Lab Work 7: Data Transformation and Visualization with Power BI

Objective:

Learn how to import financial institution data (from Excel and SQL Server) into Power BI, perform data transformations, and build visual reports.

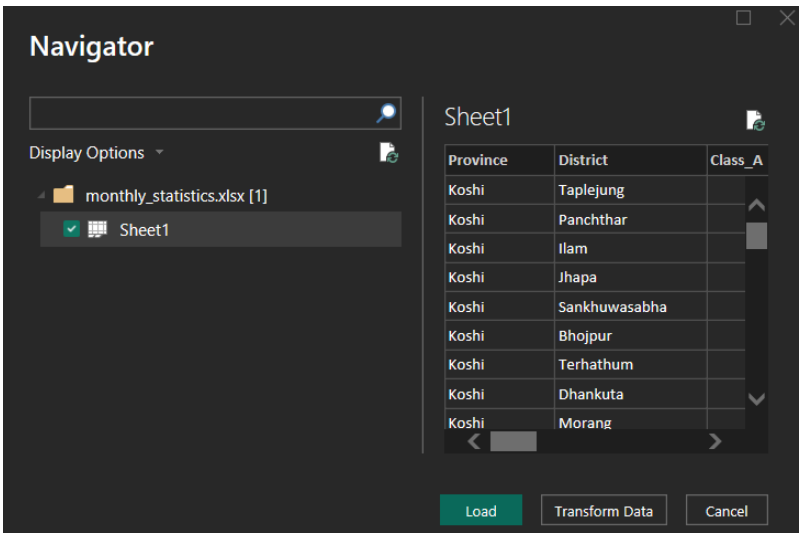
Pre-requisites:

- **Excel file from Lab 4** (Financial Institution Data with columns: *Province, District, Class 'A', Class 'B', Class 'C', Total, Population, Pop. Per Branch*).
- **Lab 6 SQL Server summary tables** (aggregated results).
- **Power BI Desktop installed**.

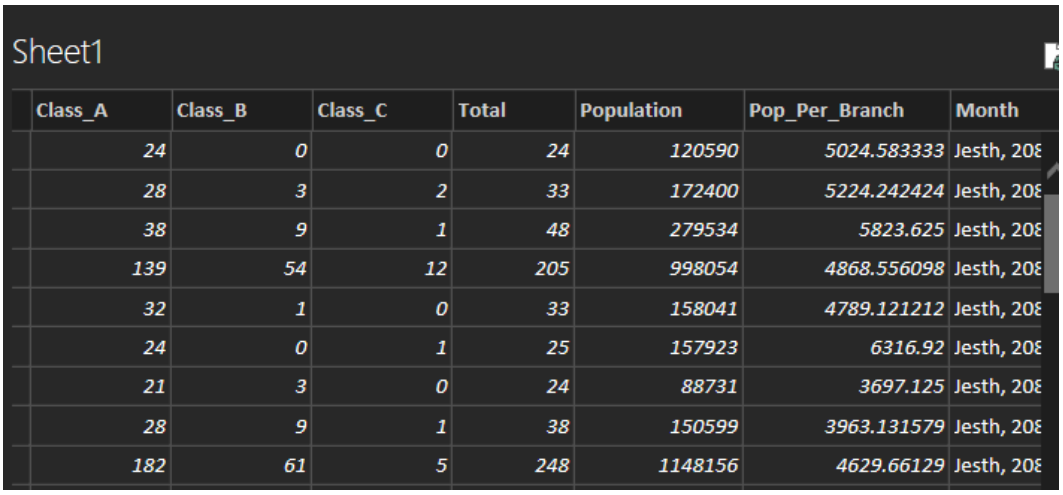
Steps:

1. **Download & Open Power BI Desktop.**

2. **Load Excel file from Lab 4**:
    - Go to **Home → Get Data → Excel → select the file**.
    - Load the sheet into Power BI.



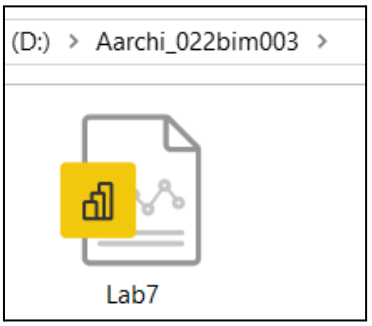
3. **Transform Excel Data in Power Query** (click *Transform Data*):
   - Remove the `S.No.` column.
   - Rename columns (e.g., `Class 'A'` → `Class A`).
   - Ensure numeric columns (`Class A`, `Class B`, `Class C`, `Total`, `Population`, `Pop. Per Branch`) have the correct data type.



