Project Plan

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Overview

- Implementation and visualisation of Conway's Game of Life
- Implement a selection of different technical approaches for simulating and visualising the Game
- Being smart about rendering, e.g. only rendering changes rather than re-rendering the entire visualisation on each iteration (a bit like how React uses diffing algorithms)

Research Question

What is the most performant technique for visualising Conway's Game of Life in a web browser?

Deliverables

Basic

- Use **several** different techniques to implement a frontend simulation of Conway's Game of Life such that it is performant on a **range of browsers** e.g.
  - `<div>` s in native HTML DOM
  - React virtual DOM
  - HTML5 canvas
- **Analyse** and **evaluate** the performance of each implementation, **suggesting possible improvements for each**

Intermediate

As above, and:

- Use a **client/server architecture** where the server is responsible for computing each iteration of the Game
- Use different techniques to implement **what** we send:
  - Do we send the whole state on each iteration?
  - Do we just send the changes between iteration?
- Use different techniques to change **how** we send iterations:
  - AJAX with long polling
  - WebSockets

Advanced

As above, and:

- **Intelligently** compute each iteration of the Game:
  - Avoid calculating the next iteration for **regions that are completely stable** (as these will not change on that iteration), taking care to respect possible changes at the boundaries of these regions
  - Try to **identify periodic regions of the Game using hashing** and record these to **avoid having to periodically recompute** these regions