Assignment Two

Raymond Lochner - 000443637

raymond.lochner@ulb.ac.be

Contents

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Preliminary information

Each simulation was being executed 100 times. For the visualizations:
- Red signifies the action *cooperation*
- Blue signifies the action *defection*

Graphic displays one specific game, Graph shows information of all games

1 Part One - Spatial Prisoners Dilemma

1.1 Moore Neighborhood

1.1.1   4x4

(a) t=0   (b) t=1   (c) t=5   (d) t=10   (e) t=20   (f) t=50
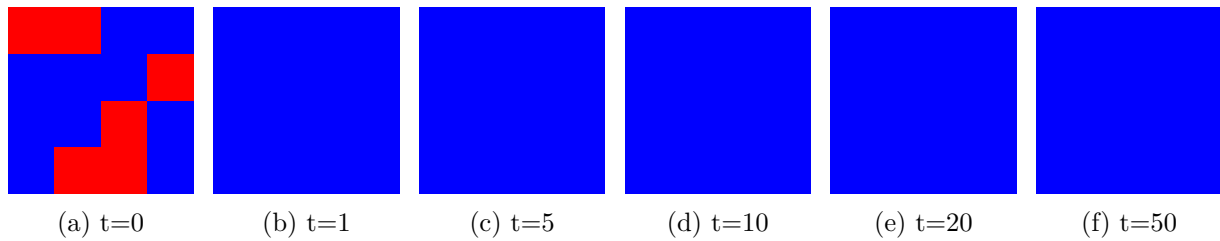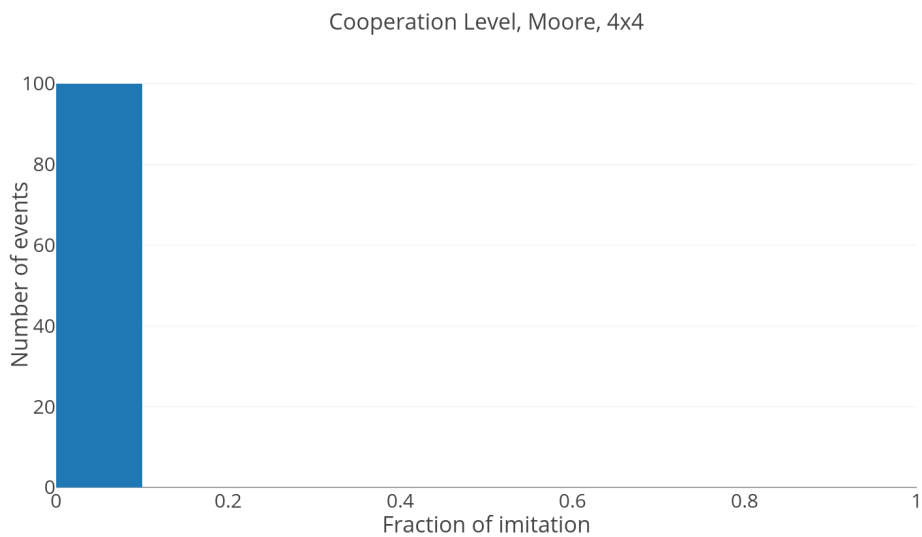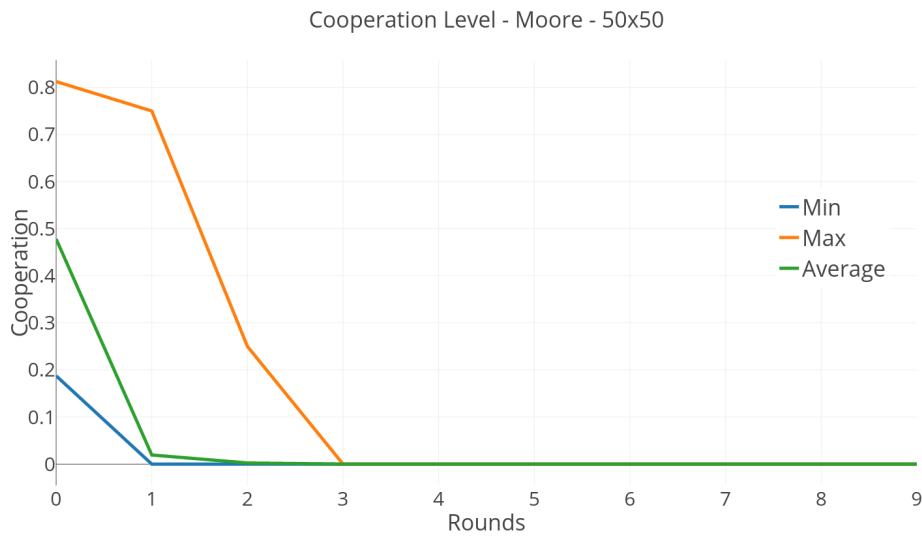
Figure 1: Prisoners Dilemma, Moore, 4x4

