



**ADDIS ABABA INSTITUTE OF TECHNOLOGY**  
**SCHOOL OF ELECTRICAL AND COMPUTER ENGINEERING**  
**DEPARTMENT OF COMPUTER ENGINEERING**  
**(Master's Program)**

**Computer System Modeling & Simulation**  
**Project**

**Team Members**

**Name:** Melat Kebede Abraham

**Id:** GSR/6124/14

**Name:** Debora Taye

**Id:** GSR/9503/14

**Submitted To:** Dr. Sosina M. Gashaw

**Submitted Date:** Feb – 01 – 2022 G.C

## Computer System Modeling & Simulation – Project

### System #2:

Your system consists of a single CPU with finite buffer capacity. Jobs arrive according to a Poisson process with rate  $\lambda$  jobs/sec. The job sizes are exponentially distributed with mean  $1/\mu$  seconds. Jobs are serviced in FCFS order. Let  $N - 1$  denotes the maximum number of jobs that your system can hold in the queue. Thus, including the job serving, there are a maximum of  $N$  jobs in the system at any one time. If a job arrives when there are already  $N$  jobs in the system, then the arriving job is rejected.

### Give a detailed description of:

#### Q1, The system model

The System model components:

**Entity:** Customers

: Server

: Queue

**State:** Number of jobs in the system

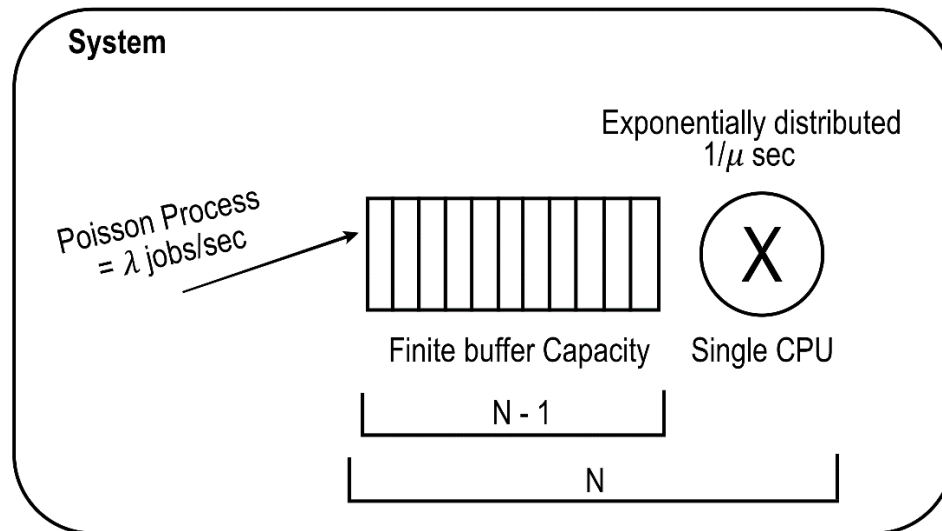
: Server state (Idle, Busy)

**Event:** Customer arrival

: Customer departure

: Simulation ending condition

- Logical relationship between model components:
  - a) **Queue length (Customers in the queue):** as the arrival rate of customers increase the number of customers in the system increase and the server state goes to busy.
  - b) **Jobs in the Server:** as the arrival rate of customers increase, the number of customers in the server increases.
- Essential characteristics for each component:
  - a) **Customers:** Arrival rate  
: Arrival pattern
  - b) **Server:** Service rate
  - c) **Queue:** Queue discipline (FCFS)  
: Queue size ( $N - 1$ )
- Structural description:



- Input models/assumptions:
  - a) Arrival rate ( $\lambda$ )
  - b) Service rate ( $1/\mu$ )
  - c) Queue capacity = ( $N - 1$ )
  - d) System capacity =  $N$

**Q2,** Pseudo code/flow chart for your DES algorithm (you have to apply the event scheduling approach)

Initialization

Schedule the first arrival

Insert the scheduled arrival in the FES

While the CurrentTime  $\leq$  SimuTime

    Remove the first event from FES

    Advance the Current time=the event time

    If the event == Arrival event

        Destroy the record (from FES)

        Check if the Number of customers in the Queue is less than  $N - 1$

        Number of customers in the queue++

        Schedule the next arrival

        Insert the scheduled arrival in the FES and Sort FES

        If the server state==idle

```

        Server state=busy
        Schedule departure event
        Insert the departure event in the FES and Sort FES
        Number of customers in the queue--
    else:
        Queue ++
    else if the Number of customers in the Queue is equal to N - 1
        Drop the Arrival event

Else If the event == Departure event
    Destroy the record (from FES)
    if Number of customers in the queue != 0
        Server state=busy
        Schedule departure event
        Insert the departure event in the FES and Sort FES
        Number of customers in the queue --
Else
    Server state=idle

```

**Q3,** Random number and random variable generation methods you employ?

**Ans:** random.expovariate()

**Random:** module is used to generate random number in Python. It generates pseudo-random numbers. That implies that these randomly generated numbers can be determined.

**Expovariate():** is an inbuilt method of the **random** module. It is used to return a random floating-point number with exponential distribution.

```

import random

lamda = 3

for i in range(10):
    value = random.expovariate(lamda)
    print(value)

```

**Output:**

```
In [2]: runfile('C:/Users/Dell-PC/Python/Runner_Simulation_Two.py', wdir='C:/Users/Dell-PC/Python')
0.0718860998003
0.688781696442
0.470857180885
0.126647188503
0.144993996667
0.530108296451
0.0504961510631
0.146068786353
0.220191982057
0.119182638699
```

**Q4,** The method you employ to verify your operational model?

**Verification:** determining if the implemented model is consistent with its specifications.

**Method:**

Comparison of the conceptual or mathematical model to computer representation by long-run measures of performance compare with that of the performance that has been obtained from the simulation or that has been computed analytically.

