

Project & Portfolio

Game of Life

ABOUT

This project is a simulation of the Game of Life concept by the famous mathematician John Conway, inspired by the polymath John von Neumann. The algorithm illustrates a cellular automaton system base on a set of rules. This project consists of 3 main elements for implementing the Game of Life: Conway's algorithm, QuadTrees, and Windows Forms.

01. Conway's Algorithm

- A cell with 2 or 3 live neighbors survives.
- A dead cell with 3 live neighbors becomes alive.
- All other live cells die.

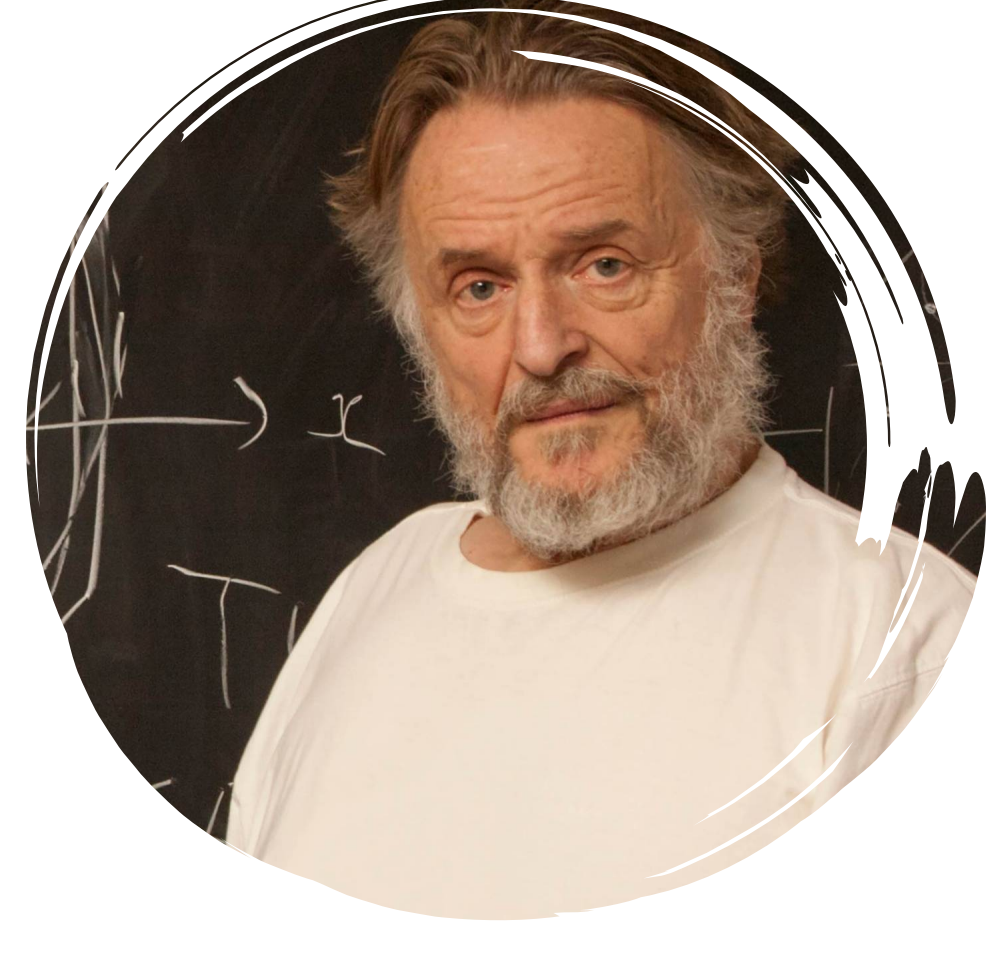
02. QuadTrees

The region quadtree represents a partition of space in two dimensions by decomposing the region into four equal quadrants,

03. Windows Forms

A free and open-source graphical (GUI) class library included as a part of Microsoft .NET, .NET Framework or Mono Framework,

BACKGROUND



John Conway
1937-2020

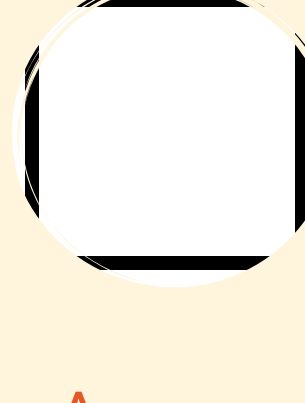
A mathematician active in the theory of finite groups, knot theory, number theory, combinatorial game theory and coding theory.

