Multi-Level Inheritance

This lesson talks about a hierarchy of classes when one class inherits from its parent class, and that parent class inherits from its parent class, and so on.

WE'LL COVER THE FOLLOWING

Introduction

In addition to single-level inheritance, Python also supports multi-level inheritance. This means that you can create a hierarchy of classes, each inheriting from its superclass. The following figure illustrates an example of multi-level inheritance.

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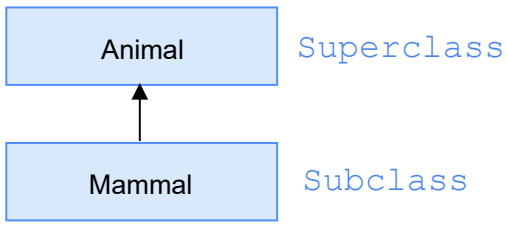

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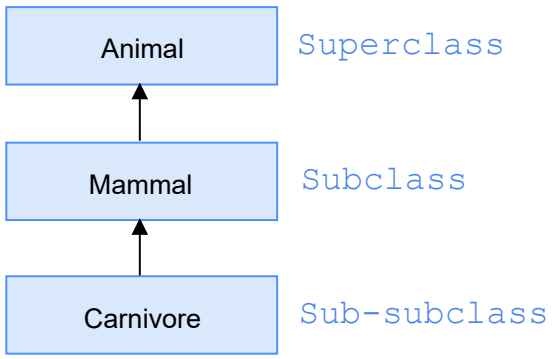

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The following hierarchy is clear from the above figure:

Class	Superclass	Relation
Carnivore	Mammal	Carnivore *is a* Mammal
Mammal	Animal	Mammal *is an* Animal
Animal	-	-

Implementation

Syntactically, multi-level inheritance in Python is quite similar to single-level inheritance. Consider the following basic code snippet:

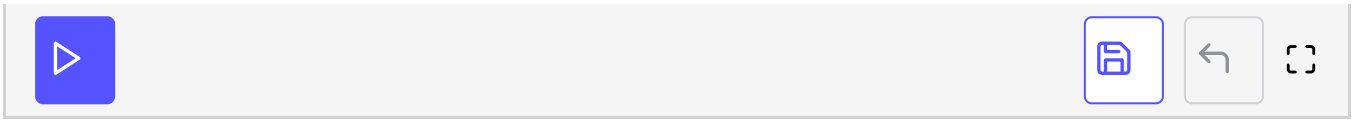
```
class Animal ():
  def __init__(self, name, food, characteristic): # Animal's constructor
    self.name = name # Animal's attribute
    self.characteristic = characteristic # Animal's attribute
    self.food = food # Animal's attribute
    print ("I am a " + str(self.name) + ".")

class Mammal (Animal): # Mammal inherits from Animal
  def __init__(self, name, food): # Mammal's constructor
    Animal.__init__(self, name, food, "warm blooded") # Animal's constructor
    print ("I am warm blooded.")
```

```
class Carnivore (Mammal): # Carnivore inherits from Mammal
  def __init__(self, name): # Carnivore's constructor
    Mammal.__init__(self, name, "meat") # Mammal's constructor

    print ("I eat meat.")

lion = Carnivore("lion") # lion is an instance of Carnivore
```



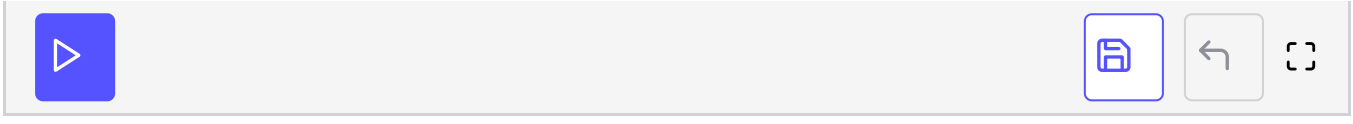
However, if we move the `print` method in a separate method, the subclass can not only access the method of its parent class—but also override it if needed. This behavior is shown in the highlighted lines of the following code:

```
class Animal ():
  def __init__(self, name, food, characteristic):
    self.name = name
    self.characteristic = characteristic
    self.food = food
  def printer(self):
    print ("I am a " + str(self.name) + ".")

class Mammal (Animal):
  def __init__(self, name, food):
    Animal.__init__(self, name, food, "warm blooded")
  def printer(self):
    print ("I am warm blooded.")

class Carnivore (Mammal):
  def __init__(self, name):
    Mammal.__init__(self, name, "meat")
  def printer(self):
    print ("I eat meat.")

lion = Carnivore("lion")
lion.printer()
```



Now if you remove the `printer()` method of the `Carnivore` class in lines 18, 19, the `lion` object will be able to access the `printer()` method of its super/parent class `Mammal`. The output will then become:

```
I am warm blooded.
```

If you also remove the `printer()` method in 12, 13 of the `Mammal` class, the `lion` object will access the `printer()` method of its superclass `Animal`. It will then print:

```
I am a lion.
```

In the next lesson, we will discuss multiple inheritance; it's slightly different from multi-level inheritance.