

Getting Started: Welcome to Python!

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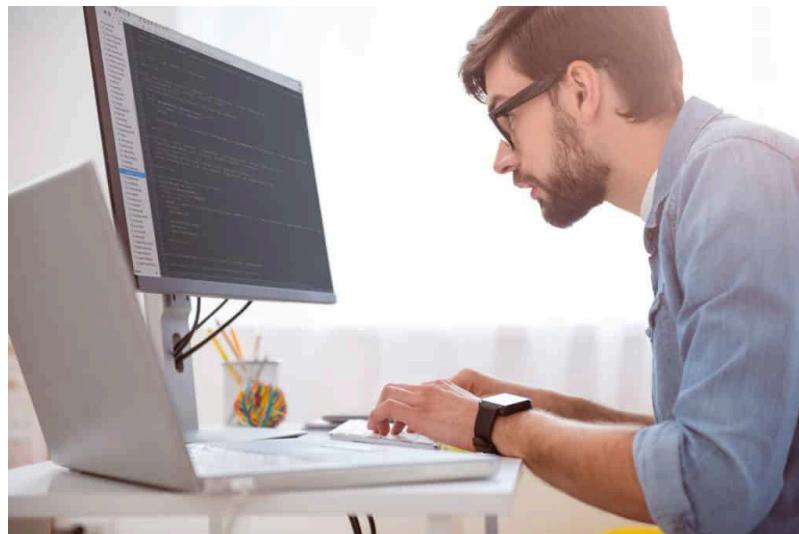
Q. How can I let my computer do something?

Example:

- Calculate the mean and stdev of the mid-term score data and draw a histogram.
- Create my personal web page.
- Develop an automated trading system.
- Collect review data from IMDB.
- Develop a machine learning model.

Programming Languages

- Designed for the purpose of instructing a machine (computer) to perform specific tasks
- Allow us to **communicate** with the machine



Many languages out there

They all have a different style in which they talk to the computer.



What can I do with a programming language on my computer?

- Development (e.g., web, game)
- Automation (e.g., autotrading, web scrapping)
- Computer vision (e.g., face detection)
- Data Science
 - Exploratory data analysis
 - Machine learning and deep learning
 - ...
- ...

Numerous Data Science Tools



So many tools out there!

Among them, *Python* is the most famous and popular tool.



Python

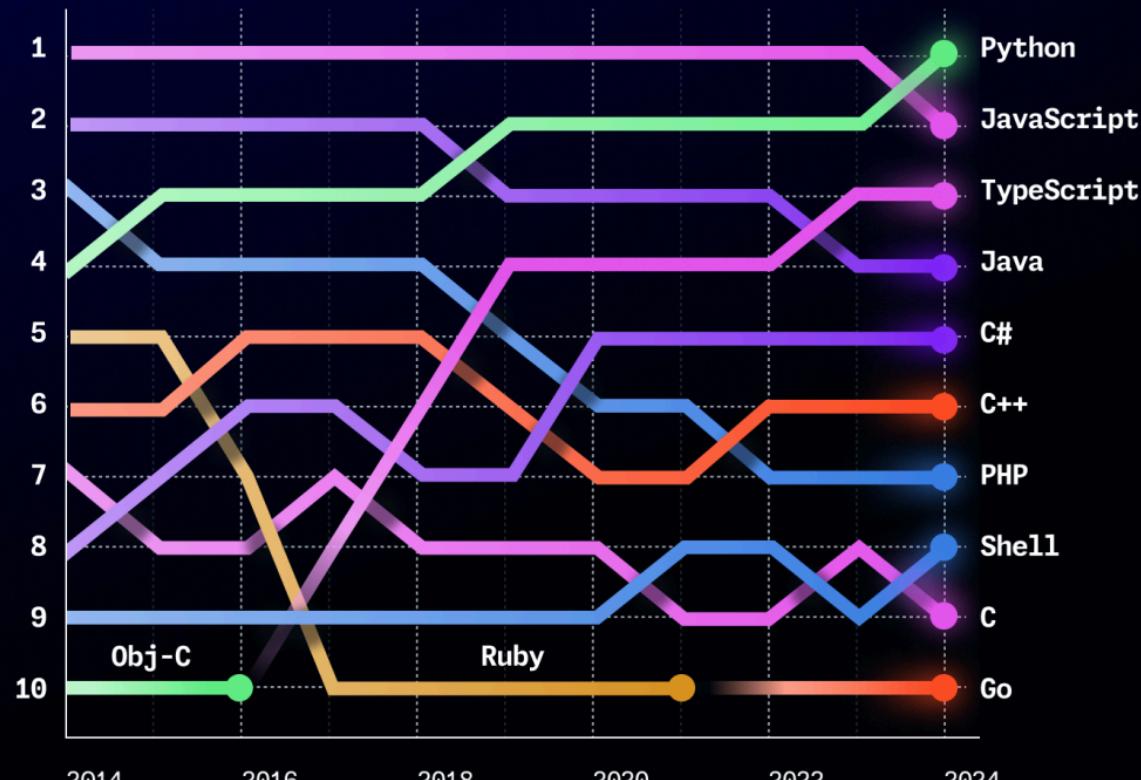
- Programming language invented by **Guido van Rossum** out of boredom in 1991
 - Made in C language
 - Intuitive and easy to understand
- Languages used by Google: C++, Java, **Python**

Why Python?

- Most popular language
 - Lots of people to ask!
- Large eco-system
 - No need to start from scratch!
- Simple, easy, and fun to use
- Free and open-source

Top programming languages on GitHub

RANKED BY COUNT OF DISTINCT USERS CONTRIBUTING TO PROJECTS OF EACH LANGUAGE.



