

Theory of Computation

Homework 1: due 16 October 2018

You are to write a program that implements the Baker-Bird two-dimensional pattern matching algorithm. To do that, you need to implement

- the Aho-Corasick algorithm and
- the Knuth-Morris-Pratt algorithm.

You may assume that $\Sigma = \{a, b, \dots, z\}$ and $m \leq n \leq 100$. You may use an array implementation for branching in the Aho-Corasick algorithm. In the Baker-Bird algorithm, you are to use $O(|\Sigma|m^2 + n)$ extra space (not $O(|\Sigma|m^2 + n^2)$).

Constraints:

- Input: The first line of the input file contains m and n . The following m lines contain an $m \times m$ pattern, one row in a line. The following n lines contain an $n \times n$ text, one row in a line.
- Output: The positions of occurrences in row major order
- Check the correctness of your program by a checker program. A checker program gets the input and output of your Baker-Bird program as its input and checks whether the output is correct or not.

Report:

- Explain how your checker program works in your report.
- Run your program with your own inputs
- Hand in your report, programs, and an example running (with at least two inputs) by email to `shmin@theory.snu.ac.kr`.
- Write down the environment you run your program.
- Write comments appropriately in your program.