Schedule Summer Math Courses

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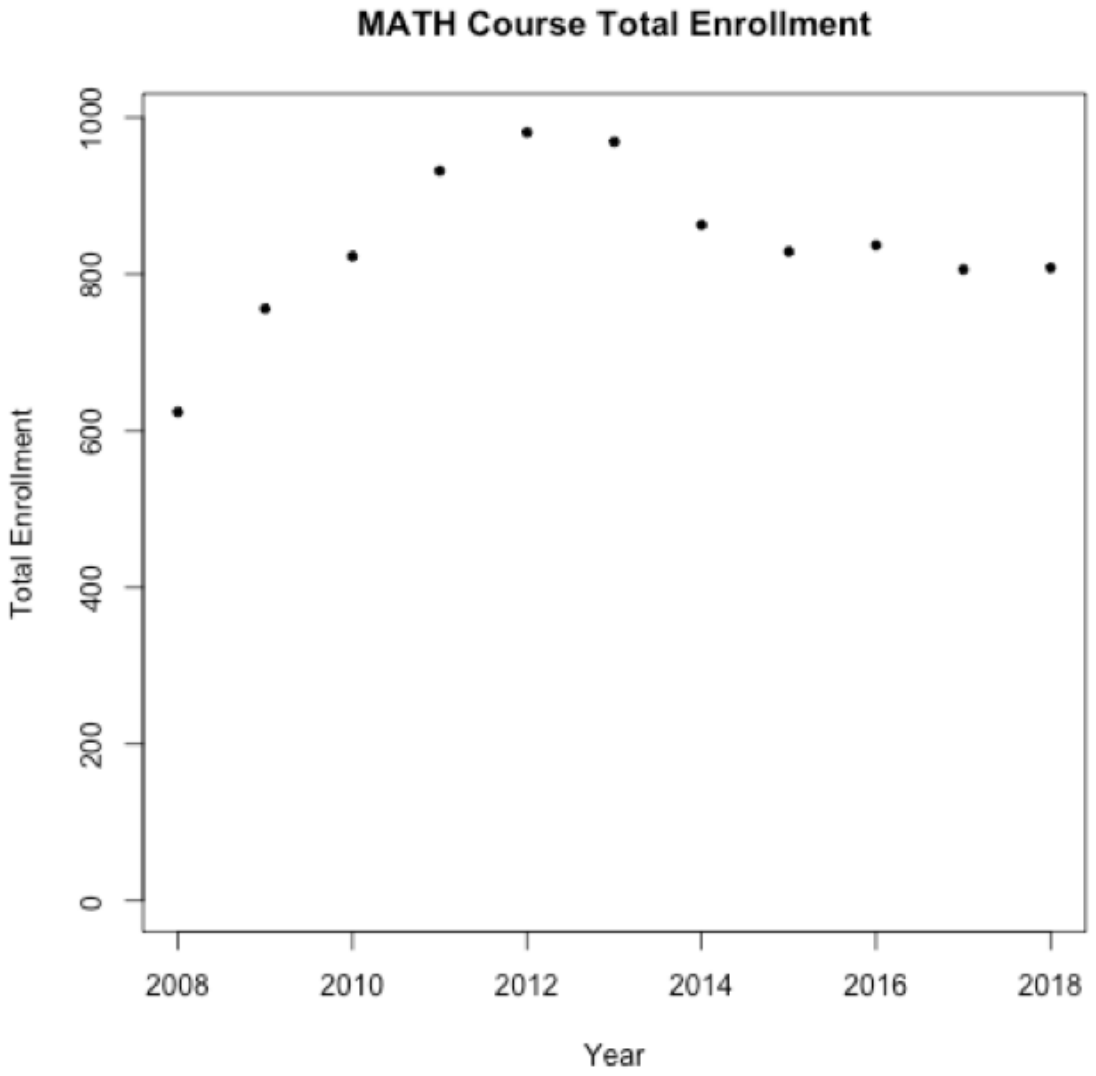
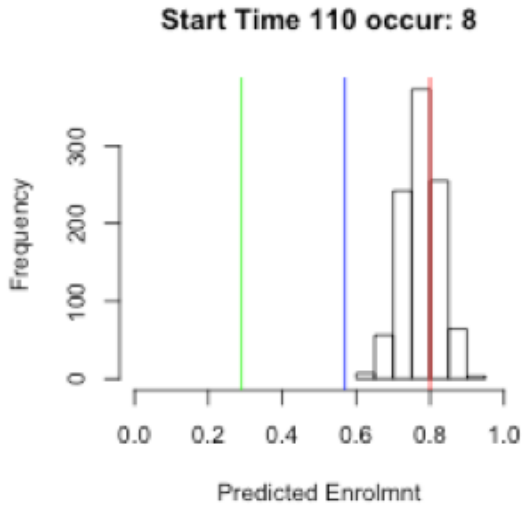
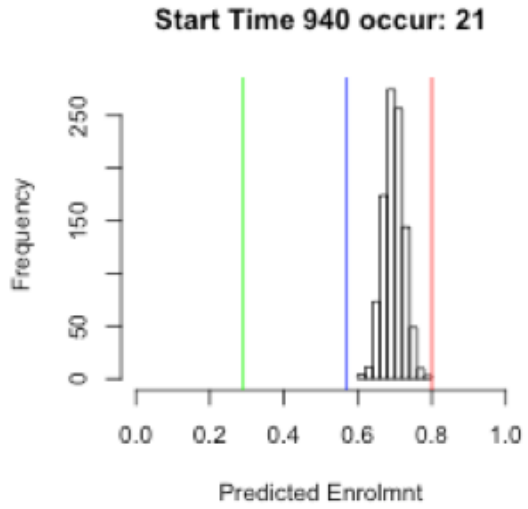
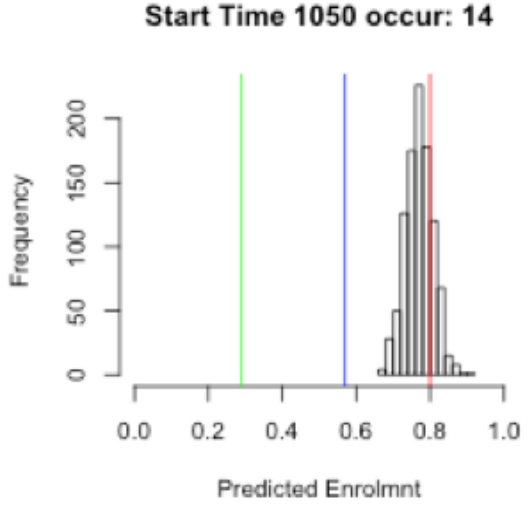
DEPARTMENT OF MATHEMATICS

