# Object-Oriented Programming Using C++

## This Pointer and Pointer to a Class

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# This Pointer

- Every object in C++ has access to its own address through an important pointer called this pointer
- The this pointer is an implicit parameter to all member functions
- Inside a member function, this may be used to refer to the invoking object
- Friend functions do not have a this pointer, because friends are not members of a class

# Example 1: This Pointer

## This pointer for a simple class

```
class Test {
  private:
     int x;
  public:
     void setX (int x)
     {
       // The 'this' pointer is used to retrieve the object's x
       // hidden by the local variable 'x'
       this->x = x;
     }
     void print()
     {
       cout << "x = " << x << endl;
     }
};

int main()
{
   Test obj;
   int x = 20;
   obj.setX(x);
   obj.print();
   return 0;
}
```

# Example 2: This Pointer

## This pointer for the Box class

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

   public:
      // Constructor definition
      Box(double l = 2.0, double b = 2.0, double h = 2.0) {
         cout <<"Constructor called." << endl;
         length = l; breadth = b; height = h;
      }
      double Volume() {
         return length * breadth * height;
      }
      int compare(Box box) {
         return this->Volume() > box.Volume();
      }
};

int main(void) {
   Box Box1(3.3, 1.2, 1.5);    // Declare box1
   Box Box2(8.5, 6.0, 2.0);    // Declare box2
   if(Box1.compare(Box2)) {
      cout << "Box2 is smaller than Box1" <<endl;
   } else {
      cout << "Box2 is equal to or larger than Box1" <<endl;
   }
   return 0;
}
```

# Example 2: This Pointer

**Output**

```
Constructor called.
Constructor called.
Box2 is equal to or larger than Box1
```

# Pointer to a Class

- A pointer to a C++ class is done exactly the same way as a pointer to a structure
- To access members of a pointer to a class you use the member access operator ->, just as you do with pointers to structures
- As with all pointers, you must initialize the pointer before using it

# Example: Pointer to a Class

## Pointer to the Box class

```
class Box {
   private:
      double length;     // Length of a box
      double breadth;    // Breadth of a box
      double height;     // Height of a box
   public:
      // Constructor definition
      Box(double l = 2.0, double b = 2.0, double h = 2.0) {
         cout <<"Constructor called." << endl;
         length = l; breadth = b; height = h;
      }
      double Volume() {
         return length * breadth * height;
      }
};

int main(void) {
   Box Box1(3.3, 1.2, 1.5);    // Declare box1
   Box Box2(8.5, 6.0, 2.0);    // Declare box2
   Box *ptrBox;                // Declare pointer to a class.

   ptrBox = &Box1;     // Save the address of first object
   // Now try to access a member using member access operator
   cout << "Volume of Box1: " << ptrBox->Volume() << endl;

   ptrBox = &Box2;    // Save the address of second object
   // Now try to access a member using member access operator
   cout << "Volume of Box2: " << ptrBox->Volume() << endl;

   return 0;
}
```

# Example: Pointer to a Class

**Output**

```
Constructor called.
Constructor called.
Volume of Box1: 5.94
Volume of Box2: 102
```

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