

Fundamentos da Programação

LEIC/LEGM

Computadores, Algoritmos e Programas
Ambiente de Desenvolvimento

Aula 02

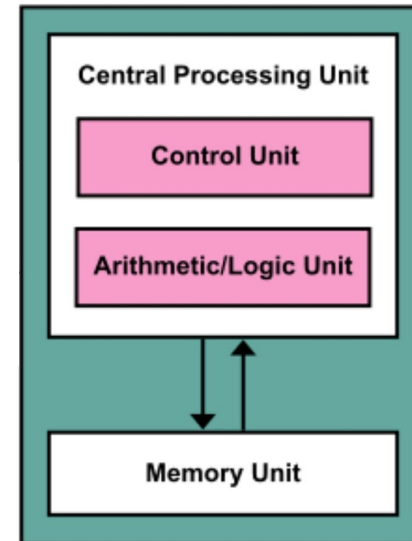
Computadores, Algoritmos e Programas

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

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

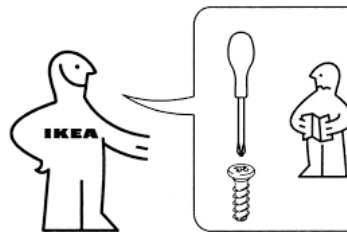
Computadores

- 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:



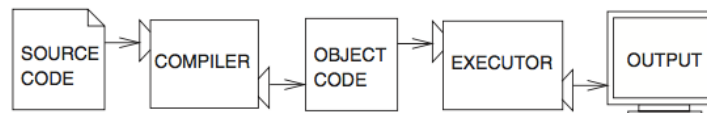
Programas

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

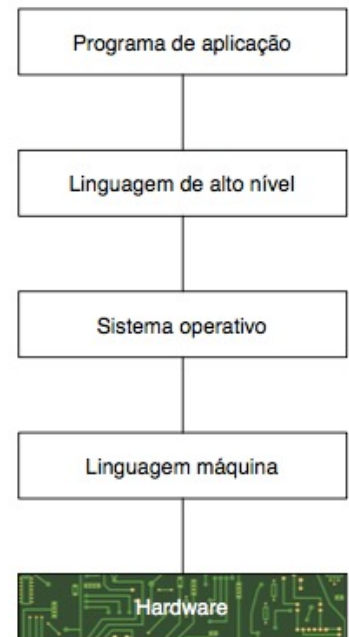
- Interpretados



- Compilados



- Testar programas → depurar/*debugging*



92

9/9

0800 Antan started
 1000 " stopped - antan ✓
 1300 (032) MP-MC $\begin{cases} 1.2700 & 9.037847025 \\ 2.130476415 & 9.037846995 \end{cases}$ convd
 (033) PRO 2 $\begin{cases} 2.130476415 \\ 2.130676415 \end{cases}$
 convd

Relays 6-2 in 033 failed special speed test
 in relay 11.000 test.

