**Code 7 (Clustering)**

import seaborn as sns

import pandas as pd

import numpy as np

df= sns.load\_dataset('iris')

df.head()

df.isnull().sum()

X = df[['sepal\_length', 'sepal\_width', 'petal\_length', 'petal\_width']]

from sklearn.cluster import AgglomerativeClustering

model = AgglomerativeClustering(n\_clusters = 3, metric = 'euclidean', linkage = 'ward')

y\_pred = model.fit\_predict(X)

y\_pred

df['cluster'] = pd.DataFrame(y\_pred)

import matplotlib.pyplot as plt

plt.scatter(X.iloc[y\_pred == 0, 0], X.iloc[y\_pred == 0, 1], s=100, c='red', label='Cluster 1')

plt.scatter(X.iloc[y\_pred == 1, 0], X.iloc[y\_pred == 1, 1], s=100, c='blue', label='Cluster 2')

plt.scatter(X.iloc[y\_pred == 2, 0], X.iloc[y\_pred == 2, 1], s=100, c='green', label='Cluster 3')

plt.title('Clusters of Data')

plt.xlabel('Feature 1')

plt.ylabel('Feature 2')

plt.legend()

plt.show()

from scipy.cluster.hierarchy import dendrogram, linkage

import matplotlib.pyplot as plt

plt.figure(figsize=(15,6))

plt.title('Dendrogram')

plt.xlabel('Flowers')

plt.ylabel('Euclidean distances')

link\_matrix = linkage(X,method='ward')

dendrogram = dendrogram(link\_matrix)

plt.savefig("iris.png")

plt.show()