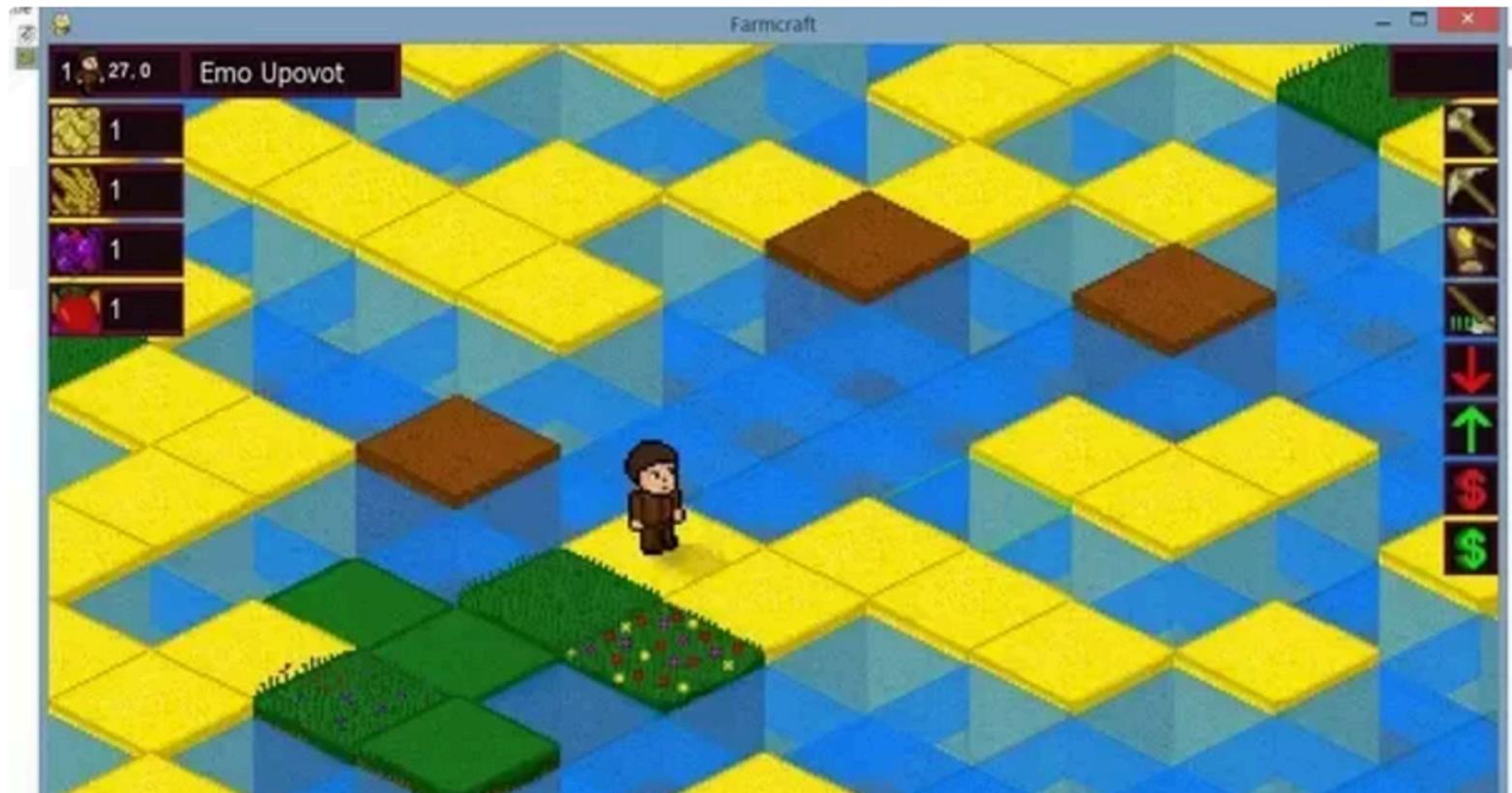
Things implemented in Python

You can develop everything!



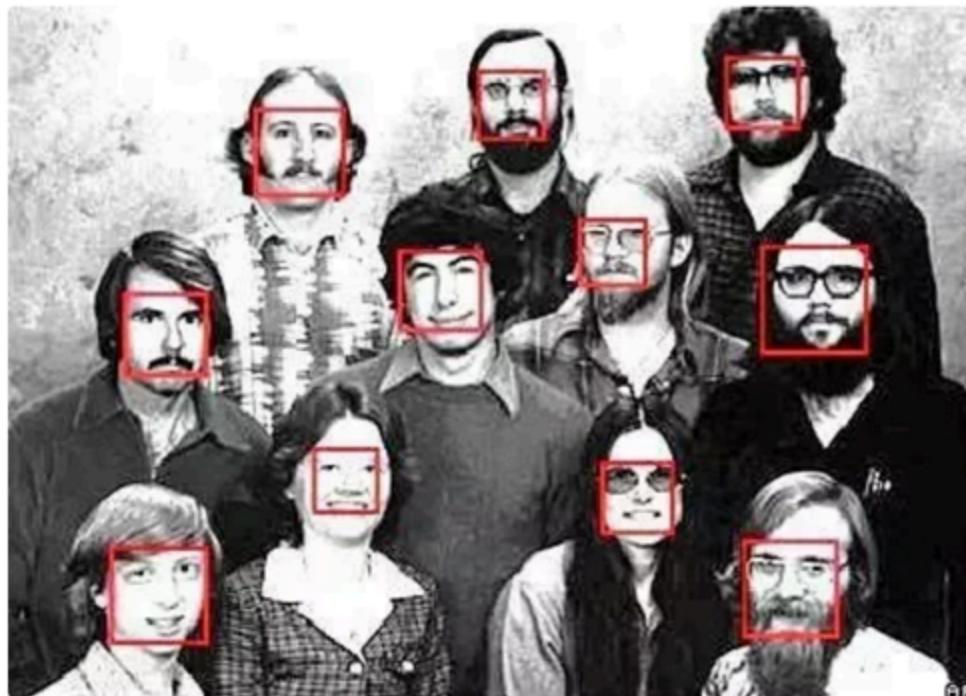
What can we do with Python?

