Dave Raines's Splendiferous Mathematical Adventures in Food Court.


SnapTimePro
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Snap
Events in 1 sec
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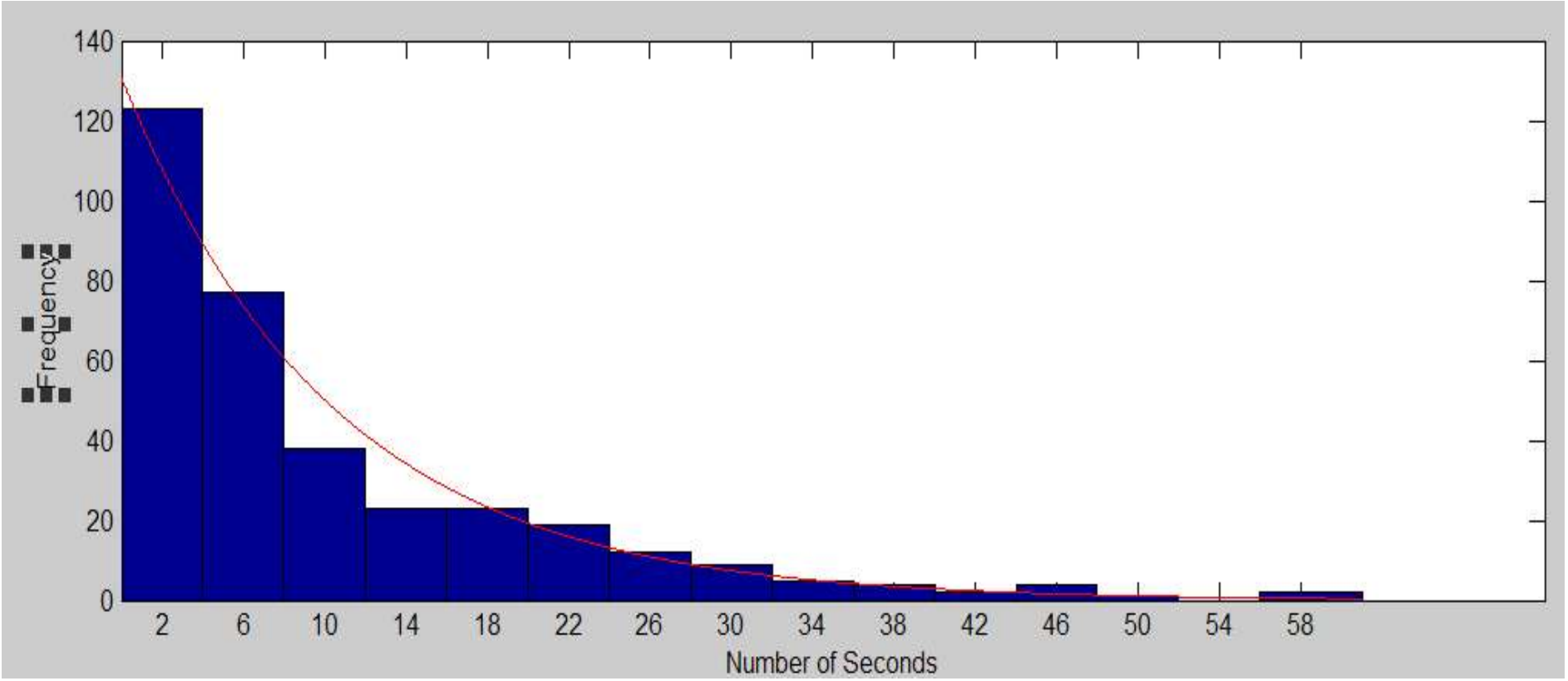
Gamma Distribution

$$f(x;k,\theta) = x^{k-1}\frac{e^{-x/\theta}}{\theta^k \Gamma(k)} \text{ for } x > 0$$

