1) Six points with the following attributes are given. Calculate and find out clustering representations and dendrogram using single, complete and average link proximity function in hierarchical clustering technique.

Single link Proximity:

- In single link, the distance between 2 clusters is minimum distance between 2 clusters

	P_1	P_2	P_3	P_4	P_5	P_6
P_1	0	0.2357	0.2218	0.3688	0.3421	0.2347
P_2	0.2357	0	0.1483	0.2042	0.1388	0.254
P_3	0.2218	0.1483	0	0.1513	0.2843	0.11
P_4	0.3688	0.2042	0.1513	0	0.2932	0.2216
P_5	0.3412	0.1388	0.2843	0.2932	0	0.3921
P_6	0.2347	0.254	0.11	0.2216	0.3921	0

The smallest distance from data is 0.11

P_3 and P_6 forms first cluster

	P_1	P_2	P_{36}	P_4	P_5
P_1	0	0.2357	0.2218	0.3688	0.3421
P_2	0.2357	0	0.1483	0.2042	0.1388
P_3	0.2218	0.1483	0	0.1513	0.2843
P_4	0.3688	0.2042	0.1513	0	0.2932
P_5	0.3421	0.1388	0.2843	0.2932	0

smallest distance is 0.1388, so p2 and p5 forms 2nd cluster

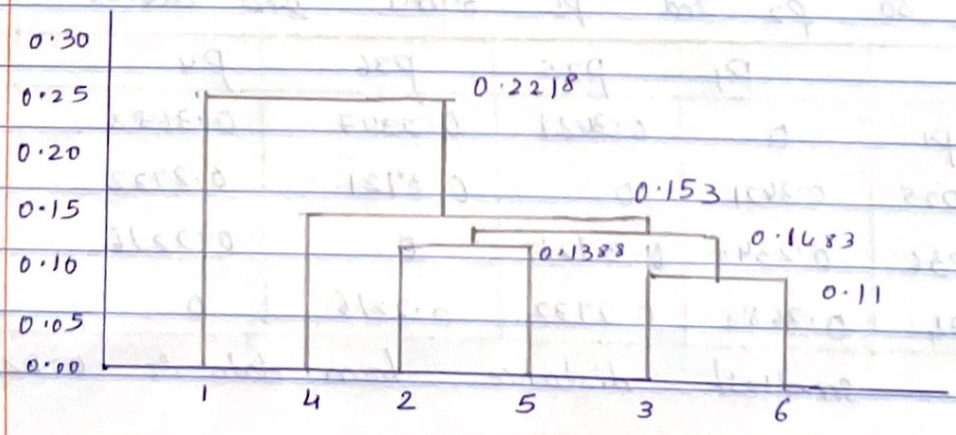
	p1	p25	p36	p4
p1	0	0.2357	0.2218	0.3688
p25	0.2357	0	0.1483	0.2042
p36	0.2218	0.1483	0	0.1513
p4	0.3688	0.2042	0.1513	0

smallest distance from data is 0.1483
So p25 and p36 forms 3rd cluster

	p1	p(25)(36)	p4
p1	0	0.2218	0.3688
p(25)(36)	0.2218	0	0.1513
p4	0.3688	0.1513	0

smallest distance from data is 0.153
So p(25)(36) and p4 forms 4th cluster

	p1	p4(25)(36)
p1	0	0.2218
p4(25)(36)	0.2218	0



Complete link Proximity:

In complete link, the distance between 2 clusters is maximum distance between 2 clusters

	p1	p2	p3	p4	p5	p6
p1	0	0.2357	0.2218	0.3688	0.3421	0.2347
p2	0.2357	0	0.1483	0.2042	0.1388	0.254
p3	0.2218	0.1483	0	0.1513	0.2843	0.11
p4	0.3688	0.2042	0.1513	0	0.2932	0.2216
p5	0.3421	0.1388	0.2843	0.2932	0	0.3921
p6	0.2347	0.254	0.11	0.2216	0.3921	0

Smallest distance from data is 0.11

So p3 and p6 forms first cluster

	p1	p2	p36	p4	p5
p1	0	0.2357	0.2347	0.3688	0.3421
p2	0.2357	0	0.254	0.2042	0.1388
p36	0.2347	0.254	0	0.2216	0.3921
p4	0.3688	0.2042	0.2216	0	0.2932
p5	0.3421	0.1388	0.3921	0.2932	0

