

Conway's Game of Life - Code Explanation

Introduction

Conway's Game of Life is a cellular automaton devised by mathematician John Conway. It consists of a grid of cells

that follow simple rules to create complex behaviors. This implementation is in JavaScript and provides an interactive

UI using the HTML5 Canvas API.

1. Game Class

- The ``Game`` class handles grid initialization, state updates, and applying the Game of Life rules.
- Key methods:
 - ``createEmptyGrid()``: Initializes a 2D grid with all cells set to false (dead).
 - ``randomize()``: Randomly assigns live cells with a 15% probability.
 - ``countNeighbors(x, y)``: Counts the number of live neighbors around a cell.
 - ``update()``: Updates the grid based on Conway's Game of Life rules.

2. Renderer Class

- The ``Renderer`` class is responsible for drawing the grid on an HTML5 Canvas.
- The ``draw()`` method iterates through the grid and renders live cells as white squares.

3. User Interaction

- Button controls allow users to start, stop, clear, randomize, and add predefined patterns.
- Keyboard shortcuts:
 - 's': Start/Stop
 - 'r': Randomize
 - 'c': Clear grid
 - 'g': Add Glider Gun

- 'p': Add Pulsar
- 'd': Add Penta-Decathlon

Summary

This JavaScript implementation of Conway's Game of Life provides an interactive simulation using Canvas. Users can experiment with different patterns and observe the evolution of cellular structures.