

Objects and Classes in C Plus Plus

Module 1 - Introduction to Classes and Objects in C Plus Plus



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Class in C++

The building block of C++ that leads to Object-Oriented programming is a Class. It is a user-defined data type, which holds its own data members and member functions, which can be accessed and used by creating an instance of that class. A class is like a blueprint for an object.



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For Example: Consider the Class of Cars. There may be many cars with different names and brands but all of them will share some common properties like all of them will have 4 wheels, Speed Limit, Mileage range, etc.



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So here, the Car is the class, and wheels, speed limits, and mileage are their properties.



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- A Class is a user-defined data type that has data members and member functions.
- Data members are the data variables and member functions are the functions used to manipulate these variables together these data members and member functions define the properties and behavior of the objects in a Class.
- In the above example of class Car, the data member will be speed limit, mileage, etc and member functions can apply brakes, increase speed, etc.



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We can say that a Class in C++ is a blueprint representing a group of objects which shares some common properties and behaviors.



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Generally, a class specification has two parts:

- a) Class declaration
- b) Class function definition



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The class declaration describes the type and scope of its members. The class function definition describes how the class functions are implemented.

Syntax:

```
class class-name
{
    private:
        variable declarations;
        function declaration;
    public:
        variable declarations;
        function declaration;
};
```



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The members that have been declared as **private** can be accessed only from within the class. On the other hand, **public members** can be accessed from outside the class also.

The data hiding is the key feature of oops. The use of keywords private is optional **by default, the members of a class are private**. The variables declared inside the class are known as **data members** and the functions are known as **members functions**. Only the member functions can have access to the private data members and private functions.

However, the public members can be accessed from the outside the class. The binding of data and functions together into a single class type variable is referred to as **encapsulation**.

Syntax:

```
class item
{
    int member;
    float cost;
public:
    void getldata (int a ,float b);
    void putdata (void);
}
```

The class item contains two data members and two function members, the data members are private by default while both the functions are public by declaration. The function **getldata()** can be used to assign values to the member variables member and cost, and **putdata()** for displaying their values . These functions provide the only access to the data members from outside the class.

Object

An Object is an identifiable entity with some characteristics and behavior. An Object is an instance of a Class. When a class is defined, no memory is allocated but when it is instantiated (i.e. an object is created) memory is allocated.

Syntax to Create an Object

We can create an object of the given class in the same way we declare the variables of any other inbuilt data type.

ClassName ObjectName;

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Accessing Data Members and Member Functions

The data members and member functions of the class can be accessed using the dot('.') operator with the object. For example, if the name of the object is *obj* and you want to access the member function with the name *printName()* then you will have to write:

obj.printName()

Solved Example of Class and Object in C++

The below program shows how to define a simple class and how to create an object of it.

```
// C++ program to illustrate how create a simple class and
// object
#include <iostream>
#include <string>
```

```
using namespace std;
```

```
// Define a class named 'Person'
```

```
class Person {
public:
```

```
// Data members
string name;
int age;
```

```
// Member function to introduce the person
void introduce()
{
```

```
    cout << "Hi, my name is " << name << " and I am "
        << age << " years old." << endl;
```

```
}
```

```
};
```

```
int main()
{
```

```
// Create an object of the Person class
Person person1;
```

```
// accessing data members
person1.name = "Deepak";
person1.age = 30;
```

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```
// Call the introduce member method  
person1.introduce();  
  
return 0;  
}
```

Output

Hi, my name is Deepak and I am 30 years old.

Assignment

Ques 1: Create a class named **Rectangle** in C++ with the following attributes:

- o **length** (float)
- o **width** (float)

Write member functions to:

- o Set the dimensions of the rectangle.
- o Calculate and return the area of the rectangle.
- o Calculate and return the perimeter of the rectangle.

Create an object in main() to test these functions.

Ques 2: Write a program to create a class called **Student** with the following attributes:

- o **name** (string)
- o **rollNo** (int)
- o **marks** (float)

Include member functions to:

- o Accept student details.
- o Display student details.

Create multiple objects of the **Student** class in the main() function and display their details.



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