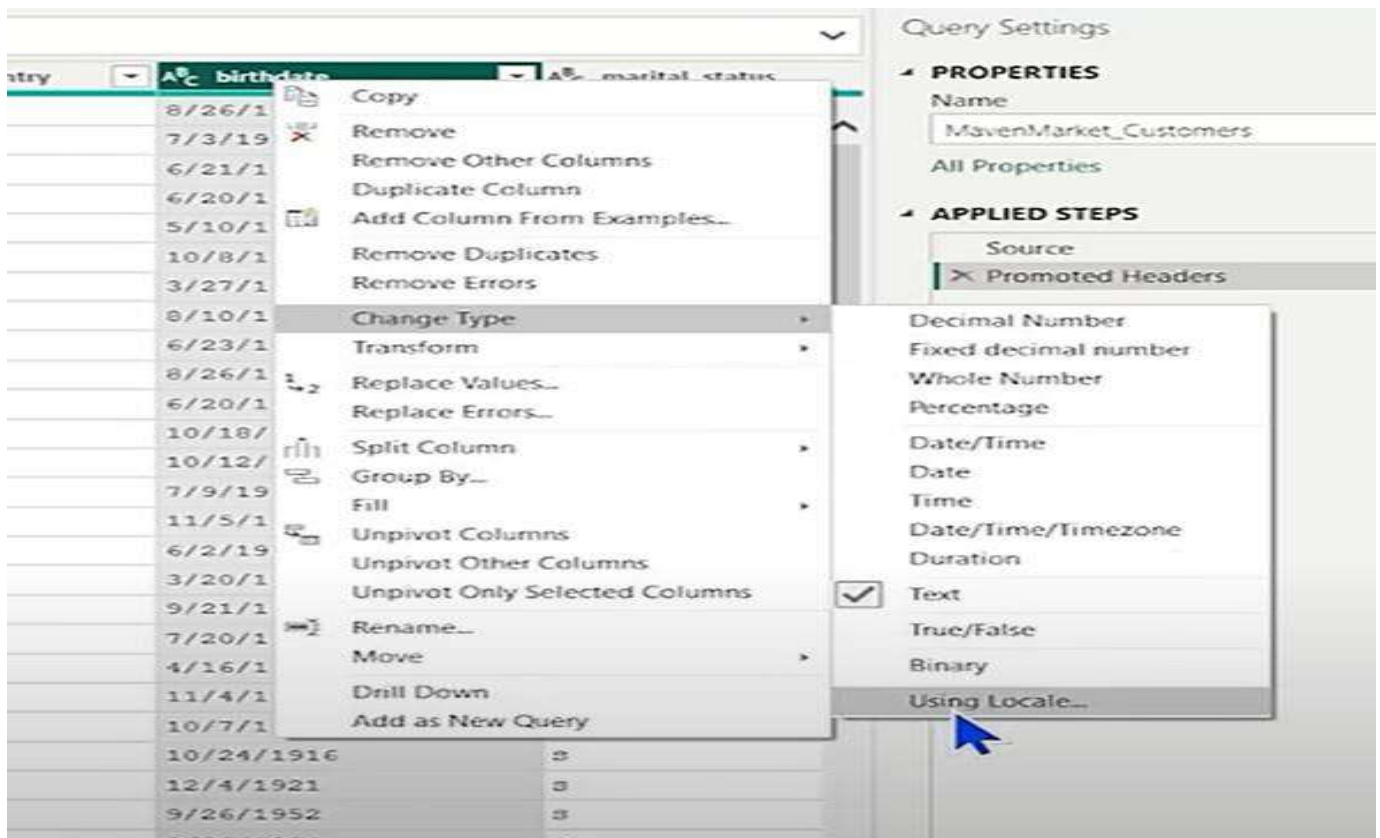


## Changing column Formats in PowerBi:-

-> Suppose we have a dataset containing column named creditLimit and we need to convert that amount into currency.

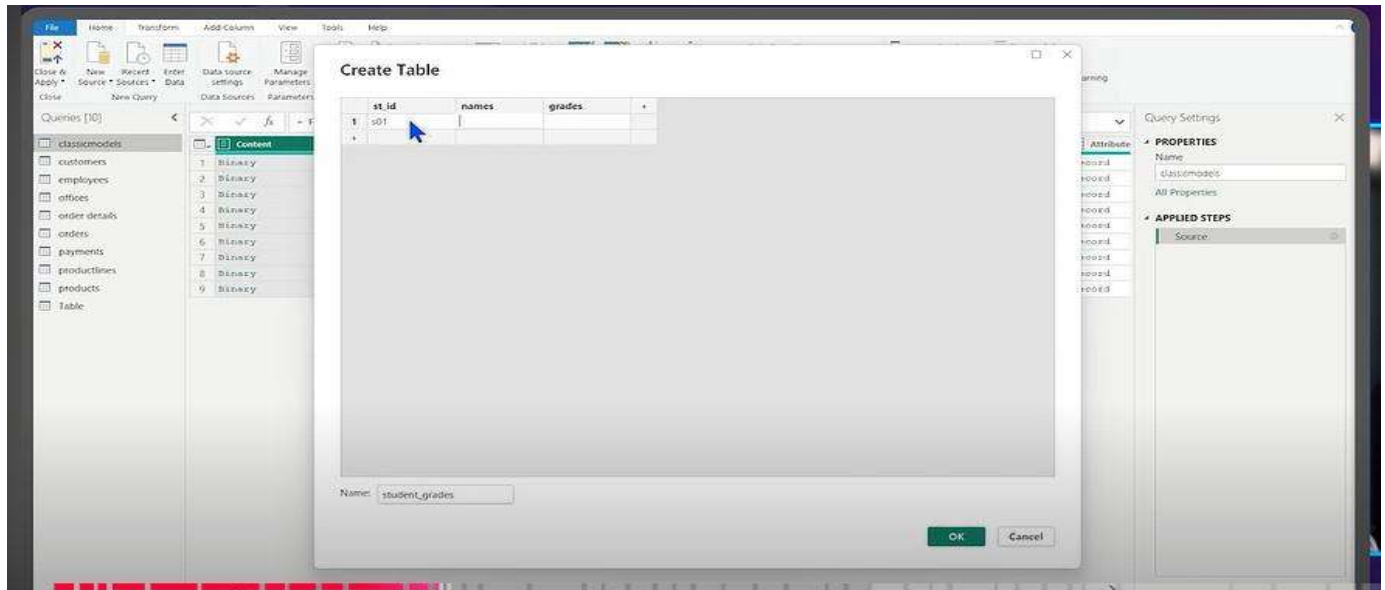


->Another example is suppose we have given a column with date format year-month-day and we need to convert it into day-month-year.



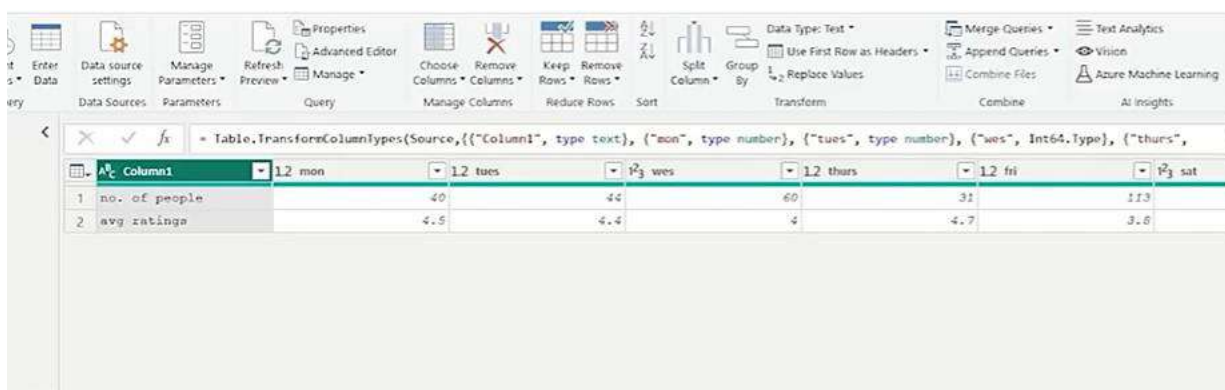
## CREATE Table using PowerBi:-

->On the top click on **Enter data** option and then create your table.



## PIVOTING AND UNPIVOTING DATA:-

There might be scenarios in which we have horizontal table instead of vertical table . We cant perform transformation in horizontal table. Hence if we have horizontal table we can convert it into vertical table.





Transform | Add Column | View | Tools | Help

Transpose | Data Type: Text | Replace Values | Unpivot Columns | Merge Columns | Statistics Standard Scientific | Number Column

Reverse Rows | Detect Data Type | Fill | Unpivot Columns | Extract | Parse

Count Rows | Rename | Pivot Column | Unpivot Other Columns | Unpivot Only Selected Columns

Any Column

fx = Table.TransformColumnTypes(Source,{{"Column1", type text}, {"mon", type number}, {"tues"

	Column1	12 mon	12 tues	123 wes	12 thu
1	no. of people	40	44	60	
2	avg ratings	4.5	4.4	4	

fx = Table.UnpivotOtherColumns("#Changed Type", {"Column1"}, "Attribute", "Value")

	Column1	Attribute	Value
1	no. of people	mon	40
2	no. of people	tues	44
3	no. of people	wes	60
4	no. of people	thurs	31
5	no. of people	fri	113
6	no. of people	sat	89
7	no. of people	sun	78
8	avg ratings	mon	4.5
9	avg ratings	tues	4.4
10	avg ratings	wes	4
11	avg ratings	thurs	4.7
12	avg ratings	fri	3.8
13	avg ratings	sat	4
14	avg ratings	sun	4.1

Queries [11]

- classicmodels
- customers
- employees
- offices
- order details
- orders
- payments
- productlines
- products
- Table
- student\_grades

fx = Table.UnpivotOtherColumns("#Changed Type", {"Column1"}, "Attribute", "Value")

	Column1	Attribute	Value
1	no. of people	mon	40
2	no. of people	tues	44
3	no. of people	wes	60

**Pivot Column**

Use the names in column "Column1" to create new columns.

Values Column: Value

Advanced options  
Learn more about Pivot Column

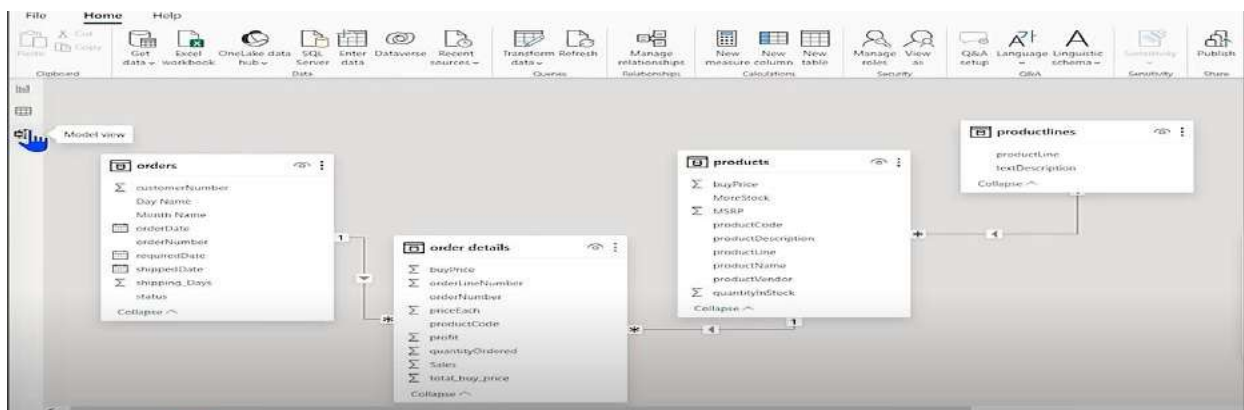
OK Cancel

Attribute	no. of people	avg ratings
1 fri	113	3.6
2 mon	40	4.5
3 sat	89	4
4 sun	78	4.2
5 thurs	31	4.7
6 tues	44	4.4
7 wed	60	4

## Data Modelling:-

Whenever we are working on a data , whether it is sales data , business data or any other data like inside sales data we have products data, customer data , orders data ,payment data etc.. so inside one folder we have many files. So to establish relationship between different tables we use data modeling to create and manage these relationships such as one to one , many to many etc... for example we have two tables one storing products data and other orders data and we want to find out sales on the basis of products.(Manage data relationship in power bi)

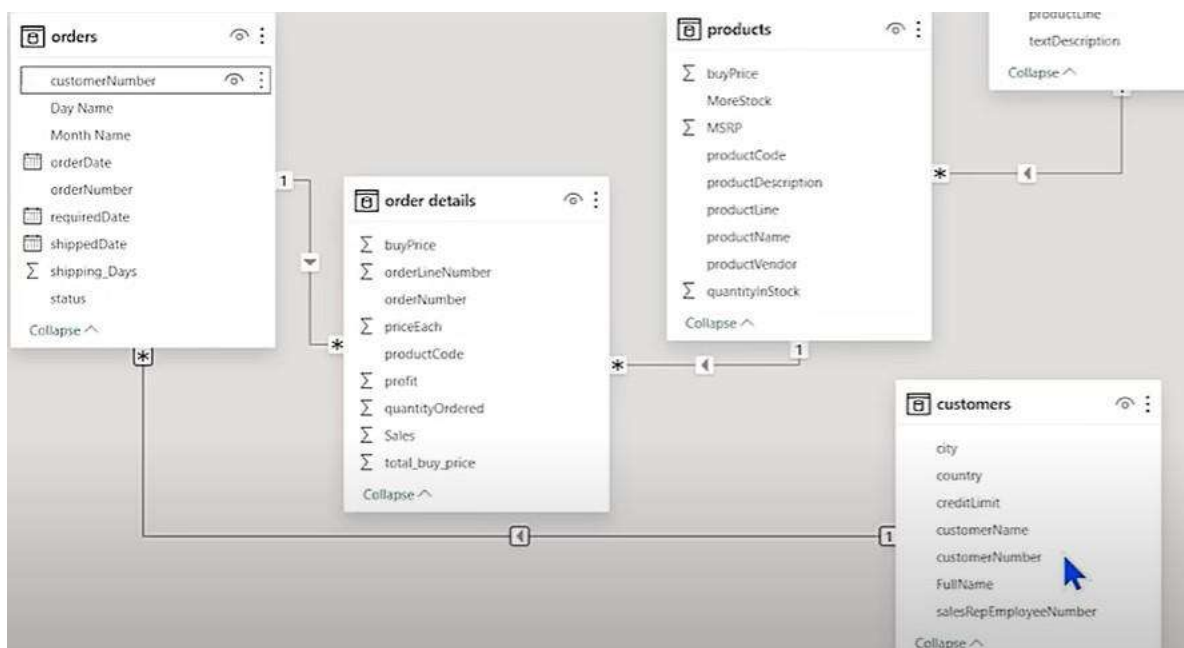
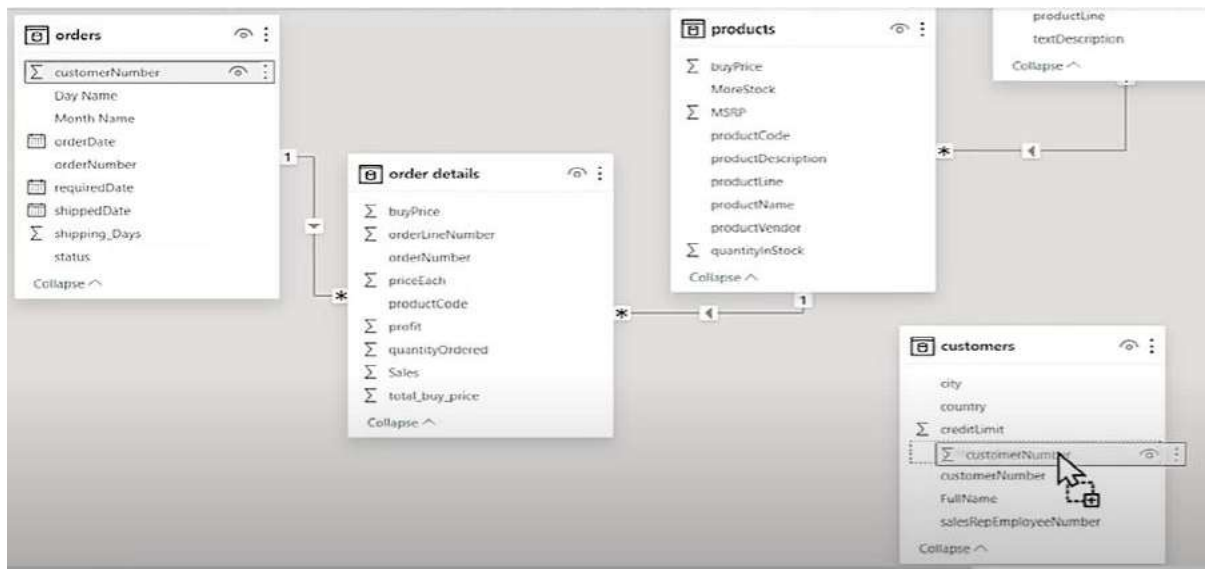
->Click on **Model view**





->Example of creating one to many relationship between orders and customer tables.

->In most of the cases the powerbi automatically detects relationships between different tables. But sometimes if not detected than you can drag property of one table over another in order to create create relationship as illustrated below:-



Products		Orders			
PN	PC	CN	PC	Q	DN
Phone	P01	1	P01	2	001
Tablet	T01	2	P01	1	002
Laptop	L01	3	P01	2	003
Macbook	M01	4	L01	1	004

LM		Managers			E		
Name	LMC	Name	MC	LMC	Name	EC	MC LMC
abc	L01	-	M01	L01	E01	M01	
xyz	L02	-	M02	L03	E02	M02	
pqr	L03	-	M03	L01	E03	M01	
pqr	L04	-	M04	L02	E04	M03	
			M05	L02	E05	M04	
					E06	M05	
					E07	M02	

## CARDINALITY AND CROSS-FILTER DIRECTION:-

Cardinality:- It means Relationship between two tables.

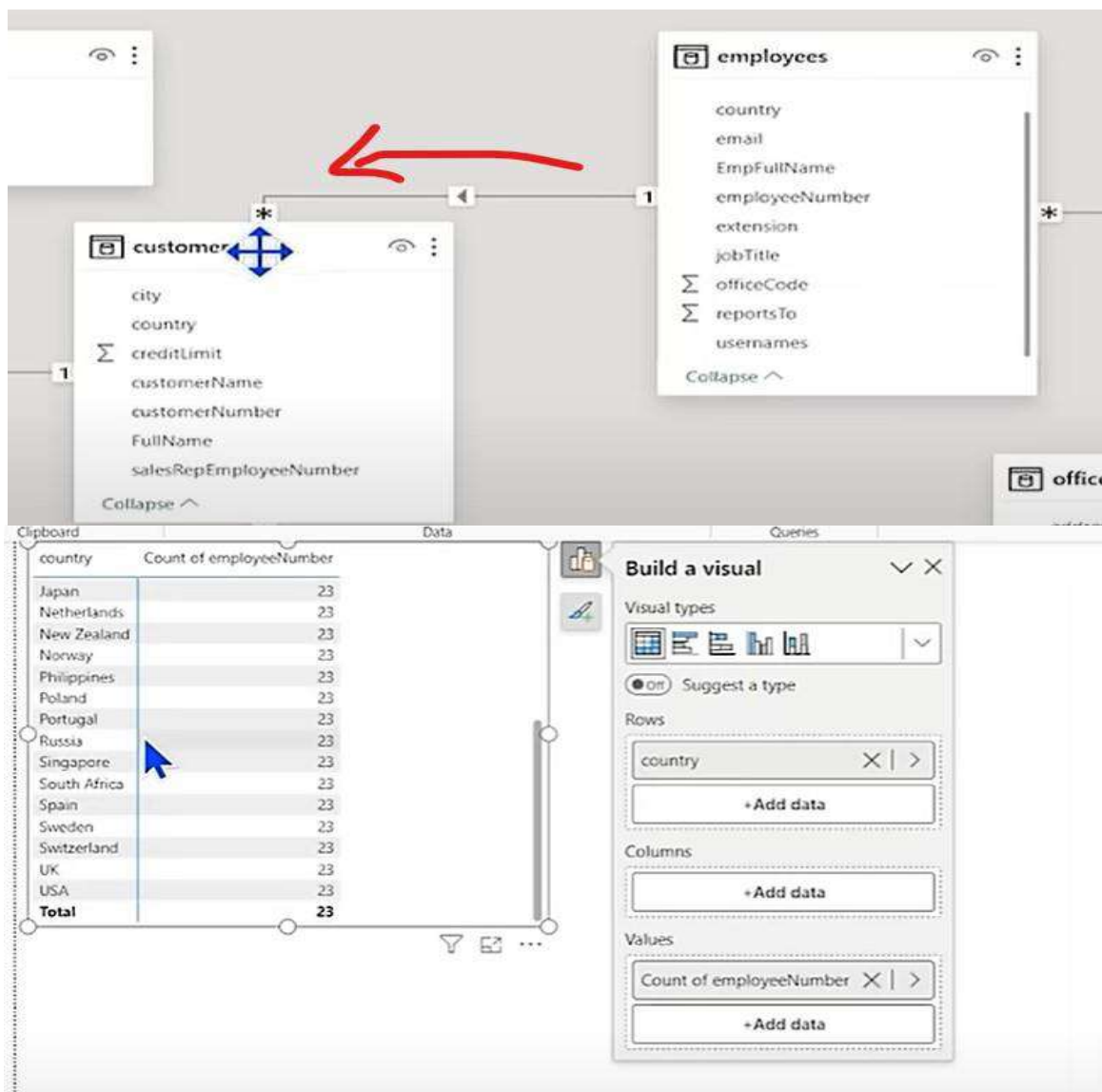
- >One to One :- Primary key to Primary key relation.
- >One to Many:- Primary key to Foreign key relation.
- >Many to one:- Foreign key to primary key relation.
- >Many to Many :- Foreign key to Foreign key relation.

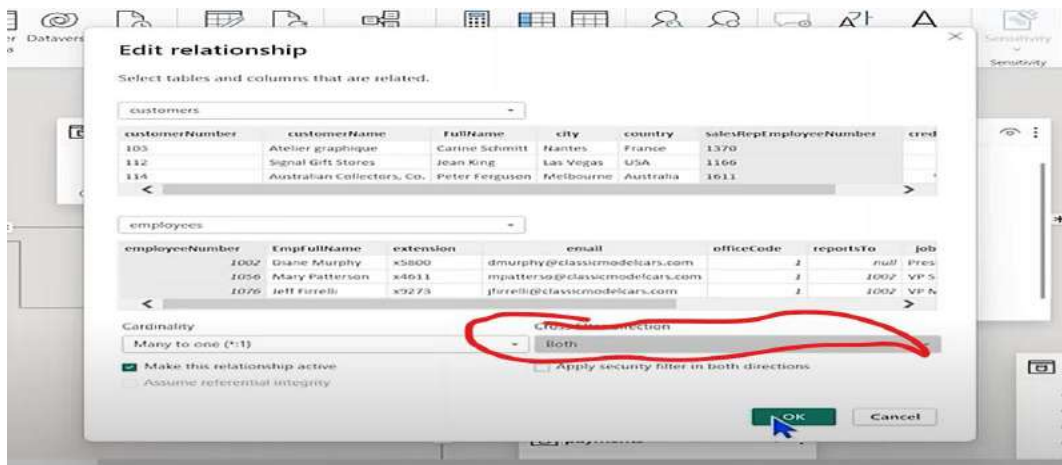
## Cross Filter Direction in Power BI:

- In Power BI, cross-filtering refers to the way that one visual element can affect the data displayed in another visual element. The cross-filter direction determines which direction the filtering will occur. There are two types of cross-filter directions in Power BI:

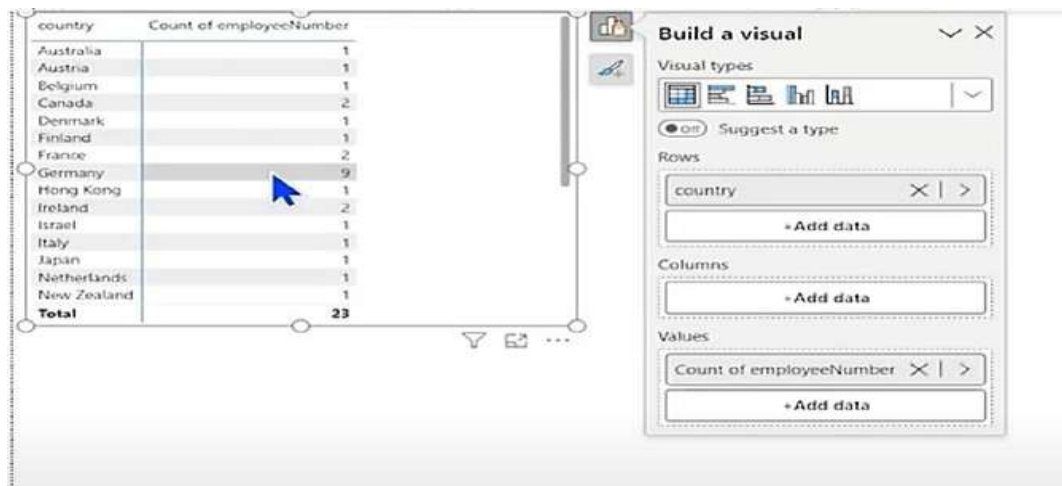
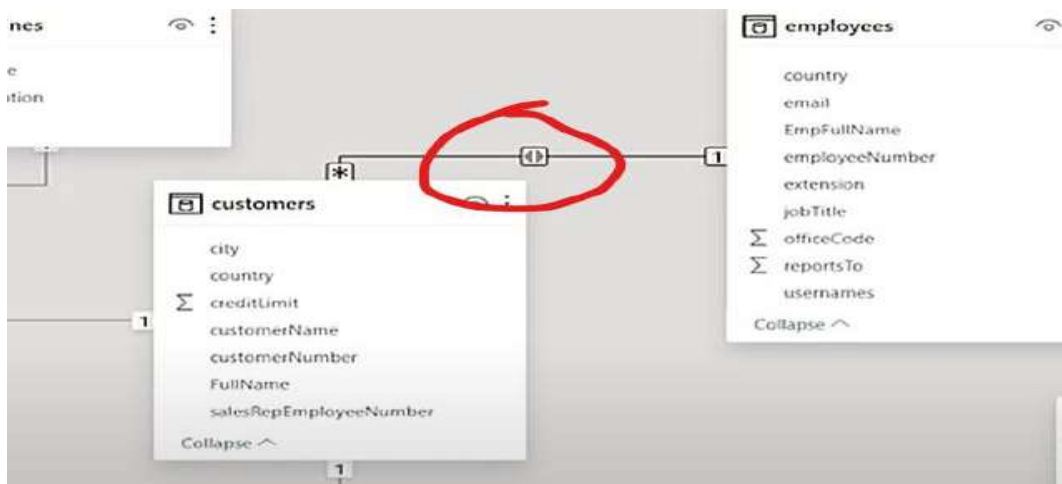
- **Single Direction:** Filtering occurs in only one direction. For example, if a user selects a specific category in a visual element, only the data related to that category will be displayed in the other visual elements. This type of cross-filtering can be set to either "Filter from the selected visual" or "Filter to the selected visual".

- **Both Directions:** Filtering occurs in both directions. This means that when a user selects a value in one visual element, it will filter the data in both the selected visual and other visuals.





If we want to derive employees data from customer



## DATA ANALYSIS EXPRESSION:-

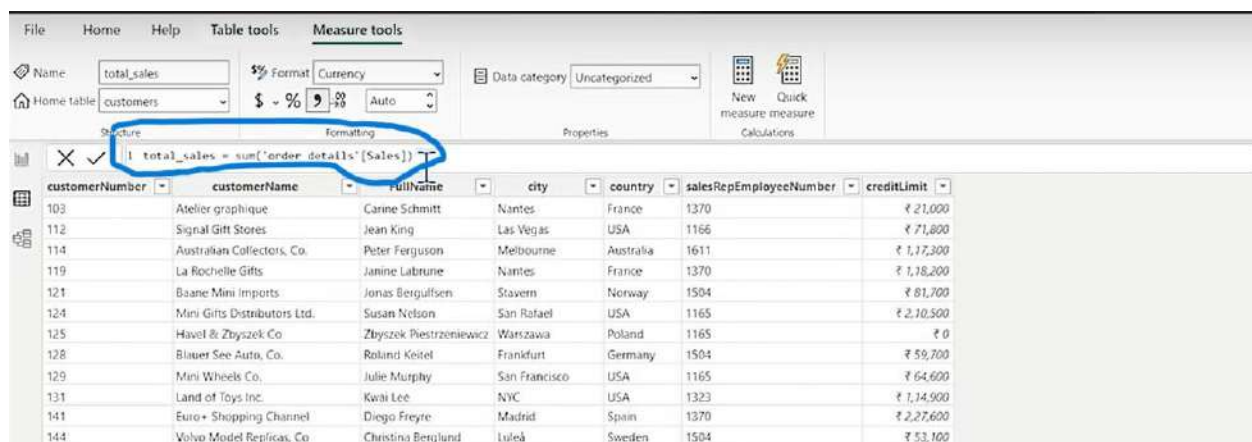
USED when we want to create new columns , new tables from existing data. So to perform any calculations we use DAX. It contains various functions and operators which we can put inside formula bars to create new columns. So in short DAX are used to create calculated columns and measures.

->Calculating complex formulas and measures.

->Creating Custom aggregations

->Dynamic grouping and Time Intelligence function.

->Custom Grouping

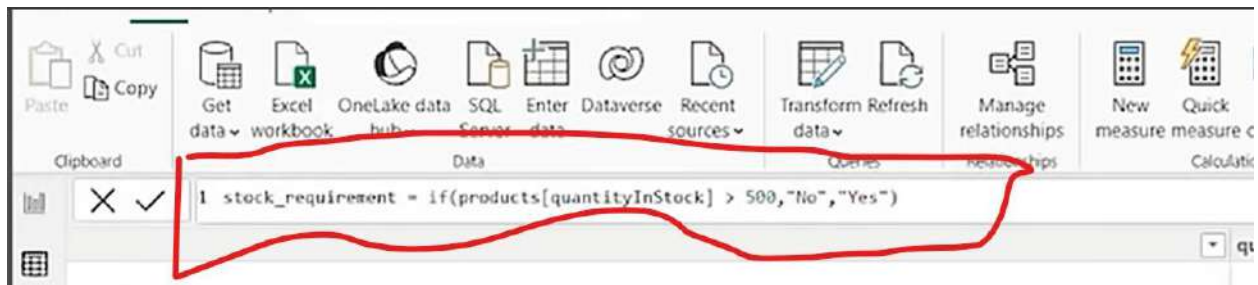


customerNumber	customerName	fullName	city	country	salesRepEmployeeNumber	creditLimit
103	Atelier graphique	Carine Schmitt	Nantes	France	1370	€ 21,000
112	Signal Gift Stores	Jean King	Las Vegas	USA	1166	€ 71,800
114	Australian Collectors, Co.	Peter Ferguson	Melbourne	Australia	1611	€ 1,17,300
119	La Rochelle Gifts	Janine Labrunie	Nantes	France	1370	€ 1,18,200
121	Baane Mini Imports	Jonas Bergulfsen	Stavern	Norway	1504	€ 81,700
124	Mini Gifts Distributors Ltd.	Susan Nelson	San Rafael	USA	1165	€ 2,10,500
125	Havel & Zbyszek Co.	Zbyszek Piestroniewicz	Warszawa	Poland	1165	€ 0
128	Blauer See Auto, Co.	Roland Koitel	Frankfurt	Germany	1504	€ 59,700
129	Mini Wheels Co.	Julie Murphy	San Francisco	USA	1165	€ 64,600
131	Land of Toys Inc.	Kwai Lee	NYC	USA	1323	€ 1,14,900
141	Euro+ Shopping Channel	Diego Freyre	Madrid	Spain	1370	€ 2,27,600
144	Volvo Model Replicas, Co	Christina Berglund	Luleå	Sweden	1504	€ 53,100

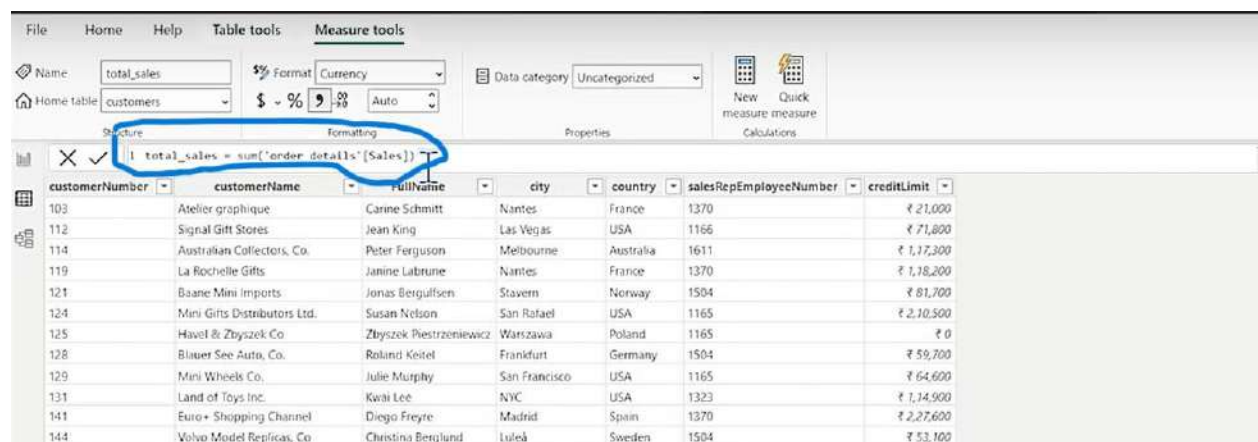
## Steps to create calculated columns in DAX:-

For example if we have a column named quantity stock and we want to create new column saying that stock required if it is less than a particular value or not required.

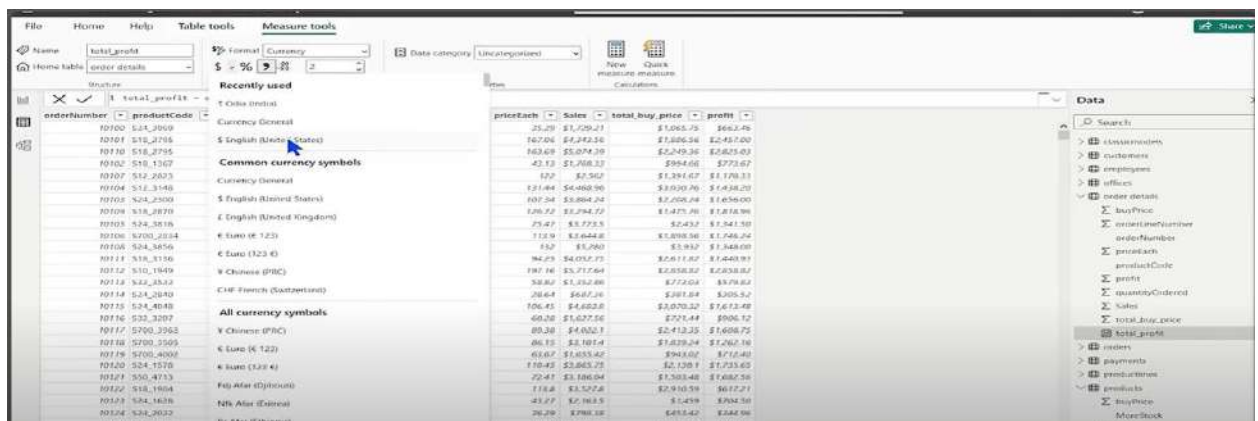
->Go to home tab and click on new column.



## Creation of measures in powerbi and its types:-

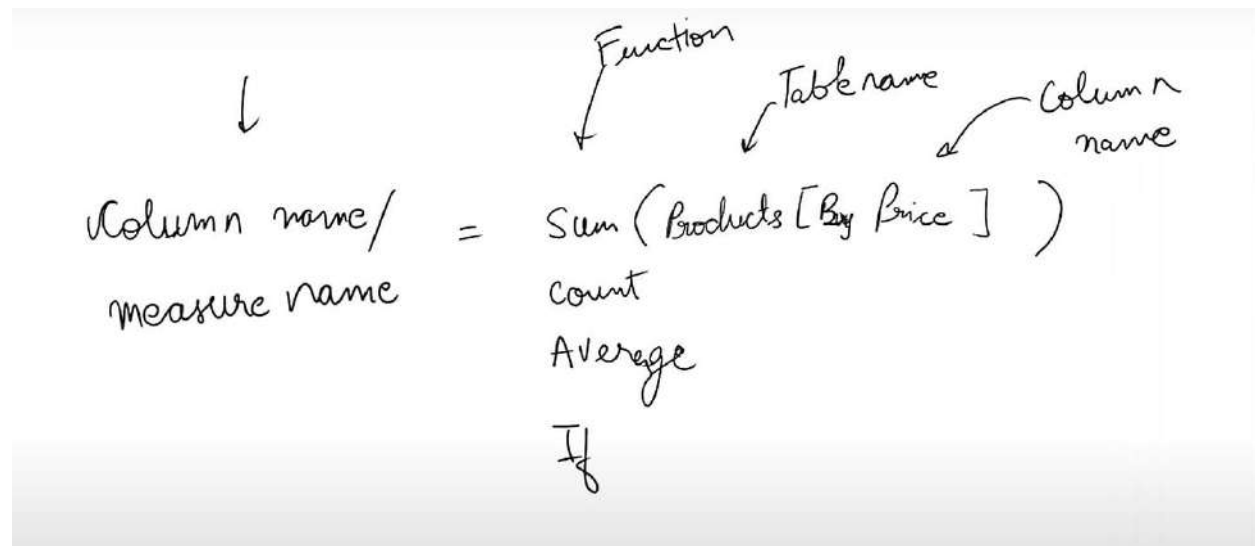


You can also convert the type of data such as changing currency type

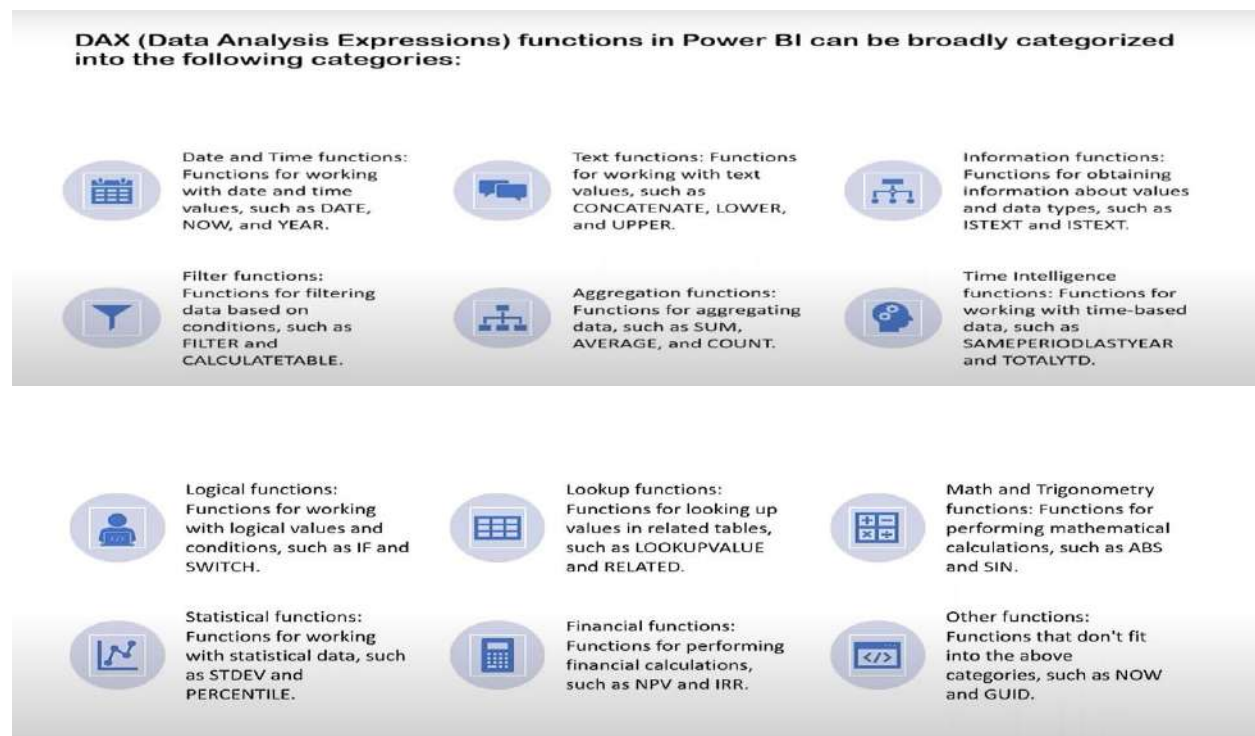




# UNDERSTANDING DAX FUNCTIONS:-

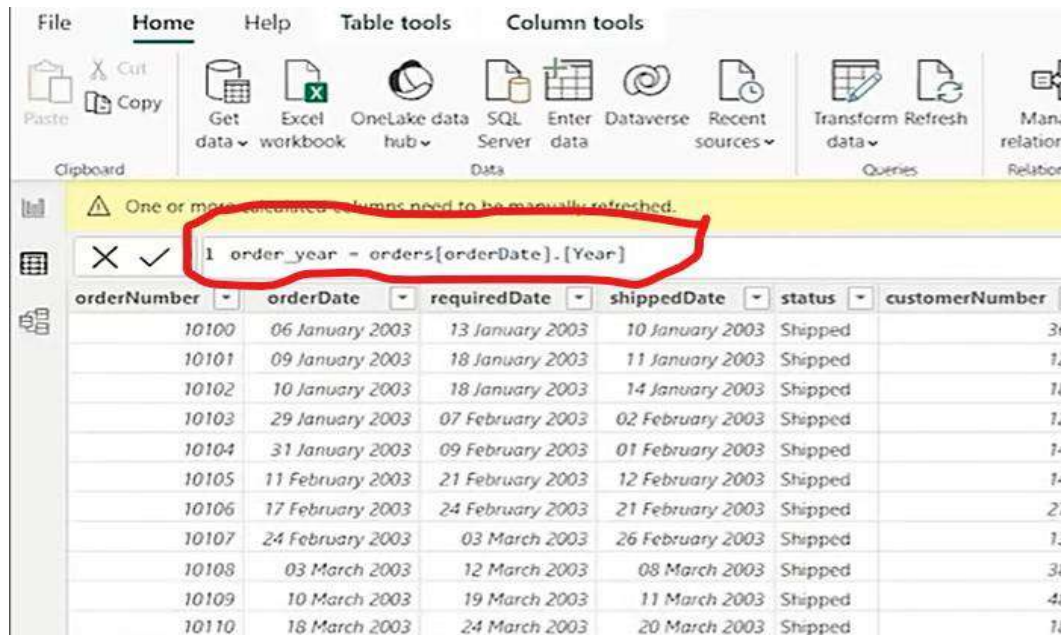


## DAX FUNCTIONS:-



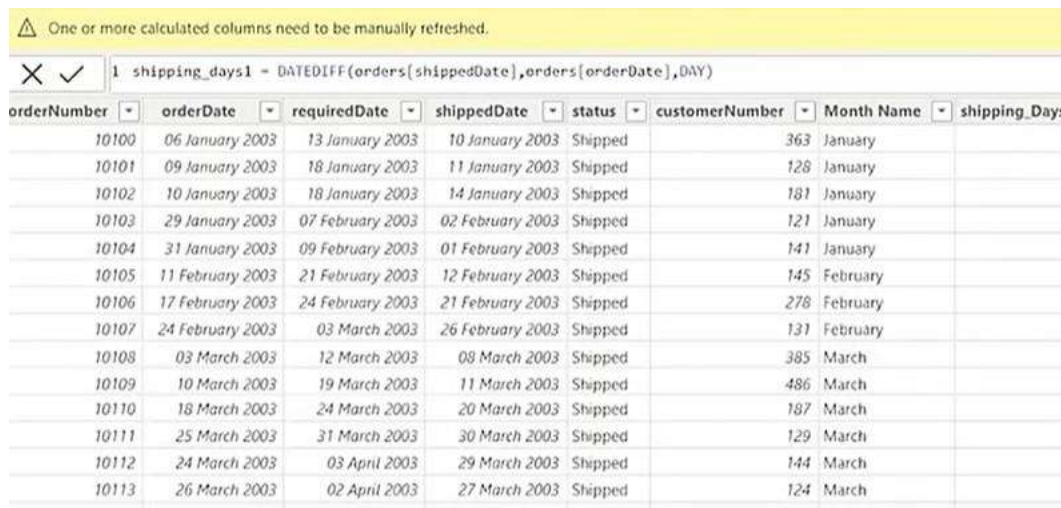
## Example of Date and Time Function:-

-> Suppose we want to know the year in which orders are placed from orderDate.



The screenshot shows the Microsoft Access interface. A query named 'order\_year' is displayed in the 'Table view' tab. The query is defined as: `1 order_year = orders[orderDate].[Year]`. The query results are shown in a table with the following columns: orderNumber, orderDate, requiredDate, shippedDate, status, and customerNumber. The data shows orders from January to March 2003.

orderNumber	orderDate	requiredDate	shippedDate	status	customerNumber
10100	06 January 2003	13 January 2003	10 January 2003	Shipped	363
10101	09 January 2003	18 January 2003	11 January 2003	Shipped	128
10102	10 January 2003	18 January 2003	14 January 2003	Shipped	181
10103	29 January 2003	07 February 2003	02 February 2003	Shipped	121
10104	31 January 2003	09 February 2003	01 February 2003	Shipped	141
10105	11 February 2003	21 February 2003	12 February 2003	Shipped	145
10106	17 February 2003	24 February 2003	21 February 2003	Shipped	278
10107	24 February 2003	03 March 2003	26 February 2003	Shipped	131
10108	03 March 2003	12 March 2003	08 March 2003	Shipped	385
10109	10 March 2003	19 March 2003	11 March 2003	Shipped	486
10110	18 March 2003	24 March 2003	20 March 2003	Shipped	187



The screenshot shows the Microsoft Access interface. A query named 'shipping\_days1' is displayed in the 'Table view' tab. The query is defined as: `1 shipping_days1 = DATEDIFF(orders[shippedDate],orders[orderDate],DAY)`. The query results are shown in a table with the following columns: orderNumber, orderDate, requiredDate, shippedDate, status, customerNumber, Month Name, and shipping\_Days. The data shows orders from January to March 2003, with the 'shipping\_Days' column calculated.

orderNumber	orderDate	requiredDate	shippedDate	status	customerNumber	Month Name	shipping_Days
10100	06 January 2003	13 January 2003	10 January 2003	Shipped	363	January	
10101	09 January 2003	18 January 2003	11 January 2003	Shipped	128	January	
10102	10 January 2003	18 January 2003	14 January 2003	Shipped	181	January	
10103	29 January 2003	07 February 2003	02 February 2003	Shipped	121	January	
10104	31 January 2003	09 February 2003	01 February 2003	Shipped	141	January	
10105	11 February 2003	21 February 2003	12 February 2003	Shipped	145	February	
10106	17 February 2003	24 February 2003	21 February 2003	Shipped	278	February	
10107	24 February 2003	03 March 2003	26 February 2003	Shipped	131	February	
10108	03 March 2003	12 March 2003	08 March 2003	Shipped	385	March	
10109	10 March 2003	19 March 2003	11 March 2003	Shipped	486	March	
10110	18 March 2003	24 March 2003	20 March 2003	Shipped	187	March	
10111	25 March 2003	31 March 2003	30 March 2003	Shipped	129	March	
10112	24 March 2003	03 April 2003	29 March 2003	Shipped	144	March	
10113	26 March 2003	02 April 2003	27 March 2003	Shipped	124	March	

## Text Functions:-

FUNCTION	DESCRIPTION
<a href="#">LEFT</a>	Returns the specified number of characters from the start of a text string.
<a href="#">LEN</a>	Returns the number of characters in a text string.
<a href="#">LOWER</a>	Converts all letters in a text string to lowercase.
<a href="#">MID</a>	Returns a string of characters from the middle of a text string, given a starting position and length.
<a href="#">REPLACE</a>	Replaces part of a text string with a different text string.
<a href="#">REPT</a>	Repeats text a given number of times. Use REPT to fill a cell with a number of instances of a text string.
<a href="#">RIGHT</a>	Returns the specified number of characters from the end of a text string.
<a href="#">SUBSTITUTE</a>	Replaces existing text with new text in a text string.

FUNCTION	DESCRIPTION
<a href="#"><u>COMBINEVALUES</u></a>	Combines the given set of operands using a specified delimiter.
<a href="#"><u>CONCATENATE</u></a>	Joins two text strings into one text string.
<a href="#"><u>CONCATENATEX</u></a>	Evaluates expression for each row on the table, then return the concatenation of those values in a single string result, seperated by the specified delimiter.
<a href="#"><u>EXACT</u></a>	Checks whether two text strings are exactly the same and return TRUE or FALSE. EXACT is case-sensitive.
<a href="#"><u>FIND</u></a>	Returns the starting position of one text string within another text string. FIND is case-sensitive and accent-sensitive.
<a href="#"><u>FIXED</u></a>	Rounds a number to the specified number of decimals and returns the result as text with optional commas.
<a href="#"><u>FORMAT</u></a>	Converts a value to text in the specified number format.

FUNCTION	DESCRIPTION
<a href="#">TOJSON</a>	Converts the records of a table into a JSON text.
<a href="#">TRIM</a>	Removes all spaces from a text string except for single spaces between words.
<a href="#">UNICHAR</a>	Returns the Unicode character that is referenced by the given numeric value.
<a href="#">UNICODE</a>	Returns the number (code point) corresponding to the first character of the text.
<a href="#">UPPER</a>	Converts a text string to all uppercase letters.
<a href="#">VALUE</a>	Converts a text string that represents a number to a number.
<a href="#">TOCSV</a>	Converts the records of a table into a CSV (comma-separated values) text.

File

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Length\_of\_name = Len(customer[FullName])

	customerNumber	customerName	FullName	city	country	salesRepEmployeeNumber	creditLimit	length_of_name
102		Atelier graphique	Carine Schmitt	Nantes	France	1379	£ 21,000	14
112		Signal Gift Stores	Joan King	Las Vegas	USA	1166	£ 79,800	14
114		Australian Collectors Co.	Peter Farquison	Melbourne	Australia	1611	£ 1,17,200	14
119		La Rochelle Gifts	Jeanne Labrousse	Nantes	France	1370	£ 1,18,200	14
121		Baane Mini Imports	Jonas Bergulfssen	Stavanger	Norway	1504	£ 81,700	16
124		Mini Gifts Distributors Ltd.	Susan Nelson	San Rafael	USA	1165	£ 2,10,500	12
125		Havel & Zbyztek Co.	Zbyztek Postozieniewicz	Warszawa	Poland	1165	£ 0	28
126		Blauer See Auto Co.	Roland Kottel	Frankfurt	Germany	1504	£ 59,700	13
129		Mini Wheels Co.	Julie Murphy	San Francisco	USA	1165	£ 64,600	12
131		Land of Toys Inc.	Kristi Lee	NYC	USA	1323	£ 123,900	14
141		Euro- Shopping Channel	Diego Freyre	Madrid	Spain	1379	£ 2,27,600	12
144		Volvo Model Replicas Co	Christina Berglund	Luleå	Sweden	1504	£ 53,100	18
145		Danish Wholesale Imports	Jytte Petersen	Copenhagen	Denmark	1401	£ 43,400	14
146		Savely & Henriot Co.	Mary Savely	Lyon	France	1337	£ 1,23,900	12
148		Dragon Souvenirs, Ltd	Eric Natividad	Singapore	Singapore	1621	£ 1,03,600	19
151		Muscle Machine Inc.	Jeff Young	NYC	USA	1286	£ 1,35,100	10
157		Orchest Classics Inc.	Karen Leung	Atlanta	USA	1216	£ 1,00,400	12
161		Technics Stores Inc.	Aun Hashimoto	Burlington	USA	1165	£ 84,600	19
166		Handic Gifts Co.	Mwenzi Victoria	Singapore	Singapore	1612	£ 92,900	15

## LOGICAL FUNCTIONS:-

->Example we need to create column saying that if credit limit is greater than particular amount then only voucher will be granted.

### Logical Function in DAX:



- IF: Returns a value based on a specified condition. The syntax is IF(condition, [value\_if\_true], [value\_if\_false]).
- AND: Returns TRUE if all its arguments are TRUE, and returns FALSE otherwise. The syntax is AND(condition1, [condition2], ...).
- OR: Returns TRUE if any of its arguments are TRUE, and returns FALSE otherwise. The syntax is OR(condition1, [condition2], ...).
- NOT: Reverses the logical value of its argument. The syntax is NOT(condition).

### Logical Function in DAX:



- SWITCH: Returns a value based on the first TRUE expression. The syntax is SWITCH(expression, value1, result1, [default or value2, result2], ...).
- IFERROR: Returns the first argument if it is not an error value, otherwise it returns the second argument. The syntax is IFERROR(value, value\_if\_error).
- IFNA: Returns the first argument if it is not the #N/A error value, otherwise it returns the second argument. The syntax is IFNA(value, value\_if\_NA).

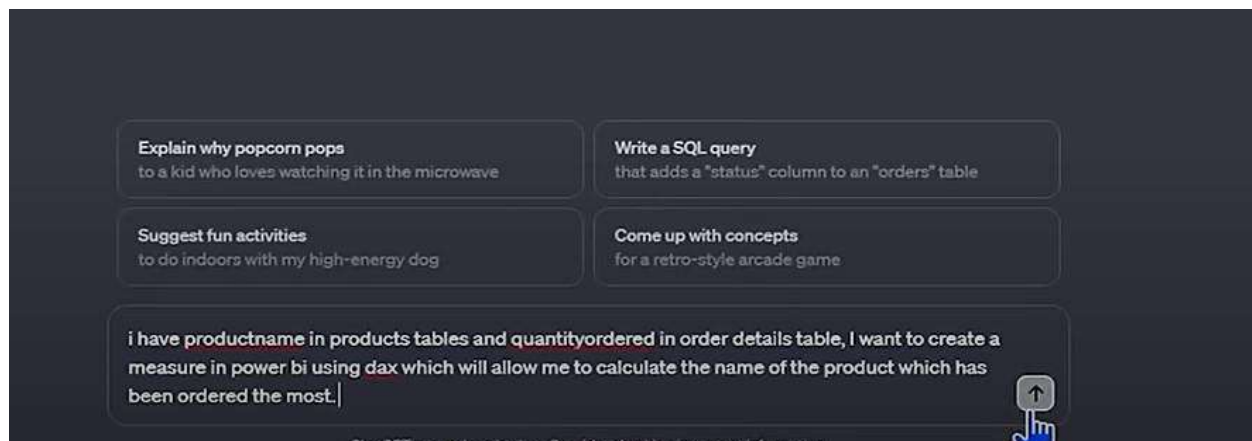


Structure: Name: voucher, Format: Text, Summarization: Don't summarize, Data category: Uncategorized, Sort by columns: Sort, Data groups: Groups, Manage relationships: Relationships, New column: Calculations

Formula: voucher = If((and(customers[country]="USA", customers[creditLimit] >= 100000),"yes", "no")

customerNumber	customerName	FullName	city	country	salesRepEmployeeNumber	creditLimit	voucher
103	Atelier graphique	Carine Schmitt	Nantes	France	1370	\$21,000	no
112	Signal Gift Stores	Jean King	Las Vegas	USA	1166	\$71,800	no
114	Australian Collectors, Co.	Peter Ferguson	Melbourne	Australia	1611	\$1,17,300	no
119	La Rochelle Gifts	Janine Labrune	Nantes	France	1370	\$1,18,200	no
121	Baane Mini Imports	Jonas Bergulsen	Stavern	Norway	1504	\$81,700	no
124	Mini Gifts Distributors Ltd.	Susan Nelson	San Rafael	USA	1165	\$2,10,500	yes
125	Havel & Zbyszek Co.	Zbyszek Pietrzeniewicz	Warszawa	Poland	1165	\$0	no
128	Blauer See Auto, Co.	Roland Keitel	Frankfurt	Germany	1504	\$59,700	no
129	Mini Wheels Co.	Julie Murphy	San Francisco	USA	1165	\$64,600	no
131	Land of Toys Inc.	Kwai Lee	NYC	USA	1323	\$1,14,900	yes
141	Euro+ Shopping Channel	Diego Freyre	Madrid	Spain	1370	\$2,27,600	no
144	Volvo Model Replicas, Co.	Christina Berglund	Luleå	Sweden	1504	\$53,100	no
145	Danish Wholesale Imports	Jytte Petersen	København	Denmark	1401	\$83,400	no
146	Saveley & Hennot, Co.	Mary Saveley	Lyon	France	1337	\$1,23,900	no
148	Dragon Souvenirs, Ltd.	Eric Natividad	Singapore	Singapore	1621	\$1,03,800	no
151	Muscle Machine Inc.	Jeff Young	NYC	USA	1206	\$1,38,500	yes
157	Diecast Classics Inc.	Kelvin Leong	Allentown	USA	1216	\$1,00,600	yes
161	Tednies Stores Inc.	Juni Hashimoto	Burlingame	USA	1165	\$84,600	no
166	Handji Gifts & Co.	Wendy Victorino	Singapore	Singapore	1612	\$97,900	no

## Using chatgpt to create measures:-



## OPERATORS

# Types of Operators in DAX



- **Arithmetic Operators:** Used to perform arithmetic operations such as addition (+), subtraction (-), multiplication (\*), and division (/).

- **Comparison Operators:** Used to compare values and return a logical result (TRUE or FALSE). These include equal to (=), not equal to (<>), greater than (>), less than (<), greater than or equal to (>=), and less than or equal to (<=).

- **Logical Operators:** Used to perform logical operations such as AND, OR, and NOT.

# Types of Operators in DAX



- **Concatenation Operators:** Used to combine text values, such as & and CONCATENATE.

- **Reference Operators:** Used to reference cells or ranges, such as [] and [].

- **Parenthesis:** Used to control the order of operations in a formula, such as () and [].

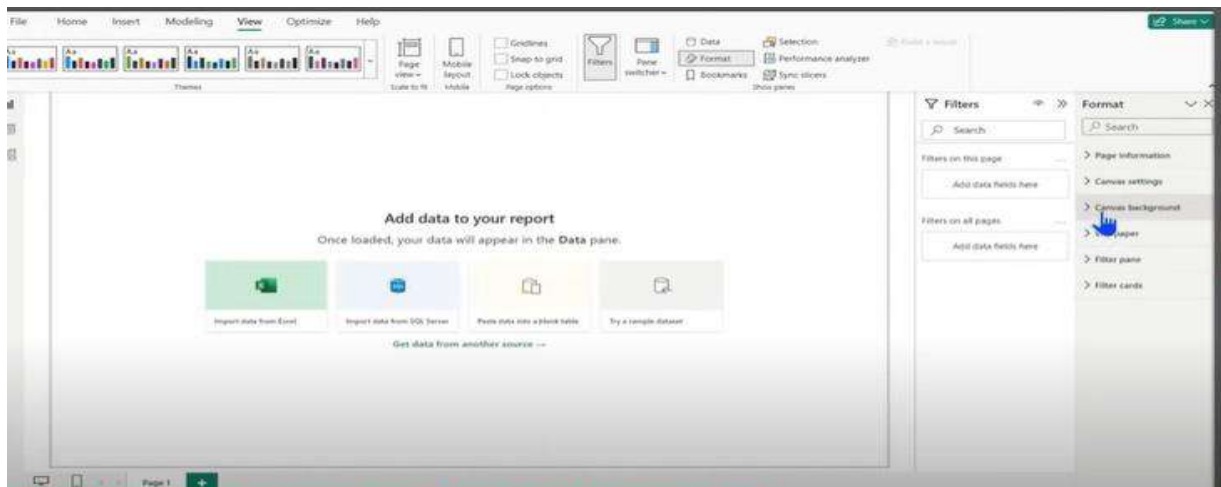
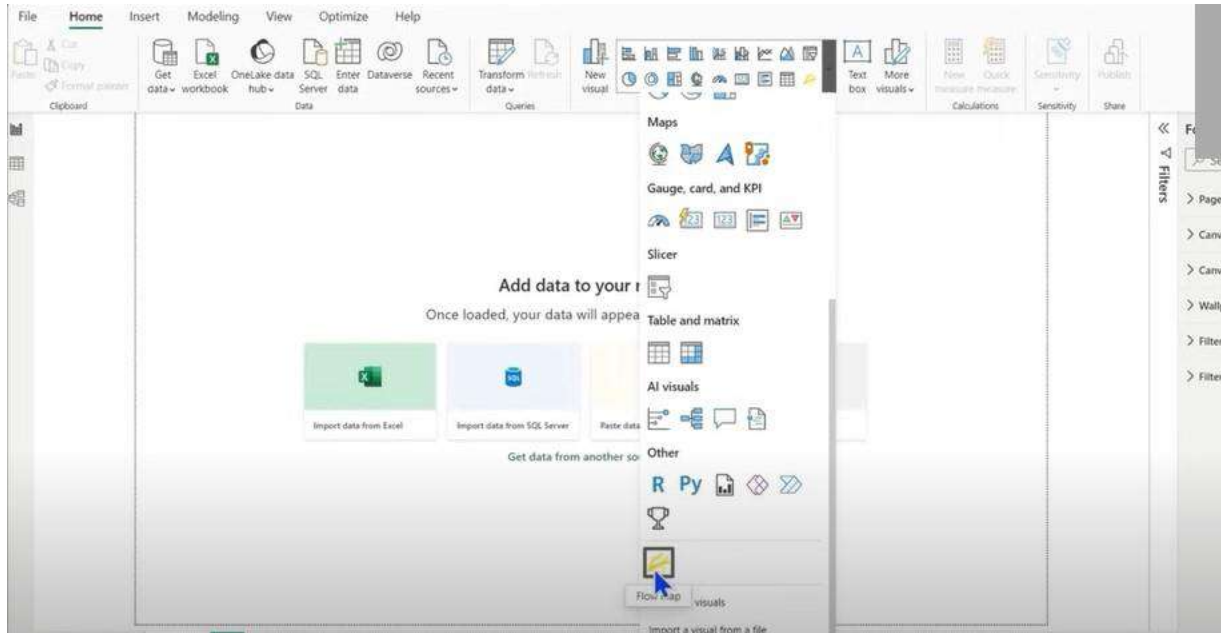
- **Miscellaneous Operators:** Used for various purposes, such as the colon (:) operator used in date and time functions and the semicolon (;) operator used in the SWITCH function.

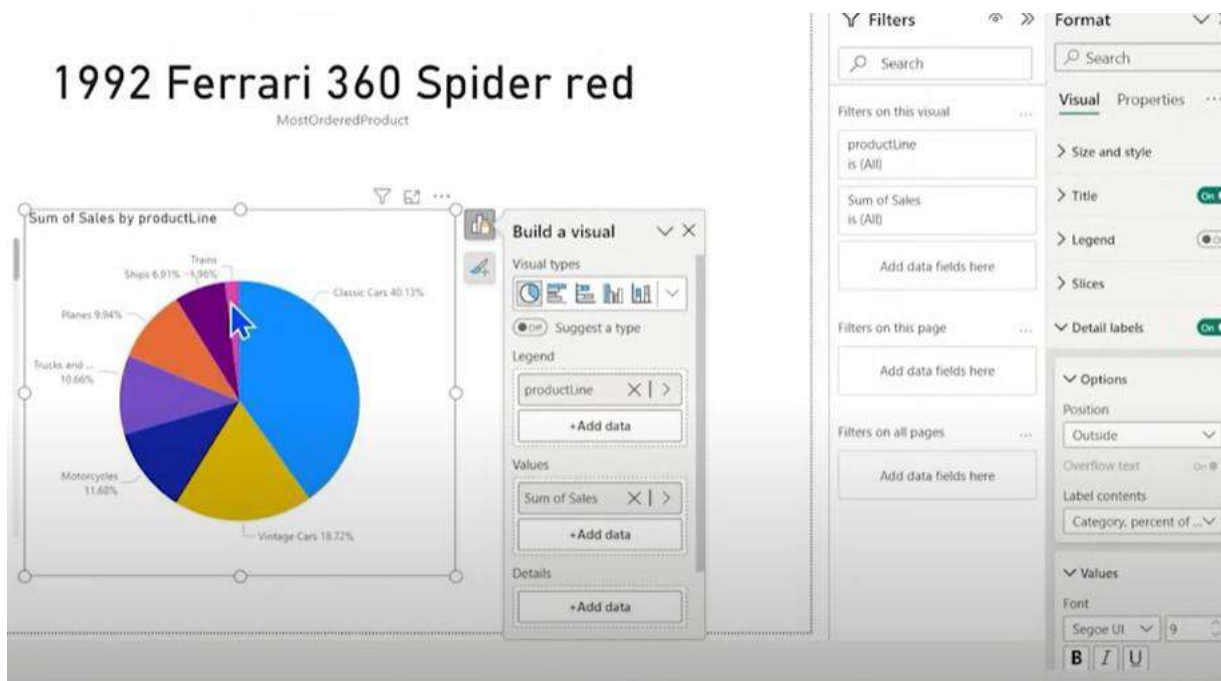
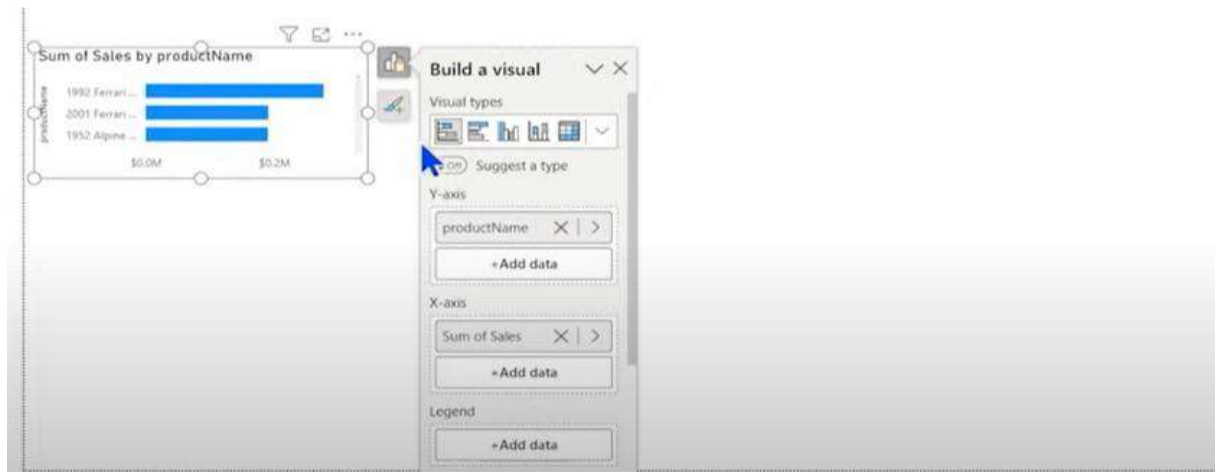


# Visuals in PowerBI:-

->Click on **Report view** to create visuals.

