Python Classes and Objects

Python is an interpreted high-level, structural, and object-oriented programming language. Since it is object-oriented, the concept of classes and objects is well-discussed and implemented. A class is the basis of object-oriented programming in Python. In this tutorial, we will learn about Classes and Objects in Python. A class is a template for an object, whereas an object is an instance of a class.

What is a class in Python?

As discussed above, a class is a blueprint for objects in Python. We can easily create a class like this:

```
class name_of_class:
# Statement1
# Statement2
# Statement3
.
.
.
StatementN
```

Class Definition in Python

The class keyword is used to create a class in Python. The class is a reserved word in Python. In the below example, we will see how to create a class in Python:

```
# creating a class with a property val
# the class keyword is used to create a class
class Studyopedia:
  val = 100

print(Studyopedia)
```

Output

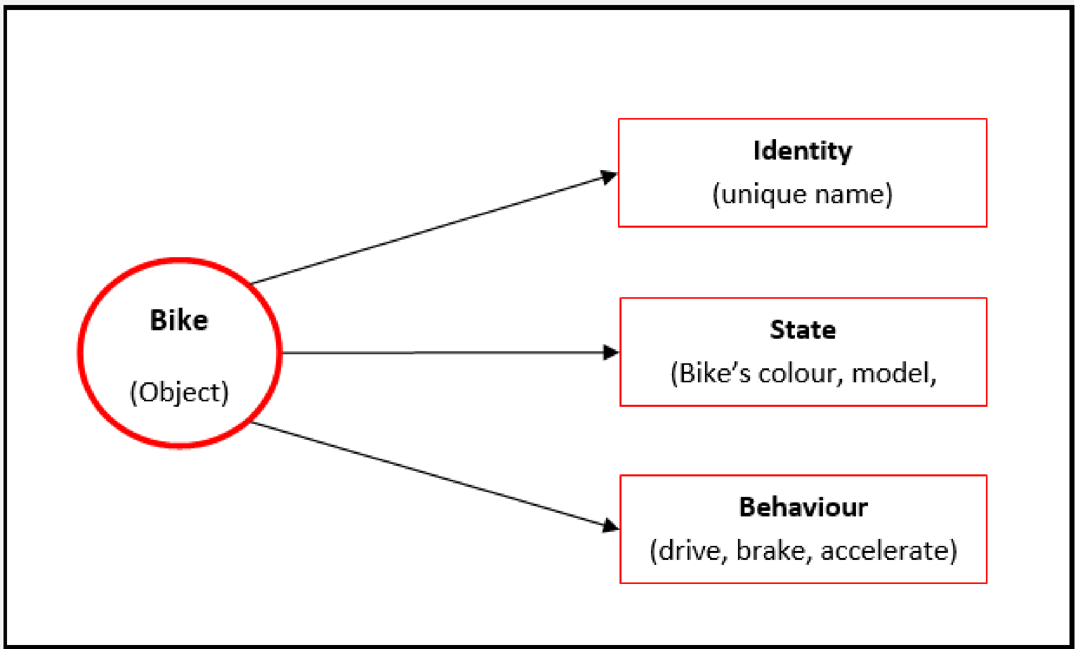
```
<class '__main__.Studyopedia'>
```

What is an object in Python?

An object is an instance of a class i.e. object is created from a class. An object represents real-life entities, for example, a Bike is an object. The object has State, Behavior, and Identity:

- **Identity**: Name of Bike
- **State (Attributes)**: The data of the object Bike i.e. Color, Model, Weight, etc.
- **Behavior (Methods)**: Behavior of object Bike like to Drive, Brake

Let us now see the representation, with Bike as an object:



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How to Create an Object in Python

Considering the above example of classes in Python, we can easily create an object.

```
# creating a class with a property val
# the class keyword is used to create a class
class Studyopedia:
  val = 100

print(Studyopedia)
```

```
# object ob
ob = Studyopedia()

# displaying the value using the object ob
print("Value = ",ob.val)
```

Output

```
<class '__main__.Studyopedia'>
Value =  100
```

Now, we can easily create a sample Python program on Classes and Objects. Let's see.

Example – Python Classes and Objects

```
# class
class Bike:

    # attributes of Bike
    name = "Hayabusa"
    body = "GEN III"
    engine = 1340

    # Custom Python function
    def demoFunc(self):
        print("\nBike = ", self.name)
        print("Body = ", self.body)
        print("Engine (cc) = ", self.engine)

# Objects
b1 = Bike()
b2 = Bike()

# Accessing using the 1st object
print("Bike name = ",b1.name)
print("Bike Engine = ",b1.engine)

# calling using the 2nd object
b2.demoFunc()
```

Output

```
Bike name =  Hayabusa
Bike Engine =  1340

Bike =  Hayabusa
Body =  GEN III
Engine (cc) =  1340
```

Python _init_() Function

The classes in Python have ___init___() function. Like constructors in Java, the ___init___() function executes when the object gets created. Using this method, easily assign values to object properties.

Let us understand with an example, wherein we will create a class **Students** and values will be assigned using the ___init___(). We have also created object functions:

```
class Students:

  # using the __init__ function
  def __init__(self, sname, ssub, sgrade):
    self.sname = sname
    self.ssub = ssub
    self.sgrade = sgrade

  # custom function
  def demofunc(self):
    print("I am " + self.sname)
    print("I am interested in the Subject " + self.ssub)

# creating 3 objects for class Students
st1 = Students("Amit", "Programming", "A+")
st2 = Students("Rohit", "Science", "A")
st3 = Students("Shreyas", "Math", "B+")

# calling the custom function using objects
st1.demofunc()
st2.demofunc()
st3.demofunc()
```

Output

```
I am Amit
I am interested in the Subject Programming
I am Rohit
I am interested in the Subject Science
I am Shreyas
I am interested in the Subject Math
```

Above, we have also used the **self** parameter. The class methods in Python have the first parameter as **self** to access the class variable. A method with no argument should also have an argument **self** However, we can give it any name. It is not mandatory to use the word **self**.

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