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

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PySprings

2017-04-08



## Outline

- ► Introduction
- ► First Steps
  - Running Python
  - Expressions
- Data Types
  - ► Strings
    - ▶ Lists
    - Dictionaries
- ▶ Libraries
- Elbraries
  - 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 at pysprings@pysprings.org or http://sayat.me/pysprings (anonymous)





Beginning Python PySprings

Libraries

Control Flow

**PySprings** 

Introduction

Greetings

Beginning Python

First Steps

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# Learning Goals

First Steps

Introduction

## 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?





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Introduction

Learning Cycle

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# Learning Cycle

First Steps

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

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



Control Flow

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# 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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# 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



PvSprings

Beginning Python

Libraries

What is Programming?

First Steps

Programming is simply the act of entering instructions for the



Control Flow

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# What is Programming?

Introduction

It doesn't involve much math

First Steps

▶ Programming is simply the act of entering instructions for the



Libraries

# What is Programming?

- ► 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

Introduction

# 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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First Steps

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```
$ python
enter the following into the interactive prompt:
>>> print("Hello, World!")
and
```

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>>> **import** this



Control Flow

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Running Python

Libraries

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Installing Python

and run it with

\$ python script.py

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▶ What problems, if any, did you encounter?

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- What mysteries if any did you encounter
- ▶ What other take-aways are there from this session, what could vou use from it in the future?

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# Notation

Introduction

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.



**Expressions** 

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### Beginning Python

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Python as a Calculator

>>> 100 \* 2

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

Libraries

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Expressions

**>** % \*\* //

Python Math Operations

▶ Does python obey order of operations?

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

First Steps

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**PySprings** 

Control Flow

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

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Python Math Operations

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

### Functions:

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

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Python Math Operations

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# Operators:

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



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Control Flow

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**Functions** 

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

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hello() hello()

Libraries

```
Pušprings
```

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Expressions

**Functions** 

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

print('Hello ' + name)

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

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**Functions** 

return a + b

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Data Types

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Strings

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>>> help(str)

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Strings

Strings

First Steps

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

>>> help(str)

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Libraries

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

We can also get more information from such as

First Steps

'This is also a string.'

We can also get more information from python:

>>> help(str)



Control Flow

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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
"there's whitespace in this string."
```

First Steps



Control Flow

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Strings

".strip()

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Libraries

Control Flow

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Hello again

hello.py

let's try it!

Beginning Python

\$ python hello.py

Strings

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Control Flow

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Introduction

Indexing

>>> s[7:10]

>>> s[-7:-4]

'the'

'say'

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#### Lists

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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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Lists

What are the methods of list?

>>> dir(list)

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Dictionaries

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## Dictionaries

Introduction

```
>>> 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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Libraries

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Dictionaries

**Dictionaries** 

What are the methods of list?

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

Remember:

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randrop\Scripts\activate # Windows

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

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**Environments** 

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Third-Party Packages

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\$ pip install requests

Installing Third-Party Packages

First Steps



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http://pypi.python.org

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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**Booleans** 

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Control Flow Booleans

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```
True
```

Introduction

**Booleans** 

Booleans

True

False

False

>>> **bool**("no")

>>> bool("")

>>> bool([])

>>> **bool**([42])

First Steps



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Looping and Branching

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Looping and Branching

```
>>> for word in words:
        print word.title()
```

Looping and Branching

First Steps

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Looping and Branching

List 0f

Words

Libraries



```
Looping and Drancining
```

First Steps

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

Boolean operators

```
▶ == != <= >= > < in
```



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print("Access granted.")

print("Access denied!")

▶ == '= <= >= > < in

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else:

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Boolean operators:

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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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Looping and Branching

```
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?")</pre>
```

First Steps

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Looping and Branching

else:

Looping and Branching

print("You can dance if you want to, you can le

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Control Flow

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#### 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.



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Looping and Branching

#### 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.



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#### 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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#### 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)
- Survey https://goo.gl/forms/ZpNl0z8pw5J8J8Rv1
- ► Feedback http://sayat.me/pysprings
- ► Based on https://automatetheboringstuff.com/released under



Looping and Branching

### Projects!

- Daily Programmer https://www.reddit.com/r/dailyprogrammer/
  - ► Game of Threes
- WordPlay https://github.com/jesstess/Wordplay
- ► Colorwall https://github.com/jesstess/ColorWall