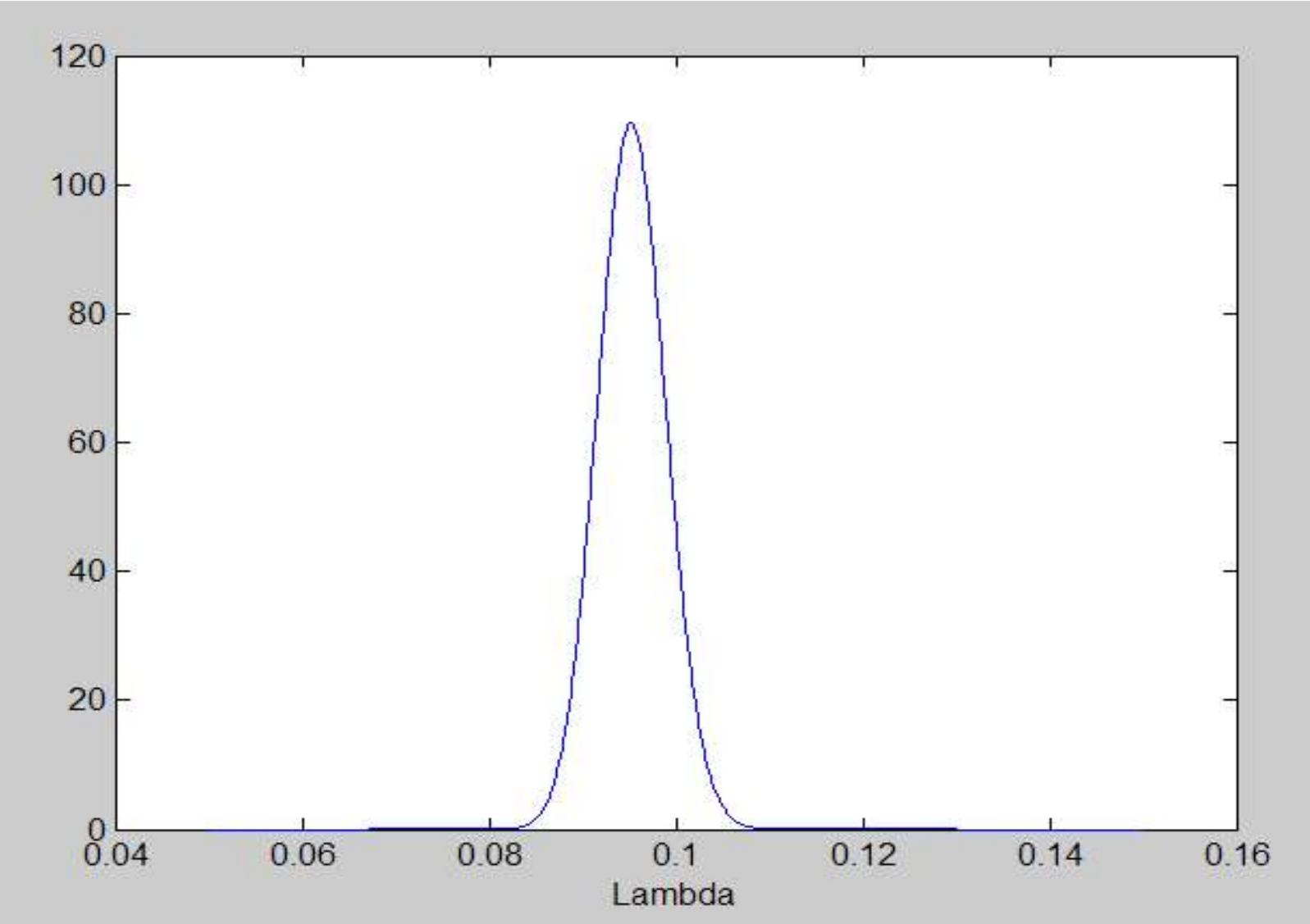
The Maximum Likelihood Estimate

$$\theta = \frac{1}{kN}\sum_{i=1}^{N} x_i$$

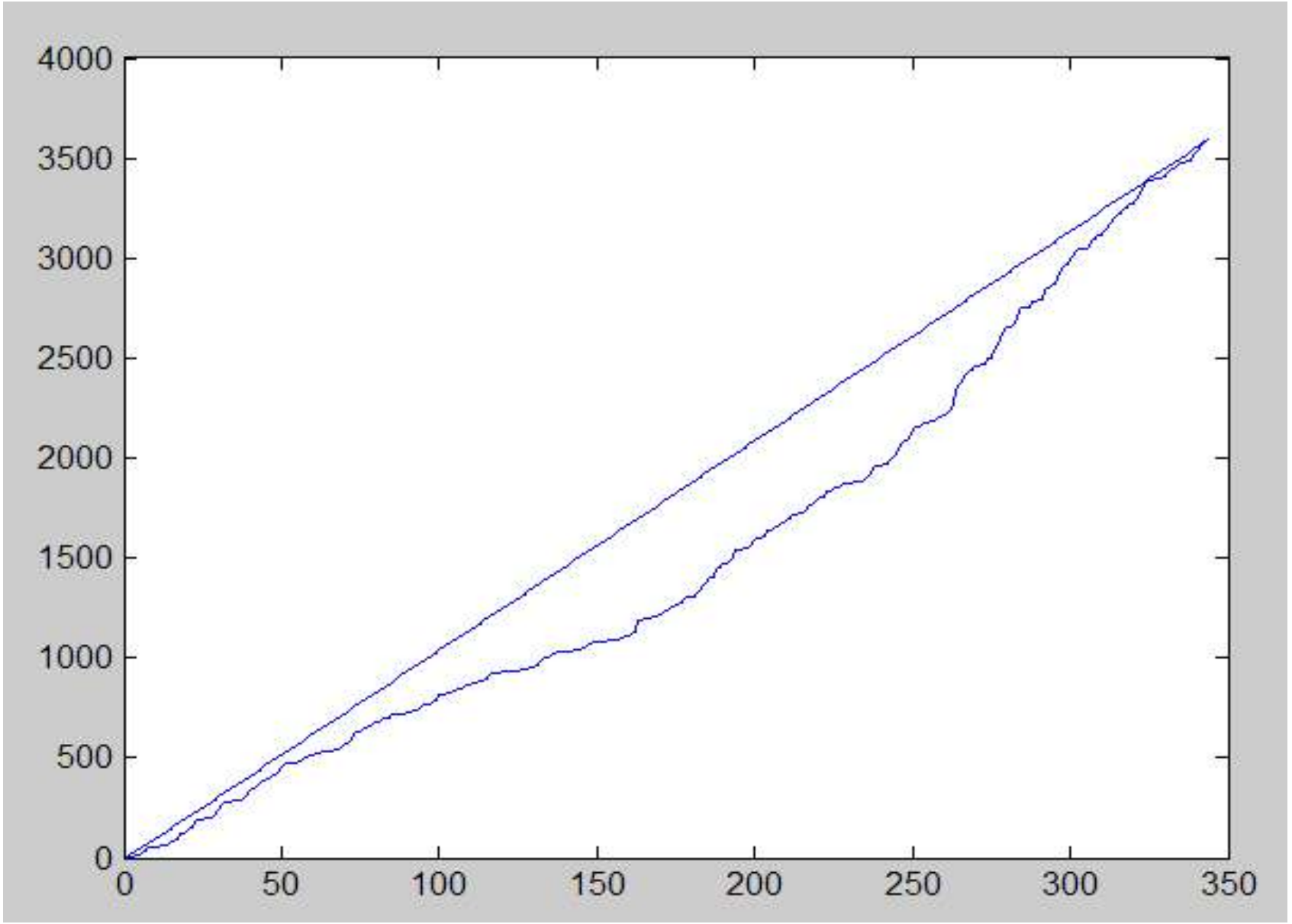
Waiting Time Between People

