Cellular automata – freeway traffic

Na–Sch model extended

Preparation:

Use the project code from the **Game Of Life** or **Sound Wave** lab as a basis. Customize the code to meet the requirements of the task. If it would be helpful use the code developed in the previous lab.

The following tasks should be performed:

1. Extend NaSch model from previous laboratory. The goal is to obtain a simulation of traffic in two lanes using cellular automata. The simulation is to include the possibility of changing lanes using appropriate rules. A basic Rickert model or more complex schemes can be used.
   Score: 4 points
2. Write a report in two-person (alternatively, by one person) groups that includes:

– description of rules which enable a car to perform change lanes maneuver (overtaking and returning)
– provide some commentary on rules you have in your model
– compare the basic NaSch model with the extended one:
   (a) check how the new functionalities influence traffic flow (number of cars per iteration)
   (b) describe the experiments
   (c) remember to choose proper car density to make your experiments rational
   (d) include charts and code snippets (optionally screenshots) in your report
   Score: 3 points

An additional task for extra points:

1. Extend the simulation to three lanes.
   Score: 1 point
2. Add to the simulation an analogous three lanes in the opposite direction.
   Score: 1 point