" The Game of Life "

In late 1940, John von Neumann defined life as a creation, which can reproduce itself and simulate a Turing machine. Motivated by questions in mathematical logic & simulation games, John Conway began doing experiments with a variety of different two-dimensional cellular automaton rules. The game made its first public appearance in 1970, Theoretically, the Game of Life has the power of a universal Turing machine.

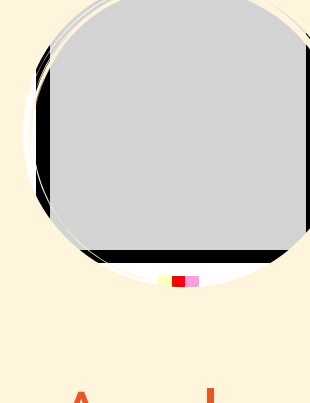
The Game of Life

Game Legend



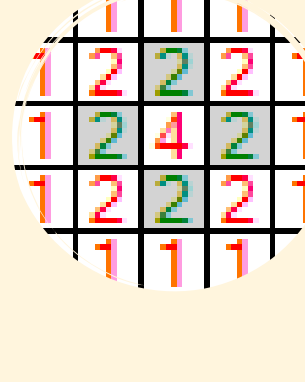
Dead Cell

An uncolored cell (background color) represents a dead cell.



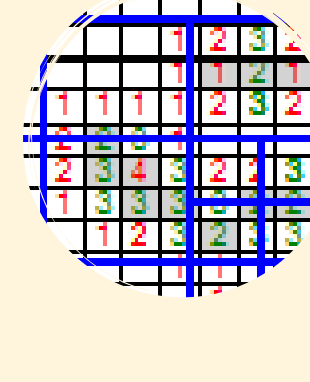
Live Cell

A colored cell represents a living cell.



Neighbor Count

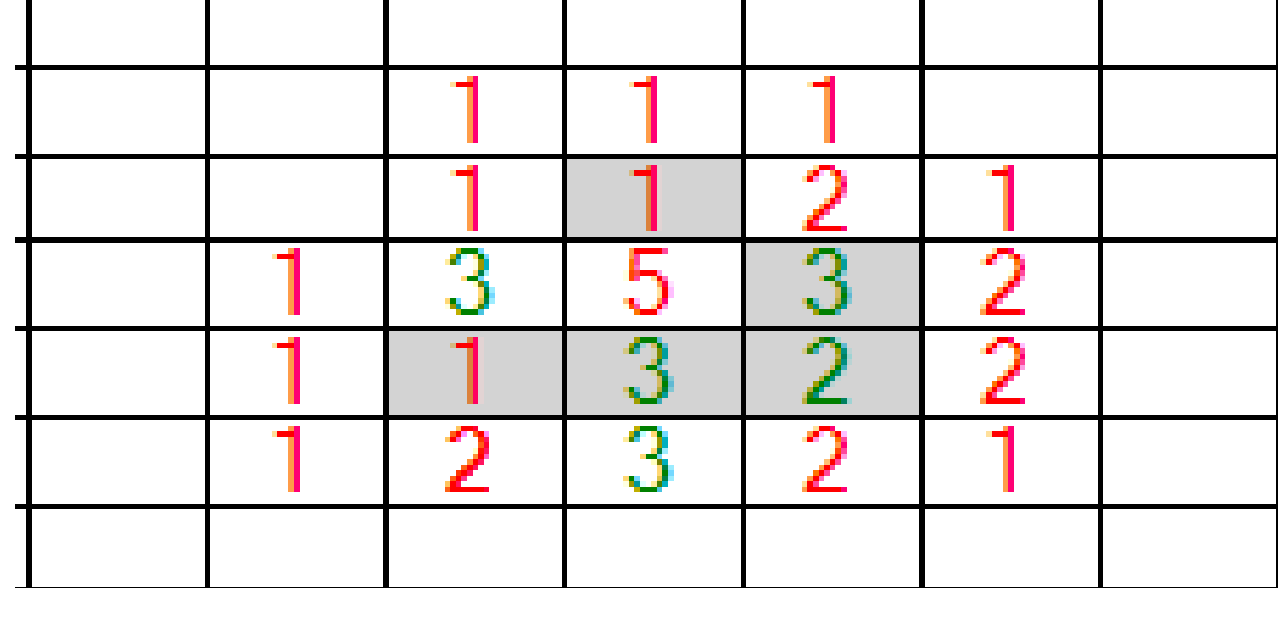
Red & green colored numbers represent the number of neighbors a cell has (red/green = dead/alive in next generation).



