

Q1-

K-Mean Clustering:-

R	Height (H)	Weight (W)	
1	185	72	→ C ₁
2	170	63	→ C ₂
3	168	56	
4	178	77	
5	192	60	
6	155	58	

Euclidian Distance:- (P)

$$E.D = (X_h - H)^2 + (X_w - W)^2$$

(Actual) ← → (Centroid)

Step 1:-

Choose Cluster:

K = 2

		H	W	Centroid
①	C ₁	185	72	(185, 72)
②	C ₂	170	63	(170, 63)

$$C_1 = \{1\}$$

$$C_2 = \{2\}$$

sl. (E.D) of R_3 for C_1

$$E.D.C_1 = (168 - 185)^2 + (56 - 72)^2$$

$$\Rightarrow E.D.C_1 = 545$$

(E.D) of R_3 for C_2

$$E.D.C_2 = (168 - 170)^2 + (56 - 63)^2$$

$$\Rightarrow E.D.C_2 = 53 \rightarrow \text{LOW}$$

R_3 is in C_2 ...

Update, Centroid of C_2

		H	W	Centroid
①	C_1	185	72	(185, 72)
②	C_2	169	59.5	(169, 59.5)

(E.D) of (R_4) for (C_1)

$$E.D.C_1 = (178 - 185)^2 + (77 - 72)^2$$

$$\Rightarrow E.D.C_1 = 25 \quad 74 \rightarrow \text{Low}$$

(E.D) of (R_4) for (C_2)

$$E.D.C_2 = (178 - 169)^2 + (77 - 59.5)^2$$

$$\Rightarrow E.D.C_2 = 390.76$$

(R_4) is in $(C_1) \dots$

Update, Centroid of (C_1)

		H	W	Centroids
①	C_1	181.5	74.5	(181.5, 74.5)
②	C_2	169	59.5	(169, 59.5)



(E.D) of (R_5) for (C_1)

$$E.D.C_1 = (192 - 181.5)^2 + (60 - 74.5)^2$$

$$\Rightarrow E.D.C_1 \approx 320.5 \rightarrow \text{Low}$$

(E.D) of (R_5) for (C_2)

$$E.D.C_2 = (192 - 169)^2 + (60 - 59.5)^2$$

$$\Rightarrow E.D.C_2 \approx 529.25$$

(R_5) is in (C_1) ...

Update centroid of (C_1)

		H	w	centroid
①	C_1	186.7	67.2	(186.7, 67.2)
②	C_2	169	59.5	(169, 59.5)

(E.D) of (R_6) for (C_1)

$$E.D.C_1 = (155 - 186.7)^2 + (58 - 67.2)^2$$

$$\Rightarrow E.D.C_1 = 1089.5$$

(E.D) of (R_6) for (C_2)

$$E.D.C_2 = (155 - 162)^2 + (58 - 58.7)^2$$

$$\Rightarrow E.D.C_2 = 198.25 \rightarrow \text{Low}$$

(R_6) is in (C_2) ...

		H	W	Centroid
①	C_1	186.7	67.2	(186.7, 67.2)
②	C_2	162	58.7	(162, 58.7)



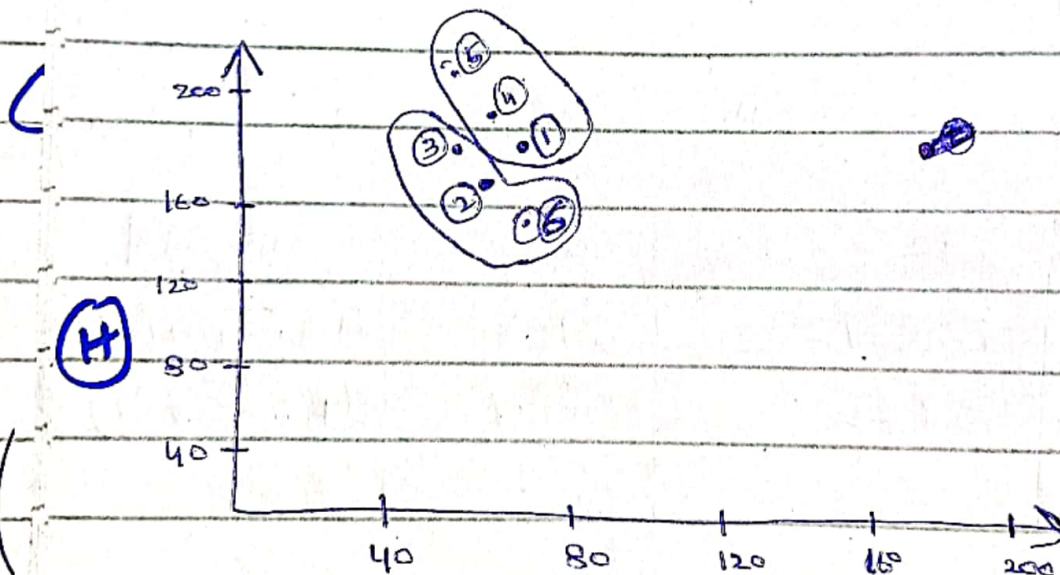
Step ②:-

Assign clusters:-

$$C_1 = \{ 1, 4, 5 \}$$

$$C_2 = \{ 2, 3, 6 \}$$

2D-Plane:-



← END →