

4 Project – submit your solution to tereza.kovarova@vsb.cz

Combinatorics

- 4.1. In how many ways can the hand of five cards be dealt from a standard deck of 52 card to two poker players Alexander nad Boris, so that both get a full house (three cards of one rank and two cards of another rank)? We distinguish the order of players – cards are at first dealt to Alexander and then to Boris. The order of received cards for the players does not matter, however the colors we distinguish (there are cards of four colors ($\clubsuit, \spadesuit, \diamond, \heartsuit$)). (2 b)
- 4.2. How many relations are there on a finite n -element set, such that they are not reflexive but are symmetric and antisymmetric at the same time.? (3 b)

Graph Theory

- 4.3. Consider a graph G with the vertex set $V(G)$ equal to the set of all two element subsets of the set $A = \{1, 2, 3, 4, 5\}$. Further let an edge XY be in $E(G)$ whenever the two-element subsets X and Y are not disjoint and neither are they identical ($X \cup Y = \emptyset \wedge X \neq Y$). Draw the graph G . Determine if G is Hamiltonian and justify your answer. (2 b)
- 4.4. How many components can a graph have if it has degree sequence $(6, 5, 4, 4, 4, 4, 2, 2, 2, 2, 2, 2, 2, 1)$? Give thorough arguments to prove your answer. (3 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. 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 uncompressed 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 11th 2017 at 23:59**.