Comp 555 Problem Set 4

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1. Consider the following four sequences Chimp GTTG Gorilla GTCA Human ACCA Orangutan ATTA Assume the following scoring matrix A T G C A 0 2 3 8 T 2 0 1 3 G 3 1 0 3 C 8 3 3 0

a. For these four species, draw any six binary tree topologies. Make at least two different tree structures. b. Apply Sankoff's algorithm to the topologies created in (a) to determine the weighted parsimony score. What is the minimum parsimony score? What is the most plausible topology of the six you created? Why? c. Apply Fitch's algorithm to the same topologies. Find the sequences for the roots for all. Which is the one with the least parsimony score. d. Do b) and c) give same results. Why or Why not?

2. Consider the following distance matrix A B C D E F A 0 18 15 21 6 16 B 0 23 19 20 24 C 0 26 17 19 D 0 23 27 E 0 18 F 0 a) Is this distance matrix additive ? Why or why not? b) Design an efficient method to determine "delta" for an iteration. c) Find "delta" and i,j,k for the first two iterations.

3. Book 10.8

4. Book 11.6

5. In problem 4 (book 11.6), for the sequence 112122, what is the probability that third 1 came from die D1