CSE31: Project #1 – Sudoku Solver

Overview

In this project, we will use all the topics we have learn about C to write a program to solve Sudoku Puzzles.

Sudoku

Sudoku is a number placement puzzle. If you do not know about this puzzle, please visit: https://en.wikipedia.org/wiki/Sudoku to find out more about how this puzzle works.

Instead of having a 9x9 Sudoku grid as a 2D array, our version of Sudoku grid is composed of 9 3x3 blocks, where each block is stored in a 2D array using int** (in Lab #4 you have learned how to use int** to construct a 2D array). As a result, a triple pointer (int***) is used to arrange these 9 3x3 blocks at the following order:

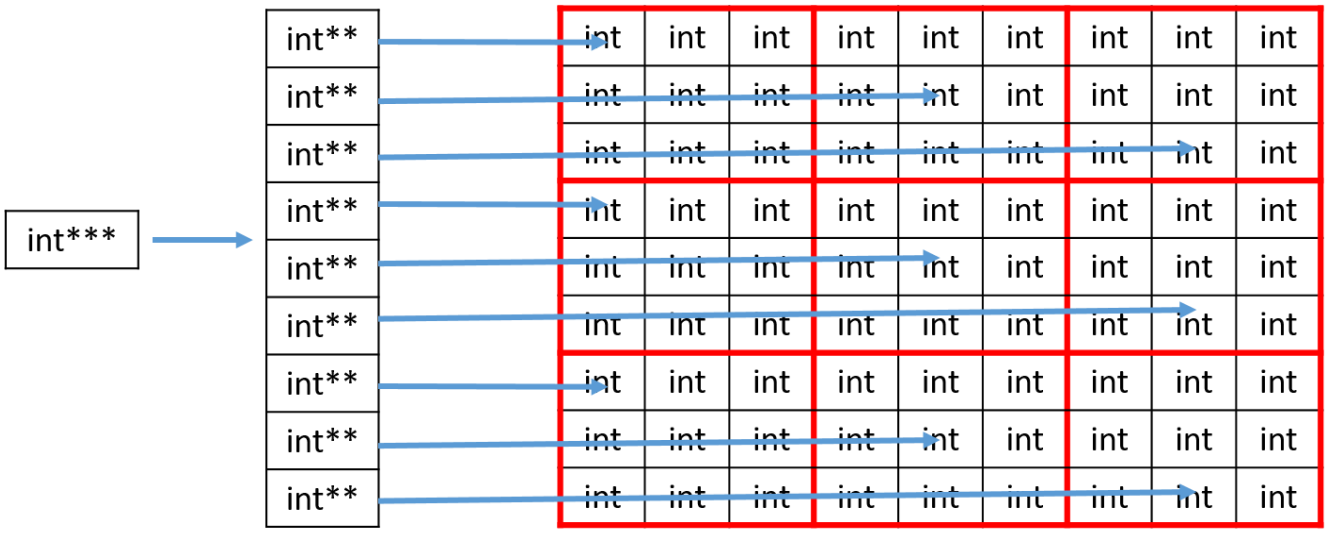

Figure 1. Organization of Sudoku grid

Your tasks

Your tasks is to implement 2 functions to complete the program (***sudoku3d.c***):

printSudoku(int***) – This function will take in the Sudoku grid and print out the comtent. Since this grid is form by 9 3x3 blocks, you need to be careful about their order and orientations. **Implement this function so that it will print out the content in the SAME format as the sample output.**

solveSudoku(int***) – This is function is the core of solving the puzzle. It till take in the Sudoku grid and solve it. In this project, we will use a **brute-force with backtracking approach** to solve the puzzle. In another word, we will keep filling the 0's in the grid with all possible values until the puzzle is solved. If a value does not work, it will take a step back and try with another value; therefore, you must implement this as a recursive function.

You can find more about the backtracking approach here: https://en.wikipedia.org/wiki/Sudoku_solving_algorithms

Feel free to declare any helper functions in this program to keep your program organized.

YOU MUST NOT USE ANY ARRAY NOTATION ([]) in this program!

Testing your program

After compiling ***sudoku3d.c,*** run the program by typing:

```
./sudoku blocks1.txt
```

Where ***sudoku*** is the executable file, and ***blocks1.txt*** is the text file containing the values of each 3x3 blocks. Feel free to create your own text files for test cases. The order of the blocks is according to Figure 1. There are many puzzles and answers available online.

What to submit

- Your completed ***sudoku3d.c***, any additional test files.
- Your assignment is closed **on 3/18** (at 11:59pm).
- You must demo your submission to your TA **within 7 days** after the assignment is closed. Try to do the demo during lab hours.