**Q5,** Any assumptions you make?

- a) Simulation end condition = 100 cycles / iterations
- b) Arrival rate ( $\lambda$ ): 2
- c) Service rate ( $1/\mu$ ): 3
- d) Queue capacity: =  $(50 - 1) = 49$
- e) System capacity:  $N = 50$

**Evaluate the performance of the system using the following parameters:**

**Q1,** Average response time/latency?

$$\text{Average response time / latency} = \frac{\lambda}{\mu} (\mu - \lambda)$$

$$\text{Average response time / latency} = \frac{3}{2} (3 - 2)$$

$$\text{Average response time / latency} = 1.5$$

**Q2,** Average number of waiting requests/jobs?

$$\text{Server Utilization} = \frac{\lambda}{\mu}$$

$$\text{Server Utilization} = \frac{3}{0.5} = 6$$

$$\text{Number of customer in queue} = \frac{\text{Server Utilization}^2}{1 - \text{Server Utilization}}$$

$$\text{Number of customer in queue} = \frac{36}{5} = 7.2$$

$$\text{Waiting time in the queue} = \frac{Lq}{\mu}$$

$$\text{Waiting time in the queue} = \frac{7.2}{2} = 3.6$$

$$\text{Waiting time in the system} = Wq + \frac{1}{\mu}$$

$$\text{Waiting time in the system} = 3.6 + \frac{1}{0.5}$$

$$\text{Waiting time in the system} = 5.6$$

$$\text{Average Number of waiting Customer} = \lambda Ws$$

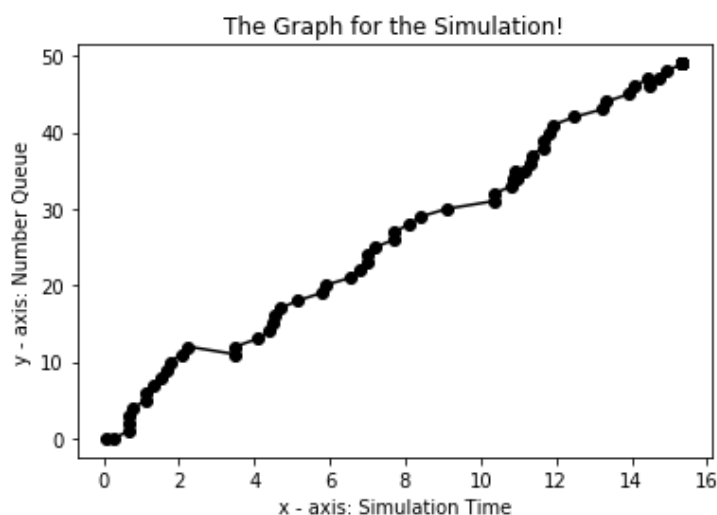
$$\text{Average Number of waiting Customer} = (3)(5.6)$$

$$\text{Average Number of waiting Customer} = 16.8$$

**Q3**, Blocking probability?

$$\text{Blocking probability} = \frac{\text{Total number of dropped customers}}{\text{Total number of arrived customers}}$$

**Q4**, Also, you have to show the evolution of the number of jobs/requests in the queue over time, i.e. number of jobs versus simulation time?



---

('Number of Arrivals:', 92)  
( 'Number of Departure:', 9)  
( 'Number of Customers in the Queue', 49)  
( 'Number of Dropped arrivals:', 32)

---

Simulation has ended at ==> 17.3795225932  
Average number of Waiting time ==> 1.38561468747  
Average Response time ==> 0.426067353236  
Average number of Waiting Customers in the system ==> 16.5  
( 'Blocking probability ==> ', 0.34782608695652173)

---

## Implementation of the Python code

```
import numpy as np
import random
import sys

path = 'C:/Users/Dell-PC/Desktop/Outputfile.txt'
sys.stdout = open(path, 'w')

def Sort_Future_event_list(List):
    for i in range(0, len(List)):
        for j in range(0, len(List)-i-1):
            if(List[j][1] > List[j+1][1]):
                value = List[j]
                List[j] = List[j+1]
                List[j+1] = value

def Generate_interarrival():
    return random.expovariate(3)

def Generate_service_time():
    return random.expovariate(0.5)

def Add_to_List(Event):
    Customer.append(Event[0])
    Arrival.append(Event[1])

Server_state = 0

Future_event_list = []
Queue = []
Waiting_time = []
Response_time = []
Simulation_time = []
Number_Queue = []

Customer = []
Arrival = []
Departure = []

Clock = 0
Arrival_No = 0
Departure_No = 0

Number_in_queue = 0
Dropped_arrival = 0

Queue_capacity = 49

# Schedule the first arrival
Arrival_time = Clock + Generate_interarrival()
Arrival_No += 1
Event_list = ["Customer : " + str(Arrival_No), Arrival_time, "Arrival"]
Add_to_List(Event_list)

Future_event_list.append(Event_list)
```



```

print("*****")
for i in range(10):
    print("For iteration : " + str(i))
    print("-----")
    print("Future Event List :", Future_event_list)

    current_event = Future_event_list[0]
    print("Current Event : " , current_event)
    Customer_No = current_event[0]
    Clock = current_event[1]
    Simulation_time.append(Clock)
    print("Current Time : " , Clock)
    print("Current Customers in the Queue" , Number_in_queue)
    Number_Queue.append(Number_in_queue)
    #print("Customers in the Queue" , Queue)
    if "Arrival" in current_event:
        Arrival_No += 1
        if Number_in_queue < Queue_capacity:
            #Number_in_queue += 1
            Arrival_time = Clock + Generate_interarrival()
            Event_list = ["Customer : " + str(Arrival_No), Arrival_time, "Arrival"]
            Add_to_List(Event_list)
            Future_event_list.append(Event_list)
            Sort_Future_event_list(Future_event_list)
            if Server_state == 0:
                # Service
                Server_state = 1
                Future_event_list.remove(current_event)
                Departure_time = Clock + Generate_service_time()
                Response = Departure_time - (Departure_time - Clock)
                Response_time.append(Response)
                Event_list = [str(Customer_No), Departure_time, "Departure"]
                Future_event_list.append(Event_list)
                Sort_Future_event_list(Future_event_list)
            else:
                Number_in_queue += 1
                Queue.append(current_event)
                Sort_Future_event_list(Queue)
                Future_event_list.remove(current_event)

        else:
            Dropped_arrival += 1
    if "Departure" in current_event:
        Current_clock = current_event[1]
        Departure.append(current_event[1])
        Future_event_list.remove(current_event)
        Departure_No += 1
        Server_state = 0
        if Number_in_queue != 0:

```

```

    # Service
    Server_state = 1
    Number_in_queue -= 1
    Event_queue = Queue[0]
    Queue_Customer_No = Event_queue[0]
    Waiting = Current_clock - Event_queue[1]
    Waiting_time.append(Waiting)
    Departure_time = Current_clock + Generate_service_time()
    Response = Departure_time - (Departure_time - Current_clock)
    Response_time.append(Response)
    Event_list = [str(Queue_Customer_No), Departure_time, "Departure"]
    Future_event_list.append(Event_list)
    Sort_Future_event_list(Future_event_list)
    Queue.remove(Event_queue)
else:
    Server_state = 0

print("-----")
print("Final Future Event List : ", Future_event_list)
print("Customers in the Queue", Queue)

print("-----")
print("Number of Arrivals : ", Arrival_No)
print("Number of Departure : ", Departure_No)
print("Number of Customers in the Queue", Number_in_queue)
print("Number of Dropped arrivals : ", Dropped_arrival)

Sum_Weighting_time = 0
for i in range(len(Waiting_time)):
    Sum_Weighting_time += Waiting_time[i]

Sum_Response_time = 0
for i in range(len(Response_time)):
    Sum_Response_time += Response_time[i]

print("-----")
print("Simulation has ended at ==> " + str(Clock))
print(" Average number of Waiting time ==> " + str(Sum_Weighting_time / Clock) )
print(" Average Response time ==> " + str(Sum_Response_time / Arrival_No) )
print(" Average number of Waiting Customers in the system ==> " + str((Number_in_queue / 3) + 0.5) )
print("Blocking probability ==> " , float(Dropped_arrival) / Arrival_No)

print("-----")
print("Customers :")
print(Customer)
print("\n")
print("Arrivals : ")
print(Arrival)
print("\n")
print("Departures : ")
print(Departure)

# importing the required module
import matplotlib.pyplot as plt

# plotting the points
plt.plot(Simulation_time , Number_Queue , '-ok')

# naming the x axis
plt.xlabel('x - axis: Simulation Time')
# naming the y axis
plt.ylabel('y - axis: Number Queue')

# giving a title to my graph
plt.title('The Graph for the Simulation!')

# function to show the plot

plt.show()

sys.stdout.close()

```

## Output Obtained

\*\*\*\*\*

\*\*\*\*\*

For iteration : 0

-----  
(Future Event List :', [['Customer : 1', 0.09834027418681303, 'Arrival']])

(Current Event : ', ['Customer : 1', 0.09834027418681303, 'Arrival'])

(Current Time :', 0.09834027418681303)

(Current Customers in the Queue', 0)

For iteration : 1

-----  
(Future Event List :', [['Customer : 2', 0.18779013555692525, 'Arrival'], ['Customer : 1', 0.6702071086893169, 'Departure']])

(Current Event : ', ['Customer : 2', 0.18779013555692525, 'Arrival'])

(Current Time :', 0.18779013555692525)

(Current Customers in the Queue', 0)

For iteration : 2

-----  
(Future Event List :', [['Customer : 3', 0.5780526611444732, 'Arrival'], ['Customer : 1', 0.6702071086893169, 'Departure']])

(Current Event : ', ['Customer : 3', 0.5780526611444732, 'Arrival'])

(Current Time :', 0.5780526611444732)

(Current Customers in the Queue', 1)

For iteration : 3

-----  
(Future Event List :', [['Customer : 1', 0.6702071086893169, 'Departure'], ['Customer : 4', 0.9903687506804082, 'Arrival']])

(Current Event : ', ['Customer : 1', 0.6702071086893169, 'Departure'])

(Current Time :', 0.6702071086893169)

(Current Customers in the Queue', 2)

For iteration : 4

-----  
(Future Event List :', [['Customer : 4', 0.9903687506804082, 'Arrival'], ['Customer : 2', 1.5460246546217804, 'Departure']])

(Current Event : ', ['Customer : 4', 0.9903687506804082, 'Arrival'])

(Current Time :', 0.9903687506804082)

