

Assignment 1 – Solution

Hand simulation:

SimTime	Current event	S Q N Event list
0	-	- - - Run
0	Run	2 0 0 Arrival 1.8
1.8	Arrival	2 1 1 SS 1.8; Arrival 3.5
1.8	SS	1 0 1 Arrival 3.5; EOS 10.5
3.5	Arrival	1 1 2 SS 3.5; Arrival 5.3; EOS 10.5
3.5	SS	0 0 2 EOS 4.2; Arrival 5.3; EOS 10.5
4.2	EOS	1 0 2 Arrival 5.3; EOS 10.5
5.3	Arrival	1 1 3 SS 5.3; Arrival 7.2; EOS 10.5
5.3	SS	0 0 3 Arrival 7.2; EOS 10.5; EOS 12.3
7.2	Arrival	0 1 4 EOS 10.5; EOS 12.3; Arrival 17.6
10.5	EOS	1 1 4 SS 10.5; EOS 12.3; Arrival 17.6
10.5	SS	0 0 4 EOS 12.3; EOS 14.1; Arrival 17.6
12.3	EOS	1 0 4 EOS 14.1; Arrival 17.6
14.1	EOS	2 0 4 Arrival 17.6

$$\text{Average arrival rate} = \frac{4}{14.1}$$

Average number of customers in the system=

$$= \frac{1(3.5-1.8)+2(4.2-3.5) + 1(5.3-4.2)+2(7.2-5.3)+3(10.5-7.2)+2(12.3-10.5)+1(14.1-12.3)}{14.1} = 1.65$$

$$\text{Average time in the system} = \frac{(4.2-1.8)+(10.5-3.5)+(12.3-5.3)+(14.1-7.2)}{4} = 5.825$$

Remark: Avg arrival rate x Avg time in system = Avg # in system