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CBCS Course

Data Visualization Lab

Code : 20IT5607



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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 Relations i.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 in 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 ?

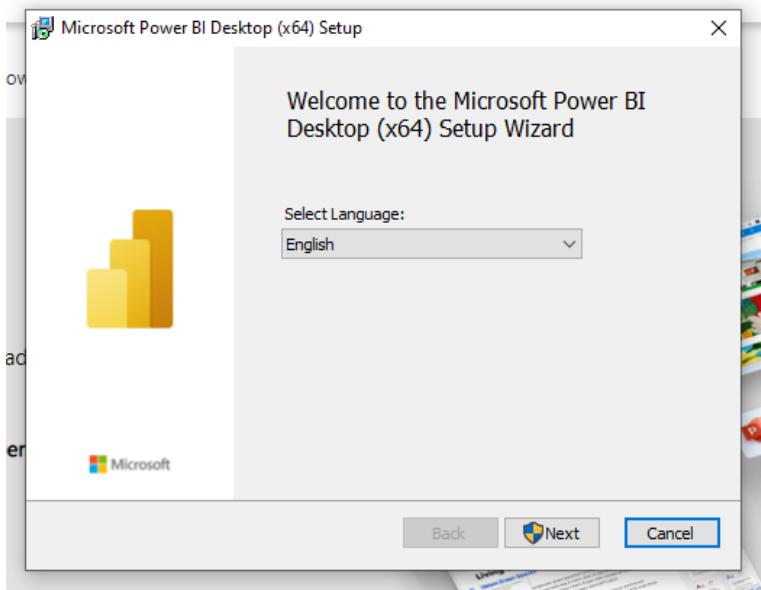
A) Tableau, Microsoft Power Bi, excel, Qlick View, Data Wrapper,
Github, Amazon Web Services,

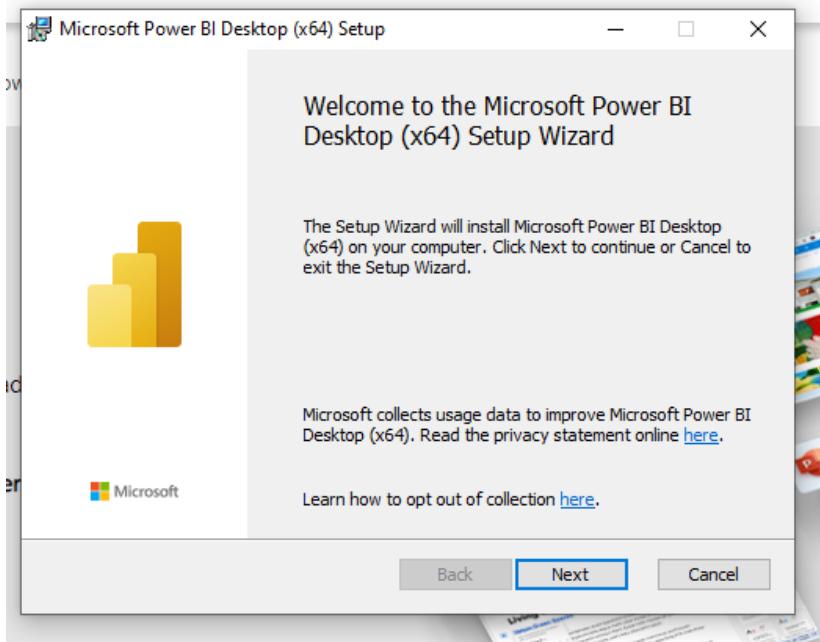
Task - 2

Aim : Install the microsoft power bi software

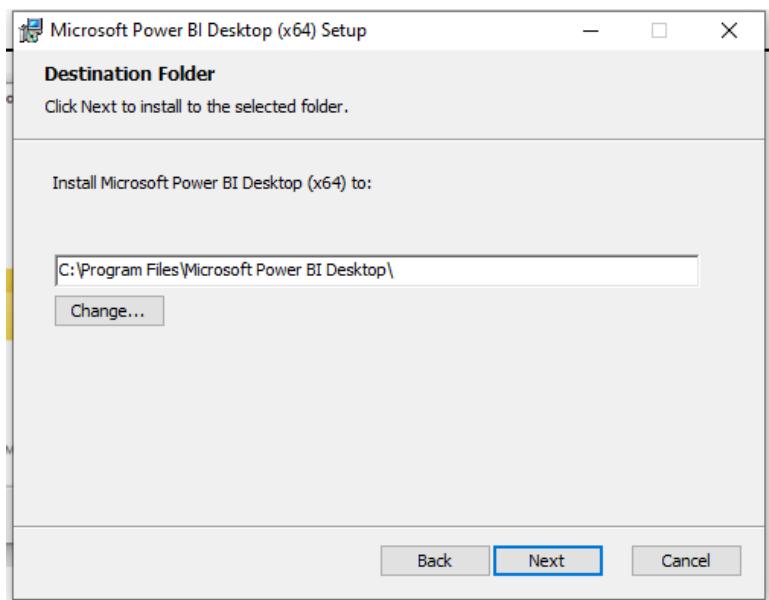
Procedure :

- 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.

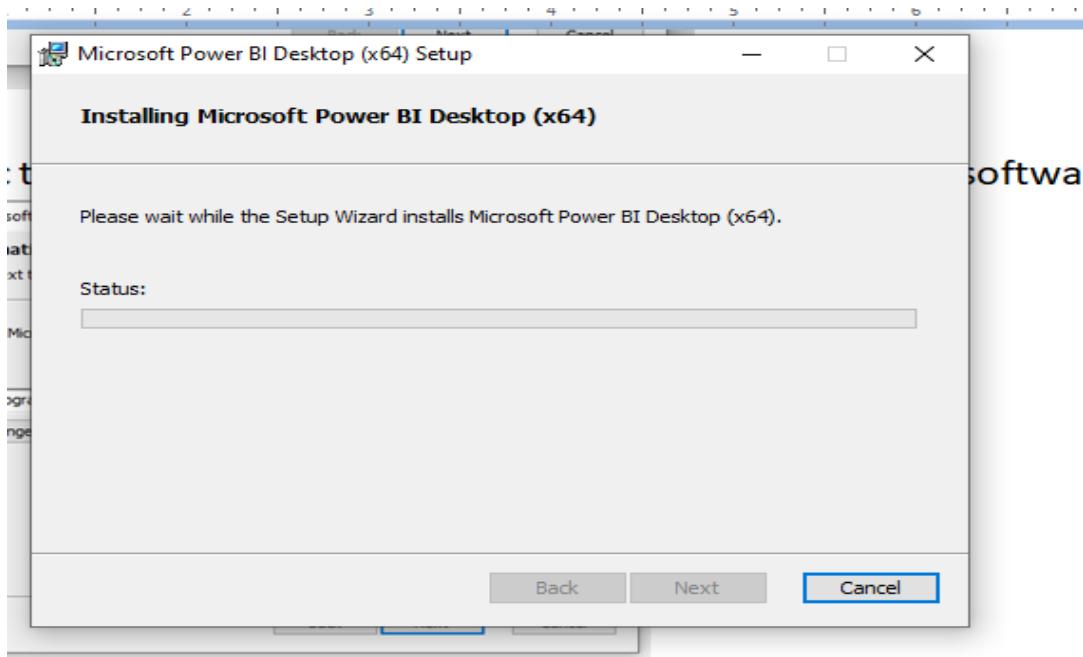




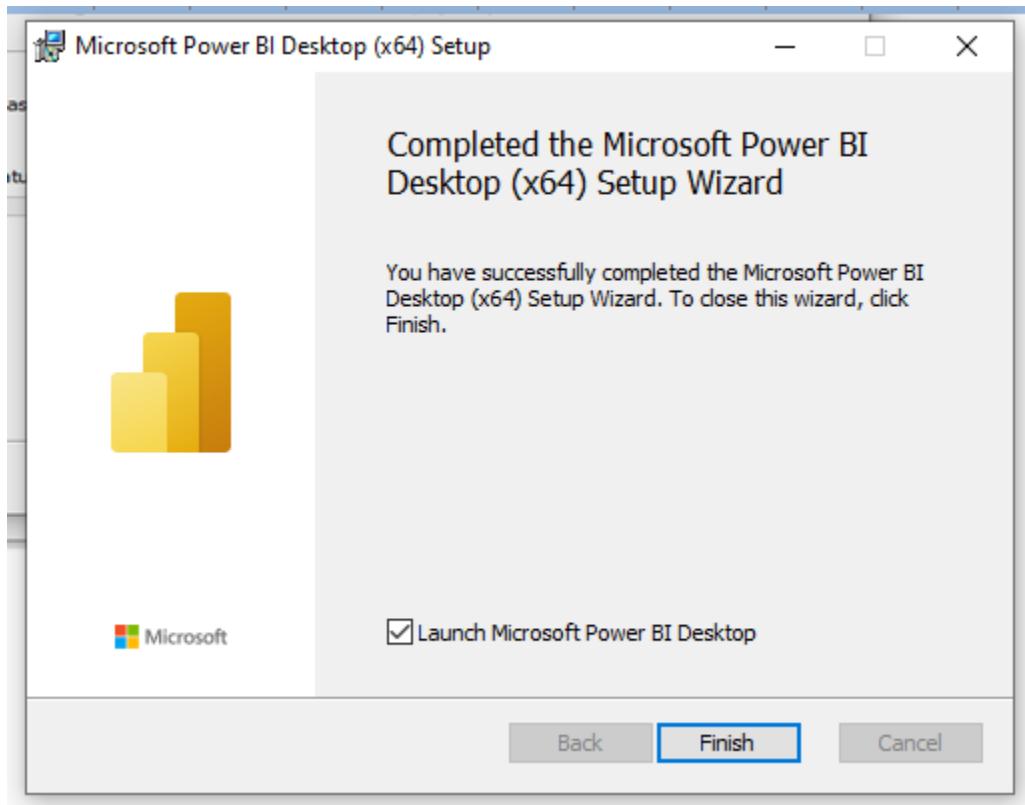
6) Select the destination drive and folder to download the software



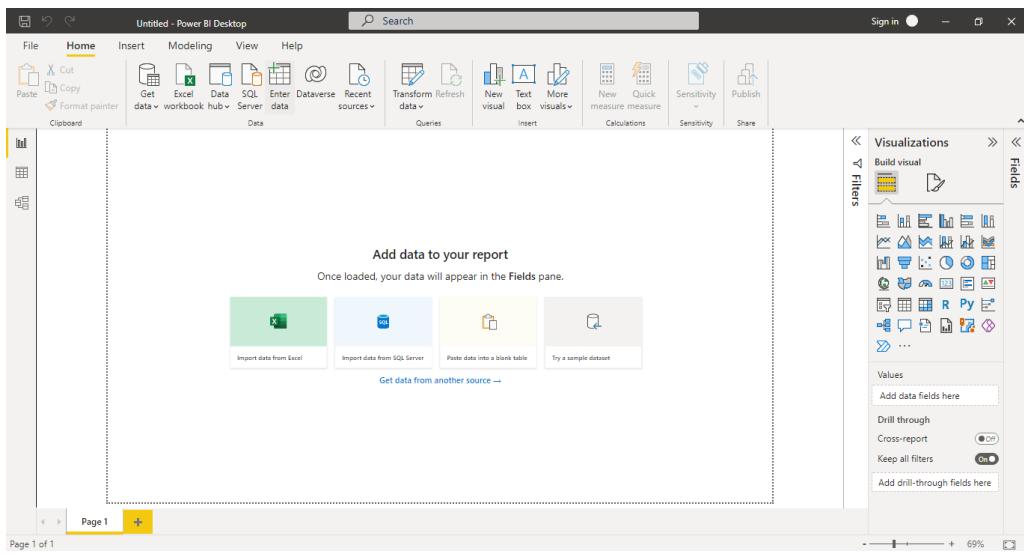
7) After then you can see the downloading the files



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

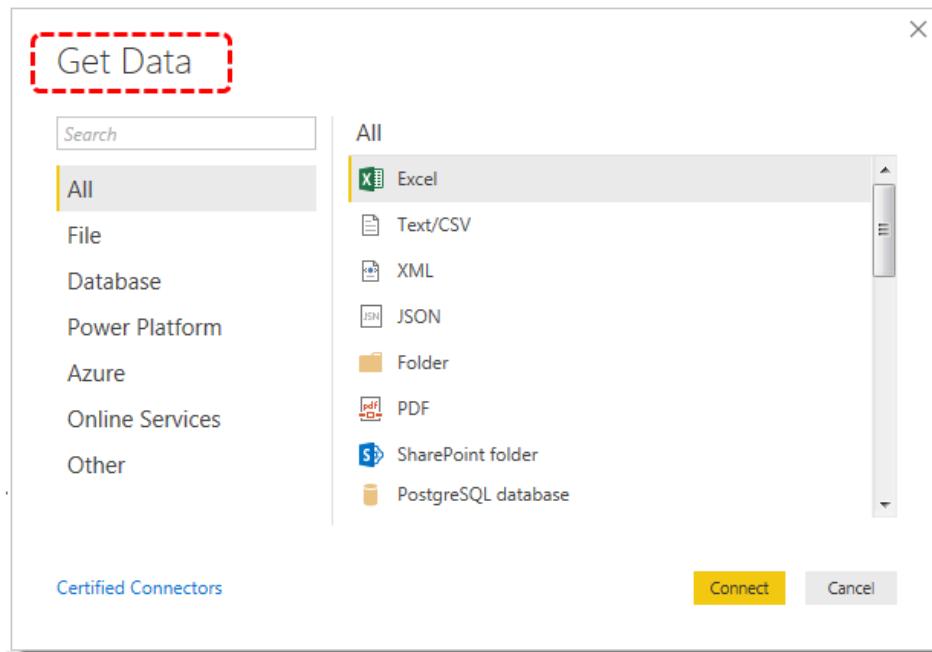
Aim : Features of the Power Bi

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 :

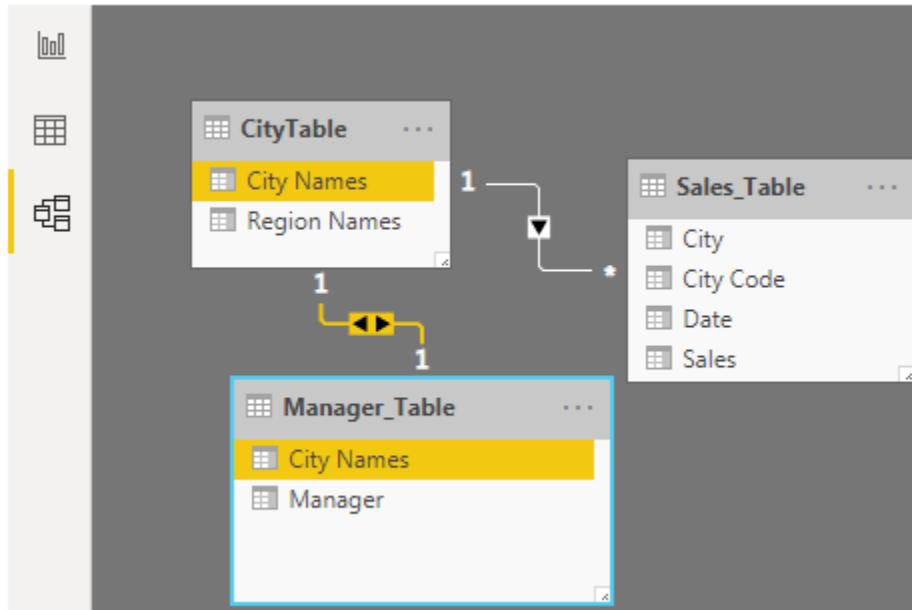
Microsoft has developed data source connections with a huge list of sources like SQL, Azure, Excel, Text, CSV, PDF, Cloud, on-premises data. It doesn't matter where the data is and what format it is; we will get a detailed view of the data.



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.

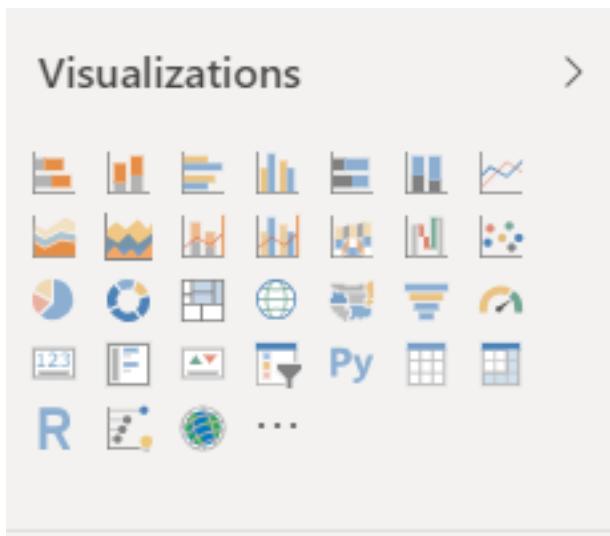


3) Power Query and Query Pivot Access :

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 Query is 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.



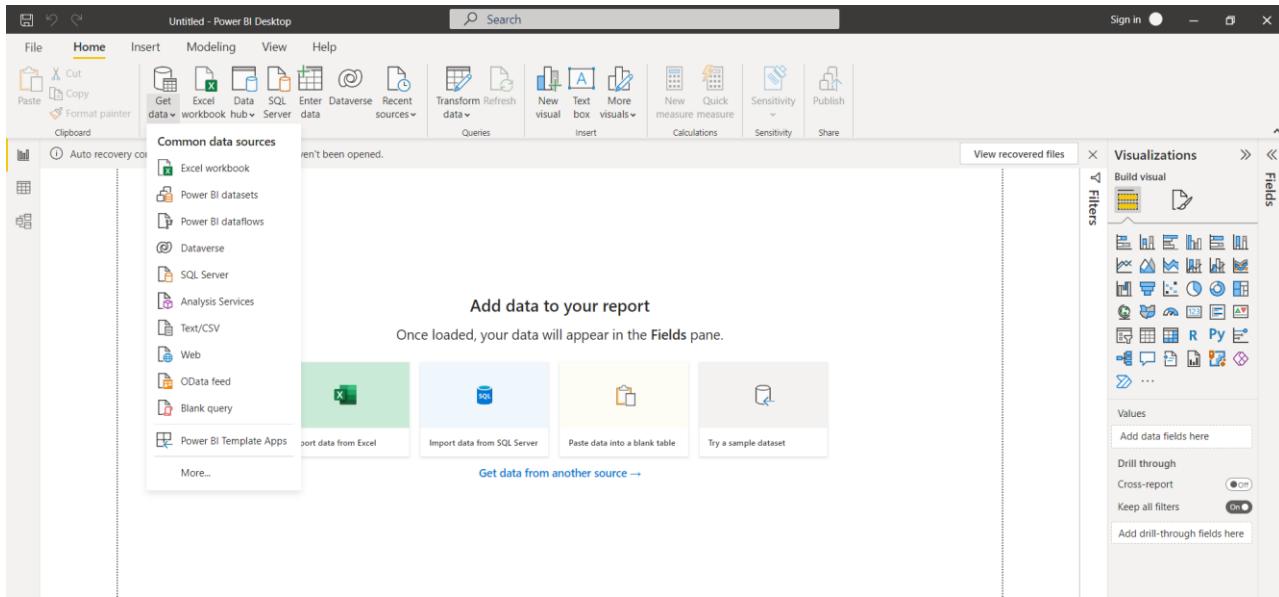
Result : Sucessfully Completed the all Tasks.

Task - 4

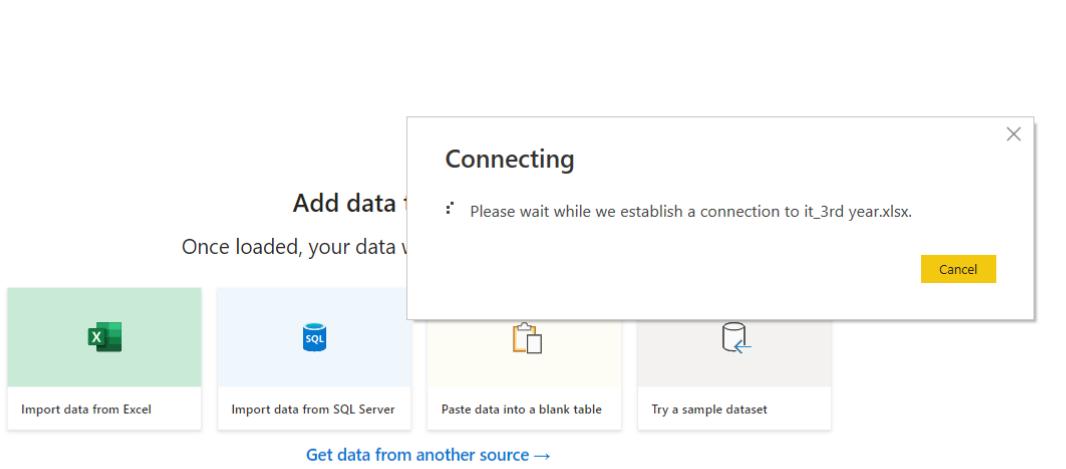
Aim : Import a flat file i.e; excel or any csv files and visualize them.

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.



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Select the any one the tables in the excel file in which you have loaded .

The screenshot shows the Microsoft Power BI Navigator window. On the left, there's a tree view with 'it_3rd year.xlsx [1]' expanded and 'it_2y_Jan2022i' selected. The main area displays a table titled 'it_2y_Jan2022i' with three columns: 'Column1', 'Column2', and 'Column3'. The data consists of approximately 30 rows of names and their corresponding values. At the bottom right of the table area are three buttons: 'Load' (yellow), 'Transform Data' (white), and 'Cancel' (white).

Column1	Column2	Column3
Name	Username	password
B DINAKAR LAXMI VISWANATH	208w1a1201	BN56
BAJI SOTSAVA SKANDHAA	208w1a1202	SJ32
BALLA RAJA SAI PRANEETH	208w1a1203	BX98
BANAVATHU NAVYA	208w1a1204	SB49
BOGGULA RAJESWARI	208w1a1205	ZC88
BONDALAPATI MAHESH	208w1a1206	ZA16
BURRA SHREE SHARVANI	208w1a1207	JY79
CHANDAKA SANDHYARANI	208w1a1208	AD46
CHENNU DEEPTHI	208w1a1209	VJ98
CHODAVARAPU DEVI KANAKA SAI SRI LIKHITHA	208w1a1210	VI51
DEVULAPALLI PRANEETHA	208w1a1211	VX37
ESA VINAY	208w1a1212	XR52
GANDIKOTA PRASANTH SATYA SAI KIRAN	208w1a1213	UP73
GOPU NITHIN SAI	208w1a1214	CL24
GORIPARTHI AASHRITHA	208w1a1215	IW21
GUDAVALLI HRUTHI SRI	208w1a1216	TR14
GUDAVALLI VISHNU VARDHAN	208w1a1217	ZF11
JULURU HASWITHA	208w1a1218	QR57
KANUGULA BHARGAVI	208w1a1219	CX75
KANURI DILIP KUMAR	208w1a1220	UZ34
KASIREDDI SUVARNA	208w1a1221	RL63
KASULA PAVAN SAI	208w1a1222	ZE85
KESARI GOPI KISHORE REDDY	208w1a1223	ON98

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 each and every column of the graph.

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The screenshot shows the Power Query Editor interface with the title "Untitled - Power Query Editor". The main area displays a table titled "Table.TransformColumnTypes(#"Promoted Headers", {{"Name", type text}, {"Username", type text}, {"password", type text}})". The table has three columns: "Name", "Username", and "password". The "Name" column contains 139 distinct values, the "Username" column contains 139 distinct values, and the "password" column contains 127 distinct values. The "password" column has a warning icon indicating it contains mostly empty values (90%). The "Applied Steps" pane on the right shows the step "Changed Type1" under the "Promoted Headers" section.

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

Output :

The screenshot shows the Power BI Desktop interface with the title "Untitled - Power BI Desktop". The main area features a chart titled "Count of Username by Name and password" and a table titled "Username, Name, password". The chart uses a stacked bar format where green represents "Increase", red represents "Decrease", and yellow represents "Other". The table lists various user names and their corresponding details. The "Applied Filters" pane on the right shows filters applied to the "Fields" and "Visualizations" sections.

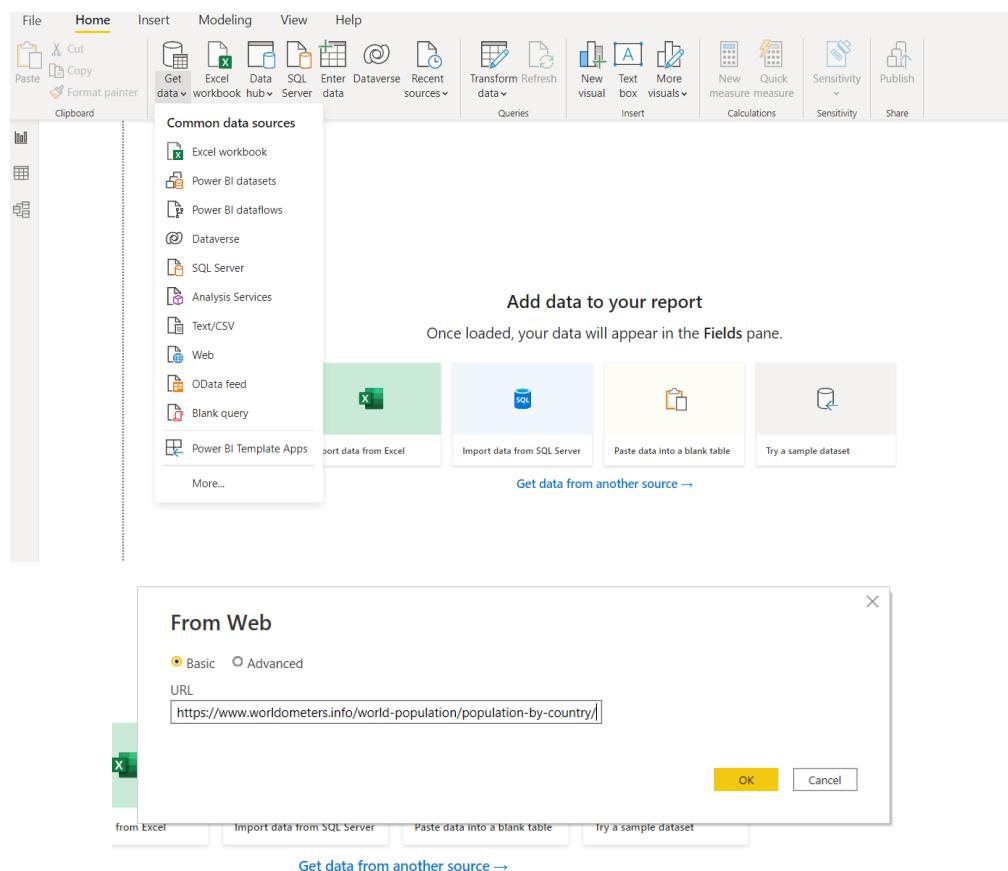
Result : Successfully completed the Aim.

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 columns 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

Display Options

- HTML Tables [1]
 - Table 1
- Suggested Tables [1]
 - Table 2
- Text [2]
 - HTML Code
 - Displayed Text

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.

Add Table Using Examples Load Transform Data Cancel

23180 900 2.8 27 79 % X

Replace Values

Replace one value with another in the selected columns.

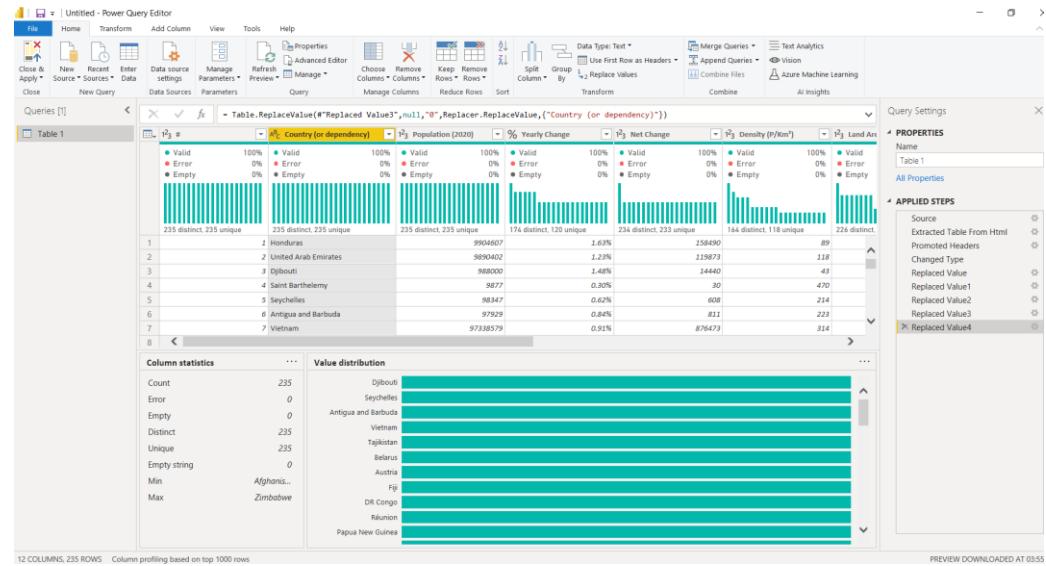
Value To Find: N.A.

Replace With: 0

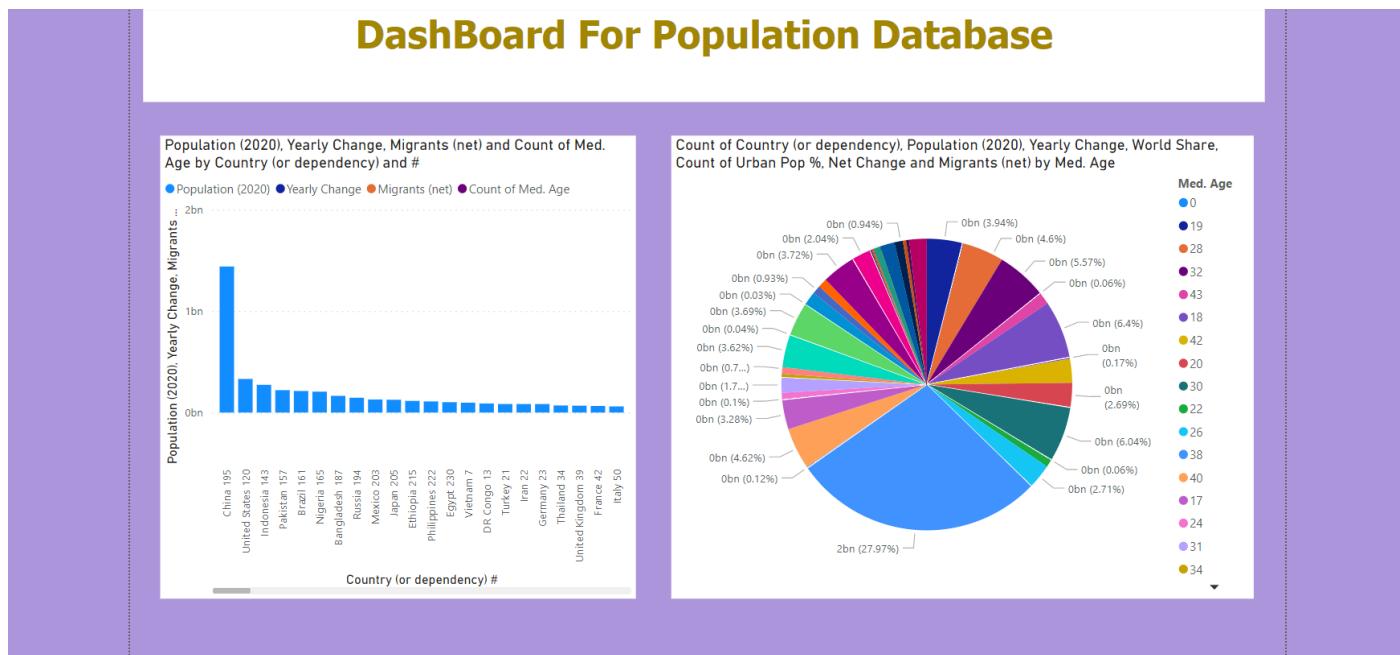
> Advanced options

OK Cancel

21640	10000	3.0	30	93 %
39516	52000	1.5	43	74 %
570	0	N.A.	N.A.	53 %
769620	222222	2.1	22	76 %



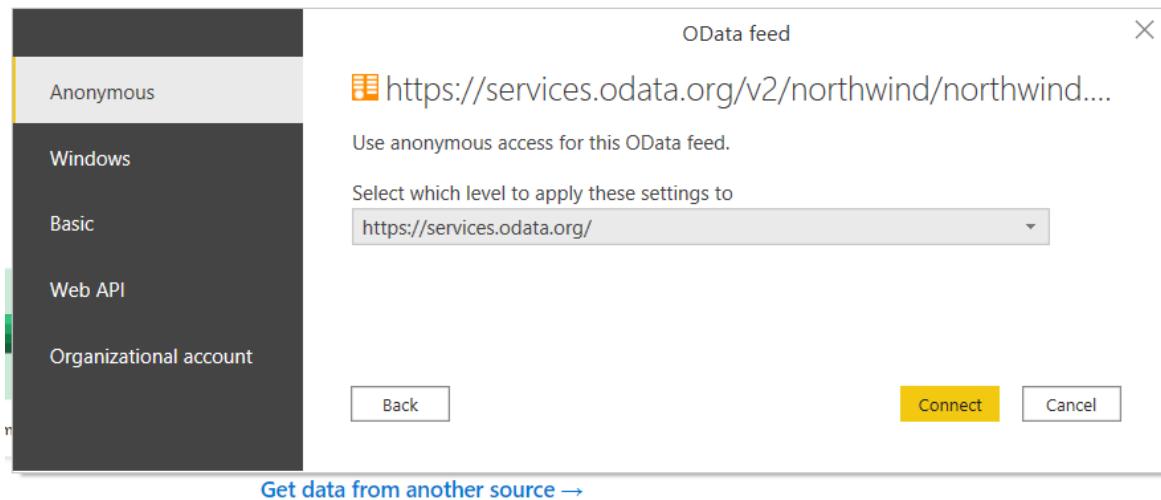
Output :



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

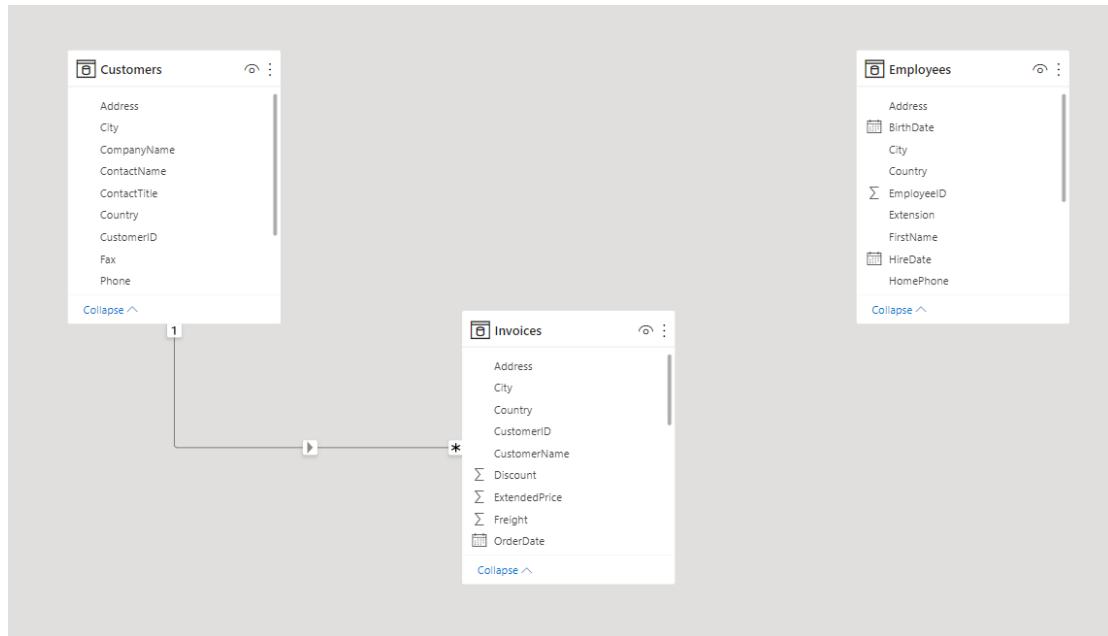
Navigator

The screenshot shows the Power BI Navigator interface. On the left, there is a tree view of available datasets and tables. Under the 'Northwind' dataset, several tables are listed: 'Alphabetical_list_of_products', 'Categories', 'Category_Sales_for_1997', 'Current_Product_Lists', 'Customer_and_Suppliers_by_Cities', 'CustomerDemographics', 'Customers' (which is checked), 'Employees' (which is also checked and highlighted in yellow), 'Invoices', 'Order_Details', 'Order_Details_Extendeds', 'Order_Subtotals', 'Orders', 'Orders_Qries', 'Product_Sales_for_1997', 'Products', 'Products_Above_Average_Prices', 'Products_by_Categories', and 'Regions'. On the right, the 'Employees' table is displayed in a grid format with columns: EmployeeID, LastName, FirstName, Title, and TitleOfCourt. The data contains 9 rows of employee information.