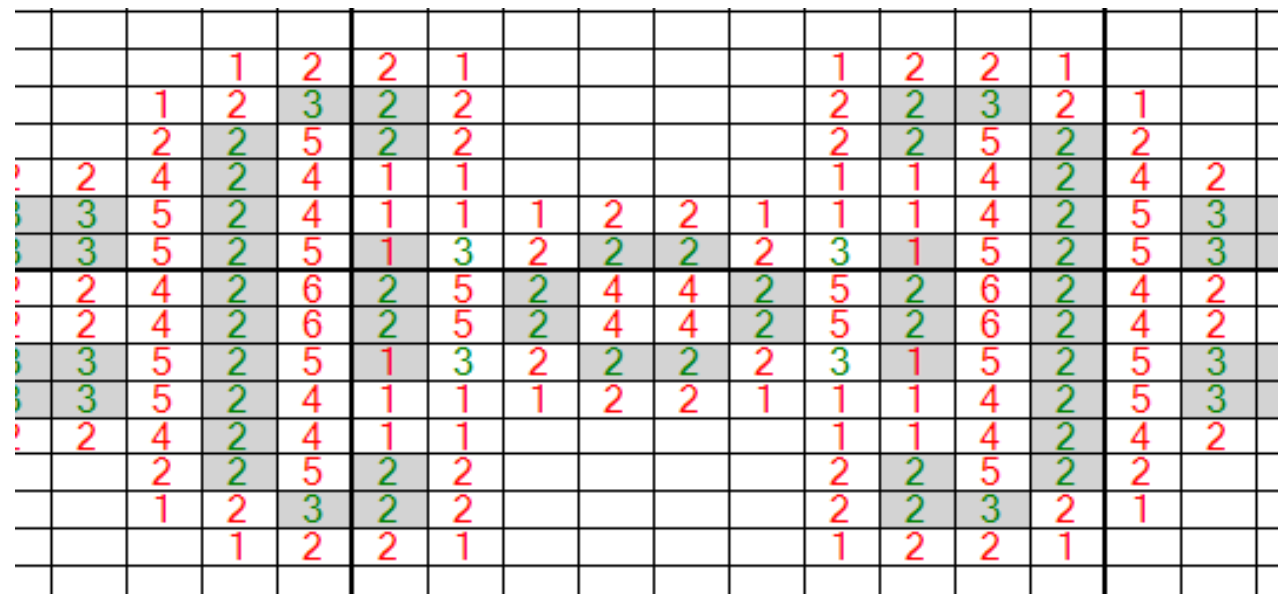
Region

Colored boundary representing a partition of the game universe.

