CMPUT 355 Fall 2020: Worksheet 2 Solutions
(Marked by Doug Rebstock; address questions on marking to this TA)

Q1: definition matching (1 ; all or nothing)

simulation game: games that resemble real-life processes
fade away: disappearing completely (from overcrowding or from becoming too sparse)
still life: settling into stable configuration that remains unchanged
oscillate: entering an oscillating phase in which they repeat an endless cycle of two or more periods
tick: a simultaneous step of birth and death which constitute a single generation

Q2: life rules; fill in the blank (1 ; all or nothing)

a live cell survives if and only if it has (a) or (b) neigbours
a live cell dies if and only if it has less than (c) or more than (d) neigbours
an empty (dead) cell is born if and only if it has (e) neigbours.

Answer should be formatted as a space separated list of numbers corresponding to blanks a b c d e. For example 6 3 2 5 3 would indicate an answer of 5 for blank (d).

Answer: 2 3 2 3 3

Long Form Question (3-5); I accepted variations that made sense in context (1 mark each)

Q3: Explain Conway's method for playing life by hand on a Go board with black and white Stones.

Answer: Put a black stone on every live cell that dies, put a white stone on every dead cell that is born, now clear all cells with two black stones, and then change all white stones to black

Q4: Explain why Conway needed a special method to play life by hand.

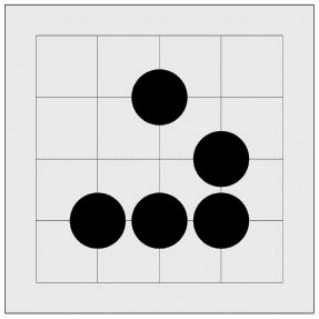
Answer: because all cell updates are performed simultaneously, but humans put and remove stones on a board one at a time)

Q5: Gardner wrote, "Without its help some discoveries about the game would have been difficult to make". What does it refer to?

computer program to simulate game of life
extra info: The program was written by M. J. T. Guy and S. R. Bourne
(but text was slightly ambiguous, allowed many variations that centered around being able to use computer)

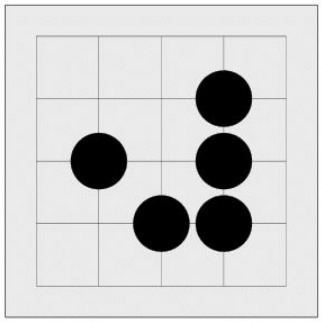
Q6: (1 mark)

Version A) The columns are ordered left to right (a - e) and the rows are ordered top to bottom (1 - 5). Here the live cells are b4 c2 c4 d3 d4. Using the same format (alphabetical order, single blank for separator), list the live cells in the next generation.

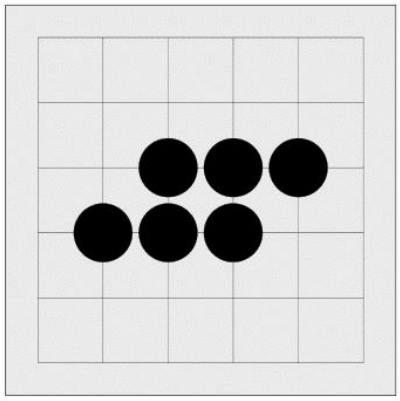


Answer: b3 c4 c5 d3 d4

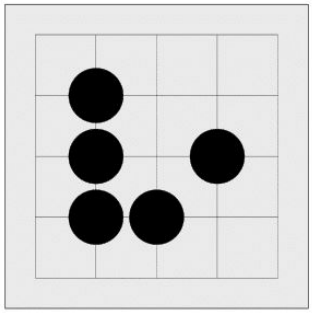
B) Live: b3 c4 d2 d3 d4 → Answer: c2 c4 d3 d4 e3



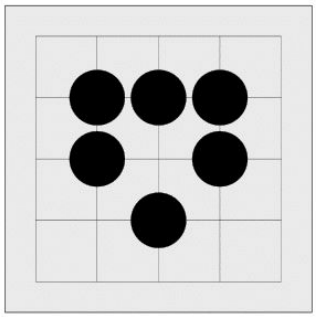
C) Live: b4 c3 c4 d3 d4 e3 → Answer: b3 b4 c5 d2 e3 e4



D) Live: b2 b3 b4 c4 d3 → Answer: a3 b3 b4 c2 c4

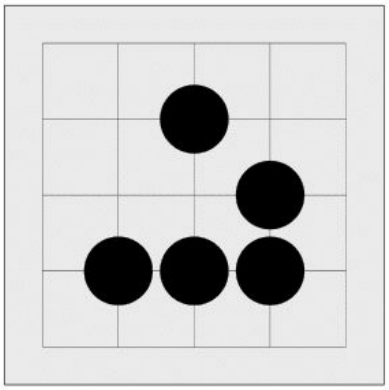


E) Live: b2 b3 c2 c4 d2 d3 → Answer: b2 b3 c1 c4 d2 d3

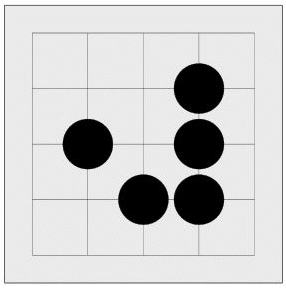


Q7 (1 mark): Change Conway's rule so that any live cell survives if and only if it has one or three live neighbours (the birth rule stays the same).
Version A)

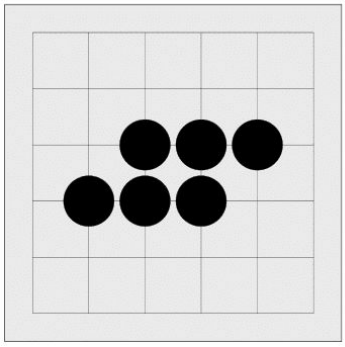
The columns (a-e) are ordered left to right. The rows (1-5) are ordered top to bottom. Here the live cells are b4 c2 c4 d3 d4. Using the same format (sorted alphabetic order, single blank for separator), list the live cells in the next generation



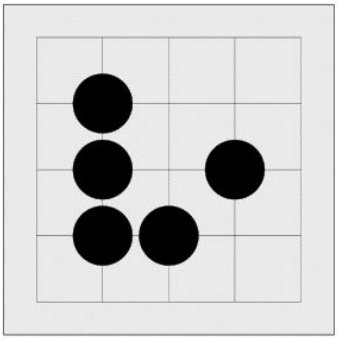
Answer: b3 b4 c2 c4 c5 d3
B) Live: b3 c4 d2 d3 d4 → Answer: b3 c2 c4 d2 d3 e3



C) Live: b4 c3 c4 d3 d4 e3 → Answer: b3 c5 d2 e4



D) Live: b2 b3 b4 c4 d3 → Answer: a3 b2 b3 c2 c4 d3



E) Live: b2 b3 c2 c4 d2 d3 → Answer: b3 c1 d3