

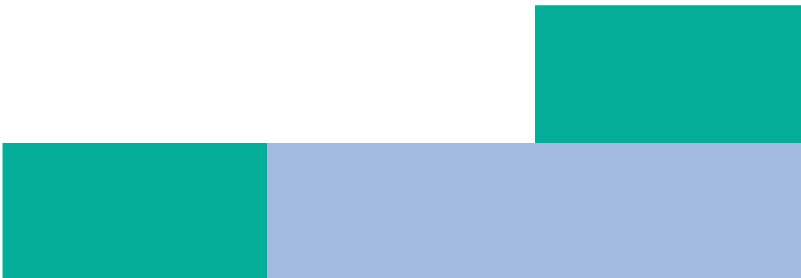


# Power BI Course (Business Intelligence)

Ghalib Alshammri, PhD  
Associate Professor in AI & Data Science

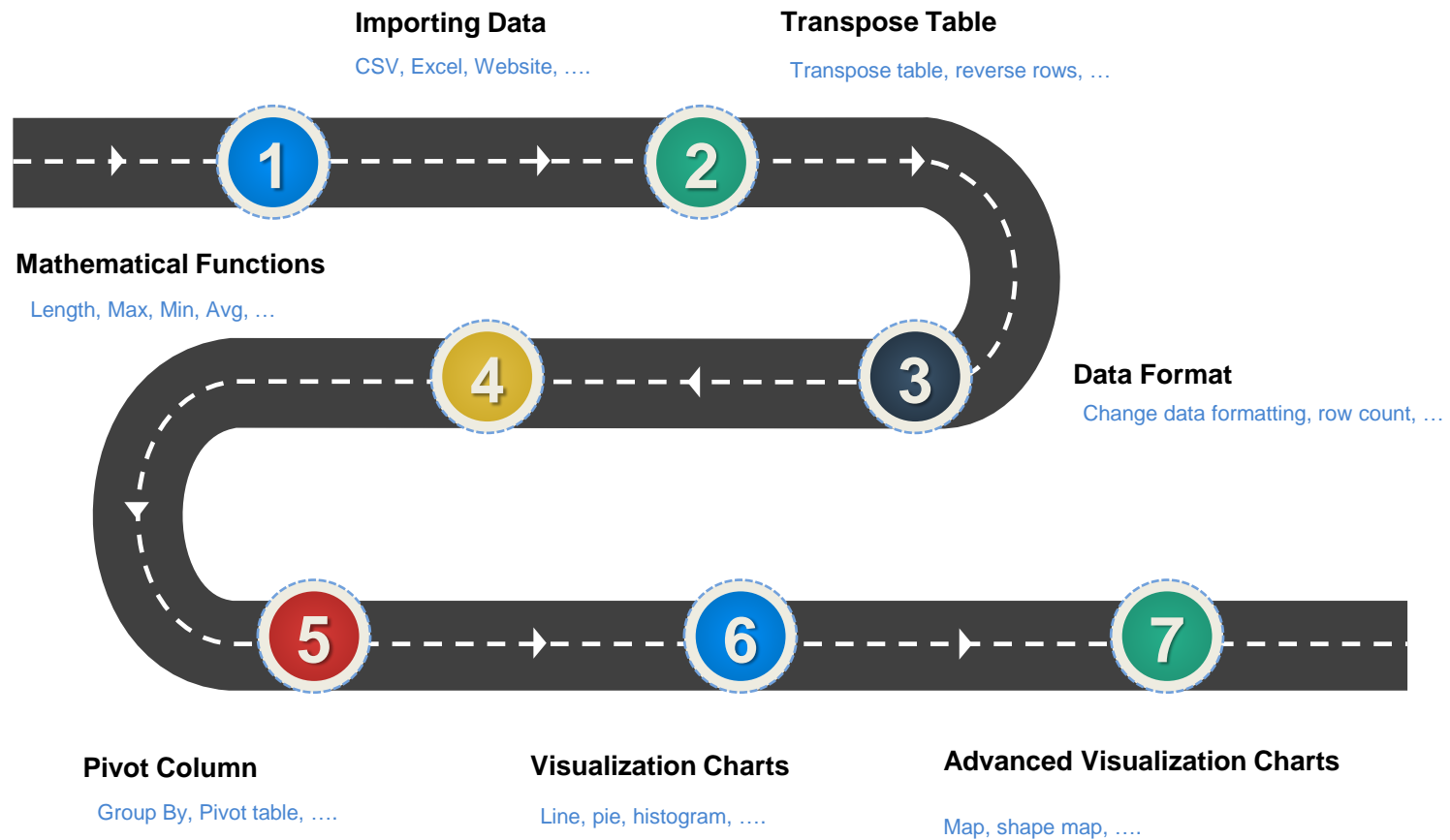


## **Second Section: Data Visualization & Advanced Functions**

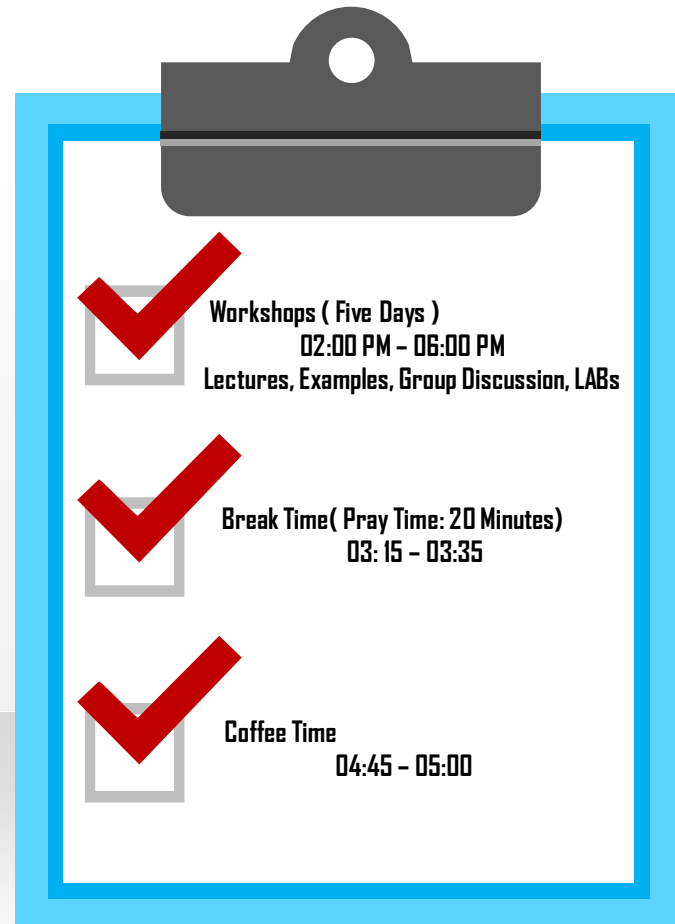
- Importing Data
  - Transpose Table & Reverse Rows
  - Change Formatting Data & Count Rows
  - Extract Characters from Data
  - Mathematical Functions
  - Pivot Column
  - Data Visualization Charts
  - Advanced Data Visualization Charts
- 

# What we'll cover?

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# Time Management



# What is Business Intelligence?

## Group Discussion:



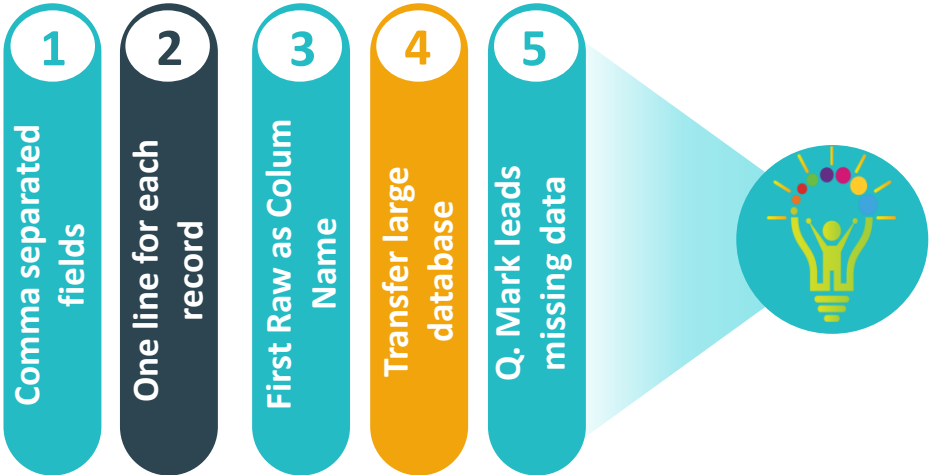
**What is CVS files?**

# Power BI Desktop: Import Dataset (\*.CSV)

## Car Dataset



3,?,alfa-romero,gas,std,two,convertible,rwd,front,88.60,168.80,64.10,48.80,2548,dohc,four,130,mpfi,3.47,2.68,9.00,111,5000,21,27,13495  
3,?,alfa-romero,gas,std,two,convertible,rwd,front,88.60,168.80,64.10,48.80,2548,dohc,four,130,mpfi,3.47,2.68,9.00,111,5000,21,27,16500  
1,?,alfa-romero,gas,std,two,hatchback,rwd,front,94.50,171.20,65.50,52.40,2823,ohcv,six,152,mpfi,2.68,3.47,9.00,154,5000,19,26,16500  
2,164,audi,gas,std,four,edan,fwd,front,99.80,176.60,66.20,54.30,2337,ohc,four,109,mpfi,3.19,3.40,10.00,102,5500,24,30,13950  
2,164,audi,gas,std,four,edan,4wd,front,99.40,176.60,66.40,54.30,2824,ohc,five,136,mpfi,3.19,3.40,8.00,115,5500,18,22,17450  
2,?,audi,gas,std,two,edan,fwd,front,99.80,177.30,66.30,53.10,2507,ohc,five,136,mpfi,3.19,3.40,8.50,110,5500,19,25,15250  
1,158,audi,gas,std,four,edan,fwd,front,105.80,192.70,71.40,55.70,2844,ohc,five,136,mpfi,3.19,3.40,8.50,110,5500,19,25,17710  
1,?,audi,gas,std,four,wagon,fwd,front,105.80,192.70,71.40,55.70,2954,ohc,five,136,mpfi,3.19,3.40,8.50,110,5500,19,25,18920  
1,158,audi,gas,turbo,four,edan,fwd,front,105.80,192.70,71.40,55.90,3086,ohc,five,131,mpfi,3.13,3.40,8.30,140,5500,17,20,23875  
0,?,audi,gas,turbo,two,hatchback,4wd,front,99.50,178.20,67.90,52.00,3053,ohc,five,131,mpfi,3.13,3.40,7.00,160,5500,16,22,?  
2,192,bmw,gas,std,two,edan,rwd,front,101.20,176.80,64.80,54.30,2395,ohc,four,108,mpfi,3.50,2.80,8.80,101,5800,23,29,16430  
0,192,bmw,gas,std,four,edan,rwd,front,101.20,176.80,64.80,54.30,2395,ohc,four,108,mpfi,3.50,2.80,8.80,101,5800,23,29,16925  
0,188,bmw,gas,std,two,edan,rwd,front,101.20,176.80,64.80,54.30,2710,ohc,six,164,mpfi,3.31,3.19,9.00,121,4250,21,28,20970  
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1,?,bmw,gas,std,four,edan,rwd,front,103.50,189.00,66.90,55.70,3055,ohc,six,164,mpfi,3.31,3.19,9.00,121,4250,20,25,24565  
0,?,bmw,gas,std,four,edan,rwd,front,103.50,189.00,66.90,55.70,3230,ohc,six,209,mpfi,3.62,3.39,8.00,182,5400,16,22,30760  
0,?,bmw,gas,std,two,edan,rwd,front,103.50,193.80,67.90,53.70,3380,ohc,six,209,mpfi,3.62,3.39,8.00,182,5400,16,22,41315  
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2,121,chevrolet,gas,std,two,hatchback,fwd,front,88.40,141.10,60.30,53.20,1488,1,three,61,2bbl,2.91,3.03,9.50,48,5100,47,53,5151



# Power BI Desktop: Import Dataset (\*.CSV)

No.	Attribute Name	Attribute Range
1	symboling	-3, -2, -1, 0, 1, 2, 3.
2	normalized-losses	continuous from 65 to 256
3	make	alfa-romero, audi, etc.
4	fuel-type	diesel, gas.
5	aspiration	std, turbo.
6	num-of-doors	four, two
7	body-style	hardtop, wagon, etc.
8	drive-wheels	4wd, fwd, rwd.
9	engine-location	front, rear.
10	wheel-base	continuous from 86.6 to 120.9.
11	length	continuous from 141.1 to 208.1.
12	width	continuous from 60.3 to 72.3.
13	height	continuous from 47.8 to 59.8.

**Target (Label)**

No.	Attribute Name	Attribute Range
14	curb-weight	continuous from 1488 to 4066.
15	engine-type	condohc, dohc, l, ohc, etc.
16	num-of-cylinders	eight, five, four, six, three, etc.
17	engine-size	continuous from 61 to 326.
18	fuel-system	1bbl, 2bbl, 4bbl, idi, mfi, etc.
19	bore	continuous from 2.54 to 3.94.
20	stroke	continuous from 2.07 to 4.17.
21	compression-ratio	continuous from 7 to 23.
22	horsepower	continuous from 48 to 288.
23	peak-rpm	continuous from 4150 to 6600.
24	city-mpg	continuous from 13 to 49.
25	highway-mpg	continuous from 16 to 54.
26	price	continuous from 5118 to 45400.

<https://github.com/plotly/datasets/blob/master/imports-85.csv>

# What is Business Intelligence?

## Group Discussion:



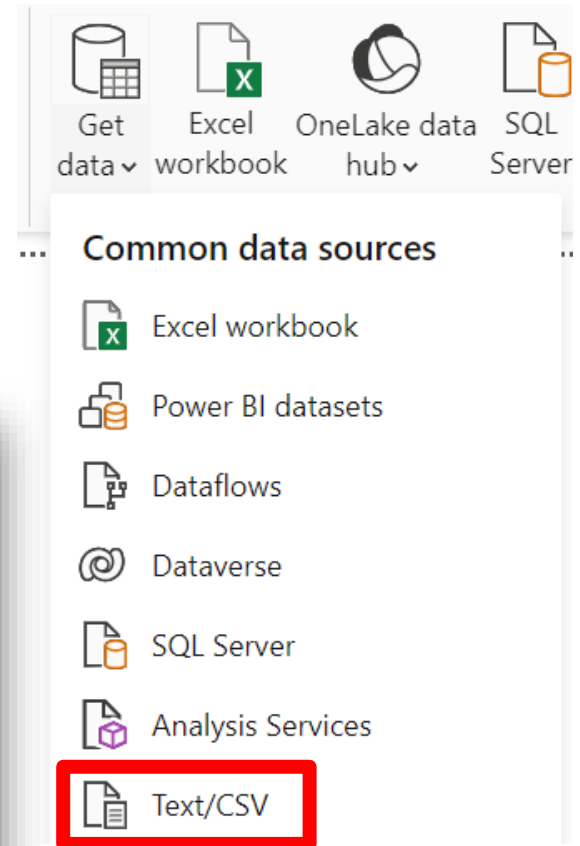
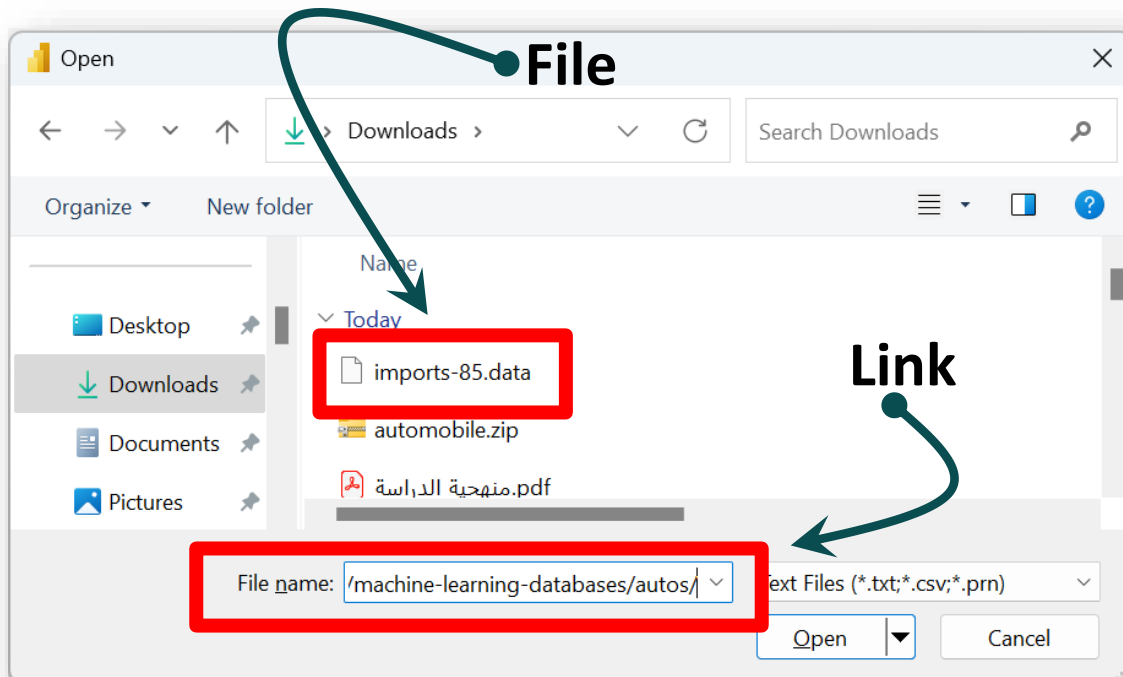
**How to import CSV files in Power BI?**



## Power BI Desktop: Import Dataset (\*.CSV)

To import (CSV File) in Power BI as following:

1. Go to the Home tab & “Data” group
2. Click on “Get Data”
3. Determine “Text/CSV”



# Power BI Desktop: Import Dataset (\*.CSV)

imports-85.data

File Origin

1252: Western European (Windows)

Delimiter

Comma

Data Type Detection

Based on first 200 rows

Missing Value

136	mpfi	3.19	3.40		8	115	5500		18	22	17450
136	mpfi	3.19	3.40		8.5	110	5500		19	25	15250
136	mpfi	3.19	3.40		8.5	110	5500		19	25	17710
136	mpfi	3.19	3.40		8.5	110	5500		19	25	18920
131	mpfi	3.13	3.40		8.3	140	5500		17	20	22975
131	mpfi	3.13	3.40		7	160	5500		16	21	?
108	mpfi	3.50	2.80		8.8	101	5800		23	29	16430
108	mpfi	3.50	2.80		8.8	101	5800		23	29	16925
164	mpfi	3.31	3.19		9	121	4250		21	28	20970
164	mpfi	3.31	3.19		9	121	4250		21	28	21105
164	mpfi	3.31	3.19		9	121	4250		20	25	24565
209	mpfi	3.62	3.39		8	182	5400		16	22	30760
209	mpfi	3.62	3.39		8	182	5400		16	22	41315

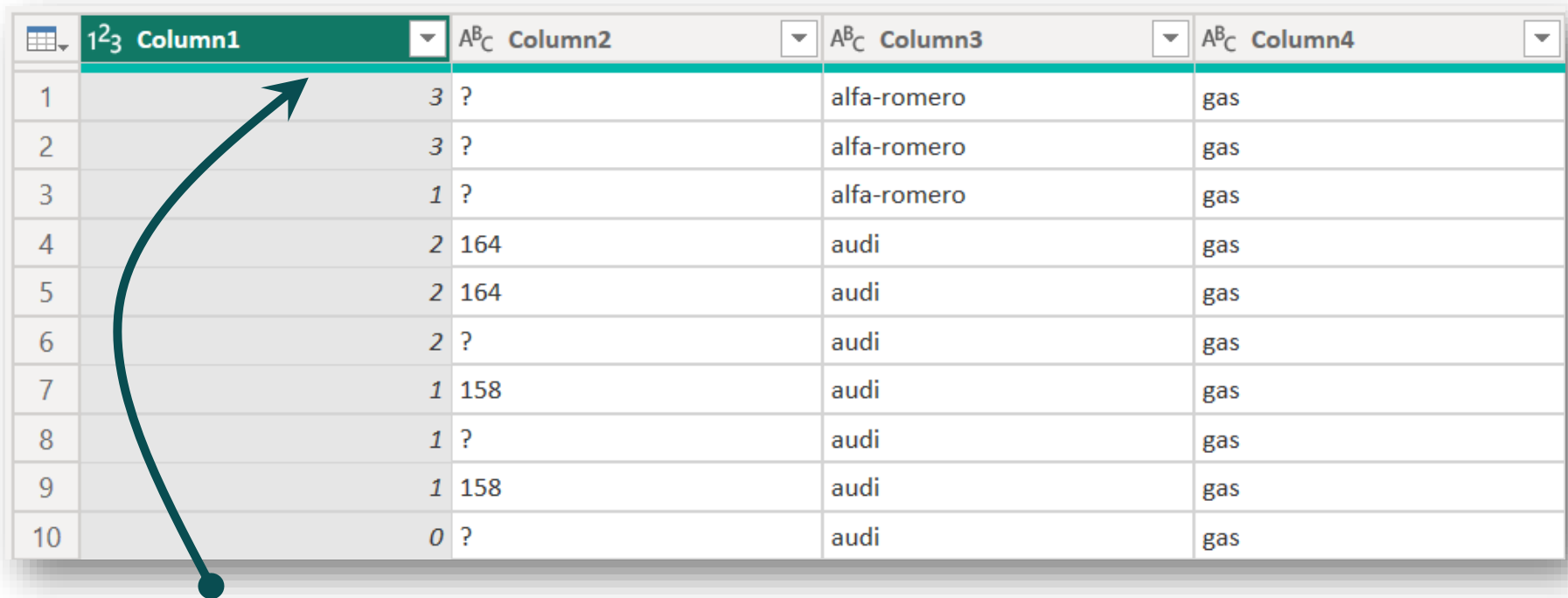
Extract Table Using Examples

Load

Transform Data

Cancel

# Power BI Desktop: Import Dataset (\*.CSV)



	1 <sup>2</sup> <sub>3</sub> Column1	AB <sub>C</sub> Column2	AB <sub>C</sub> Column3	AB <sub>C</sub> Column4
1		3 ?	alfa-romero	gas
2		3 ?	alfa-romero	gas
3		1 ?	alfa-romero	gas
4		2 164	audi	gas
5		2 164	audi	gas
6		2 ?	audi	gas
7		1 158	audi	gas
8		1 ?	audi	gas
9		1 158	audi	gas
10		0 ?	audi	gas

