DATA SCIENCE 101: FUNCTIONS & LIBRARIES

AGENDA

- Going through lab answers
- Recap of previous lessons
- Python iterations

RECAP OF PREVIOUS LESSON

- While loops (indefinite)
- Infinite loops
- for loops (definite)
  - Finding the largest/smallest
  - Counting
  - Summing
  - Average
  - Filtering results
- Range for loop

INTRODUCTION TO FUNCTIONS

- What are functions?
- Purpose of functions?
- What do functions look like?
- Types of iteration constructs (While & For)

INTRODUCING FUNCTIONS

```
def helloWorld():
    print('Hello World!')

helloWorld()
```

Step 1: Define
Defining what kind of action a function should perform

Step 2: Invoke
Call upon the defined function to perform the action. The action is only performed when you call upon it

```
Output:
Hello World!
```

- Function names are arbitrary and you can name them however you like (names adhere to same rules as that of variable-names)

WHAT ARE FUNCTIONS?

- Definition: A function is something you can call (possibly with some parameters, i.e., the things in parentheses), which performs an action
- There are two kinds of functions in python
- Built-in functions that were provided as part of python
  - print()
  - max()
  - mean()
  - Int()
- Functions we built and defined ourselves such as the helloWorld example earlier
- We treat the built-in function names as reserved words and thus do not use them as variable names

WHY USE FUNCTIONS?

- Functions are extremely useful because:
  - They make code reusable
  - They make a program more structured & more readable, especially when it gets longer
  - They make it is easier to work with several programmers

UNDERSTANDING FUNCTIONS WITH JUPYTER NOTEBOOK*

- For now, let's go to the In-Class Functions jupyter notebook to better understand what functions is exactly all about (till before python library)

IN SUMMARY: REUSING STEPS THROUGH FUNCTIONS

- Earlier we said that function allows us to reuse codes, and we shall see how so exactly

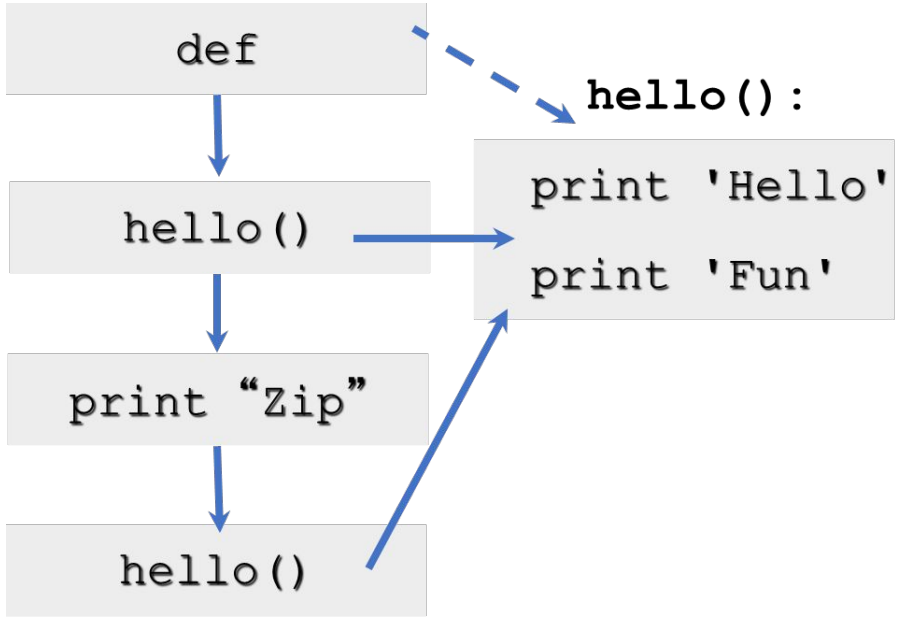
Program:

```
def thing():
    print('Hello')
    print('Fun')

thing()
print('Zip')
thing()
```

Output:

```
Hello
Fun
Zip
Hello
Fun
```



IN SUMMARY: RETURNING A RESULT FROM A FUNCTION

- We use the keyword “return” to return the results of our function

```
def helloWorld():
    return 'Hello World!'

message = helloWorld()
print(message)
```

message

‘Hello World!’

Output:

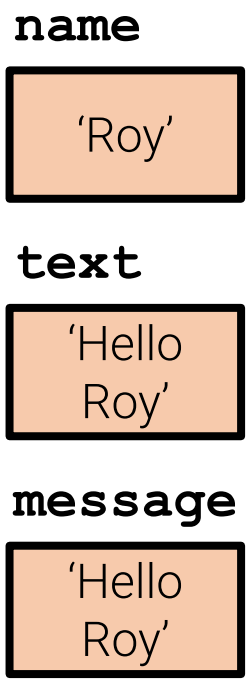
Hello World!

IN SUMMARY: FUNCTION WITH PARAMETERS

- You can also define functions that takes in variables as parameters

```
def helloWorld(name):
    text = 'Hello ' + str(name)
    return text

message = helloWorld('Roy')
print(message)
```



Output:

Hello Roy

LIBRARIES

- What are libraries?
- Common Python libraries:
  - Math
  - Statistics
  - Regular Expression

LIBRARIES

- Libraries are collections of functions that are already written
- When you import a library to your code, you can call on all of the functions within that collection without writing the functions yourself
- max(), int(), len() etc..
- One of the most important ability a good programmer needs, is the ability to learn to tap on libraries
- Especially in data science, we will be using a lot of methods that are in-built within python

PYTHON LIBRARY: MATH FUNCTIONS*

- The Python library that provides many mathematical functions
  - https://docs.python.org/3/library/math.html
- Some functions include:
  - ceil()
  - factorial()
  - floor()
  - exp()
  - log()
  - pow()
  - sqrt()

PYTHON LIBRARY: STATISTICS FUNCTIONS*

- The Python library that provides many statistics functions
  - https://docs.python.org/3/library/statistics.html
- Some functions include:
  - mean()
  - mode()
  - median()
  - stddev()
  - variance()

PYTHON LIBRARY: REGULAR EXPRESSION FUNCTIONS*

- The most used library for data cleaning
  - https://docs.python.org/3/library/re.html
  - Suppose I want to remove the non alphanumeric text in '(&^%Roy$*(^!', how do we do that?
  - Suppose I want to remove html codes in a text 'Roy', how do we do that?
- *Hint: Google/stack overflow for answer is faster!*
- Interesting RE Video: https://www.youtube.com/watch?v=R1PcJfzsUU0