SUDOKU SOLVER

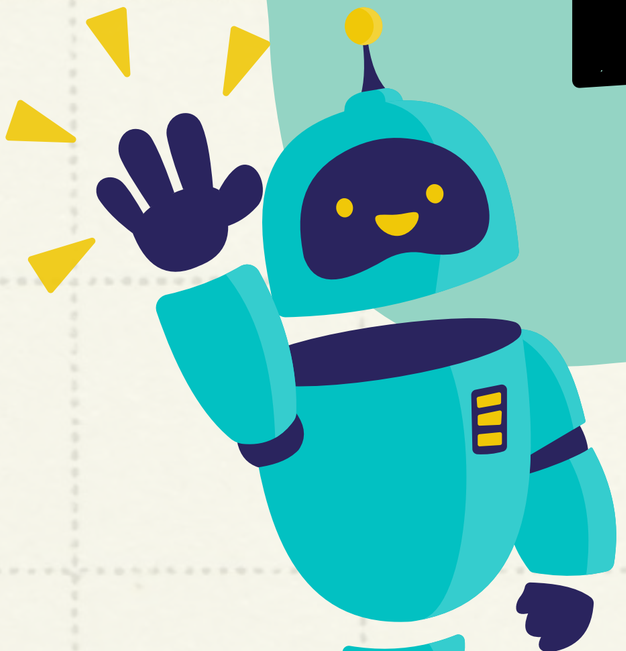
UNDERSTANDING THE BACKTRACKING ALGORITHM

OBJECTIVE

The objective of the Sudoku Solver Visualizer is to provide a real-time, step-by-step visual demonstration of how a Sudoku puzzle is solved using the backtracking algorithm.

This tool aims to enhance the understanding of the algorithm's logic and process, making it easier to comprehend how it solves complex problems like Sudoku.

RULES



1

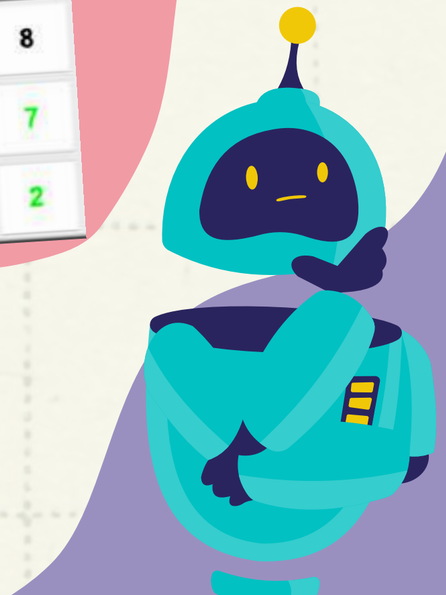
THE SUDOKU GRID SIZE IS 9X9, DIVIDED INTO NINE 3X3 SUBGRIDS.

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

2

EACH ROW, COLUMN, AND 3X3 SUBGRID MUST CONTAIN ALL OF THE DIGITS FROM 1 TO 9, WITH NO REPETITION.

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

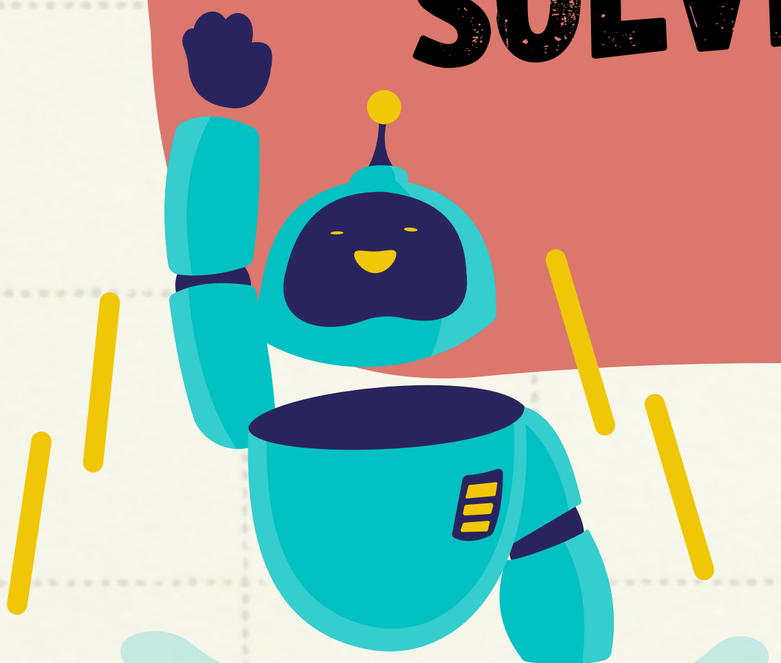


3

THE PUZZLE IS SOLVED WHEN EVERY ROW, COLUMN, AND 3X3 SUBGRID CONTAINS THE DIGITS 1–9, WITH EACH DIGIT APPEARING ONLY ONCE IN EACH ROW, COLUMN, AND SUBGRID.

