06CS81

USN

Eighth Semester B.E. Degree Examination, May/June 2010
Advanced Computer Architecture

Time: 3 hrs.

Max. Marks:100

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

PART – A

1 a. Define computer architecture. Illustrate the seven dimensions of an ISA. (08 Marks)
   b. What is dependability? Explain two main measures of dependability. (06 Marks)
   c. Given the following measurements:
      Frequency of FP operations = 25%   Average CPI of FP operations = 4.0
      Average CPI of other instructions = 1.33   Frequency of FPSQR = 2%
      CPI of FPSQR = 20
      Assume that the two design alternatives are to decrease the CPI of FPSQR to 2 or to decrease the average CPI of all FP operations to 2.5. Compare the two design alternatives using the processor performance equations. (06 Marks)

2 a. With a neat diagram, explain the classic five-stage pipeline for a RISC processor. (10 Marks)
   b. What are the major hurdles of pipelining? Illustrate the branch hazards in detail. (10 Marks)

3 a. What are the techniques used to reduce branch costs? Explain both static and dynamic branch prediction used for same. (10 Marks)
   b. With a neat diagram, give the basic structure of Tomasulo based MIPS FP unit and explain the various fields of reservation stations. (10 Marks)

4 a. Explain the basic VLIW approach for exploiting ILP, using multiple issues. (10 Marks)
   b. What are the key issues in implementing advanced speculation techniques? Explain them in detail. (10 Marks)

PART – B

5 a. Explain the basic schemes for enforcing coherence in a shared memory multiprocessor system. (10 Marks)
   b. Explain the directory based coherence for a distributed memory multiprocessor system. (10 Marks)

6 a. Assume we have a computer where the clocks per instruction (CPI) is 1.0 when all memory accesses hit in the cache. The only data accesses are loads and stores and these total 50% of the instructions. If the mass penalty is 25 clock cycles and the mass rate is 2%, how much faster would the computer be if all instructions were cache hits? (10 Marks)
   b. Explain in brief, the types of basic cache optimization. (10 Marks)

7 a. Which are the major categories of advanced optimizations of cache performance? Explain any one in detail. (10 Marks)
   b. Explain in detail, the architecture support for protecting processes from each other via virtual memory. (10 Marks)

8 a. Explain in detail, the hardware support for preserving exception behaviour during speculation. (10 Marks)
   b. Explain the prediction and speculation support provided in IA64. (10 Marks)

* * * * *

Eighth Semester B.E. Degree Examination, May/June 2010
System Modeling and Simulation

Time: 3 hrs. Max. Marks:100

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

PART- A

1 a. What is simulation? Explain with flowchart, the steps involved in simulation study. **(10 Marks)**

b. Differentiate between continuous and discrete systems. **(05 Marks)**

c. What is system and system environment? List the components of a system, with example. **(05 Marks)**

2 a. A grocery store has one checkout counter. Customers arrive at this checkout counter at random from 1 to 8 minutes apart and each interval time has the same probability of occurrence. The service times vary from 1 to 6 minutes, with probability given below :

Service (minutes)	1	2	3	4	5	6
Probability	0.10	0.20	0.30	0.25	0.10	0.05

Simulate the arrival of 6 customers and calculate :
Average waiting time for a customer
Probability that a customer has to wait
Probability of a server being idle
Average service time and
Average time between arrival.
Use the following sequence of random numbers :

Random digit for arrival	913	727	015	948	309	922
Random digit for service time	84	10	74	53	17	79

Assume that the first customer arrives at time θ. Depict the simulation in a tabular form. **(10 Marks)**

b. Briefly define any four concepts used in discrete event simulation. **(04 Marks)**

c. Explain event scheduling algorithm by generating system snapshots at clock=t and clock = t_1. **(06 Marks)**

3 a. Six dump trucks are used to have coal from the entrance of a mine to a railroad. Each truck is loaded by one of the two loaders. After loading, a truck immediately moves to the scale, to be weighed as soon as possible. Both the loader and the scale have first-come first-served waiting line for trucks. Travel time from a loader to scale is considered negligible. After being weighed, a truck begins travel time [during which time truck unloads] and then afterwards return to loader queue. The activities of loading, weighing and travel time are given in the following table :

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

End of simulation is completion of two weighings from the scale. Depict the simulation table and estimate the loader and scale utilizations. Assume that five of the trucks are at the loaders and one is at the scale at time θ. **(05 Marks)**

b. Define a discrete random variable. Explain the binomial distribution. **(05 Marks)**

c. A production process manufactures alternators for outboard engines used in recreational boating. On the average, 1% of the alternators will not perform up to the required standards when tested at the engine assembly plant. When shipment of 100 alternators is received at the plant, they are tested, and if more than two are non confirming; the shipment is returned to the alternators manufacturer. What is the probability of returning a shipment? **(10 Marks)**

