

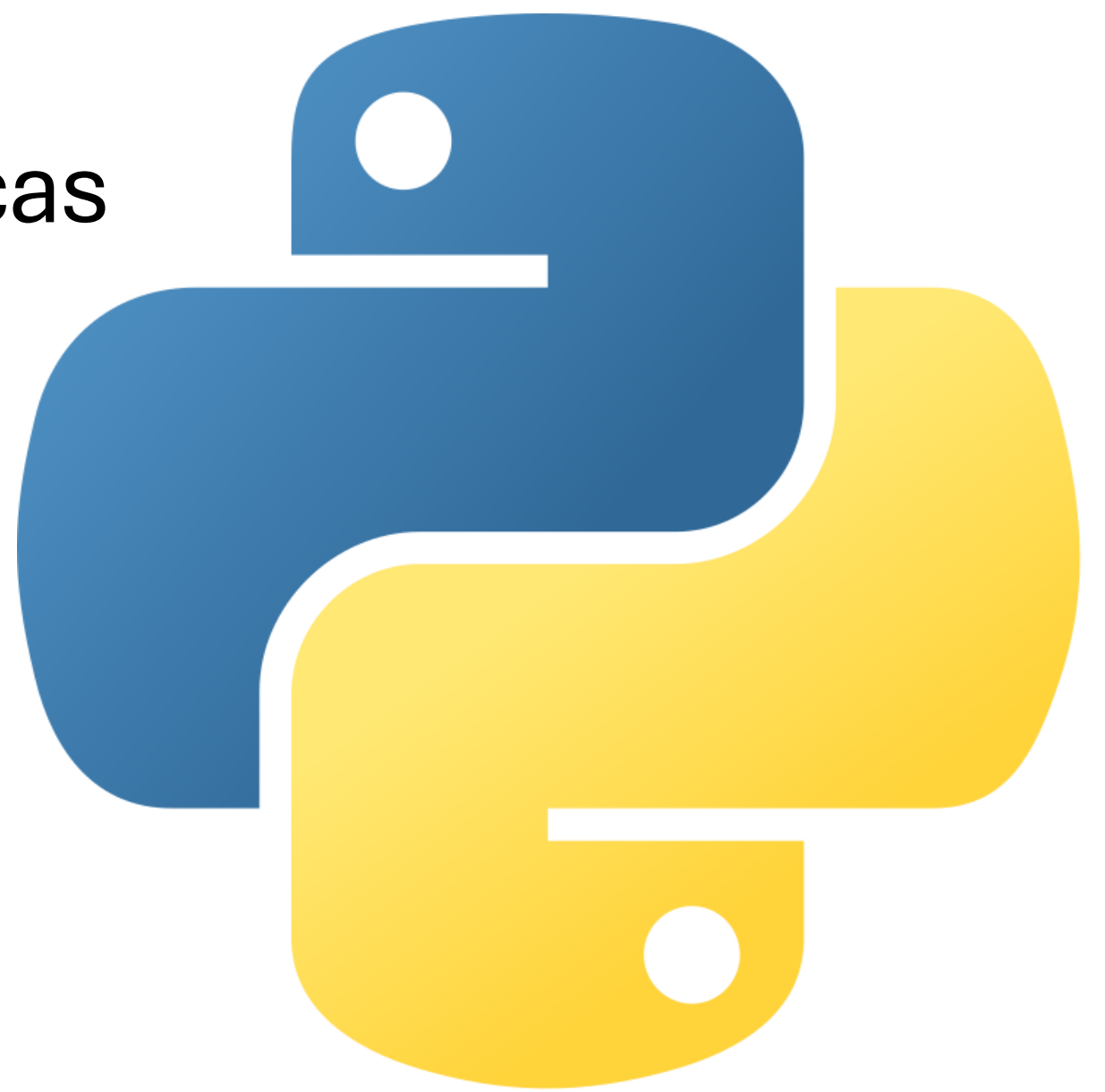
# Olá, Python

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# Instalação, Pacotes e IDE

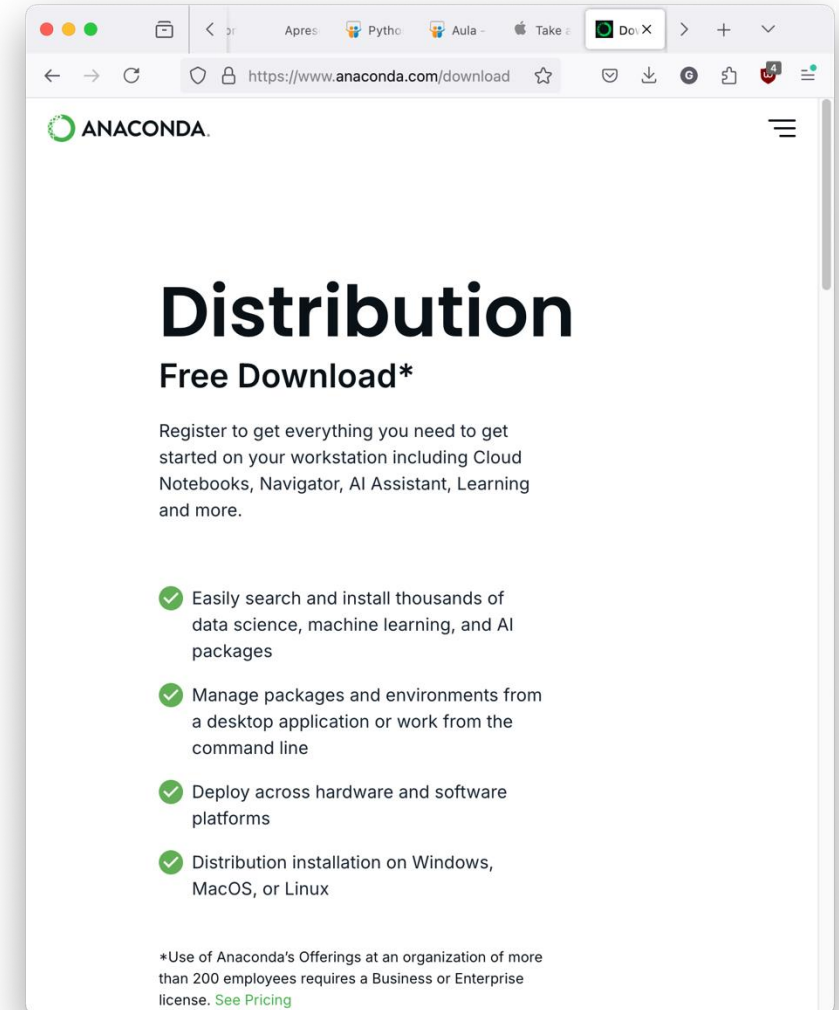
# Principais características

- Interpretada
- Script
- Orientação a objetos
- Dinamicamente tipada

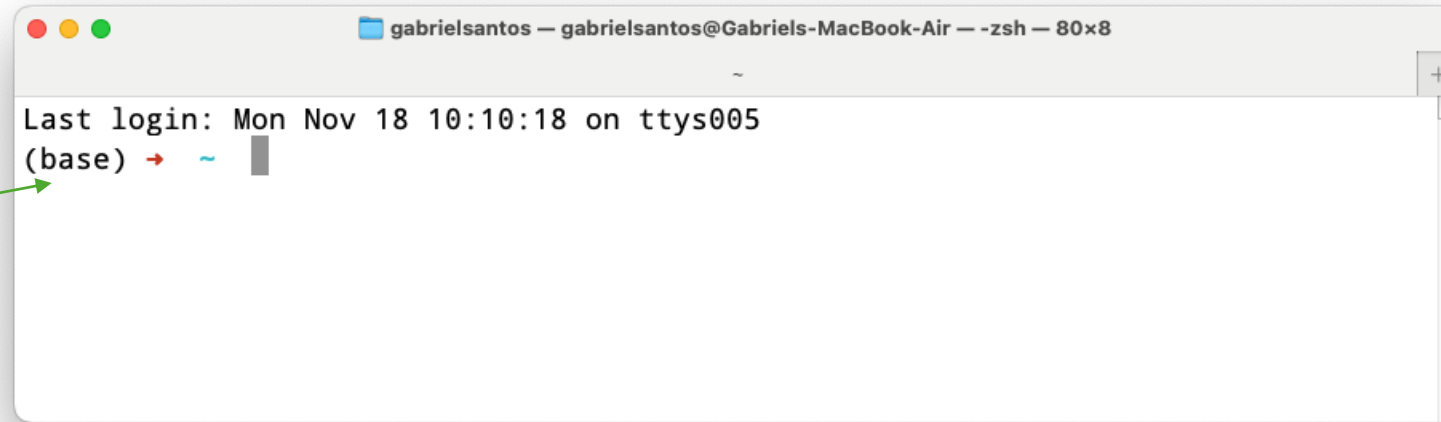


# Como posso instalar o python?

- Binários pré-compilados
  - Python.org, Windows Store, pacotes linux
- **Anaconda**
  - anaconda.com
  - Criação de diferentes ambientes
    - **Versões específicas de pacotes a distribuição**
    - **Fácil replicação para rápida execução**



# Checagem de ambiente

A terminal window titled 'gabrielsantos — gabrielsantos@Gabriels-MacBook-Air — -zsh — 80x8'. The terminal output shows 'Last login: Mon Nov 18 10:10:18 on ttys005' followed by '(base) → ~' on the next line. A green arrow points from a text box on the left to the '(base)' part of the prompt.

```
gabriel santos — gabrielsantos@Gabriels-MacBook-Air — -zsh — 80x8
Last login: Mon Nov 18 10:10:18 on ttys005
(base) → ~
```

Nome do  
environment ativo

- Abrir powershell (Windows Terminal) ou terminal linux e verificar ambiente ativo
- Não aparece?  
conda init powershell

# > Criar ambiente

conda create -n "tutorial" python=3.10

Nome do  
environment

Versão

- Permite criar ambientes
  - Especificar nome
  - Versão do python
  - Instalação de pacotes

```
gabrielsantos — conda create -n "tutorial" python=3.11 — python • conda create -n tutorial p...
conda

(base) ~ ➔ conda create -n "tutorial" python=3.11
Retrieving notices: ...working... done
Channels:
- defaults
Platform: osx-arm64
Collecting package metadata (repodata.json): done
Solving environment: done

## Package Plan ##

environment location: /opt/anaconda3/envs/tutorial

added / updated specs:
- python=3.11

The following packages will be downloaded:

package | build | size
-----|-----|-----
ca-certificates-2024.9.24 | hca03da5_0 | 131 KB
openssl-3.0.15 | h80987f9_0 | 4.3 MB
pip-24.2 | py311hca03da5_0 | 2.8 MB
python-3.11.10 | hb885b13_0 | 15.5 MB
setuptools-75.1.0 | py311hca03da5_0 | 2.2 MB
tzdata-2024b | h04d1e81_0 | 115 KB
wheel-0.44.0 | py311hca03da5_0 | 146 KB
-----|-----|-----
Total: | | 25.2 MB

The following NEW packages will be INSTALLED:

bzip2 | pkgs/main/osx-arm64::bzip2-1.0.8-h80987f9_6
