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AS402

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 199401

Roll No.

B. Tech.

(SEM. IV) THEORY EXAMINATION, 2014-15

BASICS OF SYSTEM MODELLING AND SIMULATION

Time : 3 Hours] [Total Marks : 100

SECTION-A

1 Attempt all parts: 2×10=20

(a) Can a Scale models be a type of Physical Models? Justify your statements.

(b) What are the components of system? Enlist the types of systems also.

(c) What is the system modeling? What are the types of Models?

(d) Distinguish between system approach and Analytical approach.

(e) What are the functions of two or more Random variables?

(f) What do you mean by parameter estimator?

(g) What do you mean by Bernoulli trails?

(h) Define Kendall notation for queuing theory.

(i) Define system Dynamics with Flow diagrams used to represent it.

(j) What is the real world application of simulation?

SECTION-B

2 Attempt any three parts of following : **3×10=30**

(a) Define the entities, attributes and activities of any five of the following:
- (i) University
- (ii) Traffic
- (iii) Railways
- (iv) Bank
- (v) Canteen
- (vi) Communication
- (vii) Class Room

(b) Discuss the procedure involved in developing the mathematical Model for a physical system.

(c) Discuss the role of Buffons Needle Problem in evolution of concept of Simulation, and also discuss the simulation of Pure Pursuit Problems.

(d) In a sequence of Bernoulli Trails with probability 'p' of success, determine the probability that 'r' successes will occur before 's' failures.

(e) Explain any three parts the following:
- (i) Transfer line model
- (ii) Inventory system model
- (iii) Interpretation of confidence interval of a parameter
- (iv) Deadlock detection model.

SECTION-C

Note : Attempt all questions with their instructions : **5×10=50**

3 Attempt any two parts of the following :

(a) Discuss the types of simulation with regards to output analysis and also discuss the output analysis for steady state simulation.

(b) Discuss the steps involved in Monte Carlo method and how value of π can be estimated by simulation.

(c) What is the criterion of selecting appropriate modeling techniques?

4 Attempt any two parts of following:

(a) write notes on :
(i) Probability Distribution Function
(ii) Probability Mass function for Discrete Random variables
(iii) Probability Mass Function for Continuous Random Variables
(iv) Mixed type Distribution

(b) State Little's Theorem with proof assuming with FIFO and without FIFO

(c) In car-wash service facility, cars arrive for service according to a poisson distribution with mean of 36 per hour. The time for washing and cleaning follows an exponential distribution with a mean of 1.9 min/car. There is only one washing station in the facility. Assume that there is no storage of parking spaces for arriving cars then find out LS, LQ, WS, WQ and find out the probability when six customers in the system.

5 Attempt any two parts of following :

(a) Define System Dynamics with flow diagrams used to represent it and also differentiate between Casual loop diagram and State flow diagram.

(b) What do you mean by Length of simulation runs and How it can be expressed.

(c) Write Notes on :

(i) Common Random Numbers
(ii) Antithetic Sampling
(iii) Correlated sampling
(iv) Importance Sampling
(v) Conditioning

6 Attempt any two parts of following:

(a) Discuss the relation of verification and validation with model development process.

(b) Discuss the different levels of Abstraction in networked Computer system and role of simulation tools in networked computer systems.

(c) Discuss the Method of Generation of Non-uniform Random numbers and also differentiate between Monte-carlo Computation and Stochastic Simulation.

7 Attempt any two parts of following:

(a) Discuss the Poisson distribution. Derive an expression.

(b) What are GOOD-OF-FIT tests? Explain any one method with the example.

(c) Explain any two parts the following :

(i) Computer network model
(ii) Capital recovery model
(iii) Job shop model