Data Structure Lab

CEN-391

Program 6(a)

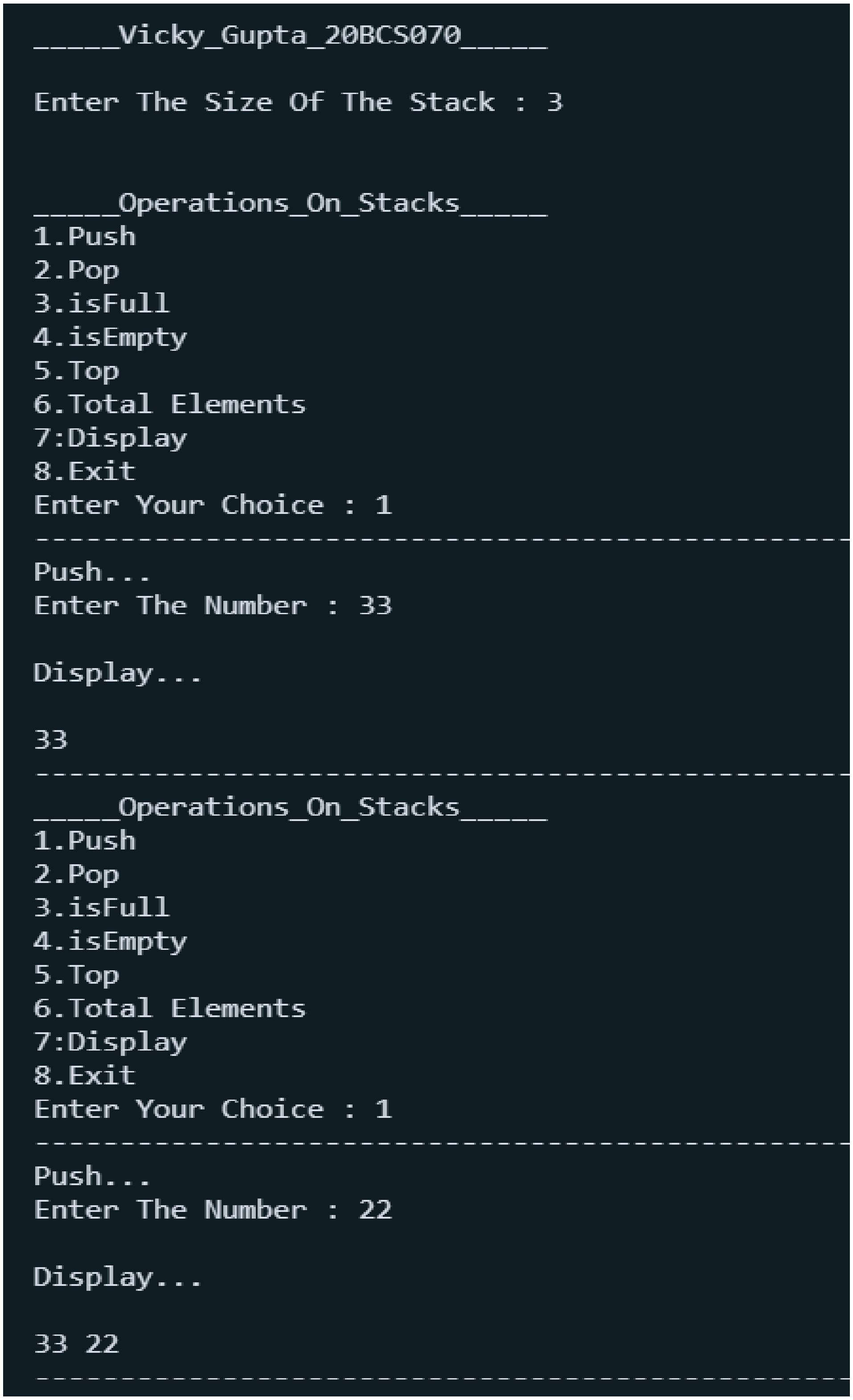
Code :-

```
#include <iostream>
using namespace std;
int size;
struct stack
{
    int *arr;
    int top;
} st;

void Display()
{
    cout << "Display...\n";
    if (st.top == -1)
    {
        cout << "Stack Is Empty" << endl;
        return;
    }
    cout << "\n";
    for (int i = 0; i <= st.top; i++)
    {
        cout << st.arr[i] << " ";
    }
    cout << "\n";
}

void Push()
{
    cout << "Push...\n";
    if (st.top == size - 1)
    {
        cout << "Stack Overflow" << endl;
        return;
    }
    st.top++;
    int val;
    cout << "Enter The Number : ";
    cin >> val;
    st.arr[st.top] = val;
    cout << "\n";
    Display();
}

void Pop()
{
    cout << "Pop...\n";
    if (st.top == -1)
    {
        cout << "Stack Underflow" << endl;
        return;
    }
    cout << st.arr[st.top] << "\n";
    st.top--;
    cout << "\n";
    Display();
}
