Introduction to python & numpy

prepared by
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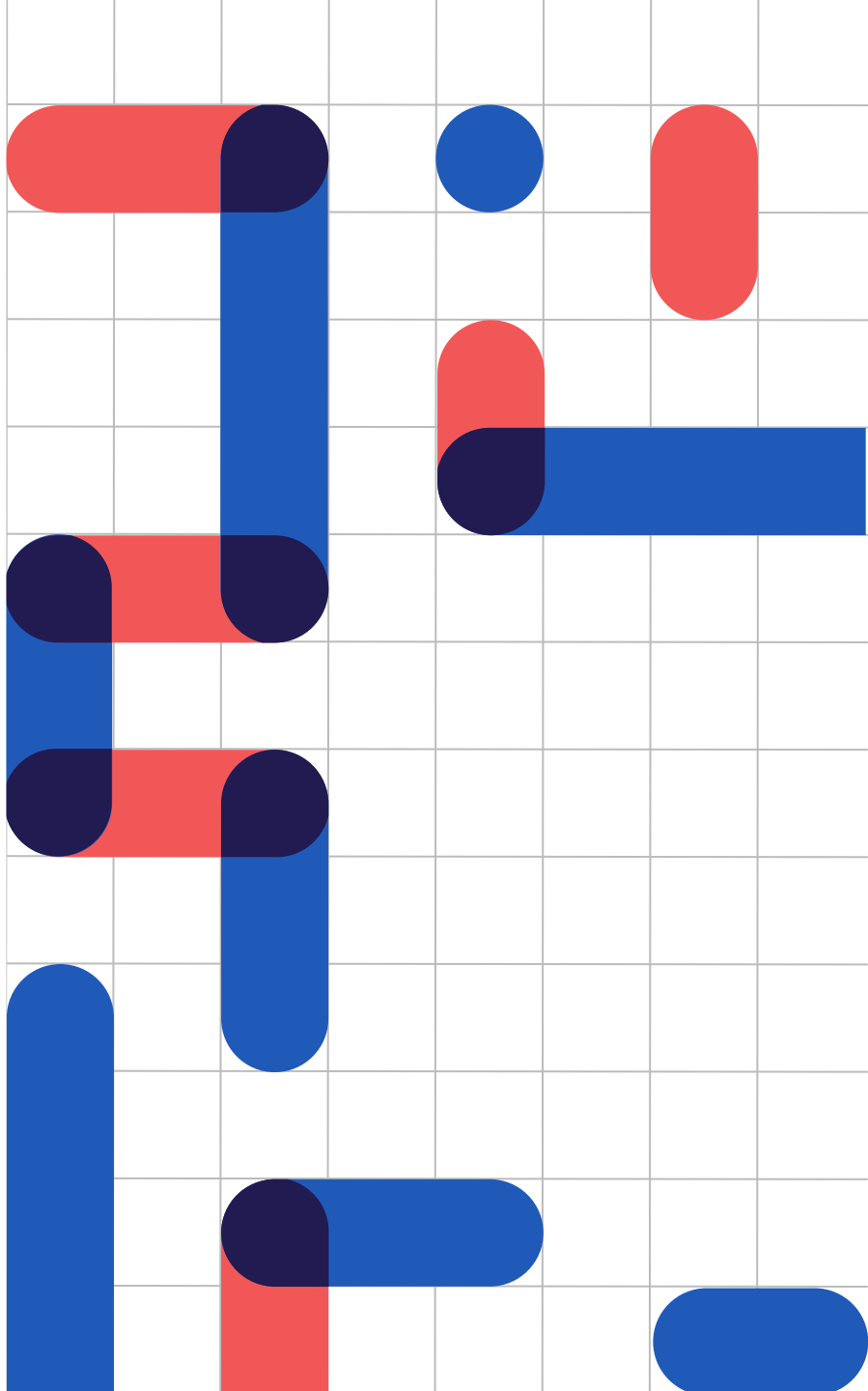


Brief History of python

- Created in 1991 by Guido van Rossum (now at Google)
  - Named for Monty Python
- Open sourced from the beginning
- Considered a scripting language, but is much more
- Object oriented and functional from the beginning
- Used by:
  - Google, Yahoo!, Youtube
  - Many Linux distributions
  - Games and apps
  - . . .

installing python

Windows:

- Download Python from http://www.python.org
- Install Python.
- Run **Idle** from the Start Menu.

