Kavita Shirsat Hierarchical Clustering

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Example

X, Y

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

d((3), 1')

min(7, 10)

min(9, 9)

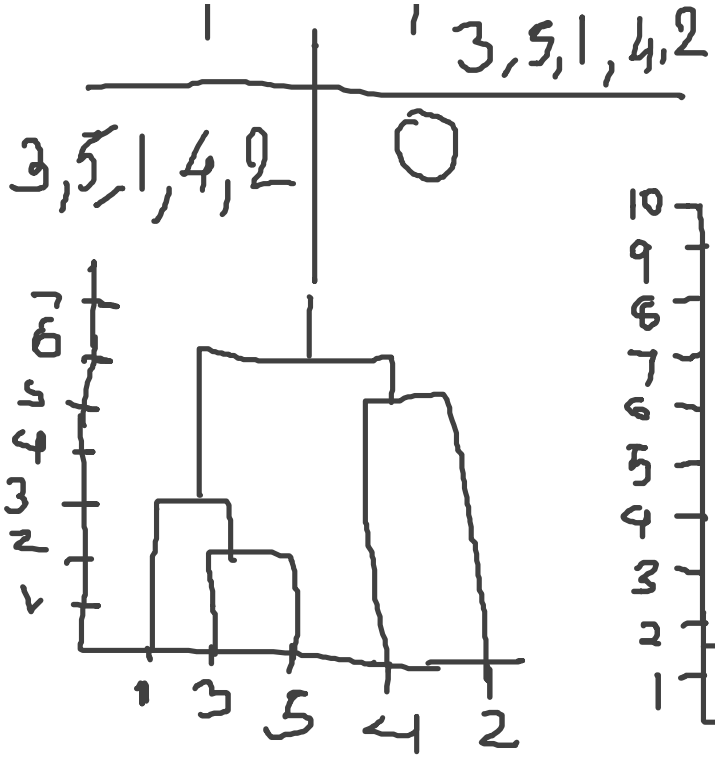
Single

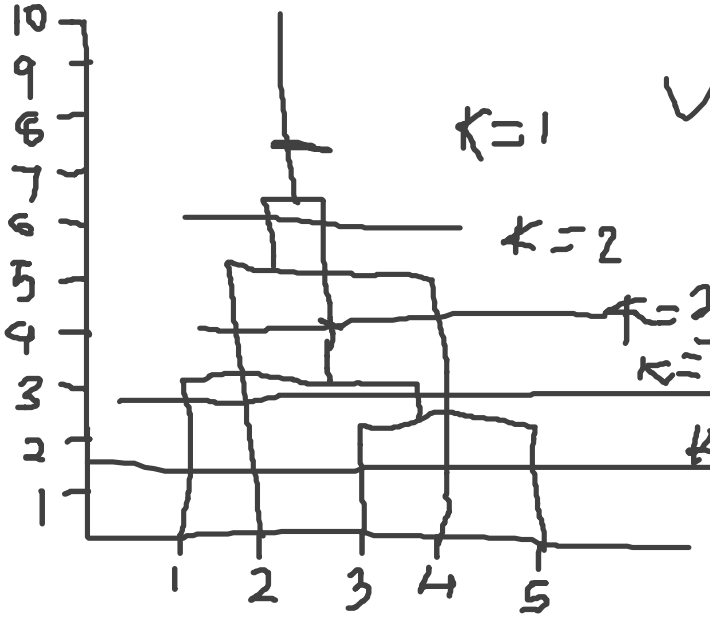
Single Linkage

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

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

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





