Roll No. 1 1 0 2 2 6 6 **Paper Code: TMC 201/TMI 202**

Mid Semester Examination 2022
MCA /M.Sc IT II Semester

Data Structure and file organization using C language

Time: 1.30 Hrs MM: 50

INSTRUCTIONS TO STUDENTS

Note :

(i) This question paper contains five questions with alternative choice.
(ii) All questions are compulsory.
(iii) Each question carries **two** parts **a or b.** Attempt either parts **a** or **b** of each question.
(iv) Total marks assigned to each question are ten.

Q1.

A. Assume that we have a stack implemented with single linked list. Pointer top is pointing to top-most node of the stack. Write a C function to print stack in reverse order i.e. bottom to top.(Do not use array) . *(10)*

OR

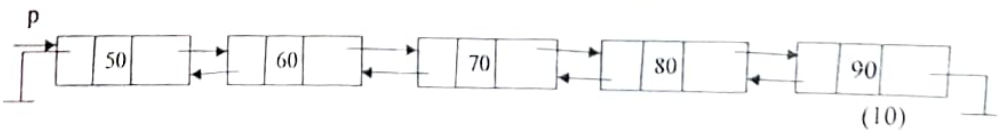
B. Assume that we have a single linked list; first node of the linked list is pointed by a pointer PTR. Write a C function to delete alternate nodes of the linked list. (10)

Q2.

A. Assume that we have a singly linked list with a pointer Q at first node .Write a C function to search for a key value given by user, in that linked list if found update that with 500 otherwise print appropriate message. (10)

OR

B. Assume that we have a double linked list, first node of the list is pointed by pointer P, write a C function to insert a node after the last node of the list.



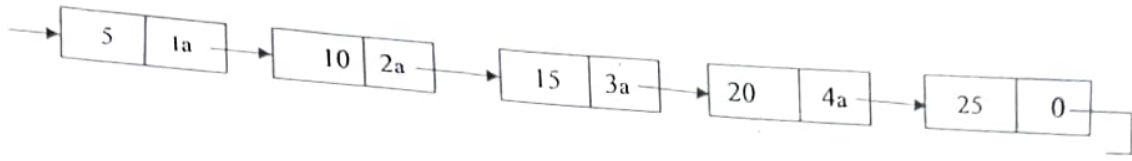
(10)

Q3.

A. Assume that we have a single linked list, first node of the linked list is pointed by a pointer Start. Write a C function to print the node having smallest information in that singly linked list. (10)

OR

B. Assume that we have a singly linked list. First and last nodes are pointed by pointer L and R respectively. Write a C function to insert a node before first node and after last node of the linked list. (10)



Q4.

A. Assume that we have a binary search tree , root node of the tree is pointed by a pointer P, write a C function to find and print the node having largest information. (10)

OR

B. What do you mean by a dynamic array? Write a 'C' function to create a dynamic array to store N elements and then find and print 3rd non repeating element. (10)

Q5.

A. Assume that we have two single linked lists. First of the first linked list is pointed by a pointer P and first node of second linked list is pointed by pointer Q. Write a C function to concatenate the second linked list after first linked list. (10)

OR

B. Assume that we have two singly linked lists. Pointers P and Q are pointing to first node of the linked lists respectively. Write a C function to print similar nodes from both the linked lists. (10)

Roll No. 110266

TMC–202

M. C. A. (SECOND SEMESTER)
MID SEMESTER EXAMINATION, MAY, 2022

OBJECT ORIENTED ANALYSIS AND JAVA PROGRAMMING

Time : 1½ Hours

Maximum Marks : 50

Note : (i) Answer all the questions by choosing any ***one*** of the sub-questions.

(ii) Each sub-question carries 10 marks.

