Fundamentos da Programação

Computadores, Algoritmos e Programas
Ambiente de Desenvolvimento

Aula 02

TÉCNICO LISBOA

Alberto Abad, IST, 24/25

Computadores, Algoritmos e Programas

"The single most important skill for a computer scientist is **problem solving**",
Python for Software Design

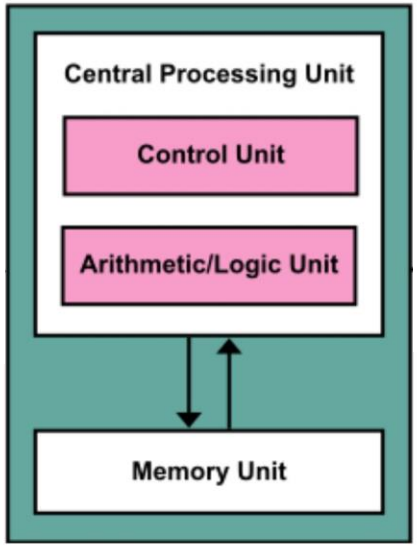
- Problema
- Algoritmo
- Computador
- Programa
- Linguagem de Programação

Computadores

- Definição: Máquina que manipula informação

- Características:
  - Automático
  - Universal
  - Digital
  - Eletrónico

- Conjunto de instruções:
  - Entrada
  - Saída
  - Aritméticas
  - Condicionais
  - Repetição

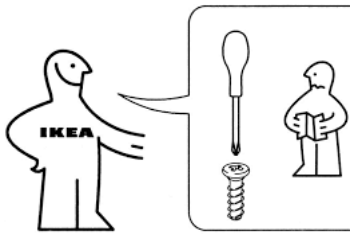


Algoritmos

- Definição: Sequência finita de instruções bem definidas e não ambíguas, executáveis num período de tempo finito e com uma quantidade de esforço finita.

- Características:
  - rigoroso
  - eficaz
  - termina

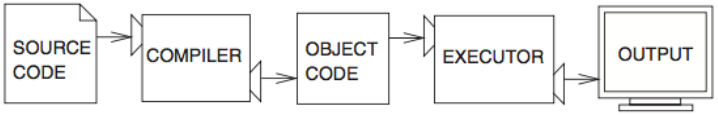
- Exemplos informais:



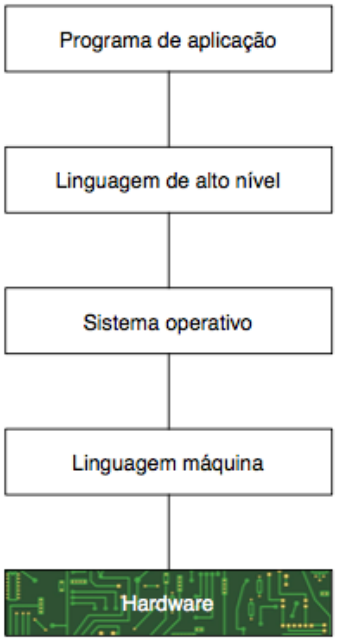
Programas

- Definição: Concretização de algoritmo numa linguagem de programação
- Linguagens de programação:
  - Assembly / Código Máquina
  - Alto-nível
- Processadores de linguagem:
  - Interpretados

