

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

Combinatorics

- 7.1. Zed Sweetchuck has to construct all possible equations and inequalities. He can use the numbers $\{0, 1, 2, 3, 4\}$ and a math operator \odot from the set $\{=, \leq\}$. How many valid equations and inequalities can he construct with numbers $\{0, 1, 2, 3, 4\}$ if the equations or inequalities have to be of the form $C \odot C$ or $C \odot CC$, (C stands for a number and \odot for an operator)? (3 b)
- 7.2. Zed Sweetchuck works as a wine-taster. In Table 2 there is information about 100 wine bottles, which will be tested during the next wine-tester competition.
By A we denote the event that red wine is to be tested. By B we denote the event that dry wine is to be tested. Are the events A and B independent? Explain carefully.

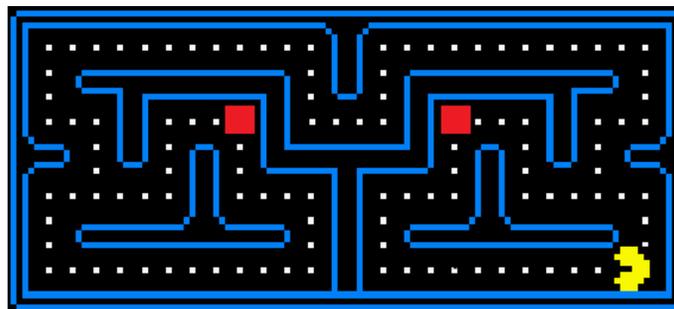
	Wine	
color	dry	semi-dry
Red	55	10
White	20	15

Tabulka 1: Table

(2 b)

Graph Theory

- 7.3. This summer there was a wine-tester meeting in Prague. Zed Sweetchuck exchanged addresses with all remaining 8 participants. The remaining participants exchanged addresses in the following way: $\{5, 4, 3, 3, 2, 2, 1, 1\}$ (some other participant exchanged address with five participants, another participant with four participants, etc.). Or maybe it was $\{5, 5, 4, 3, 3, 3, 3, 2\}$, Zed did not remember precisely, he got too tired. Which of the ways is possible? Explain carefully and draw a graph representing the exchange of addresses. (2 b)
- 7.4. Zed's favorite game is the classic Pac-man from 1980. He likes to play the game efficiently. In the figure one level of the game is depicted. Pac-man has two teleports available (red squares), hitting one he can, or he may not teleport to the other. Can Zed play the game so that he collects all the dots and traverses each corridor precisely once? Can he do that starting on the position as depicted? If some other place is a good start, which? Draw a graph, explain carefully all the answers.



(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 5th 2016 at 23:59**.