Prince of Songkla University

Faculty of Engineering

Final Examination : Semester I **Academic Year : 2005**

Date : 14 October 2005 **Time : 13:30-16:30**

Subject :225-501 System Simulations **Room : R300**

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ทุจริตในการสอบ โทษขั้นต่ำปรับตกในรายวิชานั้นและพักการเรียน 1 ภาคการศึกษา

Instruction: ***1. Answer all 5 questions in answer book(s) provided.***

2. Books, Lecture Notes, Calculator(s) and other necessary materials are allowed.

ข้อ	คะแนนเต็ม	คะแนนที่ได้
1a	6	
1b	4	
2	10	
3	10	
4	10	
5	10	
รวม	50	

Q.1a Assuming that a simulation is to be used to investigate the properties of a real system, explain the simulation process that may be necessary. (6 Points)

Q.1b Give an example of websites that you may find some resent example applications of discrete-event simulation. (4 Points)

Q.2 The time between arrivals of customers is uniformly distributed from 1 to 20 minutes. For 50% of the customers the service time is 8 minutes, whereas for the other 50% it is 14 minutes. Simulate 2 hours of activity. Keep track of total customer waiting time and service facility idle time. Use a table of random digits for both arrival times and service times. (10 Points)

Q.3 As a part of simulation model he is building, the manager of a telephone-service company has examined the data of telephone inquiries per one-hour interval of last Sunday. The frequency distribution is as shown. Test at $\alpha = 0.05$ to determine if the data come from a Poisson distribution with a mean of 0.5577. (10 Points)

No. of inquiries	Frequency of Occurence
0	315
1	142
2	40
3	9
4	2
5	1

(10 Points)

Q.4 Assume that we have historical data from 18 weeks of operation of a medium-size production system in Thailand and data from 22 weeks of simulated simulation of the system from our simulation model. The data are given below. Test to see if there is a significant difference at $\alpha = 0.05$.

System:	81	78	77	75	94	80	70	79	74	85
	89	76	82	76	77	76	71	73		
Model:	77	88	76	99	86	98	87	96	92	79
	90	91	95	90	93	83	97	72	95	84
	76	77								

(10 Points)

Q.5 Suppose that we want to estimate the value of server utilization of a small gift shop. The following are simulated output from four independence runs. What sample size (number of runs) should we use in our simulation if we want to be 95% confident that our estimate of this output is off by less than 0.04?

Run no.	Model output
1	0.817
2	0.767
3	0.850
4	0.842

(10 Points)

Assist. Prof. S. Taungbodhitham