Python Beginner's Workshop

In Collaboration with the Pikes Peak Library District 21st Century Library

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PySprings

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Outline

Conduct

- 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 at pysprings@pysprings.org or `https://sayat.me/pysprings` (anonymous)

PySprings

Greetings

1. Your name
2. How did you get here?

Learning Goals

1-2-4-All

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

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? This leads into a new exploration phase

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What is Programming?

- Programming is a creative activity
- It doesn't involve much math
- Programming is simply the act of entering instructions for the computer to perform

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An Example

```
passwordFile = open('SecretPasswordFile.txt')                1
secretPassword = passwordFile.read()                         2
print('Enter your password.')                                3
typedPassword = input()                                      4
if typedPassword == secretPassword:                          5
    print('Access granted')                                  6
    if typedPassword == '12345':                             7
        print('That one is used on luggage.')               8
else:                                                        9
    print('Access denied')                                   10
```

Outline

Running Python

Example

run python with:

```
$ python
```

enter the following into the interactive prompt:

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

and

```
>>> import this
```

exit with:

```
>>> exit()
```

Running a Python Script

Let's create script.py now

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

and run it with

```
$ python script.py
```

Invention

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

When you see an example like:

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

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

example.py

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

1

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

Outline

Python as a Calculator

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

Python Math Operations

Operators:

- `+ - * /`
- `% ** //`
- 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?

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Functions

```
def hello():
    print('Howdy!')
    print('Howdy!!!')
    print('Hello there.')

hello()
hello()
hello()
```

Functions

```
def hello(name):
    print('Hello ' + name)

hello('Alice')
hello('Bob')
```

Functions

```
def add(a, b):
      return a + b

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

Outline

Strings

Examples

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

We can also get more information from python:

```
>>> help(str)
```

Strings

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Strings

More Examples

```
>>> '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."
```

Hello again

hello.py

```
name = input('What is your name? ')
print('Hello, ' + name + '!')
```

let's try it!

```
$ python hello.py
```

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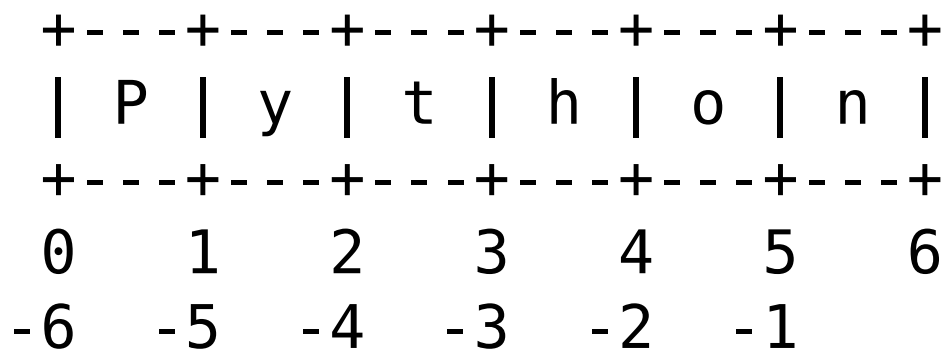
Indexing

```
>>> s = 'We are the Knights who say ni!'
>>> s[0]
'W'
>>> s[-1]
'!'
>>> s[7:10]
'the'
>>> s[-7:-4]
'say'
```

Indexing



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Outline

Lists

```
>>> 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']
```

Lists

What are the methods of list?

Remember:

```
>>> help(list)
```

and try out:

```
>>> dir(list)
```

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Outline

Dictionaries

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

Dictionaries

What are the methods of list?

Remember:

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

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Outline

Environments

virtualenv

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

Outline

Installing Third-Party Packages

```
$ pip install requests
```

Finding Third-Party Packages

`https://pypi.org/` (newer)
`https://pypi.python.org` (original)

Requests Example

requests_script.py

```
import requests                                    1
resp = requests.get('http://httpbin.org/ip')       2
print(resp.json())                                 3
```

Outline

Booleans

```
>>> bool(1)
True
>>> bool(0)
False
>>> bool("no")
True
>>> bool("")
False
>>> bool([])
False
>>> bool([42])
True
```

Outline

Looping and Branching

```
>>> words = 'this is a list of words'.split()
>>> for word in words:
...     print(word.title())
...
This
Is
A
List
Of
Words
```

Looping and Branching

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

Boolean operators:

- == != <= >= > < in

Looping and Branching

```
password = input(
    "Enter the secret word: "
)
if password == "sesame":
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```

Boolean operators:

- `==` `!=` `<=` `>=` `>` `<` `in`

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Looping and Branching

While Loop

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

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Looping and Branching

elif

```
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
```

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 the word "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.

Practice Problems

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
```

Conclusion

- Final Takeaways (1-2-4-all)
- Survey `https://goo.gl/forms/ZpNl0z8pw5J8J8Rv1`
- Feedback – `https://sayat.me/pysprings`
- Based on `https://automatetheboringstuff.com/` released under 

Projects!

- Daily Programmer
  `https://www.reddit.com/r/dailyprogrammer/`
  - Game of Threes `https://redd.it/3r7wxz`
  - Rövarspråket (Robber's Language)
    `https://redd.it/341c03`
- WordPlay `https://github.com/jesstess/Wordplay`
- Colorwall
  `https://github.com/jesstess/ColorWall`