

8. Übung zur Vorlesung “Bioinformatische Methoden in der Genomforschung”

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Exercise 1 (5 Points)

Let component C in permutation P be unoriented. Show that the inversion of an elementary interval, which extremities belong to C , results in the orientation of component C , and that the amount of cycles in P is unchanged.

Exercise 2 (5 Points)

Given a signed permutation

$$A = (0 \ 2 \ -3 \ 1 \ 4 \ 6 \ -7 \ -5 \ 8)$$

on the set $\{0, \dots, 8\}$. Find all *safe* inversions of an oriented elementary interval, so that no new unoriented components are generated.

Exercise 3 (5 Points)

Given the special case of sorting by inversion, where only inversions of length two are allowed. Design an algorithm, that produces the optimal solution for an unsigned permutation.

Exercise 4 (10 Points)

Given a signed permutation A :

$$A = (0 \ -5 \ 4 \ 3 \ -2 \ 7 \ 8 \ 9 \ 10 \ 1 \ 6 \ 11)$$

Sort the given permutation using the algorithm shown in the lecture. Determine in every step:

1. All elementary intervals of the permutation and show with intervals are oriented.
2. All cycles of the permutation.
3. All components of the permutation, and show which components are oriented.
4. Only give the carried out (safe) inversion steps.