Class_A	Class_B	Class_C	Total	Population	Pop_Per_Branch	Month
24	0	0	24	120590	5024.583333	Jesth, 208
28	3	2	33	172400	5224.242424	Jesth, 208
38	9	1	48	279534	5823.625	Jesth, 208
139	54	12	205	998054	4868.556098	Jesth, 208
32	1	0	33	158041	4789.121212	Jesth, 208
24	0	1	25	157923	6316.92	Jesth, 208
21	3	0	24	88731	3697.125	Jesth, 208
28	9	1	38	150599	3963.131579	Jesth, 208
182	61	5	248	1148156	4629.66129	Jesth, 208

4. **Connect Power BI to SQL Server database (Lab 6 results):**
   - Go to **Home → Get Data → SQL Server → enter server name & database**.
   - Select summary tables created in Lab 6.
   - Load them into the model.

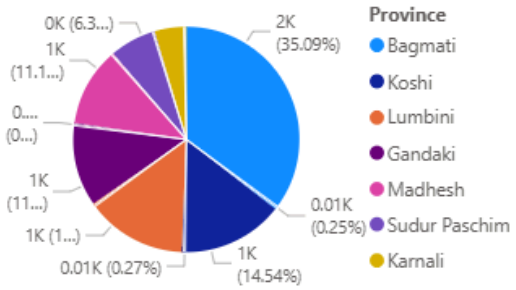
5. **Save your Power BI report file as** `Lab7.pbix`**.**



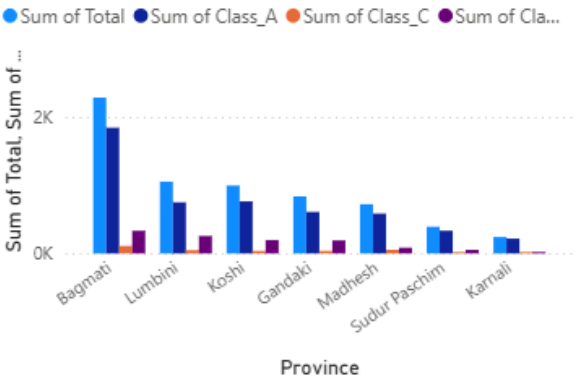
Tasks

1. **Bar Chart** – Show **Total Branches by Province**.
2. **Pie Chart** – Show **distribution of Class A, Class B, and Class C branches** across a selected province.
3. **Line Chart** – Show **Population per Branch** trend by province.
4. **Map Chart** – Show **Districts and their Total Branches** on a map.
5. **Stacked Column Chart** – Compare **Total Branches vs. Population** across provinces.

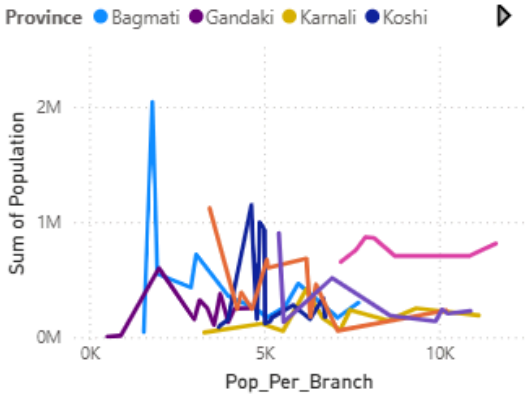
Sum of Class_A, Count of Class_B and Count of Class_C by Province



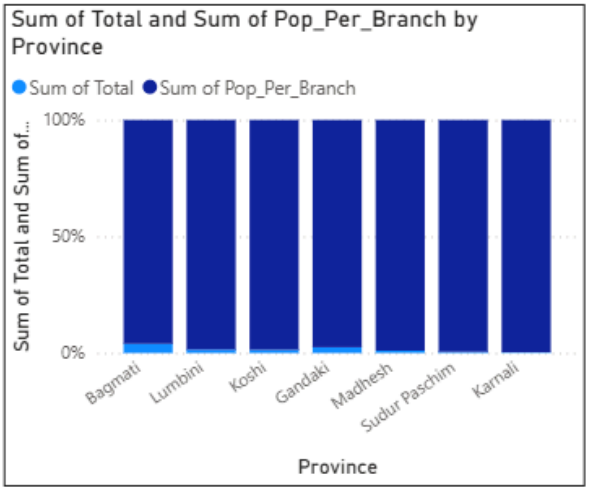
Sum of Total, Sum of Class_A, Sum of Class_C and Sum of Class_B by Province



