USN [| | | | | | | |]   **10CS71**

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 OO development? Explain the major themes that are well supported in object oriented technology. **(10 Marks)**
   b. What is model? What are its advantages? Briefly discuss about their models. **(10 Marks)**

2 a. What is aggregation and composition? Give their respective UML notations, with an example. **(10 Marks)**
   b. What is an event? Explain different types of events, with an example. **(10 Marks)**

3 a. Explain nested states and nested state diagrams, with example. **(10 Marks)**
   b. Explain activity diagram, with the UML notation. Give an example. **(05 Marks)**
   c. Mention the guidelines for activity models. **(05 Marks)**

4 a. What is Software development process? Explain the stages of software development process. **(10 Marks)**
   b. Write and explain the steps performed in constructing a domain state model, with an example. **(10 Marks)**

PART – B

5 a. Explain the various software control strategies that can be applied in the system design. **(10 Marks)**
   b. Describe application analysis, with an example of ATM. **(10 Marks)**

6 a. Explain the different tasks involved in design optimization. **(10 Marks)**
   b. Write short notes on :
      i) Reverse Engineering Vs forward Engineering
      ii) Wrapping. **(10 Marks)**

7 a. Describe the three categories of pattern. **(10 Marks)**
   b. With a neat diagram, explain the dynamics of client. Dispatcher server design pattern. **(10 Marks)**

8 a. What are idioms and styles? Explain with the help of an example, a style guide idiom. **(10 Marks)**
   b. Write short notes on :
      i) Command processor design pattern
      ii) View handler design pattern. **(10 Marks)**

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USN | | | | | | | | | | **10CS72**

Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020
Embedded Computing Systems

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 an embedded system? Explain the characteristics of embedded system. **(05 Marks)**

    b. Mention the major steps in the embedded system design process. With neat diagrams, explain the various design process in the GPS moving map. **(10 Marks)**

    c. Explain the state diagram for panel-active behavior in modern train controller. **(05 Marks)**

2 a. Differentiate the following with an example: (i) Von-Neuman and Hardward architecture (ii) Segmentation and paging **(06 Marks)**

    b. Draw a UML sequence diagram and write a program for copying characters from an input to an output device using interrupt-driven I/O. The diagram should include two I/O handlers and the foreground program. **(08 Marks)**

    c. Mention the limitations of direct-mapped cache. How to overcome the limitations? Explain. **(06 Marks)**

3 a. Discuss the requirement chart of a Alarm clock. **(08 Marks)**

    b. Explain the different types of debugging techniques. **(08 Marks)**

    c. With a neat sketch, explain the glue logic interface. **(04 Marks)**

4 a. Consider the following 'C' code statement $a * b + 5 * (c - d)$.

      i) Draw the DFG for the above 'C' statement.

      ii) Generate the ARM assembly code for the above 'C' statement. **(06 Marks)**

    b. Explain the circular buffers for the embedded programs. **(04 Marks)**

    c. Explain the different types of program, optimization techniques. **(10 Marks)**

PART – B

5 a. With a neat sketch, explain the operating system architecture. **(10 Marks)**

    b. Three processes with process IDs P_1, P_2, P_3 with estimated completion time 10, 5, 7 milliseconds respectively enters the ready queue together in the order P_1, P_2, P_3. Calculate the waiting time and Turn Around Time (TAT) for each process and the average waiting time and TAT. (Assuming there is no I/O waiting for the processes). **(08 Marks)**

    c. What is the significance of spin lock? **(02 Marks)**

6 a. Explain different types of interprocess communication with an example. **(08 Marks)**

    b. What are the factors need to be evaluated in selection of an RTOS? Explain. **(06 Marks)**

    c. Explain the system architecture of an answering machine. **(06 Marks)**

7 a. Explain the typical bus transactions on the I^2C bus with a timing diagram. **(05 Marks)**

    b. Explain the structure of IP packet. **(05 Marks)**

    c. Discuss the basic class diagram for the elevator system. Include * classes for the physical interfaces (user interface) of the elevator control panels, floor control panels and displays. **(10 Marks)**

8 a. Explain the different types of files generated during cross compilation. **(10 Marks)**

    b. Explain the following: (i) Incremental EEPROM Burning Technique

                        (ii) In circuit Emulator (Z_{CE}) Based Firmware Debugging. **(10 Marks)**

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Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020
Programming the Web

Time: 3 hrs.

