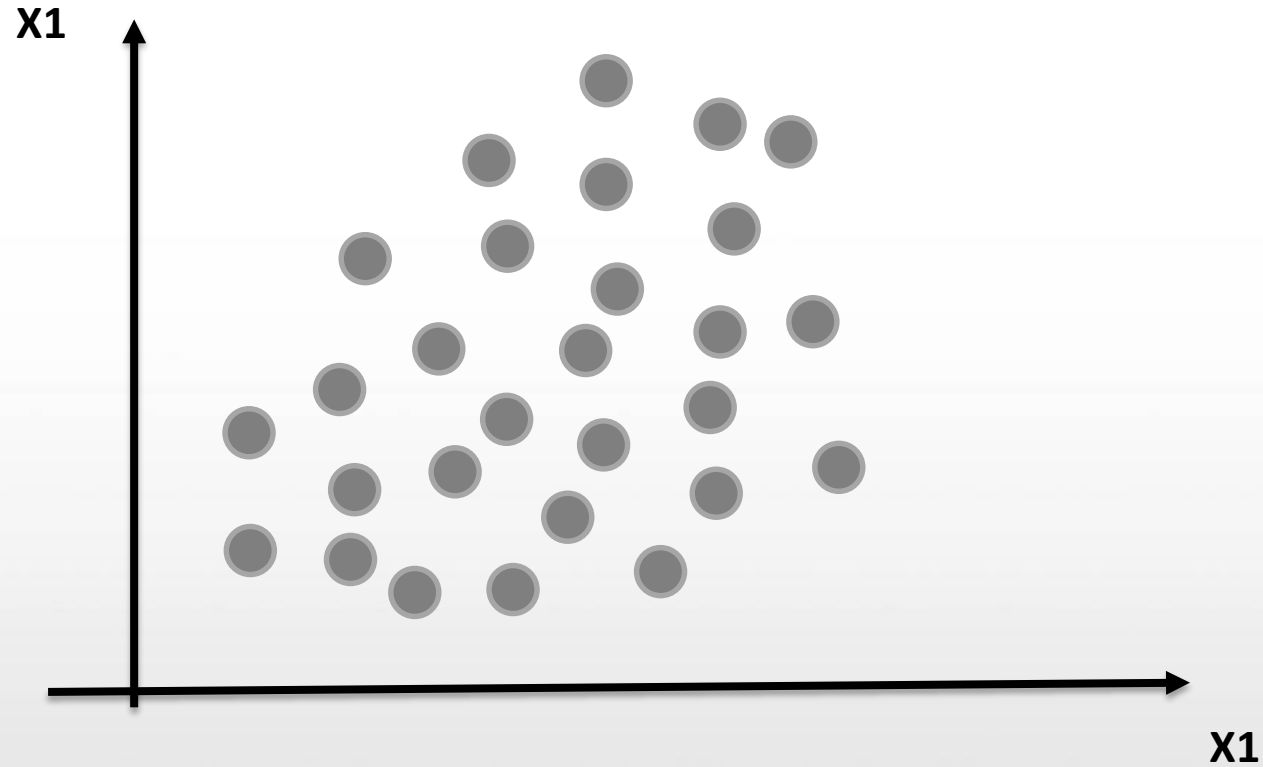


# Unsupervised Learning

# K-Means Clustering

# K Means Clustering

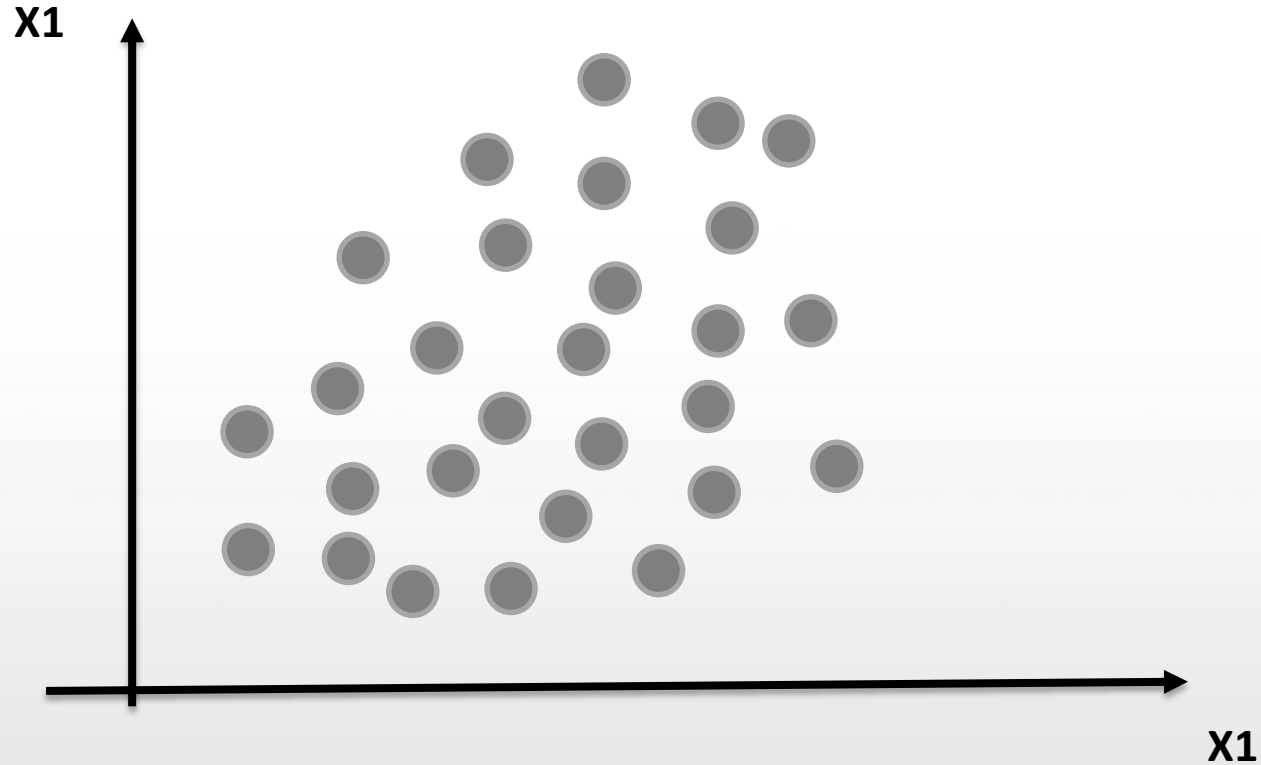


## Steps in K -Means

- Step 1 : Choose the number  $K$  of clusters
- Step 2: Select at random  $K$  points, the centroids
- Step 3: Assign each data point to closest centroid
- Step 4: Computer and place the new centroid of each clusters
- Step 5: Reassign each data point to the closest centroid. Go to step 4

