Python Bootcamp
Basics II

PhD Bruno C. Quint
bquint@ctio.noao.edu
Resident Astronomer at SOAR Telescope

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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

if/elif/else

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

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

Loops and control

if/elif/else

Python relies on identation, so DON'T MESS UP!

```
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

if/elif/else

PEP8 HIGHLY recommends you to use 4 spaces. And NEVER mix spaces and tabs. For more informations, read the PEP-8.

```
fruit = 'banana'
if fruit is 'apple':
....eat_it()
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More at https://docs.python.org/3/tutorial/controlflow.html

Loops and control

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Loops and control

if/elif/else

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fruit = 'banana'
if fruit == 'apple':
....eat_it()
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```

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

Loops and control

for

List, tuples, arrays,
matrixes, dictionaries

```
>>> 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

for

List, tuples, arrays,
matrixes, dictionaries

```
>>> 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

for List, tuples, arrays, matrixes, dictionaries

Using indexes

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

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

Loops and control

for List, tuples, arrays, matrixes, dictionaries

Using indexes

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

for List, tuples, arrays, matrixes, dictionaries

Using indexes

```
>>> my_list = ['a', 'b', 'c']
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len(x) → return the number of elements of x.

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Loops and control

for List, tuples, arrays, matrixes, dictionaries

Using indexes

```
>>> my_list = ['a', 'b', 'c']
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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

for List, tuples, arrays, matrixes, dictionaries

Using indexes

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

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

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Loops and control

for List, tuples, arrays, matrixes, dictionaries

Using indexes

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

```
>>> while some_condition_is_true:
....do_something()
```

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(“ #Success :D ”)
....n_interested = n_interested - 1
....
>>> print(“ #Fail :( ”)
```

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

Loops and control

while

```
>>> n_interested = 5
>>>
>>> while n_interest
    ....print(“ #Su
    ....n_intereste
    ....
>>> print(“ #Fail :( ”)
```

```
$ python foo.py
 #Success :D
 #Success :D
 #Success :D
 #Success :D
 #Success :D
 #Fail :(
```

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

Methods Defining your own

Define a method

```
01 def my_method(x, y):
02 ....""""Add here some description"""
03 ....k = 2 * x - y
04 ....return k
```

More on methods (Functions): [Here]

Methods Defining your own

Define a method

x and **y** are **required** parameters.

```
01 def my_method(x, y):
02 ....“““Add here some description”””
03 ....k = 2 * x - y
04 ....return k
05 ....
06 print(my_method(2, 4))
0
```

More on methods (Functions): [Here]

Methods Defining your own

Define a method

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

```
01 def my_method(x, y):
02 ....“““Add here some description”””
03 ....k = 2 * x - y
04 ....return k
05 ....
06 print(my_method(y=4, x=2))
0
```

More on methods (Functions): [Here]

Methods Defining your own

Define a method

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

```
01 def my_method(x, y, z=1, w=0):
02 ....""""Add here some description"""
03 ....k = 2 * x - y / z + w
04 ....return k
05 ....
06 print(my_method(y=4, x=2))
0
```

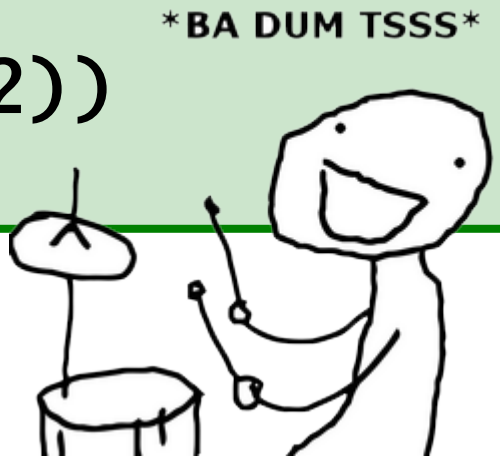
More on methods (Functions): Here

Methods Defining your own

Define a method

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

```
01 def my_method(x, y, z=1, w=0):
02 ....""""Add here some description"""
03 ....k = 2 * x - y / z + w
04 ....return k
05 ....
06 print(my_method(y=4, x=2))
0
```



Default parameters have **default** values.

More on methods (Functions): Here

Methods Defining your own

Define a method

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

```
01 def my_method(x, y, z=1, w=0):
02 ....""""Add here some description"""
03 ....k = 2 * x - y / z + w
04 ....return k
05 ....
06 print(my_method(y=4, x=2, w=5))
5
```

More on methods (Functions): [Here]

Methods Defining your own

Watch out namespaces!

```
01
02 def my_method(x, y):
03 ....""""Add here some description"""
04 ....k = 2 * x - y
05 ....return k
06 ....
07 print(my_method(2, 4))
0
```

More on methods (Functions): [Here]

Methods Defining your own

Watch out namespaces!

