

Sudoku solver

06 June 2022 23:04

Sudoku solver

3x3
total
matrix
= 9

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

i/p \rightarrow 9x9 puzzle.

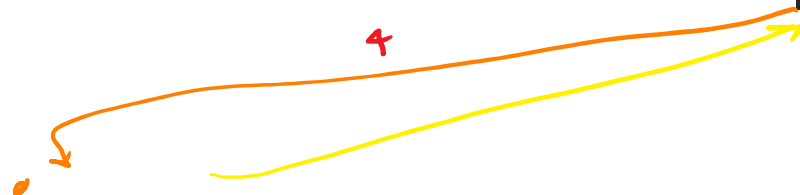
valid soln:-

- 1 row \rightarrow [1-9] \rightarrow exactly one.
- 1 col \rightarrow [1-9] exactly one.
- 3x3 \rightarrow [1-9] \rightarrow exactly one.

Approach:- kahi 1 kahi dikh raha

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

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



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

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

7 → 0

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

1

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

for(i = 0 → 9)
 for(j = 0 → 9)
 { if cell → empty
 ↳ for(int val = 1 → 9)
 { if(isSafe)
 board[i][j] = val;
 recursion;
 }
}

for(i = 0 → 9)
 $3 * \left(\frac{\text{row}}{3}\right) + \frac{i}{3}$

backtracking

val = 1 Col = 1

$3 * \left(\frac{\text{col}}{3}\right) + i \% 3$

row →

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

i = 0

$$i = 0$$

$$0 \rightarrow 3 \times \frac{0}{3} + \frac{0}{3} = 0$$

$$3 \times \frac{1}{3} + 0 \div 3 = 0$$

$$i = 1$$

$$3 \times \frac{0}{3} + \frac{1}{3} = 0$$

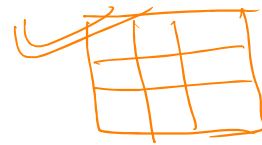
$$3 \times \left(\frac{1}{3}\right) + 1 \div 3 = 1$$

$$i = 2 \rightarrow 3 \times \left(\frac{0}{3}\right) + \frac{2}{3} = 0$$

$$3 \times \left(\frac{1}{3}\right) + \frac{2}{3} = 0 + 2 = 2$$

$$i = 3 \Rightarrow 3 \times \left(\frac{0}{3}\right) + \frac{3}{3} = 1$$

$$3 \times \left(\frac{1}{3}\right) + \frac{3}{3} = 1$$



$$TC_o (9^m)$$

$$SC_o O(\underline{\underline{L}})$$

Where m is no of empty cell

row = 0

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