Experiment No: 3 Date:

Aim: To study concept of constructors and Destructors in C++ programming

Theory:

Constructors :

Constructors are special member functions in C++ that are automatically called when an object of a class is created. Their primary purpose is to initialize the object's data members and perform any necessary setup. Key points about constructors:

Constructors have the same name as the class.

They do not have a return type (not even `void`).

You can have multiple constructors with different parameter lists, enabling object initialization in various ways.

If you don't provide a constructor, C++ provides a default constructor that initializes members to default values (e.g., 0 for numbers, an empty string for strings).

Example:

Destructors :

Destructors are special member functions used to clean up resources and perform necessary cleanup when an object goes out of scope or is explicitly deleted. Key points about destructors:

Destructors have the same name as the class but preceded by a tilde `~`.

They do not take any parameters.

You usually define a destructor when your class manages resources like memory or file handles.

If you don't provide a destructor, C++ provides a default one that does nothing.

3A: Write a c++ program to add two complex numbers by passing the real and imaginary part of a complex number as parameters to objects and display the summation as result

```
#include<iostream>
using namespace std;

class complex{
   float a, b;

public:
   complex(){
      a = 0;
      b = 0;
   }
   complex(float x, float y){
      a = x;
      b = y;
   }
   void display(){
      if(b>=0)
      cout<<a<<"+"<<b<<"i"<<endl;
      else cout<<a<<b<<"i"<<endl;
   }
   friend complex sum(complex &A, complex &B){
      float a = A.a + B.a;
      float b = A.b + B.b;
      complex C(a,b);
      return C;
   }
};

int main()
{
   complex A(1.1 , 1.2);
   complex B = complex(1.3, 1.4);
   complex C;
   C = sum(A, B);
   C.display();
   return 0;
}
```

Output:

```
2.4+2.6i
```

3B] Write a C++ program to understand concept of copy constructors(copy content of one object into another)

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

class copier{
    int roll;
    string name;
public:
    copier(copier& p){
        roll = p.roll;
        name = p.name;
    }
    copier(int r, string n){
        roll = r;
        name = n;
    }
    void display(){
        cout<<"Name "<<name<<endl;
        cout<<"Roll No. "<<roll<<endl;
    }
};

int main()
{
    string name;
    int roll;
    cout<<"Name: "; getline(cin, name, '\n');
    cout<<"Roll No. ";cin>>roll;
    copier a(roll,name);
    copier b(a);
    cout<<"sucessfully copied"<<endl;
    b.display();
    return 0;
}
```

Output:

```
Name: Divyam Redkar
Roll No. 016
sucessfully copied
Name Divyam Redkar
Roll No. 16
```

3C] Write a C++ program to understand concept of dynamic constructor (create the complete class layout)

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

class temp{
    char* word;
    int len;
public:
    temp(){
        word = NULL;
        len = 0;
    }
    temp(char* w){
        len = strlen(w);
        word = new char[len+1];
        strcpy(word,w);
    }
    void join(temp p, temp q){
        len = p.len + q.len;
        word = new char[len + 1];
        strcpy(word, p.word);
        strcat(word, q.word);
    }
    void display(){
        cout<<word<<endl;
    }
};
int main()
{
    char* f1 = "Goa ";
    temp name1(f1),
    name2("College "), name3("Engineering "), s1,
s2;
    s1.join(name1,name2);
    s2.join(s1,name3);
    s2.display();

    return 0;
}
```

Ouptut:

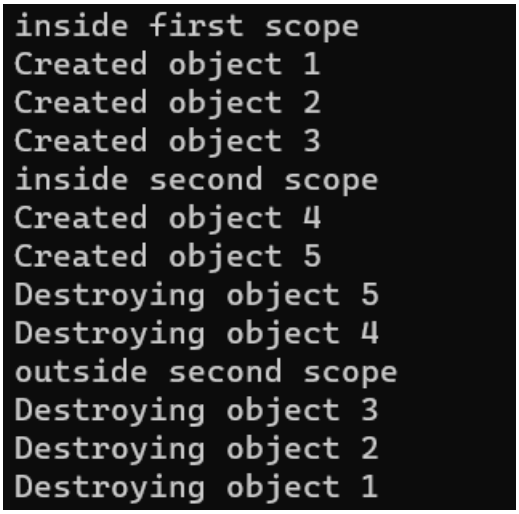
```
Goa College Engineering
```

3D] Write a C++ program to understand concept of destructors in c++ (count of object creation and deletion can be used)

```
#include<iostream>

using namespace std;

class temp{
   int num;
public:
   temp(int n){
      num = n;
      cout<<"Created object "<<num<<endl;
   }
   ~temp(){
      cout<<"Destroying object "<<num<<endl;
   }
};

int main()
{
   cout<<"inside first scope"<<endl;
   temp a(1),b(2),c(3);
   {
      cout<<"inside second scope"<<endl;
      temp d(4),e(5);
   }
```

```
    cout<<"outside second scope"<<endl;

    return 0;
}
```

Output;



Conclusion: The concepts of Constructors and Destructors in C++ were understood and implemented in the above programs.

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