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LAB 3

Submitted to :

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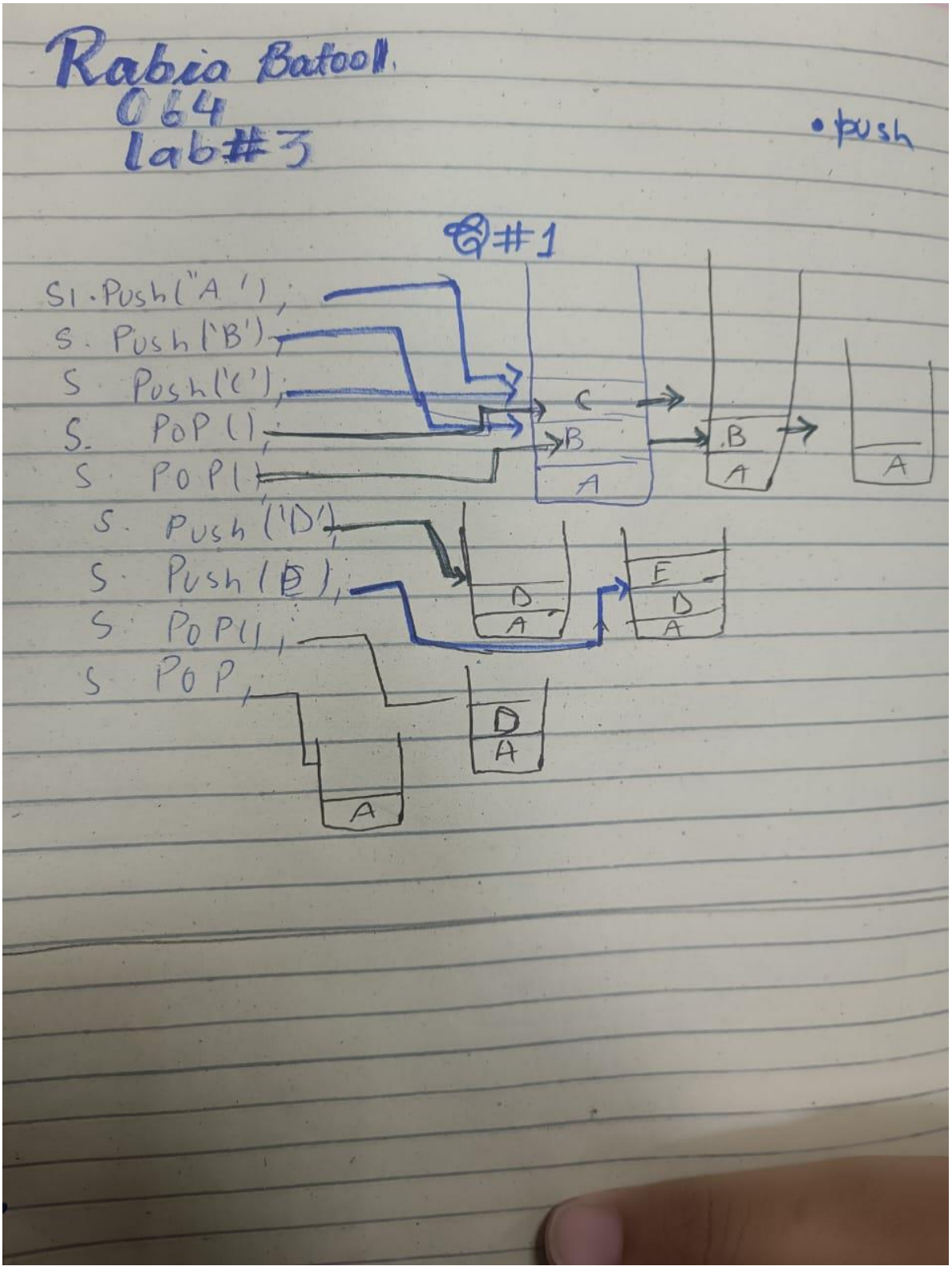
TASK – 01

CODE TASK 1

Implement the Stack class and its basic functions and test all the functions in main

constructor, push(), pop(), Is_empty(), Is_full(), Display(), Top()


Rabia Batool
064
lab#3
• push
#1
S1.Push('A');
S. Push('B');
S Push('C');
S. POP();
S POP();
S. Push('D');
S Push('E');
S POP();
S POP();
A
B
C
D
E

CODE:

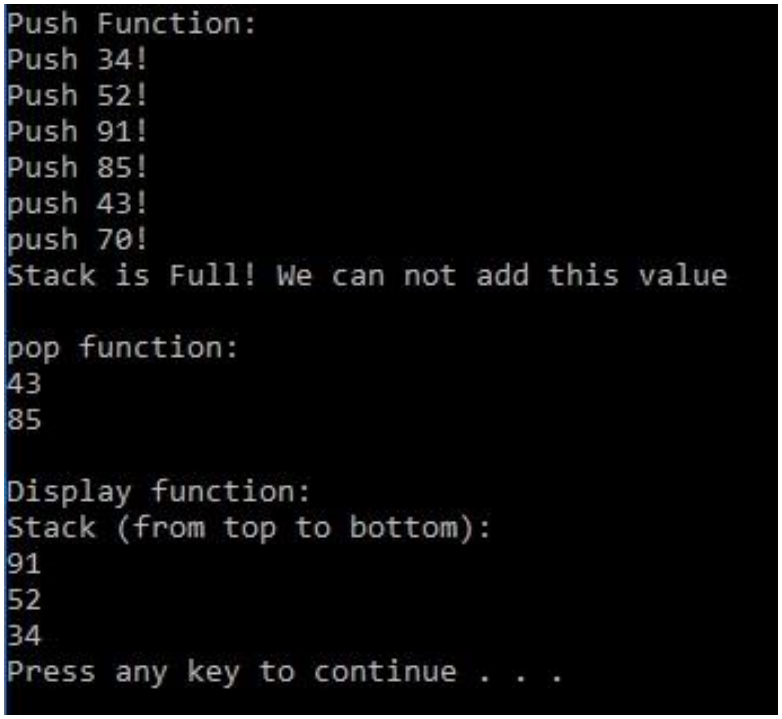
```
#include"stdafx.h"
#include<iostream> using
namespace std;

const int size=5;

class Stack{
        private:
                int array[size];
                int top;
        public:
           Stack(){
                top=-1;
                }

                void push(int val){
                        if(top<size-1){
                                ++top;
                                array[top]=val;
                        }
                        else
                        cout<<"Stack is Full! We can not add this value\n";
                }

                int pop(){
                        if(top>=0){
                return array[top--];
                        }
```

```
                else{
                        cout<<"Stack is empty!\nWe are displaying garbage
values...\n";
                }
        }

        bool empty(){
                if(top<0){
        return true;
                }
                else
                return false;
        }

        bool full(){
if(top=size-1){
                        return true;
                }
                else
                return false;
        }

        void display(){
                if(!empty()){
                        cout<<"Stack (from top to bottom):\n";
                        for(int i=top;i>=0;i--){
                                cout<<array[i]<<endl;
                        }
                }
```

```
                else
                cout<<"Stack is empty!\n";
            }

};

int main(){
        Stack s1;
   cout<<"Push Function:\n";
cout<<"Push 34!\n";
        s1.push(34);
           cout<<"Push 52!\n";
        s1.push(52);
           cout<<"Push 91!\n";
        s1.push(91);
cout<<"Push 85!\n";
s1.push(85);    cout<<"push
43!\n";         s1.push(43);
        cout<<"push 70!\n";
        s1.push(70); cout<<"\npop
        function: \n";
        cout<<s1.pop()<<endl;
        cout<<s1.pop()<<endl;
        cout<<"\nDisplay function:
        \n"; s1.display();

        system("pause");
        return 0;
```

}

OUTPUT:



CODE TASK 2

Write a C++ program that prompts user to enter a number (in decimal). Convert the number into binary and display the binary number using the Stack

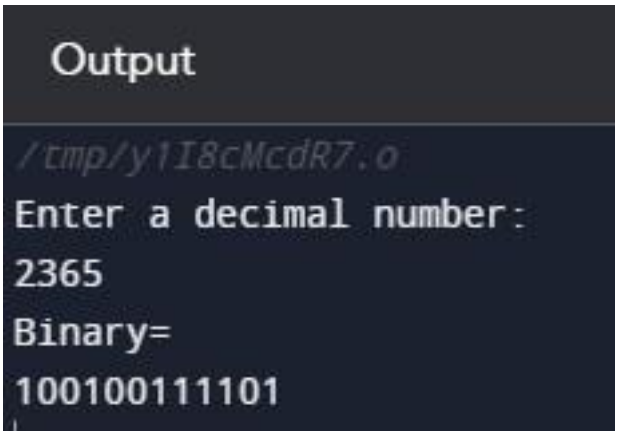
CODE:

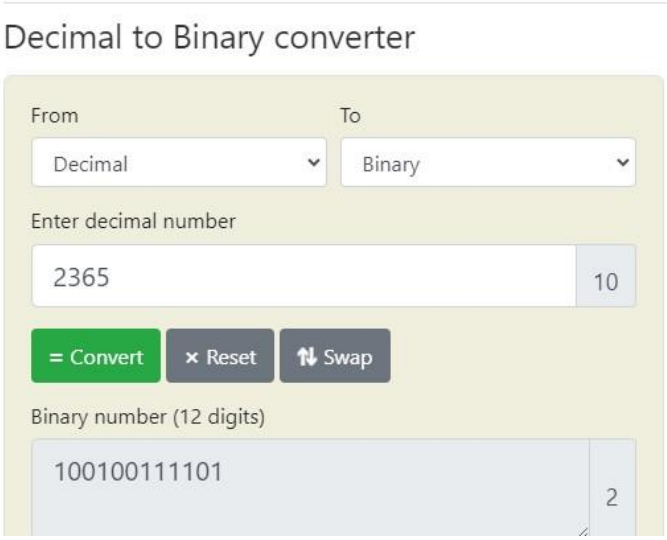
```
#include<iostream> using
namespace std;
class Stack{
        private:  int
        array[20];
        int top;
        public:
        Stack(){
```

```
        top=-1;
    }
    void push(int val){
                    ++top;
                    array[top]=val;
    }
    void display(){
                    for(int i=top;i>=0;i--){
                        cout<<array[i];
                    }
                    cout<<endl;
                }
};

main(){
    Stack s1;
    int num, remainder,quotient;
cout<<"Enter a decimal number: \n";
    cin>>num;

    while(num>0){
        remainder=num%2;
        s1.push(remainder);
        num=num/2;
    }

    cout<<"Binary= \n";
    if(num!=0){
    cout<<num;}
```

```
    s1.display();
}
```

OUTPUT:





CODE TASK 3

Write a C++ program to check the mathematical expression is valid or not using the Stack.

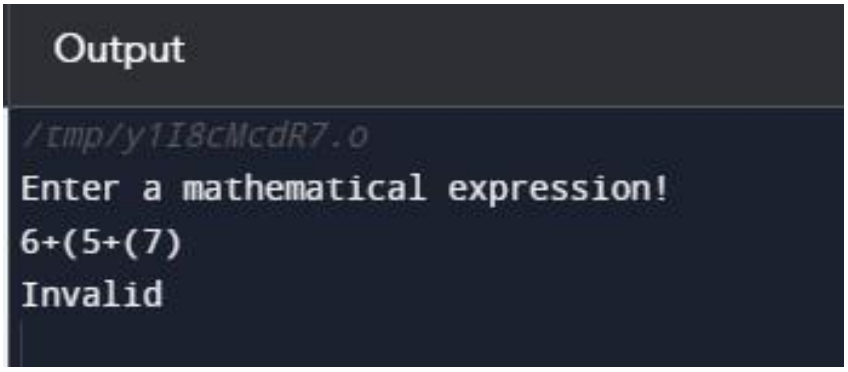
CODE:

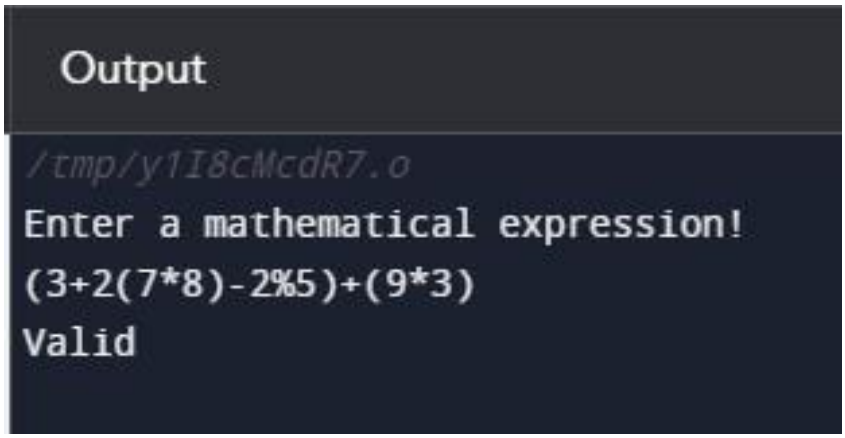
```
#include <iostream>
#include <string.h> using
namespace std;

class Stack{
private:
    static const int size = 20;
            char array[size];
            int top;
        public:
          Stack(){
            top=-1;
            }
    void push(char ch){
                        ++top;
                        array[top]=ch;
                }
            char pop(){         if(top>=0){
                return array[top--];
                }
                else{
                  cout<<"invalid\n";
                  return '/0';
                }
            }
            bool empty(){
                if(top<0){
            return true;
```

```
                        }
                        else
                        return false;
                }
    void display(){
                        if(!empty()){
                           cout<<"Invalid\n";}
                        else
                        cout<<"Valid\n";
    }
};


int main() {
Stack s1;
string st;
   cout<<"Enter a mathematical expression!\n";
   getline(cin, st);

   for(int i=0; i < st.length(); i++){
      if(st[i]=='('){
s1.push('(');
      }
      else if(st[i]==')'){
s1.pop();
      }
   }
   s1.display();
return 0;
```

}

OUTPUT:


Output
/tmp/y1I8cMcdR7.o
Enter a mathematical expression!
6+(5+(7)
Invalid


Output
/tmp/y1I8cMcdR7.o
Enter a mathematical expression!
(3+2(7*8)-2%5)+(9*3)
Valid