String Operations

Useful String functions:

Make lowercase: "A".lower()="a"
Make UPPERCASE : "a".upper()="A"
Make Title Format: "hi world".title()="Hi World"
Replace a substring: "123".replace('2','z')= "1z3"
Count occurrences of substring:"1123".count("1")=2
Get offset of substring in string: "123".index("2")=1
Detect substring in string: "is" in "fish" == True
Encode "a string": "a string".encode(*codec name*)
Decode a string: "a string".decode(*codec name*)
Example with the ROT13 codec:

```
>>> print "RAPBQR-ZR".decode("rot13")
ENCODE-ME
```

Some String encoders/decoder codec names:

Base64, bz2 , hex, rot13, uu, zip, string_escape

Convert a string to a list (default separator=space):

```
newlist = astr.split(<separator>)
>>> print "A B C".split()
['A', 'B', 'C']
>>> print "A B     C".split()
['A', 'B', 'C']
>>> print "A,B,  ,C".split(",")
['A', 'B', '  ', 'C']
>>> print "WANNA BANANA?".split("AN")
['W', 'NA B', '', 'A?']
```

Convert a list (or other iterable object) to a string:

Join a list together putting string between elements.
"astring".join([list])

```
>>> print "".join(['A','B','C'])
ABC
>>> print ",".join(['A','B','C'])
A,B,C
```

Converting Data Types

Convert anything to a string:

```
newstring = str(<any variable>)
newstring = str(100)
```

Convert String to Integer:

```
newint = int(<string>[,base])
All of the following assign the
variable ten the integer 10
>>> ten = int("1010",2)
>>> ten = int("0010")
>>> ten = int("000A",16)
```

Convert Float to Integer by dropping decimal:

```
newint = int(<float>)
>>> print int(3.1415)
3
>>> int(3.6)
3
```

Convert String or number to Float:

```
afloat = float(<var>)
>>> print float("1.5")
1.5
>>> print float(1)
1.0
```

Convert String Character to ASCII decimal:

```
newint = ord(<string length 1>)
>>> print ord("A")
65
```

Convert ASCII decimal to String of length 1:

```
newstr = chr(<integer 1 to 255>)
>>> print chr(65)
A
```

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Python 2.7 Essentials

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3 Methods of Python Execution

Command line Execution with -c:

```
# python –c ["script string"]
python –c "print 'Hello World!'"
```

Python Interpreter Script Execution:

```
# cat helloworld.py
print "Hello World"
# python helloworld.py
Hello World
```

Python Interactive Shell:

```
# python
>>> print "Hello World"
Hello World
```

Python Command Line Options

```
# python –c "script as string"
```

Execute a string containing a script

```
# python –m <module> [module args]
```

Find module in path and execute as a script
Example: python –m "SimpleHTTPServer"

```
# python –i <python script>
```

Drop to interactive shell after script execution

Loops Lists & Dictionaries

List essentials:

Create an empty list: newlist=[]
Assign value at index: alist[index]= value
Access value at index alist[index]
Add item to list: alist.append(new item)
Insert into list: alist.insert(at position, new item)
Count # of an item in list: alist.count(item)
Delete 1 matching item: alist.remove(del item)
Remove item at index del alist[index]

Dictionary essentials:

Create an empty dict: dic={}
Initialize a non-empty dictionary:
dic = { “key1”:”value1”,”key2”:”value2”}
Assign a value: dic[“key”]=”value”
Determine if key exists: dic.has_key(“key”)
Access value at key: dic[“key”], dic.get(“key”)
List of all keys: dic.keys()
List of all values: dic.values()
List of (key,value) tuples: dic.items()

Looping examples:

For loop 0 thru 9: for x in range(10):
For loop 5 thru 10: for x in range(5,11):
For each char in a string: for char in astring:
For items in list : for x in alist:
For loop retrieving indexes and values in a list :
for index,value in enumerate(alist):
For keys in a dict : for x in adict.keys():
For all items in dict: for key,value in adict.items():
while <logic test> do:

Loop Control statements (for and while):

Exit loop immediately break
Skip rest of loop and do loop again continue

Misc

Adding Comments to code:

```
#Comments begin the line with a pound sign
```

Defining Functions:

Here is a function called “add”. It accepts 2 arguments num1 and num2 and returns their sum. Calling “`print add(5,5)`” will print “10” to the screen:

```
def add(num1, num2):
    #code blocks must be indented
    #each space has meaning in python
    myresult = num1 + num2
    return myresult
```

if then else statements:

```
if <logic test 1>:
    #code block here will execute
    #when logic test 1 is True
elif <logic test 2>:
    #code block executes logic test 1 is
    #False and logic test 2 is True
else:
    #code block for else has no test and
    #executes when if an all elif are False
```

Slicing and Indexing Strings, Lists, etc

Slicing strings and lists:

x[start:stop:step]	x=[4,8,9,3,0]	x=”48930”
x[0]	4	‘4’
x[2]	9	‘9’
x[:3]	[4,8,9]	‘489’
x[3:]	[3,0]	‘30’
x[:-2]	[4,8,9]	‘489’
x[::2]	[4,9,0]	‘490’
x[::-1]	[0,3,9,8,4]	‘03984’
len(x)	5	5
sorted(x)	[0,3,4,8,9]	['0', '3', '4', '8', '9']

SEC573 PyWars Essentials

Create pyWars Object

```
>>> import pyWars
>>> game= pyWars.exercise()
```

Change Scoring Server IP

```
>>> game.serverip=”127.0.0.1”
```

Register a Team

```
>>> game.register(“team”,”password”)
```

Query a question:

```
>>> game.question(<question #>)
```

Query the data:

```
>>> game.data(<question #>)
```

Submit an answer:

```
>>> game.answer(<question #>,
   solverfunc(game.data(<question#>)))
```

Logic and Math Operators

Math Operator	Example	X=7, Y=5
Addition	X + Y	12
Subtraction	X - Y	2
Multiplication	X * Y	35
Division	X / Y	1
Exponent	X ** Y	16807
Modulo	X % Y	2
Logic Operator		
Equality	X == Y	False
Greater Than	X > Y	False
Less Than	X < Y	True
Less or Equal	X <= Y	True
Not Equal	X !=Y or X<>Y	True
Other Logical Operators: AND, OR and NOT		