Statistics 133 – Homework 5

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1. For $p = 0.2$, I find free flowing traffic after 1000 iterations on a 100×100 grid.

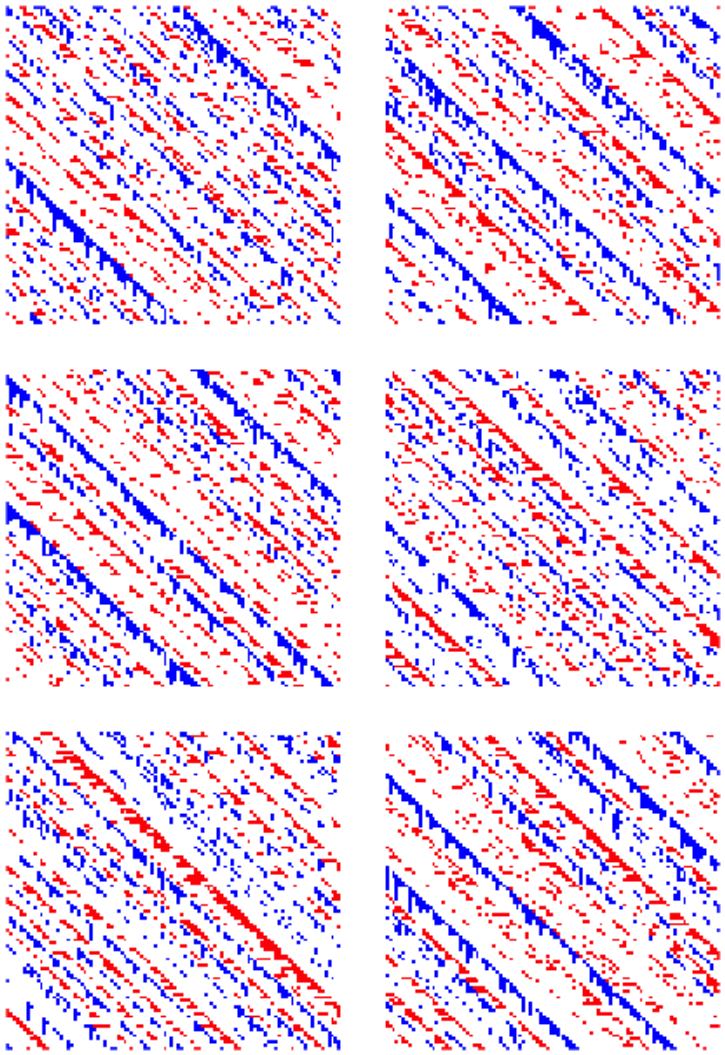

Figure 1: p=0.2, r=100, c=100

For $p = 0.3$, I find a mixture of jams and free flowing traffic on a 100×100 grid.