ca-certificates | pkgs/main/osx-arm64::ca-certificates-2024.9.24-hca03da5_0
libffi | pkgs/main/osx-arm64::libffi-3.4.4-hca03da5_1
ncurses | pkgs/main/osx-arm64::ncurses-6.4-h313beb8_0
openssl | pkgs/main/osx-arm64::openssl-3.0.15-h80987f9_0
pip | pkgs/main/osx-arm64::pip-24.2-py311hca03da5_0
python | pkgs/main/osx-arm64::python-3.11.10-hb885b13_0
readline | pkgs/main/osx-arm64::readline-8.2-h1a28f6b_0
setuptools | pkgs/main/osx-arm64::setuptools-75.1.0-py311hca03da5_0
sqlite | pkgs/main/osx-arm64::sqlite-3.45.3-h80987f9_0
tk | pkgs/main/osx-arm64::tk-8.6.14-h6ba3021_0
tzdata | pkgs/main/noarch::tzdata-2024b-h04d1e81_0
wheel | pkgs/main/osx-arm64::wheel-0.44.0-py311hca03da5_0
xz | pkgs/main/osx-arm64::xz-5.4.6-h80987f9_1
zlib | pkgs/main/osx-arm64::zlib-1.2.13-h18a0788_1

Proceed ([y]/n)? y
```

# > Ativar e desativar environment

conda activate tutorial

Nome do  
environment ativo



```
gabrielsantos — gabrielsantos@Gabriels-MacBook-Air — -zsh — 62x7

(base) ~ → conda activate tutorial
(tutorial) ~ → conda deactivate
(base) ~ →
```

Desativa  
environment

conda deactivate

# > Listar e remover ambientes

`conda env list`

`conda remove --name ENV_NAME --all`

```
gabrielsantos — gabrielsantos@Gabriels-MacBook-Air — zsh — ...

[(base) → ~ conda env list
# conda environments:
#
base                * /Users/gabrielsantos/opt/anaconda3
remove              /opt/anaconda3/envs/remove
tutorial            /opt/anaconda3/envs/tutorial

[(base) → ~ conda remove --name remove --all

Remove all packages in environment /opt/anaconda3/envs/remove:

## Package Plan ##

environment location: /opt/anaconda3/envs/remove

The following packages will be REMOVED:

bzip2-1.0.8-h80987f9_6
ca-certificates-2024.9.24-hca03da5_0
libffi-3.4.4-hca03da5_1
ncurses-6.4-h313beb8_0
openssl-3.0.15-h80987f9_0
pip-24.2-py311hca03da5_0
python-3.11.10-hb885b13_0
readline-8.2-h1a28f6b_0
setuptools-75.1.0-py311hca03da5_0
sqlite-3.45.3-h80987f9_0
tk-8.6.14-h6ba3021_0
tzdata-2024b-h04d1e81_0
wheel-0.44.0-py311hca03da5_0
xz-5.4.6-h80987f9_1
zlib-1.2.13-h18a0788_1

Proceed ([y]/n)? y

Preparing transaction: done
Verifying transaction: done
Executing transaction: done
Everything found within the environment (/opt/anaconda3/envs/r
remove), including any conda environment configurations and any
non-conda files, will be deleted. Do you wish to continue?
(y/[n])? y

(base) → ~ █
```



