PROJECT ON CHECK IN COUNTERS AT THE AIRPORT CAPACITY ANALYSIS

LAKSHMI VENKATA RAGHAVA SUDHEER DEVANABOINA

19990804-T172

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GOAL:

The goal of this project is known the difference between average service time and average arrivals of travelers in the check in counters if there is increase in the check in counters and this is done by using Matlab.

MATERIALS USED:

Matlab and its inbuilt functions and problem sets provided by the lecturer.

METHODOLOGY:

As mentioned in the goal that I see the difference between the check in counters at the airport if the check in counters are increased whether there will change in average arrival time and average service time, In this project first I analyzed for if there is one and only check in counter for a particular airways say Qatar airways and then I analyzed if there are two check in counters for particular airways say Qatar airways. Here I used two codes for the analyzing one is for if there is only one check in counter and another code is for if there is two check in counters and the 2 codes are attached to the zip folder they are checkin1.m and checkin2.m and the average arrivals of customers and average service spent by them will be given in the code analysis.m and there we can see the actual difference about what factors effecting the service time and arrival rate of the customers.

Here I generated the figures of arrival rates and service time in both ways i.e., check in counter 1 and 2 check in counters, the graphs are as follows,

No of travelers per checkin counter1

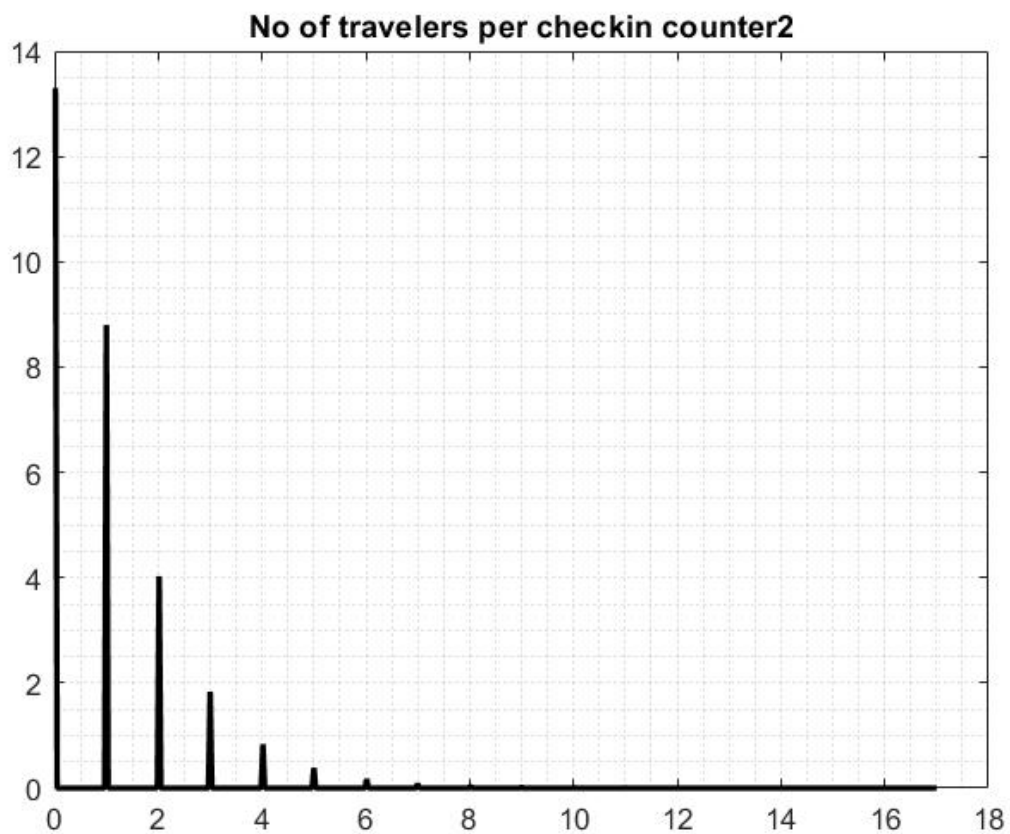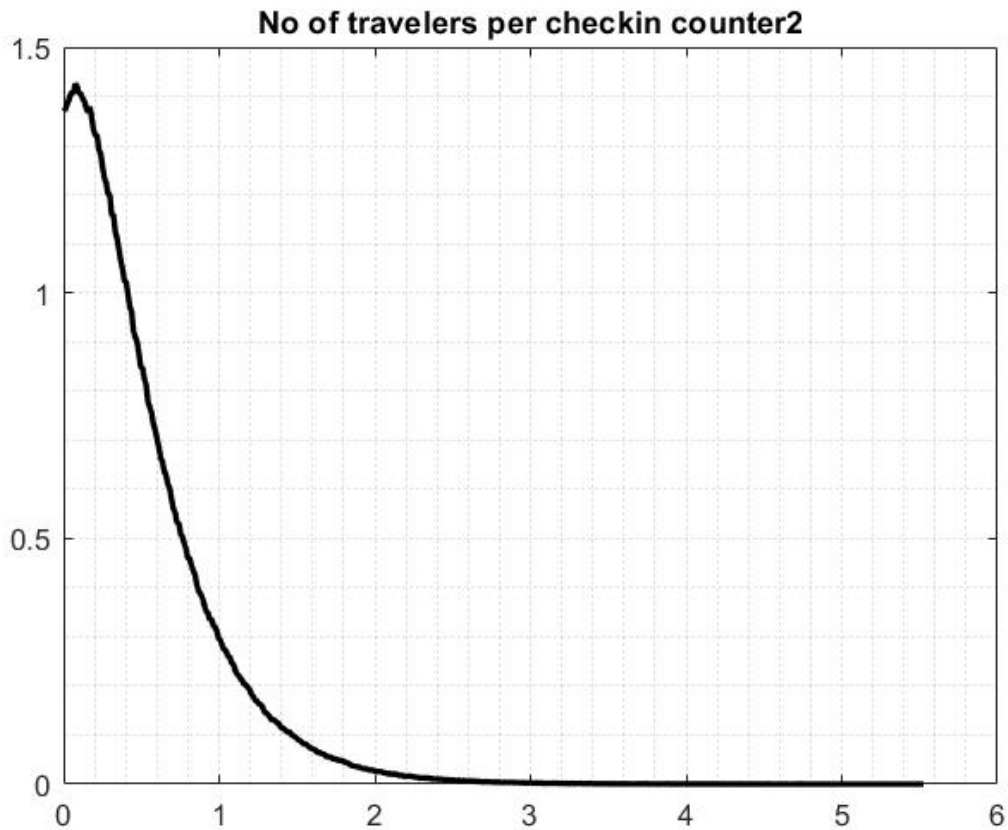## No of travelers per checkin counter1
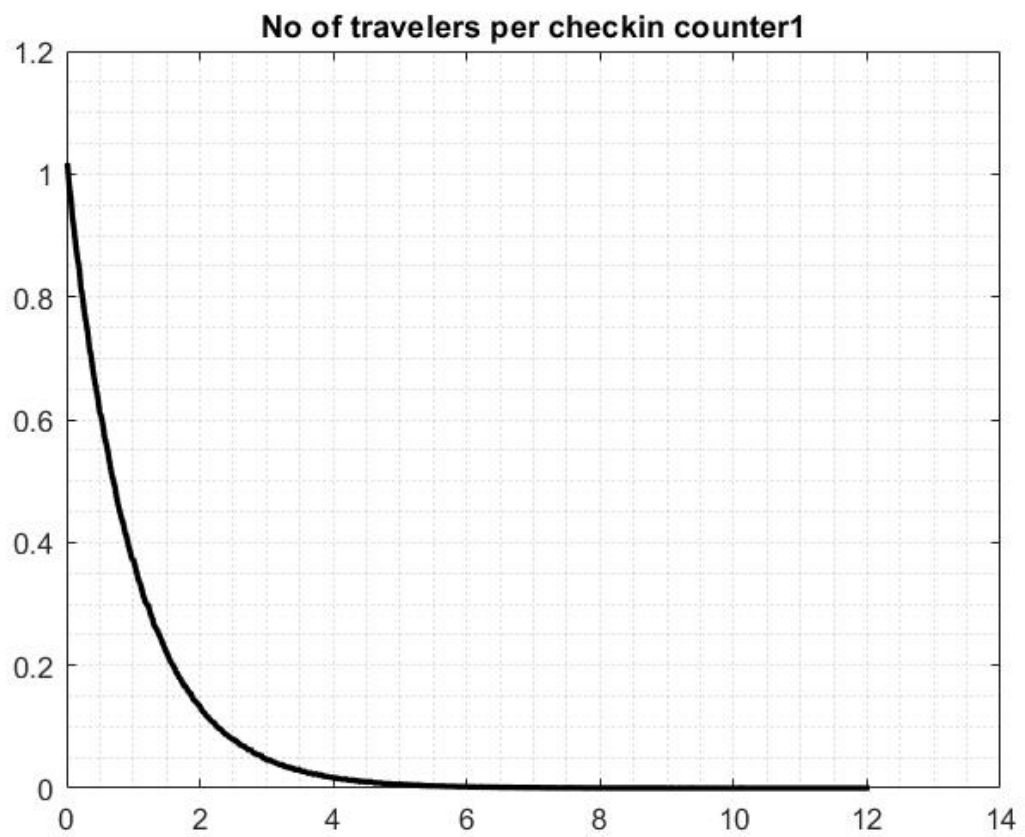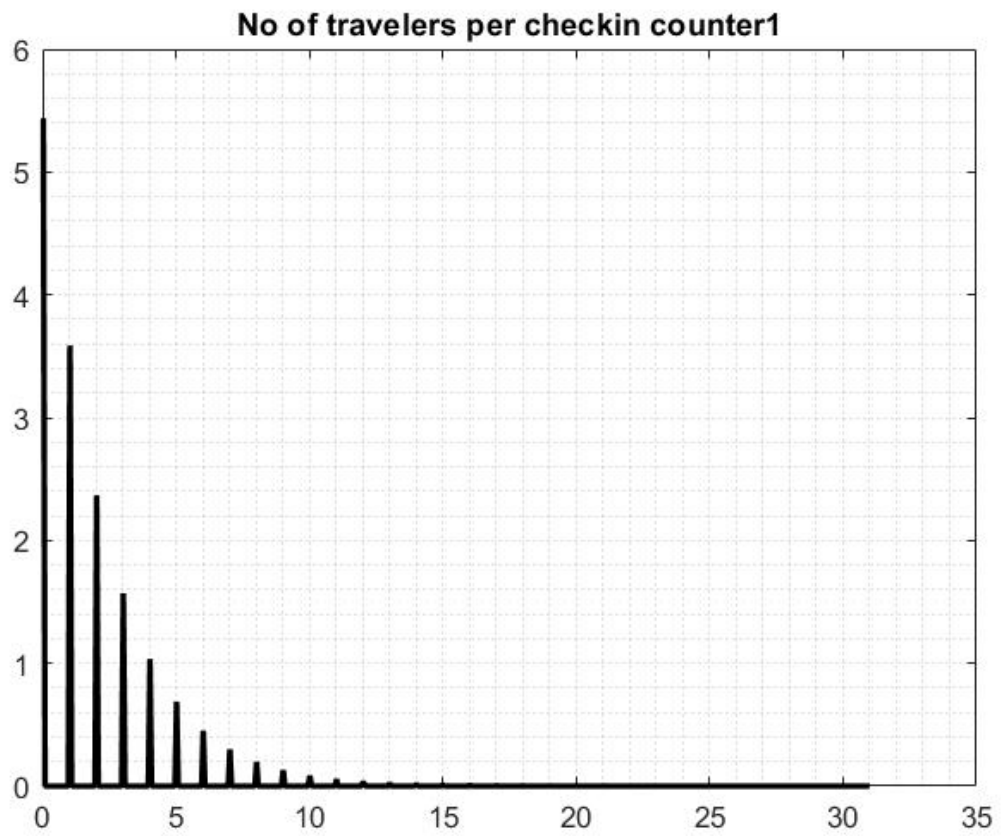
In figure 1 it represents the no of customers are in the queue per one check in counter

