Python Basics Quick Reference

To use Python in interactive mode, at the >>> prompt, type a command and press Enter.
Example: `>>> print 'Hello World'`
`Hello World`

To use the Python editor to write multi-line programs:

1. To write code: From the IDLE Shell: **Ctrl-N/Command-N** or **File → New Window**
2. To run code: Press **F5** or choose **Run → Run Module → Save with .py extension**

Commonly Used Operations:

Addition	`>>> 2 + 98` `100`	`>>> 'Hello ' + "World"` `'Hello World'`
Subtraction	`>>> 1000 - 1` `999`	
Multiplication	`>>> 10 * 10` `100`	`>>> 'hello ' * 3` `'hello hello hello'`
Division	`>>> 12/5` `2`	`>>> 12.0/5` or `12/5.0` `2.4`
Exponent	`>>> 2**3` `8`	`>>> 16**.5` `4.0`
Modulo	`>>> 12%5` `2`	`>>> 100 % 10` `0`
Equal / Not Equal	`>>> 10 == 10` `True`	`>>> 'apples" != "oranges'` `True`
Greater Than / Less Than	`>>> 'z' > 'a'` `True`	`>>> 10 < 10` `False`

Naming Variables: Make names easy to read, indicate use, start with a letter, and do not use reserved words.
Yes: `trials`, `counter`, `height`, `project_name` **No:** `v`, `3car`, `mine`, `long_variable_name`

Comments

Anything after # on a line is ignored: `>>> F = m*a #Newton's 2nd law`
Use 3 quotation marks for multiple line comments

```
>>> '''This is a comment that
      spans multiple lines.'''
```

Lists (Documentation):

Creating a List	`>>> a = ['cat','dog']`
Referencing a List	`>>> a[1]` `'dog'`

Adding to a List	`>>> a.append('bird')`
	`>>> a`
	`['cat', 'dog', 'bird']`

Finding an item in a list	`>>> a.index('dog')` `1`

Functions (Additional Functions):

Defining Functions	`def function_name(input):`
	`  #indented code`
	`  #(4 spaces or 1 tab)`
	`  return output`
		`def circle_area(radius):`
		`  area = 3.14*(radius**2)`
		`  return area`

Calling Functions	`function_name(input)` `Output`	`circle_area(5)` `78.5`

Input/Output	`>>> print(3+7)`
	`10`
	`>>> print 'Hi'`
	`Hi`
		`>>> age = input("How old are you? ")`
		`How old are you? 30`
		`>>> print age`
		`30`

Formatting	`#Convert to an integer`
	`>>> int(3.14)`
	`3`
		`#Convert into a string of characters.`
		`>>> 'I am ' + str(age) + 'years old'`
		`'I am 30 years old'`

Control Flow Documentation

While	`#initialize test variable`
	`while (test is true):`
	`  #run indented code`
	`  #increment test variable`
		`number = 0`
		`while (number < 5):`
		`  print number`
		`  number = number + 1`

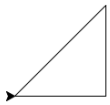
For	`for variable in list:` `  print variable`	`for number in range(0,5):` `  print variable`

If/Else	`if a < b:`
	`  #do this indented code`
	`else:`
	`  #do this indented code`
		`if 1 < 2:`
		`  print "Yes"`
		`else:`
		`  print "No"`

Other Useful Modules

Random Documentation	*Math* Documentation	*Turtle* Documentation

`>>> from random import *`
`>>> randint(1,10)`
`5`
`>>> randint(1,10)`
`8`
`>>> choice(('H', 'T'))`
`'H'`
	`>>> from math import *`
	`>>> factorial(5)`
	`120`
	`>>> log(10) #log e`
	`2.30`
	`>>> log(1000,10 #log 10`
	`3`
		`>>> from turtle import *`
		`>>> forward(100) #pixels`
		`>>> goto(100,100) #(x,y)`
		`>>> right(180) #angle`
		`>>> home() #(0,0)`

`>>> choice(('H', 'T'))` `'T'`	`>>> sin(pi/2) #Radians` `1.0`	

More lessons and examples can be found at Google's Exploring Computational Thinking website.

Python Download and Install Instructions

- Exploring Computational Thinking programs are based on Python 2.7.
- Python can be run online in Sage but it does not have Turtle or VPython.

Windows	Mac
1. Click the link to download the installer: Windows 2. Double click Python 2.7.msi to run the installer. 3. Follow the install dialog. By default, the program will be saved in a directory called Python27 4. To start the *Python interpreter*, find "Python 2.7" in your Start Menu and start IDLE a. Defaults to Interactive Mode. 5. (Optional) Once the interpreter is running, choose "File → New Window" to open the *Python Editor*.	1. Click the link to download the installer: Mac OS. 2. Open the file and double click on the Python.mpkg icon (the open box icon) 3. Click through the installation instructions. 4. Open the Finder and click "Applications". 5. Double-click the Python 2.7 folder. 6. Double-click IDLE to start the *Python interpreter*. a. Defaults to Interactive Mode. 7. (Optional) Once the interpreter is running, choose "File → New Window" to open the Python editor.

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