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06CS81

Eighth Semester B.E. Degree Examination, June/July 2011
Advanced Computer Architecture

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting atleast TWO questions each from Part – A and Part - B.***

PART – A

1 a. Explain with a learning curve, how the cost of processor varies with time along with factors influencing the cost. **(06 Marks)**

b. Find the number of dies per 200cm wafer of circular shape that is used to cut die that is 1.5cm side and compare the number of dies produced on the same wafer if die is 1.25cm. **(06 Marks)**

c. Define Amdahls law. Derive an expression for CPU clock as a function of instruction count, clocks per instruction and clock cycle time. **(08 Marks)**

2 a. What are major hazards in a pipeline? Explain data hazard and methods to minimize data hazard with example. **(08 Marks)**

b. Consider the following calculations : x = y + z ; a = b * c. Assume the calculations are done using registers. Show, using 5 stage pipeline, how many clock pulses are required for direct operations. By recording with stalls show how many clock pulses are required and saving in the number of clock pulses to solve data hazard. **(12 Marks)**

3 a. What are data dependencies? Explain name dependences with example between two instructions. **(06 Marks)**

b. What is correlating predictors? Explain with examples. **(06 Marks)**

c. For the following instructions, using dynamic scheduling show the status of R.O.B, Reservation station when only MUL.D is ready to commit and two L.D committed.

```
L.D   F6, 32(R2)
L.D   F2, 44(R3)
MUL.D  F0, F2, F4
SUB.D  F8, F2, F6
DIV.D  F10, F0, F6
ADD.D  F6, F8, F2.
```

Also show the type of hazards between instructions. **(08 Marks)**

4 a. Explain the basic VLIW approach for exploiting ILP, using multiple issues. **(08 Marks)**

b. What are the key issues in implementing advanced speculation techniques? Explain in detail. **(08 Marks)**

c. Write a note on value predictors. **(04 Marks)**

PART – B

5 a. Explain the directory based cache coherence for a distributed memory multi processor system along with state transition diagram. **(10 Marks)**

b. Explain any two hardware primitives to implement synchronization with example. **(10 Marks)**

6 a. Explain block replacement strategies to replace a block, with example when a cache . **(06 Marks)**

b. Explain the types of basic cache optimization. **(09 Marks)**

c. With a diagram, explain organization of data cache in the opteron microprocessor. **(05 Marks)**

7 a. Explain the following advanced optimization of cache :

i) Compiler optimizations to reduce miss rate.

ii) Merging write buffer to reduce miss penalty.

iii) Non blocking caches to increase cache band width. **(09 Marks)**

b. Explain in detail the architecture support for protecting processor from each other via virtual machines. **(06 Marks)**

c. Explain internal organization of 64Mb DRAM. **(05 Marks)**

8 a. Explain in detail the hardware support for preserving exception behaviour during speculation. **(10 Marks)**

b. Explain the architecture of IA64 intel processor and also the prediction and speculation support provided. **(10 Marks)**

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06CS82

Eighth Semester B.E. Degree Examination, June/July 2011

System Modeling and Simulation

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. What is system and system environment? Explain the components of a system with examples. **(10 Marks)**

b. Explain the various steps in simulation study, with the help of a neat flow diagram. **(10 Marks)**

2 a. With the help of a flow diagram, explain the simulation of a single channel queuing system. **(10 Marks)**

b. A large milling machine has three different bearings that fail in service. The cumulative distribution function of the life of each bearing is identical, as shown in Table.1. When a bearing fails, the mill stops, a repair-person is called and a new bearing is installed. The delay time of the repair-person's arriving at the milling machine is also a random variable, with the distribution given in Table.2. Downtime for the mill is estimated at \$5/minute. The direct on-site cost of the repair-person is \$15/hour. It takes 20 minutes to change 1 bearing, 30 minutes to change 2 bearings, 40 minutes to change 3 bearings. The bearing cost \$16 each. A proposal has been made to replace all 3 bearings whenever a bearing fails. Management needs an evaluation of this proposal. Simulate the system for10,000 hours of operation under proposed method and determine the total cost of the proposed system.

