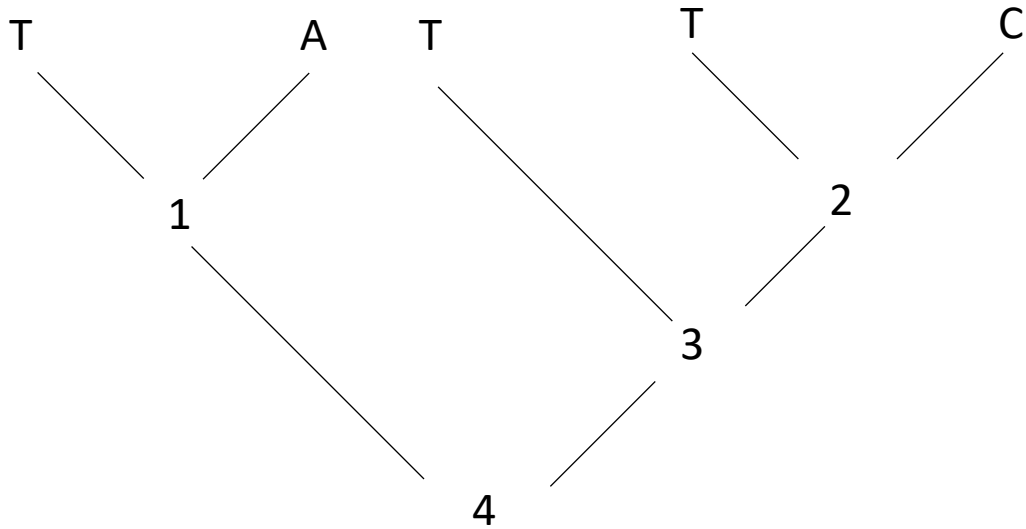
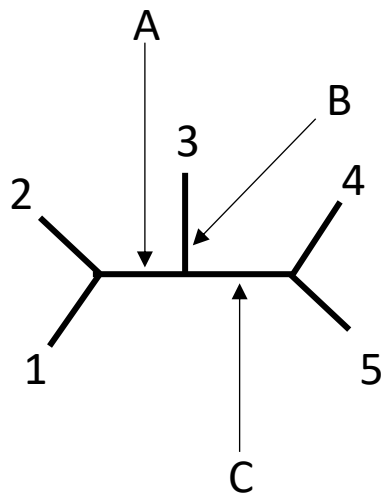


Biology 545 Problem Set 1

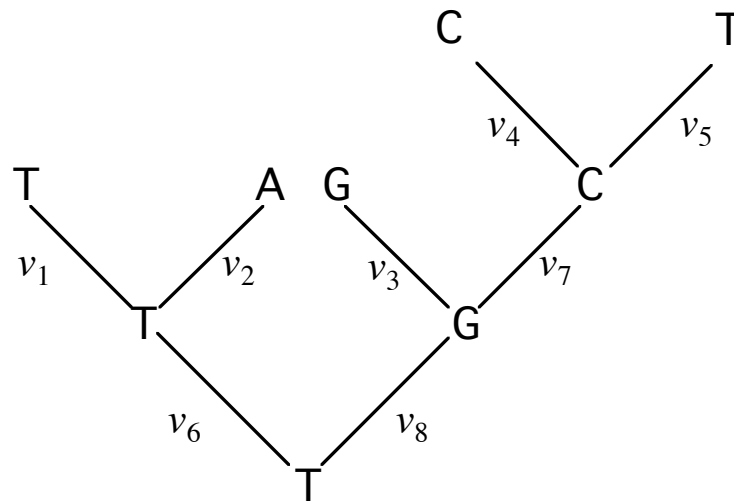
1. Use Fitch Optimization to find the length of this character on this tree. Show all state sets and accumulated lengths at all nodes.



2. Consider the following unrooted 5-taxon tree. Please show the rooted tree were we to root on the internal branch indicated by the arrows.



3. Write the likelihood function for the tree and character-state reconstruction shown:



4. The likelihood for a tree is given below.

$$L_{(\tau)} = P(D \mid \tau, m)$$

Please describe in words each of the terms of the equation.

$L_{(\tau)}$:

$P(D \mid \tau, m)$:

5. What feature(s) do MP (maximum parsimony) and ML (maximum likelihood) share?

6. What feature(s) do ME (minimum evolution) and MP share?

7. What feature(s) do ME and ML share?