Computing and Data Science
Simulations
Assignment no. 1
3rd Year
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1. **Solve the double server problem with the same IAT and Service time tablesand with a same set of random numbers but with the new rule: "When the two servers are free, go with Baker"**

Inter-arrival Time (IAT) (minutes)	Probability
1	0.25
2	0.40
3	0.20
4	0.15

Able - Server 1:

Service Time - Minutes	Probability
2	0.30
3	0.28
4	0.25
5	0.17

Baker - Server 2:

Service Time - Minutes	Probability
2	0.35
3	0.25
4	0.20
5	0.20

IAT Random Numbers	ST Random Numbers
26	95
98	21
90	51
26	92
42	89
74	38
80	13
68	61
22	50
48	49
34	39
45	53
24	88
34	01
63	81
38	53
80	81
42	64

Answer:

Inter-arrival timein Minutes (IAT)	Probability	Cumulative Probability	Random Numbers Assigned
1	0.25	0.25	00-24
2	0.40	0.65	25-64
3	0.20	0.85	65-84
4	0.15	1.00	85-99

For Able:

Service time in Minutes	Probability	Cumulative Probability	Random Numbers Assigned
2	0.30	0.30	00-29
3	0.28	0.58	30-57
4	0.25	0.83	58-82
5	0.17	1.00	83-99

For Baker:

Service time in Minutes	Probability	Cumulative Probability	Random Numbers Assigned
2	0.35	0.35	00-34
3	0.25	0.60	35-59
4	0.20	0.80	60-79
5	0.20	1.00	80-99

Customer Number	Random Digits for Inter-arrival	IAT	Clock	RandomDigits for Service Time	Able-Service Time begins	Able - Service Time	Able-Service Time Ends	Baker - ServiceTime Begins	Baker - Service Time	Baker-Service Time Ends	QueuingTime	Time Spend in System	Able -Idle Time	Baker -Idle Time
1	-	-	0	95	-	-	-	0	5	5	0	5	-	0
2	26	2	2	21	2	2	4	-	-	-	0	2	2	-
3	98	4	6	51	-	-	-	6	3	9	0	3	-	1
4	90	4	10	92	-	-	-	10	5	15	0	5	-	1
5	26	2	12	89	12	5	17	-	-	-	0	5	8	-
6	42	2	14	38	-	-	-	15	3	18	1	4	-	0
7	74	3	17	13	17	2	19	-	-	-	0	2	0	-
8	80	3	20	61	-	-	-	20	4	24	0	4	-	2
9	68	3	23	50	23	3	26	-	-	-	0	3	4	-
10	22	1	24	49	-	-	-	24	3	27	0	3	-	0
11	48	2	26	39	26	3	29	-	-	-	0	3	0	-
12	34	2	28	53	-	-	-	28	3	31	0	3	-	1
13	45	2	30	88	30	5	35	-	-	-	0	5	1	-
14	24	1	31	01	-	-	-	31	2	33	0	2	-	0
15	34	2	33	81	-	-	-	33	5	38	0	5	-	0
16	63	2	35	53	35	3	38	-	-	-	0	3	0	-
17	38	2	37	81	-	-	-	38	5	43	1	6	-	0
18	80	3	40	64	40	4	44	-	-	-	0	4	2	-

19	42	2	42	01	-	-	-	43	2	45	1	3	-	0
20	56	2	44	67	44	4	48	-	-	-	0	4	0	-
21	89	4	48	01	-	-	-	48	2	50	0	2	-	3
22	18	1	49	47	49	3	52	-	-	-	0	3	1	-
23	51	2	51	75	-	-	-	51	4	55	0	4	-	1
24	71	3	54	57	54	3	57	-	-	-	0	3	2	-
25	16	1	55	87	-	-	-	55	5	60	0	5	-	0
26	92	4	59	47	59	3	62	-	-	-	0	3	2	0

1. **Percentage of Able's busy** $= \dfrac{\text{Total time Able was busy}}{\text{Total time the simulation run}} = \dfrac{40}{59}$ ***100 % = 67.8%**

2. **Percentage of Baker's busy** $= \dfrac{\text{Total time Baker was busy}}{\text{Total time the simulation run}} = \dfrac{51}{59}$ ***100 % = 86.4%**

3. **Average waiting time(**the customers who wait.**) =**
$$\dfrac{\text{Total waiting time}}{\text{Number of customers waited}} = \dfrac{3}{3} = \textbf{1 min}$$