**3. Develop a program to implement Principal Component Analysis (PCA) for reducing the dimensionality of the Iris dataset from 4 features to 2.**

import numpy as np

import pandas as pd

from sklearn.datasets import load\_iris

from sklearn.decomposition import PCA

import matplotlib.pyplot as plt# Load the Iris dataset

iris = load\_iris()

data = iris.data

labels = iris.target

label\_names = iris.target\_names# Convert to a DataFrame for better visualization

iris\_df = pd.DataFrame(data, columns=iris.feature\_names)# Perform PCA to reduce dimensionality to 2

pca = PCA(n\_components=2)

data\_reduced = pca.fit\_transform(data)# Create a DataFrame for the reduced data

reduced\_df = pd.DataFrame(data\_reduced, columns=['Principal Component 1', 'Principal Component 2'])

reduced\_df['Label'] = labels# Plot the reduced data

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

colors = ['r', 'g', 'b']

for i, label in enumerate(np.unique(labels)):

plt.scatter(

reduced\_df[reduced\_df['Label'] == label]['Principal Component 1'],

reduced\_df[reduced\_df['Label'] == label]['Principal Component 2'],

label=label\_names[label],

color=colors[i]

)

plt.title('PCA on Iris Dataset')

plt.xlabel('Principal Component 1')

plt.ylabel('Principal Component 2')

plt.legend()

plt.grid()

plt.show ()