Smallest distance from data is 0.1388

So p2 and p5 forms 2nd cluster

	p1	p25	p36	p4
p1	0	0.3421	0.2347	0.3688
p25	0.3421	0	0.3921	0.2932
p36	0.2347	0.3921	0	0.2216
p4	0.3688	0.2932	0.2216	0

Smallest distance from data is 0.2216

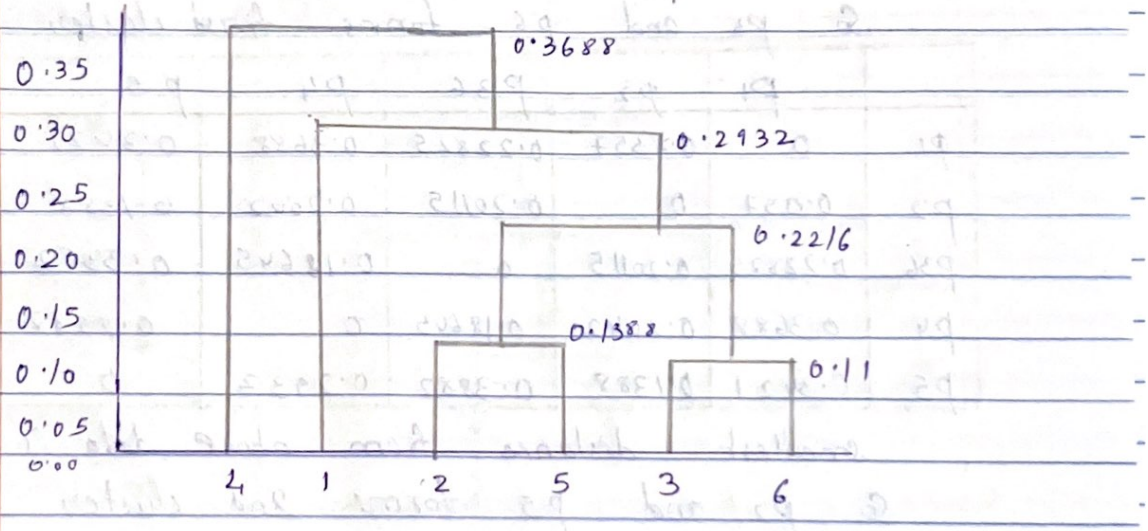
So p_{25} and p_{36} forms 3rd cluster

	p_1	$p_{(25)(36)}$	p_4
p_1	0	0.3421	0.3688
$p_{(25)(36)}$	0.3421	0	0.2932
p_4	0.3688	0.2932	0

Smallest distance from data is 0.2932

So $p_{(25)(36)}$ and p_1 forms 4th cluster

	$p_{1(25)(36)}$	p_4
$p_{(25)(36)}$	0	0.1483
p_4	0.3688	0



Average Link Proximity:

In Average link, the distance between 2 clusters is average of all distance of 2 clusters

	p1	p2	p3	p4	p5	p6
p1	0	0·2357	0·2218	0·3688	0·3421	0·2347
p2	0·2357	·0	0·1483	0·2042	0·1388	0·254
p3	0·2218	0·1483	0	0·1513	0·2843	0·11
p4	0·3688	0·2042	0·1513	0	0·2932	0·2216
p5	0·3421	0·1388	0·2843	0·2932	0	0·3921
p6	0·2347	0·254	0·11	0·2216	0·3921	0

smallest distance from data is 0·11

So p3 and p6 forms first cluster

	p1	p2	p36	p4	p5
p1	0	0·2357	0·22825	0·3688	0·3421
p2	0·2357	0	0·20115	0·2042	0·1388
p36	0·22825	0·20115	0	0·18645	0·3382
p4	0·3688	0·2042	0·18645	0	0·2932
p5	0·3421	0·1388	0·3882	0·2932	0

smallest distance from above data is 0·1388

So p2 and p5 forms 2nd cluster

	p1	p25	p36	p4
p1	0	0·2889	0·2347	0·3688
p25	0·2889	0	0·269675	0·2687
p36	0·2347	0·269675	0	0·18645
p4	0·3688	0·2487	0·18645	0

Smallest distance from data is 0.18645

So p25 and p36 forms 3rd cluster

	p1	p(25)(36)	p4
p1	0	0.2618	0.3688
p(25)(36)	0.2618	0	0.217575
p4	0.3688	0.217575	0

Smallest distance from above data is 0.217575

So p(25)(36) and p1 forms 4th cluster

	p1(25)(36)	p4
p1(25)(36)	0	0.3153
p4	0.3153	0