DATA VISUALIZATION LAB

Task – 1

Aim : Introduction to the Data Visualization

1) What is Data Visualization ?

A) It is a Graphical Representation of the Information and Data in
In the form of Visual like charts, Graphs, maps .. etc; To make data
Easier to the Human Brain to understand and pull the insights
from the visuals.

2) Difference between RDBMS, Data Warehouse, Big Data ?

A) RDMS : It stores the Data in Releationsi.e; Tables and they are
in 2 – Dimensional Data and we can easily manipulate
and calculate the data.
Data Warehouse : it is a multi dimensional Database and it
Applies the analysis, analytics on huge amount of data
At a time from all sources i.e; database, nosql;
Big Data : The name it self says that it handles and bundles of the
Trillions of data analyzes with volume, velocity, variety
Of characteristics and many more.

3) Examples for RDMS, Data Warehousing, Big data ?

A) RDMS : sql, mysql, MongoDB, microsoftsql, oracle DB.

Data Warehousing :a data warehouse might combine customer information from an organization's point-of-sale systems, its mailing lists, website, and comment cards
Big Data :   Hadoop, banking and financial services.

4) **Examples For Data Visualization ?**

A)Examples are tableau, Power Bi, MS Bi, charts, graphs, maps, Histograms, scatter plots, box plots, violin plots..

5) **Difference Between Reporting Service Tools And Data Visualization Tools ?**

A)Reporting Service Tools : it's kind of making an story telling
From data in visuals like charts, graphs, tables all together
Data Visualization Tools : after cleaning and querying the data the final step is to represent in the visuals using data visualize tools i.e; charts, visualizations panel;

6) **Difference between Different Types of Charts ?**

A)There are 2 mainly charts are used they are :
Bar charts : represents the data is rectangles , squares and in Bars.
Pie charts : represents the data in circles with high % and low % And some others by highlighting the required Parameters.

7) What is a Dashboard ?

A) A dashboard is a collection of visuals and reports all together
At a time is called dashboard

**8) What are Different Sources For any Data Visualization Tools ?**

A) Tableau, Microsoft Power Bi, excel, Qlick View, Data Wrapper,
Github, Amazon Web Services,

Task – 2

**Aim :** Install the microsoft power bi software

Procedure :

1) Go to the website https://powerbi.microsoft.com/en-us/downloads/

2) Navigate to the products panel and click on the Power Bi Desktop Option.

3) Now click on the " see download and language options " the scroll down to the webp page and select the required language and click on the download option.

4) Next select the option Powerbidesktop setup.exe file and click on the " Next option "

5) After download the file then run the file.
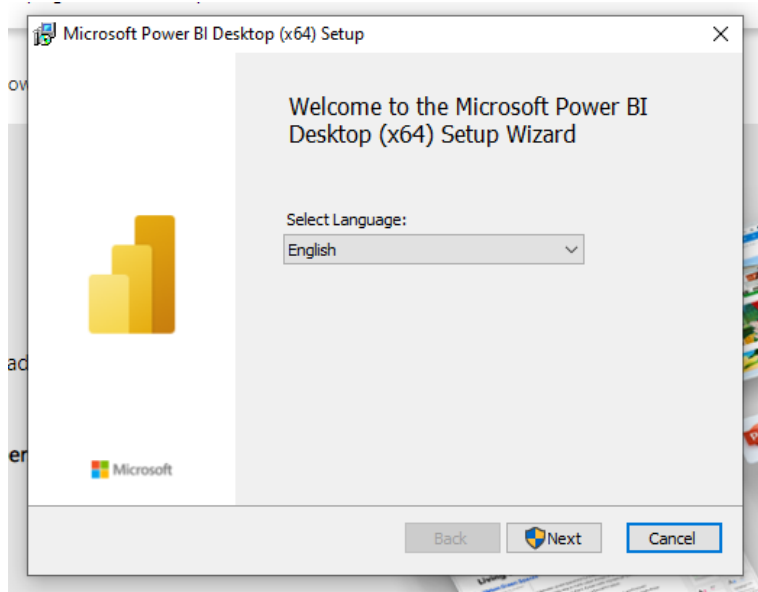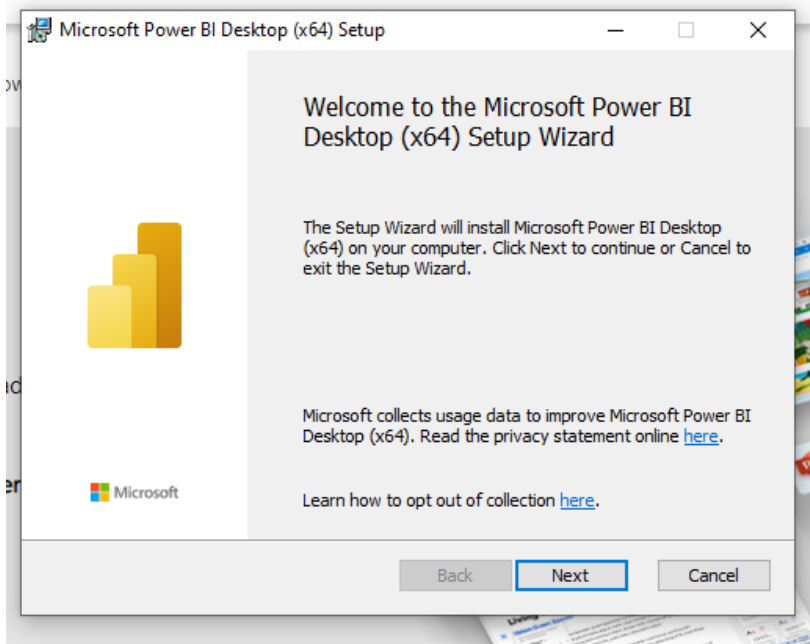
6) Selec t the destination drive and folder to download the software
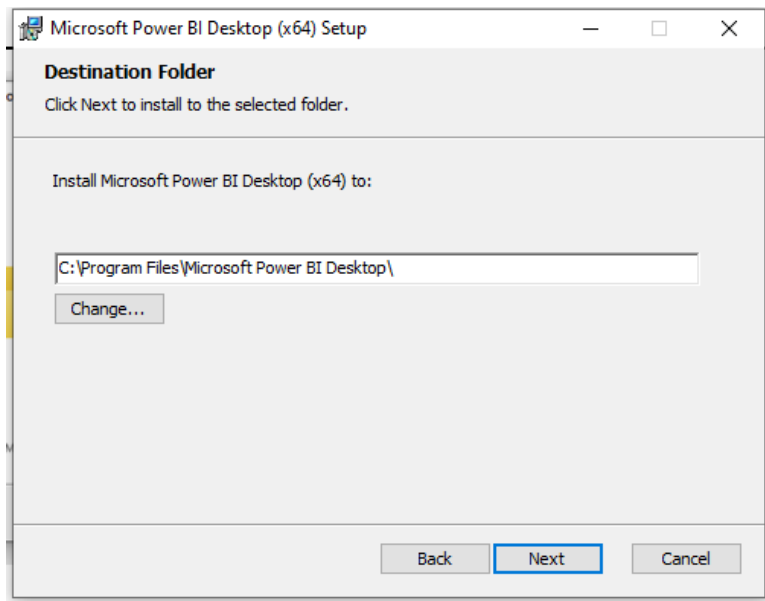
7) After then you can see the downloading the files
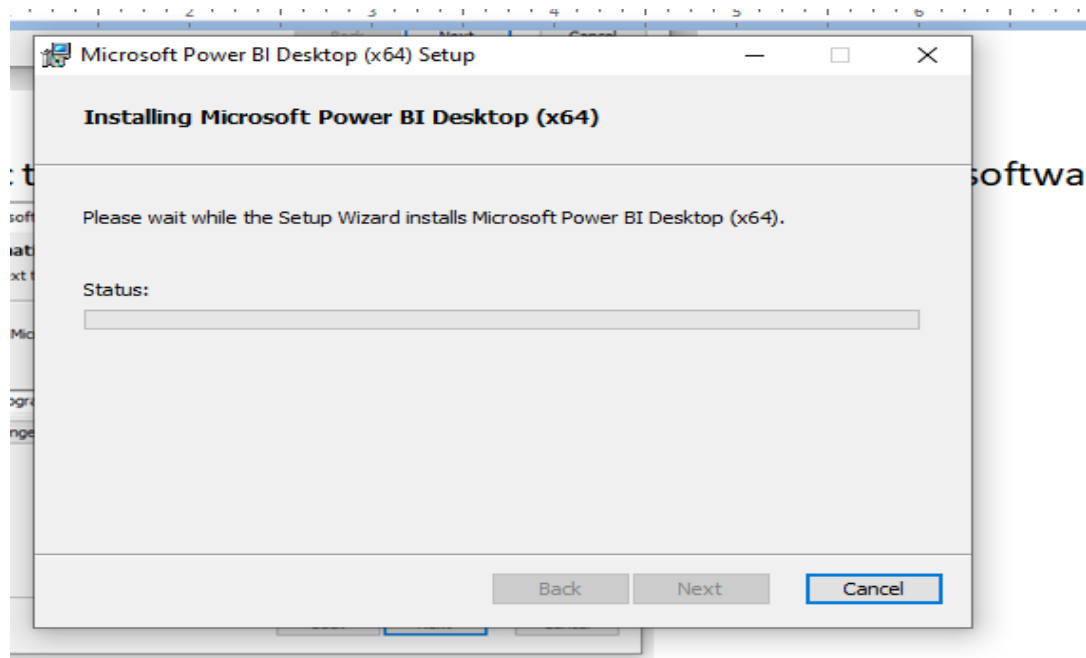
8) After downloading the files you will see the final option
That option represents the successfully downloaded.
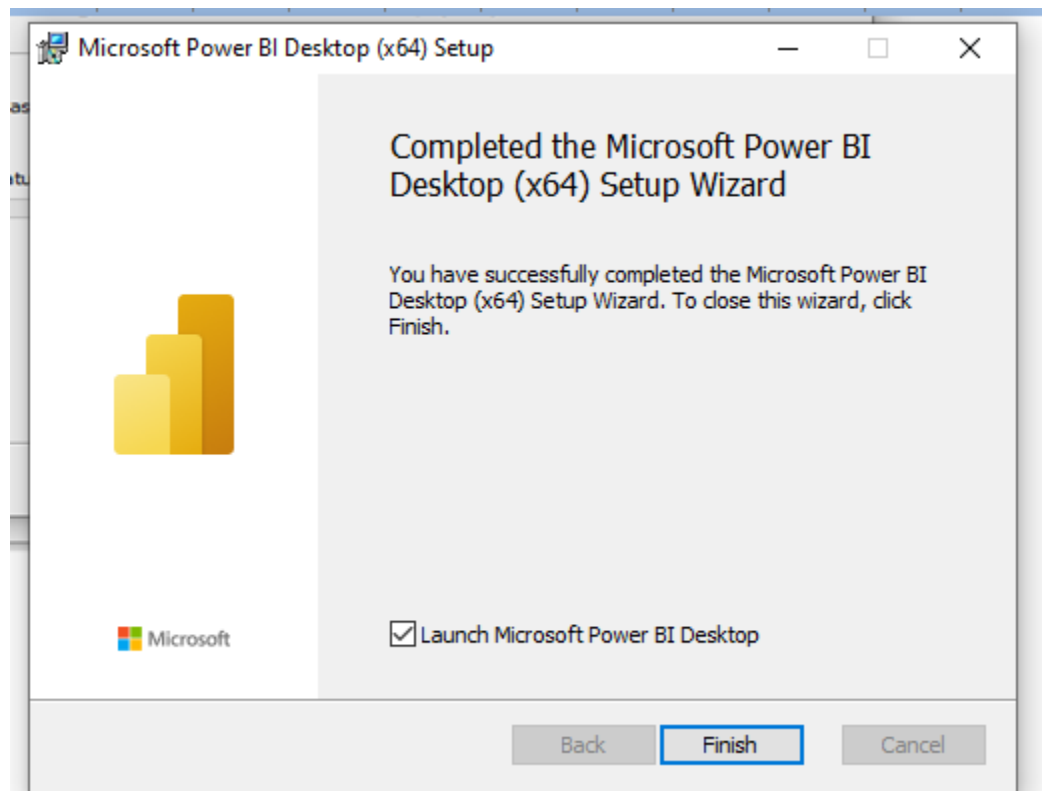
9) The final view of the power bi software is below one.
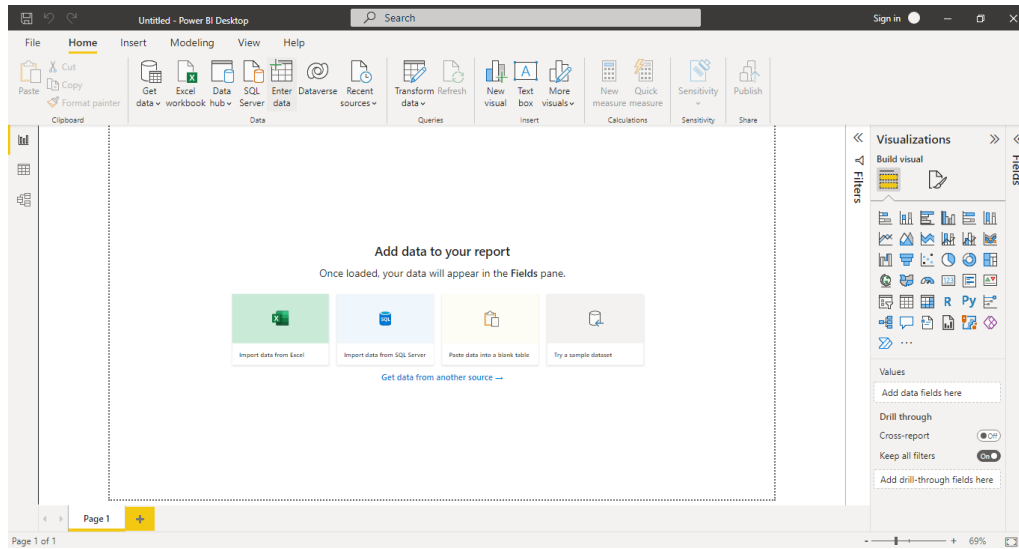
Task – 3