2) Complete Linkage

	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

1) min ⇒ 2 ⇒ merge 3,5

max((1,3),(1,5)) ⇒ max(3,11) ⇒ 11

	3,5	1	2	4
3,5	0			
1	11	0		
2	10	9	0	
4	9	6	5	0

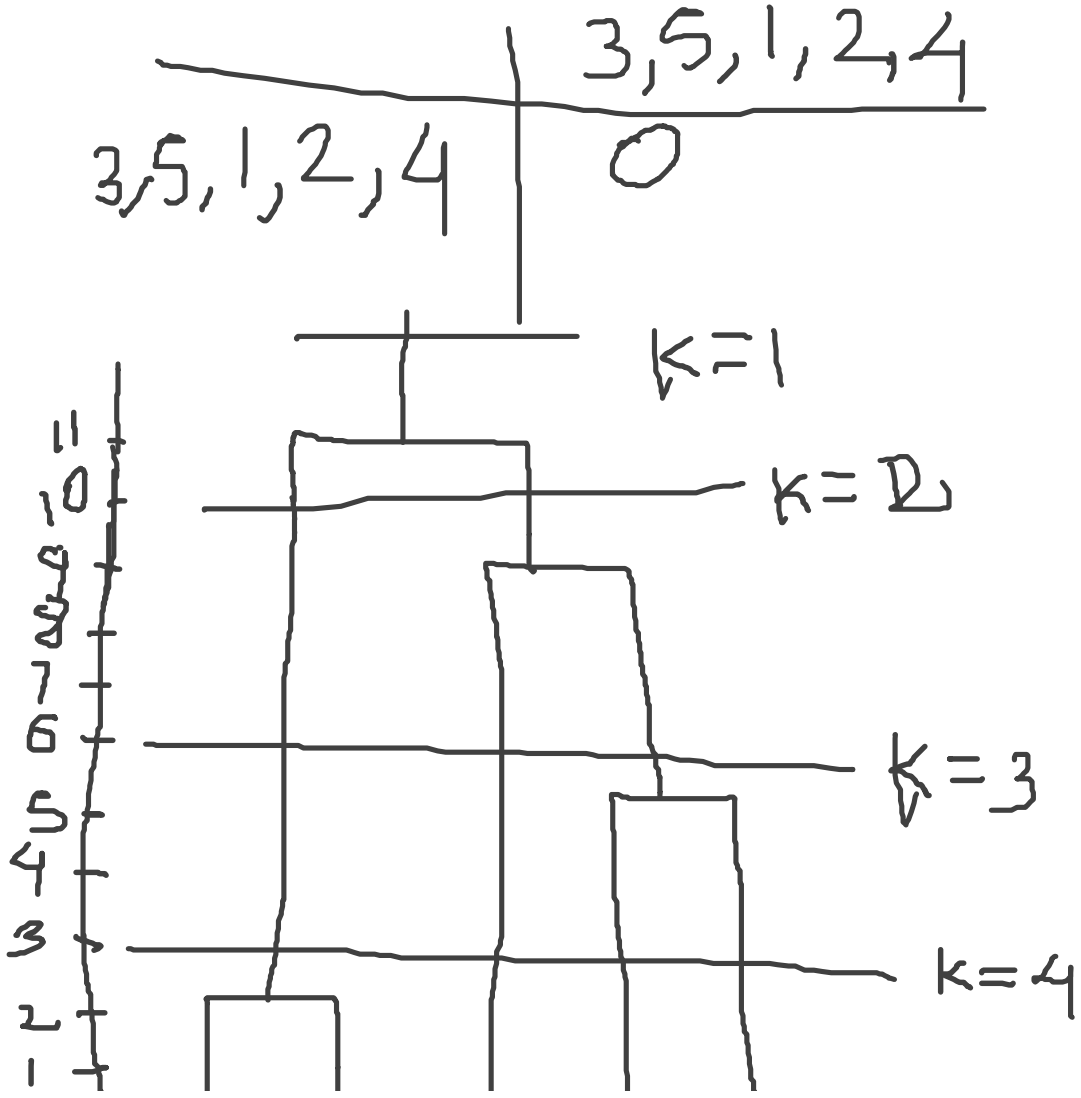
)

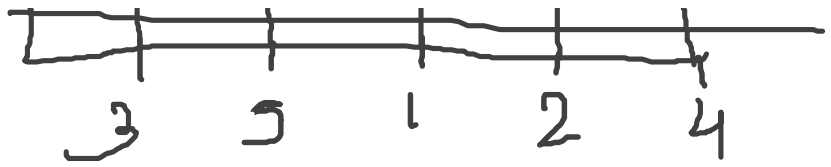
	3,5	1	2,4
3,5	0		
1	11	0	
2,4	10	9	0

3)

	3,5	1,2,4
3,5	0	
1,2,4	11	0

4)





3) Average Linkage

(3,5,1) ⇒ Avg((3,1),5,1) ⇒ $\frac{6+1}{2}$ ⇒ 7

1)

