Assignment 2

Sudoku is a mathematical puzzle game. In Sudoku, we have a 9x9 grid with numbers (from 1 to 9). Additionally, this grid is divided into 9 3x3 small grids. The initial grid is filled in with some numbers, and the final solution is a grid full of numbers. See figure 1 as an example. You have the following restrictions:

- A number will appear once in each column.
- A number will appear once in each row.
- A number will appear once in each 3x3 small grid.

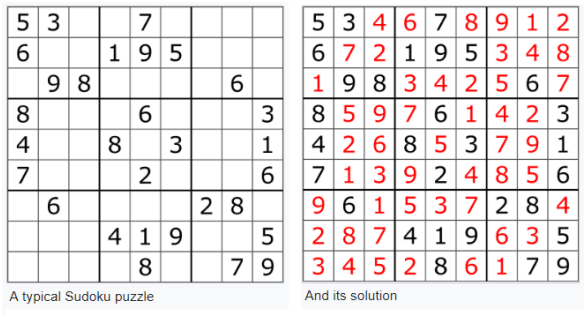

Figure 1: (left) Initial grid. (right) Solution of the Sudoku.

The different Sudokus are given in the file "assignment 2 sudoku.txt". The Sudoku from the picture would be given in the file with the following format:

SUDOKU N

530070000

600195000

098000060

.....

000080079

The empty positions are represented with zeros in the file.

What to do: Your assignment now is to apply Backtracking (or Depth-first search (DFS)) to search for a solution of the 10 Sudoku. You need to present the code to the teacher. **(2 point)**

Your report has to cover the key parts as follows:

1. - Explanation of the problem. **(3 point)**
    a. Give the representation of a solution (answer) of the problem, as explained during the course. **(1)**
    b. Give the equation for the restriction(s) of the problem. **(0.5)**
    c. What is consider as a state? In addition, explain why. **(0.5)**
    d. Which is the initial state? In addition, explain why. **(0.25)**
    e. Which is/are the possible action(s)? In addition, explain why**. (0.25)**
    f. What is the maximum branching factor of the tree (b)? In addition, explain why. (**0.25)**
    g. What is the maximum depth of the search tree (m)? In addition, explain why. **(0.25)**

Pre-conditions in order to present your code:

- The code should run under 1 second. If you cannot get it faster, talk to the teacher. The reason could be your computer.

Conditions to approve the assignment 2

In order to receive the points for the code, you need to submit the report and have more than half of the points. Example: If a report have 1 point, then you need to have a minimum of 0.5.

- Minimum score to pass assignment 2: 3 points.

SCORES 3-5

- Your score < 3: U
- 3 <= your score <= 3.75: 3
- 3.75 < your score < 4.75: 4
- 4.75 <= your score: 5

SCORES A-F

- Your score < 3: F
- 3 <= your score < 3.4: E
- 3.4 <= your score < 3.8: D
- 3.8 <= your score < 4.2: C
- 4.2 <= your score < 4.6: B
- 4.6 <= your score: A

SUBMISSION DETAILS

Maximum Score: 5 points.

Time to submit: 20 January – 20 March & 26 April & 31 May