Python Tutorial Series 2019
Basics 2: Code Flow

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Table of Contents

Basic Script Structure

```
#!/usr/bin/env python
# -*- coding: utf-8 -*-
"""
    This is a docstring with information about the file.
"""
import external_package
from external_package import external_module


def my_function(...):
    ...


class MyClass(...):
    ...

...(some code here)...
```

Loops and control

if/elif/else

```
>>> fruit = 'banana'
>>>
>>> if fruit is
... ....eat_it
...
>>> elif fruit
... ....make_a_ju
...
>>> else:
... ....leave_it()
```

Easy

More at https://docs.python.org/3/tutorial/controlflow.html

Loops and control

if/elif/else

```
>>> fruit = 'banana'
>>>
>>> if fruit is 'apple':
...     eat_it()
...
>>> elif fruit is 'orange':
...     make_a_juice()
...
>>> else:
...     leave_it()
```

Python relies on identation, so

DON'T MESS UP!

More at https://docs.python.org/3/tutorial/controlflow.html

Loops and control

if/elif/else

```
>>> fruit = 'banana'
>>>
>>> if fruit is 'apple':
...     eat_it()
...
>>> elif fruit is 'orange':
...     make_a_juice()
...
>>> else:
...     →leave_it()
```

PEP-8 HIGHLY recommends you to use 4 spaces. And NEVER mix spaces and tabs. For more informations, read the PEP-8.

More at https://docs.python.org/3/tutorial/controlflow.html

Loops and control

if/elif/else

```
>>> fruit = 'banana'
>>>
>>> if fruit is 'apple':
...     eat_it()
...
>>> elif fruit is 'orange':
...     make_a_juice()
...
>>> else:
...     leave_it()
```

More at https://docs.python.org/3/tutorial/controlflow.html

Loops and control

List, tuples, arrays, matrixes, dictionaries **for**

```
>>> my_list = ['a', 'b', 'c']
>>>
>>> for my_item in my_list:
...     print(my_item)
...
a
b
c
```

More at https://docs.python.org/3/tutorial/controlflow.html

Loops and control

List, tuples, arrays, matrixes, dictionaries **for**

```
>>> my_list = ['a', 'b', 'c']
>>>
>>> for index in range(len(my_list)):
...     print(index, my_item[index])
...
0 a
1 b
2 c
```

More at https://docs.python.org/3/tutorial/controlflow.html

Loops and control

List, tuples, arrays, matrixes, dictionaries **for**

```
>>> my_list = ['a', 'b', 'c']
>>>
>>> for index in range(len(my_list)):
...     print(index, my_item[index])
...
0 a
1 b
2 c
```

`len(x)`: return the number of elements of x.

More at https://docs.python.org/3/tutorial/controlflow.html

Loops and control

List, tuples, arrays, matrixes, dictionaries **for**

```
>>> my_list = ['a', 'b', 'c']
>>>
>>> for index in range(3):
...     print(index, my_item[index])
...
0 a
1 b
2 c
```

`len(x)`: return the number of elements of x.

More at https://docs.python.org/3/tutorial/controlflow.html

Loops and control

List, tuples, arrays, matrixes, dictionaries **for**

```
>>> my_list = ['a', 'b', 'c']
>>>
>>> for index in range(3):
...     print(index, my_item[index])
...
0 a
1 b
2 c
```

`range(n)`: return a list with n integers starting at 0.

More at https://docs.python.org/3/tutorial/controlflow.html

Loops and control

List, tuples, arrays, matrixes, dictionaries **for**

```
>>> my_list = ['a', 'b', 'c']
>>>
>>> for index in [0, 1, 2]:
...     print(index, my_item[index])
...
0 a
1 b
2 c
```

`range(n)`: return a list with n integers starting at 0.

