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Lecture: (9)

Inheritance and Access Modifiers

Subject: Object oriented programming I

Class: Second

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Inheritance and Access Modifiers

Python Inheritance

Inheritance allows us to define a class that inherits all the methods and properties from another class.

Parent class is the class being inherited from, also called base class.

Child class is the class that inherits from another class, also called derived class.

Create a Parent Class

Any class can be a parent class, so the syntax is the same as creating any other class:

Example

Create a class named `Person`, with `firstname` and `lastname` properties, and a `printname` method:

```
class Person:
    def __init__(self, fname, lname):
        self.firstname = fname
        self.lastname = lname

    def printname(self):
        print(self.firstname, self.lastname)
```

#Use the `Person` class to create an object, and then execute the `printname` method:

```
x = Person("John", "Doe")
x.printname()
```

https://www.w3schools.com/python/trypython.asp?filename=demo_inheritance_parent



Create a Child Class

To create a class that inherits the functionality from another class, send the parent class as a parameter when creating the child class:

Example

Create a class named `Student`, which will inherit the properties and methods from the `Person` class:

```
class Student(Person):  
    pass
```

Note: Use the `pass` keyword when you do not want to add any other properties or methods to the class.

Now the `Student` class has the same properties and methods as the `Person` class.

Example

Use the `Student` class to create an object, and then execute the `printname` method:

```
x = Student("Mike", "Olsen")  
x.printname()
```

https://www.w3schools.com/python/trypython.asp?filename=demo_inheritance_child



Add the `__init__()` Function

So far we have created a child class that inherits the properties and methods from its parent.

We want to add the `__init__()` function to the child class (instead of the `pass` keyword).

Note: The `__init__()` function is called automatically every time the class is being used to create a new object.

Example

Add the `__init__()` function to the `Student` class:

```
class Student(Person):  
    def __init__(self, fname, lname):  
        #add properties etc.
```

When you add the `__init__()` function, the child class will no longer inherit the parent's `__init__()` function.

Note: The child's `__init__()` function **overrides** the inheritance of the parent's `__init__()` function.

To keep the inheritance of the parent's `__init__()` function, add a call to the parent's `__init__()` function:

Example

```
class Student(Person):  
    def __init__(self, fname, lname):  
        Person.__init__(self, fname, lname)
```

https://www.w3schools.com/python/trypython.asp?filename=demo_inheritance_init

Now we have successfully added the `__init__()` function, and kept the inheritance of the parent class, and we are ready to add functionality in the `__init__()` function.



Use the super() Function

Python also has a `super()` function that will make the child class inherit all the methods and properties from its parent:

Example

```
class Student(Person):  
    def __init__(self, fname, lname):  
        super().__init__(fname, lname)
```

https://www.w3schools.com/python/trypython.asp?filename=demo_inheritance_super

By using the `super()` function, you do not have to use the name of the parent element, it will automatically inherit the methods and properties from its parent.

Add Properties

Example

Add a property called `graduationyear` to the `Student` class:

```
class Student(Person):  
    def __init__(self, fname, lname):  
        super().__init__(fname, lname)  
        self.graduationyear = 2019
```

https://www.w3schools.com/python/trypython.asp?filename=demo_inheritance_add_prop

In the example below, the year `2019` should be a variable, and passed into the `Student` class when creating student objects. To do so, add another parameter in the `__init__()` function:

Example

Add a `year` parameter, and pass the correct year when creating objects:

```
class Student(Person):  
    def __init__(self, fname, lname, year):  
        super().__init__(fname, lname)
```



```
self.graduationyear = year
```

```
x = Student("Mike", "Olsen", 2019)
```

Add Methods

Example

Add a method called `welcome` to the `Student` class:

```
class Student(Person):  
    def __init__(self, fname, lname, year):  
        super().__init__(fname, lname)  
        self.graduationyear = year  
  
    def welcome(self):  
        print("Welcome", self.firstname, self.lastname, "to the class of", self.graduationyear)
```

https://www.w3schools.com/python/trypython.asp?filename=demo_inheritance_add_method

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