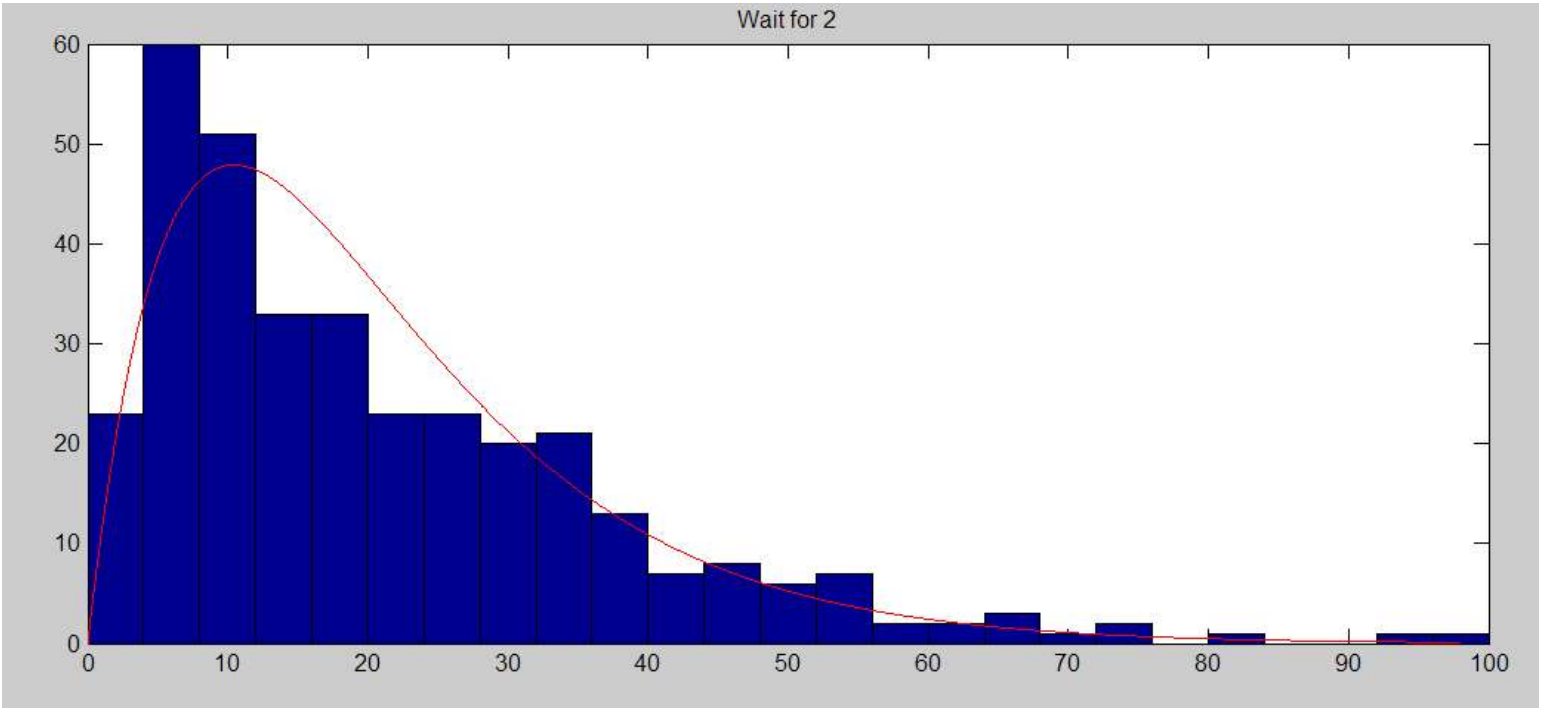


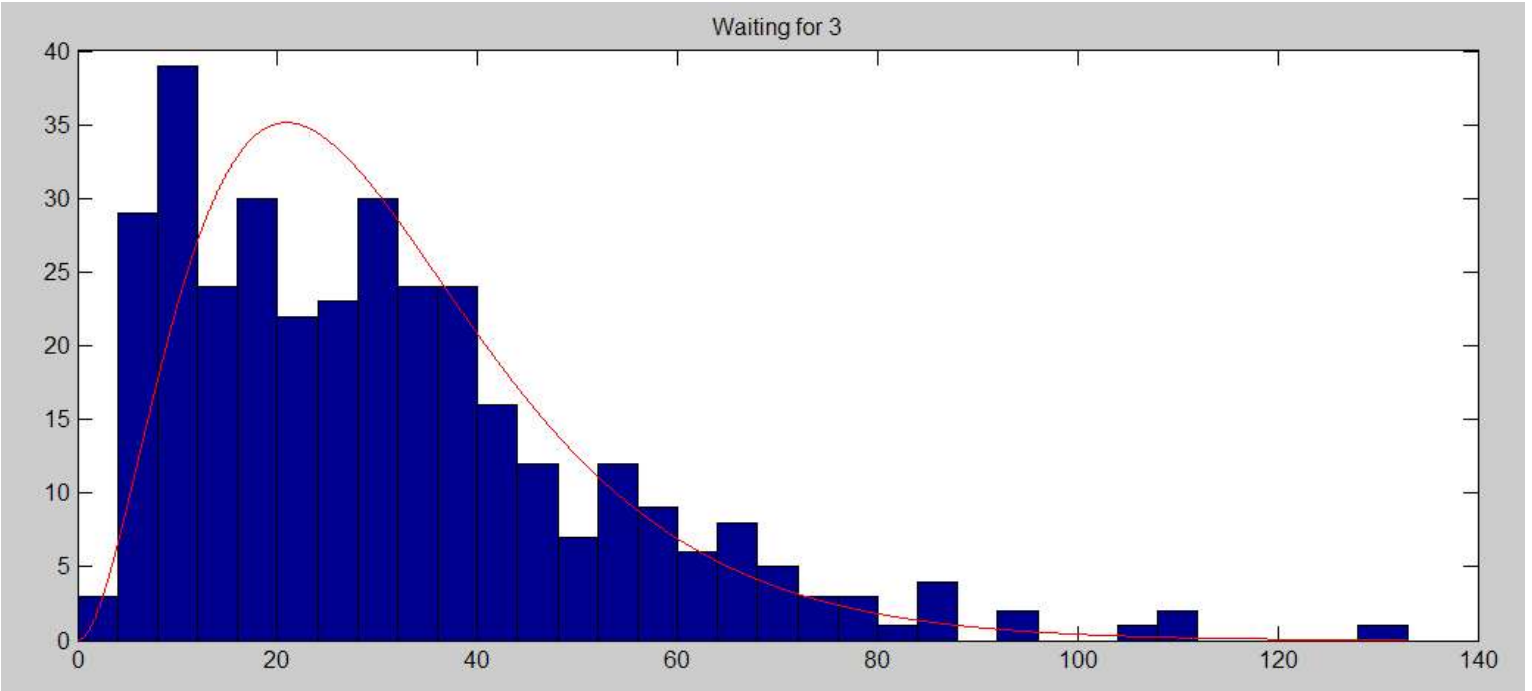
