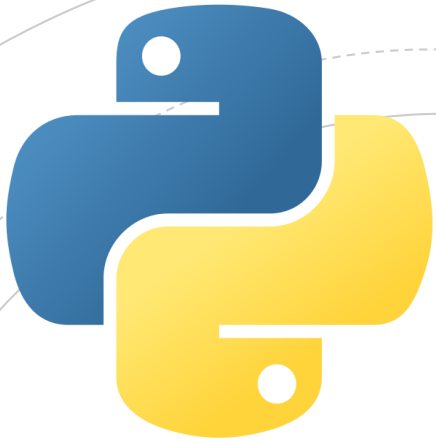


python™

# Lecture (1)

# Introduction to Programming

- What is programming?
- What is programming language?

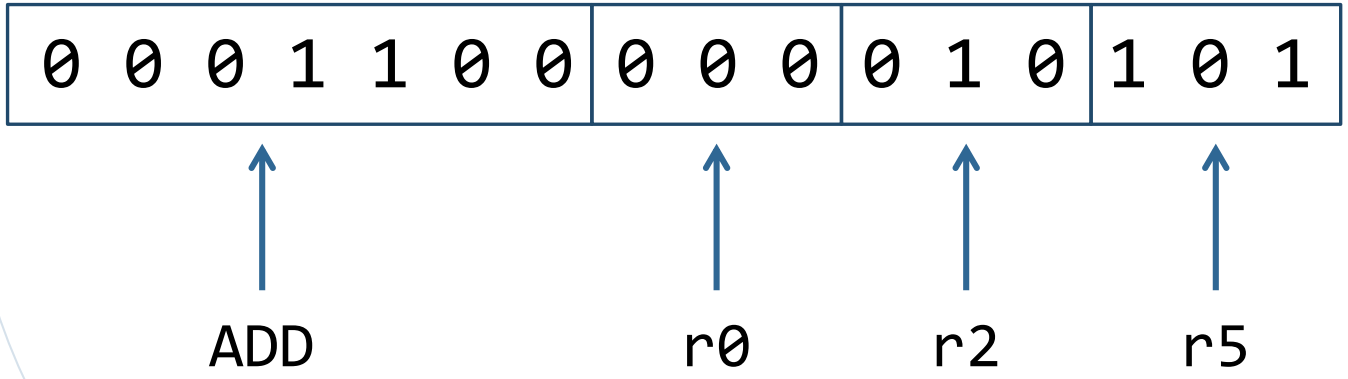
- The computer is binary. Numbers are written in binary. Letters are written as ASCII (binary). How to represent the commands?

# Low Level Programming

- How to tell the computer to perform this addition?

```
r5 = r0 + r2
```

- The computer knows only binary. We need to convert this command into binary:




- Changing any bit changes the meaning.

# Low Level Programming

- Example of a program written in machine code:

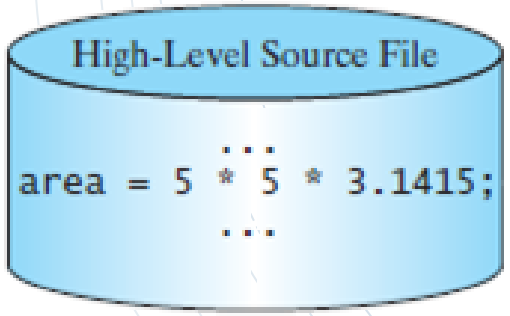
```
01100000000000000000010000000
10100100000000000000000000000000
01100000000001000000010000100
10100100000001000000010000000
01100000000001000000000000000
01100000000011000000000000100
...
```

- This is machine code: low level programming.

