

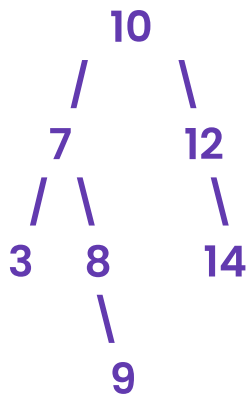
Binary trees

Assignment Questions



Q1. List some real-life applications of tree data structure.

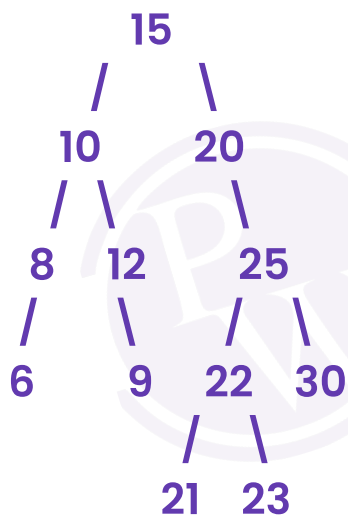
Q2. Consider the following tree:



Using this tree, answer the following questions:

1. What is the parent of node 8?
2. What is the root of the tree?
3. What are the leaf nodes of the tree?

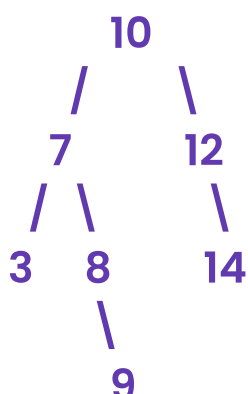
Q3. Consider the following tree:



Using this tree, answer the following questions:

1. What is the sibling node of node 12?
2. What are the ancestor nodes of node 9?
3. What is the descendant node of node 20?

Q4. Consider the following tree:



Using this tree, answer the following questions:

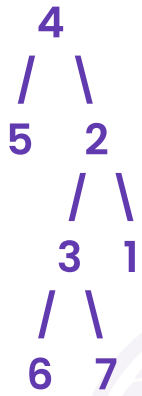
1. What is the level of node 3?
2. How many edges are there in the path from node 7 to node 14?
3. What is the height of the tree?
4. What is the size of the tree?

Q5. State True or False and also give the reason for the same.

1. Every binary tree is a generic tree.
2. Every generic tree is a binary tree.
3. A binary tree can have at most 3 children per node.
4. A generic tree can have an arbitrary number of children per node.
5. Every binary tree is a binary search tree.

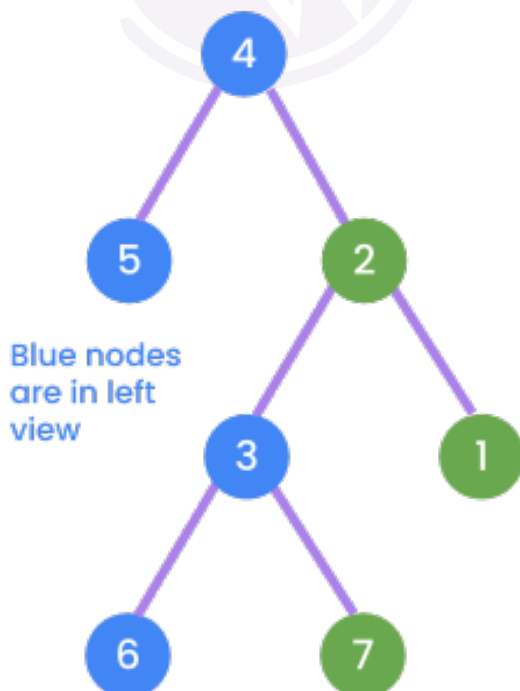
Q6. Given a Binary Tree, the task is to print the left view of the Binary Tree from top to bottom. The left view of a Binary Tree is a set of leftmost nodes for every level.