```
01
02 def my_method(x, y):
03 ....“““Add here some description”””
04 ....k = 2 * x - y
05 ....return k
06 ....
07 print(my_method(2, 4))
```

More on methods (Functions): [Here]

Methods Defining your own

Watch out namespaces!

```
01
02 def my_method(x, y):
03 ....""""Add here some description"""
04 ....k = 2 * x - y
05 ....return k
06 ....
07 print(my_method(2, 4))
TypeError: my_method() takes 1
positional argument but 2 were given.
```

More on methods (Functions): Here

Methods Defining your own

Watch out namespaces!

```
01
02 def my_method(x, y):
03 ....“““Add here some description”””
04 ....k = 2 * x - y
05 ....return k
06 ....
07 print(my_method(2, 4))
```

More on methods (Functions): [Here]

Methods Defining your own

Watch out namespaces!

```
01
02 def my_method(x, y):
03 ....“““Add here some description”””
04 ....k = 2 * x - y
05 ....return k
06 ....
07 print(my_method(2, 4))
NameError: global name 'x' is not defined
```

More on methods (Functions): [Here]

Methods Defining your own

Watch out namespaces!

```
01 x = 2
02 def my_method(x, y):
03 ....""“Add here some description”""
04 ....k = 2 * x - y
05 ....return k
06 ....
07 print(my_method(4))
0
```

More on methods (Functions): [Here]

Methods Defining your own

Watch out namespaces!

```
01
02 def my_method(x, y):
03 ....“““Add here some description”””
04 ....k = 2 * x - y
05 ....return k
06 ....
07 x = 2
08 print(my_method(4))
0
```

More on methods (Functions): [Here]

Methods Defining your own

Watch out namespaces!

```
01 x = 2
02 def my_method(x, y):
03 ....""“Add here some description”""
04 ....k = 2 * x - y
05 ....return k
06 ....
07 print(my_method(3, 4))
```

More on methods (Functions): [Here]

Methods Defining your own

Watch out namespaces!

```
01 x = 2
02 def my_method(x, y):
03 ....“““Add here some description”””
04 ....k = 2 * x - y
05 ....return k
06 ....
07 print(my_method(3, 4))
2
```

More on methods (Functions): [Here]

Methods Defining your own

Use **lambda**!

```
01 x = 2
02 my_method = lambda x, y: 2 * x - y
03
04 my_method(3, 4)
2
```

More on methods (Functions): [Here]

Methods Defining your own

Re-using your functions

```
01 def my_method(x, y):
02 ....“““Some description”””
03 ....k = 2 * x - y
04 ....return k
05
06 print my_method(3, 4)
```

foo.py

More on methods (Functions): Here

Methods Defining your own

Re-using your functions

```
01 def my_method(x, y):
02 ....“““Some description”””
03 ....k = 2 * x - y
04 ....return k
05
06 print my_method(3, 4)
```

foo.py

```
01 import foo
02 foo.my_method(5, 2)
```

use.py

More on methods (Functions): Here

Methods Defining your own

Re-using your functions

```
01 def my_method(x, y):
02 ....“““Some description”””
03 ....k = 2 * x - y
04 ....return k
05
06 print my_method(3, 4)
```

foo.py

```
01 import foo
02 foo.my_method(5, 2)
```

use.py

```
$ python use.py
2
8
```

More on methods (Functions): Here

Methods Defining your own

Re-using your functions

```
01 def my_method(x, y):
02 ....“““Some description”””
03 ....k = 2 * x - y
04 ....return k
05
06
07 print my_method(3, 4)
```

foo.py

```
01 import foo
02 foo.my_method(5, 2)
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use.py

More on methods (Functions): Here

Methods Defining your own

Re-using your functions

```
01 def my_method(x, y):
02 ....“““Some description”””
03 ....k = 2 * x - y
04 ....return k
05
06 if __name__ == ‘__main__’:
07 print my_method(3, 4)
```

foo.py

```
01 import foo
02 foo.my_method(5, 2)
```

use.py

More on methods (Functions): Here

Methods Defining your own

Re-using your functions

```
01 def my_method(x, y):
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07 ....print my_method(3, 4)
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```
01 import foo
02 foo.my_method(5, 2)
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More on methods (Functions): Here

Methods Defining your own

Re-using your functions

```
01 def my_method(x, y):
02 ....“““Some description”””
03 ....k = 2 * x - y
04 ....return k
05
06 if __name__ == ‘__main__’:
07 ....print my_method(3, 4)
```

foo.py

```
01 import foo
02 foo.my_method(5, 2)
```

use.py

```
$ python use.py
8
```

More on methods (Functions): Here

Methods Using yours

Built-in methods (or Functions)

