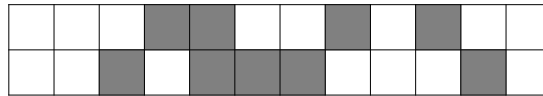


Eighth homework set

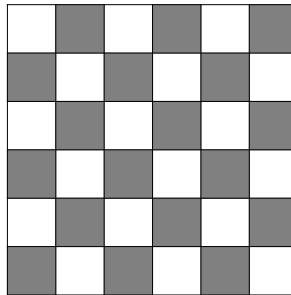
Due at the beginning of class on Thursday, Dec 3. No late homework will be accepted.

Fold your homework paper vertically and PRINT your name on the outside.

- Can the second row result from the first by an $N = 3$ binary CA? Assume wraparound. If you think the answer is “No,” explain why. If you think the answer is “Yes,” give all the CA rules that would produce the second row from the first.



- Pictured here is a portion of the initial generation of an infinite 2-dimensional CA. This pattern repeats across the plane. Suppose the CA has a von Neumann neighborhood with this rule: the central cell dies if 0, 1, or 2 of the 5 cells in its neighborhood are alive, and the central cell lives if 3, 4, or 5 of its neighborhood cells are alive. Describe completely all future generations of this CA.



- The classifier systems for two $N = 3$ CA, A and B , are shown here. Recall, for example, the darkened cells in A mean that the neighborhood configurations LLL , LLD , and DLL give a live cell, while the other five configurations give a dead cell. Find a crossover point, one of a through g , for which one of the two children is the *identity* CA, the CA that leaves every arrangement of live and dead cells unchanged. Explain why your crossover would achieve this result.