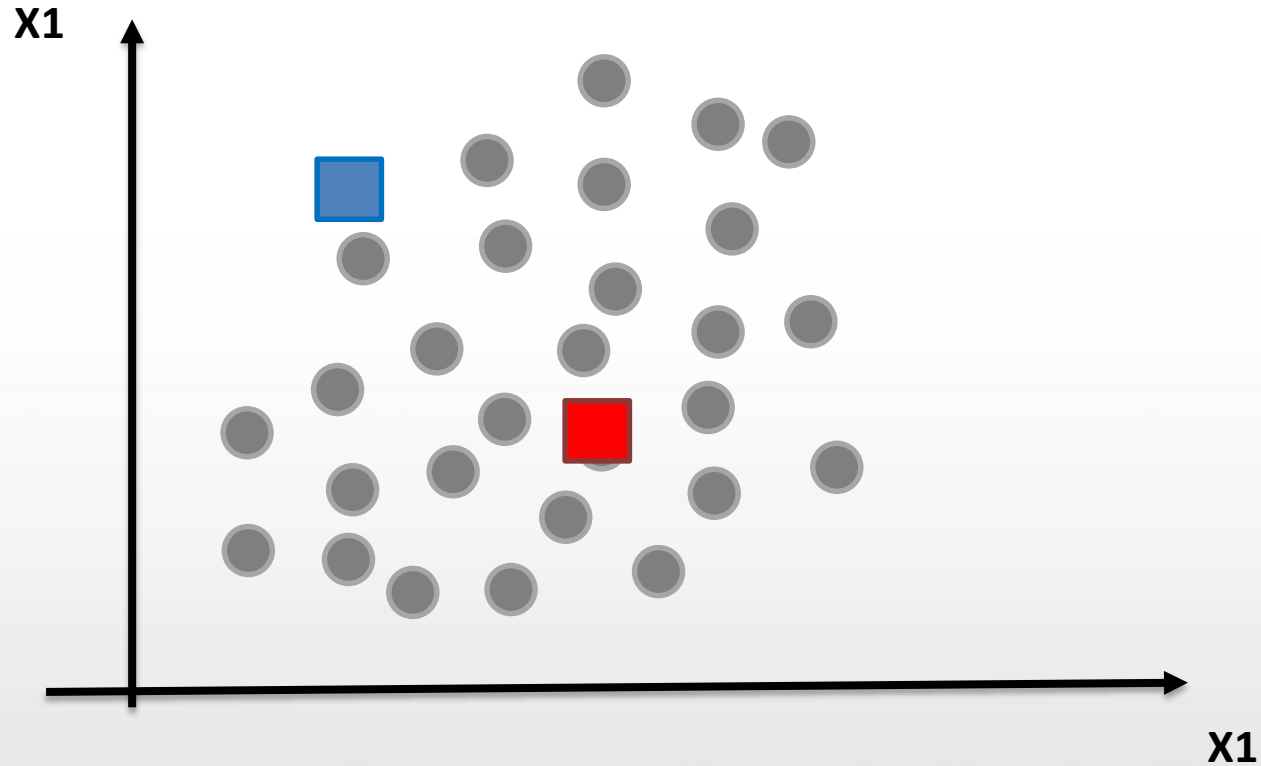
# K Means Clustering

Step 1: choose number K of clusters :  $K = 2$



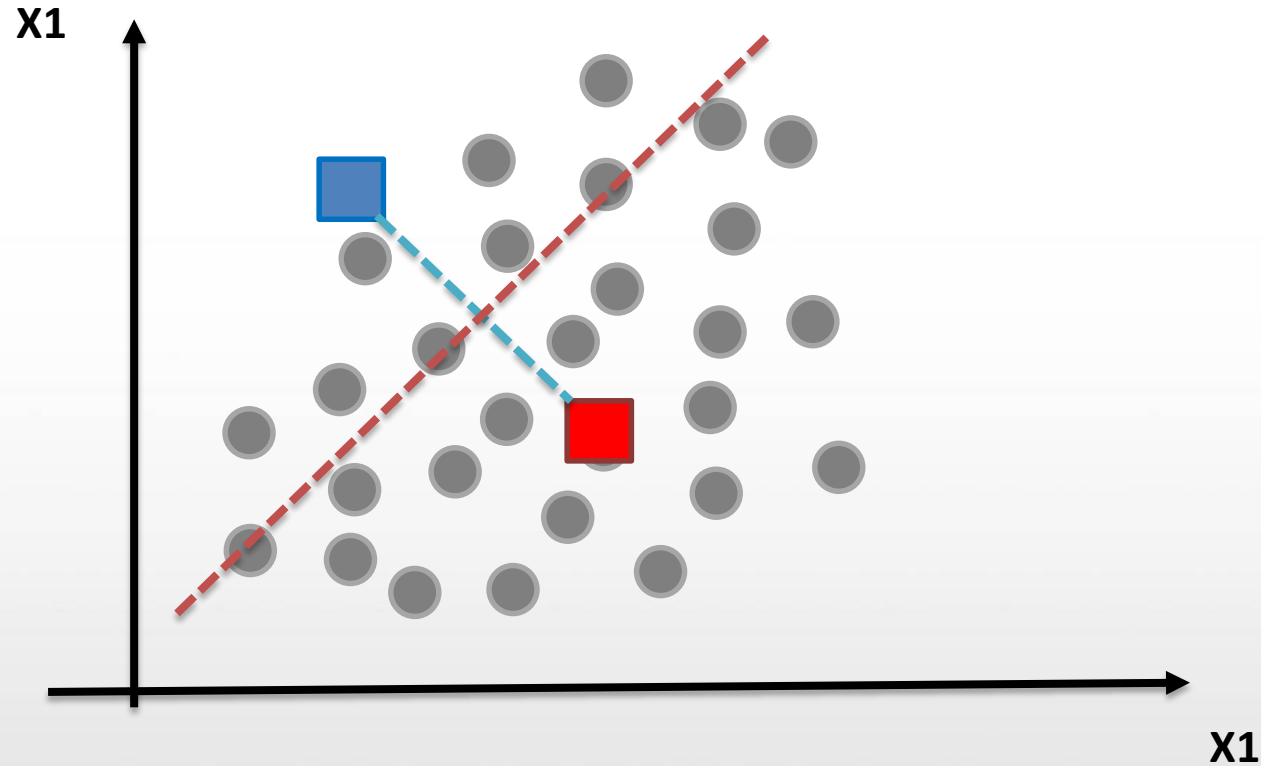
# K Means Clustering

Step 2: Select