**Simulation and Modeling Question bank**

In this post I have listed elementary questions that are related to basics of S&M.

1. Sketch and explain Basic System specification formalisms
2. Define the terms ‘System’ & ‘Model’. Also discuss various types of System and Models. Describe the various criteria of classification of systems and models. Illustrate with abundant examples.
3. Discuss modeling relation and validity
4. The inescapable fact about modeling is that it is severely constrained by complexity limitations’. Explain.
5. What do you understand by Hierarchy of System Specification? Why is it required Explain?
6. Discuss various levels of System Knowledge?
7. What are the fundamental system problems that any system has to face?
8. What do you understand by Object oriented paradigm? How can you relate it with System theory?
9. Discuss briefly evolution of System Formalism? Discuss various forms of System formalisms? Can they be used together? State with help of some examples?
10. Name and Explain different levels of system knowledge?
11. Define Time Base. How behaviors occur over time?
12. What do you understand by Coupling of systems? How advantageous is this? What are the parameters we need to keep in mind while coupling two systems.
13. What do you mean by quantized systems? Explain
14. Describe different entities of the framework for modeling and system simulation. Are these entities related to each other? Explain.

SET A   
  
  
1. Discuss the Congruential Method of generating pseudo random numbers in detail. Discuss in detail how can we make choices for a,c,m and Xo to generate maximal period. Using linear congruential method to generate a sequence of random numbers with X0,a=17, c=43 and m=100 [5]  
2. Discuss the Acceptance – Rejection method to generate variable for poisson distrbution. Generate three poisson variates with mean α=0.2. [ e-α=0.8187]. Use random numbers at your discretion[5].  
3. Discuss the properties of random numbers in detail Explicitly explain the test in used to check goodness of fit of a distribution[5].   
  
  
  
  
SET B  
1. Discuss the popular tests used for checking frequency of random numbers in detail. . Perform Kolmogrov Smirnov test on following random numbers and discuss the results[5].   
0..4,0.81,0.14,0.05,0.93  
2. Discuss chi- square test. Records pertaining to the monthly number of job-related injuries at an underground coal mine were being studied by a federal agency. The value for past 100 months were as follow [5]:  
Injuries per month Frequency of Occurrence  
0 35  
1 40  
2 13  
3 6  
4 4  
5 1  
6 1  
Apply chi square test to these data to test hypothesis that underlying distribution is poisson.  
3. What are the measures we need to keep in mind while collecting data and selecting distribution for data. Discuss the scenario in which each of the following distribution should be used. Cite your answers with appropriate examples [5].   
a. Poisson b. Normal c. Exponential d. Erlang e. Triangular  
  
  
  
  
Set C  
  
1. Discuss the test to check the autocorrelation in detail. Consider following sequence of numbers [3]:  
0.12,0.0.01, ,0.23,0.28,0.89,0.31,0.64,0.28,o.83,0.93,0.99,0.15,0.33,0.35,0.91,0.41,0.60,0.27,0.75,0.88,0.68,0.49,0.05,0.43,0.95,0.58,0.19,0.36,0.69,0.87.  
  
2. Discuss Inverse-Transform technique in detail? [2]  
  
3. Discuss the estimators for following distriubtion:  
  
a. Poisson b. Exponential c. Gamma d. Normal e. Weibull   
  
The rate of return on investment for a portfolio are 18.8,27.9,21,6.1,37.4,5.0,22.9,1.0,3.1, and 8.3 percent. Estimate parameter of a lognormal model of these data [5].  
  
  
4. Discuss Time Series Input models in detail? [5]

Posted by Shruti Kohli at 10:59 PM | [Permalink](http://lecture-notes-forstudents.blogspot.com/2010/11/system-simulation-and-modeling-quiz_30.html) | [Comments (0)](http://lecture-notes-forstudents.blogspot.com/2010/11/system-simulation-and-modeling-quiz_30.html#comments) [http://img2.blogblog.com/img/icon18_email.gif](http://www.blogger.com/email-post.g?blogID=37605489&postID=1212965121513426419)

**System Simulation and Modeling Quiz questions**

Dear students   
  
In the next three posts find the simulation quiz questions:

**SET A**

1. Identify the calling population, customer and server in the following queuing situation. [5]
   1. University Library
   2. Bank teller counter
   3. Police Station
2. The arrival of a customers at a teller counter follow Poisson with a mean of 45 per hour and teller’s time follows exponential with a mean of 1 minute. Determine the following: [5]
   1. Probability of having 0 customer in the system, 5 customer in the system and 10 customer in the system.
   2. Determine LQ,L,WQ,W.
3. Consider a grocery check out counter that follows single server queue model. Suppose we perform simulation for 60 hours. Assume that arriving customer do not join queue if 3 or more customers are already waiting in the queue. [5]  
   a. Identify the system state, entities, attributes, events, activities possible for such a system.  
   b. Write the JAVA module for single-server simulation for such a system. Explicitly write the code for arrival,departure and report generator for such a system

SET B  
1. What are the basic model building features and output we need to identify while selecting a simulation software. Cite your answer with appropriate examples? [5]  
  
2. Three different items are moving together in the conveyor. These items are inspected visually and defective items are removed. The previous production data are given as:[3]  
Item A Item B Item C  
Accepted 25 280 190  
Rejected 975 720 810  
What is probability that  
a. One item is removed at a time.   
b. Two items are removed at a time.  
c. Three items are removed simulataneously.  
3. Discuss the pmf,cdf of Weibull distribution. Calculate its mean and variance. [2]  
  
4. Consider Able Baker problem. Able claims his service time faster then Baker. Baker claim he is more consistent even if not fast. Let arrival follow Poisson process with rate 2 per hour. Able’s service time 24 mins with standard deviation of 20 mins. Baker’s service time statistics are average service time of 25 mins and standard deviation only 2mins. If average length of queue criteria of hiring which employee is a better performer.[3]  
5. What are the basic criteria of learning Queue behaviour. Give real time examples of balking and reneging. [2].  
  
  
  
SET C  
1. Discuss the application of following simulation software [5]:  
a. ARENA  
b. Micro Saint   
c. Witness  
d. Flexism  
e. OptQuest  
  
2. In the long run 3 vessels out of every 100 are sunk. If 10 vessels are out , what is the probability that [2]  
a. Exactly 6 will arrive safely  
b. at least 6 will arrive safely.  
  
  
3. Discuss following distribution in detail [3] :  
a. Gamma Distribution  
b. Uniform Distribution  
  
4. Discuss the long run measures of performance OF Queuing system in detail. Derive the same for M/M/1 models.