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#65070503428 Pitchayapat Wareevanich
import numpy as np

#to define all the data points and initial centroids
datapoints = np.array([[5, 7], [15, 12], [16, 18], [6, 6], [16, 11], [15, 11], [6, 4], [13, 13], [16, 17], [5, 5], [15, 17],
initialcentroids = np.array([[5, 12], [15, 4], [10, 17]])

def k_means(data, centroids, iterations):
    for i in range(iterations):

        #to give data points to the centroids
        clusters = [[] for i in range(len(centroids))]

        for point in data:
            distance = [np.linalg.norm(point - centroid) for centroid in centroids]
            cluster_index = np.argmin(distance)
            clusters[cluster_index].append(point)


        #calculate the new centroids
        newcentroids = []
        for cluster in clusters:
            new_centroid = np.mean(cluster, axis=0)
            newcentroids.append(new_centroid)

        centroids = np.array(newcentroids)

    return centroids

#do the k-means clustering
finalcentroids = k_means(datapoints, initialcentroids, iterations=3)

#to print the final result
for i, centroid in enumerate(finalcentroids):
    print(f"{'first', 'second', 'third'}[i]} centroid: {centroid}")

 first centroid: [5.6 6. ]
second centroid: [14.6 11.8]
third centroid: [15.8 16.8]
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