Conway's Game of Life Documentation

Table of Contents

1. Introduction

1.1 Purpose

Conway's Game of Life is a cellular automaton that simulates the evolution of cells on a two-dimensional grid. This documentation provides information on the rules of the game, implementation details, and how to use and configure the simulation.

1.2 Overview

The game consists of a grid of cells, each of which can be in one of two states: alive or dead. The state of a cell evolves over generations based on a set of rules.

2. Rules of the Game

2.1 Grid

The game is played on a two-dimensional grid of cells. Each cell has eight neighbors: horizontally, vertically, and diagonally adjacent.

2.2 Cells

- **Alive**: A live cell continues to live in the next generation.

- **Dead**: A dead cell may become alive in the next generation.

2.3 Birth and Death

- **Birth**: A dead cell with exactly three live neighbors becomes alive in the next generation.
- **Death**: A live cell with fewer than two live neighbors dies due to underpopulation, and a live cell with more than three live neighbors dies due to overpopulation.

3. Main Functions

- `void play(char* mapPath);`: Sets up the initial grid based on the map proposed.
- `bool tickArena(ARENA* arena, SETTINGS* settings)`: Advances the simulation to the next generation based on the game settings.
- `void drawNewFrame(ARENA* arena, SETTINGS* settings, unsigned int tickCount, bool isAlive)`: Draw current grid state, based on game settings

4. Usage

4.1 Compile the Game

To compile the game, type

```
gcc -Ofast -march=native -Werror=vla -Wall ps6/main.c ps6/life/engine.c
ps6/life/graphic.c ps6/utils/utils.c -o lifeGame -lcurses
```

The flag `-march=native` is extremely important. The code contains functions that need at least avx2 instructions support for the best compilation.

4.2 Configuring Initial State

To start a game, type in the terminal:

```
./lifeGame ./ps6/maps/acron.txt
```

Also, you can create and use your own maps.

4.3 Pausing and Resuming

To pause game press `q` one time To resume game press `q` again

4.4 Change simulation speed

Use `=` or `-` to increase or decrease simulation speed.

4.5 Grid Customization

Then game on pause (`q` pressed one time) press `space` to ***Add Cell*** or ***Remove Cell*** from current cursor pos.

To change the cursor position, use `Arrows` on your keyboard.

To toggle `Draw Mode`, press `Enter` 1 time.

To change `Camera Position`, use standard wasd keys.

4.6 Exiting the Game

To exit from game press `ESC` one time

5. Maps

1. acron.txt
2. aircraft-carrier.txt
3. barge.txt
4. beacon.txt
5. bee-hive.txt
6. blinkers.txt
7. block.txt
8. boat.txt
9. figure-eight.txt
10. glider-eater.txt
11. glider.txt
12. gosper-glider-gun-inf.txt
13. gosper-glider-gun.txt
14. heavyweight-spaceship-HWSS.txt
15. light-weight-spaceship-LWSS.txt
16. loaf.txt
17. long-boat.txt
18. long-ship.txt
19. middle-weight-spaceship-MWSS.txt
20. penta-decathlon.txt
21. pond.txt
22. pulsar.txt
23. queen-bee.txt
24. ship.txt
25. simkin-glider-gun.txt
26. still-life-20.txt
27. toad.txt
28. tub.txt