



DP with friends

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Modularization

- sudoku
- creator
- solver
- testing
- server-client

Algorithm Design

Create

- Starts with empty board and fills in entries randomly while adhering to sudoku rules
- Randomly plucks cells, we then solve the board and check if uniqueness still holds. Otherwise, we try to pluck another number.

Solve

- Given a valid sudoku board, will use a backtracking algorithm (or brute force) to attempt to fill in the cells.
- What this means is that our algorithm will continue to recursively fill in numbers until it comes across a cell with no valid entries. If we reach this point, then we backtrack to the last valid point.

Results Obtained

```
../sudoku/sudoku solve hard < ../tables/easyTable.txt  
Original Board:
```

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

5	0	0	0	0	8	6	0	0
0	0	0	6	9	0	4	0	7
9	0	0	0	7	0	0	0	0

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

Solved:

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

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

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

Average Run Times:

Generate Easy: 0.009s

Generate Hard: 0.221s

Solve Easy: 0.002s

Solve Hard: 0.005s

*Solving a 9x9 board on
hard mode*

A decorative network diagram in the top-left corner, featuring a complex web of interconnected nodes and lines. Some nodes are highlighted with blue circles, and others with blue dots. The lines are thin and gray, creating a mesh-like structure.

Live Demo

A decorative network diagram in the bottom-right corner, similar to the one in the top-left. It shows a network of nodes and lines, with some nodes highlighted by blue circles and others by blue dots.

Work Partition & Lessons Learned

How we worked as team

- Jeff: Algorithm design and code
- Ethan & Bansharee: Connecting the algorithms to the Sudoku interface
- Bansharee: Testing module
- Ethan: Server-Client module

Lessons Learned

1. Push to github frequently to save work
2. Modularize everything
3. Communicate within the team to avoid duplicate code/merge conflicts