

85^a EDIÇÃO

SEQ UFRJ
20 a 24 de agosto



Introdução à programação para ciência e engenharia em *Python*

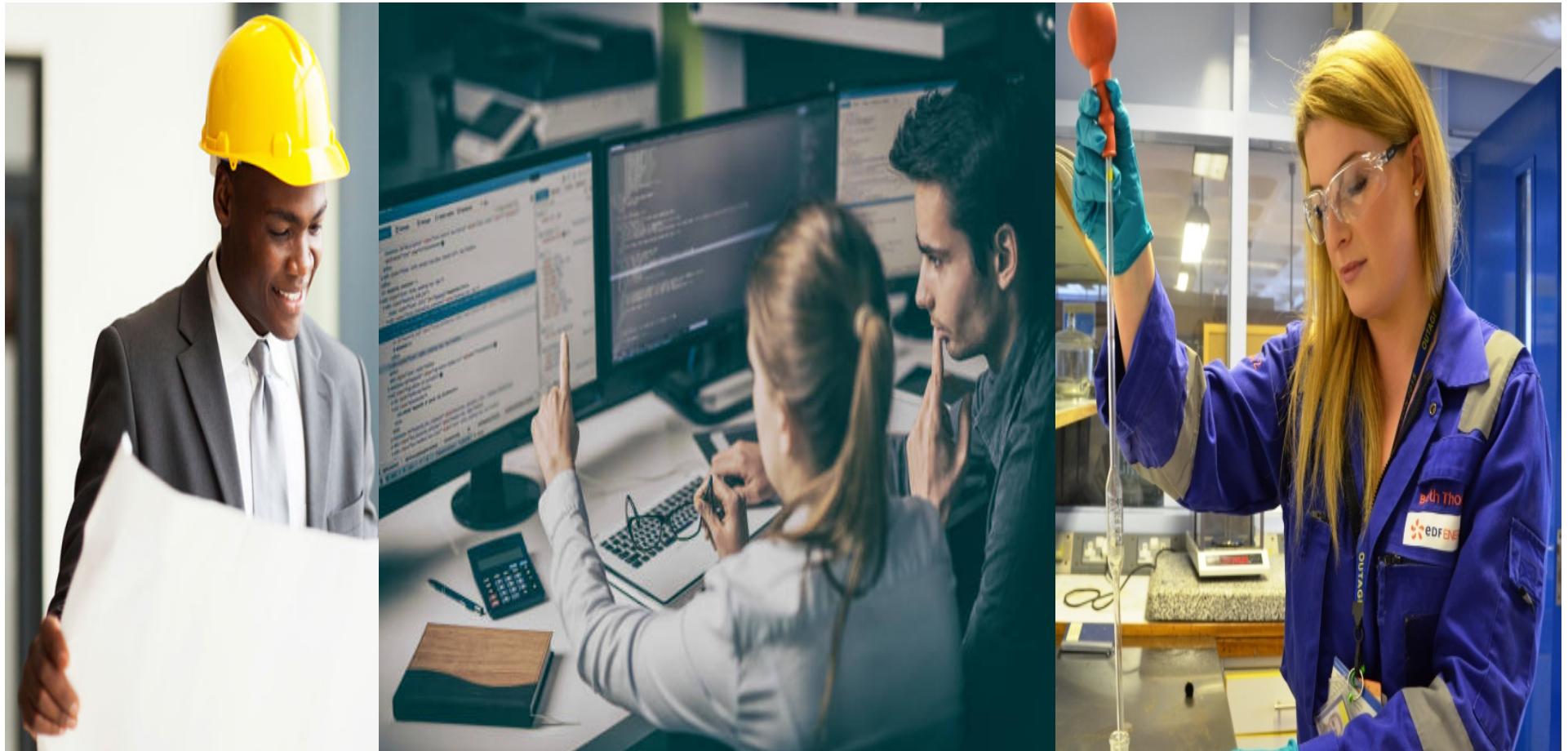
Iuri Soter Viana Segtovich

<https://github.com/>

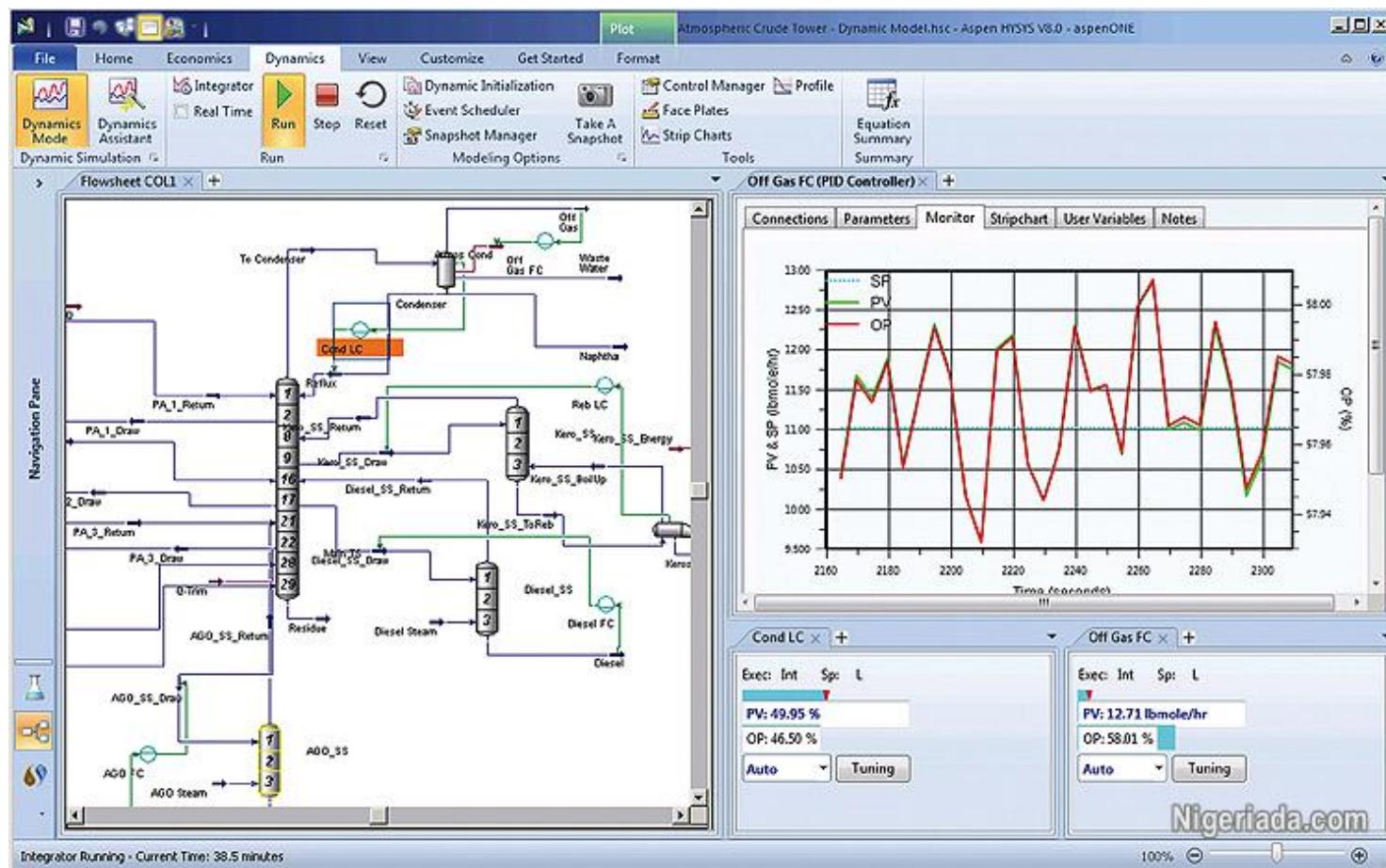
[iurisegtovich/](https://github.com/iurisegtovich)

[CursoSciPySEQ2018/](https://github.com/iurisegtovich/CursoSciPySEQ2018)