(Current Customers in the Queue', 1)

For iteration : 5

-----  
(Future Event List :', [['Customer : 2', 1.5460246546217804, 'Departure'], ['Customer : 5', 1.8110825336449272, 'Arrival']])

(Current Event : ', ['Customer : 2', 1.5460246546217804, 'Departure'])

(Current Time :', 1.5460246546217804)

(Current Customers in the Queue', 2)

For iteration : 6

-----

('Future Event List :', [['Customer : 5', 1.8110825336449272, 'Arrival'], ['Customer : 3', 1.9633290484911579, 'Departure']])  
('Current Event : ', ['Customer : 5', 1.8110825336449272, 'Arrival'])  
('Current Time :', 1.8110825336449272)  
('Current Customers in the Queue', 1)  
For iteration : 7

---

('Future Event List :', [['Customer : 3', 1.9633290484911579, 'Departure'], ['Customer : 6', 2.0109424645022176, 'Arrival']])  
('Current Event : ', ['Customer : 3', 1.9633290484911579, 'Departure'])  
('Current Time :', 1.9633290484911579)  
('Current Customers in the Queue', 2)  
For iteration : 8

---

('Future Event List :', [['Customer : 6', 2.0109424645022176, 'Arrival'], ['Customer : 4', 2.890327250952047, 'Departure']])  
('Current Event : ', ['Customer : 6', 2.0109424645022176, 'Arrival'])  
('Current Time :', 2.0109424645022176)  
('Current Customers in the Queue', 1)  
For iteration : 9

---

('Future Event List :', [['Customer : 7', 2.1301204825849602, 'Arrival'], ['Customer : 4', 2.890327250952047, 'Departure']])  
('Current Event : ', ['Customer : 7', 2.1301204825849602, 'Arrival'])  
('Current Time :', 2.1301204825849602)  
('Current Customers in the Queue', 2)  
For iteration : 10

---

('Future Event List :', [['Customer : 8', 2.211843649585851, 'Arrival'], ['Customer : 4', 2.890327250952047, 'Departure']])  
('Current Event : ', ['Customer : 8', 2.211843649585851, 'Arrival'])  
('Current Time :', 2.211843649585851)  
('Current Customers in the Queue', 3)  
For iteration : 11

---

('Future Event List :', [['Customer : 9', 2.236619812770363, 'Arrival'], ['Customer : 4', 2.890327250952047, 'Departure']])  
('Current Event : ', ['Customer : 9', 2.236619812770363, 'Arrival'])  
('Current Time :', 2.236619812770363)  
('Current Customers in the Queue', 4)  
For iteration : 12

---

('Future Event List :', [['Customer : 10', 2.8617139666485514, 'Arrival'], ['Customer : 4', 2.890327250952047, 'Departure']])  
('Current Event : ', ['Customer : 10', 2.8617139666485514, 'Arrival'])  
('Current Time :', 2.8617139666485514)  
('Current Customers in the Queue', 5)  
For iteration : 13

---

('Future Event List :', [['Customer : 4', 2.890327250952047, 'Departure'], ['Customer : 11', 2.967782614756585, 'Arrival']])  
('Current Event : ', ['Customer : 4', 2.890327250952047, 'Departure'])  
('Current Time :', 2.890327250952047)  
('Current Customers in the Queue', 6)  
For iteration : 14

---

('Future Event List :', [['Customer : 5', 2.9562188141855983, 'Departure'], ['Customer : 11', 2.967782614756585, 'Arrival']])  
('Current Event : ', ['Customer : 5', 2.9562188141855983, 'Departure'])  
('Current Time :', 2.9562188141855983)  
('Current Customers in the Queue', 5)  
For iteration : 15

---

('Future Event List :', [['Customer : 11', 2.967782614756585, 'Arrival'], ['Customer : 6', 3.982090936819505, 'Departure']])  
('Current Event : ', ['Customer : 11', 2.967782614756585, 'Arrival'])  
('Current Time :', 2.967782614756585)  
('Current Customers in the Queue', 4)  
For iteration : 16

---

('Future Event List :', [['Customer : 12', 3.8139597713825744, 'Arrival'], ['Customer : 6', 3.982090936819505, 'Departure']])  
('Current Event : ', ['Customer : 12', 3.8139597713825744, 'Arrival'])  
('Current Time :', 3.8139597713825744)  
('Current Customers in the Queue', 5)  
For iteration : 17

---

('Future Event List :', [['Customer : 6', 3.982090936819505, 'Departure'], ['Customer : 13', 4.282175923668759, 'Arrival']])  
('Current Event : ', ['Customer : 6', 3.982090936819505, 'Departure'])  
('Current Time :', 3.982090936819505)  
('Current Customers in the Queue', 6)  
For iteration : 18

---

('Future Event List :', [['Customer : 13', 4.282175923668759, 'Arrival'], ['Customer : 7', 6.142717590433175, 'Departure']])  
('Current Event : ', ['Customer : 13', 4.282175923668759, 'Arrival'])  
('Current Time :', 4.282175923668759)  
('Current Customers in the Queue', 5)  
For iteration : 19

---

('Future Event List :', [['Customer : 14', 4.616521935742785, 'Arrival'], ['Customer : 7', 6.142717590433175, 'Departure']])  
('Current Event : ', ['Customer : 14', 4.616521935742785, 'Arrival'])  
('Current Time :', 4.616521935742785)  
('Current Customers in the Queue', 6)

For iteration : 20

---

('Future Event List :', [['Customer : 15', 4.6219861017686785, 'Arrival'], ['Customer : 7', 6.142717590433175, 'Departure']])

