**Assignment 3: Data Visualization**

**Name: Parth Ulhas Katkar**

**Roll No: 282041**

**PRN: 22311293**

**Class: SY CSE AI**

**Batch: B2**

**Problem Statement:**

Visualize the data using Python by plotting the graphs for **Assignment 1 and 2** using a suitable dataset. Use **Scatter Plot, Bar Plot, Box Plot, Pie Chart, and Line Chart** for data representation.

**Task Overview:**

In this assignment, we visualize the **Admission Prediction Dataset** using Python. The key visualization techniques include:

1. **Scatter Plot** – To analyze relationships between **GRE Score** and **Chance of Admit**.
2. **Bar Plot** – To compare **University Rating** with **Average CGPA**.
3. **Box Plot** – To examine **SOP vs Chance of Admit** and detect outliers.
4. **Pie Chart** – To represent the proportion of students with **Research Experience**.
5. **Line Chart** – To observe trends in **GRE Score vs Chance of Admit**.

**Objective:**

1. Gain hands-on experience with **Matplotlib** and **Seaborn** for data visualization.
2. Understand the importance of **visual analysis** in extracting meaningful insights.
3. Explore different types of plots and their applications in analyzing **admission prediction** data.

**Tools and Resources:**

* **Software Used:** Google Colab / Jupyter Notebook
* **Libraries Used:** Pandas, Matplotlib, Seaborn

**Key Functions Used:**

1. **Scatter Plot:** Used to examine the correlation between **GRE Score** and **Chance of Admit**.
2. **Bar Plot:** Helps compare **University Rating** with **Average CGPA**.
3. **Box Plot:** Used to analyze **SOP vs Chance of Admit** and detect outliers.
4. **Pie Chart:** Displays the proportion of students who **have research experience**.
5. **Line Chart:** Shows trends in **GRE Score vs Chance of Admit**.

**Methodology:**

**1. Loading the Data**

* Read the **Admission Prediction Dataset** using Pandas.
* Check for missing values and clean data if necessary.

**2. Visualization Process**

* Choose appropriate graphs to represent relationships and trends.
* Use **Matplotlib** and **Seaborn** to generate various plots.
* Customize graphs with **labels, titles, and colors** for better readability.

**Advantages of Data Visualization:**

1. **Simplifies Complex Data** – Helps in understanding patterns and trends.
2. **Detects Outliers** – Box plots highlight extreme values.
3. **Enhances Data Interpretation** – Scatter and bar plots reveal relationships between variables.
4. **Improves Decision-Making** – Pie charts provide an overview of proportions in categorical data.

**Challenges:**

* Selecting the **right visualization** for different data types.
* Handling **large datasets** efficiently for plotting.

**Conclusion:**

This assignment provided a hands-on approach to **data visualization using Python**. I explored:

* Different types of plots for analyzing **admission prediction data**.
* The importance of **graphical representation** in data analysis.
* Practical applications of **visualization techniques** in education-based datasets.