Aim : Features of the Power Bi

Procedure :

There are many features exists in the Microsoft power bi but some of the most recently used features are listed below ones's

1) Data Connection :

Microsoft has developed data source connections with a huge list of sources like SQL, Azure, Excel, Text, CSV, PDF, Cloud, on-premises data. It doesn't matter where the data is and what format it is; we will get a detailed view of the data.
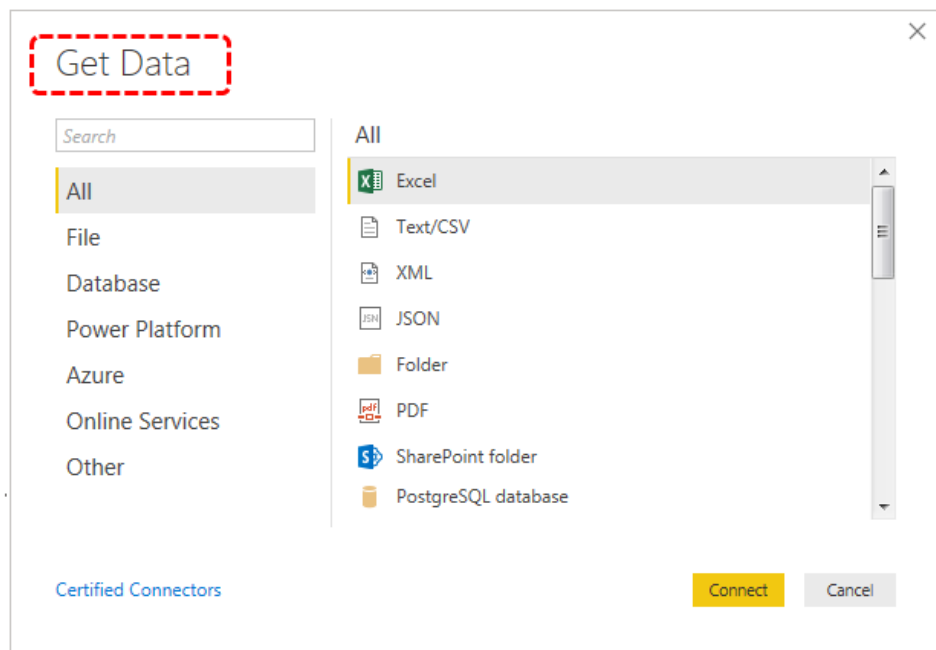
2) Data Relationships :

In Power, if you have data in multiple columns, then we can define the relationship between those tables based on at

least one matching column from either table. Below is the screenshot of creating relationships between tables.

We call this process as "Data Modelling" in Power BI.
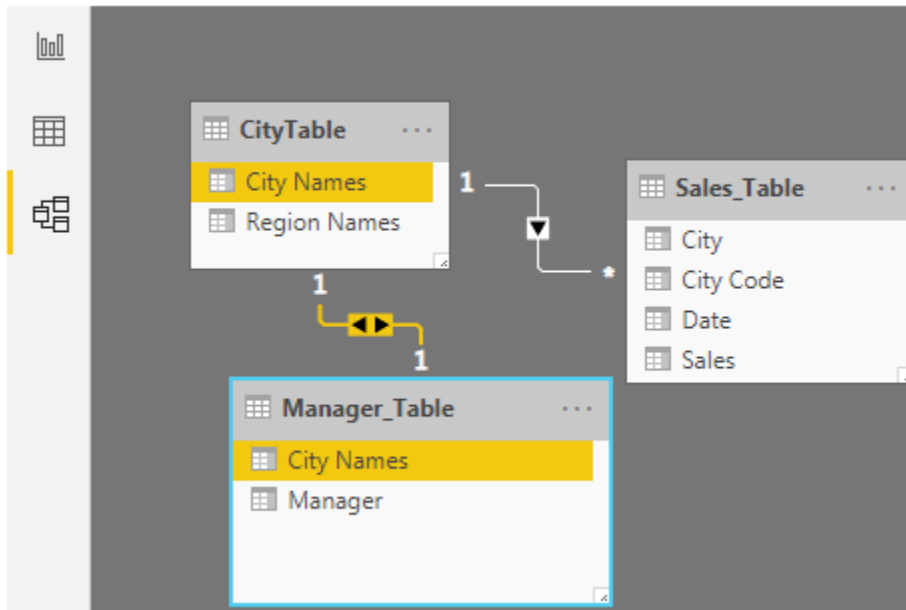
3) Power Query and Query Piviot Access :

It is also known as query processing for the data in the power Bi tool and it plays an major role in modelling the data In Power BI, we can edit the data by using "Power Query in Excel " and "Power Pivot." These are all different components of Power BI, which helps the user to alter the data in such a way it fits their needs. Power BI Queryis used to data transformation and manipulation tools, and Power Pivot is a memory tool to model the data.

4) Custom Visualizations :

Power BI comes with a lot of built-in visuals to build dashboards and reports. Apart from these built-in visuals, users are allowed to download the custom visuals from market places as per their requirement.
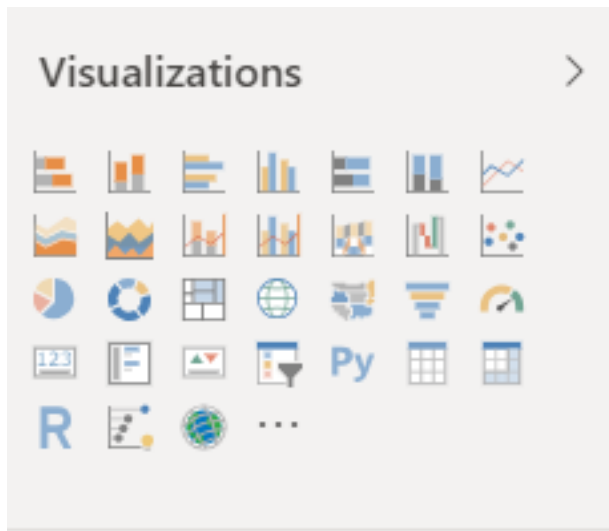
Result : Sucessfully Completed the all Tasks.

Task – 4

Aim : Import a flat file i.e; excel or any csv files and visualize them.

Procedure :

1) Open power bi and click on the Get data button and choose the import data from the excel.
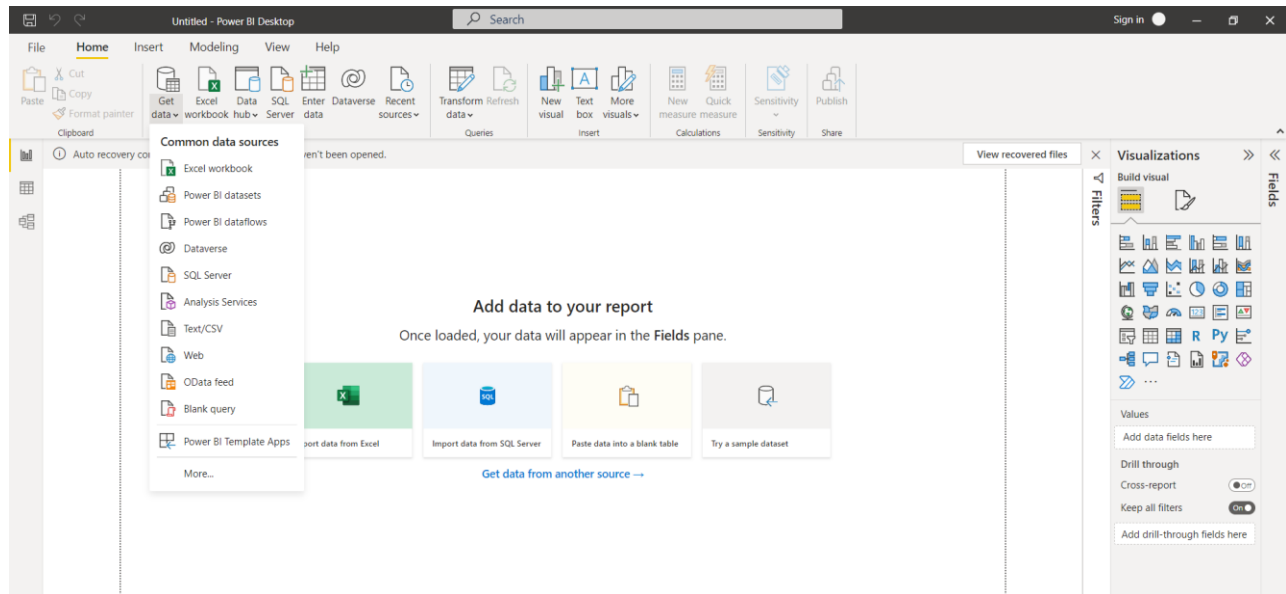
2) And then load the data into an power bi.
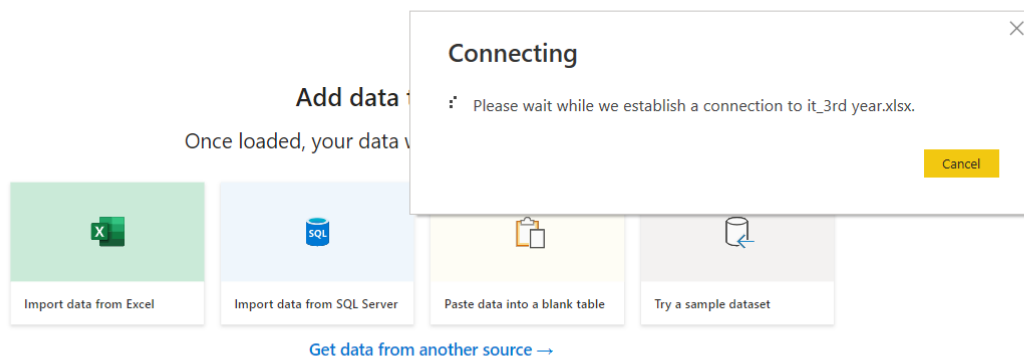
Select the any one the tables in the excel file in which you have loaded .
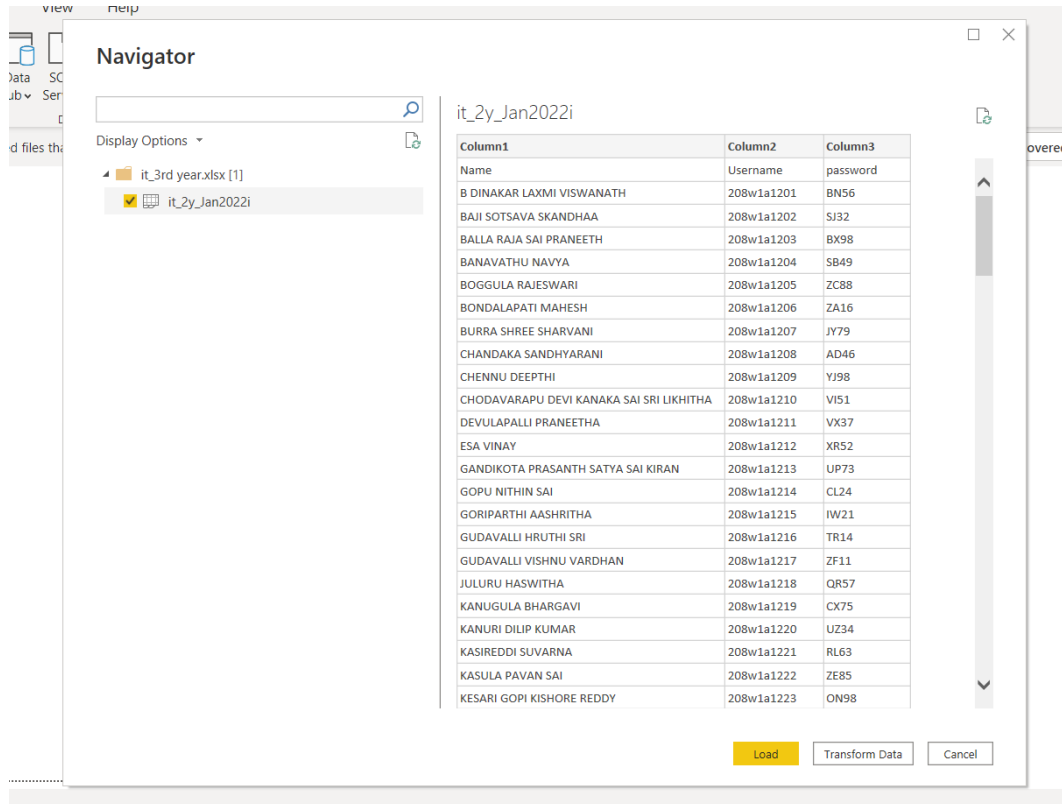
Now click the Transform data then do some heading changes in the data then apply any other modifications if you like according to your transforming the data .

