CMR ENGINEERING COLLEGE: : HYDERABAD
UGC AUTONOMOUS
I–B.TECH-II Semester End Examinations (Regular) - September- 2023
DATA STRUCTURES THROUGH C++
(Common for CSC, CSD, CSM)

[Time: 3 Hours]   [Max. Marks: 60]

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 10 marks. Answer all questions in Part A.

Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions.

PART-A   (10 Marks)

1. a) Write a short note on Time complexity?   [1M]
   b) Define Exception handling?   [1M]
   c) Explain the advantages of Linked List.   [1M]
   d) What is Queue ADT?   [1M]
   e) Represent the following binary tree in array representation? [1M]
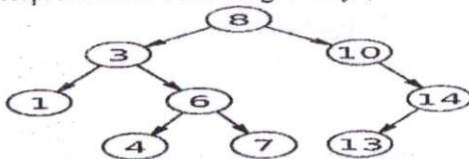
   f) Write the properties of binary trees?   [1M]
   g) What is binary search?   [1M]
   h) Write the best case, average case and worst case of quick sort? [1M]
   i) Define B-tree?   [1M]
   j) In how many ways a graph can be represented?   [1M]

PART-B   (50 Marks)

2. Demonstrate the operator overloading with an example program? [10M]

OR

3. a) Explain in detail class and object with a proper example?   [4M]
   b) What is a constructor? Illustrate default and parameterized constructors with suitable examples? [6M]

4. Describe working process of stack? Write a program to implement the stack using array? [10M]

OR

5. Explain the working procedure of singe linked list for all types of insertion operations? [10M]

6.a) Define Heap. Explain max heap with an example.   [5M]
  b) What is a binary tree? Find pre-order, in-order and post-order traversals for the   [5M]
     following binary tree.
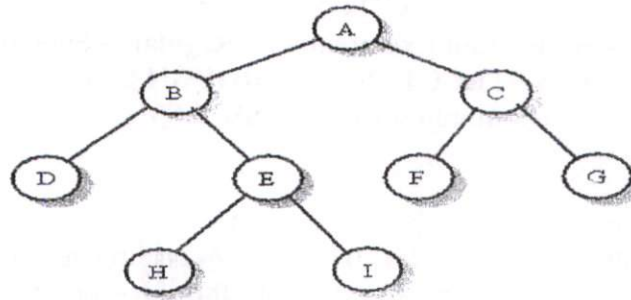
OR

7.   Explain about priority queue? Develop a program to implement priority queue?   [10M]

8.a) What is a hash function? Explain various hash functions with suitable examples.   [5M]
  b) What is a collision and briefly explain collision resolution techniques?   [5M]

OR

9.a) Write an algorithm for merge sort?   [5M]
  b) Sort the following data using merge sort; 45, 85, 15, 55, 75, 25, 35, 65, 10, 90, 75, 67 [5M]

10. Explain Breadth First Search traversal algorithm? Perform breadth first Search   [10M]
     traversal on the following graph considering the starting point as 1:
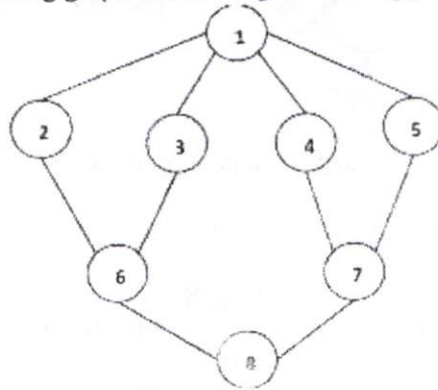
OR

11.a) Construct binary search tree with the following key elements 22, 23, 15, 25, 10, 12,   [5M]
      52, 29, 48.
   b) Reconstruct the above tree by deleting 12 and 29 from it.   [5M]
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