No Header File

**Note 1:** You can add header by double-click on Column Header

**Note 2:** You can change missing values by “Replace Values”

# What is Business Intelligence?

## Group Discussion:

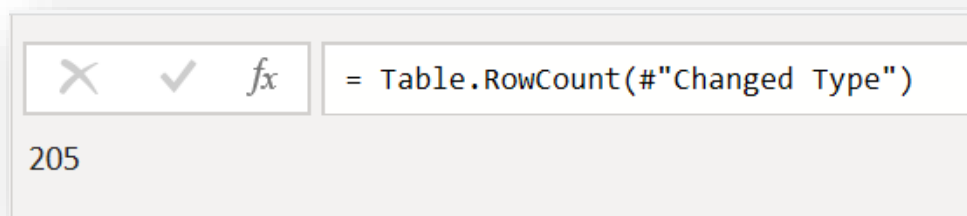
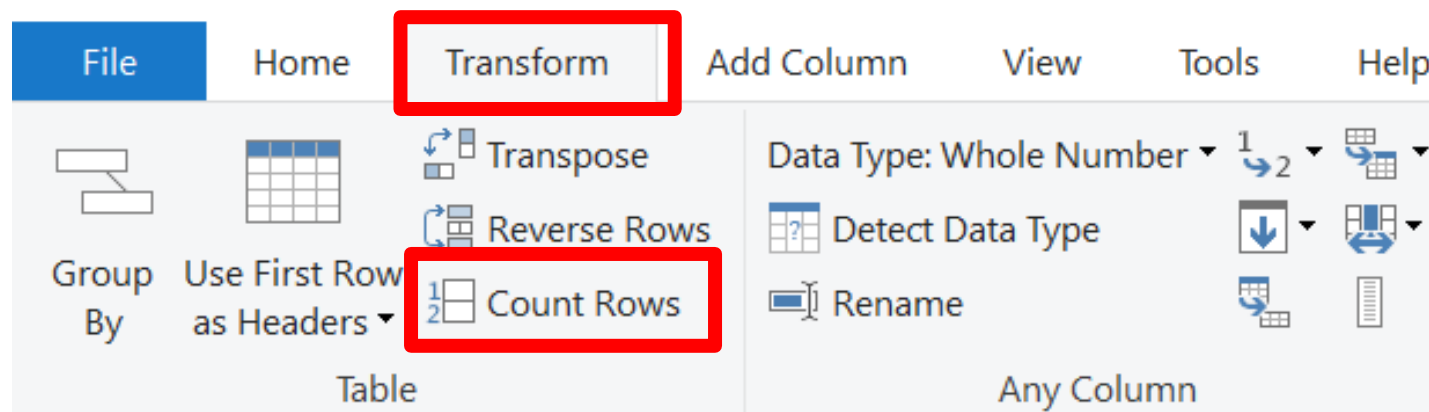


**How to determine Count Rows?**

## Power BI Desktop: Count Row

To show count rows in Power BI as following:

1. Go to the Transform tab & from “Table” group
2. Click on “Count Rows”




# What is Business Intelligence?

## Group Discussion:




**What is Transpose? How to do it?**

# Power BI Desktop: Transpose Table



	123 ID	ABC Name	ABC Department
1	101	Ali	IT
2	102	Mohammed	Sales
3	103	Salah	HR

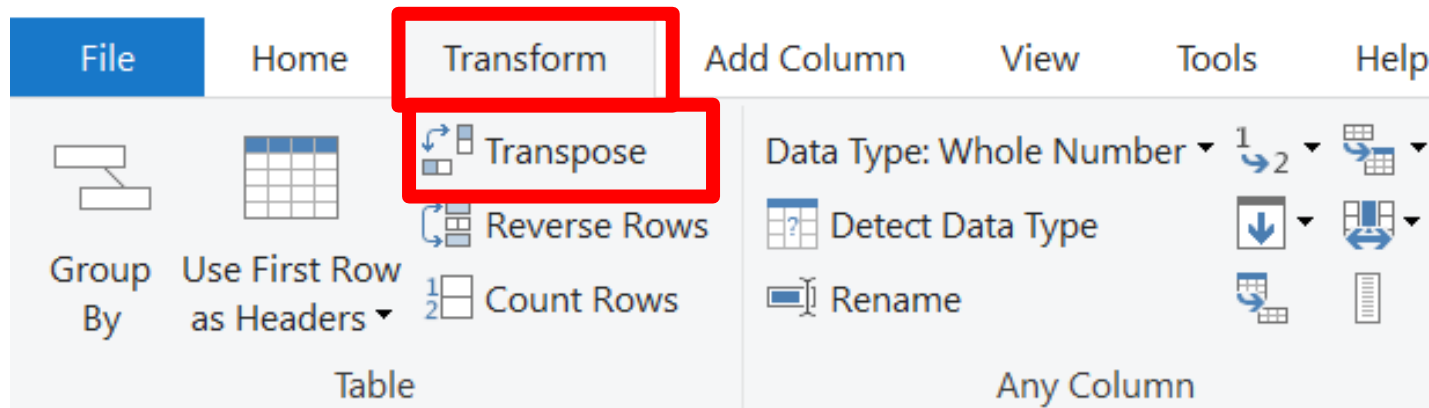


	ABC 123 Column1	ABC 123 Column2	ABC 123 Column3
	101	102	103
2	Ali	Mohammed	Salah
3	IT	Sales	HR

# Power BI Desktop: Transpose Table

To travel rows as columns & columns as rows in Power BI as following:

1. Go to the Transform tab & from “Table” group
2. Click on “Transpose”





# What is Business Intelligence?

## Group Discussion:



**How to Reverse Rows in Table?**

# Power BI Desktop: Reverse Rows

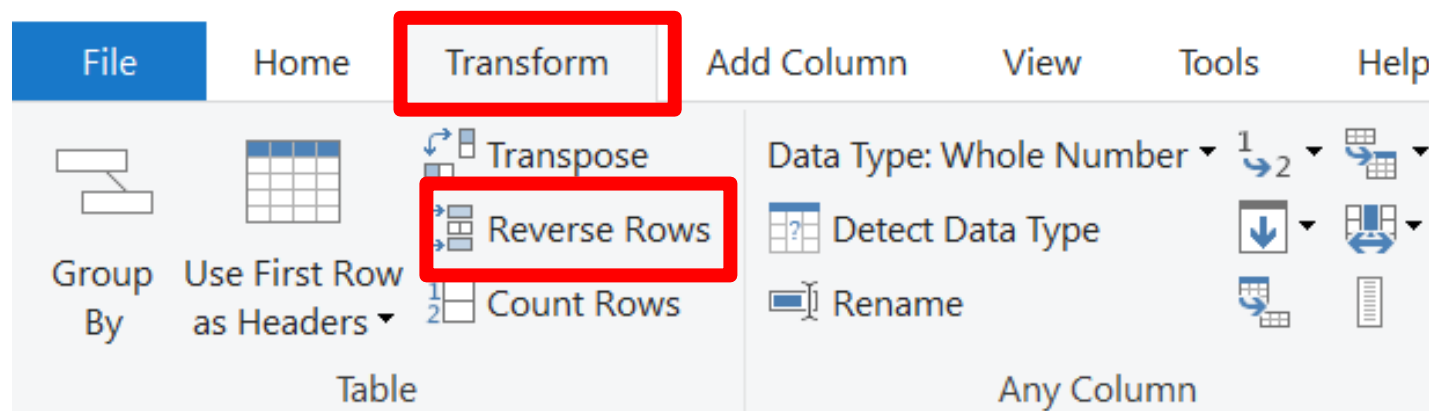


<div><div></div></div>	1 <sup>2</sup> <sub>3</sub> ID	A <sup>B</sup> <sub>C</sub> Name	A <sup>B</sup> <sub>C</sub> Department
1	103	Salah	HR
2	102	Mohammed	Sales
3	101	Ali	IT

## Power BI Desktop: Reverse Rows

To invert the last row as first row in Power BI as following:

1. Go to the Transform tab & from “Table” group
2. Click on “Reverse Rows”



# What is Business Intelligence?

## Group Discussion:

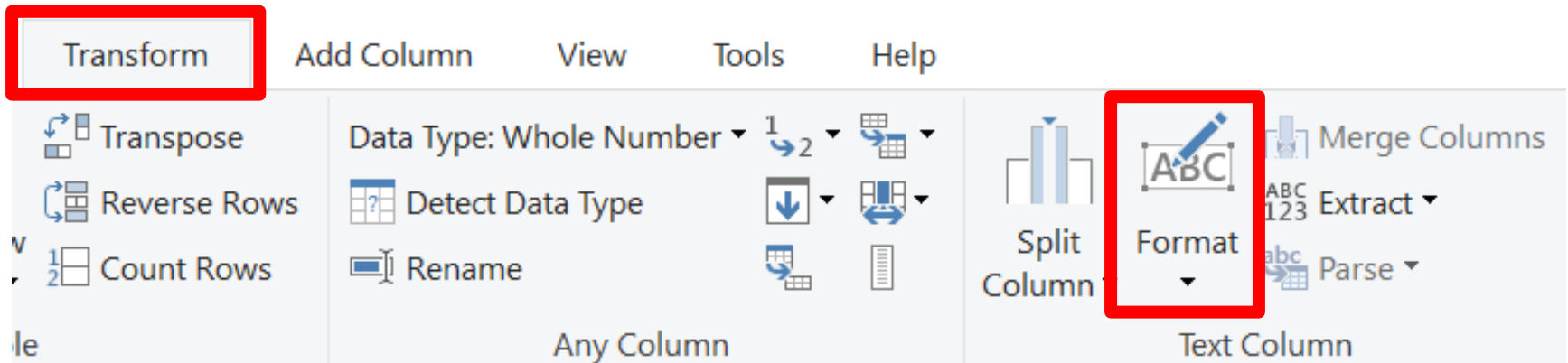


**How to change Attribute Format?**

## Power BI Desktop: Data Format

To invert the last row as first row in Power BI as following:

1. **Select Data**
2. **Go to the Transform tab & from “Text Column” group**
3. **Click on “Format”**
  - Lowercase
  - Uppercase
  - Capitalize Each Word
  - Trim
  - Clean
  - Add Prefix or Suffix



# Power BI Desktop: Data Format

**Capitalize Each  
Word**

ABC Name
Ali
Mohammed
Salah

**Lowercase  
Characters**

ABC Name
ali
mohammed
salah

**Uppercase  
Characters**

ABC Name
ALI
MOHAMMED
SALAH

# Power BI Desktop: Add Prefix or Suffix

### Prefix

Enter a text value to add to the front of each value in the column.

Value

Dr.

OKCancel

	<div><div></div><div>123 ID</div><div></div></div>	<div><div></div><div>A<sup>B</sup>C Name</div><div></div></div>	<div><div></div><div>A<sup>B</sup>C Department</div><div></div></div>
1	101	Dr. ALI	IT
2	102	Dr. MOHAMMED	Sales
3	103	Dr. SALAH	HR

# Power BI Desktop: Add New Row

To add new row in Power BI as following:

## Method 1: Write this statement in Cell Equation

✕

✓

fx

```
= Table.InsertRows(Source, 3, |  
  {[ID = 104, Name = "      Ghalib", Department = "IT"]})
```



	ABC ID	ABC Name	ABC Department
1	101	Ali	IT
2	102	Mohammed	Sales
3	103	Salah	HR
4	104	Ghalib	IT

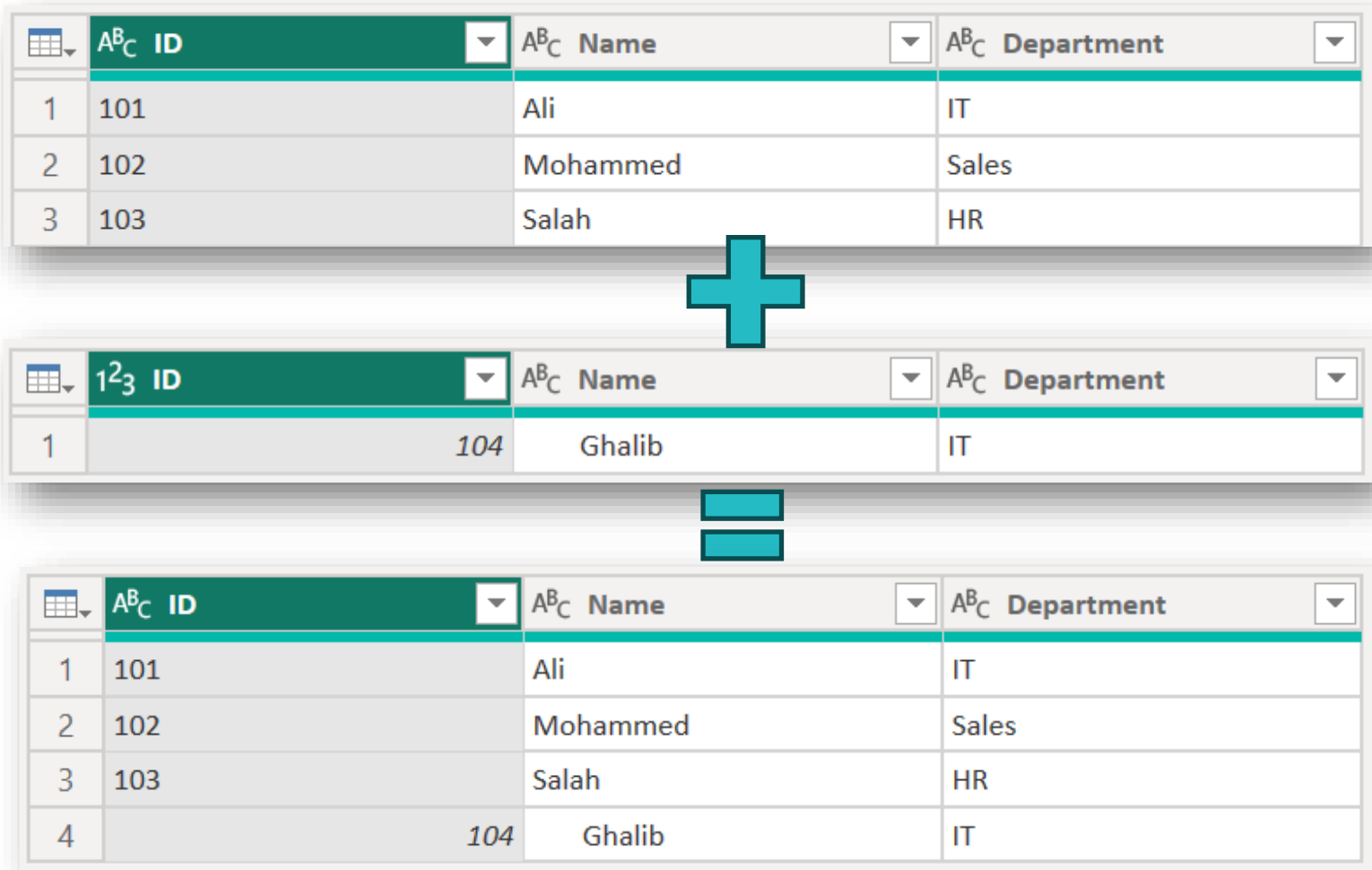
Trim



# Power BI Desktop: Add New Row

To add new row in Power BI as following:

## Method 2: Create a new table, and then append

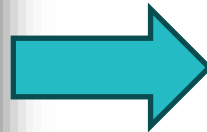


## Power BI Desktop: Clean & Trim Text

In Power Query, **Clean** removes control or non-printable characters (line breaks, for example) from a text value, whereas **Trim** just removes leading or trailing whitespace.

Clean

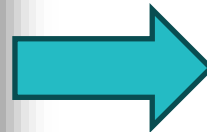
ABC Name
Ali
Mohammed
Salah
Gh alib



ABC Name
Ali
Mohammed
Salah
Ghalib

Trim

ABC Name
Ali
Mohammed
Salah
Ghalib



ABC Name
Ali
Mohammed
Salah
Ghalib

# What is Business Intelligence?

## Group Discussion:

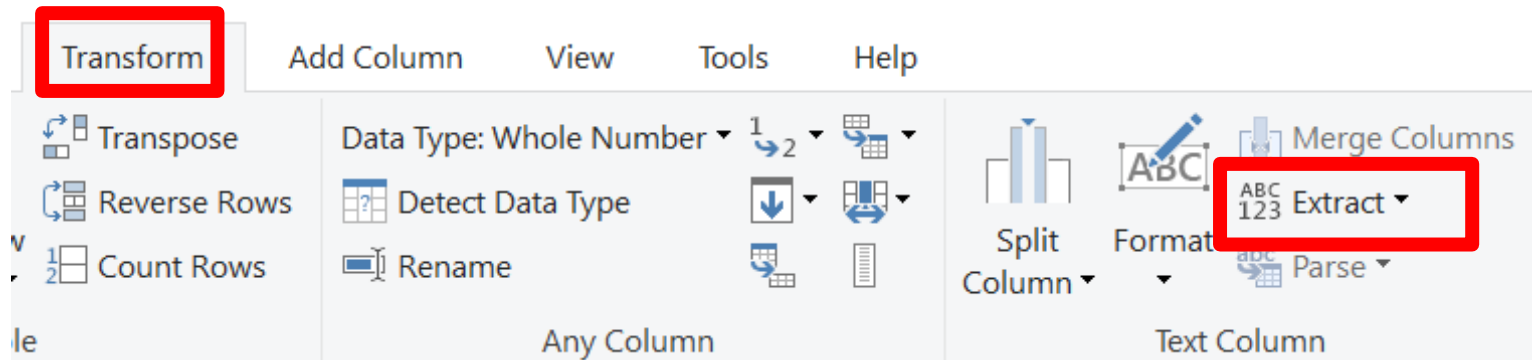


**How to extract a specific data for each attribute?**

## Power BI Desktop: Extract info. from Data

To extract info from data in Power BI as following:

1. **Select Data**
2. **Go to the Transform tab & from “Text Column” group**
3. **Click on “Extract”**
  - Length
  - First Characters
  - Last Characters
  - Range
  - Text Before Delimiter
  - Text After Delimiter
  - Text Between Delimiter



# Power BI Desktop: Extract info. from Data

Length

ABC Name	ABC Department
Ali	IT
Mohammed	Sales
Salah	HR
Ghalib	IT

123 Name	ABC Department
3	IT
8	Sales
5	HR
6	IT

First & Last Characters

### Extract First Characters

Enter how many starting characters to keep.

Count

### Extract Last Characters

Enter how many ending characters to keep.

Count

ABC Name	ABC Department
Al	IT
Mo	Sales
Sa	HR
Gh	IT

ABC Name	ABC Department
Ali	IT
med	Sales
lah	HR
lib	IT

# Power BI Desktop: Extract info. from Data


## Range

### Extract Text Range

Enter the index of the first character, and the number

Starting Index

Number of Characters




AB_C Name	AB_C Department
i	IT
ha	Sales
la	HR
al	IT

## Text Delimiters

### Text Before Delimiter

Enter the delimiter that marks the end of what you

Delimiter



AB_C Name	AB_C Department
Ali	IT
Moh	Sales
S	HR
Gh	IT

# What is Business Intelligence?

## Group Discussion:



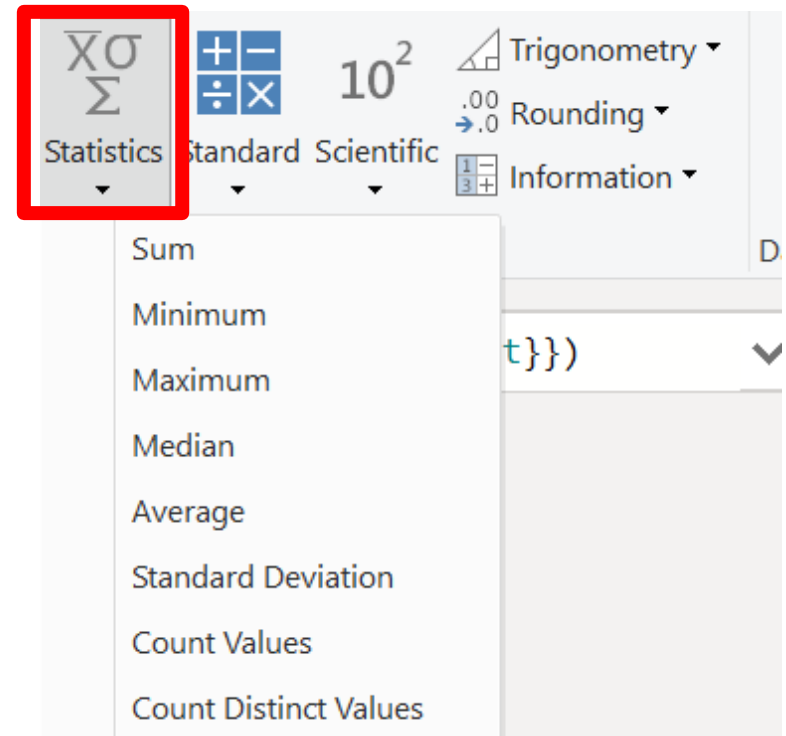
**How to apply statistical functions?**

## Power BI Desktop: Statistics

To show statistic functions in Power BI as following:

1. **Select Data**
2. **Go to the Transform tab & from “Number Column” group**
3. **Click on “Statistics”**

- Sum
- Minimum & Maximum
- Median
- Average
- Standard Deviation
- Count Values
- Count Distinct Values





## Power BI Desktop: Statistics

**Sum:** return sum up all selected cells in Table

**Minimum & Maximum:** return the minimum or maximum value in a given list of arguments

**Median:** return the measurement of central tendency, which is the location of the center of a group of numbers in a statistical distribution

**Average:** return the average value of a given series of numbers

**Standard Deviation:** measures the dispersion of a dataset relative to its mean and is calculated as the square root of the variance

$$\sigma = \sqrt{\frac{\sum (x_i - \mu)^2}{N}}$$

**Count Values:** return the number of entries in a number field that is in a range or array of numbers

**Count Distinct Values:** returns the number of unique values in a field for each GROUP BY result

# What is Business Intelligence?

## Group Discussion:

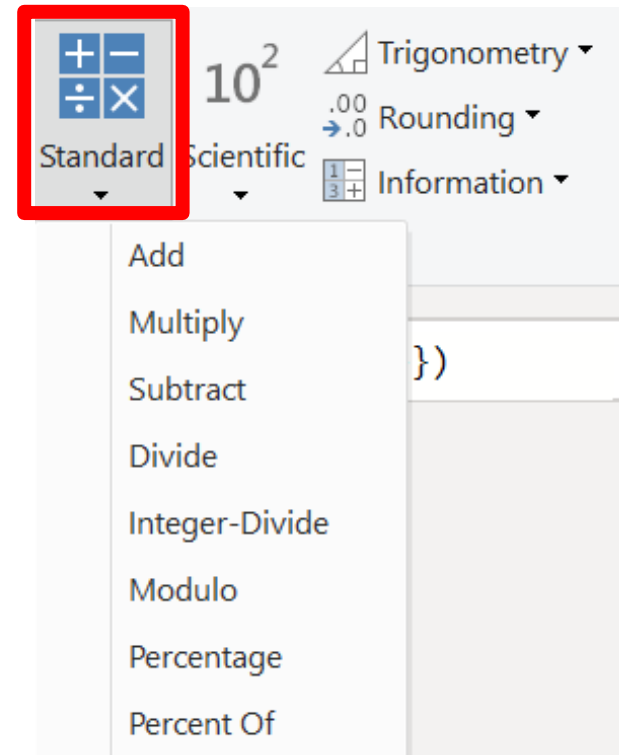


**How to apply standard mathematical equations?**

## Power BI Desktop: Standard

To show standard functions in Power BI as following:

1. **Select Data**
2. **Go to the Transform tab & from “Number Column” group**
3. **Click on “Standard”**
  - Add & Subtract
  - Multiply & Divide
  - Integer-Divide
  - Modulo
  - Percentage
  - Percent of



## Power BI Desktop: Standard

**Add:** add a specific value to all selected columns

**Subtract:** subtract a specific value to all selected columns

**Multiply:** multiply a specific value with all selected columns

**Divide:** divide a specific value with all selected columns

**Integer-Divide:** return the integer portion of the result form dividing a specific value by all selected columns

**Modulo:** return the remainder resulting from the integer division of number by divisor

**Percentage:** return the current cells multiply with a specific value and then divide by 100

**Percent of:** return the current cells divide by a specific value and then multiples with 100

# What is Business Intelligence?

## Group Discussion:

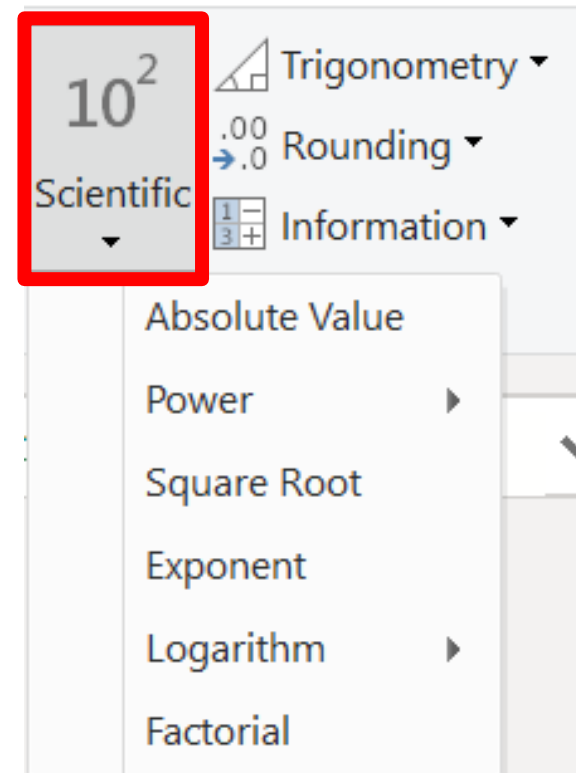


**How to apply scientific equations?**

## Power BI Desktop: Scientific

To show standard functions in Power BI as following:

1. **Select Data**
2. **Go to the Transform tab & from “Number Column” group**
3. **Click on “Scientific”**
  - Absolute Value
  - Power
  - Square Root
  - Exponent
  - Logarithm
  - Factorial



## Power BI Desktop: Scientific

**Absolute Value:** return the absolute of all selected columns

**Power:** return the result of raising specific number for all selected columns

**Square Root:** return the square root of a specific value for all selected columns

**Exponent:** return the result of a specific value to a power

**Logarithm:** return the logarithm of a specific value

**Factorial:** return the factorial of a specific value

# What is Business Intelligence?

## Group Discussion:



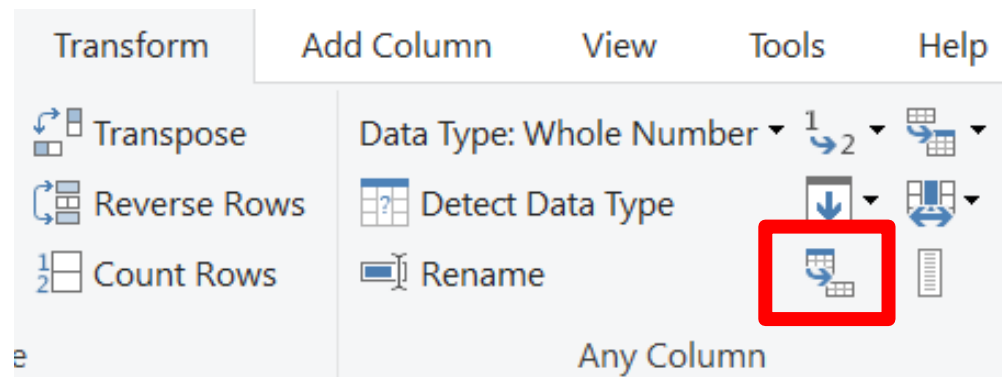
## How to pivot Table?



# Power BI Desktop: Pivot Columns

To pivot columns in Power BI as following:

1. **Group By your columns**
2. **Go to the Transform tab & from “Any Column” group**
3. **Click on “Pivot Column”**



# Power BI Desktop: Pivot Columns

## Example:

1. Clean missing data
2. Go to the Home tab & from “Transform” group
3. Select “Group By” (Drive-Wheels & Body-Style) columns with an average of (Price) column

Specify the columns to group by and one or more outputs.

☐ Basic ☒ Advanced


Column7

Column8

Add grouping

New column name	Operation	Column
Group 1	Average	Column26

# Power BI Desktop: Pivot Columns

	AB <sub>C</sub> Column7	AB <sub>C</sub> Column8	1.2 Group 1
1	convertible	rwd	23949.6
2	hatchback	rwd	14337.77778
3	sedan	fwd	9811.8
4	sedan	4wd	12647.33333
5	wagon	fwd	9997.333333
6	sedan	rwd	21711.83333
7	hatchback	fwd	8396.387755
8	wagon	rwd	16994.22222
9	hardtop	rwd	24202.71429
10	hardtop	fwd	8249
11	hatchback	4wd	7603
12	wagon	4wd	9095.75
13	convertible	fwd	11595

# Power BI Desktop: Pivot Columns

**Example:**

- 1. Go to the Transform tab & from “Any Column” group**
- 2. Select “Pivot Column”**

## Pivot Column

Use the names in column "Column7" to create new columns.

Values Column ⓘ

Group 1

▸ Advanced options

[Learn more about Pivot Column](#)

	price				
body-style	convertible	hardtop	hatchback	sedan	wagon
drive-wheels					
4wd	NaN	NaN	7603.000000	12647.333333	9095.750000
fwd	11595.0	8249.000000	8396.387755	9811.800000	9997.333333
rwd	23949.6	24202.714286	14337.777778	21711.833333	16994.222222

# What is Business Intelligence?

## Group Discussion:



## What is Data Visualizations?

## Power BI Desktop: Data Visualization Tools

“Data visualization is the graphical representation of information and data. By using visual elements like charts, graphs, and maps, data visualization tools provide an accessible way to see and understand trends, outliers, and patterns in data”



In the world of Big Data, data visualization tools and technologies are essential to analyze massive amounts of information and make data-driven decisions.

