

ASSIGNMENT I : Semester II 2018/2019

This assignment is carried out in a group of maximum 2 students.

Title: Minesweeper

Objectives

This assignment evaluates the understanding on strategies used to solve NP-complete/NP-hard problem, e.g. greedy, dynamic programming, branch and bound, heuristics, randomized etc which are discussed in the class. In addition, it is also designed to let students to explore new algorithms on their own.

Specification



Figure 1. An example of Minesweeper game

Minesweeper is a single-player puzzle video game. The objective of the game is to clear a rectangular board containing hidden "mines" without detonating any of them, with help from clues about the number of neighboring mines in each field.

Analyze the Minesweeper game and write an efficient algorithm to solve the Minesweeper puzzles using the strategies and techniques that you learn in the class. Write your program in Java. Assume that the puzzle is square of size n , and the number of mines is m , analyze the time complexity in big-O notation for best case, worst case and average case and accuracy of the algorithm. Count/trace the number of primitive operations performed to help you with the analysis. Read papers on computational complexity of Minesweeper problem, and describe it in your own words about the topic.

- Minesweeper solution algorithm. (Algorithm & program: +60%)
- Analysis of Minesweeper solution algorithm. (Report: +30%)

- c. Analysis of computational complexity of Minesweeper puzzle.
(Report+Presentation: +20%)

You could use the Minesweeper program by Sedgewick and Wayne (<http://introcs.cs.princeton.edu/java/14array/Minesweeper.java.html>) to create the puzzles.

Final Note

Please do the assignment on your own. Copying from friends or anywhere from the Internet will give you a zero mark.

References taken from any sources must be quoted and declared.

- Program and report submission deadline: Sunday, 14/4/2019 to elearning**