

Python Basics

Whitespace matters! Your code will not run correctly if you use improper indentation.

```
#this is a comment
```

Basic Python Logic

```
if:
    if test:
        #do stuff if test is true
    elif test 2:
        #do stuff if test2 is true
    else:
        #do stuff if both tests are false

while:
    while test:
        #keep doing stuff until
        #test is false
```

```
for:
    for x in aSequence:
        #do stuff for each member of aSequence
        #for example, each item in a list, each
        #character in a string, etc.

    for x in range(10):
        #do stuff 10 times (0 through 9)

    for x in range(5,10):
        #do stuff 5 times (5 through 9)
```

Python Strings

A string is a sequence of characters, usually used to store text.

```
creation:      the_string = "Hello World!"
               the_string = 'Hello World!'
```

```
accessing:    the_string[4]          returns 'o'
splitting:    the_string.split(' ')  returns ['Hello', 'World!']
               the_string.split('r') returns ['Hello Wo', 'ld!']
```

To join a list of strings together, call `join()` as a method of the string you want to separate the values in the list (' ' if none), and pass the list as an argument. Yes, it's weird.

```
words = ["this", 'is', 'a', 'list', 'of', "strings"]
''.join(words)          returns "This is a list of strings"
'ZOOl'.join(words)      returns "ThisZOOlIsZOOlLaZOOllistZOOlOfZOOlstrings"
''.join(words)          returns "Thisisalistofstrings"
```

String Formatting: similar to `printf()` in C, uses the `%` operator to add elements of a tuple into a string

```
this_string = "there"
print "Hello %s!" % this_string returns "Hello there!"
```

Python Tuples

A tuple consists of a number of values separated by commas. They are useful for ordered pairs and returning several values from a function.

```
creation:      emptyTuple = ()
               singleItemTuple = ("spam",) ← note the comma!
               thistuple = 12, 89, 'a'
               thistuple = (12, 89, 'a')
```

```
accessing:    thistuple[0] returns 12
```

Python Dictionaries

A dictionary is a set of key:value pairs. All keys in a dictionary must be unique.

```
creation:      emptyDict = {}
               thisdict = {'a':1, 'b':23, 'c':"eggs"}

accessing:    thisdict['a']      returns 1

deleting:     del thisdict['b']

finding:      thisdict.has_key('e')           returns False
               thisdict.keys()               returns ['a', 'c']
               thisdict.items()              returns [('a', 1), ('c', 'eggs')]
               'c' in thisdict                returns True
               'paradimethylaminobenzaldehyde' in thisdict returns False
```

Python List Manipulation

One of the most important data structures in Python is the list. Lists are very flexible and have many built-in control functions.

creation:	thelist = [5,3,'p',9,'e']	[5,3,'p',9,'e']
accessing:	thelist[0]	returns 5
slicing:	thelist[1:3]	returns [3,'p']
	thelist[2:]	returns ['p',9,'e']
	thelist[:2]	returns [5,3]
	thelist[2:-1]	returns ['p',9]
length:	len(thelist)	returns 5
sort:	thelist.sort()	no return value
add:	thelist.append(37)	
return &	thelist.pop()	returns 37
remove:	thelist.pop(1)	returns 5
insert:	thelist.insert(2, 'z')	
remove:	thelist.remove('e')	
	del thelist[0]	
concatenation:	thelist + [0]	
finding:	9 in thelist	

List Comprehension

A special expression enclosed in square brackets that returns a new list. The expression is of the form:
`[expression for expr in sequence if condition]` The condition is optional.

```
>>>[x*5 for x in range(5)]
[0, 5, 10, 15, 20]
>>>[x for x in range(5) if x%2 == 0]
[0, 2, 4]
```

Python Class and Function Definition

```
function: def myFunc(param1, param2):  
    """By putting this initial sentence in triple quotes, you can  
    access it by calling myFunc.__doc__"""  
    #indented code block goes here  
    spam = param1 + param2  
    return spam
```

```
class:  
class Eggs(ClassWeAreOptionallyInheriting):  
    def __init__(self):  
        ClassWeAreOptionallyInheriting.__init__(self)  
        #initialization (constructor) code goes here  
        self.cookingStyle = 'scrambled'  
    def anotherFunction(self, argument):  
        if argument == "just contradiction":  
            return False  
        else:  
            return True
```

```
theseEggsInMyProgram = Eggs()
```

Files

open: `thisfile = open("datadirectory/file.txt")` note: forward slash, unlike Windows! This function defaults to read-only

accessing:	
<code>thisfile.read()</code>	reads entire file into one string
<code>thisfile.readline()</code>	reads one line of a file
<code>thisfile.readlines()</code>	reads entire file into a list of strings, one per line
<code>for eachline in thisfile:</code>	steps through lines in a file