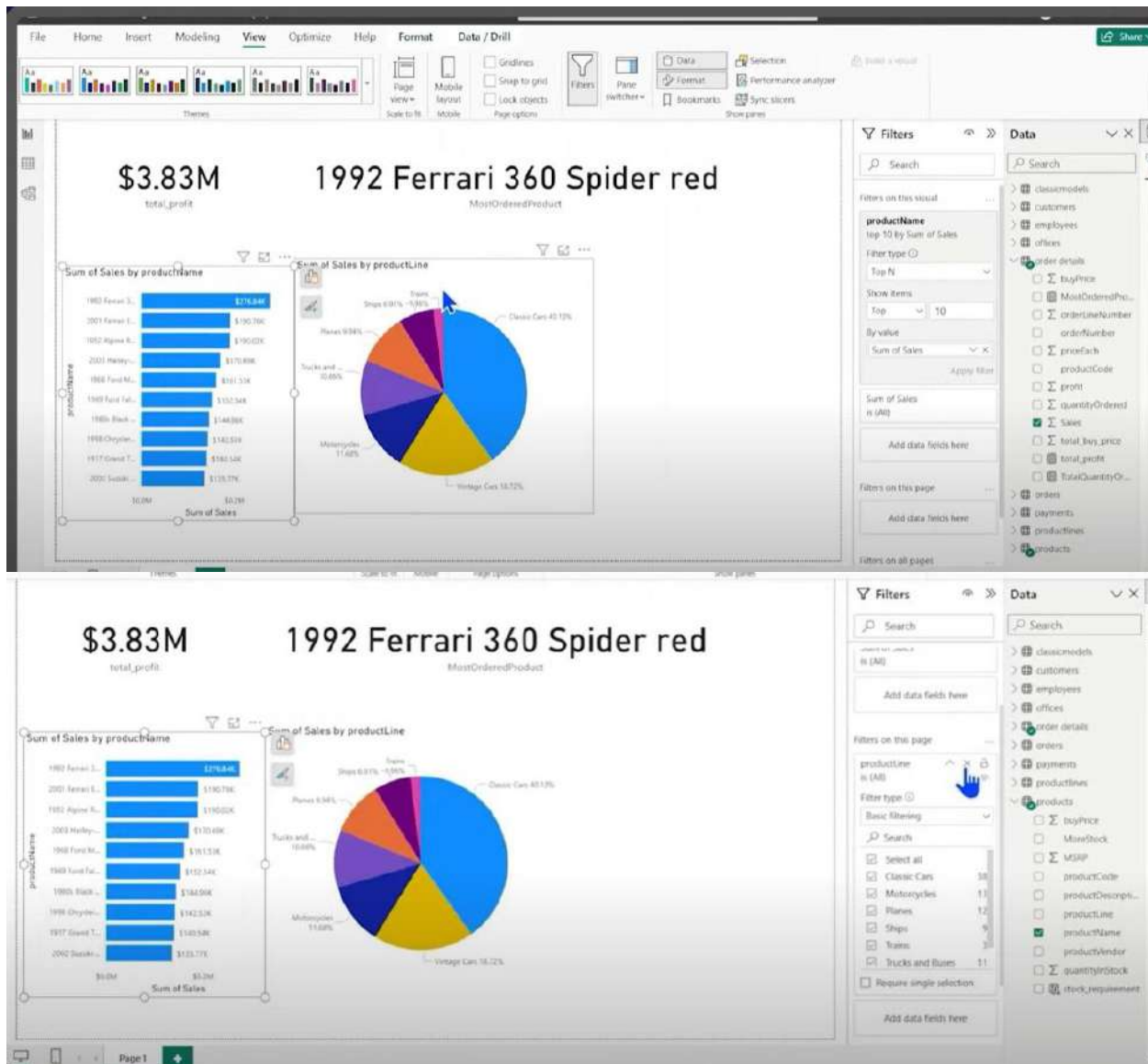
->Right click on chart and click format option to customize chart.





## Filtering options in PowerBI:-

->Example suppose we want to find out information about only first 5 products from all the products list we can use filter options.



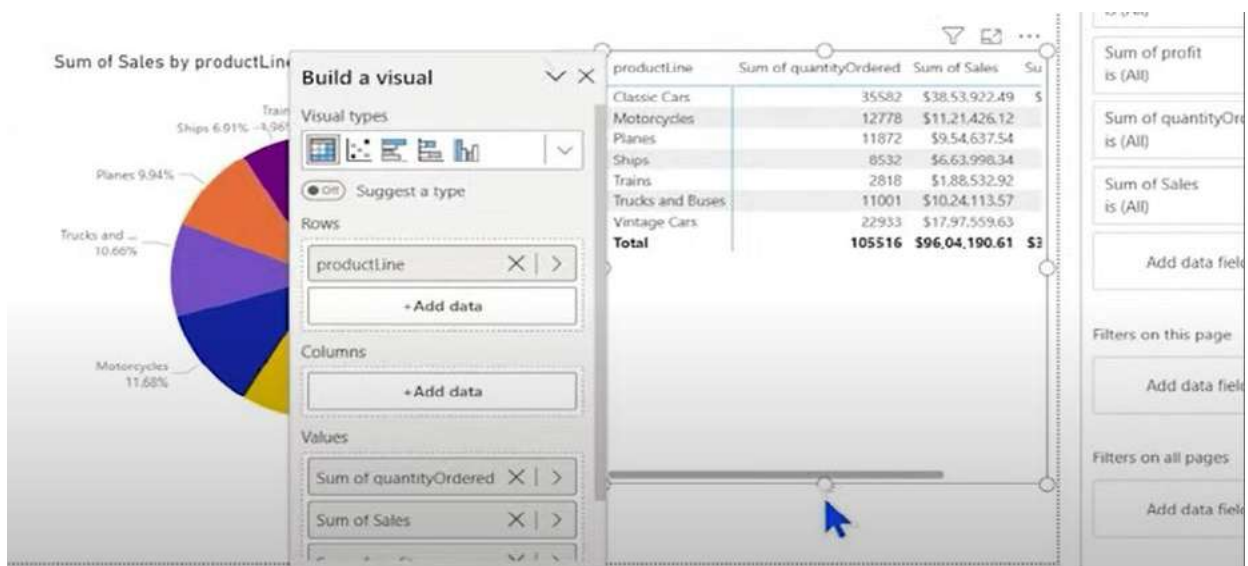
## Matrix in PowerBI:-

->Converting existing graph into matrix

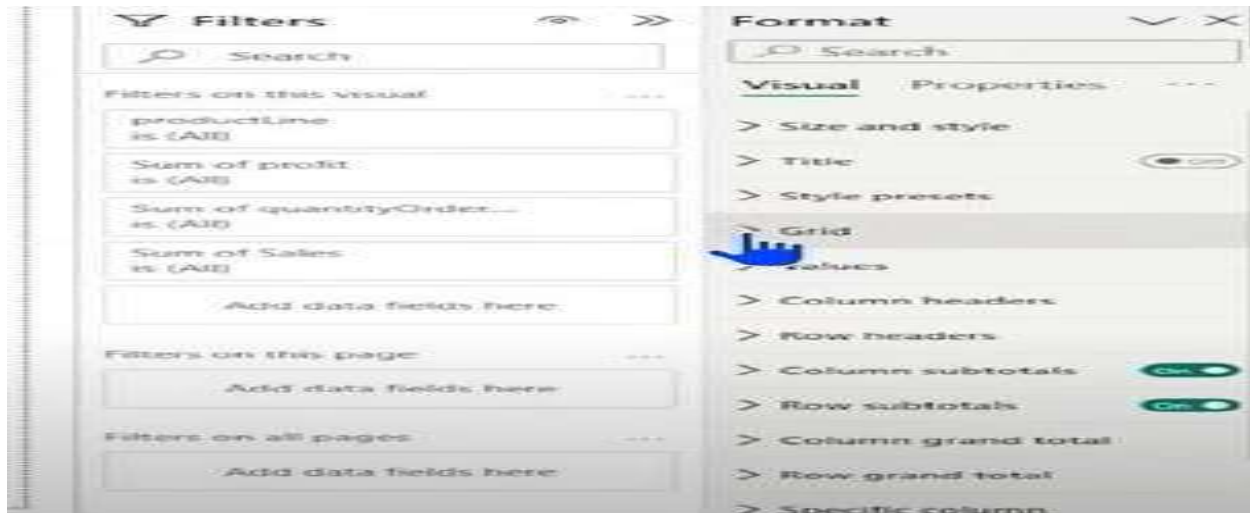


productName	Sum of Sales
1992 Ferrari 360 Spider red	\$2,76,839.98
2001 Ferrari Enzo	\$1,90,755.86
1952 Alpine Renault 1300	\$1,90,017.96
2003 Harley-Davidson Eagle Drag Bike	\$1,70,686
1968 Ford Mustang	\$1,61,531.48
1969 Ford Falcon	\$1,52,543.02
1980s Black Hawk Helicopter	\$1,44,959.91
1998 Chrysler Plymouth Prowler	\$1,42,530.63
1917 Grand Touring Sedan	\$1,40,535.6
2002 Suzuki XREO	\$1,35,767.03
<b>Total</b>	<b>\$17,06,167.47</b>

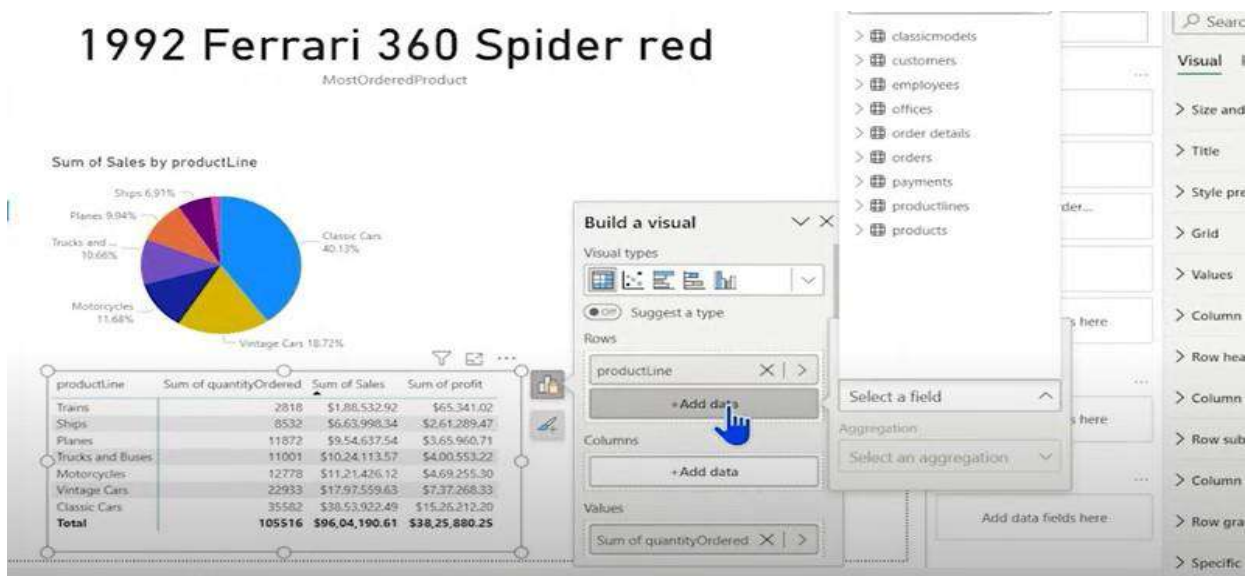
->Creating you own new matrix



->You can also format matrix such as adding colors etc.. from format tab.



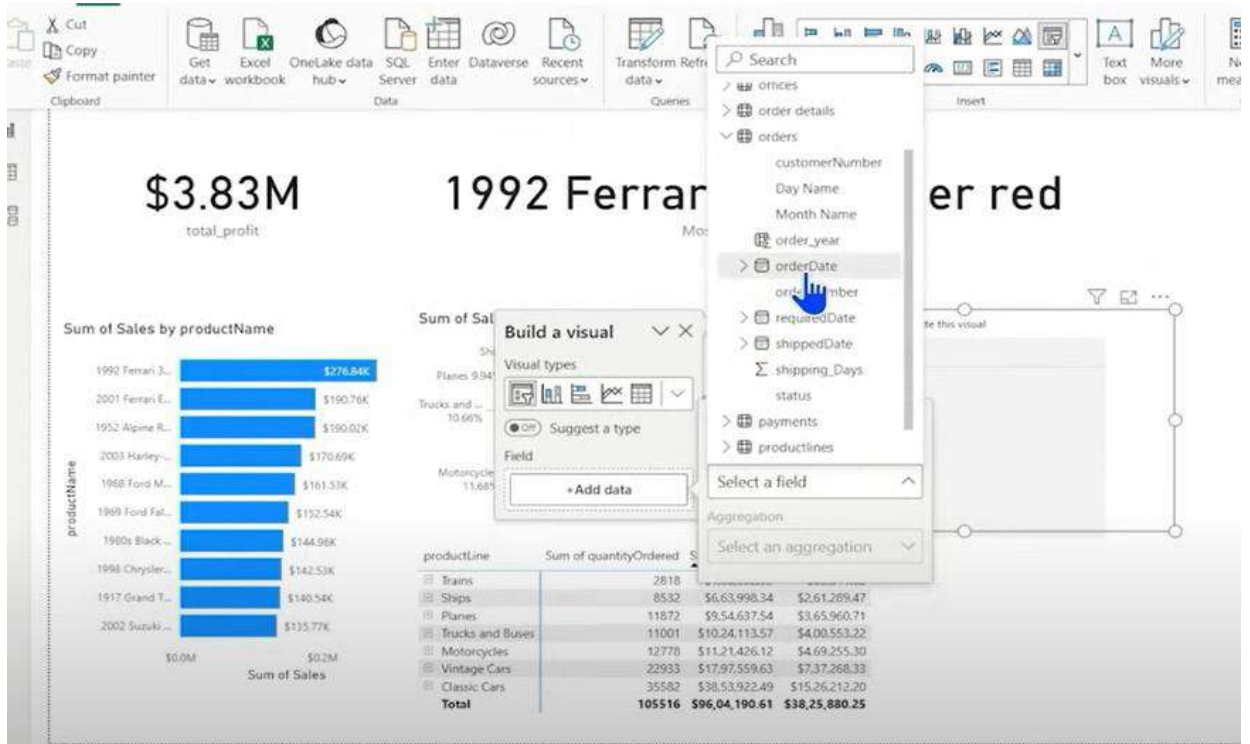
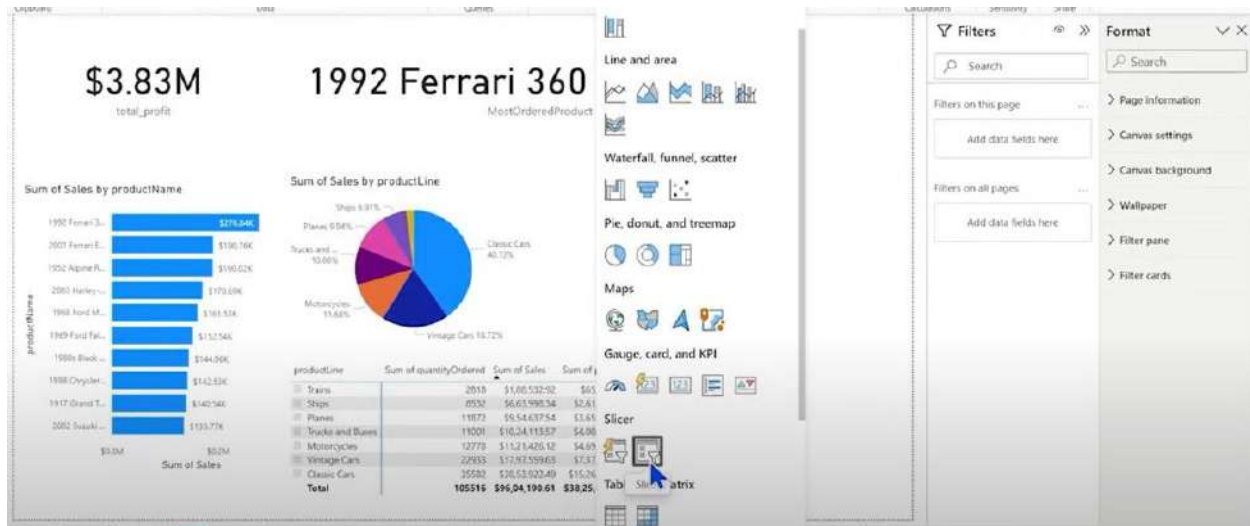
->Creating subcategory of a category.