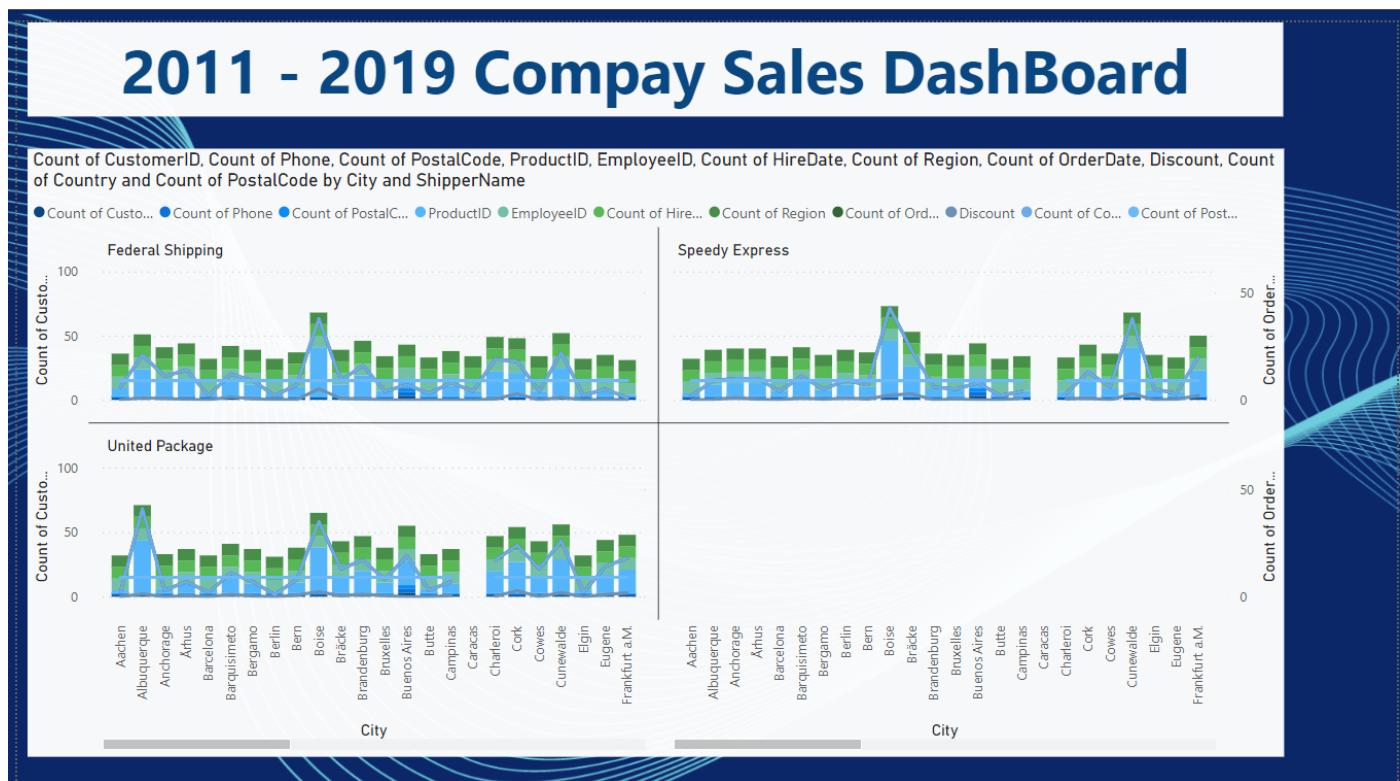
EmployeeID	LastName	FirstName	Title	TitleOfCourt
1	Davolio	Nancy	Sales Representative	Ms.
2	Fuller	Andrew	Vice President, Sales	Dr.
3	Leverling	Janet	Sales Representative	Ms.
4	Peacock	Margaret	Sales Representative	Mrs.
5	Buchanan	Steven	Sales Manager	Mr.
6	Suyama	Michael	Sales Representative	Mr.
7	King	Robert	Sales Representative	Mr.
8	Callahan	Laura	Inside Sales Coordinator	Ms.
9	Dodsworth	Anne	Sales Representative	Ms.

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

The screenshot shows the 'Replace Values' dialog box. It has four tabs at the top: 'Empty' (selected), '0%', 'Empty', and '66%'. The main area is titled 'Replace Values' and contains the instruction 'Replace one value with another in the selected columns.' Below this are two input fields: 'Value To Find' containing 'null' and 'Replace With' containing '0'. At the bottom are 'OK' and 'Cancel' buttons. In the background, a portion of a Power BI report is visible, showing a table with columns 'Address' and 'City' and some data rows.



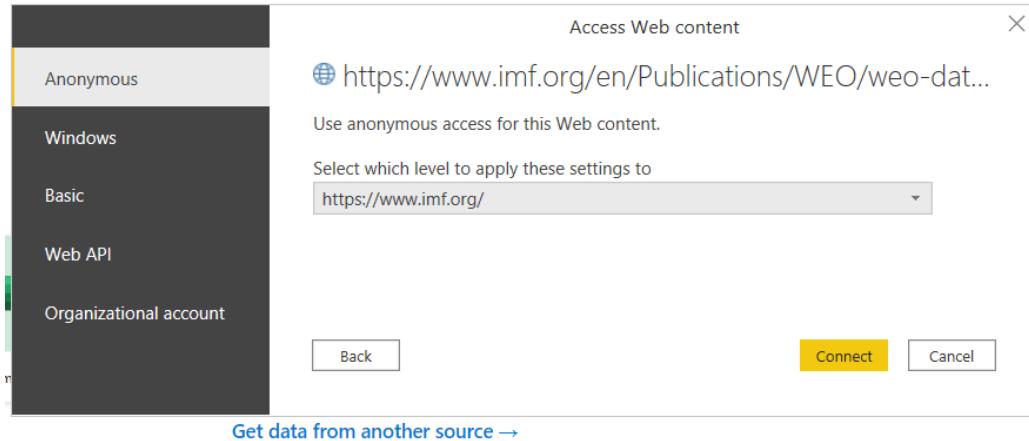
Output :



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.

Navigator

Table View Web View

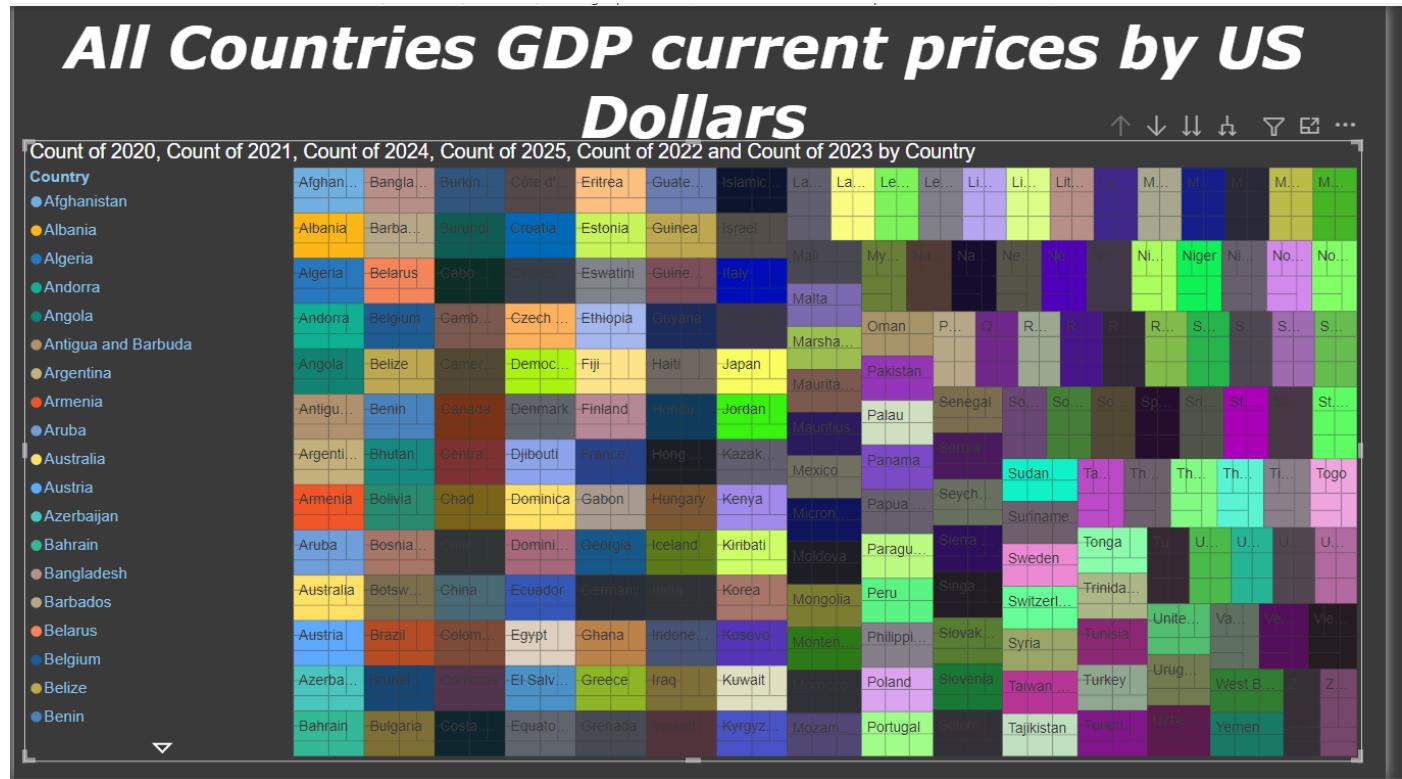
Table 2

Column1	Column2	Column3
Country	Subject Descriptor	Units
Afghanistan	Gross domestic product, current prices	U.S. dollars
Albania	Gross domestic product, current prices	U.S. dollars
Algeria	Gross domestic product, current prices	U.S. dollars
Andorra	Gross domestic product, current prices	U.S. dollars
Angola	Gross domestic product, current prices	U.S. dollars
Antigua and Barbuda	Gross domestic product, current prices	U.S. dollars
Argentina	Gross domestic product, current prices	U.S. dollars
Armenia	Gross domestic product, current prices	U.S. dollars
Aruba	Gross domestic product, current prices	U.S. dollars
Australia	Gross domestic product, current prices	U.S. dollars
Austria	Gross domestic product, current prices	U.S. dollars
Azerbaijan	Gross domestic product, current prices	U.S. dollars
The Bahamas	Gross domestic product, current prices	U.S. dollars
Bahrain	Gross domestic product, current prices	U.S. dollars
Bangladesh	Gross domestic product, current prices	U.S. dollars
Barbados	Gross domestic product, current prices	U.S. dollars
Belarus	Gross domestic product, current prices	U.S. dollars
Belgium	Gross domestic product, current prices	U.S. dollars
Belize	Gross domestic product, current prices	U.S. dollars
Benin	Gross domestic product, current prices	U.S. dollars

Add Table Using Examples Load Transform Data Cancel

9. Remove unwanted rows in home tab select reduce rows and then remove rows and 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 select remove columns which will remove the empty columns.

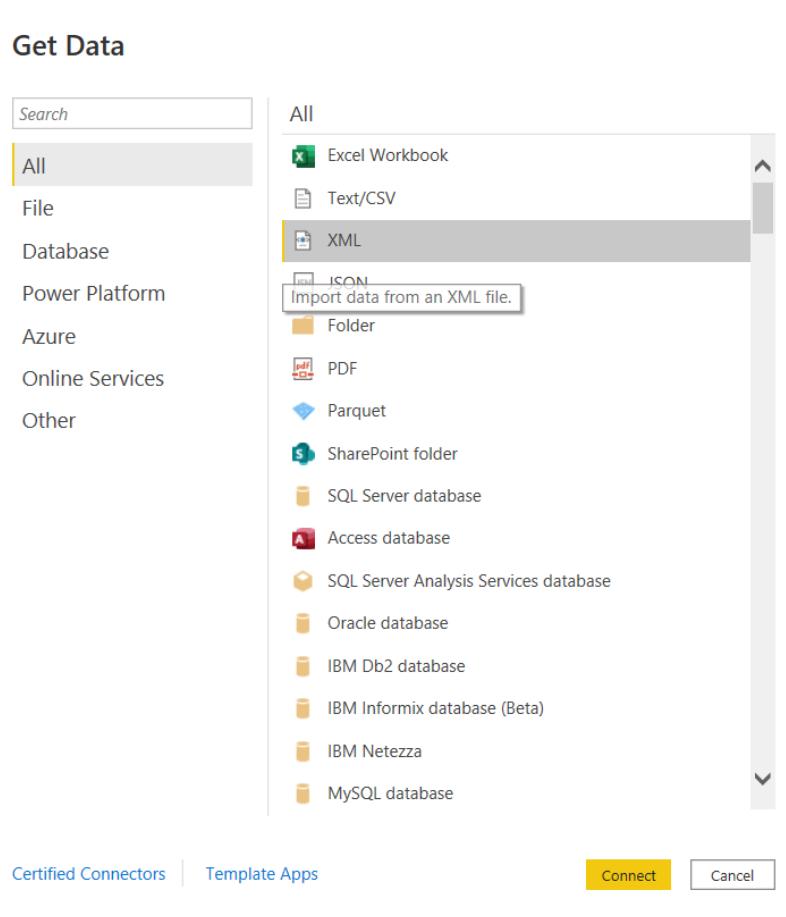
Output :



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

Display Options ▾

AEO 2011 Concept Hierarchy.xml [1]

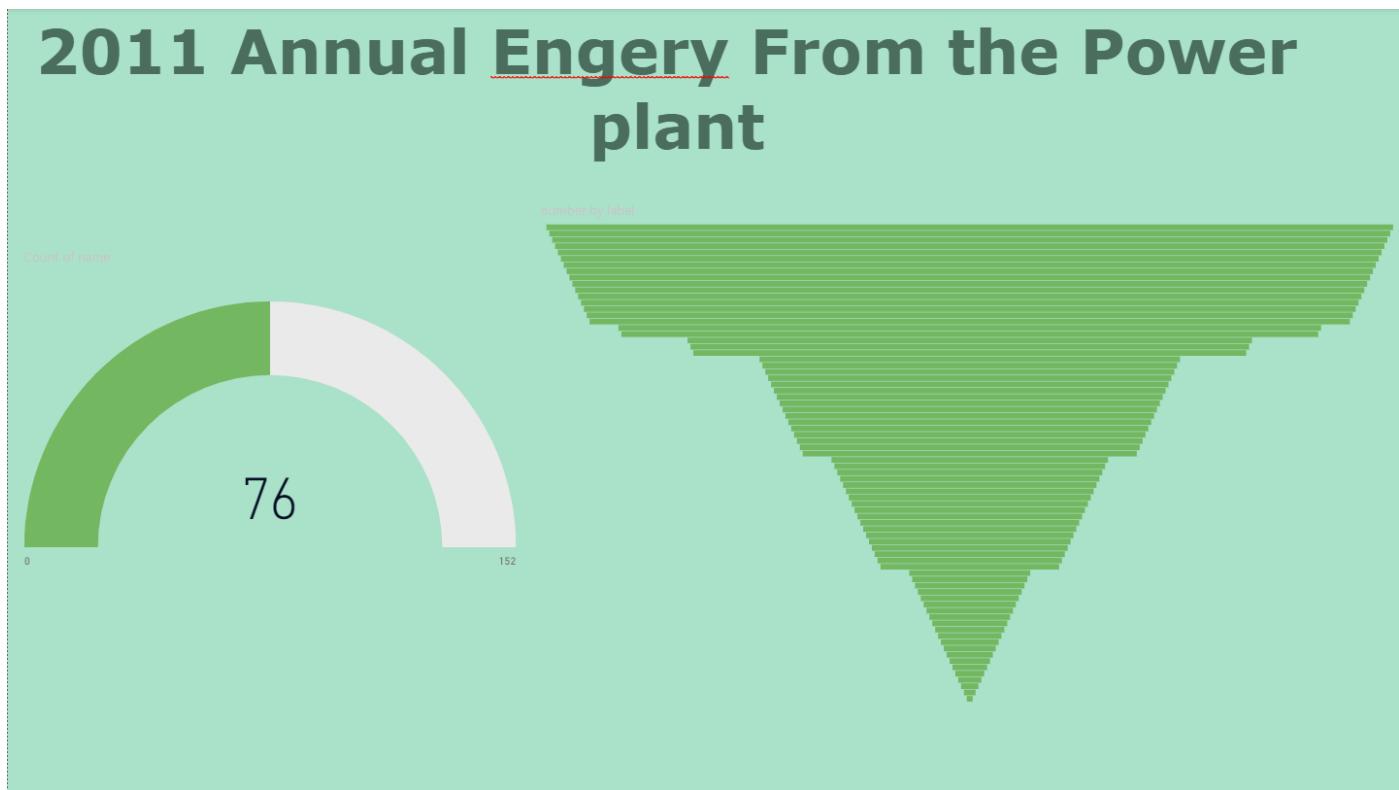
table

label	number	name
Table 1. Total Energy Supply, Disposition, and Price Summary	1	Total E
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 Consu	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	Renewab
Table 17. Renewable Energy Consumption by Sector and Source	17	Renewab
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 Equipm	32	Comme

< >

Load Transform Data Cancel

Output :



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.
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.

Client ID	Name	Age	Sex	Location ID	Joined Ba
PKR81288	Raymond Mills	24	Male	34324	
PKR65833	Julia Spencer	23	Male	42205	
PKR47499	Stephen Murray	27	Female	7314	
PKR72498	Virginia Garza	40	Male	34594	
PKR60181	Melissa Sanders	46	Female	41269	
PKR78532	Samuel Hudson	23	Male	13204	
PKR95683	Timothy Alexander	46	Female	42910	
PKR40785	Carl Martin	78	Female	6127	
PKR13570	Philip Day	67	Female	32656	
PKR53299	Jason Sims	51	Male	28340	
PKR76263	Amy Martinez	55	Male	40459	
PKR56452	David Johnston	73	Female	25563	
PKR28766	Wayne Foster	45	Female	35687	
PKR17897	Carlos Moore	44	Female	19554	
PKR86325	Lisa Johnston	36	Male	33368	
PKR74197	Andrew Mills	55	Male	27913	
PKR28503	Jack Coleman	61	Female	9505	
PKR56539	Aaron Day	56	Female	36232	
PKR53604	Kevin Weaver	43	Female	6299	
PKR32064	Mary Fox	63	Female	7694	

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

Load Transform Data Cancel

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

7. Now navigate to the transform and dropdown the information button and then select the is odd option then the savings account column.

14 COLUMNS, 999+ ROWS - Columns profiling based on top 1000 rows

Type here to search

PREVIEW DOWNLOADED ON SUNDAY 07:49 PM 26-09-2022

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.

