CA2 - STEVEN RAAIJMAKERS, 10804242

Script usage: When given no arguments the script will show a plot of the average cycle length of all the rules. Otherwise it will evaluate the average cycle length for the given argument as a rule.

Each cellular automaton has repetitive behavior since the maximum cycle length for a CA with k states of n length will simply be the number of states possible: k^n. Our height is suggested to be 10^4 or 10^6 and k =2, so if we choose n that satisfies: 2^n <= 10^4, we must find a cycle length for each rule within the height. However this will also mean we will find cycle lengths of CA's which have nonperiodic patterns. For testing we choose n = 10.

For each rule we start with a random initial_row, and we try to find the cycle length. We repeat this process X (=10) times for each rule. Based on these results, we try to define the appropriate class for each rule.

1. Since class 1 and class 2 CA's both can have cycle lengths of length 1 we have to look at the repetitive row to determine whether the CA belongs to class 1 or 2. Whenever the last row is a homogeneous row it belongs to class 1.
2. When a CA does not belong to class 1, but has cyclelengths which suggest a period we can say it belongs to class 2.
3. When the cyclelenghts found are very inconsistent (and thus seem random) we can say it is class 3.
4. When only the cyclelengths are known it's hard to say whether some CA belongs to class 4 since it leads to local structures.