  - Compilados



- Testar programas → depurar/*debugging*



- Definição
  linguagen
- Linguagen
  - Assemb
  - Alto-ní
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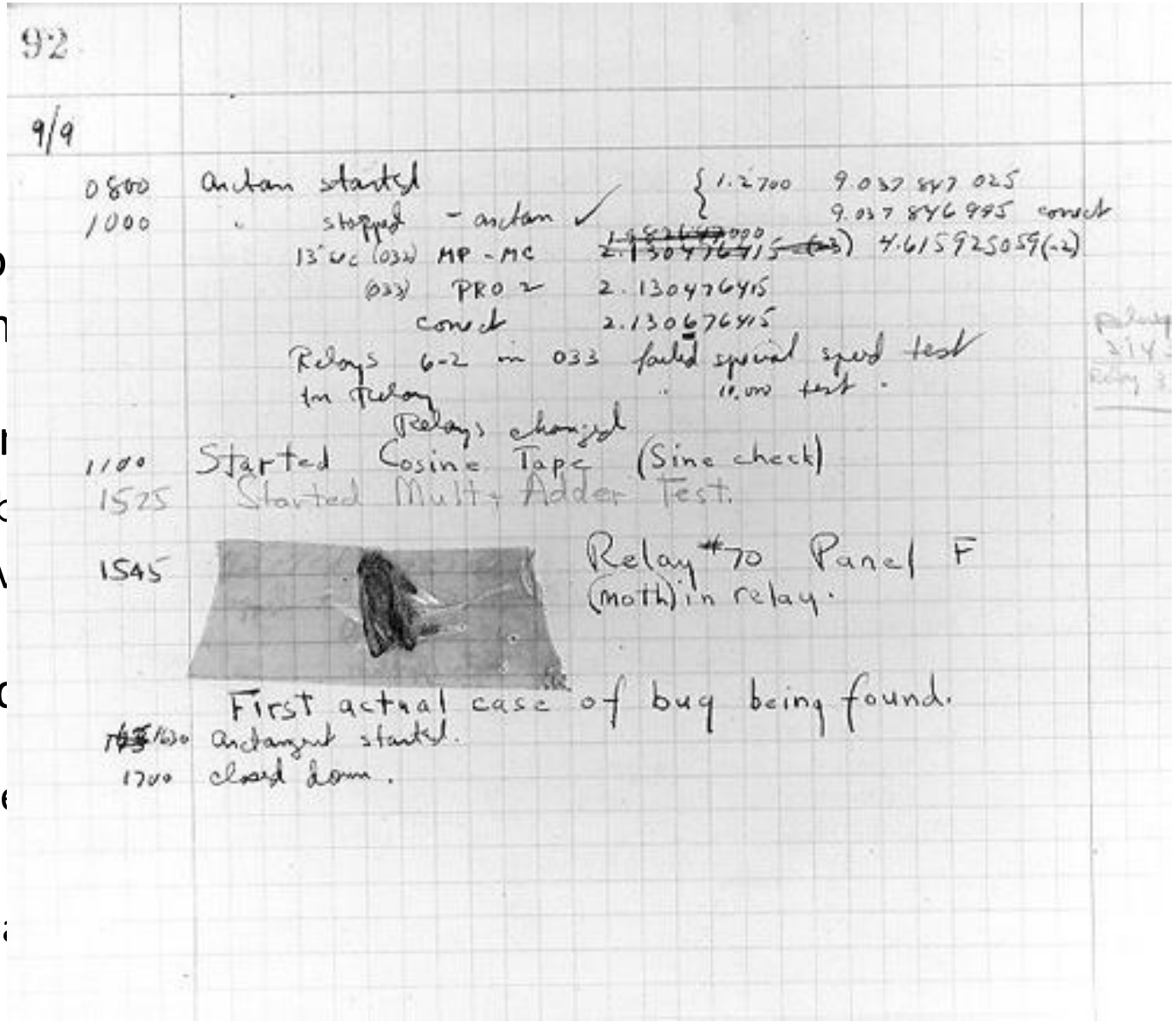
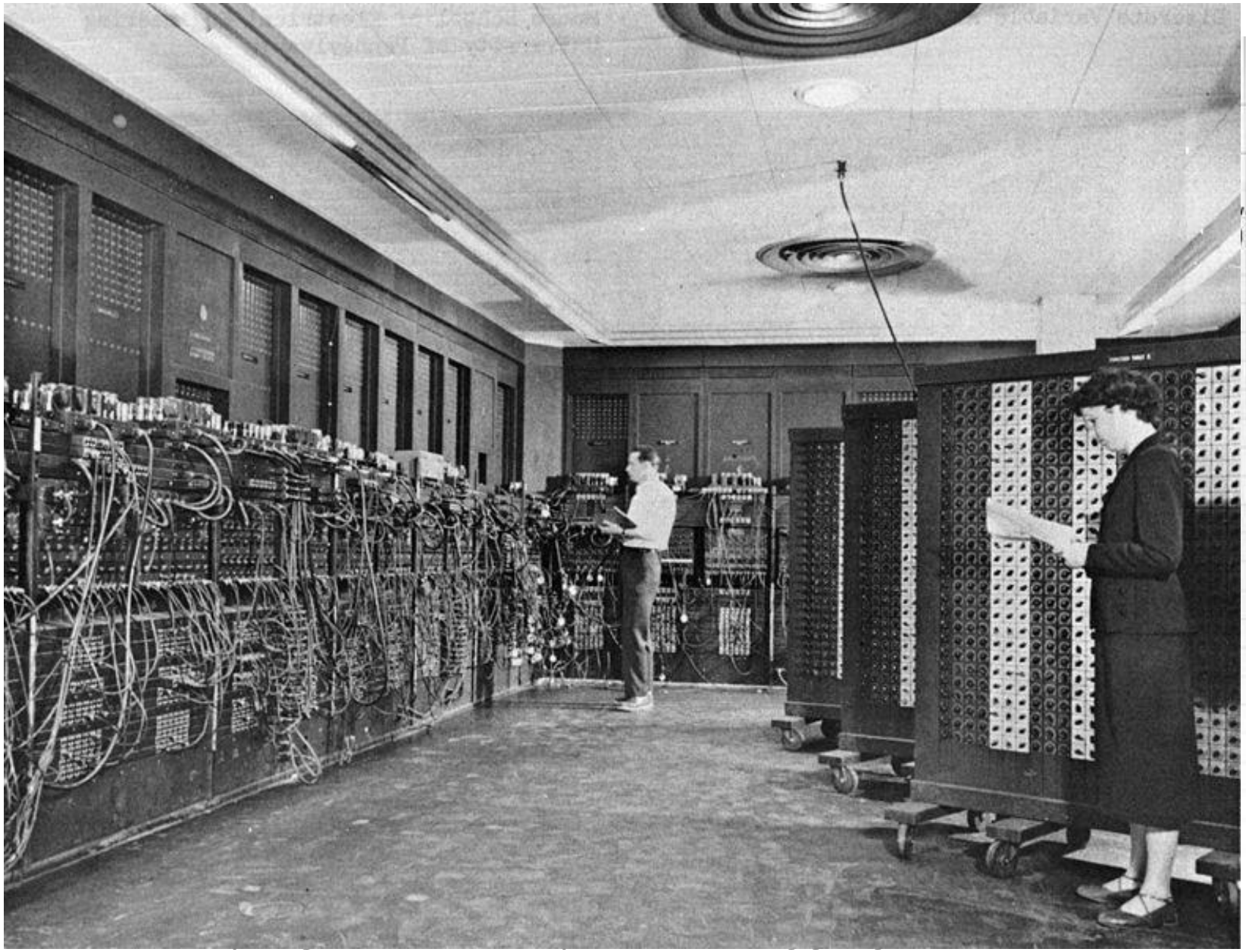
  - Interpr
  - Compil
- Testar programas → depurar/*debugging*



