

Algorithms in Genome Research
Winter 2009/2010

Exercises

Number 2, Discussion: 2009 November 06

1. Given two signed permutations (genomes)

$$A = 0 \ 2 \ 1 \ -3 \ 4$$

and

$$B = 0 \ 1 \ 2 \ 3 \ 4.$$

Calculate the reversal distance (by hand).

2. Given two signed permutations (genomes)

$$A = 0 \ 1 \ 2 \ 3 \ 4 \ 5 \ 6 \ 7 \ 8 \ 9 \ 10 \ 11 \ 12 \ 13 \ 14 \ 15 \ 16$$

and

$$B = 0 \ -3 \ 1 \ 2 \ 4 \ 6 \ 5 \ 7 \ -15 \ -13 \ -14 \ -12 \ -10 \ -11 \ -9 \ 8 \ 16.$$

- (a) Draw the breakpoint graph of A and B .
(b) What is the reversal distance between A and B ?
3. Consider the special case of Sorting By Reversals where only reversals of length two are allowed, called SB2R.
- (a) Give an algorithm for optimal SB2R of an unsigned permutation.
(b) Give an algorithm for optimal SB2R of a signed permutation.