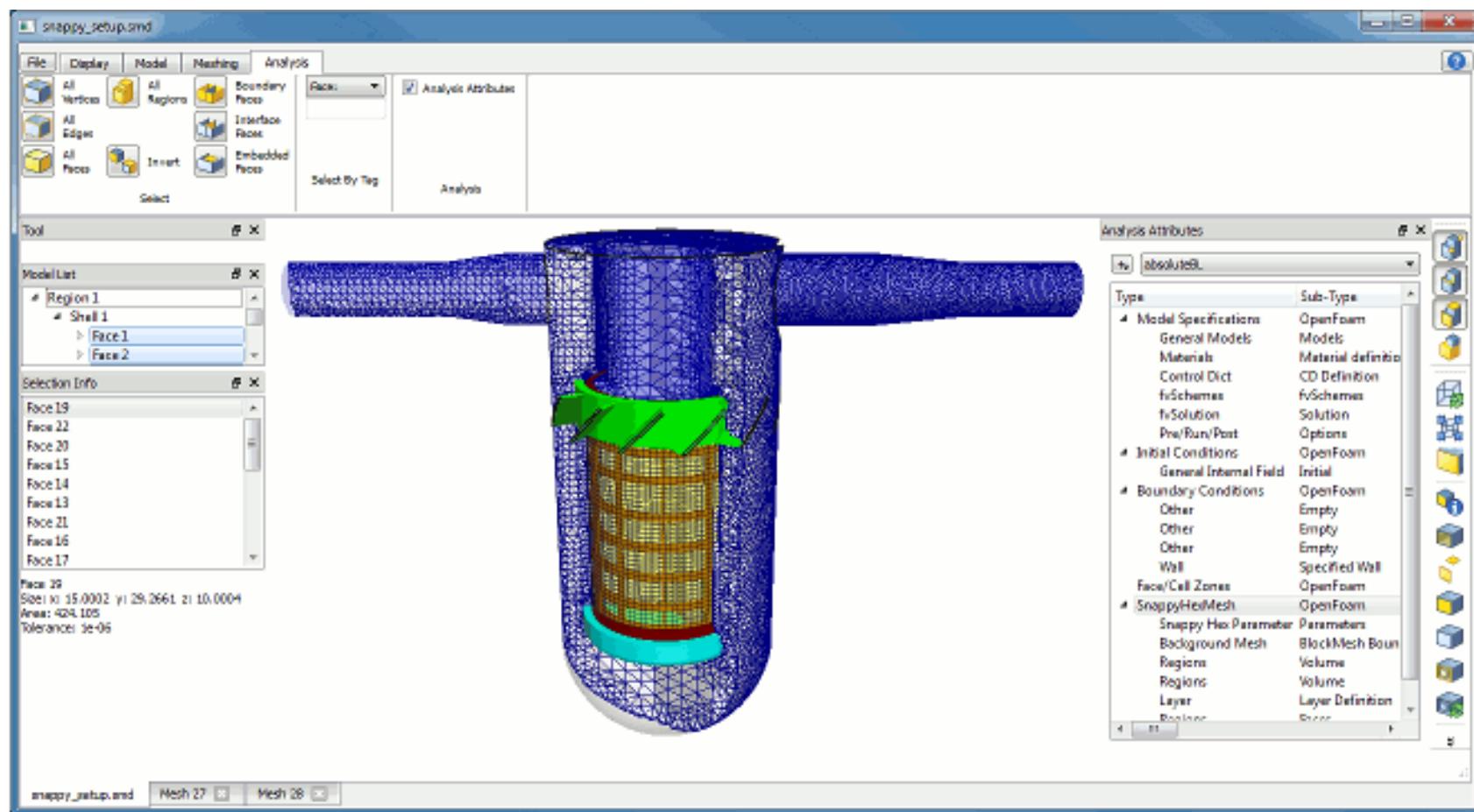
Programação em ciência e engenharia



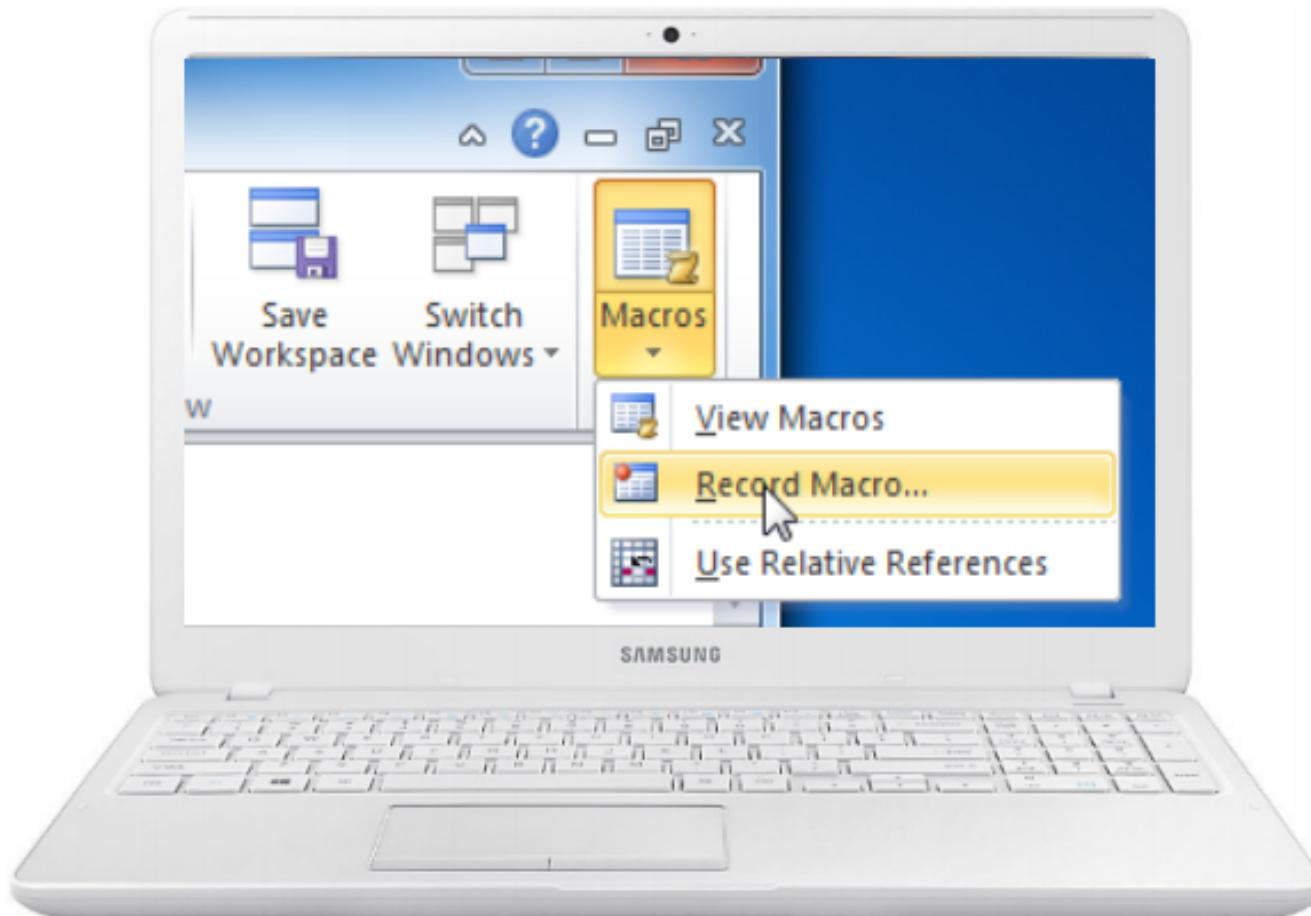
Simulador de processos