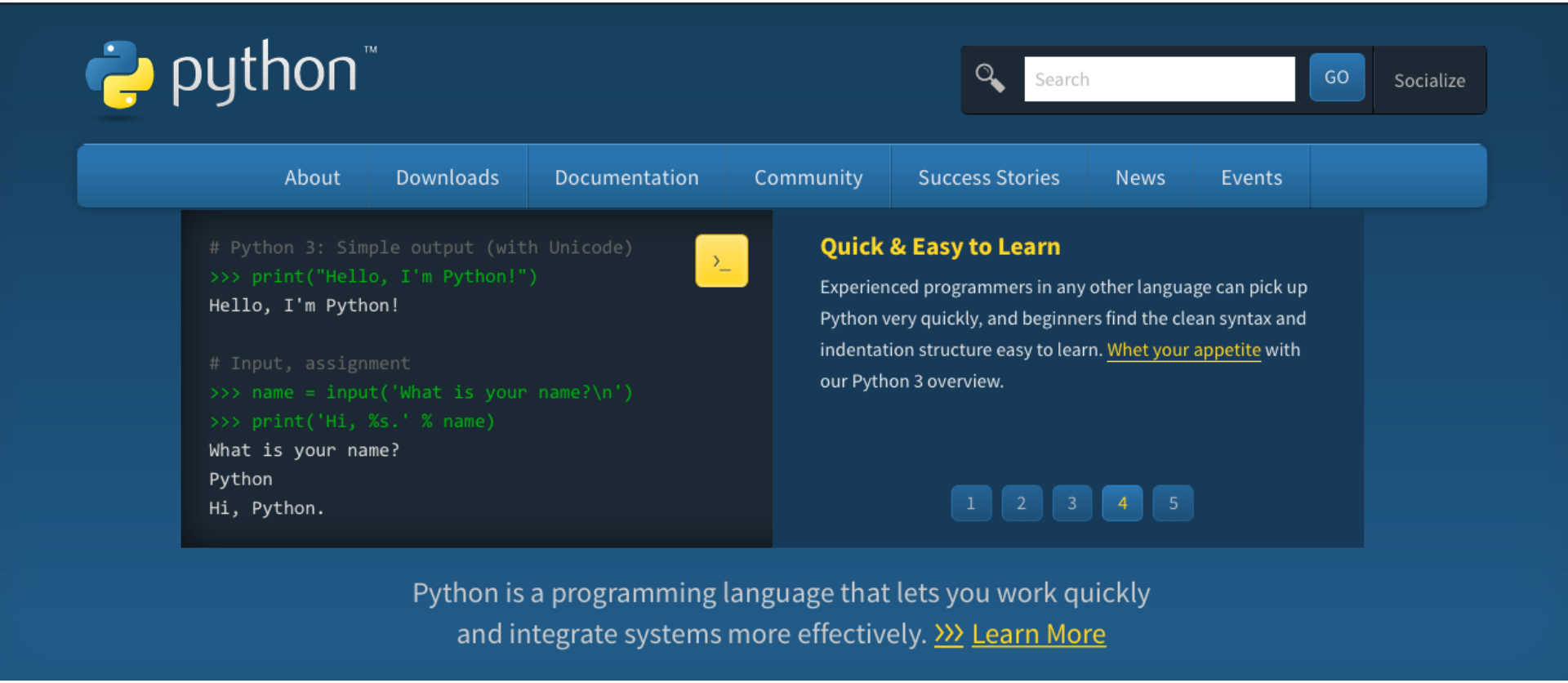


Exemplo primeiro algoritmo/programa

Em matemática, o **fatorial** de um número natural **n**, representado por **n!**, é o produto de todos os inteiros positivos menores ou iguais a **n**.

The Python Programming Language

https://www.python.org



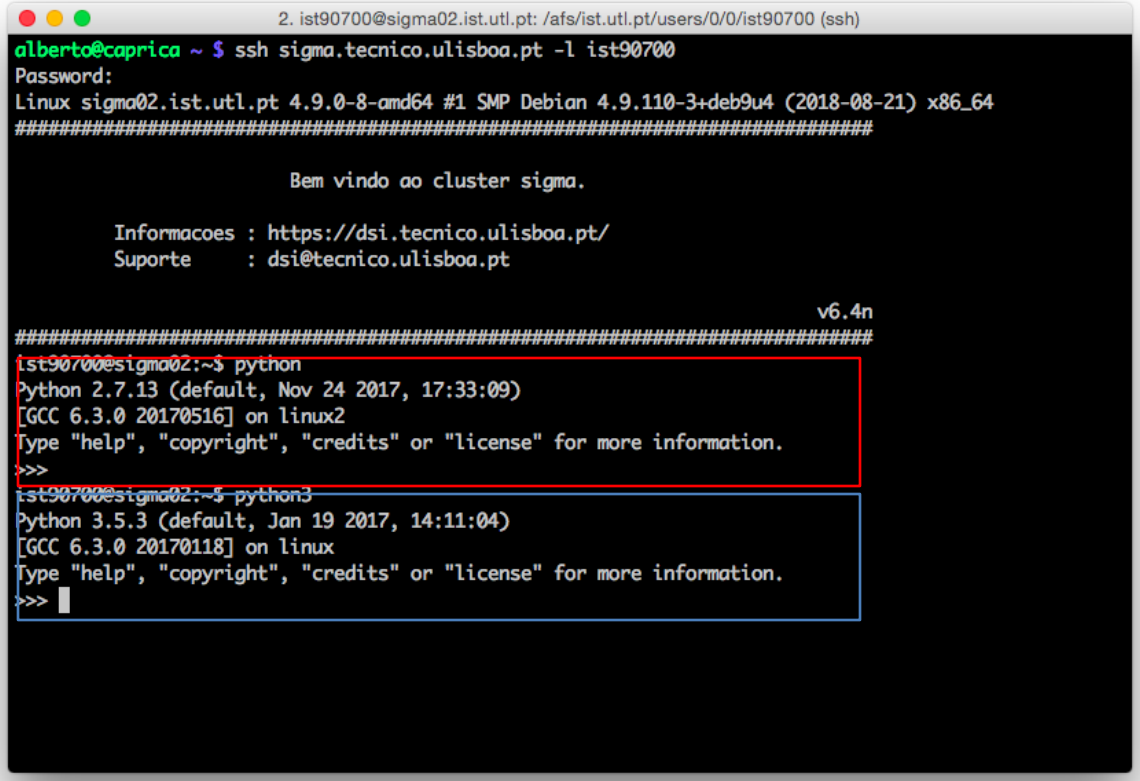
https://en.wikipedia.org/wiki/Python_(programming_language)