random K points, centroid

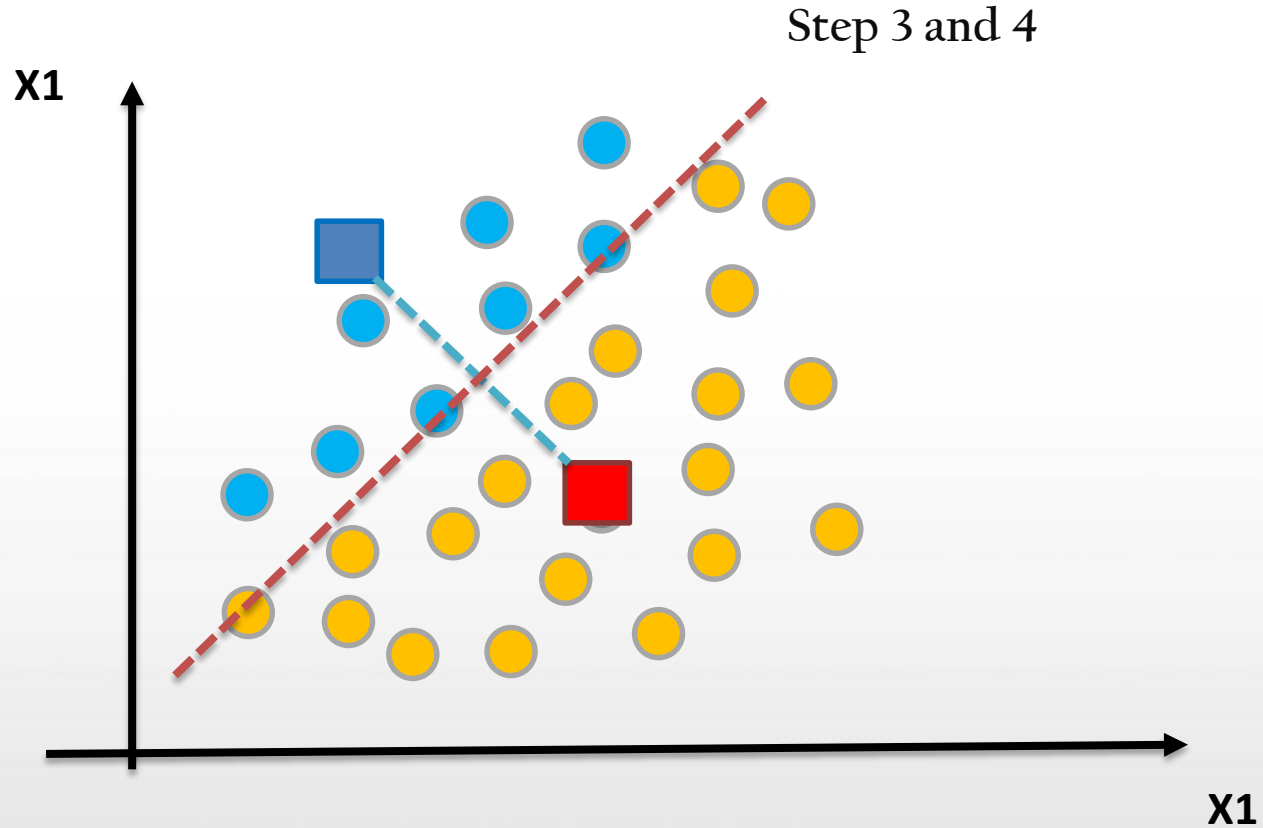


# K Means Clustering

Step 2: Assign each data point to the closest centroid → that forms K clusters

