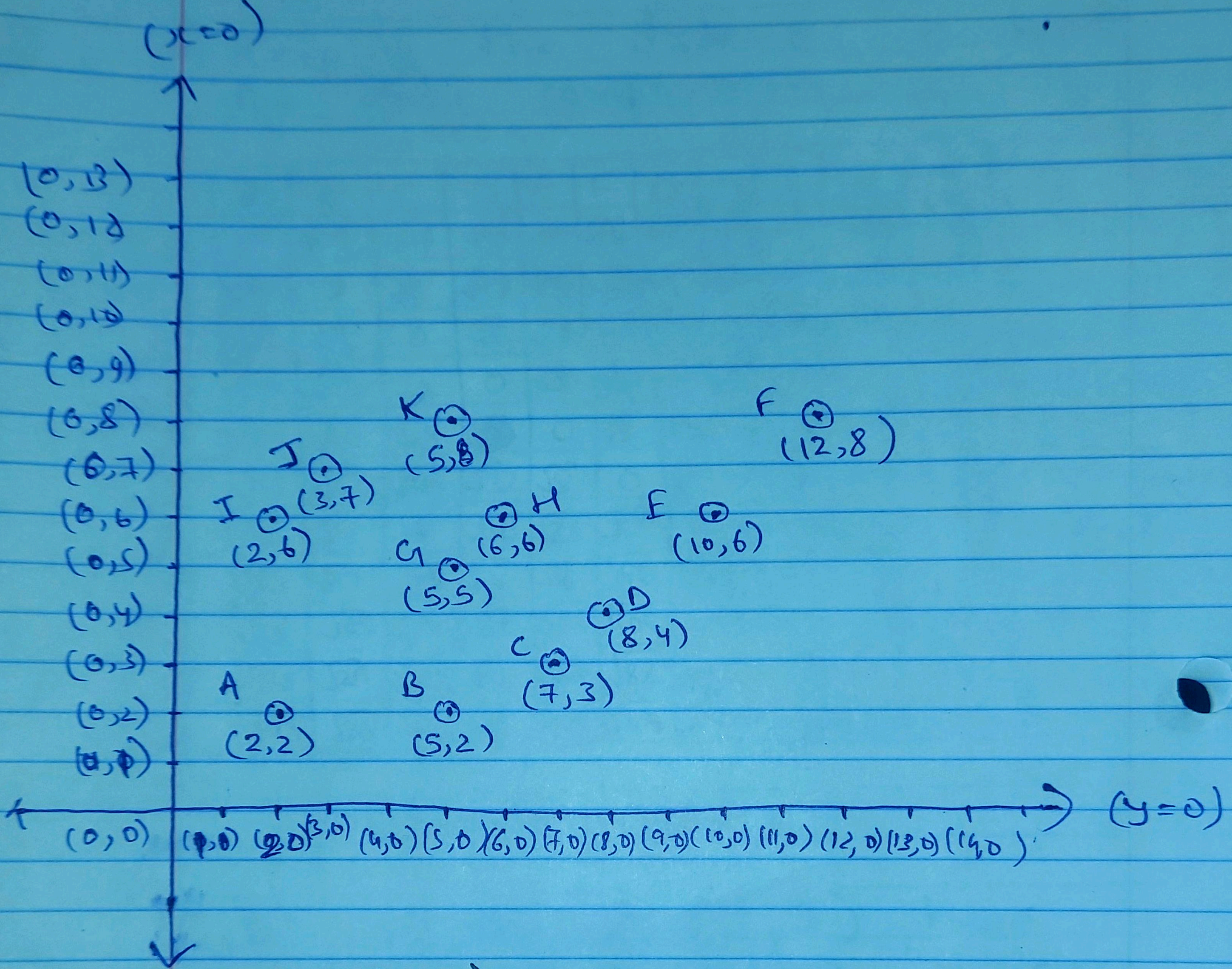

A → (2,2)

B → (5,2)

C → (7,3)

D → (8,4)

E → (10,6)

F → (12,8)

G → (5,5)

H → (6,6)

I → (2,6)

J → (3,7)

K → (5,8)

Single Link Hierarchical Clustering
(Agglomerative)

Iteration 1:

(*) keeping the distance in roots for easy comparision

	A	B	C	D	E	F	G	H	I	J	K
A	0	$\sqrt{9}$	$\sqrt{26}$	$\sqrt{40}$	$\sqrt{80}$	$\sqrt{136}$	$\sqrt{18}$	$\sqrt{32}$	$\sqrt{16}$	$\sqrt{26}$	$\sqrt{45}$
B	$\sqrt{9}$	0	$\sqrt{5}$	$\sqrt{13}$	$\sqrt{41}$	$\sqrt{85}$	$\sqrt{9}$	$\sqrt{17}$	$\sqrt{25}$	$\sqrt{29}$	$\sqrt{36}$
C	$\sqrt{26}$	$\sqrt{5}$	0	$\sqrt{2}$	$\sqrt{18}$	$\sqrt{50}$	$\sqrt{8}$	$\sqrt{10}$	$\sqrt{34}$	$\sqrt{32}$	$\sqrt{29}$
D	$\sqrt{40}$	$\sqrt{13}$	$\sqrt{2}$	0	$\sqrt{8}$	$\sqrt{32}$	$\sqrt{10}$	$\sqrt{8}$	$\sqrt{40}$	$\sqrt{34}$	$\sqrt{25}$
E	$\sqrt{80}$	$\sqrt{41}$	$\sqrt{18}$	[illegible]	0	$\sqrt{8}$	$\sqrt{26}$	$\sqrt{16}$	$\sqrt{64}$	$\sqrt{50}$	$\sqrt{29}$
F	$\sqrt{136}$	$\sqrt{85}$	$\sqrt{50}$	$\sqrt{32}$	$\sqrt{8}$	0	$\sqrt{58}$	$\sqrt{90}$	$\sqrt{104}$	$\sqrt{82}$	$\sqrt{49}$
G	$\sqrt{18}$	$\sqrt{9}$	$\sqrt{8}$	$\sqrt{10}$	$\sqrt{26}$	$\sqrt{58}$	0	$\sqrt{2}$	$\sqrt{10}$	$\sqrt{8}$	$\sqrt{9}$
H	$\sqrt{32}$	$\sqrt{17}$	$\sqrt{10}$	$\sqrt{8}$	$\sqrt{16}$	$\sqrt{40}$	$\sqrt{2}$	0	$\sqrt{16}$	$\sqrt{10}$	$\sqrt{5}$
I	$\sqrt{16}$	$\sqrt{25}$	$\sqrt{34}$	$\sqrt{40}$	$\sqrt{64}$	$\sqrt{104}$	$\sqrt{10}$	$\sqrt{16}$	0	$\sqrt{2}$	$\sqrt{13}$
J	$\sqrt{26}$	$\sqrt{29}$	$\sqrt{32}$	$\sqrt{34}$	$\sqrt{50}$	$\sqrt{82}$	$\sqrt{8}$	$\sqrt{10}$	$\sqrt{2}$	0	$\sqrt{5}$
K	$\sqrt{45}$	$\sqrt{36}$	$\sqrt{29}$	$\sqrt{25}$	$\sqrt{29}$	$\sqrt{49}$	$\sqrt{9}$	$\sqrt{5}$	$\sqrt{13}$	$\sqrt{5}$	0

Distance Matrix

(C, D), (G, H) & (I, J) have the minimum Euclidean distance i.e. $\sqrt{2}$

Therfore, combining C & D to form a new cluster, combining G & H to form a new cluster, and combining I & J to form a new cluster.

(C, D) → P
(G, H) → Q
(I, J) → R

Iteration 2:

	A	B	P	E	F	Q	R	K
A	0	$\sqrt{9}$	$\sqrt{26}$	$\sqrt{80}$	$\sqrt{136}$	$\sqrt{18}$	$\sqrt{16}$	$\sqrt{45}$
B	$\sqrt{9}$	0	$\sqrt{5}$	$\sqrt{41}$	$\sqrt{85}$	$\sqrt{9}$	$\sqrt{25}$	$\sqrt{36}$
P	$\sqrt{26}$	$\sqrt{5}$	0	$\sqrt{8}$	$\sqrt{32}$	$\sqrt{8}$	$\sqrt{32}$	$\sqrt{25}$
E	$\sqrt{80}$	$\sqrt{41}$	$\sqrt{8}$	0	$\sqrt{8}$	$\sqrt{16}$	$\sqrt{50}$	$\sqrt{29}$
F	$\sqrt{136}$	$\sqrt{85}$	$\sqrt{32}$	$\sqrt{8}$	0	$\sqrt{40}$	$\sqrt{82}$	$\sqrt{49}$
Q	$\sqrt{18}$	$\sqrt{9}$	$\sqrt{8}$	$\sqrt{16}$	$\sqrt{40}$	0	$\sqrt{8}$	$\sqrt{5}$
R	$\sqrt{16}$	$\sqrt{25}$	$\sqrt{32}$	$\sqrt{50}$	$\sqrt{82}$	$\sqrt{8}$	0	$\sqrt{5}$
K	$\sqrt{45}$	$\sqrt{36}$	$\sqrt{25}$	$\sqrt{29}$	$\sqrt{49}$	$\sqrt{5}$	$\sqrt{5}$	0

Distance Matrix

(B, P), (Q, K) & (R, Q) have the minimum Euclidean distance.

Therfore, combining B & P to form cluster X and combining Q, K & R to form cluster Y.

(B, P) $\rightarrow$ X

(Q, K, R) $\rightarrow$ Y

Consider this as combining K, Q to form O

Then combining O, R to form Y.

Iteration 3:

	A	X	E	F	Y
A	0	$\sqrt{9}$	$\sqrt{80}$	$\sqrt{136}$	$\sqrt{16}$
X	$\sqrt{9}$	0	$\sqrt{8}$	$\sqrt{32}$	$\sqrt{8}$
E	$\sqrt{80}$	$\sqrt{8}$	0	$\sqrt{8}$	$\sqrt{16}$
F	$\sqrt{136}$	$\sqrt{32}$	$\sqrt{8}$	0	$\sqrt{40}$
Y	$\sqrt{16}$	$\sqrt{8}$	$\sqrt{16}$	$\sqrt{40}$	0

Distance Matrix

(X, E), (X, Y) & (E, F) have the minimum Euclidean i.e. $\sqrt{8}$

Combining (X, Y) to form S
Combining (E, F) to form T

Iteration 4:

	A	S	T
A	0	$\sqrt{9}$	$\sqrt{80}$
S	$\sqrt{9}$	0	$\sqrt{8}$
T	$\sqrt{80}$	$\sqrt{8}$	0

Distance Matrix

(S, T) have the minimum Euclidean distance i.e. $\sqrt{8}$.
Combining (S, T) to form M.

Iteration 5:

	A	M
A	0	$\sqrt{9}$
M	$\sqrt{9}$	0

Combining A, M to form Z.

Distance Matrix

Dendrogram.