CM20252 & CM50263 Artificial Intelligence
Coursework: Programming 1
Özgür Şimşek

Date set: 5 March 2018

Date due: 23 March 2018, 17:00 pm

Total marks: 100

> CM20252 students: This coursework will determine 10% of your mark for the unit.

> CM50263 students: This coursework will determine 8% of your mark for the unit.

Where to submit: CM20252 Moodle page

What to submit: Completed Jupyter notebook (.ipynb file)

What you need to do: Design and implement a Sudoku solver (details below).

You will be given a Jupyter notebook to work with. You must follow the instructions on this notebook and submit this particular notebook. Otherwise you will receive 0 marks for this coursework.

This coursework will be marked anonymously. Please do not include any identifying information on the files you submit.

You are required to work individually. You are welcome to discuss ideas with others but you must design your own implementation and write your own code.

Do not plagiarise. Plagiarism is a serious academic offence. For details on what it is and how to avoid it, please visit the following webpage:

http://www.bath.ac.uk/library/help/infoguides/plagiarism.html

Details

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

You are familiar with the Sudoku puzzle from the lectures. You will work with the standard size of the puzzle, which is a 9×9 grid. A sample puzzle is shown on the left. The objective is to fill each cell with a digit ranging from 1 to 9 so that each row, column and 3×3 section (shown in the figure within darker boundary lines) contain every digit from 1 and 9. For example, each row of the grid has nine cells; to solve the puzzle correctly, every digit from 1 to 9 must be present in each row. Some of the cells are already filled in with digits; these digits cannot be altered.

Several weeks of lab sessions are allocated for you to work on this coursework. Our tutors will be available during these lab sessions to answer your questions and to help you in any way they can.

How your work will be evaluated

Your algorithm will be tested on a set of 100 Sudoku puzzles. Your mark will be the number of these puzzles solved correctly within 1 minute of computation time on our test machine (iMac, 3.5 GHz). This is the <u>total</u> allocated time for all 100 puzzles.

Very straightforward solutions require less than 5 seconds on our test machine on the 100 test problems. It is certainly possible to write much faster algorithms but that is not necessary for receiving full marks.

You will not be given the set of 100 test puzzles but you will be given a similar set of 100 puzzles on which you can test your code. The two sets are similar to each other (they are sampled from the same population of Sudoku puzzles).

Note that some of the puzzles may have no solution. How to handle such cases is explained in the Jupiter notebook.

Late submissions

We will follow the university policy on late submissions. Coursework submitted after the deadline will receive a maximum mark of 40 (out of 100). Coursework submitted after five working days will receive a mark of zero.

Feedback

You will be able to see your marks on the Moodle page within two weeks of the submission deadline. You can get additional feedback on your submission from the unit leader or one of the tutors via appointment.