1. **Web development** :- You can develop a **website with a backend** supporting REST api using python frameworks such as **Django / Flask**.
2. **Game development** :- You can develop a **video game** using module **Pygame**.



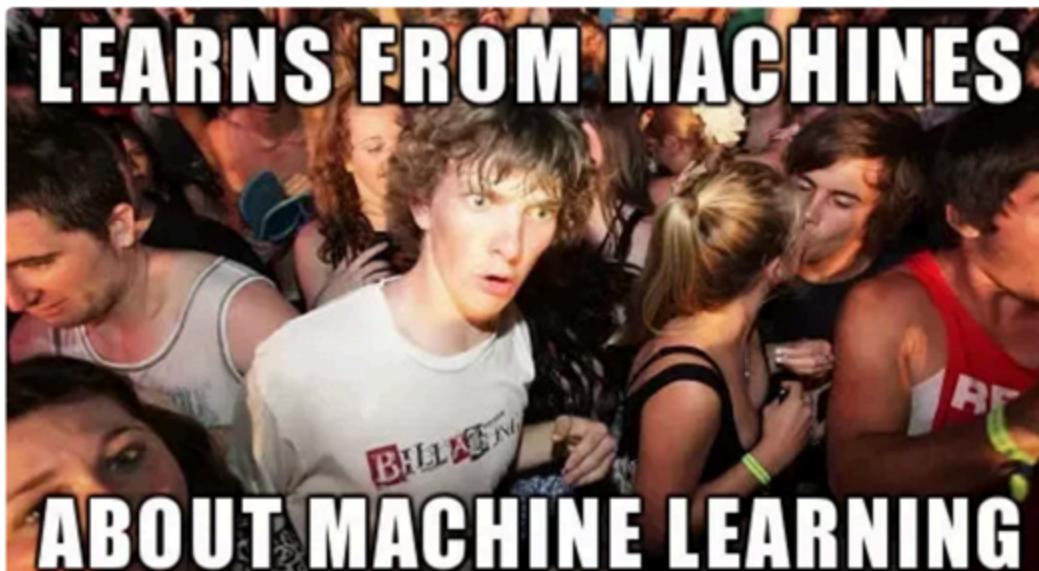
What can we do with Python?

3. **Computer Vision** :- You can do interesting things such as **Face detection, Color detection** using **Opencv with python**



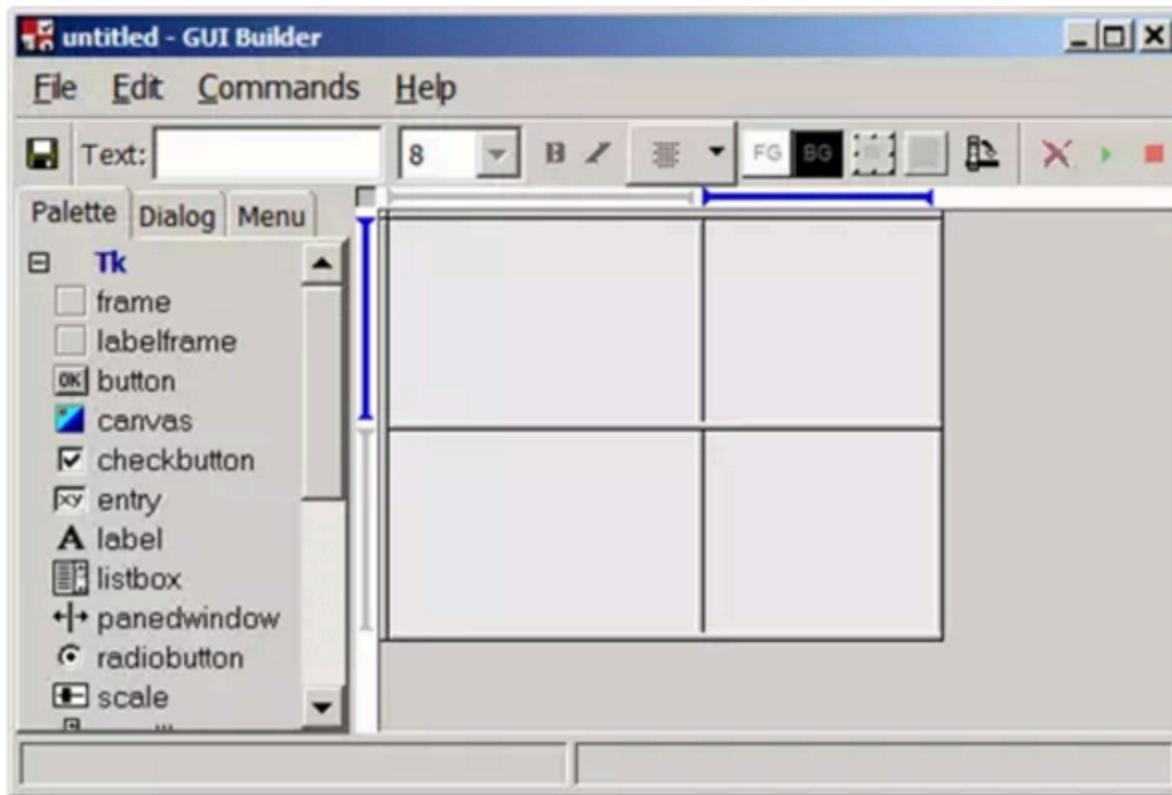
What can we do with Python?