Then you can see any the percentage of the errors and correction in eah and every column of the graph.

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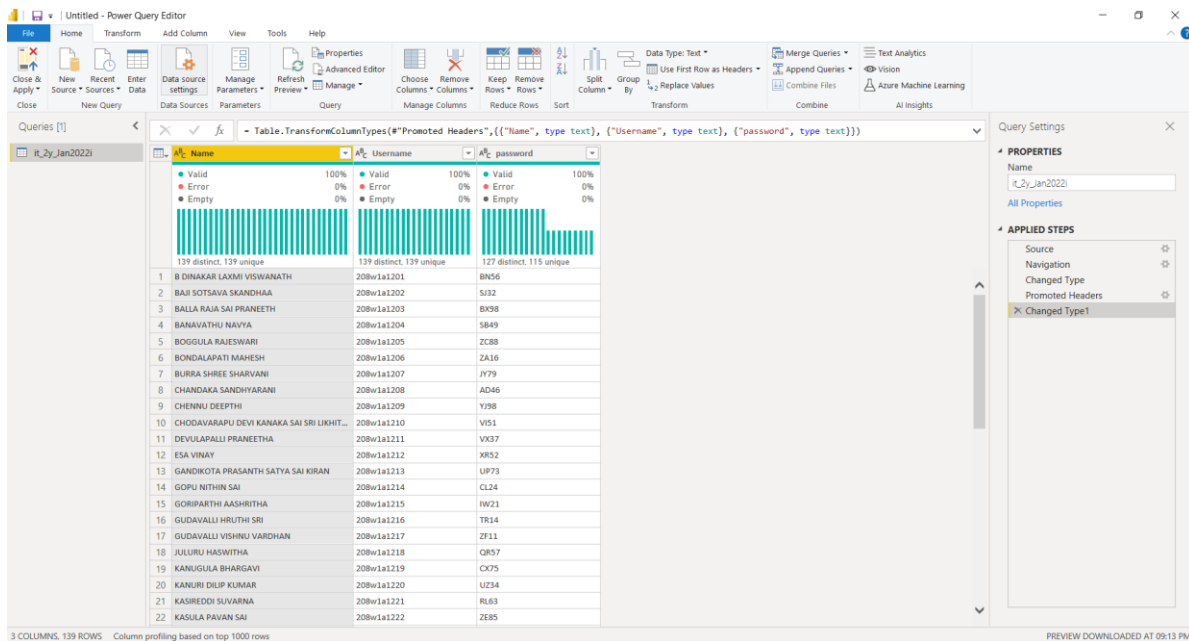
3) Now then visualize the data with different types of visuals like charts, graphs, plots.. … etc;

Output :
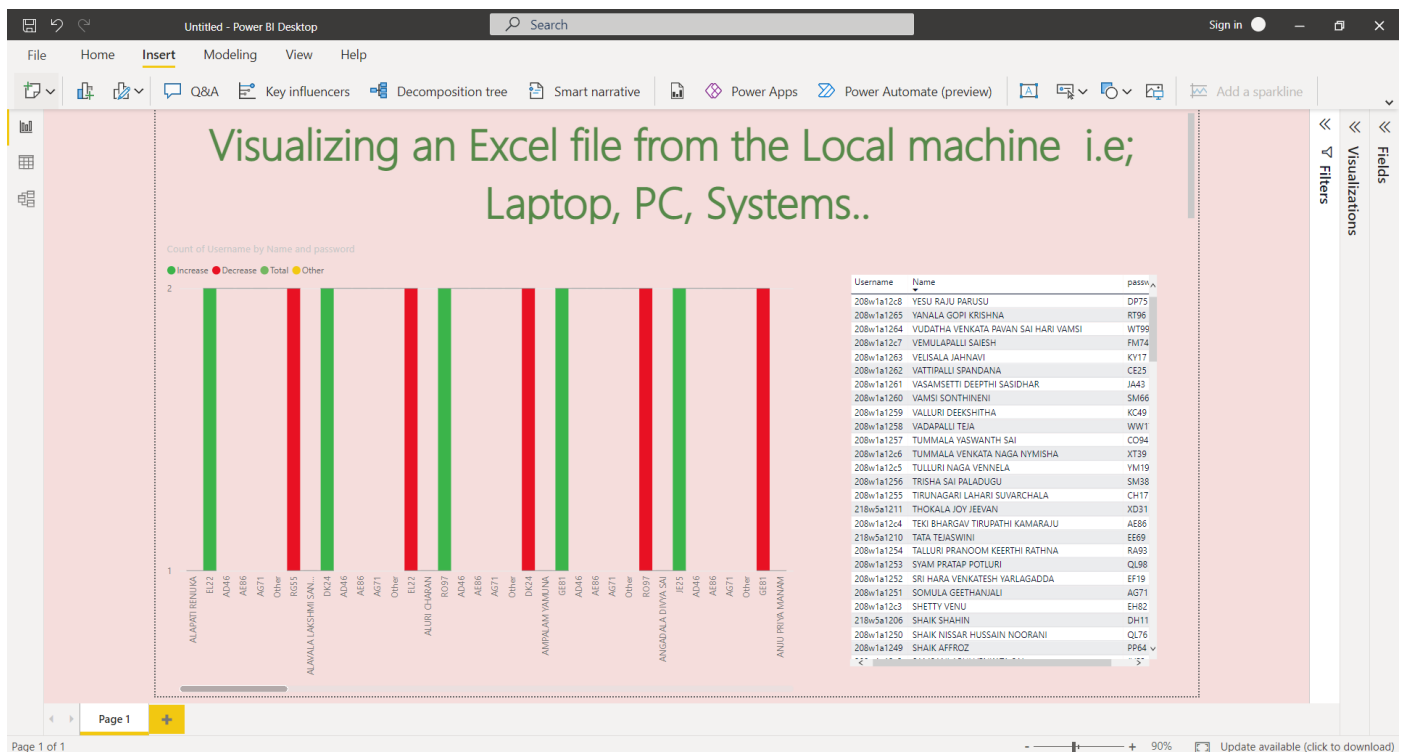
Result : Sucessfully completed the Aim.

Task – 5

Aim : Get any data From the internet web and visualize in the power bi

Procedure :

1. Click on the get data button and then click on the web and paste The url which is copied and click on to load the data
2. Then clean the data and do some changes by using the power BI Query editor
3. The next step is Once you complete all the changes then click on save and load option
4. Finally, by using colums generate the different types of visuals in the report or in dashboard
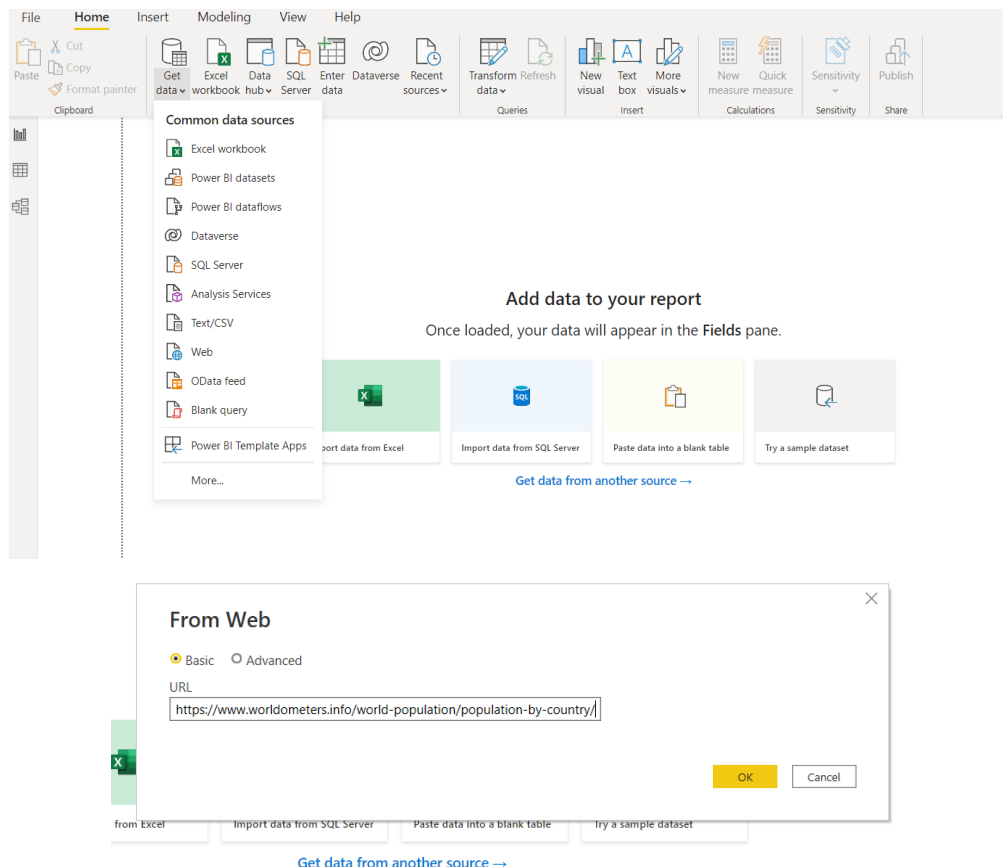
5. Choose the any one of the table and click on the transform button then you can see the query editor

Navigator

| | Table View   Web View |

Table 2

Column1	Column2	Column3	Column4	Column5	Column6
1	Honduras	9904607	1.63%	158490	
3	Djibouti	988000	1.48%	14440	
5	Seychelles	98347	0.62%	608	
7	Vietnam	97338579	0.91%	876473	
9	Tajikistan	9537645	2.32%	216627	
11	Austria	9006398	0.57%	51296	
13	DR Congo	89561403	3.19%	2770836	
15	Papua New Guinea	8947024	1.95%	170915	
17	Comoros	869601	2.20%	18715	
19	Switzerland	8654622	0.74%	63257	
21	Turkey	84339067	1.09%	909452	
23	Germany	83783942	0.32%	266897	
25	Holy See	801	0.25%	2	
27	Guyana	786552	0.48%	3786	
29	Bhutan	771608	1.12%	8516	
31	Laos	7275560	1.48%	106105	
33	Paraguay	7132538	1.25%	87902	
35	Bulgaria	6948445	-0.74%	-51674	
37	Solomon Islands	686884	2.55%	17061	
39	United Kingdom	67886011	0.53%	355839	

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

Navigator tree:
- ▲ 📁 HTML Tables [1]
  - ☐ ▦ Table 1
- ▲ 📁 Suggested Tables [1]
  - ☐ ▦ Table 2
- ▲ 📁 Text [2]
  - ☐ 📄 HTML Code
  - ☐ 📄 Displayed Text

Display Options ▾

[Add Table Using Examples]   [Load] [Transform Data] [Cancel]

| 23180 | 900 | 2.8 | 27 | 79 % | |

Replace Values

Replace one value with another in the selected columns.