https://docs.python.org/3/

Porque o Python?

- Alto nível
- Oferece múltiplos paradigmas:
  - *functional*, *object-oriented*, *imperative*, ...
- Escalável/reutilizável/extensível
- Portável
- Interpretado
- Eficiente e rápido para prototipagem
- Gestão de memória e tipos dinâmicos
- Fácil de aprender e ler
- Muito utilizado

Python: Interpreter

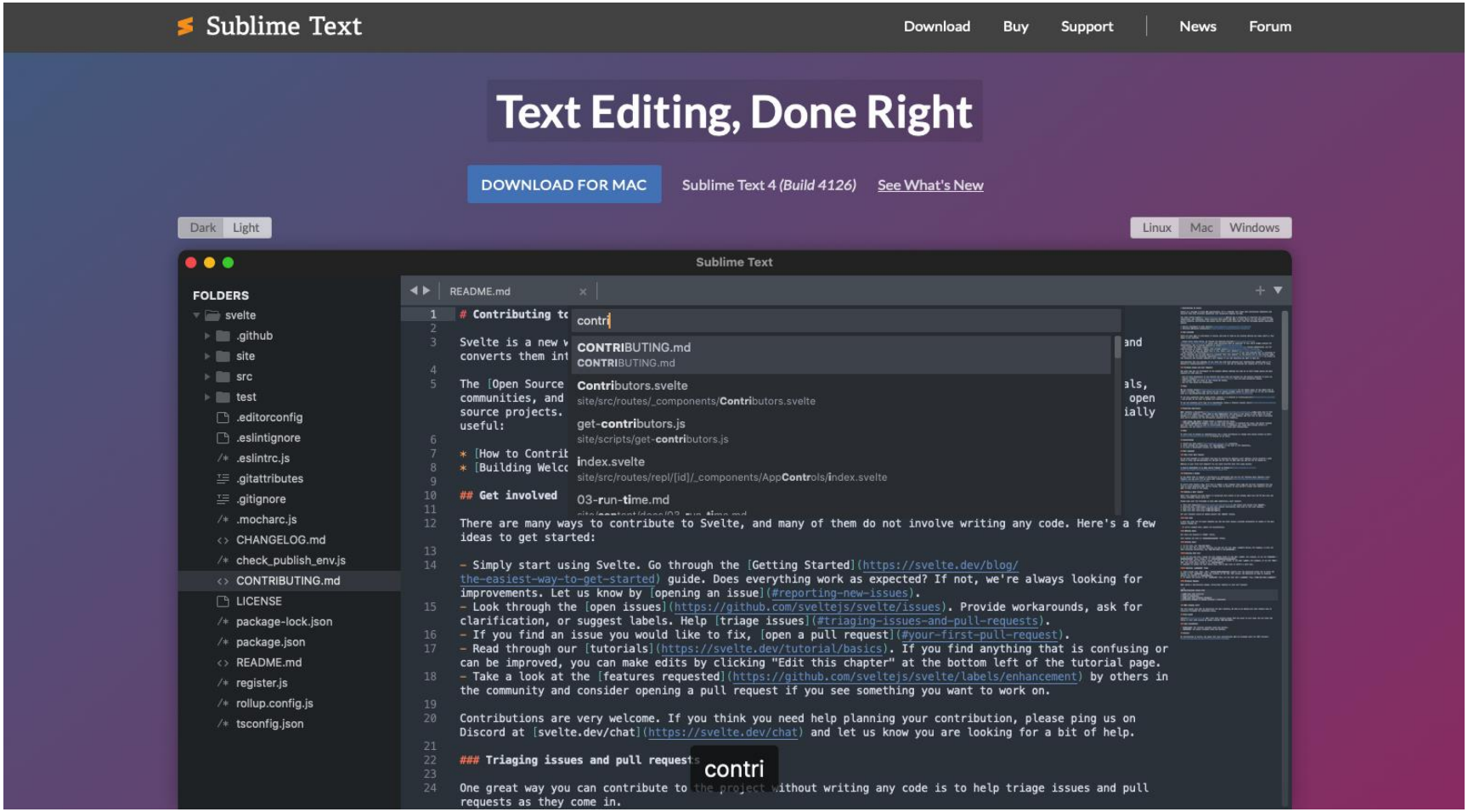


- Localmente:
  - Utilizando o terminal em sistemas Unix-like
- Remotamente por ***ssh***:
  - Ativar serviços de ***afs*** e ***shell*** no *self service* da DSI.

