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(2063)

980

MCA 2nd Semester Examination

Data Structures (C++ and Java)

MCA-201

Time : 3 Hours **Max. Marks : 60**

The candidates shall limit their answers precisely within the answer-book (40 pages) issued to them and no supplementary/ continuation sheet will be issued.

Note : Candidate are required to attempt one question from each sections A, B, C, D and the entire section E.

SECTION - A

1. What is OOP? What are its advantages over structure programming. Explain the role of abstraction and polymorphism in object oriented programming. **(12)**

2. The multidimensional array A and B are declared using

   A(-2:2. 2:22) and B(I:8. -5:5. -10:5)

   (a) Find the length of each dimension and the number of elements in A and B

   (b) Consider the clement B[3,3.3] in B. Find the effective indices E1, E2, E3 and the address of clement, assuming Base(B)=400 and there are w=4 words per memory location. **(12)**

SECTION - B

3. What is linked list? How it is different from an array? Write an algorithm to implement insertion, deletion and traversal operation in doubly linked list. **(12)**

4. What is stack? Discuss various applications of stack by taking suitable examples. **(12)**

SECTION - C

5. The order of nodes of a binary tree in Preorder and Inorder traversal arc given as below:

   Preorder: A B D G H C E F I K J

   Inorder: B G H D A E C I K F J

   Draw the corresponding binary tree. **(12)**

6. Explain the following—

   (a) Representation of Graph in memory.

   (b) Dijkastra's algorithm for shortest path. **(12)**

SECTION - D

7. What is merge sort? Write and explain an algorithm to sort an array using merge sort. **(12)**

8. What is binary search? What are its advantages over linear search? Write and explain an algorithm for searching an element using binary search. **(12)**

SECTION - E

9. (i) List and explain various asymptotic notations. **(1)**

(ii)	What are different classifications of data structures?	**(1)**
(iii)	Write an algorithm for bubble sort.	**(1)**
(iv)	Define heap Write the tunc complexity of heap sort.	**(1)**
(v)	What is need of pointers in data structure?	**(1)**
(vi)	List various merits and dements of direct file organization.	**(1)**
(vi)	Define encapsulation.	**(1)**
(vii)	List various properties of binary tree.	**(1)**
(viii)	Define role of inheritance in OOP.	**(1)**
(ix)	Write an algorithm to traverse an array	**(1)**
(xi)	What is hashing?	**(1)**
(xii)	What is in-degree and out-degree in context to a Graph?	**(1)**