('Current Event : ', ['Customer : 15', 4.6219861017686785, 'Arrival'])

('Current Time :', 4.6219861017686785)

('Current Customers in the Queue', 7)

For iteration : 21

---

('Future Event List :', [['Customer : 16', 5.019991279966137, 'Arrival'], ['Customer : 7', 6.142717590433175, 'Departure']])

('Current Event : ', ['Customer : 16', 5.019991279966137, 'Arrival'])

('Current Time :', 5.019991279966137)

('Current Customers in the Queue', 8)

For iteration : 22

---

('Future Event List :', [['Customer : 17', 5.160760377254086, 'Arrival'], ['Customer : 7', 6.142717590433175, 'Departure']])

('Current Event : ', ['Customer : 17', 5.160760377254086, 'Arrival'])

('Current Time :', 5.160760377254086)

('Current Customers in the Queue', 9)

For iteration : 23

---

('Future Event List :', [['Customer : 18', 5.614204612043698, 'Arrival'], ['Customer : 7', 6.142717590433175, 'Departure']])

('Current Event : ', ['Customer : 18', 5.614204612043698, 'Arrival'])

('Current Time :', 5.614204612043698)

('Current Customers in the Queue', 10)

For iteration : 24

---

('Future Event List :', [['Customer : 19', 5.78865074613964, 'Arrival'], ['Customer : 7', 6.142717590433175, 'Departure']])

('Current Event : ', ['Customer : 19', 5.78865074613964, 'Arrival'])

('Current Time :', 5.78865074613964)

('Current Customers in the Queue', 11)

For iteration : 25

---

('Future Event List :', [['Customer : 20', 5.911942810740196, 'Arrival'], ['Customer : 7', 6.142717590433175, 'Departure']])

('Current Event : ', ['Customer : 20', 5.911942810740196, 'Arrival'])

('Current Time :', 5.911942810740196)

('Current Customers in the Queue', 12)

For iteration : 26

---

('Future Event List :', [['Customer : 21', 6.0307692022343575, 'Arrival'], ['Customer : 7', 6.142717590433175, 'Departure']])

('Current Event : ', ['Customer : 21', 6.0307692022343575, 'Arrival'])

('Current Time :', 6.0307692022343575)

('Current Customers in the Queue', 13)

For iteration : 27

---

('Future Event List :', [['Customer : 22', 6.066689580487001, 'Arrival'], ['Customer : 7', 6.142717590433175, 'Departure']])

('Current Event : ', ['Customer : 22', 6.066689580487001, 'Arrival'])

('Current Time :', 6.066689580487001)

('Current Customers in the Queue', 14)

For iteration : 28

---

('Future Event List :', [['Customer : 7', 6.142717590433175, 'Departure'], ['Customer : 23', 6.495551090208732, 'Arrival']])

('Current Event : ', ['Customer : 7', 6.142717590433175, 'Departure'])

('Current Time :', 6.142717590433175)

('Current Customers in the Queue', 15)

For iteration : 29

---

('Future Event List :', [['Customer : 23', 6.495551090208732, 'Arrival'], ['Customer : 8', 9.41281987402414, 'Departure']])

('Current Event : ', ['Customer : 23', 6.495551090208732, 'Arrival'])

('Current Time :', 6.495551090208732)

('Current Customers in the Queue', 14)

For iteration : 30

---

('Future Event List :', [['Customer : 24', 6.721752499614304, 'Arrival'], ['Customer : 8', 9.41281987402414, 'Departure']])

('Current Event : ', ['Customer : 24', 6.721752499614304, 'Arrival'])

('Current Time :', 6.721752499614304)

('Current Customers in the Queue', 15)

For iteration : 31

---

('Future Event List :', [['Customer : 25', 6.90628073279733, 'Arrival'], ['Customer : 8', 9.41281987402414, 'Departure']])

('Current Event : ', ['Customer : 25', 6.90628073279733, 'Arrival'])

('Current Time :', 6.90628073279733)

('Current Customers in the Queue', 16)

For iteration : 32

---

('Future Event List :', [['Customer : 26', 7.255639891881666, 'Arrival'], ['Customer : 8', 9.41281987402414, 'Departure']])

('Current Event : ', ['Customer : 26', 7.255639891881666, 'Arrival'])

('Current Time :', 7.255639891881666)

('Current Customers in the Queue', 17)

For iteration : 33

---

('Future Event List :', [['Customer : 27', 7.885001200105674, 'Arrival'], ['Customer : 8', 9.41281987402414, 'Departure']])

('Current Event : ', ['Customer : 27', 7.885001200105674, 'Arrival'])

('Current Time :', 7.885001200105674)  
('Current Customers in the Queue', 18)  
For iteration : 34

---

('Future Event List :', [['Customer : 28', 7.943068152078327, 'Arrival'], ['Customer : 8', 9.41281987402414, 'Departure']])  
('Current Event :', ['Customer : 28', 7.943068152078327, 'Arrival'])  
('Current Time :', 7.943068152078327)  
('Current Customers in the Queue', 19)  
For iteration : 35

---

('Future Event List :', [['Customer : 29', 9.10847290837253, 'Arrival'], ['Customer : 8', 9.41281987402414, 'Departure']])  
('Current Event :', ['Customer : 29', 9.10847290837253, 'Arrival'])  
('Current Time :', 9.10847290837253)  
('Current Customers in the Queue', 20)  
For iteration : 36

