
BIL-489 Graph Theory

Assignment - 2

Assigned: 17.07.2014

Due: 30.07.2014 (max. 130) 10.08.2014 (max. 100) 11:59PM

Submission: Submit by email to mtan@etu.edu.tr with a subject “BIL489/589 hw2”

Rules: Late submissions are not allowed. Plagiarism is strictly forbidden, all that take part will be punished according to the regulations of the university.

There are several algorithms proposed to colour a given graph (see, for instance, http://en.wikipedia.org/wiki/Graph_coloring). This assignment has two steps, First one is,

- Choose one of the graph colouring algorithms and implement it in one of the following languages: Python, java, C or C++.

Sudoku is a puzzle that is played by assigning numbers 1 to 9 to each cell in a 9x9 board. Each 3x3 sub-board has to have all 9 numbers and a number can not appear twice in a row or column (see <http://en.wikipedia.org/wiki/Sudoku>). The second step of the assignment has two sub-steps:

- Represent sudoku as a graph colouring problem.
- By using the graph colouring algorithm that you implemented, solve a given sudoku puzzle.

A Sudoku puzzle will be read as input from a text file whose name should be taken as input from keyboard at the beginning of your program. The format of the file is as follows,

```
. 1 . 9 . . . .  
8 9 3 7 4 6 1 . 2  
. 6 7 . . 5 . . 9  
7 . . 5 . 2 9 . 3  
. . 6 . 9 7 5 2 .  
. . . . 6 1 4 . 8  
5 . . . 7 9 . . 4  
6 7 . 8 1 . . . .  
1 3 . . . 4 . 8 .
```

where a dot represents an empty cell and there is a single space between each cell.

Output will be a text file that has the solution with the same format as input. It is enough to output one of the solutions in case the given instance of sudoku has more than one.

Try to choose a fast algorithm as, you know, graph coloring is NP-complete!

Also note that there are two deadlines, if you can finish early (until July 30), send it and your max. score will be 130, otherwise max. score is 100.

Submit your code with a README file describing the execution. I will execute them on a Linux machine, so be careful if you choose to implement it in C or C++. I can call some of you for demo, to describe and execute the code.