Software Engineering Interview Homework

Introduction

As a part of your interview for a software engineering position we would like you to complete the following assignment. Note that this assignment **should not take more than 2-3 hours** to complete. We suggest putting the resulting code into GitHub and sharing the link with us. For privacy you may use a private repository and add **petrohi** and **mcollinswisc** GitHub users as collaborators.

The goal

Implement the Conway’s Game Of Life algorithm in C++. The Game Of Life is a cellular automaton algorithm. It runs on a *universe*, which is two-dimensional a grid of *cells*. Each cell can be in two states: *alive* or *dead*. There is an *initial state* for the universe, which defines alive cells and their positions in the universe. The automaton progresses one step at a time by applying a set of *rules* to each cell in the universe. There rules are the following:

1. Any live cell with two or three live neighbors survives;
2. Any dead cell with exactly three live neighbors becomes a live cell;
3. All other live cells die in the next generation. Similarly, all other dead cells stay dead.

You may check the [Wikipedia article](https://en.wikipedia.org/wiki/Conway%27s_Game_of_Life) for more details.

To demonstrate the working algorithm, implement simple terminal visualization. Populate the universe with a *glider pattern* and animate its progress.



Additional goals (not required)

1. Implement the ability to load and store the universe from and to a file.
2. Implement the “very large” (2^32 by 2^32) universe by using sparse representation.
3. Implement visualization that automatically pans the view to show the alive pattern(s).
4. Demonstrate with Gosper’s glider gun.

