# CS900 Lab - Day 10
## July 11th, 2003
## Instructor: Thomas Hofmann

**New Topics Covered**
Game of Life, Cellular Automata, Lecture: Day 9

**Compiling**
You should use the gnu C++ compiler g++. Your program will be in live.cpp . To compile type

```
g++ live.cpp –o live –lg2 –lX11 –L. –L/usr/x11R6/lib
```

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## Problem : Implementing the Game of Life

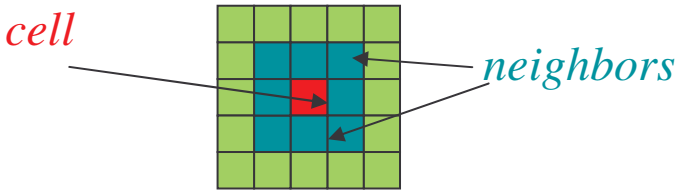
***Introduction***

In this lab, we want you to implement the game of life. The "Game of Life" is a computer simulation invented by the mathematician John Conway (published in 1970). It is a special case of a cellular automation.

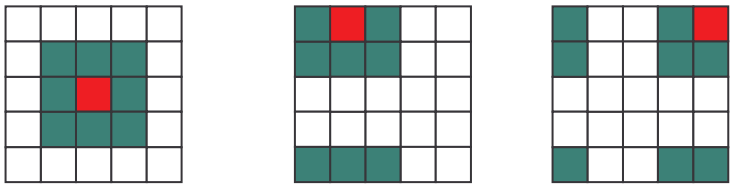
The rules of the games are as follows:

- The game board is a two-dimensional N by N grid (say N=50), where each cell is either occupied ("alive") or not occupied ("empty")
- The population of cells evolves in discrete time steps, t=1,2,3,…
- If at time step t, an alive cell has less than 2 alive neighbors ("loneliness") or more than 3 alive neighbors ("crowdedness"), it dies.
- An alive cell with 2 or 3 alive neighbors survives.
- An empty cell with exactly 3 alive neighbors at time step t will be born, i.e. become alive at time step t+1 (“birth”)

The neighborhood is defined to consist of the 8 adjacent cells on the grid




The boundary conditions are those of a torus:



***Programming***

Copy over the files from the course directory

```
cp /course/cs900/day10/* .
```

Open the file live.cpp and edit it using xemacs.

Look at the file and make sure you understand the structure of the program. There are a number of things that you need to fill in, basically implementing the missing methods as well as the main() function. The step method should also call the display method, which will display the game state.

***Extra "Credit"***

Modify the cells such that they keep track of their age. Try to modify the display function, so that it displays a different color dependent on the age of the cell.