NATIONAL UNIVERSITY OF COMPUTER & EMERGING SCIENCES
FAST - PESHAWAR CAMPUS

Subject: AL 2002 - Artificial Intelligence Lab
Instructor: Muhammad Saood Sarwar

Lab Task: Perceptron

Binary Classification Using the Iris Dataset and Perceptron Algorithm

1. **Load the Dataset:**
   Load the Iris dataset using the `scikit-learn` library.

2. **Create a DataFrame:**
   Create a `Pandas` DataFrame from the dataset and add appropriate column names for features and the target.

3. **Convert to Binary Classification:**
   Convert the multiclass problem into a binary classification problem by keeping only two classes (e.g., `setosa` and `versicolor`) and removing the third one (e.g., `virginica`). Visualize the filtered data using a scatter plot.

4. **Prepare Feature Data:**
   Remove the target column from the training and testing sets.

5. **Split the Data:**
   Split the dataset into training and testing sets.

6. **Apply Built-in Perceptron:**
   Use the built-in `Perceptron` algorithm from `scikit-learn` to train a binary classification model.

7. **Evaluate the Model (Built-in):**
   Evaluate the performance of the model using the following metrics:

   - Accuracy
   - Precision
   - Recall

- F1 Score

8. **Implement Perceptron from Scratch:**
   Implement the Perceptron algorithm from scratch using the provided code snippets.

9. **Evaluate the Model (Scratch):**
   Evaluate the performance of your custom Perceptron model using the same metrics as above:

   - Accuracy
   - Precision
   - Recall
   - F1 Score