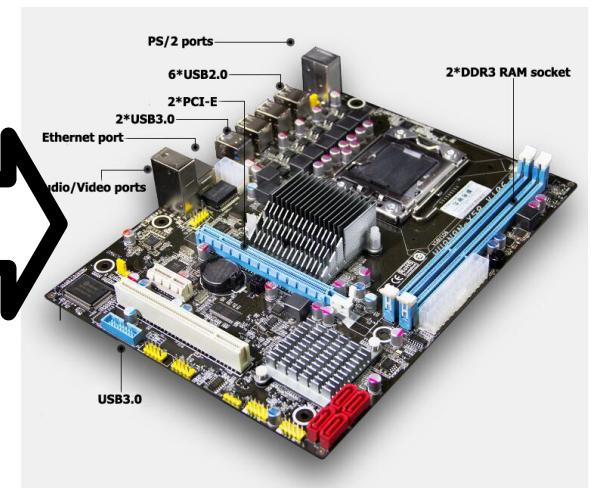
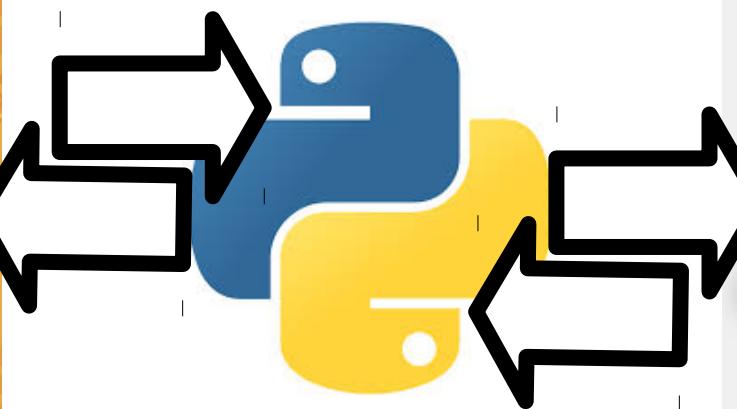
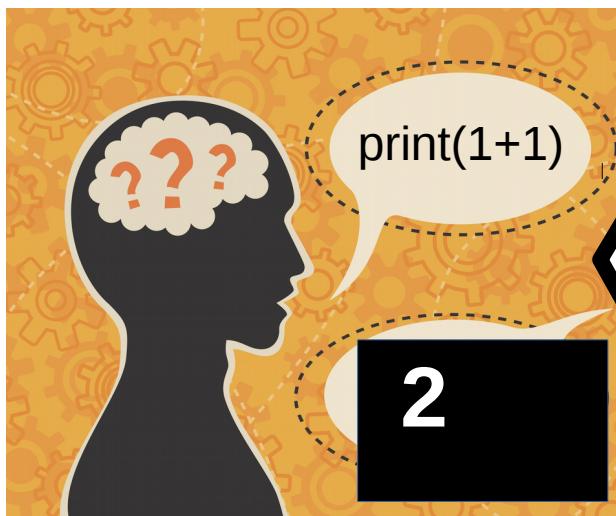
Fluidodinâmica computacional



