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10CS71

Seventh Semester B.E. Degree Examination, Dec.2015/Jan.2016

Object Oriented Modeling and Design

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 the object orientation? Explain the characteristics of an object oriented with examples. **(10 Marks)**

b. What is modeling concepts? Explain write class model of windowing system. **(10 Marks)**

2 a. Explain the properties of Association ends. **(06 Marks)**

b. What is multiple inheritance? Explain the kinds of multiple Inheritance. **(08 Marks)**

c. What is an event? Explain different types of events with example. **(06 Marks)**

3 a. Explain nested state and Nested state diagrams with example. **(10 Marks)**

b. Define use case models? Explain use case diagram for a vending machine. **(06 Marks)**

c. Discuss the Guidelines for activity models. **(04 Marks)**

4 a. Define software development process? Explain the stages of software development process. **(10 Marks)**

b. Explain the steps involved in constructing a domain state model. **(10 Marks)**

PART – B

5 a. What are the steps involved in constructing an application class model? **(10 Marks)**

b. Briefly explain common Architectural styles suited for system design. **(10 Marks)**

6 a. Explain the different steps are involved in design optimization. **(10 Marks)**

b. Explain the one – way association and Two way associations. **(05 Marks)**

c. Compare Forward Engineering and Reverse Engineering. **(05 Marks)**

7 a. What is pattern? Explain the properties of pattern for software Architecture. **(10 Marks)**

b. Describes the Three categories of Patterns. **(10 Marks)**

8 Write short notes on

a. Structure part of command processor. **(05 Marks)**

b. Dynamic scenario of view Handler **(05 Marks)**

c. Benefits of view Handler **(05 Marks)**

d. Idioms and style. **(05 Marks)**

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10CS72

Seventh Semester B.E. Degree Examination, Dec.2015/Jan.2016

Embedded Computing System

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 an Embedded Computing system? Mention its characteristics. **(04 Marks)**

b. Explain Embedded system Design process with respect to GPS moving map. **(10 Marks)**

c. Draw and explain the sequence diagram for transmitting a control input in a model train controller. **(06 Marks)**

2 a. Write ARM assembly code to implement the following C assignments

i) x = (a – b)+(c * d) ;

ii) y = (a < <3)| (b & 1b); **(06 Marks)**

b. Explain the pipelined execution of a branch in ARM using a pipeline diagram. **(04 Marks)**

c. What is a cache? Explain the following with diagram

i) Two – Level cache system

ii) Direct – Mapped cache

iii) Set – Associative cache **(10 Marks)**

3 a. Draw the UML state diagram of bus bridge operation and explain. **(06 Marks)**

b. Explain with a neat diagram, the bus with a DMA controller. **(06 Marks)**

c. Write a requirement table for an Alarm clock. **(08 Marks)**

4 a. Briefly explain Control/Data Flow Graphs. Draw the CDFG for the C codes given below

```
i) proc1( );
   If (a < b)
    proc2( );
   else
      proc3( )
   proc4 ( );
   switch(op)
    {
     case 1 : proc5( );
              break;
     case 2 : proc6( );
              break;
     case 3 : proc7( );
              break;
    }
   Proc8( )
ii) for (i=0; i<N;i++)
      {
       a = proc1(a,b);
       b =proc2 (a,b);
      }
```

(06 Marks)

b. Show the contents of the Assembler's symbol Table at the end of code generation for each line of the following program. **(10 Marks)**

i)
```
    ORG 100
P1  CMP r0, r1
    BEQ P1
P2  CMP r0, r2
    BEQ P2
P3  CMP r0, r3
    BEQ P3
```

ii)
```
    ORG  200
P1  ADR r4, a
    LDR r0, [r4]
    ADR r4, e
    LDR  r1, [r4]
    ADD r0, r0, r1
    BNE  q1
P2  ADR  r4, e
```

c. Explain briefly different types of performance measures on programs. **(04 Marks)**