Mac OS X:

- Python is already installed.
- Open a terminal and run python or run Idle from Finder.

Linux:

- Chances are you already have Python installed. To check, run python from the terminal.
- If not, install from your distribution's package system.

Different Ways to Run Python Program

There are various ways to run a Python Program, let us see them

1. The Python interactive mode
2. Using the Python command line
3. Run On IDE (PyCharm, VScode)
4. Run on IDLE
5. Google Colab (jupyter notebook)

The python interactive mode

What is the Python Shell? It is a command line interface that can be used to control the system instead of the graphical interface. In simpler words, instead of right-clicking and clicking on the option to create a folder, write in the Shell environment to create a folder with a certain name in a certain address!

This is the most frequently used way to run a Python code. Here basically we do the following:

1. Open command prompt / terminal in your system
2. Enter the command - python or python3 (based on python version installed in your system)
3. If we see these : >>> then, we are into our python prompt

The python interactive mode

It will look something like this:

```
Last login: Sun Mar  3 20:42:40 on ttys000
You have mail.
rasoul@Ramins-MacBook-Air ~ % python3
Python 3.11.4 (v3.11.4:d2340ef257, Jun  6 2023, 19:15:51) [Clang 13.0.0 (clang-1
300.0.29.30)] on darwin
Type "help", "copyright", "credits" or "license" for more information.
>>> print("Linear_Algebra")
Linear_Algebra
>>>
```

The python interactive mode

What is the IPython Shell?

A new shell called IPython was created in 2001 by Fernando Pérez. Ipython stands for Interactive Python. Interactive Python can replace the Python shell and has good features that the Python shell lacks. To use interactive Python, after installing it in the Windows command line (or Linux and Macintosh terminal), we write ipython:

```
rasoul@Ramins-MacBook-Air ~ % ipython3
Python 3.11.4 (v3.11.4:d2340ef257, Jun  6 2023, 19:15:51) [Clang 13.0.0 (clang-1
300.0.29.30)]
Type 'copyright', 'credits' or 'license' for more information
IPython 8.14.0 -- An enhanced Interactive Python. Type '?' for help.

In [1]: print("Linear_Algebra")
Linear_Algebra

In [2]:
```

Using the Python Command Line

Follow the below steps to run a Python Code through command line –

1. Write your Python code into any text editor.
2. Save it with the extension .py into a suitable directory
3. Open the terminal or command prompt.
4. Type python/python3 (based on installation) followed by the file name.py --

Example 1: Saved with hello.py

```
print("Hello World!!")
```

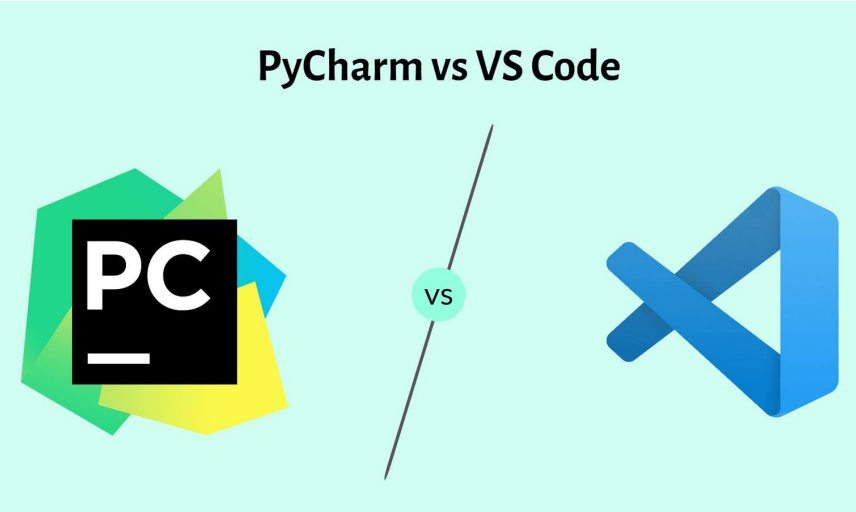
OUTPUT:

```
C:\Users\deepa>python hello.py
Hello World!!
```

Run On IDE (Pycharm, Vscode)

An **IDE** consists of an editor and a compiler that we use to write and compile programs. It has a combination of features required for developing software.