# What is Business Intelligence?

## Group Discussion:



## Why Data Visualizations?

# Power BI Desktop: Data Visualization Tools

## Why Build Visuals?

01

Exploratory Data Analysis

02

Communicate Data Clearly

03

Share Unbiased Representation of Data

04

Support Recommendations to  
Different Stakeholders

04

Different Stakeholders  
Support Recommendations to



# What is Business Intelligence?

## Group Discussion:



**What should be ..... in Data Visualizations?**

## Power BI Desktop: Data Visualization Tools

**Data Visualization should be ... in graphics:**

**01**

more clearly

**02**

less in more effective

**03**

less in more attractive

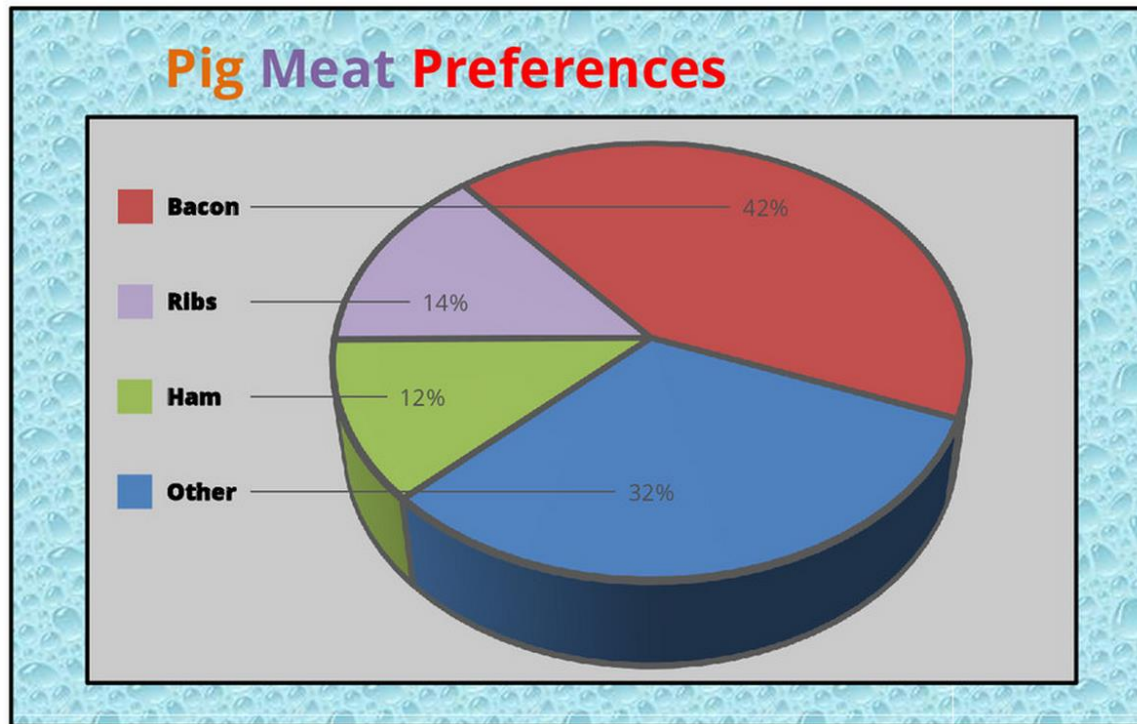
**04**

less in more impactive

**04**

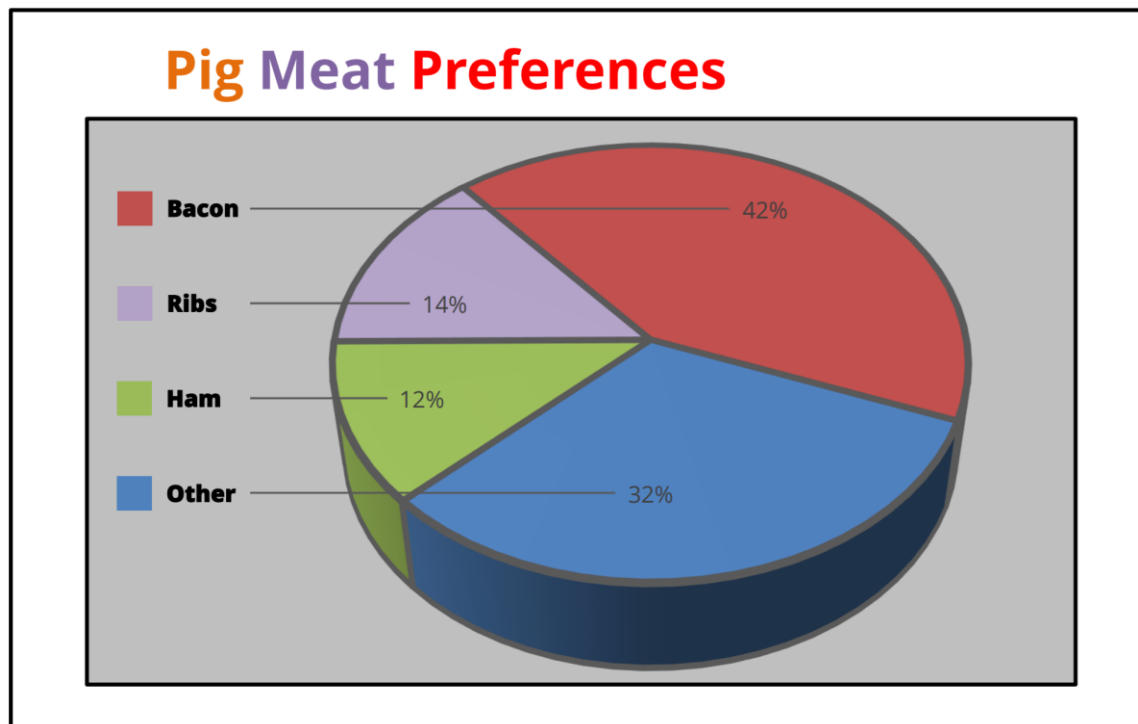
less in more impactive

# Power BI Desktop: Data Visualization Tools



**Question: Is This Graph more effective, attractive, and impactful? Why?**

# Power BI Desktop: Data Visualization Tools

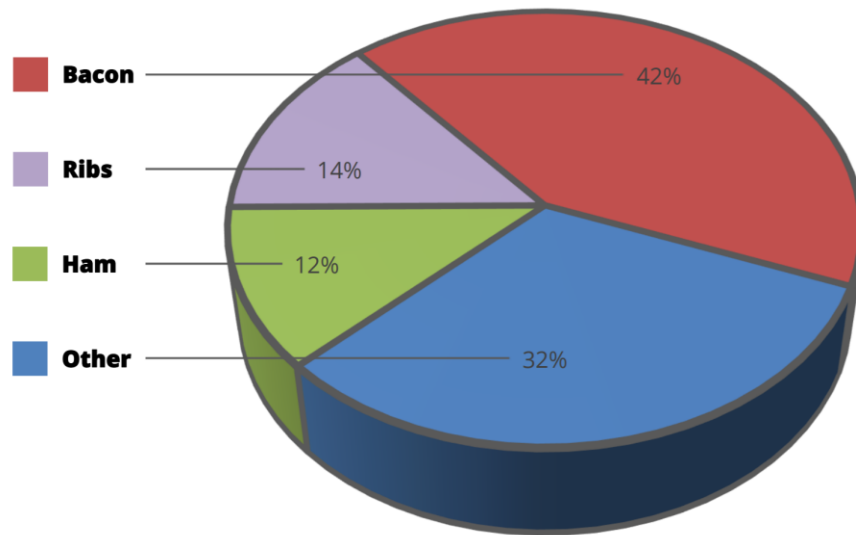


1

Remove  
Background

# Power BI Desktop: Data Visualization Tools

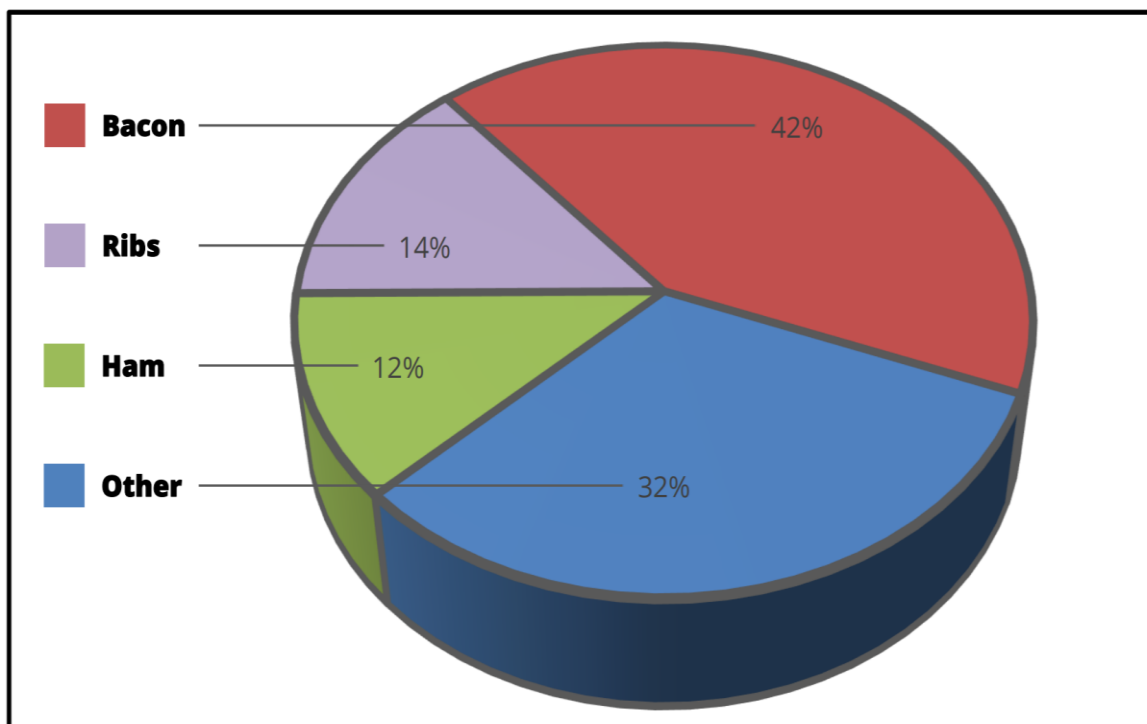
## Pig Meat Preferences



1

Remove  
Background

# Power BI Desktop: Data Visualization Tools

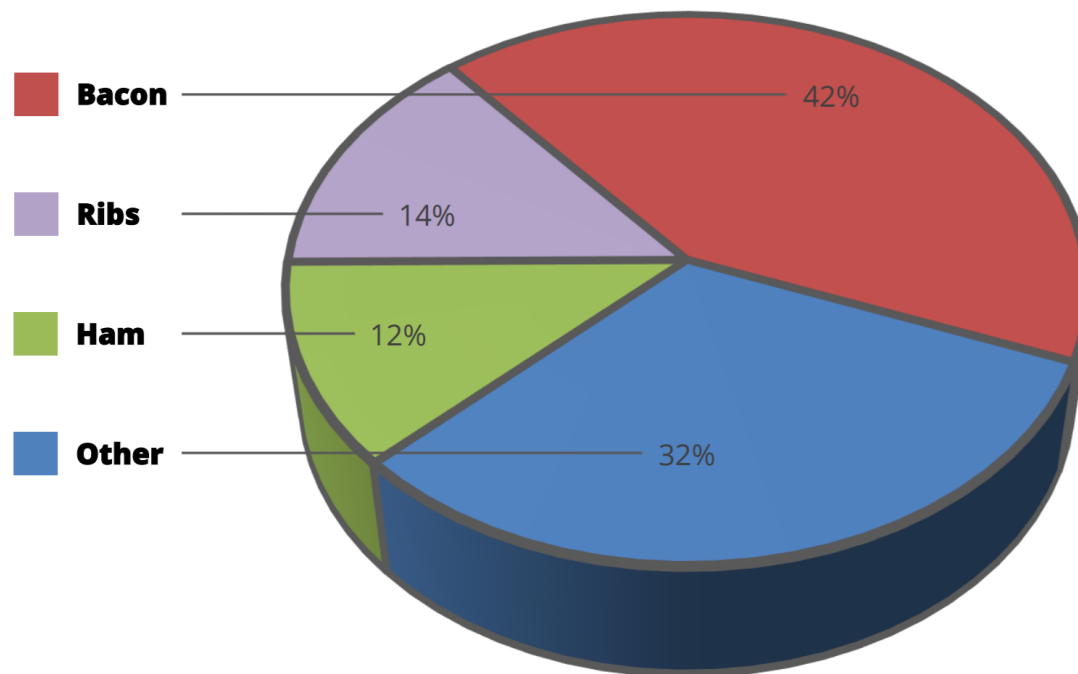


**1** Remove Background

**2** Remove Borders

# Power BI Desktop: Data Visualization Tools

## Pig Meat Preferences



1

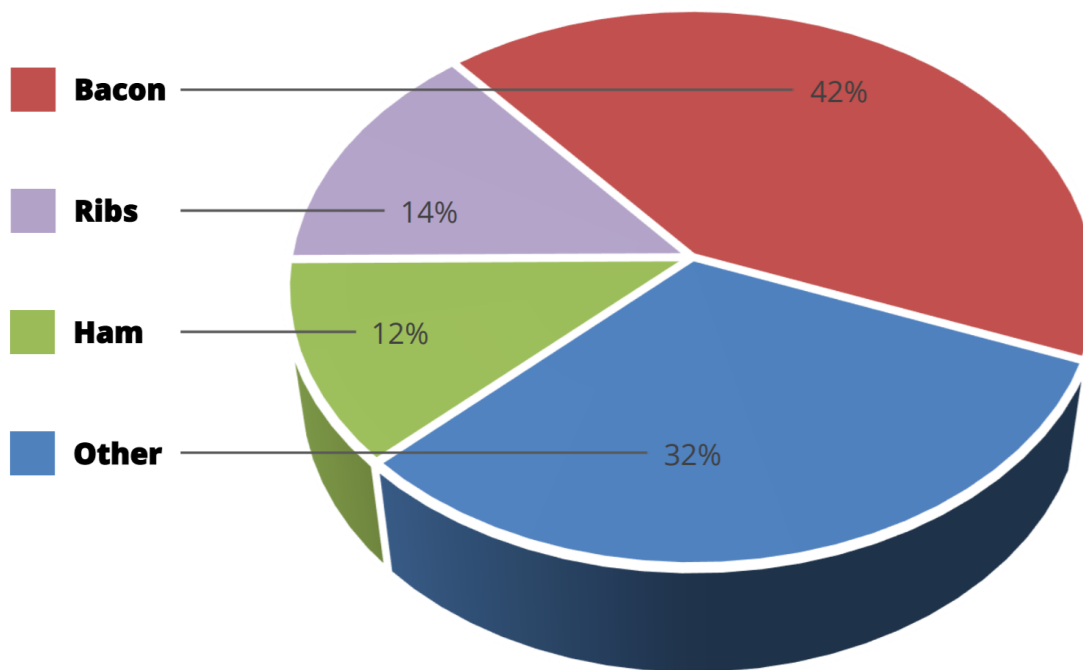
Remove  
Background

2

Remove Borders

# Power BI Desktop: Data Visualization Tools

## Pig Meat Preferences



1

Remove  
Background

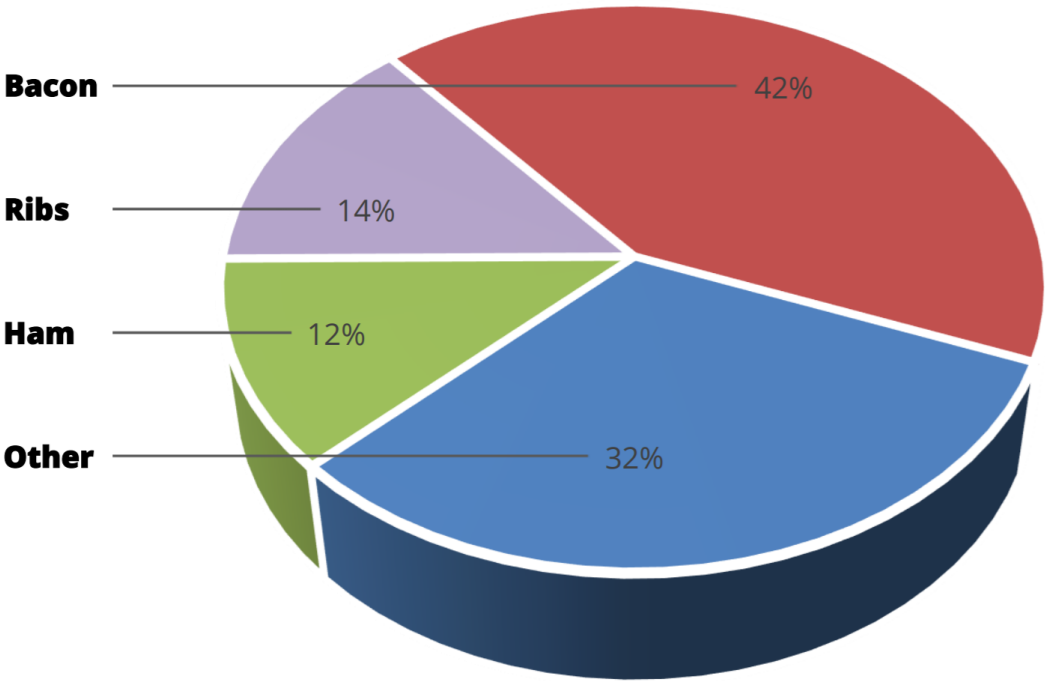
2

Remove Borders



# Power BI Desktop: Data Visualization Tools

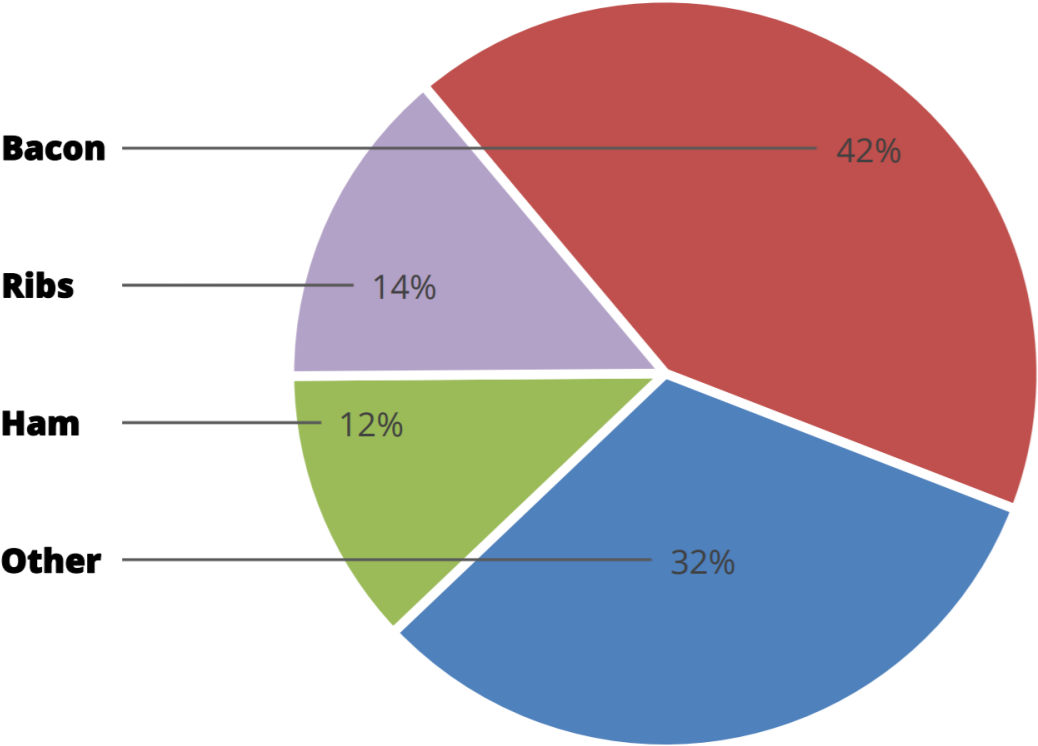
## Pig Meat Preferences



- 1 Remove Background
- 2 Remove Borders
- 3 Remove Redundant Legend

# Power BI Desktop: Data Visualization Tools

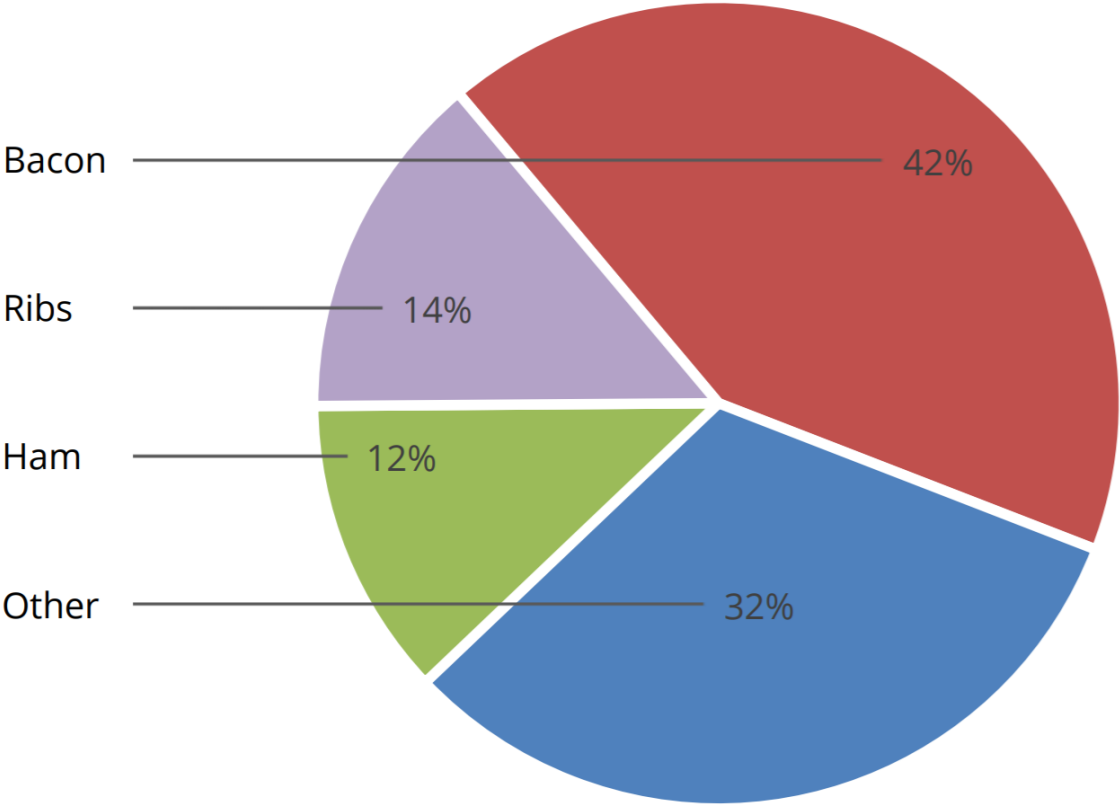
## Pig Meat Preferences



- 1 Remove Background
- 2 Remove Borders
- 3 Remove Redundant Legend & 3D

# Power BI Desktop: Data Visualization Tools

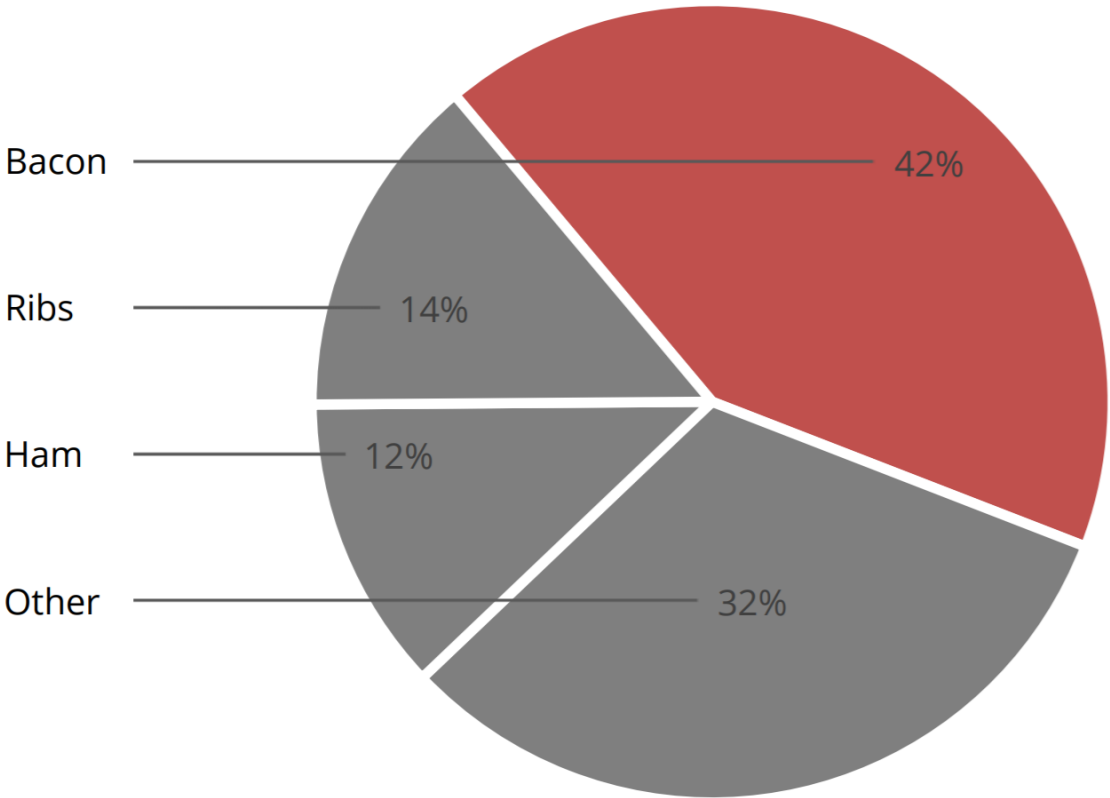
## Pig Meat Preferences



- 1 Remove Background
- 2 Remove Borders
- 3 Remove Redundant Legend & 3D & Bold

# Power BI Desktop: Data Visualization Tools

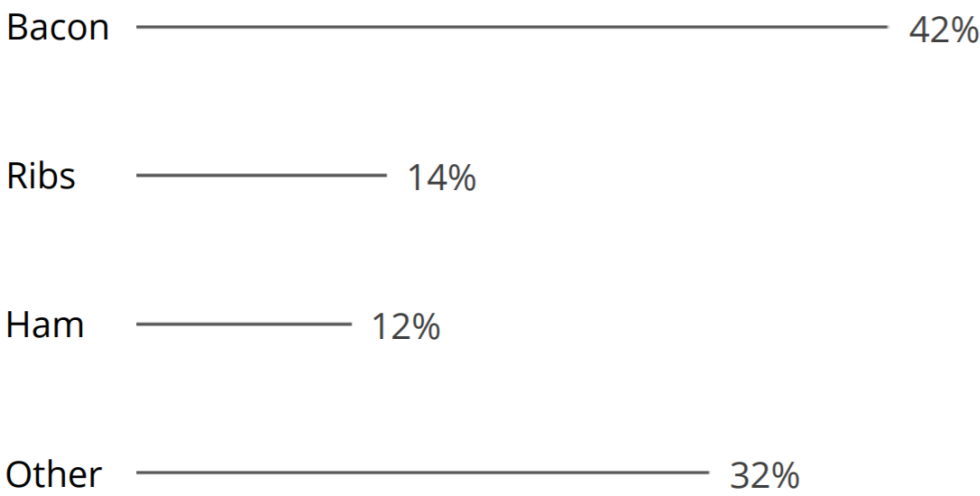
## Pig Meat Preferences



- 1 Remove Background
- 2 Remove Borders
- 3 Remove Redundant Legend & 3D & Bold
- 4 Reduce Colors

# Power BI Desktop: Data Visualization Tools

## Pig Meat Preferences



**1** Remove Background

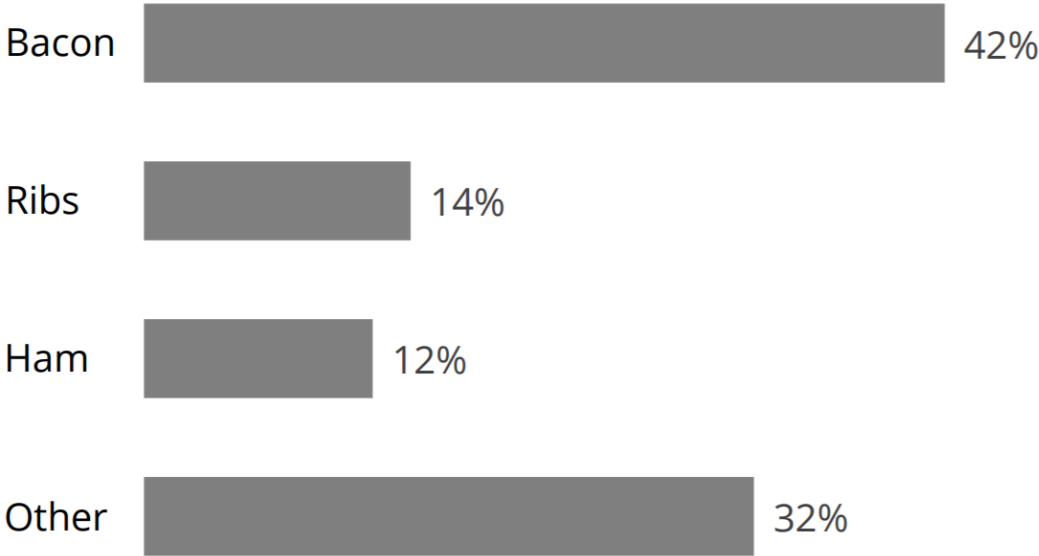
**2** Remove Borders

**3** Remove Redundant Legend & 3D & Bold

**4** Reduce Colors  
Remove The Wedges

# Power BI Desktop: Data Visualization Tools

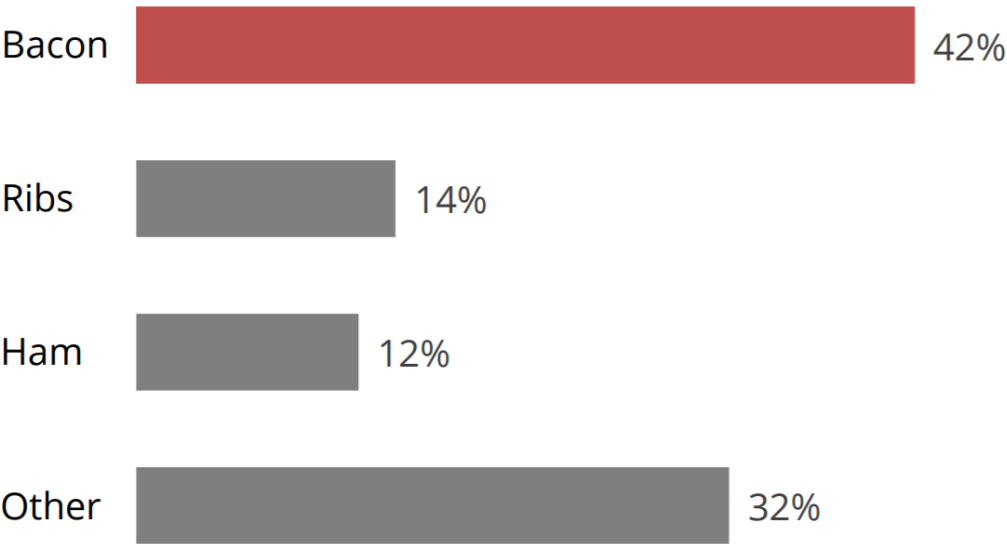
## Pig Meat Preferences



- 1 Remove Background
- 2 Remove Borders
- 3 Remove Redundant Legend & 3D & Bold
- 4 Reduce Colors Remove The Wedges
- 5 Thicken The Lines

# Power BI Desktop: Data Visualization Tools

## Pig Meat Preferences



**1** Remove Background

**2** Remove Borders

**3** Remove Redundant Legend & 3D & Bold

**4** Reduce Colors  
Remove The Wedges

**5** Thicken The Lines  
Emphasize the highest



Question: How can you determine a fair graphical types?

# What is Business Intelligence?

## Group Discussion:



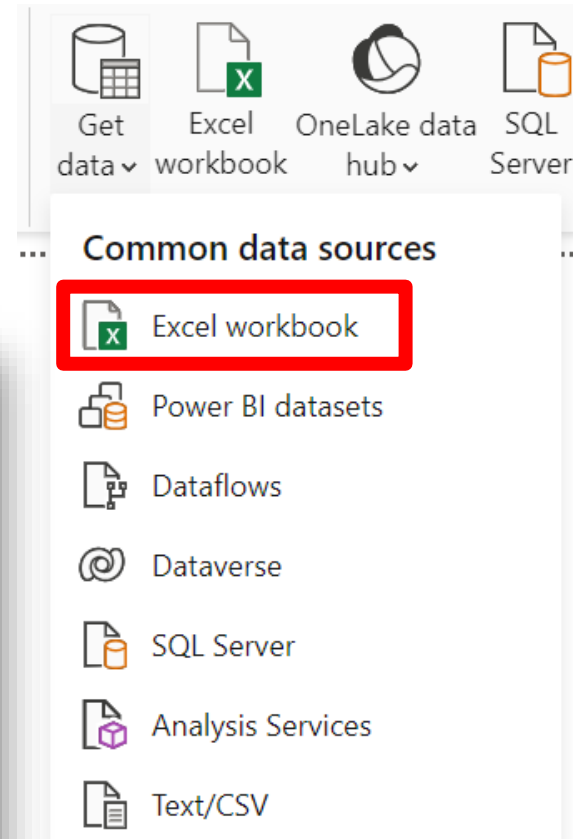
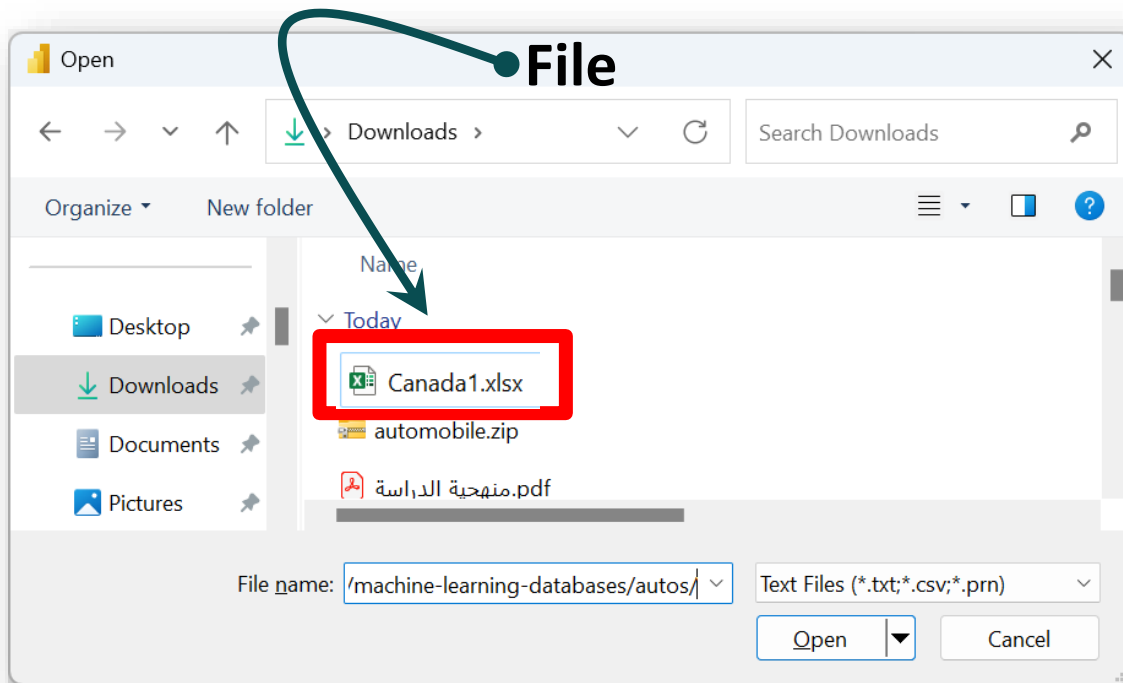
## How to import Excel Files?



# Power BI Desktop: Import Excel Sheet

To import (XLS File) in Power BI as following:

1. Go to the Home tab & “Data” group
2. Click on “Get Data”
3. Determine “Excel Workbook”



# What is Business Intelligence?

## Group Discussion:



**How to import online resources?**

# Power BI Desktop: Import Excel Sheet

To import (XLS File) in Power BI as following:

1. Go to the Home tab & “Data” group
2. Click on “Get Data”
3. Determine “Web”

**From Web**

☒ Basic ☐ Advanced

URL

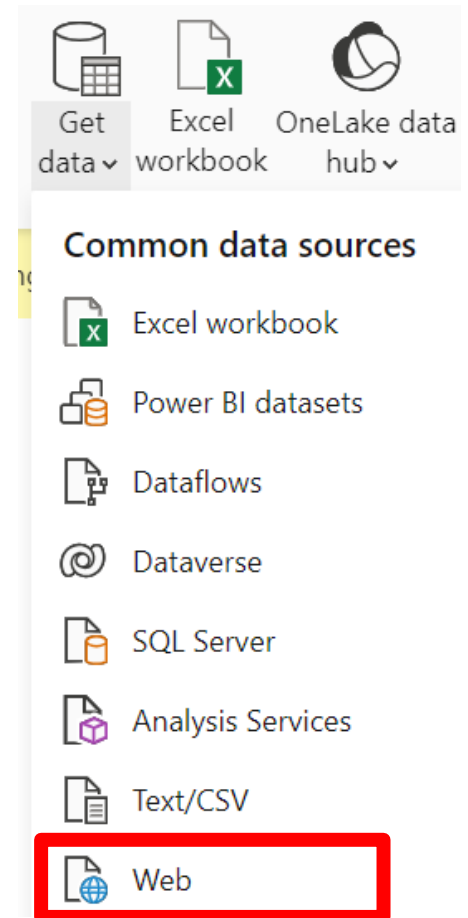
`.net/cf-courses-data/CognitiveClass/DV0101EN/labs/Data_Files/Canada.xlsx`

Use anonymous access for this Web content.

Select which level to apply these settings to


`https://github.com/`

Back Connect Cancel



# Power BI Desktop: Import Excel Sheet

**Excel Sheets**



**Navigator**

Display Options ▾

https://s3-api.us-geo.objectstorage.softlayer.n...