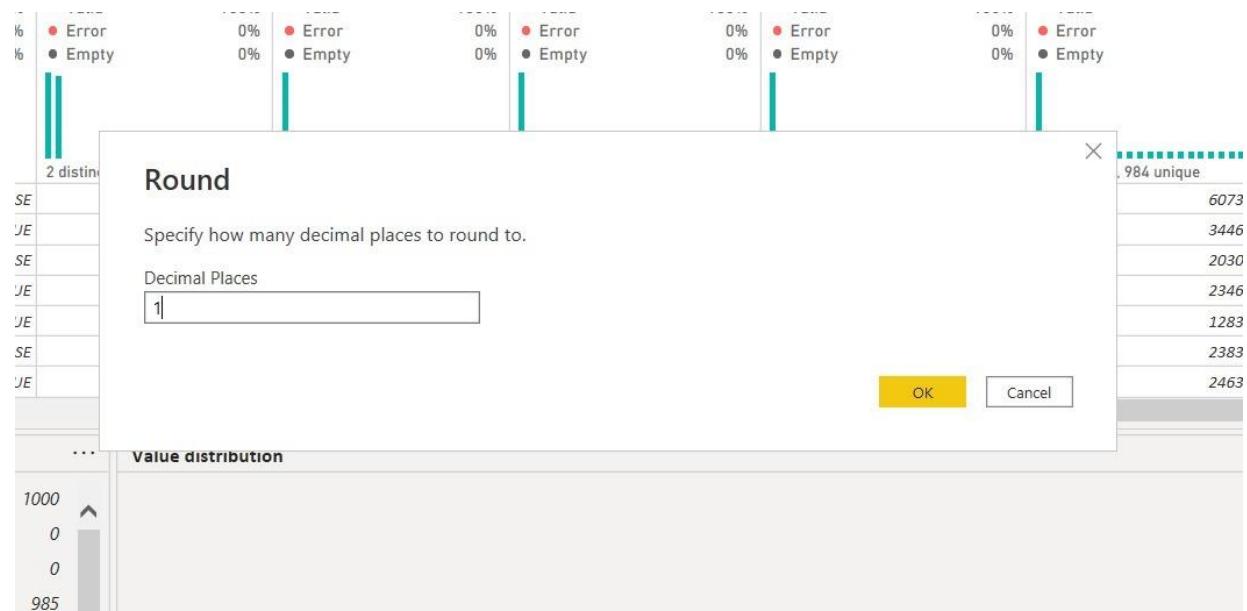
17 COLUMNS, 999+ ROWS - Columns profiling based on top 1000 rows

PREVIEW DOWNLOADED ON SUNDAY

10. Now navigate to the ADD Columns and use the “round” DropDown and use this dropdown on the saving account.

The screenshot shows the Power Query Editor interface with a table named "Banking_Clients". The table has five columns: "Saving_Odd_Amount", "Saving_Even_Amount", "Saving_Sign_Amount", "Saving_Account_Round", and "Saving_Account_RoundDown". The "Saving_Account_RoundDown" column is highlighted. The "APPLIED STEPS" pane on the right lists various steps such as "Removed Columns", "Duplicated Column", and "Renamed Columns".

11. For calculating the round value in a column it will ask the precision of the decimals and see the below pic



12. The final output values of the column will be like in below pic is calculated for all functions like round, roundup, rounddown also.

The screenshot shows the 'Banking_Clients' table in Power BI Desktop. The table contains 30 rows of data with columns: Client ID, Name, Age, Sex, Joined Bank, Nationality, Banking Relationship, Bank Deposits, Saving Accounts, Saving_Odd_Amount, Saving_Even_Amount, Saving_Sign_Amount, and Saving_Account_Round.

Output :

The screenshot shows a Power BI visual titled "Knowing The Round, Even, Odd, Sign Different Functions And Applying On A Banking DataSet". The visual displays a table with the following columns: Saving_Account_Round, Saving_Account_RoundDown, Saving_Account_RoundUp, Saving_Even_Amount, Saving_Odd_Amount, Saving_Sign_Amount, and Saving_Accounts. The table has 15 rows of data and a total row at the bottom.

Saving_Account_Round	Saving_Account_RoundDown	Saving_Account_RoundUp	Saving_Even_Amount	Saving_Odd_Amount	Saving_Sign_Amount	Saving_Accounts
17,24,118.36	1724118	1724119	True	False	1	17,24,118.36
17,12,270.28	1712270	1712271	True	False	1	17,12,270.28
16,61,769.83	1661769	1661770	False	True	1	16,61,769.83
15,74,475.78	1574475	1574476	False	True	1	15,74,475.78
15,66,778.15	1566778	1566779	True	False	1	15,66,778.15
15,49,728.93	1549728	1549729	True	False	1	15,49,728.93
15,07,703.66	1507703	1507704	False	True	1	15,07,703.66
14,52,705.47	1452705	1452706	False	True	1	14,52,705.47
14,26,470.71	1426470	1426471	True	False	1	14,26,470.71
14,22,244.37	1422244	1422245	True	False	1	14,22,244.37
14,14,641.84	1414641	1414642	False	True	1	14,14,641.84
13,85,917.65	1385917	1385918	False	True	1	13,85,917.65
13,71,926.94	1371926	1371927	True	False	1	13,71,926.94
13,68,697.46	1368697	1368698	False	True	1	13,68,697.46
13,49,469.29	1349469	1349470	False	True	1	13,49,469.29
Total						2966 69,87,25,060.31

Aim : Generation of Dates based on present date and then add a index Column to it and visualize the data.

Procedure :

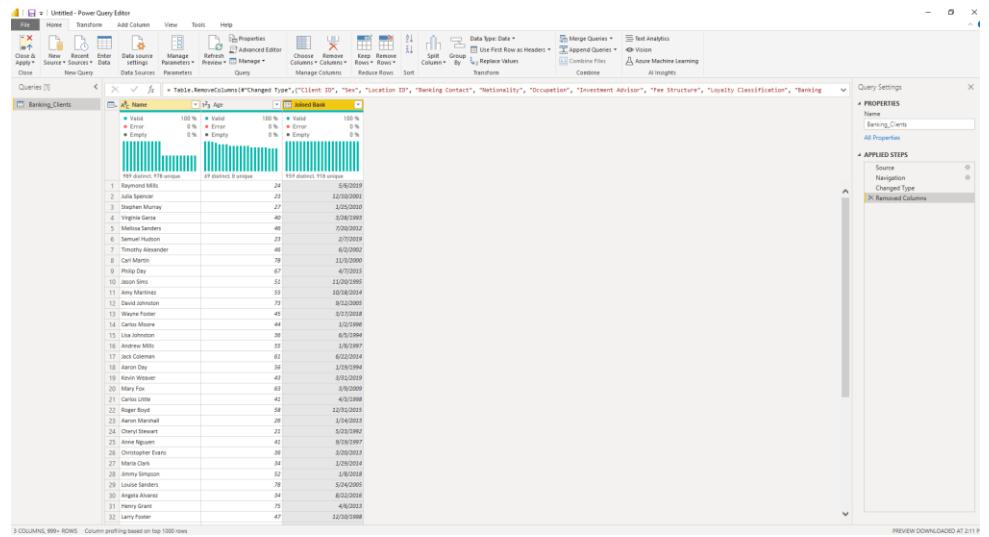
1. Take any bank dataset and then load into the power bi and then click on Transform data to do some modifications.

Client ID	Name	Age	Sex	Location ID	Joined Ba
PKR81288	Raymond Mills	24	Male	34324	
PKR65833	Julia Spencer	23	Male	42205	12
PKR47499	Stephen Murray	27	Female	7314	1
PKR72498	Virginia Garza	40	Male	34594	3
PKR60181	Melissa Sanders	46	Female	41269	7
PKR78532	Samuel Hudson	23	Male	13204	
PKR95683	Timothy Alexander	46	Female	42910	1
PKR40785	Carl Martin	78	Female	6127	1
PKR13570	Philip Day	67	Female	32656	
PKR53299	Jason Sims	51	Male	28340	11
PKR76263	Amy Martinez	55	Male	40459	10
PKR56452	David Johnston	73	Female	25563	9
PKR28766	Wayne Foster	45	Female	35687	3
PKR17897	Carlos Moore	44	Female	19554	
PKR86325	Lisa Johnston	36	Male	33368	1
PKR74197	Andrew Mills	55	Male	27913	
PKR28503	Jack Coleman	61	Female	9505	6
PKR56539	Aaron Day	56	Female	36232	1
PKR53604	Kevin Weaver	43	Female	6299	3
PKR32064	Mary Fox	63	Female	7694	

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

Load Transform Data Cancel

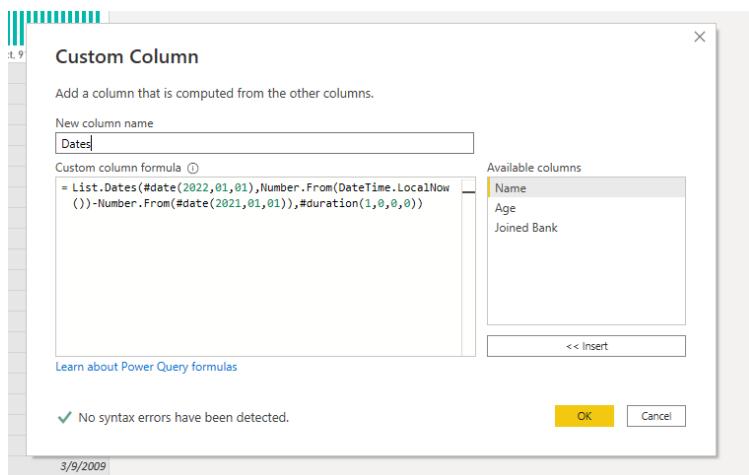
2. After loading the file in to query editor the next step is to remove the unnecessary columns or attributes so that our task to execute and easy to analyze the data.



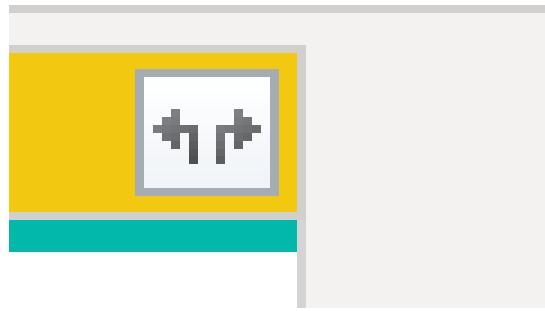
3. Now, navigate to the ADD Column there you can see the how to add a custom column and click on it.



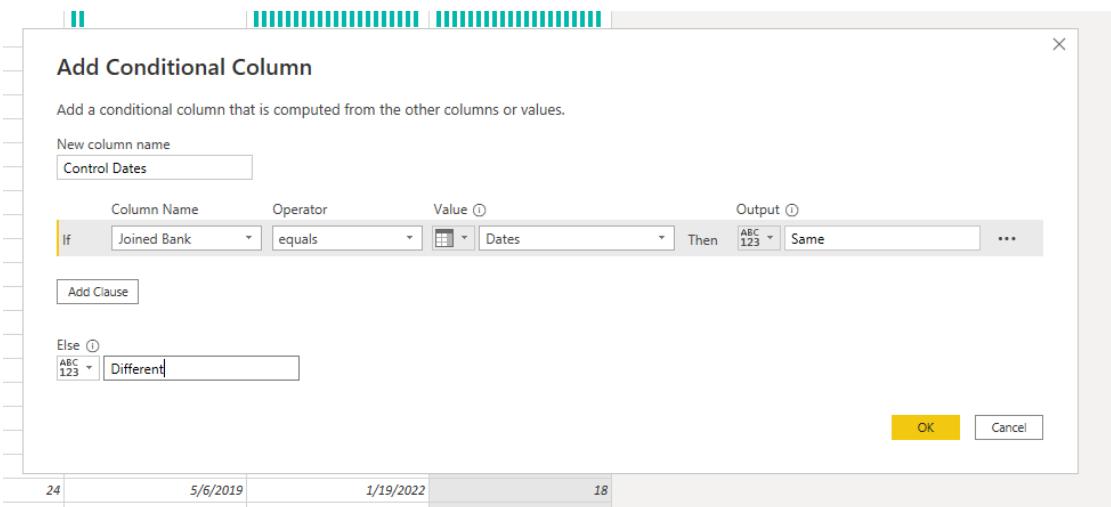
4. Now, write a query to get the list o dat which are subtracted from the joined dates. And then click on OK.



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 conditional 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.

Name	Age	Joined Bank	Dates	Index	Control Dates
Angela Lynch	76	Thursday, April 12, 2018	Saturday, January 1, 2022	886555	Different
Angela Lynch	76	Thursday, April 12, 2018	Sunday, January 2, 2022	886556	Different
Angela Lynch	76	Thursday, April 12, 2018	Monday, January 3, 2022	886557	Different
Angela Lynch	76	Thursday, April 12, 2018	Tuesday, January 4, 2022	886558	Different
Angela Lynch	76	Thursday, April 12, 2018	Wednesday, January 5, 2022	886559	Different
Angela Lynch	76	Thursday, April 12, 2018	Thursday, January 6, 2022	886560	Different
Angela Lynch	76	Thursday, April 12, 2018	Friday, January 7, 2022	886561	Different
Angela Lynch	76	Thursday, April 12, 2018	Saturday, January 8, 2022	886562	Different
Angela Lynch	76	Thursday, April 12, 2018	Sunday, January 9, 2022	886563	Different
Angela Lynch	76	Thursday, April 12, 2018	Monday, January 10, 2022	886564	Different
Angela Lynch	76	Thursday, April 12, 2018	Tuesday, January 11, 2022	886565	Different
Angela Lynch	76	Thursday, April 12, 2018	Wednesday, January 12, 2022	886566	Different
Angela Lynch	76	Thursday, April 12, 2018	Thursday, January 13, 2022	886567	Different
Angela Lynch	76	Thursday, April 12, 2018	Friday, January 14, 2022	886568	Different
Angela Lynch	76	Thursday, April 12, 2018	Saturday, January 15, 2022	886569	Different
Angela Lynch	76	Thursday, April 12, 2018	Sunday, January 16, 2022	886570	Different
Angela Lynch	76	Thursday, April 12, 2018	Monday, January 17, 2022	886571	Different
Angela Lynch	76	Thursday, April 12, 2018	Tuesday, January 18, 2022	886572	Different
Angela Lynch	76	Thursday, April 12, 2018	Wednesday, January 19, 2022	886573	Different
Angela Lynch	76	Thursday, April 12, 2018	Thursday, January 20, 2022	886574	Different
Angela Lynch	76	Thursday, April 12, 2018	Friday, January 21, 2022	886575	Different
Angela Lynch	76	Thursday, April 12, 2018	Saturday, January 22, 2022	886576	Different
Angela Lynch	76	Thursday, April 12, 2018	Sunday, January 23, 2022	886577	Different
Angela Lynch	76	Thursday, April 12, 2018	Monday, January 24, 2022	886578	Different
Angela Lynch	76	Thursday, April 12, 2018	Tuesday, January 25, 2022	886579	Different
Angela Lynch	76	Thursday, April 12, 2018	Wednesday, January 26, 2022	886580	Different
Angela Lynch	76	Thursday, April 12, 2018	Thursday, January 27, 2022	886581	Different
Angela Lynch	76	Thursday, April 12, 2018	Friday, January 28, 2022	886582	Different
Angela Lynch	76	Thursday, April 12, 2018	Saturday, January 29, 2022	886583	Different
Angela Lynch	76	Thursday, April 12, 2018	Sunday, January 30, 2022	886584	Different
Angela Lynch	76	Thursday, April 12, 2018	Monday, January 31, 2022	886585	Different
Angela Lynch	76	Thursday, April 12, 2018	Tuesday, February 1, 2022	886586	Different
Angela Lynch	76	Thursday, April 12, 2018	Wednesday, February 2, 2022	886587	Different
Angela Lynch	76	Thursday, April 12, 2018	Thursday, February 3, 2022	886588	Different
Angela Lynch	76	Thursday, April 12, 2018	Friday, February 4, 2022	886589	Different
Angela Lynch	76	Thursday, April 12, 2018	Saturday, February 5, 2022	886590	Different
Angela Lynch	76	Thursday, April 12, 2018	Sunday, February 6, 2022	886591	Different
Angela Lynch	76	Thursday, April 12, 2018	Monday, February 7, 2022	886592	Different

Output :

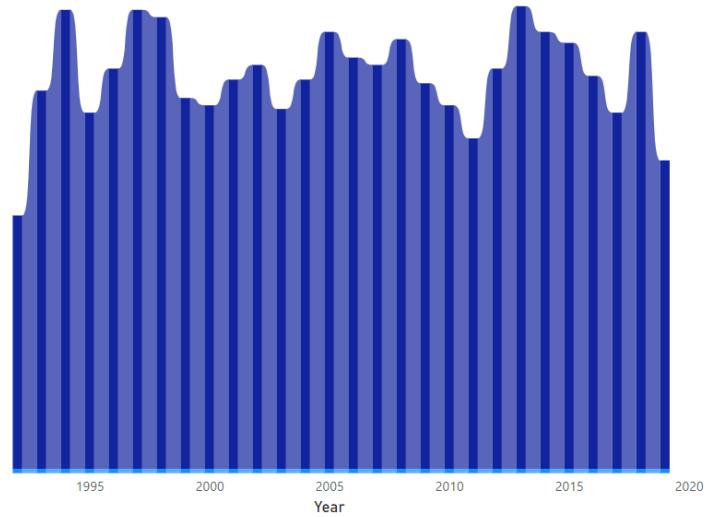
Bank Employee's Joining Day Report

Bank Joining Dates

Index	Name	Year	Year	Control Dates
498468090	Aaron Bryant	2009	2022	Different
363351079	Aaron Bryant	2009	2023	Different
349223970	Aaron Burke	2014	2022	Different
254586871	Aaron Burke	2014	2023	Different
394826340	Aaron Cook	1999	2022	Different
287820379	Aaron Cook	1999	2023	Different
3981785	Aaron Day	1994	2022	Different
2985717	Aaron Day	1994	2023	Different
104859755	Aaron Edwards	2000	2022	Different
76502265	Aaron Edwards	2000	2023	Different
469448400	Aaron Evans	2017	2022	Different
342202483	Aaron Evans	2017	2023	Different
682029145	Aaron Ferguson	1999	2022	Different
497124341	Aaron Ferguson	1999	2023	Different
553052745	Aaron George	2017	2022	Different
403130581	Aaron George	2017	2023	Different
530251560	Aaron Gray	2002	2022	Different
386513827	Aaron Gray	2002	2023	Different
1791723553500				

Count of Year and Count of Name by Year

● Count of Year ● Count of Name



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.

