

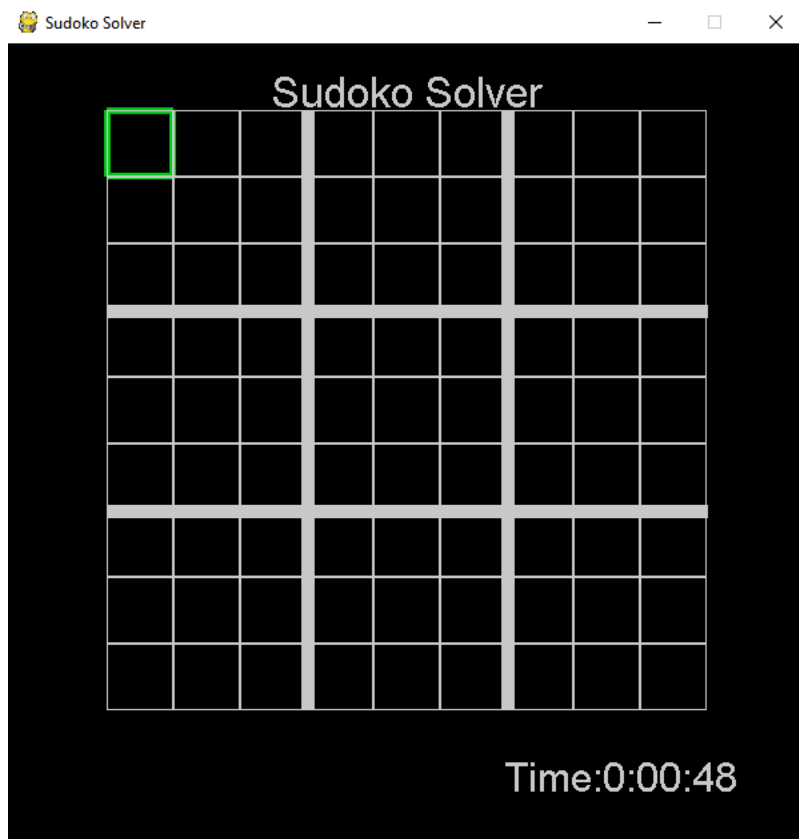
Report

Sudoku Solver using Python and Pygame

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GUI

The first task of this project was to build a basic graphic user interface. This is achieved by using Pygame. I have defined a draw grid function and a highlighter class. Highlighter class has methods that track the Pygame.events (such as down arrow key press). The green highlighted rectangle moves according to the direction indicated by the user. A timekeeper function keeps time and updates the UI frequently.



Writing a Sudoku solver algorithm.

I have used DFS algorithm to solve the sudoku problem. DFS relies on backtracking to solve its previous erroneous classification.

To check the accuracy of my solution, I have tested it against 'allegedly' the most difficult sudoku problem.

<https://www.telegraph.co.uk/news/science/science-news/9359579/Worlds-hardest-sudoku-can-you-crack-it.html>

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

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The Everest of numerical games was devised by Arto Inkala, a Finnish mathematician, and is specifically designed to be unsolvable to all but the sharpest minds.

Feeding this input to my code, I get the output,

```
[[8, 1, 2, 7, 3, 6, 5, 4, 9],
 [9, 4, 3, 6, 8, 2, 1, 5, 7],
 [6, 7, 5, 4, 9, 1, 2, 8, 3],
 [2, 5, 4, 3, 6, 7, 8, 9, 1],
 [1, 3, 9, 8, 4, 5, 7, 2, 6],
 [5, 8, 7, 1, 2, 9, 6, 3, 4],
 [7, 2, 1, 9, 5, 4, 3, 6, 8],
 [4, 6, 8, 5, 7, 3, 9, 1, 2],
 [3, 9, 6, 2, 1, 8, 4, 7, 5]]
```

And on verification, it seems to be a pretty good solution.

Combining the GUI and the sudoku solver algorithm

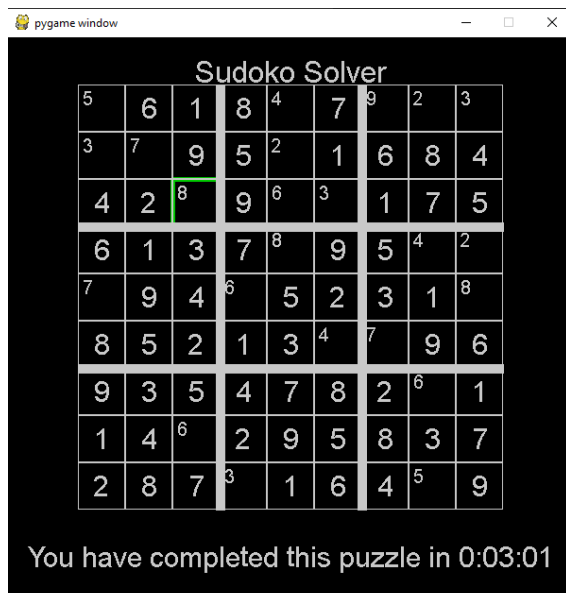
Now that I have established that validation methods and solver methods work fine, I seek to integrate the GUI and the algorithm. And I felt that this was the

hard part. Adding new methods to highlighter class, I was able to stitch the two parts together. Hitting 'space' button would solve the puzzle in its entirety.

During the 'solution phase'



After solving the problem, we get a small notification along with the amount it took to solve the puzzle.



This was a fun project trying to measure pixels and highlighting pixels, I learnt a lot at the end of the day. Please check out my repo for more projects.