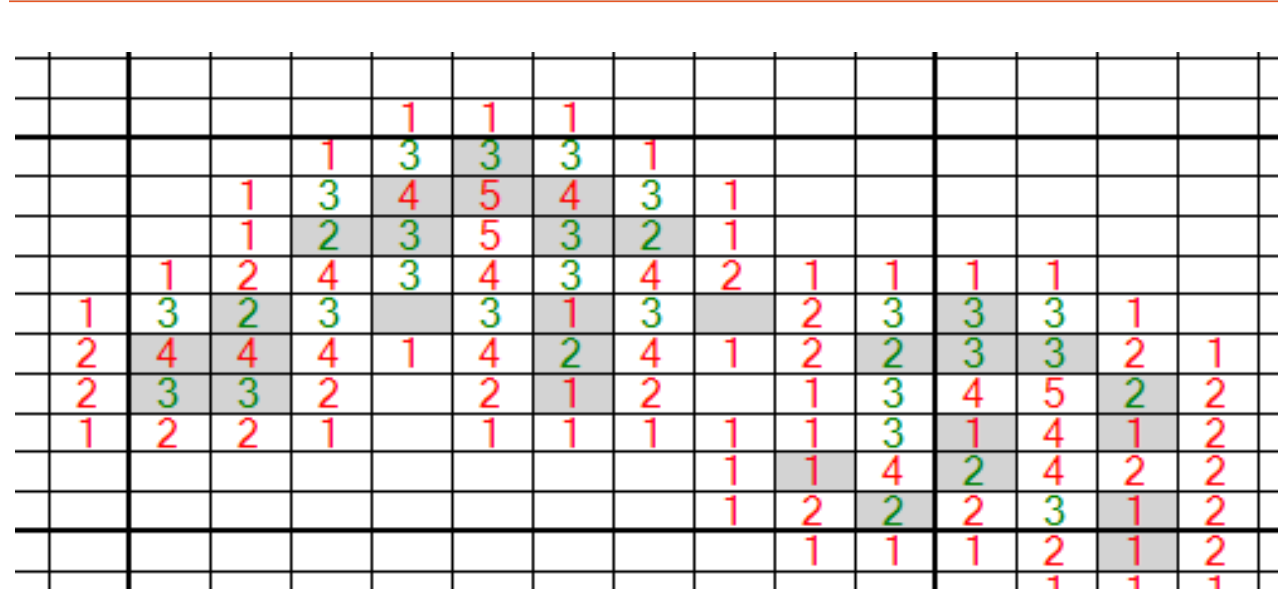
Common Patterns



Glider



Oscillator



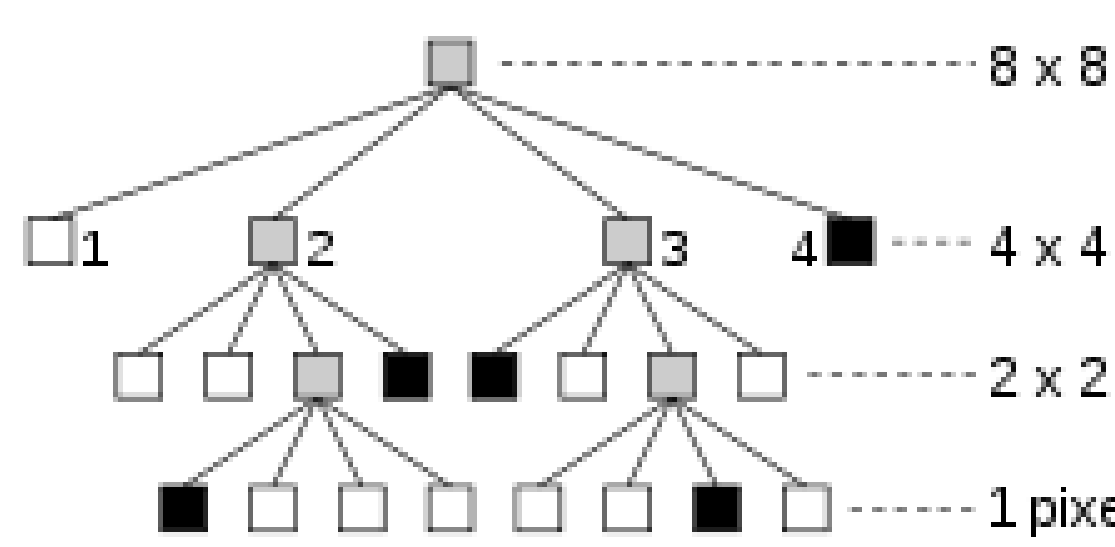
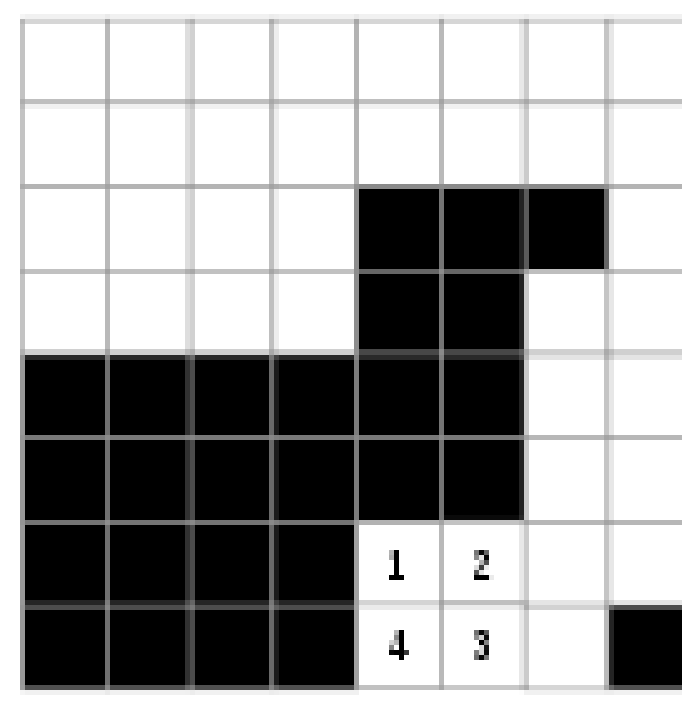
Spaceship