```

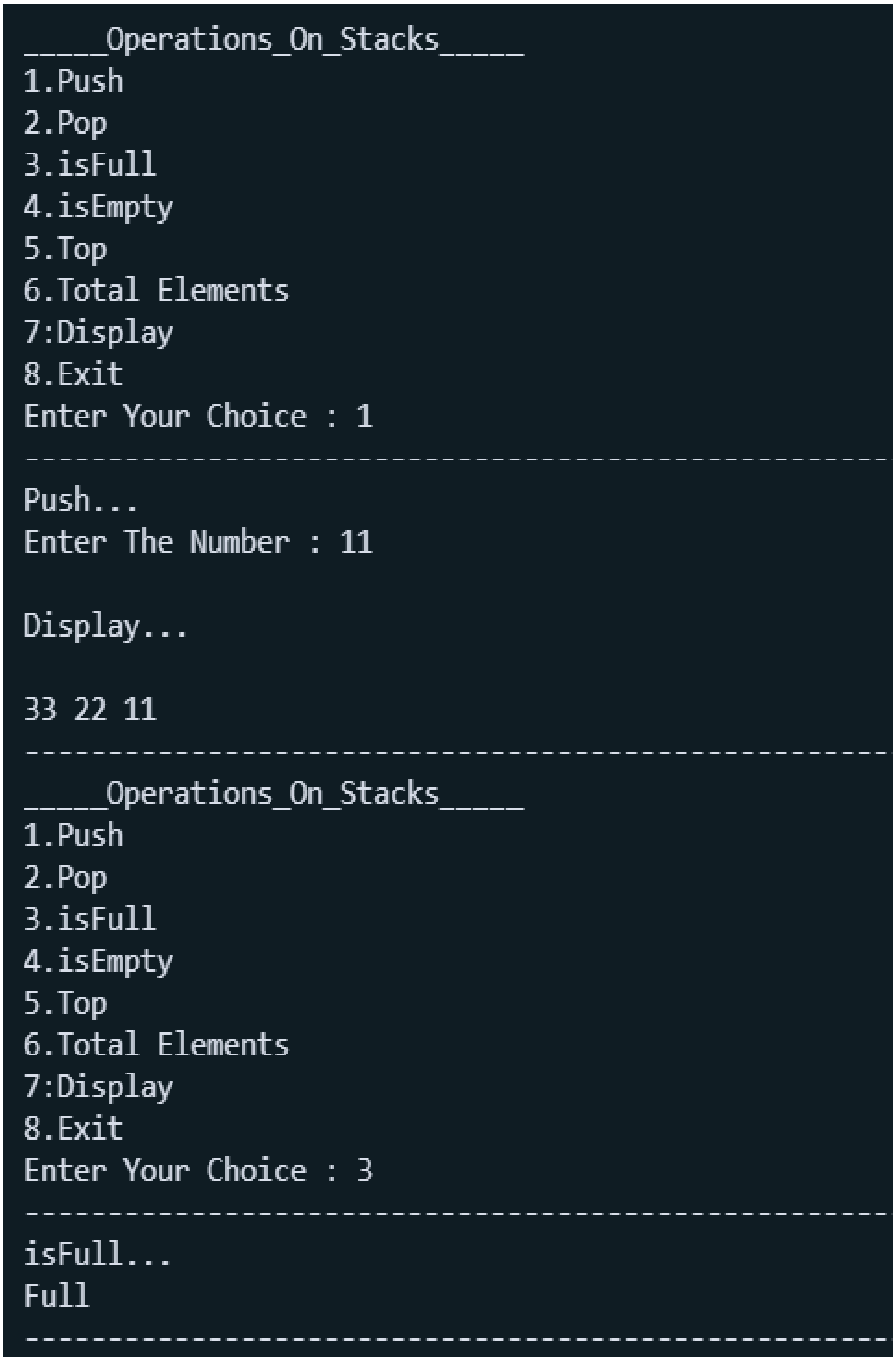
```
void Top()
{
    cout << "Top...\n";
    if (st.top == -1)
    {
        cout << "Stack Is Empty" << endl;
        return;
    }
    cout << st.arr[st.top] << "\n";
}

void isEmpty()
{
    cout << "isEmpty...\n";
    if (st.top != -1)
    {
        cout << "Not Empty \n";
    }
    else
    {
        cout << "Empty \n";
    }
}

void isFull()
{
    cout << "isFull...\n";
    if (st.top+1 == size)
    {
        cout << "Full \n";
    }
    else
    {
        cout << "Not Full \n";
    }
}

void Total_Elements()
{
    cout << "Total Elements In Stack...\n";
    cout << st.top + 1 << "\n";
}
void Bars()
{
    cout << "--------------------------------------------------
-------------\n";
}
int Options()
{
    int opt;
    cin >> opt;
    Bars();
    switch (opt)
    {
    case 1:
        Push();
        break;
    case 2:
        Pop();
        break;
    case 3:
        isFull();
        break;
