Homework (5)

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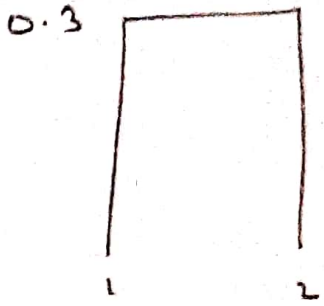
10.7.2

(a)

	P_1	P_2	P_3	P_4
P_1	0			
P_2	0.3	0		
P_3	0.4	0.5	0	
P_4	0.7	0.8	0.45	0



	P_1, P_2	P_3	P_4
P_1, P_2	0		
P_3	0.5	0	
P_4	0.8	0.45	0

Max (dist $(P_1, P_2), P_3$)

Max (dist (P_1, P_3) (P_2, P_3))

Max (0.4, 0.5)

0.5

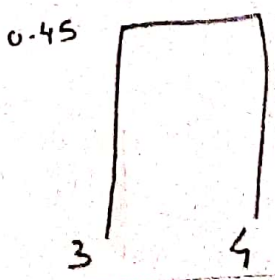
Max (dist $(P_1, P_2), P_4$))

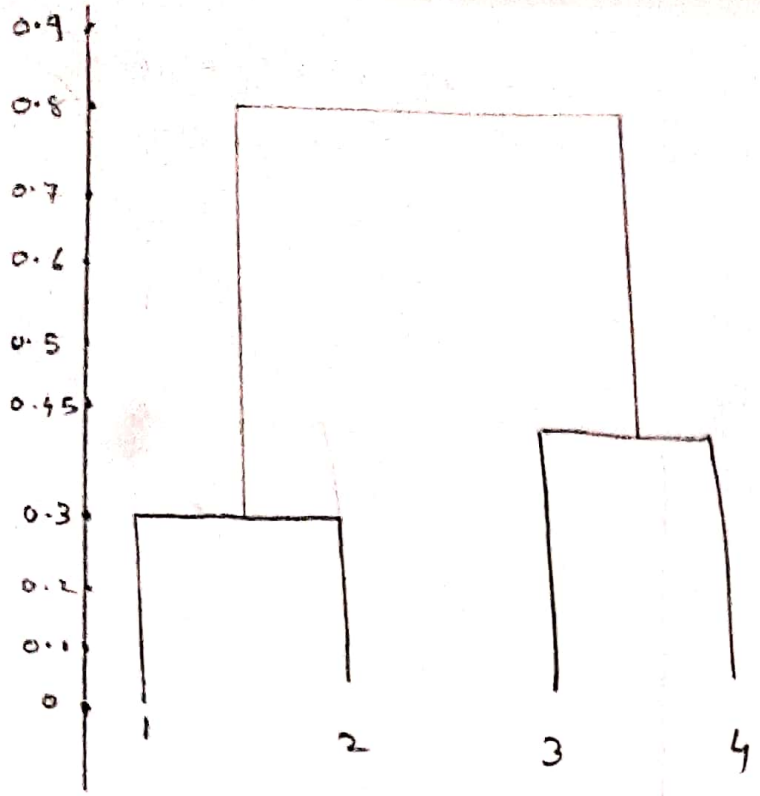
Max (dist (P_1, P_4) (P_2, P_4))

Max (0.7, 0.8)

0.8

	P_1, P_2	P_3, P_4
P_1, P_2	0	
P_3, P_4	0.8	0





$Max[(P_1,P_2),(P_3,P_4)]$

$Max[dist(P_1,P_2)(P_3,P_4)]$

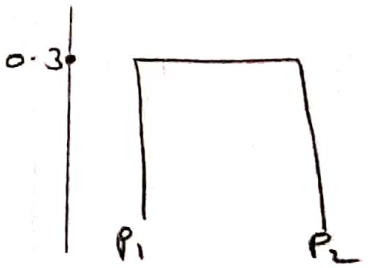
$Max[dist(P_3,(P_1,P_2)),(P_4,(P_1,P_2))]$

$Max[0.5, 0.8]$

0.8

(b)

	P_1	P_2	P_3	P_4
P_1	0			
P_2	0.3	0		
P_3	0.4	0.5	0	
P_4	0.7	0.8	0.45	0



$Min[dist(P_3,(P_1,P_2))]$

$Min[dist(P_3,P_1)(P_3,P_2)]$

$Min[0.4, 0.5]$

0.4

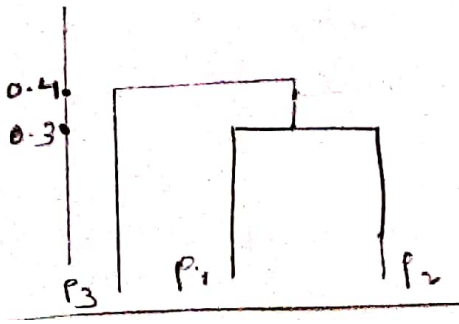
$Min[dist(P_4,(P_1,P_2))]$

$Min[dist(P_4,P_1)(P_4,P_2)]$

$Min[0.7, 0.8]$

0.7

	P_1P_2	P_3	P_4
P_1 P_2	0		
P_3	0.4	0	
P_4	0.7	0.45	0



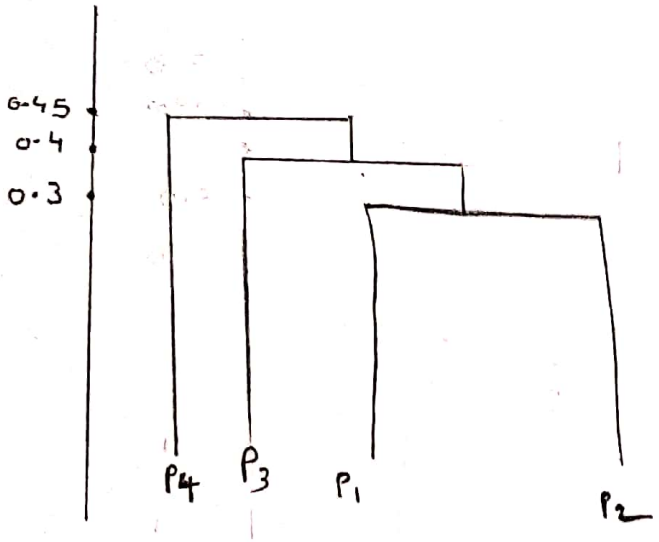
$$\begin{array}{c} \\ P_1 \\ P_2 \\ P_3 \\ P_4 \end{array} \begin{array}{c} \begin{array}{cccc} P_1 & P_2 & P_3 & P_4 \end{array} \\ \begin{bmatrix} 0 & & & \\ & & & \\ 0.45 & & 0 & \end{bmatrix} \end{array}$$

Min [dist (P4, (P1P2, P3)]

Min [(P4, (P1, P2)), (P4, P3)]

Min [0.7, 0.45]

0.45



(c) (1,2) => C_1

(3,4) => C_2

The inter cluster similarity is higher when these two pairs of points (1,2) and (3,4) are clustered together. This is evident from the smallest euclidian distance between these pairs from the matrix in (a).

(d)

$C_1 \Rightarrow (1, 2, 3)$

$C_2 \Rightarrow (4)$

the inter cluster similarity is higher between these points ~~three~~ ~~five~~ in the above cluster configuration when they need to be allocated to two different clusters

(e)