Client ID	Name	Age	Sex	Location ID	Joined Ba
PKR81288	Raymond Mills	24	Male	34324	12
PKR65833	Julia Spencer	23	Male	42205	12
PKR47499	Stephen Murray	27	Female	7314	1
PKR72498	Virginia Garza	40	Male	34594	3
PKR60181	Melissa Sanders	46	Female	41269	7
PKR78532	Samuel Hudson	23	Male	13204	-
PKR95683	Timothy Alexander	46	Female	42910	1
PKR40785	Carl Martin	78	Female	6127	1
PKR13570	Philip Day	67	Female	32656	-
PKR53299	Jason Sims	51	Male	28340	11
PKR76263	Amy Martinez	55	Male	40459	10
PKR56452	David Johnston	73	Female	25563	9
PKR28766	Wayne Foster	45	Female	35687	3
PKR17897	Carlos Moore	44	Female	19554	-
PKR86325	Lisa Johnston	36	Male	33368	1
PKR74197	Andrew Mills	55	Male	27913	-
PKR28503	Jack Coleman	61	Female	9505	6
PKR56539	Aaron Day	56	Female	36232	1
PKR53604	Kevin Weaver	43	Female	6299	3
PKR32064	Mary Fox	63	Female	7694	-

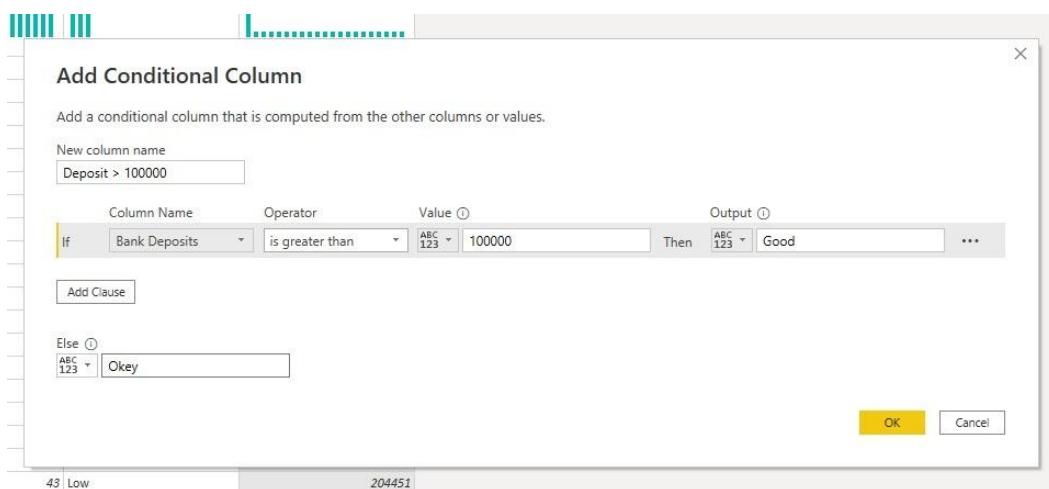
The data in the preview has been truncated due to size limits.

Load Transform Data Cancel

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.

A ^B C Name	i ² ₃ Age	A ^B C Fee Structure	i ² ₃ Bank Deposits
Valid	100 %	Valid	100 %
Error	0 %	Error	0 %
Empty	0 %	Empty	0 %
989 distinct, 978 unique	69 distinct, 0 unique	3 distinct, 0 unique	985 distinct, 984 unique
1 Raymond Mills	24 High		1485829
2 Julia Spencer	23 High		641483
3 Stephen Murray	27 High		1033402
4 Virginia Garza	40 Mid		1048157
5 Melissa Sanders	46 Mid		487783
6 Samuel Hudson	23 High		1307269
7 Timothy Alexander	46 High		41200
8 Carl Martin	78 Mid		156983
9 Philip Day	67 High		1242347
10 Jason Sims	51 Mid		317247
11 Amy Martinez	55 High		37980
12 David Johnston	73 Mid		749008
13 Wayne Foster	45 Low		616331
14 Carlos Moore	44 High		802863
15 Lisa Johnston	36 High		116400
16 Andrew Mills	55 Mid		317542
17 Jack Coleman	61 High		2446252
18 Aaron Day	56 Low		55119
19 Kevin Weaver	43 Low		204451
20 Mary Fox	63 Mid		966281
21 Carlos Little	41 Low		38407
22 Roger Boyd	58 High		547460
23 Aaron Marshall	26 Mid		103872
24 Cheryl Stewart	21 High		1115098
25 Anne Nguyen	41 High		132961
26 Christopher Evans	36 High		302541
27 Maria Clark	34 High		1724818
28 Jimmy Simpson	52 High		192712
29 Louise Sanders	78 Low		765154
30 Angela Alvarez	34 Low		447805
31 Henry Grant	75 Low		2098820
32 Larry Foster	47 High		976553

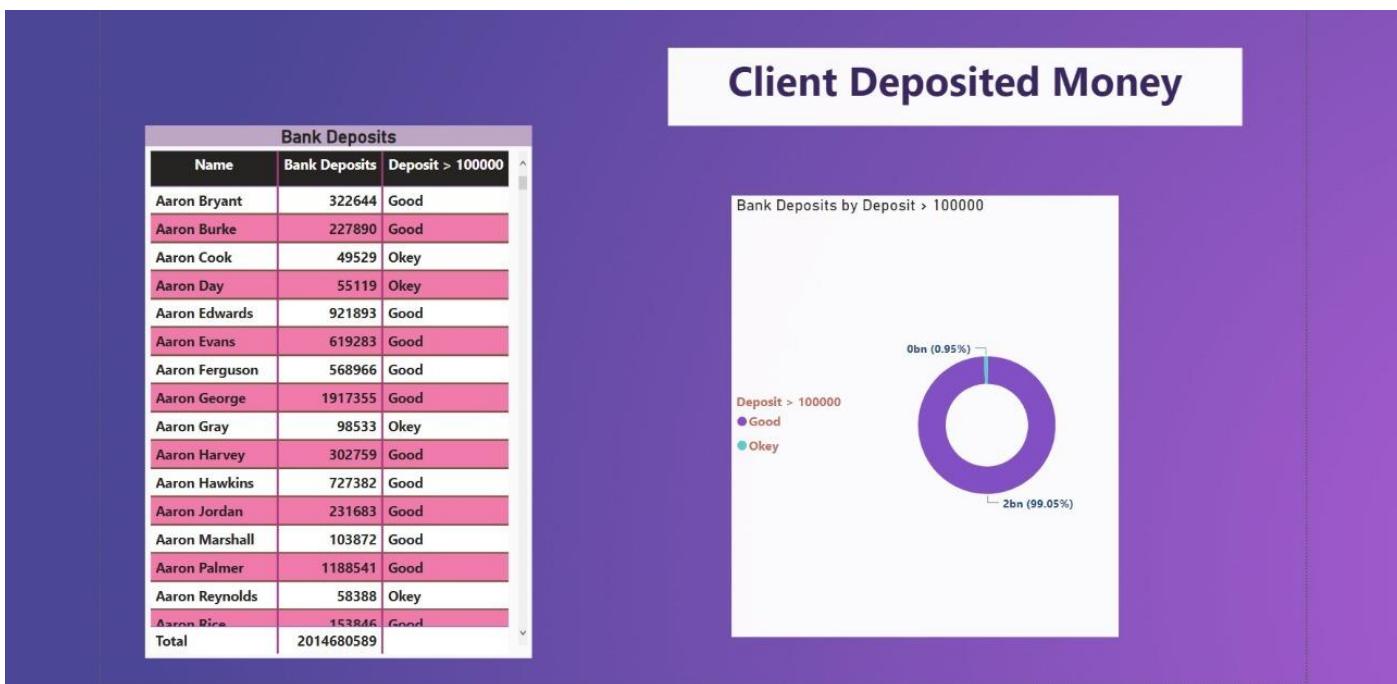
4. Now, navigate to the ADD Column there you will find an option called add an conditional column now, click on that and apply condition on that column so that you can filter your data.



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.

Output :

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.

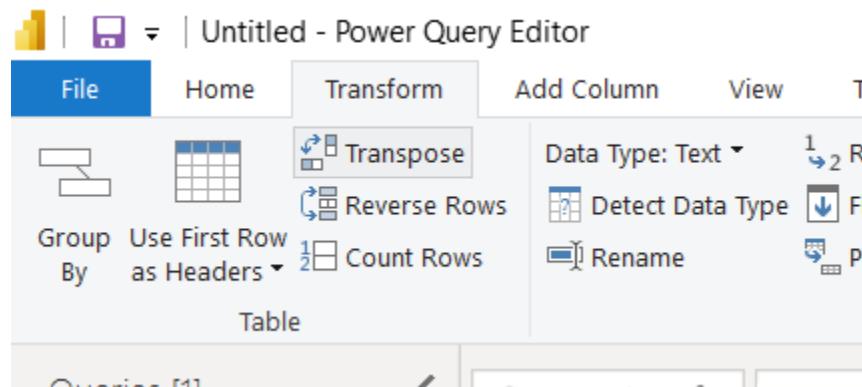
product.csv

PRODUCT	TRXN_DATE	SALES
A	11-02-2019	120
A	11-02-2019	140
B	11-02-2019	200
B	11-02-2019	120

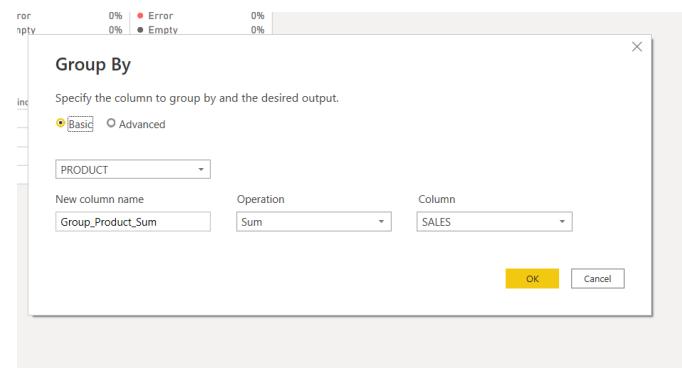
2. When you click on transform data then you will enter into a new window called power bi query editor which is also known as kitchen of the power bi.

	PRODUCT	TRXN_DATE	SALES
Valid	100%	Valid	100%
Error	0%	Error	0%
Empty	0%	Empty	0%
2 distinct, 0 unique		1 distinct, 0 unique	
1	A	11-02-2019	120
2	A	11-02-2019	140
3	B	11-02-2019	200
4	B	11-02-2019	120

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.



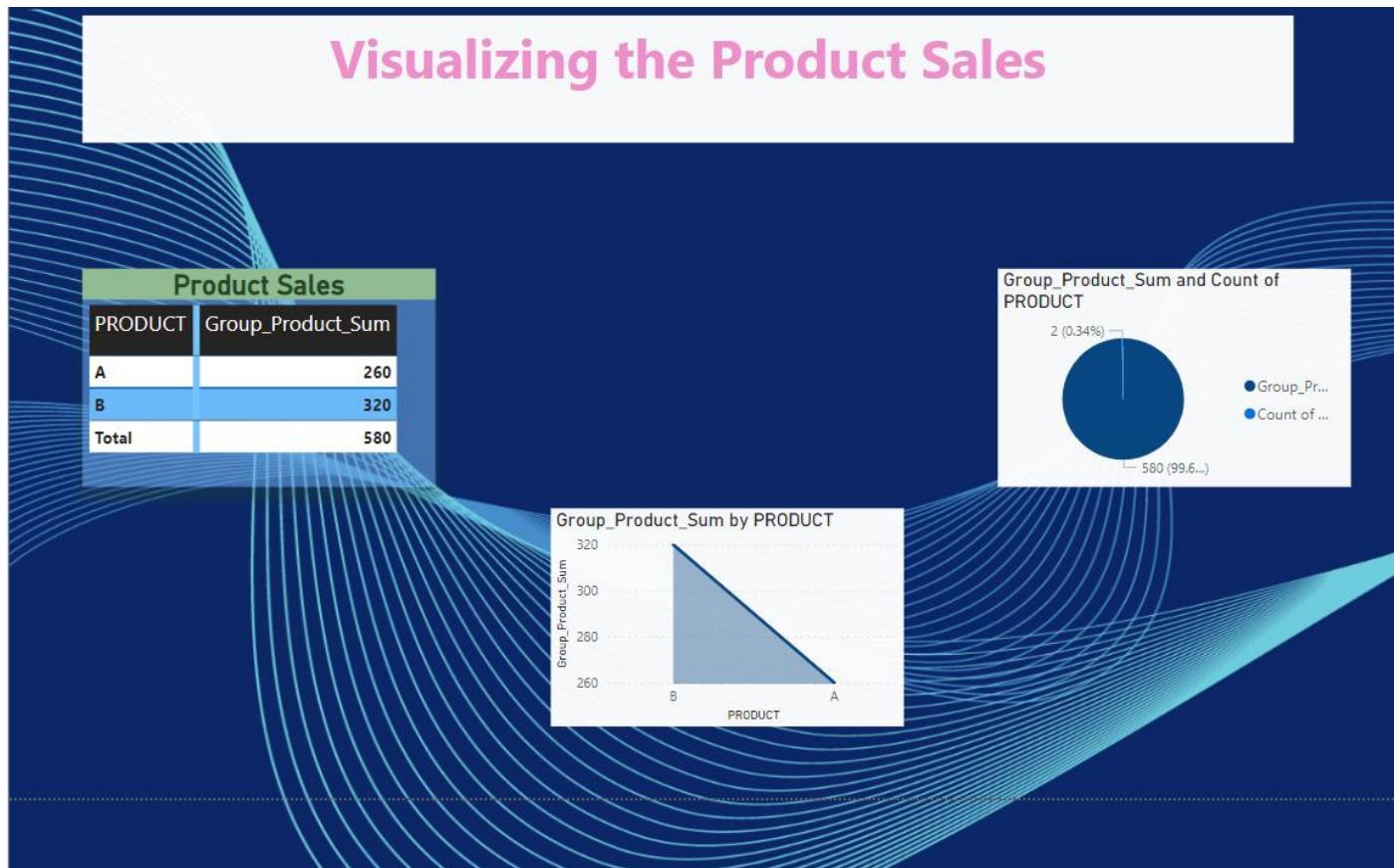
5. After clicking on group by option now select the product column i.e data will be grouped by based as product and performs aggregate sum operation also.



6. This is the final result after performing the group by operation .

PRODUCT		1.2 Group_Product_Sum	
Valid	100%	Valid	100%
Error	0%	Error	0%
Empty	0%	Empty	0%
2 distinct, 2 unique		2 distinct, 2 unique	
1 A			260
2 B			320

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.

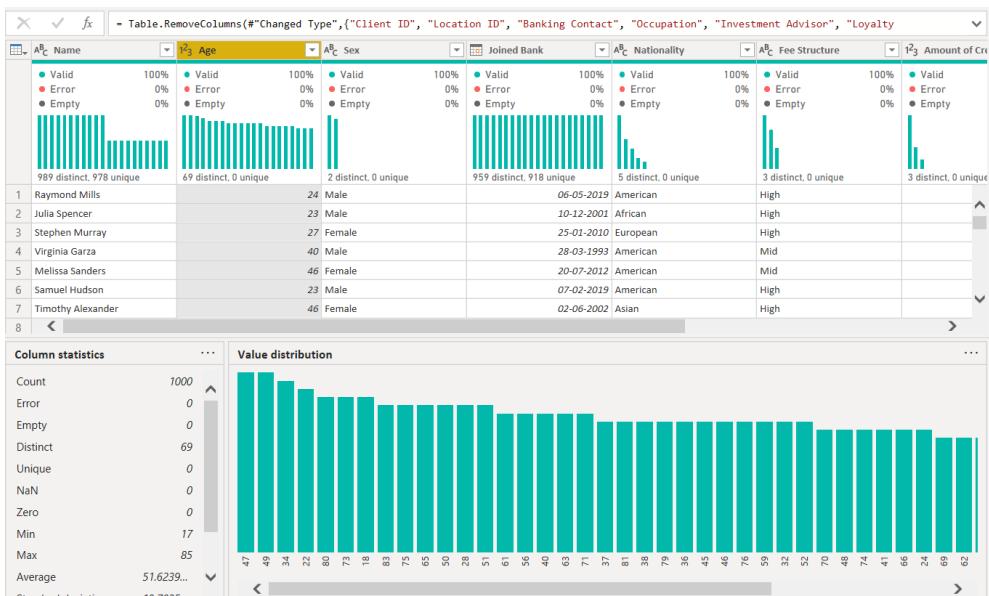
Client ID	Name	Age	Sex	Location ID	Joined Ba
PKR81288	Raymond Mills	24	Male	34324	.
PKR65833	Julia Spencer	23	Male	42205	12,
PKR47499	Stephen Murray	27	Female	7314	1,
PKR72498	Virginia Garza	40	Male	34594	3,
PKR60181	Melissa Sanders	46	Female	41269	7,
PKR78532	Samuel Hudson	23	Male	13204	.
PKR95683	Timothy Alexander	46	Female	42910	.
PKR40785	Carl Martin	78	Female	6127	1,
PKR13570	Philip Day	67	Female	32656	.
PKR53299	Jason Sims	51	Male	28340	11,
PKR76263	Amy Martinez	55	Male	40459	10,
PKR56452	David Johnston	73	Female	25563	9,
PKR28766	Wayne Foster	45	Female	35687	3,
PKR17897	Carlos Moore	44	Female	19554	.
PKR86325	Lisa Johnston	36	Male	33368	1,
PKR74197	Andrew Mills	55	Male	27913	.
PKR28503	Jack Coleman	61	Female	9505	6,
PKR56539	Aaron Day	56	Female	36232	1,
PKR53604	Kevin Weaver	43	Female	6299	3,
PKR32064	Mary Fox	63	Female	7694	.

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

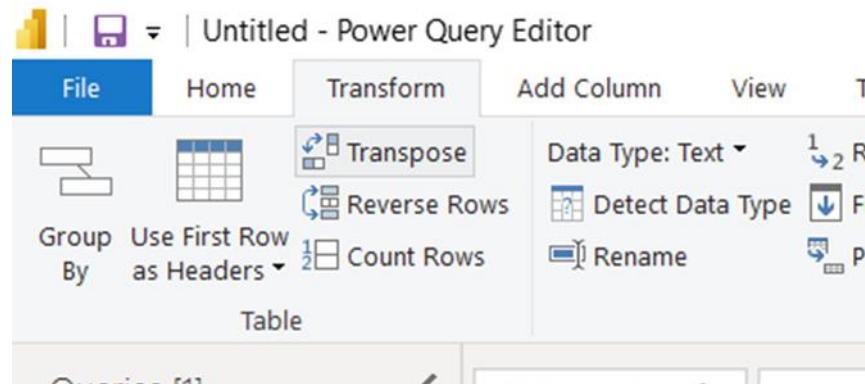
Load Transform Data Cancel

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.

