Activity No. 11	
Implementing and Traversing Binary Trees	
Course Code: CPE010	**Program:** Computer Engineering
Course Title: Data Structures and Algorithms	**Date Performed:** 11/27/2024
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6. Output

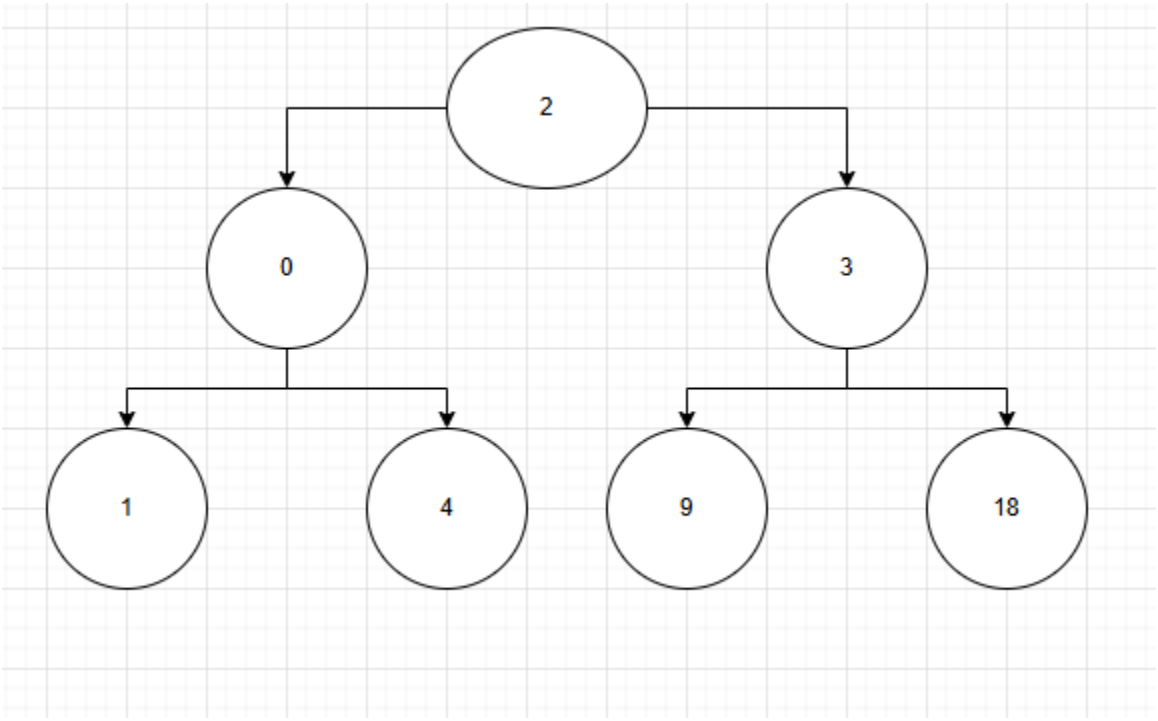
1. Write a program that will implement the use of a Tree. The program will allow the user to perform the inorder, preorder and the postorder traversal.

```
C/C++
#include <iostream>
using namespace std;

struct Node {
	int data;
	Node* left;
	Node* right;
	Node(int val) : data(val), left(NULL), right(NULL) {}
};

class Tree {
public:
	Node*insert(Node* root, int val) {
		if (root == NULL) {
			return new Node(val);
		}
		if (val < root->data) {
			root->left = insert(root->left, val);
		} else if (val > root->data) {
			root->right = insert(root->right, val);
		}
		return root;
	}

	void inorderTransversal (Node* root) {
		if (root == NULL) return;

		inorderTransversal(root->left);
		cout << root->data << " ";
		inorderTransversal(root->right);
	}
	//In-order tranversal funtion
	void inorder(Node* root)
	{
		if (root != NULL)
		{
		inorder(root->left);
```

