Golomb ruler – discrete computation

Preparation:

Read and analyze carefully the definition of Golomb ruler and optimal Golomb ruler. Link to materials in the course resources.

The following tasks should be performed:

1. Implement a Java program that generates Golomb rulers. Use a simple generator in the form of Erdős-Turán construction formula. The program should generate and display rulers and check their correctness. Use prime numbers in the range [3,100].
Score: 2p

2. Code an algorithm for finding optimally short Golomb rulers (OGR) for a given order. The program should generate and display the rulers and check their correctness. In addition, the time of this process should be measured. Optimal sets for comparison can be found on Wiki. Load tests should be performed for low rows due to the complexity of the process.
Score: 3p

4. Click on an empty cell, spawns a car. Nothing happens when clicked on an occupied cell.

Score: 1p

An additional task for extra points:

5. Adding the ability to allow cars to spontaneously appear and disappear from a lane. This is to allow the simulation of traffic flow with a certain intensity.

In a given iteration, a car can appear in a cell with index x=0 with some controlled probability. Similarly, it can disappear if it exceeds the periodic restriction also with a certain probability.