

## Bonus Homework 13

- Submit one ZIP file per homework sheet which contains one PDF file (including pictures, computations, formulas, explanations, etc.) and your source code file(s) with one makefile and without adding executable, object or temporary files.
- The implementations of algorithms has to be done using C, C++, Python or Java.
- The TAs are grading solutions to the problems according to the following criteria:  
[https://grader.eecs.jacobs-university.de/courses/ch\\_231\\_a/2020\\_1/Grading\\_Criteria\\_ADS.pdf](https://grader.eecs.jacobs-university.de/courses/ch_231_a/2020_1/Grading_Criteria_ADS.pdf)

### **Bonus Problem 13.1** *Backtracking: $n$ Horses Problem* (8 points)

Consider the  $n$  queens problem as discussed in the lecture. Solve the adapted version of the problem in which instead of placing  $n$  queens on an  $n \times n$  chessboard, you need to place  $n$  horses, which do not threaten each other.  $n$  is a natural number and the only input of the problem. Your implementation should print all possible placements for a given input  $n$ .

### **Bonus Problem 13.2** *Rabin-Karp String-Matching* (10 points)

Use the textbook "Introduction to Algorithms" by Cormen et al. or other equivalent resources to learn about the Rabin-Karp algorithm.

- (4 points) Explain the algorithm using an example (different from the example in the textbook) and explain the steps which would be performed by the algorithm.
- (6 points) Implement the algorithm.

### **How to submit your solutions**

You can submit your solutions via *Grader* at <https://grader.eecs.jacobs-university.de> as a generated PDF file and/or source code files.

If there are problems with *Grader* (but only then), you can submit the file by sending mail to [k.lipskoch@jacobs-university.de](mailto:k.lipskoch@jacobs-university.de) **with a subject line that starts with CH-231-A.**

Please note, that after the deadline it will not be possible to submit solutions. It is useless to send solutions by mail, because they will not be graded.

**This homework is due by Monday, May 11<sup>th</sup>, 23:00.**