Experiment No. : **1**

Name of the Experiment: Constructors and Destructors in C++

Theoretical Background:

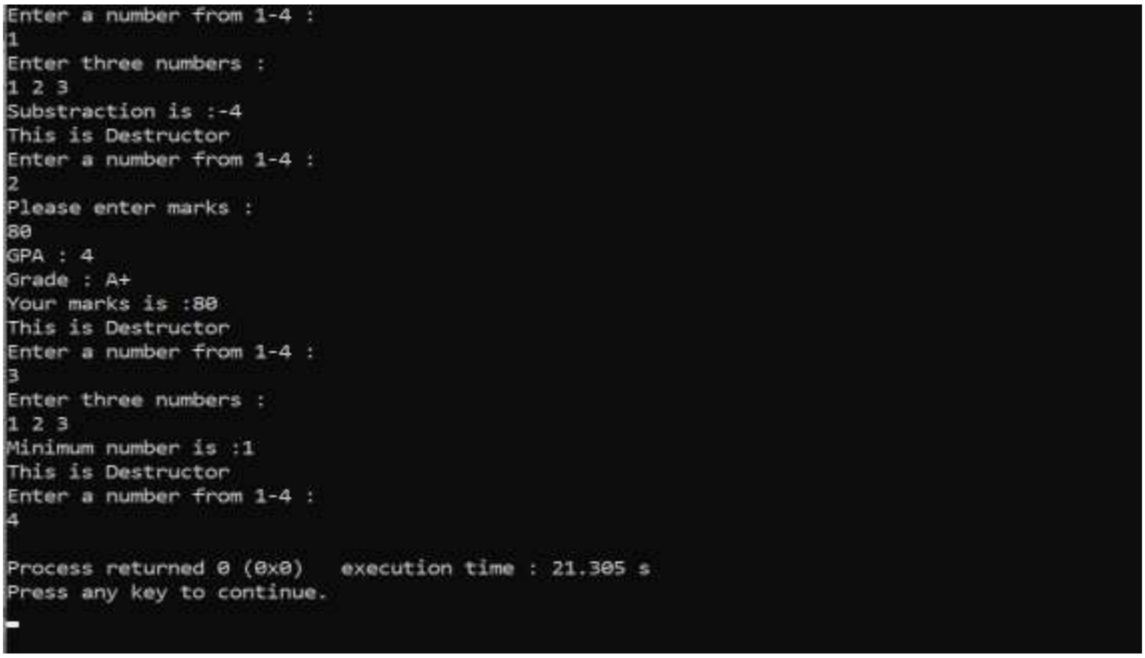
Constructors are special class functions which performs initialization of every object. The compiler calls the Constructor whenever an object is created. Constructorsinitialize values to object members after storage is allocated to the object. whereas, Destructors on the other hand is used to destroy the class object.

Code:

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

class all{
    private :
    int a;
    public :
        all(int a,int b,int c){
        cout<<"Substraction is :"<<a-b-c<<endl;
        }

        all (float a,float b,float c){
        int mini=(a<b)?(a<c ? a:c):(b<c ?b:c);
        cout<<"Minimum number is :"<<mini<<endl;
        }

        all(){
            cout<<"Please enter marks :"<<endl;
            cin>>a;
            if(a>=80) cout<<"GPA : 4  \nGrade : A+ "<<endl;
            else if(a>=70) cout<<"GPA : 3 \nGrade : B"<<endl;
            else if(a>=60) cout<<"GPA : 2 \nGrade : C"<<endl;
             else if(a>=50) cout<<"GPA : 1 \nGrade : D"<<endl;
             else  cout<<"Your grade is F"<<endl;

             cout<<"Your marks is :"<<a<<endl;
        }
           ~all(){
             cout<<"This is Destructor"<<endl;
           }


};

    int main(){
        while(1){
            cout<<"Enter a number from 1-4 :"<<endl;
            int n;
            cin>>n;

            if(n==1){
```

```
            int a,b,c;
            cout<<"Enter three numbers :"<<endl;
            cin>>a>>b>>c;
            all(a,b,c);
          }
           if(n==2){
            all a;
          }

           if(n==3){
            cout<<"Enter three numbers :"<<endl;
            float a,b,c;
            cin>>a>>b>>c;
            all(a,b,c);
          }

          if(n==4){
            exit(0);
          }
          else continue;
        }
    }
```

Output:



```
Enter a number from 1-4 :
1
Enter three numbers :
1 2 3
Substraction is :-4
This is Destructor
Enter a number from 1-4 :
2
Please enter marks :
80
GPA : 4
Grade : A+
Your marks is :80
This is Destructor
Enter a number from 1-4 :
3
Enter three numbers :
1 2 3
Minimum number is :1
This is Destructor
Enter a number from 1-4 :
4

Process returned 0 (0x0)   execution time : 21.305 s
Press any key to continue.
```

Discussion:

In this lab we have concluded about Constructor and Destructor. We have concluded how to use constructor and how to use Destructor as we have used in above tasks, with this concept of constructor and destructor, we can use it with different types of programs.

Experiment No. : 2

Name of the Experiment: Use the following class Test with the data members and methods

Problem Statement:

```
class Test{
private:
Data Member x;
Data Member y;
Data Member z;
public:
//write methods
};
```

Now extend the program do the following

i) Initialize private data members x and y to 0 when empty constructor is called

ii) Initialize private data members x and y using parameterized constructor is called

iii) Initialize private data members x and y from another object using copy constructor

iv) The data member z keeps track of total objects created

v) Write a method to initialize x and y

vi) Write a method to display data member z only

vii) Write a method to display x,y and z where their values can’t be changed

viii) Create five objects

ix) Find the sum of x

x) Find the object number whose y value is maximum

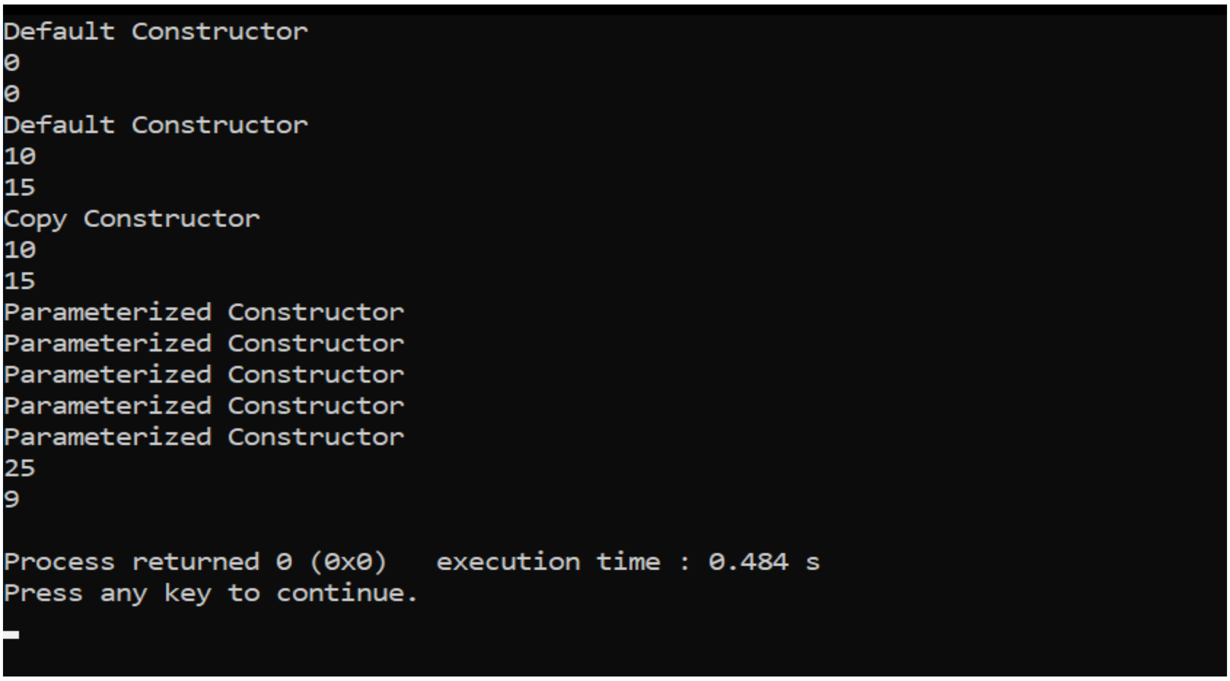
Code:

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

class Test
{
private:
   int x, y;
   static int z;

public:
   Test()
   {
      cout<<"Default Constructor"<<endl;
      x=0;
```

```
        y=0;
        z++;
    }

    Test(int a, int b)
    {
        cout<<"Parameterized Constructor"<<endl;
        x=a;
        y=b;
        z++;

    }

    Test(Test &w)
    {
        cout<<"Copy Constructor"<<endl;
        x=w.x;
        y=w.y;
        z++;
    }

    void setdata(int p, int q)
    {
        x=p, y=q ;
        z++;
    }

    void getdata(){
        cout<<""<<x<<endl;
        cout<<""<<y<<endl;
    }

    int getx(){
        return x;
    }

    int getz(){
        return z;
    }

};
```

```
int Test:: z =0;

int main()
{
   Test obj;
   obj.getdata();
   Test obj1;
   obj1.setdata(10,15);
   obj1.getdata();
   Test obj3=obj1;
   obj3.getdata();

   Test t1(1,2),t2(3,4),t3(5,6),t4(7,8), t5(9,10);
   int sum = 0;
   sum = t1.getx()+ t2.getx() +t3.getx()+ t4.getx()+ t5.getx();
   cout<<""<<sum<<endl;
   cout<<""<<t1.getz()<<endl;
   return 0;
}
```

Output:



```
Default Constructor
0
0
Default Constructor
10
15
Copy Constructor
10
15
Parameterized Constructor
Parameterized Constructor
Parameterized Constructor
Parameterized Constructor
Parameterized Constructor
25
9

Process returned 0 (0x0)   execution time : 0.484 s
Press any key to continue.
```