

Department of Industrial and Systems Engineering
Indian Institute of Technology, Kharagpur
Simulation Lab

Time-2:00 pm to 5:00 pm

Date: 19/03/2021

Excel Sheet Exercise

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1. A small grocery store has only one checkout counter. Customers arrive at this checkout counter at random times that are from 1 to 8 minutes apart. Each possible value of interarrival time has the same probability of occurrence, as shown in Table 1. The service times vary from 1 to 6 minutes, with the probabilities shown in Table 2. Analyze the system by simulating the arrival and service of 100 customers through Excel Sheet.

Table 1: Distribution of time between arrivals

Time between Arrivals (Minutes)	Probability	Cumulative Probability	Random Digit Assignment
1	0.125	0.125	001 – 125
2	0.125	0.250	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

Table 2: Service Time Distribution

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

2. Consider a computer technical support center where personnel take calls and provide service. The time between calls ranges from 1 to 4 minutes, with distribution as shown in Table 3. There are two technical support people – Able and Baker. Able is more experienced and can provide service faster than Baker. The distributions of their service times are shown in Tables 4 and 5. A simplifying rule is that Able gets the call if both technical support people are idle. Able has seniority. The problem is to find how well the current arrangement is working. Estimate the system measures of performance in Excel Sheet, with a simulation of the first 100 callers.

Table 3: Interarrival Distribution of Calls for Technical Support

Time between Arrivals (Minutes)	Probability	Cumulative Probability	Random Digit Assignment
1	0.25	0.25	01 – 25
2	0.40	0.65	26 – 65
3	0.20	0.85	66 – 85
4	0.15	1.00	86 – 00

Table 4: Service Distribution of Able

Service Time (Minutes)	Probability	Cumulative Probability	Random Digit Assignment
2	0.30	0.30	01 – 30
3	0.28	0.58	31 – 58
4	0.25	0.83	59 – 83
5	0.17	1.00	84 – 00

Table 5: Service Distribution of Baker

Service Time (Minutes)	Probability	Cumulative Probability	Random Digit Assignment
3	0.35	0.35	01 – 35
4	0.25	0.60	36 – 60
5	0.20	0.80	61 – 80
6	0.20	1.00	81 – 00