PART – B

5 a. What is Real-Time operating system and Real-Time Kernel? Define Task Control Block (TCB) and describe the structure of a TCB. **(07 Marks)**

b. Explain the synchronization issues in resource utilization. Using the Dining Philosopher's problem. Mention the solutions for those issues. **(07 Marks)**

c. Three processes with process IDs P1, P2, P3 with estimated completion time 8, 5, 4 milliseconds respectively, enters the ready queue together in the or P_2, P_3, P_1. Process P_4 with estimated execution time 4 milliseconds entered the 'Ready' queue 3 milliseconds later the start of execution of P1. Calculate the waiting time and Turn Around Time (TAT) for each process and the Average waiting time and Average Turn Around time (Assuming there is no I/O waiting for the processes in RR algorithm with Time slice = 2ms. **(06 Marks)**

6 a. Explain briefly the concept of counting semaphore and Mutex. **(08 Marks)**

b. What is advanced configuration and power interface? Explain the basic global power states supported by ACPI. **(06 Marks)**

c. Describe how to evaluate OS performance in terms of the following:
   i) Context switching
   ii) Cache scheduling **(06 Marks)**

7 a. With a neat diagram, explain the various fields of CAN frame. **(07 Marks)**

b. Explain a neat diagram, the structure of an IP packet. **(07 Marks)**

c. List and explain the advantages and limitations of simulator Based Debugging. **(06 Marks)**

8 a. With a neat diagram, explain elements of the ARM AMBA bus system. **(05 Marks)**

b. Write a short note on Logic Analizer. **(05 Marks)**

c. Explain with a diagram the concept of Context switching, context saving and context Retrieval. **(05 Marks)**

d. Differentiate Non-preemptive SJF scheduling algorithm and Preemptive SJF scheduling algorithm with simple examples. **(05 Marks)**

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10CS73

Seventh Semester B.E. Degree Examination, Dec.2015/Jan.2016

Programming the Web

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 MIME? Explain its specifications. **(04 Marks)**

b. Write the General form of HTTP request and response. Explain. **(08 Marks)**

c. Illustrate with an example, each of the following XHTML tags
   i) <pre>
   ii) <blockquote>
   iii) <a>
   iv) <meta> **(08 Marks)**

2 a. Why are lists used on web pages? With an example, explain different types of lists available in XHTML. **(06 Marks)**

b. Explain with an example the concept of framesets and frames in building web pages **(06 Marks)**

c. What are selector forms? Explain with example different types of selector forms. **(08 Marks)**

3 a. With the help of an example, explain JavaScript's screen output and keyboard input methods. **(08 Marks)**

b. Explain the following objects available in JavaScript. List atleast 3 methods available with them.
   i) Math object
   ii) Number object
   iii) Date object
   iv) Array object. **(08 Marks)**

c. Write a JavaScript to read an email ID from the user using prompt and validate it. It should contain a '@' and '.' (dot) **(04 Marks)**

4 a. Discuss any two methods of Element Access in JavaScript. Give examples for both. **(06 Marks)**

b. With the help of an example, explain any one event associated with the following elements.
   i) Body ii) Button iii) Textbox **(06 Marks)**

c. Explain different techniques to position elements in XHTML. What are the standard values for visibility property? How are they used? **(08 Marks)**

PART – B

5 a. What is DTD? What is the difference between External and Internal DTD's? Write the syntax and example for declaring elements, Attributes and Entities in a DTD. **(08 Marks)**

b. Illustrate with the help of a diagram the XSLT processing. **(06 Marks)**

c. Declare an XML document containing data of 3 Employee's (Emp_ID, Emp_Name, Emp_Desig, Emp_Age, Emp_Phone, Emp_Address) and display this XML data using CSS, with following rules:
   Emp_ID in font-size 28 pts and color – Red
   Emp_Name and Emp_Desig in font size 18 pts and color – Blue
   Emp_Age, Emp_Phone and Emp_Address in font size 15pt and color – Black. **(06 Marks)**

6 a. Write a Perl program to read a number from standard input device and check if it is a prime number. Display appropriate massages. **(06 Marks)**

b. How are Array's declared in Perl? Demonstrate the use of 'foreach' statement on perl Array's. **(06 Marks)**

c. Write an XHTML and Perl program, the XHTML should define a form containing Book_AccNO, Book_Name, Book_Author, Book_Edn, and Book_Publish as textboxes and a submit and reset button. On submission to a Perl CGI, the Perl program should extract the book information and store it into the database in 'Book' table. Handle exceptions appropriately. **(08 Marks)**