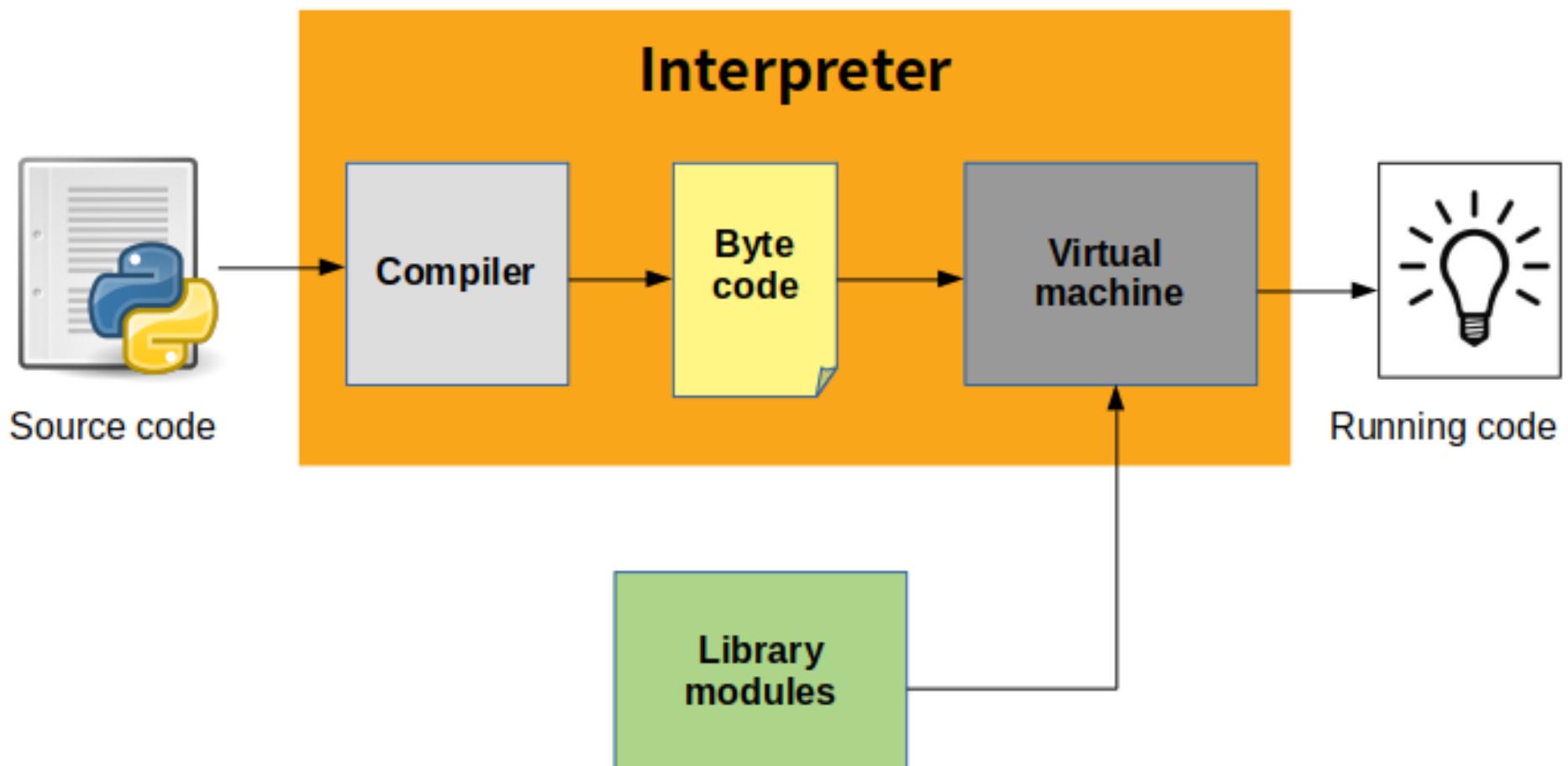
Automação de tarefas em planilhas de gestão