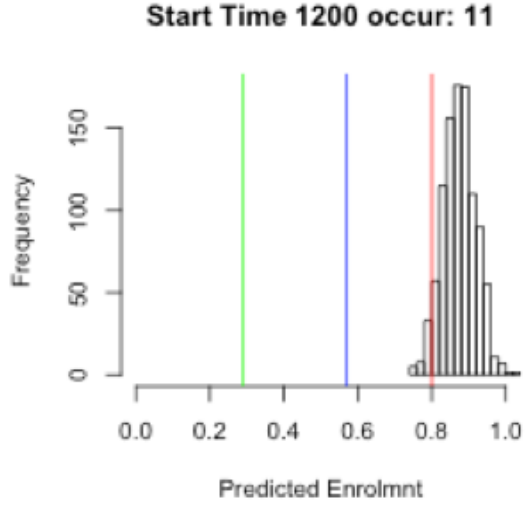
Poisson Distribution











Poisson Distribution

3.2 Stage II

we calculate weighted average as following:

- With fixed i and k

$$\frac{\sum_j pe_{i,j,k} * S_{i,j} * w'_{j-2007}}{\sum_j S_{i,j} * w'_{j-2007}} \tag{12}$$

For example:

- We have calculated the weighted average for MATH 111 in time slot 10:50 am.

