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10IS81

Eighth Semester B.E. Degree Examination, Dec.2014/Jan.2015
Software Architectures

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART – A

- 1 a. What are the factors which affect the influence on software architecture? Explain ABC. (08 Marks)
b. Explain Hybertsson's three views for software architecture. (07 Marks)
c. Explain briefly the properties of a good software architecture design. (05 Marks)
- 2 a. Define architectural style. Mention any four commonly used styles. (05 Marks)
b. Explain the advantages and disadvantages of pipes and filters in architectural style. (08 Marks)
c. Explain the basic requirements for a mobile robot's architecture. (07 Marks)
- 3 a. What is functionality? Give examples. (04 Marks)
b. Explain the quality attributes scenarios. (09 Marks)
c. Explain how the faults are detected and prevented. (07 Marks)
- 4 a. Explain the list of components of a pipe and filters and write the problems based on blackboard problem. (08 Marks)
b. Discuss the steps involved in the implementation of pipes and filters architecture. (12 Marks)

PART – B

- 5 a. What is the need of proxies and bridge components in a broker system? Explain it. (06 Marks)
b. What is broker architecture? Write down the steps involved in implementing distributed broker architecture patterns. (10 Marks)
c. What are the limitations of PAC patterns? (04 Marks)
- 6 a. List out and explain the components of a microkernel pattern. (10 Marks)
b. Explain the advantages and disadvantages of a reflective architectural pattern. (06 Marks)
c. Mention the liabilities of reflection architecture patterns. (04 Marks)
- 7 a. Explain the five steps implementation of master-slave pattern. (10 Marks)
b. What are the benefits and liabilities of proxy design patterns? Define proxy design pattern. (10 Marks)
- 8 a. Draw a neat diagram and explain the evolutionary delivering life cycle model. (10 Marks)
b. What are the steps in ADD? (04 Marks)
c. Write the uses of SA documentation. (06 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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Eighth Semester B.E. Degree Examination, Dec.2014/Jan.2015
System Modeling and Simulation

Time: 3 hrs.

Max. Marks:100

- Note: 1. Answer FIVE full questions, selecting at least TWO questions from each part.**
2. Use of statistical tables is permitted.

PART - A

- 1 a. With a neat flow diagram, explain the steps in a simulation study. (10 Marks)
 b. A computer technical support center is staffed by two people, Able and Baker, who take calls and try to answer questions and solve computer problems. The time between calls ranges from 1 to 4 minutes with the distribution as shown in Table 1b(1). Able is more experienced and can provide service faster than Baker, which means that, when both are idle, Able takes the call. The distribution of their service times are shown in Table 1b(2) and Table 1b(3) respectively.

Table 1b(1) Interarrival time distribution

Interarrival time (minutes)	1	2	3	4
Probability	0.25	0.40	0.20	0.15

Table 1b(2) Service time distribution of Able

Service time (minutes)	2	3	4	5
Probability	0.30	0.28	0.25	0.17

Table 1b(3) Service time distribution of Baker

Service time (minutes)	3	4	5	6
Probability	0.35	0.25	0.20	0.20

Random digits for inter-arrival times are: 26, 98, 90, 26, 42, 74, 80, 68, 22, 48, 34, 45, 24, 34
 Random digits for service times are: 95, 21, 51, 92, 89, 38, 13, 61, 50, 49, 39, 53, 88, 01, 81
 Simulate this system for 10 customers, by finding (i) Average inter arrival time (ii) Average service time of Able (iii) Average service time of Baker (iv) Average waiting time of all the customers (v) Average waiting time of those who wait. (10 Marks)

- 2 a. Explain the following terms used in discrete event simulation: (i) List (ii) Event notice (iii) Delay (iv) Clock (04 Marks)
 b. Explain Event scheduling/Time Advance algorithm by generating system snapshots at $\text{clock} = t$ and $\text{clock} = t_1$. (06 Marks)
 c. Six dump trucks are used to haul coal from a mine to railroad. Each truck is loaded by one of two loaders. After loading, the truck immediately moves to scale for weighing. Both loaders and scale have First In First Out queue discipline. After being weighed, the truck travels to the rail road (begins travel time), unloads and later returns to the loader queue. The distribution of loading time, weighing time and travel time are given in Table 2c(1), Table 2c(2) and Table 2c(3) respectively. It is assumed that 5 trucks are at the loaders and one is at the scale at time $t = 0$.

