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Code No: F-13670/N/BL/AICTE

FACULTY OF ENGINEERING

B.E. (IT) III - Semester (AICTE) (Backlog) (New) Examination, August / September 2024

Subject: Data Structures

Time: 3 Hours Max. Marks: 70

Note: (i) First question is compulsory and answer any four questions from the remaining six questions. Each question carries 14 Marks.
(ii) Answer to each question must be written at one place only and in the same order as they occur in the question paper.
(iii) Missing data, if any, may be suitably assumed.

1. a) Write the syntax for function template.
   b) Define Data Encapsulation.
   c) Differentiate between Stack and Queue.
   d) Give the equivalent postfix expression for the following: 3 * 2 + 4 * (A + B).
   e) Write the template class for Chain ADT.
   f) Define complete binary tree.
   g) Define spanning tree.

2. a) Write the recursive function for binary search.
   b) Differentiate between different types of access specifiers in C++ classes.

3. a) Explain the Row Major Order representation of multidimensional arrays.
   b) Write a C++ program to implement the String Abstract Datatype.

4. a) Write a function in C++ to implement the remove operation on a Doubly Linked List.
   b) Explain various hashing methods with the help of examples.

5. a) Define balance factor of a binary tree. Discuss the double rotations on AVL tree with the help of suitable examples.
   b) Create a binary search tree by inserting the following keys on an initially empty tree: 11, 23, 25, 22, 90, 18, 33. 19, 28, 100.

6. a) Write a C++ function to implement merge sort.
   b) Explain the steps involved in performing table sort.

7. a) Describe the process of dynamic memory allocation in C++ with the help of an example.
   b) Write Prim's algorithm to find minimum cost spanning tree of a weighted graph.

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