Practical No. 10 (Group D)

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Problem Statement :

Implement C++ program for expression conversion as infix to postfix and its evaluation using stack based on given conditions:

1. Operands and operator, both must be single character.
2. Input Postfix expression must be in a desired format.
3. Only '+', '-', '*' and '/ ' operators are expected.

Code :

```
#include <iostream>
#include <cstring>  // Use for strlen
using namespace std;

class StackOp {
    char st[20], st1[20];
    int top;
```

```
public:
    StackOp() {
        top = -1;
    }
    void input();
    void push(char a);
    void pop();
    int pri(char b);
};

int StackOp::pri(char b) {
    if (b == '+' || b == '-') return 1;
    if (b == '*' || b == '/') return 2;
    return 0; // Default case for unsupported operators
}

void StackOp::input() {
    char ch[20];
    top = -1;
    int f = 1, l, i = 0, j = 0;
    cout << "\nEnter the expression: ";
    cin >> ch;
    l = strlen(ch);
    while (i < l) {
```

```
f = 1;
if (isalpha(ch[i]) || isdigit(ch[i])) {
    cout << ch[i]; // Outputting operand directly
    st1[j++] = ch[i];
}
if (ch[i] == '(') {
    push(ch[i]);
}
if (ch[i] == ')') {
    while (st[top] != '(') {
        cout << st[top];
        st1[j++] = st[top];
        pop();
    }
    pop(); // Remove '('
}
if (ch[i] == '+' || ch[i] == '-' || ch[i] == '*' || ch[i] == '/') {
    while (f == 1) {
        if (top == -1 || st[top] == '(') {
            push(ch[i]);
            f = 0;
        } else {
            if (pri(ch[i]) > pri(st[top])) {
                push(ch[i]);
```

```
                f = 0;
            } else {
                cout << st[top];
                st1[j++] = st[top];
                pop();
            }
        }
    }
    i++;
}

// Pop remaining operators in the stack
while (top != -1) {
    cout << st[top];
    st1[j++] = st[top];
    pop();
}

// Output the postfix expression
cout << "\nPostfix expression: ";
for (i = 0; i < j; i++) {
    cout << st1[i];
}
```

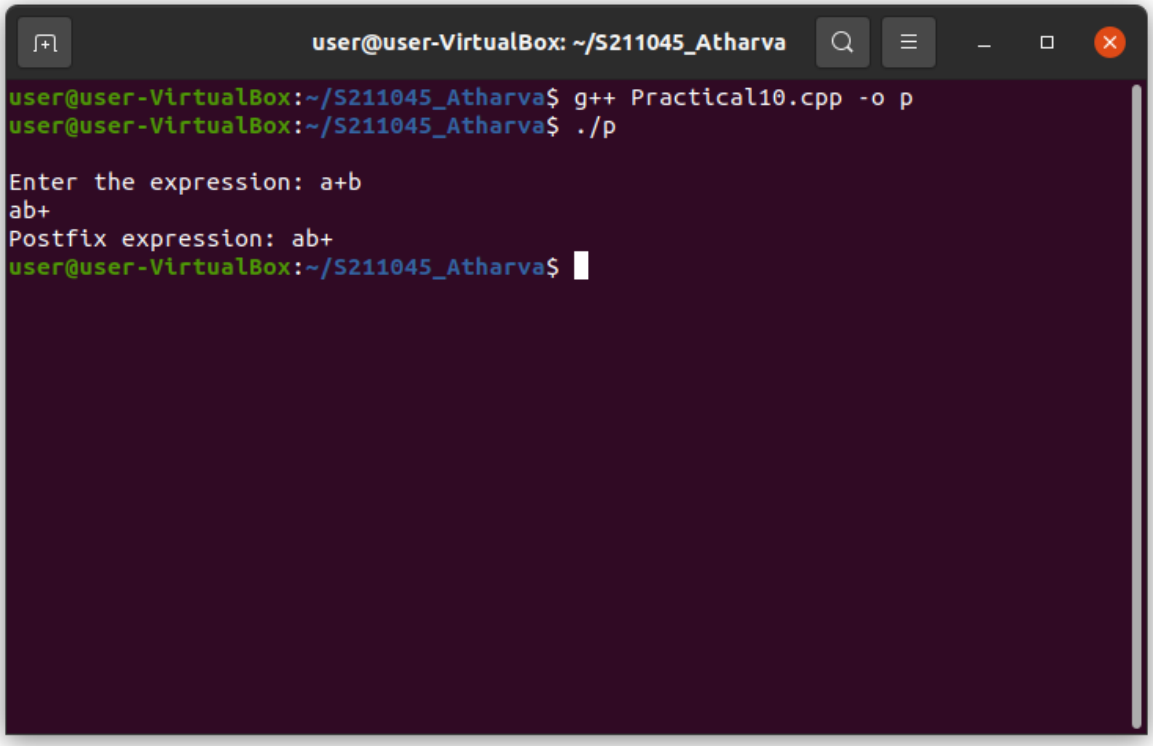
```
    cout << endl;
}

void StackOp::push(char a) {
    if (top >= 19) {
        cout << "Stack overflow\n";
        return;
    }
    st[++top] = a;
}

void StackOp::pop() {
    if (top < 0) {
        cout << "Stack underflow\n";
        return;
    }
    top--;
}

int main() {
    StackOp s;
    s.input();
    return 0;
}
```

Output :


user@user-VirtualBox: ~/S211045_Atharva
user@user-VirtualBox:~/S211045_Atharva$ g++ Practical10.cpp -o p
user@user-VirtualBox:~/S211045_Atharva$ ./p
Enter the expression: a+b
ab+
Postfix expression: ab+
user@user-VirtualBox:~/S211045_Atharva$