

# Introduction to Python

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# Content

Basic introduction to python

- Setup
- Code Walkthrough

# Mac and Windows

## Mac

Most Macs come with Python 2.7 already installed, open the Terminal, type command:

```
python -V  
Python 2.7.3
```

## Windows 7

Open the Windows menu, search **Command Prompt** and type command:

```
python  
Python 2.7.4 (r264:75708, Oct 10 2009, 07:36:50) [MSC v.1500 64 bit (AMD64)]  
on win32  
Type "help", "copyright", "credits" or "license" for further information.
```

# Linux users

Ubuntu 14.04 comes with python 2 and python 3

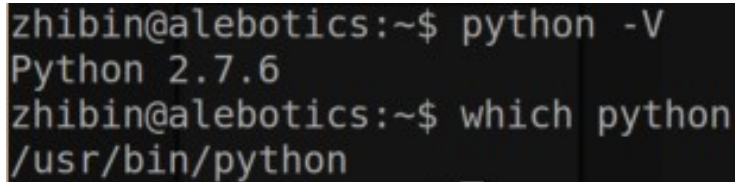
```
zhibin@alebotics:~$ python
Python 2.7.6 (default, Oct 26 2016, 20:30:19)
[GCC 4.8.4] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> quit()
zhibin@alebotics:~$ python3
Python 3.4.3 (default, Nov 17 2016, 01:08:31)
[GCC 4.8.4] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> quit()
zhibin@alebotics:~$ █
```

We opt to Python 2.7 for this tutorial since much existing code needs quite some modification to run in Python 3.

# Python version and directory

Check your Python version and directory

```
zhibin@alebotics:~$ python -V
Python 2.7.6
zhibin@alebotics:~$ which python
/usr/bin/python
zhibin@alebotics:~$ python3 -V
Python 3.4.3
```

A terminal window screenshot with a black background and white text. It shows the same commands and outputs as the text block on the left: 'python -V' returns 'Python 2.7.6', 'which python' returns '/usr/bin/python', and 'python3 -V' returns 'Python 3.4.3'.

```
zhibin@alebotics:~$ python -V
Python 2.7.6
zhibin@alebotics:~$ which python
/usr/bin/python
```

# Text editor

Linux default: gedit

Or install sublime

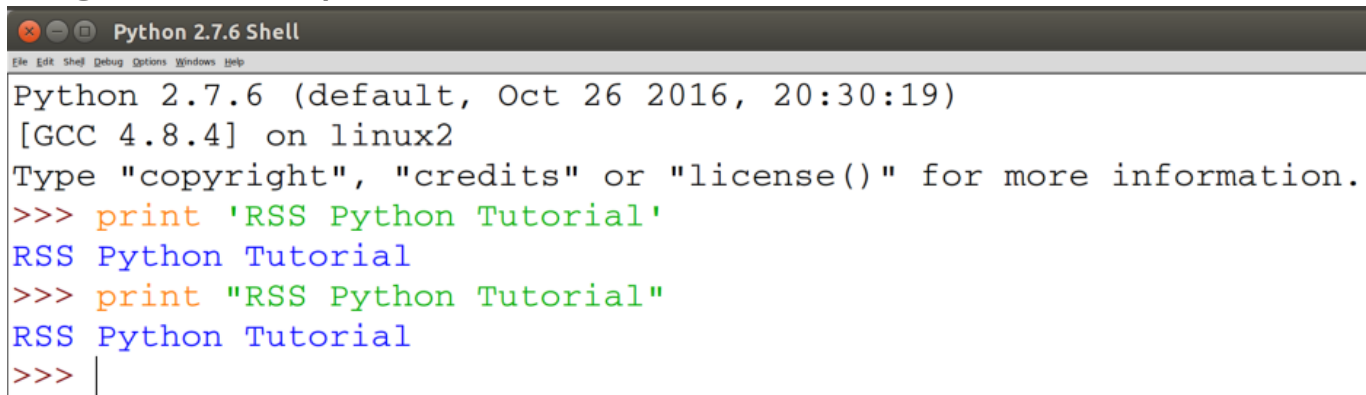


1. `wget -qO - https://download.sublimetext.com/sublimehq-pub.gpg | sudo apt-key add -`
2. `echo "deb https://download.sublimetext.com/ apt/stable/" | sudo tee /etc/apt/sources.list.d/sublime-text.list`
3. `sudo apt-get update`
4. `sudo apt-get install sublime-text`

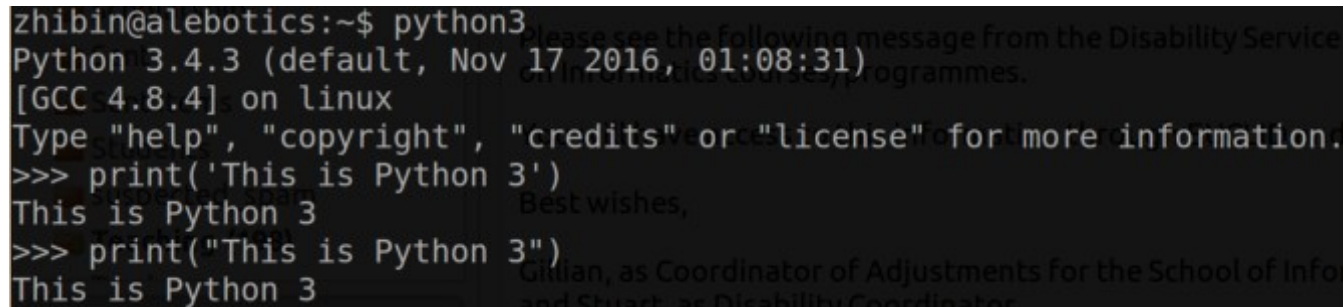
**IDLE** `sudo apt-get install idle`

# Getting started with IDLE

Both single/double quotation marks work .