# High Level Programming

- You just type:

```
a = b + c
```

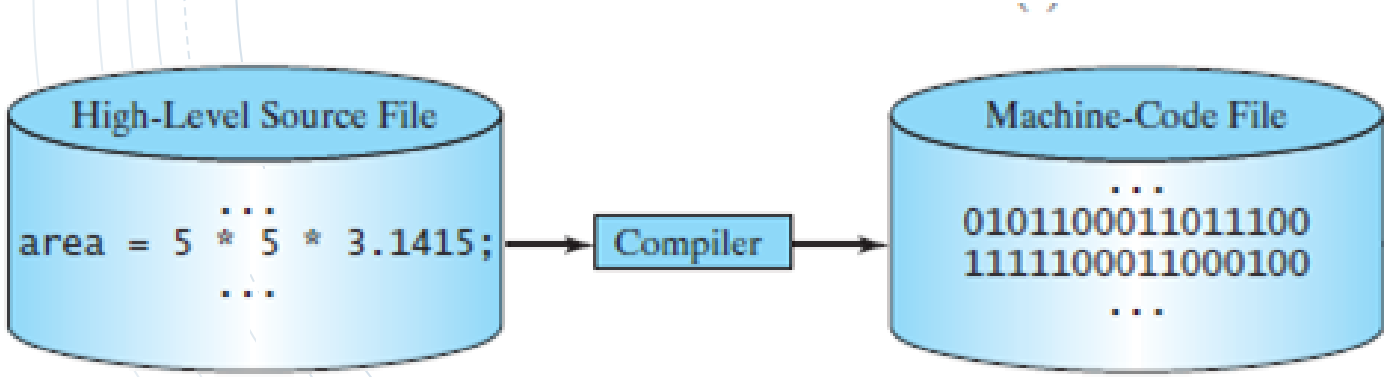


# HIGH LEVEL PROGRAMMING

- You just type:

```
a = b + c
```

- The compiler convert this command into machine code sequence.

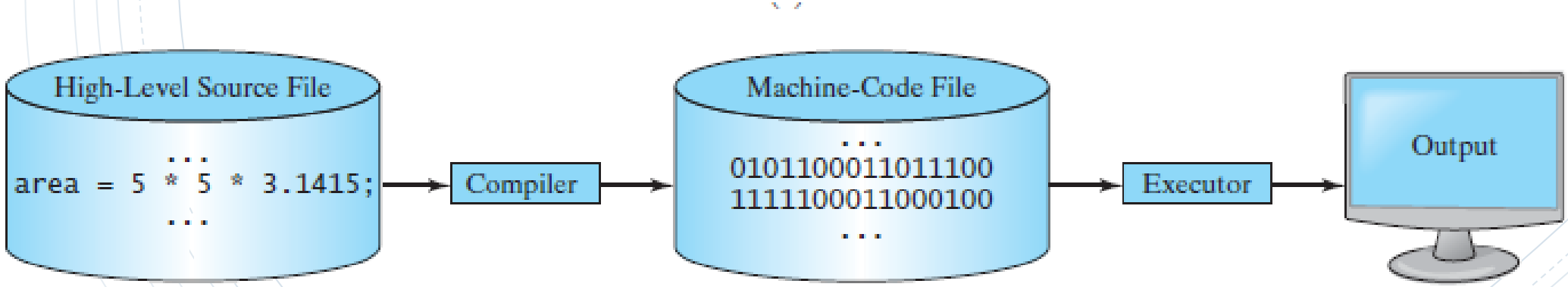


# HIGH LEVEL PROGRAMMING

- You just type:

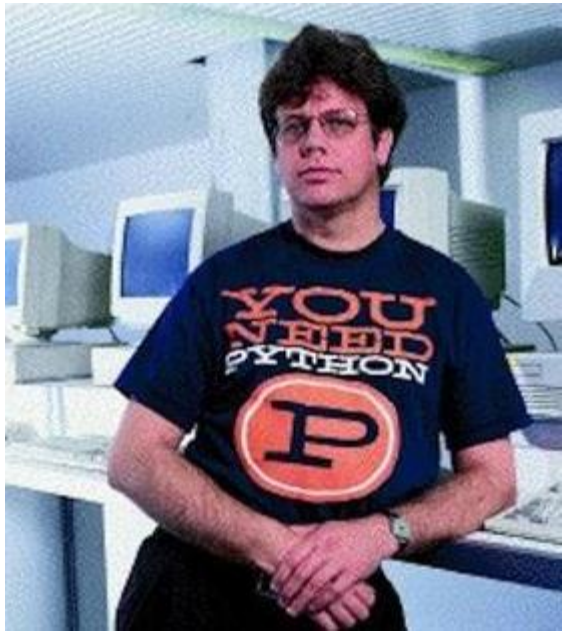
```
a = b + c
```

- The compiler convert this command into machine code sequence.
- A program written in a high-level language is called a source program.



