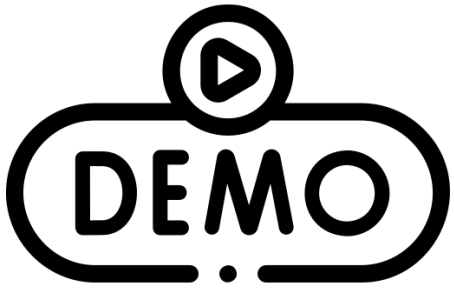
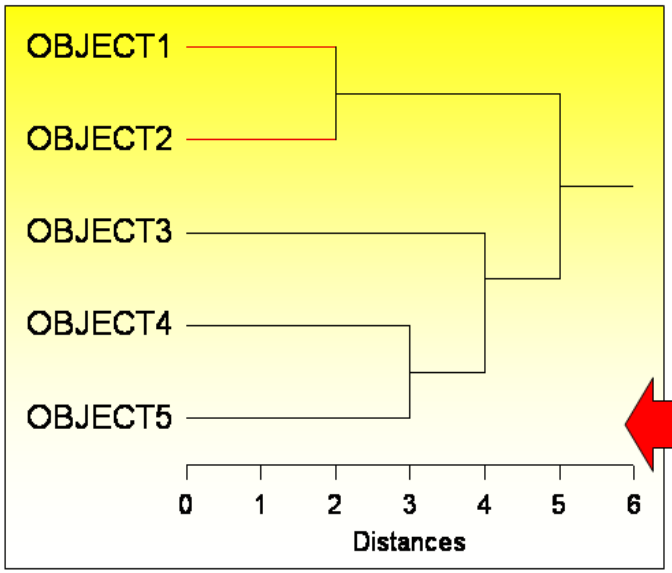
Clustering – hierarchical: An illustration



Simple joining (nearest neighbour)



Object	1	2	3	4	5
1					
2	2				
3	6	5			
4	10	9	4		
5	9	8	5	3	

Distance matrix

Distance	Cluster
0	1,2,3,4,5
2	(1, 2), 3, 4, 5
3	(1, 2), 3, (4, 5)
4	(1, 2), (3, 4, 5)
5	(1, 2, 3, 4, 5)

Distance matrix

Object	1	2	3	4	5
1					
2	2				
3	6	5			
4	10	9	4		
5	9	8	5	3	

Step 1

group 1 & 2, at the distance of 2

(1,2), 3, 4, 5

(1,2)

3	5		
4	9	4	
5	8	5	3

Dist(2,3) = 5
Dist(1,3) = 6
5 < 6

Step 2 : group 5 & 4 at distance of 3

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

(1,2)

3	5	
(4,5)	8	4

Dist(1,4) = 10
Dist(1,5) = 9
Dist(2,4) = 9
Dist(2,5) = 8

Object	1	2	3	4	5
1					
2	2				
3	6	5			
4	10	9	4		
5	9	8	5	3	

Step 3: group 3 & (4, 5), at distance 4

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

(1, 2)