    case 4:
        isEmpty();
        break;
    case 5:
        Top();
        break;
    case 6:
        Total_Elements();
        break;
    case 7:
        Display();
        break;
    case 8:
        cout << "Exit...\n";
        return 0;
    default:
        cout << "Invalid Input!\nTry Again!\n";
```

```cpp
    }
    Bars();
    return 1;
}

void Menu()
{
    cout << "_____Operations_On_Stacks_____ \n";
    cout << "1.Push \n";
    cout << "2.Pop \n";
    cout << "3.isFull \n";
    cout << "4.isEmpty \n";
    cout << "5.Top \n";
    cout << "6.Total Elements \n";
    cout << "7:Display \n";
    cout << "8.Exit \n";
    cout << "Enter Your Choice : ";
}

int main()
{
    system("cls");
    cout << "_____Vicky_Gupta_20BCS070_____\n";
    cout << "Enter The Size Of The Stack : ";
    cin >> size;
    st.arr = (int *)malloc(size * sizeof(int));
    st.top = -1;
    cout << "\n\n";
    while (true)
    {
        Menu();
        if (!Options())
            break;
    }
    cout << "Exiting...\n";
    Bars();
    return 0;
}
```

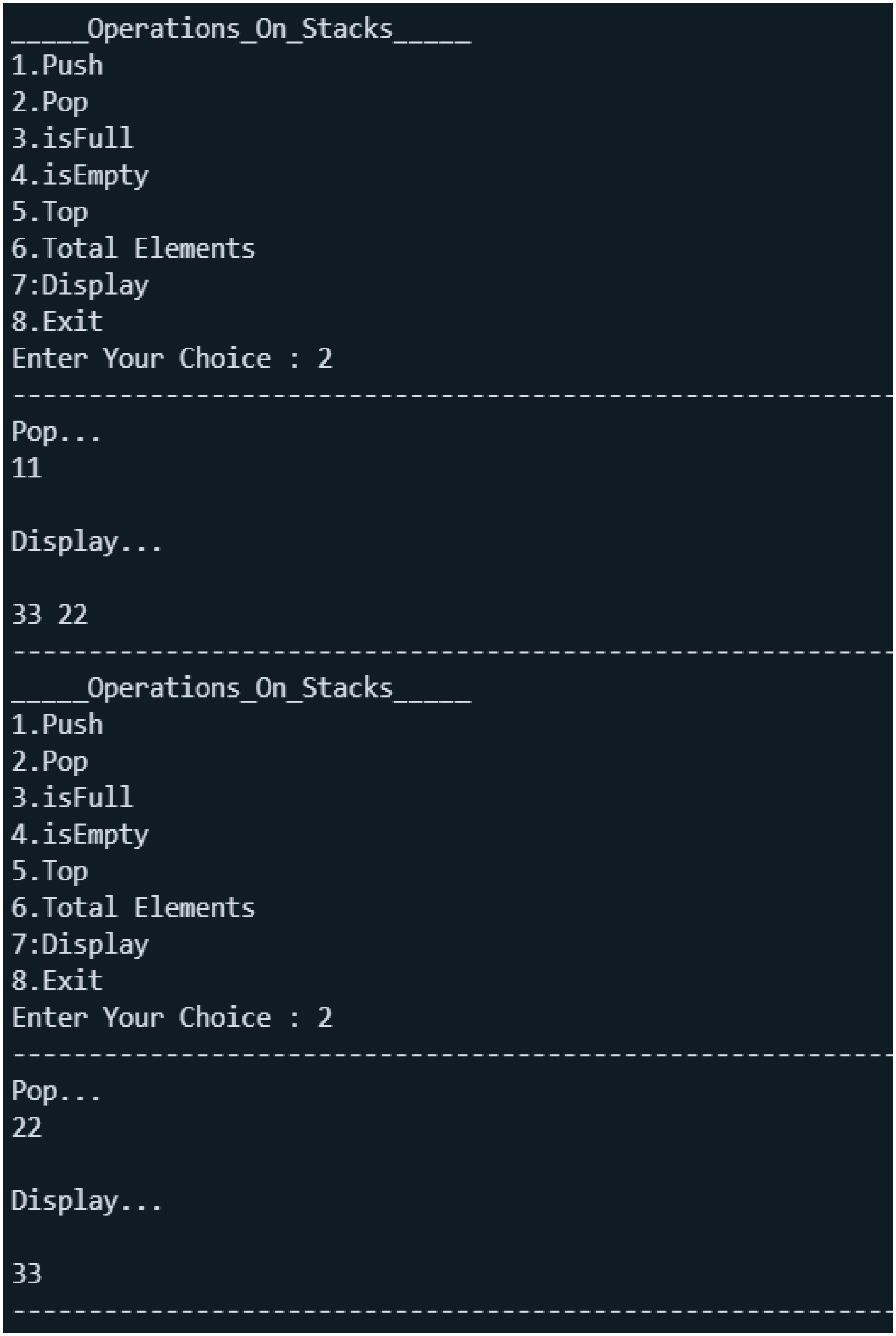
Output :-



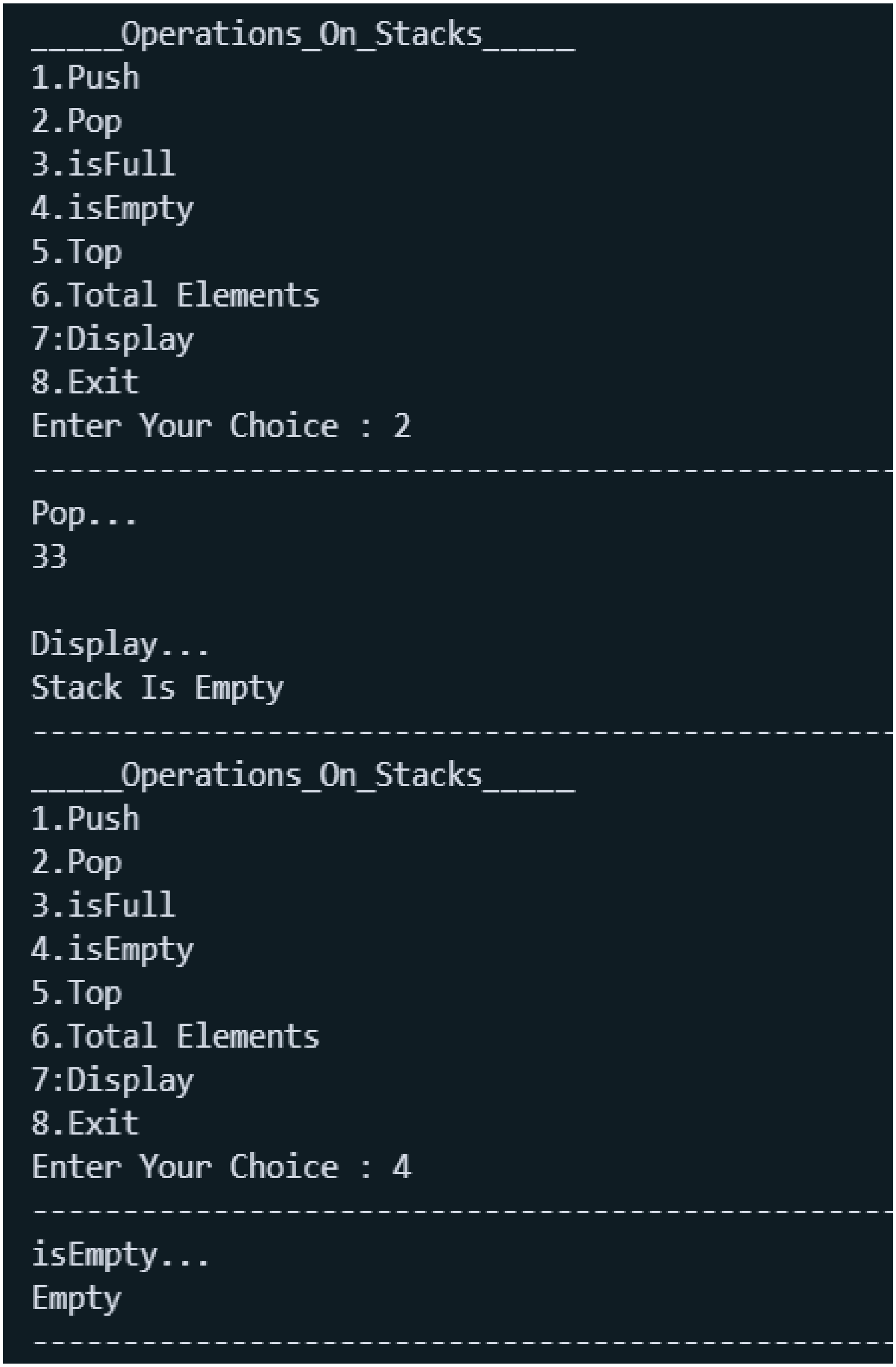
```
_____Vicky_Gupta_20BCS070_____

Enter The Size Of The Stack : 3


_____Operations_On_Stacks_____
1.Push
2.Pop
3.isFull
4.isEmpty
5.Top
6.Total Elements
7:Display
8.Exit
Enter Your Choice : 1
------------------------------------------------
Push...
Enter The Number : 33

Display...

33
------------------------------------------------
_____Operations_On_Stacks_____
1.Push
2.Pop
3.isFull
4.isEmpty
5.Top
6.Total Elements
7:Display
8.Exit
Enter Your Choice : 1
------------------------------------------------
Push...
Enter The Number : 22

Display...

33 22
------------------------------------------------
```



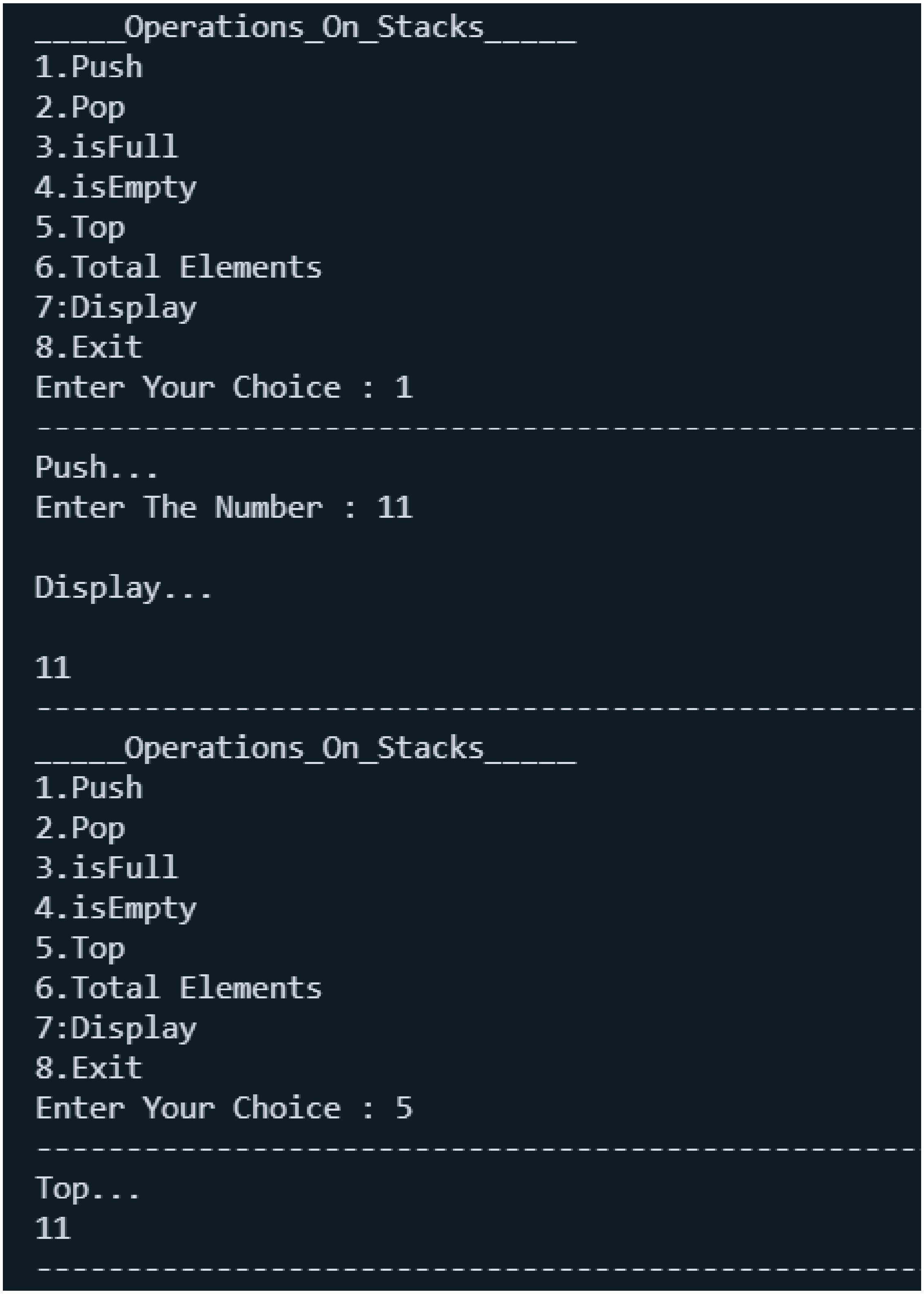
```
_____Operations_On_Stacks_____
1.Push
2.Pop
3.isFull
4.isEmpty
5.Top
6.Total Elements
