

# 27 Lecture - CS301

## Important Subjective

- 1. What is a binary tree?**  
A binary tree is a data structure in which each node has at most two children, referred to as the left child and the right child.
- 2. What is the height of a binary tree?**  
The height of a binary tree is the maximum number of edges between the root node and any leaf node in the tree.
- 3. What is a full binary tree?**  
A full binary tree is a binary tree in which every node other than the leaves has two children.
- 4. What is a complete binary tree?**  
A complete binary tree is a binary tree in which all the levels are completely filled except possibly for the last level, which is filled from left to right.
- 5. What is a balanced binary tree?**  
A balanced binary tree is a binary tree in which the difference in height between the left and right subtrees of any node is at most one.
- 6. What is an AVL tree?**  
An AVL tree is a self-balancing binary search tree in which the heights of the left and right subtrees of every node differ by at most one.
- 7. What is a red-black tree?**  
A red-black tree is a self-balancing binary search tree in which each node has a color either red or black, and the root node is always black.
- 8. What is an expression tree?**  
An expression tree is a binary tree in which each internal node represents an operator and each leaf node represents an operand.
- 9. What is a binary search tree?**  
A binary search tree is a binary tree in which the left subtree of a node contains only nodes with values less than the node's value, and the right subtree contains only nodes with values greater than the node's value.
- 10. What is the maximum number of nodes in a binary tree of height h?**  
The maximum number of nodes in a binary tree of height h is  $2^{(h+1)} - 1$ .