

# Installing Python

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WASHINGTON, DC

# Get Scientific Python!

- Python is a general language, but we care about the science!
- Use the Anaconda distribution
- Includes everything we need

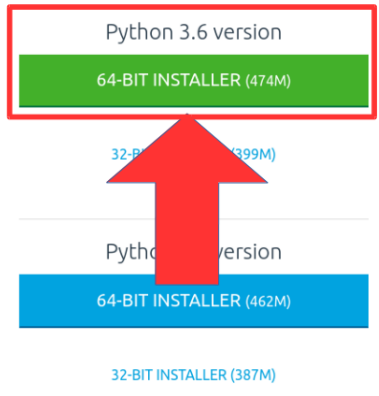
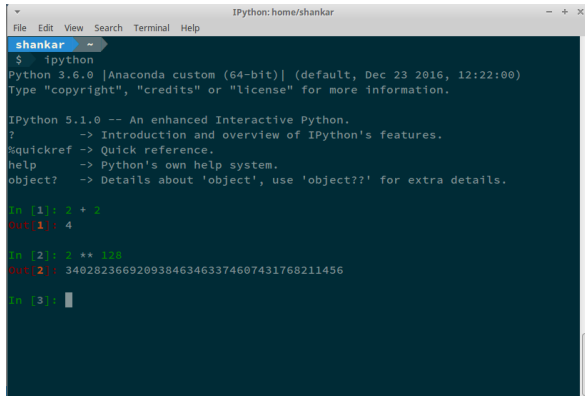


Figure: You want Python 3

# Using Python

- Only need to use the “command line” and a text editor
  - Win - cmd, OSX - Terminal, Linux
  - Atom, Sublime, Notepad++
    - Use 4 spaces instead of tabs



```
IPython: home/shankar
File Edit View Search Terminal Help
shankar ~
$ ipython
Python 3.6.0 [Anaconda custom (64-bit)] (default, Dec 23 2016, 12:22:00)
Type "copyright", "credits" or "license" for more information.

IPython 5.1.0 -- An enhanced Interactive Python.
?                -> Introduction and overview of IPython's features.
%quickref        -> Quick reference.
help             -> Python's own help system.
object?         -> Details about 'object', use 'object??' for extra details.

In [1]: 2 + 2
Out[1]: 4

In [2]: 2 ** 128
Out[2]: 340282366920938463463374607431768211456

In [3]:
```

# History of Python

- Guido van Rossum started creating Python in 1989

Over six years ago, in December 1989, I was looking for a "hobby" programming project that would keep me occupied during the week around Christmas. ... I chose Python as a working title for the project, being in a slightly irreverent mood (and a big fan of Monty Python's Flying Circus).



Figure: “Benevolent Dictator For

# What is Python?

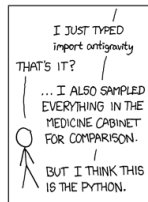
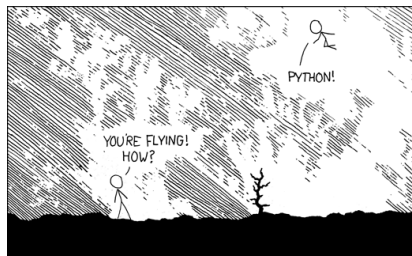
Python is a modern, general-purpose, object-oriented, high-level language.

- *clean and simple language*: Easy to read and easy to learn syntax
- *expressive language*: Fewer lines of code = fewer mistakes
- *dynamically typed*: no need to define variable types or function arguments
- *automatic memory management*: no need to allocate/deallocate memory
- *interpreted*: No need to compile! Fast and easy

# Why Python?

- Free - free as in beer **AND** free as in speech
- General purpose - packages/modules for everything!
- Dynamic - no compiling
- Easy to read - enforces good structure!
- Open - everything is an object

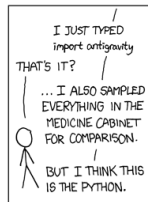
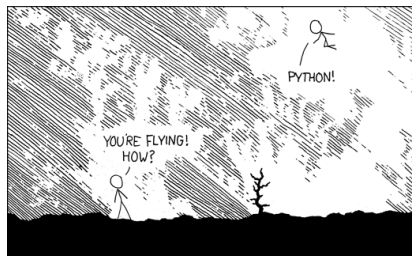
It's harder to read code than to write it!



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# Python vs. Matlab

## Disadvantages:

- Matlab is a commerical product - entire computing environment with code, IDE
- Matlab is expensive - Between \$49 - \$2150 per license! Extra for toolboxes
- Matlab is proprietary - Cannot inspect source code and restrictions on sharing
- Matlab is closed - difficult to extend functionality

## Advantages:

- Matlab handles arrays automatically and by design
- Lots of functionality - control design, linear algebra, optimization, ODEs etc.
- Real engineers (with funding) use it so students have to as well
- Simulink is still unmatched
- Powerful plotting capability

Python can offer all of the same functionality and some extra!



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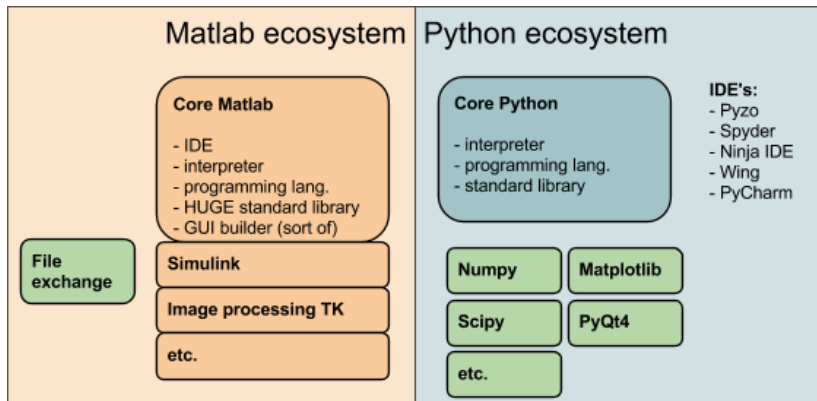
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# Learning Python 3

- We have Python installed from Anaconda
- There are many, many free Python tutorials online
  - Learn Python 3 the Hard Way
  - Python Tutorial
  - Go through these to learn the basics of Python!