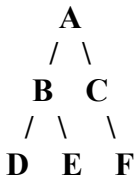
STUDY MATERIAL: Preorder Traversal (Tree Traversal)

Definition: Preorder traversal is a Depth-First Traversal technique used in trees where nodes are visited in the following order:

Root → Left Subtree → Right Subtree

This is often remembered as: **R → L → R**

Example: Consider the binary tree:



Preorder Traversal Output: A B D E C F

Algorithm (Steps)

1. Visit the root node
2. Traverse the left subtree using preorder
3. Traverse the right subtree using preorder

Recursive Implementation (C)

```
void preorder(struct Node* root) {
        if (root == NULL)
                return;

        printf("%d ", root->data);   // Visit root
        preorder(root->left);        // Traverse left
        preorder(root->right);       // Traverse right
}
```

Iterative Approach (Using Stack)

1. Push root into stack
2. Pop node and print it
3. Push right child
4. Push left child
5. Repeat until stack is empty

Time and Space Complexity

Case	Complexity
Time Complexity	O(n)
Space Complexity	O(h) (recursive stack)

Where:

- n = number of nodes
- h = height of tree

Key Points to Remember

- Preorder starts with the root node
- Used for tree copying and prefix expression evaluation
- Belongs to Depth First Search (DFS) traversal

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