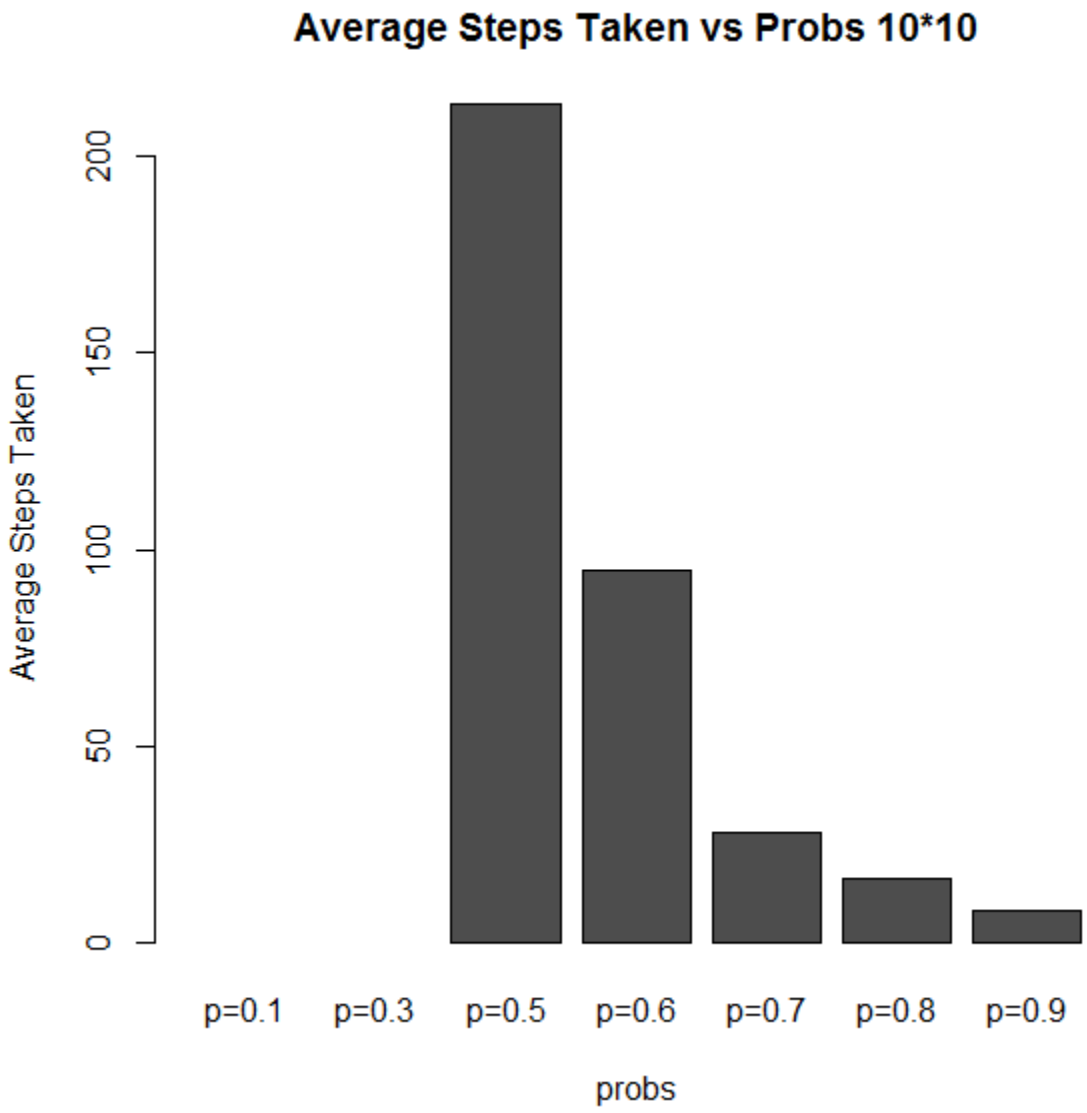