# History

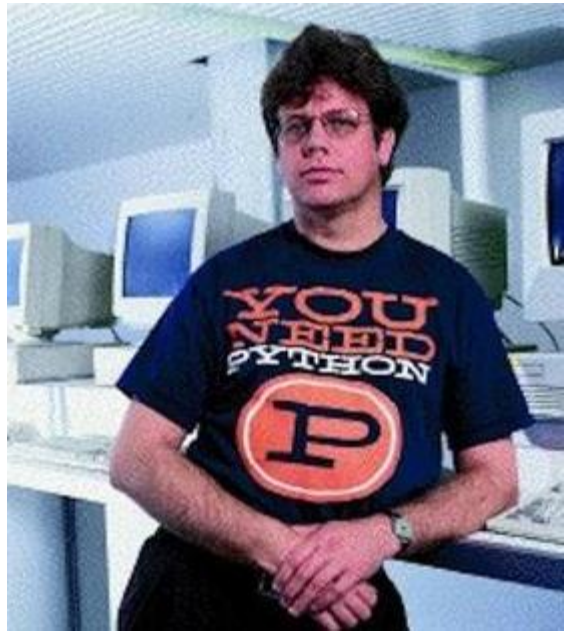
- Python was started as a side project by Dutch programmer Guido van Rossum. He needed some hobby to work with during his Christmas and holidays.
- In the late 1980s, frustrated by the inadequacies of existing programming languages, Van Rossum decided to create a new one that would be both easy-to-use and capable.




# History

- He launched the Computer Programming for Everybody (CP4E) initiative, intending to make programming more accessible to more people similar to the basic English and math skills required by most employers.

- Van Rossum worker for Google for some time and now he is working with Dropbox.




# History

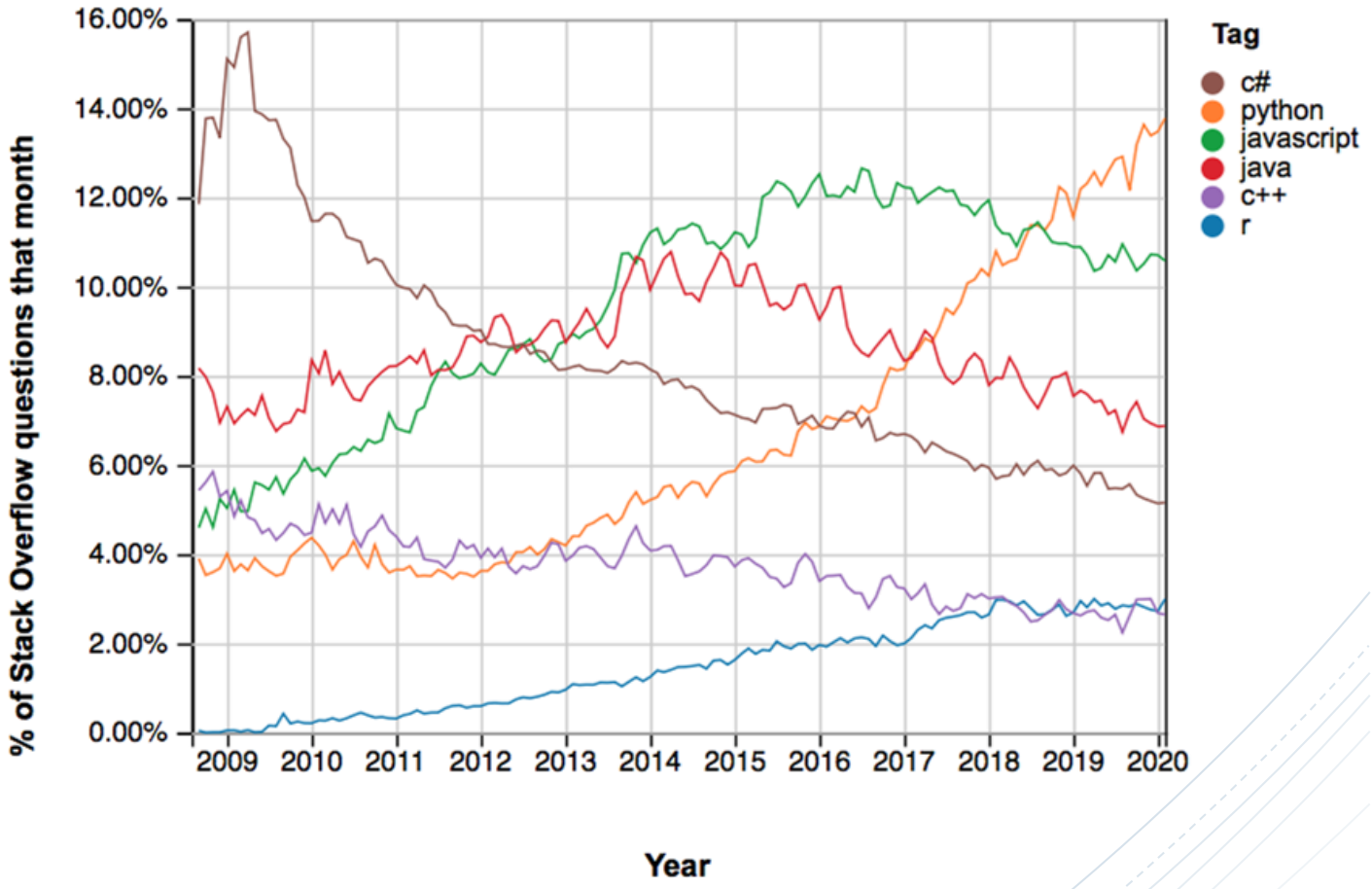
- Despite all the reptiles on Python books and icons, Python is named after the British comedy group “Monty Python” presenting a show on BBC which was favorite for Van Rossum.
- This legacy inevitably adds a humorous quality to Python code examples:
  - The metasyntactic variables are named spam, ham, eggs instead of foo, bar, baz.