Value To Find

N.A.

Replace With

0

> Advanced options

[OK] [Cancel]

21640	10000	3.0	30	93 %
39516	52000	1.5	43	74 %
570	0	N.A.	N.A.	53 %
769630	283922	2.1	32	76 %
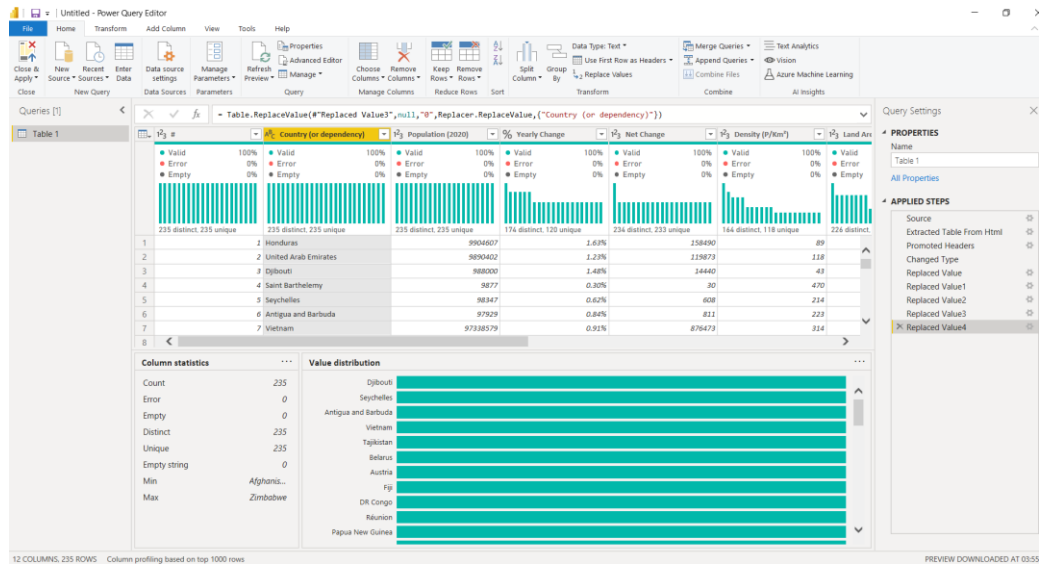
Output :
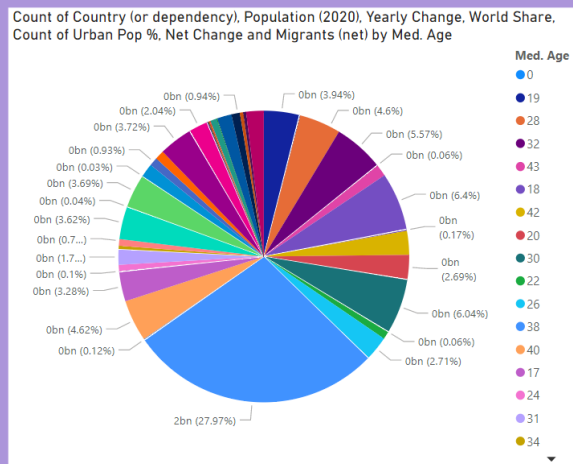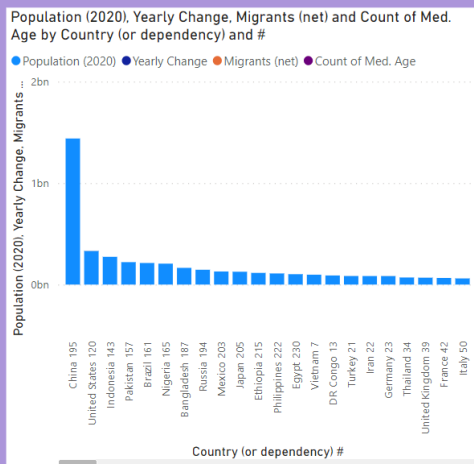
Aim : Take any ODATA url from web any analyze and visual in the

Power BI dashboard or report

Procedure :

1. Now, go to the internet and search for NORTH wind ODATA wind dataset and copy the url
2. Open the power Bi desktop and click on the get data from the ODATA feed and paste the copied url and then click on the Load data .
3. Now visualize the data in different types of charts.
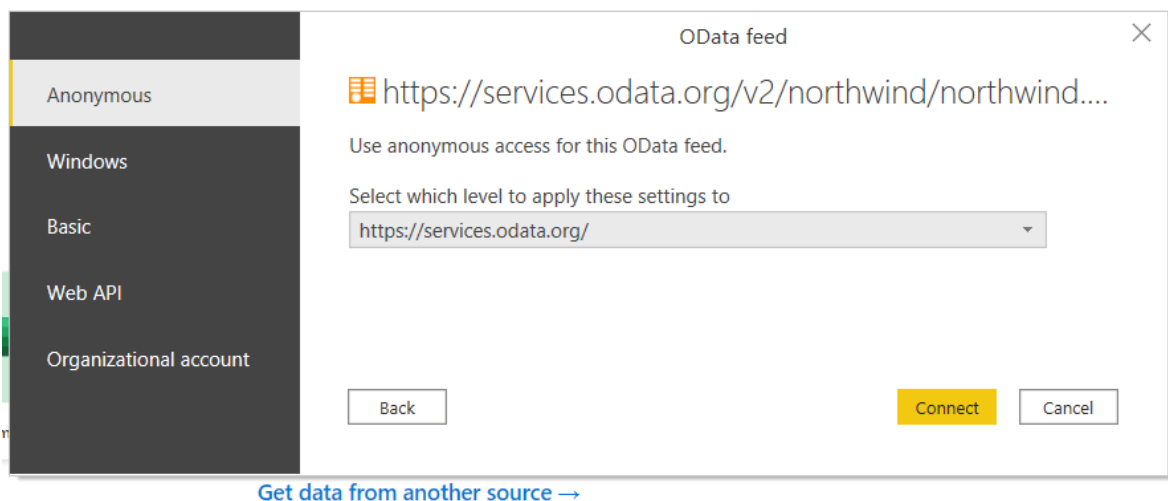
4. Load the data and display in the dashboard

5. Replace the empty cell with the 0 so that it is easy to visualize the column in that table

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Aim : get the data from IMF world database and generate the country

Report and copy the url and visualize the data

Procedure :

1. First go to the Imf world database and select the Year.
2. click on the first available link and in that site under download.
3. click on All countries ,select All and click on continue.
4. select subject as GDP current prices by US dollars and click and continue.
5. click on prepare Report and copy the URL.
6. open powerbi click on get data and select web and double click on the web connector and paste the URL.
7. in web view select the required table and click on edit,it will opens query editor.
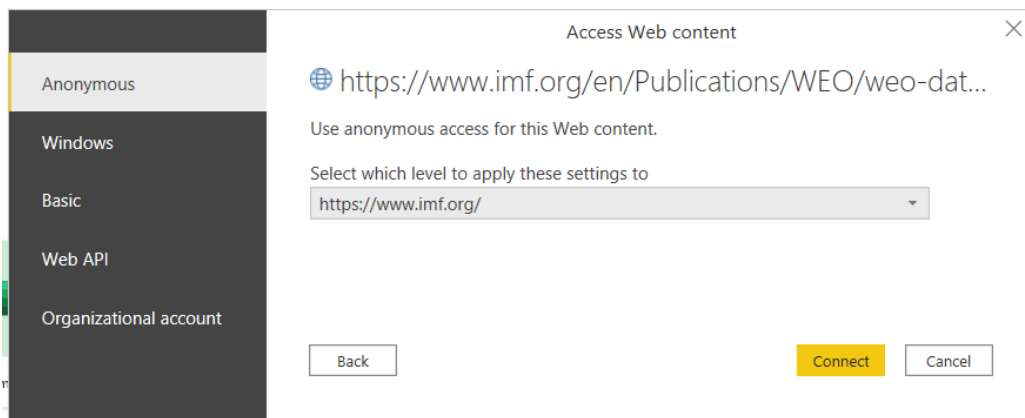
8. Click on the Transform data so that you can edit many thing on the extracted data from the internet.

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9. Remove unwanted rows in home tab select reduce rows and then remove rowsand then select remove top rows and select number of rows as 1 and click on ok.

10. To take the first row as a header click on transform tb and select use first row as header.

11. In home tab select manage columns,then select remove columns and then selectremove columns which will remove the empty columns.
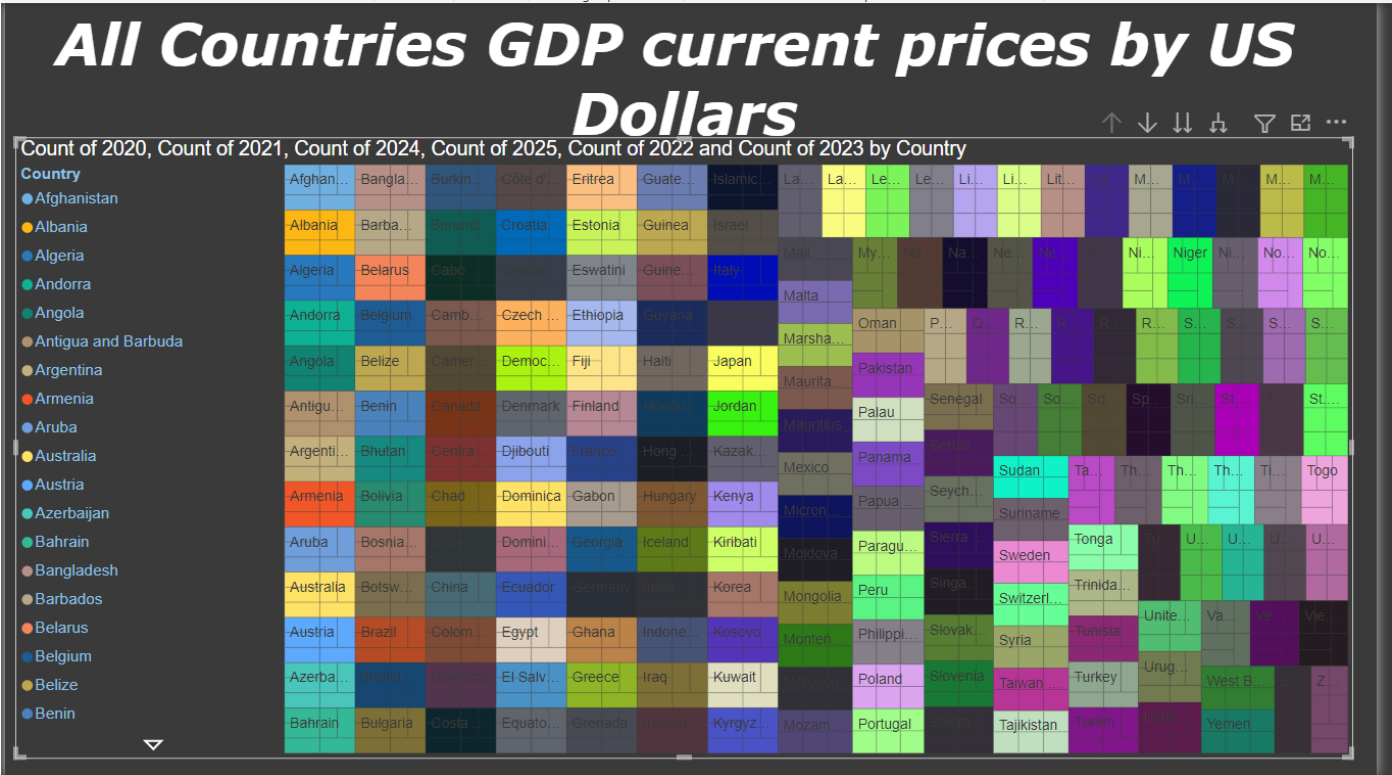
Aim : Download any xml data file and Load in power Bi and display in

Dash board

Procedure :

