# Introduction to Python

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# GIS Services in the Libraries

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- Statistical consulting
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- Funding for open access publishing
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# Workshop Outline

1. Presentation
    1. Brief background of Python, Python versions
    2. What can we do with Python? Why we want to use python?
    3. Python Environment Setup(Mac ,PC , Linux) & Command Line
2. Exercises
    1. Python Syntax, Built-in data types, Operators
    2. Basic Data Types, Loop, Function
    3. Data Import
    4. Basic Data Visualization (Histogram, Line chart, pie chart el.)
    5. Final Project
3. Q & A

Guido van Rossum


Python is a popular language for scientific computing, and great for general-purpose programming as well.

*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. My office ... would be closed, but I had a home computer, and not much else on my hands. I decided to write an interpreter for the new scripting language I had been thinking about lately: a descendant of ABC that would appeal to Unix/C hackers. 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).*

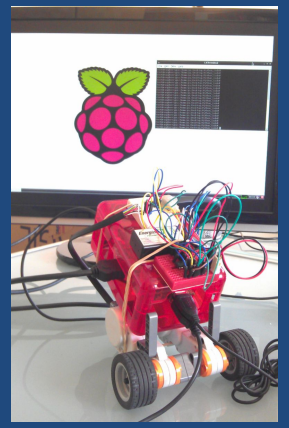
# Python 2.x vs 3.x

Python 2.0 was released on 16 October 2000 and had many major new features, including a cycle-detecting garbage collector and support for Unicode. With this release the development process was changed and became more transparent and community-backed.

Python 3.0 (which early in its development was commonly referred to as Python 3000 or py3k), a major, backwards-incompatible release, was released on 3 December 2008, after a long period of testing. Many of its major features have been backported to the backwards-compatible Python 2.6.x and 2.7.x version series.

# What can we do with python?

## Robotics



## Web Scraping

Beautiful Soup

## Data Science

NumPy

SciPy

matplotlib

IPython
Interactive Computing

pandas

scikit learn

## Web Test

Se

## Computer Vision

OpenCV

## Web Development

django

Flask
web development,
one drop at a time

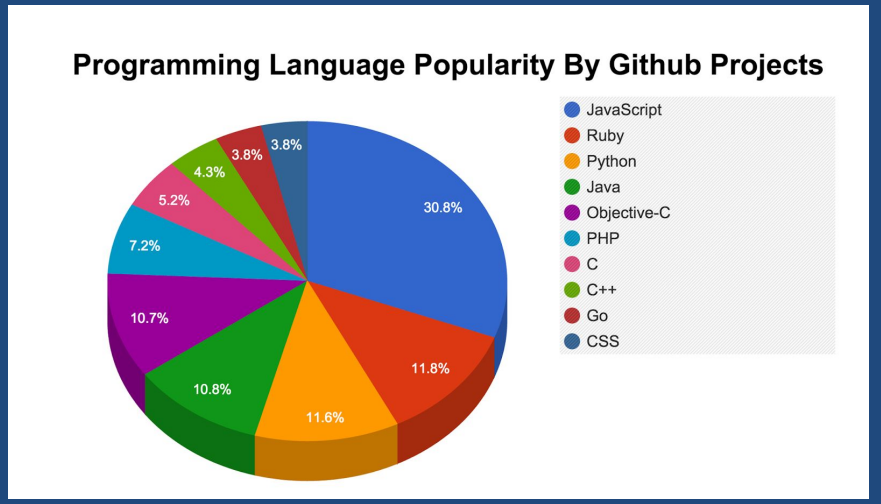
Pyramid™

And
More

# Why we want to use Python?

## Advantages:

- Open Source software, supported by Python Software Foundation
- Available on all platforms
- Syntax readable
- Supports multiple programming paradigms
- Large community



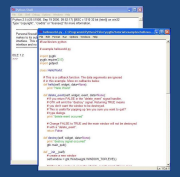

## Disadvantages:

- Slow
- Python is not a good language for mobile development.
- Python is not a good choice for memory intensive tasks.
- It's near impossible to build a high-graphic 3D game using Python.
- Python is not good for multi-processor/multi-core work.