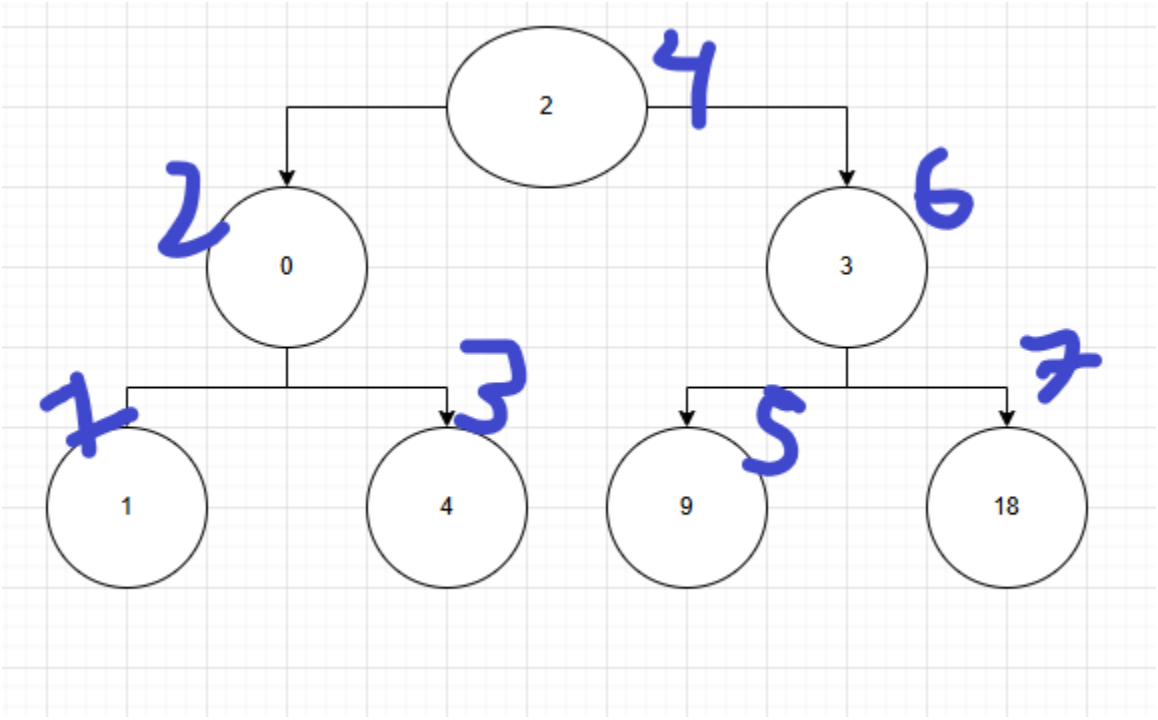
```
                cout << root->data << "-";
                inorder(root->right);
                }
        }

        //Pre-order traversal function
        void preorder(Node*root)
        {
                if (root != NULL)
                {
                cout << root->data << "-";
                preorder(root->left);
                preoder(rooot->right);
                }
        }
        //Post-order traversal funtion
        void postorder(node*root)
        {
                if (root != NULL)
                {
                        postorder(root->left);
                        postotder(root->right);
                        cout << root->data << "-";
                }
        }
};

int main() {
        Tree bst;
        Node* root = NULL;

        int values[] = {1,2,3,4,5,6,7,8};
        int numValues = sizeof(values) / sizeof(values[0]);

        for (int i = 0; i < numValues; ++i) {
                root = bst.insert(root, values[i]);
        }

        cout << "Inorder transversal of TREE:";
        bst.inorderTransversal(root);
        cout << endl;

        return 0;
}
```

2. Based on your output. Create a diagram to show the tree after all values have been inserted. Then, with the use of visual aids (like arrows and numbers) indicate the traversal order for in-order, pre-order and post-order traversal on the diagram.

