

Algorithms in Comparative Genomics, Winter 2018/19

Dr. Daniel Dörr

Exercises

Exercise 12, 20.12.2018

1. Develop an $O(n)$ algorithm for finding the bounds of intervals of *IMax* for a permutation of size n . (Suggestion: Find the left and right bounds separately.) (4 P)
2. Given permutation $\pi = (5\ 4\ 3\ 1\ 6\ 7\ 8)$, (4 P)
 - (a) compute generators (*Sup*, *Inf*),
 - (b) visualize their intervals ($i..R[i]$) and ($L[i]..i$), and
 - (c) calculate $Support_R$
3. Prove (in your own words) the following Lemma: (4 P)

Lemma 1 *Let (R_1, L_1) and (R_2, L_2) be generators of common intervals of two sets of permutations Π^1 and Π^2 . The pair $(\min(R_1, R_2), \max(L_1, L_2))$ is a generator for the common intervals of $\Pi^1 \cup \Pi^2$.*

Note that $\hat{R} = \min(R_1, R_2)$ is defined as follows $R[i] = \min(R_1[i], R_2[i])$ for all $1 \leq i \leq n$. $\max(L_1, L_2)$ is defined analogously.

Discussion of solutions in tutorial on 10.01.2019