7 a. Explain different functions available in php for handling files. Give examples for opening, closing, reading and writing to files. **(08 Marks)**

b. What is session tracking in web pages? With the help of an example php program demonstrate how session can be used to track number of web pages visited in a session. **(08 Marks)**

c. What is a Cookie? Why are they used? Which function is used in php to set a Cookie? Give an example and syntax. **(04 Marks)**

8 a. Explain keyboard input and screen output functions in Ruby. **(04 Marks)**

b. Write a Ruby program to declare an array, store in it 10 elements of type integer. Use 'for – in' statement to sum the array elements and display the sum. **(06 Marks)**

c. With a help of a diagram explain how rails responds to simple web requests. **(04 Marks)**

d. Write a note on the concept of classes and inheritance in Ruby. **(06 Marks)**

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10CS74

Seventh Semester B.E. Degree Examination, Dec.2015/Jan.2016
Advanced Computer Architecture

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Define the computer architecture. Explain the Bandwidth over Latency, and Benchmarks. **(06 Marks)**

b. Briefly explain the Amdahl's law. **(08 Marks)**

c. Assume a disk subsystem with the following components and MTTF:
   i) 10 disks, each rated at 1,000,000 hour MTTF
   ii) 1 SCSI controller, 5,00,000 – hour MTTF
   iii) 1 power supply, 2,00,000 – hour MTTF
   iv) 1 fan, 2,00,000 – hour MTTF
   v) 1SCSI cable, 1,000,000 – hour MTTF.

   Using the simplifying assumptions that the lifetimes are exponentially distributed and that failure are independent, compute the MTTF of the system as a whole. **(06 Marks)**

2 a. What is pipelining? List pipeline hazards. Explain any two in details. **(10 Marks)**

b. List and explain five different ways of classifying exception in a computer system. **(10 Marks)**

3 a. List the steps to unroll the code and schedule. **(04 Marks)**

b. What is the drawback of 1 – bit dynamic branch prediction method? Clearly state, how to overcome in 2 – bit prediction. Give the state transition diagram of 2 – bit predictor. **(06 Marks)**

c. With a neat diagram, give the basic structure of Tamasulo based MIPS FP unit and explain the various fields of reservation stations. **(10 Marks)**

4 a. Explain the basic VLIW approach List its drawbacks. **(10 Marks)**

b. With a neat diagram, explain the steps involved in handling an instruction, with a branch target buffer. **(10 Marks)**

PART – B

5 a. With a neat diagram, explain the basic structure of a centralized shared – memory and distributed memory multiprocessor. **(08 Marks)**

b. Define multiprocessor cache coherence. **(02 Marks)**

c. Explain the basic schemes of enforcing coherence in a shared memory multiprocessor system. **(10 Marks)**

6 a. Explain the six basic cache optimization techniques. **(12Marks)**

b. How to protect virtual memory and virtual machines? **(08 Marks)**

7 a. Assume we have a computer where the clock 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 miss penalty is 25 clock cycles and the miss rate is 2%, how much faster would the computer be if all instructions were cache hits? **(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 behavior during speculation **(10 Marks)**

b. Write short notes on :
   i) The Itanium 2 processor **(05 Marks)**
   ii) IA – 64 register model **(05 Marks)**

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10CS/IS765

Seventh Semester B.E. Degree Examination, Dec.2015/Jan.2016
Storage Area Networks

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. A hospital uses an application that stores patient X-ray data in the form of large binary objects in an oracle database. The application is hosted on a UNIX server, and the hospital staff accesses the X-ray records through a GB Ethernet backbone. An EMC CLARiion storage array provides storage to the UNIX server, which has 6 TB of usable capacity. Explain the core elements of the data center, and key requirements for data center elements. What are the typical challenges the storage management team may face in meeting the service-level demands of the hospital staff? **(12 Marks)**

b. Consider a disk I/O system in which an I/O request arrives at the rate of 80 IOPS. The disk service time is 6ms.

i) Compute the following: utilization of I/O controller, total response time, average queue size and total time spent by a request in a queue.