More at https://docs.python.org/3/tutorial/controlflow.html

Loops and control

While

test_while.py

```
n_interested = 5

while n_interested > 0:
    print(" Keep going!")
    n_interested = n_interested - 1

print(" Time to go home!")
```

More at https://docs.python.org/3/tutorial/controlflow.html

Loops and control

While

test_while.py

```
n_interested = 5

while n_interested >
....print(" Keep goi
....n_interested = n

print(" Time to go h
```

```
$ python test_while.py
 Keep going!
 Keep going!
 Keep going!
 Keep going!
 Keep going!
 Time to go home!
```

More at https://docs.python.org/3/tutorial/controlflow.html

Loops and control

break

test_break.py

```
n_interested = 5

while True:
    print(" Keep going!")
    n_interested = n_interested - 1
    if n_interested <= 0:
        break

print(" Time to go home!")
```

More at https://docs.python.org/3/tutorial/controlflow.html

Loops and control

continue

```
>>> my_list = ['a', 'b', 'c']
>>>
>>> for index in [0, 1, 2]:
...     if index == 1:
...         continue
...     print(index, my_item[index])
...
0 a
2 c
```

More at https://docs.python.org/3/tutorial/controlflow.html

Functions

Define a new function

```
>>> def my_function(x, y):
...     """I am a docstring!"""
...     k = 2 * x - y  # I am a comment
...     return k
```

Functions

Define a new function

```
>>> def my_function(x, y):
...     """I am a docstring!"""
...     k = 2 * x - y  # I am a comment
...     return k
...
>>> my_function(2, 4)
0
```

x and y are **positional** parameters.

Functions

Define a new function

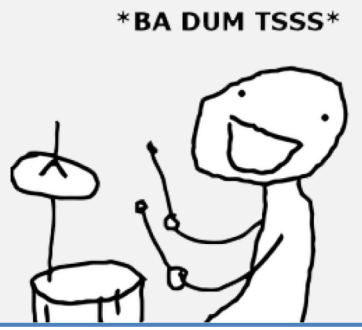
```
>>> def my_function(x, y):
...     """I am a docstring!"""
...     k = 2 * x - y  # I am a comment
...     return k
...
>>> my_function(y=4, x=2)
0
```

x and y are now **keyword** parameters.

Functions

Define a new function

```
>>> def my_function(x, y, z=1, w=0):
...     """I am a docstring!"""
...     k = 2 * x - y / z + w
...     return k
...
>>> my_function(y=4, x=2)
0
```



`z` and `w` are now **default** parameters.

Default parameters have **default** values.

Functions

Define a new function

```
>>> def my_function(x, y, z=1, w=0):
...     """I am a docstring!"""
...     k = 2 * x - y / z + w
...     return k
...
>>> my_function(y=4, x=2, w=5)
5
```

`z` and `w` are now **default** parameters.

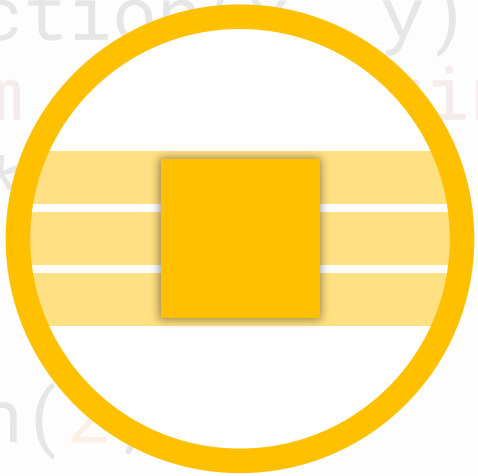
Default parameters have **default** values.

Functions

```
>>>
>>> def my_function(x, y):
...     """I am a docstring!"""
...     k = 2 * x - y
...     return k
...
>>> my_function(2, 4)
0
```

Functions

```
>>>
>>> def my_function(x, y):
...     """I am ing!"""
...     k = 2 *
...     return
...
>>> my_function(2,
0
```



Medium

Functions

Bug Alert

Functions

Watch out namespaces!

```
>>>
>>> def my_function(x, y):
...     """I am a docstring!"""
...     k = 2 * x - y
...     return k
...
>>> my_function(2, 4)
```

Functions

Watch out namespaces!

```
>>>
>>> def my_function(x, y):
...     """I am a docstring!"""
...     k = 2 * x - y
...     return k
...
>>> my_function(2, 4)
NameError: global name 'x' is not defined
```

Functions

Watch out namespaces!

```
>>> x = 2
>>> def my_function(x, y):
...     """I am a docstring!"""
...     k = 2 * x - y
...     return k
...
>>> my_function(2, 4)
```

