Algorithms for Bioinformatics (Autumn 2015)

Exercise 5 (Tue 6.10., 10-12, B222)

If you cannot make it to the exercise session, please e-mail your solutions and the reason why you cannot attend to daniel.valenzuela@cs.helsinki.fi before the exercise session to get credit.

Some of the problems below are programming exercises on the Rosalind platform at `http://rosalind.info/problems/list-view/?location=bioinformatics-textbook-track`

1. Solve the Rosalind problem BA6A: *Implement GreedySorting to Sort a Permutation by Reversals.*

2. Solve the Rosalind problem BA6B: *Compute the Number of Breakpoints in a Permutation.*

3. Prove that if a signed permutation P contains negative signs, there is always a reversal that decreases Breakpoints(P).

4. Perform the breakpoint reversal sort algorithm with $P = (+3 \ +4 \ -6 \ -5 \ +7 \ +1 \ -8 \ -2)$ as the input and show all intermediate permutations. Is this the optimal solution to this instance of reversal sorting problem?

5. Compute the 2-break distance $d(P, Q)$ for $P = (+a \ +b \ +c \ +d \ +e \ +f \ +g \ +h)$ and $Q = (+c \ +d \ -f \ -e \ +g \ +a \ -h \ -b)$. Show the breakpoint graph Breakpoint(P, Q).