Libraries

Data Types

Python Beginner's Workshop In Collaboration with the Pikes Peak Library District 21st Century Library

Ryan E. Freckleton

PySprings

2017-08-19



Introduction

First Steps

Outline

- ► Introduction
- ► First Steps
 - Running Python
 - Expressions
- ► Data Types
 - ► Strings
 - ▶ Lists
 - Dictionaries
- ▶ Libraries
- Libraries .
 - Environments
 - Third-Party Packages
- Control Flow
 - Booleans
 - ► Looping and Branching



- Treat everyone with the respect due their inherent dignity.
- ► All communication should be appropriate for a professional audience including people of many different backgrounds.
- Be kind to others. Make an environment conducive to learning. Behave professionally.
- ▶ Thank you for helping make this a welcoming, friendly event for all.
- Contact the organizers atpysprings@pysprings.org orhttp://sayat.me/pysprings (anonymous)





Beginning Python **PySprings**

Libraries

Control Flow

PySprings

Introduction

Greetings

Beginning Python

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Learning Goals

First Steps

Introduction

1-2-4-All

► What's one thing you know about programming in Python?

Data Types

What's one thing that you'd like to learn about programming in Python?



Control Flow



Beginning Python

Introduction Short lecture introducing a new concept from Python

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Introduction

Learning Cycle

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Learning Cycle

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Introduction

Exploration Hands-on application of the concept introduced. Work in groups and collaborate if you prefer! Explore the material in a hands-on manner

Introduction Short lecture introducing a new concept from Python



Beginning Python **PySprings**

Learning Cycle

Introduction Short lecture introducing a new concept from Python

Exploration Hands-on application of the concept introduced.

Work in groups and collaborate if you prefer! Explore the material in a hands-on manner

Invention What have we learned through our exploration? What surprises did we encounter? What mysteries did we uncovered?

Application With our newly "invented" knowledge, what can we do? Thisleads into a new exploration phase



Beginning Python PySprings

Learning Cycle

Introduction Short lecture introducing a new concept from Python

Exploration Hands-on application of the concept introduced.

Work in groups and collaborate if you prefer! Explore the material in a hands-on manner

Invention What have we learned through our exploration? What surprises did we encounter? What mysteries did we uncovered?

Application With our newly "invented" knowledge, what can we do? Thisleads into a new exploration phase



Beginning Python PySprings

Programming is simply the act of entering instructions for the

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What is Programming?

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What is Programming?

First Steps

▶ Programming is simply the act of entering instructions for the computer to perform



Control Flow

Introduction

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Introduction

- Programming is a creative activity
- It doesn't involve much math

First Steps

▶ Programming is simply the act of entering instructions for the computer to perform



Control Flow



Beginning Python

An Example

```
passwordFile = open('SecretPasswordFile.txt')
secretPassword = passwordFile.read()
print('Enter your password.')
typedPassword = input()
if typedPassword == secretPassword:
    print('Access granted')
    if typedPassword == '12345':
        print('That one is used on luggage.')
else:
    print('Access denied')
```

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Running Python

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```
>>> print("Hello, World!")
and
```

```
>>> import this
```

enter the following into the interactive prompt:

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Control Flow

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Running Python

Running Python

\$ python3

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Beginning Python

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Installing Python

and run it with

\$ python3 script.py

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► What other take-aways are there from this session, what could you use from it in the future?



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What mysteries, if any, did you encounter?

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▶ What problems, if any, did you encounter?

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- ► What mysteries, if any, did you encounter?
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Notation

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When you see an example like:

First Steps

```
>>> print("Hello, World!")
```

it means to type that out in the interactive prompt. When you see an example like:

example.py

```
print("Hello, World!)
```

it means to type that out into a file, in this case, named example.py.



Control Flow

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First Steps **Expressions** Beginning Python **PySprings**

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Python as a Calculator

First Steps

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Data Types

```
>>> 100 * 2
200
>>> (1 + 2 + 3 + 4 + 5 + 6) / 6
3.5
>>> 1 - 2*100 + 3*12
- 163
>>> abs(-163)
163
```



Libraries

```
▶ Does python obey order of operations?
```

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unctions:

Turiculoris.

Python Math Operations

► abs bin hex oct ord round

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- ▶ divmod min max pow
- ► What's the difference between these two lists of functions?



▶ What's the difference between these two lists of functions?

▶ Does python obey order of operations?

▶ abs bin hex oct ord round

divmod min max pow

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```
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```

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Python Math Operations

Operators:

Functions:

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Python Math Operations

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Operators:

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Does bython obey order of operations

Functions:

- ▶ abs bin hex oct ord round
- ▶ divmod min max pow
- ► What's the difference between these two lists of functions?



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- **>** % ** //
- Does python obey order of operations?

Functions:

- ▶ abs bin hex oct ord round
- divmod min max pow

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What's the difference between these two lists of functions?



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Operators:

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- **>** % ** //
- Does python obey order of operations?

Functions:

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Operators:

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Operators:

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- **>** % ** //
- ► Does python obey order of operations?

Functions:

- ▶ abs bin hex oct ord round
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Python Math Operations

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Operators:

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- **»** ** //
- ► Does python obey order of operations?

Functions:

- ▶ abs bin hex oct ord round
- ▶ divmod min max pow
- ▶ What's the difference between these two lists of functions?



▶ What other take-aways are there from this session, what could

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```
hello() 7 8
```

hello()

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print('Howdy!!!')
print('Hello there.')

