**Final Project - Initial Plan Task**

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For my final project, I’m very interested in making a webpage devoted to representing and discussing cellular automata. At a basic level, cellular automation is simply a process of taking a matrix of input values and applying a certain set of rules in order to produce the state of the matrix in the next iteration.

**A brief example of cellular automata**

Take, for example, the famous cellular automation “[Conway’s Game of Life](https://en.wikipedia.org/wiki/Conway%27s_Game_of_Life)”.

We can give it the following set of squares as input:

![A picture containing shoji, building, clipart

Description automatically generated]()

The simulation will apply the following rules:

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

(Source: [Wikipedia](https://en.wikipedia.org/wiki/Conway%27s_Game_of_Life#Rules))

To produce the following output:

A picture containing crossword puzzle, shoji, text, tiled

Description automatically generated

This particular input is called a “glider”, and is special in that it repeats, gliding across the page:

A picture containing shoji, crossword puzzle

Description automatically generated

([view animated original](https://conwaylife.com/w/images/8/81/Glider.gif))

**Team Members**

At this point, I am interested in pursuing this project without any teammates, as I am interested in potentially including languages and technologies that may be unfamiliar to my classmates.

In particular, I am interested in potentially leveraging [WebAssembly, Canvas, and Rust](https://rustwasm.github.io/wasm-bindgen/examples/2d-canvas.html) in order to increase the performance of any simulations I create. I am not sure if I am going to be able to be 100% successful, but I think it is worth a shot.

**Website’s Idea**

My motivation for this project largely derives from my personal interest in cellular automation, and my desire to create some simulations thereof. My goals are to create a webpage that other people would find approachable and informative regarding this topic, hopefully assisted with some live simulations. I hope that these live simulations will greatly assist the site’s usefulness.

**Suggested domain name**

If I had to pick a domain name for this website, I would ideally go with something like “cellularautomaton.net”, as it concisely describes the what information this website contains. However, if I am to actually go through with registering a domain name, I would likely register the domain name “zack.fyi” for personal use, and then create a subdomain for this project, like “cellularautomaton.zack.fyi”. That way, it’s more directly represented as a one-off project of mine, rather than a real resource on cellular automation, as I have no plans for long-term expansion or maintenance.

**Website’s structure**

I am currently envisioning the following structure for this project (subject to change):

|  |  |
| --- | --- |
| **Path** | **Contents** |
| /index.html | An introduction to the concept of cellular automation, and a collection of animated .gifs that illustrate how they function. This will be the main informational page to the site, with other pages acting more as visualizations. |
| /conways-game-of-life.html | A live simulation following the rules of [Conway’s Game of Life](https://en.wikipedia.org/wiki/Conway's_Game_of_Life) |
| /elementary-automaton.html | A live simulation of [Elementary cellular automaton](https://en.wikipedia.org/wiki/Elementary_cellular_automaton), where the user can choose which “rule” to simulate, and see its corresponding output |
| /images/ | A folder containing all of the images for my site |

I believe this would be a flat, understandable structure, but still provide a significant amount of information for users looking to learn more about this topic.

**Web Page Design**

The following rough blocks are my attempt to illustrate how the html pages may be structured. I am attempting to only show the general structure. Not specific designs. The colors chosen are random.

/index.html

Header

Navigation to the other pages on the site

A main section that provides more information on cellular automation.

A description and more information on this topic.

A description of the history of this topic, plus more general information.

A header element for Conway’s Game of Life

A header element for Elementary cellular automata

Images of Conway’s Game of Life, with image links to the simulation.

List elements describing the rules on Conway’s Game of life.

Images of elementary cellular automata, with image links to the simulation.

Footer, with copyright information

Potentially a table illustrating some of the basic rules of elementary cellular automata

/conways-game-of-life.html

Footer, with copyright information

Randomize Board

Select Initial State

Play / Pause

A canvas element with a simulation of Conway’s Game of Life.

This simulation will either be written in JavaScript or Rust, depending on how easily I am able to get WebAssembly working.

Header

Navigation to the other pages on the site

/elementary-automaton.html

Select Initial State

Header

Navigation to the other pages on the site

Footer, with copyright information

A canvas element with a simulation of [elementary automaton](https://en.wikipedia.org/wiki/Elementary_cellular_automaton).

This simulation will either be written in JavaScript or Rust, depending on how easily I am able to get WebAssembly working.

Play / Pause