

Algorithms for Genome Rearrangement
Summer 2017

Exercises

Exercise 10, 23.06.2017

1. Prove the following statements: (4 P)
 - (a) “*Every adjacency and every telomere conserved in all genomes A, B, C are part of the median.*”
 - (b) “*There exists a median that contains all adjacencies and all telomeres conserved in at least two out of three genomes $A, B,$ and $C.$ ”*

2. Choose between one of the following two exercises: (6 P)
 - (a) Read Section 3 of David Bryant’s paper which describes the NP-hardness proof for the circular breakpoint median problem: David Bryant, “The complexity of the breakpoint median problem.” *Centre de recherches mathematiques* (1998). You should be able to understand the notation without reading previous sections. Note that David considers only genomes that constitute a single circular chromosome.
 - (b) Review Hopcroft-Karp’s algorithm for bipartite maximum cardinality matchings. Research literature of your choice.
 - i. What are augmenting paths?
 - ii. What does Hall’s theorem say?
 - iii. What does König-Egerváry’s theorem say? Does it also apply to general graphs?

Hand in solutions before the tutorial on 30.06.2017