Stat 133
BML Traffic Model Simulation

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1 BML Simulation Study

I choose my grid size to be 64 by 64.

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

   Ans: In my simulation, p is around 0.3 to 0.4 because when $p >= 0.5$, the grids tend to be blocked.

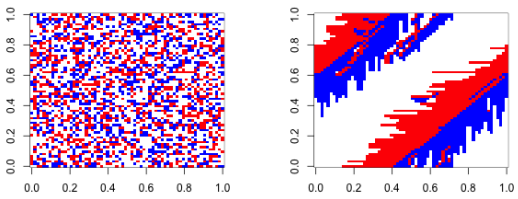
b. How many simulation steps did you need to run before observing this behavior?

   Ans: I choose simulation steps to be 1000 because when $p >= 0.5$, the grids are almost always blocked within 1000 steps. (See Figure 2)

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

   Ans: It depends on the shape of the grid because one can easily make a blocked matrix by manually placing the red and blue cars; however, in my observation, the transition does not really depend on the size of the grid because when I ran large matrices, critical density is about 0.3 to 0.4 as well. Thus, I believe that the transition depends on the density of the grids.

2 Simulation Data and Graphs



(a) Initial Matrix (b) After 251 Steps

Figure 1: 64 by 64 matrix with p=0.5

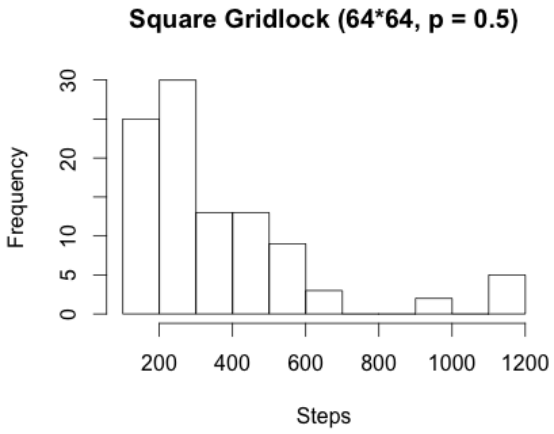


Figure 2: Distribution of A hundred 64 by 64 Matrices.
About ninty-five of them are blocked within 1000 Steps