

Homework 2 (Due February 9)

CS3642: Artificial Intelligence
Kennesaw State University
Spring 2024

In this project, we will solve a super-hard Sudoku puzzle using a SAT solver.

Consider the following Sudoku puzzle.

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

This puzzle has two additional constraints (highlighted in light blue):

1. The (upper-left to lower-right) diagonal cells $(1,1), (2,2), \dots, (9,9)$ contain every digit from 1 to 9
2. The (lower-left to upper-right) diagonal cells $(9,1), (8,2), \dots, (1,9)$ contain every digit from 1 to 9

In this assignment, your task is to solve the above sudoku puzzle. The sudoku solver that we implemented in class is included with this assignment. It is suggested that you modify this script to solve the above puzzle. The code will print out all of the digits appearing in the diagonal. **Your solution must contain all 9 digits on both diagonals.**

Turn in: a text file containing the solution to the above sudoku puzzle, submitted to the course website under **Assignments** and **Homework 2**. Assignments are due Friday, February 9 by 11:59pm. Please start early in case you encounter any unexpected difficulties.

The solution you submit should be in the following form:

```
+---+---+---+
|134|672|985|
|972|548|631|
|568|931|472|
+---+---+---+
|297|316|854|
|351|894|726|
|846|725|319|
+---+---+---+
|483|159|267|
|719|263|548|
|625|487|193|
+---+---+---+
```

which is the same form that is produced by the included scripts. For reference, the above solution is based on the following (easy) sudoku puzzle:

```
+---+---+---+
|1.4|6..|...|
|9..|5..|6..|
|...|93.|4.2|
+---+---+---+
|29.|...|85.|
|..1|..4|.2.|
|..6|7.5|.1.|
+---+---+---+
|.83|...|..7|
|7..|.6.|5.8|
|.2.|.87|..3|
+---+---+---+
```

Included files:

- `homework02.pdf`: this document
- `solver.py`: this is the main script for solving sudoku's using a SAT solver.
- `sudoku.py`: this provides a helper code for visualizing sudoku

Make sure you install the `python-sat` module (not the one called `pysat` which is for analyzing satellite data). More info on the python module is available here: <https://pysathq.github.io>.

Hint: Read the code. USE THE DEBUGGER. For example, insert this line in your code:

```
import pdb; pdb.set_trace()
```

and whenever your code runs this line, it will start the command-line debugger at that point in the code.