University of Freiburg
Dept. of Computer Science
Prof. Dr. F. Kuhn
M. Fuchs, G.Schmid

Algorithms and Datastructures
Exercise Sheet 12

Exercise 1: Rabin-Karp Algorithm   *(10 Points)*

(a) Implement the Rabin-Karp algorithm. You may use the template `StringMatching.py`. The algorithm should return a Python-list containing all starting points of the pattern. That is, for each time the pattern is recognized, the list should contain the position of the first letter of this appearance.   *(5 Points)*

(b) Run your algorithm on the text and pattern given in `input.txt`. Write down your output. *(5 Points)*

   Remark: When choosing the parameters b and M, consider that the procedure **read_input** *used on* **input.txt** *creates an array with values from* **ord(' ')** $= 32$ *(whitespace) to* **ord('z')** $= 122$.

Exercise 2: Knuth-Morris-Pratt Algorithmus   *(10 Points)*

Consider the pattern $P = AABAAA$ and the text $T = BAABAABAAABAAABBAA$.

(a) Compute the array S of the Knuth-Morris-Pratt algorithm.   *(5 Points)*

(b) Use the Knuth-Morris-Pratt algorithm to find all appearances of P in T. Document the steps analogously to the lecture.   *(5 Points)*