# History

- This legacy inevitably adds a humorous quality to Python code examples:
  - Some events at Python conferences are regularly billed as “The Spanish Inquisition” which is a famous show of the group.

# Why Python?

- It took the programming community a couple of decades to appreciate Python. But since the early 2010's, it has been booming and eventually surpassing C, C#, Java and JavaScript in popularity.



# Why Python?

- Python is beginner-friendly.
- Python is often described as a "batteries included" language due to its comprehensive standard library with many third-party libraries.
- Less coding: Python code is typically one-third to one-fifth the size of equivalent C++ or Java code. That means there is less to type and less to debug.

# Why Python?

- Python is multi-paradigm language: It supports Procedural programming and Object-Oriented Programming (OOP).
- It is free:
  - Unlike MATLAB where for most people, a license to use MATLAB is quite expensive, which means that if you have code in MATLAB, then only people who can afford a license will be able to run it.
  - Plus, users are charged for each additional toolbox they want to install to extend the basic functionality of MATLAB.

# Why Python?

- It is open source:
  - Unlike MATLAB which is closed source, i.e., MATLAB language is developed exclusively by MathWorks. If MathWorks were ever to go out of business, then MATLAB would no longer be able to be developed and might eventually stop functioning.
  - There are no restrictions on copying the Python source, embedding it in your systems, or shipping it with your products. In fact, you can even sell Python's source code, if you are so inclined.

# Why Python?

- Integration with other languages: Can call and can be called from other languages like C/C++.
  - Systems may be implemented in Python first, to leverage its speed of development, and later moved to C for delivery, one piece at a time, according to performance demands.
- It is generally considered to be in the top 5 or top 10 most widely used programming languages in the world today and is growing exponentially.

# Why Python?

- The usage of Python as follows.
  - Desktop Applications and GUI.
  - Web Applications.
  - Interface with databases.
  - Artificial Intelligence.
  - Robotics.
  - Internet of Things (IoT).
  - Gaming.
  - Mobile Apps.

# WHY PYTHON?

- The usage of Python as follows.
  - Raspberry Pi and Arduino boards.
  - Document processing and generation, Excel spreadsheet function and macro programming, CSV file processing.
  - Animation, 3D visualization, parallel processing, game developments … among others.