1. connect to the .xml and click on edit to open the query editor.
2. it will display first level and for the below levels it displays as table.
3. click on "expand" <> button for every table to get all the levels complete data.
4. click on close and apply and check the data.
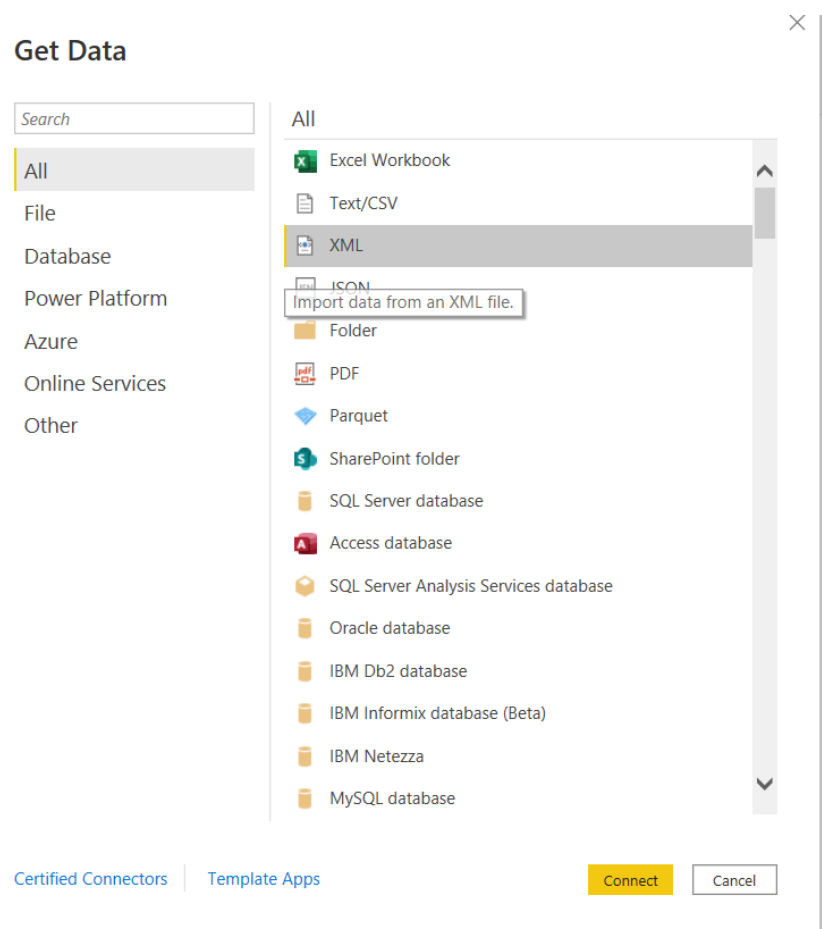
6. Now click on the Load data and then draw an hierarchy if there are more than 2 tables.

7. Finally fill your dashboard with the visuals.

Navigator

label	number	name
Table 1. Total Energy Supply, Disposition, and Price Summary	1	Total Er
Table 2. Energy Consumption by Sector and Source - United States	2	Energy
Table 3. Energy Prices by Sector and Source - United States	3	Energy
Table 4. Residential Sector Key Indicators and Consumption	4	Resider
Table 5. Commercial Sector Key Indicators and Consumption	5	Comme
Table 6. Industrial Sector Key Indicators and Consumption	6	Industri
Table 7. Transportation Sector Key Indicators and Delivered Energy Consul	7	Transpo
Table 8. Electricity Supply, Disposition, Prices, and Emissions	8	Electric
Table 9. Electricity Generating Capacity	9	Electric
Table 10. Electricity Trade	10	Electric
Table 11. Liquid Fuels Supply and Disposition	11	Liquid F
Table 12. Petroleum Product Prices	12	Petrole
Table 13. Natural Gas Supply, Disposition, and Prices	13	Natural
Table 14. Oil and Gas Supply	14	Oil and
Table 15. Coal Supply, Disposition, and Prices	15	Coal Su
Table 16. Renewable Energy Generating Capacity and Generation	16	Renewa
Table 17. Renewable Energy Consumption by Sector and Source	17	Renewa
Table 18. Carbon Dioxide Emissions by Sector and Source - United States	18	Carbon
Table 19. Energy-Related Carbon Dioxide Emissions by End Use	19	Energy-
Table 20. Macroeconomic Indicators	20	Macroe
Table 21. International Liquids Supply and Disposition Summary	21	Interna
Table 31. Residential Sector Equipment Stock and Efficiency	31	Resider
Table 32. Commercial Sector Energy Consumption, Floorspace, and Equipr	32	Comme

Display Options ▾

▲ 📁 AEO 2011 Concept Hierarchy.xml [1]
  ☐ 📋 table

Load   Transform Data   Cancel

Output :

2011 Annual Engery From the Power plant
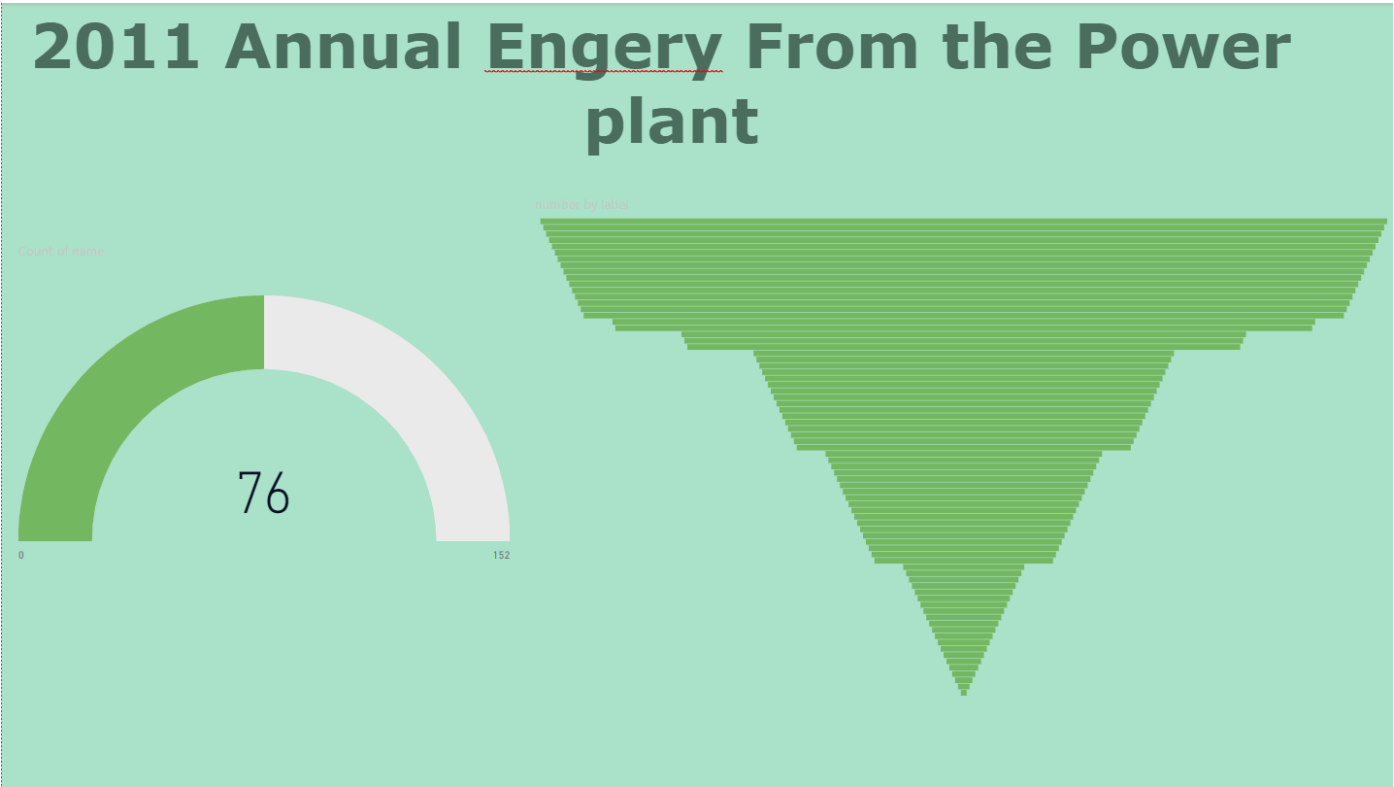
Task – 6

Aim : Apply Round, RoundUp, RoundDown, Even, Odd, Sign functions

On any dataset and visualize it.

Procedure :

1. First step is to take any dataset based on your domain and dump into Power BI.
2. Open the Power BI and select the data from the excel workbook. And load into the power bi.
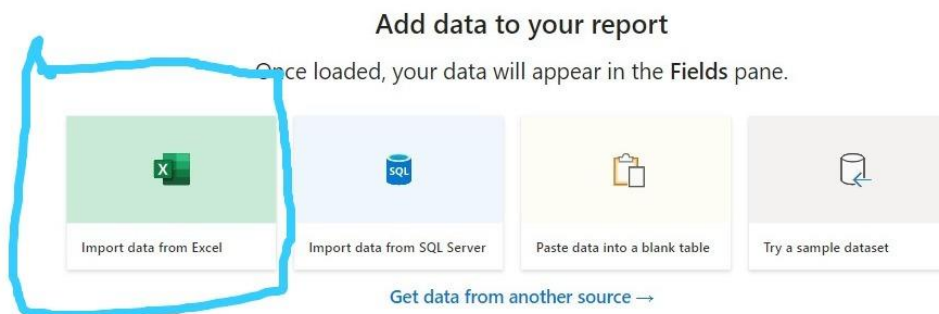
3. After loading the data in power bi and select the relations or tables based on your requirements and see the preview of the tables which you have selected and then click on Transform the data to Do some modifications on the Data.

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4. After clicking on the transforming the data the next and imidate step is to remove the unwanted and unnecessary columns in the dataset.

5. After removing the columns or attributes now create 6 duplicate columns of the saving account column.

6. Now change the duplicate column names to the odd, even, sign, round, roundup, roundown names

7. Now navigate to the transform and dropdown the information button and then select the is odd option then the savings account column.
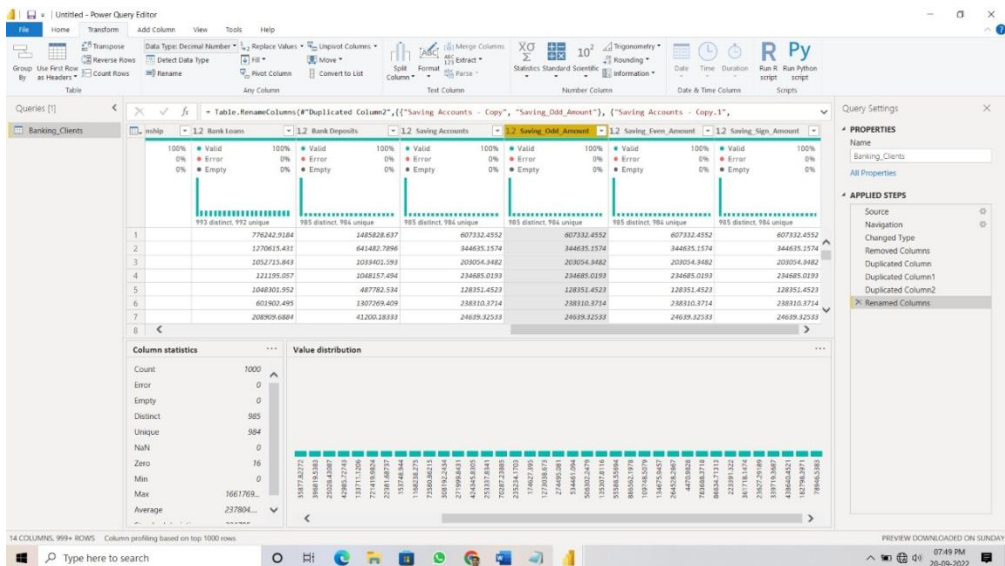
8. Repeat the same process for the ODD, Even, Sign numbers for the savings account.