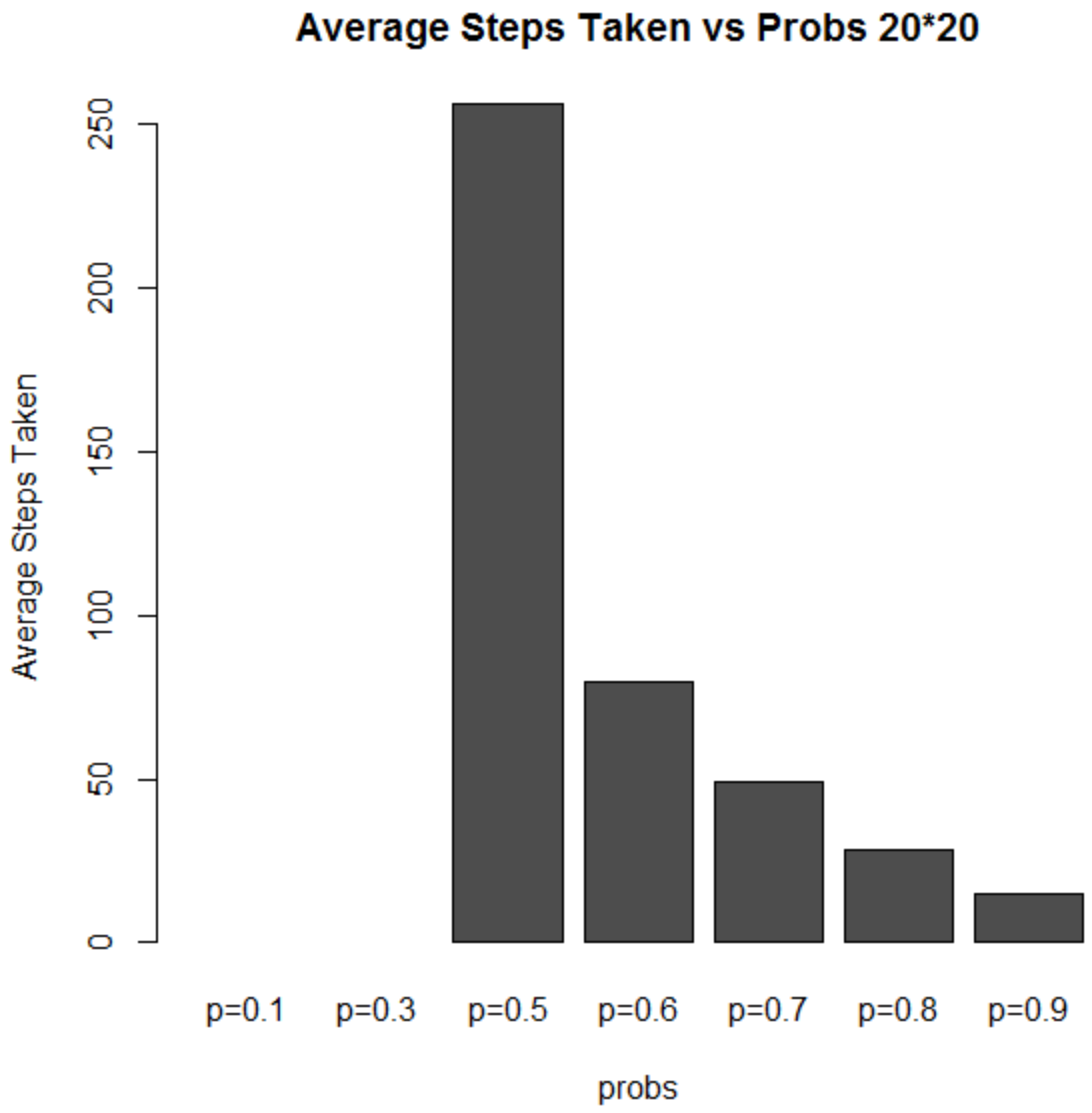
The BML Simulation Study