4. **Web scraping** :- Want to get data from a website but the website doesn't have an api to expose data, you can use scraping. Most of the **News aggregators**, e-commerce **price comparison websites** such as buyhatke do web scraping. Python has **Requests**, **BeautifulSoup**, **Scrapy** to support webscraping.
5. **Machine Learning** :- You can do cool things such as **predicting stocks**, **finger print identification**, **spam detection** etc. using machine learning. Python has modules **scikit-learn**, **theano**, **tensorflow** to support it. Currently **Deep Learning** is all the hype and tensorflow has support for Deep Learning.



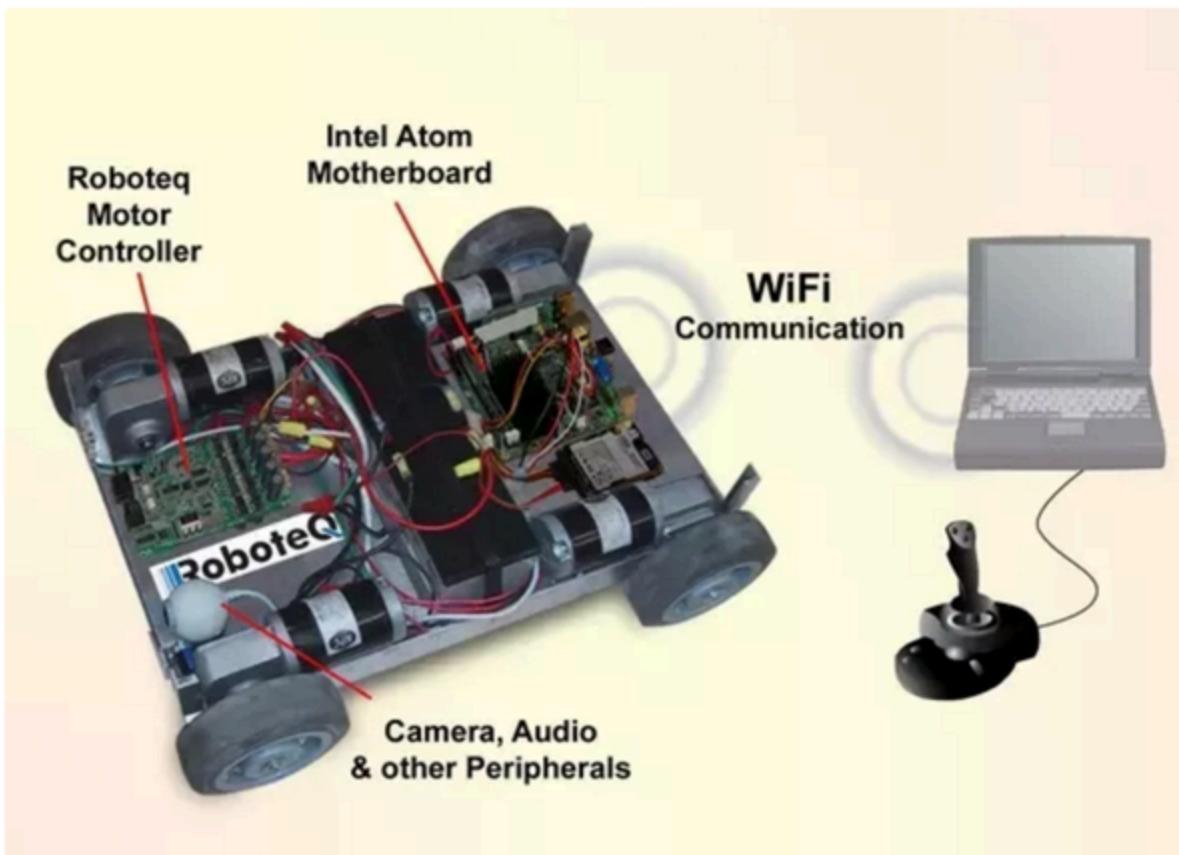
What can we do with Python?

6. **GUI development** :- To develop a **cross-platform desktop application** python can be used. Python has modules **Tkinter, PyQt** to support it.



What can we do with Python?

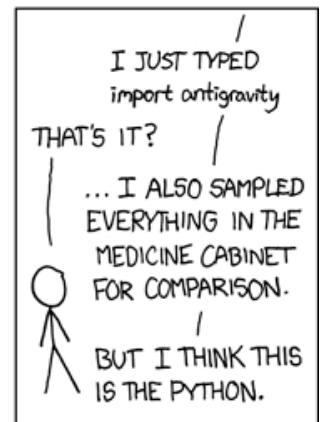
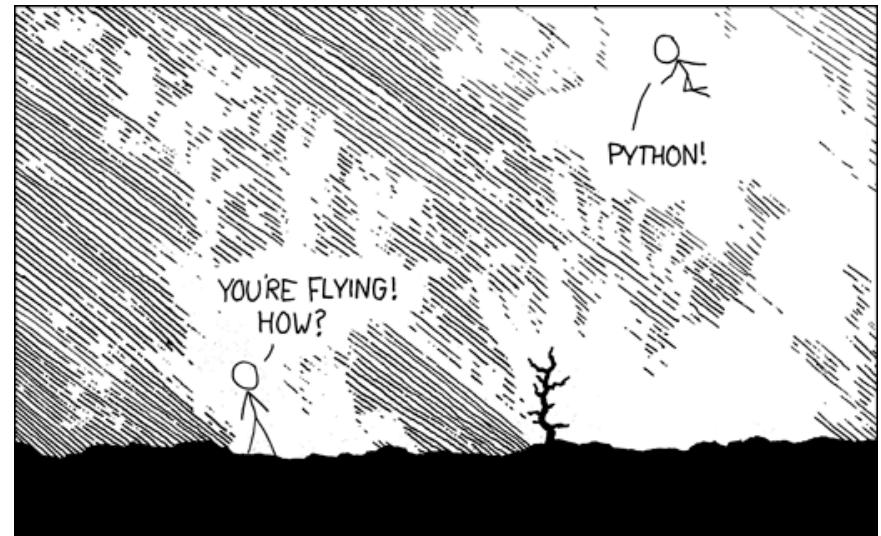
7. **Robotics** :- Raspberry pi can be used as a **brain** to the **robot** to perform various actions and to react to the environment and the coding on a **Raspberry pi** can be done using python.



