1. You are given a dataset with two numerical features Height and Weight. Your goal is to cluster these people into 3 groups using K-Means clustering. After clustering, you will visualize the clusters and their centroids.

- Load the dataset (or generate random data for practice).
- Apply K-Means clustering with k = 3.
- Visualize the clusters and centroids.
- Experiment with different values of k and see how the clustering changes.

2. You have a dataset of customers with features Age, Annual Income, and Spending Score. You need to apply hierarchical clustering to segment these customers. Plot a dendrogram to decide the optimal number of clusters and compare it with K-Means clustering results.

Steps:

- Load the dataset.
- Apply hierarchical clustering.
- Plot a dendrogram and choose the number of clusters.
- Apply K-Means clustering with the same number of clusters.
- Compare the results.

3. Evaluate clustering performance using the Silhouette Score and Elbow Method on the Wine dataset. Determine the optimal number of clusters.

Note : Load the wine dataset from sklearn

4. You have a 2D dataset with some clusters and random noise. Your task is to apply DBSCAN clustering to identify the core samples, outliers, and clusters. Compare the DBSCAN results with K-Means on the same dataset.

- Generate a dataset with clusters and noise.
- Apply DBSCAN clustering and tune parameters (`eps`, `min_samples`).
- Visualize the clusters and outliers.
- Apply K-Means clustering and compare.

5. Cluster text documents based on their TF-IDF vectors using K-Means clustering. Use the 20 Newsgroups dataset.

Note : Load the 20 Newsgroup dataset(fetch_20newsgroups) from sklearn