1. (a) What is the use of String class over character array ? Write a program to find maximum length palindrome substring from a given string. (CO1)

OR

(b) What is the use of package in Java ? Write a program to show the working of protected keyword. (CO2)

2. (a) What is method overriding ? Write a program to show the use of this keyword properly while overriding any of methods of object class. (CO2)

OR

(b) Write any *one* disadvantage of using static import in Java. Write program to show the use of super keyword in three-way. (CO1)

P. T. O.

3. (a) What is the use of command line arguments ? Write a program to print sum of all command line arguments which are positive integers. (CO2)

OR

(b) What is array of objects in Java ? Write a program to initlize integer array of size ten at runtime. Print sum of all elements which are having first starting as even value. (CO2)

4. (a) What is the use of final and finally keyword in Java ? Write all steps to create an executable jar file. How can we use a package class that is part of some jar file ? (CO2)

OR

(b) What is difference between interface and abstract class ? Write a program to show how we can use an interface in upcasting. (CO3)

5. (a) What is the use of StringBuffer over String Class ? Write a program to enter a string and print all characters removing duplicates from it. (CO1)

OR

(b) What are checked and unchecked exceptions in Java ? Write a program to generate and throw custom exception name MyException if there is no integer digit in any user entered String value. (CO2)

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Roll No. 1102266

TMC–203

M. C. A. (SECOND SEMESTER)
MID SEMESTER EXAMINATION, MAY, 2022

COMPUTER NETWORK

Time : 1½ Hours

Maximum Marks : 50

Note : (i) Answer all the questions by choosing any *one* of the sub-questions.

(ii) Each sub-question carries 10 marks.

(iii) Your answer should be to the point. Extra writing will lead to deduction of marks.

1. (a) Match the following to one or more layers of the OSI model :

(CO1, CO3)

(i) Reliable process-to-process message delivery

(ii) Route selection

(iii) Defines frames

(iv) Provides user services such as e-mail and file transfer

(v) Transmission of bit stream across physical medium

OR

(b) Give *five* advantages and *five* disadvantages of combining the session, presentation and application layer in the OSI model into one single application layer in the Internet model. (CO1, CO3)

P. T. O.

2. (a) How long does it take a packet of length 1,000 bytes to propagate over a link of distance 2,500 km, propagation speed 2.5×10^8 m/s and transmission rate 4 Mbps ? More generally, how long does it take a packet of length L to propagate over a link of distance *d*, propagation speed *s* and transmission rate Rbps ? Does this delay depend on packet length ? Does this delay depend on transmission rate ? (CO2, CO3)

OR

(b) Assume that a voice channel occupies a bandwidth of 6 kHz. We need to multiplex 12 voice channels with guard bands of 500 Hz using FDM. Calculate the required bandwidth. (CO2, CO3)

3. (a) Give any *three* differences between a port address, a logical address and a physical address. (CO3, CO4)

OR

(b) Consider a short, 10-meter link, over which a sender can transmit at a rate of 150 bits/sec in both directions. Suppose that packets containing data are 1,00,000 bits long, and packets containing only control (e.g., ACK or handshaking) are 200 bits long. Assume that N parallel connections each get 1/N of the link bandwidth. Now consider the HTTP protocol and suppose that each downloaded object is 100 K bits long, and that the initial downloaded object contains 10 referenced objects from the same sender. Would parallel downloads via parallel instances of non-pemistent HTTP make sense in this case ? Now consider persistent HTTP. Do you expect significant gains over the non-persistent case ? Justify and explain your answer. (CO3, CO4)

4. (a) Can a machine with a single DNS name have multiple IP' addresses ? How could this occur ? DNS uses UDP instead of TCP. If a DNS packet is lost, there is no automatic recovery. Does this cause a problem, and if so, how is it solved ? Can a computer have two DNS names that fall in different top-level domains ? If so, give a plausible example. If not, explain why not ? (CO3, CO4)

OR

(b) Consider the following string of ASCII characters that were captured by Wireshark when the browser sent an HTTP GET message (i.e., this is the actual content of an HTTP GET message). The characters *<cr> <lf)* are carriage return and line-feed characters (that is, the italized character string *<cr>* in the text below represents the single carriage-return character that was contained at that point in the HTTP header). Answer the following questions, indicating where in the HTTP GET message below you find the answer :

