

## Assignment No. 5

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### Programme:

```
#include <iostream>

#include <cstring>

#include <cctype>

using namespace std;

struct Node {
    char data;

    Node *left, *right;

    Node(char val) : data(val), left(nullptr), right(nullptr) {}
};

class Tree {
public:
    Node *root;

    Tree() : root(nullptr) {}

    void buildExpressionTree(const char *prefix) {
        Node *stack[50];

        int top = -1;

        for (int i = strlen(prefix) - 1; i >= 0; i--) {
            if (isalpha(prefix[i])) {
                stack[++top] = new Node(prefix[i]);
            } else {
```

```

        Node *node = new Node(prefix[i]);

        node->left = stack[top--];

        node->right = stack[top--];

        stack[++top] = node;
    }
}

root = stack[top];
}

```

```

void displayPostfix(Node *node) {
    if (!node) return;

    displayPostfix(node->left);

    displayPostfix(node->right);

    cout << node->data;
}

```

```

void deleteTree(Node *node) {
    if (!node) return;

    deleteTree(node->left);

    deleteTree(node->right);

    cout << "Deleting node: " << node->data << endl;

    delete node;
}

};

```

```

int main() {
    Tree tree;

    char expression[50];

    int choice;

    do {
        cout << "1 -> Enter prefix expression\n";

        cout << "2 -> Display postfix expression\n";
    }
}

```

```

cout << "3 -> Delete tree\n";

cout << "4 -> Exit\n";

cout << "Choose an option (1-4): ";

cin >> choice;


switch (choice) {

    case 1:

        cout << "Enter the prefix expression (e.g., ++a*bc/def): ";

        cin >> expression;

        tree.buildExpressionTree(expression);

        break;

    case 2:

        if (tree.root) {

            tree.displayPostfix(tree.root);

            cout << endl;

        } else {

            cout << "Tree is empty.\n";

        }

        break;

    case 3:

        if (tree.root) {

            tree.deleteTree(tree.root);

            tree.root = nullptr;

        } else {

            cout << "Tree is already empty.\n";

        }

        break;

    case 4:

        cout << "\n// END OF CODE\n";

        break;

    default:

        cout << "Choose a valid option (1-4).\n";

}

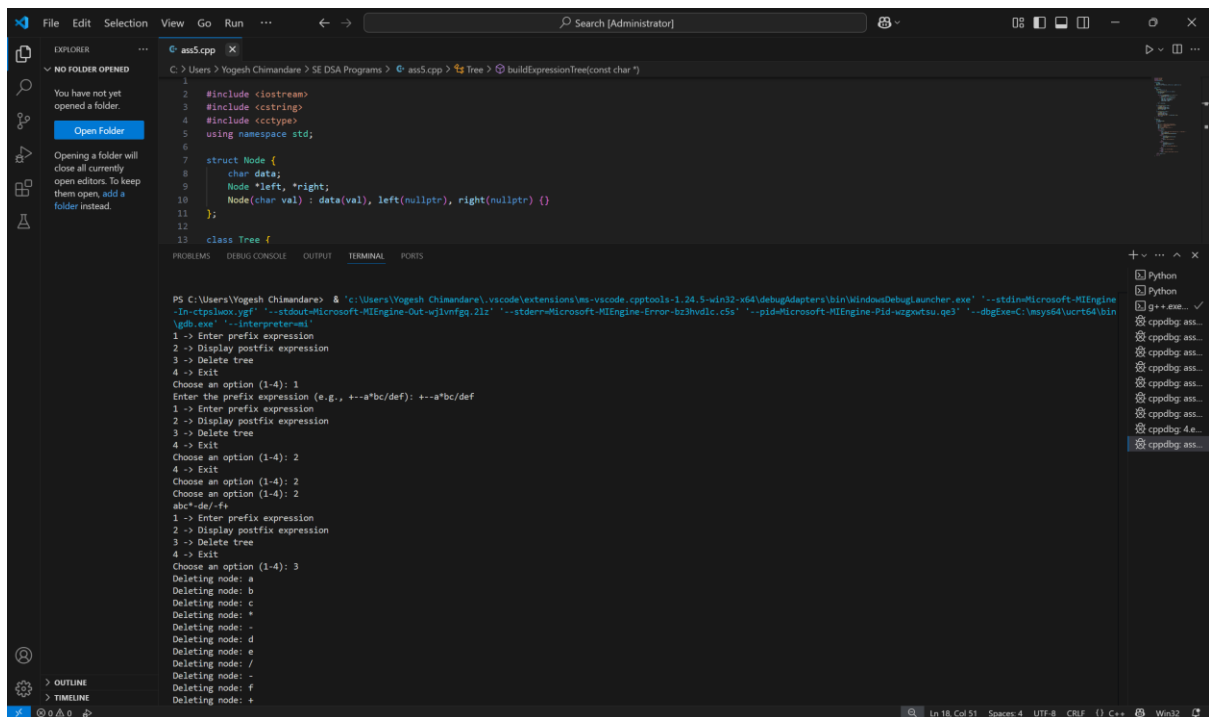
```

```
} while (choice != 4);
```

```
return 0;
```

```
}
```

## Output:



The screenshot shows the Visual Studio Code interface. The Explorer pane on the left indicates 'NO FOLDER OPENED'. The main editor displays a file named 'ass5.cpp' with the following C++ code:

```
1
2 #include <iostream>
3 #include <string>
4 #include <ctype>
5 using namespace std;
6
7 struct Node {
8     char data;
9     Node *left, *right;
10    Node(char val) : data(val), left(nullptr), right(nullptr) {}
11 };
12
13 class Tree {
```

The TERMINAL pane at the bottom shows the execution of the program using a debugger. The output is as follows:

```
PS C:\Users\Yogesh Chhimandare> "c:\Users\Yogesh Chhimandare\.vscode\extensions\ms-vscode.cpptools-1.24.5-win32-x64\debug\adapters\bin\WindowsDebugLauncher.exe" --stdin=Microsoft-MIEngine-In-cppdbg\ass5.yf --stdout=Microsoft-MIEngine-Out-wjlmfqa.2ic --stderr=Microsoft-MIEngine-Error-bzhwalc.c5s --pid=Microsoft-MIEngine-Pid-wzgoutsu.qe3 --dbgExe=C:\msys64\usr\bin\gdb.exe --interpreter=mi
1 -> Enter prefix expression
2 -> Display postfix expression
3 -> Delete tree
4 -> Exit
Choose an option (1-4): 1
Enter the prefix expression (e.g., ++a*bc/def): ++a*bc/def
1 -> Enter prefix expression
2 -> Display postfix expression
3 -> Delete tree
4 -> Exit
Choose an option (1-4): 2
4 -> Exit
Choose an option (1-4): 2
Choose an option (1-4): 2
abc+def/a
1 -> Enter prefix expression
2 -> Display postfix expression
3 -> Delete tree
4 -> Exit
Choose an option (1-4): 3
Deleting node: a
Deleting node: b
Deleting node: c
Deleting node: *
Deleting node: -
Deleting node: d
Deleting node: e
Deleting node: /
Deleting node: -
Deleting node: f
Deleting node: +
```