

Structs vs Classes in C++

In C++, a structure is the same as a class except for a few differences. The most important of them is security. A Structure is not secure and cannot hide its implementation details from the end user while a class is secure and can hide its programming and designing details.

Following are the points that expound on this difference:

1. Members of a class are private by default and members of a struct are public by default.

e.g.

```
#include <bits/stdc++.h>
using namespace std;

struct A {
    int x; // x is public
};

class B {
    int x; // x is private
};

int main()
{
    A a;
    B b;

    cout << a.x << endl;
    cout << b.x << endl;

    return 0;
}
```

```
Error generated by above code:
prog.cpp: In function 'int main()':
prog.cpp:10:9: error: 'int B::x' is private
    int x; // x is private
    ^
```

```
prog.cpp:19:15: error: within this context
    cout << b.x << endl;
              ^
```

Above code generates compilation-error because we tried to access data-member *x* for instance *b* (which is private).

2. When deriving a **struct from a class/struct**, default access-specifier for a base class/struct is **public**. And when **deriving a class**, the default access specifier is **private**.

```
#include <bits/stdc++.h>
using namespace std;

class Base
{
    public:
        int x; // x is public
};

class Derived1 : Base
//equivalent to private Base
{
};

struct Derived2 : Base
//equivalent to public Base
{
};

int main()
{
    Derived1 d1; //class
    Derived2 d2; //struct

    cout << d1.x << endl;
    cout << d2.x << endl;
```

```
    return 0;
}
```

Error generated by above code:

```
prog.cpp: In function 'int main()':
prog.cpp:8:13: error: 'int Base::x' is inaccessible
    int x; // x is public
        ^
prog.cpp:26:16: error: within this context
    cout << d1.x << endl;
               ^
```

The above code generates compilation error because of the access statement *d1.x*. Since we didn't specify the access-modifier for the Base class, *x* became private in Derived Class.