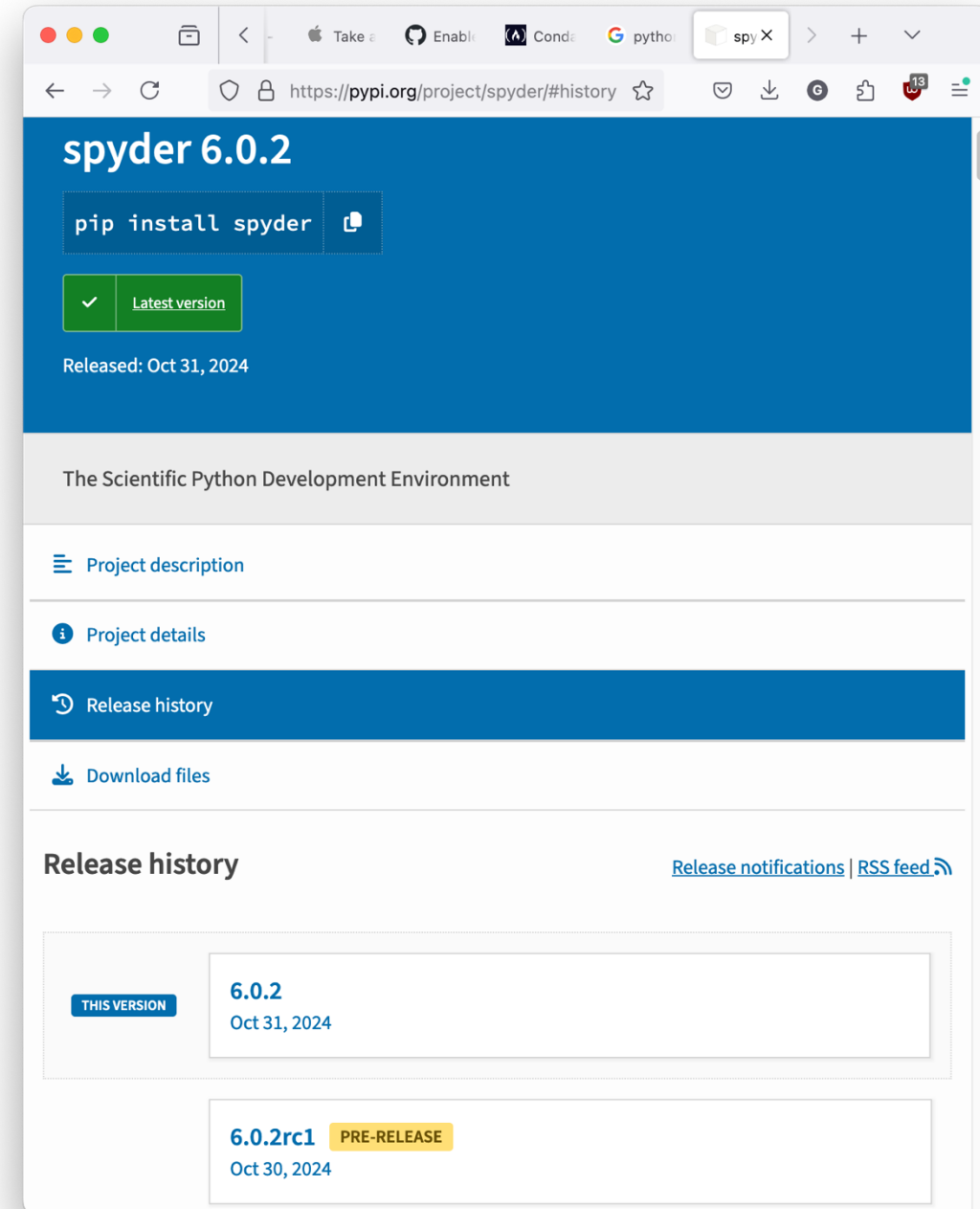
# Pacotes

- Extendem a linguagem
- Distribuição
  - Anaconda
  - pip
  - Evitar misturar
- Principais pacotes
  - IDE -> **Spyder, Jupyter**
  - Tabular data -> **Pandas**
  - Vectors -> **Numpy**
  - Plots -> **Matplotlib, Seaborn**
  - DataScience -> **Scikit-learn**
  - Remote Sensing -> **Rasterio, Shapely**
  - Images -> **Opencv**
  - Deep Learning -> **Pytorch, Tensorflow**



# > Gerenciar de Pacotes

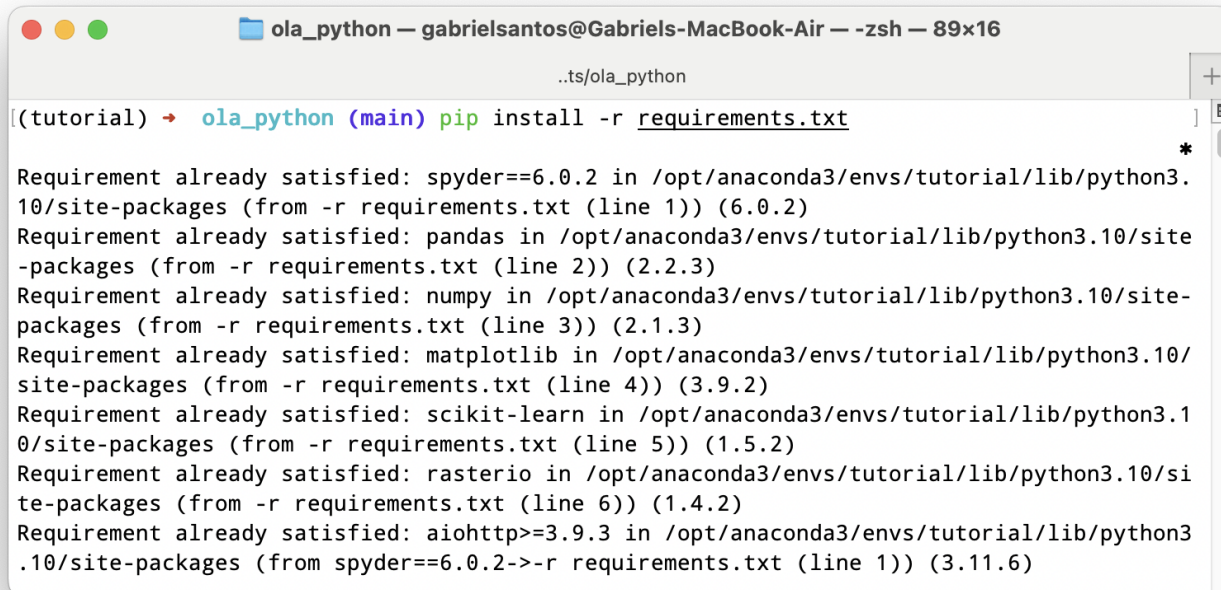
- Instalar
  - `pip install spyder`
  - `pip install spyder==6.0.1`
- Remover
  - `pip uninstall spyder`
- Ver detalhes
  - `pip show spyder`
- Importar no código
  - `import numpy as np`
  - `import matplotlib.pyplot as plt`