Functions

Watch out namespaces!

```
>>> x = 2
>>> def my_function(x, y):
...     """I am a docstring!"""
...     k = 2 * x - y
...     return k
...
>>> my_function(2, 4)
0
```

Functions

Watch out namespaces!

```
>>>
>>> def my_function(x, y):
...     """I am a docstring!"""
...     k = 2 * x - y
...     return k
...
>>> x = 2
>>> my_function(2, 4)
```

Functions

Watch out namespaces!

```
>>>
>>> def my_function(x, y):
...     """I am a docstring!"""
...     k = 2 * x - y
...     return k
...
>>> x = 2
>>> my_function(2, 4)
0
```

Functions

Watch out namespaces!

```
>>>
>>> def my_function(x, y):
...     """I am a docstring!"""
...     k = 2 * x - y
...     return k
...
>>> x = 2
>>> my_function(3, 4)
2
```

Classes

```
>>> class MyClass:
...     ....
...         my_atribute = "I am an alien"
...     ....
...         def my_method(self):
...     ....        ....return "Calling my_method"
...
>>>
```

More about Classes on W3Schools

Classes

```
>>> class MyClass:
...     ....
...         my_atribute = "I am an alien"
...     ....
...         def my_meth
...             retu          my_method"
...
>>>
```

Difficult

More about [Classes on W3Schools]

Classes

Methods and atributes

```
>>> class MyClass:
...     ....
...         my_atribute = "I am an alien"
...     ....
...         def my_method(self):
...             ....return "Calling my_method"
...
>>> my_object = MyClass()
```

More about [Classes on W3Schools]

Classes

Methods and atributes

```
>>> class MyClass:
...     my_atribute = "I am an alien"
...     def my_method(self):
...         return "Calling my_method"
...
>>> my_object = MyClass()
>>> print(my_object.my_atribute)
```

More about Classes on W3Schools

Classes

Methods and atributes

```
>>> class MyClass:
...     ....
...         my_atribute = "I am an alien"
...     ....
...         def my_method(self):
...             ....    ....return "Calling my_method"
...
>>> my_object = MyClass()
>>> print(my_object.my_atribute)
I am an alien
```

More about [Classes on W3Schools]

Classes

Methods and atributes

```
>>> class MyClass:
...     my_atribute = "I am an alien"
...     def my_method(self):
...         return "Calling my_method"
...
>>> my_object = MyClass()
>>> print(my_object.my_method)
<bound method MyClass.my_method of <__main__.MyClass object at 0x1087d42b0>>
```

More about Classes on W3Schools

Classes

Methods and atributes

```
>>> class MyClass:
...     my_atribute = "I am an alien"
...     def my_method(self):
...         return "Calling my_method"
...
>>> my_object = MyClass()
>>> print(my_object.my_method())
Calling method
```

More about Classes on W3Schools

Classes

Methods and atributes

```
>>> class Person:
...     ....
...         def __init__(self, name):
...             self.name = name
...         ........
...         def introduce_yourself(self):
...             print("I am {}!".format(
...                 ............self.name))
...
>>> stranger = Person(name="Bruno")
```

More about [Classes on W3Schools]

Classes

Methods and atributes

```
>>> class Person:
...     def __init__(self, name):
...         self.name = name
...     def introduce_yourself(self):
...         print("I am {}!".format(
...             self.name))
...
>>> stranger = Person(name="Bruno")
```

More about Classes on W3Schools

Classes

Methods and atributes

```
>>> class Person:
...     
...     def __init__(self, name):
...         self.name = name
...     
...     def introduce_yourself(self):
...         print("I am {}!".format(
...             self.name))
...
>>> stranger = Person(name="Bruno")
>>> type(stranger)
<class '__main__.Person'>
```

More about Classes on W3Schools

Classes

Methods and atributes

```
>>> class Person:
...     
...     def __init__(self, name):
...         self.name = name
...         
...     def introduce_yourself(self):
...         print("I am {}!".format(
...                 self.name))
...
>>> stranger = Person(name="Bruno")
>>> print(stranger.name)
Bruno
```

