

project

Sudoku game



Team Members :

Ahmed Hesham EL_kady

2305277

Yousef Hesham Moustafa

2305205

Nour Eldin Saudi

2305421

- **1. Algorithms and Techniques**
- **1.1 Backtracking:**
 - Used to validate input puzzles by ensuring they are solvable.
 - Essential for generating random puzzles and solving them efficiently.
- **1.2 Arc Consistency:**
- **Representation:**
- **Variables:** Each cell in the Sudoku grid is treated as a variable.
- **Domains:** Possible values (1 to 9) for each cell.
- **Constraints:** Rules ensuring no repeated digits in rows, columns, or 3x3 subgrids.
- **Steps:**
- **Define Arcs:**
 - Binary constraints between connected cells (e.g., cells in the same row, column, or subgrid).
- **Initial Domain Reduction:**
 - Pre-filled cells limit domains to a single value.
 - Empty cells start with all possible values (1 to 9).
- **Apply Arc Consistency:**
 - Iteratively revise arcs to remove inconsistent values.
 - Assign values to cells with singleton domains.

- **2. Implementation**
- **2.1 Data Structures:**
- **Grid Representation:** A 9x9 2D array.
- **Domains:** A dictionary mapping each cell to its possible values.
- **Arcs:** A list of pairs representing binary constraints.
- **2.2 Code Explanation:**
- The implementation consists of:
- **GUI:** Displays the Sudoku grid and provides user interaction.
- **Solver:** Uses backtracking and arc consistency to solve puzzles.
- **Validator:** Ensures input puzzles meet Sudoku rules.
- **Sample Runs:**
- Easy Puzzle: Solved in 0.2 seconds.
- Intermediate Puzzle: Solved in 0.5 seconds.
- Hard Puzzle: Solved in 1.5 seconds.

- ***The run of code:***

SUDOKU

by ahmed, yousef and nour

PLAY

LEADERBOARD

SOLVER

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Let the Game Begin

Enter your name

Ahmed

Choose difficulty level

Easy

Medium

Hard

Expert

Insanely Extreme

Home

• *The run of code when (AI)solve :*

Let the Game Begin

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

	7	2	6	4	5	1	8	
8					2	4		
								7

	8	4				3		
6			4	1				2
		3					7	4

Time Elapsed:
00:00:07

Check

Reveal Solution

Go Back

Let the Game Begin

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

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

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

Go Back

- ***The run of code when (User)solve :***

Let the Game Begin

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

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

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

Time Elapsed:
00:03:03

Check

Reveal Solution

Go Back

Great work, User!

YOU WIN


You took 3 minutes and 21 seconds to complete

Home

- *Time taken:*

LEADERBOARD		
Name	Time Taken	Difficulty Level
User	03:21	Easy
Home		

- ***When user put number at random then (AI) Solve it:***

 Let the Game Begin

Reveal Solution

Open

Save

Clear

Go Back