Problem Statement

A small grocery store has only one checkout counter. Customers arrive at this checkout counter at random from 1 to 8 minutes apart. Each possible value of inter-arrival time is the same probability of occurrence, as shown in Table. The service times vary from 1 to 6 minutes with the probabilities shown in Table. The problem is to analyze the system by simulation for the arrival and service of 15 customers.

Time between Arrivals (Minutes)	Probability	Cumulative Probability	Random Digit Assignment
1	0.125	0.125	001-125
2	0.125	0250	126-250
3	0.125	0.375	251-375
4	0.125	0.500	376-500
5	0.125	0.625	501-625
6	0.125	0.750	626-750
7	0.125	0.875	751-875
8	0.125	1.000	876-000

Service Time (Minutes)	Probability	Cumulative Probability	Random Digit Assignment
1	0.10	0.10	01-10
2	0.20	0.30	11-30
3	0.30	0.60	31-60
4	0.25	0.85	61-85
5	0.10	0.95	86-95
6	0.05	1.00	96-00

Find out
1. The average waiting time for a customer
2. The probability that a customer has to wait in the queue
3. The proportion of idle time of the server
4. The average service time
5. The average time between arrivals
6. The average waiting time of those who wait
7. The average time a customer spends in the system

Additional Task

In the above problem let the service distribution be changed to the following

Service time (Minutes)	1	2	3	4	5	6
Probability	0.05	0.10	0.20	0.30	0.25	0.10

Develop the simulation table and the analysis for 20 customers. What is the effect of changing the service-time distribution?