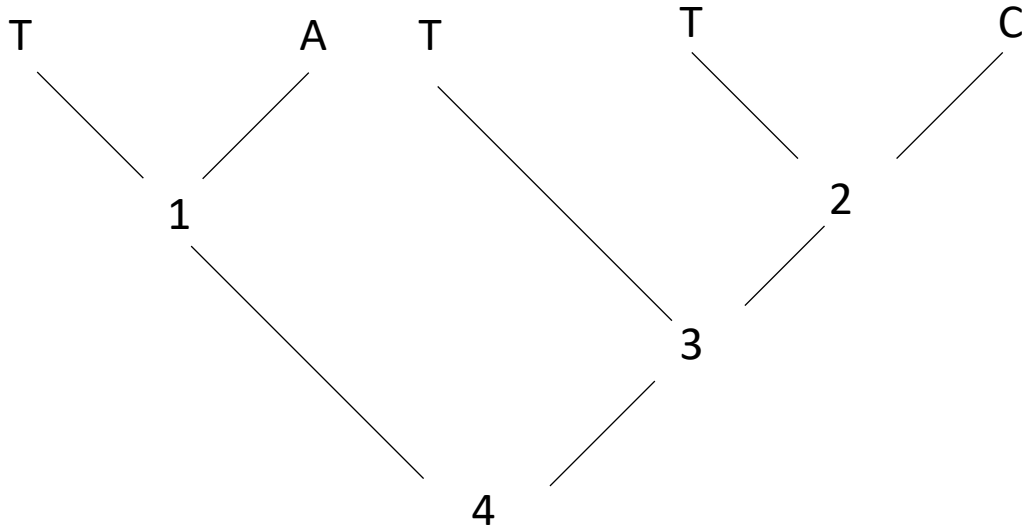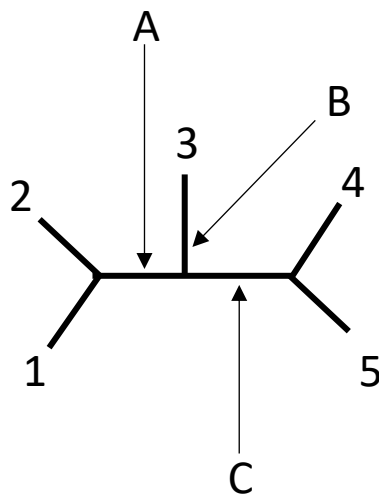Biology 545 Problem Set 1
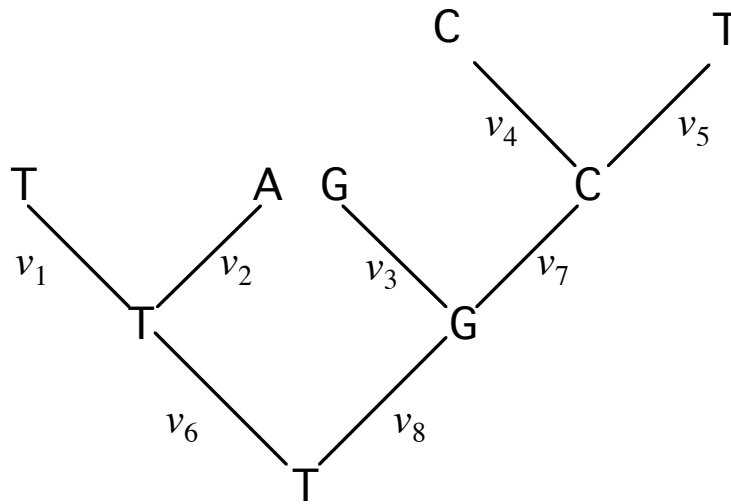
1. Use Fitch Optimization to find the length of this character on this tree. Show all state sets and accumulated lengths at all nodes.

T   A   T   T   C

1

2

3

4

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.

A

B

3

2   4

1   5

C

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 | τ, 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?