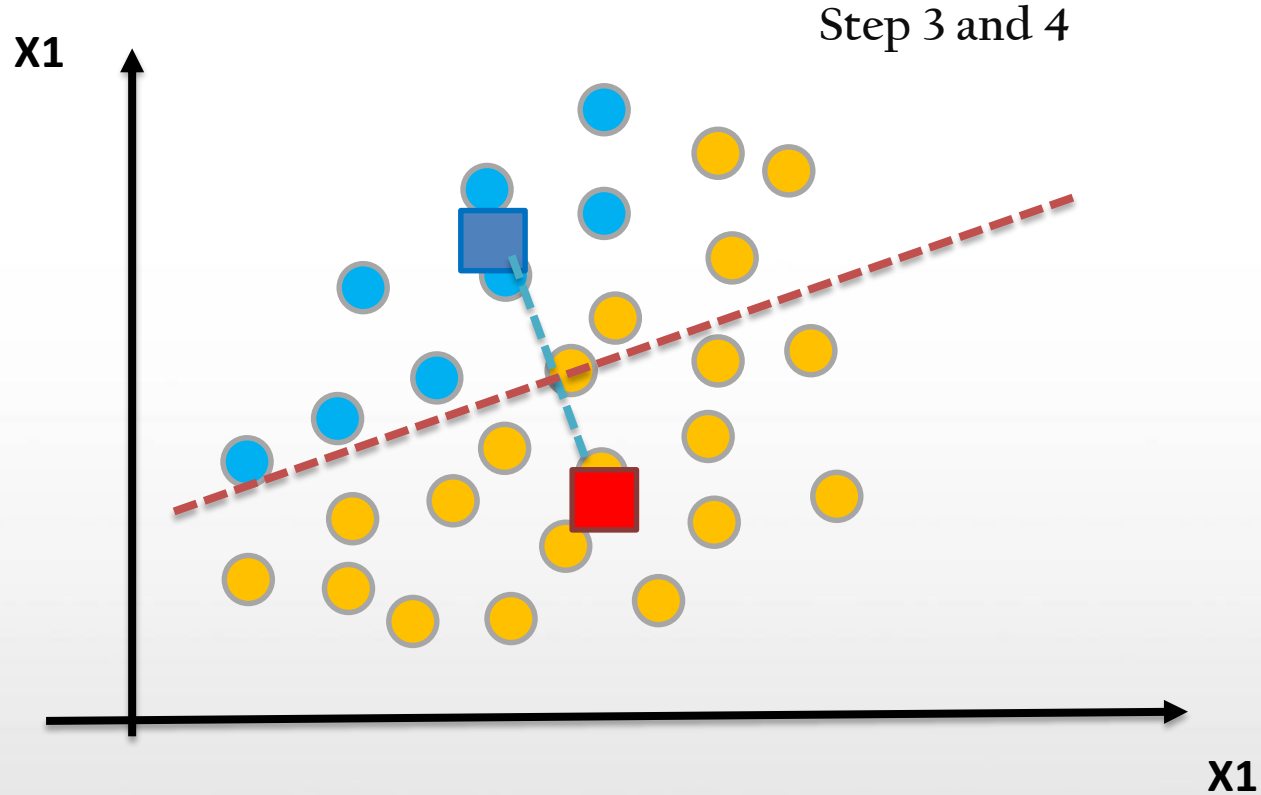


# K Means Clustering

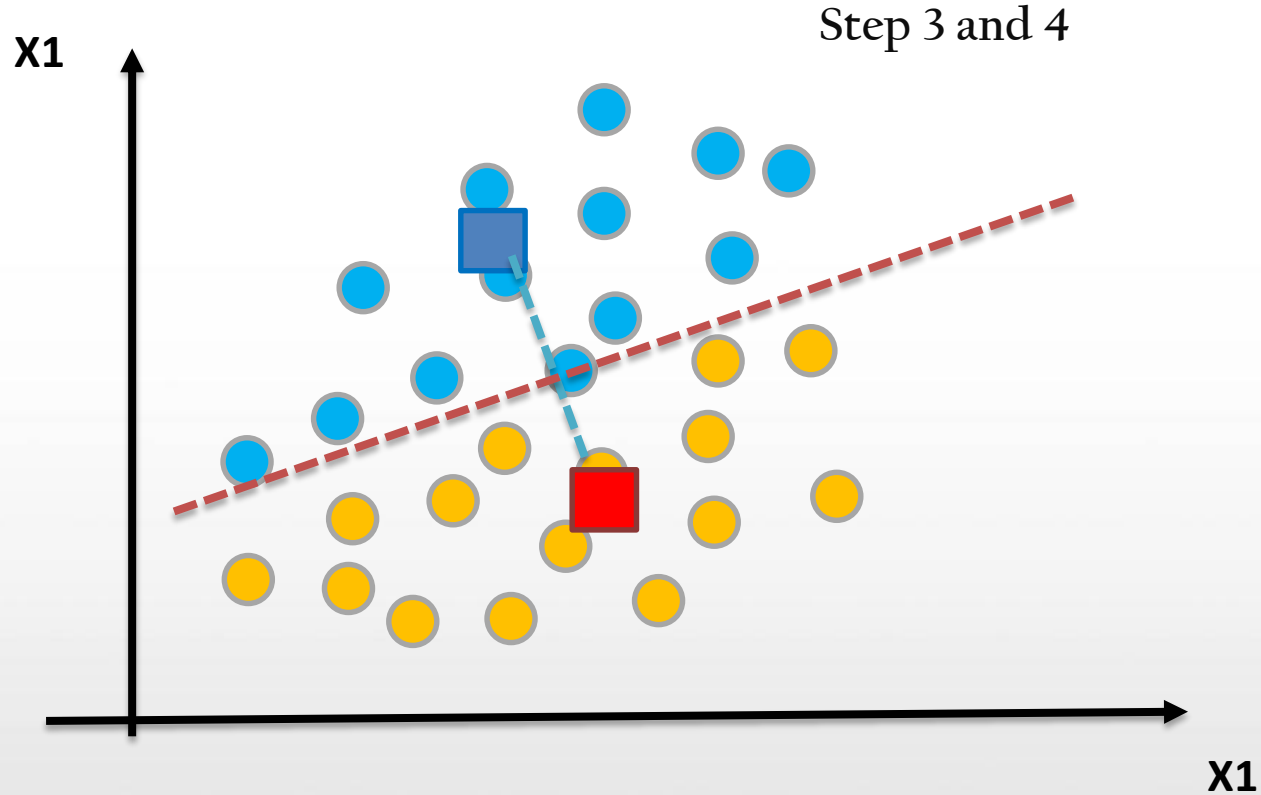




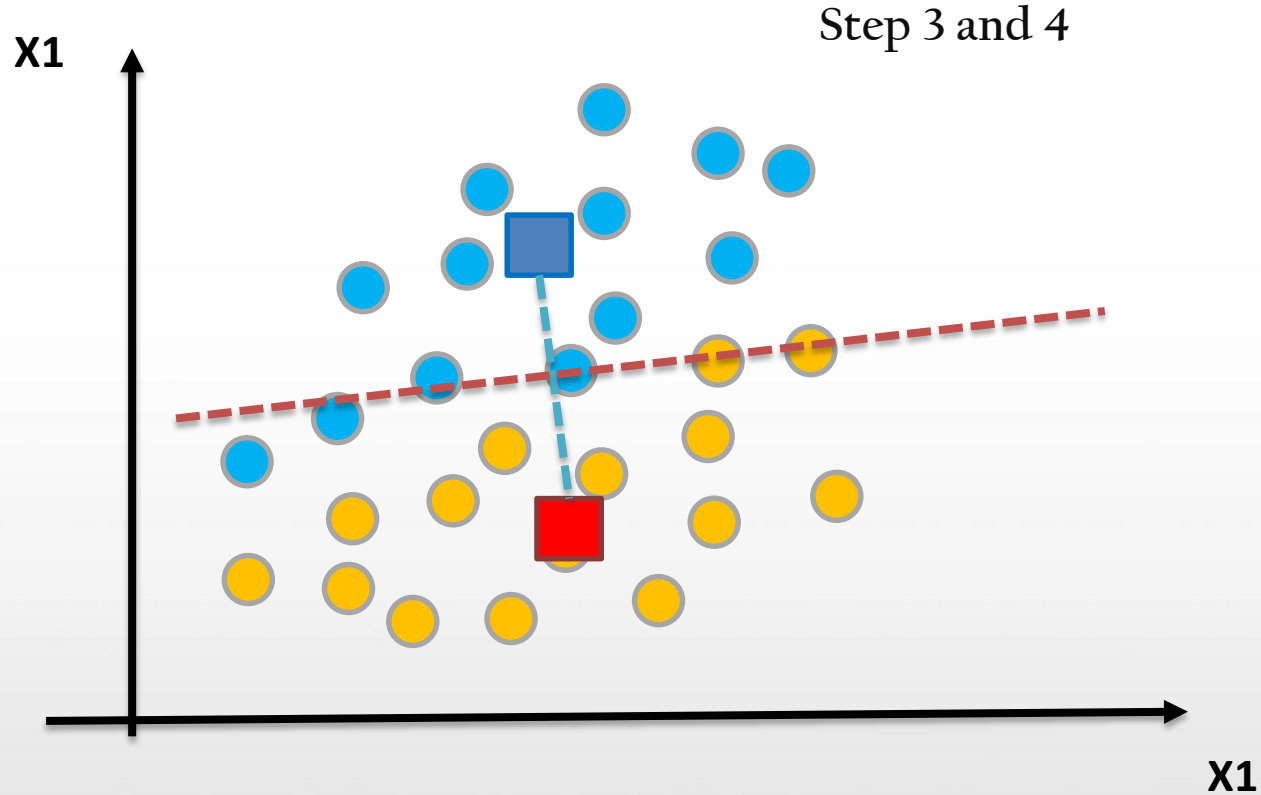
# K Means Clustering



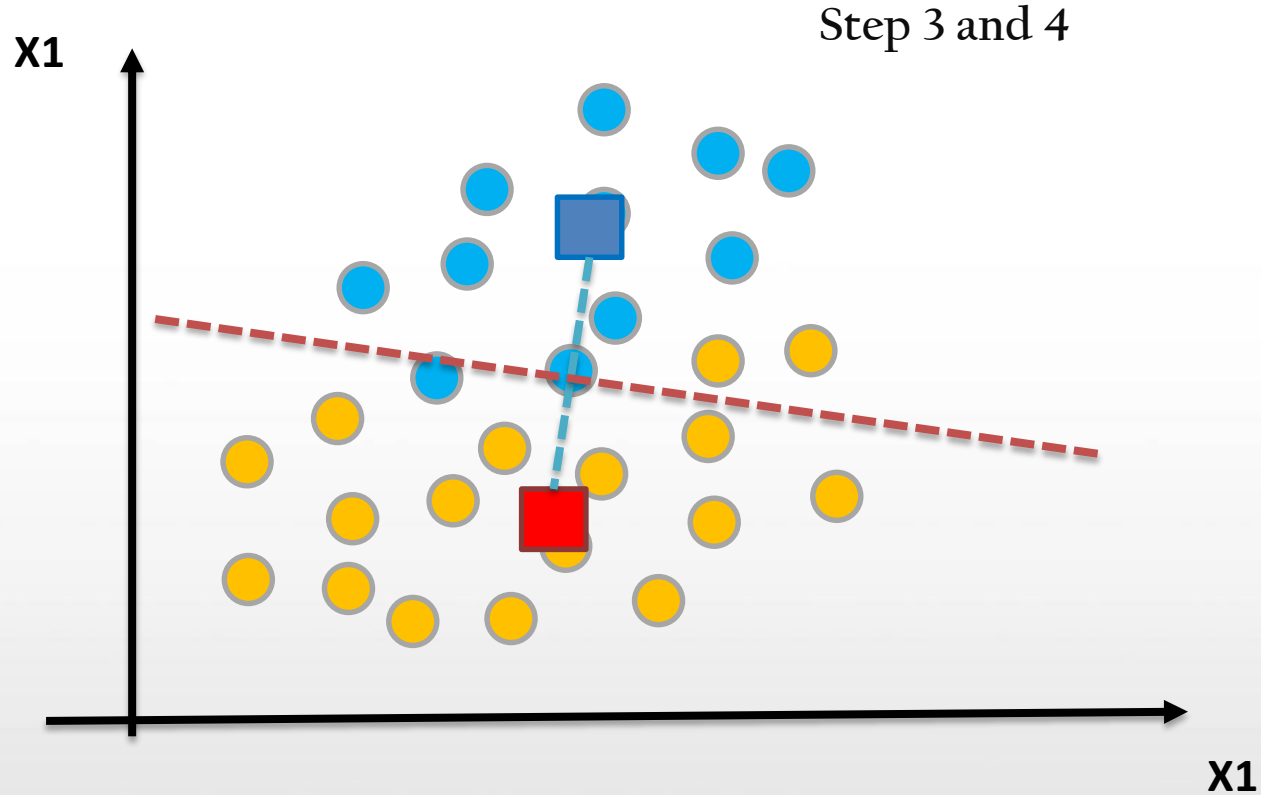