- Atenção à versão de Python (>=3.6)
- Interpretador: *interativo* vs *script*

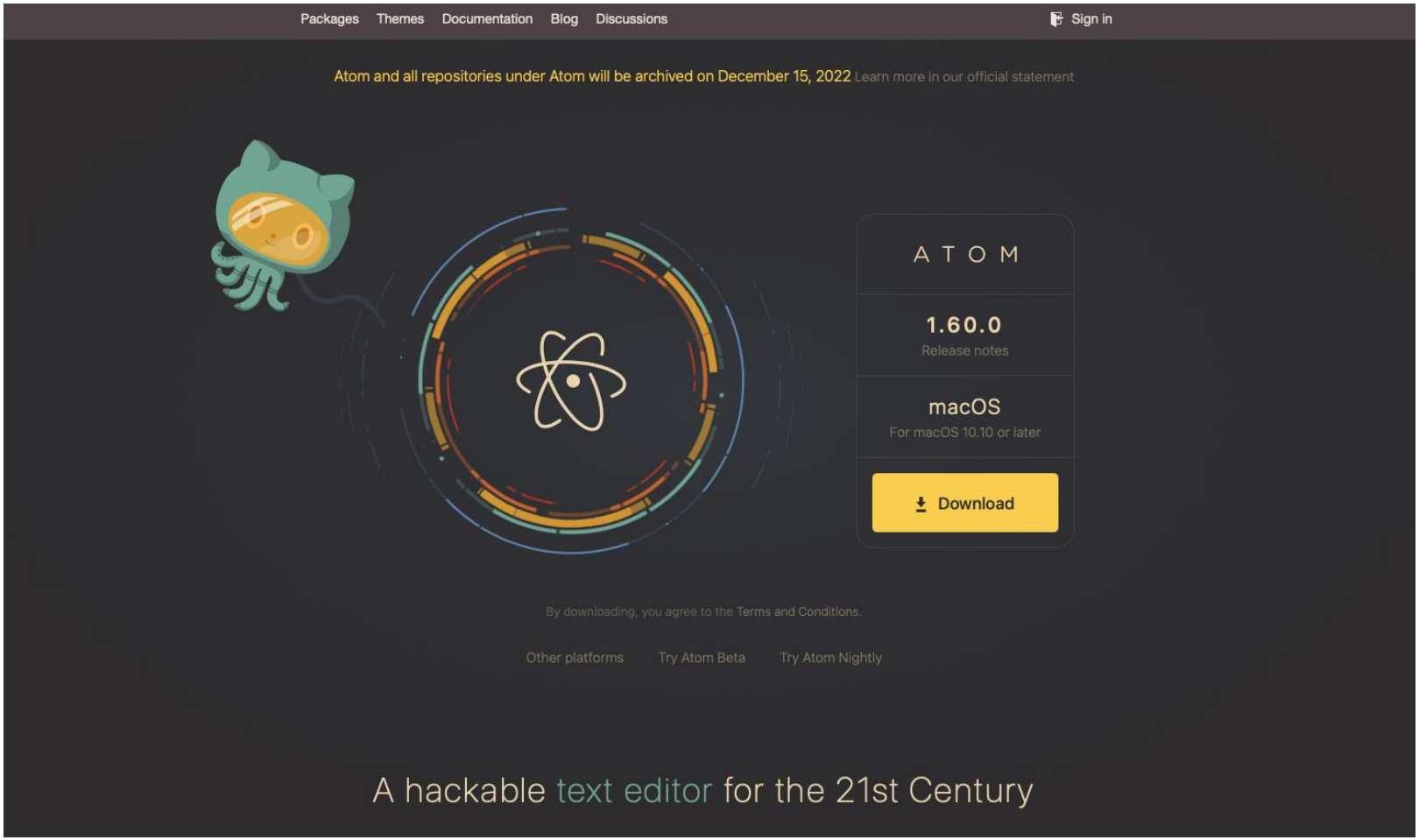
Text Editors: SublimeText (and others)

https://www.sublimetext.com



Text Editors: SublimeText (and others)

https://atom.io



Text Editors: SublimeText (and others)

https://notepad-plus-plus.org

Current Version 8.4.5

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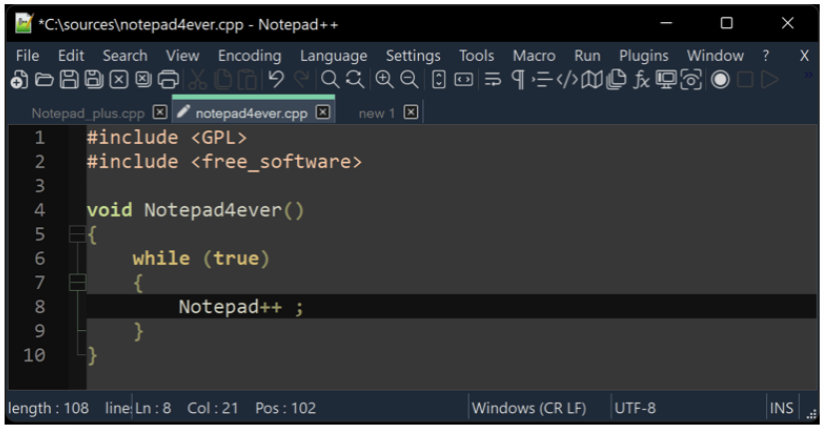
What is Notepad++

