Inheritance

This lesson introduces the concept of Inheritance focusing on base and derived classes.

WE'LL COVER THE FOLLOWING ^

- What is Inheritance
- Terminology
- Characteristics
- Notation
- Example

What is Inheritance

Inheritance is a very useful and popular concept that enhances the objectoriented programming experience. It allows a programmer to create and define classes that can inherit and build upon functionalities already present in existing classes without having to duplicate a lot of the code.

- Provides a way to create a new class from an existing class.
- The **new** class is a *specialized* version of the **existing** class.
- Allows the new class to override or redefine inherited methods from the
 existing class to perform differently than how they are defined in the
 existing class.

Terminology

- Base Class (or Parent): inherited by child class.
- Derived Class (or child): inherits from base class.

Characteristics

A **derived** class has:

- All *members* defined in the **derived** class.
- All *members* declared in the **base** class.

A derived class can:

- Use all public and protected members defined in the derived class.
- Use all public and protected members defined in the base class.
- Override an inherited member

A **derived** class cannot:

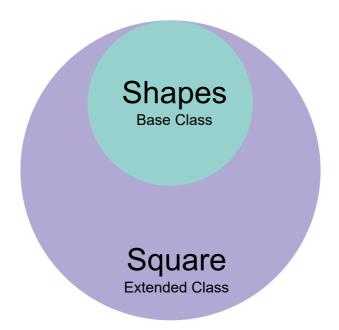
• Inherit constructors and destructors

Inheritance is one of the major reasons for using object-oriented programming in PHP.

Notation

Classes can *inherit* the properties and methods of another class using the keyword extends.

Let's take a look at the notation below.



Example

Let's consider an example with the *base* class Shape and the *derived* class Square.

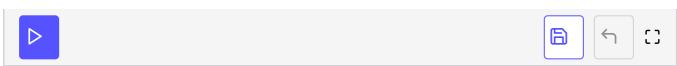
```
<?php
class Shape
{ //base class
    public $sides = 0;
    public $name = " ";
    public function __construct($name, $sides)
    { //base class constructor
        $this->sides = $sides;
        $this->name = $name;
    }
    public function description()
        return "A $this->name with $this->sides sides.";
    }
}
class Square extends Shape
{ //derived class inheriting from base class
    public $sideLength = 0;
    public function __construct($sideLength)
        parent::__construct("square", 4); //calling parent class constructor
        $this->sideLength = $sideLength;
```

```
public function perimeter()

{
    return $this->sides * $this->sideLength;
}

public function area()
{
    return $this->sideLength * $this->sideLength;
}

$mySquare = new Square(10);
$mySquare->description();
echo "Perimeter of the square is " . $mySquare->perimeter() . "\n";
echo "Area of the square is ";
echo $mySquare->area();
}
```



In the above example, the **extended class** Square *extends* from the **base class**, Shape. While doing so, it is inheriting all of its properties, \$sides and \$names, and its methods, description().

It then goes on to define new properties: \$sideLength and new methods: perimeter() and area().

As seen in the example above, a derived class cannot inherit the base class constructor however it can call the base class constructor as seen in **line 25**. Hence, once the derived class constructor is called it will further call upon the parent class constructor, where it'll set the name and sides, and after that, it'll set the sideLength as well.

This marks the end of our discussion on inheritance. In the next chapter, we will discuss *exception handling*.