

**Group 5**

# Sudoku

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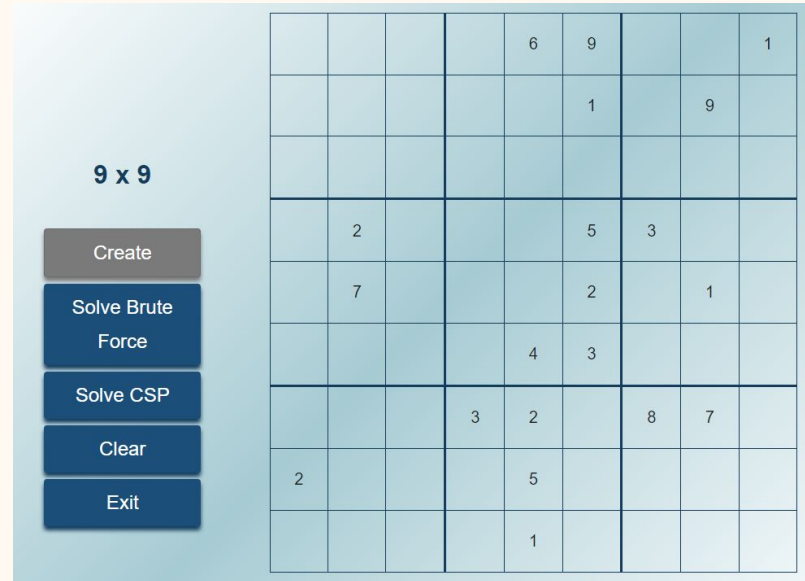
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# LANGUAGES AND TOOLS USED

- Javascript
- Next.js - Frontend
- Node - Backend



# BF TECHNIQUES

25 x 25

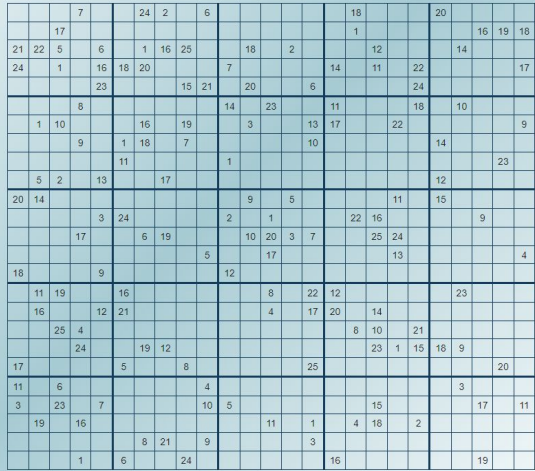
Create

Solve Brute Force

Solve CSP

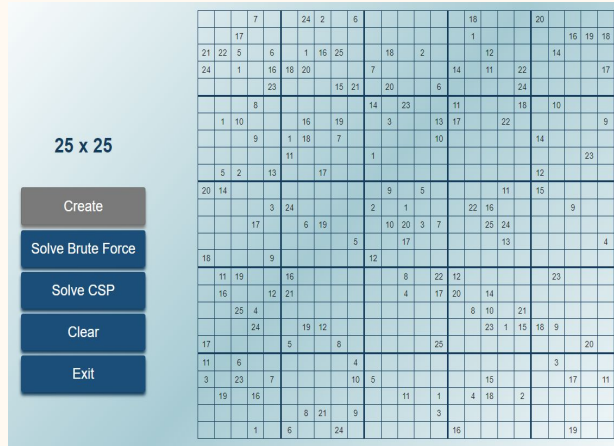
Clear

Exit



- BF: DFS with a Stack (stack = unassigned cells)
- 5 min timeout

# CSP TECHNIQUES



- CSP: Backtracking + AC3
- MRV - smallest domain
- Degree - most unassigned neighbouring cells
- LCV - order which we are testing numbers
- 5 min time out

# INPUT FILES

Created manually,  
randomly took out  
75% of numbers

The screenshot displays a 9x9 Sudoku solver interface. On the left is a 9x9 grid with numbers 1-9, where 75% of the cells are empty. In the center are five buttons: 'Create', 'Solve Brute Force', 'Solve CSP', 'Clear', and 'Exit'. On the right is another 9x9 grid showing the solved state. Below each grid is text indicating the solving method and time spent.

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

Solved Brute Force  
Time spent: 0.4688s

9 x 9

Create

Solve Brute Force

Solve CSP

Clear

Exit

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

Solved CSP  
Time spent: 0.1874s

# BRUTE FORCE

Puzzle Size	Average for 15 samples	Standard Deviation	Number of puzzles solved
9x9	0.024s	0.0026s	15/15
12x12	0.044s	0.026s	15/15
16x16*	758.27s	1447.74s	9/15
25x25	Unable to solve in time	N/A	0/15

# CSP

Puzzle Size	Average for 15 samples	Standard Deviation	Number of puzzles solved
9x9	0.03s	0.004s	15/15
12x12	0.024s	0.0038s	15/15
16x16*	0.29s	0.520s	7/15
25x25*	Unable to solve in time	N/A	0/15
100x100	Unable to solve in time	N/A	0/5





# DEMO



# FFT

Every piece of the puzzle  
that doesn't fit gets you  
closer to the answer