

8.00

Clusters

9.00

Complete Linkage - Agglomerative Clustering.

10.00

$$\text{Euclidean Distance} = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

11.00

For two dimension dataset

12.00

$$\text{Euclidean Distance} = \sqrt{(x_2 - x_1)^2}$$

For one dimension dataset.

Lunch

2.00

Data Set :

1 2 3 4 5

3.00

1 0 4 7 9 1

4.00

2 4 0 3 5 3

5.00

3 7 3 0 2 6

6.00

4 9 5 2 0 8

7.00

5 1 3 6 8 0

8.00

Using complete linkage formula :

Notes

Find the distance between $(2, \{1, 5\})$

$$= \max \{d(2, 1), d(2, 5)\} = \max \{4, 3\} = 4$$

27 January
Friday

2023

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January 2023
S M T W T F S
1 2 3 4 5 6 7
8 9 10 11 12 13 14
15 16 17 18 19 20 21
22 23 24 25 26 27 28
29 30 31

$$d(3, \{1, 5\}) = \max \{d(3, 1), d(3, 5)\}$$

$$= \max \{7, 6\} = 7$$

$$d(4, \{1, 5\}) = \max \{d(4, 1), d(4, 5)\}$$

$$= \max \{9, 8\} = 9$$

Let the 1st column (row) denote the distances between this cluster and other points, we have

28 January, Saturday, ১৪ মাঘ ১৪২৯ বাংলা, ৫ রজব ১৪৪৪ হিজরি

the following distance matrix :

10.00		1,5	2	3	4
11.00					
12.00	1,5	0	4	7	9
2.00					
3.00	2	4	0	3	5
4.00					
5.00	3	7	3	0	2
6.00					
7.00	4	9	5	2	0
8.00					

Notes

January 2023						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	11	10	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

2023

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January 29
Sunday

From the above distance matrix, we can see the distance between points 3 and 4 is smallest

Hence they merge together to form a cluster $\{3, 4\}$

Using the complete link, we have the distance between different points / clusters as follows:-

$$d(\{1, 5\}, \{3, 4\}) = \max \{d(\{1, 5\}, 3), d(\{1, 5\}, 4)\} = \max \{7, 9\} = 9$$

$$d(2, \{3, 4\}) = \max \{d(2, 3), d(2, 4)\} = \max \{3, 5\} = 5$$

Thus, we can update the distance matrix, where now 2 corresponds to point 2,

now 1, and 3 corresponds to clusters $\{1, 5\}$ and $\{3, 4\}$ as follows:

30 January
Monday

2023

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January 2023						
S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	11	10	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

8.00	1, 5	2	3, 4
9.00	1, 5	0	4
10.00	2	4	0
11.00	3, 4	0	5

12.00

Lunch

2.00

3.00

4.00

5.00

6.00

7.00

8.00

Following the same procedure; we merge Point 2 with the cluster {1, 5} to form {1, 2, 5} update the distance matrix as follows :-

	[1, 5], 2	[3, 4]
[1, 5], 2	0	9
[3, 4]	9	0

January 2023						
S	M	T	W	T	F	S
5	1	2	3	4	5	6
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

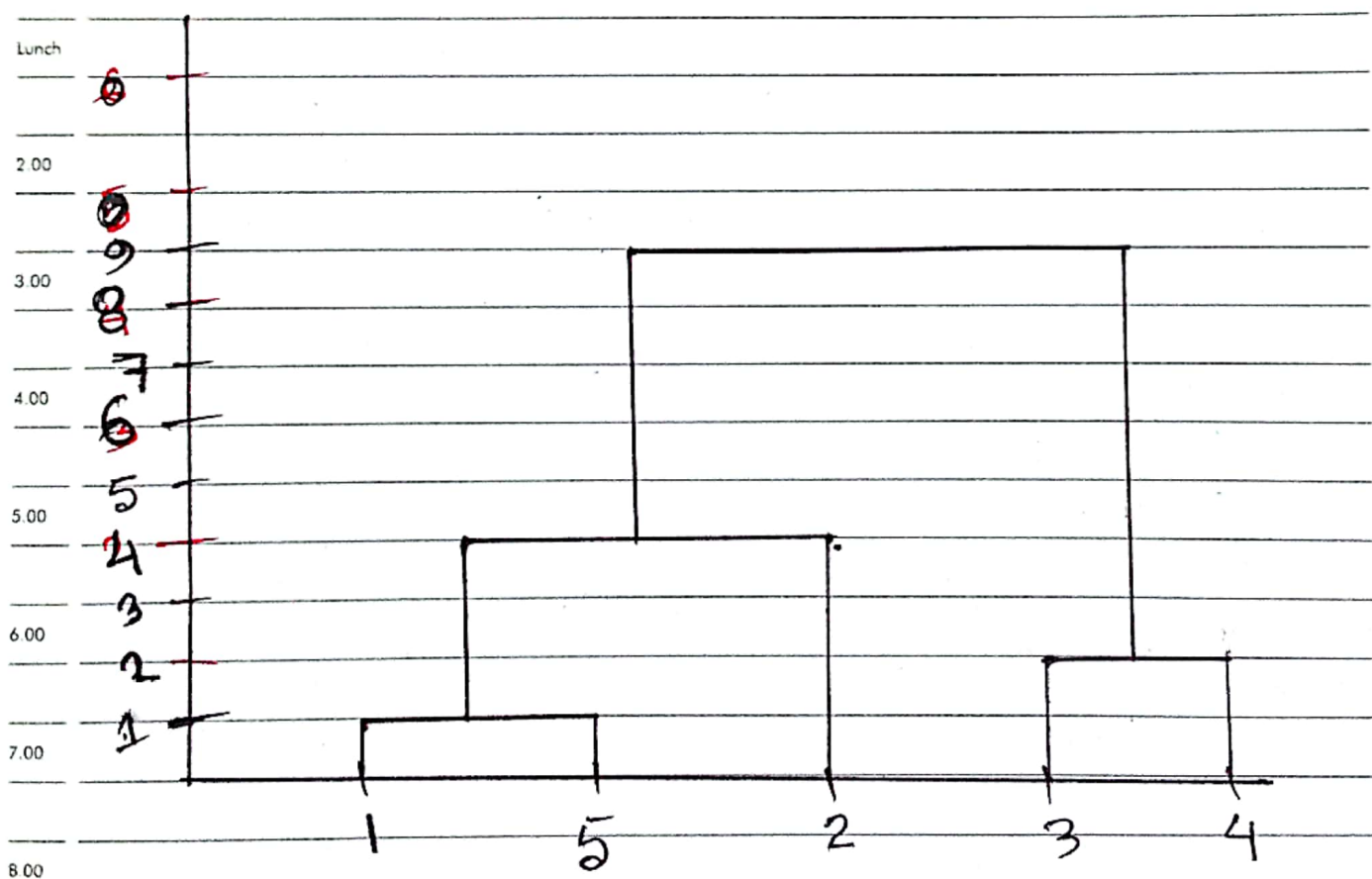
2023

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January 31
Tuesday

8.00 After increasing the distance threshold to 9,
9.00 all clusters would merge

10.00 Based on all above distance matrix we draw
11.00 the dendrogram thus as follows :-
12.00



Notes