From simulating 100 runs we observe that all converge to *defecting*. It is however possible that it converges to a cooperative field, but it requires that we have a sub-matrix of 2x2 with only cooperators and all other players being defectors. This did obviously not happen during one of the simulations.

1.1.2 8x8

(a) t=0   (b) t=1   (c) t=5   (d) t=10   (e) t=20   (f) t=50
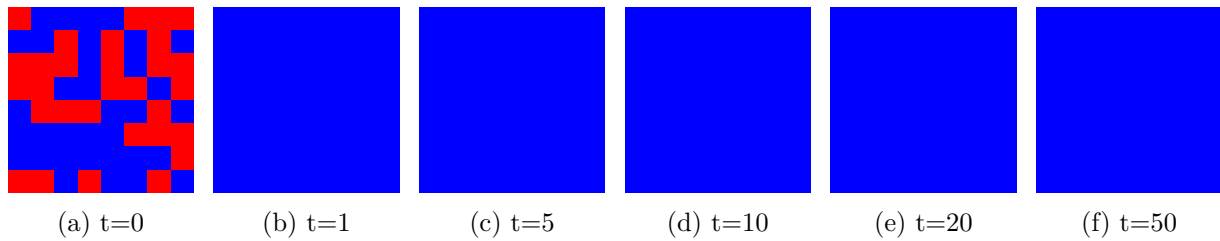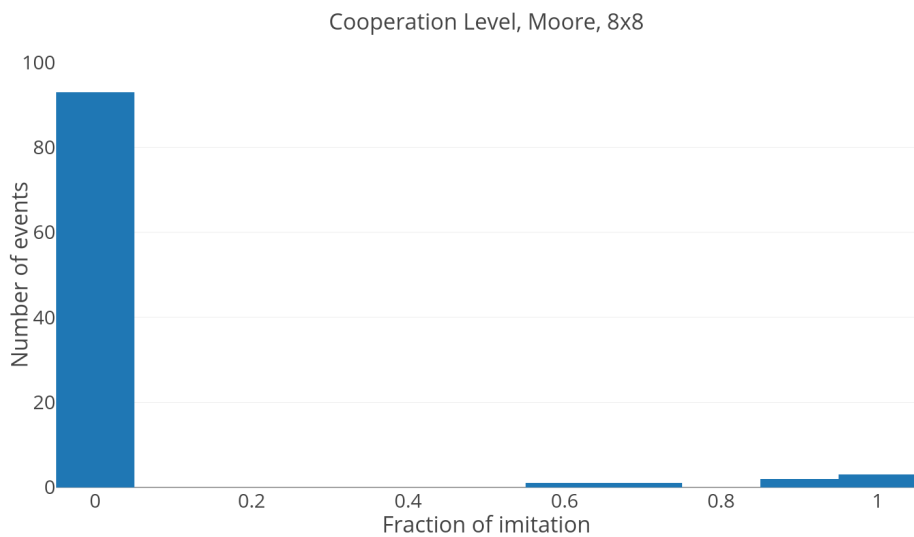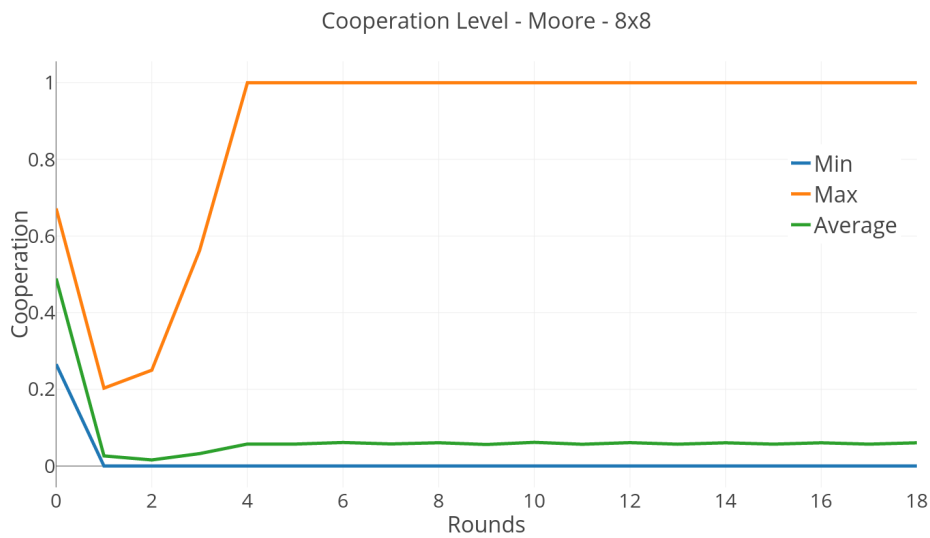
Figure 3: Prisoners Dilemma, Moore, 8x8