What can we do with Python?

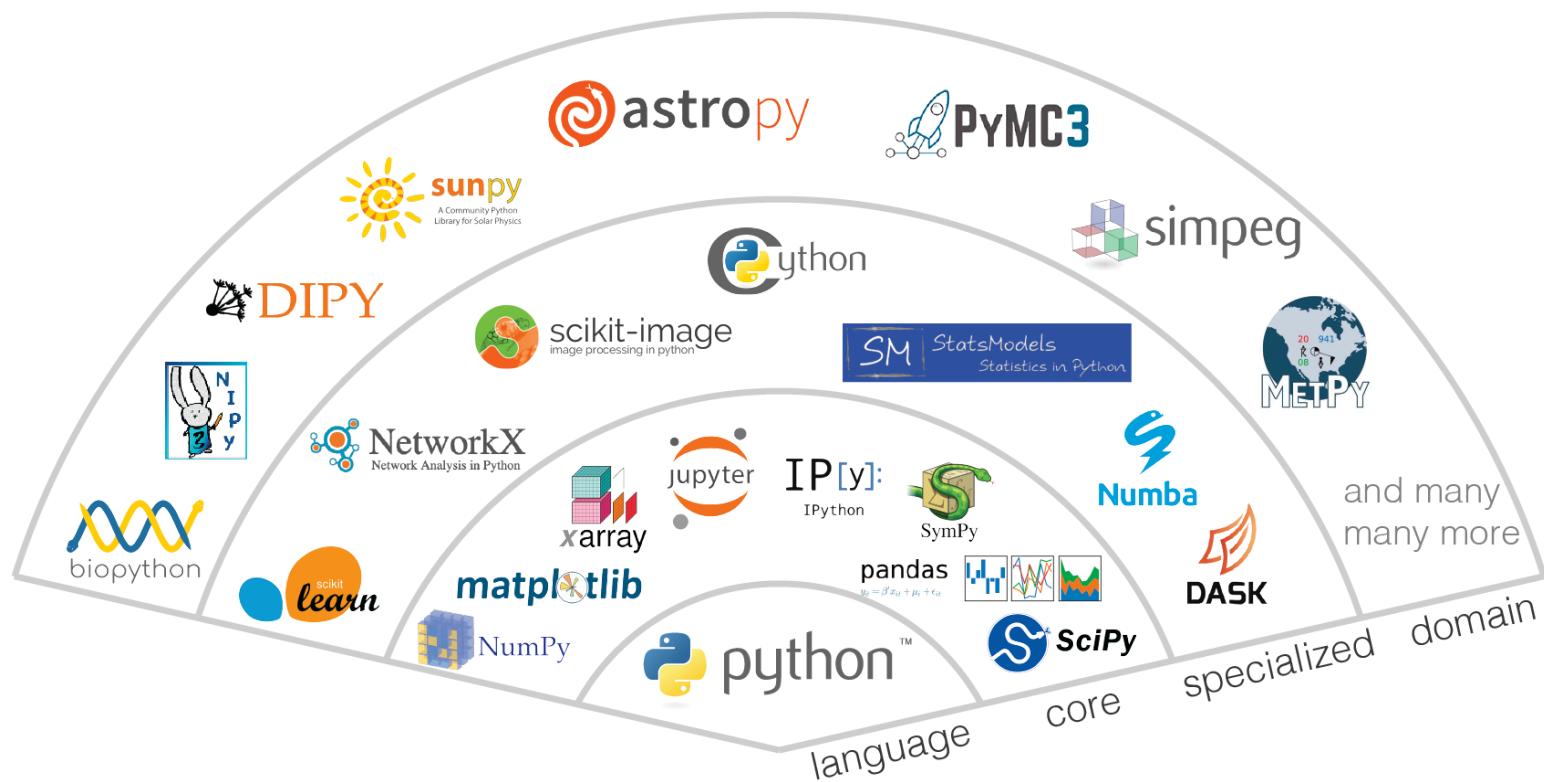
8. **Data Analysis** :- Data whenever obtained either online or offline would not be properly formatted with various issues such as missing values etc. This data can be cleaned using **Pandas**. And to find patterns from the data **Matplotlib** can be used in visualizing the data. These are used as a first step in machine learning before applying any ML algo.
9. **Browser Automation** :- Cool things such as opening a browser and posting a fb status can be done using **Selenium** with python.

*"Life is too short, you
need Python."*



Python's Scientific Ecosystem

All packages and libraries are ready-to-use and free!
Just **install** and **import** what you need!



How to install Python and Packages?

Installing Python

The installation of Python differs depending on the operating system (OS).

If you are using *Windows* or *MacOS*, download Python
(<https://www.python.org/downloads/>) and install it.

If you are using another OS, I guess you can install Python on your own! 😊

Installing Packages

To install a package, use `pip install` command in a prompt.

For example, to install `pandas`, type the following command in your terminal or command prompt:

```
pip install pandas
```

Essential Packages for Data Analysis

- Numpy, pandas, matplotlib
- Jupyter notebook
- scikit-learn
- ...

But, installing libraries one by one can be cumbersome.

Q. Is there any way to install Python and data analysis packages all at once?

A. Yes. Just install [Anaconda!](#)

Anaconda

A distribution of the Python language for data science

- **Easy to install:** Anaconda aims to simplify package management and deployment
- **All-in-one:** includes not only Python interpreter but also data-science packages suitable for Windows, Linux, and macOS.

