HARTH INSTITUTE OF ENGINEERING & TECHNOLOGY :: PUTTUR

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QUESTION BANK

Subject with Code : Advanced **D**ata Structures **T**hrough **C**++(**16CS505**)

Course & Branch: B.Tech– CSE   **Year &Sem:** II-B.Tech& I-Sem

UNIT-I

1. What are the Object Oriented Programming principles? Explain about the Data Abstraction and Polymorphism.

2. Explain about the Access Controls? How they can be used to provide the accessing benefit with an example.

3. Describe the constructor and destructor? Write a C++ program to implement copy constructor?

4. Write a C++ Program for the following specifications.

    Class: AddressBook
    Data Members: Name, Address, PhoneNo, Email

    Member functions: InsertData(), DisplayData(), SearchPhNo().

5. What is inline function? Write a C++ program to find the area of circle using inline function?

6. Describe 'this' pointer and friend function with suitable examples.

7. Write a program using a try block to detect and throw an exception if the conditions " divide-by-zero" occurs.

8. Write a C++ program to display the student result using Dynamic Memory Allocation.

9. What are static classes? How static members are executed with an example.

10. Describe about the parameter passing methods? Write a C++ program to swap two numbers using parameter passing method.

UNIT-II

1. What are the differences between function overloading and function overriding? Give suitable example.

2. Write a C++ program to overload binary plus (+) operator to add two strings using Operator Overloading concept.

3. Explain about the Generic Programming? Write the syntax for both function and class templates? Write a C++ program to swap two numbers (int, float) using function template

4. What is Inheritance? Explain types of Inheritances? Give an example of hybrid inheritance.

5. Write a C++ program to find the maximum of two numbers using class templates.

6. What is a virtual function? Write the syntax and how the virtual functions are implemented in a class with an example.

7. What are abstract classes? Define the rules to create an abstract class with example.

8. Define stream I/O? explain the use of ifstream and ofstream classes? Write a C++ program to check whether the given file is available or not.

9. Write a C++ program to copy one file data into another file using File I/O concept.

10. Explain about the Runtime polymorphism with suitable example.

UNIT-III

1. What is a Binary Tree? Explain the preorder, inorder and postorder traversals? Write the code for Binary Tree Insertion.

2. Explain about the Binary Search Tree? What are the rules to create a BST? Give an example.

3. Write the C++ code for Deletion operation of Binary Search Tree(BST)? Delete a leaf node, delete a node having one child and delete a node having two childrens.

4. Explain about the Threaded Binary Tree(TBT) with an example.

5. Explain with code in how to search for an element in the Binary Search Tree? Explain how many types of skewing Binary Search Trees are available.

6. Explain Graph Terminology: a) Graph Definition b) Directed Acyclic Graph c) Isomorphic Graph d) Weighted Graph e) Digraph f) Completely Connected Graph.

7. Compare BFS and DFS with examples and also with a good example

8. Illustrate in how many ways a Graph can be represented with example

   a. Adjacency Matrix   b. Incedence Matrix   c. Adjacency List

9. Explain the applications of Graphs

   a. Minimum Cost Spanning Trees (Prims and Kruskals Techniques)

   b. Shortest Path Algorithm

10. Explain Selection Trees. Construct a Winner Tree and a Loser Tree by taking an example.

UNIT- IV

1. a. Define Dictionary. Define Hash Function and Mapping.

   b. Construct a Hash table for the values 12 , 5 , 34, 6, 42, 8, 45, 21, 24. Use Hashing Function as MOD 7.

2. Define Collision and discuss about Collision resolution Techniques such as

   a. Linear Probing   b. Random Probing   c. Double Hashing   d. Quadratic Probing

3. Explain the following in detail:

   a. Static Hashing

   b. Dynamic Hashing

4. a. Explain Skip List. Why it is called as a Randomized Data Structure.

   b. Explain the Operations Insertion, Deletion and Searching with a Skip List.

5. a. Define Priority Queue. Define Min Heap and Max Heap.

   b. Construct a Min Heap for the following Elements:

      40 12 3 9 50 26 16 5 14 30

6. a. Construct a Max Heap for the following Elements:

      42 12 13 19 39 26 16 5 14 33

   b. Explain the role of a Complete Binary Tree in a Priority Queue along with its properties.

7. Explain Lefist Trees with an example

8. Explain Binomial Heaps with an example

9. Explain Fibonacci Heaps with an example

10. Explain Pairing Heaps with an example

UNIT – V

1. Explain Optimal Binary Search Tree with an example.

2. a. Define AVL Tree. How to find the Balance factor of a Node in a AVL Tree.

   b. Explain How LL and RR Rotations can be performed on a AVL Tree.

3. Explain different types of Rotations associated with AVL Tree with an example for each.

4. a. Explain the issues with AVL Tree and recommend how Red Black Trees can be a solution for it.

   b. Explain the properties of Red Black Trees with an example

5. Explain when to change the color of a sibling and when to do rotation clearly with an example on a Red Black Tree.

6. Explain Splay Trees with an example

7. a. Define M-Way Search Tree. How the height has been balanced in M-way Search Trees.

   b. Define the Node Structure of a B-Tree.

8. Differentiate B Trees and B+ Trees with an example for each.

9. Explain clearly the operations that can be performed on a B Tree with example

10. Explain clearly the operations that can be performed on a B+ Tree with example