**KMeans**

K-means is an algorithm used for clustering, which is a technique to group similar data points together. The algorithm works as follows:

1. Initialize: Choose the number of clusters you want to create (represented by n\_clusters).
2. Randomly initialize the cluster centroids (representative points for each cluster).
3. Assign each data point to the nearest cluster centroid based on its distance.
4. Update the cluster centroids by computing the mean of all data points assigned to each cluster.
5. Repeat steps 3 and 4 until convergence (when the cluster assignments no longer change significantly or a maximum number of iterations is reached).

The goal of the K-means algorithm is to minimize the sum of squared distances between each data point and its assigned cluster centroid. This sum of squared distances is called the inertia.

The elbow method is a technique used to find the optimal number of clusters for a given dataset. It involves plotting the inertia values against different numbers of clusters. The plot typically resembles an elbow shape. The idea is to choose the number of clusters where adding more clusters doesn't significantly decrease the inertia. This point, where the plot forms an "elbow," is considered a good balance between the number of clusters and the compactness of the clusters.

To apply the elbow method:

1. Choose a range of possible numbers of clusters to evaluate (e.g., from 1 to 15).
2. For each number of clusters, perform the K-means algorithm and calculate the inertia.
3. Plot the inertia values against the number of clusters.
4. Identify the point where adding more clusters doesn't reduce the inertia significantly. This is the "elbow" point.
5. Choose the number of clusters at the elbow point as the optimal number of clusters for your dataset.