I have 1 thread for the timer, another for the handler of incoming people, and N number threads for the cars. I used a single mutex lock and 2 condition variables as they were used to signify when an event occurred (when a minute passed or when car people were loading in more passengers). The critical section of my timer was when it altered the current time and before releasing the lock it alerts the other thread that a virtual minute has passed. Incoming people thread's critical section using a global var that needs to be synchronized correctly. Car thread's critical section requires that the length of the queue always be accurate and should only have access to the queue one at a time. There are at times a discrepancy in the people riding and how many are rejected in that it does not add up to the total riders at times. It occurs on my Linux machine but not as often on my Windows machine. I used Matlab to generate plots and source code for that will also be provided in zip.

```
Timer{
  While time valid {
    Mutex lock
    Increase time (Alters a global time var that all threads share)
    Signal the condition variable for people handler thread
    Broadcast the condition variable for the cars
    Mutex unlock
  }
}
Incoming people handler{
  While time valid{
    Mutex lock
    Wait for condition variable (signal minute)
    Handle incoming people accordingly. Uses global time var that
    Needs to be synchronized correctly as time dictates the correct
    Incoming people.
    Mutex unlock
  }
}
Car handler{
  While time valid{
```

Mutex lock

Wait for car condition variable

Handle loading accordingly (Alter queue length, and total riders)