$$\frac{pe_{i,k,j=2008} * S_{i,j=2008} * w'_1 + pe_{i,k,j=2009} * S_{i,j=2009} * w'_2 + \ldots + pe_{i,k,j=2018} * S_{i,j=2018} * w'_{11}}{S_{i,j=2008} * w'_1 + S_{i,j=2009} * w'_2 + \ldots + S_{i,j=2018} * w'_{11}} \tag{13}$$

Monte Carlo Simulation

```
X = rnorm(100)
X_med = median(X)
X_med
```

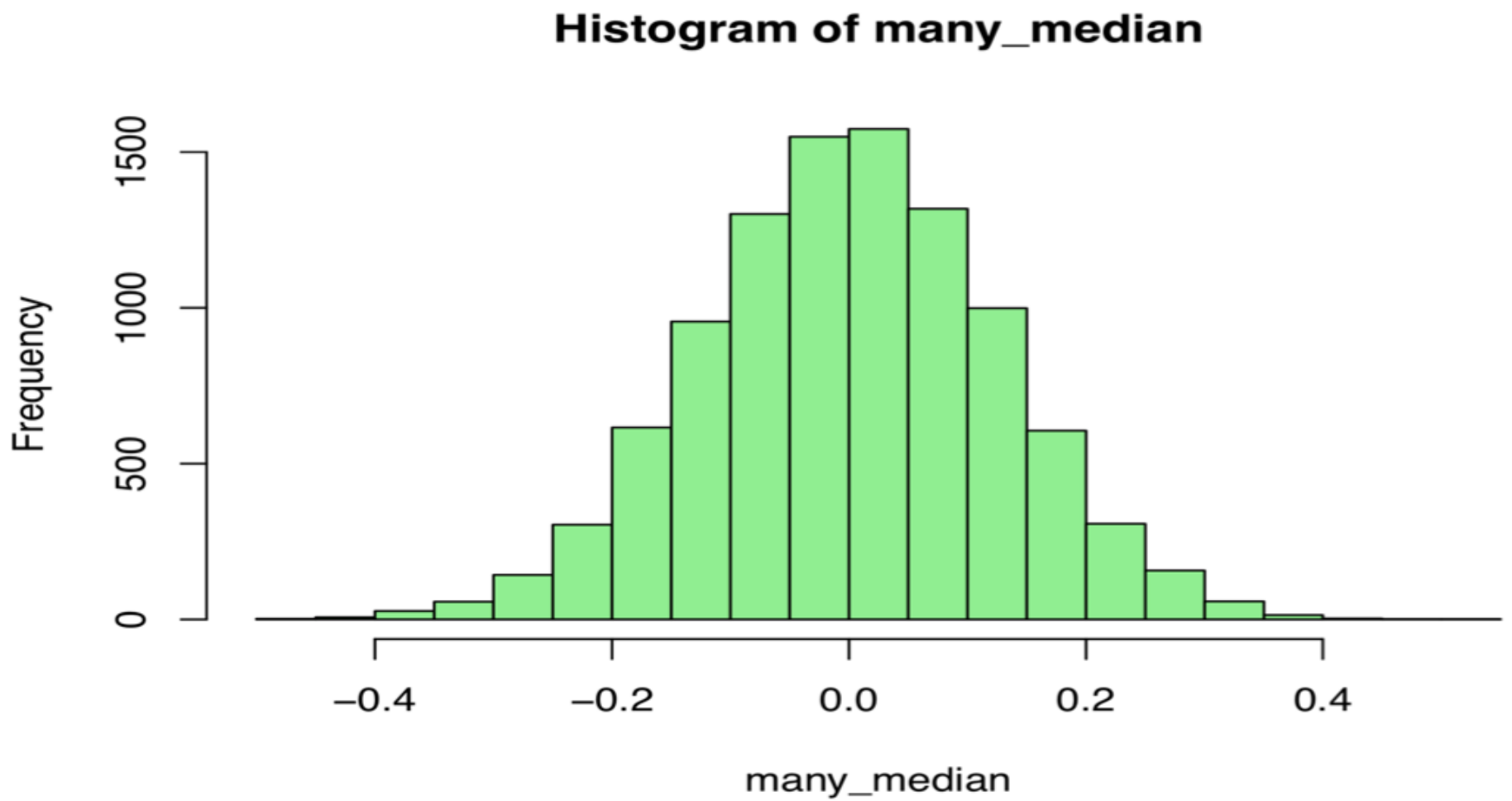
```
## [1] 0.01708379
```

```
N = 10000
  # number of repitions
many_median = rep(NA, N)
for(i in 1:N){
  X = rnorm(100)
  X_med = median(X)
  many_median[i] = X_med
    # save the median in each repitition
}
head(many_median)
```