PyCharm is a dedicated Python Integrated Development Environment (IDE) providing a wide range of essential tools for Python developers, tightly integrated to create a convenient environment for productive Pythob, web, and data science development.



Run on IDLE

IDLE stands for **Integrated Development and Learning Environment.**

The lightweight and user-friendly Python IDLE is a tool for Python programming. The Python installer for Windows contains the IDLE module by default. IDLE is not available by default in Python distributions for Linux. It needs to be installed using the respective package managers.

IDLE can be used to execute a single statement just like Python Shell and also to create, modify, and execute Python scripts. IDLE provides a fully-featured text editor to create Python script that includes features like syntax highlighting, autocompletion, and smart indent. It also has a debugger with stepping and breakpoints features.
To start an IDLE interactive shell, search for the IDLE icon in the start menu and double click on it.

Google Colab (jupyter notebook)

What is Colaboratory?

Colaboratory, or “Colab” for short, is a product from Google Research. Colab allows anybody to write and execute arbitrary python code through the browser, and is especially well suited to machine learning, data analysis and education. More technically, Colab is a hosted Jupyter notebook service that requires no setup to use, while providing access free of charge to computing resources including GPUs.

Compiling and interpreting

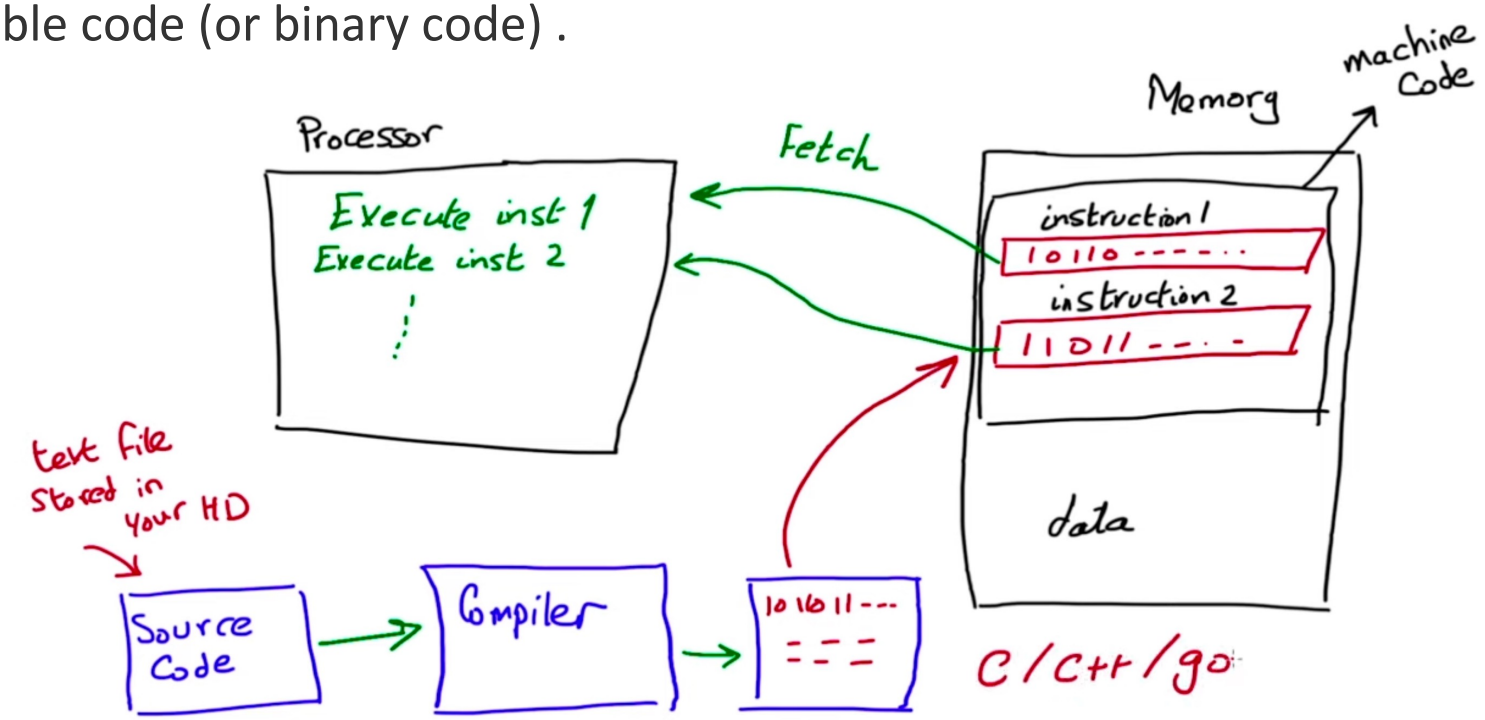
it's very useful for you to understand how the python interpreter works because this is something that you will be subjected to when you're installing python or when you are using an ide you're always going to come across the python interpreter so it's important for you to understand what is the python interpreter and how does python work.

