

# Fatima Jinnah Women University

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**Course : Date Structures**

## Lab 03

1. S.push('A');	A
2. S.push('B');	A,B
3. S.push('C');	A,B,C
4. S.Pop();	A,B
5. S.Pop();	A
6. S.push('D');	A,D
7. S.push('E');	A,D,E
8. S.Pop();	A,D
9. S.Pop();	A

### Task 2

```
// Lab 03 : Defines the entry point for the console application.  
//
```

```
#include "stdafx.h"  
#include<iostream>  
#include<stack>  
using namespace std;  
void dec_to_bin(int number)
```

```

{
    stack<int> stk;
    while(number > 0)
    {
        int rem = number % 2; //take remainder
        number = number / 2;
        stk.push(rem);
    }
    while(!stk.empty())
    {
        int item;
        item = stk.top();
        stk.pop();
        cout << item;
    }
}

```

```

int _tmain(int argc, _TCHAR* argv[])
{
    int num;
    cout << "Enter a number: ";
    cin >> num;
    dec_to_bin(num);
    cout<<endl;
    system("pause");
    return 0;
}

```

## **Output**



```

c:\users\fwu\documents\visual studio 2010\Projects\lab03\Debug\lab03.exe
Enter a number: 87
1010111
Press any key to continue . . .

```

### **TASK NO 1:**

// Lab 03 : Defines the entry point for the console application.

//

```
#include "stdafx.h"
```

```
#include<iostream>
```

```
#define SIZE 5
```

```
using namespace std;
```

```
class STACK
```

```
{
```

```
    private:
```

```
        int num[SIZE];
```

```
        int top;
```

```
    public:
```

```
        STACK();    //default constructor
```

```
        int push(int);
```

```
        int pop();
```

```
        int isEmpty();
```

```
        int isFull();
```

```
        void displayItems();
```

```
};
```

```
STACK::STACK(){
```

```
    top=-1;
```

```
}
```

```
int STACK::isEmpty(){
```

```
    if(top==-1)
```

```
        return 1;
```

```
    else
```

```
        return 0;
```

```
}
```

```
int STACK::isFull(){
```

```
    if(top==(SIZE-1))
```

```
        return 1;
```

```
    else
```

```
        return 0;
```

```
}
```

```

int STACK::push(int n){
    //check stack is full or not
    if(isFull()){
        return 0;
    }
    ++top;
    num[top]=n;
    return n;
}

int STACK::pop(){
    //to store and print which number
    //is deleted
    int temp;
    //check for empty
    if(isEmpty())
        return 0;
    temp=num[top];
    --top;
    return temp;
}

void STACK::displayItems(){
    int i; //for loop
    cout<<"STACK is: ";
    for(i=(top); i>=0; i--)
        cout<<num[i]<<" ";
    cout<<endl;
}

int _tmain(int argc, _TCHAR* argv[])
{
    //declare object
    STACK stk;
    int choice, n,temp;

    do
    {
        cout<<endl;

```

```

cout<<"0 - Exit."<<endl;
cout<<"1 - Push Item."<<endl;
cout<<"2 - Pop Item."<<endl;
cout<<"3 - Display Items (Print STACK)."<<endl;

cout<<"Enter your choice: ";
cin>>choice;

switch(choice){
    case 0: break;

    case 1:
        cout<<"Enter item to insert: ";
        cin>>n;
        temp=stk.push(n);
        if(temp==0)
            cout<<"STACK is FULL."<<endl;
        else
            cout<<temp<<" inserted."<<endl;
        break;

    case 2:
        temp=stk.pop();
        if(temp==0)
            cout<<"STACK IS EMPTY."<<endl;
        else
            cout<<temp<<" is removed (popped)."<<endl;
        break;

    case 3:
        stk.displayItems();
        break;

    default:
        cout<<"An Invalid choice."<<endl;
}
}while(choice!=0);
system("pause");
return 0;
}

