Assignment 4 The Game of Life

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1 Overview

This writeup document must include everything you learned from this assignment. Make sure to mention everything in detail while being as precise as possible. How well you explain all the lessons you have learned in this assignment will be really important here.

2 Things I learned

- When reading a line in a file. For exmaple if i call fscanf() and I call it again. It will read the nextline. This applies for anything that reads lines.
- swapping pointers is exactly like swapping integers
- DON'T DE-REFERENCE A NULL POINTER OR SEGFAULT CITY

3 Functions I Learned

3.0.1 fscanf

This function can read elements within a file. When reading through a file it continues after reading the first line and goes to the next.

3.1 fopen

this opens files with different modes. I used the read mode for reading the input file and writing for the output file.

3.2 fclose

if you fclose a file that is equal to stdin, stdout or NULL. it will give a segfault.

3.3 fseek

When a line gets read it goes to next line but when i'm looking for errors in the rows and columns I want to be able to read the first line again. This function allows me to go back to the first line and to read the rows and columns again when my condition of if elements in first line of infile != 2. I needed to use this since in my helper function I was reading the amount of elements within the first line. This moves the next read to a new line. my fscanf would have scanned the second line for the rows and cols for my universe which would have been wrong. Using fseek resets it and scans the first line correctly.

3.4 fputc

this helps print to files

3.5 atoi

this allow you to convert command line parsing strings into integers which can be read. I used this for generations. strtoul could also be used but atoi is cleaner

4 ncurses

This was the library that allowed all the animations of the files.

- initscr() Initialize the screen
- curs_set (FALSE) Hide the cursor
- clear () Clear the window
- mvprintw(ROW , col , "o") Displays "o"
- refresh () Refresh the window
- usleep (DELAY) Sleep for 50000 microseconds
- endwin() Close the screen

5 Compiling/Linking

To compile we need to link the ncurses library with -lcurses. Also since ./life is the "main" file we have to target that to compile it correctly.

6 Summary of Conway's Game of Life

The Game of Life, often known as Conway's Game of Life, is a cellular automaton designed in 1970 by mathematician John Horton Conway. It is a two-dimensional grid simulation of cell formation, death, and continuation. The grid is made up of cells that are living or dead. The game is played in phases, with each step defining the condition of each cell in the following generation based on a 3 sets of rules.

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 cells die, either due to loneliness or overcrowding.