

Lesson 7 - Object-oriented python

Definition: to create objects with properties and methods

Green Sea Turtles

The green sea turtle, a species found throughout the pacific, atlantic, and indian oceans, migrate large distances to beaches where females dig nests and lay eggs. By using a small temporary tooth, the hatchlings break out of their eggs and make their way towards the water in an almost unison group effort to overwhelm and ward off predators. As [this scene](#) looks like the sand is boiling, it is commonly referred to as a “turtle boil”.

Another [unique feature](#) of the green sea turtle is that alongside other reptiles such as alligators and crocodiles, their sex is not determined genetically (they do not have sex chromosomes). So instead, their sex is determined by the temperature at which their nest incubates in the sand. Should the nest incubate in sand that is above approximately 28-29 degrees celsius/ 83-85 degrees fahrenheit, the turtle will become female. On the other hand, should the temperature become lower, the turtle will become male.



However, as demonstrated by [recent studies](#) that have found pacific green sea turtles to produce increasingly female offspring (a ratio of females to males of 116 to 1 on Raine island), climate change has extreme impacts on the survival of green sea turtle populations. A change in a few degrees could potentially produce exclusively female populations, and if temperatures climb even higher, literally cook the eggs in the sand. What this example illustrates is that climate change has unforeseen and severe consequences. It is a crisis that requires our attention.

Photo source: [National Ocean Service](#).

Part 1: Create an object and access its attributes

1. To create an object, create a **class** followed by its name (in this example, "Turtle" - objects are typically capitalized) and a **colon** :

```
class Turtle:
```

2. **Indent** the following line and include the **attributes** of species and location. An attribute is a characteristic of an object.

```
    species = "Pacific Green Sea"
```

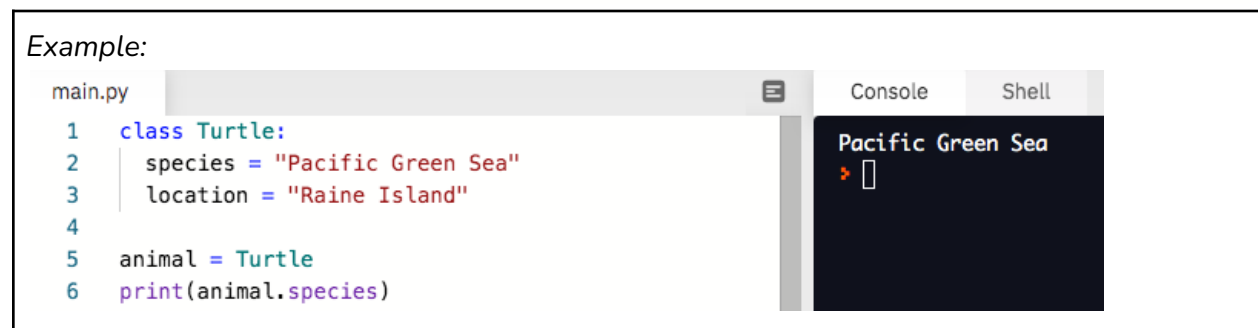
```
    location = "Raine Island"
```

3. Access the class turtle by creating a variable named animal.

```
animal = Turtle
```

4. To print one of the attributes, the species, print the variable, followed by a dot and the name of the attribute. The connection between the attributes of an object with the object itself is indicated by a "dot" written between them.

Example:



```
main.py
1 class Turtle:
2     species = "Pacific Green Sea"
3     location = "Raine Island"
4
5 animal = Turtle
6 print(animal.species)
```

Console Shell

```
Pacific Green Sea
> []
```

Part 2: Use the `__init__` function

Instead of creating a class and identifying the properties individually, you can use a constructor `__init__()` to create a shell for the object. Similar to a function, which had parameters in which you could pass argument(s), you can create the shell of an object, by **defining a method** (a method is like a function used in object-oriented programming) and using the constructor `__init__()` method. Similar to creating parameters for a function, you can create parameters for this object shell, otherwise known as **instance variables**, and pass specific attributes later by calling the object. This is different from the **class variables** created in part 1. In the example of the object Turtle, it always has the same species and location - these variables are shared by all instances of this class. Everytime that object is called, the variables will be the same for each instance. However, in the following example using the `__init__` method, many different and unique instances, different species of turtles, can be created for the same object.

1. Create a `class`, `indent` the following line, `define` the `__init__ ()` function beginning with `self`, followed by the attributes of species and location and a `colon`. The keyword `self` allows you to access the attributes specific to the object.

```
class Turtle:
    def __init__ (self, species, location, conservation_status):
```

2. `Indent` the following line, write `self` followed by a `dot` and the attribute and restate the attribute.

```
        self.species = species
        self.location = location
        self.conservation_status = conservation_status
```

3. Create a new line for the variable `pacific_green_sea_turtle` and include the attributes of “Pacific Green Sea” and “Raine Island” in `parentheses ()`.

```
pacific_green_sea_turtle = Turtle("Pacific Green Sea", "Raine Island",
    "Endangered")
```

4. Print the location and conservation status.

Example:



```
main.py
15
16 class Turtle:
17     def __init__ (self, species, location, conservation_status):
18         self.species = species
19         self.location = location
20         self.conservation_status = conservation_status
21
22
23 pacific_green_sea_turtle = Turtle("Pacific Green Sea", "Raine Island",
    "Endangered")
24
25
26 print(pacific_green_sea_turtle.location)
27 print(pacific_green_sea_turtle.conservation_status)
```

Console Shell

```
Raine Island
Endangered
```

✓ **Task 1:** Add another turtle species (*nubian flapshell turtle, location: West Africa, conservation status: critically endangered*) to the same object. Print the location.

✓ **Task 2:** Create an object called `Greenhouse_gases` with the attributes of formula and source. Add the variables of `CO2`, `CH4`, and `NO2`. Print the sources.