Max. Marks:100

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

PART – A

1   a. What is HTTP? Explain its phases in detail. **(10 Marks)**
    b. Explain the following tags with example:
        (i) < a >   (ii) < img >   (iii) < blockquote >   (iv) < meta >   **(08 Marks)**
    c. Explain MIME type specifications. **(02 Marks)**

2   a. Explain the following with respect to table creation in XHTML documents:
        (i) Align and valign attributes
        (ii) Rowspan and colspan attributes
        (iii) Cell Padding and Cell spacing attributes. **(06 Marks)**
    b. Different between HTML and XHTML. **(06 Marks)**
    c. List out the variety of selector forms available in CSS and explain in detail. **(08 Marks)**

3   a. Explain the different levels of style sheets available in CSS. **(04 Marks)**
    b. Explain the concept of object creation and modification in Javascript. **(08 Marks)**
    c. Explain with examples, the screen output and keyboard input methods. **(08 Marks)**

4   a. Explain events and event handling in Javascript. **(10 Marks)**
    b. Explain the different types of positioning elements in Javascript with example. **(10 Marks)**

PART – B

5   a. Explain XML Document Type Definitions with example. **(10 Marks)**
    b. With a neat diagram explain the transformation process by an XSLT processor. **(07 Marks)**
    c. Explain the purposes of XML processors. **(03 Marks)**

6   a. Explain string functions in PERL. **(05 Marks)**
    b. Explain the concept of Arrays in PERL. **(06 Marks)**
    c. What is CGI? With a neat diagram, explain communication configuration for CGI. **(09 Marks)**

7   a. Explain the four scalar types of PHP. **(06 Marks)**
    b. Explain how to create a cookie in a PHP script. **(08 Marks)**
    c. Explain Session Tracking in a PHP script. **(06 Marks)**

8   a. Explain the concept of Classes in Ruby. **(10 Marks)**
    b. Explain how to build the Database in Rails. **(10 Marks)**

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Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020
Advanced Computer Architectures

Time: 3 hrs.   Max. Marks:100

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

PART – A

1 a. Define Instruction Set Architecture (ISA). Explain seven dimensions of an ISA. **(10 Marks)**
   b. 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, 500,000 – hour MTTF
      iii) 1 power supply, 200,000 – hour MTTF
      iv)   1 fan, 2,00,000 hour MTTF
      v)   1 SCSI cable, 1,000,000 hour MTTF.
      Using the simplifying assumptions that the lifetimes are exponentially distributed and that
      failures are independent, compute the MTTF of the system as a whole. **(05 Marks)**
   c. Briefly explain the Amdahl's law. **(05 Marks)**

2 a. With a neat diagram, explain the classic five stage pipeline for a RISC processor. **(08 Marks)**
   b. Explain different techniques in reducing pipeline branch penalties. **(06 Marks)**
   c. Consider the unpipelined processor in RISC. Assume that it has a 1ns clock cycle and that it
      uses 4 cycles for ALU operations and branches and 5 cycles for memory operations. Assume
      that the relative frequencies of these operations are 40%, 20% and 40%, respectively.
      Suppose that due to clock skew and setup, pipelining the processor adds 0.2ns of overhead
      to the clock. Ignoring any latency impact, how much speedup in the instruction execution
      rate will be given from a pipeline? **(06 Marks)**

3 a. What are data dependencies? Mention the different types of dependencies. Explain name
      dependencies with example. **(06 Marks)**
   b. What is the drawback of 1 bit dynamic branch prediction method? Clearly state how it is
      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 Tomasulo based MIPS FP unit and explain
      the various field of reservation stations. **(08 Marks)**

4 a. Explain the basic VLIW approach for exploiting ILP, using multiple issues. **(08 Marks)**
   b. Explain branch target buffer with neat diagram. **(04 Marks)**
   c. Explain Pentium 4 pipeline supporting multiple issue with speculation. **(08 Marks)**

PART – B

5 a. Explain with a neat diagram the basic structure of a centralized shared memory and
      distributed shared memory multiprocessor. **(10 Marks)**
   b. To achieve a speedup of 80 with 100 processors what fraction of the original computation
      can be sequential? **(04 Marks)**
   c. Explain directory based cache coherence for a distributed memory multiprocessor system
      along with the state transition diagram. **(06 Marks)**

6 a. List the basic cache optimization techniques. Explain any four. **(10 Marks)**

b. With a neat diagram, explain the translation buffer of fast address translation. **(10 Marks)**

7 a. Which are the major categories of advanced optimization of cache performance? Explain any two. **(10 Marks)**

b. Explain briefly how memory protection is enforced via virtual memory and via virtual machines. **(10 Marks)**

8 a. Explain detecting and enhancing loop level parallelism for VLIW. **(10 Marks)**

