

Algorithms in Comparative Genomics, Winter 2018/19

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Exercises

Exercise 04, 15.11.2018

1. Given the following two genomes:

$$\begin{aligned} A &= (\circ 11 - 12 \circ) (\circ 2 3 - 4 5 6 7 \circ) (-9 - 10 1 8) \\ B &= (1 2 5 3 - 4 6 7) (\circ 8 - 9 - 10 11 - 12 \circ) \end{aligned}$$

- (a) draw the genome graph of A and B ,
 - (b) draw the adjacency graph of A and B .
 - (c) What is the DCJ distance between A and B ?
 - (d) Give an optimal DCJ sorting scenario from A to B and name the operations in your sorting scenario.
 - (e) If any of your intermediate genomes contains a circular intermediate chromosome, try to find an alternative optimal scenario that does not contain such a chromosome.
2. Given a genome A with l linear chromosomes, and B with k linear chromosomes, how many paths does the adjacency graph $AG(A, B)$ have?
3. How many different optimal DCJ sorting scenarios exist for the following two genomes?

$$\begin{aligned} A &= (\circ 1 \circ) (\circ 4 3 2 5 \circ) \\ B &= (\circ 1 2 3 4 5 \circ) \end{aligned}$$

Discussion of solutions in tutorial on 22.11.2018