

## Technical Papers Data Structure: Data Structure Part II

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Traverse the given tree using Inorder, Preorder and Postorder traversals.

Inorder: D H B E A F C I G J

Preorder: A B D H E C F G I J

Postorder: H D E B F I J G C A

There are 8, 15, 13, 14 nodes were there in 4 different trees. Which of them could have formed a full binary tree? 15.

In general:

There are  $2n - 1$  nodes in a full binary tree.

By the method of elimination:

Full binary trees contain odd number of nodes. So there cannot be full binary trees with 8 or 14 nodes, so rejected. With 13 nodes you can form a complete binary tree but not a full binary tree. So the correct answer is 15.

Note:

Full and Complete binary trees are different. All full binary trees are complete binary trees but not vice versa.

In the given binary tree, using array you can store the node 4 at which location?

At location 6, then 1 2 3--4--5

Root LC1 RC1 LC2 RC2 LC3 RC3 LC4 RC4

where LCn means Left Child of node n and RCn means Right Child of node n

Sort the given values using Quick Sort?

65 70 75 80 85 60 55 50 45

Sorting takes place from the pivot value, which is the first value of the given elements, this is marked bold. The values at the left pointer and right pointer are indicated using L and R respectively.

65 70L 75 80 85 60 55 50 45R

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Since pivot is not yet changed the same process is continued after interchanging the values at L and R positions

65 45 75 L 80 85 60 55 50 R 70

65 45 50 80 L 85 60 55 R 75 70

65 45 50 55 85 L 60 R 80 75 70

65 45 50 55 60 R 85 L 80 75 70

When the L and R pointers cross each other the pivot value is interchanged with the value at right pointer. If the pivot is changed it means that the pivot has occupied its original position in the sorted order (shown in bold italics) and hence two different arrays are formed, one from start of the original array to the pivot position-1 and the other from pivot position + 1 to end.

60 L 45 50 55 R 65 85 L 80 75 70 R

55 L 45 50 R 60 65 70 R 80 L 75 85

50 L 45 R 55 60 65 70 80 L 75 R 85

In the next pass we get the sorted form of the array.

45 50 55 60 65 70 75 80 85

For the given graph, draw the DFS and BFS?

BFS: A X G H P E M Y J

DFS: A X H P E Y M J G

Classify the Hashing Functions based on the various methods by which the key value is found.

Direct method.

Subtraction method.

Modulo-Division method.

Digit-Extraction method.

Mid-Square method.

Folding method.

Pseudo-random method.

What are the types of Collision Resolution Techniques and the methods used in each of the type?

Open addressing (closed hashing).

The methods used include:

Overflow block.

Closed addressing (open hashing)

The methods used include:

Linked list.

Binary tree

In RDBMS, what is the efficient data structure used in the internal storage representation?

B + tree. Because in B + tree, all the data is stored only in leaf nodes, that makes searching easier. This corresponds to the records that shall be stored in leaf nodes.

Draw the B-tree of order 3 created by inserting the following data arriving in sequence 92 24 6 7 11 8 22 4 5 16 19 20 78

Of the following tree structure, which is, efficient considering space and time complexities?

Incomplete Binary Tree

Complete Binary Tree (Correct Answer)

Full Binary Tree

By the method of elimination:

Full binary tree loses its nature when operations of insertions and deletions are done. For incomplete binary trees, extra storage is required and overhead of NULL node checking takes place. So complete binary tree is the better one since the property of complete binary tree is maintained even after operations like additions and deletions are done on it.

What is a spanning Tree?

A spanning tree is a tree associated with a network. All the nodes of the graph appear on the tree once. A minimum spanning tree is a spanning tree organized so that the total edge weight between nodes is minimized.

Does the minimum spanning tree of a graph give the shortest distance between any 2 specified nodes?

No.

Minimal spanning tree assures that the total weight of the tree is kept at its minimum. But it doesn't mean that the distance between any two nodes involved in the minimum-spanning tree is minimum.

Convert the given graph with weighted edges to minimal spanning tree.

the equivalent minimal spanning tree is:

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Which is the simplest file structure?

Sequential (it is the easiest)

Indexed

Random

Whether Linked List is linear or Non-linear data structure?

According to Access strategies Linked list is a linear one.

According to Storage Linked List is a Non-linear one.

Draw a binary Tree for the expression:

$A * B - (C + D) * (P/Q)$

For the following COBOL code, draw the Binary tree?

- 01 STUDENT\_REC.
- 02 NAME.
- 03 FIRST\_NAME PIC X (10).
- 03 LAST\_NAME PIC X (10).
- 02 YEAR\_OF\_STUDY.
- 03 FIRST\_SEM PIC XX.
- 03 SECOND\_SEM PIC XX.