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

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Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020
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 JAVA buzzwords.   **(10 Marks)**
    b.   Explain any five Boolean logical operators with an example program.   **(05 Marks)**
    c.   Explain the following:
         (i)   For-each version of the for loop.
         (ii)   Using break as a form of Goto.   **(05 Marks)**

2   a.   What is instance variable hiding? How to overcome it?   **(05 Marks)**
    b.   What is an Applet? Explain the skeleton of an applet.   **(05 Marks)**
    c.   Explain the following with an example program:
         (i)   super
         (ii)   final
         (iii)   Inner class.   **(10 Marks)**

3   a.   What are threads? Explain the two ways of creating threads with an example program.   **(10 Marks)**
    b.   What is synchronization in Java? How to achieve synchronization in Java?   **(05 Marks)**
    c.   What is an event? Explain the delegation event model.   **(05 Marks)**

4   a.   What is swing? List the main swing features. Explain the different types of panes of swing containers.   **(06 Marks)**
    b.   Create a swing application having two button named alpha and beta, when either of the buttons pressed, it should display "alpha is pressed" and "beta is pressed" respectively.   **(06 Marks)**
    c.   List the different types of swing buttons. Write a program to create four types of buttons on JApplet. Use suitable event to how actions on the buttons and use JLabel to display the action invoked.   **(08 Marks)**

PART – B

5   a.   Explain the four types of JDBC drivers.   **(04 Marks)**
    b.   Describe the steps of JDBC process with suitable exception handling blocks.   **(08 Marks)**
    c.   Briefly explain the callable statement object. Write a program to call stored procedure using callable statement.   **(08 Marks)**

6   a.   Explain the servlet life cycle with an example.   **(04 Marks)**
    b.   Write a short notes on:
         (i)   Session tracking.
         (ii)   Cookies.   **(08 Marks)**
    c.   Write a JAVA servlet to read name from client page and say "Hello to the name as response".   **(08 Marks)**

7 a. What is JSP? Explain the different types of JSP tags.   (06 Marks)

    b. What is RMI? Describe the code snippet RMI at client side.   (10 Marks)

    c. Write the differences between JSP and servlets.   (04 Marks)

8 a. What is deployment descriptor? List the deployment descriptor for EJB1.1.   (06 Marks)

    b. With a skeleton, explain entity Java bean.   (06 Marks)

    c. Explain

        (i)   JAR file   (02 Marks)

        (ii) Stateless bean   (03 Marks)

        (iii) Stateful bean   (03 Marks)

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Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020
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. Explain the evolution of storage technology from non intelligent internal storage to intelligent network storage. **(10 Marks)**
   b. What are the key requirements for data center elements? **(05 Marks)**
   c. Consider a disk I/O system in which an I/O request arrives at the rate of 80IOPS. The disk service time is 6 ms. Compute (i) Utilization of I/O controller (ii) Total response time (iii) Average queue size. (iv) Total time spent by a request in a queue. If the controller power is doubled or service time is halved, what is the utilization? **(05 Marks)**

2 a. Compare RAID5 and RAID6. **(05 Marks)**
   b. With neat diagrams, explain the structure, read and write operations in cache. **(10 Marks)**
   c. 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 application also experiences an overhead of 10 percent for other work loads. Calculate IOPS requirement for RAID 1, RAID 3, RAID 5 and RAID 6. **(05 Marks)**

3 a. Write about SCSI-3 architecture, with a neat diagram. **(05 Marks)**
   b. What is the significance of various layers of SCSI communication model? **(05 Marks)**
   c. Explain the three basic connectivity options in FC architecture. **(10 Marks)**

4 a. What is NAS? What are its benefits? **(10 Marks)**
   b. Write a note on iSCSI. **(10 Marks)**

PART – B

5 a. Explain the features and benefits of CAS. **(10 Marks)**
   b. What is virtualization? Elaborate on the types of storage virtualization. **(10 Marks)**

6 a. Define the following terms:
      (i) Disaster recovery   (ii) Disaster restart   (iii) Recovery point objective
      (iv) Recovery time objective. **(10 Marks)**
   b. Explain the three basic topologies used in backup environment. **(10 Marks)**

7 a. Differentiate between full volume mirroring and pointer based full volume replication. **(10 Marks)**
   b. What are the basic approaches to host based remote replication? **(10 Marks)**

8 a. What are the primary security attributes? **(05 Marks)**
   b. Explain the various management tasks in which a storage infrastructure can be classified. **(10 Marks)**
   c. Write a note on threats. **(05 Marks)**

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