



डा बी आर अम्बेडकर राष्ट्रीय प्रौद्योगिकी संस्थान,
जालन्धर

Dr B R AMBEDKAR NATIONAL INSTITUTE OF
TECHNOLOGY, JALANDHAR
DEPARTMENT OF MATHEMATICS
B. TECH. FIFTH SEMESTER
MINOR-I (11.09.18)
MAX-206, NUMERICAL METHODS

Time Allowed: 1 Hr

MM-20

This Question Paper Consists of 5 Questions and 1 Printed Page.

Note: Attempt all Questions. All Questions Carry Equal Marks.

- Define order of convergence. Prove that the Regula-Falsi method is linear order convergent.
- Using Lin-Bairstow's method, obtain the quadratic factor of the equation $x^4 - 3x^3 - 4x^2 - 2x + 8 = 0$ with $p_0 = 1.5, q_0 = 1.5$ (perform one iteration correct to three decimals).
- Find the fifth root of 3 correct to five decimals using Newton-Raphson method.
- Solve the following system of equation by Gauss-Seidal method:
 $10x + y + z = 12; 2x + 10y + z = 13; 2x + 2y + 10z = 14$
correct to three decimals.
- Apply Crout's method to solve the equations:
 $3x + 2y + 7z = 4; 2x + 3y + z = 5; 3x + 4y + z = 7.$

$$\left(1 - \frac{14}{3}\right) \times \frac{3}{5}.$$
$$-\frac{11}{5}$$



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Dr B R AMBEDKAR NATIONAL INSTITUTE OF TECHNOLOGY,
JALANDHAR
DEPARTMENT OF MATHEMATICS
B. TECH. FIFTH SEMESTER
MINOR-II (23.10.18)
MAX-206, NUMERICAL METHODS

MM-20

Time Allowed: 1 Hr

This Question Paper Consists of 5 Questions and 1 Printed Page.

Note: Attempt all Questions. All Questions Carry Equal Marks.

- Determine the largest eigenvalue and corresponding eigenvector of matrix:

$$A = \begin{bmatrix} 4 & 1 & 0 \\ 1 & 20 & 1 \\ 0 & 1 & 4 \end{bmatrix}$$

using power method with initial approximation to the eigenvector as $(1, 1, 1)^t$.

- Given the values of x and $f(x)$ as follows:

x :	5	7	11	13	17
$f(x)$:	150	392	1452	2366	5202

Find $f(9)$ using Newton's divided difference formula.

- The population of a certain town (as obtained from census data) is shown in the following table:

Year :	1961	1971	1981	1991	2001
Population :	19.96	39.65	58.81	77.21	94.61

(in thousand)

Find the rate of growth of population in 1991.

- Derive the formula for Simpson's 1/3 rule and also explain its geometrical interpretation.
- With usual notations, show that

$$(i) \nabla^2 = h^2 D^2 - h^3 D^3 + \frac{7}{12} h^4 D^4 - \dots$$

$$(ii) E^{\frac{1}{2}} = \left(1 + \frac{\delta^2}{4}\right)^{\frac{1}{2}} + \frac{\delta}{2}$$



Time Allowed: 1 hr

This Question Paper Consists of 7 Questions and i Page
Note: Attempt all Questions. Be brief and to the points in writing answers.

