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ICS4UI

# Conway's Game of Life: 3-D

# What it models

This automoton is created to model the ability of life to thrive in different environments, represented by different rules. When the user presses “w” (for “world”), a new set of rules is generated for the automaton, meant to simulate a different environment. Then, each cell is randomly assigned to be alive or dead (also able to be triggered by pressing “r” for “random”) and the simulation begins.

Other controls are as follows:

|  |  |
| --- | --- |
| Key | Action |
| + or = | Speed simulation up |
| - | Slow simulation down |
| S or s | Save current state + rules to file |
| L or l | Load state + rules from file |
| Space | Play or pause the simulation |
| C or c | Clear the simulation |

# States of a cell

Each cell exists in one of two states: alive or dead.

# Evolution Rules

A cell's neighbours are considered to be the 26 cells immediately adjacent to it. Also similar to Conway's Game of Life, there are three values which are essential to moving from one generation to the next: the minimum value, the maximum value, and the “zombie” value. Any living cell which has a number of living neighbours between the minimum value and the maximum value will continue to live to the next generation. Any dead cell with a number of live neighbours exactly equal to the zombie value (which will always be between the minimum and maximum values) will come to life in the next generation, much like in Conway's original game of life.

# Diagrams

In the first diagram, each individual cell that is currently alive will die due to having no live neighbours. These cubes will turn into a hollow cube, as seen in the second diagram, as each of those cells will have had exactly one neighbour in the previous generation.