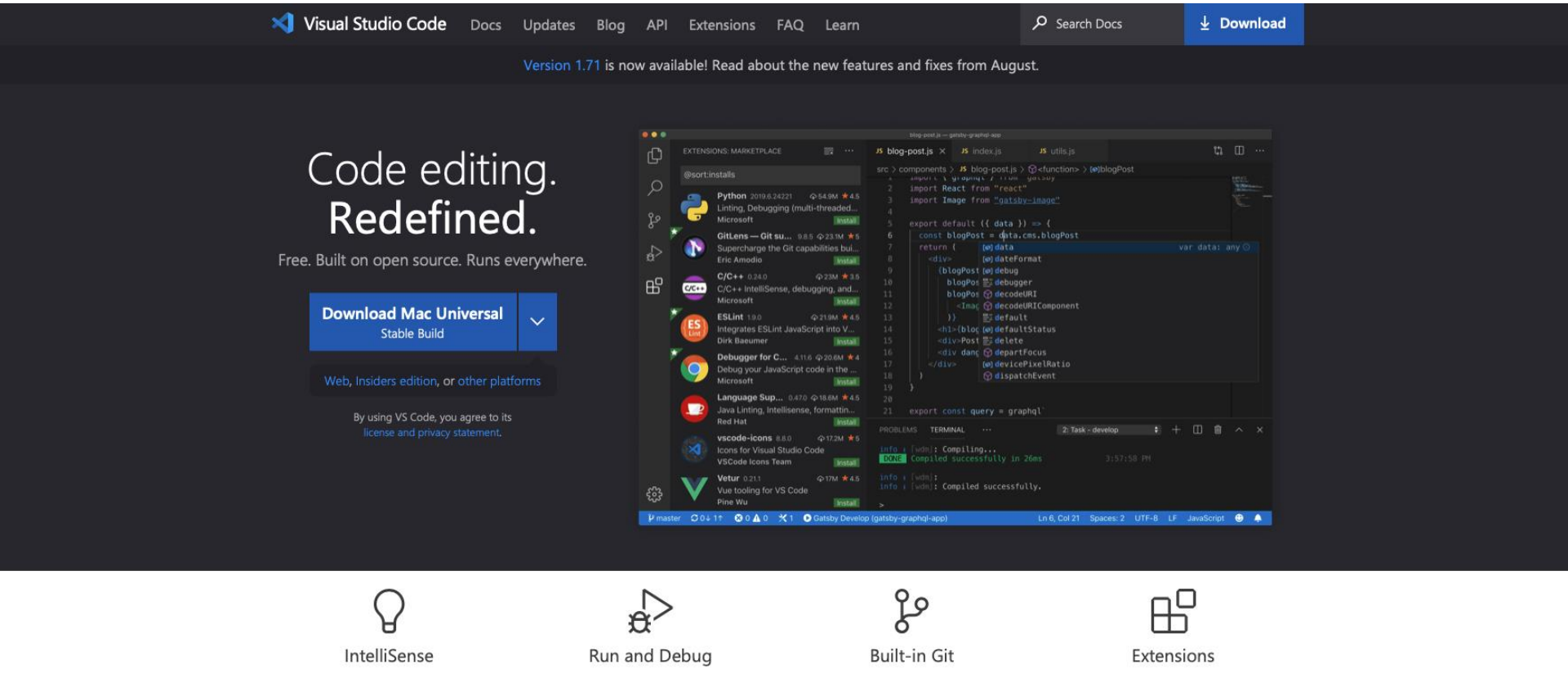
Notepad++ is a free (as in "free speech" and also as in "free beer") source code editor and Notepad replacement that supports several languages. Running in the MS Windows environment, its use is governed by GNU General Public License.

Based on the powerful editing component Scintilla, Notepad++ is written in C++ and uses pure Win32 API and STL which ensures a higher execution speed and smaller program size. By optimizing as many routines as possible without losing user friendliness, Notepad++ is trying to reduce the world carbon dioxide emissions. When using less CPU power, the PC can throttle down and reduce power consumption, resulting in a greener environment.