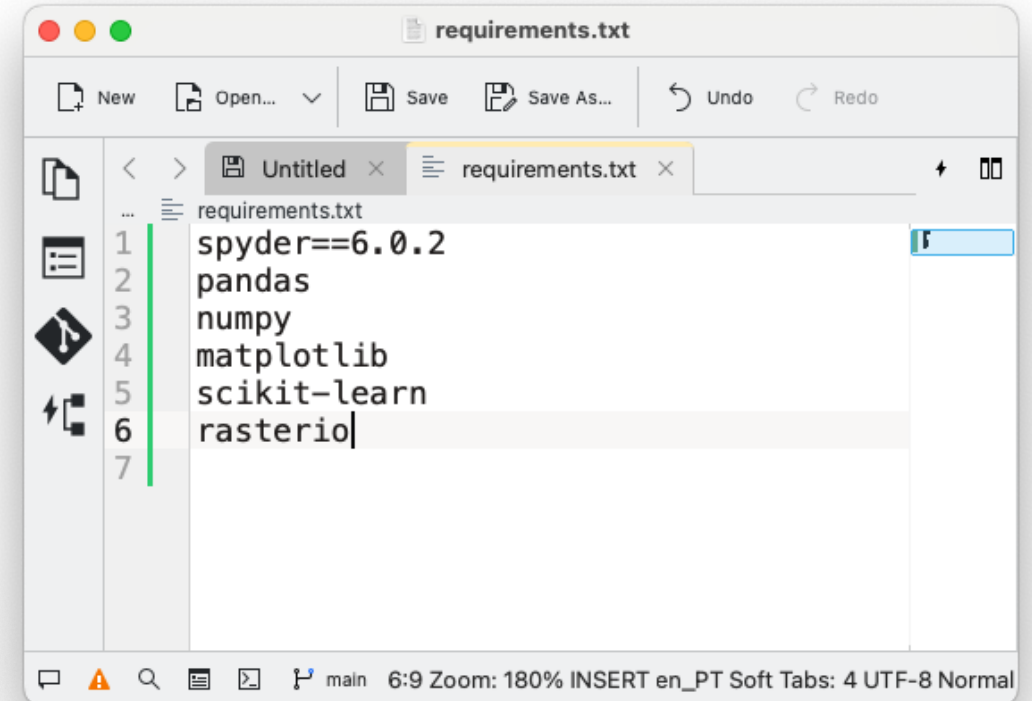
# > Requirements.txt

`pip install -r requirements.txt`

- Arquivo que automatiza a instalação de pacotes
  - Versão



```
ola_python — gabrielsantos@Gabriels-MacBook-Air — zsh — 89x16
..ts/ola_python
(tutorial) → ola_python (main) pip install -r requirements.txt
Requirement already satisfied: spyder==6.0.2 in /opt/anaconda3/envs/tutorial/lib/python3.10/site-packages (from -r requirements.txt (line 1)) (6.0.2)
Requirement already satisfied: pandas in /opt/anaconda3/envs/tutorial/lib/python3.10/site-packages (from -r requirements.txt (line 2)) (2.2.3)
Requirement already satisfied: numpy in /opt/anaconda3/envs/tutorial/lib/python3.10/site-packages (from -r requirements.txt (line 3)) (2.1.3)
Requirement already satisfied: matplotlib in /opt/anaconda3/envs/tutorial/lib/python3.10/site-packages (from -r requirements.txt (line 4)) (3.9.2)
Requirement already satisfied: scikit-learn in /opt/anaconda3/envs/tutorial/lib/python3.10/site-packages (from -r requirements.txt (line 5)) (1.5.2)
Requirement already satisfied: rasterio in /opt/anaconda3/envs/tutorial/lib/python3.10/site-packages (from -r requirements.txt (line 6)) (1.4.2)
Requirement already satisfied: aiohttp>=3.9.3 in /opt/anaconda3/envs/tutorial/lib/python3.10/site-packages (from spyder==6.0.2->-r requirements.txt (line 1)) (3.11.6)
```



```
requirements.txt
1 spyder==6.0.2
2 pandas
3 numpy
4 matplotlib
5 scikit-learn
6 rasterio|
7
```

# > Spyder

spyder

- IDE que facilita a programação
  - Autocomplete
  - Visualização de valores de variáveis
  - Plots

