3 Project – submit your solution to `petr.kovar@vsb.cz`

Combinatorics

3.1. Eleven students sit in the last row of the classroom. They are waiting to get assignments of the Discrete Math exam test. Lecturer is left with 5 pieces of the test version A, 2 pieces of the test version B, and one piece of the test versions C,D,E,F. How many possibilities are there to hand assignments among students of the last row, if every two neighbouring students must have a different version of the test? (3 b)

3.2. In a chicken egg hatchery the eggs are placed in boxes containing three eggs each. (Suppose that hatching a hen is equally likely as hatching a cock.) By A we denote an event that from three eggs emerge at least one hen and also at least one cock. By B we denote an event that from three eggs emerge at most one cock. Are these two events independent? Proove your statement. (2 b)

Graph Theory

3.3. Let T be a tree on 10 vertices. At least how many edges do we need to add to this tree, to obtain a vertex 3-connected graph? Prove your statement. Give (draw) an example of such a tree on 10 vertices into which adding the minimum number of edges is sufficient. Draw and mark the added edges. (3 b)

3.4. Find out how many components a 2-regular graph with n vertices can have. Discuss all the possibilities depending on the value of the parameter n, where n is a natural number. Explain your solution clearly. (2 b)

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. 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 `petr.kovar@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 8.12.2014 at 23:59**.