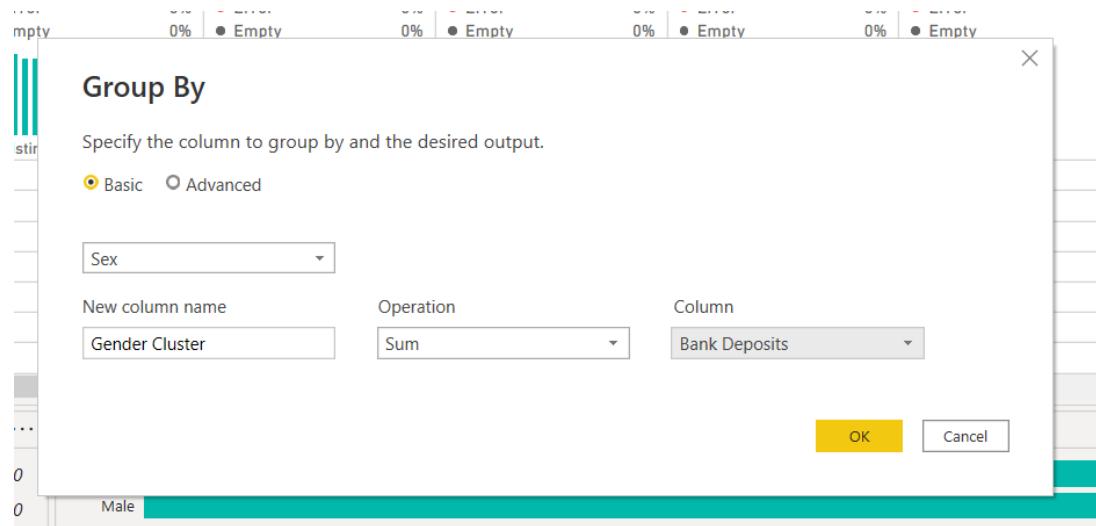
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4. Navigate to the Transform there you can find the group by operation click on the option then fill the details in the pop up box and then click ok.



5. Now, do group the sex attribute and apply the aggregate sum operation on bank deposits make sure that attribute should contain labelled data.



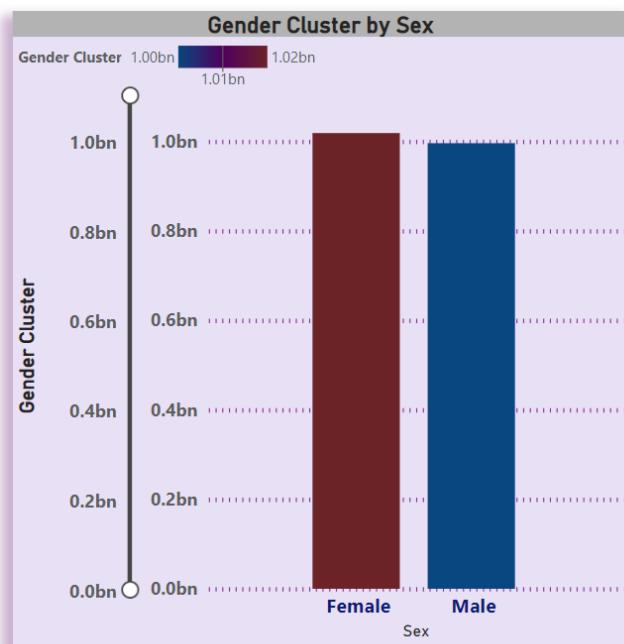
6. The final data will be like below pic after grouping the sex attribute.

Sex		Gender Cluster
Valid	100%	Valid
Error	0%	Error
Empty	0%	Empty
2 distinct, 2 unique		2 distinct, 2 unique
1 Male		996003473.9
2 Female		1018677108

Output :

Aggregate Sum Of Bank Deposits By Using Group By Gender

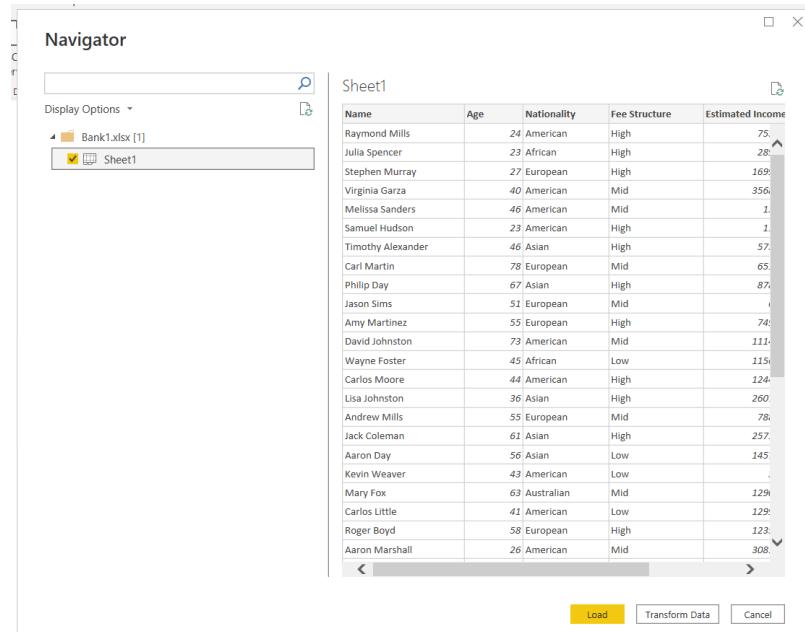
Bank Deposits	
Sex	Gender Cluster
Female	1,01,86,77,107.64
Male	99,60,03,473.89
Total	2,01,46,80,581.53



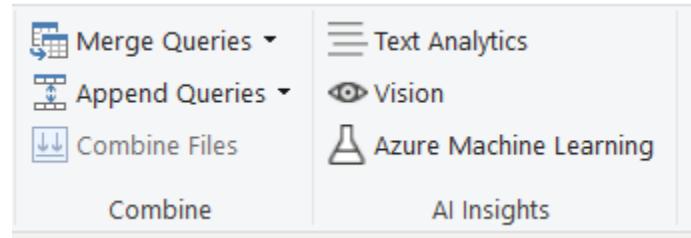
Aim : Apply joins and merging queries topic in any dataset and
Visualize it.

Procedure :

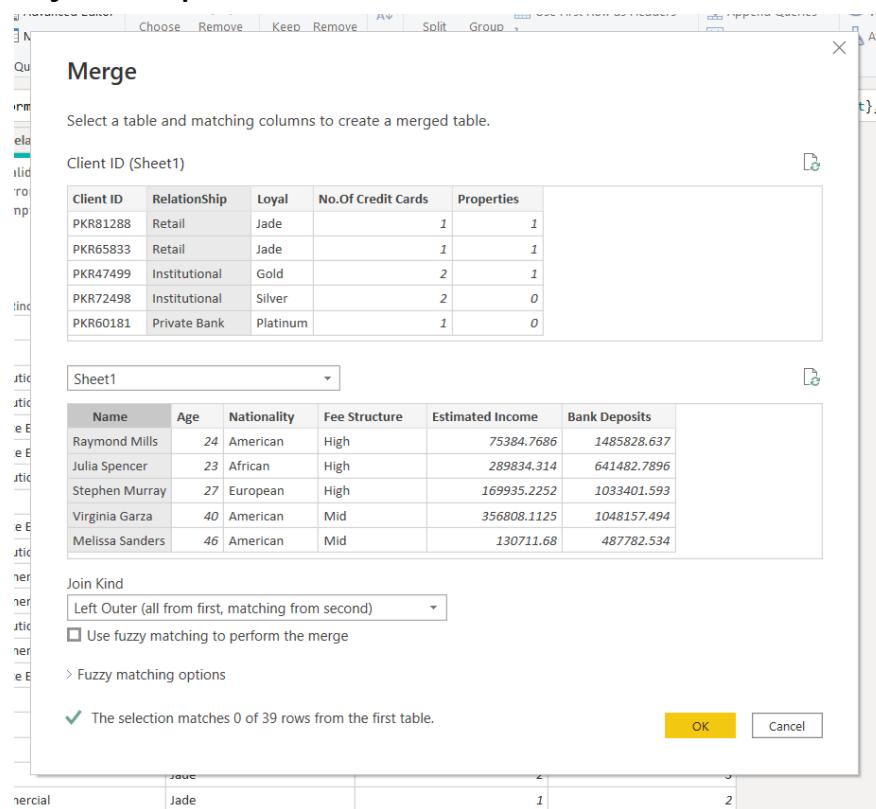
1. To apply joins we shold have atleast 2 Tables or relations.
2. First, we have load the both relations or tables into an power bi.
3. After click on Get Data select the excel option to load the fisrt table into an power bi after then click on Load option.



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.



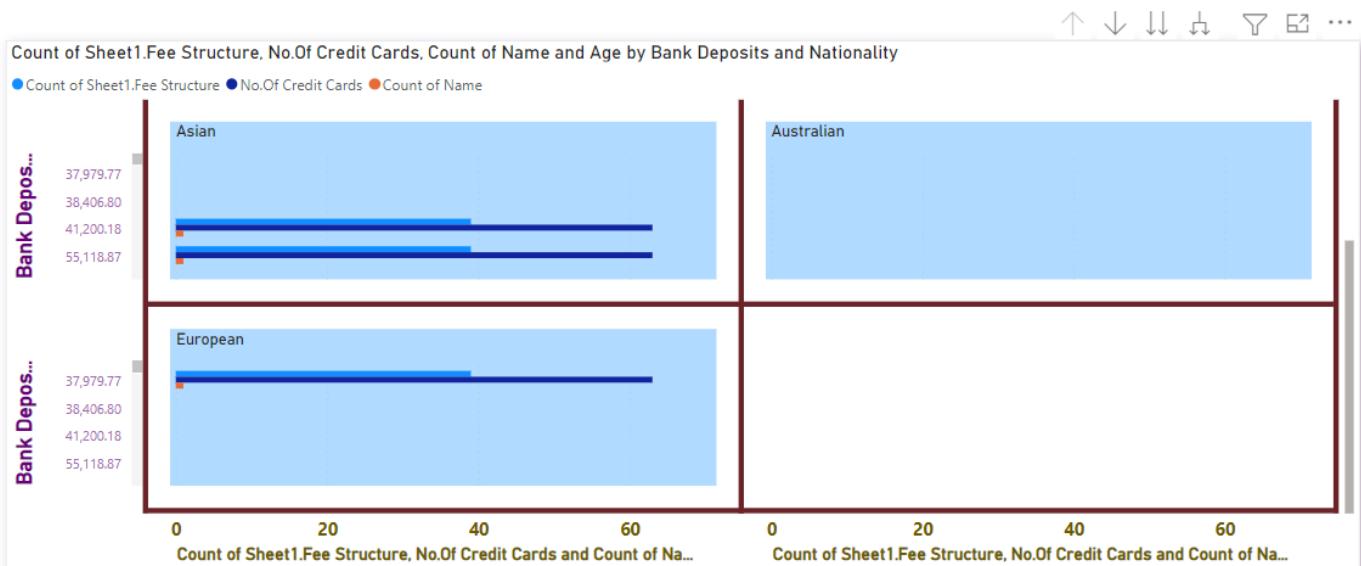
7. Then you will get an pop up window fill the required details to perform the joins operation.



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.

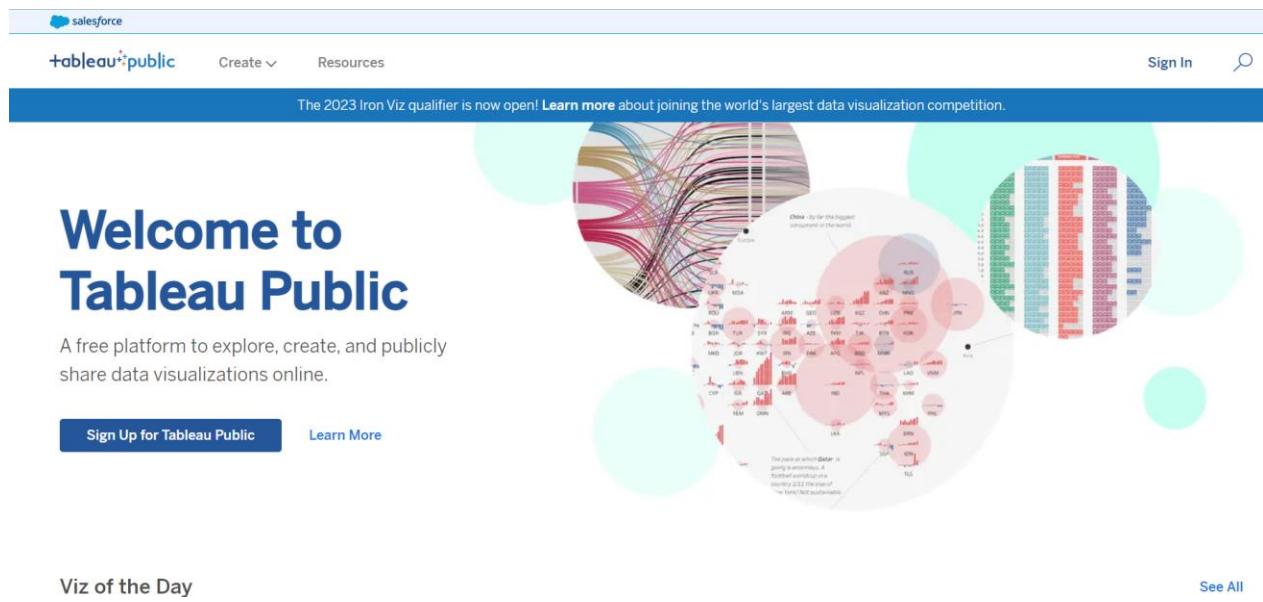
Result : Sucessfully completed the Aim .

Task – 9

Aim : Installation of the tableau application.

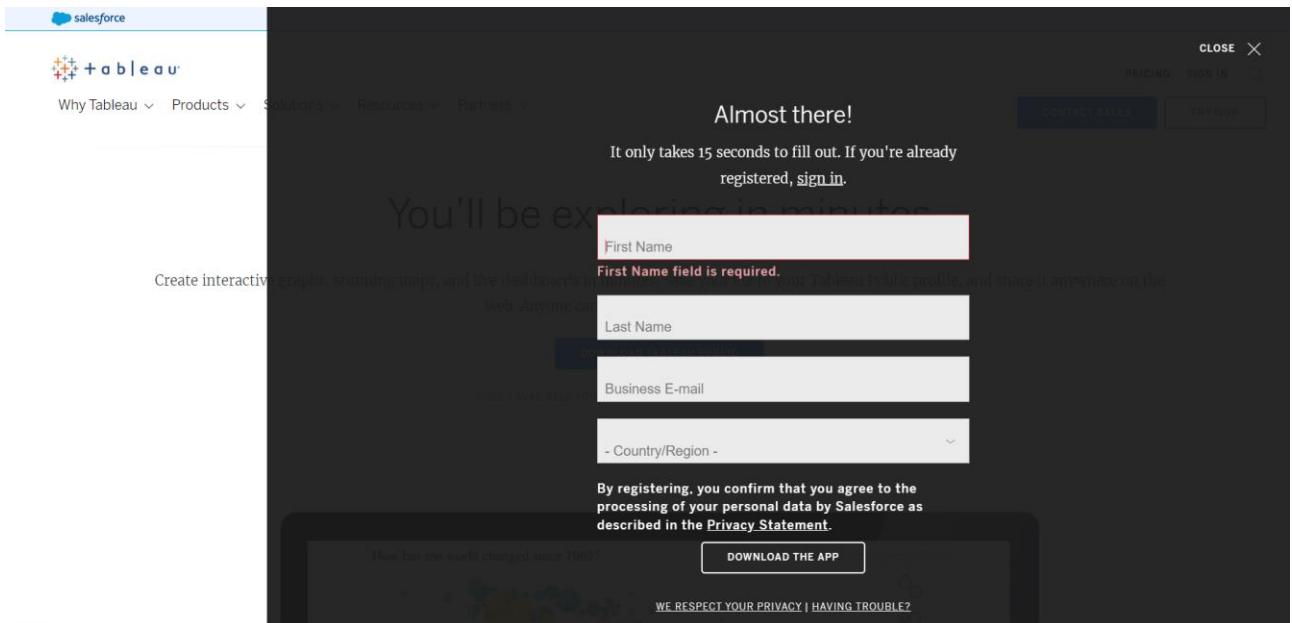
Procedure :

1. Open any interactive browser and type the url i.e;
<https://public.tableau.com> .
2. After visiting to that site then navigate to the create dropdown in the navigation bar and there select the “download tableau public version.”

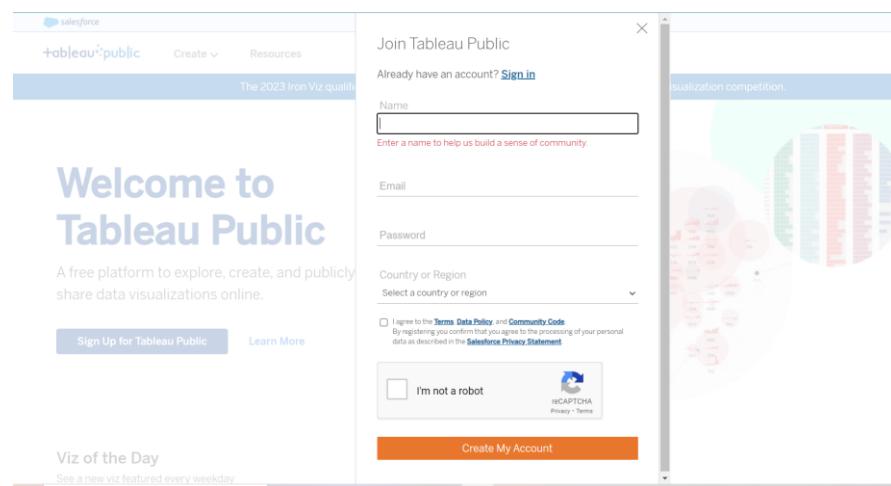


3. After clicking on the option it will ask the registration form details.
4. Fill the form with your details and then click on the download.

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5. After clicking on the download option then you can the application on your system.
6. To save the work on the tableau application you have to create a account in the <https://public.tableau.com> .



7. The account you have created is also called a tableau viz account.
8. Where all your work will be saved to this account.
9. And it's is in public state by default.

Result : successfully installed the application.

Task - 10

Aim : implement pie chart, area chart, bubble chart on real time data.

