**Data Transformation and Visualization**

**✅ Data Transformation in Power Query**

Open the dataset in **Power BI** and use Power Query to clean and transform the data:

**1. Remove Unnecessary Columns**

* Remove RowNumber and Surname (not relevant for analysis).

**2. Rename Columns**

* Make column names more readable:
  + CreditScore → Credit Score
  + NumOfProducts → Number of Products
  + HasCrCard → Has Credit Card
  + IsActiveMember → Active Member
  + EstimatedSalary → Estimated Salary

**3. Data Type Conversion**

* Convert data types where necessary:
  + CustomerId → Text
  + Credit Score, Age, Tenure, Balance, Number of Products, Estimated Salary → Whole Number/Decimal
  + Exited → Binary (0 or 1)

**4. Handle Missing Values**

* Fill missing values with defaults or drop rows with excessive missing data.

**5. Create Custom Columns**

* Create new calculated columns:
  + **Age Group** → Create using if-else conditions:
    - 18-25 → "Young"
    - 26-35 → "Adult"
    - 36-50 → "Middle-aged"
    - 51+ → "Senior"
  + **Balance Status** → Create a column to classify balance status:
    - Balance = 0 → "Zero Balance"
    - Balance > 0 → "Active Balance"
  + **Retention Status** → Based on Exited column:
    - 0 → "Retained"
    - 1 → "Churned"

**6. Transform Binary Data to Labels**

* Convert Gender, Exited, Active Member, and Has Credit Card to descriptive labels:
  + 1 → "Yes"
  + 0 → "No"

**📊 Visualization Ideas in Power BI**

Use the transformed data to create the following visualizations:

**1. Churn Rate Overview**

➡️ **Chart Type:** Donut Chart

* Display the percentage of customers who have exited (Exited) vs retained.

**2. Churn Rate by Geography**

➡️ **Chart Type:** Stacked Column Chart

* X-axis → Geography
* Y-axis → Count of Customers
* Grouping → Exited (Yes/No)

**3. Credit Score Distribution**

➡️ **Chart Type:** Histogram

* X-axis → Credit Score
* Y-axis → Number of Customers

**4. Balance vs. Credit Score**

➡️ **Chart Type:** Scatter Plot

* X-axis → Credit Score
* Y-axis → Balance
* Color → Exited (Yes/No)

**5. Customer Retention by Age Group**

➡️ **Chart Type:** Clustered Column Chart

* X-axis → Age Group
* Y-axis → Count of Customers
* Grouping → Exited

**6. Churn by Number of Products**

➡️ **Chart Type:** Stacked Bar Chart

* X-axis → Number of Products
* Y-axis → Count of Customers
* Color → Exited

**7. Active Members and Churn Rate**

➡️ **Chart Type:** Stacked Bar Chart

* X-axis → Active Member
* Y-axis → Count of Customers
* Color → Exited

**8. Balance Status vs Geography**

➡️ **Chart Type:** Stacked Column Chart

* X-axis → Geography
* Y-axis → Count of Customers
* Grouping → Balance Status

**9. Correlation Between Credit Score and Age**

➡️ **Chart Type:** Scatter Plot

* X-axis → Age
* Y-axis → Credit Score
* Color → Exited

**10. Gender-based Churn Rate**

➡️ **Chart Type:** Clustered Bar Chart

* X-axis → Gender
* Y-axis → Count of Customers
* Color → Exited

**🚀 Additional Tips**

✅ Create a **Dashboard** combining the most important charts.  
✅ Use **Filters** for Geography, Gender, Number of Products, and Age Group.  
✅ Add **Drill-throughs** to explore detailed customer behavior.  
✅ Create a **KPI Card** to display churn rate, average credit score, and balance.