Algorithms in Comparative Genomics

Exercise sheet 13, 05.07.2024

Exercise 1 (From $\mathcal{P}$ to PQ) (12 pts)

Consider the set of permutations $\mathcal{P} = \{(2, 3, 4, 1, 9, 8, 6, 5, 7), id_9\}$ and a corresponding generator (R', L') with $R' = [9, 4, 4, 4, 9, 6, 7, 9, 9]$ and $L' = [1, 2, 2, 1, 5, 5, 5, 5, 1]$.

1. List all common intervals following the optimal time algorithm.

2. Determine *Support* for both R' and L' following the linear time algorithm.

3. Determine the canonical generator (R, L) from (R', L') following the linear time algorithm.

4. Decide which of the common intervals are strong intervals. (There exists an efficient algorithm for this. But since this was not covered in the lecture, do it "by eye".)

5. Construct the inclusion tree of the set of strong common intervals as a skeleton of a PQ-tree for $\mathcal{P}$. (Again, there exists an efficient algorithm for this. But since this was not covered in the lecture, do it "by eye".)

6. Decide for each node in the tree, whether it becomes a P- or a Q-node.