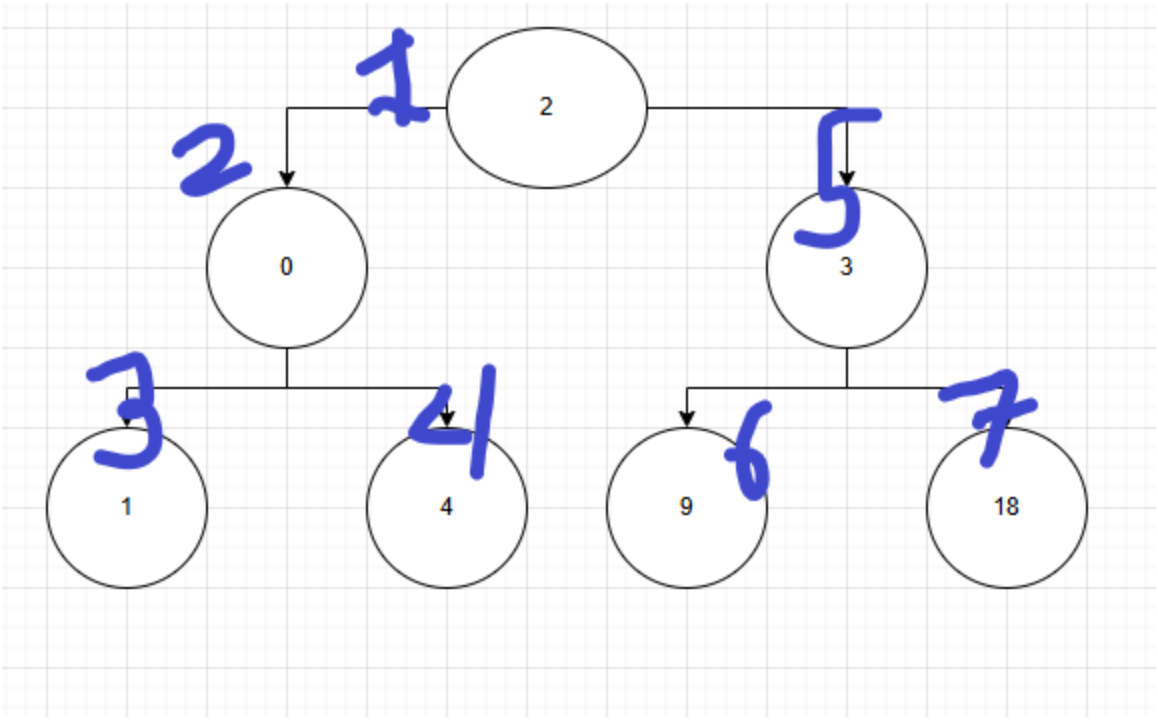
(Screenshot of tree diagram)



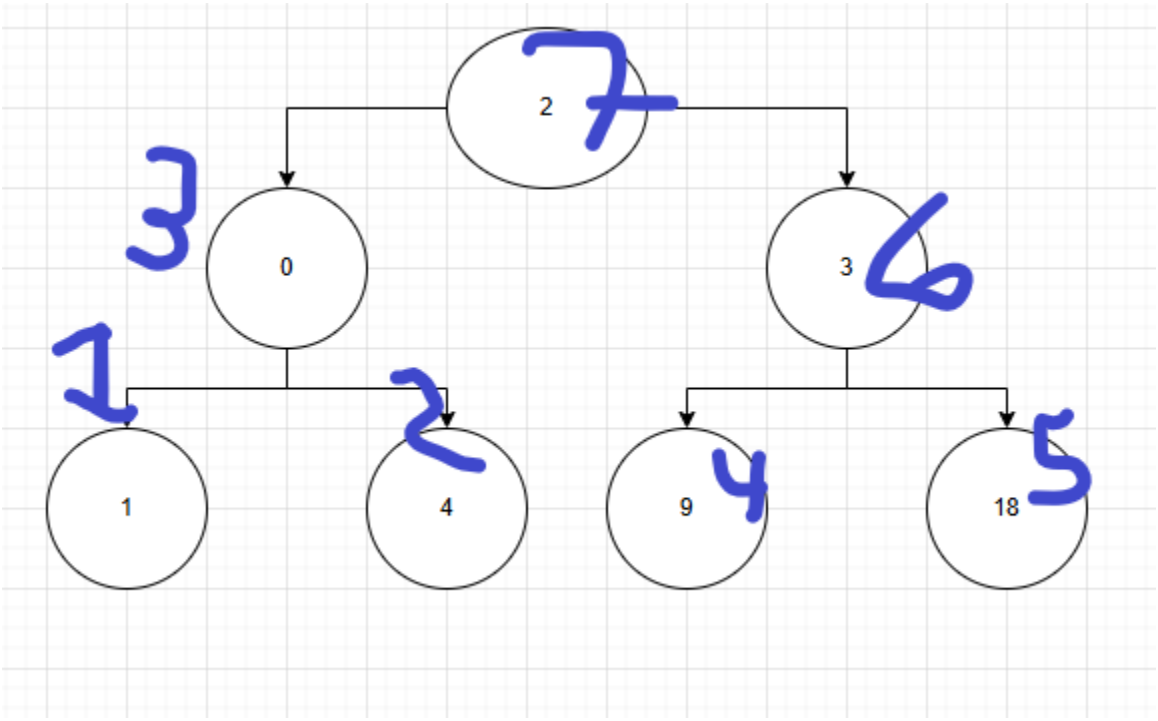
(Screenshot of tree diagram with indicated in-order traversal)