mean = 0.0605
deviation = 0.2251

converge at 10, 20 rounds

From simulating 100 runs we observe that all converge to *defecting*. It is however possible that it converges to a cooperative field, but it requires that we have a sub-matrix of 2x2 with only cooperators and all other players being defectors. This did obviously not happen during one of the simulations.
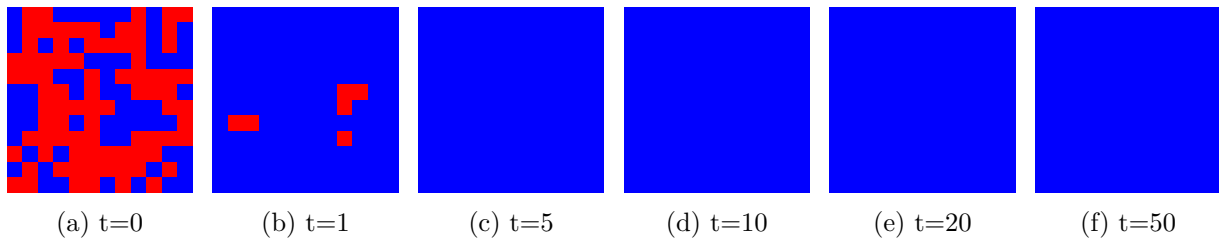
1.1.3 12x12