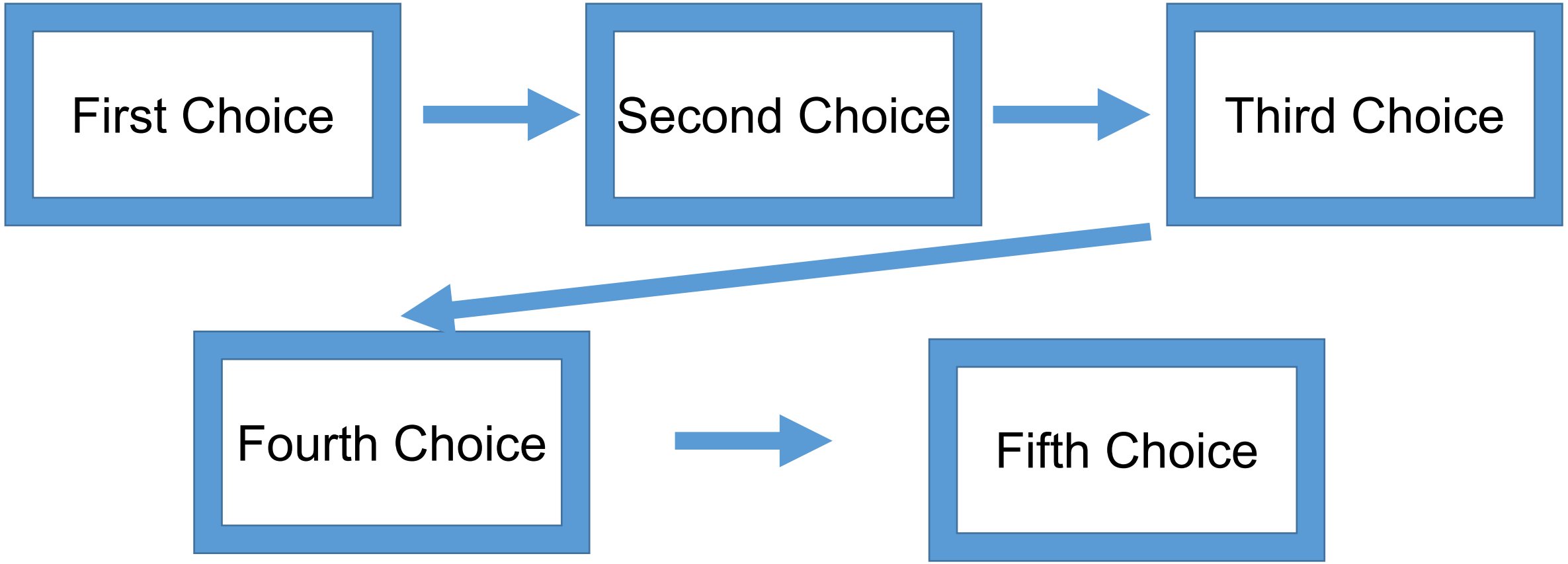
```
## [1]  0.03550759  0.13135906 -0.14435323 -0.12738564  0.03880981 -0.01144368
```