More about Classes on W3Schools

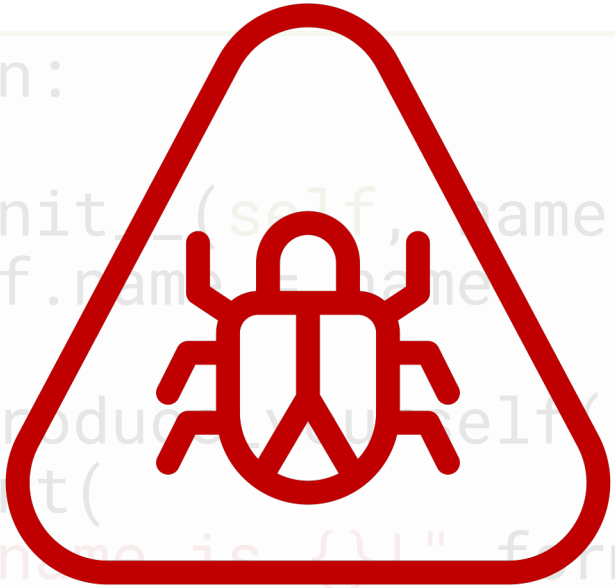
Classes

Methods and atributes

```
>>> class Person:
...     ....
...         def __init__(self, name):
...             self.name = name
...         ........
...         def introduce_yourself(self):
...             print("I am {}!".format(
...                 ............self.name))
...
>>> stranger = Person(name="Bruno")
>>> print(stranger.introduce_yourself())
```

More about [Classes on W3Schools]

Classes



Bug Alert

More about [Classes on W3Schools]

Classes

Bug Alert

```
>>> class Person:
...     
...     def __init__(self, name):
...         self.name = name
...         
...     def introduce_yourself(self):
...         print("I am {}!".format(
...                 self.name))
...
>>> stranger = Person(name="Bruno")
>>> print(stranger.introduce_yourself())
Hello! My name is Bruno!
None
```

More about Classes on W3Schools

Classes

Bug Alert

```
>>> class Person:
...     
...     def __init__(self, name):
...         self.name = name
...     
...     def introduce_yourself(self):
...         print("I am {}!".format(
...                 self.name))
...
>>> stranger = Person(name="Bruno")
>>> stranger.introduce_yourself()
Hello! My name is Bruno!
```