7:Display
8.Exit
Enter Your Choice : 1
----------------------------------------------------
Push...
Enter The Number : 11

Display...

33 22 11
----------------------------------------------------
_____Operations_On_Stacks_____
1.Push
2.Pop
3.isFull
4.isEmpty
5.Top
6.Total Elements
7:Display
8.Exit
Enter Your Choice : 3
----------------------------------------------------
isFull...
Full
----------------------------------------------------
```



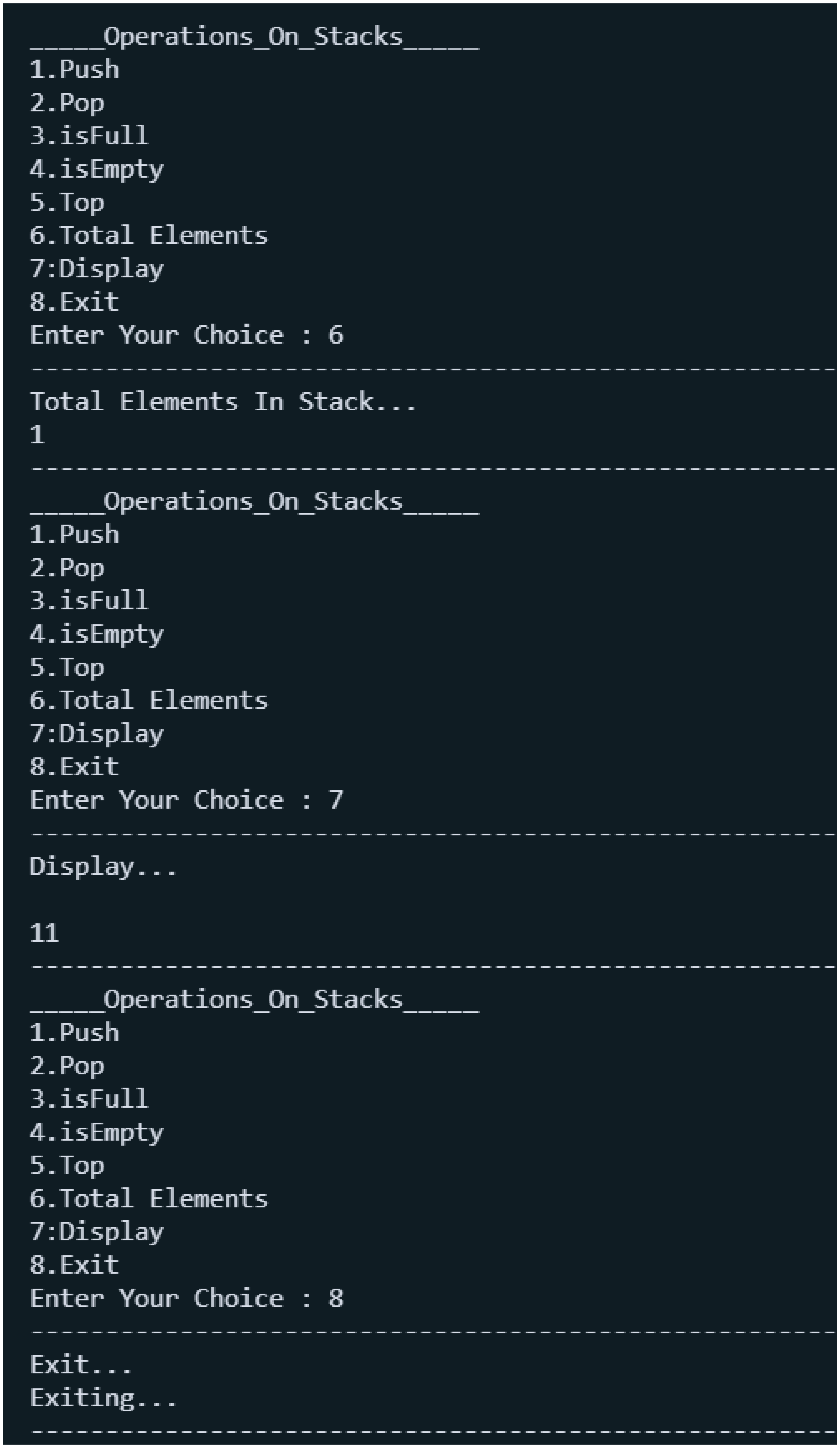
```
_____Operations_On_Stacks_____
1.Push
2.Pop
3.isFull
4.isEmpty
5.Top
6.Total Elements
7:Display
8.Exit
Enter Your Choice : 2
----------------------------------------------------------
Pop...
11

Display...

33 22
----------------------------------------------------------
_____Operations_On_Stacks_____
1.Push
2.Pop
3.isFull
4.isEmpty
5.Top
6.Total Elements
7:Display
8.Exit
Enter Your Choice : 2
----------------------------------------------------------