Procedure :

1. Open the tableau application and then load the real time dataset on to the tableau.

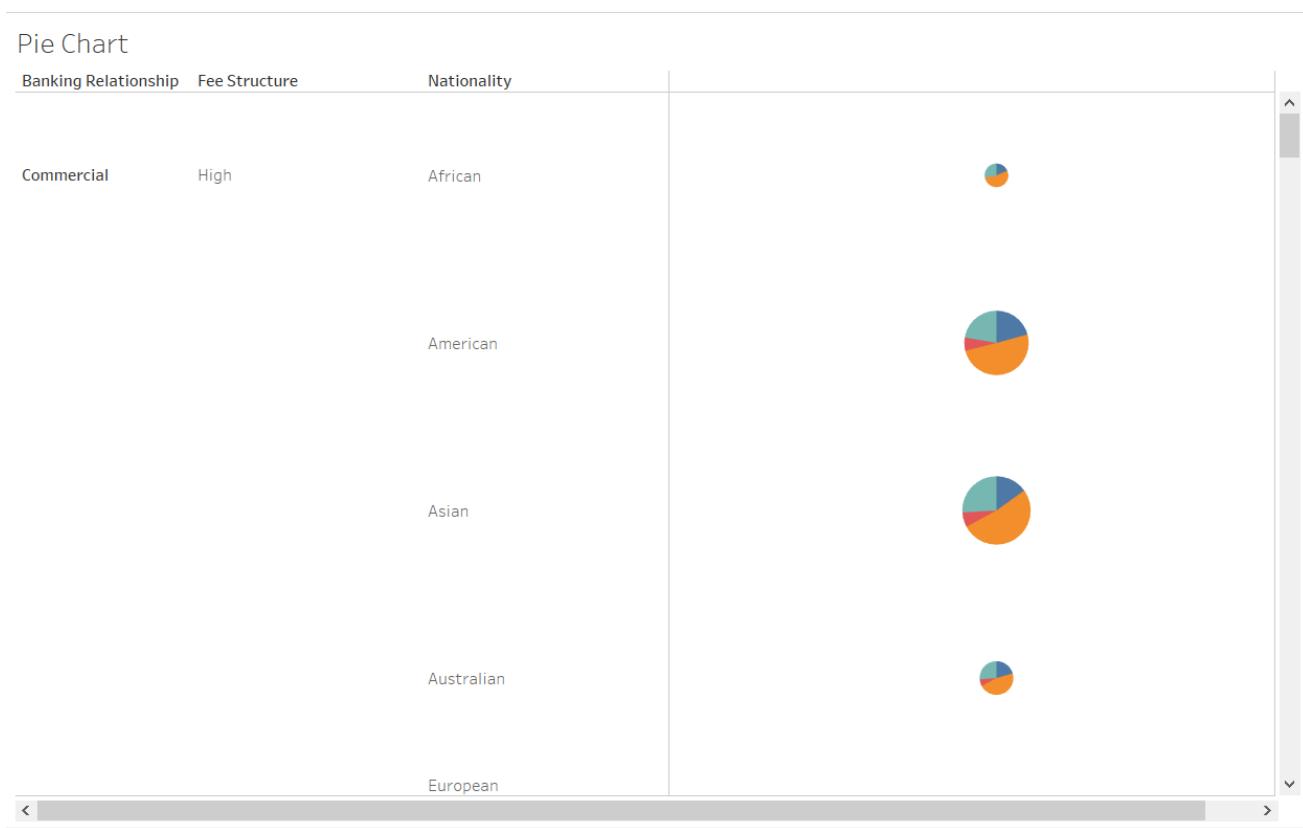
The screenshot shows the Tableau Public interface with a connection to a Microsoft Excel file named 'Bank_analysis'. The connection is titled 'Clients - Banking (Bank_analysis)'. The data preview shows 25 fields and 3000 rows. The columns include Client ID, Name, Age, Sex, Location ID, Joined Bank, and Banking Contact. A tooltip 'Go to Worksheet' points to the 'Sheet1' tab at the bottom.

	Client ID	Name	Age	Sex	Location ID	Joined Bank	Banking Contact
PKR81288	Raymond Mills	24	Male	34324	06-05-2019	Anthony Torres	
PKR65833	Julia Spencer	23	Male	42205	10-12-2001	Jonathan Hawkins	
PKR47499	Stephen Murray	27	Female	7314	25-01-2010	Anthony Berry	
PKR72498	Virginia Garza	40	Male	34594	28-03-1993	Steve Diaz	
PKR60181	Melissa Sanders	46	Female	41269	20-07-2012	Shawn Long	
PKR78532	Samuel Hudson	23	Male	13204	07-02-2019	Douglas Tucker	

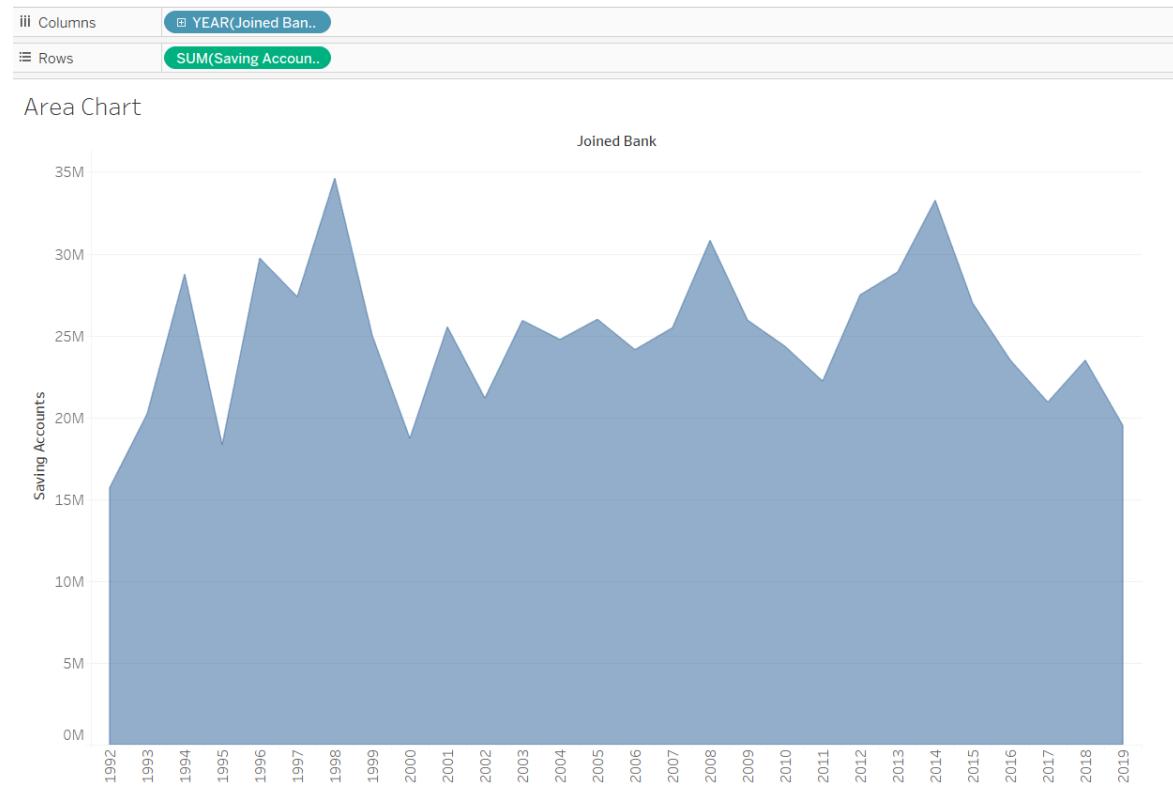
2. Now create a Pie Chart with an connection between banking relationship, fee structure , nationality.
3. And create a Area chart with year and saving account attribute and make sure that it is having discrete data on those attributes.
4. Last one create a packed bubble chart with occupation and risk weighting analysis attributes.

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5. Pie chart :



6. Area Chart :



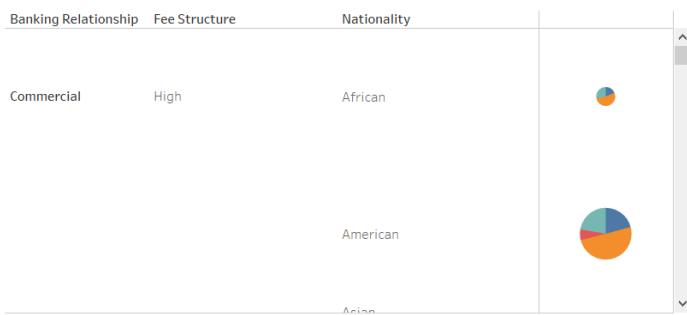
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7. Packed Bubble chart :

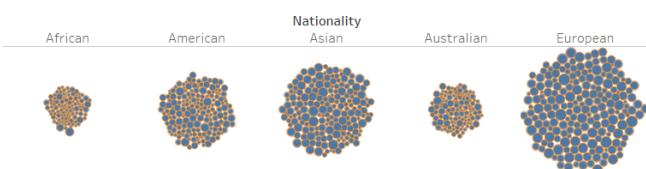


Output :

Pie Chart

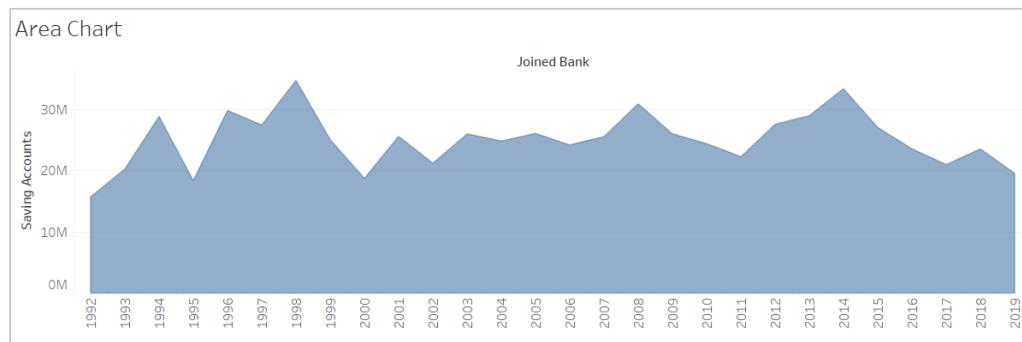


Bubble Chart



Loyalty Classification

- Gold
- Jade
- Platinum
- Silver



Result : Sucessfully completed the task.

Task - 11

Aim : Explore the features of the tableau application or software.

Features :

1. Tableau DashBoard :

Tableau Dashboards provide a wholesome view of your data by the means of visualizations, visual objects, text, etc. Dashboards are very informative as they can present data in the form of stories, enable the addition of multiple views and objects, provide a variety of layouts and formats, enable the users to deploy suitable filters. You even have the option to copy a dashboard or its specific elements from one workbook to another easily.

2. Collaboration Sharing :

Tableau provides convenient options to collaborate with other users and instantly share data in the form of visualizations, sheets, dashboards, etc. in real-time. It allows you to **securely share data** from various data sources such as on-premise, on-cloud, hybrid, etc. Instant and easy collaboration and data sharing help in getting quick reviews or feedback on the data leading to a better overall analysis of it.

3. Live & In – Memory Data :

Tableau ensures connectivity to both live data sources or data extraction from external data sources as in-memory data. This gives the user the flexibility to use data from more than one

type of data source without any restrictions. You can use data directly from the data source by establishing live data connections or keep that data in-memory by extracting data from a data source as per their requirement. Tableau provides additional features to support data connectivity such as automatic extract refreshes, notifying the user upon a live connection fail, etc.

4. Data Sources in Tableau :

Tableau offers a myriad of data source options you can connect to and fetch data from. Data sources ranging from on-premise files, spreadsheets, relational databases, non-relational databases, data warehouses, big data, to on-cloud data are all available on Tableau. One can easily establish a secure connection to any of the data sources from Tableau and use that data along with data from other sources to create a combinatorial view of data in the form of visualizations.

5. Maps :

Yet another important feature of Tableau is the map. Tableau has a lot of pre-installed information on maps such as cities, postal codes, administrative boundaries, etc. This makes the maps created on Tableau very detailed and informative. You can add different layers of geology on the map as per your requirements and **create informative maps** in Tableau with your data. The different kinds of maps available in Tableau

are Heat map, Flow map, Choropleth maps, Point distribution map, etc.

6. Robust Security :

Tableau takes special care of data and user security. It has a fool-proof security system based on authentication and permission systems for data connections and user access. Tableau also gives you the freedom to integrate with other security protocols such as Active Directory, Kerberos, etc. An important point to note here is that Tableau practices row-level filtering which helps in keeping the data secure.

Result : Successfully gained knowledge towards the features of the tableau.

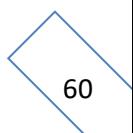
Task - 12

Aim : Implementing data visualization using R

1. Find the data distributions using box and scatter plot.
2. Find the outliers using plot.
3. Plot the histogram, bar chart and pie chart on sample data

R – Program :

```
install.packages("readxl")  
library("readxl")  
  
# ggplot installation  
  
install.packages("ggplot2")  
  
library(ggplot2)  
  
install.packages("dplyr")  
  
library(dplyr)  
  
  
getwd()  
  
setwd(choose.dir())  
  
getwd()  
  
  
re = read_excel("Bank_analysis.xlsx")
```



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```
re = data.frame(re)
```

```
re
```

```
class(re)
```

Box Plot

```
ggplot(re, aes(x = Bank.Deposits, y = 1)) + geom_boxplot()
```

Scatter Plot

```
ggplot(re, aes(x = Name, y = Bank.Loans)) + geom_point()
```

Outliers in Box Plot

```
boxplot(re$Bank.Deposits, plot=TRUE)$out
```

histogram

```
ggplot(data = re) + geom_histogram(aes(x = re$Saving.Accounts))
```

Bar Chart