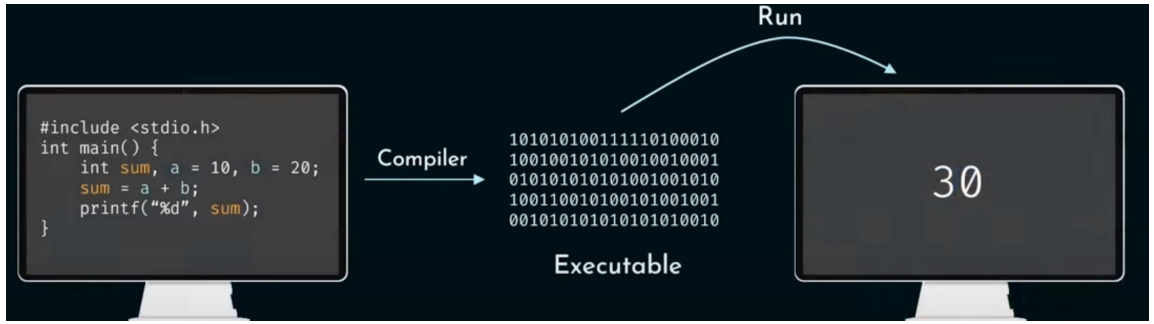
How does your computer runs programs?

How does interpreter work?