Visual Studio Code: (Python) IDE

https://code.visualstudio.com



iPython & Jupyter: Advanced interpreter and interactive notebooks

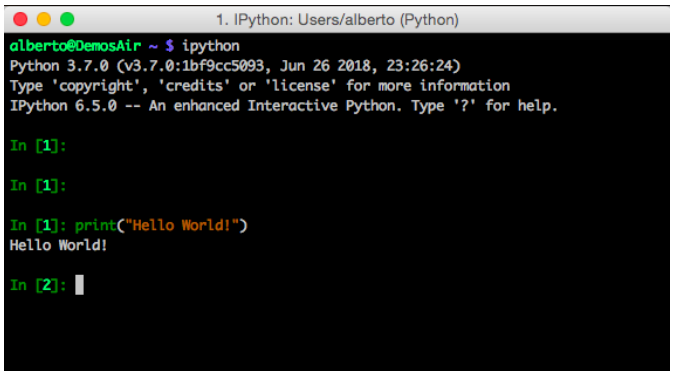
http://jupyter.org

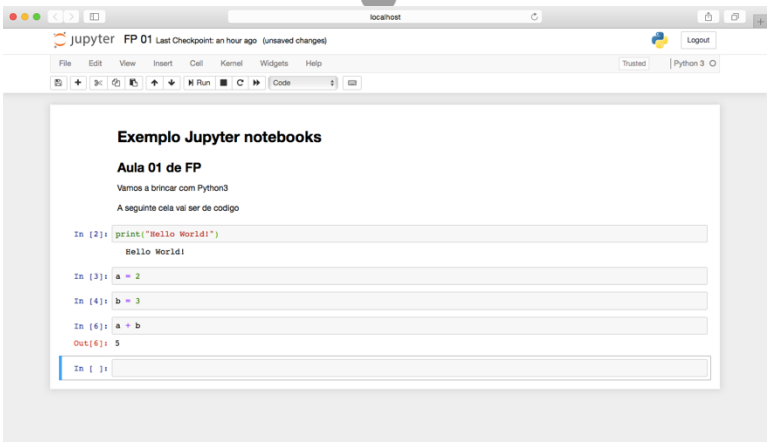
ANACONDA®

```
pip3 install jupyter
```

IP[y]: IPython
Interactive Computing

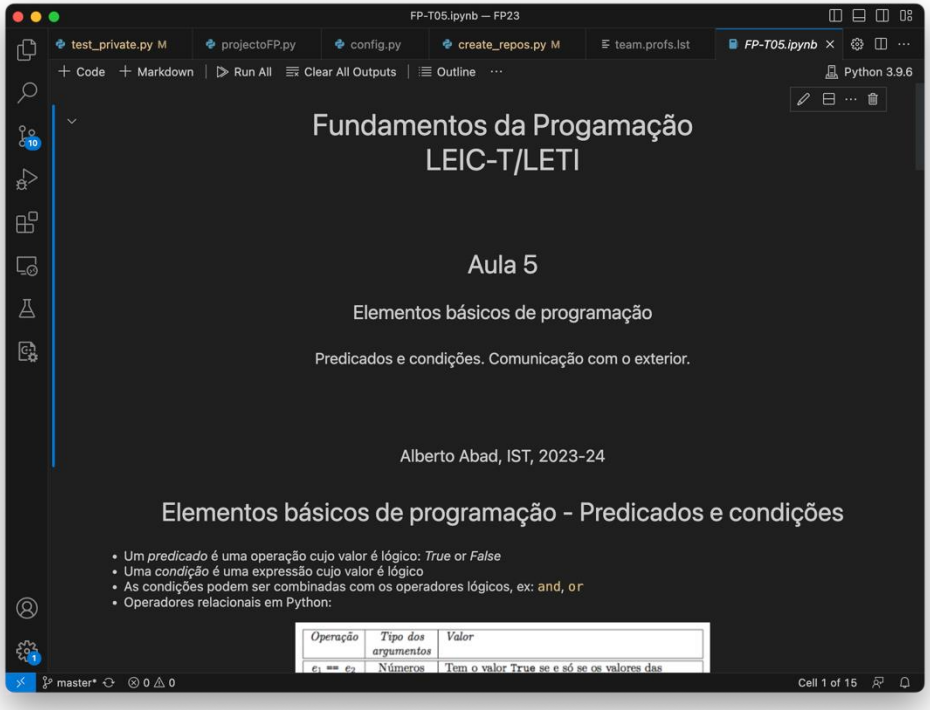
jupyter





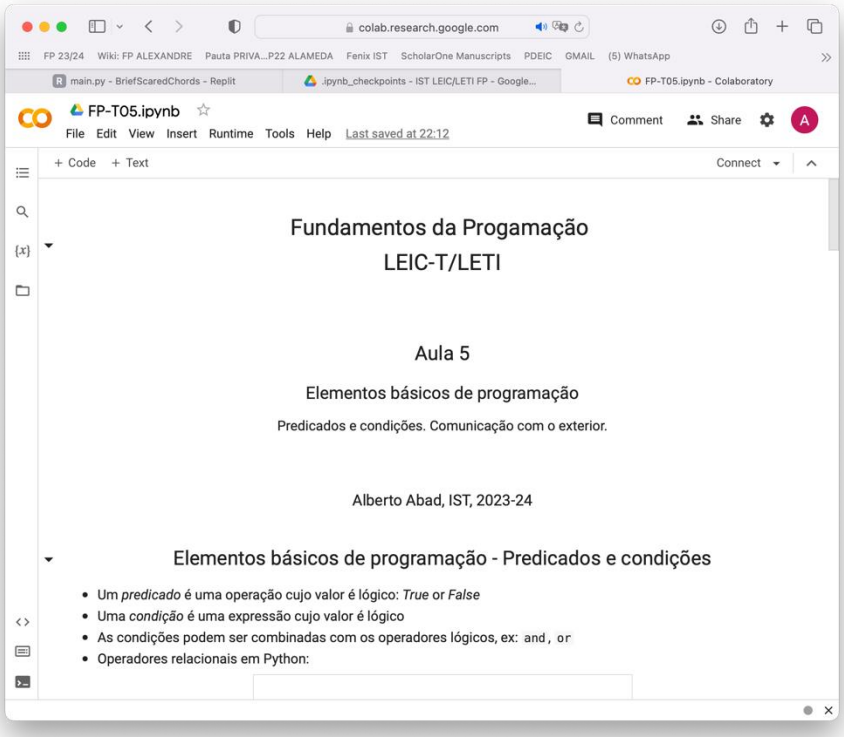
Outras formas de utilizar Jupyter Notebooks

Visual Studio Code (local)



