Programming for engineers II

Master in Sustainable Production Creation

Gustavo Martín Larrea Gallegos
[gustavo.larrea@list.lu]

University of Luxembourg

Master in Sustainable Product Creation

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Summary

>> The history of computer science is the history of problem solving

>> Digital systems process discrete information using binary values

>>> numbers, strings, or code are expressed as bytes

>>> In modern computers, instructions are also stored as data.

>> We can operate a machine thanks to the operating system

>>> We can use GUI or CLIs

>>> Programs are files in executable formats

>>> There are different types of programming languages.

What is python?

Python

“Python is an interpreted, object-oriented, high-level programming language with dynamic semantics. Its high-level built in data structures, combined with dynamic typing and dynamic binding, make it very attractive for Rapid Application Development, as well as for use as a scripting or glue language to connect existing components together. Python's simple, easy to learn syntax emphasizes readability and therefore reduces the cost of program maintenance. [...] “

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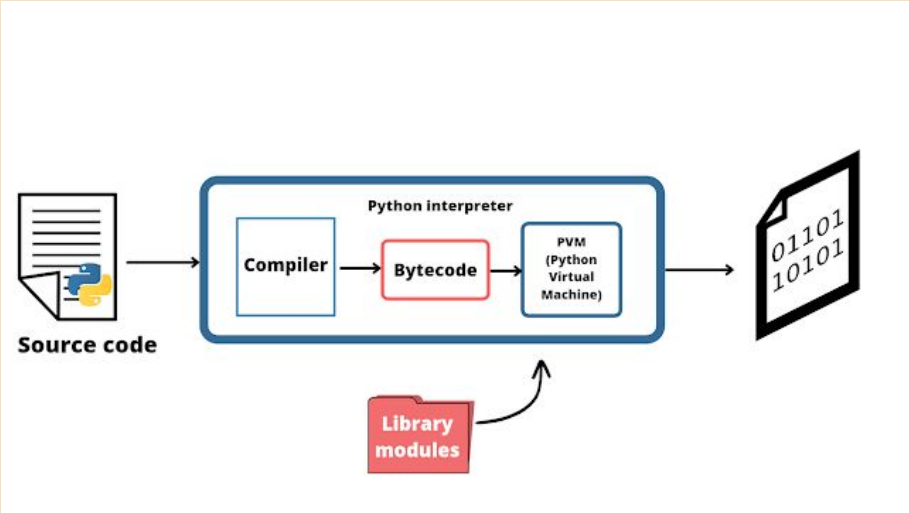
Interpreted language

- Interpreters take code and convert it to machine code



[source]

Object Oriented language

- Python is object-oriented, but it also allows other paradigms.

- In Python, everything is an object
  - Objects are instances of classes that contain data and behavior
  - Code is reusable and modular (Each object is self-contained)

High-level language

- Python has multiple abstractions
  - Easy to read and maintain
  - Has simpler abstractions compared to other programming languages

test.c

```c
/* Simple C program (test.c) */
#include <stdio.h>
int main() {
   int year = 2024;
   printf("Hello World!\n");
   printf("Luxembourg changed a lot in %d.\n", year);
   return 0;
}
```

```
> gcc -o test test.c
> ./test
Hello World!
Luxembourg changed a lot in 2024.
```

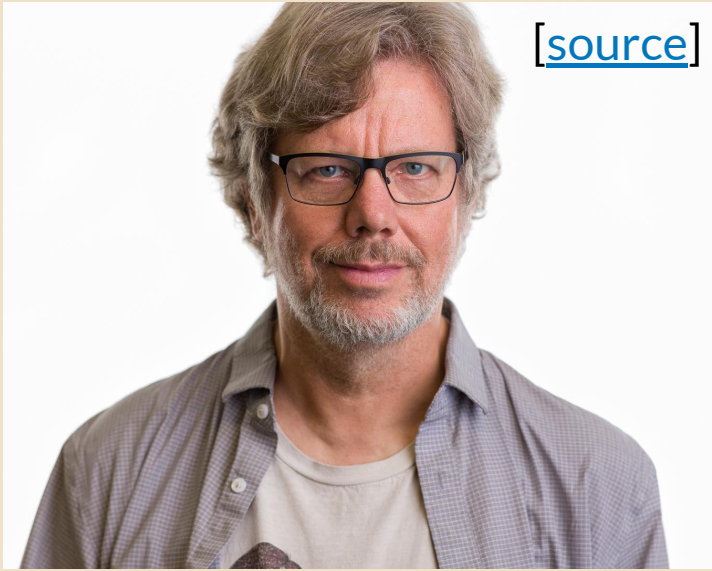
test.py

```python
year = 2024
print("Hello World!")
print(f"Luxembourg changed a lot in {year}")
```

```
> python test.py
Hello World!
Luxembourg changed a lot in 2024
```

History of python

Released in 1991 by Guido van Rossum (successor of the ABC language).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[cool video here]

Lets install Ananconda/miniconda, all OS [here]

Setup your environment

```
$ conda create -n my_environment python=3.13

$ conda activate my_environment

$ pip install jupyterlab
```

Elements of python programming