

Conway's Game of Life

Katie Storey & Jörn Zimmerling

Project Description: In this LoG(M) project, we will study Conway's Game of Life, a 2D cellular automaton. The rules of Conway's game of life are deceptively simple. In a two dimensional network of cells, a cell can be alive or dead:

1. A living cell with two or three living neighbors survives to the next time step
2. A cell with no or one living neighbor dies
3. A dead cell with exactly three neighbors will be alive in the next time step

These rules seem to balance the population and allow for interesting dynamics. We will implement our own Game of Life and study patterns and behavior of this system. After studying the many life forms that can support themselves in this rule set, we will investigate a few questions:

- What are "good" rules for a 3D version of Game of Life?
- Can we build simple logic gates in Game of Life?
- Can we find new stable configurations or oscillators?
- Can we find alternative rules in 2D with similar properties as Conway's rules?
- Can we come up with a probabilistic version of Game of Life?

Prerequisites: Knowing a programming language will help us get the project of the ground quickly. Having taken a flavor of linear algebra will help but is not required.