```cpp
#include <bits/stdc++.h>
using namespace std;

class doubleStack
{
    int *arr;
    int MAX;
    int top1, top2;

public:
    doubleStack(int n)
    {
        MAX = n;
        arr = new int[n];
        top1 = n / 2 + 1;
        top2 = n / 2;
    }

    void pushS1(int x)
    {

        if (top1 > 0)
        {
            top1--;
            arr[top1] = x;
        }
        else
        {
            cout << "Stack Overflow" << endl;
            return;
        }
    }

    void pushS2(int x)
    {

        if (top2 < MAX - 1)
        {
            top2++;
            arr[top2] = x;
        }
        else
        {
            cout << "Stack Overflow" << endl;
            return;
        }
    }

    int popS1()
    {
        if (top1 <= MAX / 2)
        {
            int x = arr[top1];
            top1++;
            return x;
        }
        else
        {
            cout << "No Elemenst in Stack" << endl;
        }
        return -1;
    }

    int popS2()
    {
        if (top2 >= MAX / 2 + 1)
        {
            int x = arr[top2];
            top2--;
            return x;
        }
        else
        {
            cout << "No Elemenst in Stack" << endl;
        }
        return -1;
    }
};

int main()
{
    doubleStack st(10);
    st.pushS1(15);
    st.pushS2(210);
    st.pushS2(135);
    st.pushS1(131);
    st.pushS2(71);
    cout << "Popped element from stack1 is "
         << ": " << st.popS1() << endl;
    st.pushS2(40);
    cout << "Popped element from stack2 is "
         << ": " << st.popS2() << endl;
    return 0;
}
```

```
rohit@Rohits-Air CP Lab % cd "/Users/rohit/Documents/Programming/C++/Programs/CP
grams/CP Lab/"program1
Popped element from stack1 is : 131
Popped element from stack2 is : 40
rohit@Rohits-Air CP Lab %
```

```c
#include<stdio.h>


int f(int n)
{
    if(n<=1)
    {
        return 1;
    }
    if(n%2==0)
    {
        return f(n/2);
    }
    return f(n/2)+f(n/2+1);
}

int main()
{
    for(int i=1;i<=50;i++)
        printf("%d ",f(i));
}
```

```cpp
#include "stack.h"

using namespace std;

void reverse(stack &original, int k)
{
    stack s1, s2;
    int temp = k;
    while (!original.isEmpty())
        s1.push(original.pop());

    while (k--)
    {
        s2.push(s1.pop());
    }
    while (!s2.isEmpty())
    {
        original.push(s2.pop());
    }
    while (!s1.isEmpty())
    {
        original.push(s1.pop());
    }
}

void print(stack s)
{
    while (!s.isEmpty())
    {
        printf("%d ", s.pop());
    }
}

int main()
{
    stack original;
    cout << "Enter Number of Elements in Stack: ";
    int num;
    cin >> num;
    int ele;
    cout << "Enter the stack elements: ";
    while (num--)
    {
        cin >> ele;
        original.push(ele);
    }
    cout << "Enter K: ";
    int k;
    cin >> k;
    reverse(original, k);
    cout << "Elements Are: \n";
    print(original);
}
```

```
rohit@Rohits-Air CP Lab % cd "/Users/rohit/Documents/Programming/C++/Programs/CP Lab/" && g++-12 -st
/Programs/CP Lab/"program3-1
Enter Number of Elements in Stack: 6
Enter the stack elements: 1
2
3
4
5
6
Enter K: 3
Elements Are:
6 5 4 1 2 3 %
rohit@Rohits-Air CP Lab %
```

```cpp
#include "stack.h"

using namespace std;

void print(stack s)
{
    while (!s.isEmpty())
    {
        printf("%d ", s.pop());
    }
}

void insertBottom(stack &st, int ele)
{
    if (st.isEmpty())
    {
        st.push(ele);
        return;
    }
    int temp = st.pop();
    insertBottom(st,ele);
    st.push(temp);
}

int main()
{
    stack st;
    cout << "Enter Number Of Elements in Stack: ";
    int n;
    cin >> n;
    cout << "Enter Elements Of Stack: ";
    int ele;
    while (n--)
    {
        cin >> ele;
        st.push(ele);
    }
    int ins;
    cout << "Enter Element to be inserted: ";
    cin >> ins;
    insertBottom(st, ins);
    print(st);
}
```

```
rohit@Rohits-Air CP Lab % cd "/Users/rohit/Documents/Programming/C++/Programs/CP Lab/" && g++-12 -st
/Programs/CP Lab/"program3-2
Enter Number Of Elements in Stack: 5
Enter Elements Of Stack: 2
 3
 4
 5
 6
Enter Element to be inserted: 1
6 5 4 3 2 1 %
rohit@Rohits-Air CP Lab %
```

```cpp
#include"stack.h"

using namespace std;

void print(stack s)
{
    while (!s.isEmpty())
    {
        printf("%d ", s.pop());
    }
}


int main()
{
    cout<<"Enter The Decimal Number: ";
    int dec;
    cin>>dec;
    stack bin;
    while(dec!=0)
    {
        bin.push(dec%2);
        dec=dec/2;
    }
    print(bin);
}
```

```
rohit@Rohits-Air CP Lab % cd "/Users/rohit/Documents/Programming/C++/Programs/CP Lab/" && g++-12 -st
/Programs/CP Lab/"program4-1
Enter The Decimal Number: 134
 1 0 0 0 0 1 1 0 %
rohit@Rohits-Air CP Lab %
```

```cpp
#include <iostream>

using namespace std;

#define MAX 100

class stack
{
    char arr[MAX];
    int top;

public:
    stack()
    {
        top = -1;
    }
    void push(char num)
    {
        top++;
        arr[top] = num;
    }

    char pop()
    {
        char temp = arr[top];
        top--;
        return temp;
    }

    bool isEmpty()
    {
        if (top == -1)
        {
            return 1;
        }
        return 0;
    }
};

void print(stack s)
{
    while (!s.isEmpty())
    {
        printf("%c ", s.pop());
    }
}


int main()
{
    string str;
    stack st;
    cout << "Enter The String: ";
    cin>>str;
    int i=0;
    while(str[i])
        st.push(str[i++]);
    print(st);
}
```

```
rohit@Rohits-Air CP Lab % cd "/Users/rohit/Documents/Programming/C++/Programs/CP Lab/" && g++-12 -st
/Programming/C++/Programs/CP Lab/"tempCodeRunnerFile
Enter The String: rohit
t i h o r %
rohit@Rohits-Air CP Lab %
```

```cpp
#include <bits/stdc++.h>
using namespace std;

int longestValid(string s)
{
    int maxans = 0;
    stack<int> st;
    st.push(-1);
    for (int i = 0; i < s.length(); i++)
    {
        if (s[i] == '[')
        {
            st.push(i);
        }
        else
        {
            st.pop();
            if (st.empty())
            {
                st.push(i);
            }
            else
            {
                maxans = max(maxans, i - st.top());
            }
        }
    }
    return maxans;
}

int main()
{

    string s;
    cin >> s;
    cout << longestValid(s);
    return 0;
}
```

```
rohit@Rohits-Air CP Lab % cd "/Users/rohit/Documents/Programming/C++/Programs/CP Lab/" && g++-12 -st
grams/CP Lab/"program5
[ ] [ ] [ [ [ ] [ ] [ ]
6%
rohit@Rohits-Air CP Lab %
```