- Q.1 A computer has a cache, main memory, and a disk used for virtual memory. If a referenced word is in the cache, 15 ns are required to access to it. If it is in the main memory but not in cache, 45 ns are needed to load it into the cache (including the time to check cache), and then the reference is started again. If the word is not in the main memory, 10 ms are required to fetch the word from disk, followed by 45 ns to copy it in cache, and then reference is started again. The cache hit ratio is 0.8 and the main-memory hit ratio is 0.7. What is the average time in ns required to access a referenced word in this system? (2)
- Q.2 Suppose a computer has A I/O devices and B processors. Further suppose that main memory is only large enough to hold C processes at any given time. You can assume that $A < B < C$, if needed.
a. What is the maximum number of processes that can be in each of the Ready, Running, Blocked, Ready-suspend, and Block-suspend state at one time.
b. What is the minimum number of processes again in each of the above states as in part a. (2)
- Q.3
a. What is an address space switch? What is a context switch? How are they different from each other?
b. Why do application developers use API calls in the library instead of making system calls directly? (3)
- Q.4
a. Suppose you have a multithreaded application process. One of those threads executes a fork to create a new process? Does the new process is an exact replica of the parent process and have the same number of threads?
b. In a single CPU system at most one process is at the running state. In such systems, why can we not use a single common kernel stack for all processes? Why do different processes have their own kernel stacks?
c. What is an exception? In what way is it similar to an interrupt? In what way are they different from each other? (4)
- Q.5 Suppose five CPU-bound processes P₁, P₂, P₃, P₄, and P₅ arrive in a computer system in the said order at time points 0, 5, 15, 20, and 25, respectively. Their execution requirements are 12, 10, 15, 14, and 16 time units, respectively. Draw the Gantt chart and compute the turnaround time for each process and their average turnaround time for FCFS, SJF, and SRTN scheduling disciplines. You may assume negligible context switching overhead. (6)
- Q.6 Suppose the syntax "P || Q" means processes P and Q are concurrent processes. Assume that only read and write operations on shared variables are atomic. We have the following three processes (A, B, and C) that share a single integer variable x, as follows. The variable is initialized to 0. When "A || B || C", what are the possible values for x after A, B, and C have terminated?
int x = 0;
A
x = 2 x;
x = 2 x;
B
x = 2 x;
x = 3 x;
C
x = 1;
x = x + 1; (3)



Time Allowed: 1 hr

MM-20

This Question Paper Consists of 6 Questions and 1 Page
Note: Attempt all Questions. Be brief and to the points in writing answers.

Q.1 Consider a traffic crossing between two roads, one in the east-west direction, and the other in the north-south direction. Suppose the crossing is modeled as a shared data structure, and cars are modeled as processes that access the crossing in order to pass through it. Assume that cars only travel straight, without turning left or right. Two or more cars are allowed to simultaneously pass through the crossing only if they are headed in the same or opposite directions (e.g., a north-bound and a south-bound car), but east-west traffic and north-south traffic can never access the crossing simultaneously. Device a synchronization solution for the cars using semaphores. You should write two procedures east_west() and north_south() to show how cars traveling in the respective direction should behave. (3)

Q.2 Consider a segmentation-based system. At some point in the system operation, the main memory has the following holes (a.k.a., free segments) in this order: 21K, 5K, 90K, 54K, 10K, 25K, and 56K; there are three new requests for memory of sizes 10K, 7K, and 22K. The system does first-come first serve service. Explain what holes will be taken for each of First Fit and Best Fit memory allocation schemes. (2)

Q.3 What is the difference between absolute and relocatable binary images? At what stages are such images produced? (2)

Q.4 Let T1(2,4) and T2(2,8) be two tasks where the first value of task is its execution time and the second value is its period. Assume that the deadlines coincide with their periods and the tasks are released simultaneously in the beginning at time 0.
(a) Compute the CPU utilization if they are scheduled alone, assuming the cost of scheduling and task switch times are 0. (b) Do the tasks meet their deadlines if they are scheduled (i) by RM and (ii) by EDF. Illustrate your answer by drawing the schedule. (6)

Q.5 In the paging scheme, each process has a page table. This consumes a lot of memory space. Suppose, instead, we have a common single table for all memory frames. Each entry of the table contains information about which process owns the frame, what page number maps to that frame. Such table is popularly called inverted page table. Describe the page translation in this system. How would you share a frame among multiple processes in the system? (3)

Q.6 A system has four processes P1 to P4 and 6,4,8,5 units of resource classes R1, R2, R3 & R4, respectively. The state of the system is
Allocated P1(1,1,1,1); P2(2,0,1,0); P3(2,0,2,2); P4(0,2,1,1)
Max. Need P1(2,1,2,1); P2(2,4,3,2); P3(5,4,2,2); P4(0,3,4,1)
Whether the current allocation safe or not, prove by using algorithm
also check whether the request P2(0,1,1,0) can be granted safely? (4)

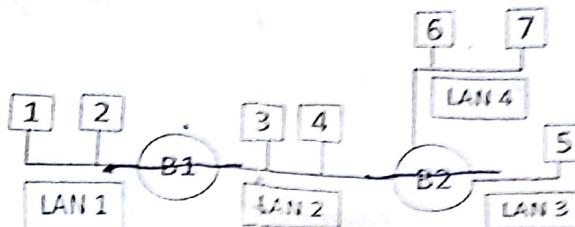


Duration: 1 Hr.

