University of Freiburg
Dept. of Computer Science
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Algorithms and Datastructures
Winter Term 2024
Exercise Sheet 12
Due: Wednesday, Febuary 5th, 2pm

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)*