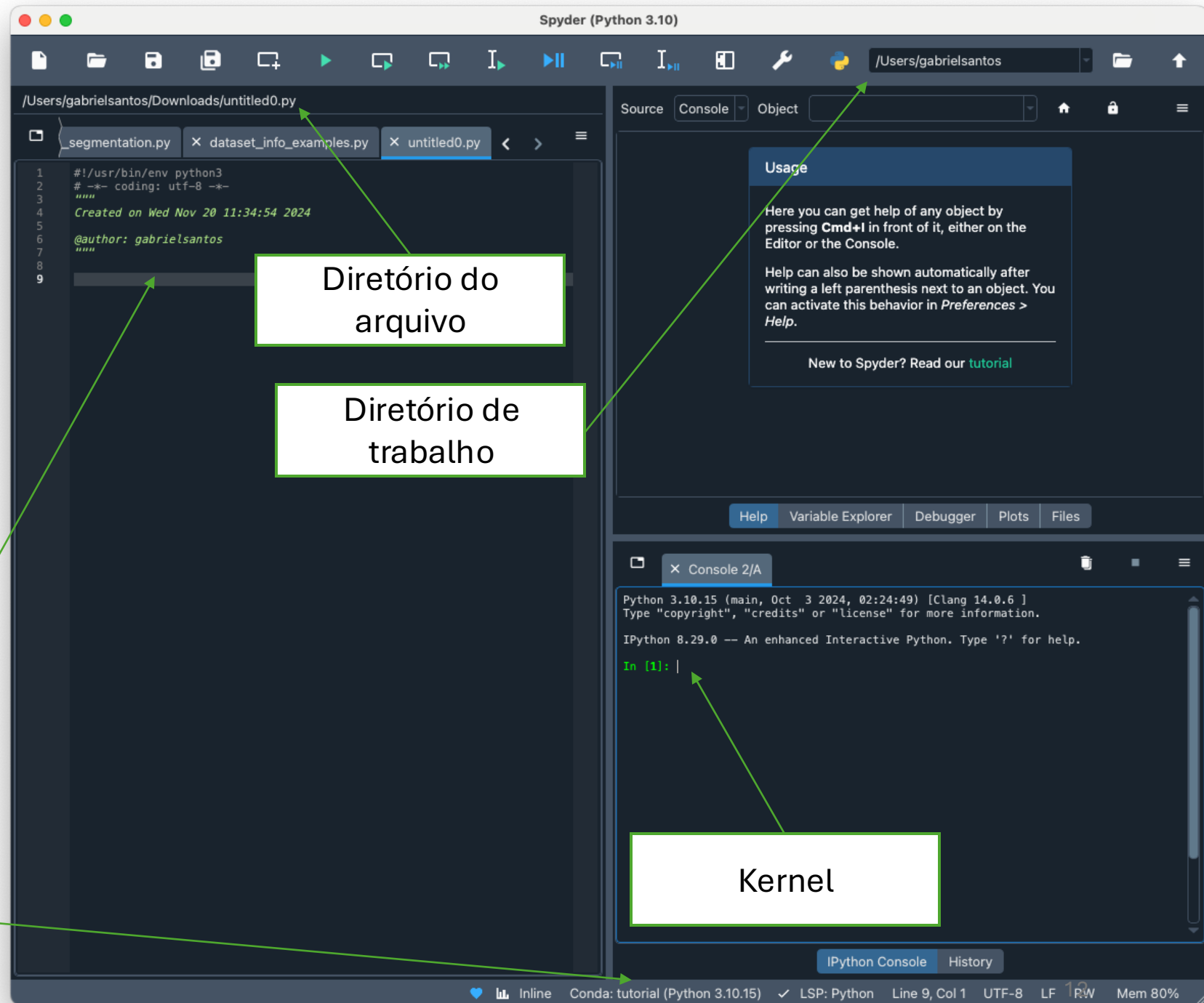
Código

Nome do  
environment ativo

Diretório do  
arquivo

Diretório de  
trabalho

Kernel

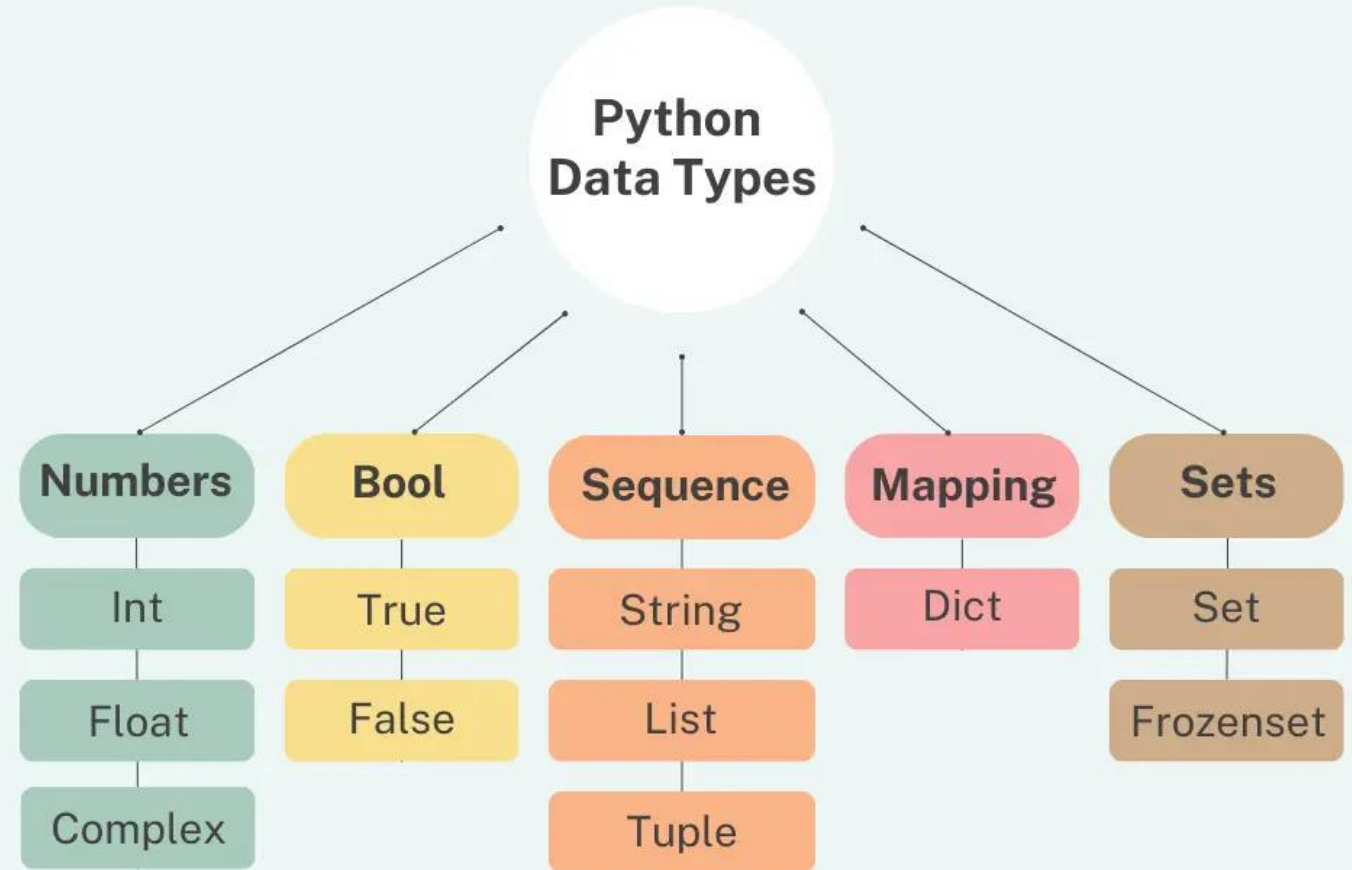


# Variáveis, Tipos de Dados e Operadores

# > Variáveis

- Tipagem dinâmica
- Declarar e inicializar variável

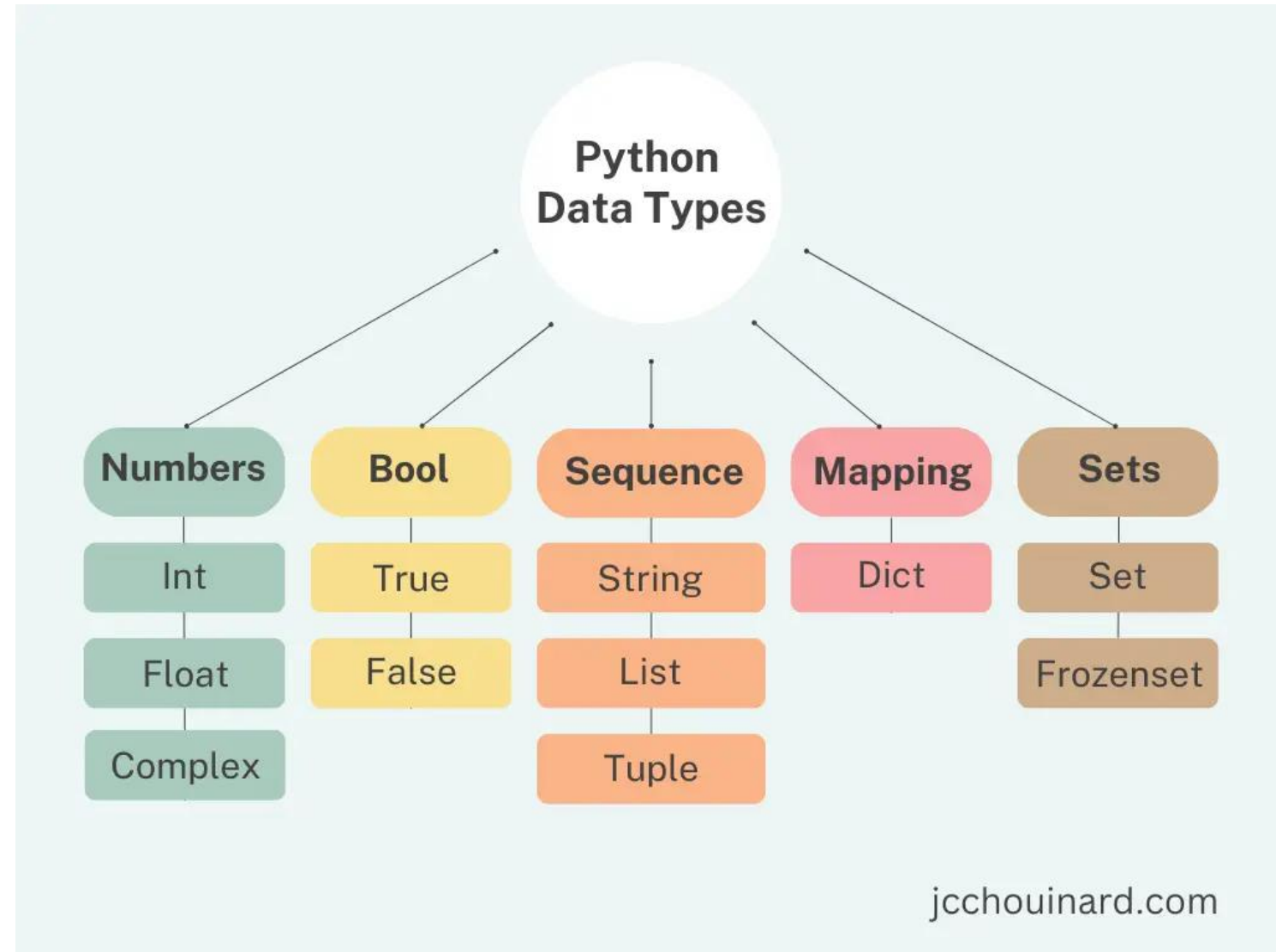
```
v = 0.0
print(v)
v = "esse valor pode variar"
print(v)
v = -3j
print(v)
v = True
```



jcchouinard.com

# Sequências

- List
  - Lista de elementos que podem ser modificado
- Tuple
  - Lista de elementos que não podem ser modificados
- String
  - Lista de caracteres