(3, 4, 5) 5 ←

Dist(1, 3) = 6

Dist(2, 3) = 5 *

⋮

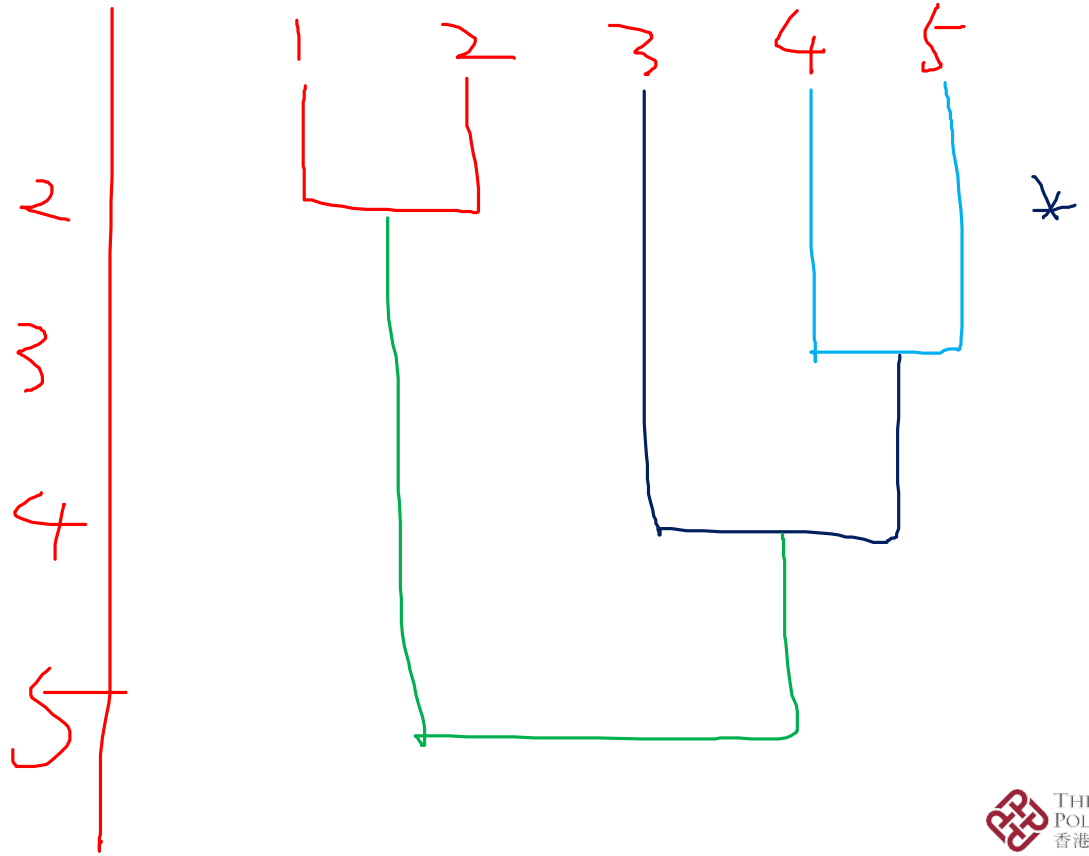
Dist(2, 5) = 8

Step 4: group (1, 2) & (3, 4, 5) at distance 5

Done

Object	1	2	3	4	5
1					
2	2				
3	6	5			
4	10	9	4		
5	9	8	5	3	

Dendrogram



Cluster Outcome

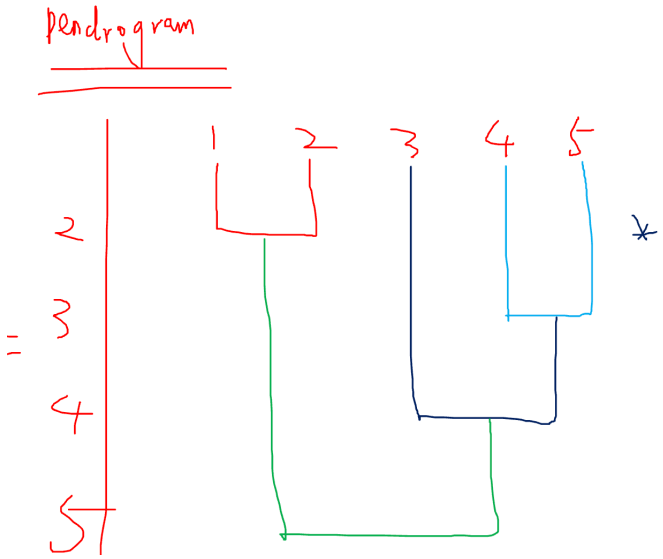
Suppose:

* cutoff = 4.5

⇒ two clusters

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

Object	1	2	3	4	5
1					
2	2				
3	6	5			
4	10	9	4		
5	9	8	5	3	



Suppose:

+ cut off = 3.5

Three clusters: (1, 2), (3), (4, 5)