Autonomous Intelligent Systems,
Institute for Computer Science VI, University of Bonn

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Exercises for Artificial Life (MA-INF 4201), SS25

Exercises sheet 3, till: Mon 28. April, 2025

21.4.2025

Remark:
This assignment sheet is designed to make you work with the content of the lecture.
Although no points can be achieved with this assignment sheet, you can present the results in the exercise groups to practice presentation and to get the approval for the exam.

Assignment 16 (No Points)

Draw pictures, that visualize the methods of *Fixed Boundary* and *mirroring boundary* for d=1, $k > 2$, r=2, and r=3, Cellular Automata.

Assignment 17 (No Points)

Give or create a one dimensional CA, ($d = 1, k = 2, r \leq 3$) that is capable of making a pattern $\mathbf{Q}$ move from left to right, but that will make the mirrored pattern $\overline{\mathbf{Q}}$ not move.
Depict the pattern $\mathbf{Q}$.

Assignment 18 (No Points)

Develop and implement a formula for a classical spreadsheet program that implements the 1-dimensional cellular automaton with: $d = 1, k = 2, r = 1$, totalistic rule $\mathbf{150}_D$, (Rule number following the Wolfram notation) and print the result for at least 20 timesteps.

Assignment 19 (No Points)

Consider a one dimensional totalistic peripheral cellular automaton with $d = 1, r = 5$ and $k = 2$ (values $0, 1$). Explain the structure of the rule table for this totalistic CA. How large shall the table be? What entries do we find there? Think of a way of describing the rule table by a decimal numerical value, and explain how to obtain this value.