Region QuadTree

Uses & Types

Quadtrees may be classified according to the type of data they represent, Quadtrees, particularly the region quadtree, have lent themselves well to uses such as:

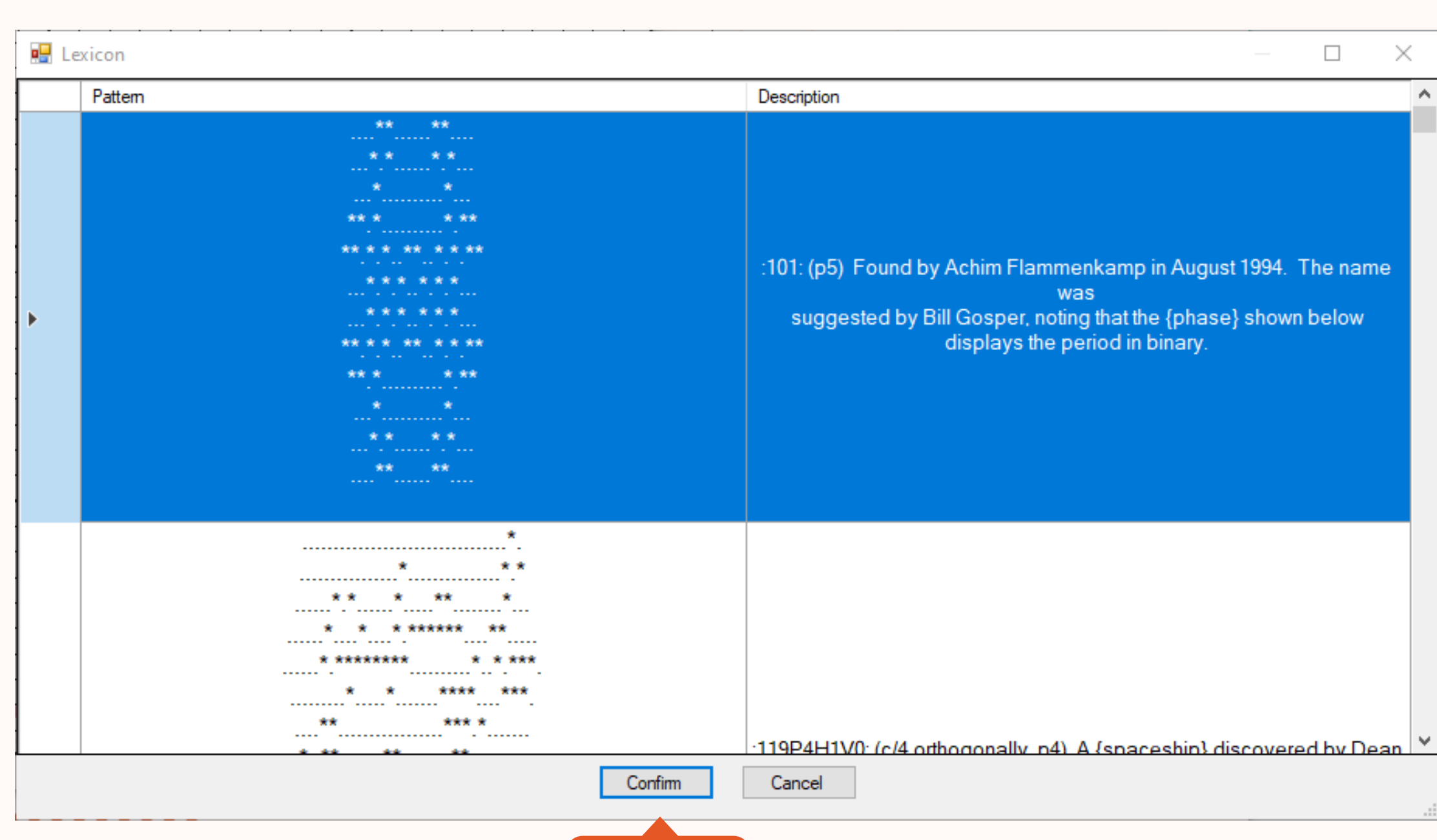
- Image Processing
- Mesh Generation
- Spatial Indexing
- Collision Detection
- etc.



