Experiment No-01: Introduction to Class and Objects in OOP

Objectives

- Introduce with the Class and Objects in C++.
- Create data member and member function (Method) of a class.
- Understand the concept of visibility of data member and member function(Public and Private access).

Example 1: Write a C++ program to define a class **BOX** and create objects of this class.

Data member: [length, breadth and height]
Now find the volume of a box by accessing the members of this class using its object.

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

class Box {
   public:
      double length; // Length of a box
      double breadth; // Breadth of a box
      double height; // Height of a box
};

int main() {
   Box Box1;       // Declare Box1 of type Box
   Box Box2;       // Declare Box2 of type Box
   double volume = 0.0;   // Store the volume of a box here

   // box 1 specification
   Box1.height = 5.0;
   Box1.length = 6.0;
   Box1.breadth = 7.0;

   // box 2 specification
   Box2.height = 10.0;
   Box2.length = 12.0;
   Box2.breadth = 13.0;

   // volume of box 1
   volume = Box1.height * Box1.length * Box1.breadth;
   cout << "Volume of Box1 : " << volume <<endl;
   // volume of box 2
   volume = Box2.height * Box2.length * Box2.breadth;
   cout << "Volume of Box2 : " << volume <<endl;
   return 0;
}
```

Example 2: Write a C++ program to define a class **BOX** with member functions.

Data member: [length, breadth and height]
Member function: [input_value(), print_value() and volume()].

Now find the volume of a box by accessing the members of this class using its object.

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

class BOX
{
    public: // public access of the members
      double length, breadth, height;// data members

      // defining member functions
      void input_value()
      {
          cout<<"Enter three sides of a box: "<<endl;
          cin>>length>>breadth>>height;
      }
      void print_value()
      {
          cout<<"Length : "<<length<<endl;
          cout<<"Breadth : "<<breadth<<endl;
          cout<<"Height : "<< height<<endl;
      }
      double volume()
      {
          double v=length*breadth*height;
          return v;
      }
};
int main()
{
    BOX myBox; //creating a object

    // Accessing members of class through its object
    myBox.input_value(); //taking the inputs

    myBox.print_value();//printing the values

    double vol= myBox.volume(); //calculating volume

    cout<<"Volume of the box: "<<vol<<endl;
}
```

Example 3: Write a C++ program to understand public and private access of class data members.

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

class myTest
{
    private:
       int a,b,c;
    public:
        void access_private()
        {
            cin>>a>>b>>c;
            cout<<a<<' '<<b<<' '<<c<<endl;
        }
};
int main()
{
    myTest v;
    cin>>v.a>>v.b>>v.c;
    // This will give us an error because we can not access the private
        data members outside of a class. To access this we must have a
        public member function.

    v.access_private();//Public function to access private members

}
```

Example 4: Write a C++ program to understand public and private access of class data members.

```
// Program to illustrate the working of
// public and private in C++ Class

#include <iostream>
using namespace std;

class BOX {

   private:
    double length;
    double breadth;
    double height;

   public:

    // function to initialize private variables
    void initData(double len, double brth, double hgt) {
        length = len;
```

```
        breadth = brth;
        height = hgt;
    }

    double calculateArea() {
        return length * breadth;
    }

    double calculateVolume() {
        return length * breadth * height;
    }
};

int main() {

    // create object of BOX class
    Box box1;

    // pass the values of private variables as arguments
    box1.initData(42.5, 30.8, 19.2);

    cout << "Area of BOX = " << box1.calculateArea() << endl;
    cout << "Volume of BOX = " << box1.calculateVolume() << endl;

    return 0;
}
```

*** For better understanding please feel free to search on internet because it is the best source of learning. ***

Practice Exercise

1. Write a class having two private variables and one member function which will return the area and perimeter of the rectangle.

2. Write a C++ Program to define a class batsman with the following specifications:
Private members:

batsman_code: 4 digits code number
batsman_name: 20 characters(string)
total_innings, notout_innings, toal_runs: integer type
calcavg(): Function to compute batavg

batting_avg: [total_runs/(total_innings-notout_innings)] (formula to calculate batting average)

Public members:

readdata(): Function to accept value from batsman_code, batsman_name, total_innings, notout_innings, total_runs and invoke the function calcavg().

displaydata(): Function to display the data members on the screen.

Access all the data members and member functions to calculate batting average of a batsman by creating its object.

[Resource Link 1]
[Resource Link 2]
[Resource Link 3]