

Single linkage

Example:

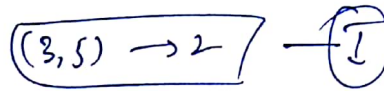
Distance matrix

D = 5x5

	1	2	3	4	5
1	0				
2	9	0			
3	3	7	0		
4	6	5	9	0	
5	11	10	2	8	0

Stage 1

d_{35} is min \Rightarrow fuse 3&5 to form first stage cluster - at a distance level of 2 units



Stage 2

update the distance matrix (1)

D = 4x4

	3,5	1	2	4
3,5	0			
1	3	0		
2	7	9	0	
4	8	6	5	0

$(3,5), 1) \rightarrow (1,3), (1,5)$
 $(3, 11)$

$(3,5), 2) \Rightarrow (2,3), (2,5)$
 $(7, 10)$
 $(3,5), 4) \Rightarrow (3,4), (4,5)$
 $(9, 8)$

Stage 3 look for min distance in the updated distance matrix Fuse $(1, (3,5)) \rightarrow \text{③} \rightarrow \text{②}$

D = 3x3

	1,3,5	2	4
1,3,5	0		
2	7	0	
4	6	5	0

$$\text{dist}(1,3,5,2) \rightarrow (2,1), (2,3), (2,5) \rightarrow 7$$

$$\rightarrow (9, 7, 10)$$

$$\text{dist}(1,3,5,4) \rightarrow (1,4), (3,6), (5,4) \rightarrow 6$$

$$(6, 8)$$

Stage 4 updation of new distance matrix

$D =$
 3×3

	1, 3, 5	2	4
1, 3, 5	0		
2	7	0	
4	6	5	0

Stage 5: Note that d_{24} is min.

\Rightarrow fuse (2) & (4) to form a cluster

$$\boxed{(2,4) \rightarrow 5} \text{ --- III}$$

Stage 6 updation of new distance matrix

$D =$
 2×2

	(1, 3, 5)	(2, 4)	distance b/w cluster (1, 3, 5) & (2, 4) $d_{(2,1), (3,5)}, d_{(4,1,3,5)}$ \downarrow 7
(1, 3, 5)	0	6	
(2, 4)	6	0	6

fuse $\boxed{(1,1,3,5) \rightarrow 6}$

\Rightarrow updated d .

Stage 7 look into the

fuse (1, 3, 5) & (2, 4) at a level of 6

$$\boxed{((1,3,5), (2,4)) \rightarrow 6} \text{ --- IV}$$

Stage-7

Construction of dendrogram tree