☐

Canada by Citizenship

☒

Canada by Citizenship (2)

☐

Regions by Citizenship

**Data**




Canada by Citizenship (2)

Column1	Column2	Column3	Column4	Column5
Type	Coverage	OdName	AREA	AreaName
Immigrants	Foreigners	Afghanistan	935	Asia
Immigrants	Foreigners	Albania	908	Europe
Immigrants	Foreigners	Algeria	903	Africa
Immigrants	Foreigners	American Samoa	909	Oceania
Immigrants	Foreigners	Andorra	908	Europe
Immigrants	Foreigners	Angola	903	Africa
Immigrants	Foreigners	Antigua and Barbuda	904	Latin America and tl
Immigrants	Foreigners	Argentina	904	Latin America and tl

*The data in the preview has been truncated due to size limits.*

# Power BI Desktop: Use First Row as Header

 ABC Type	ABC Coverage	ABC OdName	123 AREA
1	Immigrants	Foreigners	Afghanistan935
2	Immigrants	Foreigners	Albania908
3	Immigrants	Foreigners	Algeria903
4	Immigrants	Foreigners	American Samoa909
5	Immigrants	Foreigners	Andorra908
6	Immigrants	Foreigners	Angola903
7	Immigrants	Foreigners	Antigua and Barbuda904
8	Immigrants	Foreigners	Argentina904
9	Immigrants	Foreigners	Armenia935
10	Immigrants	Foreigners	Australia909
11	Immigrants	Foreigners	Austria908
12	Immigrants	Foreigners	Azerbaijan935
13	Immigrants	Foreigners	Bahamas904
14	Immigrants	Foreigners	Bahrain935
15	Immigrants	Foreigners	Bangladesh935
16	Immigrants	Foreigners	Barbados904

## Power BI Desktop: Exercises

Apply the following steps in Power BI:

1. **Rename Columns**
2. **Show the number of records**
3. **Remove missing values & errors**
4. **Delete Columns**
5. **Add “Total” column**
6. **Sort Data as “Total” column**
7. **Group “Country” by using “Continent”**



# What is Business Intelligence?

## Group Discussion:

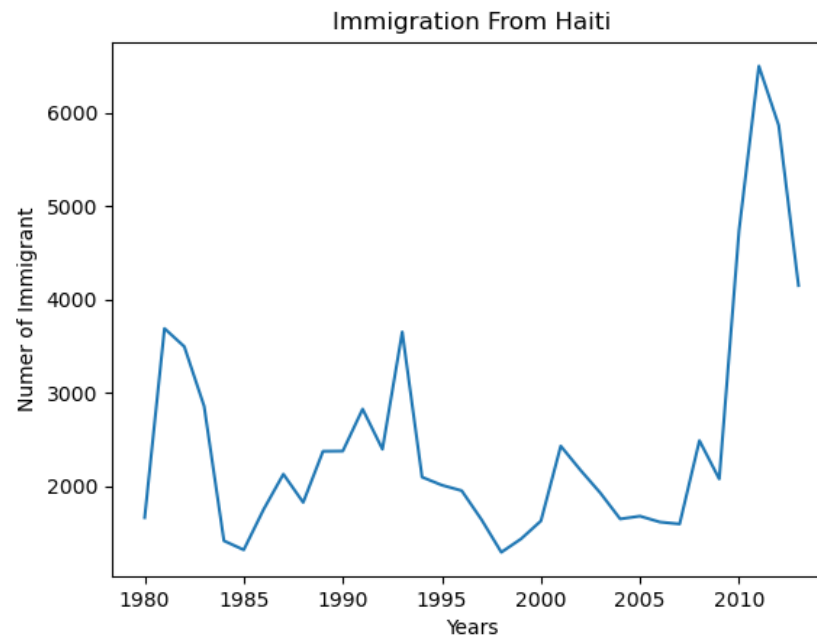


## What is Line Chart?

## Power BI Desktop: Data Visualization Tools

A **line Chart** is a type of plot which displays information as a series of data points call 'Markers' connected by straight line segments.

- Provide a quick and easy way to organize data.
- Best used when comparing fewer than 25 different numbers.
- Continuous Dataset over a period of time.

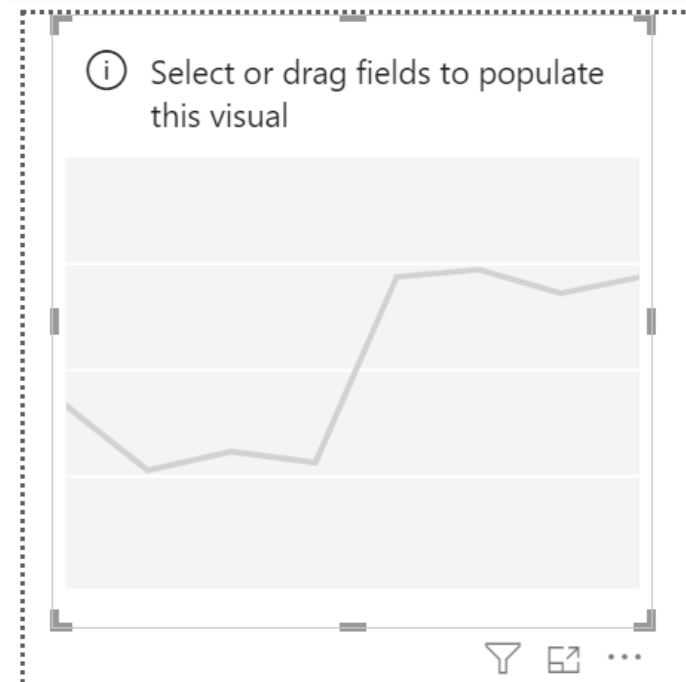
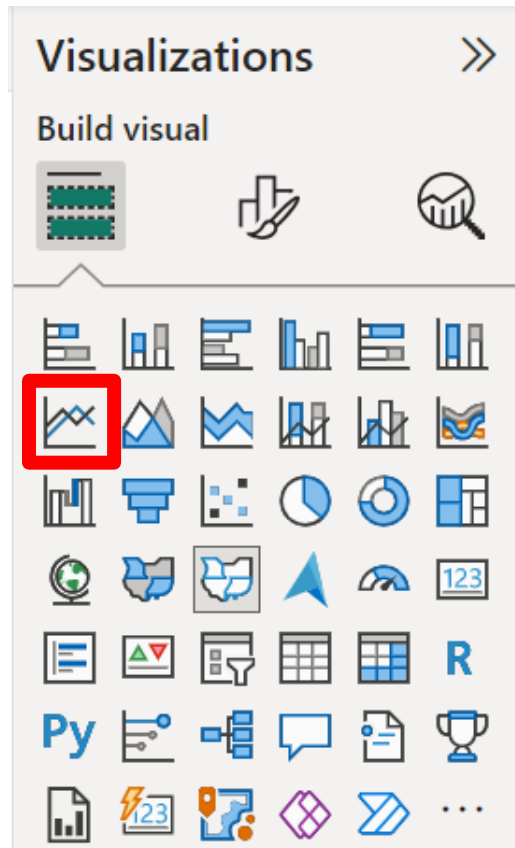




# Power BI Desktop: Line Chart

To create line chart in Power BI as following:

1. Select “Line Chart” icon from the Visualizations pane
2. Create it on visual design canvas



## Power BI Desktop: Line Chart

To create line chart in Power BI as following:

3. Select all columns that represent years
4. From Transform tab, select “Unpivot Only Selected Columns”
5. Drag & drop “Attribute & Country” in X-axis, and “Value” in Y-axis
6. Filter “Country” for only Haiti

X-axis	
Attribute	▼ ×
Country	▼ ×
Y-axis	
Sum of Value	▼ ×

**Country**  
is Haiti

Filter type ⓘ

Basic filtering ▼

🔍 Search

<input type="checkbox"/>	Guinea	34
<input type="checkbox"/>	Guinea-Bissau	34
<input type="checkbox"/>	Guyana	34
<input checked="" type="checkbox"/>	Haiti	34
<input type="checkbox"/>	Honduras	34
<input type="checkbox"/>	Hungary	34
<input type="checkbox"/>	Iceland	34

☐ Require single selection

# Power BI Desktop: Line Chart

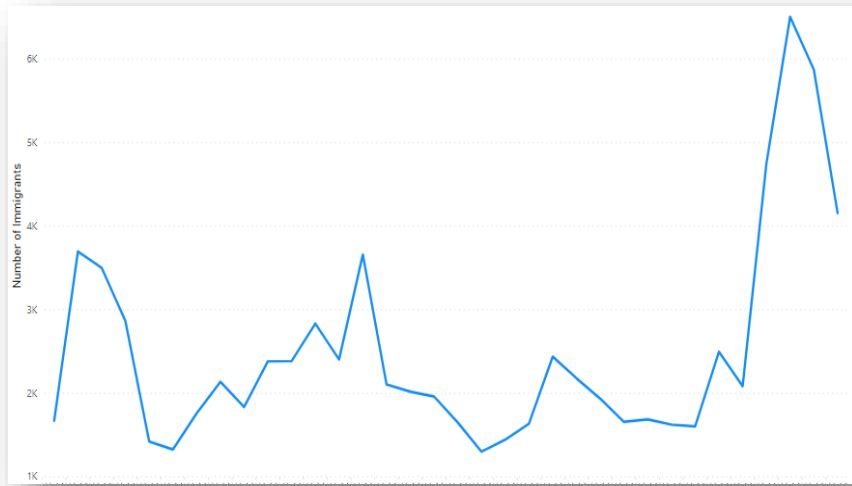
To create line chart in Power BI as following:

## 6. To Change Chart Format

Format Visual → Visual → Line Chart Settings

6. X-axis → Title → write “Years” to change x-axis title

7. Y-axis → Title → write “Number of Immigrants” to change y-axis title



Format Visual → Visual → Line Chart Settings

6. X-axis → Title → write “Years” to change x-axis title

7. Y-axis → Title → write “Number of Immigrants” to change y-axis title

Format Visual → Visual → Line Chart Settings

6. X-axis → Title → write “Years” to change x-axis title

7. Y-axis → Title → write “Number of Immigrants” to change y-axis title

Format Visual → Visual → Line Chart Settings

6. X-axis → Title → write “Years” to change x-axis title

7. Y-axis → Title → write “Number of Immigrants” to change y-axis title

Format Visual → Visual → Line Chart Settings

6. X-axis → Title → write “Years” to change x-axis title

7. Y-axis → Title → write “Number of Immigrants” to change y-axis title

# What is Business Intelligence?

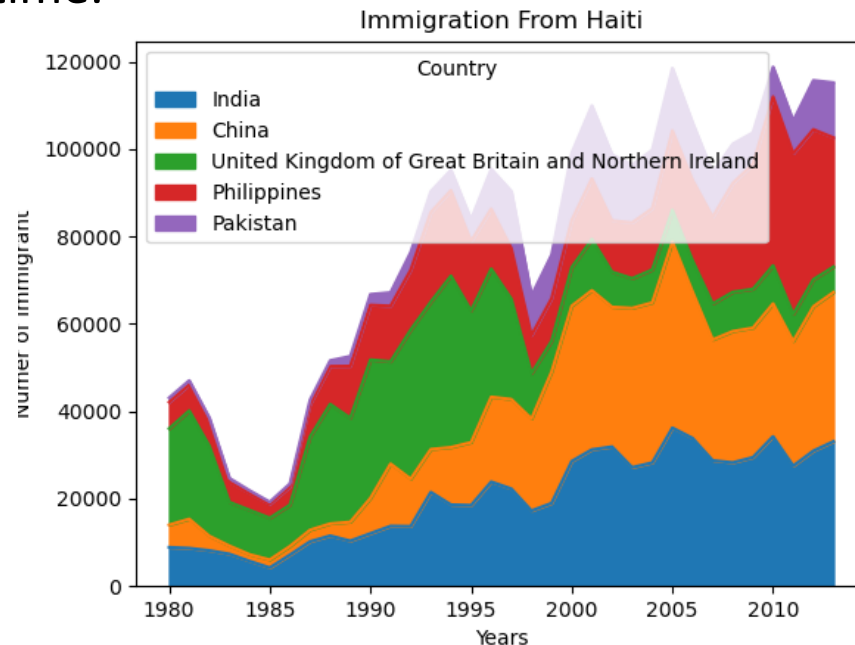
## Group Discussion:



## What is Area Chart?

## Power BI Desktop: Data Visualization Tools

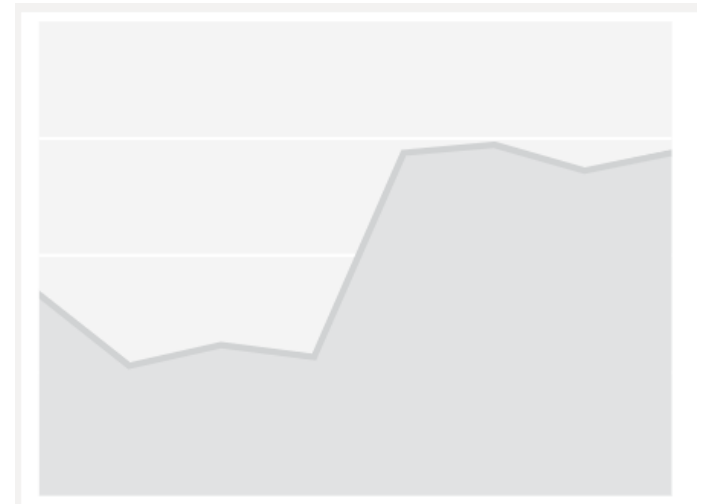
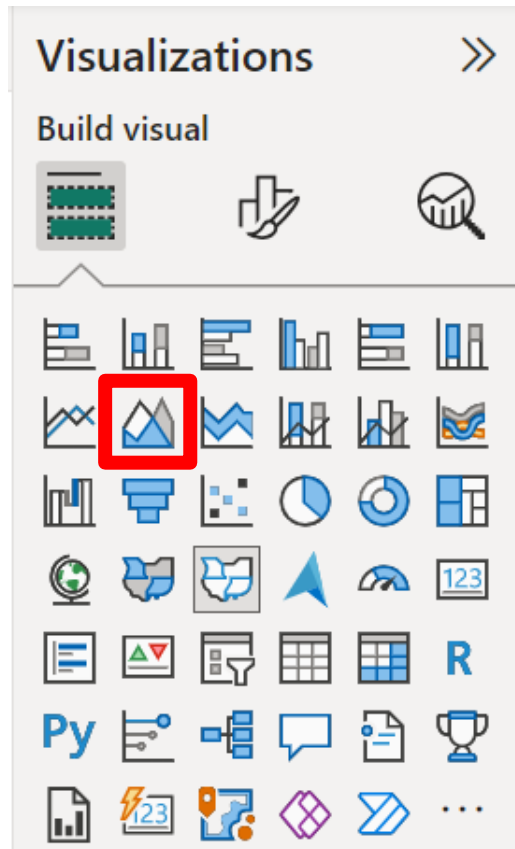
An **Area chart** or area graph displays graphically quantitative data. It is based on the line chart. The area between axis and line are commonly emphasized with colors, textures and hatchings. Commonly one compares two or more quantities with an area chart. Commonly used to represent cumulated totals using numbers or percentages over time.



## Power BI Desktop: Area Chart

To create area chart in Power BI as following:

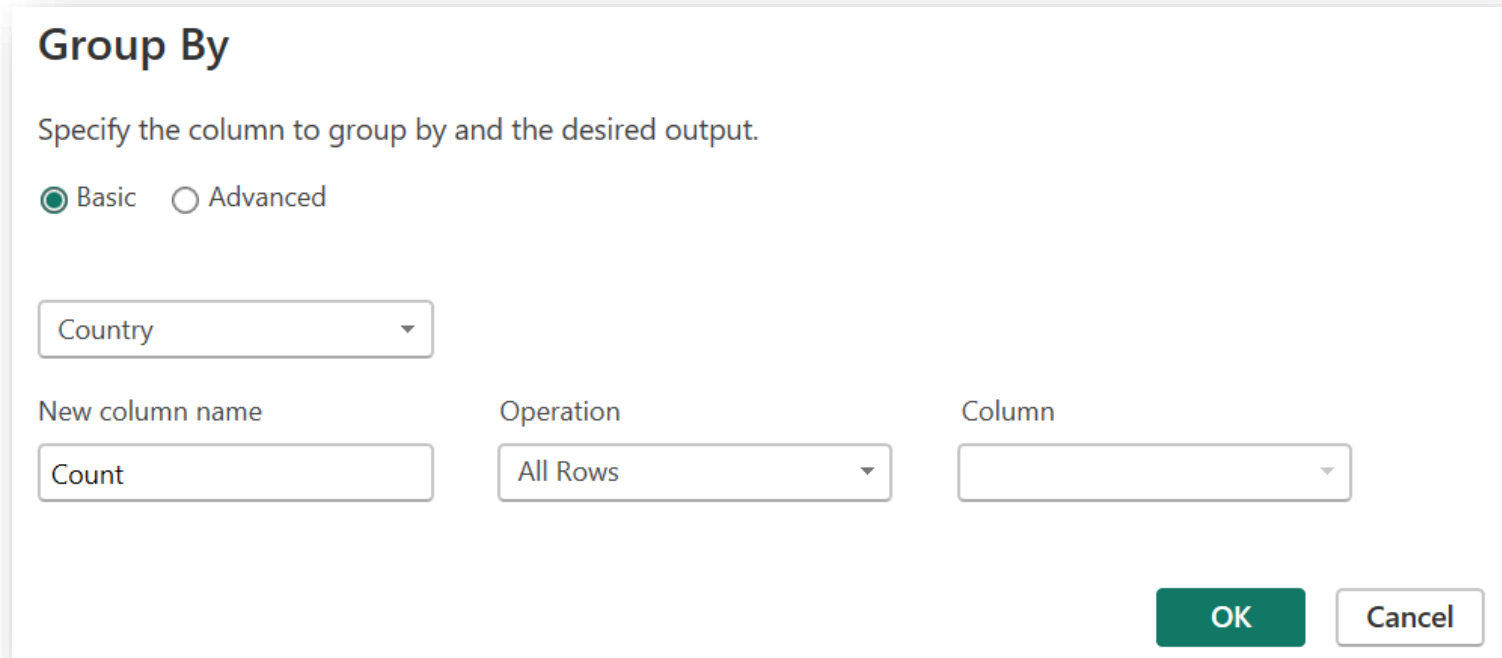
1. Select “Area Chart” icon from the Visualization pane
2. Create it on visual design canvas



## Power BI Desktop: Area Chart

To create area chart in Power BI as following:

3. **Select all columns that represent years**
4. **From Transform tab, select “Unpivot Only Selected Columns”**
5. **From Home tab, select Group By**



The screenshot shows the 'Group By' dialog box in Power BI Desktop. The title is 'Group By'. Below the title is the instruction 'Specify the column to group by and the desired output.' There are two radio buttons: 'Basic' (selected) and 'Advanced'. Below the radio buttons is a dropdown menu with 'Country' selected. Below this is a section with three fields: 'New column name' with a text box containing 'Count', 'Operation' with a dropdown menu showing 'All Rows', and 'Column' with an empty dropdown menu. At the bottom right are 'OK' and 'Cancel' buttons.

**Group By**

Specify the column to group by and the desired output.

☒ Basic ☐ Advanced

Country ▼

New column name: Count

Operation: All Rows ▼

Column: ▼

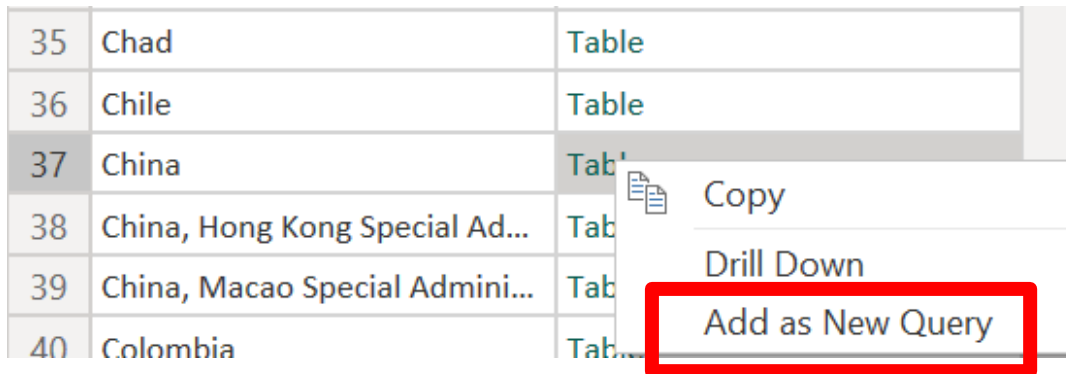
OK Cancel

## Power BI Desktop: Area Chart

To create area chart in Power BI as following:

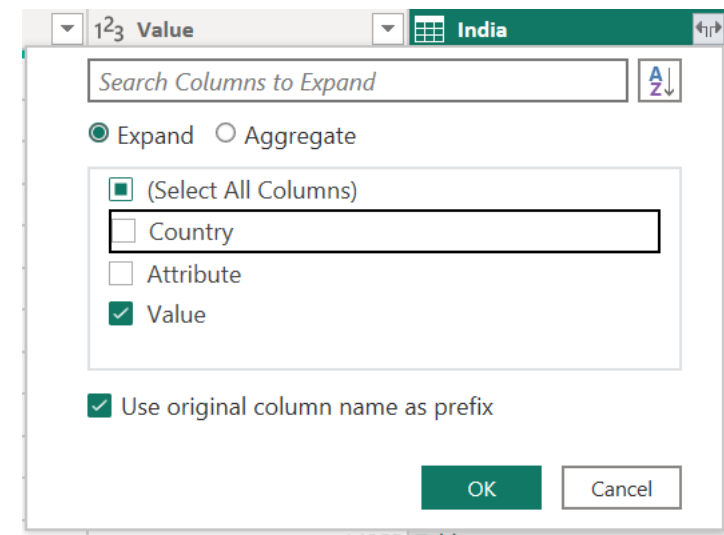
6. Create a new query for all selected country
7. Merge all selected tables
8. Show only “value” field (Filter)

35	Chad	Table
36	Chile	Table
37	China	Table
38	China, Hong Kong Special Ad...	Table
39	China, Macao Special Admini...	Table
40	Colombia	Table



