IMGT 4133

162129

Tutorial #06

1. **What are the pros and cons of starting a simulation with the system empty? With the system in equilibrium?**

	Advantages	Disadvantages
1	Ability to factor in a range of values for various inputs.	Assumptions need to be fair because the output is only as good as the inputs.
2	Useful method for advisors.	It tends to underestimate the probability of extreme bear events like a financial crisis.
3	Provides a graphical distribution. Having a graph to understand the results can be beneficial for the organization and for stakeholders too.	Unable to factor in the behavioral aspects of finance and the irrationality exhibited by market participants.
4	Give the correct parameters; completely survey the parameter space of a problem.	Have to run the simulations a number of times to get a statistically valid answer.
5	The results are relatively easy to understand, provided an individual point estimate of the result is also easy to understand.	When there are a lot of variables or a wide range of statistical variance in a few key variables, the simulation may not generate any useful insights into what the “model” is actually simulating.

2. What is the importance of run length in simulation?

The run length is required to achieve desired statistical precision. The average run length (ARL) of a chart is usually used as an important indicator for evaluating control chart performance.

To define the optimal simulation, run length is necessary to distinguish two phases of simulation: transient stage and steady stage. In the steady state phase, run length gives the trustworthy results. The run length, number of replication and steady state of simulation should be well specified in order to produce results that must be statistically reliable.

3.

4.

Using the daily demand distribution, obtained a probability distribution as shown in the following table.

Daily Demand	Probability	Cumulative Probability	Random Numbers
1	0.01	0.01	0
10	0.20	0.21	1-20
20	0.15	0.36	21-35
30	0.50	0.86	36-85
40	0.12	0.98	86-97
50	0.02	1.00	98-99

At the start of simulation, the first random number 48 generates a demand of 30 cakes as shown in table below. The demand is determined from the cumulative probability values in table above. At the end of first day, the closing quantity is 5 (30-30) cakes.

Similarly, then calculate the next demand for others.

Demand	Random Numbers	Next Demand	**Daily Production = 30 cakes**	
			Left Out	Shortage
1	48	30	0	-
2	78	30	0	-
3	19	10	20	-
4	51	30	20	-
5	56	30	20	-
6	77	30	20	-
7	15	10	40	-
8	14	10	60	-
9	68	30	60	-
10	09	10	80	-
Total		**230**	**50**	

Total Demand = 230

Average Demand = Total Demand/No. of days

The daily average demand for the cakes = 230/50 = 4.6 cakes

5.

No. of calls received from the same mobile company = 15 calls * (45/100) = 6.75 calls ~ 7 calls

S/No.	Duration (s)	Cost: Rs. (Policy 1)	Cost: Rs. (Policy 2)	Probability	Cumulative Probability	Random Numbers
1	28	00.00	00.00			
2	100	4.00	00.00	0		
3	35	00.00	00.00			
4	135	7.50	1.25	0		
5	80	2.00	00.00			
6	65	0.50	00.00	0		
7	55	00.00	00.00			
8	78	1.80	00.00	0		
9	5	00.00	00.00			
10	89	2.90	00.00	0		
11	145	8.50	2.08			
12	90	3.00	00.00	0		
13	77	1.70	00.00			
14	150	9.00	2.50	0		
15	180	12.00	5.00			
Total		52.90	10.83			