GET /cs453/index.html HTTP/1.1<cr><lf>Host: gaia.cs.umass.edu<cr><lf>User-Agent: Mozilla/5.0 (Windows;U; Windows NT 5.1; en-US; rv:1.7.2) Gecko/20040804 Netscape/7.2 (ax) <cr><lf>Accept:ext/xml, application/xml, application/xhtml+xml, text/html;q=0.9, text/plain;q=0.8,image/png, */*;q=0.5<cr><lf>Accept-Language: en-us,en;q=0.5<cr><lf>Accept-Encoding: zip,deflate<cr><lf>Accept-Charset: ISO-8859-1,utf-8;q=0.7,*;q=0.7<cr><lf>Keep-Alive: 300<cr><lf>Connection:keep-alive<cr><lf><cr><lf>

(i) What is the URL of the document requested by the browser ?

(ii) What version of HTTPis the browser running ?

(iii) Does the browser request a non-persistent or a persistent connection ?

(iv) What is the IP address of the host on which the browser is running ?

(v) What type of browser initiates this message ? Why is the browser type needed in an HTTP request message ?

5. (a) It is desired to send a sequence of computer screen images over an optical fiber. The screen is 1024 × 780 pixels, each pixel being 24 bits. There are 90 screen images per second. How much data rate is needed ? Explain. (CO4, CO5)

OR

(b) Suppose Host A sends two TCP segments back to back to Host B over a TCP connection. The first segment has sequence 100; the second segment has sequence number 1025. (CO4, CO5)

(i) How much data is there in the first segment ?

(ii) Suppose that the first segment is lost but the second segment arrives at B. In the acknowledgement that Host B send to Host A, what will be the acknowledgement number ?

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Roll No. 1102268.

TMC–204/TMI–201

M. C. A./M. SC. (IT) (SECOND SEMESTER)

MID SEMESTER EXAMINATION, MAY, 2022

DATABASE MANAGEMENT SYSTEM

Time : 1½ Hours

Maximum Marks : 50

Note : (i) Answer all the questions by choosing any *one* of the sub-questions.

(ii) Each sub-question carries 10 marks.

1. (a) (i) "To maintain a large database which approach is better, file system or Database approach." Justify your answer with proper reasons.

(ii) State and explain at least *five* Codd's rules. (CO1)

OR

(b) (i) Differentiate Schema and Instances.

(ii) Differentiate DBMS and RDBMS. (CO1)

2. (a) (i) Demonstrate the role of three-schema architecture in the context of DBMS.

(ii) Classify the importance of data independence and differentiate logical and physical data independence. (CO2)

P. T. O.

OR

(b) (i) What are the roles and responsibilities of (I) DBA, (II) Database Designer ?

(ii) Classify End Users. (CO2)

3. (a) (i) Define the terms tool developers and maintenance personnel.

(ii) What interfaces are provided by DBMS ? Explain. (CO2, CO3)

OR

(b) (i) Differentiate DDL and DML command with suitable examples (at least *three* commands in each category).

(ii) Differentiate Intension and Extension. (CO2, CO3)

4. (a) (i) Differentiate the following :

(I) Atomic *vs.* Composite

(II) Single-valued *vs.* Multi-valued attributes

(ii) Write short notes on UPDATE and ALTER Table commands.

(CO3, CO4)

OR

(b) (i) Define the types of attributes.

(ii) Explain Degree, Role Names and Recursive Relationships.

(CO3, CO4)

5. (a) Draw an ERD for the following scenario : (CO4)

A candidate registers in Employment Agency. A candidate can be Un-employed or Employed. Employment Agency registers candidates

Name, Age, Qualification, Address, Job Profile, Candidate_Registration number and Company_registration_no. Employment Agency also registers different companies and sends candidates record to the company. Company have Company Registration Number, Company name, Company Location, Company Profile, Number of Registered Employees. Company can recruit appropriate candidate through Employment Agency. Agency gains Commission on every recruitment.

