Introduction to Python

What is Programming?

Programming is the process of designing and building an executable computer program to accomplish a specific task.

Or simply
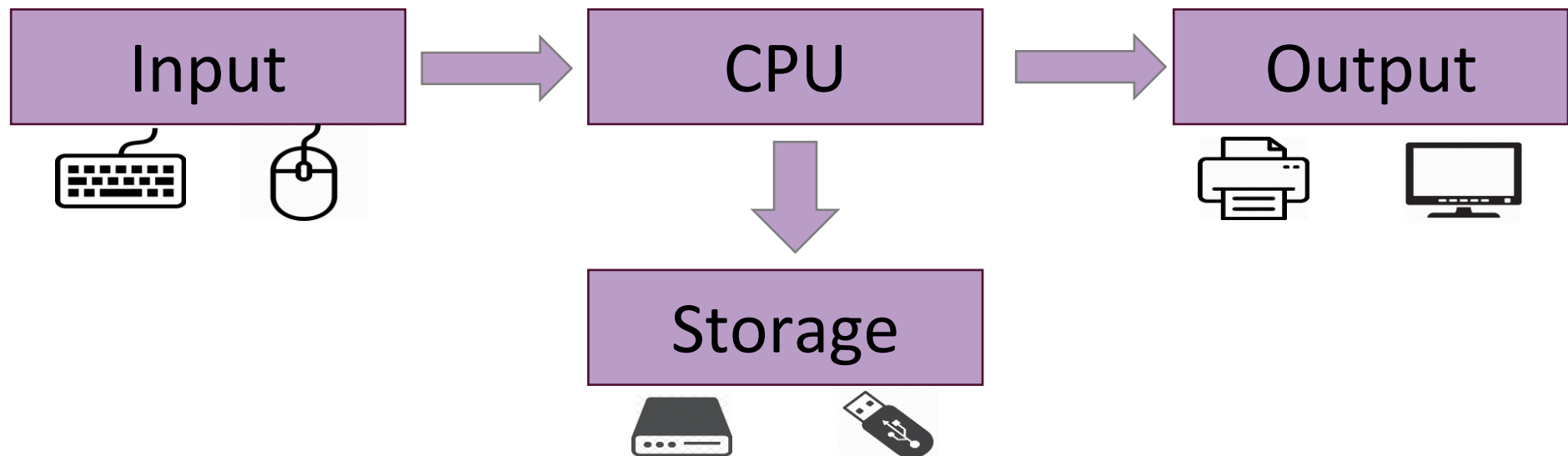**Using a set of instructions (code) to communicate with computers**

Purpose
- Automate tasks
- solve problems
- create software
- ...

What is a computer?

- Electronic device.

- Programmable.

- It can store, retrieve and process data.

- A computer processes data in a device called the central processing unit (CPU).

Input → CPU → Output

CPU → Storage

Programming Languages

Low-Level Languages:

- **Machine Code**: Binary (0s and 1s), understood directly by the computer.
- **Assembly Language**: Symbolic representation of machine code, closer to hardware.

High-Level Languages:

- **Procedural**: C, Fortran - focuses on procedures and routines.
- **Object-Oriented**: Python, Java - focuses on objects and classes.
- **Functional**: Haskell, Lisp - focuses on functions and immutability.
- **Scripting**: Python, JavaScript - focuses on automating tasks.

Compiled vs Interpreted Languages

Compiled:
Converts code into machine language (e.g., C)

Interpreted:
Executes code line by line

	Complier	Interpreter
Read program	Entire program	Line by line
Errors	At compilation time	At run time
Execution time	Overall faster	Overall slower
Debugging	Need to recompile after any code change	Easy
Examples	C, Java	Python

