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

1. Find a RR for the number of ways to climb n stairs if the allowed steps are 1 or 2 staircases. What are the initial conditions for this RR? Solve the problem. In how many ways can one the climb 50 stairs?

2. Plot the value of the derivative of $g(x)$ at the two fix points for $0 < a < 4$. Formulate a criteria for stability of a fix point.

3. Consider the following 1D CA: A cell is black in next generation if and only if either of it neighbours, but not both, was black on the step before. What is the rule number? Do 5 iterations using one black cell as seed.

4. Start with 9 black cells in a box (3 times 3) and use the 2D CA with rule number 746 (Circular Growth). Do 3 iterations.