A linguagem python



Como o python funciona



Como o python funciona



Source code



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

```
00000000: 00000011 11110011 00001101 00001010 01000010 00101001 ....B)
00000006: 01110100 01011011 01100011 00000000 00000000 00000000 t[c...
0000000c: 00000000 00000000 00000000 00000000 00000000 00000001 .....
00000012: 00000000 00000000 00000000 01000000 00000000 00000000 ...@..
00000018: 00000000 01110011 00001001 00000000 00000000 00000000 .s....
0000001e: 01100100 00000000 00000000 01000111 01001000 01100100 d..GHd
00000024: 00000001 00000000 01010011 00101000 00000010 00000000 ..S..
0000002a: 00000000 00000000 01110011 00001100 00000000 00000000 ..s...
00000030: 00000000 01001000 01100101 01101100 01101100 01101111 .Hello
00000036: 00100000 01010111 01101111 01110010 01101100 01100100 World
0000003c: 00100001 01001110 00101000 00000000 00000000 00000000 !N...
00000042: 00000000 00101000 00000000 00000000 00000000 00000000 .(....
00000048: 00101000 00000000 00000000 00000000 00000000 00101000 (....(
0000004e: 00000000 00000000 00000000 00000000 01110011 00001101 ....s.
00000054: 00000000 00000000 00000000 01101000 01100101 01101100 ...hel
0000005a: 01101100 01101111 01110111 01101111 01110010 01101100 loworl
00000060: 01100100 00101110 01110000 01111001 01110100 00001000 d.pyt.
00000066: 00000000 00000000 00000000 00111100 01101101 01101111 ...<mo
0000006c: 01100100 01110101 01101100 01100101 00111110 00000001 dule>.
00000072: 00000000 00000000 00000000 01110011 00000000 00000000 ...s...
00000078: 00000000 00000000 ..
```

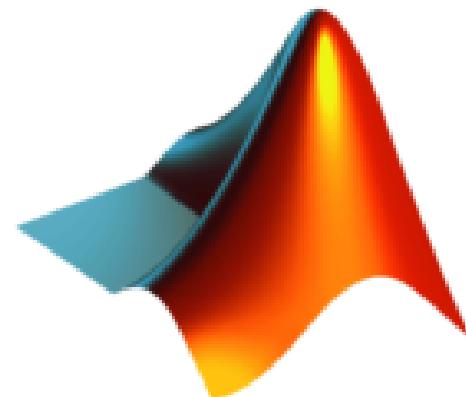
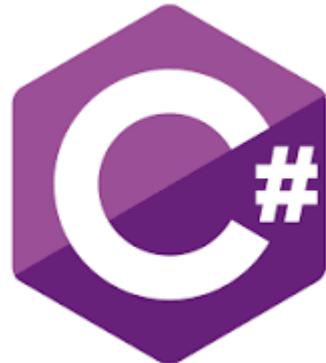


Running code



```
Hello World
```

Por quê o python?



assembly → C → python

```
section .data
msg    db      'Como programar em Assembly'
len     equ     $-msg

section .text
global _start
_start: mov     edx, len
        mov     ecx, msg
        mov     ebx, 1
        mov     eax, 4
        int     80h

        mov     ebx, 0
        mov     eax, 1
        int     80h
```

```
#include <stdio.h>
int main()
{
    // printf() displays the string
    printf("Hello, World!");
    return 0;
}
```

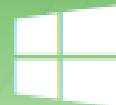
```
print('Hello, world!')
```

Multiplataforma

Download Anaconda Distribution

Version 5.2 | Release Date: May 30, 2018

Download For:



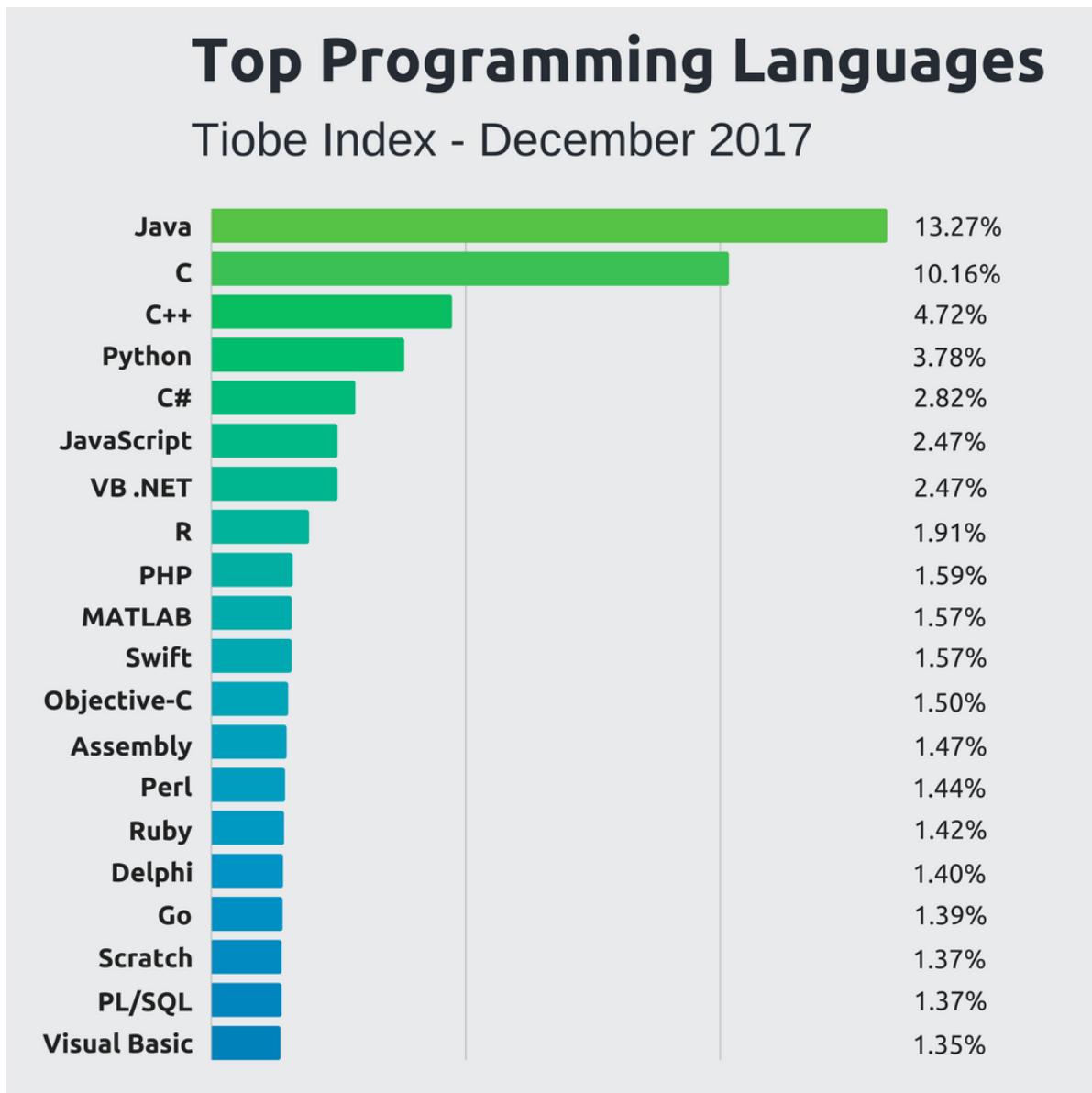
Gratis

Anaconda Distribution

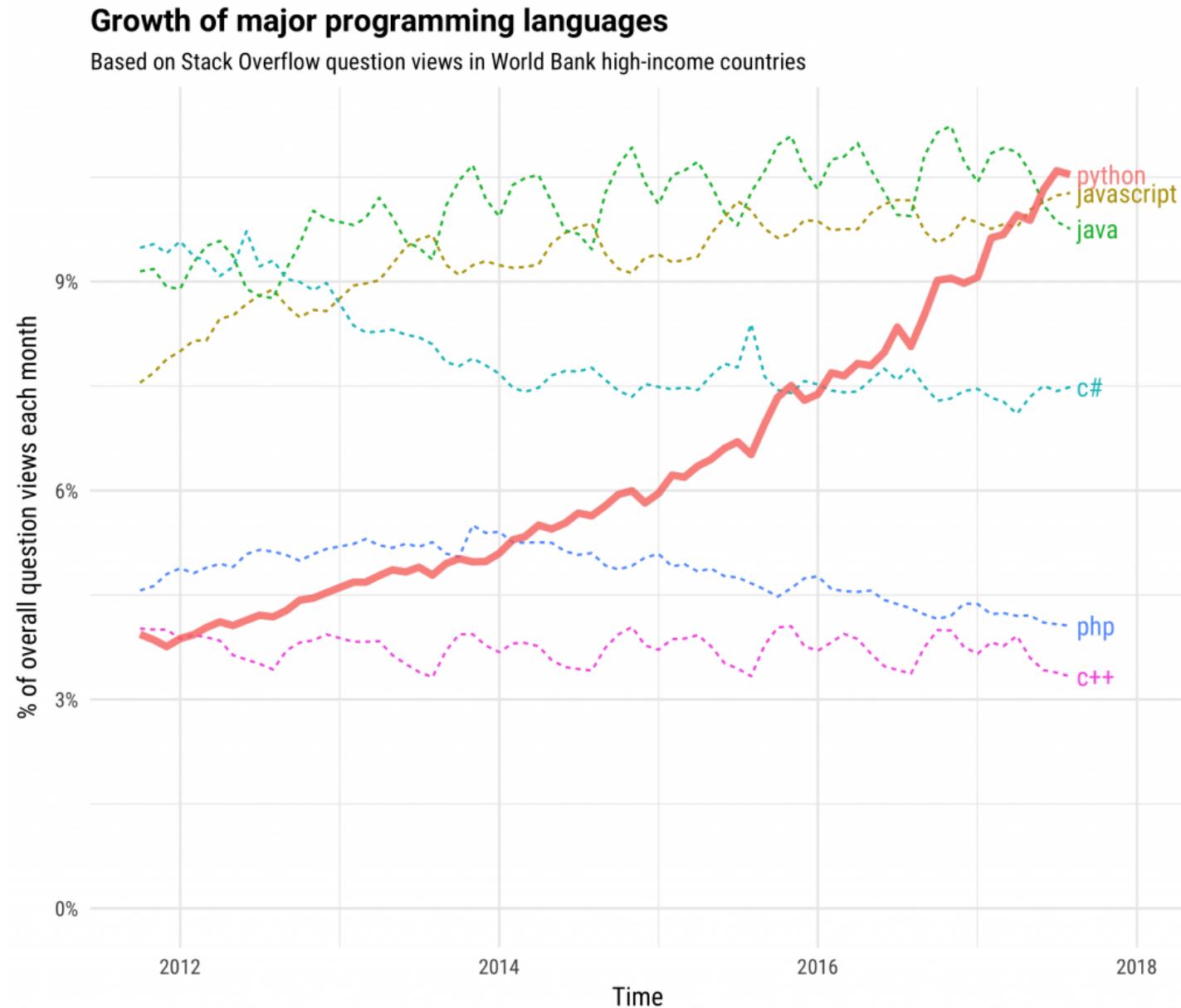
With over 6 million users, the open source [Anaconda Distribution](#) is the fastest and easiest way to do Python and R data science and machine learning on Linux, Windows, and Mac OS X. It's the industry standard for developing, testing, and training on a single machine.



