LAB-3

THEORY

Class

⇒ Class is a combination of data members and member function collectively called as members of the class. class is an example of encapsulation. class is a user defined data type. It is the extension of the idea of the structure used in C.

Constructors

⇒ A constructor is a special member function of a class whose task is to initialize the data members of the class.

Syntax:

```
class class-name
{
  //private data_members ;
  public:
  class_name (arguments or no argument) // constructor
   {
      //body of constructor;
    }
};
```

Destructors

⇒ A destructor is used to destroy the objects that have been created by the constructor. Destructor is a function appeared in public section of a class preceeded by tilde (~) sign.

syntax:

```
class class-name
{
  public:
  ~class_name() //destructor
  }
```

```
        //Body of destructor
      }
  };
```

Object operations

⇒ Object operations in c++ are actions that can be performed on objects which are instances of classes. These operations are defined within the class and are accessed through the objects.

QN1

WAP to create a class Teacher with data members teachers_id, teachers_name, department and subject_taught and create member functions for reading and displaying data members. At least one of the member function should be defined outside the class.

Program

```
#include <iostream>
using namespoce std;
class teacher
 {
  private:
    int teacher_id;
    string name;
    String depart;
    string subject;
  public:
        void read();
        void display();
          {
            cout << teacher_id <<" "<< name <<" "<< depart <<" "
                 << subject << endl;
          }
 };
```

```
void teacher :: read()
{
 cout <<" Enter your ID : "<<endl;
 cin >> teacher_id ;
 cout << "Enter name : "<<endl;
 cin>> name ;
 cout << "Enter department :"<<endl;
 cin>> depart ;
 cout << " Enter subject : "<<endl;
 cin>>subject ;
}
int main()
{
 teacher t1;
 t1. read() ;
 t1. display () ;
 return 0 ;
}
```

OUTPUT

```
Enter your ID: 4↵
Enter name : Abhishek ↵
Enter department : IT
Enter subject : C++

4  Abhishek  IT  C++
```

Discussion

class is the combination of data members and member function collectively called as member of the class.

QN2

Create a class called "time" with data member hour, minute and second. Initialize all the data member using constructor. WAP to add two time object using necessary member functions and display the result.

Program

```
#include <iostream>
Using namespace std;
class time {
    private:
        int hour, minute, second;
    public:
      time (int h=0, int m=0 ,int s=0)
        {
          hour = h;
          minute = m;
          second = s;
        }

    time  add_time (time& t)
        {
          time result;
          result.second = second + t.second;
          result.minute = minute + t.minute + (result.second/60);
          result.hour   = hour + t.hour + (result.minute/60);

          result.second %= 60;
          result.minute %= 60;
          return result;
        }
  void display()
      {
       cout << hour << ":" << minute << ":" << second << endl;
      }
  };
```

```
int main()
{
   time t1(2,45.50);
   time t2 (1,20,30);
    cout<<" Time 1:";
     t1.display();
    cout<<"Time2 :"<<endl;
     t2.display();
    time sum = t1.addtime(t2)
    cout<<" sum of time1 and Time 2 is ";
     sum.display() ;
     return 0;
}
```

OUTPUT

```
 Time 1:   2:45:50
 Time 2:   1:20:30
 sum of time1 and time2 is  4:6:20
```

Discussion

Here the constructor's use is shown as it has initialized the data member ie hour, minute and second to zero as in the question. and two times are added.

QN3

Program

```
#include <iostream>
# include <string>
using namespace std ;
class person {
    private:
            string name;
             int age ;
      public :
          person (string n ,int a)
             {
               name =n ;
                age = a;
              }
            person ( person &p )
              {
                name = p.name ;
                age  = p.age ;
               }
       void display()
          {
           cout<<"Name:"<<name <<"   "<< "Age:" <<age <<endl;
           }
    };
  int main()
  {
     person person1 ("Abhishek", 19);
     person person2 = person1 ;
     cout << "Details of person2:" <<endl;
      person2.display();
      return0;
   }
```

OUTPUT

```
 Details of person2 :
 Name: Abhishek  Age:19
```

Discussion

Copy constructor takes reference object as an argument of the same class. It initalizes the object by copying the value of the object of its own type from the argument.

QN4

Progrom

```
#Include <iostream>
Using namespace std;
class Rectangle
  {
   private :
          int len;
          int wid ;
   public :
              Reltangle (int l=0 , int w=0)
                 {
                  leng~~th~~= l;
wid = w;
 }
Rectangle (int ln, int wd )
    {
      len = ln;
      wid = wd ;
    }
int Calculate_area()
    {
      return len * wid;
     }
Rectangle doublesize (Rectangle & r)
      {
         return Rectangle (r.len *2 , r.wid *2);
      }
};
int main()
  {
   Rectangle r1 (5,10);
   Rectangle r2 = r1. doublesize (r1);
   cout << " Area of the rectangle of double size is "<< r2.calculate_
                                                          area <<endl;
   return 0;
 }
```

OUTPUT

Area of the ~~double~~ rectangle of double size is 200.

Discussion

This program makes the use of parameterized constructor. The constructor that takes parameters is known as parameterized constructor.

QN5

Program

```
#include <iostream>
 using namespace std;
class statement
    {
    public:
      statement()
         {
          cout << "constructor is called."<<endl;
         }
     ~statement()
         {
          cout<< "Memory is released."<<endl;
         }
  };
  int main()
   {
     statement object ;
     return 0;
   }
```

OUTPUT

```
constructor is called.
Memory is released.
```

Discussion

This program makes the destructor. It is used to destroy the objects that have been created by the constructor.