	3,5	1	2	4
3,5	0			
1	7	0		
2	8.5	9	0	
4	8.5	6	(5)	0

As min ⇒ 5 merge (2,4)

2)

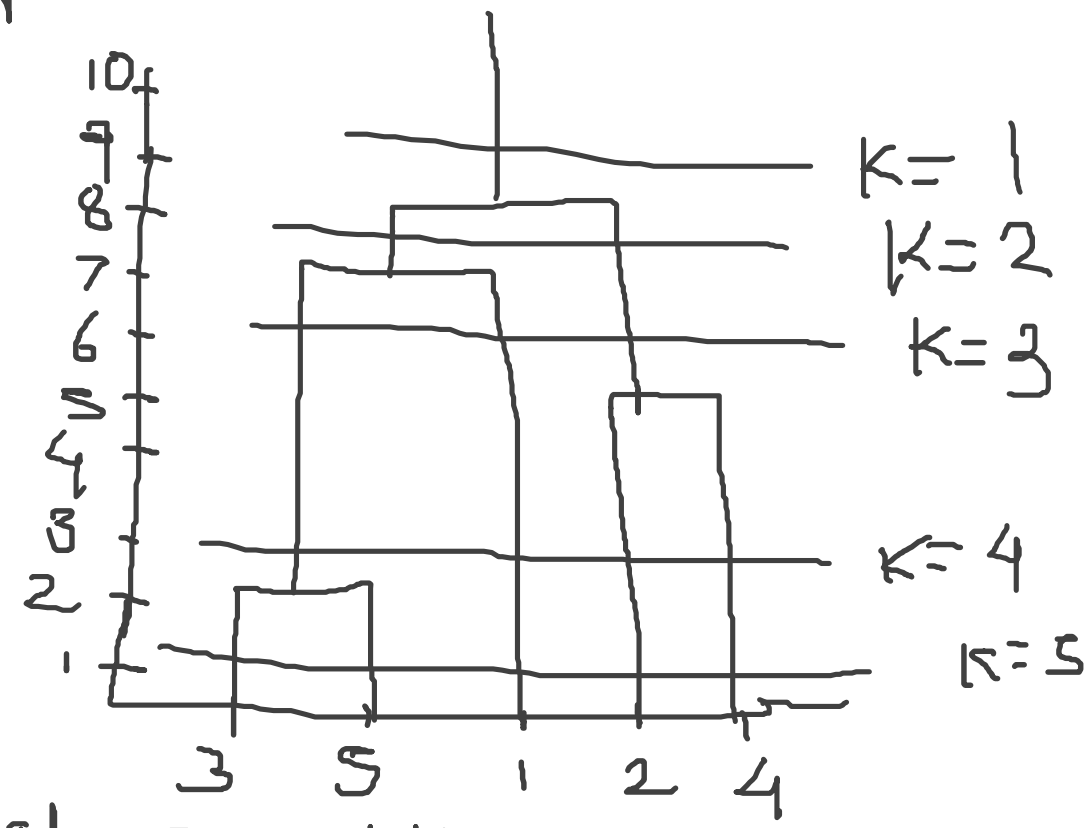
	3,5	1	2,4
3,5	0		
1	(7)	0	
2,4	8.5	7.5	0

min ⇒ 7 merge 3,5,1

3)

