Single linkage

Example:

Distance Matrix

D: 5×5

	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_{53} is min $\Rightarrow$ fuse 3 & 5 to form first stage cluster - at a distance level of 2 units

$(3,5) \rightarrow 2$ — (1)

Stage (2) Update the distance matrix (1)

$1)$ = 4×4

	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 dist matrix fuse $(1,(3,5)) \rightarrow (3)$ — (11)

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

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

$\rightarrow (9, 7, 10)$

$dist\,[(1,3,5),4) \rightarrow (1,4), ((3,5),4) \rightarrow 6$

$(6, 8)$

Stage ④ Updation of new distance matrix

D =
3×3

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

Stage ⑤ : Note that d_{24} is min.

⇒ fuse (2) & (4) to form a cluster

(2,4) → 5 — III

Stage ⑥ Updation of new distance matrix

	(1,3,5)	(2,4)
(1,3,5)	0	6
(2,4)	(6)	0

D =
2×2

distance b/w cluster (1,3,5) & (2,4)

$d_{(2,1),3,5)}, d_{(4,1,3,5)}$

↓

7 (6)

fuse (4,1,3,5) → 6

→ updated d).

Stage ⑦ ~~Look into the~~

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

((1,3,5),(2,4)) → 6 — (IV)

Stage-7 Construction of dendrogram tree