(a) t=0   (b) t=1   (c) t=5   (d) t=10   (e) t=20   (f) t=50

Figure 5: Prisoners Dilemma, Moore, 12x12

mean = 0.1347
deviation = 0.3115

converge at 10, 25 rounds

From simulating 100 runs we observe that all converge to *defecting*. It is however possible that it converges to a cooperative field, but it requires that we have a sub-matrix of 2x2 with only cooperators and all other players being defectors. This did obviously not happen during one of the simulations.
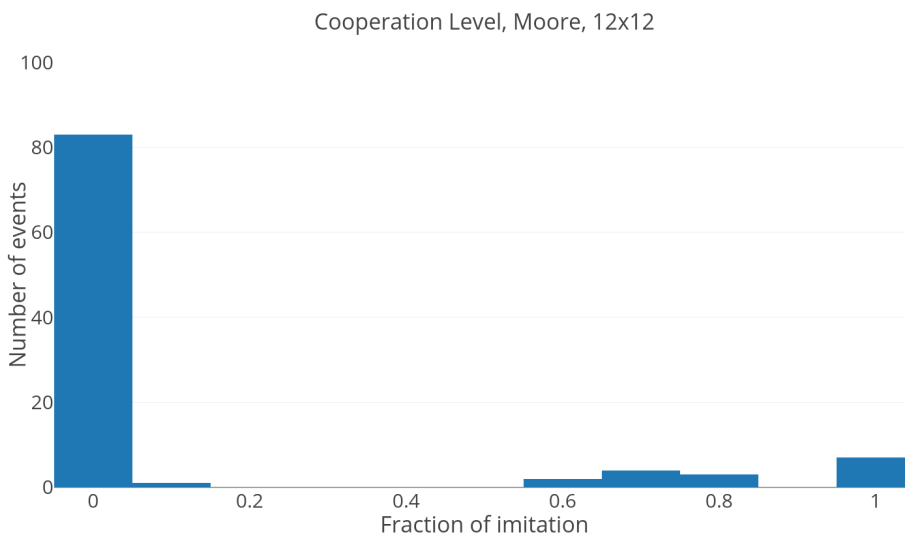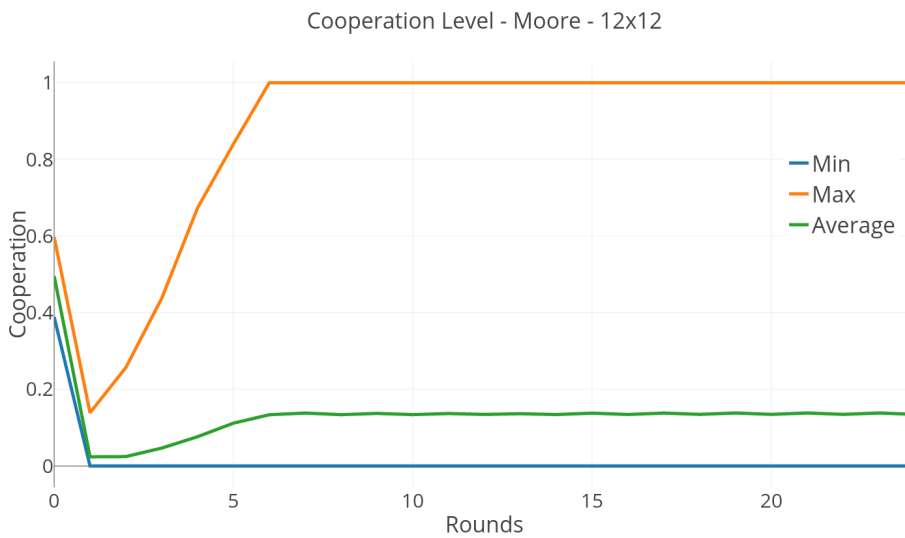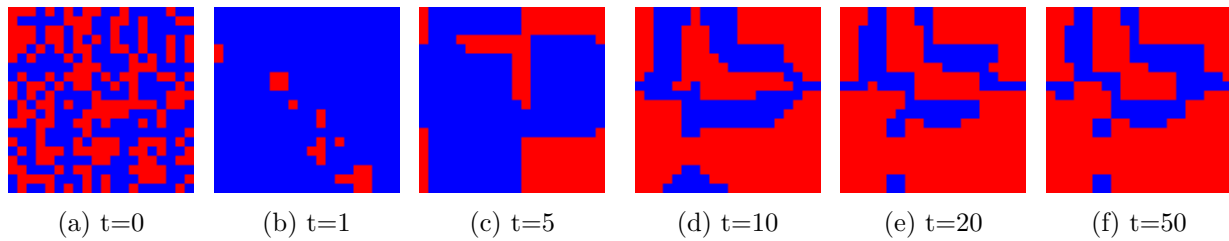
(a) t=0   (b) t=1   (c) t=5   (d) t=10   (e) t=20   (f) t=50