# > Listas

```
#inicializa nossa variável como lista
v = list()
v = []

#inicializa nossa variável como lista com valores iniciais
v = [1, 2, 3, 4]

#usar a palavra reservada len para saber tamanho da lista
print(len(v))

#inicializa lista usando uma variável e outra lista (matriz!)
k = [v, [8, 9, 10]]

#imprime quantidade de elementos na lista
print(len(k))

#imprime elemento 0 da lista
print(k[0])

#imprime elemento 1 do elemento 0 da lista
print(k[0][1])

#deleta elemento da lista
del v[0]
print(v)
print(k) #por que o valor foi também deletado de k?

#adiciona elemento na lista
v.append('new')
print(v)

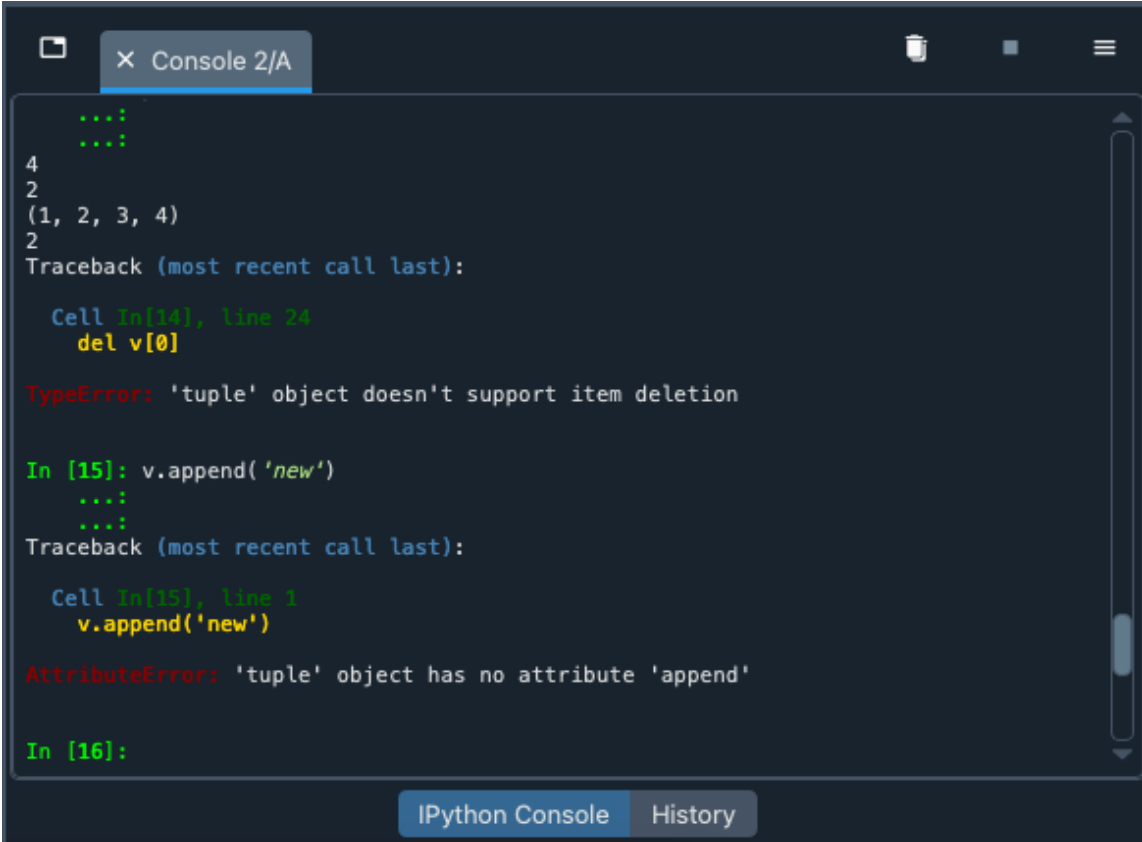
#expande lista com valores de outra lista
v.extend('new')
print(v)
```



# > Tuplas

- Mudar inicialização de v para tupla

```
v = (1, 2, 3, 4)
```



```
...:
...:
4
2
(1, 2, 3, 4)
2
Traceback (most recent call last):
  Cell In[14], line 24
    del v[0]
TypeError: 'tuple' object doesn't support item deletion

In [15]: v.append('new')
...:
...:
Traceback (most recent call last):
  Cell In[15], line 1
    v.append('new')
AttributeError: 'tuple' object has no attribute 'append'

In [16]:
```

IPython Console History

# String

**"codingforfun"**

**Capitalize()**

**Codingforfun**

**"codingforfun"**

**.isalpha()**

**True**

**"54369"**

**.isnumeric()**

**True**

**"codingforfun"**

**.isupper()**

**False**

**"codingforfun"**

**.split()**

**['coding', 'for', 'fun']**

**"runningforfun"**

**.title()**

**Runningforfun**

**" coding "**

**.strip()**

**coding**

**"codingforfun"**

**.replace("d", "m")**

**comingforfun**

# Operadores

Operator	Name	Description	Syntax	Example
+	Addition	Performs addition	$c = a + b$	$a = 5, b = 5$ then $c = 10$
-	Subtraction	Performs subtraction	$c = a - b$	$a = 5, b = 3$ then $c = 2$
*	Multiplication	Performs multiplication	$c = a * b$	$a = 5, b = 5$ then $c = 25$
/	Division	Performs division	$c = a / b$	$a = 10, b = 5$ then $c = 2$
%	Modulus	Performs division but returns the remainder	$c = a \% b$	$a = 15, b = 2$ then $c = 1$
//	Floor Division	Performs division but returns the quotient in which the digits after the decimal points are removed	$c = a // b$	$a = 15, b = 2$ then $c = 7$
**	Exponent	Performs multiplication to power raised	$c = a ** b$	$a = 2, b = 4$ then $c = 16$

# Operadores

## Operators in Python

Operators	Type
+, -, *, /, %	Arithmetic operator
<, <=, >, >=, ==, !=	Relational operator
AND, OR, NOT	Logical operator
&,  , <<, >>, -, ^	Bitwise operator
=, +=, -=, *=, %=	Assignment operator

# > Operadores

```
#importa biblioteca math
import math

#inicializa variaveis
a = 2
b = 51
c = 1 + 2j

m = [1, 2, 3]
n = [4, 5]

aux = a > 2
print(aux)
print(a > 2)

#verifica se a eh menor que 2 e 51 nao eh par
print(a == 2 and not 51 % 2 == 0)
print(a == 2 and 51 % 2 != 0)

#imprime o valor da concatenacao de m e n
print(m + n)

#tenta operacao de subtracao com listas
aux = m - n

#alguns outros operadores
print(a ** b)
print(c ** 2)

#biblioteca math
print(math.sqrt(c))
print(math.sqrt(b))
print(math.log(b))
print(math.sin(a))
```

# Dicionários

- Estrutura de dados baseadas em chave-valor
  - Similar ao json

```
country_capitals = {  
    'Germany' : 'Berlin',  
    'Canada' : 'Ottawa',  
    'England' : 'London'  
}
```

Diagram illustrating the structure of a dictionary (key-value pairs):

- element 1: 'Germany' : 'Berlin'
- element 2: 'Canada' : 'Ottawa'
- element 3: 'England' : 'London'

Labels for the components:

- key: 'Germany', 'Canada', 'England'
- value: 'Berlin', 'Ottawa', 'London'

# > Dicionários

- dicionarios.py

```
varieties = {  
    ..  
}  
  
#imprime chaves  
print(varieties.keys())  
  
#imprime valores  
print(varieties.values())  
  
#acessa um valor atraves de uma chave  
print(varieties['alveralhao'])  
  
#verifica se a chave rufete esta definida  
print('rufete' in varieties)  
  
#verifica se existe TR dentro de valores  
print('TR' in varieties.values())  
  
...
```

# Estruturas Condicionais e Estruturas de Repetição

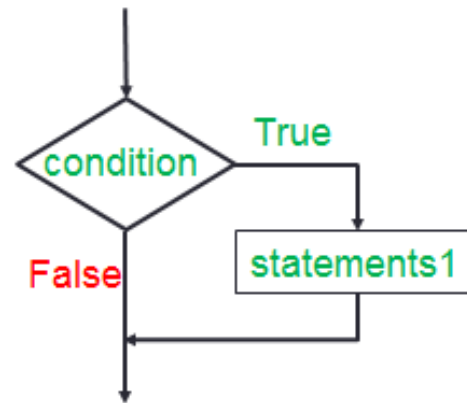


# Estrutura Condicionais

- Controlam a ordem de execução do código
  - Condições lógicas
    - True | False

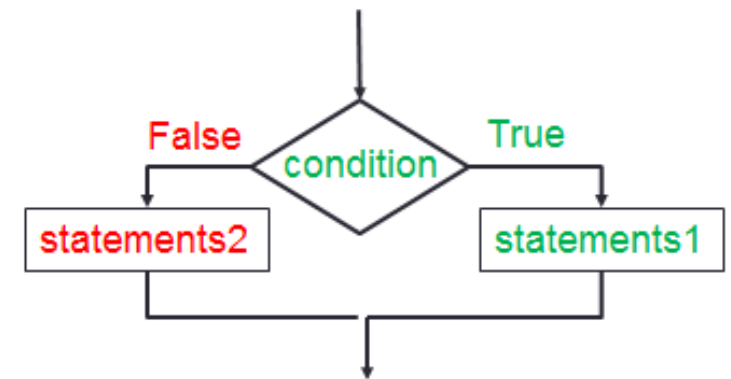
## Simple structure

```
if condition:  
    statements1
```



