**NAME : MANGESH A. GHADWAJE**

**ROLL NO:24**

**BATCH : B2**

**COURSE: DATA SCIENCE PRACTICAL**

**Assginment No. 5**

**Problem Statement**

**Write a Python script for Correlation and Covariance a. Find the correlation matrix. b. Plot the correlation plot on dataset and visualize giving an overview of relationships among any dataset.**

**Code :**

**import numpy as np**

**import pandas as pd**

**import matplotlib.pyplot as plt**

**# Load dataset (You can load your own dataset, here we'll generate some data similar to 'tips' dataset)**

**data = {**

**'total\_bill': np.random.uniform(10, 50, 100),**

**'tip': np.random.uniform(1, 10, 100),**

**'size': np.random.randint(1, 6, 100)**

**}**

**df = pd.DataFrame(data)**

**# a) Find Covariance Matrix**

**cov\_matrix = df.cov()**

**print("Covariance Matrix:")**

**print(cov\_matrix)**

**# b) Find Correlation Matrix**

**corr\_matrix = df.corr()**

**print("\nCorrelation Matrix:")**

**print(corr\_matrix)**

**# Plotting the correlation matrix using Matplotlib (without seaborn)**

**plt.figure(figsize=(8, 6))**

**# Create a heatmap manually**

**plt.imshow(corr\_matrix, cmap='coolwarm', interpolation='nearest')**

**# Add a color bar**

**plt.colorbar()**

**# Add tick marks and labels**

**plt.xticks(np.arange(len(corr\_matrix.columns)), corr\_matrix.columns, rotation=45)**

**plt.yticks(np.arange(len(corr\_matrix.columns)), corr\_matrix.columns)**

**# Annotate the matrix with the correlation values**

**for i in range(len(corr\_matrix.columns)):**

**for j in range(len(corr\_matrix.columns)):**

**plt.text(j, i, f'{corr\_matrix.iloc[i, j]:.2f}', ha='center', va='center', color='black')**

**plt.title("Correlation Matrix Heatmap")**

**plt.tight\_layout()**

**plt.show()**

**OUTPUT:**