# K Means Clustering



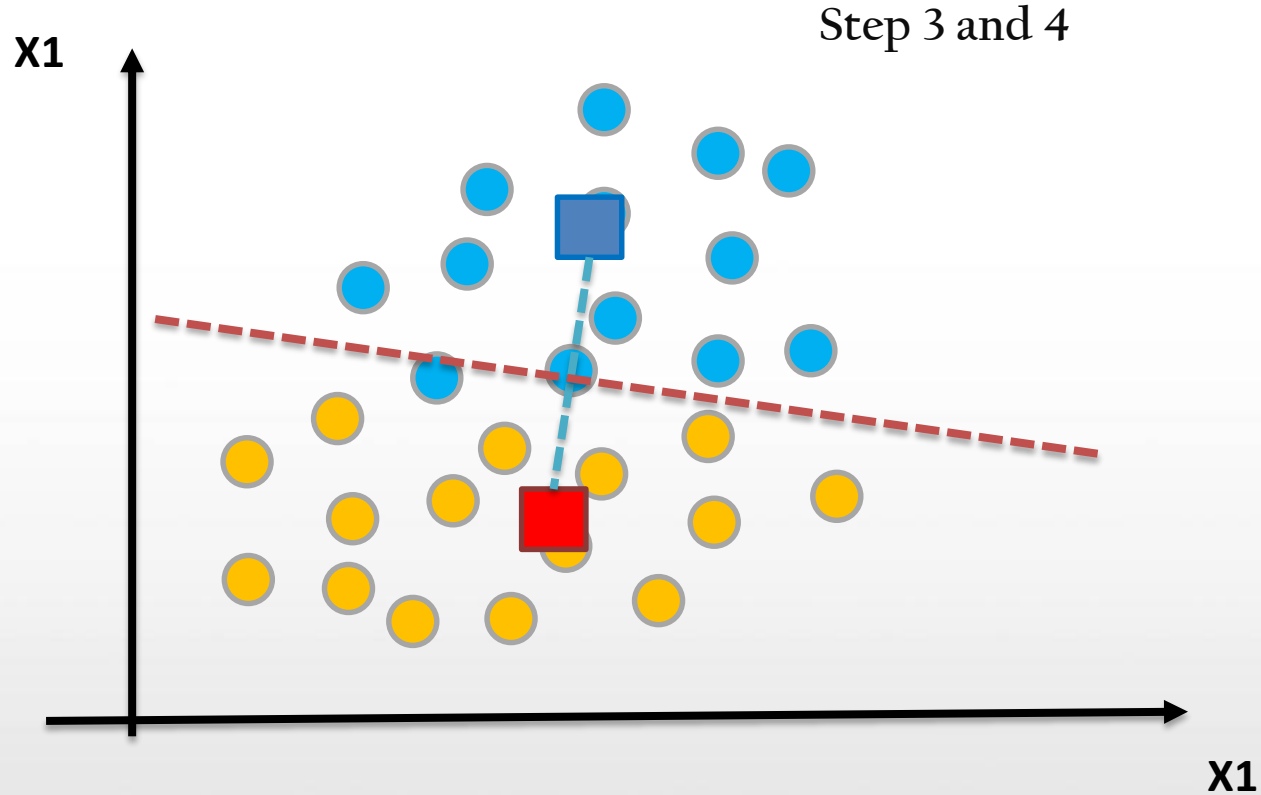
# K Means Clustering



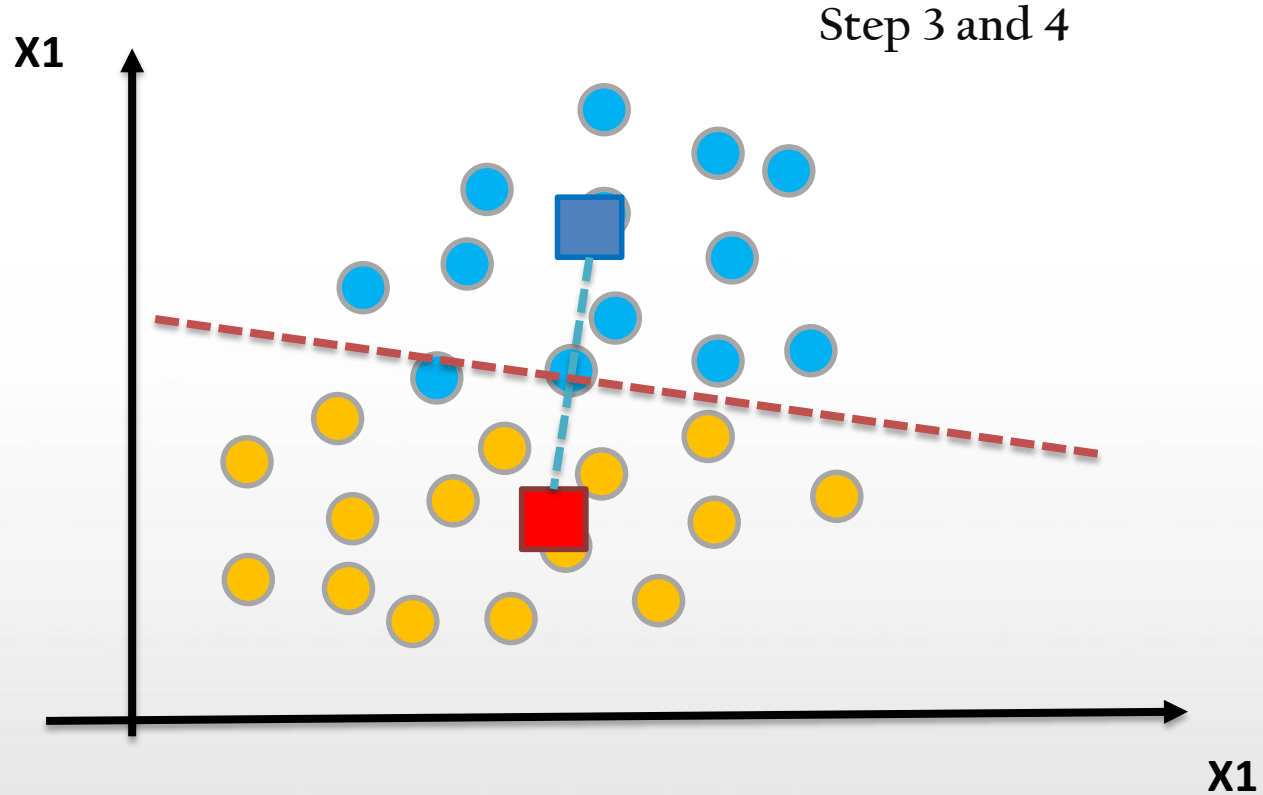
# K Means Clustering



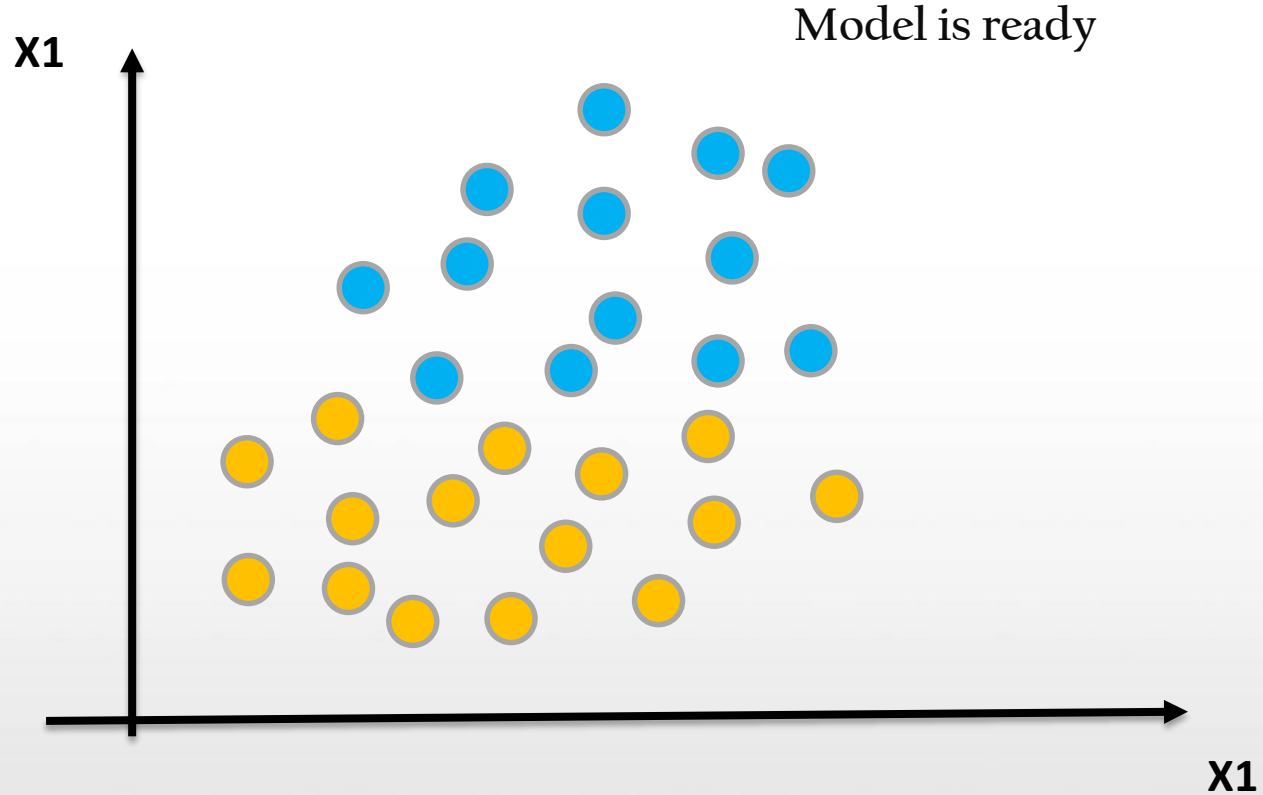