```
barplot(re$Estimated.Income, names.arg = re>Name, xlab ="Names",
```

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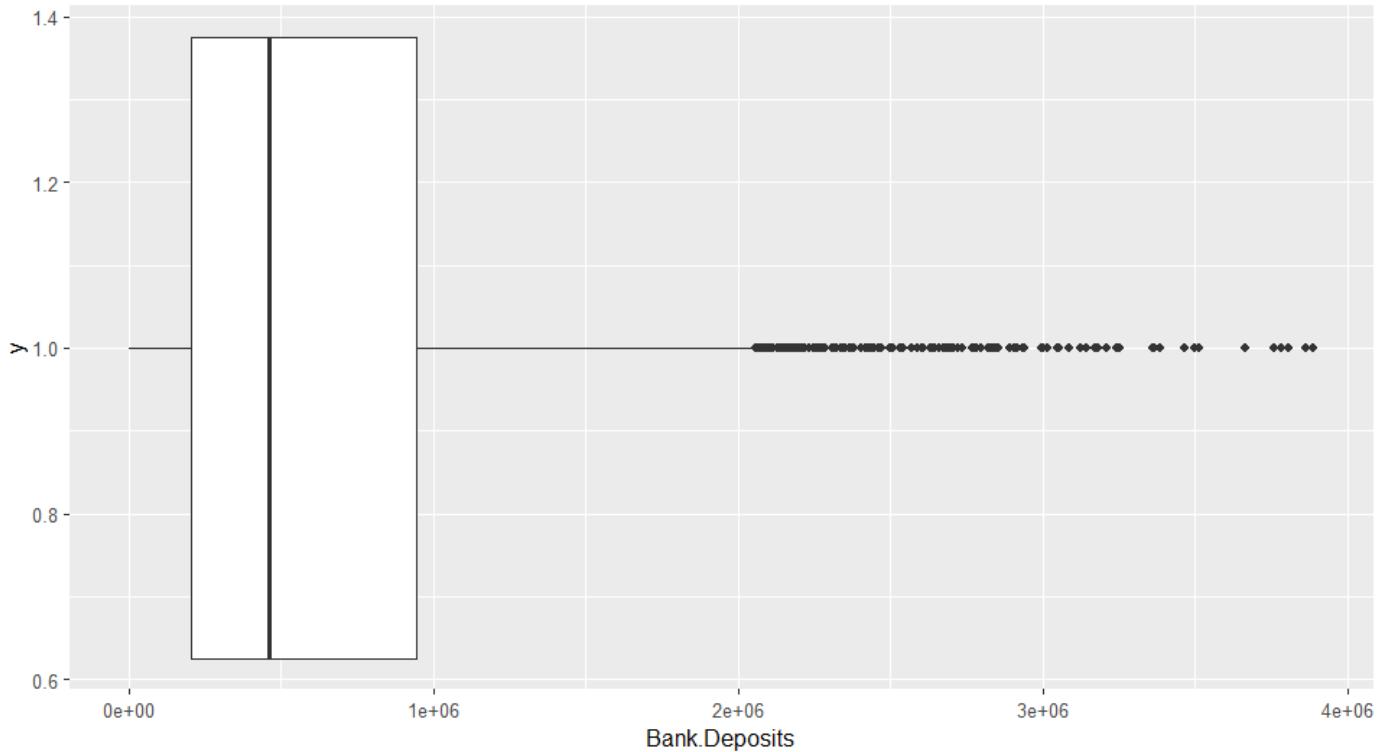
```
ylab ="Income",  
main ="Bar Chart")
```

Pie Chart

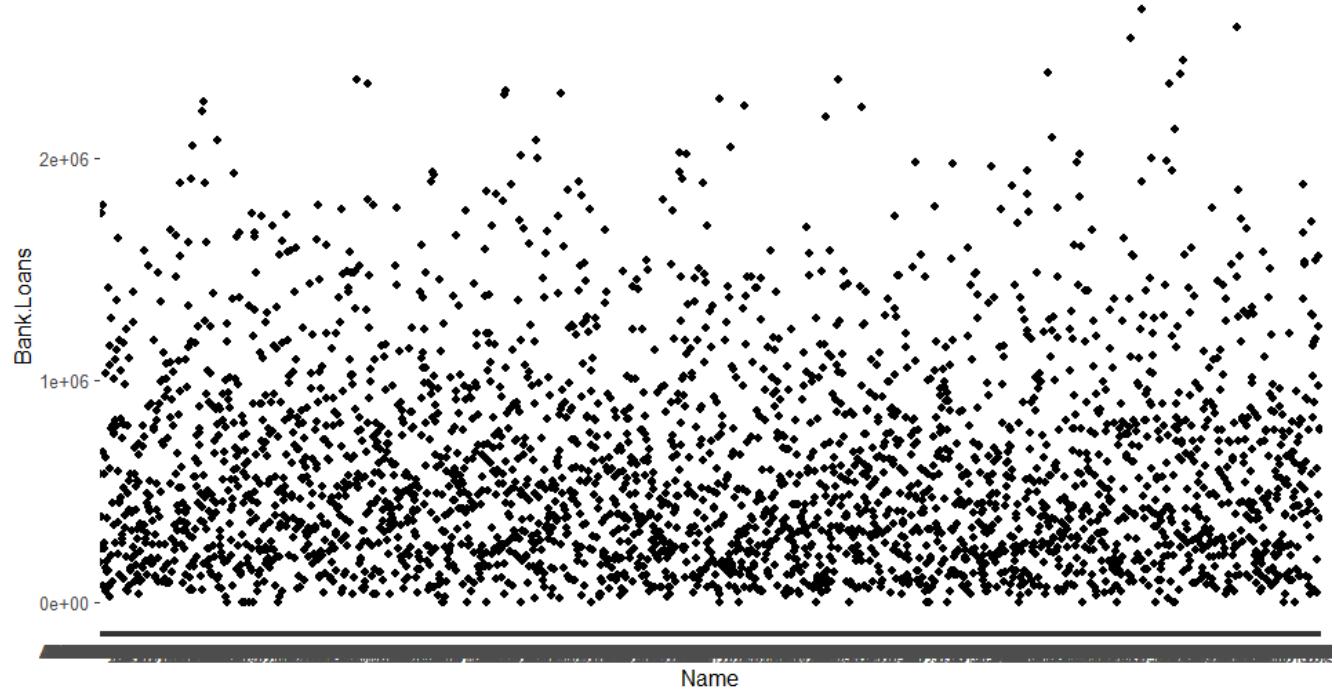
```
pie(re$Credit.Card.Balance, re$Nationality,  
main = "PIE chart", col = rainbow(5))
```

Outputs :

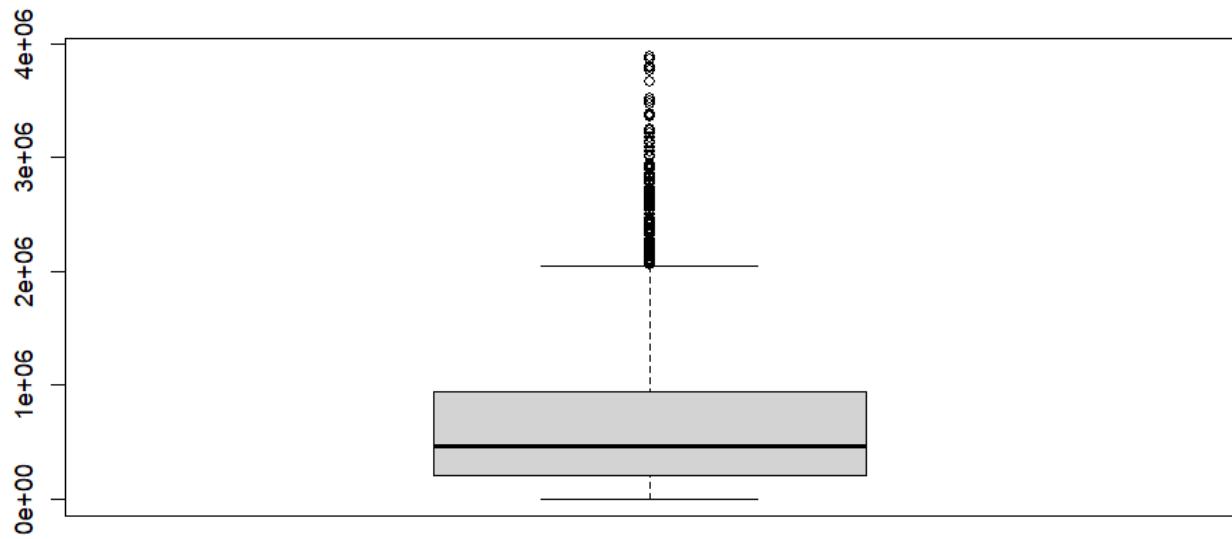
- **Box Plot :**



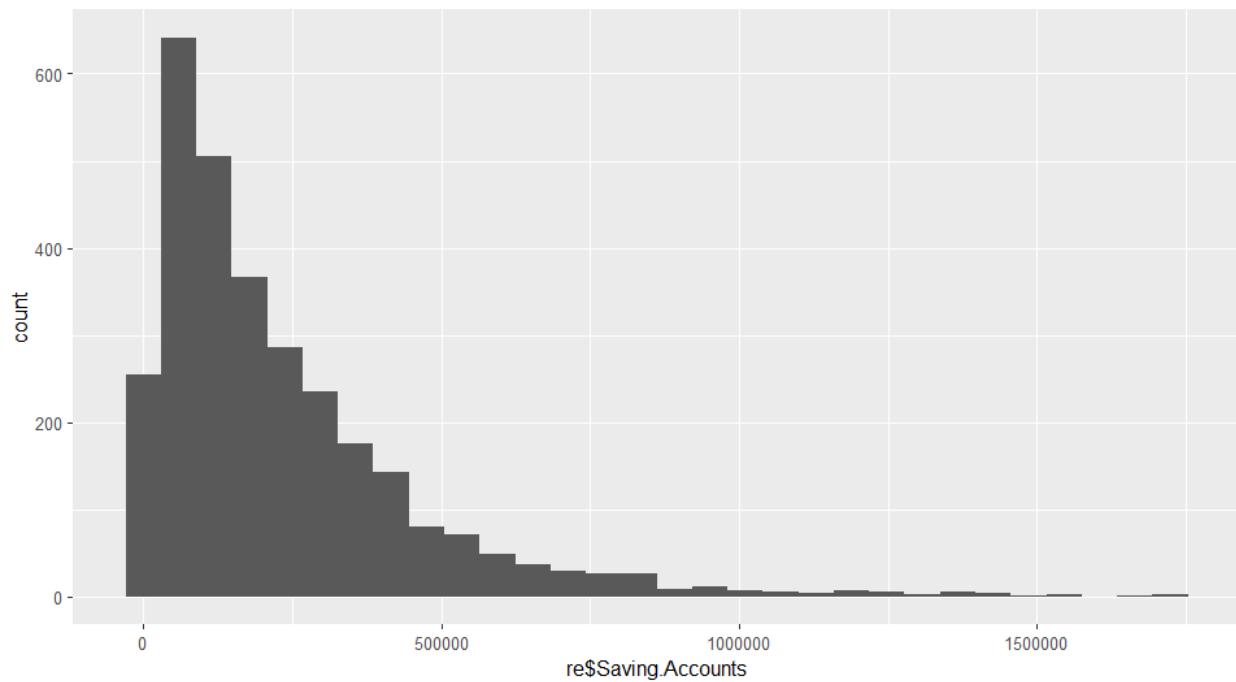
- **Scatter Plot :**



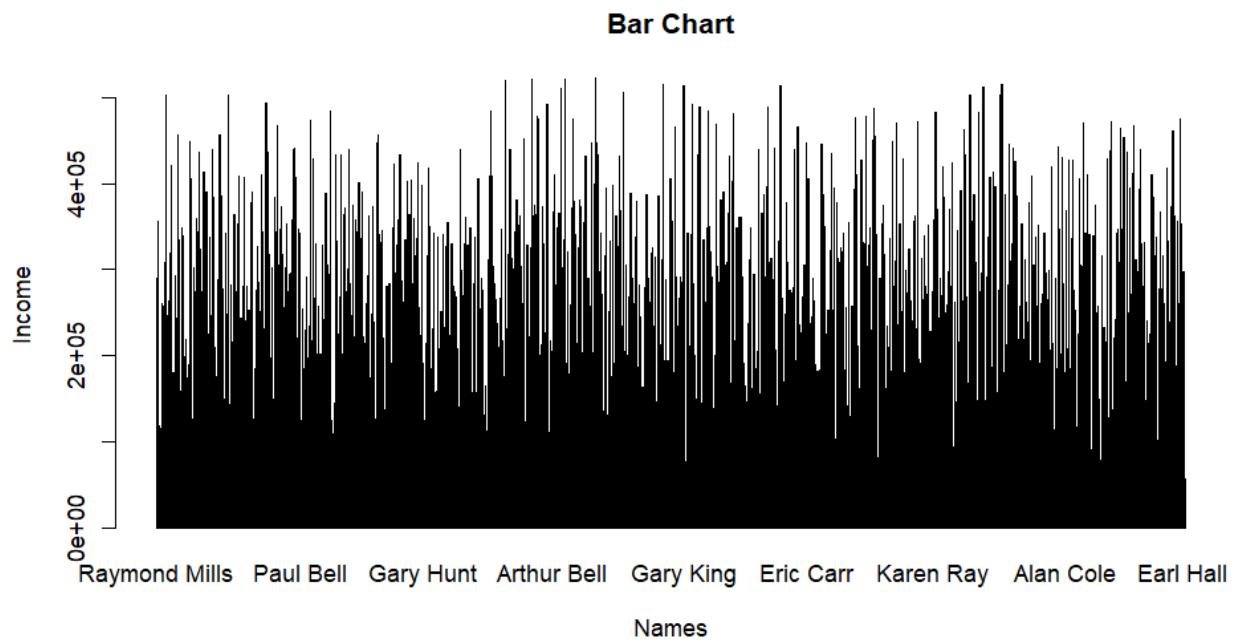
- **Outliers in Boxplot :**



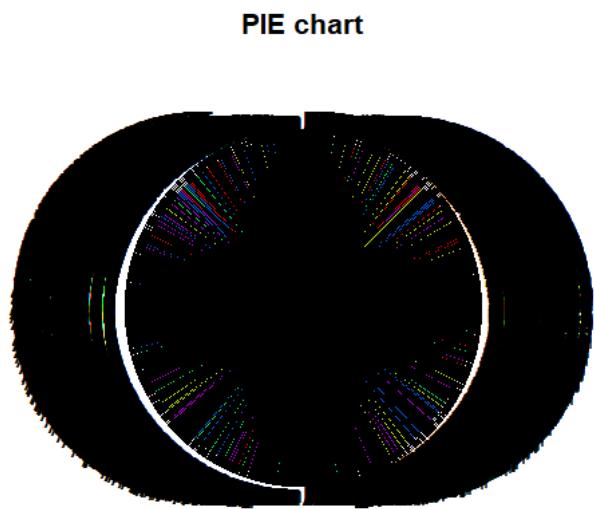
○ Histogram :



○ Bar Chart :



○ Pie Chart :



Result : Sucessfully Executed the Program.

Task - 13

Aim : Implementing basic operations in Tableau to get accustomed to its interface and Emphasizing the Results and Map View

[1] Tableau Workspace, Connecting to a Data Source, Creating a view and Refining the view

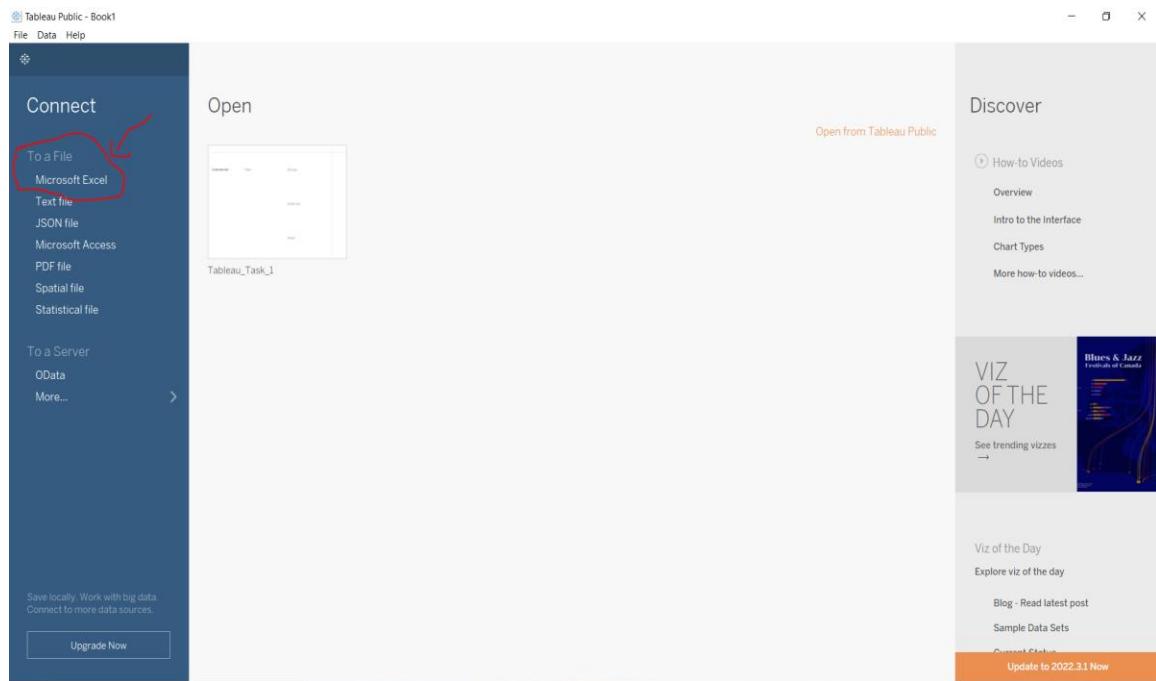
[2] Adding Filters to the view, Adding Colors to the view and Key Findings

[3] Building a Map View, Getting into details and Identifying the Key Points.

Procedure :

Connecting to the Data Source :

1. Open the tableau software and click on the “ To a File Microsoft Excel ” and then click on connect option.



2. Then it will load the data source into the tableau.

Clients - Banking (Bank_analysis)

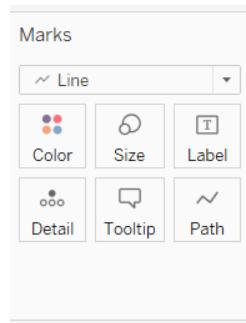
Clients - Banking

Need more data?
Drag tables here to relate them. [Learn more](#)

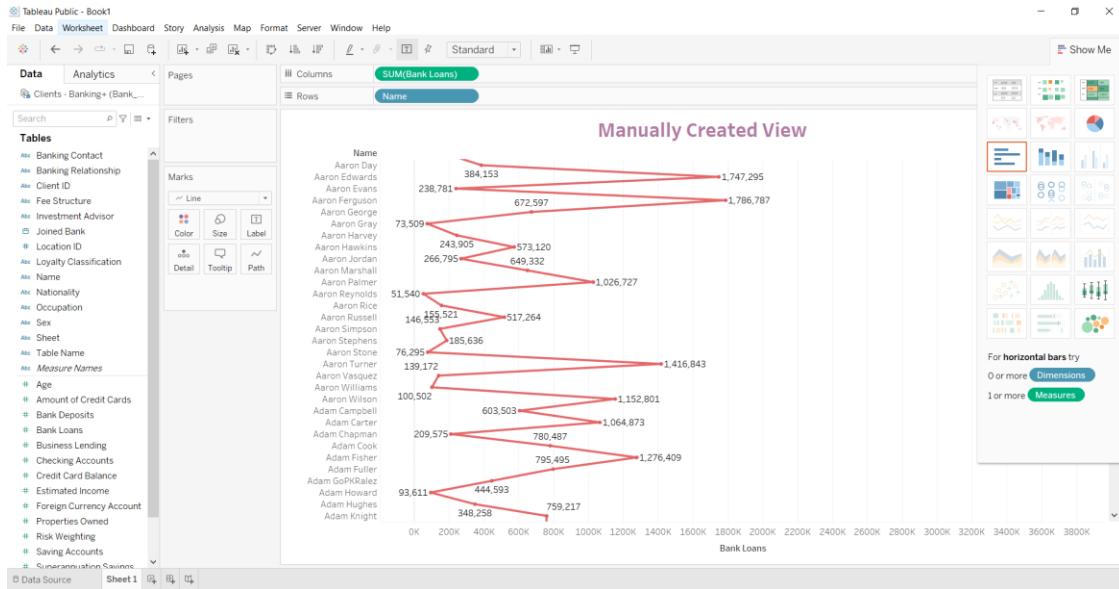
Client ID	Name	Age	Sex	Location ID	Joined Bank	Banking Contact
PKR81288	Raymond Mills	24	Male	34324	06-05-2019	Anthony Torres
PKR65833	Julia Spencer	23	Male	42205	10-12-2001	Jonathan Hawkins
PKR47499	Stephen Murray	27	Female	7314	25-01-2010	Anthony Berry
PKR72498	Virginia Garza	40	Male	34594	28-03-1993	Steve Diaz
PKR60181	Melissa Sanders	46	Female	41269	20-07-2012	Shawn Long
PKR78532	Samuel Hudson	23	Male	13204	07-02-2019	Douglas Tucker

3. Manually Created a view using the existed data in the data source. And you can use the marks card to make changes in the view for better understanding

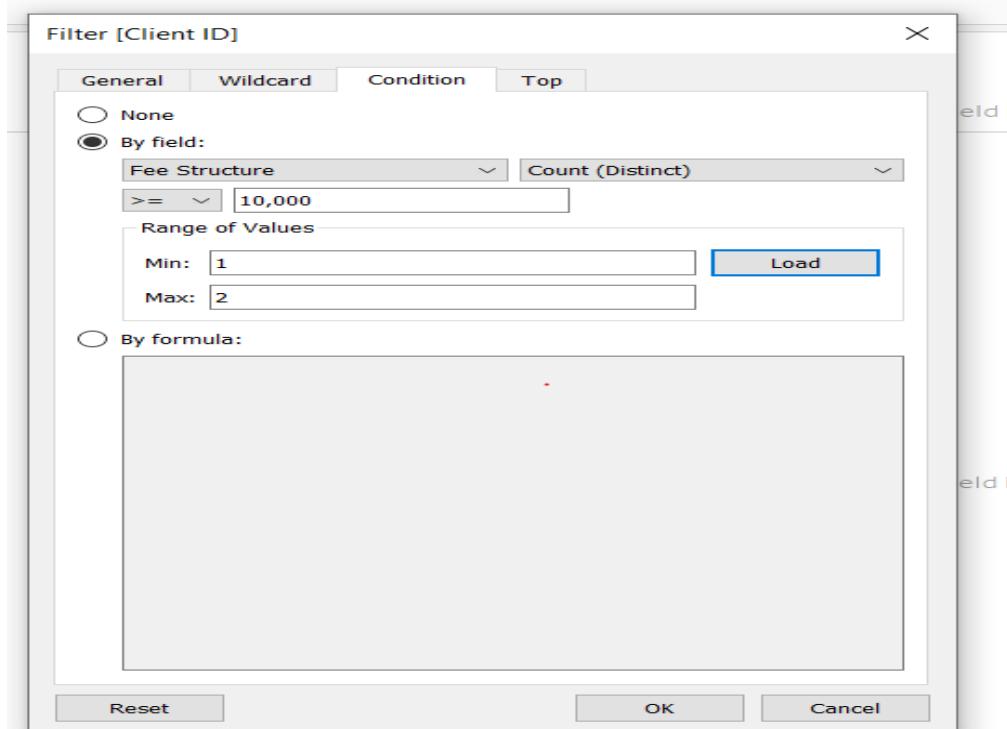
5. Here is a small pic of marks which helps in understanding the view while hovering on the point or for understanding purpose.



6. In this view we can see the bank customers pointing to their how much they have taken the loans using the line chart.
7. And also added colors , filters to the row and column shelf.



8. Filter the data present in column by right clicking and choosing the filter option.



Output :

