1.2.4.4.7 HAC Example.

Q:

point	#1	#2	#3	#4
x	1.9	1.8	2.3	2.3
y	1	0.9	1.6	2.1

distance metrics:

1. single Linkage (MIN distance)
2. complete Linkage (Max)
3. Centroid Distance
4. Average Distance

Solution (a) Centroid

①

	1	2	3	4
1	0			
2	0.14	0		
3	0.72	0.86	0	
4	1.17	1.3	0.5	0

0.14 is the min of 6 numbers.

merge 1 and 2.

② calculate new centroid for (#1 and #2)

	1+2	3	4
Centroid	1.85	2.3	2.3
	0.95	1.6	2.1

skip

$D(1+2, 3) = 0.5 \times D(1,3) + 0.5 \times D(2,3)$

$= 0.36 + 0.43$

$= 0.79$

③

	1+2	3	4
1+2	0		
3	0.79	0	
4	1.24	0.5	0

$D(1+2,4) = 0.5 \times D(1,4) + 0.5 \times D(2,4)$

$= 0.59 + 0.65$

$= 1.24$

0.5 is the small num.

merge 3 and 4

④

	1+2	3+4
Centroid	1.85 0.95	2.3 1.85

↓ skip

don't need to calculate centroid

	1+2+3+4
Centroid	2.075 1.4

↓

D(1+2, 3+4)

= 0.5 × D(1+2, 3)

+ 0.5 × D(1+2, 4)

= 0.4 + 0.62

= 1.02

	1+2	3+4
1+2	0	
3+4	1.02	0