# K Means Clustering



# K Means Clustering

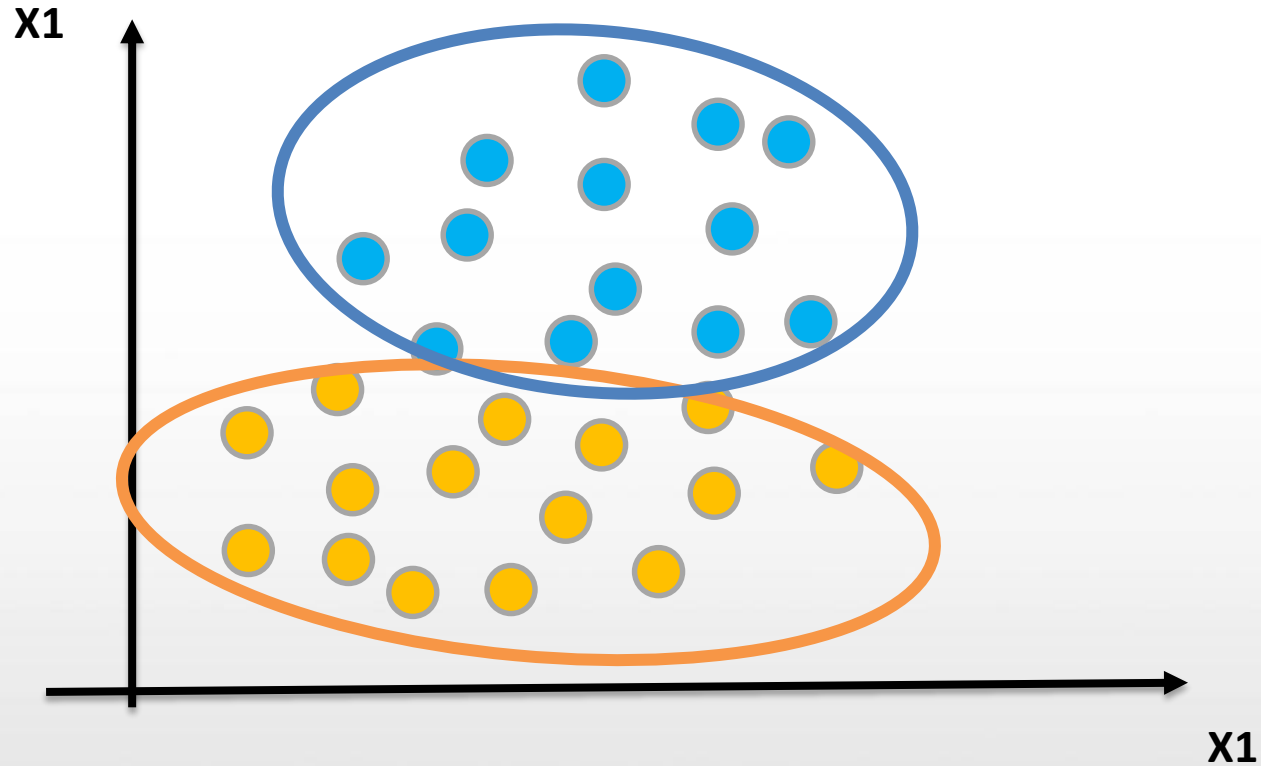


# K Means Clustering



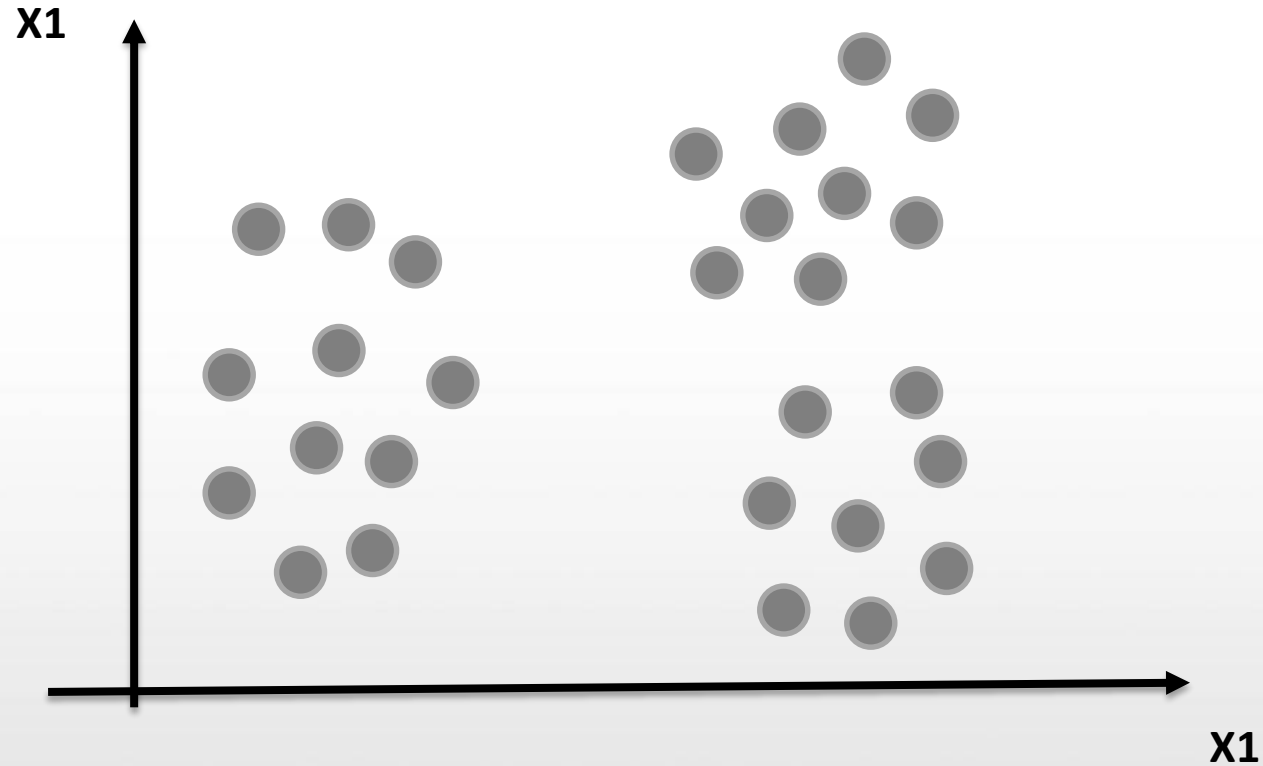