Figure 7: Prisoners Dilemma, Moore, 20x20

mean = 0.3305
deviation = 0.4262

From simulating 100 runs we observe that all converge to *defecting*. It is however possible that it converges to a cooperative field, but it requires that we have a sub-matrix of 2x2 with only cooperators and all other players being defectors. This did obviously not happen during one of the simulations.
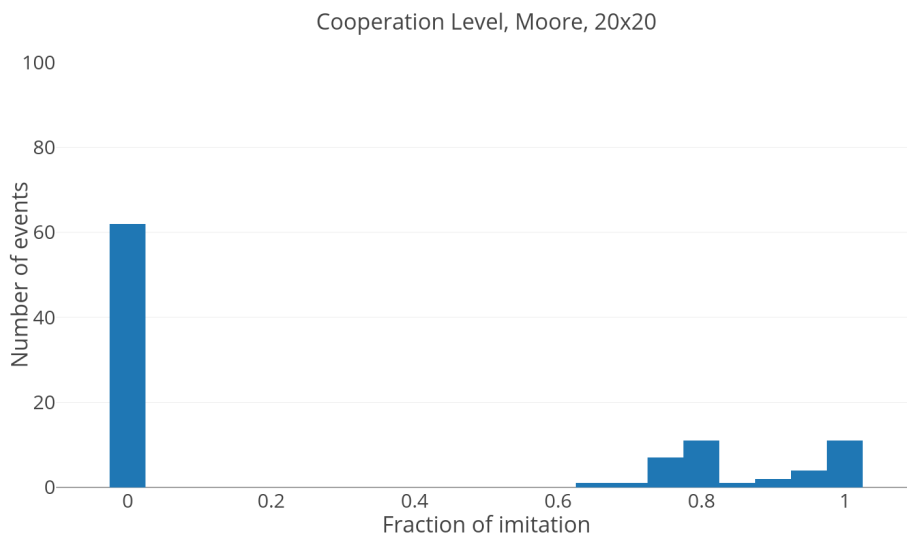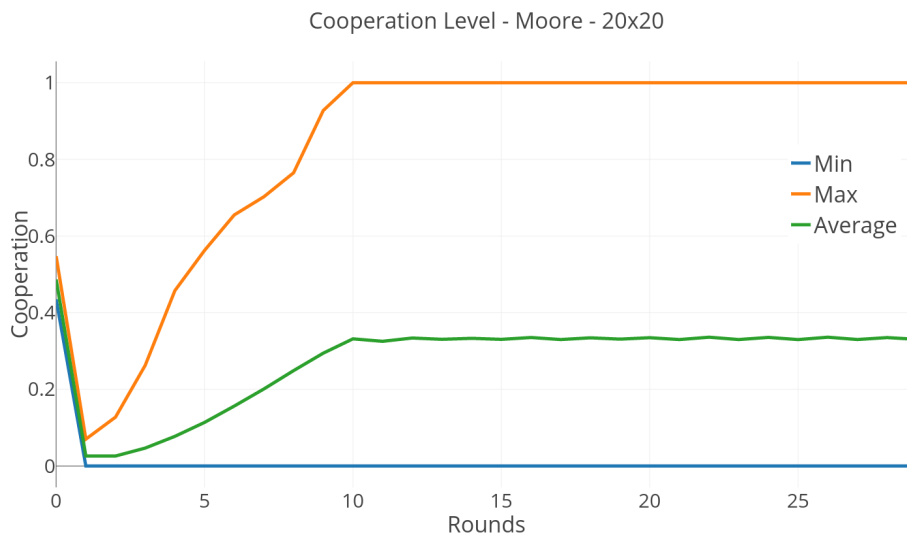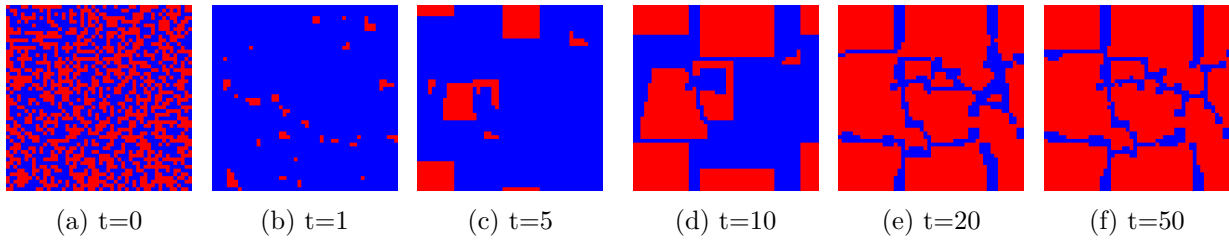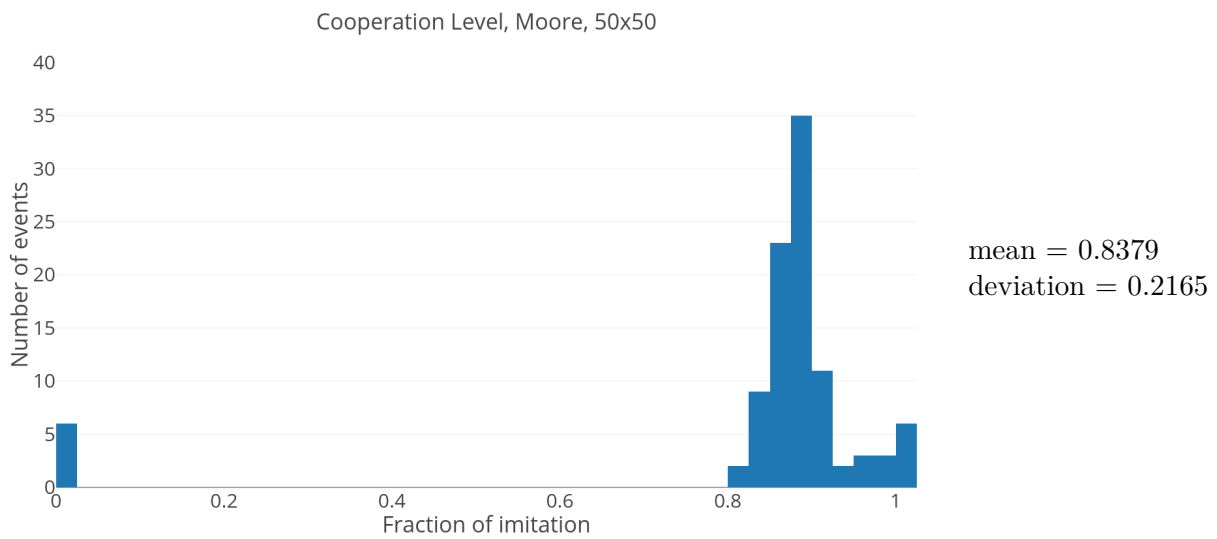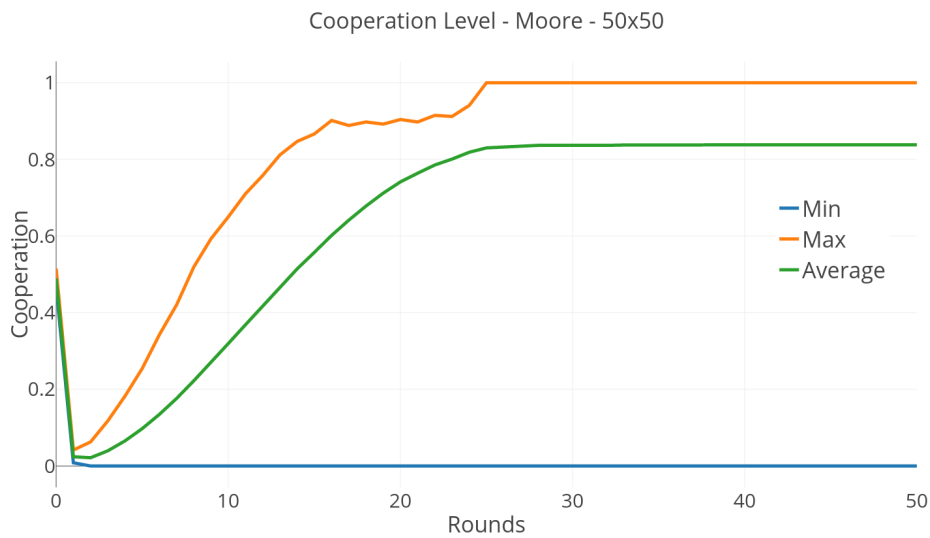
1.1.5   50x50