9. And the final output for this columns will be down below one.
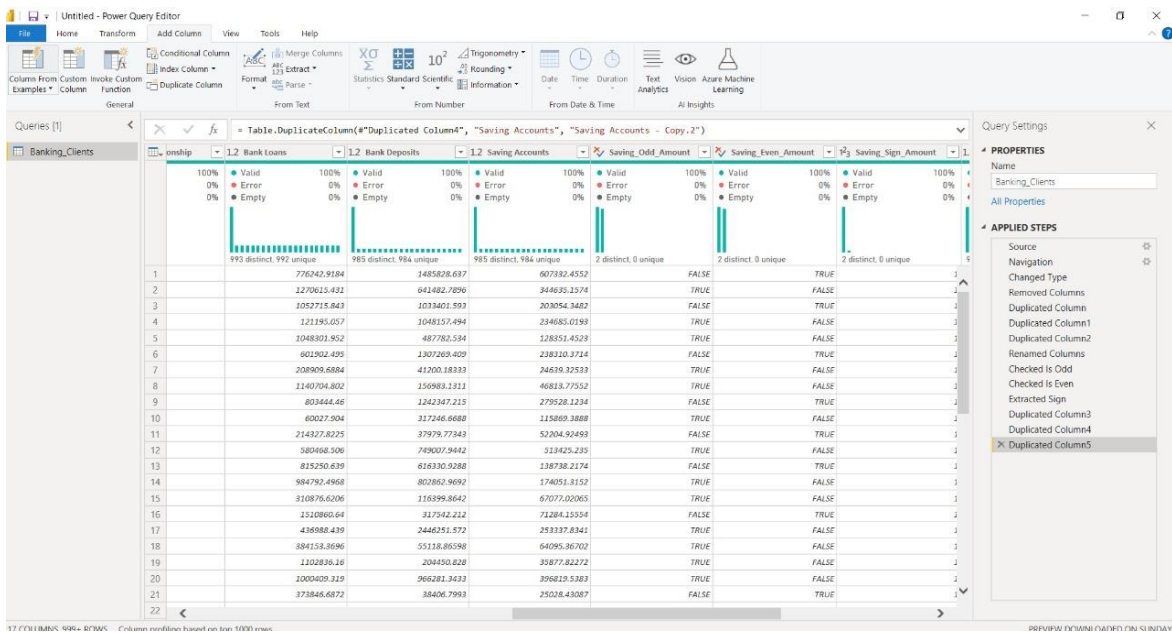
10. Now navigate to the ADD Columns and use the "round" DropDown and use this dropdown on the saving account.
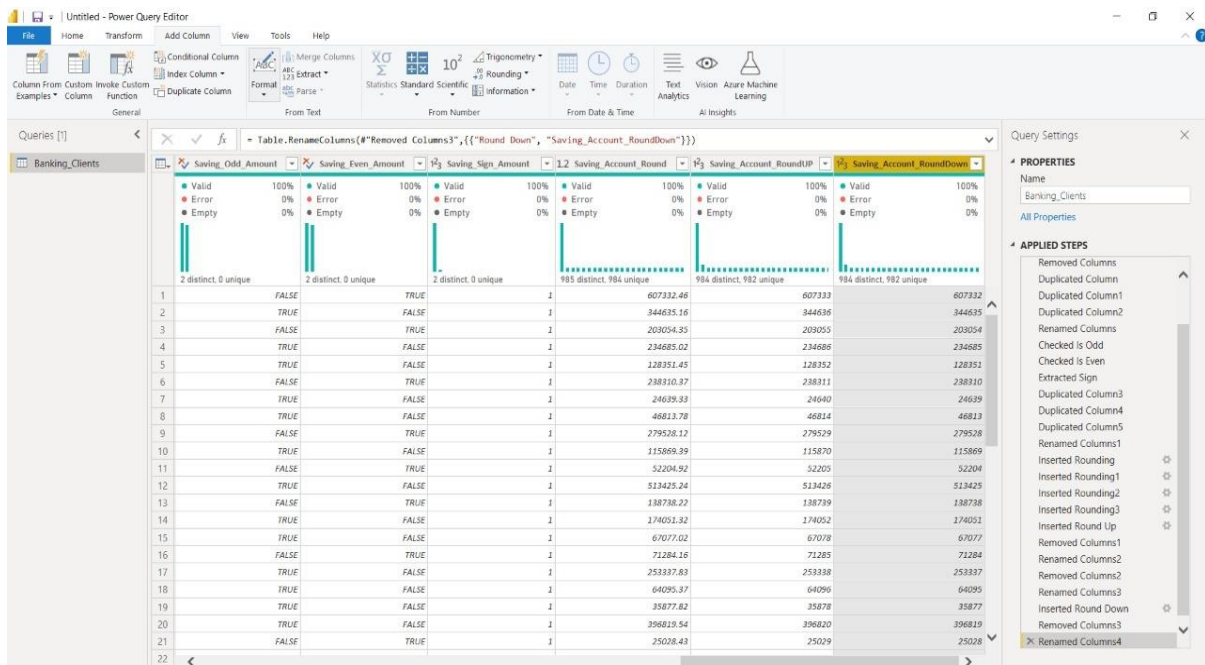
11. For calculating the round value in a column it will ask the precsion of the decimals and see the below pic
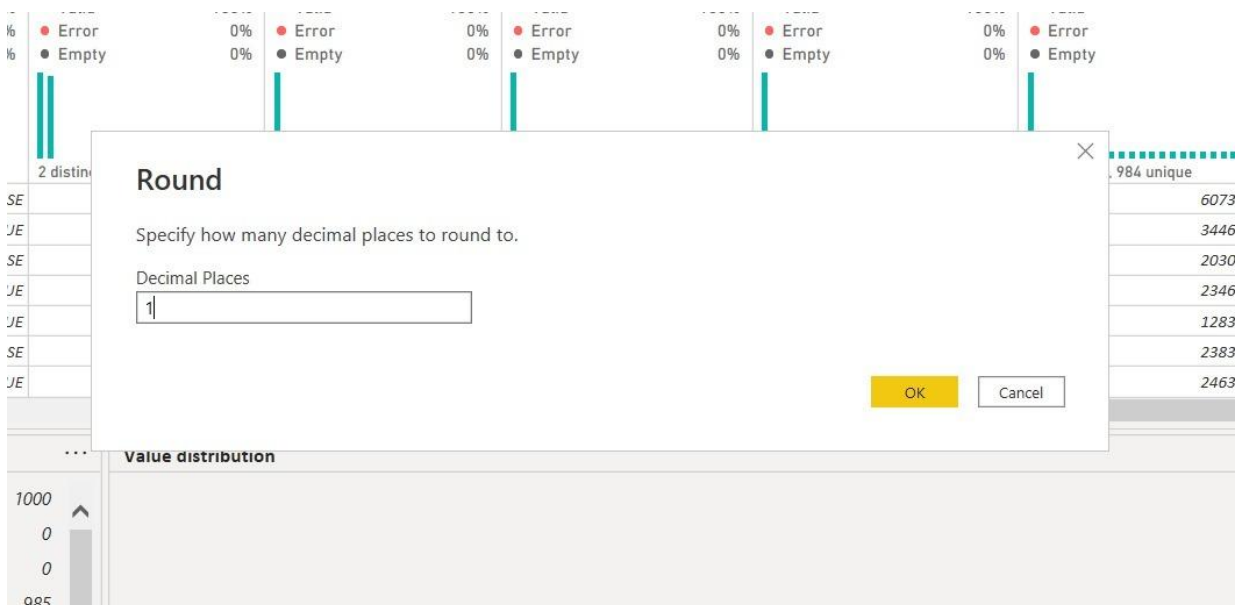
12. The final output values of the column will be like in below pic is calcaulated for all functions like round, roundup, rounddown also.

Output :

Aim : Generation of Dates based on present date and then add a index

Column to it and visualize the data.

Procedure :

1. Take any bank dataset and then load into the power bi and then click on Transform data to do some modifications.
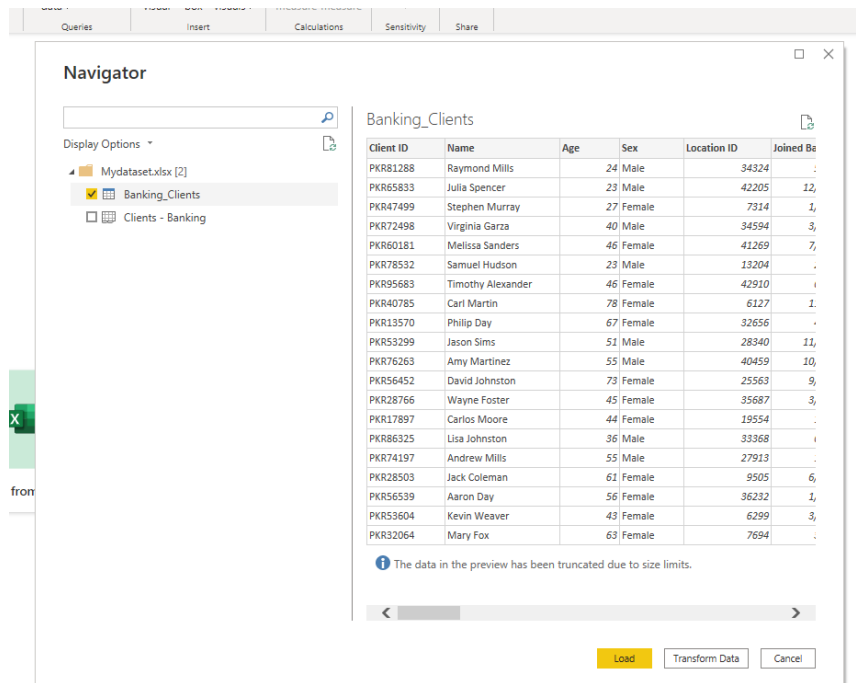
2. After loading the file in to query editor the next step is to remove the unnecessary colums or attributes so that our task to execute and easy to analyze the data.

3. Now, navigate to the ADD Column there you can see the how to add a custom column and click on it.
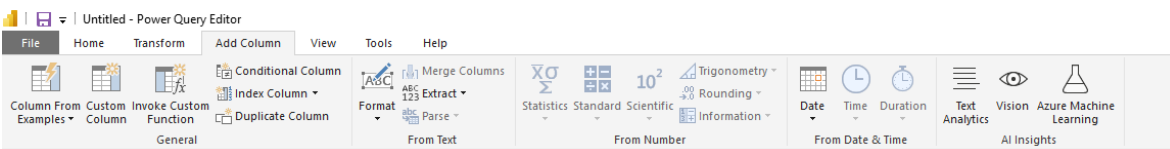
4. Now, write a query to get the list o dats which are subtracted from the joined dates. And then click on OK.

5. After clicking the ok, see at the top left in the column header in which you have added newly and click on the expanding rows then the data will be converted to table.
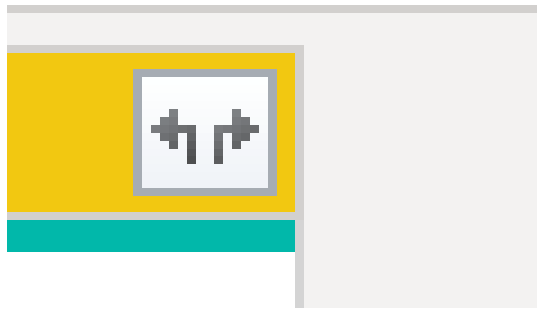
6. Navigate to the add column and click on the add a condoitional column option now you can apply the condition on columns and fill the required fields to get an expected output data in the new column.

7. After modifying the all data and applying the conditions difference adding new columns the new modified data will like the below one.

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Output :

Aim : Load any Data and then classify Data by condition column.

Procedure :

1. First Load the dataset into the Power bi and click on transform to remove the unwanted attributes or columns in dataset.
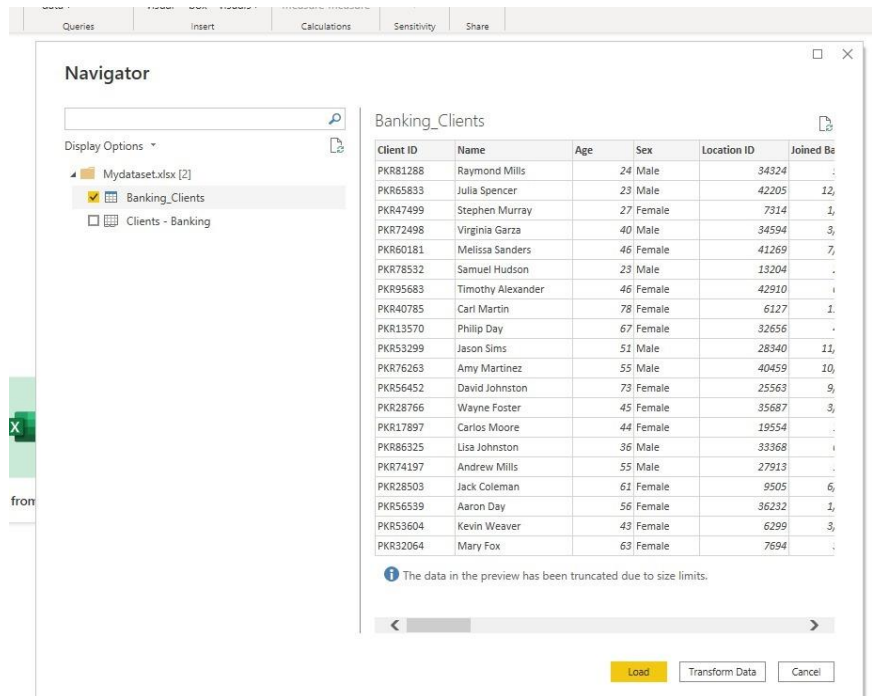
2. After clicking on Transform data then remove all unwanted unnecessary columns so that we can perform the operation on the column which we want to visualize them in a dashboard or a report generation.
3. After deleting the column the data will be remained like below one.

