



IE3081 MODELING & DISCRETE SIMULATION HOMEWORK #3 (PROJECT PHASE #1)

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1. System Components

Customers, 2 Baristas, 2 Cashiers, 1 Food Server, Tables

2. Relations Between System Components

Customers arrives in the coffee shop with a defined interarrival time. Each of them selects their own requests individually. When the queue comes to them for payment, one of the cashiers takes the order and payment. Order can be include either beverages, foods or both of them. Payment can be taken in three different way which are directly cash, credit card or via Starbucks online account. After the giving order and payment process, customers get involved the delivery queue. This delivery queue depends on cashiers, baristas and food server service time distribution. When the delivery queue comes to customer, customer takes the order and get a table or leave the shop.

3. Input Variables

Interarrival times of customers. Service distributions of cashiers, baristas, and food server. Payment types' service times.

4. Type and Values

Interarrival Times (minutes)	
Minimum	0.5
Maximum	10

Cashier1's Service Distribution		
Service Times (min)	PDF	CDF
2	0.4	0.4
3	0.23	0.8
4	0.37	1

Cashier2's Service Distribution		
Service Times (min)	PDF	CDF
1	0.16	0.16
2	0.62	0.78
4	0.22	1

Barista1's Service Distribution		
Service Times (min)	PDF	CDF
3	0.1	0.2
4	0.4	0.1
5	0.05	0.3
7	0.25	1

Barista2's Service Distribution		
Service Times (min)	PDF	CDF
1	0.2	0.2
2	0.32	0.52
5	0.25	0.77
6	0.15	0.92
7	0.08	1

Food Server's Service Distribution		
Service Times (min)	PDF	CDF
1	0.6	0.54
2	0.2	1

PaymentType1(Cash)'s Service Distribution		
Service Times (min)	PDF	CDF
0.5	0.3	0.3
1	0.7	1

PaymentType2(Credit Card)'s Service Distribution		
Service Times (min)	PDF	CDF
0.8	0.74	0.74
1.5	0.26	1

PaymentType3(Starbucks Online Account)'s Service Distribution		
Service Times (min)	PDF	CDF
0.8	0.75	0.75
3.2	0.25	0.1

5. Output Variables

Average time that customer spent system, number of customers wait in queue, total service time, average waiting time, average service time.