(a) t=0   (b) t=1   (c) t=5   (d) t=10   (e) t=20   (f) t=50

Figure 9: Prisoners Dilemma, Moore, 50x50

mean = 0.8379
deviation = 0.2165

blablabla

1.2 Von Neumann Neighborhood

1.2.1 50x50

(a) t=0   (b) t=1   (c) t=5   (d) t=10

(e) t=20   (f) t=50   (g) t=75   (h) t=100
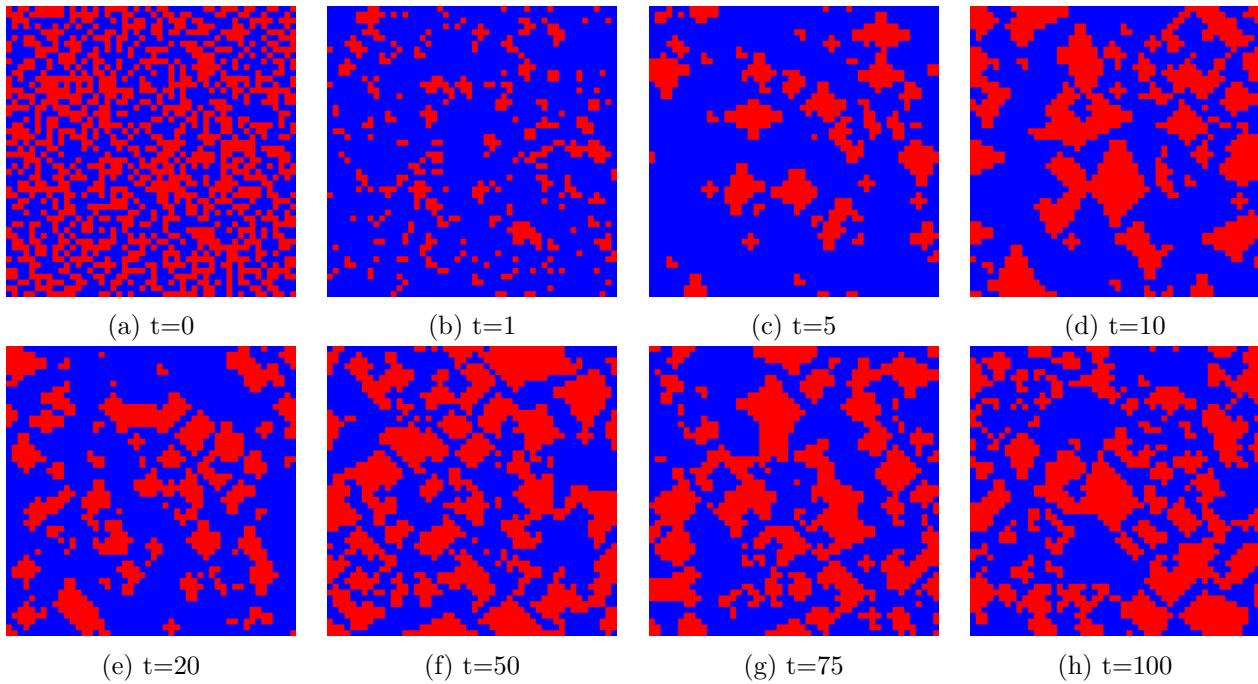
Figure 11: Prisoners Dilemma, Von Neumann, 50x50

Changing the neighborhood to the *Von Neumann* mode, we get a mean $= 0.3914$ and deviation $= 0.0263$.

2   Part Two

$$P_{ij} = \frac{1 + \frac{W_j - W_i}{N \times (max\{P,R,T,S\} - min\{P,R,T,S\})}}{2}$$

3 Part Three