Max. Marks: 20

Notes: Attempt all the Questions.

1. a. Consider the network below, which shows four 10 Mbps LANs connected by two bridges, labeled B1 and B2. Assume all users (labeled 1 through 7) are very chatty and equally chatty. [2]



- I. What is the effective data rate seen by user 4?
- II. What is the effective data rate seen by user 5?
- III. What is the effective data rate seen by user 6?
- IV. What is the effective data rate seen by user 6 if ~~the two bridges~~ are

- b. Five protocol layers. 100 byte message. 10 bytes header added at each layer (including 1st and 5th). What is the efficiency? [2]

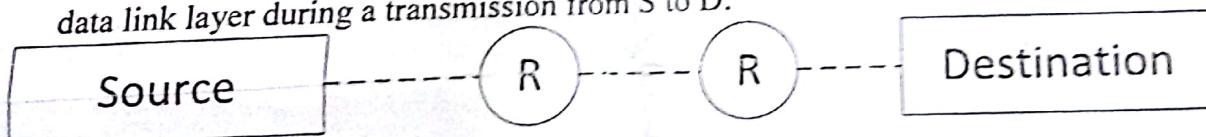
2. a. Suppose an application entity sends an m-byte message to its peer entity. The layers in the TCP/IP model add a total of 58 bytes of overhead (header and trailer). What percentage of the total layer bits corresponds to the application message if m=100 bytes. [3]

- b. What are the advantages of dividing an Ethernet LAN with a bridge? [1]

3. a. A network with CSMA/CD protocol in the MAC layer is running at 1 Gbps over a 1 km cable with no repeaters. The signal speed in the cable is 2×10^8 m/sec. The minimum frame size for this network should be [2]

- b. Explain CSMA/CD and draw the flow diagram? [2]

4. a. Assume that source S and destination D are connected through two intermediate routers labeled R. Determine how many times each packet has to visit the network layer and the data link layer during a transmission from S to D. [1]



- b. Asynchronous Transfer Mode (ATM) is a virtual-circuit (VC) based technology in which data is transmitted in cells. Explain the terms cell and virtual-circuit. Explain how VCs are identified within an ATM network and the constraints that apply when identifiers are allocated. [3]

5. a. In classless addressing, we know the first and the last address in the block. Can we find the prefix length? If the answer is yes, show the process and an example. [2]

CN - minor

- b. In a TDM medium access control bus LAN, each station is assigned one time slot per [2] cycle for transmission. Assume that the length of each time slot is the time to transmit 100 bits plus the end-to-end propagation delay. Assume a propagation speed of 2×10^8 m/sec. The length of the LAN is 1 km with a bandwidth of 10 Mbps. The maximum number of stations that can be allowed in the LAN so that the throughput of each station can be 2/3 Mbps is

-----end-----



Duration: 1 Hr.

Notes: Attempt all the Questions.

- | | | |
|----|---|-----|
| 1. | a) You have sub-netted your class C network 200.138.1.0 with a subnet mask of 255.255.255.252. Please list the following: number of networks, number of hosts per network, the full range of the first three networks, and the usable address range from those first three networks. Additionally, identify the broadcast addresses for each network. | [4] |
| | b) Compare and contrast the IPv4 and IPv6? (Min. 5 points) | [4] |
| 2. | a) With respect to network management, what is SNMP? What is a SNMP trap receiver? | [2] |
| | b) You have the following address: 192.16.5.133/29
How many total bits are being used to identify the network, and how many total bits identify the host? | [2] |
| 3. | Briefly explain about Telnet? | [2] |
| 4. | Discuss at least four differences between TFTP and FTP? | [2] |
| 5. | a) Assume that Bob uses an e-mail client (mail reader) such as Outlook to send an e-mail to Alice who uses a Web-based e-mail account (such as Hotmail). The IP address of Alice's mail server is initially unknown to Bob's mail server. List all the transport and application layer protocols that are involved from the time when Bob sends the e-mail to the time when Alice reads it. Clearly indicate in which part of the transfer of the e-mail these transport/application layer protocols are used | [2] |
| | b) Explain DNS? How can iterated DNS queries improve the overall performance? | [2] |