# K Means Clustering

Model is ready





# How many cluster should I choose

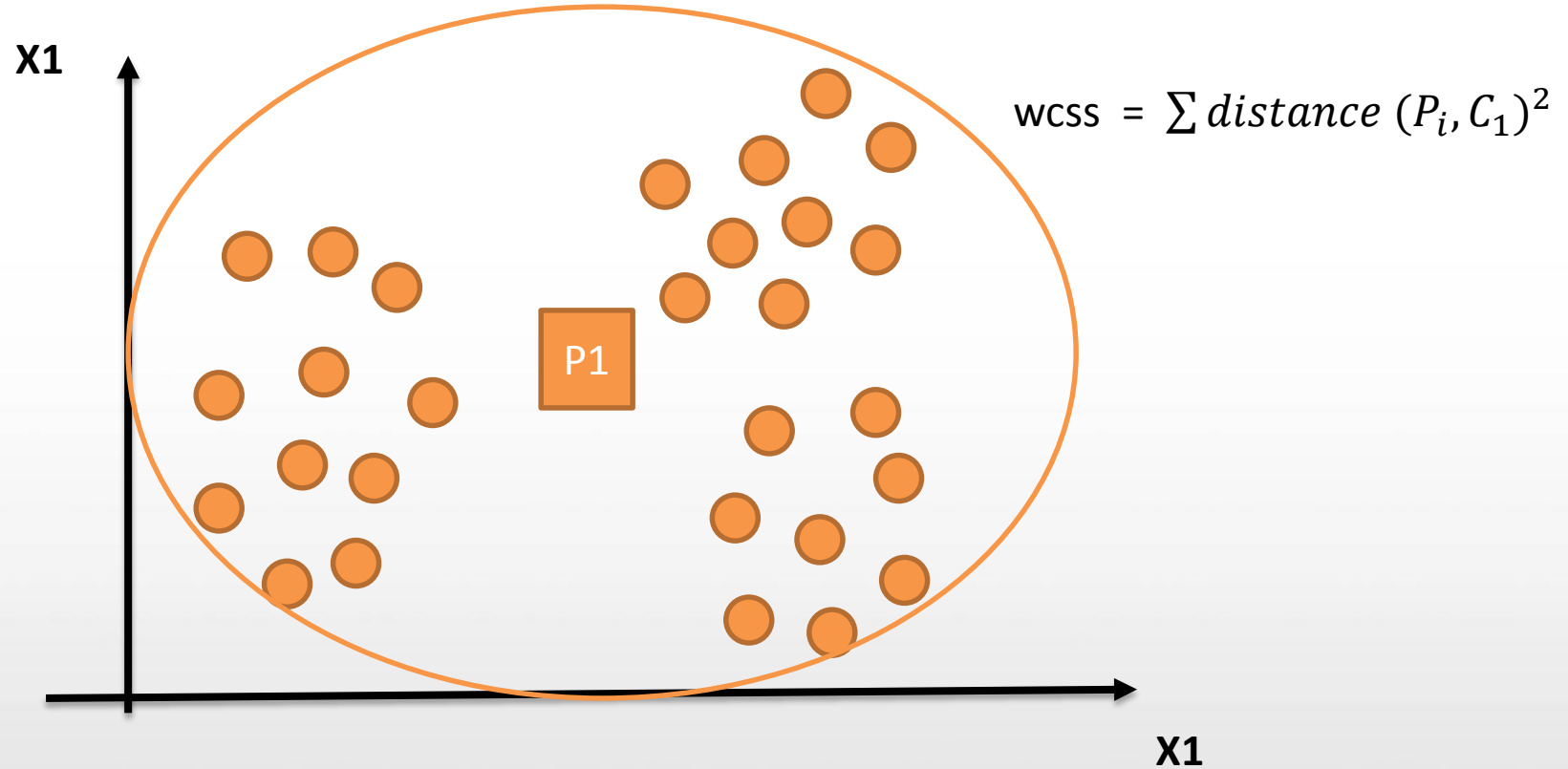


Choosing right number of clusters using within-cluster sums of squares (WCSS)

