DSC 430: Python Programming
Assignment 0902: Game of Life

Read the Wikipedia article on Conway's Game of Life. We will implement this simulation on a torus because it will make the code easier and we won't need to deal with boundaries. This means that cells on the top are adjacent to cells on the bottom and the same is true for the left and right sides.

Write a function called conway(s, p) that generates a board, which is a square two dimensional NumPy array of size s by s. The board should be randomly populated with probability p. If p is set to 0, all cells should be 0 (dead). If p is set to 1, all cells should be 1 (alive). Start with p=0.1; about 10 percent of cells should 1.

Write a function advance(b,t) that accepts a Conway board and advances it t time steps according to the rules:

- Any live cell (marked as 1) with fewer than two live neighbors dies, as if by underpopulation.
- Any live cell (marked as 1) with two or three live neighbors lives on to the next generation.
- Any live cell (marked as 1) with more than three live neighbors dies, as if by overpopulation.
- Any dead cell (marked as 0) with exactly three live neighbors becomes a live cell, as if by reproduction.

Write a function to pleasantly display the board.

Record a three minute video in which you run the code. Then, present your code. Specifically, answer the following questions:

- Show how you created the NumPy array.
- Show your logic in updating the board.
- Which values for s and p did you find to create an interesting colony of cells.

Submission: Submit a single .py file containing all the code to the D2L. Do not zip or archive the file. Your code must include comments at the top including your name, date, video link, and the honor statement, "I have not given or received any unauthorized assistance on this assignment." Each function must include a docstring and be commented appropriately.