DSA Lab

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Lab # 9
Binary Tree Implementation

LAB Journal

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Lab 9: Binary Tree Implementation

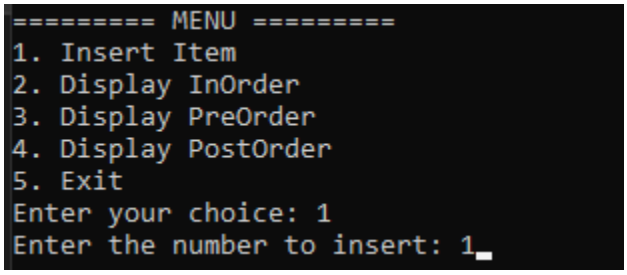
TASK:

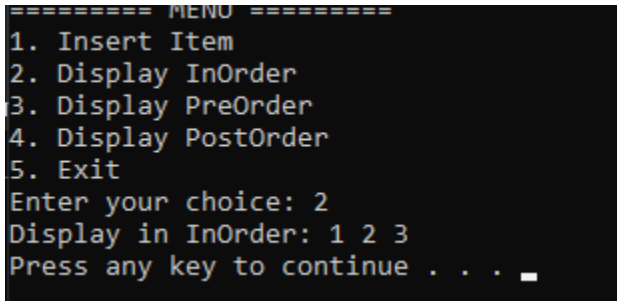
Binary Tree Implementation.

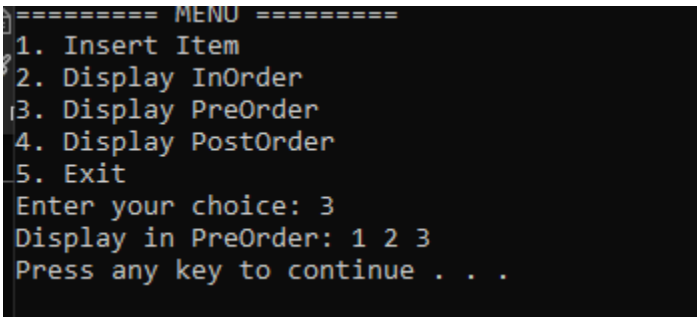
Lab Task GitHub Link:

Link

OUTPUT:







```
========== MENU ==========
1. Insert Item
2. Display InOrder
3. Display PreOrder
4. Display PostOrder
5. Exit
Enter your choice: 4
Display in PostOrder: 3 2 1
Press any key to continue . . .
```

CODE:

```
#include<iostream>

using namespace std;

class Tree {
private:
	struct Node {
		int num;
		Node* left, * right;
	};

	Node* root;

public:
	Tree() {
		root = NULL;
	}

	bool isEmpty() {
		return (root == NULL);
	}

	void insertItem(int n) {
		insertHelper(root, n);
	}
	void insertHelper(Node*& ptr, int n) {
		if (ptr == NULL) {
			ptr = new Node;
			ptr->num = n;
			ptr->right = ptr->left = NULL;
		}

		else if (n > ptr->num) {
			insertHelper(ptr->right, n);
		}

		else if (n < ptr->num) {
			insertHelper(ptr->left, n);
		}
```

```
	else {
		cout << "Can't add duplicate in tree\n";
	}
}
//---------------------------------
void inOrder() {
	if (!isEmpty()) {
		inOrderHelper(root);
	}
	else {
		cout << "Tree Empty\n";
	}
}
void inOrderHelper(Node* ptr) {
	if (ptr == NULL)
	{
		return;
	}
	inOrderHelper(ptr->left);
	cout << ptr->num << " ";
	inOrderHelper(ptr->right);
}
//---------------------------------
void preOrder() {
	if (!isEmpty())
	{
		preOrderHelper(root);
	}
	else {
		cout << "Tree Empty\n";
	}
}
void preOrderHelper(Node* ptr) {
	if (ptr == NULL) {
		return;
	}
	cout << ptr->num << " ";
	preOrderHelper(ptr->left);
	preOrderHelper(ptr->right);
}

//---------------------------------
void postOrder() {
	if (!isEmpty())
	{
		postOrderHelper(root);
	}
	else {
		cout << "Tree Empty\n";
	}
}
void postOrderHelper(Node* ptr) {
	if (ptr == NULL) {
		return;
	}
	postOrderHelper(ptr->left);
	postOrderHelper(ptr->right);
	cout << ptr->num << " ";
```

```
	}


};

int main() {
	Tree tree;
	int choice, value;

	while (true) {
		system("cls");
		cout << "========= MENU =========" << endl;
		cout << "1. Insert Item" << endl;;
		cout << "2. Display InOrder" << endl;;
		cout << "3. Display PreOrder"<< endl;
		cout << "4. Display PostOrder"<<endl;
		cout << "5. Exit" << endl;

		cout << "Enter your choice: ";


		if (!(cin >> choice)) {
			cout << "Invalid input! Please enter a valid choice.\n";
			cin.clear();
			cin.ignore();
			continue;
		}

		switch (choice) {
		case 1:
			cout << "Enter the number to insert: ";
			if (!(cin >> value)) {
				cout << "Invalid input! Please enter a valid number." <<
endl;
				cin.clear();
				cin.ignore();
				continue;
			}
			tree.insertItem(value);
			cout << value << " inserted successfully."<< endl;
			break;

		case 2:
			cout << "Display in InOrder: ";
			tree.inOrder();
			cout << endl;
			break;

		case 3:
			cout << "Display in PreOrder: ";
			tree.preOrder();
			cout << endl;
			break;

		case 4:
			cout << "Display in PostOrder: ";
			tree.postOrder();
			cout << endl;
```

```
                break;

        case 5:
                cout << "Exiting program...\n";
                exit(1);

        default:
                cout << "Invalid choice. Please select a valid option.\n";
        }

        system("pause");
}

return 0;
 }
```