Python Beginner's Workshop

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

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PySprings

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Data Types

Outline

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Practice Problems

Final Takeaways Projects!



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)



Control Flow

Data Types

1. Your name

First Steps

2. How did you get here?



Control Flow

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Learning Goals

First Steps

Introduction

1-2-4-AII

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



Introduction Short lecture introducing a new concept from Python

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Introduction Short lecture introducing a new concept from Python

 ${\color{red}\textbf{Exploration}} \ \ \textbf{Hands-on application of the concept introduced}.$

What have we learned through our exploration?

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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



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



Learning Cycle

Introduction Short lecture introducing a new concept from Python

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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?

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What is Programming?

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Introduction

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



An Example

First Steps

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```
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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>>> exit()

and

exit with:

Running Python

Running Python

Example

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

>>> **import** this

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Control Flow

Running a Python Script

Let's create script.py now

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

and run it with

\$ python3 script.py



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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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Invention

- ► What problems, 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!)
```

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



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Pušprings
```

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>>> 1 - 2*100 + 3*12

>>> **abs**(-163)

Python as a Calculator

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

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abs bin hex oct ord round

divmod min max pow

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Python Math Operations

Operators:

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

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Python Math Operations

Operators:

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

Functions

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

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Python Math Operations

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



Control Flow

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Operators:

Expressions

- **>** + *
- **>** % ** //
- ▶ 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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Control Flow

Operators:

- **-** + +
- **>** % ** //
- ▶ 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?



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?



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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print('Howdy!')

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

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



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Expressions

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Functions

Expressions

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

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

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

print(add(1,2))

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

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>>> help(str)

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Pu**š**prings

Strings

Strings

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

>>> help(str)

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Examples

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

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We can also get more information from python:

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



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>>> 'this is a string'.title()

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More Examples

```
'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."
```



Control Flow

Hello again

hello.py

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

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let's try it!

\$ python3 hello.py

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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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Strings

Indexing

' | '

'the'

'sav'

>>> s[7:10]

>>> s[-7:-4]

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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?'l
>>> words = s.split()
>>> words.sort()
>>> words
['What', 'are', 'in', 'string?', 'the', 'this'
   . 'words'l
```

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Lists

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What are the methods of list?

and try out:

>>> dir(list)

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Dictionaries

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Dictionaries

```
>>> 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

Dictionaries

What are the methods of list?

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

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virtualenv

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virtualenv raindrop

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- . raindrop/source/bin/activate # Linux and OSX

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randrop\Scripts\activate # Windows



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Finding Third-Party Packages

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Third-Party Packages

Requests Example

```
requests_script.py
```

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



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True

False

>>> bool("")

>>> bool([]) False >>> bool([42])

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Looping and Branching

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

Boolean operators

```
▶ == != <= >= > < in
```



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```
password = input(
    "Enter the secret word: "
)
if password == "sesame":
    print("Access granted.")
else:
    print("Access denied!")
Boolean operators:
    == != <= >= > < in</pre>
```



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

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Looping and Branching

Looping and Branching While Loop

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



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

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Looping and Branchin

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</pre>
```



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Practice Problems

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

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

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.



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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
 - o torci
 - 1 dagger

Total number of items: 62



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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 massed



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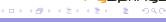
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Projects!





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Projects!

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