Amplamente utilizado

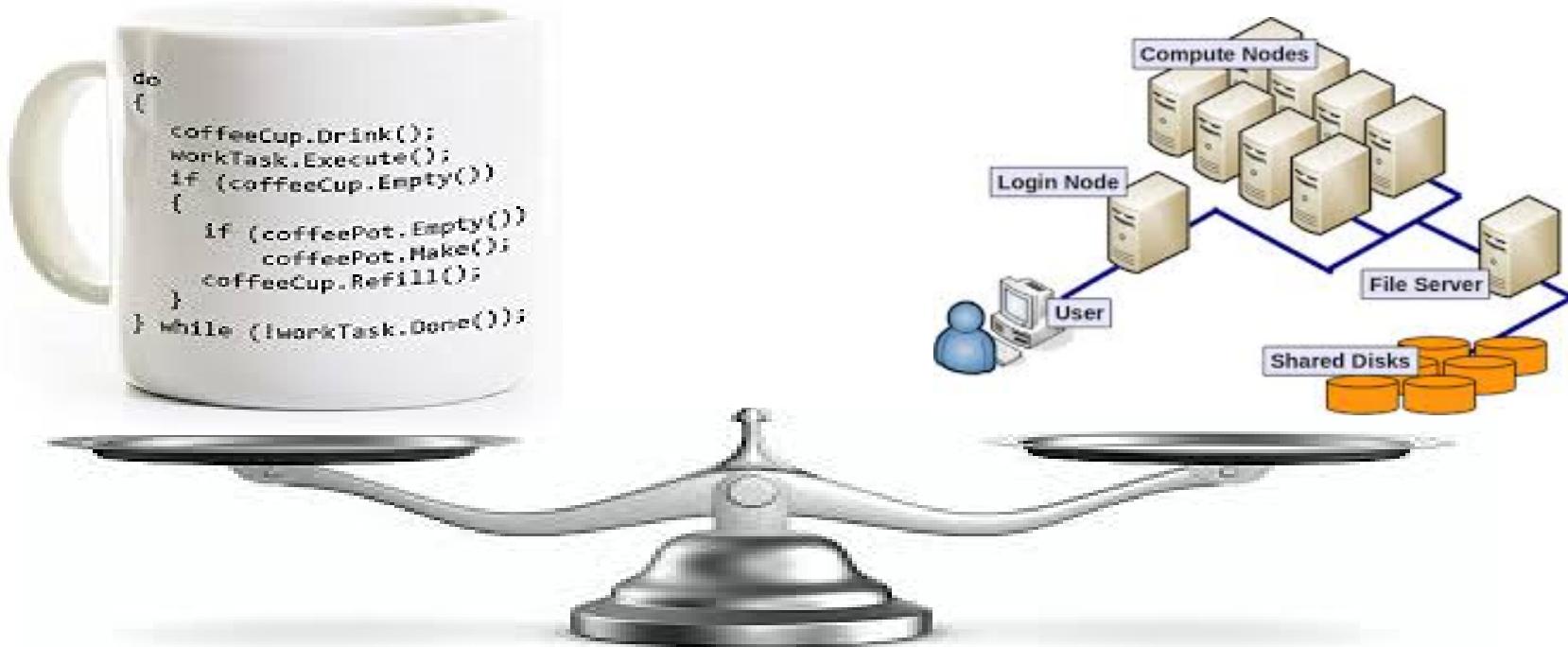


Tendência de crescimento

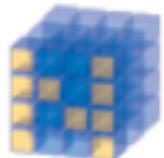


Eficiente

- Tempo de desenvolvimento
 - Prototipagem
- Tempo de execução
 - Bibliotecas de alto desempenho



O ecosistema python científico



NumPy
Base N-dimensional
array package



SciPy library
Fundamental library
for scientific
computing



Matplotlib
Comprehensive 2D
Plotting



IPython
Enhanced Interactive
Console



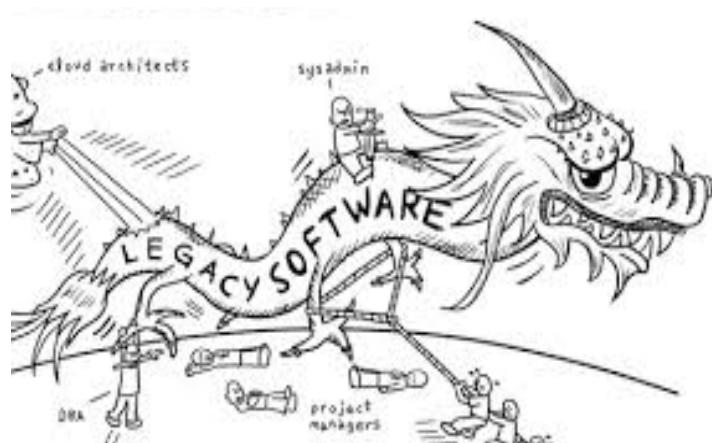
Sympy
Symbolic mathematics



pandas
Data structures &
analysis

Versões

- Python 2.x
 - Manutenção de projetos antigos. (*legacy*)
- Python 3.x
 - Desenvolvimento de projetos novos.
 - Acesso a bibliotecas atualizadas.



Does ... work with Python 3?



95% of most popular
PyPI libraries support
Python 3

<http://py3readiness.org/>

Paradigmas

- Procedural
 - Lista de instruções
- Orientação a objeto (*OOP*)
 - Encapsular dados e métodos
- Funcional
 - Evitar variáveis globais