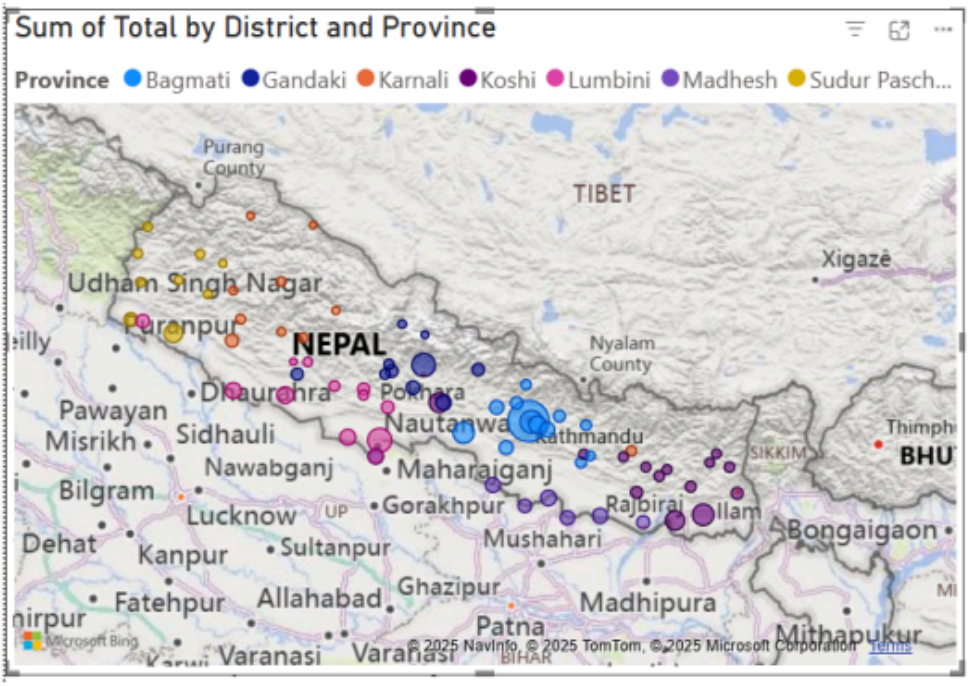
Sum of Population by Pop_Per_Branch and Province



Sum of Total and Sum of Pop_Per_Branch by Province



Sum of Total by District and Province



Explanation:

Based on the data for Jestha, 2082, the bar chart would clearly show Bagmati province as the leader in total branches, with a sum significantly higher than all others due to the dense concentration in the Kathmandu Valley. Koshi and Lumbini provinces would follow as the next largest, reflecting their higher populations and developed status. Provinces like Gandaki and Madhesh would have a moderate number of branches. The chart would highlight Karnali and Sudur Paschim as the provinces with the fewest branches in Nepal.

For a selected province like Bagmati, the pie chart would reveal a heavy reliance on Class A branches, which would constitute the vast majority of the total. Class B branches would form a significantly smaller slice, indicating fewer of these secondary facilities. Class C branches would be the smallest segment, showing that the province's branch network is overwhelmingly composed of the primary class. Similarly, a pie chart for Madhesh province would show that most of its branches are Class A, with much smaller portions being Class B and C.

The line chart would plot the average Population per Branch for each province, revealing a clear trend of service accessibility. Provinces like Karnali, Sudur Paschim, and Madhesh would show sharply elevated trend lines, indicating that each branch must serve a very large number of people, suggesting a service shortage. In contrast, the line for Bagmati province would dip dramatically, reflecting easy access due to a high branch density.

The map chart visualizes the total number of branches in each district of Nepal, using color shading to represent density. Darker areas indicate districts with more branches, such as Kathmandu and other urban centers, while lighter areas show remote districts with fewer branches, highlighting a clear urban-rural divide in service distribution.

The stacked column chart would place provinces along the x-axis, with each column's total height representing the province's population and segments colored to show the number of branches. For populous provinces like Madhesh, a very tall column would be served by a relatively small stack of branches at the base.

Conclusion

This lab work provided hands-on experience with data transformation and visualization using Power BI. By importing data from both Excel and SQL Server, cleaning and transforming it in Power Query, and creating calculated columns, we learned how to prepare data for analysis. The visualizations—bar charts, pie charts, line charts, maps, and stacked columns—enabled clear representation of branch distribution, population ratios, and provincial comparisons. Overall, the exercise strengthened skills in integrating multiple data sources, transforming raw datasets, and building interactive reports for meaningful decision-making. The key takeaways from this lab work include the following important aspects:

- Practice **cleaning & transforming data** in Power Query.
- Learn to **merge Excel and SQL data** inside Power BI.
- Create **five different types of charts** for financial institution data.
- Understand how **visuals support decision-making** (e.g., identifying underserved provinces).