ii) Compute the preceding parameter if the service time is halved. **(08 Marks)**

2 a. An application has 1000 heavy users at a peak of 2 IOPS each and 2000 typical users at a peak of 1 IOPS each, with a read/write ratio of 2:1. It is estimated that the application also experiences an overhead of 20% for other workloads. Calculate the IOPS required for RAID 1, RAID 3, RAID 5 and RAID 6. Also compute the number of drives required to support the application in different RAID environments if 10K rpm drives with a rating of 130 IOPS per drive were used. **(10 Marks)**

b. Categories and explain intelligent storage systems with diagram. **(10 Marks)**

3 a. If three hard disk drives are connected in a daisy chain and communicate over SCSI, explain SCSI-3 standard architecture and SCSI communication model. **(10 Marks)**

b. What is zoning? Discuss a scenario, where soft zoning is preferred and where hard zoning is preferred. **(05 Marks)**

c. Differentiate between full and partial mesh topology. **(05 Marks)**

4 a. What are the factors affecting NAS performance? **(04 Marks)**

b. Draw and explain the components, the topologies and the protocol stack of iSCSI. **(16 Marks)**

PART – B

5 a. Explain the data object storage process and process of data retrieval from CAS system with diagram. **(10 Marks)**

b. Illustrate a NAS environment before and after the implementation of file level virtualization. **(10 Marks)**

6 a. Draw and explain BC planning life cycle. **(12 Marks)**

b. What are different back-up topologies? Explain. **(08 Marks)**

7 a. A host generates 8000 I/Os at peak utilization with an average I/O size of 32 KB. The response time is currently measured at an average of 12 ms during peak utilizations. When synchronous replication is implemented with a fibre channel link to a remote site, what is the response time experienced by the host if the network latency is 6 ms per I/O? **(04 Marks)**

b. What is the importance of recoverability and consistency in local replication? **(04 Marks)**

c. Discuss the effects of a bunker failure in a three-site replication for the following implementations:
   i) Multihop synchronous and disk buffered
   ii) Multihop synchronous and asynchronous
   iii) Multitarget **(12 Marks)**

8 a. What are monitoring parameters and components monitored for storage infrastructure? Explain in details. **(10 Marks)**

b. Explain storage infrastructure management activities in detail. **(10 Marks)**

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10CS/IS753

Seventh Semester B.E. Degree Examination, Dec.2015/Jan.2016

Java and J2EE

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. List and explain the java buzzwords. **(08 Marks)**

b. Explain with example
i) >>> ii) short circuit logical operator iii) for each. **(06 Marks)**

c. Explain different access specifiers in java with examples. **(06 Marks)**

2 a. What is meant by instance variable hiding? How to overcome it? **(04 Marks)**

b. What is exception? Explain the different exception handling mechanisms with an example. **(08 Marks)**

c. What is an applet? Write an applet program to display the message "WELCOME TO VTU BELGAUM". Set the background color to green and foreground to red. **(08 Marks)**

3 a. What is thread? Explain two ways of creating thread. **(08 Marks)**

b. What is synchronization? Explain the producer consumer problem with a program. **(08 Marks)**

c. Explain KeyEvent and MouseEvent class. **(04 Marks)**

4 a. Create swing applet that has two buttons named beta and gamma. When either of the buttons pressed it should display " beta was pressed" and "gamma was pressed" respectively. **(06 Marks)**

b. Explain different types of swing buttons with syntax. **(08 Marks)**

c. Write a program to create table with headings " fname, lname, age" and insert at least 5 records. **(06 Marks)**

PART – B

5 a. Describe the various steps of JDBC process with suitable exception handling blocks. **(10 Marks)**

b. Explain the different types of statement object, give example for each. **(10 Marks)**

6 a. Explain the different stages in the life cycle of servlet. **(06 Marks)**

b. Write a short note on HttpRequest and HttpResponse. **(06 Marks)**

c. What is cookie? List out the methods defined by cookie. Write a program to add a cookie. **(08 Marks)**

7 a. What is JSP? Explain different types of JSP tags by taking suitable examples. **(10 Marks)**

b. What is RMI? Describe with code snippet RMI at client and server side. **(10 Marks)**