Table 2c(1)

Loading time	Probability
5	0.3
10	0.5
15	0.2

Table 2c(2)

Weighing time	Probability
12	0.7
16	0.3

Table 2c(3)

Travel time	Probability
40	0.4
60	0.3
80	0.2
100	0.1

The activity times are given in Table 2c(4)

Table 2c(4)

Loading time	10	5	5	10	15	10	10
Weighing time	12	12	12	16	12	16	
Travel time	60	100	40	40	80		

Simulate the system for 25 minutes to estimate the loader and scale utilization. (10 Marks)

- 3 a. Define random variable. What are the different types of random variables? Explain with at least one example in each case. (05 Marks)
- b. A production process manufactures computer chips one the average at 2% nonconforming. Everyday a random sample of size 50 is taken from the process. If the sample contains more than 2 nonconforming chips, the process will be stopped. Compute the probability that the process is stopped by the sampling scheme. Also find the mean and variance. (08 Marks)
- c. Find the mean and variance of exponential distribution. Suppose that the life of an industrial lamp, in thousands of hours, is exponentially distributed with failure rate $\lambda = 1/3$ (one for every 3000 hours, on the average). Find the probability that the lamp will last longer than its mean life. (07 Marks)
- 4 a. Explain the characteristics of queuing system. Also explain the queuing notation in general. (10 Marks)
- b. Explain the steady state parameters of M/G/1 queue. (10 Marks)

PART - B

- 5 a. What are pseudo random numbers? What are the problems that occur while generating pseudo random numbers? (06 Marks)
- b. Consider the sequence of random numbers 0.12, 0.01, 0.23, 0.28, 0.89, 0.31, 0.04, 0.28, 0.83, 0.93, 0.99, 0.15, 0.33, 0.35, 0.91, 0.41, 0.6, 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. Test whether 3rd, 8th, 13th and so on numbers in the above sequence are auto correlated. At significance level $\alpha = 0.05$, normal table value is given as 1.96. (08 Marks)
- c. Explain inverse transform technique for exponential and uniform distributions. (06 Marks)
- 6 a. List the steps involved in development of a useful model of input data. (04 Marks)
- b. Records pertaining to the monthly number of job related injuries at an underground coal mine were being studied by a federal agency. The values for the past 100 months were as follows:

Injuries per month	0	1	2	3	4	5	6
Frequency of occurrence	35	40	13	6	4	1	1

Apply the chi-square test to these data to test the hypothesis that the underlying distribution is Poisson. Take $\alpha = 0.05$. (08 Marks)

- c. Let X_1 represent the average lead time (in months) to deliver and X_2 the annual demand, for industrial robots. The following data are available on demand and lead time for the last ten years.

Lead time	6.5	4.3	6.9	6.0	6.9	6.9	5.8	7.3	4.5	6.3
Demand	103	83	116	97	112	104	106	109	92	96

Find the dependency between lead time and demand. (08 Marks)

- 7 a. Explain the replication method for steady-state simulations. (10 Marks)
- b. Differentiate between point estimation and interval estimation. (05 Marks)
- c. Differentiate between terminating and steady state simulations by giving one example each. (05 Marks)
- 8 a. With a neat flow diagram, explain the concept of model building, verification and validation of simulation models. (10 Marks)
- b. Describe the three step approach of Naylor and Finger in the validation process. (10 Marks)

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10CS/IS835

Eighth Semester B.E. Degree Examination, Dec.2014/Jan. 2015
Information and Network Security

Time: 3 hrs.