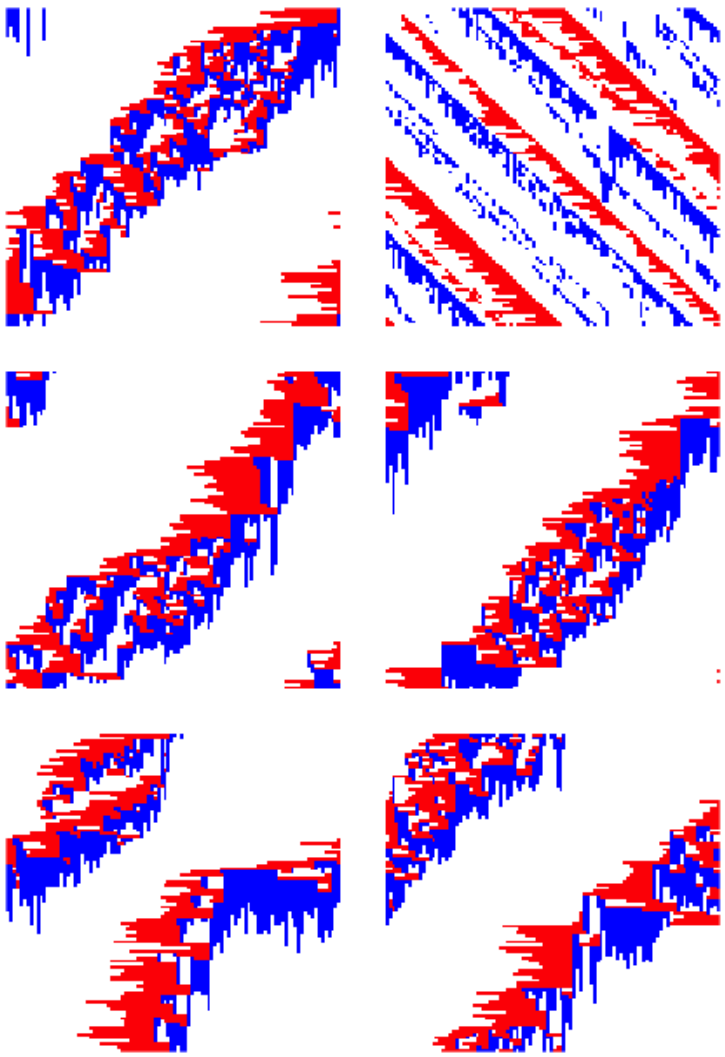

Figure 2: p=0.3, r=100, c=100

For $p = 0.4$, I find traffic jams after around 160 iterations on a 100×100 grid.
For $p = 0.6$, I find traffic jams after around 40 iterations on a 100×100 grid.
For $p = 0.8$, I find traffic jams after around 20 iterations on a 100×100 grid.

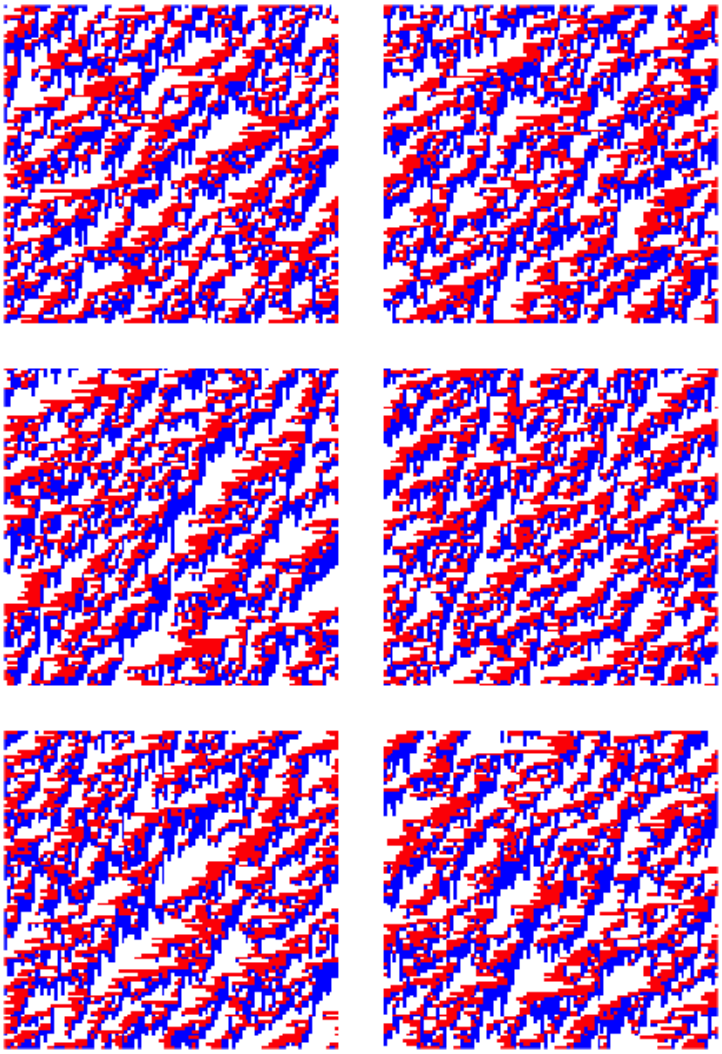

Figure 3: p=0.6, r=100, c=100

2. The values in the table is the number of steps it has taken until it hits gridlock.

	Run 1	Run 2	Run 3	Run 4	Run 5	Run 6
p=0.2	1000	1000	1000	1000	1000	1000
p=0.3	354	1000	430	371	555	423
p=0.4	198	134	205	107	193	205
p=0.6	41	39	50	35	46	45
p=0.8	29	17	24	16	18	23

3. For $p = 0.3$, the probability of gridlock increases as I increase the dimension of the grid from 50×50 to 200×200. Therefore, the transition depends on the size of the grid. Also, the probability of gridlock increase as I stretch the dimension of the grid from 100×100 to 1000×10. Therefore, the transition depends on the shape of the grid.

