Home Assignment <1>: Predicting Student Performance using Multiple Linear Regression

Learning Objective:

The objective of this assignment is to apply **Multiple Linear Regression** to predict a student's **Performance Index** using multiple input features.
Students will learn how to prepare data, build and train a regression model, evaluate it using standard metrics, and visualize results.

Dataset:

You are provided with a dataset containing details of Student's activities.

Expected Completion Time:

Best Case: 70 minutes
Average Case: 90 minutes

Assignment Details:

1. You are provided with a dataset named **`Student_Performance.csv`**.
   The dataset contains multiple features (such as hours studied, sleep hours, attendance, etc.) and a target column **`Performance Index`**.
2. Your task is to build a **Multiple Linear Regression model** to predict `Performance Index`.

- **Steps to Perform:**

  1. Import Required Libraries
  2. Create a Class `StudentPerformanceModel`
  3. Data Preprocessing
  4. Train-Test Split
  5. Model Training
  6. Model Evaluation
  7. **User Input Prediction**
     - After evaluating the model, allow the user to **enter values for all independent variables** (for example: study hours, sleep hours, attendance %).
     - Convert the input values into a 2-D array and use the trained model to predict the **Performance Index**.
     - Display the predicted result clearly.
  8. Visualization

Expected Outcome:

Upon completion of this assignment, you should be able to:

- Apply **Multiple Linear Regression** on multivariate datasets.
- Identify independent and dependent variables correctly.
- Train and evaluate regression models using scikit-learn.
- Interpret MSE, RMSE, and R^2 metrics for performance analysis.
- Visualize prediction accuracy using scatter plots.