(Screenshot of tree diagram with indicated pre-order traversal)



(Screenshot of tree diagram with indicated post-order traversal)



7. Conclusion

In conclusion, trees are basic data structures. One kind of tree that preserves order is the Binary Search Tree (BST), which makes sure that values on a node's right are larger and those on its left are smaller. Users can investigate how data is accessible and processed in various sequences, each with its own set of use cases, by participating in the activities that illustrate the various order types of trees, such as in-order, pre-order, and post-order. We may state that we performed well on the supplemental activity because of its simple built-in features and lack of complexity.

8. Assessment Rubric

Rubric for SO 7 (3)

Criteria	Ratings						Pts
SO 7 PI 1 IILO4 Utilize lifelong learning skills in pursuit of personal development and excellence in professional practice. threshold: 4.8 pts	6 pts Excellent | Educational interests and pursuits exist and flourish outside classroom requirements,knowledge and/or experiences are pursued independently and applies knowledge learned into practice	5 pts Good | Educational interests and pursuits exist and flourish outside classroom requirements,knowledge and/or experiences are pursued independently	4 pts Satisfactory | Look beyond classroom requirements, showing interest in pursuing knowledge independently	3 pts Unsatisfactory | Begins to look beyond classroom requirements, showing interest in pursuing knowledge independently	2 pts Poor | Relies on classroom instruction only	1 pts Very Poor | No initiative or interest in acquiring new knowledge	6 pts
SO 7 PI 2 IILO4 Utilize lifelong learning skills in pursuit of personal development and excellence in professional practice. threshold: 4.8 pts	6 pts Excellent | Completes an assigned task independently and practices continuous improvement	5 pts Good | Completes an assigned task without supervision or guidance	4 pts Satisfactory | Requires minimal guidance to complete an assigned task	3 pts Unsatisfactory | Requires detailed or step-by-step instructions to complete a task	2 pts Poor | Shows little interest to complete a task independently	1 pts Very Poor | No interest to complete a task independently	6 pts
SO 7 PI 3 IILO4 Utilize lifelong learning skills in pursuit of personal development and excellence in professional practice. threshold: 4.8 pts	6 pts Excellent | Synthesizes and integrates information from a variety of sources; formulates a clear and precise perspective; draws appropriate conclusions	5 pts Good | Evaluate information from a variety of sources; formulates a clear and precise perspective.	4 pts Satisfactory | Analyze information from a variety of sources; formulates a clear and precise perspective.	3 pts Unsatisfactory | Apply the gathered information to formulate the problem	2 pts Poor | Gather and summarized the information from a variety of sources but failed to formulate the problem	1 pts Very Poor | Gather information from a variety of sources	6 pts
SO 7 PI 4 IILO4 Utilize lifelong learning skills in pursuit of personal development and excellence in professional practice. threshold: 4.8 pts	6 pts Excellent | Ideas are combined in original and creative ways in line with the new and emerging technology trends to solve a problem or address an issue.	5 pts Good | Ideas are creative and adapt the new knowledge to solve a problem or address an issue	4 pts Satisfactory | Ideas are creative in solving a problem, or address an issue	3 pts Unsatisfactory | Shows some creative ways to solve the problem	2 pts Poor | Shows initiative and attempt to develop creative ideas to solve the problem	1 pts Very Poor | Ideas are copied or restated from the sources consulted	6 pts
							Total Points: 24