

UPGMA Exercise Solution

	A	B	C	D
A	0	3	10	10
B	3	0	2	12
C	10	2	0	4
D	10	12	4	0

1. Run the UPGMA Algorithm on distance matrix D, using centroid based (average) linkage when computing inter-cluster distances, showing intermediate steps. Parts (a) and (c) are worth 5 points each. Parts (b), (d), and (e) are worth 10 points each.
 - a. Which pair of nodes is Merged first? **B and C**
 - b. What is the resulting inter-cluster distance matrix?

	BC	A	D
BC	0	6.5	8
A	6.5	0	10
D	8	10	0

- c. Which pair of nodes or clusters is Merged next? **(BC) and A**
 - d. What is the resulting inter-cluster distance matrix?

	ABC	D
ABC	0	$26/3 = 8.66667$
D	$26/3 = 8.66667$	0

- e. What is the final phylogenetic tree based on the above UPGMA algorithm run?

((B C) A) D)