2068

Dr B R AMBEDKAR NATIONAL INSTITUTE OF TECHNOLOGY, JALANDHAR
DEPARTMENT OF COMPUTER SCIENCE ENGINEERING
B.Tech 5th SEMESTER
Final Examination (AY 2018-19 Semester I)
CSX-301 Computer Networks

Max. Marks: 50

Duration: 3 Hrs.

Notes: Attempt all the Questions. Make assumption were necessary

1. a) What is the smallest size of an Ethernet frame? What is the largest size of an [2]
Ethernet frame?
- b) How long time does it take to create the smallest frame in a 10Base5 [3]
Ethernet?
- c) What are differences between classful and classless IP addressing? [2]
- d) Write a short note on CSMA channel access techniques [3]
2. a) In ATM, what is the relationship between TPs, VPs and VCs? [5]
- b) You currently use the default mask for your IP network 192.168.1.0. You [2]
need to subnet your network so that you have 30 additional networks, and 4
hosts per network. Is this possible, and what subnet mask should you use?
- c) Write a short note on IPv4? Also draw the header of IPv4 [3]
3. a) With respect to network management, briefly explain Abstract Syntax [5]
Notation One (ASN.1)
- b) Given the following: Network address: 192.168.10.0 Subnet mask: [2]
255.255.255.224 ? How many subnets? How many hosts? What are the valid
subnets?
- c) Discuss how many timers are used for TCP implementations? [3]
4. a) Distinguish at least six differences between Distance Vector Routing [5]
Protocols and RIP?
- b) What is Congestion control? Explain various congestion prevention policies? [5]
5. a) Distinguish between passive attack and active attack? [2]
- b) What are IPsec and its use? What are the Benefits of IPsec? [3]
- c) What is a Firewall? What are the limitations of firewall? [2]
- d) Explain symmetric and asymmetric key cryptography [3]



DR B R AMBEDKAR NATIONAL INSTITUTE OF TECHNOLOGY
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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
B. TECH CSE, FIFTH SEMESTER
CLASS TEST - I (Sept 12, 2018)
CSX-331 Advanced Programming Concepts in Java

20/68

MM: 20

Duration: 1 Hr

This Question Paper Consists of 7 Questions and 2 Pages

Note: Attempt all Questions. Be brief and to the point in writing answers

1. Give the error/output of the following programming statements:

a) `public static void main(String[] args){
 byte x = 12;
 byte y = 13;
 byte result = x + y;
 System.out.println(result);
}`

b) `public static void main(String[] args){
 final int a = 1, b = 5;for (int i = 0; a < b; i++) {
 System.out.print("Hello ");
 a++;
 }
 System.out.print("Hi");
}`

c) `class Helper{
 private int data;
 private Helper() {
 data = 5;
 }
}
public class Test {
 public static void main(String[] args)
 {
 Helper help = new Helper();
 System.out.println(help.data);
 }
}`

d) `class Test {
 public final int a;
}
class Example {
 public static void main(String args[]){
 Test obj = new Test();
 System.out.println(obj.a);
 }
}`

e)

```
public static void main(String args[]) {
    String str1 = new String("Hello World");
    String str2 = new String("Hello World");
    if(str1 == str2)
        System.out.println("Hello England");
    else
        System.out.println("Hello India");
}
```

f)

```
class Base {
    public void foo() {}
}
class Derived extends Base {
    private void foo() {}
}
public class Main {
    public static void main(String args[]) {
        Derived d = new Derived();
    }
}
```

(0.5*6 =3)