Monte Carlo Simulation

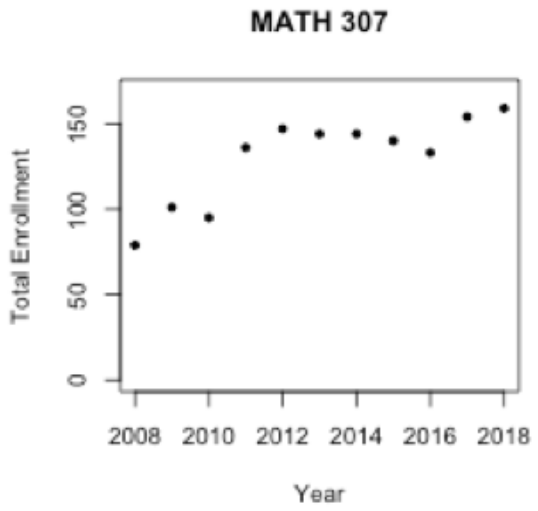
```
hist(many_median, col="lightgreen")
```

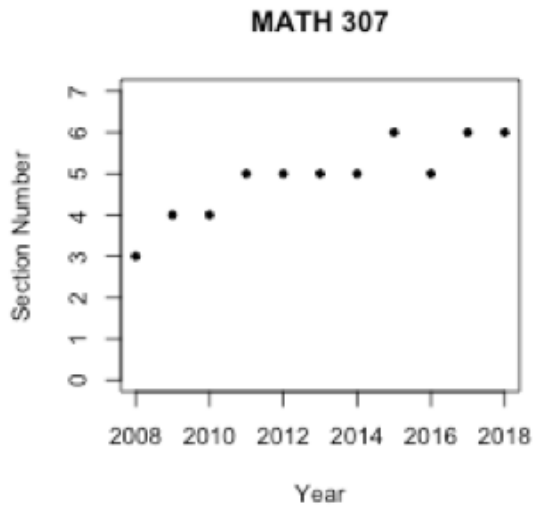


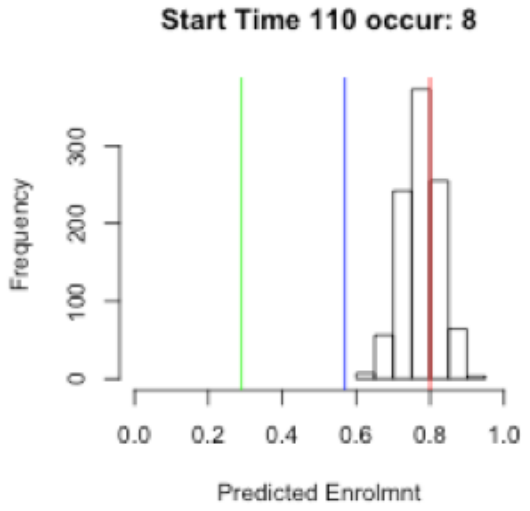
Priority Queue

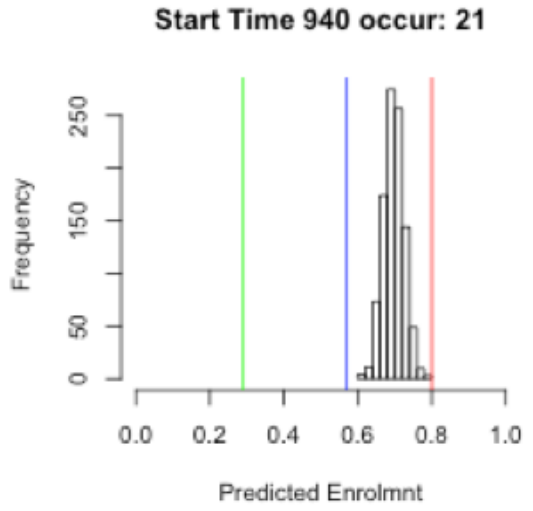


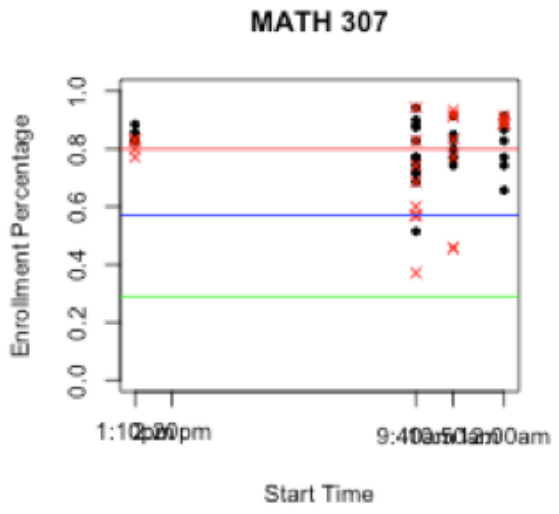
Priority Queue

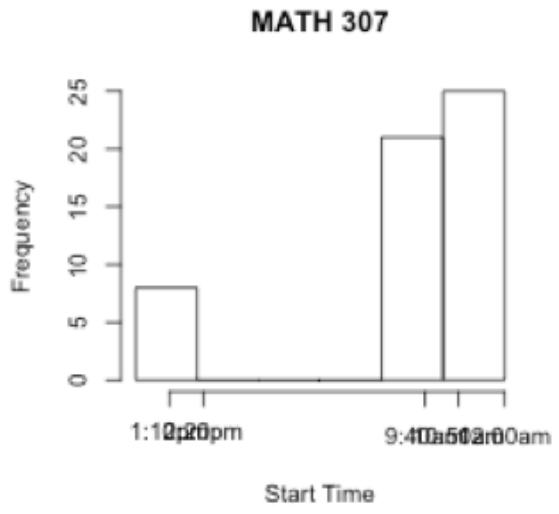


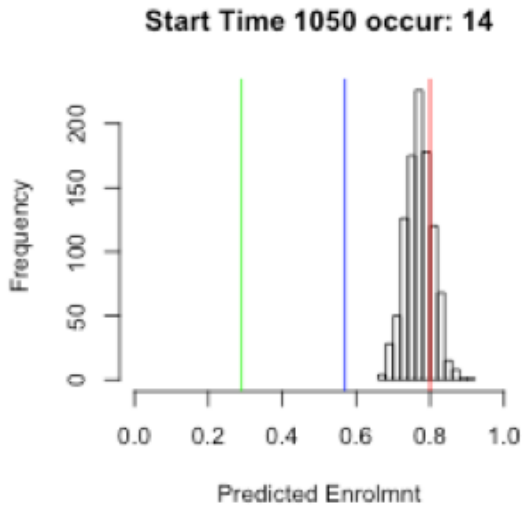


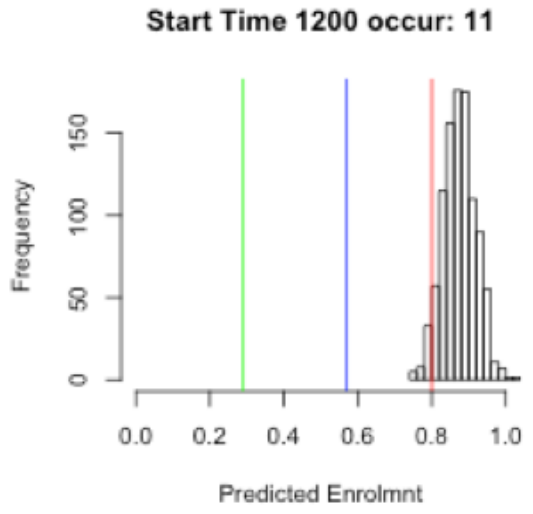










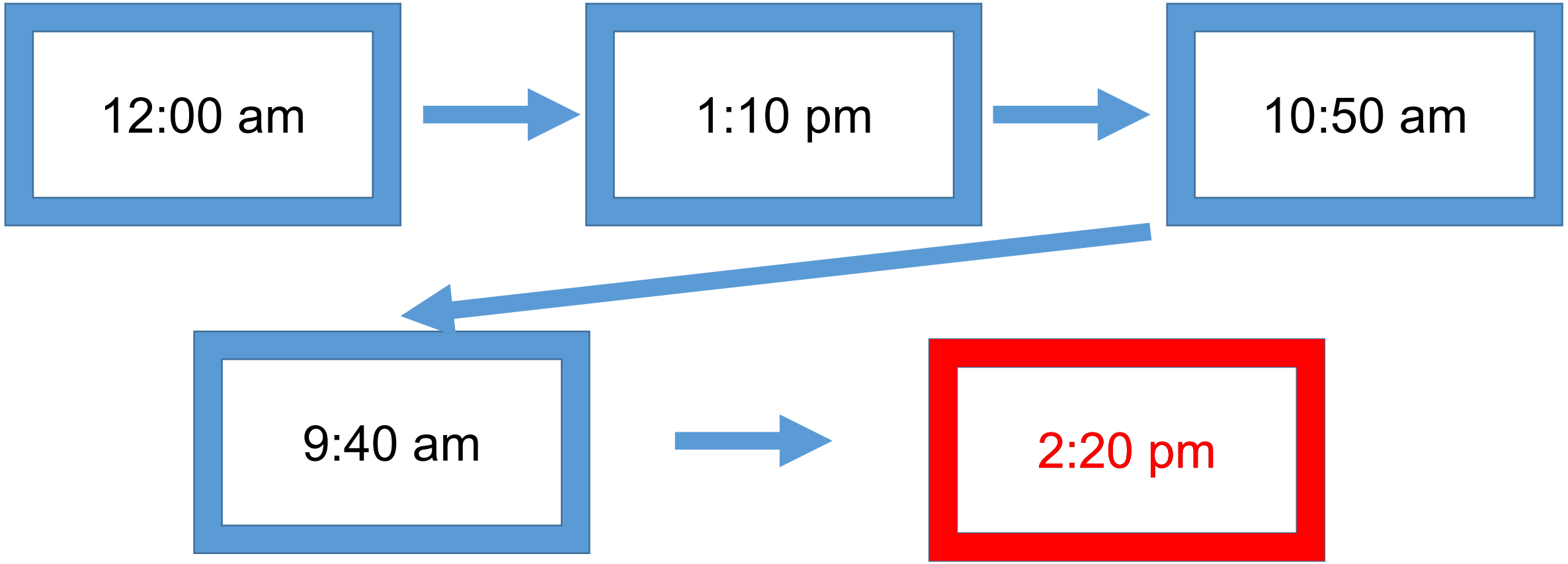


Priority Queue

```
[1] 307
