

# Python101

December 20, 2016

## 1 Python Basics

### 1.1 Whitespace Is Important

```
In [1]: listOfNumbers = [1, 2, 3, 4, 5, 6]
```

```
    for number in listOfNumbers:
        print(number)
        if (number % 2 == 0):
            print("is even")
        else:
            print("is odd")

    print "All done."
```

```
1
is odd
2
is even
3
is odd
4
is even
5
is odd
6
is even
All done.
```

### 1.2 Importing Modules

```
In [2]: import numpy as np
```

```
    A = np.random.normal(25.0, 5.0, 10)
    print A
```

```
[ 27.35419908  25.67049043  25.50538002  30.82249618  24.89535506
 27.37209996  21.39864835  20.5220847   24.05849852  26.26014998]
```

### 1.3 Lists

```
In [3]: x = [1, 2, 3, 4, 5, 6]
        print(len(x))
```

```
6
```

```
In [4]: x[:3]
```

```
Out[4]: [1, 2, 3]
```

```
In [5]: x[3:]
```

```
Out[5]: [4, 5, 6]
```

```
In [6]: x[-2:]
```

```
Out[6]: [5, 6]
```

```
In [7]: x.extend([7,8])
        x
```

```
Out[7]: [1, 2, 3, 4, 5, 6, 7, 8]
```

```
In [8]: x.append(9)
        x
```

```
Out[8]: [1, 2, 3, 4, 5, 6, 7, 8, 9]
```

```
In [9]: y = [10, 11, 12]
        listOfLists = [x, y]
        listOfLists
```

```
Out[9]: [[1, 2, 3, 4, 5, 6, 7, 8, 9], [10, 11, 12]]
```

```
In [10]: y[1]
```

```
Out[10]: 11
```

```
In [11]: z = [3, 2, 1]
        z.sort()
        z
```

```
Out[11]: [1, 2, 3]
```

```
In [12]: z.sort(reverse=True)
        z
```

```
Out[12]: [3, 2, 1]
```

## 1.4 Tuples

```
In [13]: #Tuples are just immutable lists. Use () instead of []
         x = (1, 2, 3)
         len(x)
```

```
Out[13]: 3
```

```
In [14]: y = (4, 5, 6)
         y[2]
```

```
Out[14]: 6
```

```
In [15]: listOfTuples = [x, y]
         listOfTuples
```

```
Out[15]: [(1, 2, 3), (4, 5, 6)]
```

```
In [16]: (age, income) = "32,120000".split(',')
         print(age)
         print(income)
```

```
32
120000
```

## 1.5 Dictionaries

```
In [17]: # Like a map or hash table in other languages
         captains = {}
         captains["Enterprise"] = "Kirk"
         captains["Enterprise D"] = "Picard"
         captains["Deep Space Nine"] = "Sisko"
         captains["Voyager"] = "Janeway"

         print(captains["Voyager"])
```

```
Janeway
```

```
In [18]: print(captains.get("Enterprise"))
```

```
Kirk
```

```
In [19]: print(captains.get("NX-01"))
```

```
None
```

```
In [20]: for ship in captains:
         print(ship + ": " + captains[ship])
```

```
Voyager: Janeway
Deep Space Nine: Sisko
Enterprise D: Picard
Enterprise: Kirk
```

## 1.6 Functions

```
In [21]: def SquareIt(x):
         return x * x

         print(SquareIt(2))
```

4

```
In [22]: #You can pass functions around as parameters
         def DoSomething(f, x):
             return f(x)

         print(DoSomething(SquareIt, 3))
```

9

```
In [23]: #Lambda functions let you inline simple functions
         print(DoSomething(lambda x: x * x * x, 3))
```

27

## 1.7 Boolean Expressions

```
In [25]: print(1 == 3)
```

False

```
In [26]: print(True or False)
```

True

```
In [27]: print(1 is 3)
```

False

```
In [28]: if 1 is 3:
          print("How did that happen?")
        elif 1 > 3:
          print("Yikes")
        else:
          print("All is well with the world")
```

All is well with the world

## 1.8 Looping

```
In [29]: for x in range(10):
          print(x)
```

0  
1  
2  
3  
4  
5  
6  
7  
8  
9

```
In [30]: for x in range(10):
          if (x is 1):
              continue
          if (x > 5):
              break
          print(x)
```

0  
2  
3  
4  
5

```
In [31]: x = 0
          while (x < 10):
              print(x)
              x += 1
```

0  
1  
2

3  
4  
5  
6  
7  
8  
9

## 1.9 Activity

Write some code that creates a list of integers, loops through each element of the list, and only prints out even numbers!

In [ ]: