

Algorithms in Comparative Genomics, Winter 2018/19

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Exercises

Exercise 07, 13.12.2018

1. Given permutations $\pi = (1\ 3\ 5\ 6\ 4\ 2)$ and $\sigma = (2\ 6\ 1\ 4\ 5\ 3)$, calculate $\tau = \pi \circ \sigma$. (2 P)
What is the minimum cycle decomposition of τ ?
2. Given permutations $\pi = (1, 4)(7, 3, 5, 6)$ and $\sigma = (1, 6)(2, 3)(5, 7)$ in *cycle notation*. (2 P)
Calculate $\tau = \pi \circ \sigma$. What is the normal representation of permutation τ ?
3. Given two genomes $\pi = (1, 4)(2, 3)(7, 8, 5)$ and $\sigma = (3, 6, 2, 1)(8, 4)$, (6 P)
 - (a) compute the FFT distance $ad(\pi, \sigma)$ (also known as algebraic distance),
 - (b) find an optimal rearrangement scenario transforming π into σ ,
 - (c) draw the cycle graph for all steps of your rearrangement scenario from (b) and indicate the corresponding fusions, fissions, and transpositions of your scenario.

Discussion of solutions in tutorial on 20.12.2018