Create a New  
Query

### Filter Value



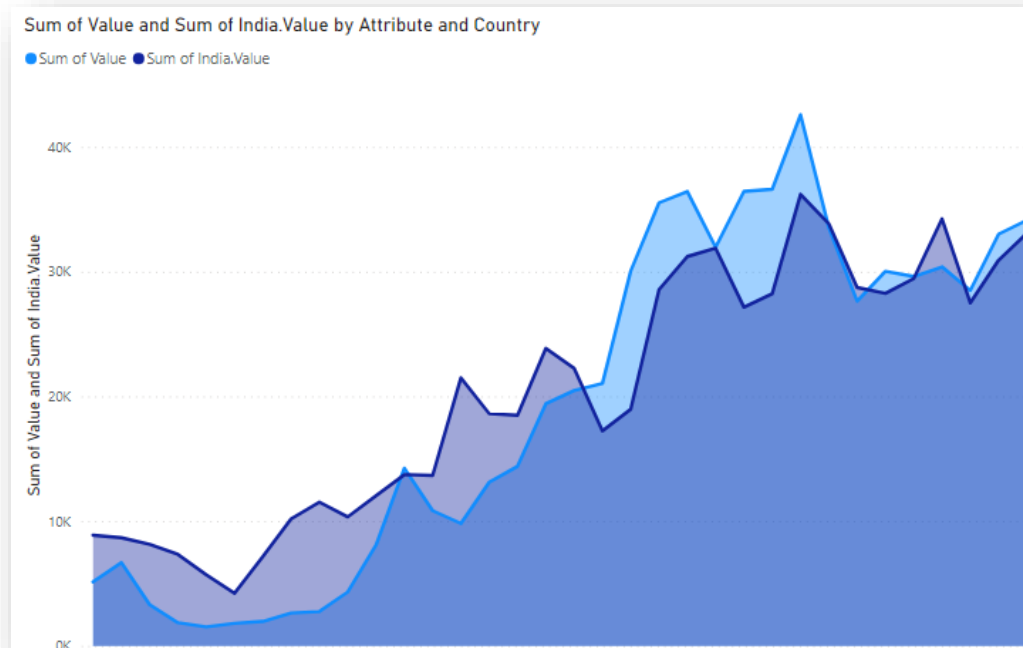


## Power BI Desktop: Area Chart

To create area chart in Power BI as following:

**9. Drag & drop “Attribute & Country” in X-axis**

**10. Drag & drop all value fields for countries in Y-axis**



X-axis		
Attribute	▼	×
Country	▼	×

Y-axis		
Sum of Value	▼	×
Sum of India.Value	▼	×

# What is Business Intelligence?

## Group Discussion:

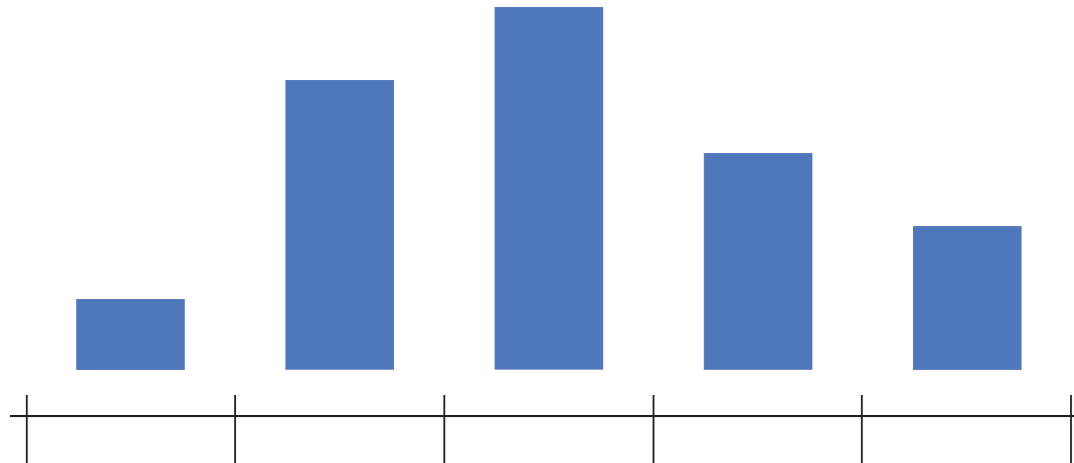


## What is Histogram Chart?

## Power BI Desktop: Data Visualization Tools

**Histogram** is a way of representing the frequency distribution of a variable.

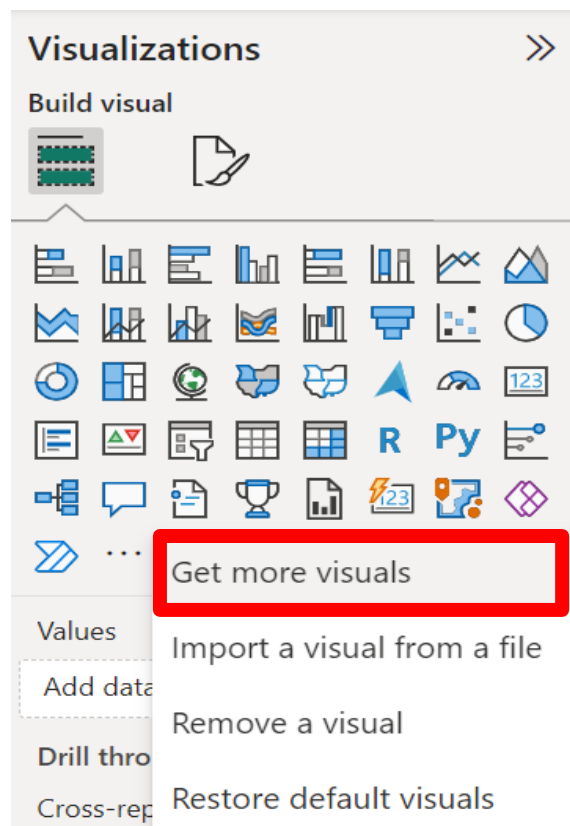
- Provide a visual representation of numerical data by indicating the number of data points that lie within a range of values.
- The highest frequency is the greater data value in that bin.
- Use with the appropriate binomial distribution table or straightforward calculations with the binomial formula.



# Power BI Desktop: Histogram Chart

To create histogram chart in Power BI as following:

1. Import the histogram chart from “Get more visuals”
2. Create it on visual design canvas



# What is Business Intelligence?

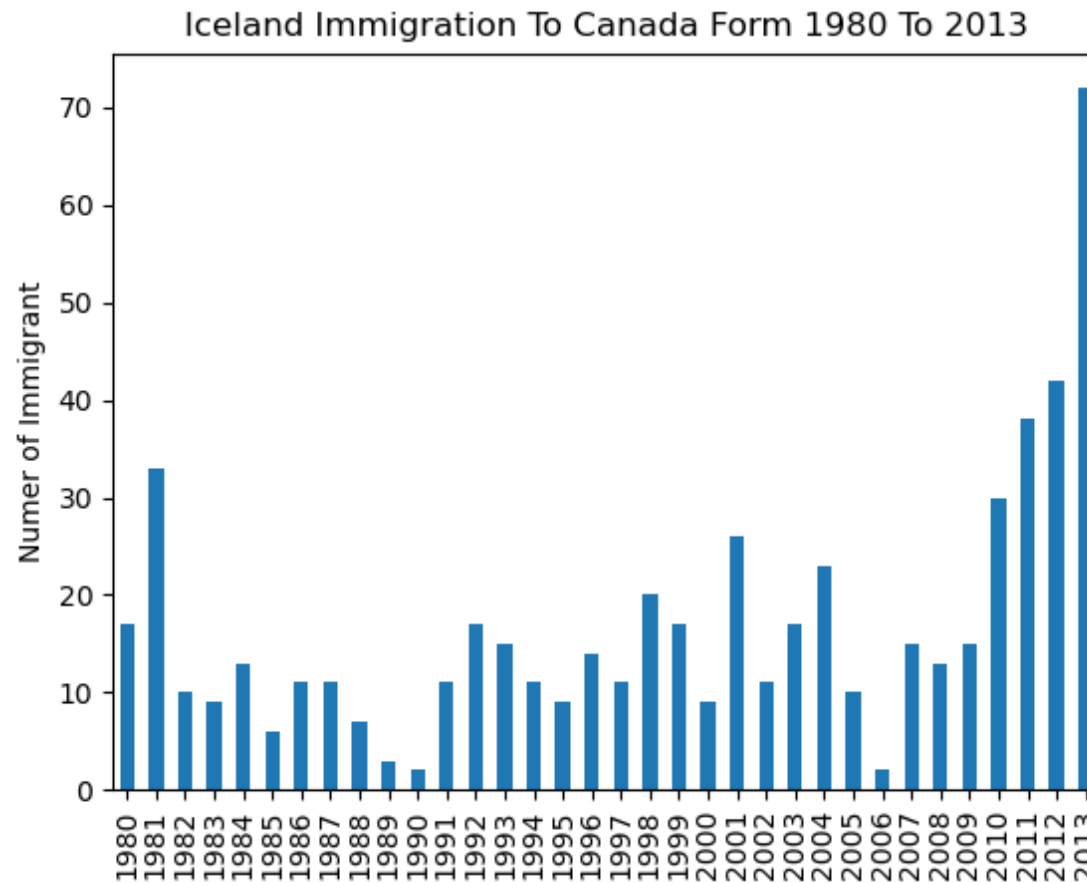
## Group Discussion:



## What is Bar Chart (Column Chart)?

## Power BI Desktop: Data Visualization Tools

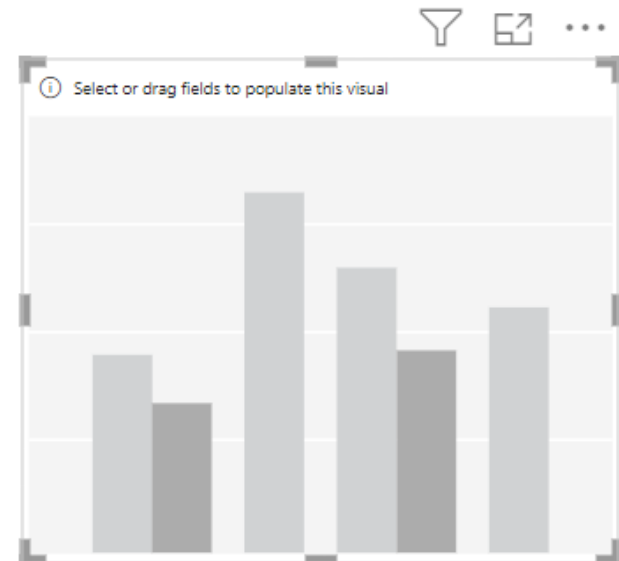
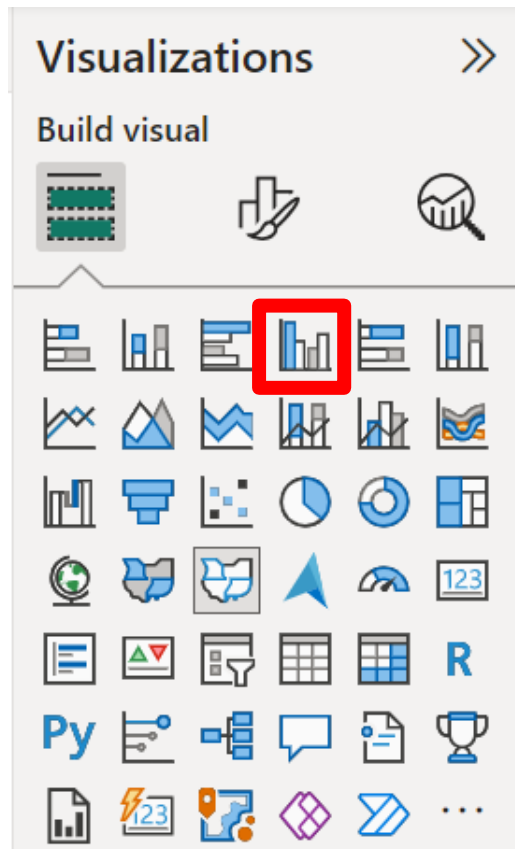
Unlike a Histogram, a **Column chart** is commonly used to compare the value of a variable at a given point in time.



## Power BI Desktop: Column Chart

To create column chart in Power BI as following:

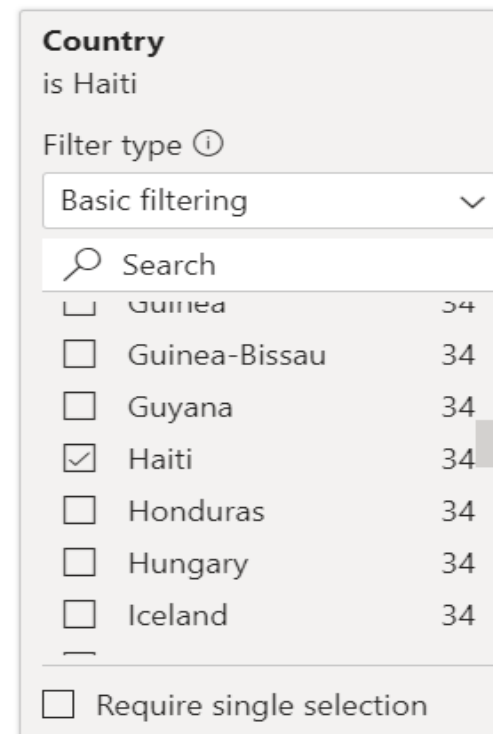
1. Select “Clustered Column Chart” from the Visualization pane
2. Create it on visual design canvas



## Power BI Desktop: Column Chart

To create column chart in Power BI as following:

3. Select all columns that represent years
4. From Transform tab, select “Unpivot Only Selected Columns”
5. Drag & drop “Attribute & Country” in X-axis, and “Value” in Y-axis
6. Filter “Country” for only Haiti





# Power BI Desktop: Column Chart

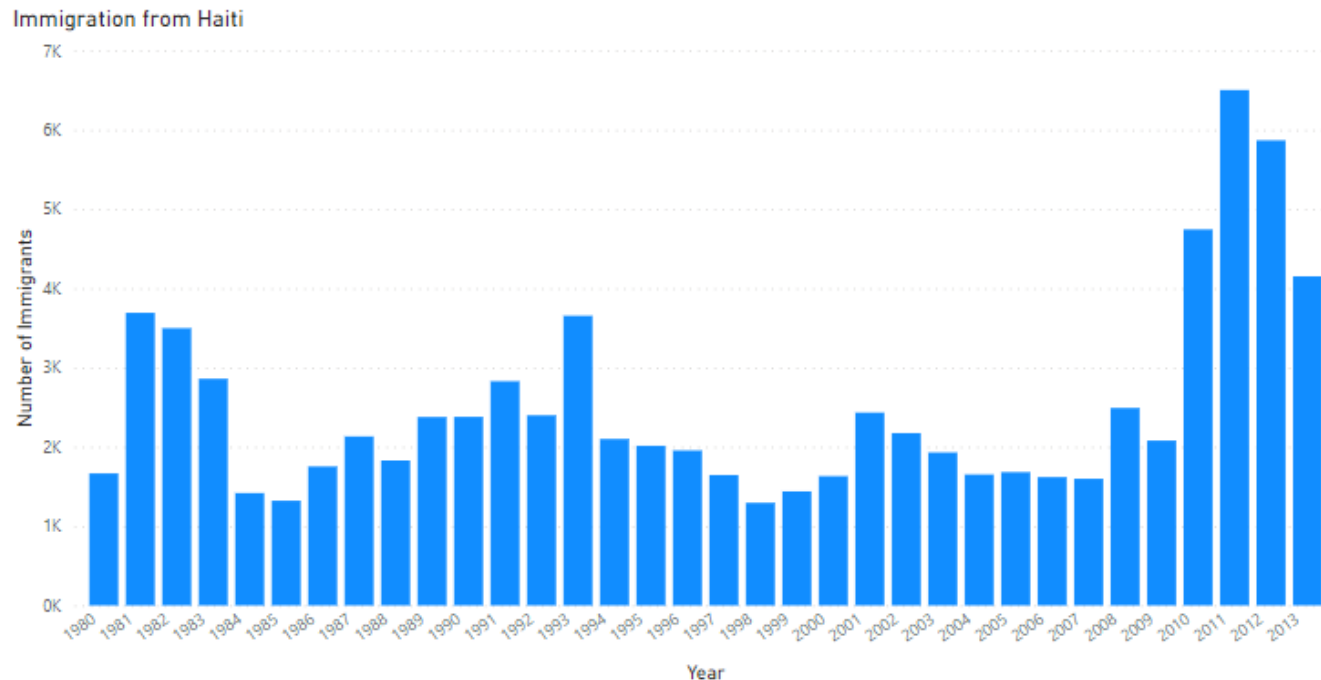
To create Column chart in Power BI as following:

## 6. To Change Chart Format

Format Visual → Visual → Column Chart Settings

6. X-axis → Title → write “Years” to change x-axis title

7. Y-axis → Title → write “Number of Immigrants” to change y-axis title



# What is Business Intelligence?

## Group Discussion:



## What is Pie Chart?

## Power BI Desktop: Data Visualization Tools

A **pie chart** (or a **circle chart**) is a circular statistical graphic, which is divided into slices to illustrate numerical proportion. Pie charts are very widely used in the business world and the mass media, e.g. showing the populations of English native speakers.

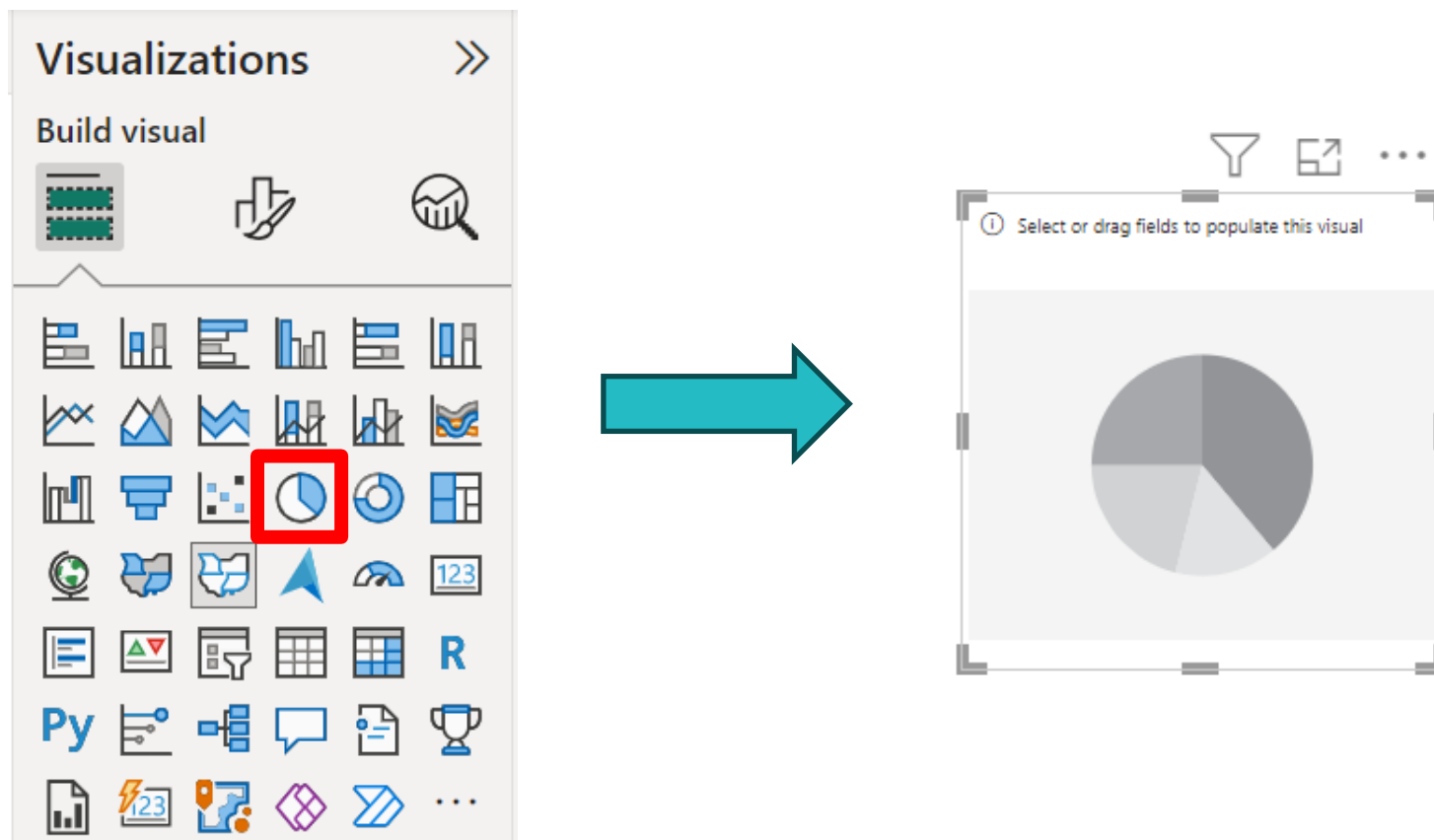
- Useful for displaying data that are classified into nominal or ordinal categories. Nominal data are categorized according to descriptive or qualitative information such as county of birth. Ordinal data are similar, but the different categories can also be ranked, for example in a survey people may be asked to say whether they classed something as very poor, poor, fair, good, very good.
- Show percentage or proportional data for each category.
- Great for displaying data for around 6 categories or fewer.



