**Task 5**

**Part b:**

In-depth understanding of tree traversal techniques is essential when working with depth-first search (DFS). For binary trees, the three common types of depth-first traversal are **Inorder**, **Preorder**, and **Postorder**. Each of these methods follows a different sequence of visiting nodes.

**1. Inorder Traversal (Left, Root, Right):**

* In an Inorder traversal, the left subtree is visited first, then the root node, and finally the right subtree.
* It is mainly used in binary search trees (BST) to retrieve data in a sorted manner.

**2. Preorder Traversal (Root, Left, Right):**

* In a Preorder traversal, the root node is visited first, followed by the left subtree and then the right subtree.
* It is useful for creating a copy of the tree or to prefix expressions.

**3. Postorder Traversal (Left, Right, Root):**

* In a Postorder traversal, the left subtree is visited first, then the right subtree, and finally the root node.
* It is useful for deleting trees or evaluating postfix expressions.

**Recursive Definitions:**

For a given node, root, in a binary tree:

* **Inorder**: dfs\_inorder(root.left), visit(root), dfs\_inorder(root.right)
* **Preorder**: visit(root), dfs\_preorder(root.left), dfs\_preorder(root.right)
* **Postorder**: dfs\_postorder(root.left), dfs\_postorder(root.right), visit(root)