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```
print('Hello ' + name)
hello('Alice')
hello('Bob')
```



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return a + b

print(add(1,2) + add(3,4))

print(add(1,2))

Data Types Strings Beginning Python **PySprings**

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Control Flow

>>> help(str)

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Strings

Strings

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Strings

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"This is 'a' string" 'This is "a" string'

>>> help(str)

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Libraries

'This is "a" string'
We can also get more information from python:

First Steps

'This is also a string.'
"This is 'a' string"

>>> help(str)



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Strings

Strings

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```
>>> 'this is a string'.title()
'This Is A String'
>>> 'this is a string'.upper()
'THIS IS A STRING'
>>> 'what ARE you doing!?'.lower()
'what are you doing!?'
>>> " there's whitespace in this ".strip()
"there's whitespace in this string."
```

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```
$ python3 hello.py
```

First Steps

print('Hello, ' + name + '!')

Control Flow

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Hello again

let's try it!

Strings

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Strings

Mhat mysteries if any did you encounter

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>>> s = 'We are the Knights who say ni!'

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>>> s[7:10]

>>> s[-7:-4]

'the'

'say'

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```
>>> mylist = [1, 2, 'three', "4", 5.3]
>>> s = "What are the words in this string?"
>>> s.split()
['What', 'are', 'the', 'words', 'in', 'this',
   'string?'
>>> words = s.split()
>>> words.sort()
>>> words
['What', 'are', 'in', 'string?', 'the', 'this'
   . 'words'l
```

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What are the methods of list?

>>> dir(list)

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Data Types **Dictionaries**

Data Types

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```
>>> myCat = {'size': 'fat', 'color': 'gray',
... 'disposition': 'loud'}
>>> myCat['size']
'fat'
>>> 'My cat has ' + myCat['color'] + ' fur.'
'My cat has gray fur.'
```



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Dictionaries

What are the methods of list?

>>> help(dict)
>>> dir(dict)

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virtualenv

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- virtualenv raindrop
- . raindrop/source/bin/activate # Linux and OSX
- randrop\Scripts\activate # Windows



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Third-Party Packages

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\$ pip3 install requests

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Installing Third-Party Packages



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Third-Party Packages

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Finding Third-Party Packages

http://pypi.python.org

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Requests Example

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```
requests script.py
```

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```
import requests
resp = requests.get('http://httpbin.org/ip')
print(resp.json())
```



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>>> bool("")

>>> bool([])

False

False

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Booleans

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Looping and Branching

This Is A

Looping and Branching

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"Enter the secret word: "

print("Access granted.")

Data Types

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Boolean operators:

password = input(

```
▶ == != <= >= > < in
```

if password == "sesame":

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```
if password == "sesame":
    print("Access granted.")
else:
    print("Access denied!")
Boolean operators:
 ▶ == '= <= >= > < in
```

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Looping and Branching While Loop

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```
while True:
    password = input("Enter the secret word: ")
    if password == "sesame":
        print("Access granted.")
        break
    else:
        print("Access denied!")
```



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- ▶ What other take-aways are there from this session, what could



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elif

Looping and Branching

Looping and Branching

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```
age = int(input("How old are you? "))
if age < 18:
    print("You're not old enough dance.")
elif age == 18:
    print("Welcome, is it your first time here?")
else:
    print("You can dance if you want to, you can le</pre>
```

Control Flow

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Introduction

Practice Problems

- ▶ Write code that prints Hello if 1 is stored in spam, prints Howdy if 2 is stored in spam, and prints Greetings! if anything else is stored in spam.
- ▶ Write a short program that prints the numbers 1 to 10 using a for loop. Then write an equivalent program that prints the numbers 1 to 10 using a while loop.
- ▶ Write a function named collatz() that has one parameter named number. If number is even, then collatz() should print number // 2 and return this value. If number is odd, then collatz() should print and return 3 * number + 1.



Practice Problems

► Say you have a list value like this:

```
spam = ['apples', 'bananas', 'tofu', 'cats']
```

Write a function that takes a list value as an argument and returns a string with all the items separated by a comma and a space, with and inserted before the last item. For example, passing the previous spam list to the function would return 'apples, bananas, tofu, and cats'. But your function should be able to work with any list value passed to it.



Practice Problems

➤ You are creating a fantasy video game. The data structure to model the player's inventory will be a dictionary where the keys are string values describing the item in the inventory and the value is an integer value detailing how many of that item the player has. For example, the dictionary value

```
{'rope': 1, 'torch': 6, 'gold coin': 42,
  'dagger': 1, 'arrow': 12}
```

means the player has 1 rope, 6 torches, 42 gold coins, and so on.



Libraries

Practice Problems

Introduction

Write a function named displayInventory() that would take any possible "inventory" and display it like the following:

```
Inventory:
```

- 12 arrow
- 42 gold coin
- 1 rope
- 6 torch
- 1 dagger
- Total number of items: 62

First Steps



Conclusion

- ► Final Takeaways (1-2-4-all)
- Surveyhttps://goo.gl/forms/ZpNl0z8pw5J8J8Rv1
- ► Feedback —http://sayat.me/pysprings
- ► Based onhttps://automatetheboringstuff.com/



Projects!

- Daily Programmerhttps: //www.reddit.com/r/dailyprogrammer/
 - ► Game of Threes
- WordPlayhttps://github.com/jesstess/Wordplay
- ► Colorwallhttps://github.com/jesstess/ColorWall