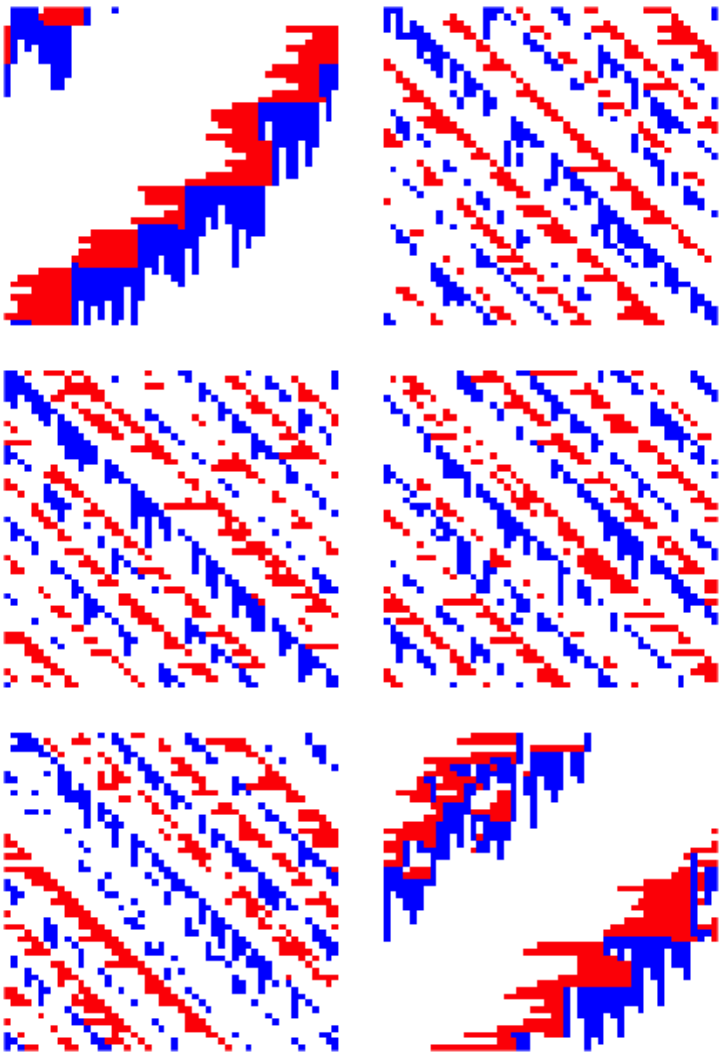

Figure 4: p=0.3, r=50, c=50

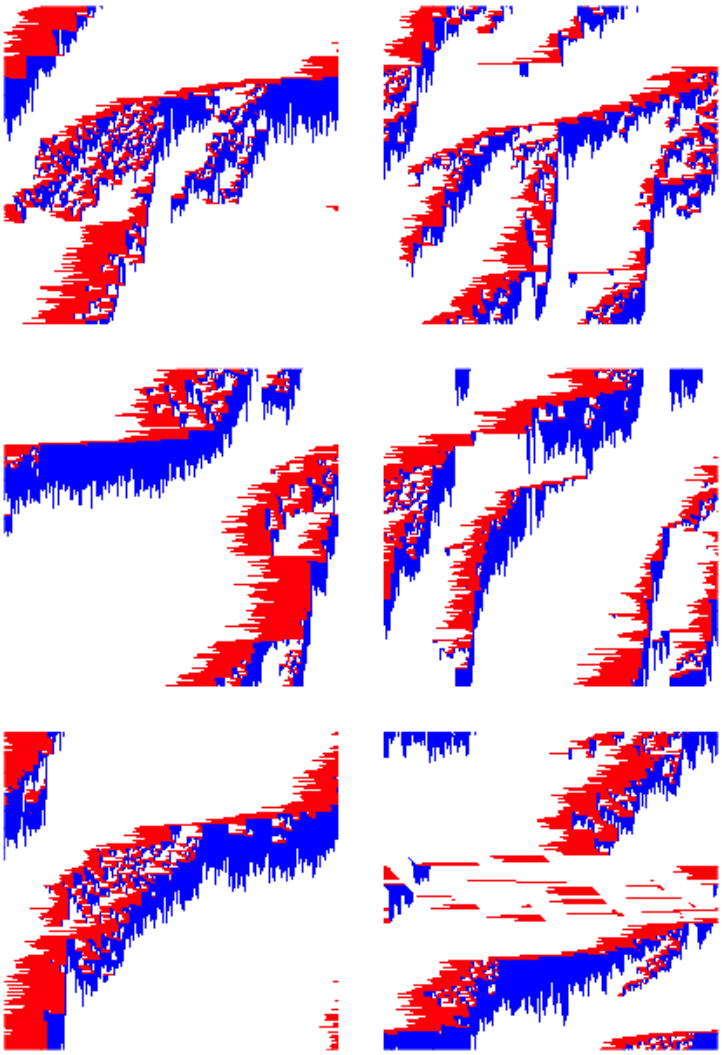

Figure 5: p=0.3, r=200, c=200