# 11 Project – submit your solution to petr.kovar@vsb.cz

## Combinatorics

11.1. The password for log into the school network has 8 characters: numbers or upper case letters of English alphabet. No number or letter can repeat more than two times. How many such passwords exist?

We forgot the password. Suppose entering one password take 5 s. How long would it take to try all feasible passwords? (5 p)

## Graph Theory

11.2. We have a chess board of $8 \times 8$ fields. We choose any two fields $S$ and $C$ by random. We have a peg, that is allowed to move always by 1 field horizontally or vertically in each move. What is the expected number of moves, when starting at $S$ and going to $C$ we always follow the shortest path possible? What is the graph describing this problem?

What is the solution for an $n \times n$ board? (5 p)

## Guidelines

Write the project using a computer, include the title with your name, student ID, number of the project, year and a grading table (see the sample project). The project will contain a detailed description of your solution for each problem. Show your work by explaining the steps carefully. If you skip a problem, mark it clearly in the text by saying „*I did not solve the problem number X*“.

Submit your project to tereza.kovarova@vsb.cz as an uncompresed PDF file, use your student ID in the name of your submitted file.

You will be awarded 0 upto 2 or 0 upto 3 points for each of the problems.

Submit your project no later than on **Monday December 5th 2016 at 23:59**.