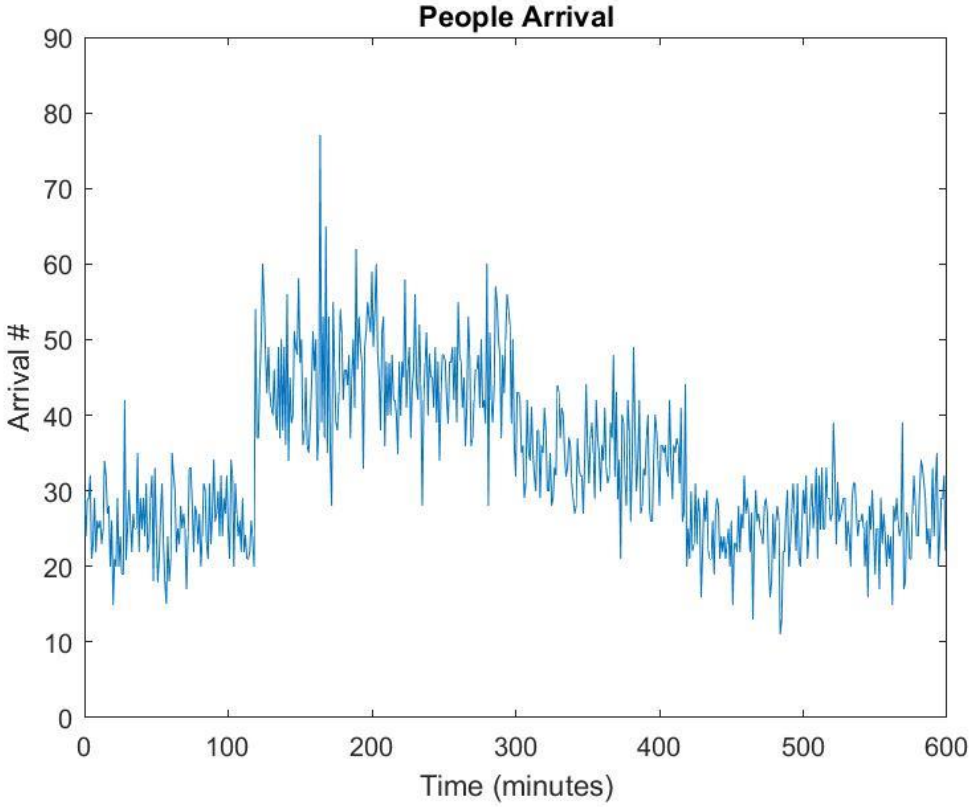
Broadcast to other cars

Mutex unlock

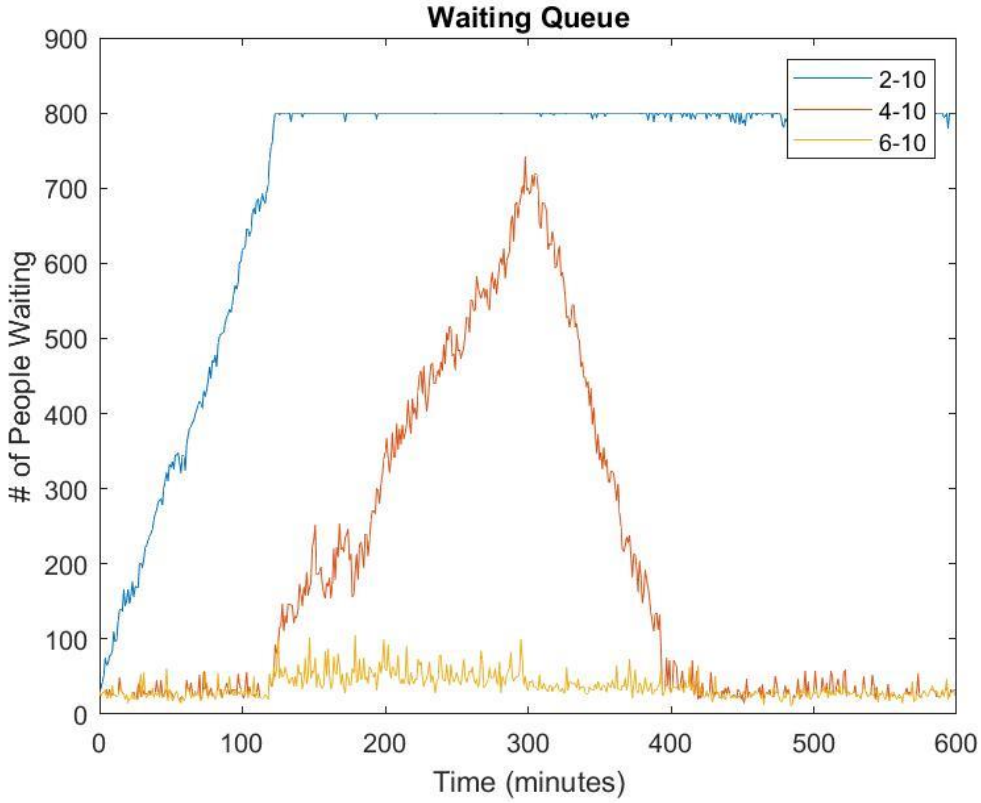
}

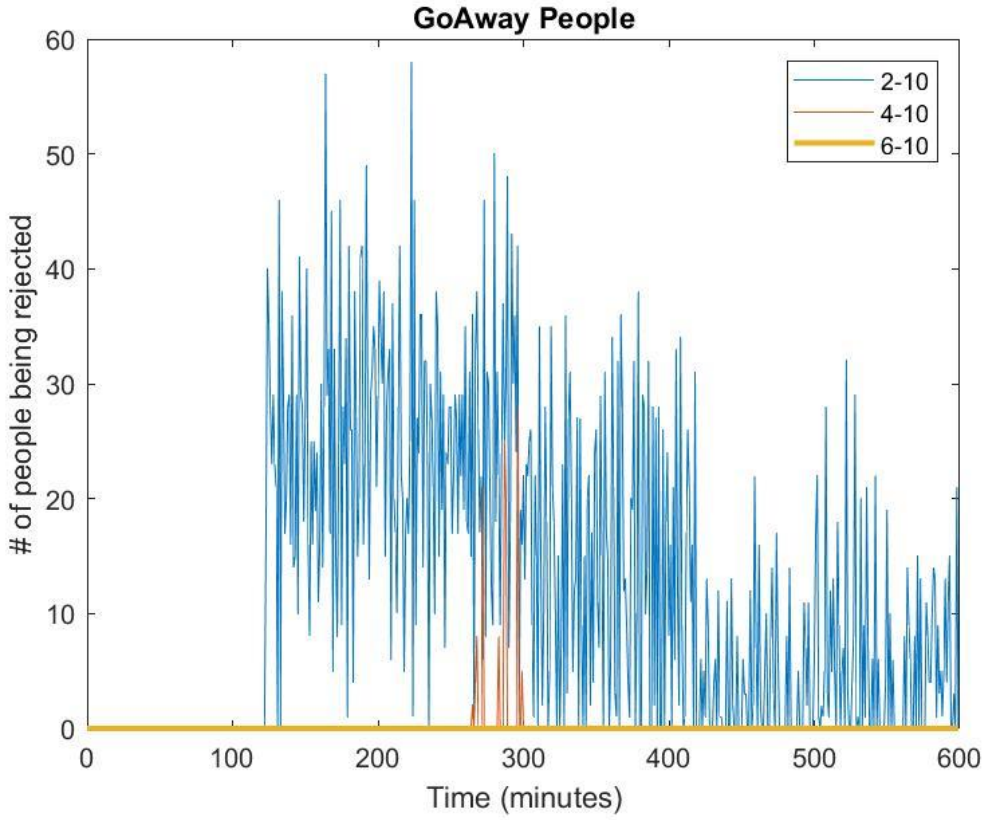
}

(N,M)	Total Arrival	Total Rejected	Rejection Ratio	Average Wait Time (Mins)	Max Waiting Line
N=2, M=7	20002	10543	8673:10543	49	800
N=2, M=9	20002	8267	10944:8267	37	800
N=4, M=7	20002	2892	16933:2892	20	800
N=4, M=9	20002	513	18558:513	21	800
N=6, M=7	20002	0	All ride	14	171
N=6, M=9	20002	0	All ride	25	101


People Arrival
Arrival #
Time (minutes)
0
10
20
30
40
50
60
70
80
90
0
100
200
300
400
500
600

}


Waiting Queue
# of People Waiting
Time (minutes)
2-10
4-10
6-10
0
100
200
300
400
500
600
700
800
900
0
100
200
300
400
500
600


GoAway People
2-10
4-10
6-10
# of people being rejected
Time (minutes)
0
10
20
30
40
50
60
0
100
200
300
400
500
600