OR

(b) Create the following table and solve given queries : *(CO4)*

Table Name : Insurance_Policy

Policy Name	Policy_ID	Policy_Period (in years)	Policy_Price (₹)	Purchase_Date
Jeevan Adhar	P1	5	50,000	22/July/2018
Sukhi Jeevan	P2	6	20,000	23/August/2018
Nirogya	P3	10	1,00,000	22/June/2018
Aarogya	P4	12	1,50,000	24/May/2018
Mrityu Kawach	P5	Null	5,00,000	23/March/2018

(i) Find the Name of the Policy whose Period is not known.

(ii) Find the Name and ID of the Policy whose has been purchased before 21/January/2018.

(iii) How much money is invested by a customer if he/she purchases all policies ?

(iv) Add a new colunm named "Customer Name" to the table and fill corresponding data. You can assume names of your choice.

(v) Change the Period of Policy of Mrityu Kawach from Null to 4.

Roll No. 1102266

TMC–205

M. C. A. (SECOND SEMESTER)
MID SEMESTER EXAMINATION, MAY, 2022

VIRTUALIZATION AND CLOUD COMPUTING

Time : 1½ Hours

Maximum Marks : 50

Note : (i) Answer all the questions by choosing any ***one*** of the sub-questions.

(ii) Each sub-question carries 10 marks.

1. (a) Discuss essential characteristics of Cloud Computing model.

OR

(b) Explain the advantages and disadvantages of Cloud Computing.

2. (a) What are Service Models ? Explain the service stack with example.

OR

(b) Explain in brief cloud storage. Discuss with appropriate example.

3. (a) Explain in detail Private Cloud Model. Also elaborate the advantages and disadvantages of private cloud model.

OR

(b) Differentiate between Public and Community cloud model with appropriate example.

P. T. O.

4. (a) Discuss the system models for Scalable computing over internet.

OR

(b) Explain NIST cloud computing reference model.

5. (a) Write short notes on any *two* of the following :

(i) GAE

(ii) AWS

(iii) Architectural design of Compute and Storage cloud

OR

(b) "An online library is migrating to cloud environment." Discuss the deployment and service model requirements.

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Roll No. 1102266

TMC–206/TMI–204

M. C. A./M. SC. (IT) (SECOND SEMESTER)

MID SEMESTER EXAMINATION, May, 2022

SOFTWARE ENGINEERING AND PROJECT MANAGEMENT

Time : $1\frac{1}{2}$ Hours

Maximum Marks : 50

Note : (i) Answer all the questions by choosing any ***one*** of the sub-questions.

(ii) Each sub-question carries 10 marks.

1 (a) Define the term Software Engineering as per IEER. Explain how software engineering principles and practices make the software development effective. 10 Marks (CO1)

(b) If all the requirements are clearly defined before the commencement of software development and user interaction is only in first phase, which development model is best suitable ? Explain the selected model with its advantages and disadvantages. 10 Marks (CO1)

2. (a) What is characteristics of software and explain software as vehicle and as product ? Explain with suitable examples. 10 Marks (CO1)

P. T. O.

(b) If you have to develop a yen large project for at least 8 to 10 years and there is the requirement of risk analysis in every phase, which development model is best suitable. Explain the selected model with its advantages and disadvantages. 10 Marks (CO1)

3. (a) Give the comparative analysis of Incremental model and Prototype model. 10 Marks (CO2)

(b) Describe software quality parameters. Explain Correctness, Reliability, Robustness and Security with reference to software. 10 Marks (CO2)

4. (a) Write and explain RAD model with its advantages mid disadvantages. 10 Marks (CO2)

(b) Explain SEI Capability Maturity Model (CMM) and its importance in software development. Compare between ISO 9001 and SEI CMM. 10 Marks (CO2)

5. (a) Describe software engineering process and its all phases. What do you mean by mature process of software development ? 10 Marks (CO2)

(b) Explain Requirements Engineering and its activities. Describe characteristics of good SRS. 10 Marks (CO2)

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