National University of Computer and Emerging Sciences, Lahore Campus

Course:	Artificial Intelligence	Course Code:	AI-2002
Program:	BS(Computer Science)	Semester:	Spring 2023
Duration:	40 Minutes	Total Marks:	10
Paper Date:	7-May-23	Weight	3.33 %
Section:	C/D	Page(s):	1
Exam:	Quiz 4	Roll No.	

Instruction/Notes:

- There are 2 questions. Attempt all questions.
- Provide your solution on this sheet. You may use an extra page for rough work.

Point	x Coordinate	y Coordinate
p1	0.40	0.53
p2	0.22	0.38
p3	0.35	0.32
p4	0.26	0.19
p5	0.08	0.41
p6	0.45	0.30

	p1	p2	p3	p4	p5	p6
p1	0.00	0.24	0.22	0.37	0.34	0.23
p2	0.24	0.00	0.15	0.20	0.14	0.25
p3	0.22	0.15	0.00	0.15	0.28	0.11
p4	0.37	0.20	0.15	0.00	0.29	0.22
p5	0.34	0.14	0.28	0.29	0.00	0.39
p6	0.23	0.25	0.11	0.22	0.39	0.00

Problem#1 (CLO-3)

Apply K Medoid clustering on the given data. K=2. M1 is p1 and M2 is p6. Perform three iterations.

Point	Distance with M1	Distance with M2
P1		

P2	0.24	0.25
P3	0.22	0.11
P4	0.37	0.22
P5	0.34	0.39
P6		

C1 = P2, P5

cost = 0.24+0.34 = 0.58

C2 = P3, P4

cost = 0.11+0.22 = 0.33

Total = 0.91

Iteration 2

Taking p3 as M2

Point	Distance with M1	Distance with M2
P1		
P2	0.24	0.15
P3		
P4	0.37	0.15
P5	0.34	0.28
P6	0.23	0.11

C1 = -

C2 = P2,P4,P5,P6

cost = 0.69<0.91

Iteration 3

Taking M2 as p5

Point	Distance with M1	Distance with M2
P1		
P2	0.24	0.14
P3	0.22	0.28
P4	0.37	0.29
P5		
P6	0.23	0.39

C1 = P3,P6

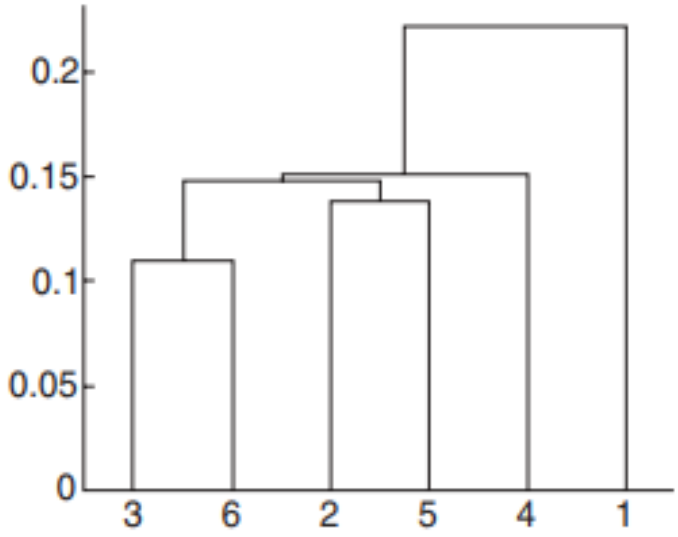
C2 = P2,P4

Cost = 0.88>0.69 **(Stopped)**

Problem#2 (CLO-3)

Apply Agglomerative Clustering (Single link) on the given data. Show the Cluster dendrogram as well.

K	D	Clusters
6	0	p1,p2,p3,p4,p5,p6
5	0.11	P1, p2 {p3,p6}, p4, p5
4	0.14	P1, {p2,p5}, {p3,p6}, p4
3	0.15	P1 {{p2,p5}, {p3,p6}}, p4
2	0.15	P1, {{{p2,p5}, {p3,p6}}, p4}
1	0.22	{P1, {{{p2,p5}, {p3,p6}}, p4}}


0.2
0.15
0.1
0.05
0
3
6
2
5
4
1