Relay
 214
 Relay 3

1100 Started Cosine Tap (Sine check)
 1525 Started Multi Adder Test.
 Relays changed

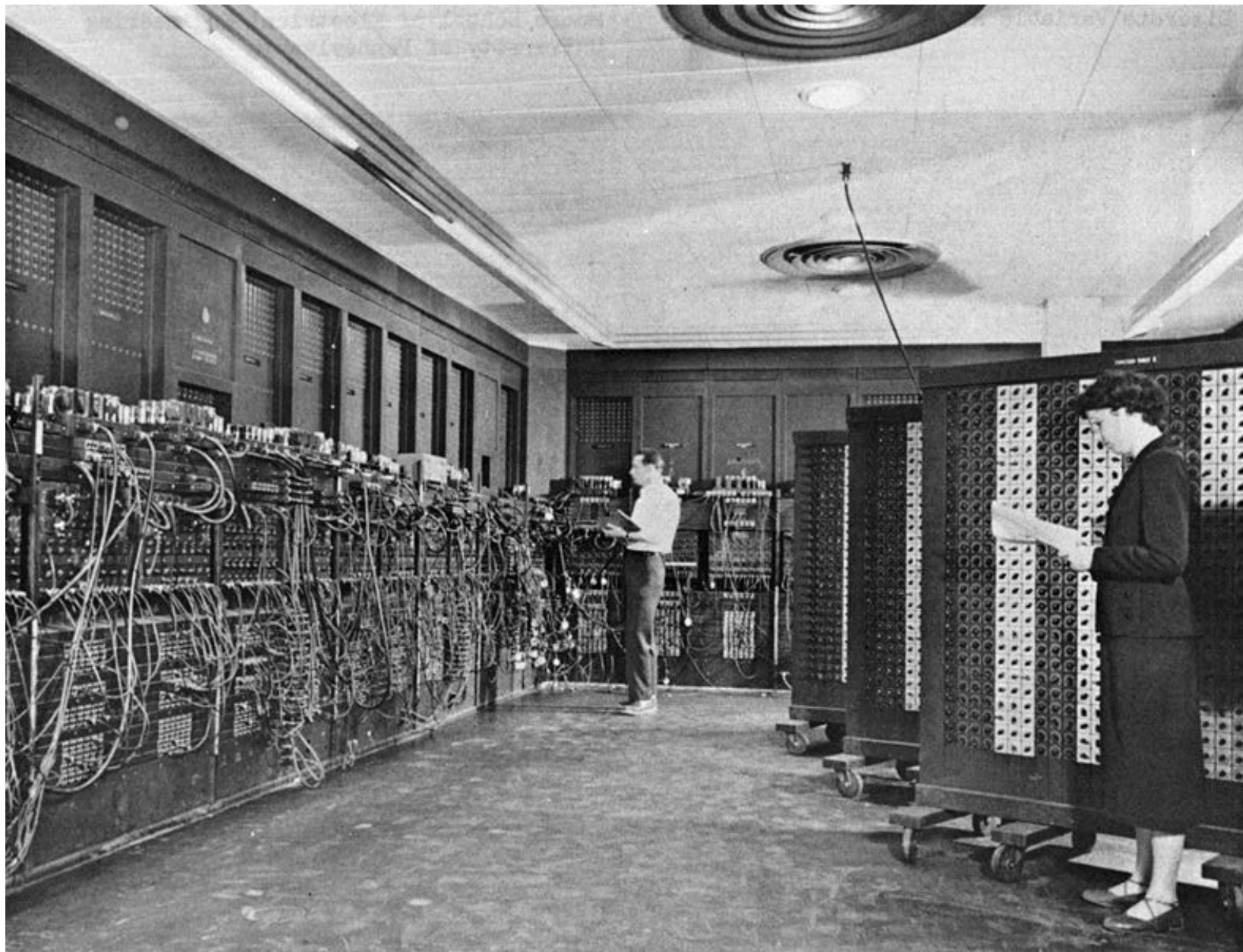
1545



Relay #70 Panel F
 (moth) in relay.

First actual case of bug being found.

1630 Antan started.
 1700 closed down.



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>



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```
# Python 3: Simple output (with Unicode)
```

```
>>> print("Hello, I'm Python!")
```

```
Hello, I'm Python!
```

```
# Input, assignment
```

```
>>> name = input('What is your name?\n')
```

```
>>> print('Hi, %s.' % name)
```

```
What is your name?
```

```
Python
```

```
Hi, Python.
```



Quick & Easy to Learn

Experienced programmers in any other language can pick up Python very quickly, and beginners find the clean syntax and indentation structure easy to learn. [Whet your appetite](#) with our Python 3 overview.

1

2

3

4

5

Python is a programming language that lets you work quickly and integrate systems more effectively. [>>> Learn More](#)

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

```
2. ist90700@sigma02.ist.utl.pt: /afs/ist.utl.pt/users/0/0/ist90700 (ssh)
alberto@caprica ~ $ ssh sigma.tecnico.ulisboa.pt -l ist90700
Password:
Linux sigma02.ist.utl.pt 4.9.0-8-amd64 #1 SMP Debian 4.9.110-3+deb9u4 (2018-08-21) x86_64
#####

      Bem vindo ao cluster sigma.

