Exercises – Algorithms for Genome Research

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Exercise List 11 — 23.01.2015

Discussion of exercises on: 30.01.2015

Exercise 1 Find all common intervals of the two permutations below:

$$\sigma_A = (1, 2, 3, 4, 5, 6, 7, 8)$$

$$\sigma_B = (5, 3, 1, 4, 2, 8, 7, 6)$$

Exercise 2

Read the following paper:

Uno, T., & Yagiura, M. (2000). **Fast Algorithms to Enumerate All Common Intervals of Two Permutations**. Algorithmica, 26(2), 290-309.

On section **4. An Algorithm with O(n + K) Worst-Case Running Time.**, the authors describe the algorithm seen in the lecture. About this algorithm, answer the following questions:

(a) Describe the data structure used to store the values of $u(x, y)$, $l(x, u)$, and the list of y.

(b) How does the data structure change when the next $x - 1$ is included?

Exercise 3

Write an algorithm that finds all the common intervals between k permutations, with $k > 2$. You can use a common intervals algorithm for 2 permutations as an internal step.