Compiling and interpreting

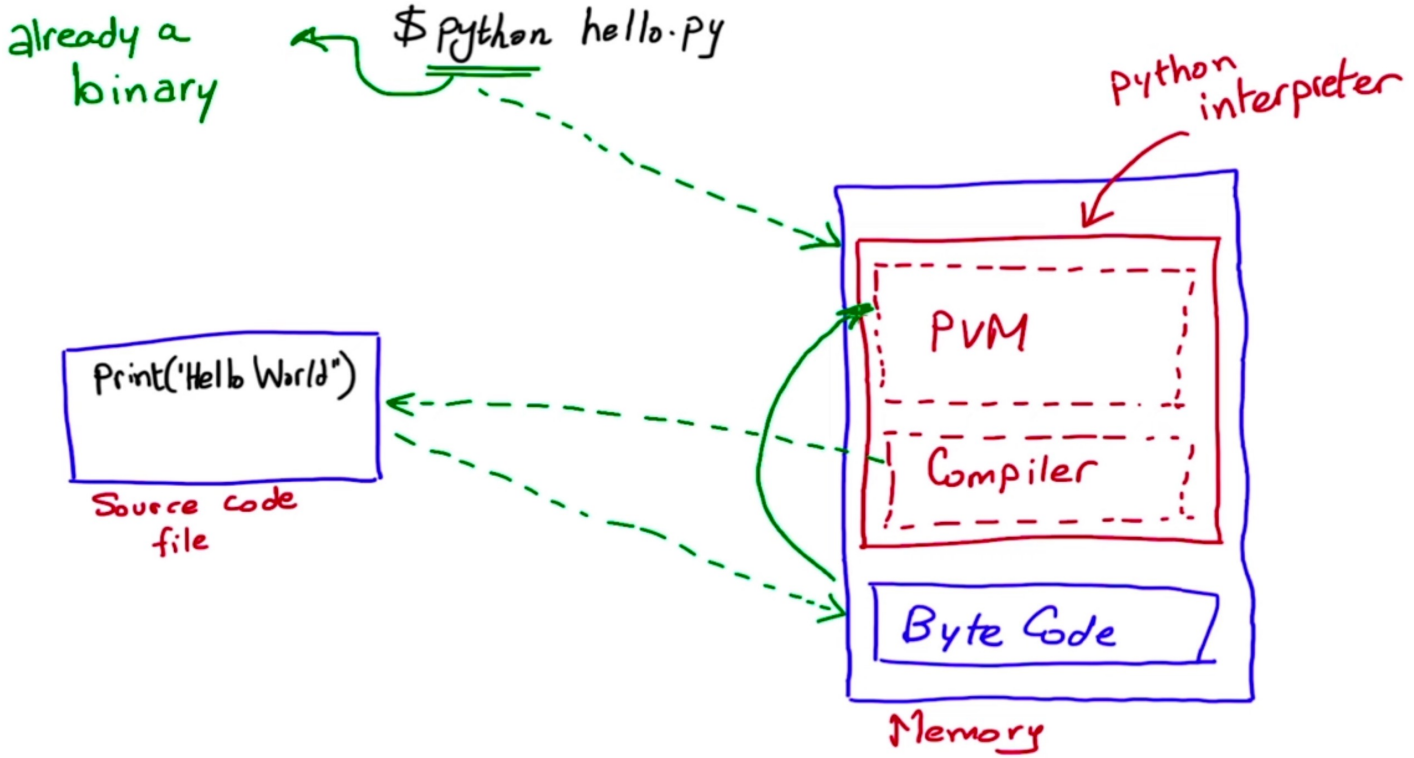
A compiler is a complex piece of software whose job is to convert source code to machine understandable code (or binary code) .





Compiling and interpreting

A python interpreter is a computer program that converts each high-level program statement into machine code. An interpreter translates the command that you write out into code that the computer can understand. However, to better understand this definition, we must explain what high-level and low-level languages are.



we will keep going in session 0 file

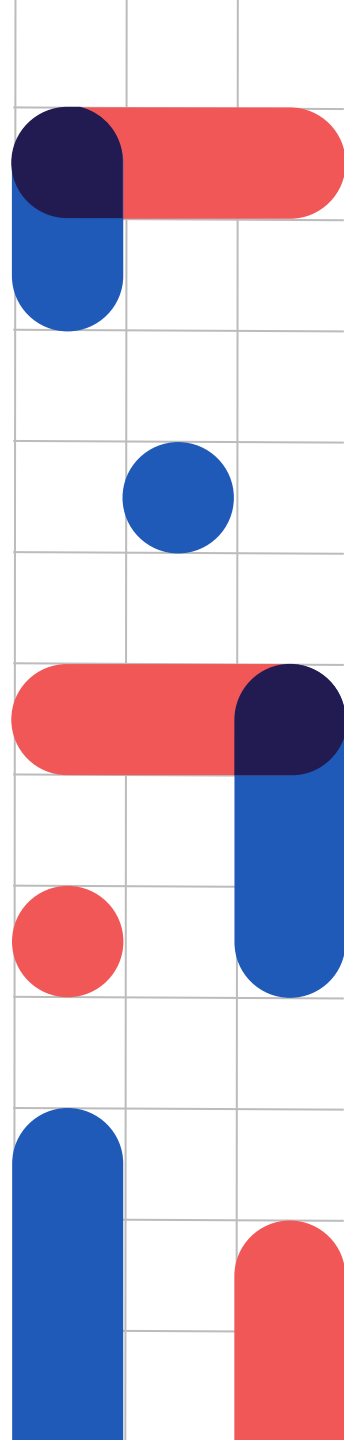
- **Primitive Data Structures**

Integers
Float
Strings
Boolean

- **Non-Primitive Data Structures**

Arrays
Lists
Tuples
Dictionary

- **Conditional execution**
- **Iteration**
- **Functions**
- **python modules**
- **List Comprehensions**



Thank you!

Do you have any questions?

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