---

('Future Event List :', [['Customer : 30', 9.122196551513104, 'Arrival'], ['Customer : 8', 9.41281987402414, 'Departure']])  
('Current Event :', ['Customer : 30', 9.122196551513104, 'Arrival'])  
('Current Time :', 9.122196551513104)  
('Current Customers in the Queue', 21)  
For iteration : 37

---

('Future Event List :', [['Customer : 31', 9.175766810062886, 'Arrival'], ['Customer : 8', 9.41281987402414, 'Departure']])  
('Current Event :', ['Customer : 31', 9.175766810062886, 'Arrival'])  
('Current Time :', 9.175766810062886)  
('Current Customers in the Queue', 22)  
For iteration : 38

---

('Future Event List :', [['Customer : 8', 9.41281987402414, 'Departure'], ['Customer : 32', 9.609383641612844, 'Arrival']])  
('Current Event :', ['Customer : 8', 9.41281987402414, 'Departure'])  
('Current Time :', 9.41281987402414)  
('Current Customers in the Queue', 23)  
For iteration : 39

---

('Future Event List :', [['Customer : 9', 9.536120945313572, 'Departure'], ['Customer : 32', 9.609383641612844, 'Arrival']])  
('Current Event :', ['Customer : 9', 9.536120945313572, 'Departure'])  
('Current Time :', 9.536120945313572)  
('Current Customers in the Queue', 22)  
For iteration : 40

---

('Future Event List :', [['Customer : 32', 9.609383641612844, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])



('Current Event : ', ['Customer : 32', 9.609383641612844, 'Arrival'])  
('Current Time : ', 9.609383641612844)  
('Current Customers in the Queue', 21)  
For iteration : 41

---

('Future Event List : ', [['Customer : 33', 9.626423668278138, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 33', 9.626423668278138, 'Arrival'])  
('Current Time : ', 9.626423668278138)  
('Current Customers in the Queue', 22)  
For iteration : 42

---

('Future Event List : ', [['Customer : 34', 10.035341981592016, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 34', 10.035341981592016, 'Arrival'])  
('Current Time : ', 10.035341981592016)  
('Current Customers in the Queue', 23)  
For iteration : 43

---

('Future Event List : ', [['Customer : 35', 10.04198187413557, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 35', 10.04198187413557, 'Arrival'])  
('Current Time : ', 10.04198187413557)  
('Current Customers in the Queue', 24)  
For iteration : 44

---

('Future Event List : ', [['Customer : 36', 10.127857311709894, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 36', 10.127857311709894, 'Arrival'])  
('Current Time : ', 10.127857311709894)  
('Current Customers in the Queue', 25)  
For iteration : 45

---

('Future Event List : ', [['Customer : 37', 10.195791077129185, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 37', 10.195791077129185, 'Arrival'])  
('Current Time : ', 10.195791077129185)  
('Current Customers in the Queue', 26)  
For iteration : 46

---

('Future Event List : ', [['Customer : 38', 10.486890092499312, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 38', 10.486890092499312, 'Arrival'])  
('Current Time : ', 10.486890092499312)  
('Current Customers in the Queue', 27)  
For iteration : 47

---

('Future Event List :', [['Customer : 39', 10.493914856938556, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 39', 10.493914856938556, 'Arrival'])  
('Current Time :', 10.493914856938556)  
('Current Customers in the Queue', 28)  
For iteration : 48

---

('Future Event List :', [['Customer : 40', 10.589773549204104, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 40', 10.589773549204104, 'Arrival'])  
('Current Time :', 10.589773549204104)  
('Current Customers in the Queue', 29)  
For iteration : 49

---

('Future Event List :', [['Customer : 41', 10.64554019447827, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 41', 10.64554019447827, 'Arrival'])  
('Current Time :', 10.64554019447827)  
('Current Customers in the Queue', 30)  
For iteration : 50

---

('Future Event List :', [['Customer : 42', 11.746452130341924, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 42', 11.746452130341924, 'Arrival'])  
('Current Time :', 11.746452130341924)  
('Current Customers in the Queue', 31)  
For iteration : 51

---

('Future Event List :', [['Customer : 43', 11.78414548083285, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 43', 11.78414548083285, 'Arrival'])  
('Current Time :', 11.78414548083285)  
('Current Customers in the Queue', 32)  
For iteration : 52

---

('Future Event List :', [['Customer : 44', 11.842057236771831, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 44', 11.842057236771831, 'Arrival'])  
('Current Time :', 11.842057236771831)  
('Current Customers in the Queue', 33)  
For iteration : 53

---

('Future Event List :', [['Customer : 45', 12.99633334991605, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 45', 12.99633334991605, 'Arrival'])  
('Current Time :', 12.99633334991605)  
('Current Customers in the Queue', 34)  
For iteration : 54

---

('Future Event List :', [['Customer : 46', 13.693918914678438, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 46', 13.693918914678438, 'Arrival'])  
('Current Time :', 13.693918914678438)  
('Current Customers in the Queue', 35)  
For iteration : 55

---

('Future Event List :', [['Customer : 47', 13.704001671091431, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 47', 13.704001671091431, 'Arrival'])  
('Current Time :', 13.704001671091431)  
('Current Customers in the Queue', 36)  
For iteration : 56

---

('Future Event List :', [['Customer : 48', 13.778408212448404, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 48', 13.778408212448404, 'Arrival'])  
('Current Time :', 13.778408212448404)  
('Current Customers in the Queue', 37)  
For iteration : 57

