CS 580 Specification of Software Systems

Homework 01: Game of Life.

The *Game of Life* is a simulation of life and death in a community of simple organisms. A rectangular grid holds tokens indicating the presence or absence of an organism at a particular position in 2D space. Each cell has eight neighbors. The rules of the game are simple:

- an organism dies if it has more than four neighbors or fewer than three
- a new organism is born in empty cells having exactly three occupied neighboring cells

Assignment:

- 1. Write a UNITY program, which simulates this game and assures that births and deaths take place one at a time and in a nondeterministic order.
- 2. Write a UNITY program, which simulates this game and assures that all births and deaths take place simultaneously over the entire community of organisms.
- 3. Write a UNITY program which simulates this game and assures that all births and deaths take place simultaneously within a single colony of organisms at a time. A colony is defined as a closed set of neighboring organisms extended to include empty cells immediately adjacent to them. Colonies are to be selected and updated at random.

Hints:

- 1. Design the grid as an integer arrray holding only 0 and 1.
- 2. Make the arrray 0..N+1 and zero the border and never update the border. Use the initialization section to set the border to zero.

3. Use the always section to define a function that counts the number of neighbors, e.g., sum(i,j) = < number of neighbors>

4. You may want ot define the conditions for birth and death in the always section as well.

5. In the assign section, separate the code by cases. Do not try to write one single supperformula that I will not be able to read.