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

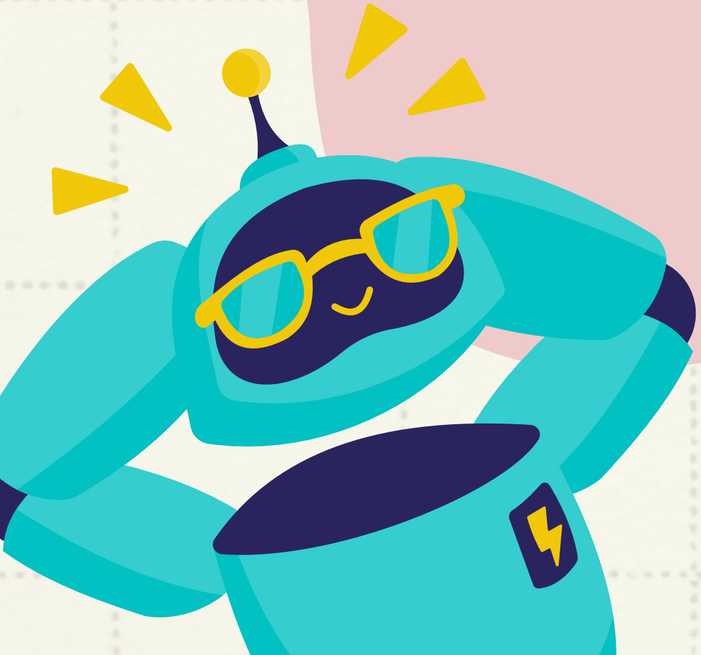
HOW A SUDOKU SOLVER VISUALIZER WORKS

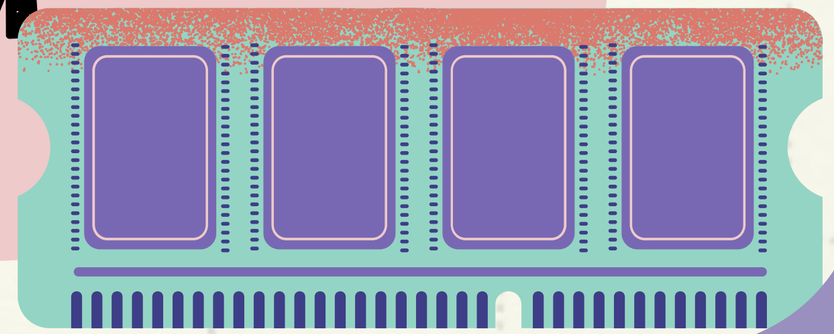


The visualizer starts with an unsolved Sudoku puzzle. The algorithm begins at the first cell and tries to insert a number. If the number fits the Sudoku rules (the same number does not exist in the current row, column, or 3x3 grid), it moves on to the next cell and repeats the process.

If it encounters a cell where no number fits, it "backtracks" to the previous cell and tries the next number. This process continues until the puzzle is solved or it's determined that no solution exists.

BACKTRACKING ALGORITHM

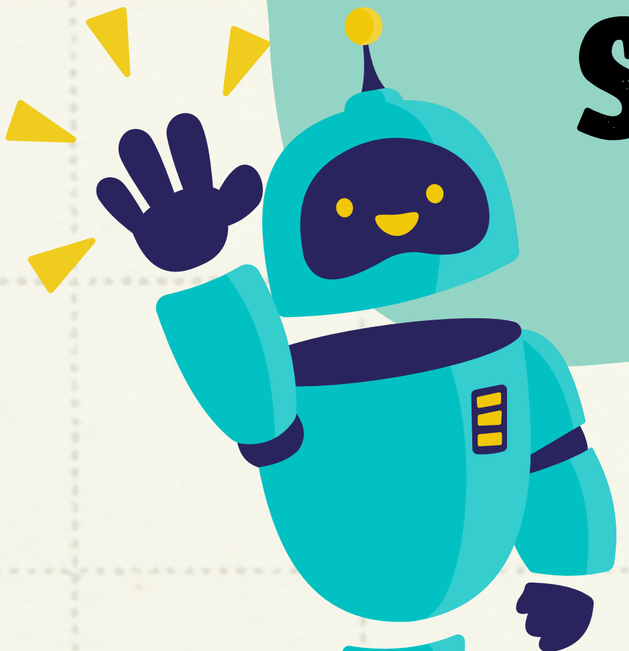




Backtracking is a general algorithm for finding all (or some) solutions to computational problems, notably constraint satisfaction problems.

It incrementally builds candidates for the solutions, but abandons a candidate as soon as it determines hat the candidate cannot possibly be extended to a valid solution.

VISUALIZING THE SOLVING PROCESS



Sudoku Solver

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

THANKS FOR SOLVING!

How fast can you do?