



K.S. INSTITUTE OF TECHNOLOGY, BANGALORE - 560109

I SESSIONAL TEST QUESTION PAPER 2020 – 21 EVEN SEMESTER

USN

Degree : B.E
Branch : Computer Science & Engineering
Course Title : System Modelling and Simulation
Duration : 90 Minutes

Semester: VI
Course Code: 18CS645
Date: 25- 5-2021
Max Marks: 30

Note: Answer ONE full question from each part.

Q No.	Question	Marks	CO mapping	K-Level																														
PART-A																																		
1(a)	Identify the categories of systems with examples	6	CO1	K3																														
(b)	<p>In a technical support center 2 personnel Able and Baker take calls and provide service. Able is more experience and he gets calls when both of them are free. The interarrival distribution of the calls, Able's & Baker's service times are as shown below.</p> <p>Create a simulation table till 6th call's service ends.</p> <p>Find the utilization of Able and Baker with the following data</p> <p>Interarrivals distribution between Calls</p> <table><tr><td>IAT for calls</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>Probability</td><td>0.25</td><td>0.40</td><td>0.20</td><td>0.15</td></tr></table> <p>Able's Service distribution</p> <table><tr><td>Service time</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Probability</td><td>0.30</td><td>0.28</td><td>0.25</td><td>0.17</td></tr></table> <p>Baker's Service distribution</p> <table><tr><td>Service time</td><td>3</td><td>4</td><td>5</td><td>6</td></tr><tr><td>Probability</td><td>0.35</td><td>0.25</td><td>0.20</td><td>0.20</td></tr></table> <p>Random digits for calls – 26,98,90,26,42</p> <p>Random Digits for Service times – 95,21,51,92,89,3</p>	IAT for calls	1	2	3	4	Probability	0.25	0.40	0.20	0.15	Service time	2	3	4	5	Probability	0.30	0.28	0.25	0.17	Service time	3	4	5	6	Probability	0.35	0.25	0.20	0.20	6	CO1	K3
IAT for calls	1	2	3	4																														
Probability	0.25	0.40	0.20	0.15																														
Service time	2	3	4	5																														
Probability	0.30	0.28	0.25	0.17																														
Service time	3	4	5	6																														
Probability	0.35	0.25	0.20	0.20																														
(c)	Organize the situations when simulation is appropriate	6	CO1	K3																														
OR																																		
2(a)	Plan the system and its components for the following – call center, University library	6	CO1	K3																														
(b)	<p>A grocery store has one checkout counter. Customers arrive at this checkout counter at random between 1 to 10 minutes apart. Each inter arrival times has same probability of occurrence. The service times vary between 1 to 6 minutes. Assume that 1st Customer arrives at time 0.</p> <table><tr><td>Service Times</td><td>3</td><td>5</td><td>6</td><td>8</td></tr><tr><td>Probability</td><td>0.2</td><td>0.35</td><td>0.20</td><td>0.25</td></tr></table> <table><tr><td>Random - digits for IAT</td><td>-</td><td>91</td><td>72</td><td>15</td><td>94</td></tr><tr><td>Random Digits for service times</td><td>84</td><td>10</td><td>74</td><td>53</td><td>17</td></tr></table> <p>Simulate the arrival of 5 customers in tabular form and calculate</p> <p>a) Average waiting time of Customers</p> <p>b) Probability of customer has to wait</p> <p>c) Probability of server being idle.</p>	Service Times	3	5	6	8	Probability	0.2	0.35	0.20	0.25	Random - digits for IAT	-	91	72	15	94	Random Digits for service times	84	10	74	53	17	6	CO1	K3								
Service Times	3	5	6	8																														
Probability	0.2	0.35	0.20	0.25																														
Random - digits for IAT	-	91	72	15	94																													
Random Digits for service times	84	10	74	53	17																													

(c)	Organize the Models in to different classes	6	CO1	K3																				
PART-B																								
3(a)	Develop a cumulative distribution function to measure the probability of a random variable	6	CO2	K3																				
(b)	Construct the snap shots of single channel check out counter’s simulation table along with CHECK OUT LINE using the Inter arrival times and service times given below until clock reaches 15. Calculate total number of customers who spent 5 or more minutes in the system <table><tr><td>IAT</td><td>1</td><td>1</td><td>6</td><td>3</td><td>7</td><td>5</td><td>2</td><td>4</td><td>1</td></tr><tr><td>ST</td><td>4</td><td>2</td><td>5</td><td>4</td><td>1</td><td>5</td><td>4</td><td>1</td><td>4</td></tr></table>	IAT	1	1	6	3	7	5	2	4	1	ST	4	2	5	4	1	5	4	1	4	6	CO2	K3
IAT	1	1	6	3	7	5	2	4	1															
ST	4	2	5	4	1	5	4	1	4															
OR																								
4(a)	Experiment with tossing a die to identify the discrete random variable and life of a device to identify the continuous random variable	6	CO2	K3																				
(b)	Calculate the Loader and Scale utilization in a coal mining company, which has 6 Dump trucks. Trucks will be loaded, weighed then travel to rail road, dump the ore and join back to Loaders. The time taken to unload and to travel between loaders to scale is considered as negligible. Initially one truck is on Scale and remaining trucks are at loaders. The trucks get loaded by two loaders and weighed at one scale. Queues are maintained in FIFO fashion for loaders and scale. Consider the following activity timings to create the simulation Table. <table><tr><td>Loading Times</td><td>10</td><td>5</td><td>10</td><td>10</td><td>5</td></tr><tr><td>Weighing Time</td><td>12</td><td>16</td><td>12</td><td>12</td><td>16</td></tr><tr><td>Travel Time</td><td>40</td><td>60</td><td>40</td><td>80</td><td>100</td></tr></table>	Loading Times	10	5	10	10	5	Weighing Time	12	16	12	12	16	Travel Time	40	60	40	80	100	6	CO2	K3		
Loading Times	10	5	10	10	5																			
Weighing Time	12	16	12	12	16																			
Travel Time	40	60	40	80	100																			

Semester	Section	Name of the Faculty	E-mail Address
VI	A And B	Dr Rekha B Venkatapur	rekhabvenkatapur@ksit.edu.in