A screenshot of a terminal window titled "Python 2.7.6 Shell". The window has a menu bar with "File", "Edit", "Shell", "Debug", "Options", "Windows", and "Help". The terminal output shows the Python version (2.7.6), GCC version (4.8.4), and the operating system (linux2). It prompts the user to type "copyright", "credits", or "license()" for more information. Two code snippets are shown: one using single quotes and one using double quotes, both resulting in the output "RSS Python Tutorial".

```
Python 2.7.6 Shell
File Edit Shell Debug Options Windows Help
Python 2.7.6 (default, Oct 26 2016, 20:30:19)
[GCC 4.8.4] on linux2
Type "copyright", "credits" or "license()" for more information.
>>> print 'RSS Python Tutorial'
RSS Python Tutorial
>>> print "RSS Python Tutorial"
RSS Python Tutorial
>>> |
```

A screenshot of a terminal window showing the execution of Python 3.4.3. The prompt is "zhibin@alebotics:~\$ python3". The output shows the Python version (3.4.3), GCC version (4.8.4), and the operating system (linux). It prompts the user to type "help", "copyright", "credits", or "license" for more information. Two code snippets are shown: one using single quotes and one using double quotes, both resulting in the output "This is Python 3".

```
zhibin@alebotics:~$ python3
Python 3.4.3 (default, Nov 17 2016, 01:08:31)
[GCC 4.8.4] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> print('This is Python 3')
This is Python 3
>>> print("This is Python 3")
This is Python 3
```

# Python's built-in functions (direct use without import math)

		<b>Built-in Functions</b>		
<code>abs()</code>	<code>divmod()</code>	<code>input()</code>	<code>open()</code>	<code>staticmethod()</code>
<code>all()</code>	<code>enumerate()</code>	<code>int()</code>	<code>ord()</code>	<code>str()</code>
<code>any()</code>	<code>eval()</code>	<code>isinstance()</code>	<code>pow()</code>	<code>sum()</code>
<code>basestring()</code>	<code>execfile()</code>	<code>issubclass()</code>	<code>print()</code>	<code>super()</code>
<code>bin()</code>	<code>file()</code>	<code>iter()</code>	<code>property()</code>	<code>tuple()</code>
<code>bool()</code>	<code>filter()</code>	<code>len()</code>	<code>range()</code>	<code>type()</code>
<code>bytearray()</code>	<code>float()</code>	<code>list()</code>	<code>raw_input()</code>	<code>unichr()</code>
<code>callable()</code>	<code>format()</code>	<code>locals()</code>	<code>reduce()</code>	<code>unicode()</code>
<code>chr()</code>	<code>frozenset()</code>	<code>long()</code>	<code>reload()</code>	<code>vars()</code>
<code>classmethod()</code>	<code>getattr()</code>	<code>map()</code>	<code>repr()</code>	<code>xrange()</code>
<code>cmp()</code>	<code>globals()</code>	<code>max()</code>	<code>reversed()</code>	<code>zip()</code>
<code>compile()</code>	<code>hasattr()</code>	<code>memoryview()</code>	<code>round()</code>	<code>__import__()</code>
<code>complex()</code>	<code>hash()</code>	<code>min()</code>	<code>set()</code>	
<code>delattr()</code>	<code>help()</code>	<code>next()</code>	<code>setattr()</code>	
<code>dict()</code>	<code>hex()</code>	<code>object()</code>	<code>slice()</code>	
<code>dir()</code>	<code>id()</code>	<code>oct()</code>	<code>sorted()</code>	



# Code walk-through

- Reading and writing files
- Common math operation with built-in functions
- Math operation by *math*
- Matrix operation by *numpy*
- Create and call functions
- If else statement
- Creating loops

# Programming!

Write a function for solving the roots of a quadratic polynomial:

$$ax^2 + bx + c = 0$$

Use a, b, c as arguments

Hint:

$$x_1 = (-b + \sqrt{b^2 - 4ac}) / (2a)$$

$$x_2 = (-b - \sqrt{b^2 - 4ac}) / (2a)$$

Then, solve two roots of the following equation:  $x^2 - 8x - 16$

# Resources for learning Python

Python online resources:

[wiki.python.org/moin/BeginnersGuide](http://wiki.python.org/moin/BeginnersGuide)

[en.wikibooks.org/wiki/A\\_Beginner's\\_Python\\_Tutorial/](http://en.wikibooks.org/wiki/A_Beginner's_Python_Tutorial/)

[scipy.org](http://scipy.org)

Or textbooks (library)

