CMPT 470/816 HOME EXERCISE 3

ENHANCING FLEXIBILITY VIA PARAMETERIZATION USING FUNCTIONS

Suppose now that you wanted to modify the code that you handed in for take-home exercise 2 (or which was provided to you as a solution for that exercise) to offer the flexibility to perform variants of Conway's Game of Life using alternative functions for determining the state of the cell in the next timestep based on the current state of the system. Suppose further that this information about which rule to apply were available within the main function – that is, we want the main function to be able to "tell" the system which function we wish to apply for a given simulation to govern updating the state of the cell from timestep to timestep. The following questions ask how we would go about modifying the system so that we could achieve this flexibility (this ability for main to indicate which specific function to use for updating within a given simulation).

Part A: Suppose that it were guaranteed that this rule for updating a given cell need only use information about the 8 immediately adjacent cells within the "Moore neighborhood" surrounding that cell. The existing rule is the standard one for the Game of Life (a currently occupied patch survives into the next timestep iff and only if that cell has 2 or 3 occupied cells as neighbours amongst the 8 adjacent cells; an empty patch is colonized in the next timestep iff it has exactly 3 occupied cells as neighbours amongst the 8 adjacent cells) Please modify the code so that the code has the flexibility to apply alternative rules – that is, the code in *main* should be able to specify which rule to use.

Please note that you do not need to implement a means of specifying or creating such rules, merely to modify the code so as to have the requisite flexiblity to support them if they were instantiated in a C form of your choosing. With this being said, for concreteness, it is particularly suggested that you define an alternative such rule within the code (e.g., a more forgiving rule that allows a cell to survive if it has 2, 3, or 4 cells as neighbours amongst the 8 adjacent cells), and show how "main" could be equipped to apply either the standard rule or the alternative rule.

Part B: Suppose now that you wanted to relax the constraint that the rule to update a cell have to depend on the 8 immediate neighbors (e.g., allowing rule to update cell A to use information on cells further away from A). How would this change the code? **Please note that you do not need to undertake the code changes required to implement this; either a textual description, design diagram or pseudocode would be fine.**

Due in class January 19, 2017