# Why Python?

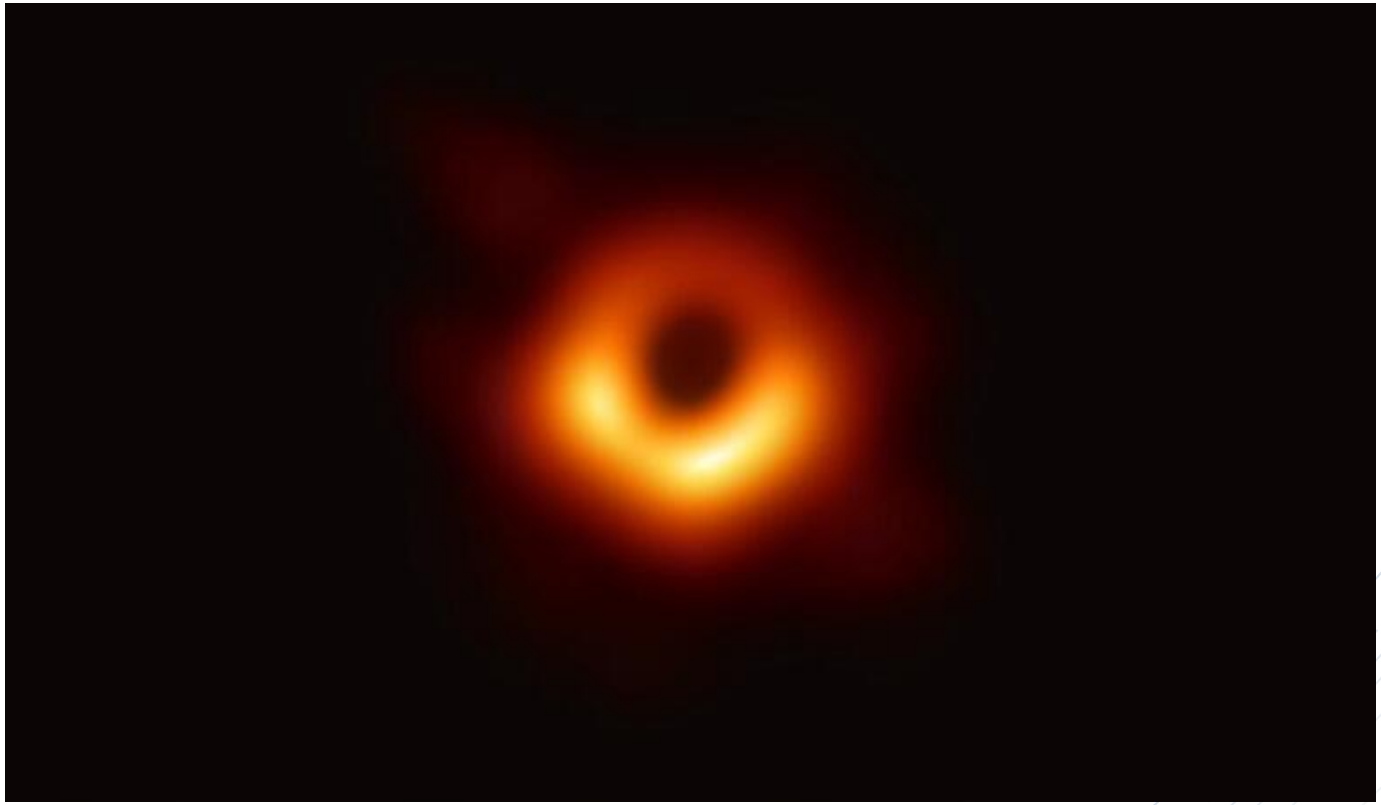
- It is widely used in many companies like:
  - Success stories: https://www.python.org/about/success/.
  - List of software: https://en.wikipedia.org/wiki/List_of_Python_software
  - Google: Python is used to build YouTube. The original Google algorithm was written in Python.
  - Facebook: Python is used to build Instagram.
  - Spotify
  - Netflix.

# WHY PYTHON?

- It is widely used in many companies like:
  - Dropbox.
  - Quora – Reddit.
  - Mozilla.
  - The BitTorrent peer-to-peer file sharing system began its life as a Python program.
  - Intel, Cisco, HP, Seagate, Qualcomm, and IBM use Python for hardware testing.
  - NASA.

# Why Python?

- It was Python that earlier this year helped stitch together the first images of a black hole some 500 million trillion km away.



# WHY NOT PYTHON?

- Speed: On average, you'll need about 2–10 times longer to complete a task with Python than with any other language.
  - However, none of the speed issues matter. Computers and servers have gotten so cheap that we're talking about fractions of seconds so that we are talking about 0.001 or 0.01 seconds.
- It requires more support for parallel processing and multicore platforms.

# WHY NOT PYTHON?

- Not mobile-friendly: Python was not made with mobile in mind.
  - There are Python packages for this purpose. Although it might produce passable results for basic tasks, your best bet is to use a language that was created for mobile app.
- Sometimes the rate of change in Python and its libraries to be a negative.