Bayesian Estimate on Rate

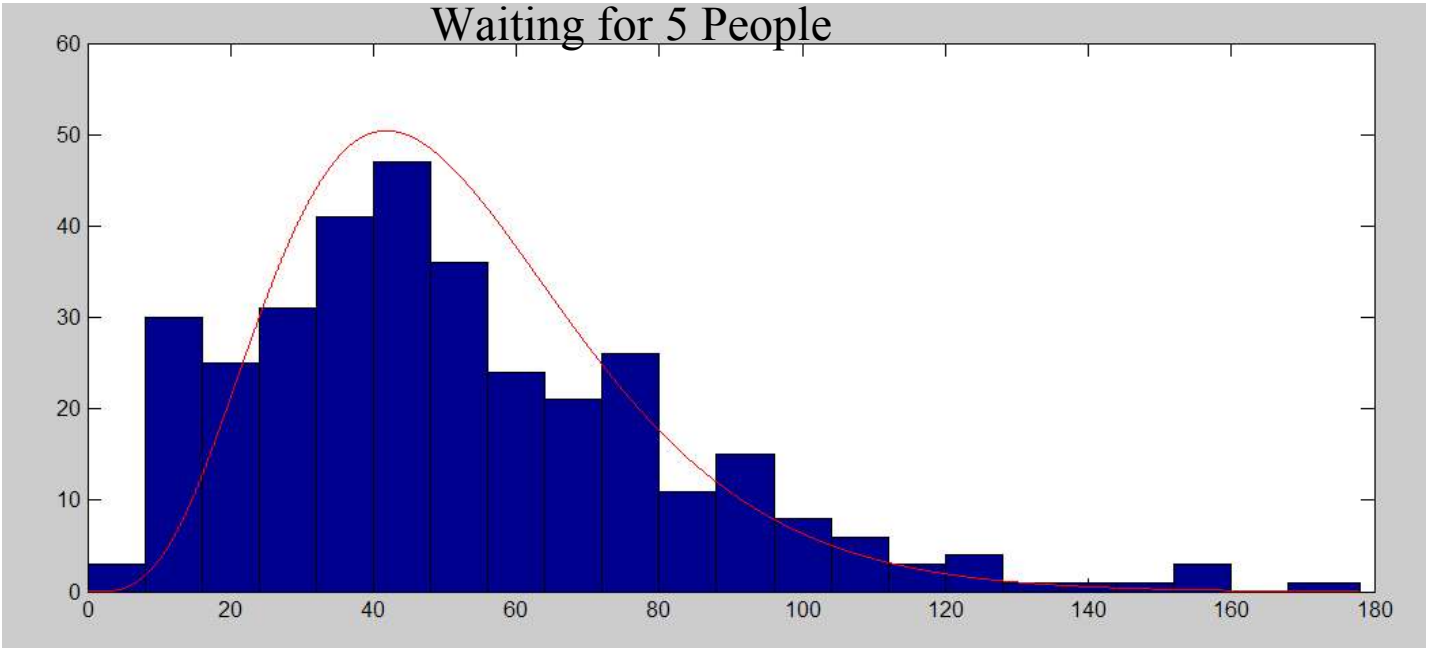


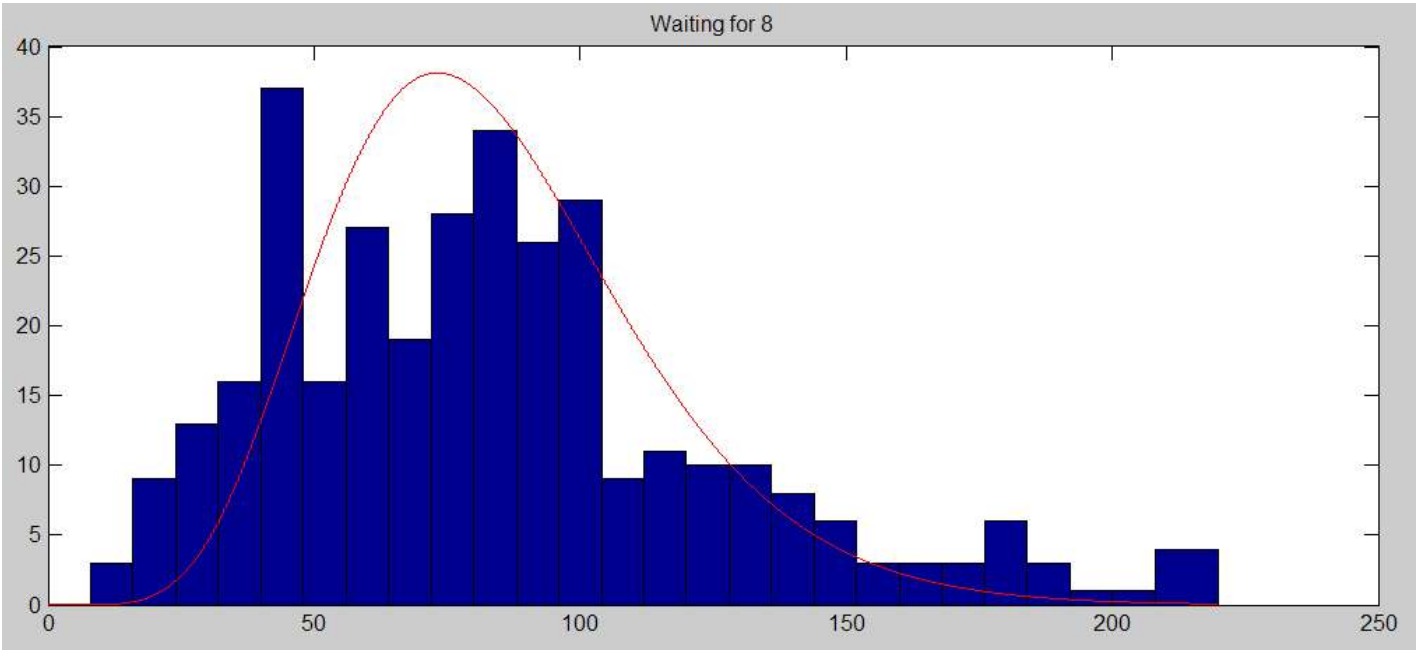
Expected Value = .0951 – same as MLE
95% confidence interval - .088 to .1022

