**Assignment No. 3**

**Problem Statement:** CORRELATION AND COVARIANCE: a. Find the correlation matrix on the iris dataset. b. Plot the correlation plot on the dataset and visualize giving an overview of relationships among data on iris dataset.

**Objective:** The objective of this task is to calculate the correlation matrix for the Iris dataset and visualize it using a correlation heatmap. This will help to understand the relationships between the different features of the dataset

**Prerequisite :**

 **Python**: Basic knowledge of Python programming.

 **Pandas & NumPy**: Familiarity with the pandas library (for data manipulation) and numpy (for numerical operations).

 **Matplotlib & Seaborn**: Understanding of matplotlib and seaborn for data visualization.

**Theory :**

 **Correlation**:

* **Correlation** is a statistical measure that describes the strength and direction of a relationship between two variables.
* **Pearson correlation coefficient** (often denoted as **r**) is the most common type, which ranges from -1 to +1:
  + **+1** indicates a perfect positive correlation.
  + **0** indicates no correlation.
  + **-1** indicates a perfect negative correlation.

 **Covariance**:

* **Covariance** measures how two variables vary together. A positive covariance indicates that variables move in the same direction, while a negative covariance means they move in opposite directions. However, covariance is sensitive to the scale of the variables, so correlation is often preferred for standardization.

 **Visualization**:

* A **heatmap** is a common way to visualize correlation, where colors represent the strength of correlation between variables.

**Algorithm (if any to achieve the objective ):**

 **Load the Iris dataset**.

 **Compute the correlation matrix** using corr() from the pandas library.

 **Visualize the correlation matrix** using a heatmap with the seaborn library.

 Optionally, calculate the covariance matrix using the cov() function.

**Conclusion** :

This Python script calculates and visualizes the correlation matrix for the Iris dataset. The correlation heatmap provides an intuitive way to identify relationships between different features, helping to understand how features like sepal length and petal length are related. The covariance matrix is optional, but it offers further insights into the variability of the features.