2. a. How is Git different from GitHub? Explain briefly. (3)
b. What is the use of *classpath* in Java? (1)
3. Why is Java known as a robust programming language? Describe briefly. (2)
4. How does Java 8 avoid/handle diamond inheritance problem? Explain with examples. (3)
5. What is limitation form of inheritance? List at least four examples for the same. (3)
6. Compare the following with the help of appropriate examples: (2)
 - a. default method and abstract method
 - b. universal object and immutable object
7. How do Java and C++ differ in supporting call by value and call by reference? Describe with examples. (3)



Duration: 1 Hr

This Question Paper Consists of 7 Questions and 1 Page

Note: Attempt all Questions. Be brief and to the point in writing answers

1. What is Reflection? Describe at least three applications of Java Reflections. (3)
2. Compare the features of the following:
 - a. wait() and join().
 - b. Collection and Collections(4)
3. How do threads communicate with each other in a synchronized way? Explain with a java example. (3)
4. Define an exception called 'TooSmallNumberException' that is thrown when a number is less than 0. Write a program that uses this exception. (3)
5. Explain the purpose of using 'finally' keyword? Also give an appropriate example. (2)
(2)
6. Differentiate between Error and Exception hierarchies.
7. Compile and run OatsThreads.java having the following code:

```
public class OatsThreads {  
    static String message;  
    private static class CorrectorThread extends Thread {  
        public void run() {  
            try {  
                sleep(1000);  
            } catch (InterruptedException e) {}  
            message = "Ranjan do eat oats.";  
        }  
    }  
  
    public static void main(String args[]) throws InterruptedException {  
        (new CorrectorThread()).start();  
        message = "Ranjan do not eat oats.";  
        Thread.sleep(2000);  
        System.out.println(message);  
    }  
}
```

The application should print out "Ranjan do eat oats." Is it guaranteed to always do this? If not, why not? Would it help to change the parameters of the two invocations of sleep method? How would you guarantee that all changes to message will be visible in the main thread? (3)



Duration: 3 Hrs

This Question Paper Consists of 10 Questions and 2 Pages

Note: Attempt all Questions. Be brief and to the point in writing answers

- Q1. a) Describe at least six differences between the features of Java 7 and Java 8. (3)
b) Illustrate (diagrammatically) the commonly used steps in creating and executing a java application program? Also briefly describe each step. (3)

- Q2. a) What is the role of "String[] args" when passed as parameter to a java program's "main" method?
b) i) Fill in the blank:
/* */ are traditional commenting syntax whereas /** */ are _____
ii) What will be the output/error generated for the following code?

```
int x, y;  
x=50;y=100;  
while(y >= x){  
    System.out.println(y+x);  
    x++;  
    y--;}  
(1x2=2)
```

- Q3. a) Explain the concept of method overriding with a suitable example. (2)
b) Differentiate between the following (4)
i) Nested class and Inner class
ii) hasNext() and nextInt() methods
c) Most classes need to be imported before they can be used in an application. Why is every application allowed to use classes System and String without first importing them? (1)

- Q4. a) Write an enum type TrafficLight, whose constants (RED, GREEN, YELLOW) take one parameter – the duration of light. Write a program to test the TrafficLight enum so that it displays the enum constants and their durations. (2)
b) Name the exception that can be thrown by the following statements: (1x2=2)

i) {
 int a = 0;
 int b[] = new int[5];
 for(;a<6;a++)
 { b[a] = -1;
 }
}

- ii) Will the following program code compile without errors? Justify.

```

abstract class GraphicObject {
    int x, y;
    void moveTo(int newX, int newY) {
    }
    abstract void draw();
    abstract void resize();
}
class Circle extends GraphicObject {
    void draw() {
    }
}
class Rectangle extends GraphicObject {
    void draw() {
    }
    void resize() {
    }
}

```

Q5. a) When are the following exceptions thrown in a java program? (2)

- i) NullPointerException
- ii) StringIndexOutOfBoundsException
- b) Define an exception called 'NotAPalindromeException' that is thrown when a string is not a palindrome. Write a program that uses this exception. (3)

Q6. a) Write a program showing thread deadlock in a java multithreaded program. (3)

- b) What are the various reasons for altering a thread's blocked state? For each of these reasons, also describe the ways to go from blocked to runnable state. (3)

Q7. a) Explain the use of JTabbedPane class in java. (2)

- b) Describe the association among Component, JButton, Container, JPanel, Component, and Window classes? Also list the packages to which they belong. (2)

