

Classes

Part 1 – Defining a new type

by

Lilian Blot

Object-Oriented Framework



Procedural paradigm: Organising programs around functions or blocks of statements which manipulate data.



Object-Oriented paradigm: combining data and functionality and wrap it inside what is called an object.

Object-Oriented Framework



Classes and objects are the two main aspects of object-oriented programming.



A class creates a new *type*.



Where objects are *instances* of the class.



An analogy is that we can have variables of type **list**, such variables are instances (objects) of the **list** class.

Object-Oriented Framework

- Objects can store data using ordinary variables that *belong* to the object.
- Variables that belong to an object or class are called as **fields** or **attributes**.
- Objects can also have functionality by using functions that *belong* to the class. Such functions are called **methods**.
- This terminology is important because it helps us to differentiate between a function which is separate by itself and a method which belongs to an object.

- Remember, that fields are of two types
 - they can belong to each instance (object) of the class
 - or they belong to the class itself.
 - They are called **instance variables** and **class variables**, respectively.
- A **class** is created using the **class** keyword.
- The **fields** and **methods** of the class are listed in an indented block.

Creating our Own Data Structure

- Keyword `class`
- General Form:

Code

```
class TypeName:  
    """ doc-string """  
  
    pass
```

- Example

Code

```
class Point():  
    """ doc-string """  
  
    pass
```

The `__init__` method



`__init__` is called immediately after an instance of the class is created by `__new__`.



In many texts, `__init__` is (incorrectly) call the **constructor** of the class.



by convention, `__init__` is the first method defined for the class),



it's the first piece of code executed in a newly created instance of the class

Terminology



Class Rectangle is the definition of a Type of object



r is an instance of Rectangle



x, y, ... are instance variables



__init__ is a “constructor”