# Using Slicers to filter Data:-

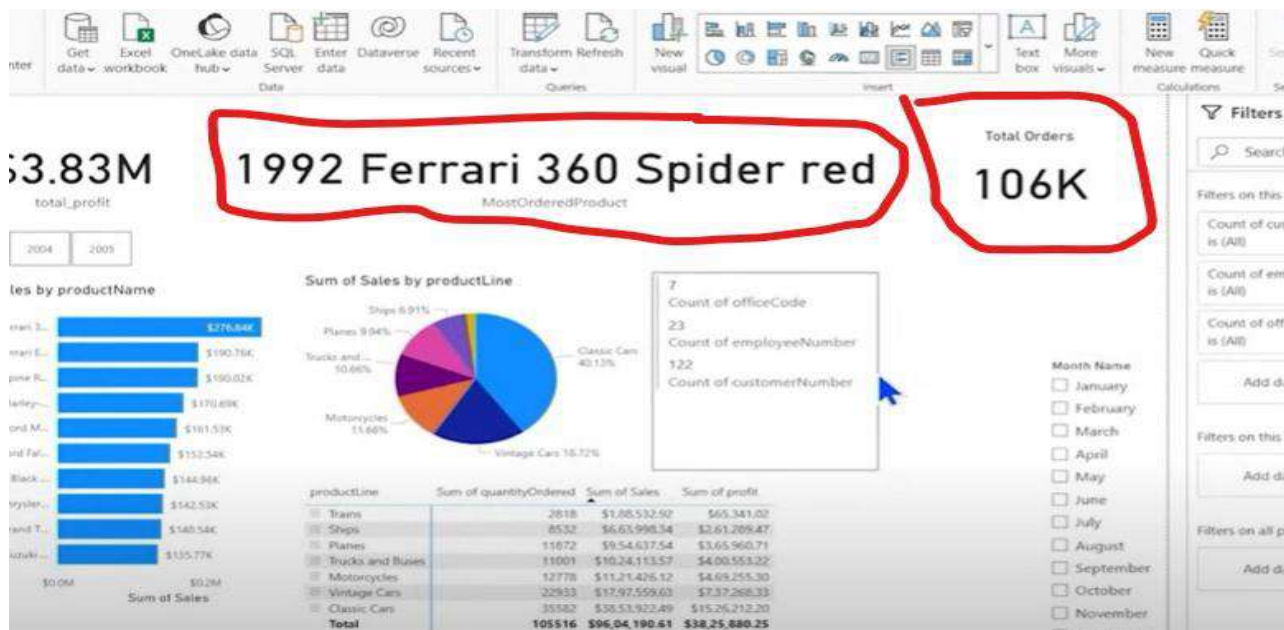
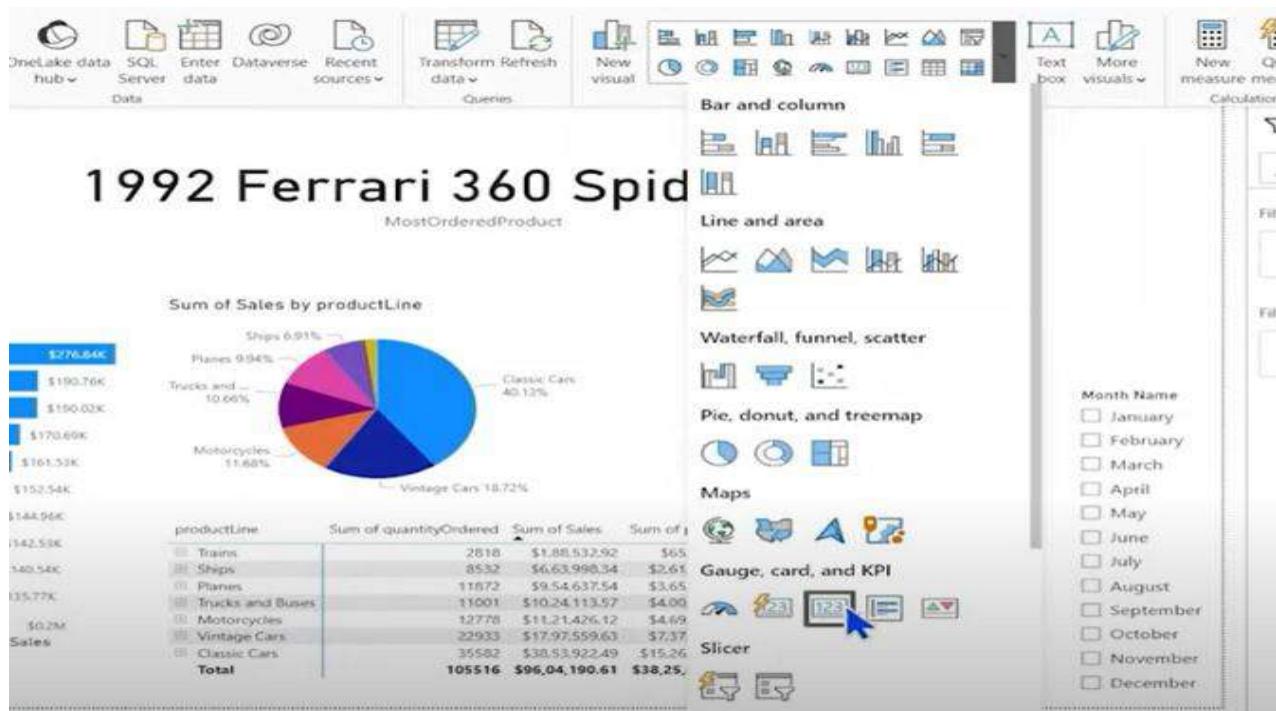
By using this feature you can filter data based on month , year etc...





## Number cards and Text cards:-

Cards are used to display things such as product that is ordered highest number of times.



## KPI VISUALS:-

->Used to handle cases such as it you want to find out how much sale is decreased or increased in comparison to previous years.

**File Home Help Table Tools Measure Tools**

New measure Quick measure measure

---

**Name:** Measure  
 Format: \$ - %  
 Data category: Uncategorized

**Structure:**  
 Formula bar: =CALCULATE(SUM('order'...))  
 Properties:

orderNumber	orderDate	requiredDate	shippedDate	status	customerNumber	Month Name	shipping Days	Day Name	order year	month name
10100	26 January 2003	10 January 2003	10 January 2003	Shipped	263	January	4	Monday	2003	
10101	09 January 2003	18 January 2003	11 January 2003	Shipped	128	January	2	Thursday	2003	
10102	10 January 2003	18 January 2003	14 January 2003	Shipped	181	January	4	Friday	2003	
10103	29 January 2003	07 February 2003	02 February 2003	Shipped	121	January	4	Wednesday	2003	
10104	31 January 2003	09 February 2003	01 February 2003	Shipped	141	January	1	Friday	2003	
10105	11 February 2003	21 February 2003	12 February 2003	Shipped	145	February	1	Tuesday	2003	
10106	17 February 2003	24 February 2003	21 February 2003	Shipped	278	February	4	Monday	2003	
10107	24 February 2003	01 March 2003	26 February 2003	Shipped	131	February	2	Monday	2003	
10108	03 March 2003	12 March 2003	08 March 2003	Shipped	385	March	3	Monday	2003	
10109	10 March 2003	19 March 2003	11 March 2003	Shipped	406	March	1	Monday	2003	
10110	18 March 2003	24 March 2003	20 March 2003	Shipped	187	March	2	Tuesday	2003	
10111	25 March 2003	31 March 2003	30 March 2003	Shipped	129	March	5	Tuesday	2003	
10112	24 March 2003	03 April 2003	29 March 2003	Shipped	144	March	5	Monday	2003	
10113	20 March 2003	02 April 2003	27 March 2003	Shipped	124	March	1	Wednesday	2003	
10114	01 April 2003	07 April 2003	02 April 2003	Shipped	172	April	1	Tuesday	2003	
10115	04 April 2003	12 April 2003	07 April 2003	Shipped	424	April	3	Friday	2003	
10116	11 April 2003	19 April 2003	18 April 2003	Shipped	140	April	2	Friday	2003	
10117	16 April 2003	24 April 2003	17 April 2003	Shipped	146	April	1	Wednesday	2003	
10118	21 April 2003	29 April 2003	26 April 2003	Shipped	216	April	5	Monday	2003	

Name
Measure

Format
\$ %

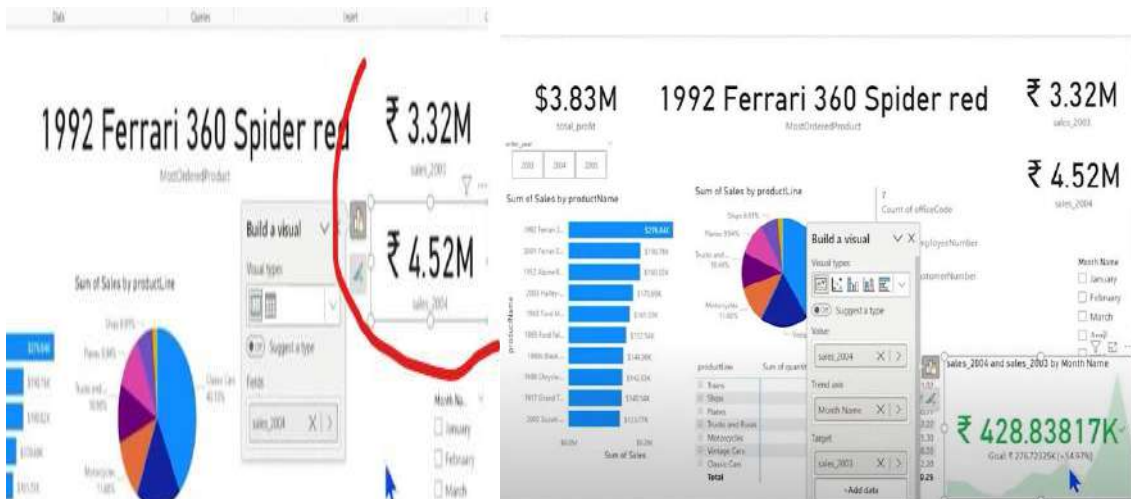
Data category
Uncategorized

New Quick measure measure

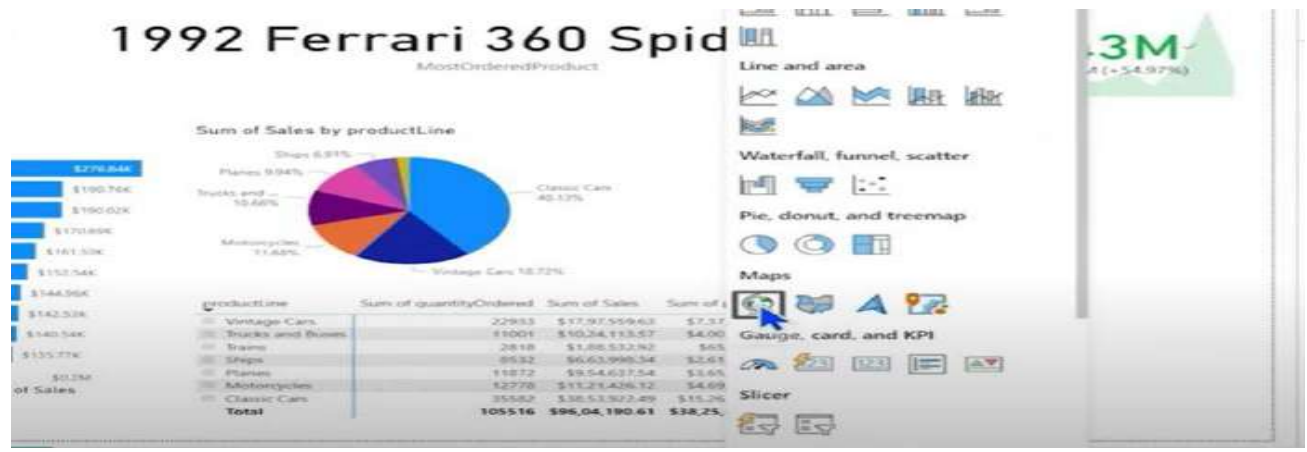
Structure
Formatting
Properties
Calculations

1 sales\_2004 = CALCULATE(sum('order details'[Sales]), orders[order\_year] = 2004)

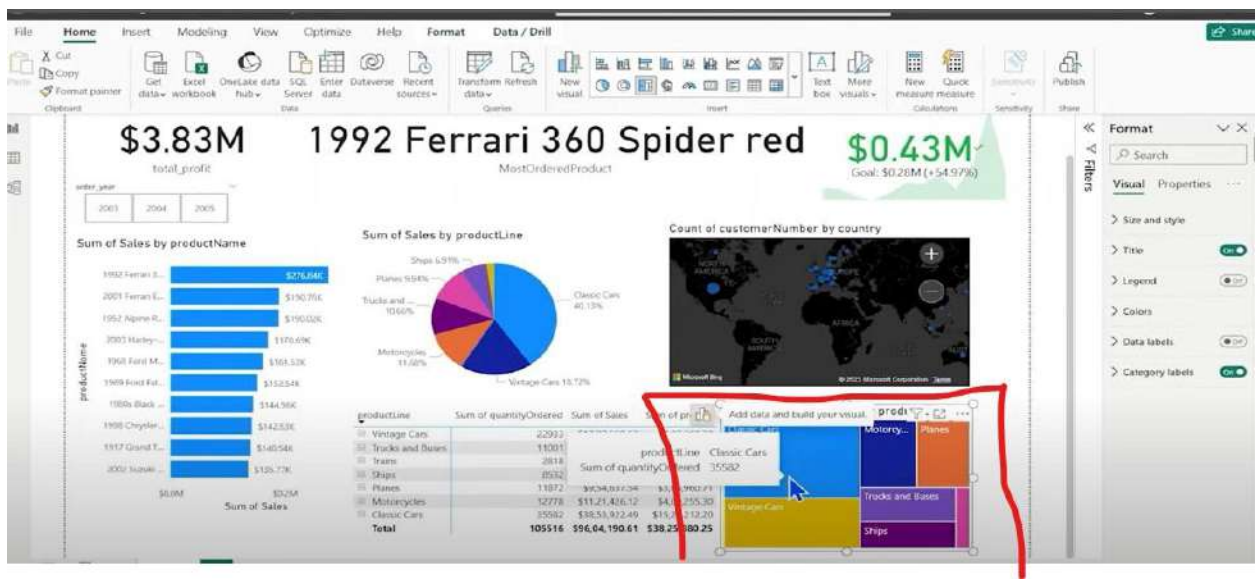
orderNumber	orderDate	requiredDate	shippedDate	status	customerNumber	Month Name	shipping
10100	06 January 2003	13 January 2003	10 January 2003	Shipped	363	January	
10101	09 January 2003	18 January 2003	11 January 2003	Shipped	128	January	
10102	10 January 2003	18 January 2003	14 January 2003	Shipped	181	January	
10103	29 January 2003	07 February 2003	02 February 2003	Shipped	121	January	
10104	31 January 2003	09 February 2003	01 February 2003	Shipped	141	January	
10105	11 February 2003	21 February 2003	12 February 2003	Shipped	145	February	
10106	17 February 2003	24 February 2003	21 February 2003	Shipped	278	February	
10107	24 February 2003	03 March 2003	26 February 2003	Shipped	131	February	
10108	03 March 2003	12 March 2003	08 March 2003	Shipped	385	March	
10109	10 March 2003	19 March 2003	11 March 2003	Shipped	486	March	
10110	18 March 2003	24 March 2003	20 March 2003	Shipped	187	March	
10111	25 March 2003	31 March 2003	30 March 2003	Shipped	129	March	
10112	24 March 2003	03 April 2003	29 March 2003	Shipped	144	March	
10113	26 March 2003	02 April 2003	27 March 2003	Shipped	124	March	
10114	01 April 2003	07 April 2003	02 April 2003	Shipped	172	April	
10115	04 April 2003	12 April 2003	07 April 2003	Shipped	424	April	