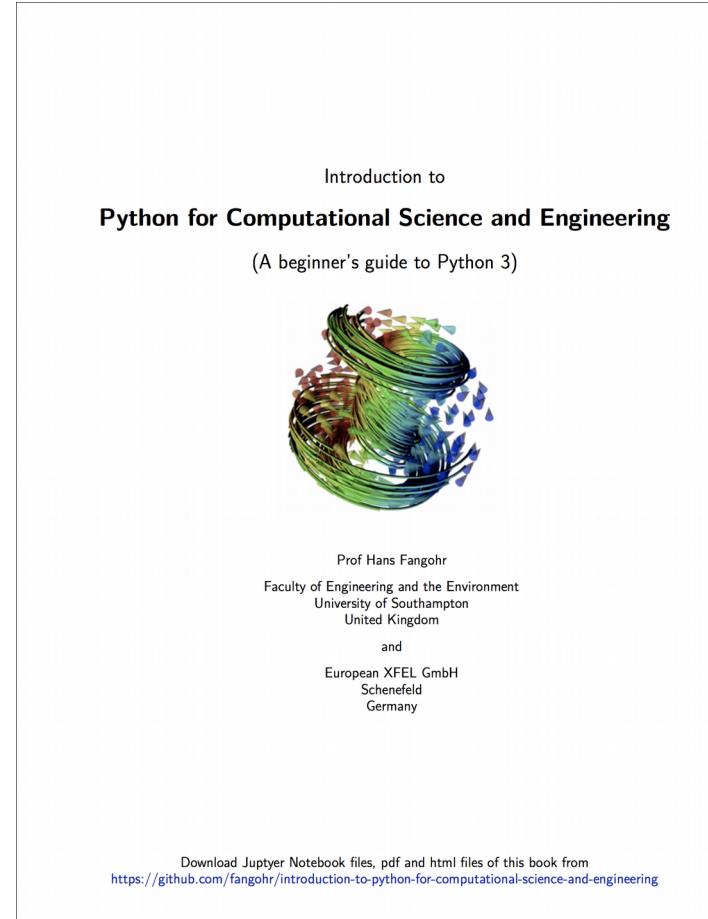
Livro referência

"Introduction to Python for Computational Science and Engineering (A beginner's guide)"
livro (em inglês, 173 páginas)
de Hans Fangohr.

<https://github.com/fangohr/introduction-to-python-for-computational-science-and-engineering/>

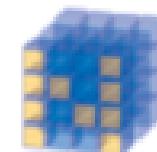
Traduzido para português por Gustavo C. P. de Oliveira.

<https://github.com/gcpeixoto/lecture-ipynb/>



Estrutura do curso

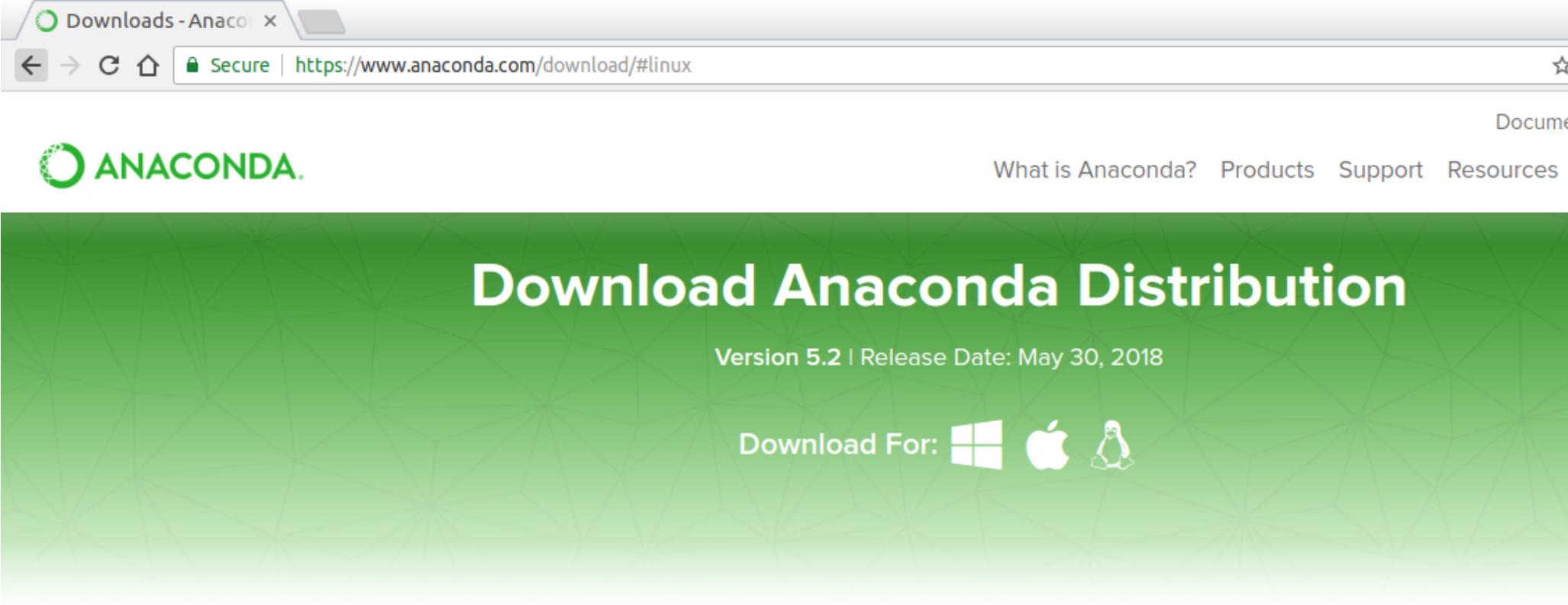
- Ferramentas
 - Python tutor
 - Anaconda
 - Spyder
 - Jupyter-lab
 - Google colab
- Tópicos
 - Lógica e sintaxe
 - Python científico



Expectativa X Realidade



Instalar o python + scipy pela distribuição Anaconda



The screenshot shows a web browser window displaying the Anaconda download page at <https://www.anaconda.com/download/#linux>. The page has a green header with the Anaconda logo and navigation links for 'What is Anaconda?', 'Products', 'Support', and 'Resources'. The main section features the title 'Download Anaconda Distribution' and 'Version 5.2 | Release Date: May 30, 2018'. It includes download links for Windows, macOS, and Linux, each accompanied by its respective icon. Below this, three sections describe the distribution: 'High-Performance Distribution', 'Package Management', and 'Portal to Data Science'. The bottom of the page shows download links for Windows, macOS, and Linux.

Downloads - Anaconda

Secure | <https://www.anaconda.com/download/#linux>

Document

ANACONDA.

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Portal to Data Science

Uncover insights in your data and create interactive visualizations

 Windows  macOS  Linux

Perguntas

