**Task 16**

# Machine Learning (Clustering Algorithm I)

Upload the .py or .ipynb extension file to GitHub public repo “100DaysofBytewise" and share the link in the submission form by July 31, 2024.

##### **Dataset :** **Iris**

##### **Implementing K-Means Clustering**

##### Task: Apply K-Means clustering to the Iris dataset and visualize the clusters using a scatter plot of two features. Evaluate the clustering by comparing it to the actual species labels.

##### **Choosing the Optimal Number of Clusters**

##### Task: Use the Elbow Method and Silhouette Score to determine the optimal number of clusters for the Iris dataset. Visualize the Silhouette Score for different cluster counts.

##### **Cluster Visualization with PCA**

##### Task: Use Principal Component Analysis (PCA) to reduce the Iris dataset to two dimensions. Visualize the clusters obtained from K-Means clustering in the PCA-reduced space.

##### **Hierarchical Clustering: Dendrogram**

##### Task: Implement hierarchical clustering using the Iris dataset. Plot a dendrogram to visualize the clustering process and choose an appropriate number of clusters.

##### **Comparing Clustering Algorithms**

##### Task: Compare the performance of K-Means and Agglomerative Hierarchical Clustering on the Iris dataset. Discuss the strengths and weaknesses of each approach based on the results.