---

('Future Event List :', [['Customer : 49', 13.785208374284597, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 49', 13.785208374284597, 'Arrival'])  
('Current Time :', 13.785208374284597)  
('Current Customers in the Queue', 38)  
For iteration : 58

---

('Future Event List :', [['Customer : 50', 14.037108635224408, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 50', 14.037108635224408, 'Arrival'])  
('Current Time :', 14.037108635224408)  
('Current Customers in the Queue', 39)  
For iteration : 59

---

('Future Event List :', [['Customer : 51', 14.55788795025575, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 51', 14.55788795025575, 'Arrival'])  
('Current Time :', 14.55788795025575)  
('Current Customers in the Queue', 40)  
For iteration : 60

---

('Future Event List :', [['Customer : 52', 15.2222118590173, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 52', 15.2222118590173, 'Arrival'])  
('Current Time :', 15.2222118590173)  
('Current Customers in the Queue', 41)

For iteration : 61

---

('Future Event List :', [['Customer : 53', 15.251791776456846, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])

('Current Event : ', ['Customer : 53', 15.251791776456846, 'Arrival'])

('Current Time :', 15.251791776456846)

('Current Customers in the Queue', 42)

For iteration : 62

---

('Future Event List :', [['Customer : 54', 15.309183184070609, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])

('Current Event : ', ['Customer : 54', 15.309183184070609, 'Arrival'])

('Current Time :', 15.309183184070609)

('Current Customers in the Queue', 43)

For iteration : 63

---

('Future Event List :', [['Customer : 55', 15.311696503129301, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])

('Current Event : ', ['Customer : 55', 15.311696503129301, 'Arrival'])

('Current Time :', 15.311696503129301)

('Current Customers in the Queue', 44)

For iteration : 64

---

('Future Event List :', [['Customer : 56', 16.63188212251961, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])

('Current Event : ', ['Customer : 56', 16.63188212251961, 'Arrival'])

('Current Time :', 16.63188212251961)

('Current Customers in the Queue', 45)

For iteration : 65

---

('Future Event List :', [['Customer : 57', 17.06096425422809, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])

('Current Event : ', ['Customer : 57', 17.06096425422809, 'Arrival'])

('Current Time :', 17.06096425422809)

('Current Customers in the Queue', 46)

For iteration : 66

---

('Future Event List :', [['Customer : 58', 17.097527882216404, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])

('Current Event : ', ['Customer : 58', 17.097527882216404, 'Arrival'])

('Current Time :', 17.097527882216404)

('Current Customers in the Queue', 47)

For iteration : 67

---

('Future Event List :', [['Customer : 59', 17.12015104636889, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])

('Current Event : ', ['Customer : 59', 17.12015104636889, 'Arrival'])

('Current Time :', 17.12015104636889)

('Current Customers in the Queue', 48)

For iteration : 68

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])

('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])

('Current Time :', 17.37952259320546)

('Current Customers in the Queue', 49)

For iteration : 69

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])

('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])

('Current Time :', 17.37952259320546)

('Current Customers in the Queue', 49)

For iteration : 70

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])

('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])

('Current Time :', 17.37952259320546)

('Current Customers in the Queue', 49)

For iteration : 71

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])

('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])

('Current Time :', 17.37952259320546)

('Current Customers in the Queue', 49)

For iteration : 72

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])

('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])

('Current Time :', 17.37952259320546)

('Current Customers in the Queue', 49)

For iteration : 73

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])

('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])

('Current Time :', 17.37952259320546)

('Current Customers in the Queue', 49)

For iteration : 74

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])

('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])

('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 75

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 76

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 77

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 78

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 79

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 80

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 81

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])

('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time : ', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 82

---

('Future Event List : ', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time : ', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 83

---

('Future Event List : ', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time : ', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 84

---

('Future Event List : ', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time : ', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 85

---

('Future Event List : ', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time : ', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 86

---

('Future Event List : ', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time : ', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 87

---

('Future Event List : ', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time : ', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 88

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 89

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 90

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 91

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 92

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 93

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 94

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 95



---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 96

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 97

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 98

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)  
For iteration : 99

---

('Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Current Event : ', ['Customer : 60', 17.37952259320546, 'Arrival'])  
('Current Time :', 17.37952259320546)  
('Current Customers in the Queue', 49)

---

('Final Future Event List :', [['Customer : 60', 17.37952259320546, 'Arrival'], ['Customer : 10', 18.702699128771236, 'Departure']])  
('Customers in the Queue', [['Customer : 11', 2.967782614756585, 'Arrival'], ['Customer : 12', 3.8139597713825744, 'Arrival'], ['Customer : 13', 4.282175923668759, 'Arrival'], ['Customer : 14', 4.616521935742785, 'Arrival'], ['Customer : 15', 4.6219861017686785, 'Arrival'], ['Customer : 16', 5.019991279966137, 'Arrival'], ['Customer : 17', 5.160760377254086, 'Arrival'], ['Customer : 18', 5.614204612043698, 'Arrival'], ['Customer : 19', 5.78865074613964, 'Arrival'], ['Customer : 20', 5.911942810740196, 'Arrival'], ['Customer : 21', 6.0307692022343575, 'Arrival'], ['Customer : 22', 6.06689580487001, 'Arrival'], ['Customer : 23', 6.495551090208732, 'Arrival'], ['Customer : 24', 6.721752499614304, 'Arrival'], ['Customer : 25', 6.90628073279733, 'Arrival'], ['Customer : 26', 7.255639891881666, 'Arrival'], ['Customer : 27', 7.885001200105674, 'Arrival'], ['Customer : 28', 7.943068152078327, 'Arrival'], ['Customer : 29', 9.10847290837253, 'Arrival'], ['Customer : 30', 9.122196551513104, 'Arrival'], ['Customer : 31', 9.175766810062886, 'Arrival'], ['Customer : 32',