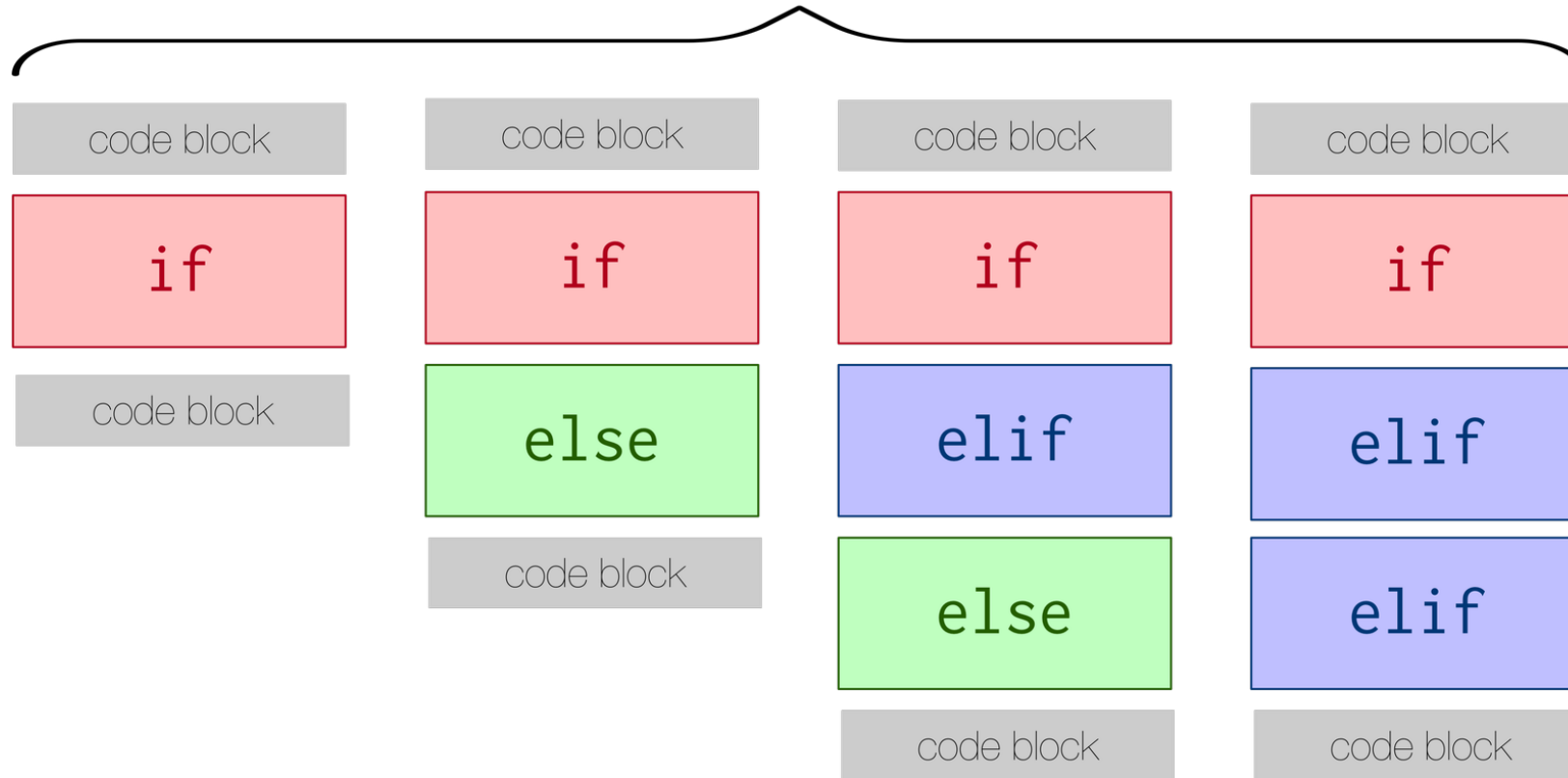
## Dual Structure

```
if condition:  
    statements1  
else:  
    statements2
```



