SPA homework 02

The aim of this homework is to strengthen the student's knowledge of working with linear lists.

Introduction

Game of Life is a 0-player game devised by British mathematician John Horton Conway in 1970:

- http://en.wikipedia.org/wiki/Conway's_Game_of_Life
- https://www.youtube.com/watch?v=CgOcEZinQ2I&list=FLwikA_t8e6TSJW-L-lAHkKw

This game consists of a series of organisms that live in their own cells in a two-dimensional world. The configuration of organisms changes in discrete moments of time, with each cell matrix it can be empty (dead) or busy (alive). A new generation of organisms in cells is formed on the basis of old generations of organisms depending on the content of eight adjacent cells of each individual cell (all outside matrices are considered dead organisms). The rules for the formation of a new generation of organisms are as follows:

1. A living organism in a cell survives in the next generation if the number of its neighbors is two or three.

2. A living organism in a cell dies in the next generation if the number of its neighbors is less than two (due to loneliness) or greater than three (due to overcrowding).

3. A new organism is born in an empty cell if there are living organisms in exactly three of its neighboring cells.

The game of life starts from the given initial configuration. In discrete moments, the next configurations of organisms are created, simultaneously applying the above rules to all previous cells configurations. This means that the transition to the next generation consists of two steps:

1. Calculate what will happen to each cell based on the above rules.

2. Apply calculated to all cells.

The game has no end.

Your task

Your task is to make the implementation of the Game of Life. You have several options at your disposal which you need to choose one:

a) Take the finished files program.cpp and game_of_life.h from the attachments and build a game based on them(implement game_of_life.cpp), where you can change class members as needed. This approach uses a two-dimensional field, i.e. a field whose each element stores a new field (http://www.cplusplus.com/doc/tutorial/arrays/).

b) Like a), just delete the two-dimensional field and use the regular field instead, array <T, N> or vector <T>. In the container of the first N elements, you consider the data on the first line, the next N elements of the second line data, etc.

c) Implement the game in SFML with continuous refresh every 2 seconds. As a foundation take the project https://github.com/gdambic/gdambic-rvs19-spa-dz-02 and the procedure is the same as on the first homework.

When initializing the game, there is a 25% chance that there will be a living organism in the cell.

Attachments:

- Executable file Game_of_Life.exe with ready-made solution (for illustration only).
- If you cannot run the executable file, Screenshots.docx contains several screenshots for illustration.
- Option a - files\game_of_life.h
- Option a - files\program.cpp

Scoring

This homework carries a maximum of 2 points from outcome 2. A fully functional game will carry 2 points, whichever design option is chosen.

Bonus

All solutions made in SFML enter the competition for bonuses in the amounts of 1, 2 and 3 dollars. Bonuses will be divided according to the visual WAAAAUUUU effect caused by assistants, teachers and colleagues students.

Submission of the solution

When you're done, put the solution on your GitHub and email your assistant with a link.