9.609383641612844, 'Arrival'], ['Customer : 33', 9.626423668278138, 'Arrival'], ['Customer : 34', 10.035341981592016, 'Arrival'], ['Customer : 35', 10.04198187413557, 'Arrival'], ['Customer : 36', 10.127857311709894, 'Arrival'], ['Customer : 37', 10.195791077129185, 'Arrival'], ['Customer : 38', 10.486890092499312, 'Arrival'], ['Customer : 39', 10.493914856938556, 'Arrival'], ['Customer : 40', 10.589773549204104, 'Arrival'], ['Customer : 41', 10.64554019447827, 'Arrival'], ['Customer : 42', 11.746452130341924, 'Arrival'], ['Customer : 43', 11.78414548083285, 'Arrival'], ['Customer : 44', 11.842057236771831, 'Arrival'], ['Customer : 45', 12.99633334991605, 'Arrival'], ['Customer : 46', 13.693918914678438, 'Arrival'], ['Customer : 47', 13.704001671091431, 'Arrival'], ['Customer : 48', 13.778408212448404, 'Arrival'], ['Customer : 49', 13.785208374284597, 'Arrival'], ['Customer : 50', 14.037108635224408, 'Arrival'], ['Customer : 51', 14.55788795025575, 'Arrival'], ['Customer : 52', 15.2222118590173, 'Arrival'], ['Customer : 53', 15.251791776456846, 'Arrival'], ['Customer : 54', 15.309183184070609, 'Arrival'], ['Customer : 55', 15.311696503129301, 'Arrival'], ['Customer : 56', 16.63188212251961, 'Arrival'], ['Customer : 57', 17.06096425422809, 'Arrival'], ['Customer : 58', 17.097527882216404, 'Arrival'], ['Customer : 59', 17.12015104636889, 'Arrival']]]

---

('Number of Arrivals : ', 92)

('Number of Departure : ', 9)

('Number of Customers in the Queue', 49)

('Number of Dropped arrivals : ', 32)

---

Simulation has ended at ==> 17.3795225932

Average number of Waiting time ==> 1.38561468747

Average Response time ==> 0.426067353236

Average number of Waiting Customers in the system ==> 16.5

('Blocking probability ==> ', 0.34782608695652173)

---

Customers :

['Customer : 1', 'Customer : 2', 'Customer : 3', 'Customer : 4', 'Customer : 5', 'Customer : 6', 'Customer : 7', 'Customer : 8', 'Customer : 9', 'Customer : 10', 'Customer : 11', 'Customer : 12', 'Customer : 13', 'Customer : 14', 'Customer : 15', 'Customer : 16', 'Customer : 17', 'Customer : 18', 'Customer : 19', 'Customer : 20', 'Customer : 21', 'Customer : 22', 'Customer : 23', 'Customer : 24', 'Customer : 25', 'Customer : 26', 'Customer : 27', 'Customer : 28', 'Customer : 29', 'Customer : 30', 'Customer : 31', 'Customer : 32', 'Customer : 33', 'Customer : 34', 'Customer : 35', 'Customer : 36', 'Customer : 37', 'Customer : 38', 'Customer : 39', 'Customer : 40', 'Customer : 41', 'Customer : 42', 'Customer : 43', 'Customer : 44', 'Customer : 45', 'Customer : 46', 'Customer : 47', 'Customer : 48', 'Customer : 49', 'Customer : 50', 'Customer : 51', 'Customer : 52', 'Customer : 53', 'Customer : 54', 'Customer : 55', 'Customer : 56', 'Customer : 57', 'Customer : 58', 'Customer : 59', 'Customer : 60']

Arrivals :

[0.09834027418681303, 0.18779013555692525, 0.5780526611444732, 0.9903687506804082, 1.8110825336449272, 2.0109424645022176, 2.1301204825849602, 2.211843649585851, 2.236619812770363, 2.8617139666485514, 2.967782614756585, 3.8139597713825744, 4.282175923668759, 4.616521935742785, 4.6219861017686785, 5.019991279966137, 5.160760377254086, 5.614204612043698, 5.78865074613964, 5.911942810740196, 6.0307692022343575, 6.066689580487001, 6.495551090208732, 6.721752499614304, 6.90628073279733, 7.255639891881666, 7.885001200105674, 7.943068152078327, 9.10847290837253, 9.122196551513104, 9.175766810062886, 9.609383641612844,

9.626423668278138, 10.035341981592016, 10.04198187413557, 10.127857311709894,  
10.195791077129185, 10.486890092499312, 10.493914856938556, 10.589773549204104,  
10.64554019447827, 11.746452130341924, 11.78414548083285, 11.842057236771831,  
12.99633334991605, 13.693918914678438, 13.704001671091431, 13.778408212448404,  
13.785208374284597, 14.037108635224408, 14.55788795025575, 15.2222118590173,  
15.251791776456846, 15.309183184070609, 15.311696503129301, 16.63188212251961,  
17.06096425422809, 17.097527882216404, 17.12015104636889, 17.37952259320546]

Departures :

[0.6702071086893169, 1.5460246546217804, 1.9633290484911579, 2.890327250952047,  
2.9562188141855983, 3.982090936819505, 6.142717590433175, 9.41281987402414,  
9.536120945313572]