4. Now, navigate to the ADD Column there you will find an option called add an conditional column now, click on that and apply condition on that column so that you can filter your data.

5. After applying the conditions on the column now, can see the change effected on the dataset the below pic is the final dataset which I modified according the requirements of the given Aim.

Name	Age	Fee Structure	Bank Deposits	Deposit > 100000
Raymond Mills	24	High	1485829	Good
Julia Spencer	23	High	641483	Good
Stephen Murray	27	High	1033402	Good
Samuel Hudson	23	High	1307269	Good
Philip Day	67	High	1242347	Good
Carlos Moore	44	High	802863	Good
Lisa Johnston	36	High	116400	Good
Jack Coleman	61	High	2446252	Good
Roger Boyd	58	High	547460	Good
Cheryl Stewart	21	High	1115098	Good
Anne Nguyen	41	High	132961	Good
Christopher Evans	36	High	302541	Good
Maria Clark	34	High	1724818	Good
Jimmy Simpson	52	High	192712	Good
Larry Foster	47	High	976553	Good
Carol GoPKRalez	34	High	828227	Good
Timothy Stanley	79	High	187826	Good
Billy Wilson	73	High	1420246	Good
Philip Fisher	27	High	309362	Good
Mark Mccoy	33	High	1818216	Good
Kathy Wheeler	67	High	295346	Good
Nicholas Gilbert	49	High	202406	Good
Ronald Larson	29	High	1209656	Good
Angela Roberts	22	High	130416	Good
Joshua Hughes	58	High	376150	Good

6. Now, we have to visualize this modified dataset in the dashboard.

Task – 7

Aim : Create a small dataset and perform a group by operation on dataset

And perform visualize them on dashboard.

Procedure :

1. Open the power bi and click on the get data option and then click on the text /csv format then upload the csv file and click on transform data to perform group by operation.

2. When you click on transform data then you will enter into an new window called power bi query editor which is also known as kitchen of the power bi.

3. Now , navigate to the Transform there you can see the group by option. Click on the option.

4. Group by operation means grouping the similar data based on given aggregate operation.
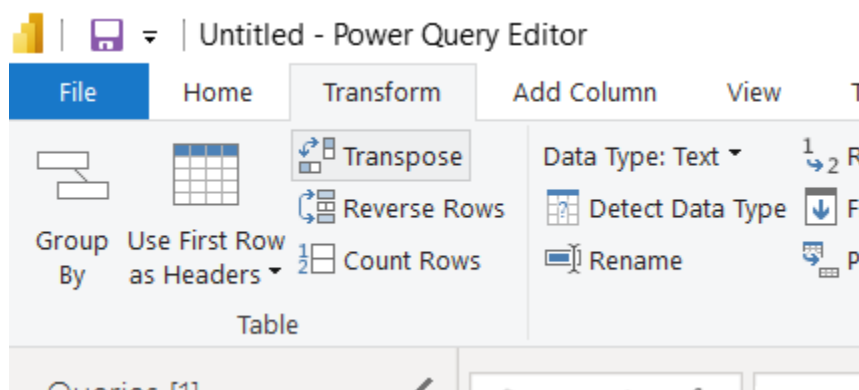
5. After clicking on group by option now select the product column i.e data will be grouped by based as product and performs aggregate sum operation also.
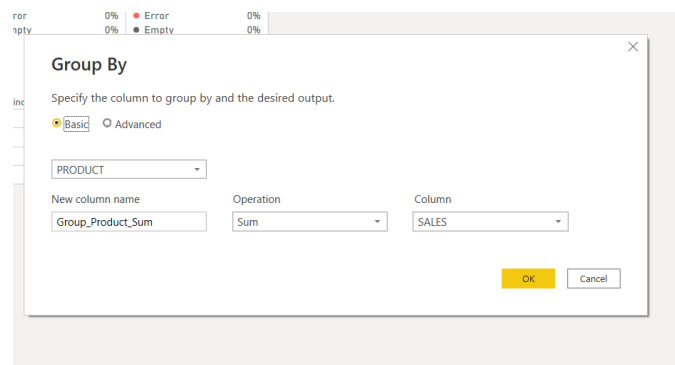
6. This is the final result after performing the group by operation .

Output :
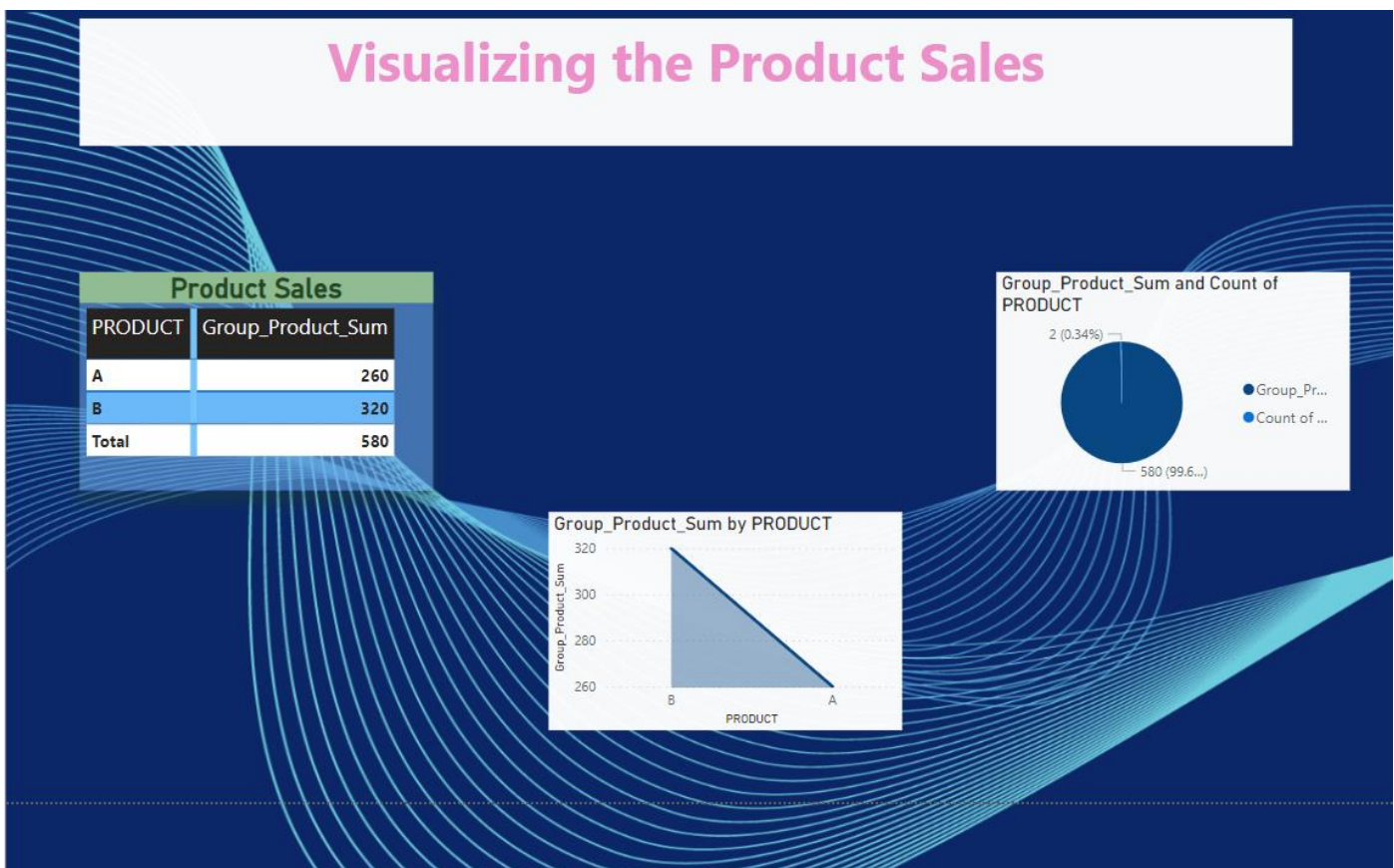
Aim : Perform group By operations on Banking dataset and visualize them.

Procedure :

1. First Load the dataset into the Power bi and click on transform to remove the unwanted attributes or columns in dataset.

2. After clicking the transform data then you will be entered in to an power bi query editor where you can fully analyze the data now we have to remove the unwanted or unnecessary attributes which are not releated to the present doing Task.
3. After deleting or removing all unwanted attributes in the dataset then the final modified dataset will be like below one.
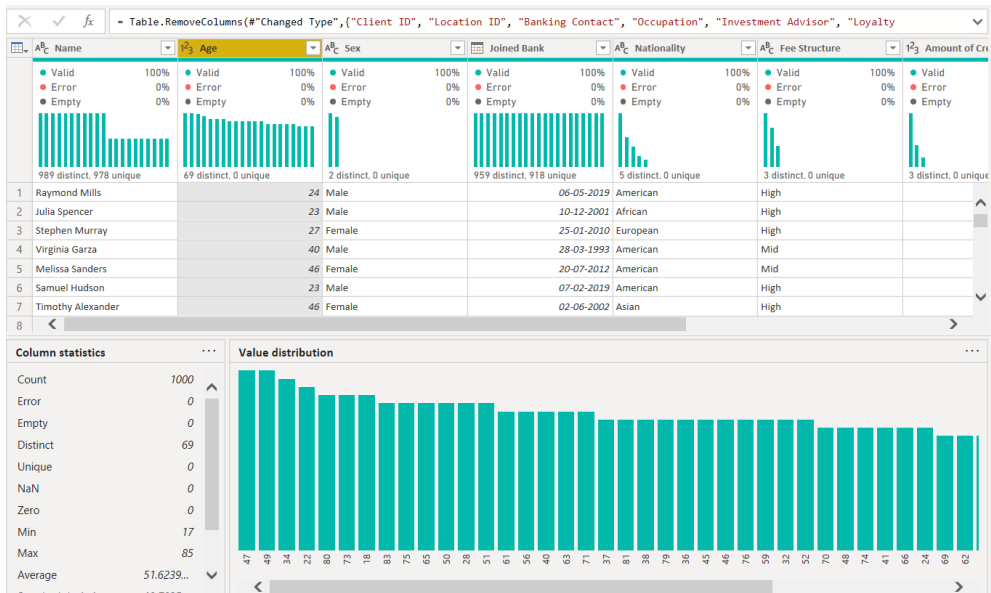
4. Navigate to the Transform there you can find the group by operation click on the option then fill the details in the pop up box and then click ok.
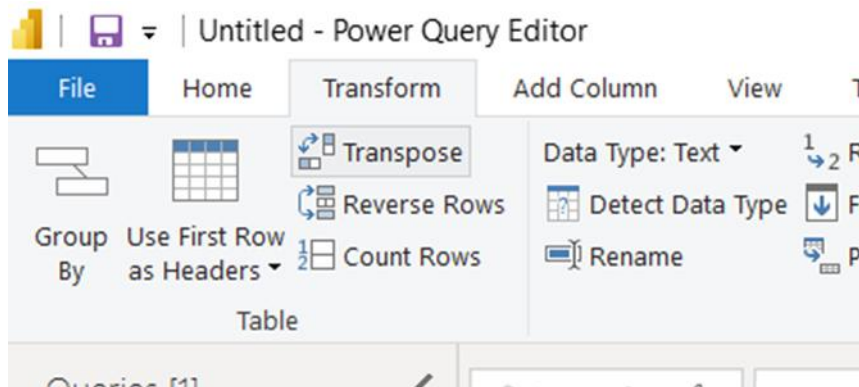
5. Now, do group the sex attribute and apply the aggregate sum operation on bank deposits make sure that attribute should contain labelled data.
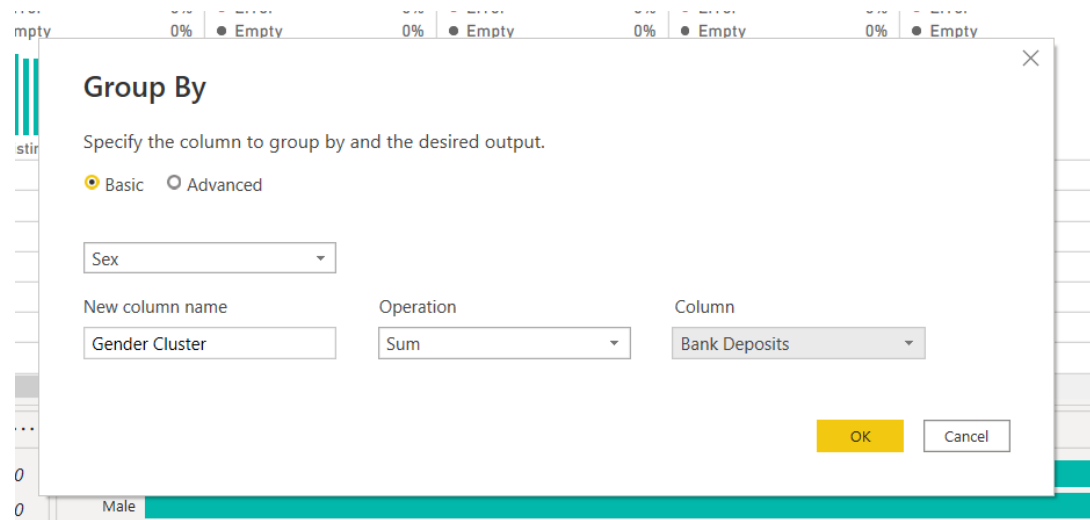
6. The final data will be like below pic after grouping the sex attribute.

