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# Algorithms and Datastructures

## Summer Term 2022

### Exercise Sheet 12

Due: January 25th, 12pm

#### 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.
- (b) Run your algorithm on the text and pattern given in `input.txt`. Write the output into `erfahrungen.txt`.  
*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  $P = BBABAB$  and the text  $T = ABBABBABABBABABBA$ .

- (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)