Input:

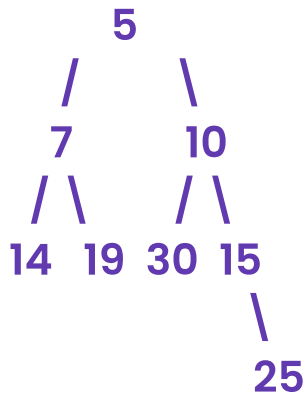


Output: 4 5 3 6

Explanation:

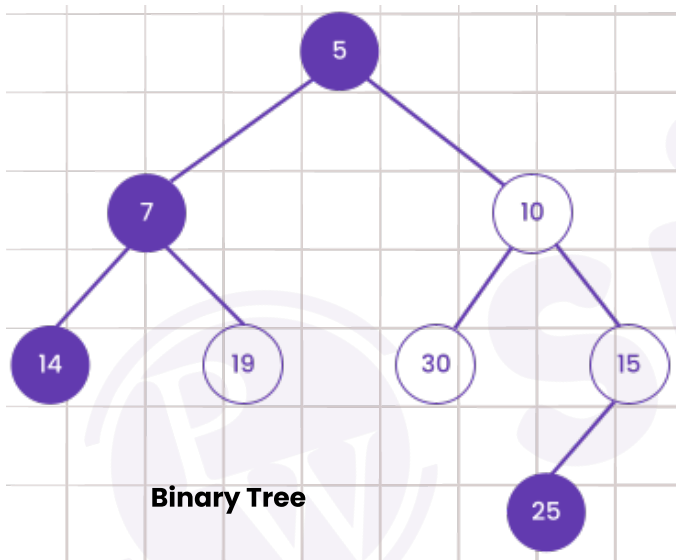


Input2:



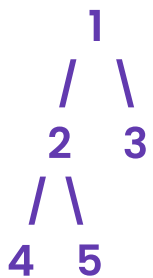
Output2: 5 7 14 25

Explanation:



Q7. Write a program to find the reverse level order traversal on a binary tree.

Input:



Output:

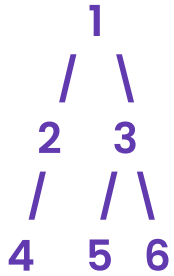
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Reverse Level order traversal of binary tree is:
4 5 2 3 1
```

Q8. Check if two nodes are cousins in a Binary Tree

Input: Given the root of a binary tree with all unique values and two integers x and y representing the values of the nodes for which we need to check if they are cousins in the binary tree. Cousins in a binary tree are nodes that are at the same level but have different parents.

Output: The program returns true if x and y are cousins and false otherwise.

Binary Tree:



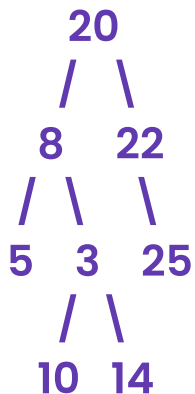
Output:

```
Preorder of Tree: 1 2 4 3 5 6
Enter node-1: 4
Enter node-2: 5
4 and 5 are cousins.
```

```
Preorder of Tree: 1 2 4 3 5 6
Enter node-1: 1
Enter node-2: 4
1 and 4 are not cousins.
```

Q9. Given a Binary Tree, The task is to print the bottom view from left to right. A node x is there in output if x is the bottommost node at its horizontal distance. The horizontal distance of the left child of a node x is equal to a horizontal distance of x minus 1, and that of a right child is the horizontal distance of x plus 1.

Input:

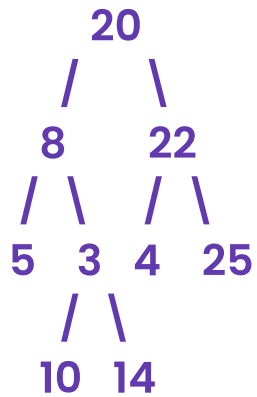


Output:

5 10 3 14 25

Explanation:

The bottom-most nodes here are 5 10 3 14 and 25.

Input2:**Output2:**

5 10 4 14 25

Explanation: If there are multiple bottom-most nodes for a horizontal distance from the root, then print the later one in the level traversal. 3 and 4 are both the bottom-most nodes at a horizontal distance of 0, we need to print 4.