C++: Part 7

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Friend Function

- Class: private data, public data
  - Private members cannot be accessed (outside class domain)
  - ONLY via member functions of the class
- Sometimes two classes share a particular function:
  - Doctor, Patient class: both should get info about the experience/seniority of the physician
  (by some criterion age > 50yrs or etc., etc..)

Friend function: example 1

```
Class sample
{
     int a; int ;
     public:
        void setvalue() {a = 20; b = 45;}
        friend float mean(sample s); // friend function prototype decl.
};
float mean(sample s)
{
     return float (s.a+s.b)/2.0;
}
int main()
{
   sample X; X.setvalue(); cout <<"Mean Value= "<<mean(X)<<"\n"; return(0);
}
```

Example2

Syntax: **friend** function-type function-name(args)

```
class ABC;  // forward declaration
class XYZ
{
     int x;
     public:
       void setvalue(int i) {x = i;}
       friend void max(XYZ, ABC);
};
class ABC
{
     int a;
     public:
        void setvalue(int i) { a = i;}
        friend void max(XYZ, ABC); };
```
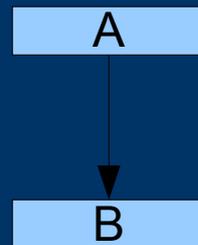
Example 2 contd.

```
void max(XYZ m, ABC n)
{
      if (m.x >= n.a)
        cout<< m.x;
      else
         cout << n.a;
}
int main()
{
      ABC abc;
      abc.setvalue(10);
      XYZ xyz;
      xyz.setvalue(20);
      max(xyz,abc);
      return(0); }
```
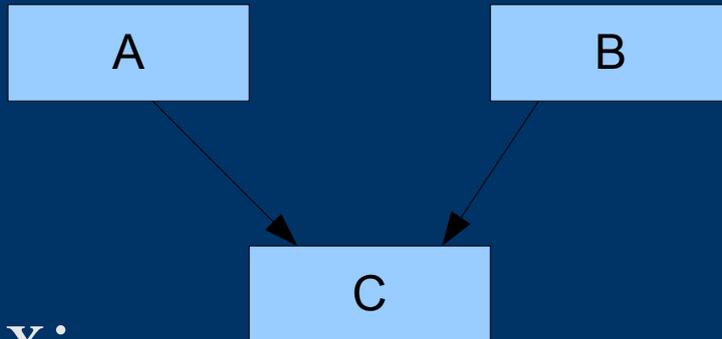
Inheritance

- Inheritance -> re usability
  - Child inherits properties from parent(s), grandparent
- Single Inheritance:
  - One Base class and we derive another class from it
  - eg. class A: base class and class B is a derived one

```
    ┌──────────┐
    │    A     │
    └────┬─────┘
         │
         ▼
    ┌──────────┐
    │    B     │
    └──────────┘
```

- Multiple Inheritance:

Inheritance contd.

- Multiple inheritance

- Syntax:

class derived-class-name : visibilitymode base-class-name
{

};

Inheritance contd.

- Visibility mode:
  - public, private, protected*

Base Class *Visibility*		Derived Class *Public*	*Private*
private		not inherit	not inherit
protected		protected	private
public		public	private

Visibility mode:

- Protected
  - Making a private member inheritable
  - **protected**:
    - Visible to member functions of its own class and the derived class
- Example

```
class B
{
};
class D : public B  // public derivation
{
};
```