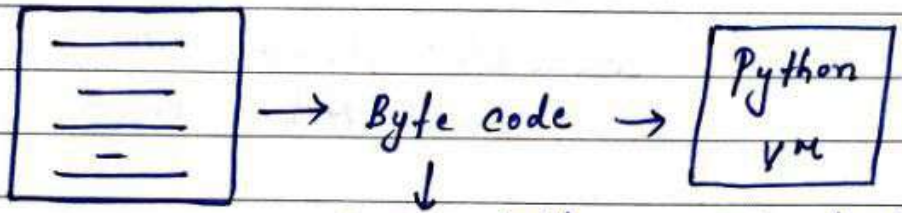
Python's Inner Working

> python hello.py

Using python interpreter to run our script/program.



Mostly hidden Virtual Machine
(visible in some cases such as 'import')

1. Compile to Byte Code
   ↳ low level & platform Independent

* Not a compiled language
  ↳ just a term

→ Byte code runs faster
because almost all checks are done

.pyc → compiled python (frozen binaries)*

→ __pycache__
↳ special directory in python
↳ used to store simple bytecode file (.pyc)
↳ makes python scripts more efficient by avoiding unnecessary recompilation of source code.

→ Source change & Python version

hello_python.cpython-310.pyc

source file name — standard python version 3.10

↳ Works only for imported files.
↳ not for top level files.

cpython → default and most widely used implementation of python.
↳ Written in 'C'

Other implementations:- JPython (for JVM), IronPython (for .NET), PyPy (Just-in-time)

* frozen binaries → refers to a standalone executable that includes both the python interpreter and the application code, along with any necessary dependencies.

Done to create a self-contained package that can be distributed and executed without requiring the end user to install python or any additional libraries.

Two notable ones:- PyInstaller & cx_Freeze.

Python Virtual Machine (PVM)

→ Code loop to iterate byte code
→ Run time engine
→ Also known as python interpreter.

Byte code is Not machine code.
↳ Python specific interpretation
↳ cpython, jpython, IronPython, Stackless, Pypy
↳ Standard implementation.