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MCS-021

MASTER OF COMPUTER APPLICATION (REVISED) / BACHELOR OF COMPUTER APPLICATIONS (REVISED) (MCA/BCA)

Term-End Examination

June, 2024

MCS–021 : DATE AND FILE STRUCTURE

Time : 3 Hours *Maximum Marks : 100*

Weightage : 75%

Note : *Question No.1 is compulsory. Attempt any three questions from the rest. All algorithms should be written near to 'c' language.*

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1. (a) Write an algorithm to find greatest common division of two positive integers. Calculate both space and time complexity for this algorithm. 10

(b) What is Depth First Search (DFS) ? Explain the strategy adopted in DFS with an example. 10

(c) Write an algorithm to implement a polynomial function using linked list, where function is given as : 10

$f(x) = ax^3 + bx^2 + cx + d$; a, b, c, d are constants.

(d) Write an algorithm to create a doubly linked list. Explain how it is different from circular linked list. 10

2. (a) Write an algorithm for linked list representation of a stack. Explain why this algorithm is better than array representation of the stack ? 10

(b) What is a Binary Search Tree. (BST) ? Generate a BST containing the following nodes : 10

15, 11, 17, 7, 13, 16, 19

3. (a) Write algorithms for the following tasks : 10

(i) To insert a node in AVL-Tree

(ii) To delete a node from AVL-Tree.

(b) What is spanning tree ? Write Prim's algorithm to find minimum cost spanning tree. What are its applications ? 10

4. (a) Answer the following questions :

(i) What is a linear search ? Explain whether linear search is more efficient than binary search or not. 5

(ii) Explain which searching technique does the spell checker based application uses. 5

(b) What is Heap Sort ? Write an algorithm for heap short and find its complexity. 10

5. (a) What are AA-trees ? Explain how they are different from Red-Black Trees ? 10

(b) What is a direct file organization ? Explain how it is different from Indexed File Organization. 10