

# EXAMPLE: GROCERY STORE CENTER

1. One Checkout Counter
2. Arrival Time between customer are 1 to 8 minutes (equal probability)
3. Service Time vary from 1 to 6 (Service table)
4. We are going to analyze for 20 customers

solution :

**Notations :**

**Color - A :** Given in question.

**Color - A :** Has to be calculated .

**Color - A :** Calculated in previous steps .

1. Analysis of small grocery store

INTER – ARRIVAL TIME	PROBABILITY	CUMULATIVE PROBABILITY
1	0.125	0.125
2	0.125	0.250
3	0.125	0.375
4	0.125	0.500
5	0.125	0.625
6	0.125	0.750
7	0.125	0.875
8	0.125	1.000

## 2. PROBLEM SIMPLIFICATION

SERVICE TIME	PROBABILITY	CUMULATIVE PROBABILITY
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1	0.10	0.10
2	0.20	0.30
3	0.30	0.60
4	0.25	0.85
5	0.10	0.95
6	0.05	1.00

### 3. DISTRIBUTION OF INTER ARRIVAL TIME TABLE

INTER ARRIVAL TIME	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(neglect 1)

### 4. SERVICE TIME DISTRIBUTION

SERVICE TIME	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(neglect 1)

## 5.TIME BETWEEN ARRIVALS DETERMINATION

CUSTOMER	RANDOM DIGITS	TIME BETWEEN ARRIVALS
1	-	-
2	913	8
3	727	6
4	015	1
5	948	8
6	309	3
7	922	8
8	753	7
9	235	2
10	302	3
11	109	1
12	093	1
13	607	5
14	738	6
15	359	3
16	888	8
17	106	1

18	212	2
19	493	4
20	535	5

## 6. SERVICE TIME GENERATION

CUSTOMER	RANDOM DIGITS	SERVICE TIME
1	84	4
2	10	1
3	74	4
4	53	3
5	17	2
6	79	4
7	91	5
8	67	4
9	89	5
10	38	3
11	32	3
12	94	5
13	79	4
14	05	1
15	79	4
16	84	4
17	52	3
18	55	3
19	30	2

20	50	3
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## 7. SIMULATION TABLE

A	B	C	D	E	F	G	H	I
CUSTOMER	INTER – ARRIVAL TIME	ARRIVAL TIME	SERVICE TIME	TIME SERVICE BEGINS	TIME CUSTOMER WAITS IN QUEUE (C-E)	TIME SERVICE ENDS (E+D)	TIME CUSTOMER SPENDS IN THE SYSTEM (D+F)/ (G-C)	IDLE TIME OF SERVER (E2 - G1)
1	-	0	4	0	0	4	4	0
2	8	8	1	8	0	9	1	4
3	6	14	4	14	0	18	4	5
4	1	15	3	18	3	21	6	0
5	8	23	2	23	0	25	2	2
6	3	26	4	26	0	30	4	1

7	8	34	5	34	0	39	5	4
8	7	41	4	41	0	45	4	2
9	2	43	5	45	2	50	7	0
10	3	46	3	50	4	53	7	0
11	1	47	3	53	6	56	9	0
12	1	48	5	56	8	61	13	0
13	5	53	4	61	8	65	12	0
14	6	59	1	65	6	66	7	0
15	3	62	4	66	4	70	8	0
16	8	70	4	70	0	74	4	0
17	1	71	3	74	3	77	6	0
18	2	73	3	77	4	80	7	0
19	4	77	2	80	3	82	5	0
20	5	82	3	82	0	85	3	0
Σ	82		67		51		118	18