Download Anaconda

Download the OS-specific installer from <https://www.anaconda.com/download>!

 Windows Python 3.12 ↳ 64-Bit Graphical Installer (912.3M)	 Mac Python 3.12 ↳ 64-Bit (Apple silicon) Graphical Installer (704.7M) ↳ 64-Bit (Apple silicon) Command Line Installer (707.3M) ↳ 64-Bit (Intel chip) Graphical Installer (734.7M) ↳ 64-Bit (Intel chip) Command Line Installer (731.2M)	 Linux Python 3.12 ↳ 64-Bit (x86) Installer (1007.9M) ↳ 64-Bit (AWS Graviton2 / ARM64) Installer (800.6M) ↳ 64-bit (Linux on IBM Z & LinuxONE) Installer (425.8M)
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Install Anaconda

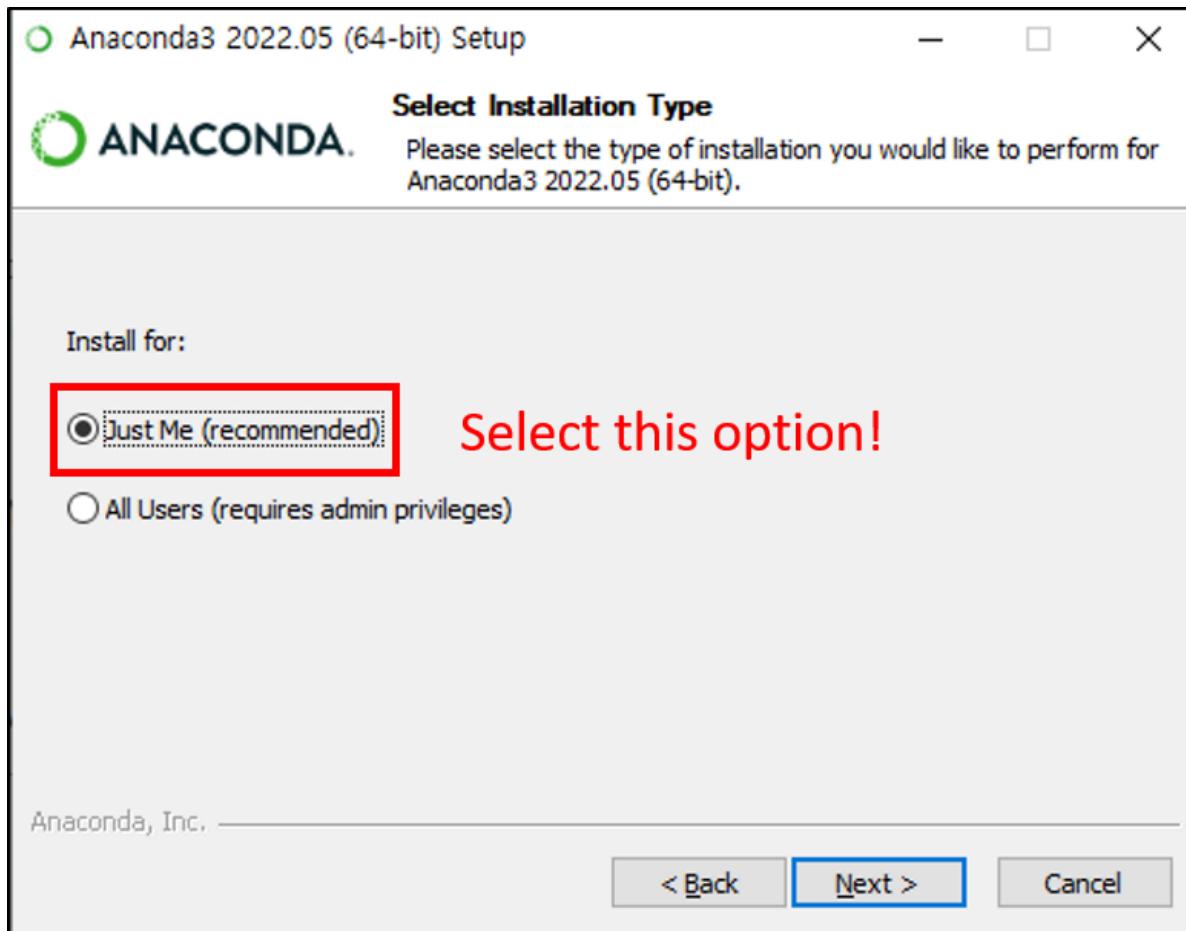
Run the Anaconda executable and follow steps for installation.



Official documentation for installation

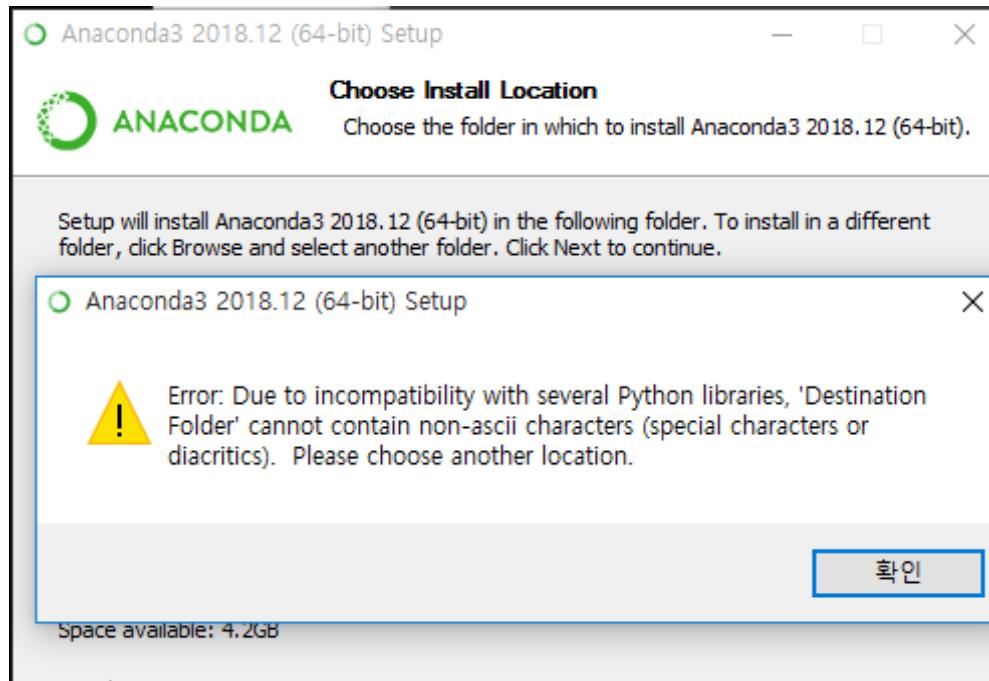
<https://docs.continuum.io/anaconda/install/#>