```
>>> len('Hello World!')
12
>>> range(5)
[0, 1, 2, 3, 4]
>>> type('Aloha!')
<type 'string'>
>>> abs(-5.3)
5.3
```

Check all the build-in functions at
https://docs.python.org/3/library/functions.html

Methods Using yours

Using methods from libs

```
>>> import math
>>> math.sqrt(9)
3
```

For more, check:
https://docs.python.org/3/tutorial/modules.html

Methods Using yours

Using methods from libs

```
>>> import math
>>> math.sqrt(9)
3
>>> import math as m
>>> m.sqrt(9)
3
```

For more, check:
https://docs.python.org/3/tutorial/modules.html

Methods Using yours

Using methods from libs

```
>>> from math import sqrt, log
>>> sqrt(9)
3
>>> log(10)
1
```

For more, check:
https://docs.python.org/3/tutorial/modules.html

Methods Using yours

Using methods from libs

```
>>> from math import *
>>> sqrt(9)
3
>>> log(10)
1
```

For more, check:
https://docs.python.org/3/tutorial/modules.html

Methods Using yours

Using methods from libs

```
>>> from math import *
>>> from numpy import *
>>> sqrt(9)
3
>>> x = array([1, 4, 9])
>>> sqrt(x)
[1, 2, 3]
```

For more, check:
https://docs.python.org/3/tutorial/modules.html

Methods Using yours

Using methods from libs

```
>>> from numpy import *
>>> from math import *
>>> sqrt(9)
3
>>> x = array([1, 4, 9])
>>> sqrt(x)
TypeError: only length-1 arrays can be converted to Python scalars
```

For more, check:
https://docs.python.org/3/tutorial/modules.html

Methods Using yours

Using methods from libs

```
>>> from numpy import *
>>> from math import *
>>> sqrt(9)
3
>>> x = array([1, 4, 9])
>>> sqrt(x)
TypeError: only length-1 arrays can be converted to Python scalars
```

For more, check:
https://docs.python.org/3/tutorial/modules.html

Methods Using yours

Using methods from libs

```
>>> from math import sqrt as msqrt
>>> from numpy import sqrt as nsqrt
>>> msqrt(9)
3.
>>> nsqrt([1, 4, 9])
[1., 2., 3.]
```

For more, check:
https://docs.python.org/3/tutorial/modules.html

Methods Using yours

Using methods from libs

```
>>> import math
>>> import numpy as np
>>> math.sqrt(9)
3.
>>> np.sqrt([1, 4, 9])
[1., 2., 3.]
```

For more, check:
https://docs.python.org/3/tutorial/modules.html

Methods Using yours

Using methods from objects

```
>>> s = 'Hello World!'
>>> s.lower()
'hello world!'
>>> s.isdigit()
False
```

For more, check:
https://docs.python.org/3/tutorial/modules.html

Gathering information

The built-in function **help()**

```
>>> def double(x):
>>> ....“““Doubles the value of x”””
>>> ....return 2 * x
>>>
```

Different DocString Styles here.

Help on built-in function **help()** here.

Gathering information

The built-in function **help()**

```
>>> help(double_value)
    Help on function double_value:

double_value(x)
    Return the double of x
```

Help on built-in function **help()** here.

Gathering information

The built-in function **help()**

```
>>> y = 3.
>>> help(y)
Help on float object:

    class float(object)
 |  float(x) -> floating point number
 |
 |  Convert a string or number to a floating point
 |  number, if possible.
...
```

Help on built-in function **help()** here.

Gathering information

The built-in function **help()**

```
>>> y = 3.
>>> help(y)
```

```
>>> z = 3
>>> help(z)
```

```
>>> s = 'a string'
>>> help(s)
```

Help on built-in function **help()** here.

Gathering information

The built-in function **dir()**

```
>>> y = 3.
>>> dir(y)
['__abs__',
 '__add__',
  ...,
 'is_integer',
 'real']
```

Help on built-in function dir() here.

Gathering information

The built-in function **dir()**

```
>>> y = 3.
>>> dir(y)
['__abs__',
 '__add__',
  ...,
 'is_integer',
 'real']
```

```
>>> y = 3
>>> dir(y)
['__abs__',
 '__add__',
  ...,
 ‘real',
 ‘to_bytes']
```

Help on built-in function dir() here.

Gathering information

The built-in function **dir()**

```
>>> y = 3.
>>> dir(y)
['__abs__',
 '__add__',
 ...,
 'is_integer',
 'real']
```

._variable

is semiprivate and meant just for convention

.__variable

is considered superprivate and gets namemangled to prevent accidental access

.__variable__

is typically reserved for builtin methods or variables

Help on built-in function dir() here.

Questions?