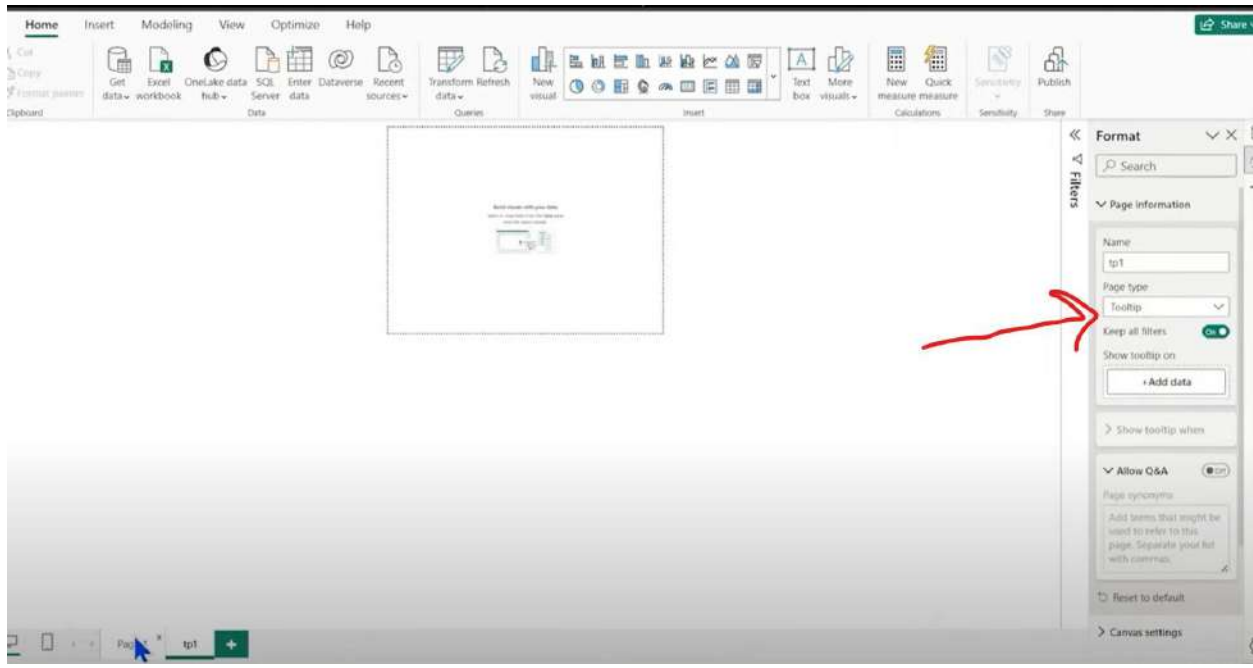
# 



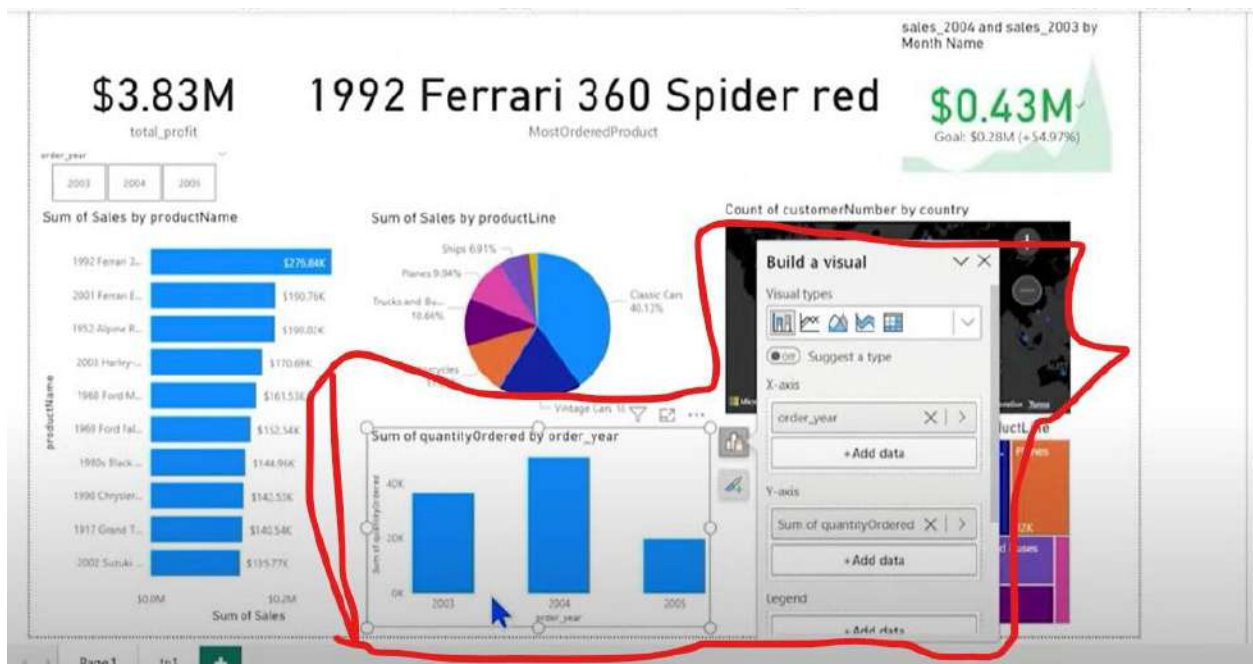
## 



## ToolTip:-



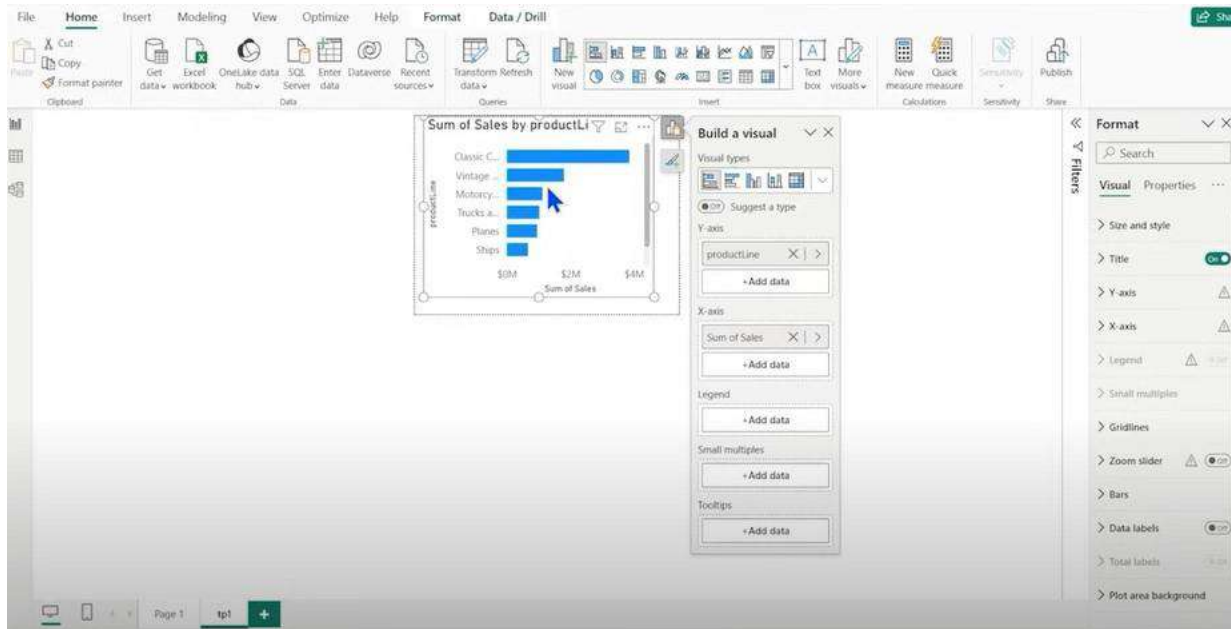
->Consider the graph below:-



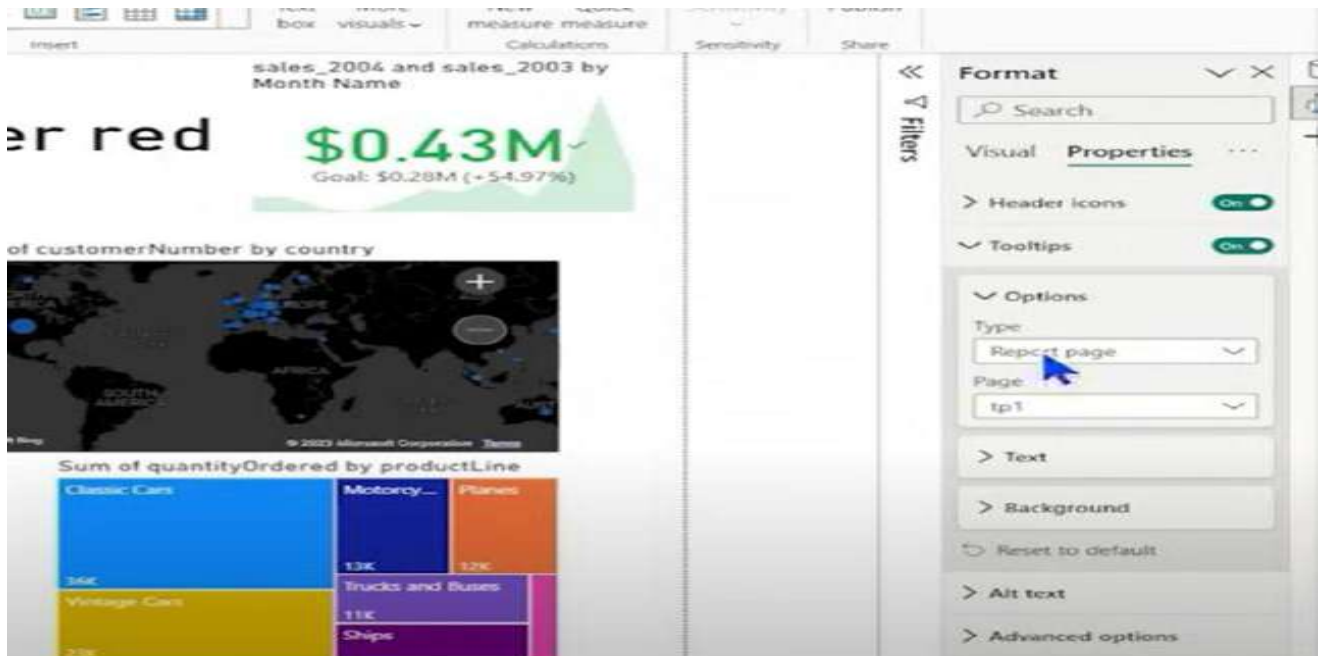
->Now what we want is , whenever we hover on 2003 then we should get a chart showing different categories sales for that year.



->Go to the “tp1 page” in first image and add a chart.

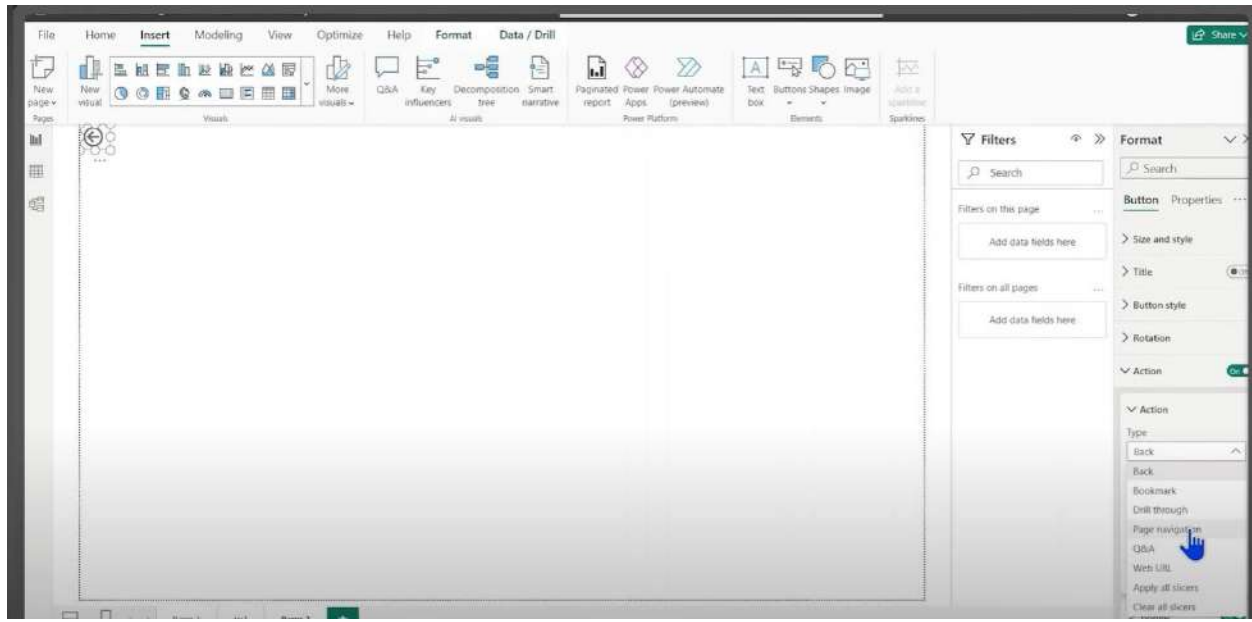


->Again go to page1 and select the chart , click on properties , click on tooltips and set page to tp1.

