

Advanced Algorithmic Techniques for Bioinformatics

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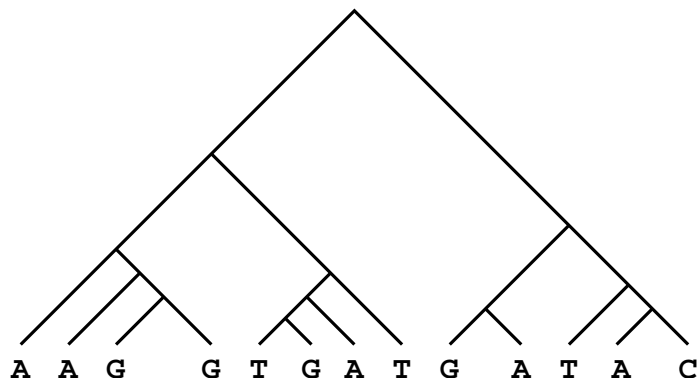
Exercise sheet no. 3 (out: 21 Nov. 2007, in: 28 Nov. 2007)

1. Small Parsimony - Sankoff.

Use Sankoff's algorithm to compute the most parsimonious tree for the phylogeny below. Is there more than one optimal solution?

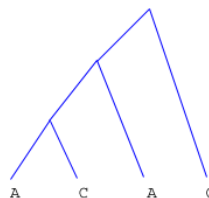
2. Small Parsimony - Fitch.

Repeat the previous exercise using Fitch's algorithm.



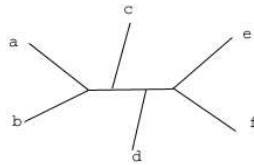
The phylogeny for exercises 1 and 2

3. Fitch's algorithm. Can all possible maximum parsimony trees for the example below be obtained by Fitch's algorithm?



4. **NNI.**

List all neighbors of the following tree as obtained by NNI:



5. **SPR.**

The reference tree is the one used in exercise 4. This time you are asked to use SPR and produce all trees obtained from acting on inner edges. How many distinct trees do you obtain? Mark those that you also obtained via NNI in exercise 4.