4 a. Explain the characteristics of a queuing system. List different queuing notations. **(10 Marks)**
   b. A tool crib has exponential interarrival and service times, and it serves a very large group of mechanics. The mean time between arrivals is 4 minutes. It takes 3 minutes on the average for a tool crib attendant to service a mechanic. The attendant is paid $ 10 per hour and the mechanic is paid $ 15 per hour. Would it be advisable to have a second tool-crib attendant? **(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. Explain combined linear congruential method for random number generation. **(06 Marks)**
   c. The sequence of numbers 0.54, 0.73, 0.98. 0.11 and 0.68 has been generated. Use the Kolmogorov-Smirnov test with $\alpha = 0.05$ to determine if the hypothesis that the numbers are uniformly distributed on the interval [0, 1] can be rejected. **(08 Marks)**

6 a. Suggest a step by step procedure to generate random variates using inverse transform technique for exponential distribution. **(06 Marks)**
   b. Enlist the steps involved in development of a useful model of input data. **(04 Marks)**
   c. 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

   i) Apply the chi-square test to these data to test the hypothesis, that, underlaying distribution is Poisson. Use a level of significance of $\alpha = 0.05$.
   ii) Apply the chi-square test to these data to test the hypothesis, that, the distribution is Poisson with mean 1.0. Again let $\alpha = 0.05$. **(10 Marks)**

7 a. Briefly explain the measure of performance of a simulation system. **(10 Marks)**
   b. Explain the distinction between terminating or transient simulation and steady state simulation. Give examples. **(10 Marks)**

8 a. Explain with a neat diagram, model building, verification and validation process. **(10 Marks)**
   b. Describe the three steps approach to validation by Naylor and Finger. **(10 Marks)**

* * * * *

Eighth Semester B.E. Degree Examination, May/June 2010
Software Testing

Time: 3 hrs.   Max. Marks:100

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

PART – A

1   a. Define the following:
        i) Error   ii) Fault   iii) Failure   iv) Bug.   **(04 Marks)**
    b. Discuss the attributes associated with software quality.   **(08 Marks)**
    c. What is a test metric? List the various test metrics associated with software testing. Explain any two.   **(08 Marks)**

2   a. Explain the following:
        i) Testability   ii) Verification   **(04 Marks)**
    b. What is defect management? List the different activities. Explain any two.   **(08 Marks)**
    c. Explain the following:
        i) Static testing   ii) Model based testing and model checking.   **(08 Marks)**

3   a. Explain the following:
        i) Equivalence portioning   ii) Boundary value analysis   **(04 Marks)**
    b. Explain the steps associated in creating the equivalence classes for the given problem requirements.   **(08 Marks)**
    c. Identify the steps in the generation of tests, using the category partition method. Explain any two.   **(08 Marks)**

4   a. List the generic procedure which is used for generation of tests, using cause-effect graphing.   **(04 Marks)**
    b. Explain the process of creating cause effect graph.   **(08 Marks)**
    c. Explain the fault model for predicate testing.   **(08 Marks)**

PART – B

5   a. Explain the branch testing, with an example.   **(04 Marks)**
    b. Explain the following:
        i) Procedure call testing   ii) Path testing   **(08 Marks)**
    c. Explain in detail, condition testing and the infeasibility problem associated with it. **(08 Marks)**

6   a. What do you understand by definition use pairs? Draw the control graph of GCD method.   **(04 Marks)**
    b. Explain the following:
        i) Data flow analysis   ii) Classic analysis.   **(08 Marks)**
    c. Explain in detail, the data flow testing criteria.   **(08 Marks)**

7   a. Explain the following:
        i) Test case   ii) Test case specification   iii) Test suite   iv) Adequacy criteria.   **(04 Marks)**
    b. Explain in detail, the scaffolding and test oracles, with reference to test execution.   **(08 Marks)**
    c. Discuss: i) Test case specification to test cases   ii) Capture and replay.   **(08 Marks)**

8   Write short notes on:
    a. Quality process   b. Integration testing
    c. Regression testing   d. Acceptance testing   **(20 Marks)**

* * * * *

06CS/IS834

Eighth Semester B.E. Degree Examination, May/June 2010
Network Management Systems

Time: 3 hrs.   Max. Marks:100

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

PART – A

1   a. Define data and telecommunication network. Explain IBM systems network architecture model.   (10 Marks)
    b. Explain ISO/OSI communication architecture.   (10 Marks)

2   a. Define network management. Explain OSI network management model.   (08 Marks)
    b. What is managed object? Explain managed object perspectives with reference to OSI perspective.   (08 Marks)
    c. Write a note on management information trees.   (04 Marks)

3   a. Explain SNMP proxy server organization model.   (06 Marks)
    b. List SNMP – Based ASN.1 data type structures and explain them.   (09 Marks)
    c. Write a note on structure of managed objects.   (05 Marks)

4   a. Explain different MIB – II groups.   (10 Marks)
    b. Explain various SNMP operations.   (10 Marks)

PART - B

5   a. What is remote monitoring? Explain the relationship between control and data tables.
                                                                             (08 Marks)
    b. Explain RMON token ring extension groups.   (07 Marks)
    c. Explain RMON2 conformance specifications.   (05 Marks)

6   a. With a neat block diagram, explain protocol architecture of an ATM ELAN with an Ethernet LAN.   (10 Marks)
    b. Explain the following : i) Virtual LAN   ii) M2 interface.   (10 Marks)

7   a. Explain broadband LAN.   (07 Marks)
    b. Explain the ADSL line encoding scheme.   (06 Marks)
    c. Explain the ADSL foult management.   (07 Marks)

8   a. Explain finite state machine with communicating finite state machine. (08 Marks)
    b. What is secure communication network? Explain security breaches and the resources needed to prevent it.   (07 Marks)
    c. Discuss the requirement of cryptography.   (05 Marks)

*****

06CS/IS841

Eighth Semester B.E. Degree Examination, May/June 2010
ADHOC Networks

Time: 3 hrs.