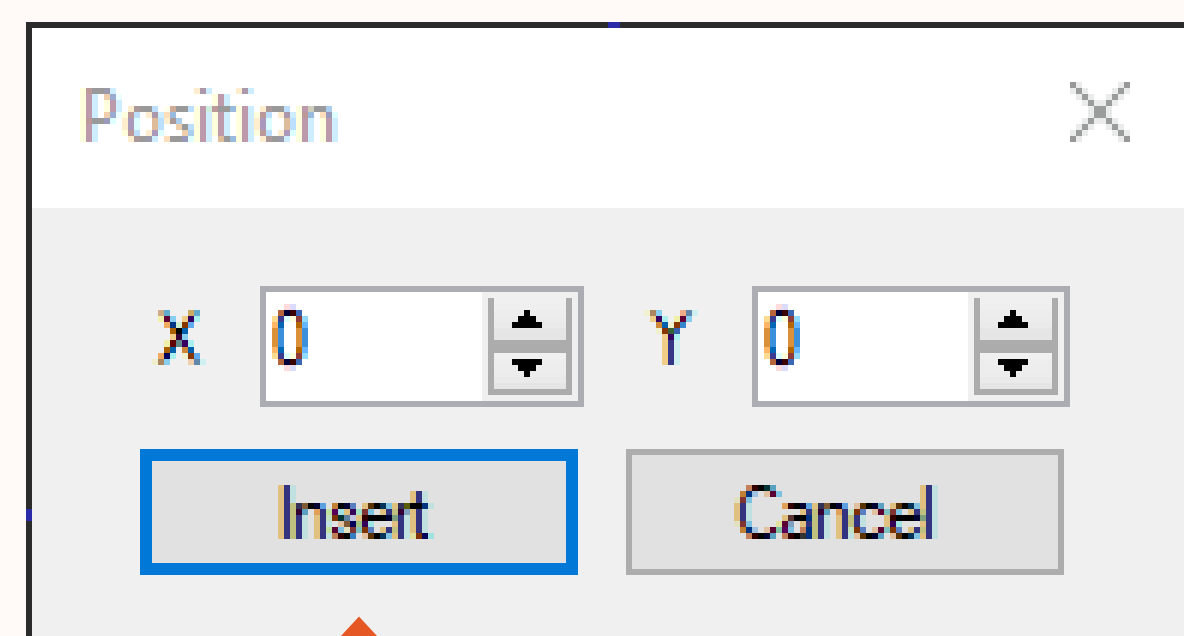
FEATURES

Select any cell on the grid in order to toggle its state to dead or alive

File > Import > Yes > Confirm > Insert



Confirm



Insert

