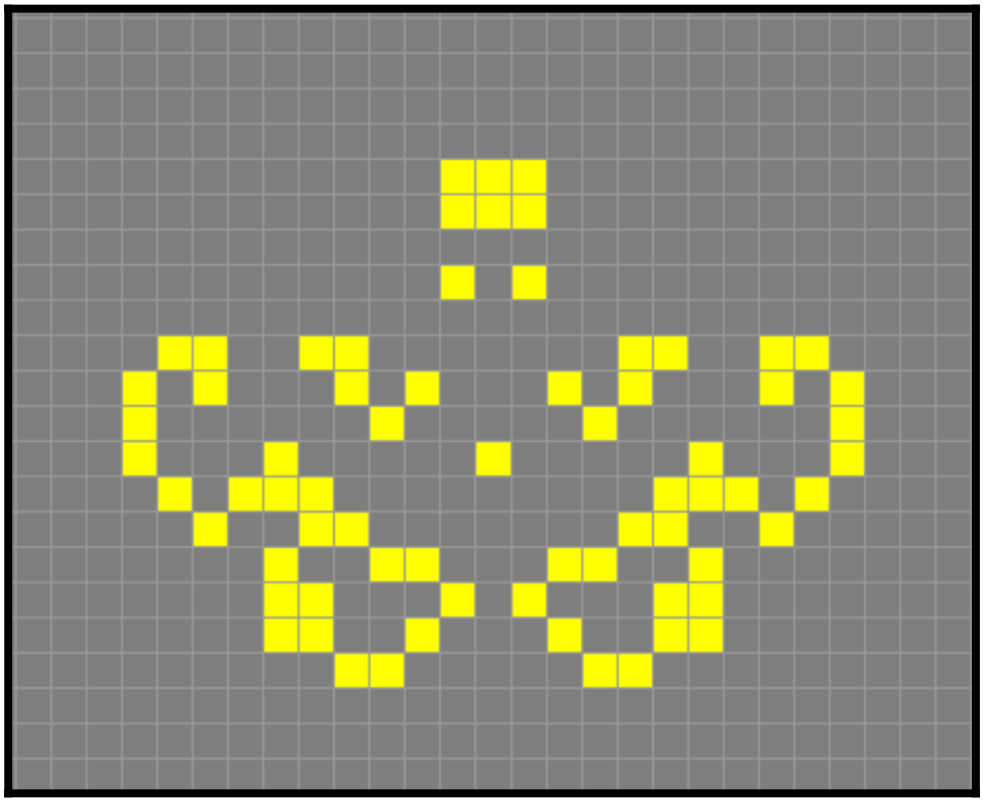
Lab 10: Conway's Game of Life

Biol135: Introduction to Bioinformatics Programming



For this lab we will practice using next for loops to implement Conway's game of life. For this we will need to first define how the game will be represented in our R environment. Use the online game of life simulator https://playgameoflife.com/ to check the expected behavior.

Rules for the game of life.

1) Any alive cell that is touching less than two alive neighbors dies.
2) Any alive cell touching four or more alive neighbors dies.
3) Any alive cell touching two or three alive neighbors does nothing.
4) Any dead cell touching exactly three alive neighbors becomes alive.

Part 0: Create a new R script entitled [your last name]GameOfLife.R

Part 1: Create the following three functions.

1) **countNeighbors**: given a matrix of boolean values a row, and a column, returns the number of "Alive" neighbors for that cell.
2) **updateCells:** Given a matrix of Boolean values, check each cell and update it based on the standard Game of life rules.
3) **runGOL**: Given a matrix and an integer input, the function will iterate the game of life for a the number of cycles indicted by the integer input.

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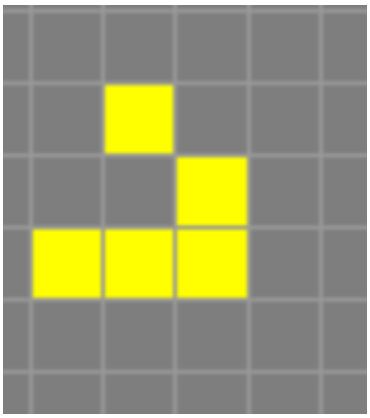
Part 2: Test your code by creating a glider with the form featured below. Use matrix indexing to set the connect number of cells to alive such that he form the pattern below. If the function



Part 3: Once you have the functions working such that you can see the game behaving as expected in the console. Add comments to your functions to explain how they work. Make sure the wording is exact so I can test them without changing their name,

Part 4: Upload your script to the Mycourses Dropbox. I will test your code using a few examples and see if they produce the expected output.

Part 4 + 1: Use rhshiny and gganimate packages to make an interactive webapp version. The app should prompt the user to enter a number of iterations and begin with the pattern shown below. The size of the grid and the method of visualization are up to you. This part is not required but will be considered for bonus credit.