# LAB TASK 3:

Name: Saif Majid Khan

SAP-ID: 57114

CS3-1

Data Structures.

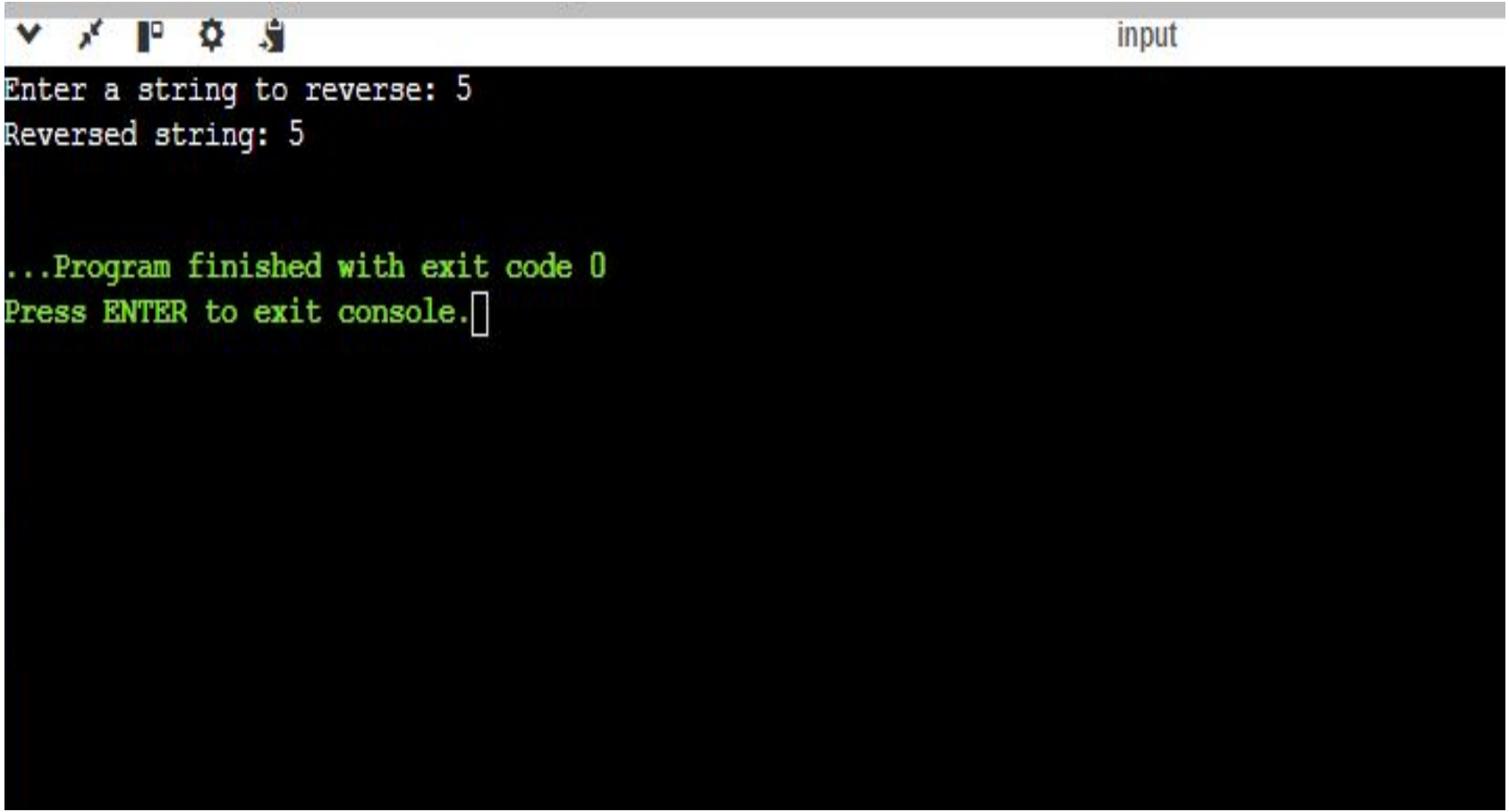
```
#include <iostream>
#include <string>
using namespace std;

class Stack {
private:
    char* arr;  // Dynamic array to hold stack elements
    int top;    // Index of the top element
    int capacity; // Stack capacity

public:
    // Constructor: Creates an empty stack
    Stack(int size = 100) {
        arr = new char[size];
        top = -1;  // Stack is initially empty
        capacity = size;
    }
```

```
Stack() {
        delete[] arr;
    }

    void push(char item) {
        if (top < capacity - 1) {
            arr[++top] = item;
        } else {
            cout << "Stack overflow!\n";
        }
    }

    void pop() {
        if (!isEmpty()) {
            --top;
        } else {
            cout << "Stack underflow!\n";
```

```
char peek() {
        if (!isEmpty()) {
            return arr[top];
        }
        cout << "Stack is empty!\n";
        return '\0';
    }

    void clear() {
        top = -1;
    }

    bool isEmpty() {
        return top == -1;
    }
};
```

```
string reverseString(const string& str) {
    Stack stack(str.length());
    string reversed = "";

    for (char ch : str) {
        stack.push(ch);
    }

    while (!stack.isEmpty()) {
        reversed += stack.peek();
        stack.pop();
    }

    return reversed;
}
```

```
int main() {
    string input;
    cout << "Enter a string to reverse: ";
    getline(cin, input);

    string reversed = reverseString(input);
    cout << "Reversed string: " << reversed << endl;

    return 0;
}
```


input
Enter a string to reverse: 5
Reversed string: 5
...Program finished with exit code 0
Press ENTER to exit console.