⚠ DO NOT install with administrator privileges!



FAQ. Path Setup Error

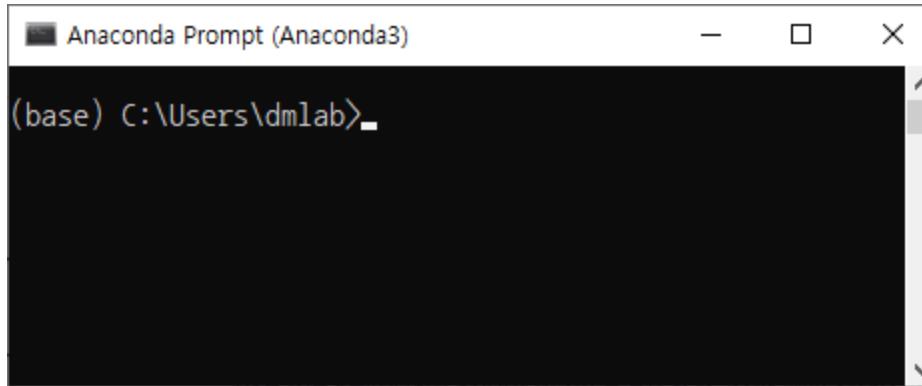
Q. 설치 경로 설정시 아래와 같은 오류창이 떠요.



A. 설치 경로에 한글이 포함되면 안됩니다. 설치 경로에 한글이 포함되어있다면 제거해주세요. 만약 본인이 윈도우즈 운영체제를 사용하고 있으며, 사용자 계정명이 한글인 경우에는, 설치 권한을 Just Me (recommended)가 아닌 All Users (administrator privileges)로 선택하시고, C:\Anaconda3 경로에 설치해보세요.

Verify Your Install

To check if Python is installed properly, launch the `Anaconda Prompt`, and the following interface should appear:



If it does, Anaconda has been successfully installed!

 This type of interface is called a **command line interface**, which may feel a bit strange to most of who are far more familiar with **graphical user interface**.

