1. What is the maximum number of nodes at level 3 in a binary tree?
   1. 4
   2. 6
   3. **8**
   4. 2
2. In a binary tree, the maximum number of nodes with height 'h' is:
   1. 2^h
   2. **2^(h+1) - 1**
   3. h^2
   4. h \* log2(h)
3. A complete binary tree can have all its levels filled except the last, and the last level is filled left to right.
   1. **True**
   2. False
4. Which traversal visits the root node after its left and right subtrees?
   1. Inorder
   2. Preorder
   3. **Postorder**
   4. Level order
5. In which type of binary tree, every level except the last is completely filled and all nodes are as left as possible?
   1. Perfect Binary Tree
   2. **Complete Binary Tree**
   3. Full Binary Tree
   4. Balanced Binary Tree
6. A binary tree with all leaf nodes at the same level is known as:
   1. **Perfect Binary Tree**
   2. Complete Binary Tree
   3. Full Binary Tree
   4. Skewed Binary Tree
7. Which type of binary tree has the least possible height?
   1. Perfect Binary Tree
   2. Complete Binary Tree
   3. **Full Binary Tree**
   4. Skewed Binary Tree
8. A binary tree in which each node has exactly zero or two children is called:
   1. Perfect Binary Tree
   2. Complete Binary Tree
   3. **Full Binary Tree**
   4. Skewed Binary Tree
9. Which traversal visits the root node between its left and right subtrees?
   1. **Inorder**
   2. Preorder
   3. Postorder
   4. Level order
10. In a binary search tree (BST), the left subtree of a node contains:
    1. **Nodes with smaller keys**
    2. Nodes with greater keys
    3. Nodes with equal keys
    4. Nodes with random keys
11. In a binary search tree (BST), the right subtree of a node contains:
    1. Nodes with smaller keys
    2. **Nodes with greater keys**
    3. Nodes with equal keys
    4. Nodes with random keys
12. Which operation is used to find the successor of a node in a binary search tree?
    1. Predecessor
    2. **Inorder successor**
    3. Postorder successor
    4. Level order successor
13. The average time complexity of searching in a balanced binary search tree (BST) is:
    1. O(1)
    2. **O(log n)**
    3. O(n)
    4. O(n log n)
14. Which type of binary tree has the height balanced such that the difference between the heights of the left and right subtrees is at most one?
    1. Perfect Binary Tree
    2. Complete Binary Tree
    3. **AVL Tree**
    4. B-Tree
15. Which tree data structure is used for efficient searching, insertion, and deletion operations?
    1. Binary Tree
    2. **AVL Tree**
    3. B-Tree
    4. Heap
16. Which tree data structure is used to maintain a dynamic set of elements and supports insertion, deletion, and search operations?
    1. **Binary Search Tree (BST)**
    2. AVL Tree
    3. Red-Black Tree
    4. B-Tree
17. In a binary tree, a node with no children is called:
    1. Root node
    2. Internal node
    3. **Leaf node**
    4. Sibling node
18. In a binary tree, a node with at least one child is called:
    1. Root node
    2. **Internal node**
    3. Leaf node
    4. Sibling node
19. Which traversal visits the nodes in the order: left child, root, right child?
    1. **Inorder**
    2. Preorder
    3. Postorder
    4. Level order
20. Which traversal visits the nodes in the order: root, left child, right child?
    1. Inorder
    2. **Preorder**
    3. Postorder
    4. Level order
21. Which traversal visits the nodes in the order: left child, right child, root?
    1. Inorder
    2. Preorder
    3. **Postorder**
    4. Level order
22. Which traversal visits the nodes level by level from left to right?
    1. Inorder
    2. Preorder
    3. Postorder
    4. **Level order**
23. A binary tree with only one node is also a:
    1. Perfect Binary Tree
    2. Complete Binary Tree
    3. Full Binary Tree
    4. **Degenerate Binary Tree**
24. In a binary search tree (BST), the operation to find the smallest element is called:
    1. **Minimum**
    2. Maximum
    3. Successor
    4. Predecessor
25. In a binary tree, the degree of a node is defined as:
    1. **The number of subtrees it has**
    2. The number of children it has
    3. The number of edges it has
    4. The number of ancestors it has
26. In a binary tree, a node with the highest level is known as:
    1. **Root node**
    2. Internal node
    3. Leaf node
    4. Ancestor node
27. In a binary tree, the depth of a node is defined as:
    1. The number of subtrees it has
    2. The number of children it has
    3. The number of ancestors it has
    4. **The distance from the root node**
28. Given a binary tree, write a function to determine whether it is a valid binary search tree (BST).
    1. Check if it is a complete binary tree
    2. Check if it is a full binary tree
    3. **Perform an inorder traversal and check if the values are in ascending order**
    4. Check if the root node is greater than its left child and smaller than its right child
29. What is the time complexity of finding the lowest common ancestor (LCA) of two nodes in a binary tree?
    1. O(log n)
    2. **O(n)**
    3. O(n^2)
    4. O(1)
30. In a binary tree, the diameter is defined as:
    1. **The longest path between two leaf nodes**
    2. The shortest path between two leaf nodes
    3. The maximum distance between any two nodes
    4. The minimum distance between any two nodes
31. A binary tree is threaded by:
    1. Adding extra nodes to the tree
    2. **Linking the null pointers of leaf nodes to other nodes**
    3. Creating a circular linked list from the tree nodes
    4. Replacing each null pointer with a pointer to the previous node
32. The Morris Traversal algorithm is used to perform which type of traversal?
    1. **Inorder**
    2. Preorder
    3. Postorder
    4. Level order
33. A binary tree can be represented by an array by using the following formula to find the indices of left and right children of a node at index 'i':

Left child index: 2i + 1

Right child index: 2i + 2

* 1. **True**
  2. False