More about Classes on W3Schools

Classes

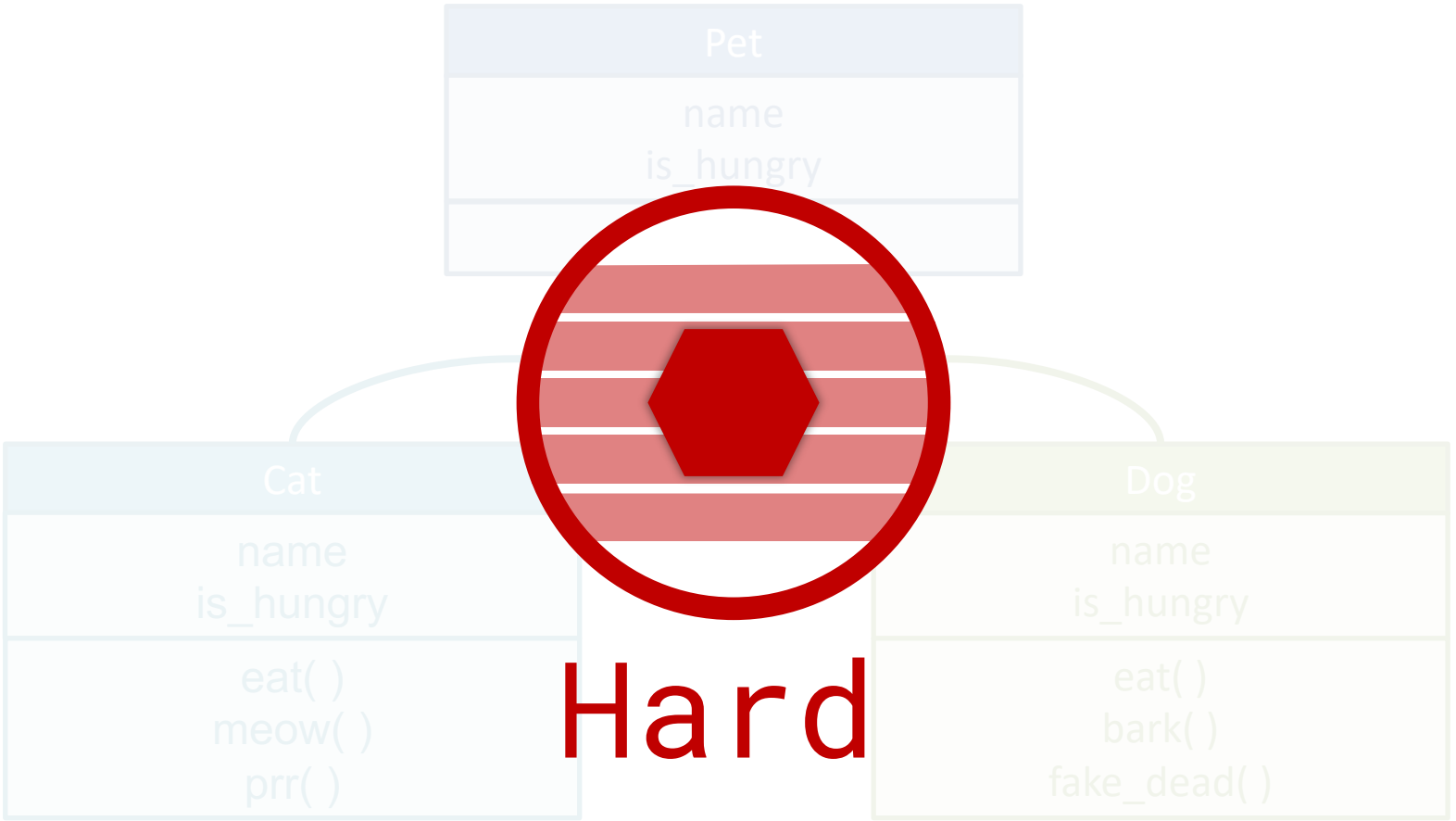
Bug Alert

```
>>> class Person:
...     
...     def __init__(self, name):
...         self.name = name
...     
...     def introduce_yourself(self):
...         return "I am {}!".format(
...                 self.name)
...
>>> stranger = Person(name="Bruno")
>>> print(stranger.introduce_yourself())
Hello! My name is Bruno!
```

