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18EC643

Sixth Semester B.E. Degree Examination, Feb./Mar. 2022
Data Structures Using C++

Time: 3 hrs.   Max. Marks: 100

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1   a. With example explain the different data types used in C++.   **(07 Marks)**
    b. Define and explain variables, operators and expressions used in C++ along with suitable examples.   **(07 Marks)**
    c. Explain classes and objects with simple program.   **(06 Marks)**

OR

2   a. Explain functions and parameters used in C++ with example.   **(06 Marks)**
    b. Define a constructor. Also explain the concept of operator overloading in C++. **(08 Marks)**
    c. With example, explain the concept of inheritance.   **(06 Marks)**

Module-2

3   a. Write the abstract data type array. Also explain the concept of Row-major and Column-major mapping for 2 dimensional array.   **(09 Marks)**
    b. Define a matrix. Explain the special matrices.   **(06 Marks)**
    c. Explain data objects and its structures used in C++.   **(05 Marks)**

OR

4   a. What is a linear list? Also explain the ADT linear list.   **(05 Marks)**
    b. Let L = (a, b, c, d) be a linear list. What is the result of each of following operations?
        i)   empty( )
        ii) size( )
        iii) get(0), get(2), get(6), get(–3)
        iv) indexOf(a), indexOf(c)
        v)   erase(0), erase(2)
        vi) insert(0, e), insert(2, t).   **(10 Marks)**
    c. Explain single linked list and chains.   **(05 Marks)**

Module-3

5   a. Write the ADT stack. Also write C++ program for abstract class stack.   **(07 Marks)**
    b. Explain the array representation of stack using suitable example.   **(07 Marks)**
    c. Write a note on linked representation of a stack.   **(06 Marks)**

OR

6   a. Convert the following infix expression to postfix expression : $(A + B) * (C - D)\$$. **(08 Marks)**
    b. Explain the concept of parenthesis matching with example.   **(06 Marks)**
    c. With respect to application of stack explain towers of Hanoi.   **(06 Marks)**

Module-4

7 a. Write the ADT queue. Also explain the array representation of queue. (07 Marks)
   b. Explain linked representation of queue with diagram. (07 Marks)
   c. Write a short note on railroad car rearrangement. (06 Marks)

OR

8 a. What is dictionary? Also mention the operation to be performed on dictionaries. (07 Marks)
   b. Explain the linear list representation of a dictionary. (06 Marks)
   c. What is hashing? Explain the hash table representation. (07 Marks)

Module-5

9 a. What is a binary tree? Explain the properties of binary trees. (08 Marks)
   b. Write a short note on array based representation of binary tree. (06 Marks)
   c. Mention the common binary tree operations. (06 Marks)

OR

10 a. Write the ADT binary tree. (05 Marks)
   b. Explain binary search tree operations and implementation. (08 Marks)
   c. Define heap and explain heap sorting with relevant diagrams. (07 Marks)

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