Pop...
22

Display...

33
----------------------------------------------------------
```



```
_____Operations_On_Stacks_____
1.Push
2.Pop
3.isFull
4.isEmpty
5.Top
6.Total Elements
7:Display
8.Exit
Enter Your Choice : 2
------------------------------------------------
Pop...
33

Display...
Stack Is Empty
------------------------------------------------
_____Operations_On_Stacks_____
1.Push
2.Pop
3.isFull
4.isEmpty
5.Top
6.Total Elements
7:Display
8.Exit
Enter Your Choice : 4
------------------------------------------------
isEmpty...
Empty
------------------------------------------------
```



```
_____Operations_On_Stacks_____
1.Push
2.Pop
3.isFull
4.isEmpty
5.Top
6.Total Elements
7:Display
8.Exit
Enter Your Choice : 1
-------------------------------------------------
Push...
Enter The Number : 11

Display...

11
-------------------------------------------------
_____Operations_On_Stacks_____
1.Push
2.Pop
3.isFull
4.isEmpty
5.Top
6.Total Elements
7:Display
8.Exit
Enter Your Choice : 5
-------------------------------------------------
Top...
11
-------------------------------------------------
```



```
_____Operations_On_Stacks_____
1.Push
2.Pop
3.isFull
4.isEmpty
5.Top
6.Total Elements
7:Display
8.Exit
Enter Your Choice : 6
------------------------------------------------------
Total Elements In Stack...
1
------------------------------------------------------
_____Operations_On_Stacks_____
1.Push
2.Pop
3.isFull
4.isEmpty
5.Top
6.Total Elements
7:Display
8.Exit
Enter Your Choice : 7
------------------------------------------------------
Display...

11
------------------------------------------------------
_____Operations_On_Stacks_____
1.Push
2.Pop
3.isFull
4.isEmpty
5.Top
6.Total Elements
7:Display
8.Exit
Enter Your Choice : 8
------------------------------------------------------
Exit...
Exiting...
------------------------------------------------------
```