

Biology 445/545 Exam I – Spring 2007

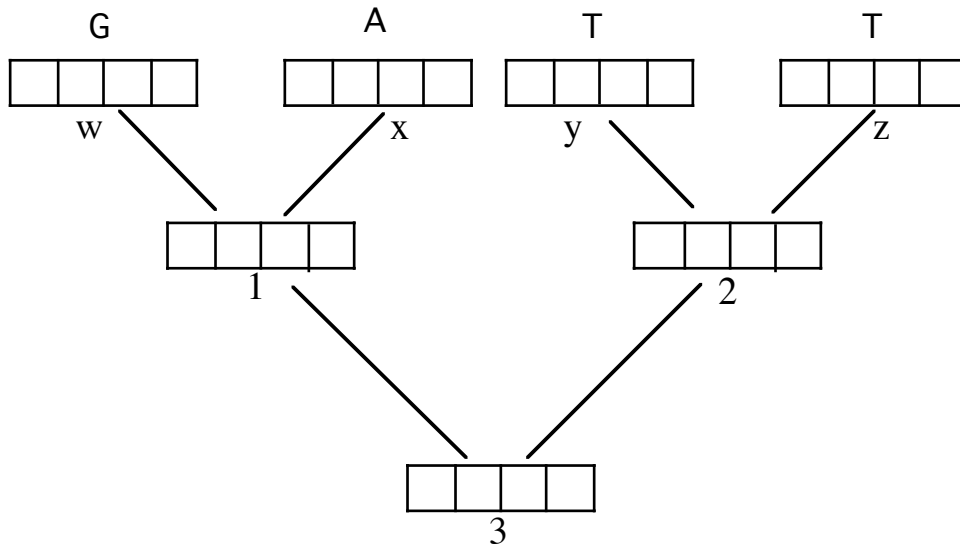
Name: _____

1) Briefly, describe three ways that systematics impacts society (12 pts.)

2) Describe the fundamental differences between evolutionary systematics, phenetics, and cladistics, with respect to phylogeny inference (12 pts.).

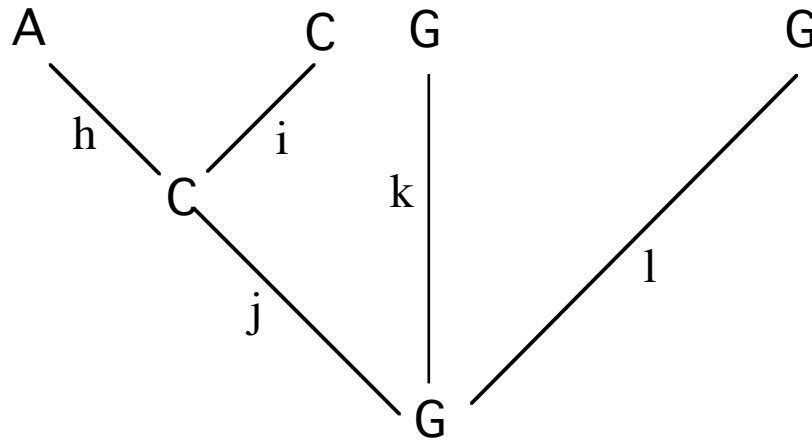
3) Use Sankoff's algorithm to optimize the character on the tree below. Use the following transformation costs (28 pts.).

	A	C	G	T
A	--	3	2	3
C	3	--	3	1
G	2	3	--	3
T	3	1	3	--



4) In words, briefly describe the manner in which progressive alignments work (It's fine to describe the steps; 12 pts.).

- 5) Consider the following character on the tree shown. The taxa at the tips have the nucleotides shown, and h,i,j,k,& l represent branch lengths. Write out the contribution of the reconstruction shown to the single-site likelihood for this character (20 pts.). How many such steps would there be in the calculation of the single-site likelihood for this character (this is a bit of a trick question - 4 pts.).



6) Describe how you would go about assigning transformation costs if you were interested in conducting parsimony analysis using dynamic weighting and “six parameter parsimony” (12pts.).