

Ninth homework set

Due at the beginning of class on Thursday, Nov 29. No late homework will be accepted.

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

1. Consider the 1-dimensional CA with this rule

LLL and LLD give L , and all other configurations give D .

Suppose generation 1 consists of a string of 20 L cells in an infinite state space. How many cells will be L in generation 2, in generation 3, and so on for all future generations. Explain how you arrived at your answer.

2. Consider the 1-dimensional CA with this rule

DDL , DLD , and LDD give L , and all other configurations give D .

Starting from a single L cell in generation 1 shown here, fill in the succeeding generations.

[illegible]

3. A collection of live and dead cells is called a *Garden of Eden* configuration for a CA if it cannot occur in generation 2 regardless of the arrangement of live and dead cells in generation 1. For example, in the CA with rule *DLD* gives *L* and all other configurations give *D*, the configuration *LL* is Garden of Eden.

For the 1-dimensional, $N = 3$ CA with rule *LLD* and *DLL* give *L*, and all other configurations give *D*, show that three consecutive *L* cells is a Garden of Eden configuration.