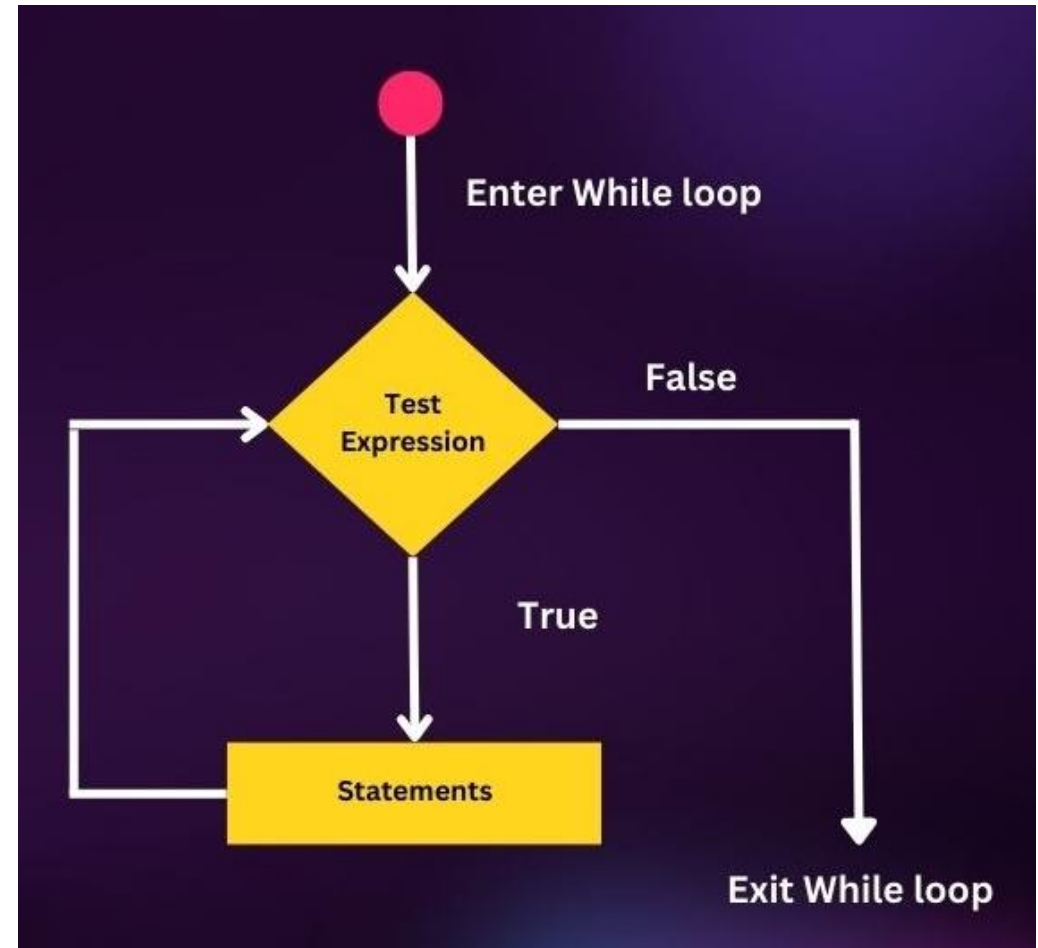
# Estrutura Condicionais

valid if/elif/else order examples



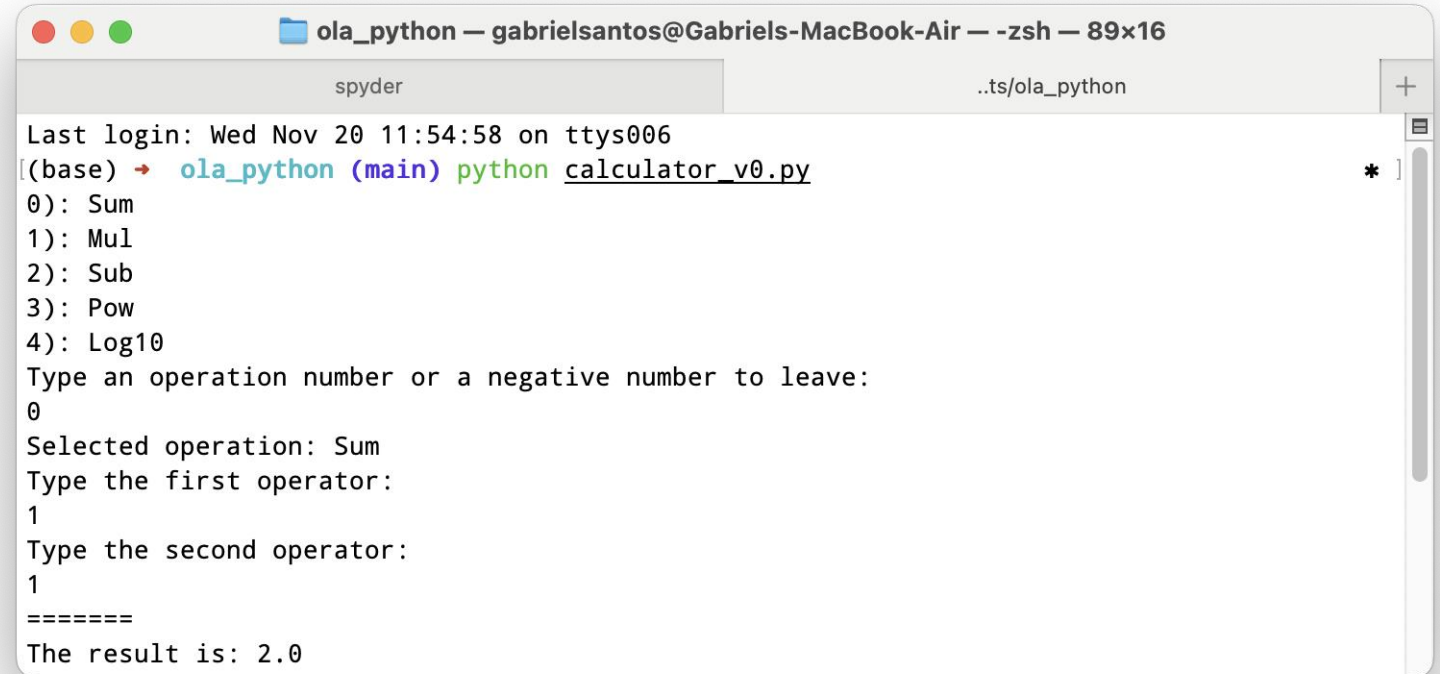
# Estururas de Repetição

- Executa mais de uma vez o mesmo trecho de código
  - Condição lógica
- Iterar sobre sequências



# > Primeiro programa

Calculator\_v0.py

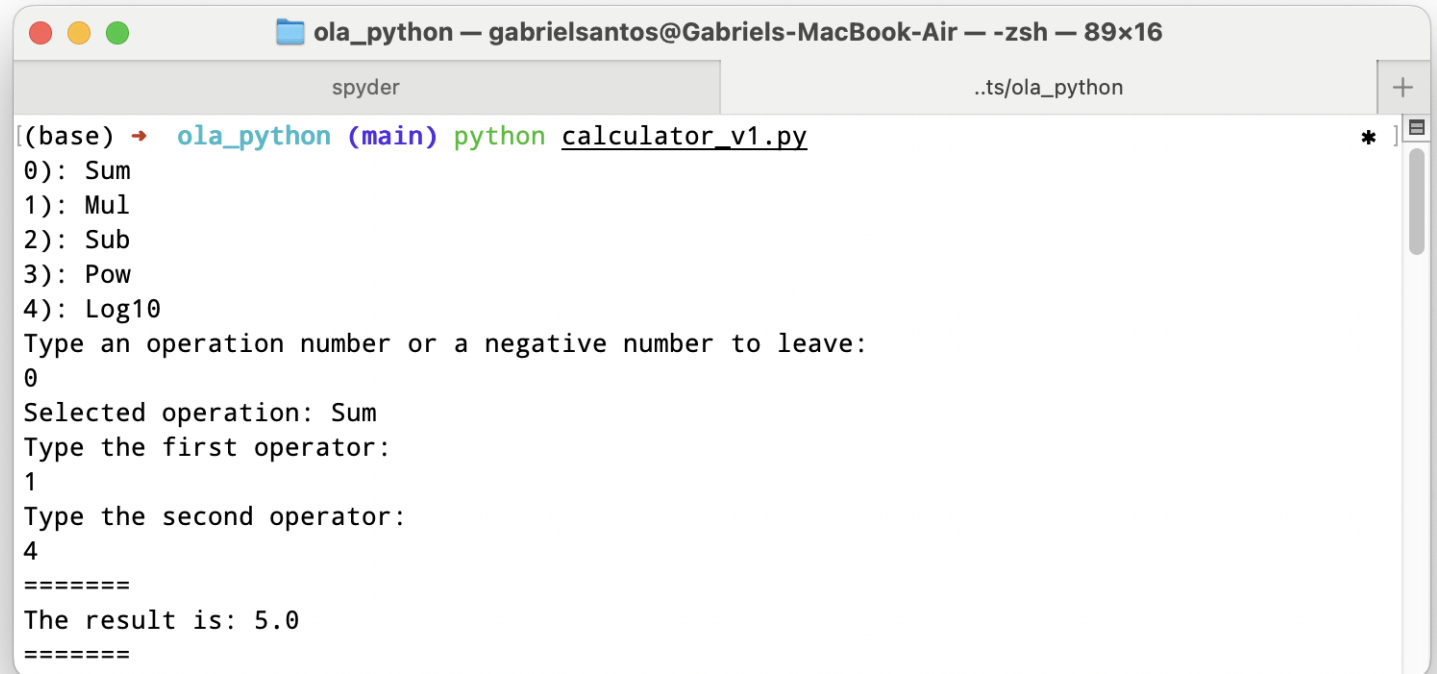


```
Last login: Wed Nov 20 11:54:58 on ttys006
(base) → ola_python (main) python calculator_v0.py
0): Sum
1): Mul
2): Sub
3): Pow
4): Log10
Type an operation number or a negative number to leave:
0
Selected operation: Sum
Type the first operator:
1
Type the second operator:
1
=====
The result is: 2.0
```

# Funções

# > Métodos

- Encapsula parte do código e pode ser chamada em qualquer parte do código
  - Evitar a repetição de código
- Podem receber parâmetros
- Podem retornar valores



```
ola_python — gabrielsantos@Gabriels-MacBook-Air — -zsh — 89x16
spyder ..ts/ola_python
[(base) → ola_python (main) python calculator_v1.py
0): Sum
1): Mul
2): Sub
3): Pow
4): Log10
Type an operation number or a negative number to leave:
0
Selected operation: Sum
Type the first operator:
1
Type the second operator:
4
=====
The result is: 5.0
=====]
```

# Outras funções

- Livraria random
  - Random.random()
  - Random.choice()
  - Random.randint()
- Livraria time
  - time.time()
- Livraria json
  - json.dumps()
  - json.loads()
- Livraria requests
  - Requests.get()
- Cast
  - int(), float(), str()
- Values
  - max(), min(), abs(), sum()
- zip()
- round()
- type()
- Livraria os
  - Trabalhar com diretórios e arquivos