Table.1 : Bearing life distribution

Bearing life (hrs)	1000	1100	1200	1300	1400	1500	1600	1700	1800	1900
Probability	0.10	0.13	0.25	0.13	0.09	0.12	0.02	0.06	0.05	0.05

Table.2 : Delay-time distribution

Delay (minutes)	5	10	15
Probability	0.6	0.3	0.1

Note : Consider the following sequence of random digits for bearing life-times.

Bearing 1	67	8	49	84	44	30	10	63
Bearing 2	70	43	86	93	81	44	19	51
Bearing 3	76	65	61	96	65	56	11	86

Consider the following sequence of random digits for delay time.

Delay	3	7	5	1	4	3	7	8

(10 Marks)

3 a. What do you mean by "world view"? Discuss the various types of world views. **(10 Marks)**

b. Suppose the maximum inventory level M, is 11 units and the review period, N, is 5 days. Estimate by simulation, the average ending units in inventory and number of days when a shortage condition occurs.

The number of units demanded per day is given by the following probability distribution. Assume that orders are placed at the close of business and are received for inventory at the beginning of business as determined by the lead-time. Initially simulation has started with inventory level of 3 units and an order of 8 units scheduled to arrive in two days time.

Demand	0	1	2	3	4
Probability	0.10	0.25	0.35	0.21	0.09

Question No.3(b) continued...

Lead time is a random variable, with the following probability distribution:

Lead time (days)	1	2	3
Probability	0.6	0.3	0.1

Note : The sequence of random digits for demand and random digits for lead-time should be considered in the given order.

RD for demand	24	35	65	81	54	3	87	27	73	70	47	45	48	17	9
RD for lead time	5	0	3												

(10 Marks)

4 a. What is the role of maximum density and maximum period in generation of random numbers? With given seed 45, constant multiplier 21, increment 49 and modulus 40, generate a sequence of five random numbers. **(10 Marks)**

b. For the following sequence can the hypothesis that the numbers are independent can be rejected on the basis of length of runs up and down when $\alpha = 0.05$, $z_{0.025} = 1.96$.

0.34	0.90	0.25	0.89	0.87	0.44	0.12	0.21	0.46	0.67
0.83	0.76	0.79	0.64	0.70	0.81	0.94	0.74	0.22	0.74
0.96	0.99	0.77	0.67	0.56	0.41	0.52	0.73	0.99	0.02
0.47	0.30	0.17	0.82	0.56	0.05	0.45	0.31	0.78	0.05
0.79	0.71	0.23	0.19	0.82	0.93	0.65	0.37	0.39	0.42

(10 Marks)

PART – B

5 a. What is inverse transform technique? Derive an expression for exponential distribution. **(10 Marks)**

b. A sequence of 1000 four digit numbers has been generated and analysis indicates the following combinations and frequencies. Based on poker test check whether the numbers are independent. Use $\alpha = 0.05$, $x^2_{0.05,2} = 5.99$.

Combination (i)	O_i
Four different digits	565
One pair	392
Two pairs	17
Three like digits	24
Four like digits	2

(10 Marks)

6 a. What is acceptance-rejection technique? Generate three Poisson variates with mean $\alpha = 0.2$. **(10 Marks)**

b. For the given sequence of +'s and –'s, can the hypothesis that the numbers are independent be rejected on the basis of the length of runs above and below the mean at $\alpha = 0.05$? The critical value is given as 5.99. **(10 Marks)**

– – – – + – + – + + – + – + + – – + – +
– + – – + + + + + + + – – + + – – – – +
+ – – + – + – – – + + + + – – – – – + –

7 a. What do you mean by verification and validation of simulation models? Explain calibration and validation of models with the help of diagram. **(10 Marks)**

b. Discuss types of simulations with respect of output analysis with examples. **(10 Marks)**

8 Write short notes on : **(20 Marks)**

a. Characteristics of queuing system
b. Errors while generating pseudorandom numbers
c. Network of queue
d. Optimization via simulation.