8 a. What is deployment descriptor? List the deployment descriptor for EJB2.0. **(06 Marks)**

b. Explain i) JAR File ii) Stateless bean versus statefull bean. **(06 Marks)**

c. Explain with a skeleton entity java bean. **(08 Marks)**

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10IS72

Seventh Semester B.E. Degree Examination, Dec.2015/Jan.2016
Information Systems

Time: 3 hrs. Max. Marks:100

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

PART – A

1 a. Discuss the trends in information systems. **(10 Marks)**
b. Define cybernetic system with an example. **(05 Marks)**
c. List and explain the activities of an information system. **(05 Marks)**

2 a. Explain with a neat figure, how a customer focused business builds customer value and loyalty using internet. **(10 Marks)**
b. How a business uses internet technologies to form a virtual company and alliance with business partners? **(10 Marks)**

3 a. List and explain various transactions processing cycle with a neat diagram. **(10 Marks)**
b. What is manufacturing information system? Explain computer-integrated manufacturing (CIM) with a neat figure. **(10 Marks)**

4 a. Define CRM. Explain the phases of CRM and support between business and its customers. **(10 Marks)**
b. What is SCM? Explain how SCM software and internet technologies can help companies re-engineer and integrate the functions of SCM process that support the supply chain life cycle. **(10 Marks)**

PART – B

5 a. Explain the e-commerce process architecture with a neat diagram. **(10 Marks)**
b. Explain the secure E-payment system, with an example. **(10 Marks)**

6 a. Explain the need for OLAP with a diagram. Also elaborate basic analytical operations used in OLAP. **(10 Marks)**
b. List the major domain areas of AI and its commercial applications. **(10 Marks)**

7 a. What is hacking? Explain the common hacking tactics to assault the companies. **(10 Marks)**
b. What is security management? List and explain the important security defenses. **(10 Marks)**

8 a. Explain the major components of business / IT planning process and IT architecture. **(10 Marks)**
b. Describe the top issues in managing international data communications. **(10 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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10CS/IS761

Seventh Semester B.E. Degree Examination, Dec.2015/Jan.2016

C# Programming and .Net

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 building blocks of .Net? With neat diagram give the relationship between .Net runtime layer and base class library. **(10 Marks)**

b. Define an Assembly? Explain each component of an assembly. Differentiate between single file assembly and multiple file assembly. **(10 Marks)**

2 a. Explain how csc.exe command is used to build C# application on .Net Framework. Explain any 5 flags with appropriate example. **(08 Marks)**

b. Explain the following C# preprocessor directives
i) # Error ii) Conditional code compilation. **(04 Marks)**

c. What is a Command Line Debugger? List and explain any five command line flags recognized by Command Line Debugger. **(08 Marks)**

3 a. Explain with an example static keyword. When used with
i) Variable ii) Method iii) Constructor. **(06 Marks)**

b. With a neat example, explain what happens when reference types is passed by value and passed by reference? **(08 Marks)**

c. Explain Boxing and Unboxing with example. **(06 Marks)**

4 a. Explain two different roles of this keyword with example. **(06 Marks)**

b. Explain with example, Read-only properties and Write-only properties. **(06 Marks)**

c. What are the three pillars of object oriented programming in C#, Differentiate between "is a" Relationship and "has a" Relationship with appropriate examples. **(08 Marks)**

PART – B

5 a. What are bugs, errors and exception? List and explain with code, the core members of System. Exception type. **(12 Marks)**

b. What is meant by object life time? Explain Garbage Collection Optimization process in C#. **(08 Marks)**

6 a. Explain three different ways of obtaining interface references with neat examples. **(10 Marks)**

b. List and explain in detail the different System.Collections Interface types. **(05 Marks)**

c. Explain the class types of System.Collection . **(05 Marks)**

7 a. What is a delegate? Differentiate between Synchronous and Asynchronous delegate with example. **(10 Marks)**

b. Illustrate the use of Callback Interfaces with a C# program. **(10 Marks)**

8 a. Explain the two conceptual views of .Net Assembly, with a neat diagram. What are the benefits of this? **(10 Marks)**

b. Write short notes on : i) Cross Language Inheritance ii) Shared Assembly. **(10 Marks)**

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