

Object-Oriented Programming Using C++

Classes and Objects

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- A class is used to specify the form of an object and it combines data representation and methods for manipulating that data into one neat package
- The data and functions within a class are called members of the class

Box class

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

- An object is created from a class
- Objects of a class are declared in the same way as we declare variables of basic types

Creation of Box class objects

```
Box Box1;           // Declare Box1 of type Box
Box Box2;           // Declare Box2 of type Box
```

Example:Classes and Objects

Box class and its objects

```
#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;
}
```

Member Functions

- A function that has its definition or its prototype within the class definition like any other variable.
- It operates on any object of the class of which it is a member
- Has access to all the members of a class for that object.

Class with function prototype

```
class Box {  
    public:  
        double length; double breadth; double height;  
        double getVolume(void); // Returns box volume  
};  
  
double Box::getVolume(void) {  
    return length * breadth * height;  
}
```

Class with function definition

```
class Box {  
    public:  
        double length; double breadth; double height;  
  
        double getVolume(void) {  
            return length * breadth * height;  
        }  
};
```

Invocation of Member Functions

Class with function definition

```
Box myBox;           // Create an object  
  
myBox.getVolume();   // Call member function for the object
```

Example: Member Functions

Box class with functions

```
#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

    // Member functions declaration
    double getVolume(void);
    void setLength( double len );
    void setBreadth( double bre );
    void setHeight( double hei );
};

// Member functions definitions
double Box::getVolume(void) {
    return length * breadth * height;
}

void Box::setLength( double len ) {
    length = len;
}

void Box::setBreadth( double bre ) {
    breadth = bre;
}

void Box::setHeight( double hei ) {
    height = hei;
}
```

Example: Member Functions (Contd.)

Invocation of Box class functions

```
....

// Main function for the program
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.setLength(6.0);
    Box1.setBreadth(7.0);
    Box1.setHeight(5.0);

    // box 2 specification
    Box2.setLength(12.0);
    Box2.setBreadth(13.0);
    Box2.setHeight(10.0);

    // volume of box 1
    volume = Box1.getVolume();
    cout << "Volume of Box1 : " << volume << endl;

    // volume of box 2
    volume = Box2.getVolume();
    cout << "Volume of Box2 : " << volume << endl;
    return 0;
}
```


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