Mathematica Problems on Recurrence Relations (RR) and Cellular Automata (CA) VII

1. Determine the number of n-digit quartenary $\{0, 1, 2, 3\}$ sequences, a_n, with an even number of 1's by finding a RR and solve it with RSolve. What is the initial condition? How many such strings of length 50 are there? Plot with command Plot the first 10 values of a_n. Hint: You can split the strings into those with even or odd number of ones. For example, some allowed 6-digit strings are 002333, 122201, 301111 and 111111.

2. Try to find a truly chaotic orbit in the logistic map with $a = 4$ and plot it. That is, an orbit that seems to spread uniformly over the whole interval.

3. Consider a 1D cellular automata where a black cell survives only if it is surrounded by 2 white cells. No birth takes place. What is the rule number? Run it for a long randomly generated seed. Use the command RandomInteger for the seed. **OP**

4. Run a Glider in Game of Life and plot it. Is it sensitive to a change of one cell in the initial state? See the Wikipedia article about Game of Life for the seed.