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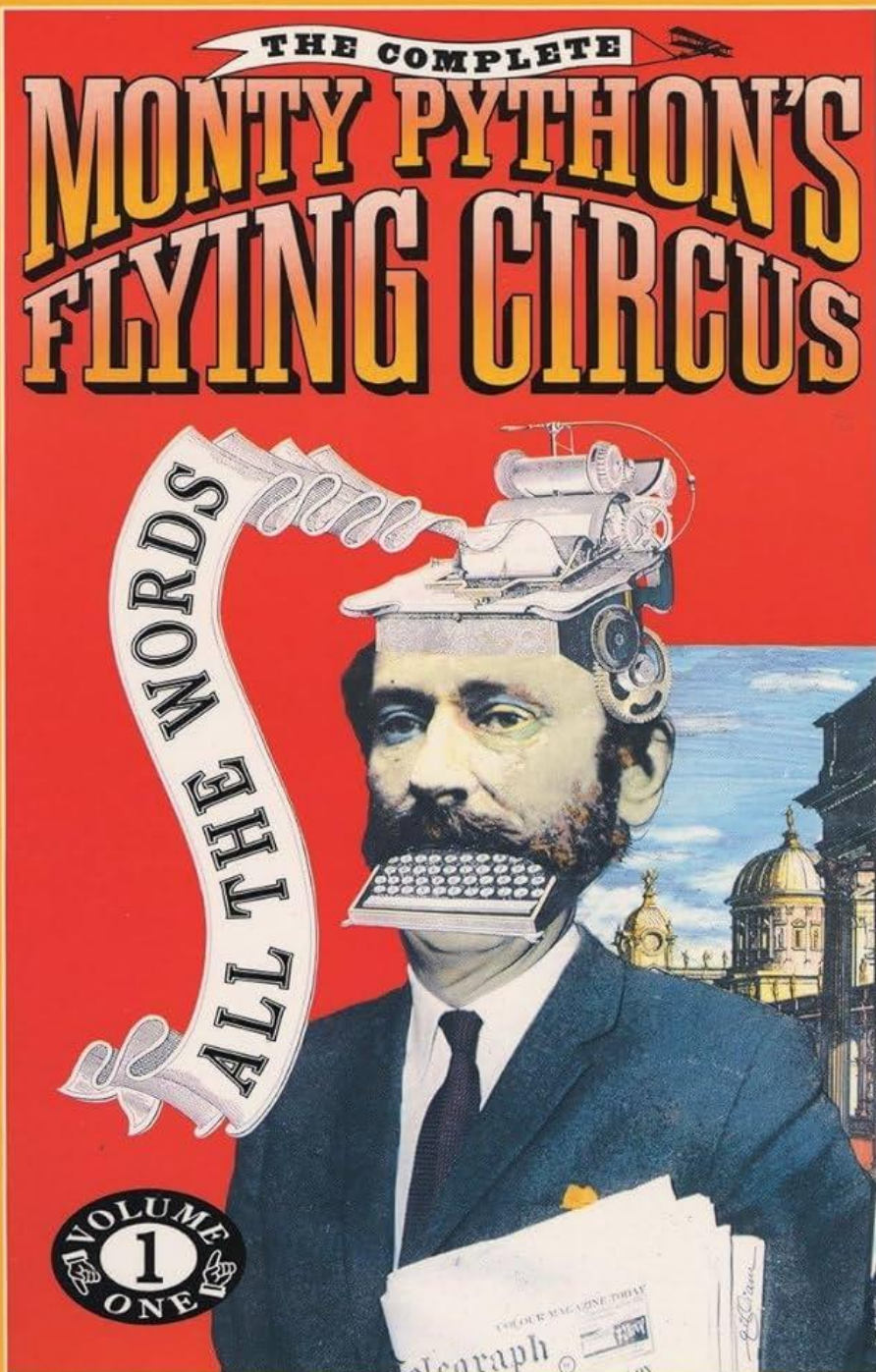
Python

- Created by Guido van Rossum in 1989.
- Python 2 – end of life in 2020.
- Python 3 – current python main version.
- Used by major companies like Google, Facebook, , Netflix, NASA.

Philosophy
- Beautiful is better than ugly.
- Explicit is better than implicit.
- Simple is better than complex.
- Complex is better than complicated.

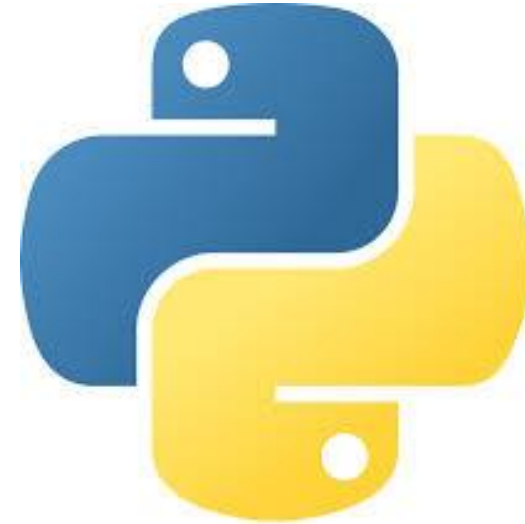# Python- advantages

Simple & elegant

High Level

General purpose

Big community

Open source philosophy

Supports oop

Cross platform

Python 3 Installation

- Let's install it together!

- We'll download the latest version for Windows, here:
  https://www.python.org/downloads/

- And run it.

- ▢ Make sure to tick the "Add Python to PATH"

First run of Python

- Open CMD: Winkey + r

- Type in Python.

- We exit Python's interpreter by typing:

     ⬛ exit() !

`cmd`

`python`

`exit()`

Python Enviroments

Python Shell (CMD):

- Overview: Basic interactive environment.

- Pros/Cons: Quick and easy; limited features

Google Colab:

- Overview: Cloud-based Jupyter notebook.

- Pros/Cons: No setup needed; requires internet

Anaconda with Jupyter Notebook:

- Overview: Integrated environment with powerful tools

- Pros/Cons: Comprehensive; requires installation.

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Thank you