

# Sudoku Solver

# Sudoku: The game

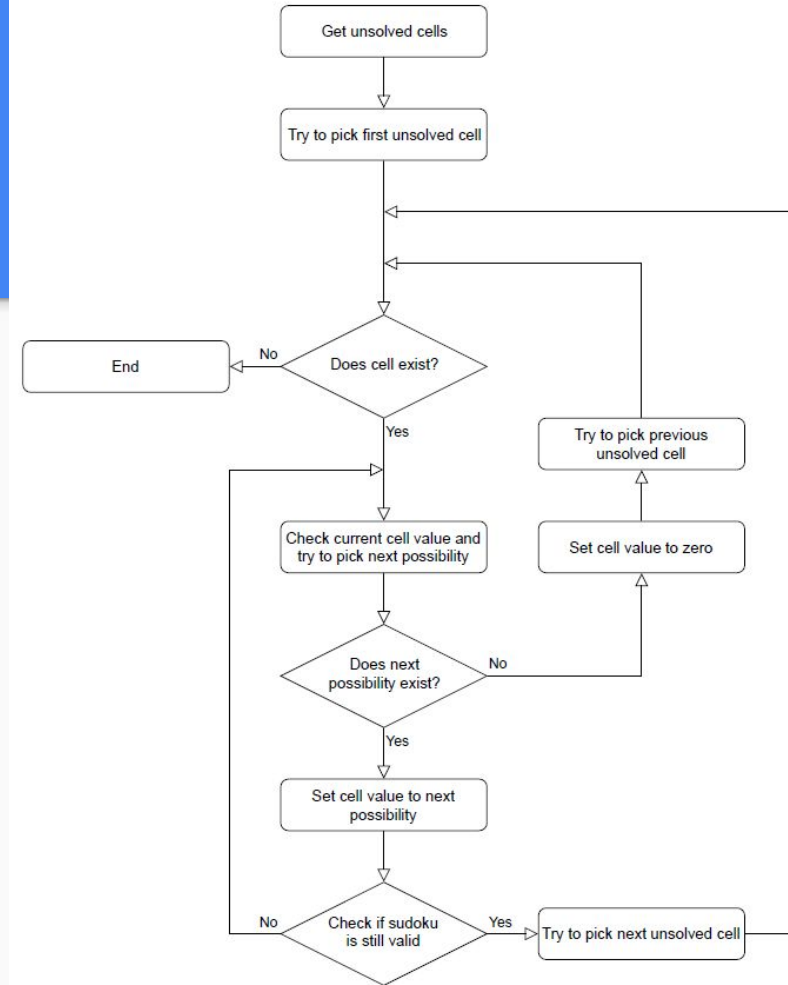
## Rules:

- Solve a 9x9 grid with no duplicate values in rows and columns
- Ideally one solution if at least 17 squares are prefilled

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

# Backtracking Algorithm

Intelligent Agent uses graph/tree search



# Sudoku Generator

```
generator = SudokuGenerator(0.4)
```

Generated Puzzle:

0 9 2	0 0 4	0 0 0
7 8 4	5 0 0	0 0 0
6 3 0	0 9 7	0 0 0
- - -	- - -	- - -
3 0 0	9 2 0	8 0 4
0 0 0	0 3 0	0 0 7
4 0 8	0 7 5	0 0 0
- - -	- - -	- - -
0 0 3	7 5 0	9 0 0
9 0 0	8 0 6	0 0 0
8 0 7	0 1 0	0 6 2

Generated Puzzle:

4 7 0	5 2 8	0 9 1
8 1 3	6 4 9	2 7 5
0 9 2	7 0 3	8 4 6
- - -	- - -	- - -
2 3 8	4 7 1	6 5 9
9 0 7	8 3 6	1 2 4
1 6 4	2 9 5	7 3 8
- - -	- - -	- - -
3 4 9	1 6 2	5 0 7
0 2 5	9 8 7	4 1 3
7 8 1	3 5 4	9 6 2

Generated Puzzle:

0 0 0	0 0 0	0 0 0
0 0 0	0 0 0	0 0 0
0 0 4	0 2 5	0 0 0
- - -	- - -	- - -
0 0 0	0 0 0	0 0 0
0 0 0	0 9 0	0 0 0
0 0 0	0 0 0	0 0 0
- - -	- - -	- - -
0 0 0	0 0 0	0 0 0
7 0 0	0 1 0	8 0 0
0 0 9	0 0 0	7 0 0

# Sudoku Solver

Generated Puzzle:

1	5	6		0	8	0		0	9	0
0	2	0		5	9	0		1	0	8
0	0	4		2	0	6		5	3	0

2	4	0		8	6	3		7	0	0
0	3	8		0	0	5		4	0	6
7	6	5		0	4	1		0	0	2

5	1	2		0	7	8		9	0	0
4	8	0		0	3	2		6	0	0
0	7	3		4	5	9		8	0	1

Solved Board:

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

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

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

# Improvements

- Allow for multiple solutions - help choose the most optimal solution
- Track steps - help evaluate agent performance
- Incorporate constraint satisfaction solving? - get more accurate results