Max. Marks:100

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

PART – A

1   a. Give any five differences between cellular wireless networks and ADHOC wireless networks. **(05 Marks)**
    b. Explain any six issues of ADHOC wireless networks. **(12 Marks)**
    c. Write a note on ADHOC wireless internet. **(03 Marks)**

2   a. Describe in detail, MACAW and MACA-BY-invitation protocols. **(10 Marks)**
    b. Explain any two contention based with preservation mechanism MAC protocols. **(10 Marks)**

3   a. Explain :
       i) Distributed priority scheduling MAC protocol
       ii) Distributed wireless ordering MAC protocol. **(08 Marks)**
    b. Describe the working mechanism of MAC protocol using directional antennas. Also in brief, explain one protocol in this category. **(12 Marks)**

4   a. What are the characteristics of routing protocol for ADHOC network? **(08 Marks)**
    b. Give the classification of routing protocols for ADHOC wireless networks. **(06 Marks)**
    c. Explain any one table-driven routing protocol for ADHOC wireless networks. **(06 Marks)**

PART – B

5   a. Explain core extraction based distributed ADHOC routing protocol. **(10 Marks)**
    b. Describe any two hierarchical routing protocols. **(10 Marks)**

6   a. Explain the issues and design goals of transport layer protocol for ADHOC wireless networks. **(10 Marks)**
    b. Explain ADHOC and split TCP. **(10 Marks)**

7   a. Give the classification of security attacks in ADHOC wireless networks. **(06 Marks)**
    b. Describe the symmetric key algorithm for security. **(06 Marks)**
    c. Explain the key management in ADHOC wireless networks. **(08 Marks)**

8   a. Explain the issues and challenges in providing QoS in ADHOC wireless networks. **(10 Marks)**
    b. Explain :
       i) Cluster TDMA protocol for MAC layer QoS
       ii) Ticket-based QoS routing protocol QoS. **(10 Marks)**

* * * * *

06CS846

Eighth Semester B.E. Degree Examination, May/June 2010
Programming Languages

Time: 3 hrs.

Max. Marks:100

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

PART – A

1 a. With diagrams, explain the compilation and interpretation. Compare the two,. **(07 Marks)**
   b. What is a frame with respect to stack based allocation? With relevant diagram, explain the contents and importance of activation record. **(07 Marks)**
   c. Explain the explicit parametric polymorphism. Write a C++ code to find the smallest of two integers and smallest of two real numbers. **(06 Marks)**

2 a. What is unlimited extent of local variables? With a LISP code, bring out how it is useful and implemented. What are the problems? **(06 Marks)**
   b. What is precedence and associativity of operators in a PL? Explain the same taking the arithmetic operators of 'C' language. **(06 Marks)**
   c. Write notes on :
      i) Ordering within expression   ii) Short circuit evaluation. **(08 Marks)**

3 a. Explain with suitable examples, the characteristics of sequencing and selection control flows in PLs. **(10 Marks)**
   b. Compare iteration v/s recursion. Write a 'C' code to compute n! using these. **(10 Marks)**

4 a. Explain the two purposes served by a type in PL. **(05 Marks)**
   b. What is type inference? Describe the contexts in which it occurs. **(08 Marks)**
   c. What is a dope vector? What purpose does it serve? **(03 Marks)**
   d. Explain the difference between row major and column major layout for contiguously allocated arrays. **(04 Marks)**

PART – B

5 a. What are dangling references? How are they created? What problems do they result in? Explain with an example. **(08 Marks)**
   b. Discuss the advantages and disadvantages of the interoperability of pointers and arrays in 'C' language. **(08 Marks)**
   c. What is a pointer reversal? What problem does it address? **(04 Marks)**

6 a. With a typical stack frame layout, explain how a calling sequence operates in subroutines. Further, how do calling sequences differ in RISC and CISC compilers? **(10 Marks)**
   b. Explain exception handling mechanism and its implementation. Distinguish between exception implementation in functional languages and imperative languages. **(10 Marks)**

7 a. Briefly bring out the concept of coroutines in PL. **(05 Marks)**
   b. Explain the three benefits provided by abstraction. **(05 Marks)**
   c. Summarise the rules in C++ to determine the order of constructor's invocation. How are these simplified in other languages? **(10 Marks)**

8 a. Explain the following LISP functions, with examples :
      i) car   ii) cdr   iii) cons   iv) cond   v) let. **(10 Marks)**
   b. Explain the functional programming in perspective. **(10 Marks)**

* * * * *