# Python IDE

**Integrated Development Environment**

IDLE



Pycharm

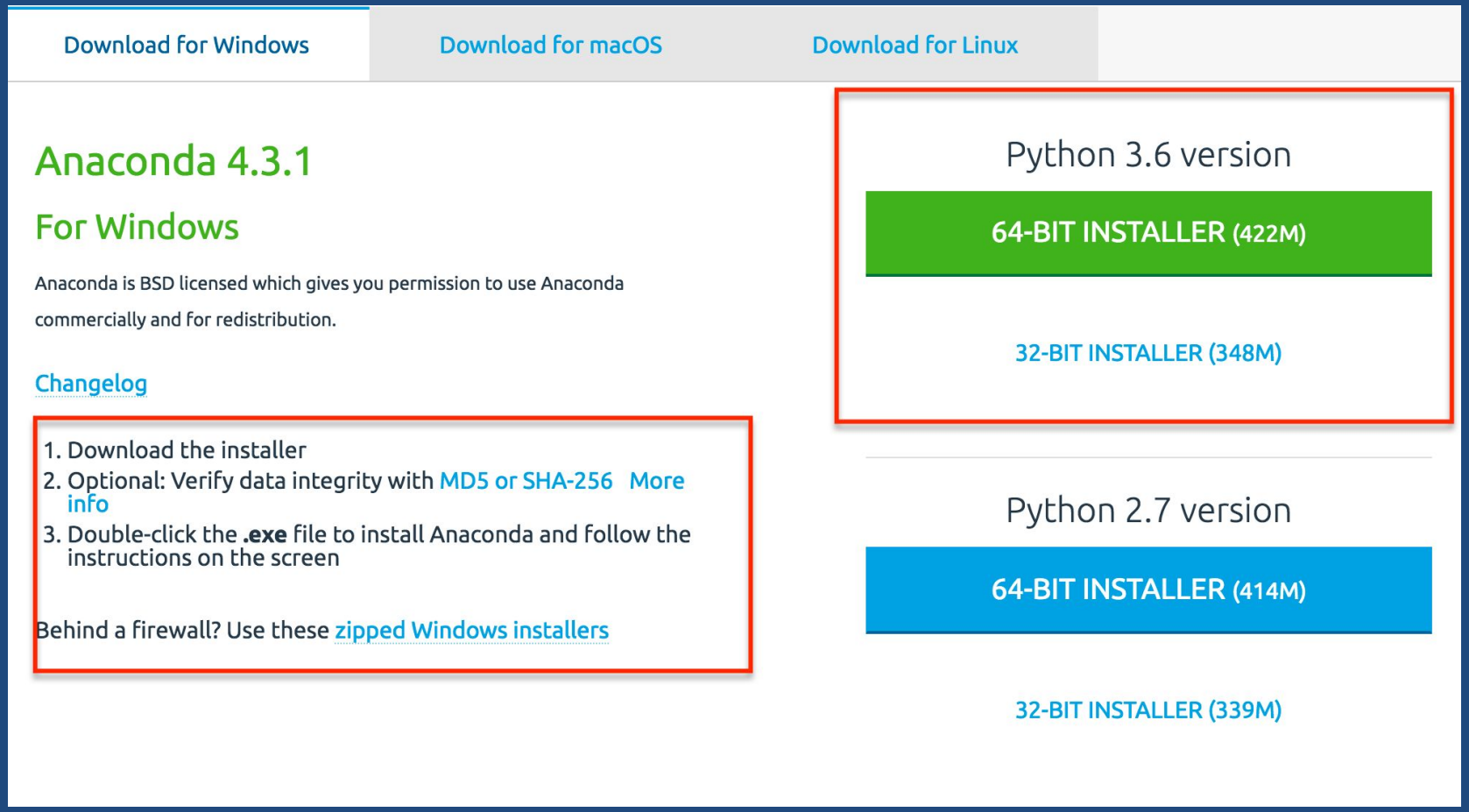

Spyder


Sublime Text


The **Jupyter Notebook** is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations and explanatory text.

# Python Environment Setup

1. Go to ANACONDA website to download and install Anaconda (Python 3.6) that based on your OS.



# Setup Cont.

2. Open your Command Prompt and create a working directory in your Desktop/Laptop and move to the directory.

3. After installed Anaconda to launch the jupyter notebook you need to type this “Ipython notebook” command in your Mac terminal/ Windows Power shell.

4. It will automatically popup from you default browser. If nothing show up, you can open this link in your browser: http://localhost:8888.

5. Please drag the “Python_Intro.ipynb” file to your working directory and refresh your Ipython notebook and open it.

# Features of Python

Python is a high-level, interpreted, interactive and object-oriented scripting language. Python is designed to be highly readable. It uses English keywords frequently where as other languages use punctuation, and it has fewer syntactical constructions than other languages.

## Python is:

- **Interpreted**
- **Interactive**
- **Object-Oriented**
- **A Beginner's Language**

# More Python Related Source

## Books

Learning Python **Mark Lutz**


Fluent Python **Luciano Ramalho**


## Websites

Code cademy: https://www.codecademy.com/

DataCamp: https://www.datacamp.com/

## Video Tutorials

Sentdex Youtube Channel: https://www.youtube.com/user/sentdex

Corey Schafer Youtube Channel: https://www.youtube.com/user/schafer5

# References

Wikipedia: https://en.wikipedia.org/wiki/Guido_van_Rossum

Tutorials point: https://www.tutorialspoint.com

Sentdex Youtube Channel: https://www.youtube.com/user/sentdex

Data Carpentry: http://www.datacarpentry.org

# Continue Learning

- **GEOG 373** – Geographic Information Systems
- **GEOG 473** – Geographic Information Systems and Spatial Analysis
- **GEOG 376** – Programming for Geographers
- **GEOG 306** – Introduction to Quantitative Methods for the Geographic Environmental Sciences

- **Virtual Campus Courses**
  - Learning ArcGIS Desktop
  - Understanding Map Projections and Coordinate Systems
  - Working with Rasters in ArcGIS Desktop