

Algorithms in Genome Research
Winter 2011/2012

Exercises

Number 09, Discussion: 2012 January 20

1. Given two genomes (represented as sequences of gene families):

$$A = (1, 4, 7, 6, 5, 4, 5, 1, 4, 3, 2)$$

$$B = (1, 2, 3, 4, 3, 4, 5, 7)$$

- (a) Find all maximal common intervals of A and B of size at least 2.
(b) Find all maximal median gene clusters of A and B of size at least 2 with a symmetric set distance of at most 1.
2. A common interval C is called a *nested common interval* of two genomes if either $|C| = 2$, or if $|C| > 2$ and it contains a nested common interval of size $|C| - 1$.

A nested common interval of size ℓ is *maximal* if it is not contained in a nested common interval of size $\ell + 1$.

- (a) Find all maximal nested common intervals in the following two genomes:

$$A = (4, 6, 5, 7, 3, 1, 2)$$

$$B = (1, 2, 3, 4, 5, 6, 7)$$

- (b) Develop an algorithm to find all maximal nested common intervals in two permutations.