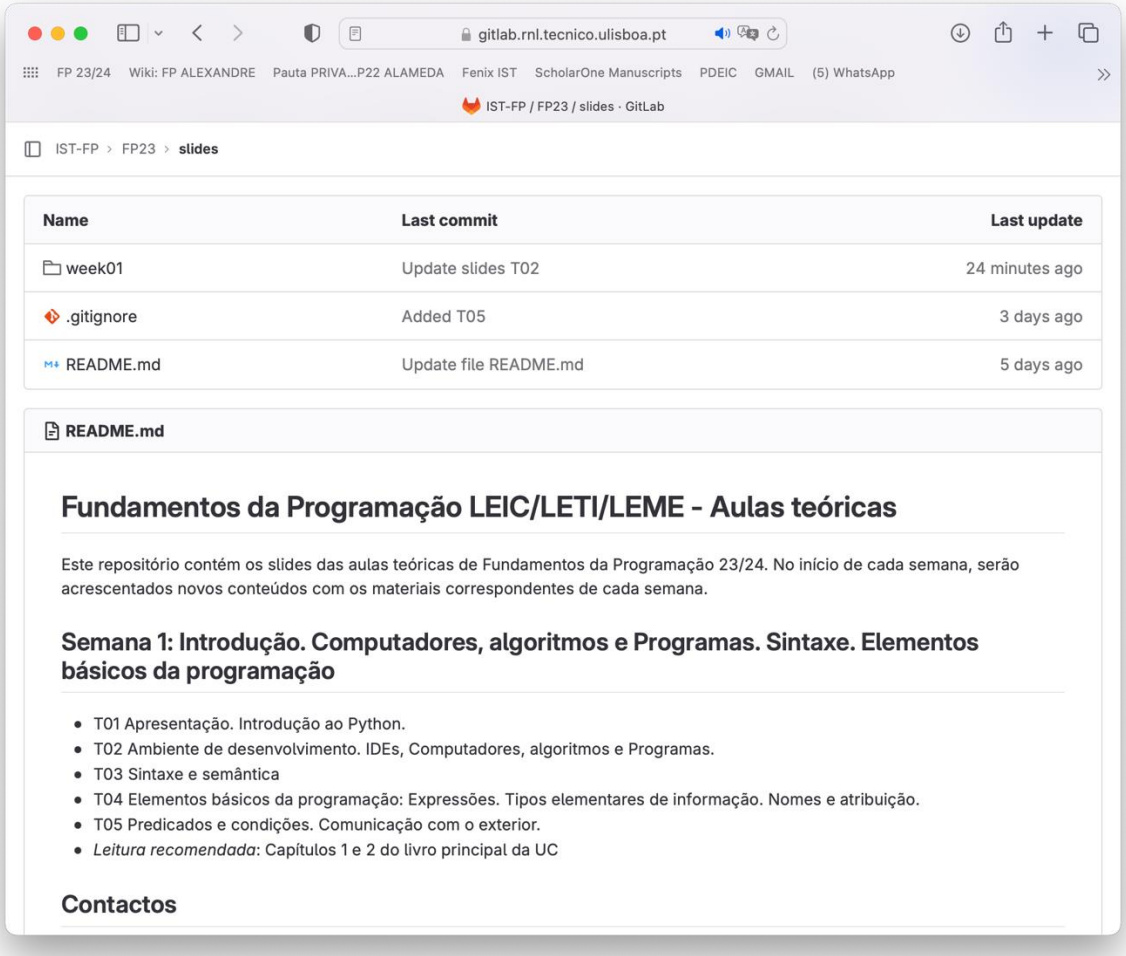
Google Colab (remoto)

https://colab.research.google.com

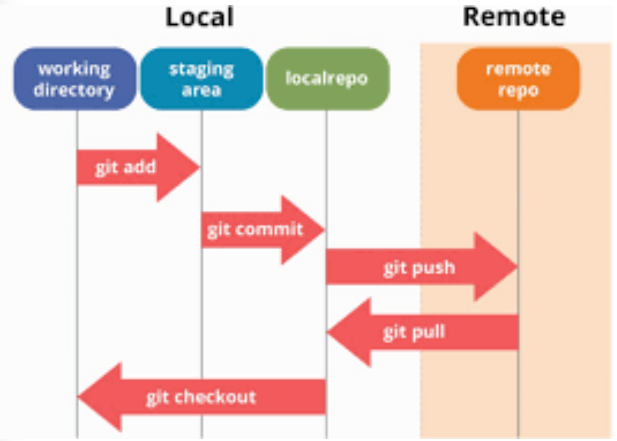


GitLab: Software repository (and more)

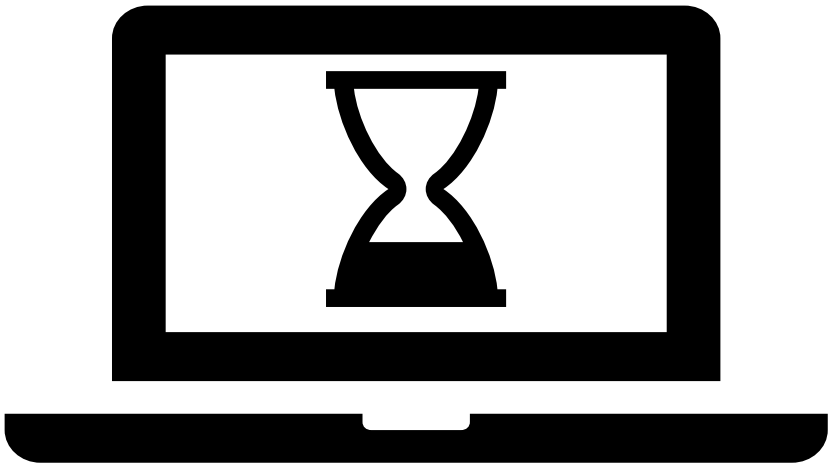
https://gitlab.rnl.tecnico.ulisboa.pt



GitLab



Tempo de prática: Tarefas



- Explorar site da cadeira
- Registrar no Slack e deixar uma mensagem
- Instalar Python3
- Abrir um interpretador
  "Olá mundo"
- Instalar um IDE (*VS Code* recomendado)
- Instalar Jupyter notebooks
- Aceder ao GitLab da RNL
- …

Tarefas antes da próxima aula

- Explorar site da cadeira
- Registrar no Slack
- Instalar Python3
- Abrir um interpretador
  - "Olá mundo"
- Instalar um IDE (*VS Code* recomendado)
- Instalar Jupyter notebooks
- Aceder ao GitLab da RNL
- Ler o Capítulo 1 do livro da disciplina