Graphical User Interface vs. Command line interface

GUI



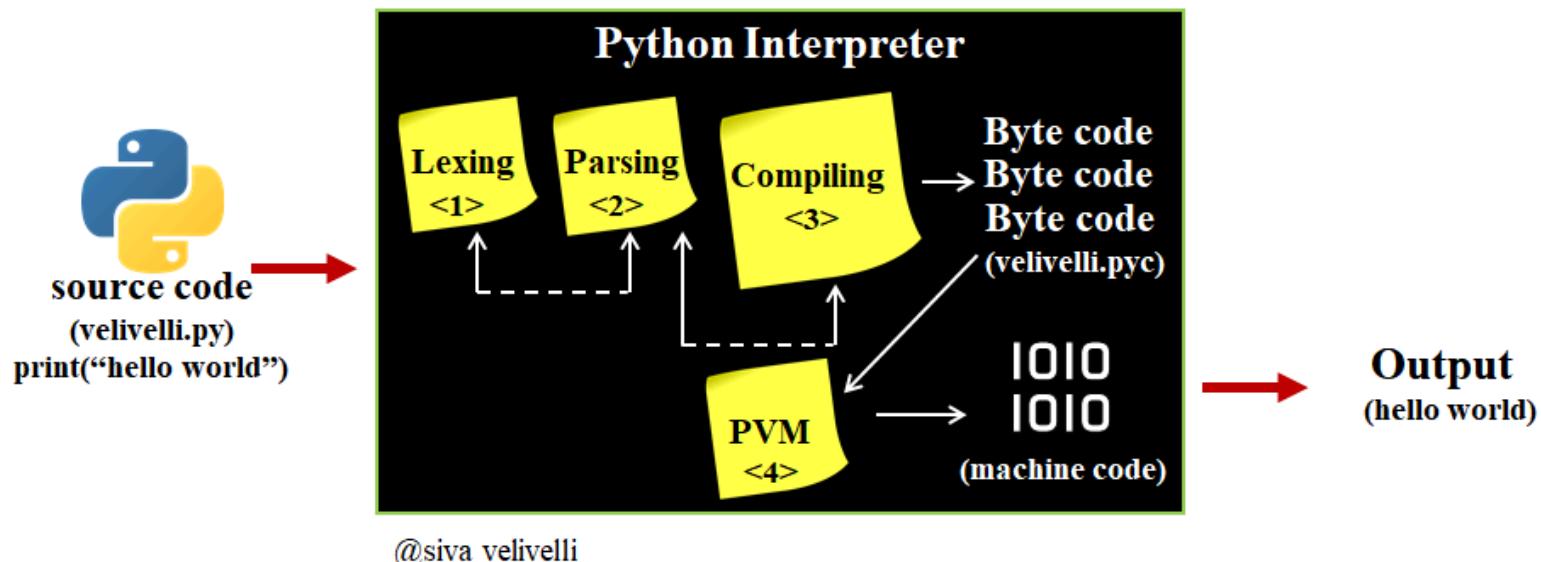
CLI



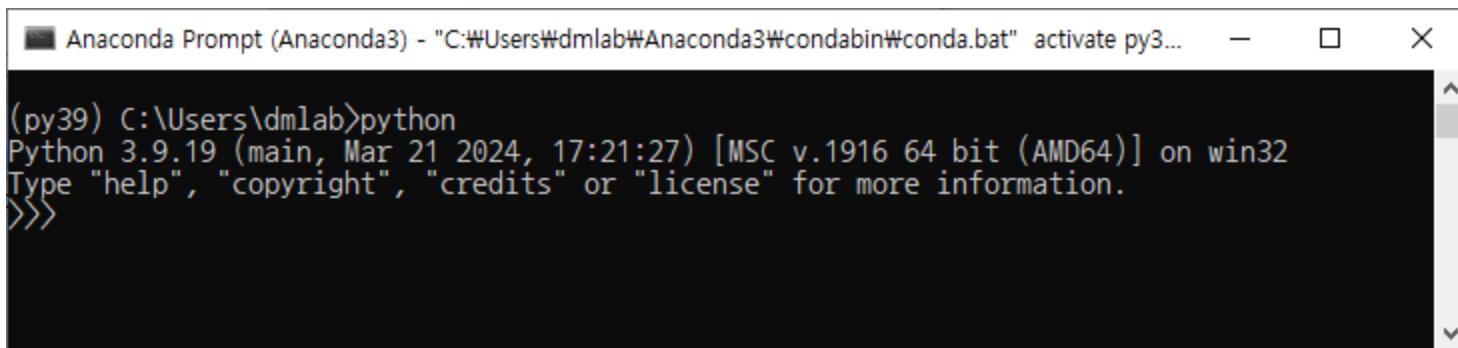
Python Interpreter

A Python interpreter is the program that reads and executes Python code.

- You write Python code (e.g., `print("Hello, world!")`) in a `.py` file or directly in an interactive shell.



To invoke the interpreter as an interactive shell, type `python` on the Anaconda Prompt:

A screenshot of the Anaconda Prompt window. The title bar says "Anaconda Prompt (Anaconda3) - "C:\Users\dmlab\Anaconda3\condabin\conda.bat" activate py3...". The main window has a black background and contains the following text:
(py39) C:\Users\dmlab>python
Python 3.9.19 (main, Mar 21 2024, 17:21:27) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
The text "(py39)" is in blue, indicating the Python environment. The prompt "C:\Users\dmlab>" is in white, and the rest of the text is in light gray.

The interpreter is now running and ready to accept your Python commands.

- You can see three greater than signs (`>>>`) at the beginning of the line, indicating that the Python interpreter is ready.
- The current Python version is 3.9.

Example

Here is the simple Python program that takes two inputs as `a` and `b` and prints the sum in the third variable which is `c`. The last line prints a text string.

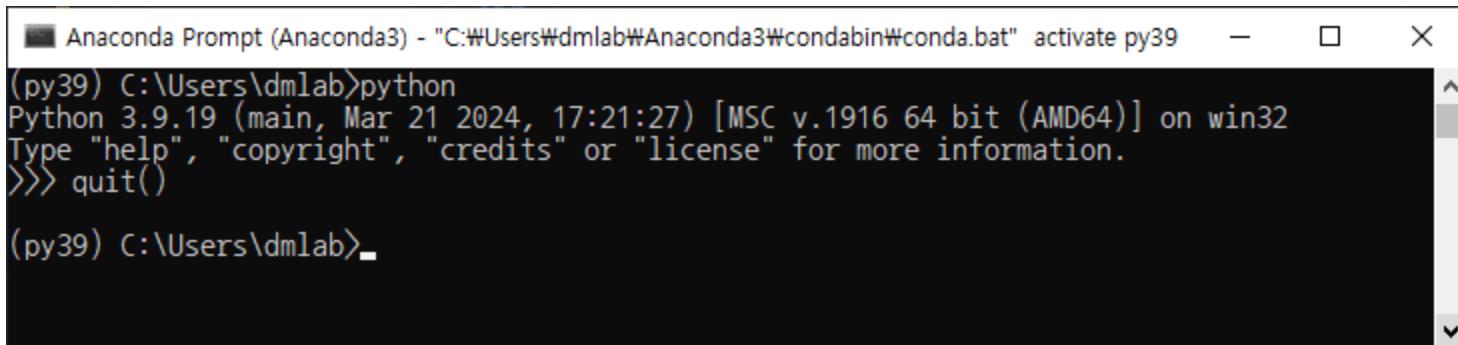
Python interpreter executes a program line by line.

```
a = 3  
b = 7  
c = a + b  
print(c)  
print("hello Python!")
```

Output:

```
10  
hello Python!
```

To exit the interpreter, simply type `quit()` or `exit()`.



A screenshot of an Anaconda Prompt window titled "Anaconda Prompt (Anaconda3) - "C:\Users\dmlab\Anaconda3\condabin\conda.bat" activate py39". The window shows a Python 3.9.19 interactive session. The user has typed `quit()` and the prompt has returned to the user's directory.

```
Anaconda Prompt (Anaconda3) - "C:\Users\dmlab\Anaconda3\condabin\conda.bat" activate py39
(py39) C:\Users\dmlab>python
Python 3.9.19 (main, Mar 21 2024, 17:21:27) [MSC v.1916 64 bit (AMD64)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> quit()

(py39) C:\Users\dmlab>
```

Then, You can return to the prompt.

Thank You.