Max. Marks:100

**Note: Answer FIVE full questions, selecting
atleast TWO questions from each part.**

PART – A

- 1 a. Explain the major steps specified in BS7799:2 documents. How these steps help in provide security planning? (10 Marks)
- b. Mention the major steps involved in contingency mans? Describe briefly Pipkin's three categories of incident indicators. (10 Marks)
- 2 a. What is firewall? Explain screened host and screened host with subnets firewall architecture, with neat diagram. (10 Marks)
- b. What is VPN? Explain the working modes of VPN with neat diagram. (10 Marks)
- 3 a. Describe briefly network based IDPS and host based IDPS. (10 Marks)
- b. What is intrusion? Explain the IDPS detection methods. (05 Marks)
- c. Explain the deployment of NIDPs. (05 Marks)
- 4 a. Describe symmetric and asymmetric encryption techniques. (10 Marks)
- b. Who can attack cryptosystems? Discuss the different categories of attacks on cryptosystem. (10 Marks)

PART – B

- 5 a. Describe briefly the various security attacks and security mechanisms covered by x.800. (10 Marks)
- b. Explain the network-access security model. (05 Marks)
- c. Describe the authentication procedure covered by x.509. (05 Marks)
- 6 a. Explain PGP message generation and reception techniques. (10 Marks)
- b. Explain S|MIME transfer encodings. (05 Marks)
- c. Explain S|MIME functionality. (05 Marks)
- 7 a. Describe the transport and tunnel modes used for IP sec AH authentication. Bring their importance in IPv4. (10 Marks)
- b. Explain okaley key determination protocol. (10 Marks)
- 8 a. Explain the SSL handshake protocol, with neat diagram. (10 Marks)
- b. Explain SET participants and sequence of events for transaction, in detail. (05 Marks)
- c. Explain the dual signature in SET protocol. Describe its importance. (05 Marks)

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10CS/IS841

Eighth Semester B.E. Degree Examination, Dec.2014/Jan.2015
Adhoc Networks

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO questions from each part.

PART - A

- 1 a. Differentiate between Cellular Network and Adhoc Network. (08 Marks)
b. Explain wireless sensor network. (06 Marks)
c. Explain Adhoc wireless internet with a neat schematic diagram. (06 Marks)
- 2 a. Discuss the issues in designing a MAC protocol for Adhoc wireless networks? (10 Marks)
b. Define Five-phase Reservation protocol and explain five-phase reservation protocol. (10 Marks)
- 3 a. Explain directional busy tone-based MAC protocol in detail. (06 Marks)
b. Explain interleaved carrier-sense multiple access. (06 Marks)
c. Write a note on multi-channel MAC protocol. (08 Marks)
- 4 a. Discuss the issues in designing a routing protocol for Adhoc wireless network. (08 Marks)
b. List the characteristics of an ideal routing protocol for Adhoc wireless networks. (08 Marks)
c. List the advantages and disadvantages of on-demand routing protocol. (04 Marks)

PART - B

- 5 a. Briefly explain the core extraction distribution Adhoc routing protocol by mentioning its advantages and disadvantages. (12 Marks)
b. Explain Power-Aware routing protocol. (08 Marks)
- 6 a. Discuss briefly why the TCP does not perform well in Adhoc wireless networks? (10 Marks)
b. Write a note on "Issues considered in designing transport layer protocol for Adhoc wireless networks". (06 Marks)
c. List the advantages and disadvantages of Adhoc TCP. (04 Marks)
- 7 a. Briefly discuss network layer attacks. (08 Marks)
b. Explain the following :
i) Network security requirements
ii) Key management approaches
iii) Requirements of a secure routing protocol for Adhoc wireless networks. (12 Marks)
- 8 a. Briefly explain the issues and challenges in providing QoS in Adhoc wireless networks. (10 Marks)
b. Briefly explain the on-demand QoS routing protocol by mentioning its advantages and disadvantages. (10 Marks)

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