Q8. a) What are different ways of getting user input in java? Explain briefly with appropriate examples. (2)

- b) Why are adapter classes used in event handling? Explain with an example. (3)

Q9. a) How is an applet class embedded into the HTML code? (1)

- b) Describe different types of layout managers in java swings? (3)

- c) Java designers extended class Vector to define class Stack. What are some of the disadvantages of this use of inheritance? (2)

(3)

Q10. Compare the following:

- i) Socket and ServerSocket
- ii) invokeLater() and invokeAndWait()



**Dr B R AMBEDKAR NATIONAL INSTITUTE OF
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DEPARTMENT OF COMPUTER SCIENCE ENGINEERING
Minor I (AY 2018-19 Semester 1)
CSX-303 Software Engineering

Max. Marks: 20

Duration: 1 Hr.

Notes: All questions are compulsory. The paper has total four questions on two printed pages. Despite the correctness of an answer, the quality of the answer is an important evaluation criterion. Overwritten answers will not be entertained.

1. [1M*2=2M] Answer the following questions:

- What do you mean by component testing? How it differs from the system testing. Explicitly highlight the difference. Vague answer will be awarded zero mark.
- Consider a NITJ accounting system that replaces an existing system, suggest the most appropriate generic software process model that might you use for the development of the software.

2. [2M*4=8M] Answer the following questions:

- Extreme programming represents requirements in the form of user stories, with each story written on a card. Discuss two advantages and two disadvantages of this approach to requirements specification.
 - With the help of a suitable diagram, explain the essential distinctions between plan-driven and agile approaches to system specification.
 - What do you mean by pair-programming? How does it support the principle of refactoring to improve software structure?
 - How do the factors such as system type, lifetime, scale, regulation related to the system being developed influence the choice of plan-driven or agile based development? Explain in detail.
3. [1M*2=2M] Differentiate the following terms. Vague justification will be awarded with Zero marks:
- Scope and Feasibility
 - Change Anticipation and Change Tolerance

4. [2M*4=8M] Answer the following questions:
- (a) With the help of a suitable diagram, write short note on the spiral model.
 - (b) Identify and explain four major differences between the exploratory style and modern software development practices.
 - (c) Identify and explain the four factors contributing to the present software crisis.
 - (d) Explain the essential stages/phases through which a software product undergoes during its lifetime.

--End--



Dr B R AMBEDKAR NATIONAL INSTITUTE OF
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DEPARTMENT OF COMPUTER SCIENCE ENGINEERING
Minor 2 (AY 2018-19 Semester 1)
CSX-303 Software Engineering

Duration: 1 Hr.

Max. Marks: 20

Notes: All questions are compulsory. The paper has total Five questions on two printed pages. Despite the correctness of an answer, the quality of the answer is an important evaluation criterion. Overwritten answers will not be entertained.

1. [2M] Name the different types of cohesion. Arrange them in a decreasing order of their severities.
2. [3M] What do you mean by *system requirements* and *user requirements*? Why it is so vital to make a distinction between developing the system requirements and developing the user requirements during the requirements engineering process? Justify.
3. [3M] With the help of an example, distinguish between the ways of gathering requirements through "Task Analysis" and through "Scenario Analysis".
4. [7M] Create a *labeled Data Flow Diagram Model (DFD model)* with its Data Dictionary for an ATM (Automated teller machine) system. Explicitly mention the *requirements statement* for the ATM system you will design. Mention the assumptions you made while designing the DFD model. Draw diagrams neatly and explain each element of the DFD model in detail. Vague information and justification will lead to the deduction of marks.
[Hint: First create your requirements statement for the ATM system, then convert the requirements statement into a hierarchy of DFDs at different levels.]
5. [3+2=5M] What do you mean by *inconsistency* and *incompleteness* in an SRS document? Explain each with supportive examples. Consider the following requirements specification given to you for

an academic activity automation software of an educational institute:

"The semester performance of each student is computed as the average academic performance for the semester. The guardians of all students having poor performance record in the semester are mailed a letter informing about the poor performance of the ward and intimating that repetition of poor performance in the subsequent semester can lead to expulsion. The extracurricular activities of a student are also graded and taken into consideration for determination of the semester performance."