Output :

Aggregate Sum Of Bank Deposits By Using Group By Gender
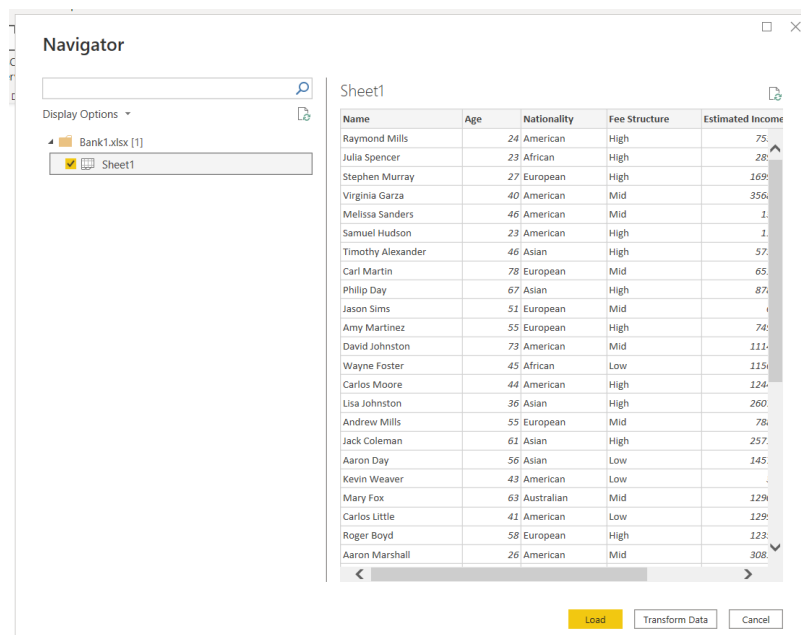
Bank Deposits	
Sex	**Gender Cluster**
Female	1,01,86,77,107.64
Male	99,60,03,473.89
Total	2,01,46,80,581.53
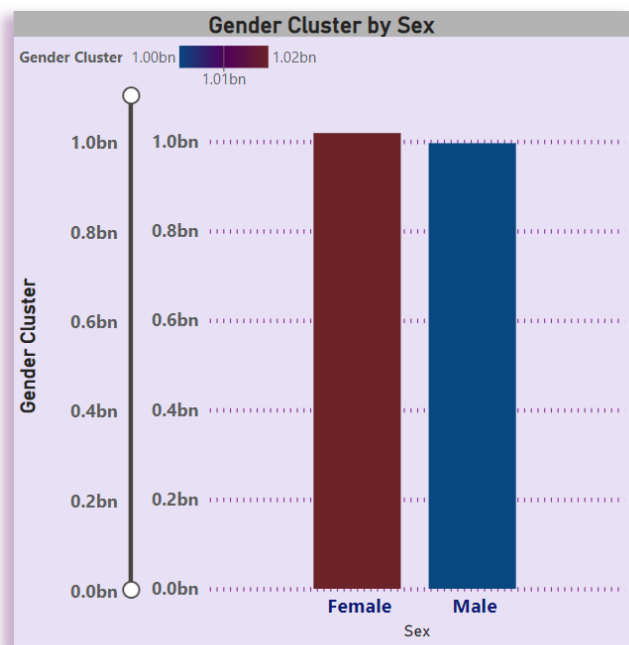
Aim : Apply joins and merging queries topic in any dataset and

Visualize it.

Procedure :

1. To apply joins we shold have atleast 2 Tables or relations.
2. First, we have load the both relations or tables into an power bi.
3. After click on Get Data select the excel option to load the fisrt table into an power bi after then click on Load option.

4. After click on Get Data select the excel option to load the Second table into an power bi after then click on Load option.
5. The next step is to enter into an power bi query editor where we can perform joins and merging queries at a same time.
6. Navigate to the home tab where you can find the merging queries option now click on that option.
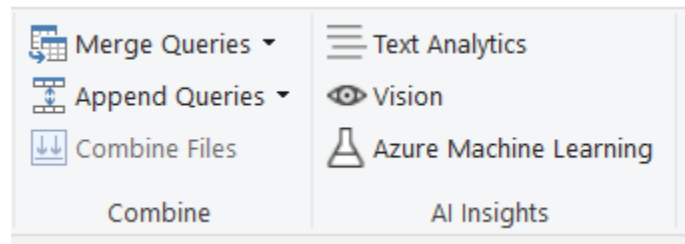
7. Then you will get an pop up window fill the required details to perform the joins operation.
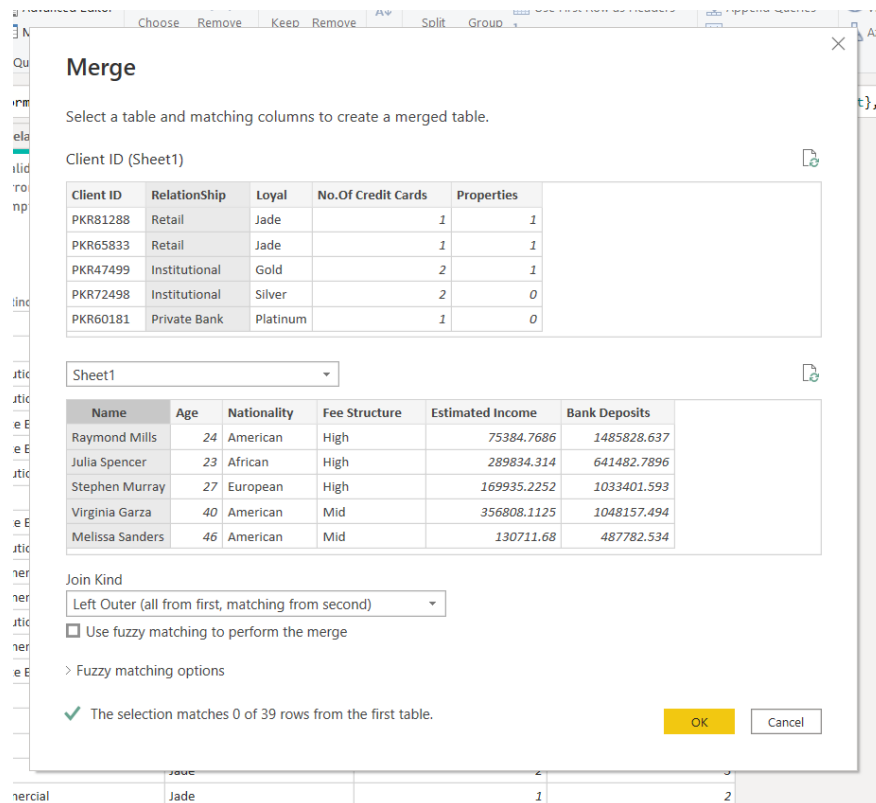
8. After performing the merging operation now save the changes in query editor.
9. The last and final step is visualize them in a interactive dashboard.

Output :

Bank Deposits By Joining the Countries

Task – 8

Aim : Explore the different types of charts and graphs in the visualizing

The data.

Description :

- Data from a table can be presented in many ways and they are
  - Charts
  - Graphs

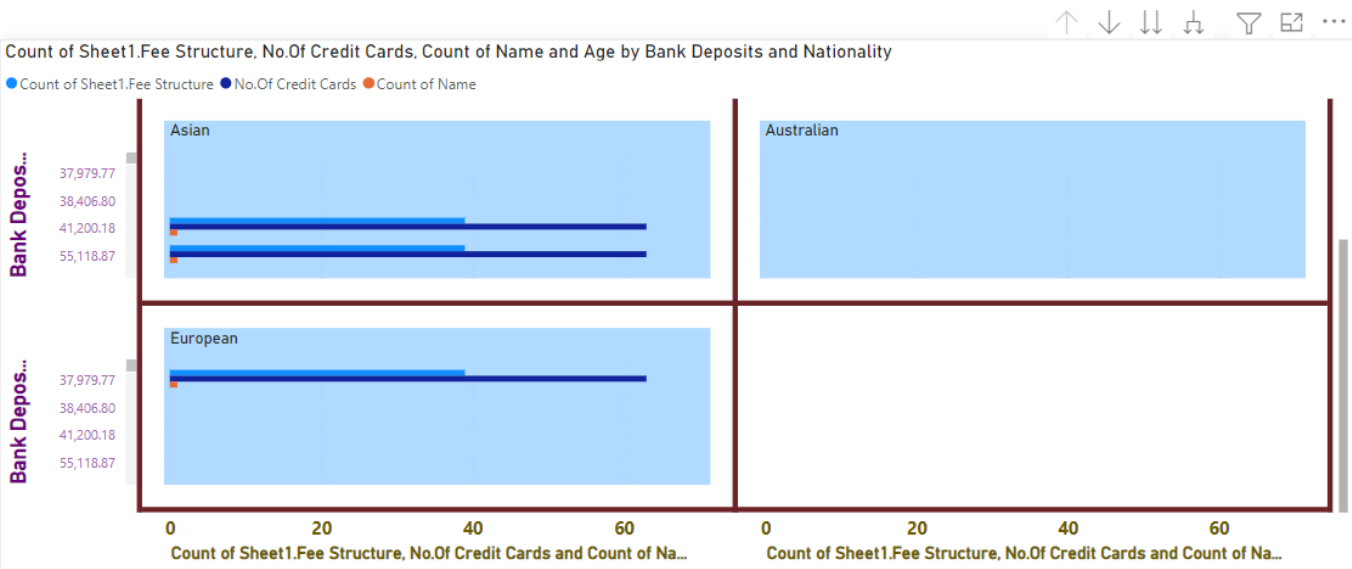| S.no	Chart Name	Parameters	Significance
1	Dot Plot	X : 1 Y : min 1	It is one of the way to visualize the similarity between 2 parameters by using an similarity matrix.
2	Bar Chart	X : 1 Y : 1	This is a very simple chart to understand the status of work and also Compares the 2 variables like day and sales.
3	Floating Bar Chart	X : Category Value Y : 1	They visually show in a very effective at-a-glance way, the overall time line of the project, the current status & progress (or lack thereof) along with the assignment at considerable details. With this custom visual,
4	Pixelated Bar Chart	X : 1 or more Y : 1	The basic idea of a pixel bar chart is to present the data values directly instead of aggregating them into a few data values. The approach is to represent each data item (e.g. a customer) by a single pixel in the bar chart.
5	Histogram	X : 1	By combining a histogram chart with

			points that show the actual data for each range. Easily track where data clusters (points) across your data distribution (bars) to identify patterns, trends, and areas of opportunity.
6	Pie Chart	variables	It displays the status percentage of the work or project in various categories
7	Tree Map Chart	Any number of variables	A treemap chart provides a hierarchical view of your data and makes it easy to spot patterns, such as which items are a store's best sellers. The tree branches are represented by rectangles and each sub-branch is shown as a smaller rectangle.
8	Bubble Chart	Categorical variables	Bubble Chart with categorical Data on X and Y axis will enable the user to visualise categorical data such as date, category or any text field on X-axis and Y-axis simultaneously. This chart will help you to visualise data in three dimensions on X axis, Y axis and size dimension.

Result : Sucessfully completed the Aim .