More about Classes on W3Schools

Classes

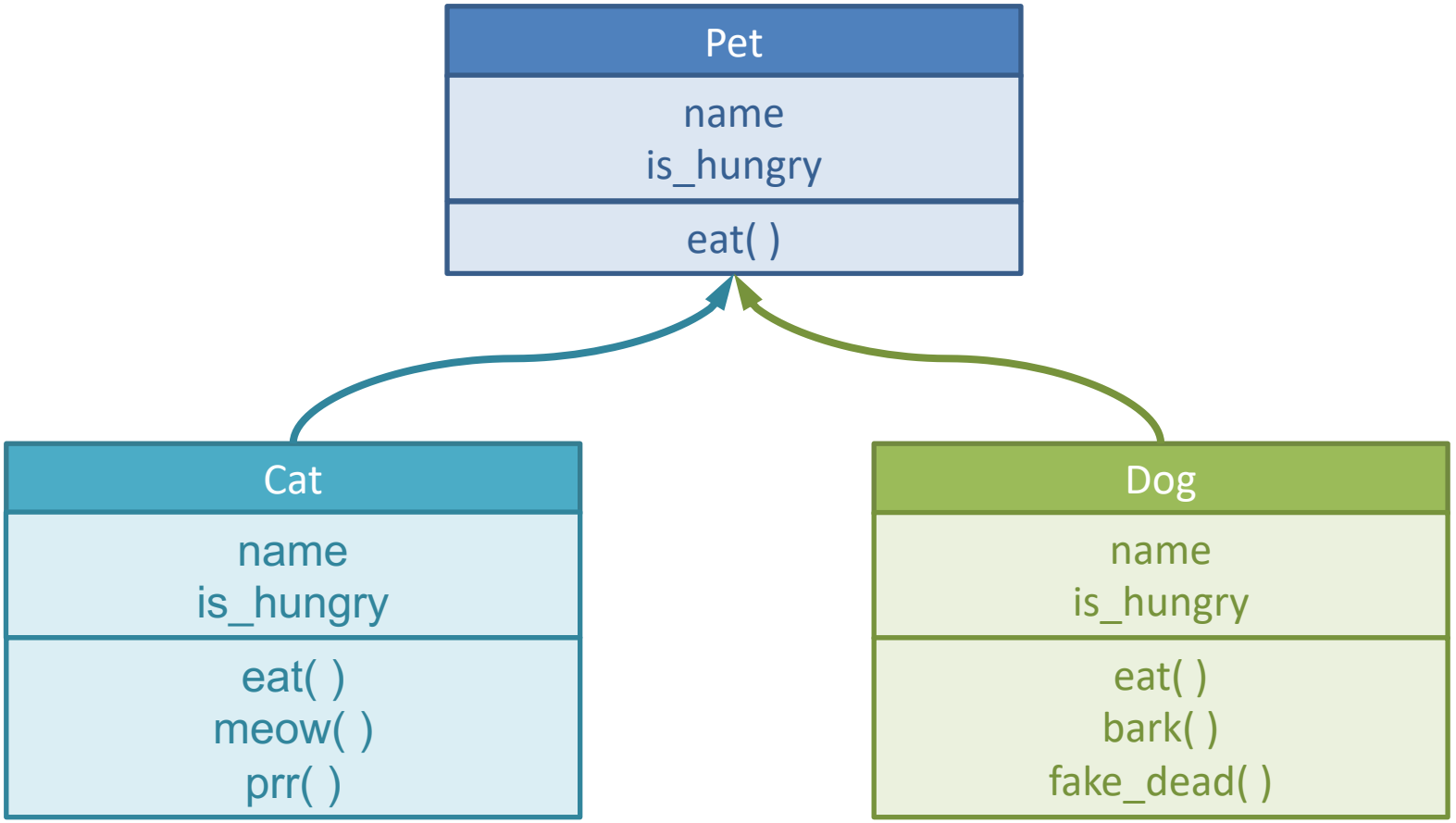
Creating sub-classes
aka: inheritance



Hard

Classes

Creating sub-classes
aka: inheritance



Classes

Creating sub-classes
aka: inheritance

```
>>> class Pet:
...
...     def __init__(self, new_name):
...         self.name = new_name
...         self.is_hungry = True
...
...     def eat(self, food_name):
...
...         print("{} eats {}".format(
...             self.name, food_name))
...
...         self.is_hungry = False
...
```

Classes

Creating sub-classes
aka: inheritance

```
>>> class Cat(Pet):
...     def eat(self, food_name):
...         if food_name not in ['Biscuit']:
...             print("{} eats {}".format(
...                 self.name, food_name)
...             )
...             self.is_hungry = False
...
```

```
>>> class Dog(Pet):
...     def eat(self, food_name):
...         if food_name not in ['Milk']:
...             super(Dog, self).eat(food_name)
...
```

More about Class Inheritance and super()

Classes

Creating sub-classes
aka: inheritance

```
>>> Mila = Cat('Mila')
>>> isinstance(Mila, Pet)
True
>>> isinstance(Mila, Cat)
True
>>> isinstance(Mila, Dog)
False
```

```
>>> Haru = Dog('Haru’)
>>> print(Haru.is_hungry)
True
>>> Haru.eat("Biscuit")
Haru eats Biscuit
>>> print(Haru.is_hungry)
False
```

More about Class Inheritance and super()

Now what?

The Exercise 2 holds a simple example of the basic Python code flow syntax. It includes:

```
- A method
- A class
- A sub-class
- A if/elif/else case
- A for loop
```

Exercise

1. Find all the Syntax Errors before running
2. Debug why the cat is not eating the Meat.
3. Create a new class called Dog and write how it behaves depending on the food it eats.
    1. Create an empty class
    2. Add the *docstring* explaining how it will behave
    3. Implement the actual code in a way it behaves as you explained
4. (Challenge) Add a "while" loop that will only stop when all the pets are not hungry anymore.

Questions?