1. For what values of p, the density of the gird, did you find free flowing traffic and traffic jams? Did you find and cases of a mixture of jams and free flowing traffic?



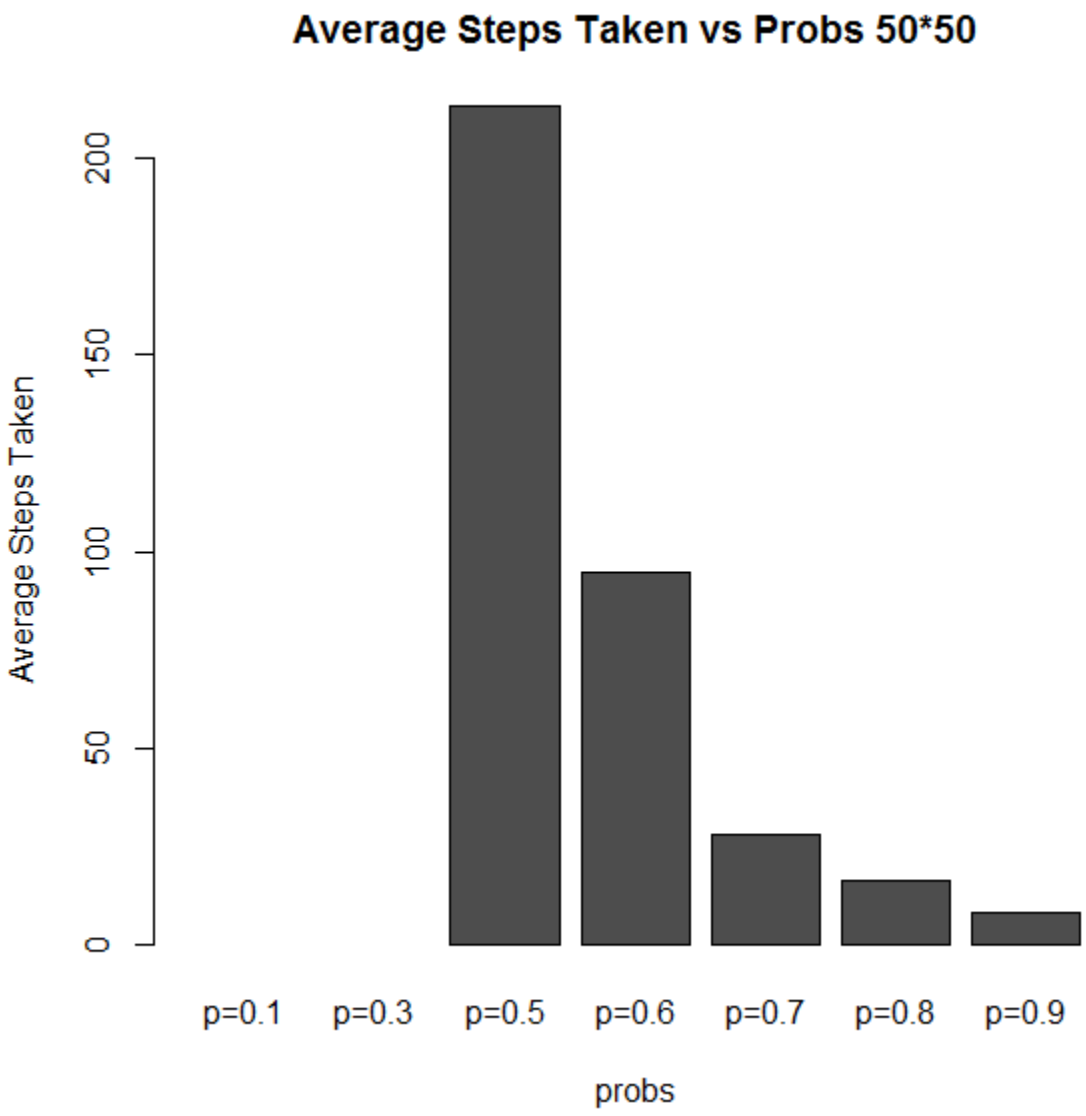
P	0.1	0.3	0.5	0.6	0.7	0.8	0.9
Gridlock Frequency	0	0	0.408	0.916	0.997	0.999	0.999
Free Flow Frequency	1	1	0.592	0.084	0.003	0.001	0.001

In 10*10 case, when density p = 0.1 and p = 0.3 there is not jams when repletion is under 1000. However, when p = 0.5, = 0.6, = 0.7, = 0.8, = 0.9 we see a mixture of jams and free flowing traffic. The great the value p is, the more likely the traffic is going to hit gridlock.



P	0.1	0.3	0.5	0.6	0.7	0.8	0.9
Gridlock Frequency	0	0	0.805	0.999	1	1	1
Free Flow Frequency	1	1	0.195	0.001	0	0	0

In 20*20 case, when density p = 0.1 and p = 0.3 there is not jams when repletion is under 1000. However, when p = 0.5, = 0.6, = 0.7, = 0.8, = 0.9 we see a mixture of jams and free flowing traffic. The great the value p is, the more likely the traffic is going to hit gridlock.



P	0.1	0.3	0.5	0.6	0.7	0.8	p=0.9
Gridlock Frequency	0	0	0.974	0.999	1	1	1
Free Flow Frequency	1	1	0.026	0.001	0	0	0

In 50*50 case, when density p = 0.1 and p = 0.3 there is not jams when repletion is under 1000. However, when p = 0.5, = 0.6, = 0.7, = 0.8, = 0.9 we see a mixture of jams and free flowing traffic. The great the value p is, the more likely the traffic is going to hit gridlock.

2. How many simulation steps did you need to run before observing this behavior?

I ran each simulation under different density value 1000 times and observed this behavior.

3. Does the transition depend on the size or shape of the grid?

As we see from the graph, this transition is observed in 10 by 10 case, 20 by 20 case and 50 by 50 case. So this transition is not dependent on the size of the grid.