```

## **Output**

```
c:\users\fjwu\documents\visual studio 2010\Projects\lab03\Debug\lab03.exe

0 - Exit.
1 - Push Item.
2 - Pop Item.
3 - Display Items (Print STACK).
Enter your choice: 2
STACK IS EMPTY.

0 - Exit.
1 - Push Item.
2 - Pop Item.
3 - Display Items (Print STACK).
Enter your choice: 1
Enter item to insert: 65
65 inserted.

0 - Exit.
1 - Push Item.
2 - Pop Item.
3 - Display Items (Print STACK).
Enter your choice: 3
STACK is: 65

0 - Exit.
1 - Push Item.
2 - Pop Item.
3 - Display Items (Print STACK).
Enter your choice: 0
Press any key to continue . . .
```

### **Task 03**

// lab 03.cpp : Defines the entry point for the console application.  
//

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

```

bool isBalanced(string expr) {
    stack<char> s;
    char ch;
    for (int i=0; i<expr.length(); i++) {    //for each character in the expression, check
conditions
        if (expr[i]=='('||expr[i]=='['||expr[i]=='{') {    //when it is opening bracket, push into
stack
            s.push(expr[i]);
            continue;
        }
        if (s.empty())    //stack cannot be empty as it is not opening bracket, there must be
closing    bracket
            return false;
        switch (expr[i]) {
            case ')':    //for closing parenthesis, pop it and check for braces and square brackets
                ch = s.top();
                s.pop();
                if (ch=='{' || ch=='[')
                    return false;
                break;
            case '}': //for closing braces, pop it and check for parentheses and square brackets
                ch = s.top();
                s.pop();
                if (ch=='(' || ch=='[')
                    return false;
                break;
            case ']': //for closing square bracket, pop it and check for braces and parentheses
                ch = s.top();
                s.pop();
                if (ch == '(' || ch == '{')
                    return false;
                break;
        }
    }
    return (s.empty()); //when stack is empty, return true
}

```

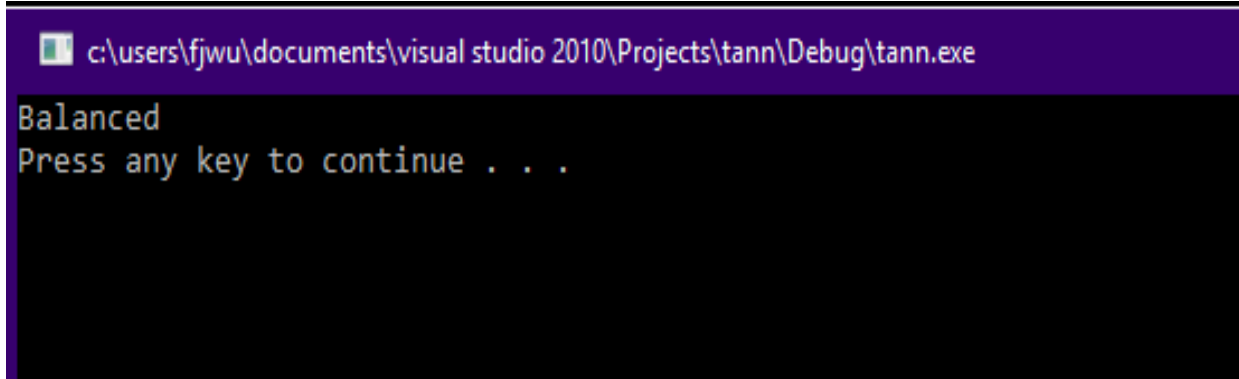
```

int _tmain(int argc, _TCHAR* argv[])
{
    string expr = "[{}(){}]";
    if (isBalanced(expr))
        cout << "Balanced"<<endl;
    else

```

```
    cout << "Not Balanced"<<endl;
    system("pause");
    return 0;
}
```

## Output



A screenshot of a Windows command prompt window. The title bar is purple and contains the text "c:\users\fjwu\documents\visual studio 2010\Projects\tann\Debug\tann.exe". The main area of the window is black with white text. The first line of output is "Balanced". The second line of output is "Press any key to continue . . .".