KUMARAGURU
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M.E / M.TECH /MCA DEGREE EXAMINATIONS: NOV/ DEC 2024

(Regulation 2024)

First Semester

INDUSTRIAL ENGINEERING

24ILT502: System Modelling and Simulation

COURSE OUTCOMES

CO1: Illustrate the concept of simulation, types of simulation and types of models.

CO2: Generate random variates and random numbers using distributions.

CO3: Manipulate the tests on random numbers to check the uniformity.

CO4: Model the system using GPSS.

CO5: Develop simulation models for queuing systems, production and inventory models.

Time: Three Hours   **Maximum Marks: 100**

PART A (4*20 = 80 Marks)

1.	a)	What is simulation? List few advantages and disadvantages of simulation. with examples.	6	CO1	[K_1]

	b)	Define the following terms used in simulation
		    i) Discrete system
		    ii) continuous system
		    iii) Stochastic system
			6	CO1	[K_1]

	c)	Draw the flowchart of steps involved in simulation study.	8	CO1	[K_2]

2.	a)	Consider the grocery store with one checkout counter. Prepare the simulation table for eight customers and find out average waiting time of customer in queue, idle time of server and average service time .The inter arrival time (IAT) and service time (ST) are given in minutes.
		
		    IAT : 3,2,6,4,4,5,8
		    ST(min) :3,5,5,8,4,6,2,3
		
		Assume first customer arrives at time t=0
			10	CO2	[K_3]

	b)	What is the role of maximum density and maximum period in generation of random numbers? With given seed 27, constant multiplier 17, increment 43 and modulus 100. And generate Five random numbers?	10	CO2	[K_3]

3.	a)	Explain chi-square goodness of fit test to accept or reject a candidate distribution.	12	CO3	[K$_2$]
	b)	With illustrative example describe the output analysis for steady state simulation.	8	CO3	[K$_2$]
4.	a)	What is queuing model? How it is useful for simulation? Example the simulation of single queuing system.	8	CO4	[K$_2$]
	b)	Explain the following queuing system characteristics: i) Calling population ii)Arrival process and iii)Queue behavior and discipline.	12	CO4	[K$_2$]

Answer any ONE Question

PART B (1*20 = 20 Marks)

5.	a)	Define simulation language. Give detailed overview of GPS.	8	CO4	[K$_2$]
	b)	Enlist various simulation software used in simulation of discrete system manufacturing with its important features.	12	CO4	[K$_2$]

OR

6.	a)	Explain the following	12	CO2	[K$_2$]
		i) Monte Carlo method simulation and			
		ii) Pseudo-Random Numbers.			
	b)	Discuss types of simulations With respect of output Analysis with Example?	8	CO2	[K$_2$]

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