Identify the inconsistencies and incompletenesses, if any, in the above-given requirements specification.

--End--

Roll No. - - - - -



Dr B R AMBEDKAR NATIONAL INSTITUTE OF
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DEPARTMENT OF COMPUTER SCIENCE ENGINEERING
End Semester Examination (AY 2018-19 Semester 1)
CSX-303 Software Engineering

Max. Marks: 50

Duration: 3 Hrs.

Notes: All questions are compulsory. The paper has a total of seven questions on three printed pages. Despite the correctness of an answer, the quality of the answer is an important evaluation criterion. Overwritten answers will not be entertained.

1. [6M] Consider a *Mess Service Charges Calculator* function that reads integer value "NumbersOfDiets" and returns integer value "ServiceChargePM". Assume "NumberofDiets" as having a valid range of inputs from 10 to 90 (both values inclusive). The function calculates the amount of the Service Charge per month as:

- 1) Numbers of Diets up to 40, Service Charge is Rs 600 per month
- 2) Numbers of Diets from 41 to 70, Service Charge is Rs 750 per month
- 3) Numbers of Diets above 70, Service Charge is Rs 900.

Design equivalence class partitioning test suite for the above function. Show all the steps with proper justifications and mention relevant test suite example. Zero marks will be awarded for no/incomplete justification.

2. [10M] Consider a "dice game" in which software simulates a player rolling two dice at a time. If the sum of the rolls is equal to seven, he/she win; otherwise, he/she lose.

(a) [4M] Define *Use Case(s)* and corresponding *Use Case Model* for the dice game. Provide the complete *text description* of the proposed Use Case Model.

(b) [3M] Construct a Class Diagram for the dice game. Clearly mention attributes and methods for each class specified in the class diagram. Further, specify various class relationships

among different classes. Provide proper justification and explanation for your design.

- (c) [3M] Draw and explain step by step construction of the sequence diagram for the dice game.

Be clear while answering the question, there must not be inconsistency among the diagrams.

3. [7M] Clearly explain the phases of Waterfall Model with the help of a diagram. Further, for each phase, mention the phase entry criteria, exit criteria, and the deliverables that need to be produced at the end of the phase in the following format:

Phase Name	Phase Entry Criteria	Phase Exit Criteria	Deliverables at the end of the Phase
------------	----------------------	---------------------	--------------------------------------

Also, mention the name of the phase which consumes the maximum effort for developing a typical software.

4. [5M] Consider the following problem statement:

Consider a computer game in which a human player and the computer make alternate moves on a 3×3 square. A move consists of marking a previously unmarked square. The player who is first to place three consecutive marks along a straight line (i.e., along a row, column, or diagonal) on the square wins. As soon as either of the human player or the computer wins, a message congratulating the winner should be displayed. If neither player manages to get three consecutive marks along a straight line, and all the squares on the board are filled up, then the game is drawn.

Apply Booch's Object Identification Method on the above-given problem statement. Show all the steps with proper justifications.

5. [5M] Explain the three important concepts associated with abstract data types (ADTs) using examples—data abstraction, data structure, data type. Also clearly mention at least two advantages of using ADTs in programs.

6. [5M] With the help of a diagram, explain Prototyping model in detail. What are the strengths and weaknesses of using prototyping model? Identify different types of projects for which using prototyping model is advantageous.
7. [3M*4=12M] Answers the following questions:
- (a) Identify the types of defects that you would be able to find during
 - (i) Code Inspection
 - (ii) Walkthrough
 - Be precise, the vague answer will be awarded zero marks.
 - (b) If the condition expression in a conditional statement is composed of N atomic conditions, what is the number of test cases required to achieve multiple condition coverage? Justify your answer using an example.
 - (c) List four desirable characteristics of a good Software Requirements Specification (SRS) document. Explain each of them in detail.
 - (d) Referring to Structure Charts, how does the following information is represented diagrammatically by a Structure Chart:
 - (i) A module invokes one out of the several modules based on the outcome of the condition attached with the invoking module.
 - (ii) A set of modules is invoked repeatedly by a module.

--End--