## Power BI Desktop: Pie Chart

To create Pie chart in Power BI as following:

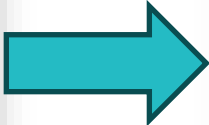
1. Select “Pie Chart” icon from the Visualization pane
2. Create it on visual design canvas



## Power BI Desktop: Pie Chart

To create Pie chart in Power BI as following:

3. In Dataset, all columns you want to calculate
4. From Transform tab, select “Statistics” → “Sum”
5. Sort table as Descending, from Home tab

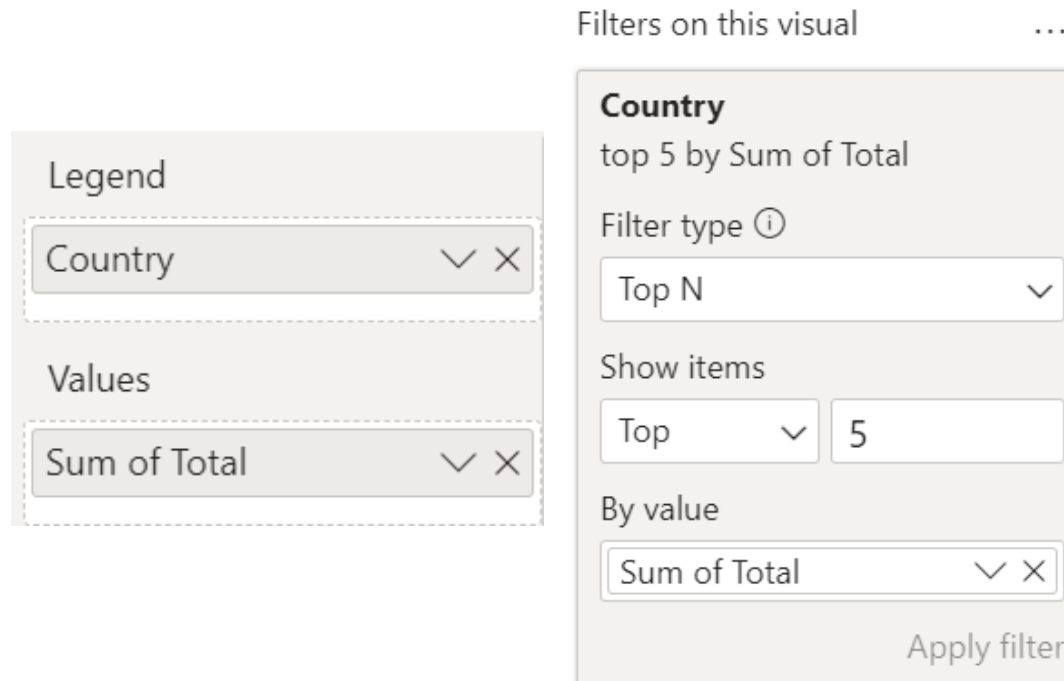


1 <sup>2</sup> <sub>3</sub> Total	
15699	691904
69439	659962
6	551500
15	515059
2113	511391
981	241600
19596	241122
3310	175923
23829	148358

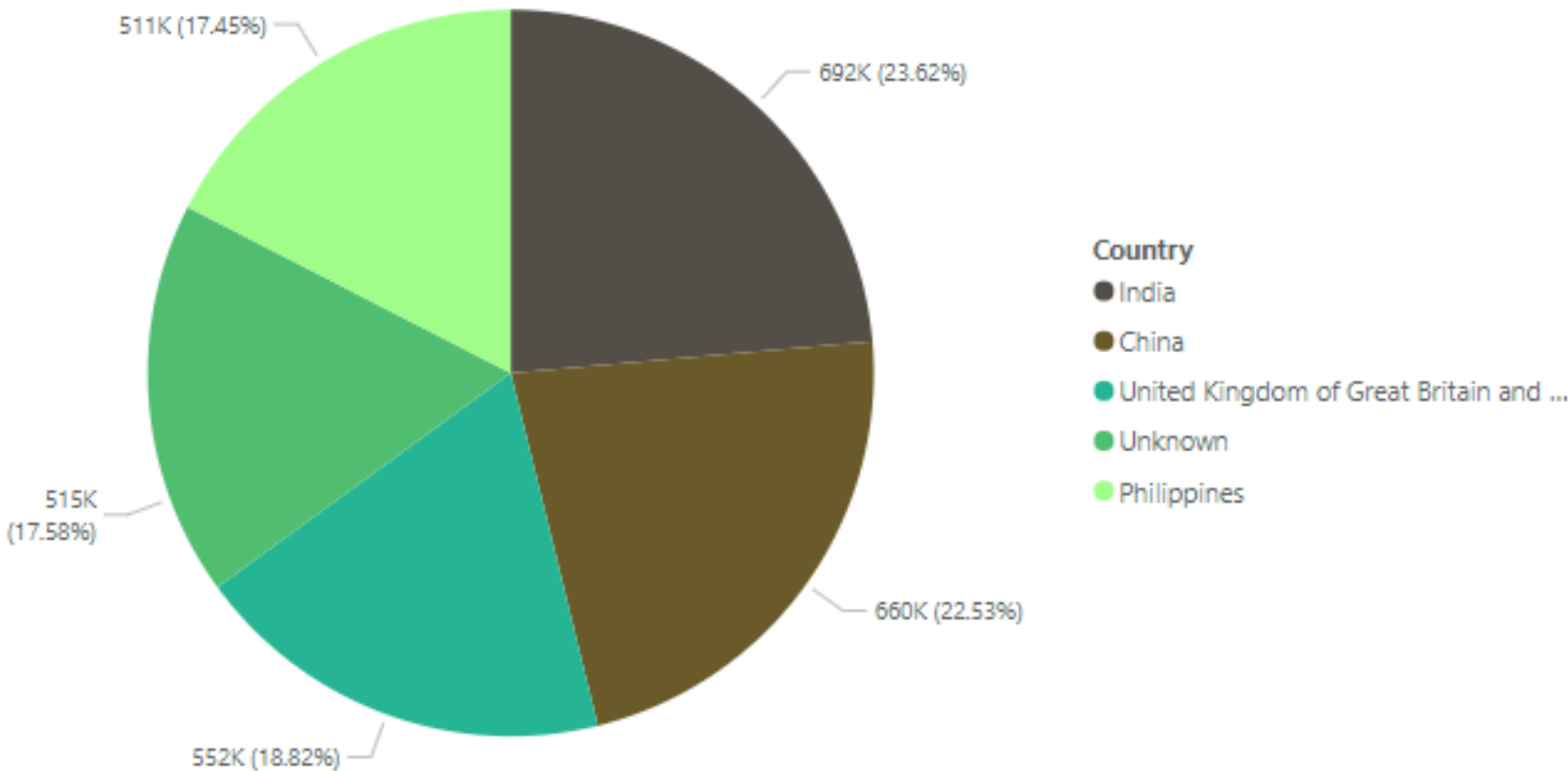
## Power BI Desktop: Pie Chart

To create Pie chart in Power BI as following:

6. Add “Country” column to Legend
7. Add “Total” column to Values
8. From Filter, select Filter Type as “Top N” → Top = 5
9. Select “By Value” → “Total” column



# Power BI Desktop: Pie Chart



# What is Business Intelligence?

## Group Discussion:



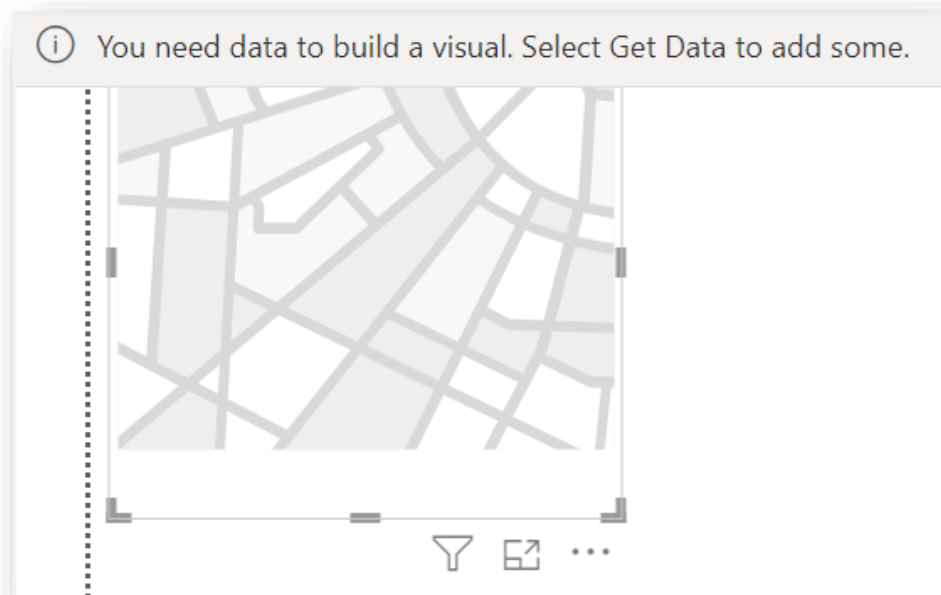
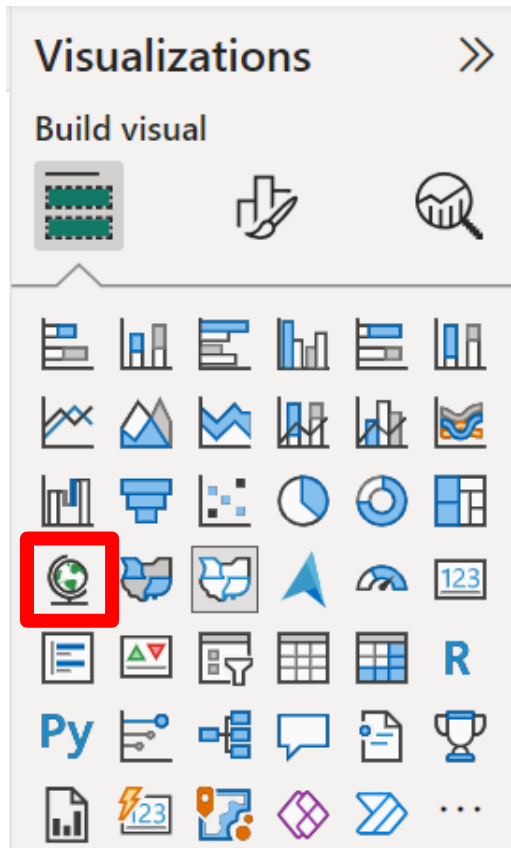
## What is Map Chart?



## Power BI Desktop: Creating Map

To create map in Power BI as following:

1. Select “Map” icon from the Visualization pane
2. Create it on visual design canvas



# Power BI Desktop: Creating Map

To create map in Power BI as following:

## 3. Import Map Data “CountriesData.xlsx”

The screenshot shows the Power BI Navigator window. On the left, under 'Display Options', the 'MapsDemo' data source is selected and highlighted with a red box. On the right, a preview of the data is shown in a table format. At the bottom right, the 'Load' button is highlighted with a red box, along with 'Transform Data' and 'Cancel' buttons.

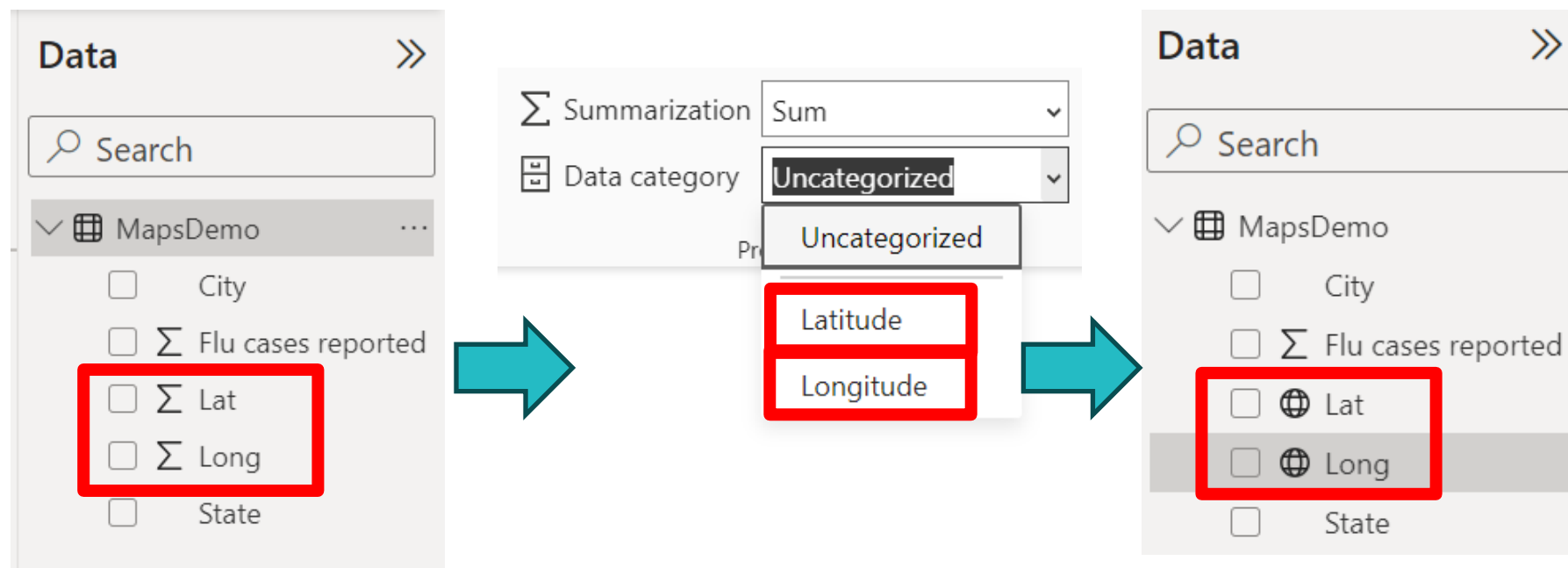
City	State	Lat	Long	Flu casi
Brethren	Michigan	44.2989	-86.0185	
White Pine	Michigan	46.7402	-89.5812	
Westphalia	Michigan	42.9303	-84.798	
Holt	Michigan	42.6416	-84.5307	
Frontier	Michigan	41.7817	-84.6047	
Bay Shore	Michigan	45.3609	-85.1117	
Cutlerville	Michigan	42.8406	-85.6739	
Zilwaukee	Michigan	43.4809	-83.9223	
Eckerman	Michigan	46.3653	-85.0354	
Old Bridge	New Jersey	40.3946	-74.3323	
Somers Point	New Jersey	39.3167	-74.6066	
Franklinville	New Jersey	39.6182	-75.0757	
Allamuchy	New Jersey	40.9222	-74.8116	
Laurel Springs	New Jersey	39.8213	-75.0053	
West Belmar	New Jersey	40.1707	-74.0376	
Pomona	New Jersey	39.4687	-74.5501	
Avon-by-the-Sea	New Jersey	40.1914	-74.0162	

## Power BI Desktop: Creating Map

To create map in Power BI as following:

4. See all fields
5. To recognize values correctly, we need to map them to respective Latitude & Longitude data categories:

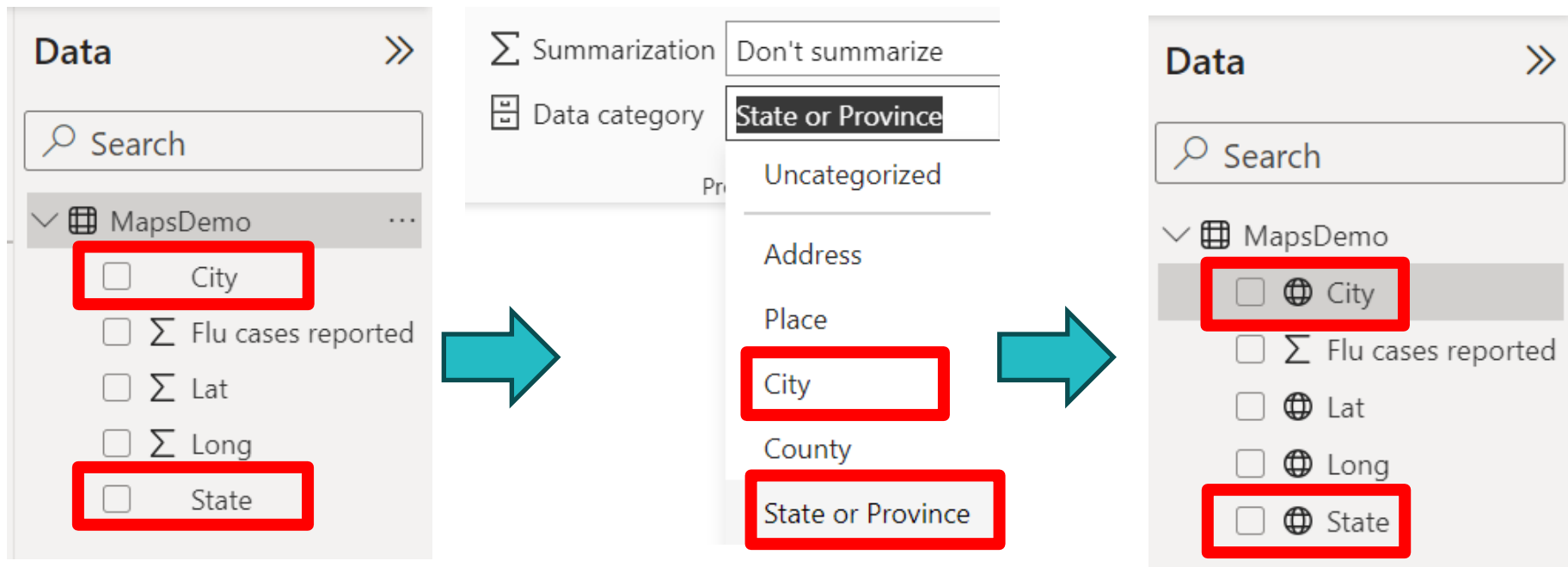
Column tools → Data category



## Power BI Desktop: Creating Map

To create map in Power BI as following:

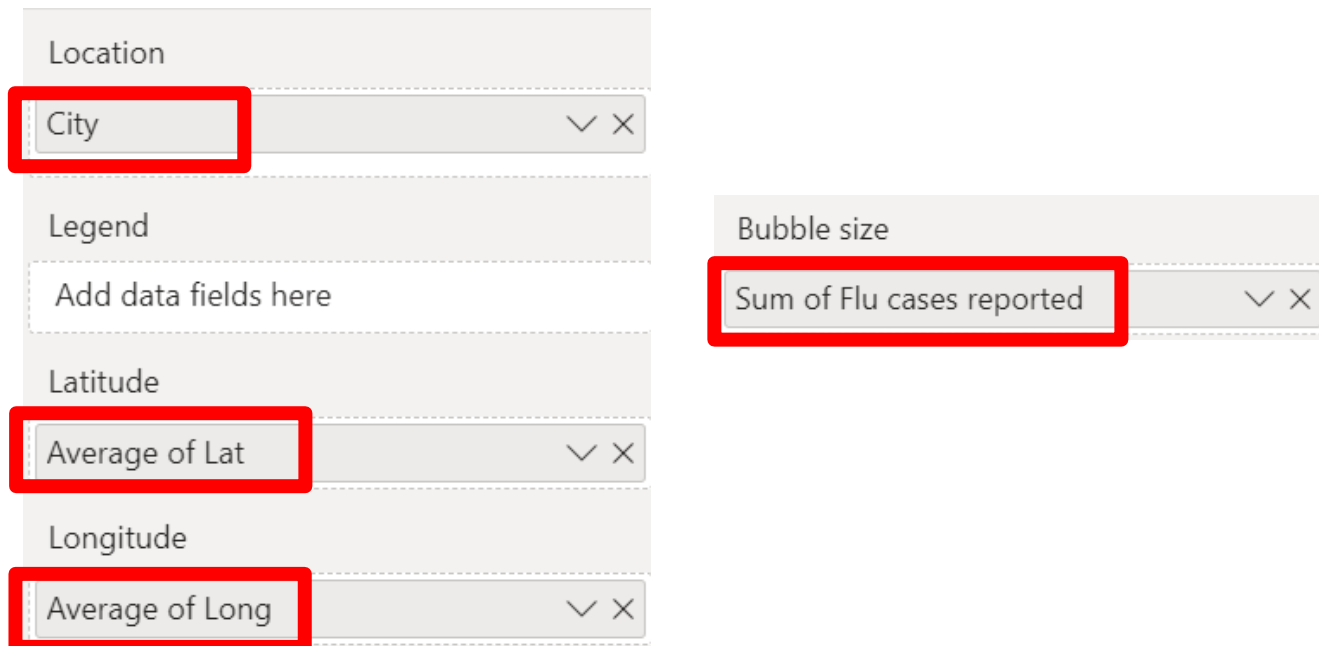
6. To recognize values correctly, we need to map them to respective City & State data categories:
  - Column tools → Data category



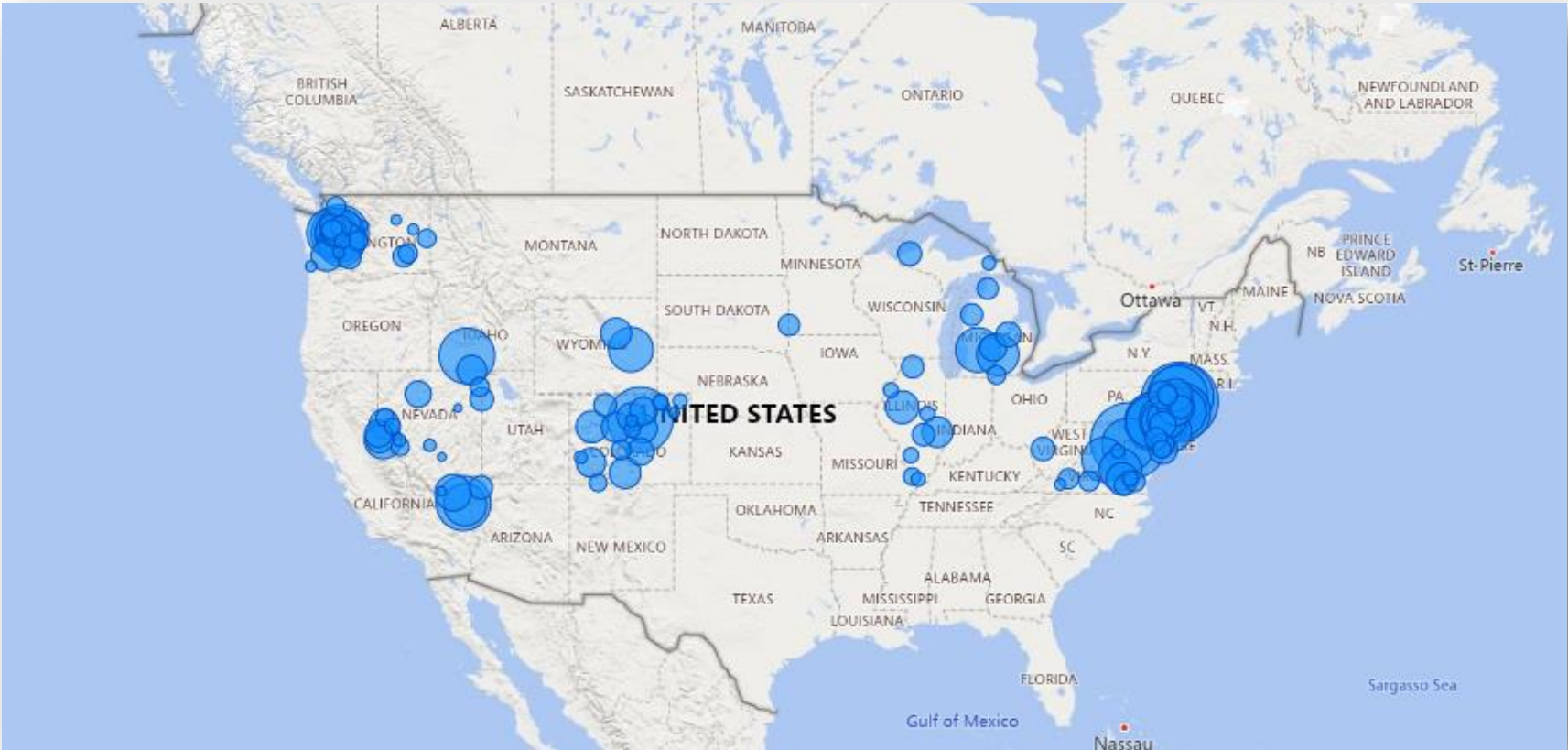
## Power BI Desktop: Creating Map

To create map in Power BI as following:

7. Drag & drop “City” field to Location in Visualization pane
8. Drag & drop “Lat” field to Latitude
9. Drag & drop “Long” field to Longitude
10. Drag & drop “Flu cases” field to Size



# Power BI Desktop: Creating Map



## Power BI Desktop: Filtering Map

To filter map in Power BI as following:

- 11. Show only more than 150 flu cases in total from Filters pane**

Sum of Flu cases repor...  
is (All)

Show items when the value

is greater than ▼

150

☒ And ☐ Or

▼

Apply filter



**Note:** You can filter City, State, or location

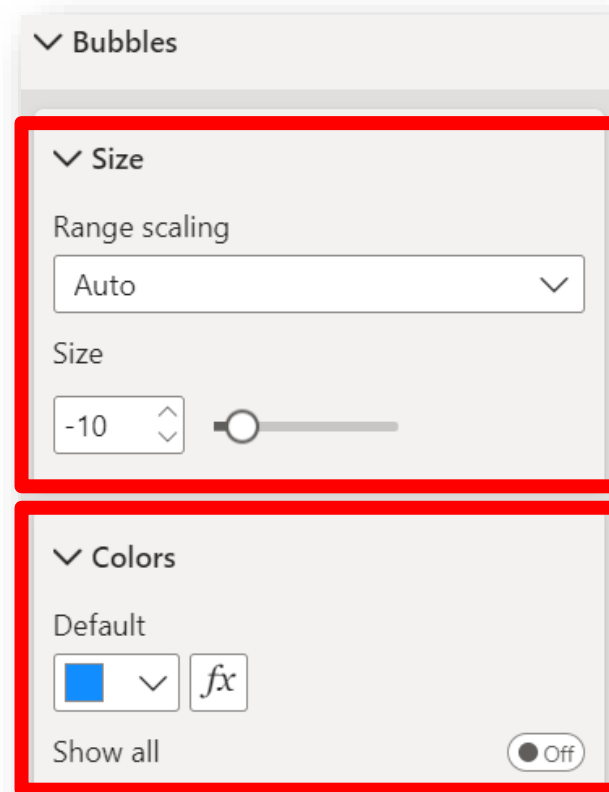
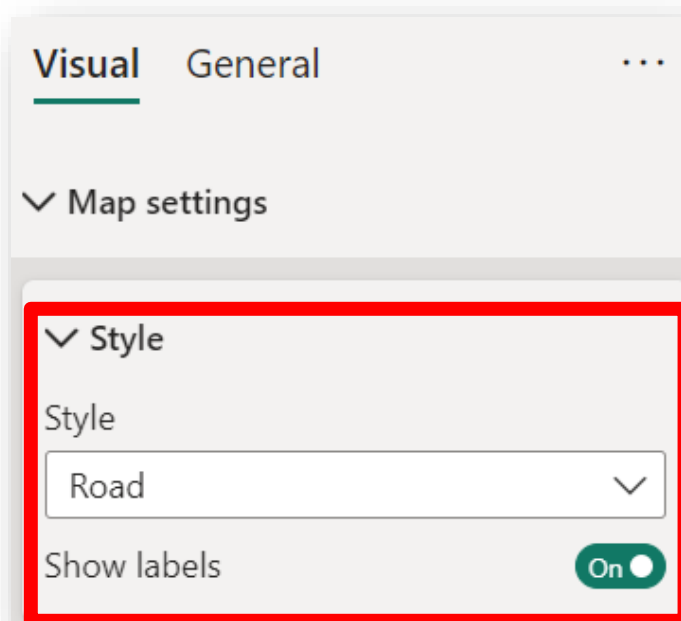
## Power BI Desktop: Formatting Map

To filter map in Power BI as following:

**12. Change map style**

**15. Change bubbles size & color**

**Format Visual → Visual → Map Settings**





# Power BI Desktop: Enabling Shape Map

To enable shape map in Power BI as following:

1. To enable Shape Map: File → Options & Settings
2. Select “Options” → Preview Features → Shape Map Visual

## Options

The screenshot shows the 'Options' dialog box in Power BI Desktop. On the left, a sidebar lists various settings categories: GLOBAL, Data Load, Power Query Editor, DirectQuery, R scripting, Python scripting, Security, Privacy, Regional Settings, Updates, Usage Data, Diagnostics, and Preview features. The 'Preview features' category is selected and highlighted with a black border. The main area, titled 'Preview features', lists several features that can be enabled or disabled. The 'Shape map visual' feature is checked (indicated by a green checkmark) and is highlighted with a red rectangular box. Other features listed include Spanish language support for Q&A, Q&A for live connected Analysis Services databases, Connect to external datasets shared with me, Modern visual tooltips, Sparklines, Metrics visual, Quick measure suggestions, Field parameters, Enhanced row-level security editor, On-object interaction, and Power BI Home in Desktop. Each feature has a checkbox and a 'Learn more' link.

**GLOBAL**

- Data Load
- Power Query Editor
- DirectQuery
- R scripting
- Python scripting
- Security
- Privacy
- Regional Settings
- Updates
- Usage Data
- Diagnostics
- Preview features**

**Preview features**

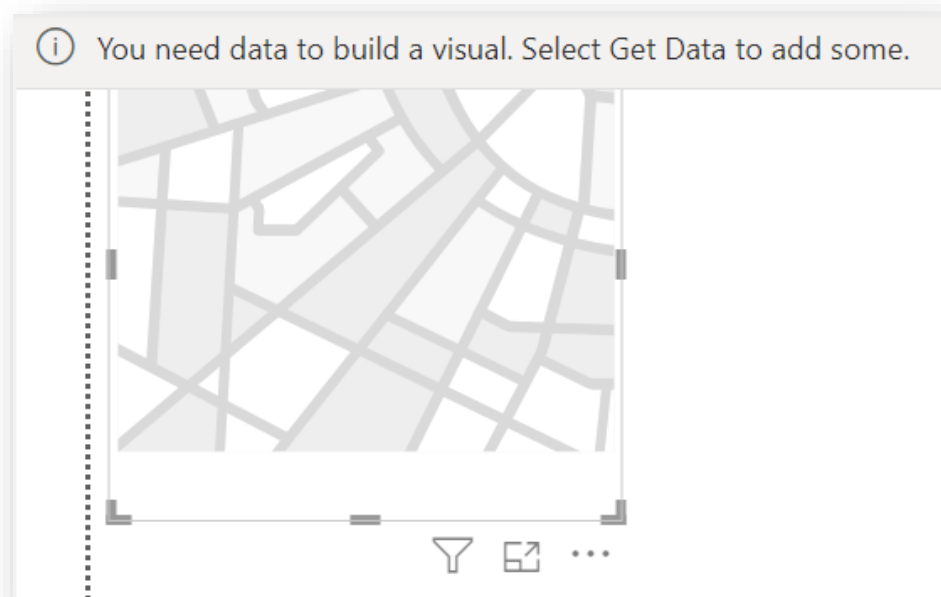
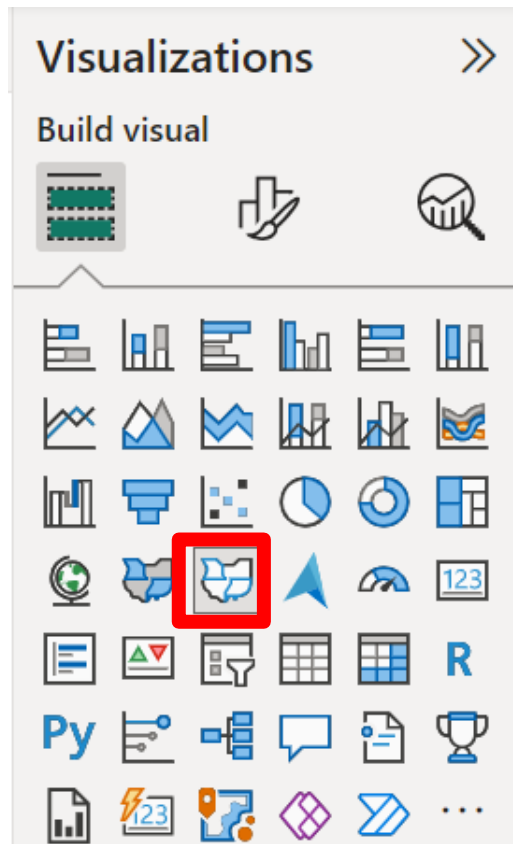
The following features are available for you to try in this release. Preview features

- ☒ Shape map visual [Learn more](#)
- ☐ Spanish language support for Q&A [Learn more](#)
- ☐ Q&A for live connected Analysis Services databases [Learn more](#)
- ☐ Connect to external datasets shared with me [Learn more](#) | [Share feedback](#)
- ☐ Modern visual tooltips [Learn more](#) | [Share feedback](#)
- ☒ Sparklines [Learn more](#)
- ☒ Metrics visual [Learn more](#)
- ☒ Quick measure suggestions [Learn more](#) | [Share feedback](#)
- ☒ Field parameters [Learn more](#)
- ☐ Enhanced row-level security editor [Learn more](#)
- ☐ On-object interaction [Learn more](#) | [Share feedback](#)
- ☐ Power BI Home in Desktop [Learn more](#) | [Share feedback](#)

# Power BI Desktop: Creating Shape Map

To create shape map in Power BI as following:

1. Select “Shape Map” icon from the Visualizations pane
2. Create it on visual design canvas



# Power BI Desktop: Creating Shape Map

To create shape map in Power BI as following:

## 3. Import Map Data “CountriesData.xlsx”

**Navigator**

Display Options ▾

- CountriesData.xlsx [2]
- MapsDemo
- ShapeMapDemo**

**ShapeMapDemo**

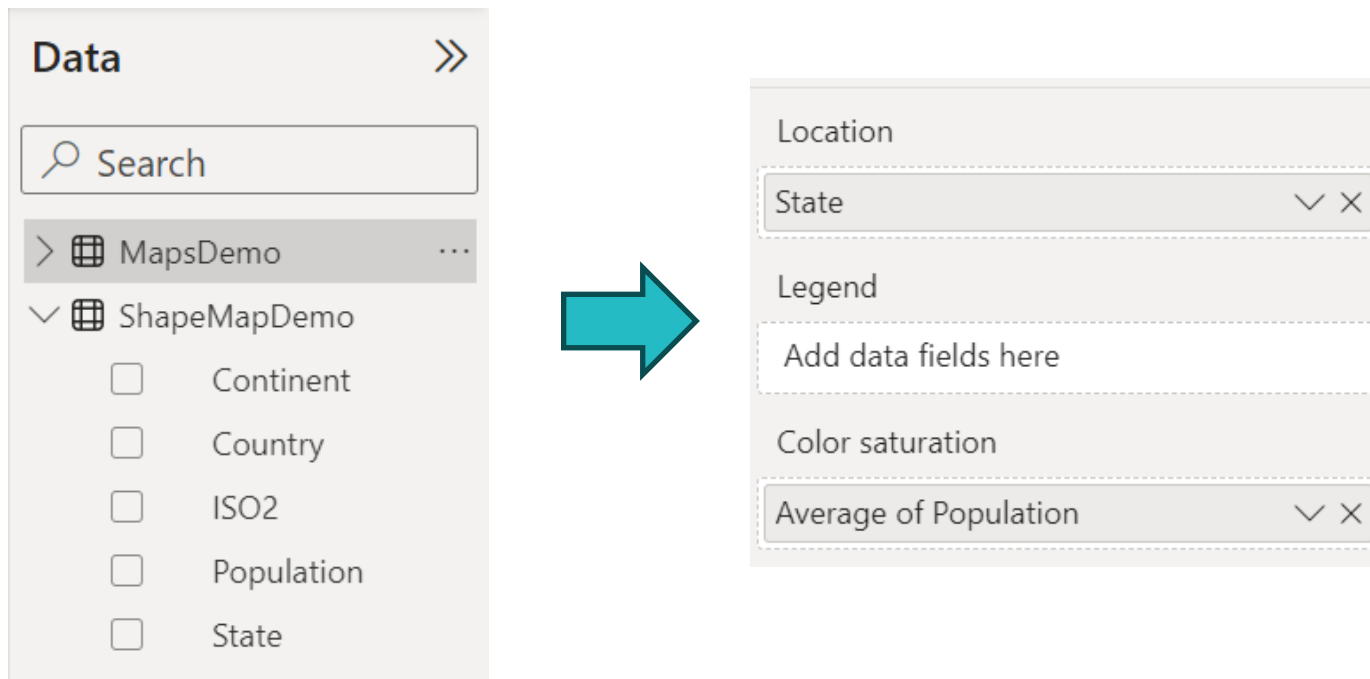
State	Country	Continent	Population	ISC
California	United States	North America	3678000	
Florida	United States	North America	2313328	
Texas	United States	North America	1145000	
Washington	United States	North America	1110000	
New York	United States	North America	1058000	
Georgia	United States	North America	721053	
New Jersey	United States	North America	632063	
Michigan	United States	North America	624177	
Colorado	United States	North America	450963	
Virginia	United States	North America	417001	
Arizona	United States	North America	359111	
Berlin	Germany	Europe	346765	
Hamburg	Germany	Europe	319246	
Saxony	Germany	Europe	289625	
Hesse	Germany	Europe	198958	

**Load** Transform Data Cancel

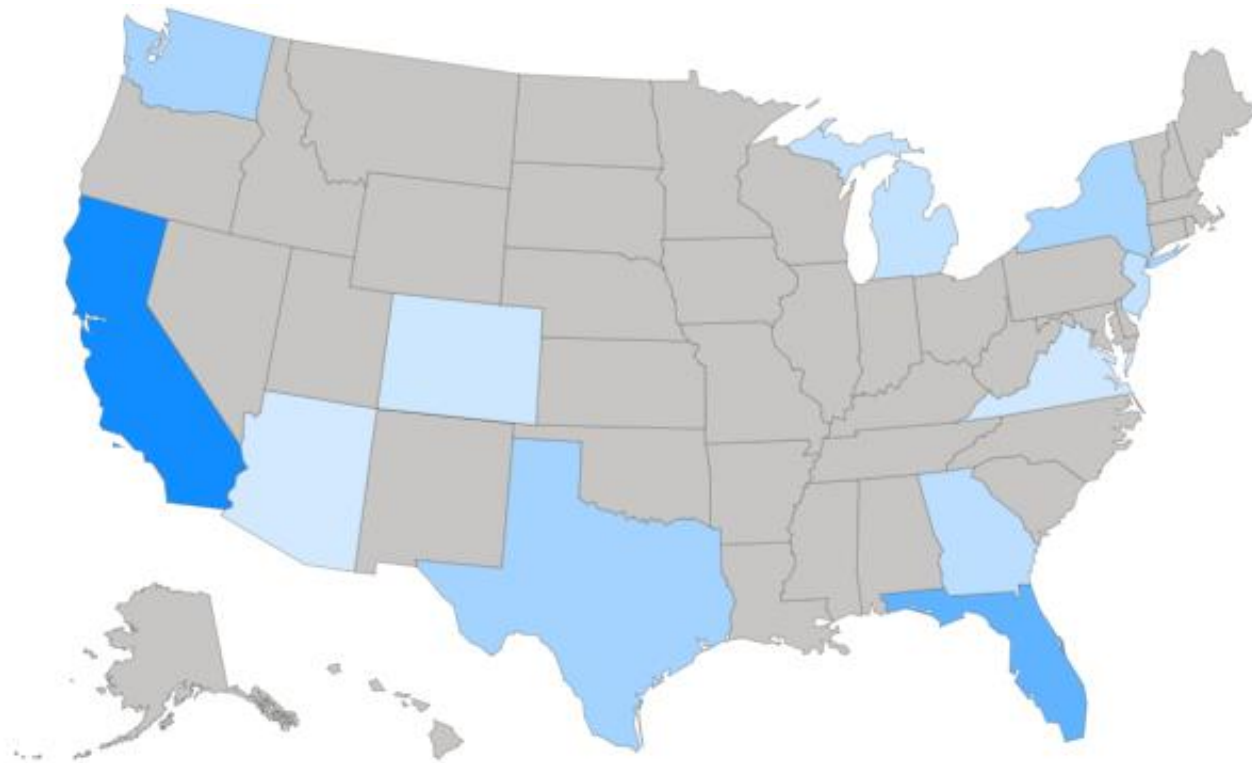
## Power BI Desktop: Creating Shape Map

To create shape map in Power BI as following:

4. Drag & drop “State” to location
5. Drag & drop “Population” to Color Saturation



# Power BI Desktop: Creating Shape Map



# What is Business Intelligence?

## Group Discussion:

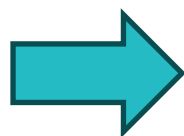
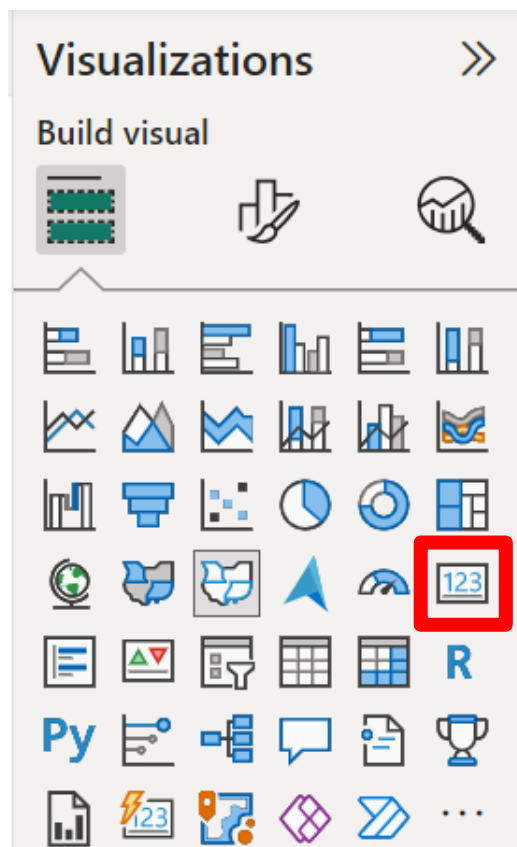


## What is Card Chart?

# Power BI Desktop: Creating Card

To create card in Power BI as following:

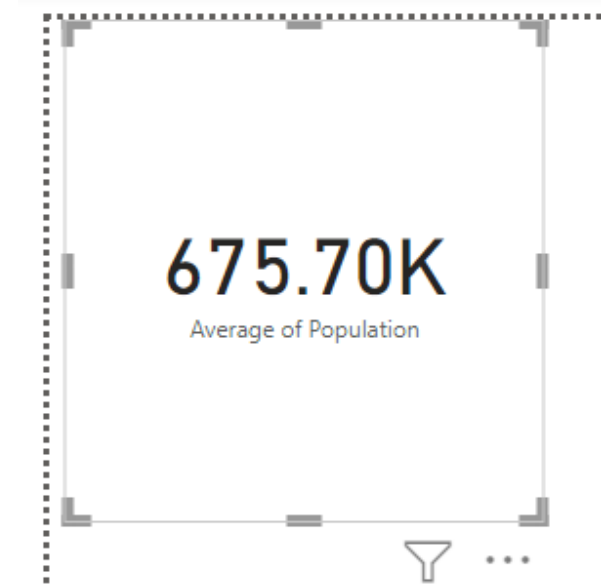
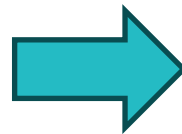
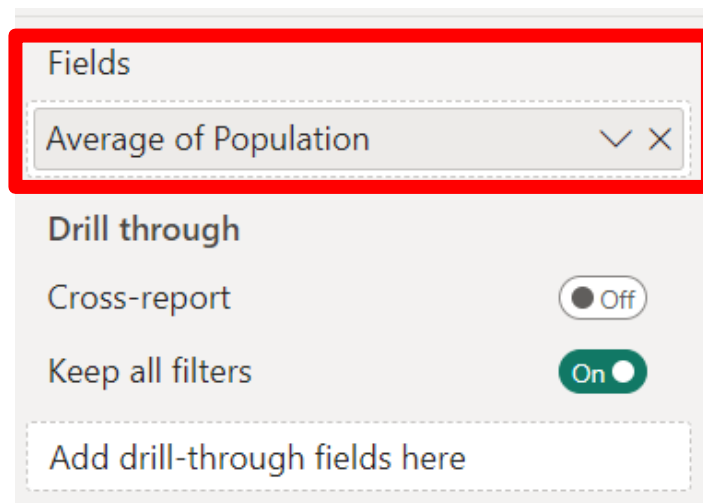
1. Select “card” icon from the Visualization pane
2. Create it on visual design canvas



## Power BI Desktop: Creating Card

To create card in Power BI as following:

1. To create an average of population (previous example)
2. Drag & drop “Population” to Fields in visualization pane





# What is Business Intelligence?

## Group Discussion:

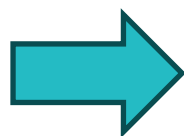
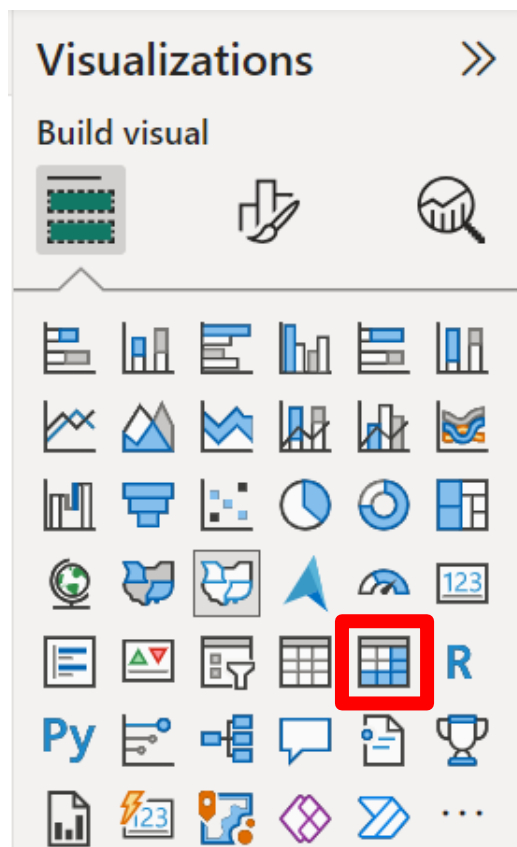


## What is Matrix Chart?

# Power BI Desktop: Creating Matrix

To create matrix in Power BI as following:

1. Select “card” icon from the Visualizations pane
2. Create it on visual design canvas



## Power BI Desktop: Creating Matrix

To create matrix in Power BI as following:

**In Matrix, we should determine (previous example):**

- **Column (Continent)**
- **Row (Country)**
- **Value (Sum of Population)**



Rows

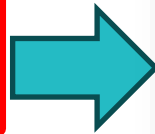
Continent

Columns

Country

Values

Sum of Population



Continent	Australia	Germany	United States	Total
Australia	1210096			1210096
Europe		1822358		1822358
North America			12508696	12508696
Total	1210096	1822358	12508696	15541150