University of Helsinki
Department of Computer Science

Intensive Course on Genome Rearrangements, Winter 2018

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Exercises

Exercise 04, 11.01.2018

1. Given the following two genomes:

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

   (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?

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

Discussion of solutions in tutorial on 12.01.2018 10:15-11:45 AM