

## Homework 3 (due Fri, March 15)

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Print out and fill in the last page.

1. likelihood calculations

- (a) As data, use a character in which C is the state for taxa 1 and 2 , taxon 3 has state G, and taxon 4 has a T
- (b) Fill in the circle with character state (either the observed data for tips or the inferred states)
- (c) There are 16 trees on each page, use them to show all 16 possible ancestral character state combinations.
- (d) Calculate the probability of each reconstruction under the Kimura model.
- (e) Use  $\kappa = 2$
- (f) For branch lengths, use (1:0.03, 3:0.4, (2:0.03, 4:0.4):0.03)

2. Which branch length has the higher ratio of the transition probability to transversion probability?

3. What is the likelihood for this character?

I recommend, using a spreadsheet (or some other software) to:

1. calculate all three change probabilities (no change, transition, transversion) for the 0.03 branch length.
2. calculate all three change probabilities (no change, transition, transversion) for the 0.4 branch length
3. multiply the appropriate numbers.

If you label the cells of the spreadsheet logically, I'll be able to figure out your system.