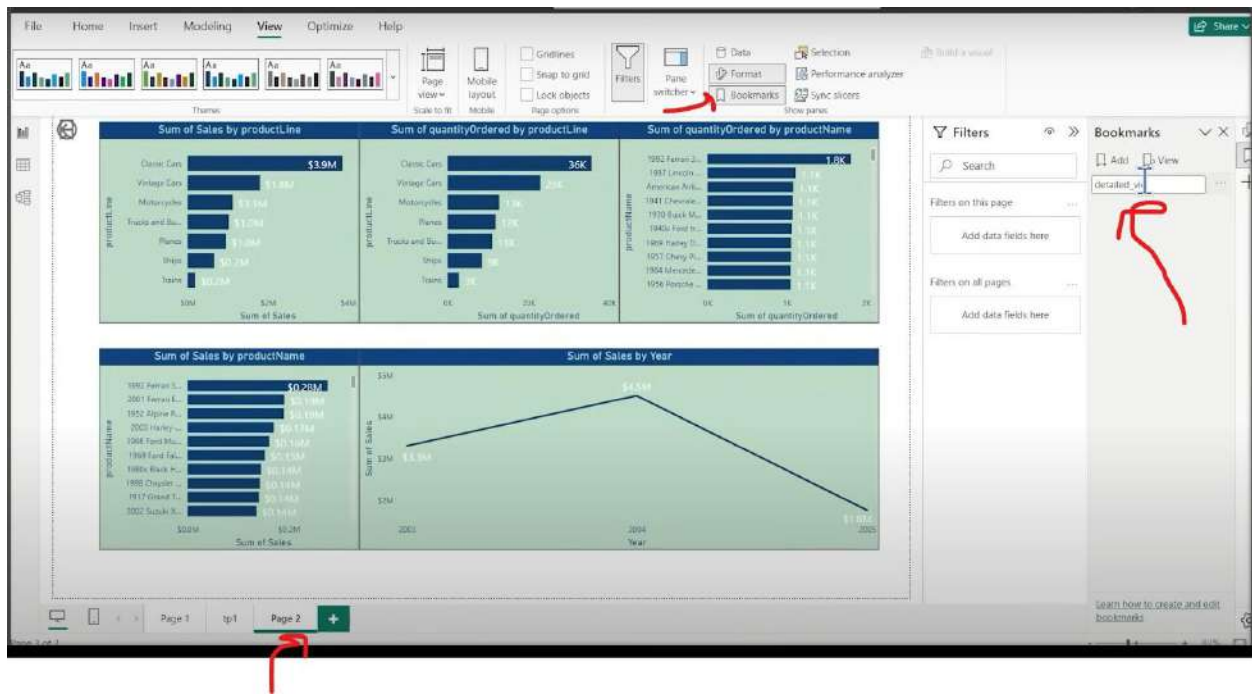


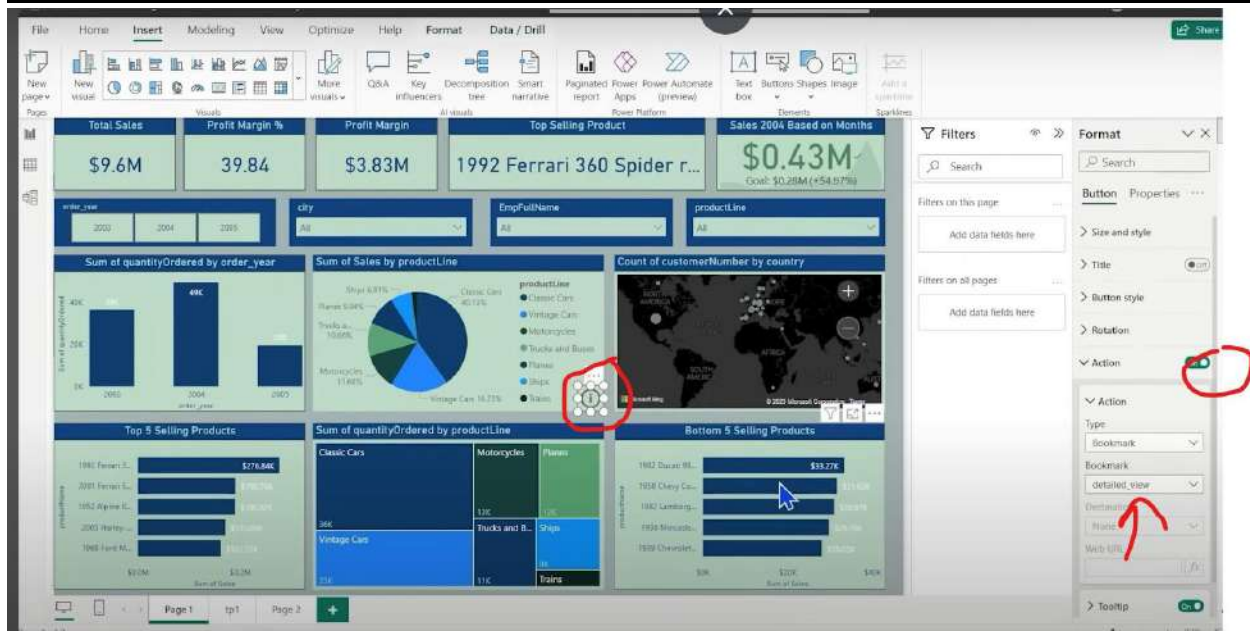
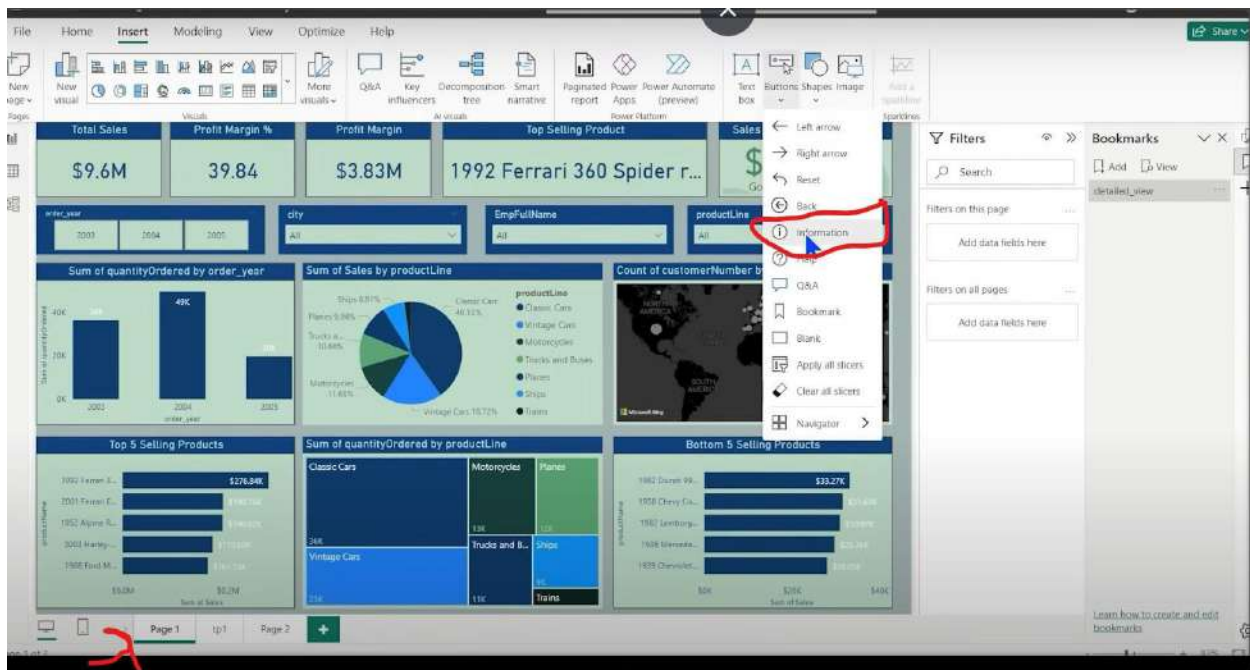


## Adding Button:-

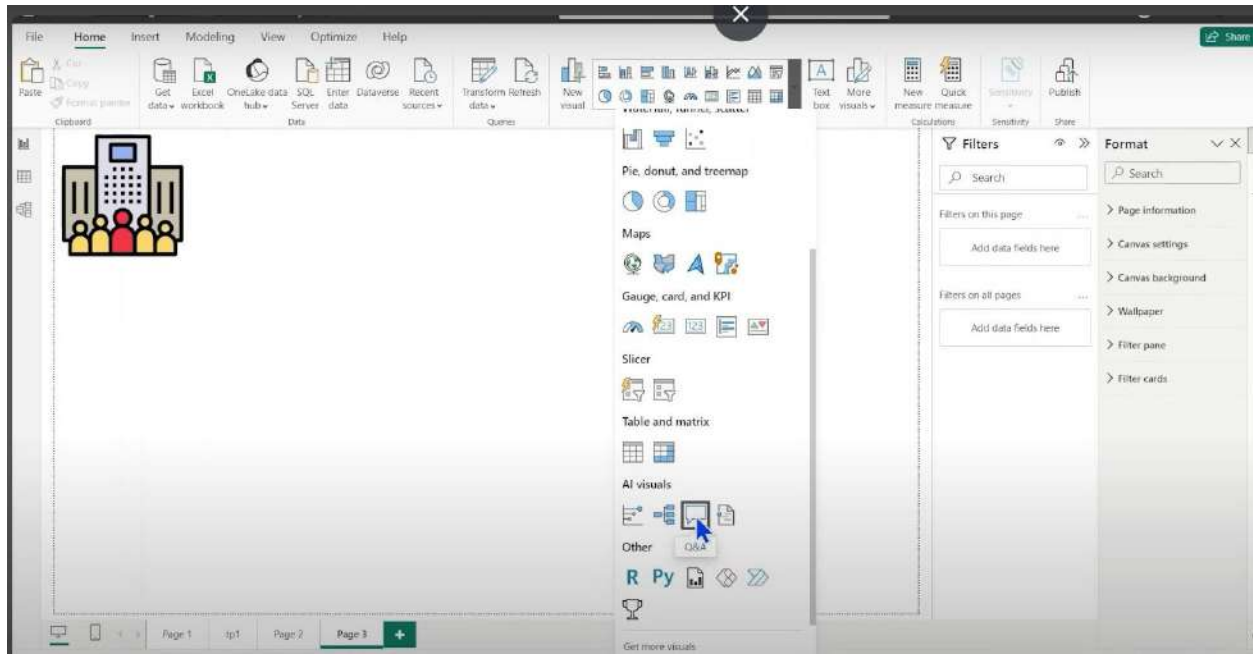


## Adding bookmarks:-

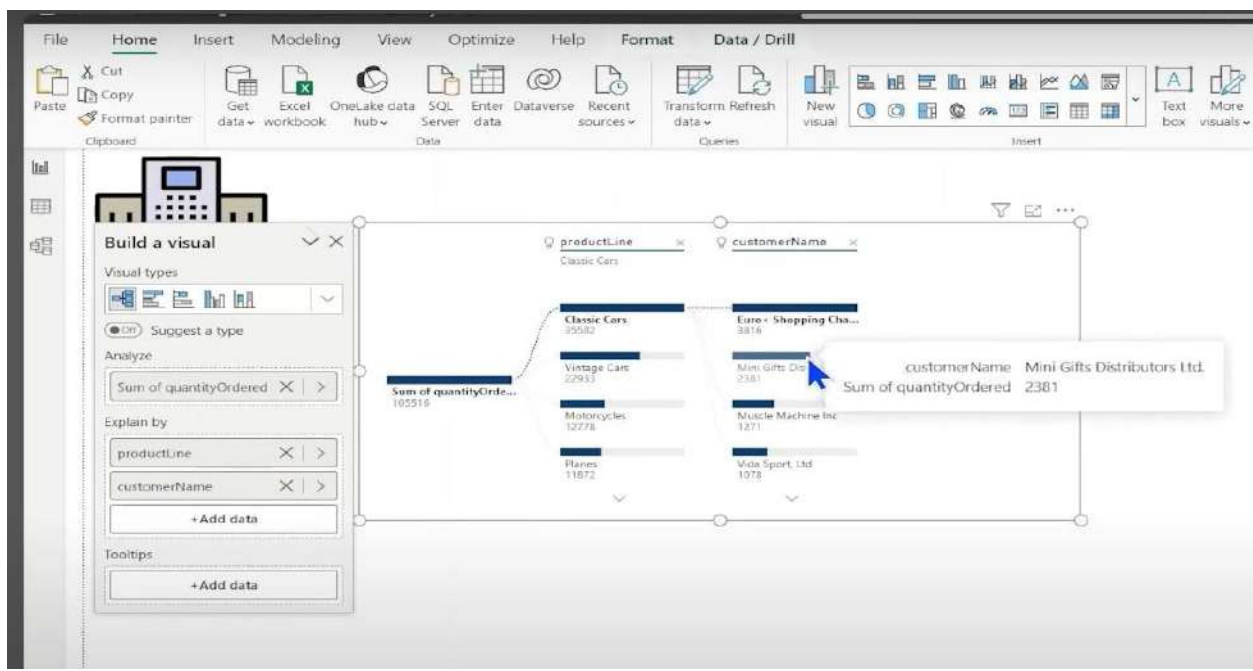




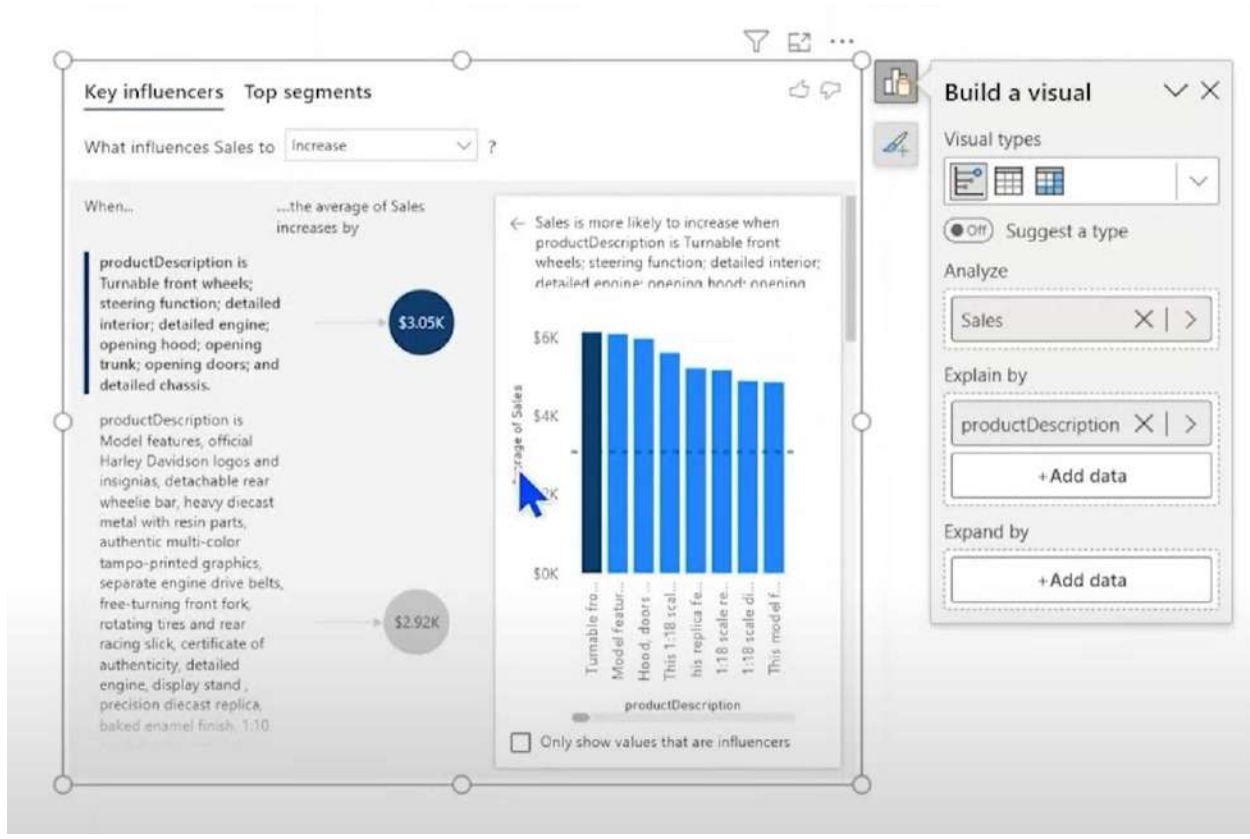
## A.I Visuals in Powerbi:-



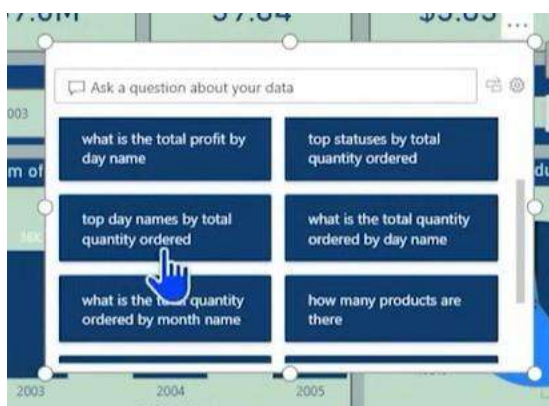
## Decomposition tree



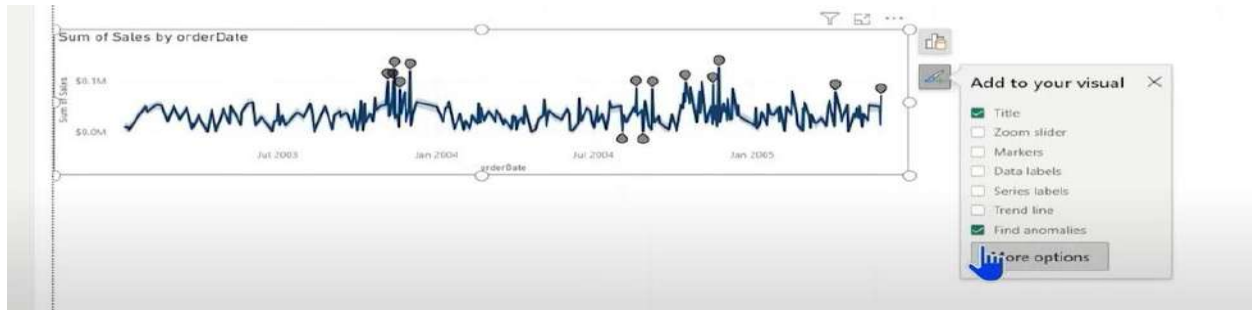
# Smart Narrative visuals



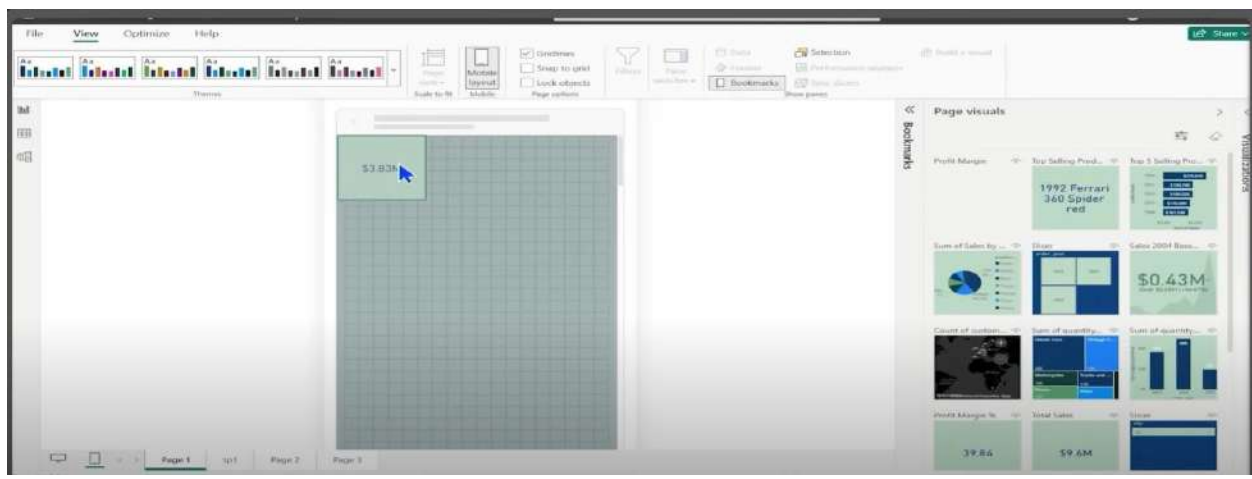
## Q&A



## Handling or Marking anonymous trends



## Converting Desktop to Mobile Visuals



## Publishing Reports