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06CS/IS835

Eighth Semester B.E. Degree Examination, June/July 2011

Information and Network Security

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Define policy and explain issue specific security policy. **(10 Marks)**

b. Explain the importance of incident response planning strategy. **(10 Marks)**

2 a. What is firewall? Explain categories of firewalls based on processing mode. **(10 Marks)**

b. What are virtual private networks? Explain different techniques to implement a virtual private network. **(10 Marks)**

3 a. Explain network based intrusion detection and prevention systems. **(10 Marks)**

b. Describe the need of operating system detection tools. **(10 Marks)**

4 a. List out the elements of cryptosystems and explain transposition cipher technique. **(10 Marks)**

b. Who can attack cryptosystems? Discuss different categories of attacks on cryptosystems. **(10 Marks)**

PART – B

5 a. Compare active and passive attacks. **(05 Marks)**

b. With a neat diagram, explain network security model. **(07 Marks)**

c. List out the differences between Kerberos version 4 and version 5. **(08 Marks)**

6 a. Explain PGP message generation and PGP message reception techniques. **(10 Marks)**

b. Describe S/MIME functionality. **(05 Marks)**

c. Explain S/MIME certificate processing method. **(05 Marks)**

7 a. Describe SA parameters and SA selectors in detail. **(10 Marks)**

b. Describe Oakley key determination protocol. **(10 Marks)**

8 a. Explain SSL handshake protocol with a neat diagram. **(10 Marks)**

b. List out the key features of secure electronic transaction and explain in detail. **(10 Marks)**

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06CS846

Eighth Semester B.E. Degree Examination, June/July 2011
Programming Languages

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Why are there so many programming languages? **(06 Marks)**

b. What makes a programming languages successful? **(06 Marks)**

c. What is binding and binding time? Explain various binding times with suitable examples. **(08 Marks)**

2 a. Discuss on subroutine clousres, first and second class subroutines in the bindings of referencing environments. **(08 Marks)**

b. Explain the difference between prefix, infix and postfix notation. What is Cambridge polish notation? Name two programming languages those uses postfix notation. **(06 Marks)**

c. What is short circuit Boolean evaluation? Why is it useful? Explain with suitable examples. **(06 Marks)**

3 a. What is tail-recursive function? Explain the tail-recursive function for finding gcd. Why is tail recursion important? **(06 Marks)**

b. Explain with examples mid test, pre test and post test loop. **(06 Marks)**

c. Describe the various "iteration count" loop implementation methods. **(08 Marks)**

4 a. Explain numeric, Enumeration, sub range and composite types in various programming languages. **(08 Marks)**

b. What is type inference? Describe three contexts in which it occurs. **(07 Marks)**

c. What is the difference between type equivalence and type compatibility? **(05 Marks)**

PART – B

5 a. What is dangling reference? Explain dangling reference detection using Tomstones, Locks and Keys. **(10 Marks)**

b. What is Garbage collection? Explain reference count an tracing collection as a means of solving Garbage collection. **(10 Marks)**

6 a. Describe the four common parameter passing modes. **(08 Marks)**

b. Describe three common mechanisms for specifying the return value of a function. **(06 Marks)**

c. What is subroutine calling sequence? What does it do? What is meant by the sub routine prologue and epilogue? **(06 Marks)**

7 a. What are generally considered to be the five defining characteristics of object oriented programming? **(05 Marks)**

b. Explain cactul stack with an example. **(05 Marks)**

c. Define multiple inheritance, repeated inheritance, replicated inheritance and shared inheritance with an example and list the sematric and pragmatic issues associated with multiple inheritance. **(10 Marks)**

8 a. Describe the following list manipulating function with an example for each cdr, cons, car, wnd. **(03 Marks)**

b. Explain the difference between let, let* and letrec in scheme. **(07 Marks)**

c. What are following with respect to logic programming?
i) Horn clouse.
ii) Resolution and unification. **(10 Marks)**
iii) Terms in prolog.
iv) Structure in prolog.

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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.