	3,5,1	2,4
3,5,1	0	
2,4	[8]	0

	1,3,5,2,4
1,3,5,2,4	0



** using single, complete & Average

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

** 9

	A	B	C	D	E	F
X	1	1.5	5	3	4	2

x_2	1	1.5	5	4	4	3.5

A) Using Euclidian distance first create distance matrix

$$D(A,B) = \sqrt{(1.5-1)^2 + (1.5-1)^2}$$

$$\sqrt{(0.5)^2 + (0.5)^2}$$

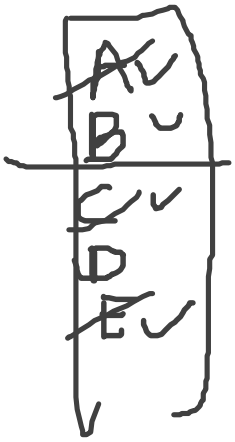
$$\approx 0.71$$

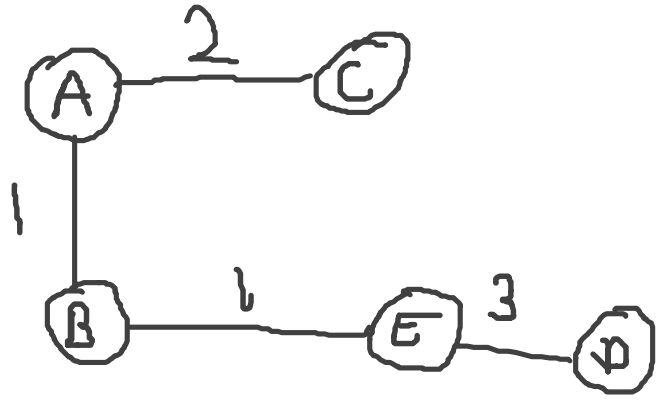
	A	B	C	D	E	F
A	0					
B	0.7	0				
C	5.65	4.95	0			
D	3.6	2.92	2.42	0		
E	4.24	3.54	1.41	1	0	
F	3.2	2.5	2.5	0.5	1.12	0

Divigive Algorithm

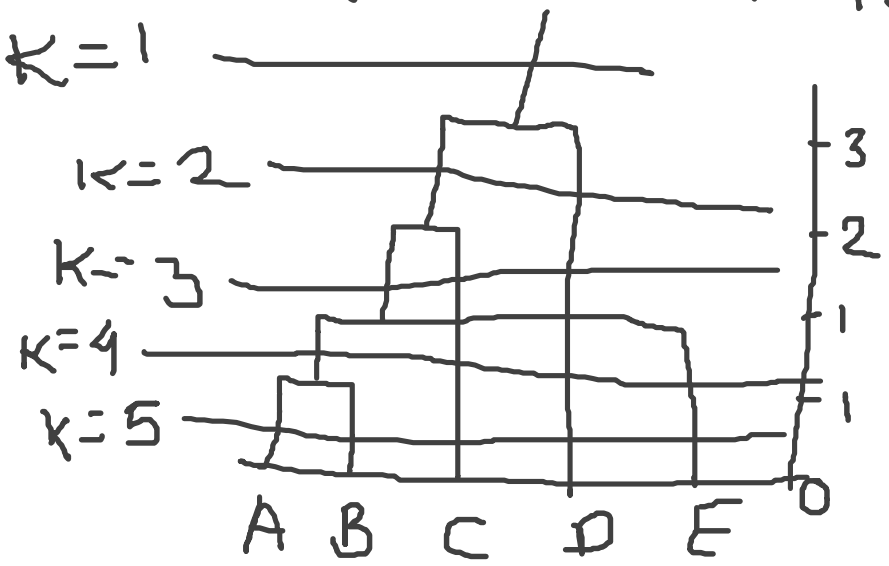
	A	B	C	D	E
A	0				
B	1	0			
C	2	3	0		

D	5	4	6	0
E	4	[illegible]	2	3	0





cost = 2+1+1+3 = 7



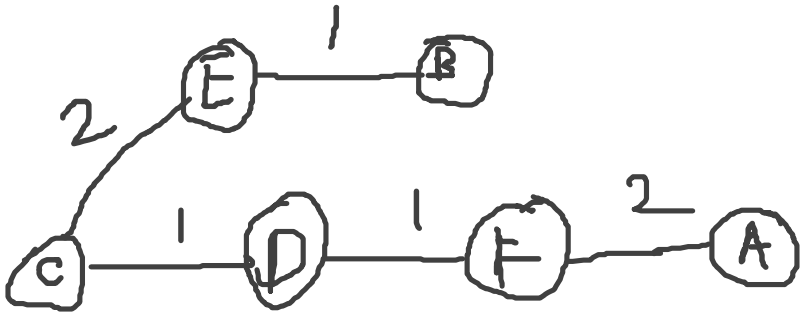
Q. 10 M

Apply Divisive Based approach to from the cluste

a)

	A	B	C	D	E	F
A	0					
B	3	0				
C	4	2	0			
D	7	3	1	0		
E	5	[illegible]	2	3	0	

F	2	6	7	1	4	0



A
B
C
D
E
F