Example

items	variables (x_1, x_2)
A	(5, 3)
B	(−1, 1)
C	(1, −2)
D	(−3, −2)

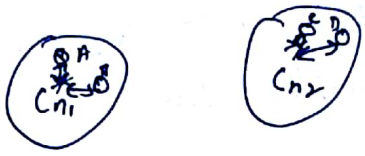
→ K-means Cluster (K = 2)

Sol? K = 2.

(I) Arbitrary partition → (A, B), (C, D)

cluster centroid.

Cluster	cluster centroid $(\bar{x}_1, \bar{x}_2)$
(A, B)	(2, 2) → C_{n_1}
(C, D)	(−1, −2) → C_{n_2}



(II) Compute distances from cluster centroid & reassign items (if required) to the nearest groups.

A:

$$d^2(A, (A,B)) = 10$$

↑ centroid of (A, B)

$$d^2(A, (C,D)) = 61$$

↑ centroid of (C, D)

→ No reassignment of A is required

B:

$$d^2(B, (A,B)) = 10$$

$$d^2(B, (C,D)) = 9.$$

⇒ B reassignment required, B is closer to (C, D) than to (A, B)

⇒ Reassign B to cluster (C, D)

→ $\underline{(A, (B, C, D))}$

(III) → Updation of Cluster centroid

III

Clusters	centroids $(\bar{x}_1, \bar{x}_2)$
(A)	(5, 3)
(B, C, D)	(−1, −1)

Step IV) Squared distance to group clusters

items.

Cluster	A ✓	B ✓	C ✓	D ✓
(A)	0	40	41	89
(B, C, D)	52	4	5	5

⇒ No reassignment is required further

Terminate the process.

⇒ (A), & (B, C, D) are the desired clusters.