In figure 2 it represents the the service time per each customer in the Check in counter.

As we can see that in the figure 2 the service time increases as the probability for service time decreases.

In the same way I ran it for 2 Check in counters,

No of travelers per checkin counter2

No of travelers per checkin counter2

In figure 1 it represents the no of customers are in the queue per two check in counters.

In figure 2 it represents the the service time per each customer in the two Check in counter.

From figure 1 we can say that keeping 2 check in counters decreases the probability of waiting time in the queue at the check in counters.

THEORITICAL CALCULATIONS:

For 1 check in counter

$\text{lambda} = 2$

$\text{mu} \quad = 3$

$\text{rho} \quad = \text{lambda/mu}$

$\quad = 2/3$

$\quad = 0.66$

Average no of travelers $= \text{rho}/(1 - \text{rho})$

$= 0.66/(1 - 0.66)$

$= 1.94$

Average service time = (1/mu) / (1 – rho)

$$= 0.33/ 0.34$$

$$= 0.97$$

For 2 checkin counters

m = 2

lambda = m * 3

$$= 6$$

mu= 3

rho= lambda/2 * mu

$$= 6/6 = 1$$

Rho_0 = ($€$(k=0 to m-1) (m*rho)^k/k! + ((m*rho)^m/m!)(1/(1-rho)))^-1

Average no of customers=m*rho + (rho(m*rho)^m/m!)(rho_0/1-rho)^2)

By substituting the given values we get,

P_0 = 1/3

Average no of customers = 0.9

We can calculate average service time using the little's formula, i.e.,

Average service time = Average no of customers / eff. lambda

$$= 0.45$$

ANALYSIS OF RESULTS:

By comparing the practical and theoretical calculations,

Analysis	Theoretical	Practical	Accuracy
Avg no of arrivals	1.94	1.95	99%
Avg Service time	0.97	0.96	99%

For 2 check in counters

Analysis	Theoretical	Practical	Accuracy
Avg no of arrivals	0.99	1.01	98%
Avg Service time	0.45	0.50	97%

CONCLUSION:

From the above results we can conclude that if there are more no of checkin counters at the airport it will be feasable for the travelers to get there work fast and they can catch their flight on time which is very important, it is almost reducing half of the load which will take place in one checkinm counter.

REFERENCE:

- Matlab Help documentation
- Problem sets provided by the lecturer
- Project Opputunities
- S chand P&S