[1] "performance:"
  Section     > 0.8 LB    > 0.8 UB 0.57~0.8 LB
5    1200 9.021621e-01 1.024763617  0.02689106
1     110 2.849505e-01 0.355998235  0.63080647
4    1050 1.797598e-01 0.237201916  0.73876009
3     940 2.531781e-05 0.005571643  0.93800402
  0.57~0.8 UB > 0.57 LB > 0.57 UB
5  0.05215797  0.938973  1.063952
1  0.73412518  0.938973  1.063952
4  0.85016884  0.938973  1.063952
3  1.06292115  0.938973  1.063952

  Section Nmuber
1     110      1
2     220      1
3     940      1
4    1050      1
5    1200      2
```

Priority Queue



Priority Queue

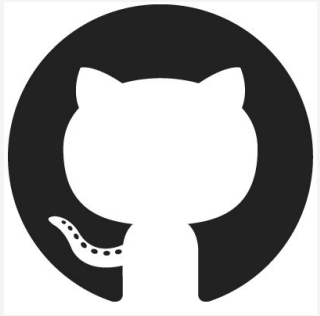
Time Slot	Number of Sections
9:40 am	1
10:50 am	1
12:00 am	2
1:10 pm	1
2:20 pm	1

Table 9: Section Schedule for Math 307 in 2019 (6 sections)

For MATH 307, this represent that we suggest to open six sections, one at 8:30 am, one at 9:40 am, one at 10:50 am, two sections at 12:00 am, one at 1:10 pm, one at 2:20 pm.

Thank you

Get more details of our project in Github



https://github.com/MathSummerProject/MathSummerScheduling