Python Functions

Describing Functions

- **Code**

  Python, App Inventor, …
- **Human language**

  English, Spanish, …
- **Pseudocode**

  Mix of code and human language

Describing Functions

- Accepts ___ as arguments
- Does _____
- Returns _____

Example: Describe `range()`

```
In [ ]:   range(3)
Out[ ]:   [0, 1, 2]
```

Example: Describe `range(stop)`

```
In []:  range(3)
Out[]:  [0, 1, 2]
```

Human Language

- Accepts a numeric value for stop
- Returns a list that counts from 0 up to stop, except that it stops short of actually including stop.

Example: Describe `range(stop)`

```
In []:  range(3)
Out[]:  [0, 1, 2]
```

Pseudocode

start with an empty list

```
counter = 0
while counter<stop:
```

    put `counter` in the list

```
    counter = counter + 1
```

return the list

Example: Describe `range(stop)`

```
In [ ]:  range(3)
Out[ ]:  [0, 1, 2]
```

```
1  def range(stop):
2      '''Accept numeric value for stop
3      Return a list from 0 to stop, not
4      including stop
5      '''
6      number_list = [] # Start empty list
7      counter = 0
8      while counter<stop:
9          # Put counter in the list
10         number_list.append(counter)
11         counter = counter + 1
12     return number_list
```

Docstring Protocols

- Provide a convenient way to associating documentation w//Python modules, functions, classes etc…
- Used like a comment but for specific segment of code
- UNLIKE code comments the docstring should describe WHAT the function DOES, not how
- ALL functions should have a docstring

Taken from: http://www.pythonforbeginners.com/basics/python-docstrings/ ; 1/17/17

Docstring Format Rules

- Should begin with a capital letter and end with a period.
- First line should be a short description
- DON’T write name of object
- If more lines in string, second line should be blank
- Following lines should be one / more paragraphs describing calling conventions etc…

Taken from: http://www.pythonforbeginners.com/basics/python-docstrings/ ; 1/17/17

Docstring Example

```
def my_function():
    """Do nothing, but document it.

    No, really, it doesn't do anything.
    """
    pass
```

Taken from: http://www.pythonforbeginners.com/basics/python-docstrings/ ; 1/17/17

Docstring (documentation string)

```
1  def range(stop):
2      '''Accept numeric value for stop
3      Return a list from 0 to stop, not
4      including stop
5      '''
6      number_list = [] # Start empty list
7      counter = 0
8      while counter<stop:
9          # Put counter in the list
10         number_list.append(counter)
11         counter = counter + 1
12     return number_list
```

`def` statement

Pseudocode → comments

```
1  def range(stop):
2      '''Accept numeric value for stop
3      Return a list from 0 to stop, not
4      including stop
5      '''
6      number_list = [] # Start empty list
7      counter = 0
8      while counter<stop:
9          # Put counter in the list
10         number_list.append(counter)
11         counter = counter + 1
12     return number_list
```

`def` statement

Defines a function

```
1  def range(stop):
2      '''Accept numeric value for stop
3      Return a list from 0 to stop, not
4      including stop
5      '''
6      number_list = [] # Start empty list
7      counter = 0
8      while counter<stop:
9          # Put counter in the list
10         number_list.append(counter)
11         counter = counter + 1
12     return number_list
```

def statement

Function name (arguments)

```
1  def range(stop):
2      '''Accept numeric value for stop
3      Return a list from 0 to stop, not
4      including stop
5      '''
6      number_list = [] # Start empty list
7      counter = 0
8      while counter<stop:
9          # Put counter in the list
10         number_list.append(counter)
11         counter = counter + 1
12     return number_list
```

`def` statement

Indented body

```
1  def range(stop):
2      '''Accept numeric value for stop
3      Return a list from 0 to stop, not
4      including stop
5      '''
6      number_list = [] # Start empty list
7      counter = 0
8      while counter<stop:
9          # Put counter in the list
10         number_list.append(counter)
11         counter = counter + 1
12     return number_list
```

def statement

return statement

```
1  def range(stop):
2      '''Accept numeric value for stop
3      Return a list from 0 to stop, not
4      including stop
5      '''
6      number_list = [] # Start empty list
7      counter = 0
8      while counter<stop:
9          # Put counter in the list
10         number_list.append(counter)
11         counter = counter + 1
12     return number_list
```

Define, execute, call
Edit, execute, call, call, call


```
1  def sum(a, b):
2      '''Return sum of two numeric values
3      '''
4      return a+b
```

```
In [ ]:   sum(3, 2)
Out[ ]:   5
```

Resources

- http://www.pythonforbeginners.com/learn-python/