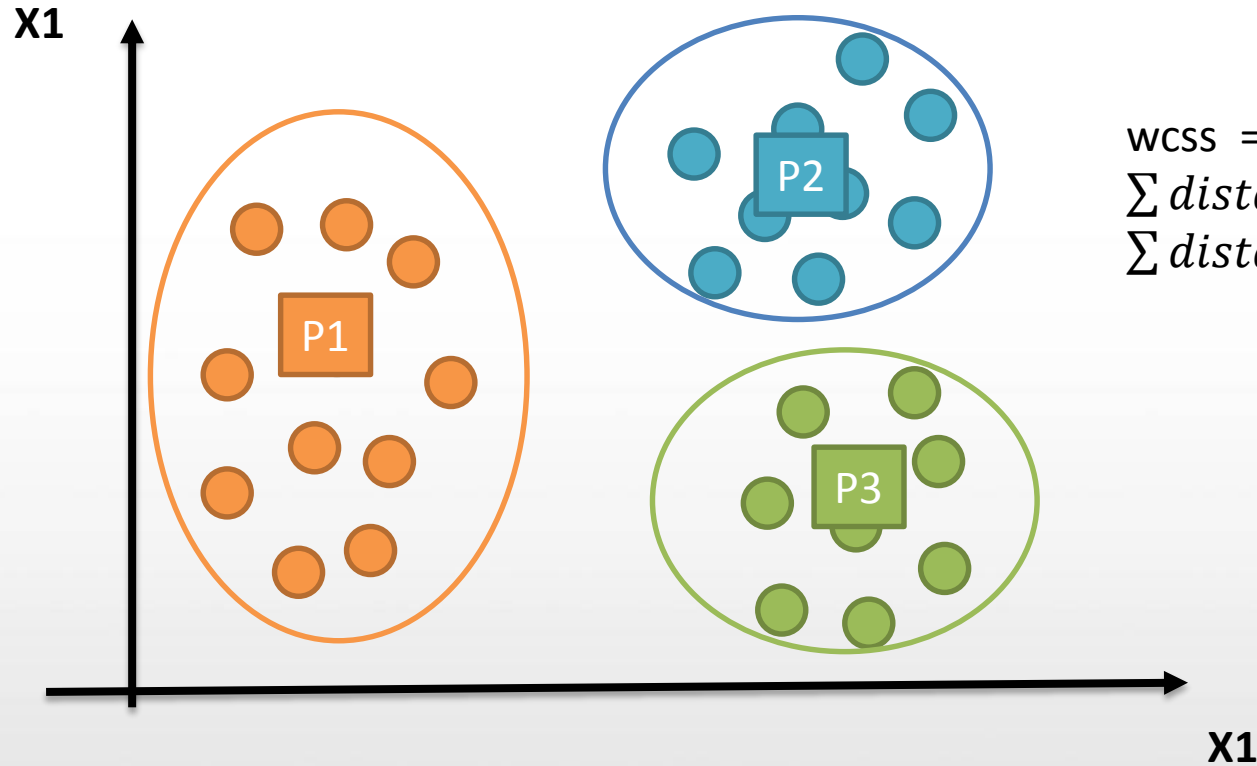
$$\text{WCSS} = \sum \text{distance} (P_i, C_1)^2 + \sum \text{distance} (P_i, C_2)^2 + \dots$$

Choose wcss should be minimum

# How many cluster should I choose

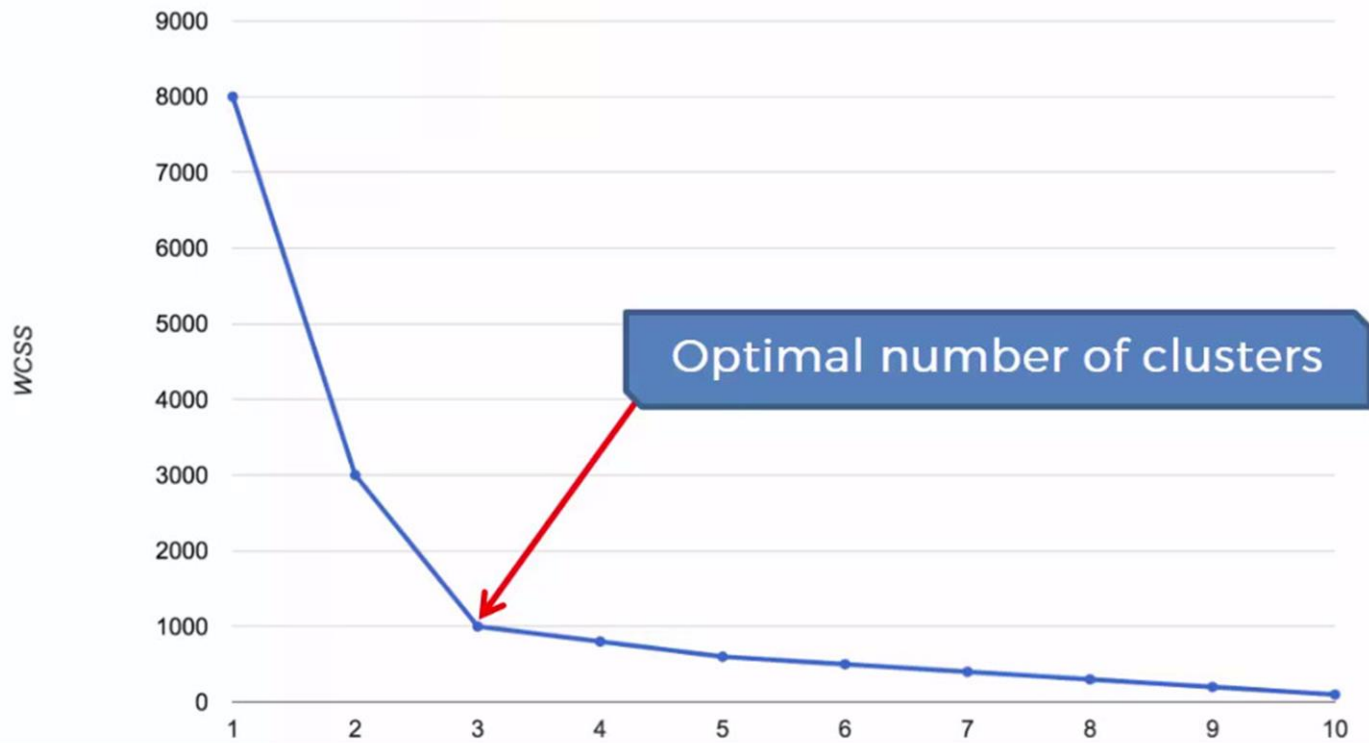


# How many cluster should I choose



$$wcss = \sum distance (P_i, C_1)^2 + \sum distance (P_i, C_2)^2 + \sum distance (P_i, C_3)^2$$

# The Elbow Method



# Hands on Clustering

The image features the word "IOTGYAN" in a white, serif, all-caps font, centered horizontally. The background is a dark blue gradient with large, light blue geometric shapes, including triangles and diamonds, creating a modern, tech-oriented aesthetic.

IOTGYAN