

## Lab 6 – Exercises

EXERCISE 1. Implement the BM algorithm on arbitrary lists.

**Programming instructions.** Extend the unbounded array data structure for lists by member functions  $d_1$  and  $d_2$  used in the BM algorithm. Then add a member function  $bm$ , which takes a pattern list as input and decides whether this pattern is a sublist of the given list.

**Testing instructions.** Test your implementation with several pattern strings  $P$ , represented as lists with elements of type **char**. For each pattern string explore several target strings  $S$ . You must cover cases, where  $P$  is a substring of  $S$  and where this is not the case.

EXERCISE 2. Modify the BM algorithm such that it will find all occurrences of a pattern sequence  $P$  in target sequence  $S$  in time in  $O(n)$ , where  $n$  is the length of  $S$ .

EXERCISE 3.

- (i) Discuss how to implement the algorithms for the fast Fourier transform and the inverse transform on lists representing the coefficients of polynomials. Think of using a simple recursive implementation; an iterative implementation is quite challenging.
- (ii) Discuss how to exploit your implementation ideas in (i) for the multiplication of large integers.