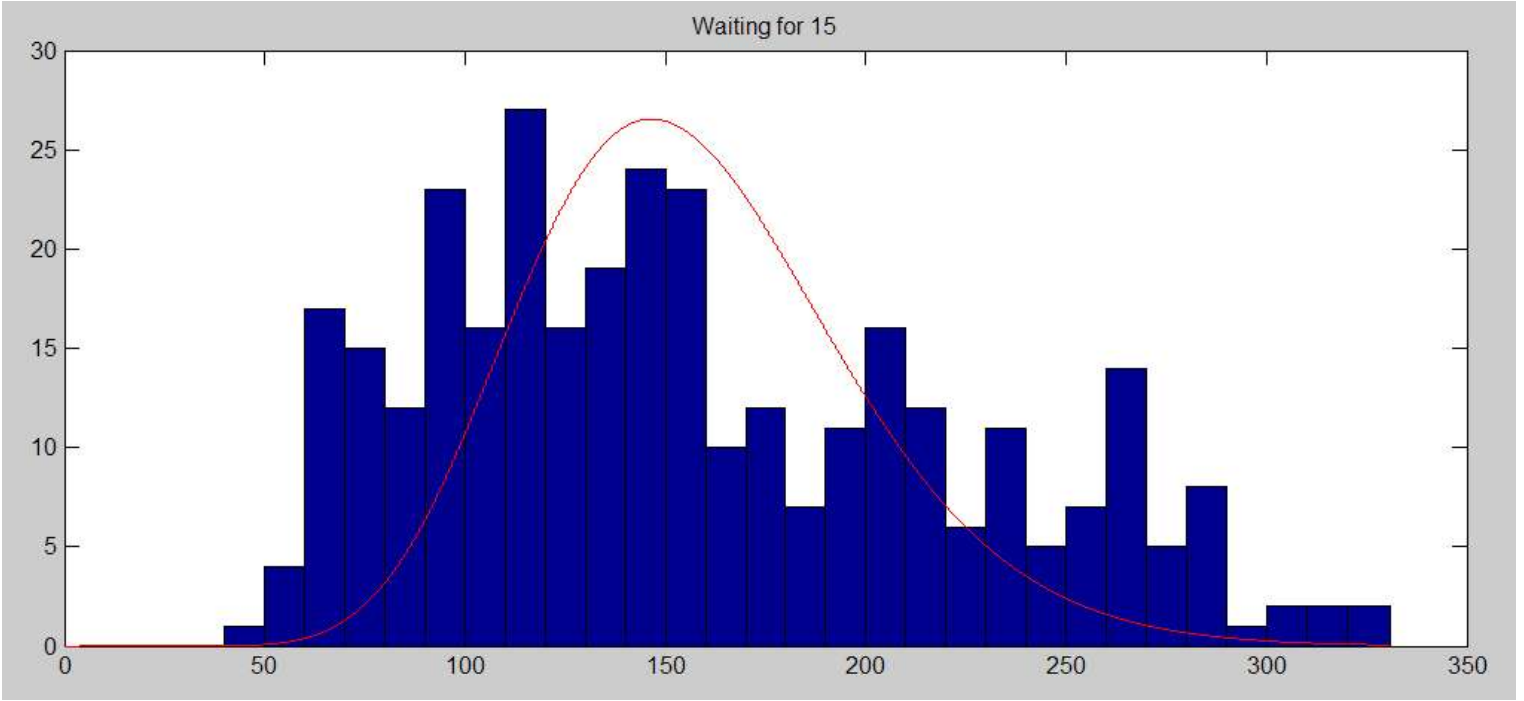

4000
3500
3000
2500
2000
1500
1000
500
0
0
50
100
150
200
250
300
350


Wait for 2
60
50
40
30
20
10
0
0
10
20
30
40
50
60
70
80
90
100

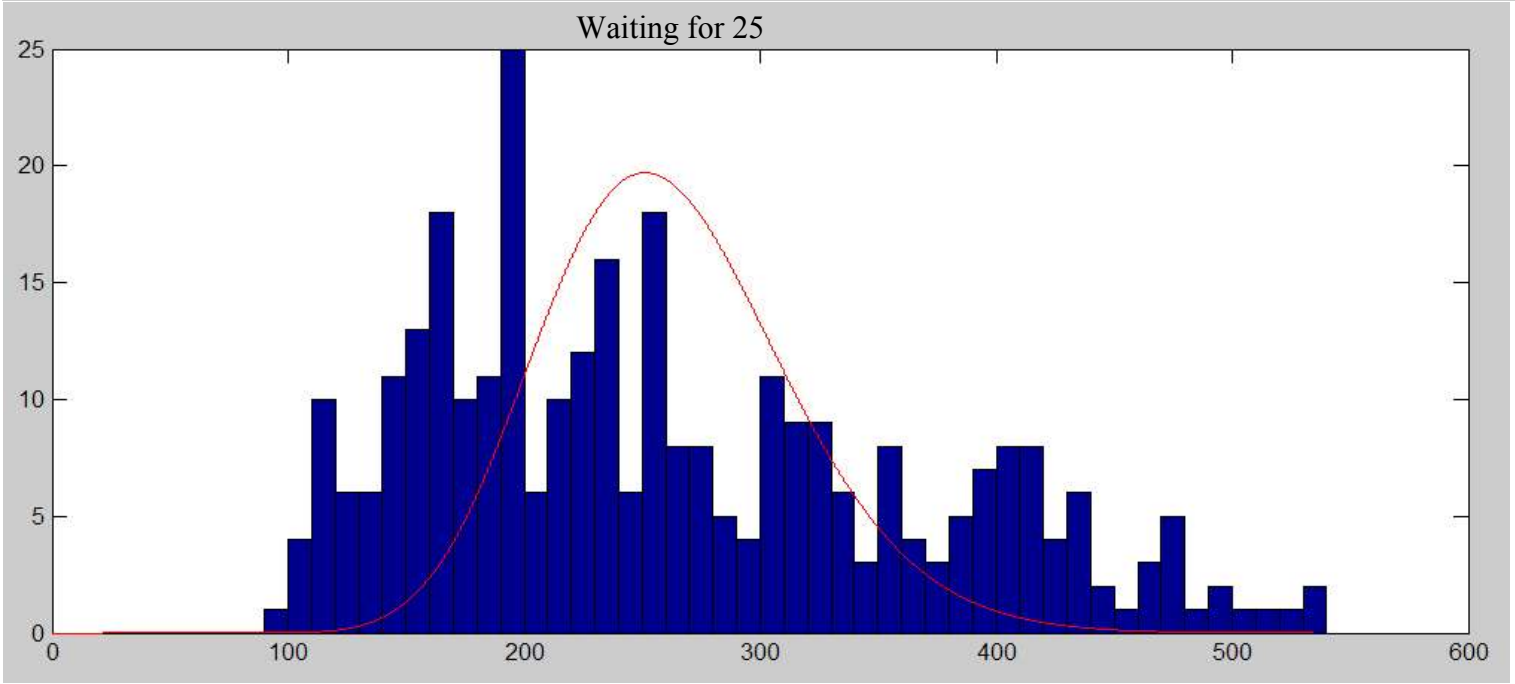

Waiting for 3
40
35
30
25
20
15
10
5
0
0
20
40
60
80
100
120
140


Waiting for 5 People
60
50
40
30
20
10
0
0
20
40
60
80
100
120
140
160
180


Waiting for 8
40
35
30
25
20
15
10
5
0
0
50
100
150
200
250



Waiting for 25



Modeling Group Size As a Positive Poisson Distribution

$$f(y;\lambda) = \begin{cases} \dfrac{e^{-\lambda}\,\lambda^{y}}{y!\,(1-e^{-\lambda})} & y = 1, 2, \ldots \text{ and } \lambda > 0, \\ 0, & y = 0. \end{cases}$$

$$\hat{\mu}_i = \frac{\hat{\lambda}_i}{1 - e^{-\hat{\lambda}_i}}$$

Group Size Results

Group size	group	predict
1	240	231.2
2	74	85.8
3	21	21.26
4	6	3.925
5	1	.9898
6	1	.116

average = 486/343 --> 1.4169 = lambda/(1-e^-lambda)
lambda = .7427

This is the End. My
Friend. The End.