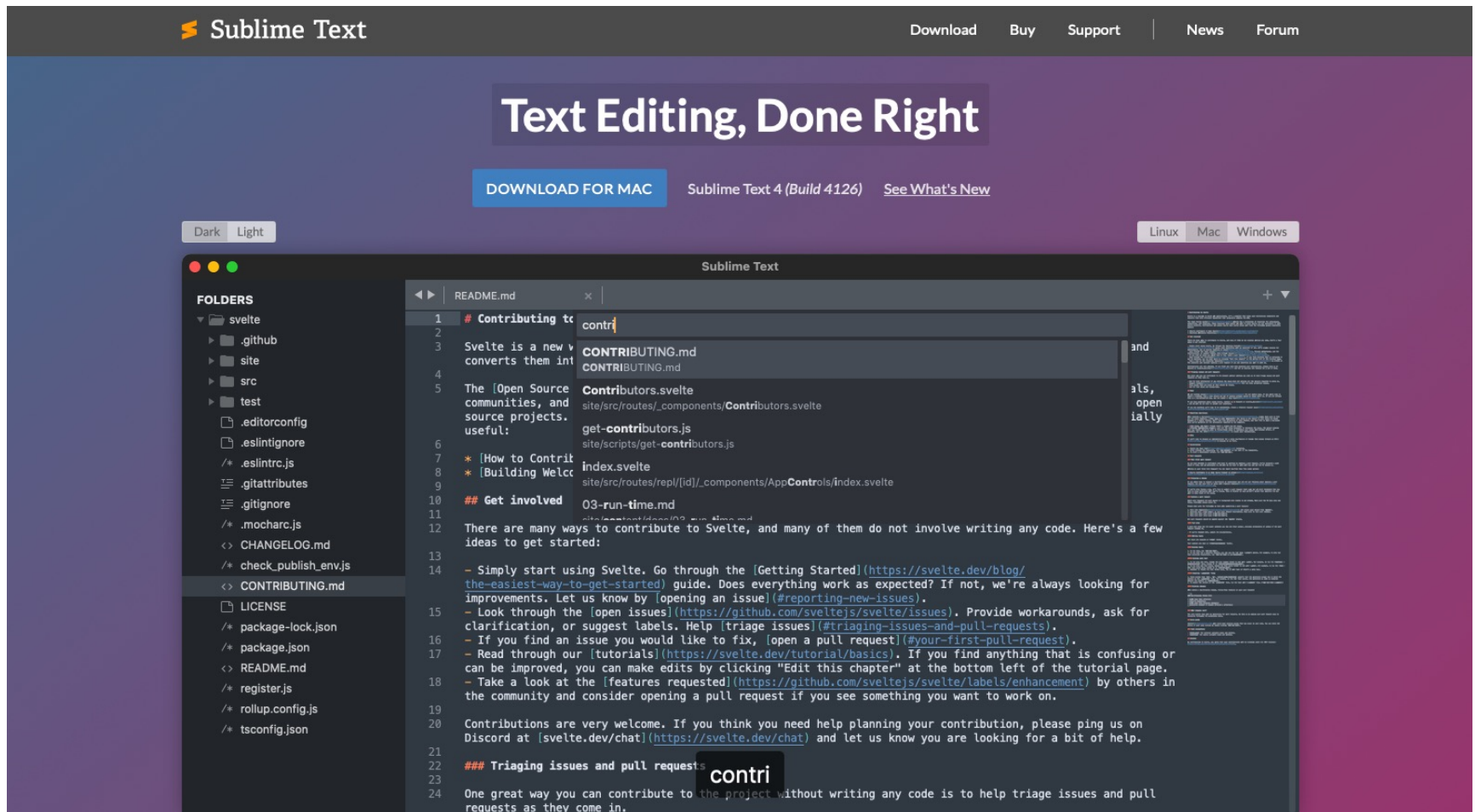
  Informacoes : https://dsi.tecnico.ulisboa.pt/
  Suporte     : dsi@tecnico.ulisboa.pt

#####
v6.4n
ist90700@sigma02:~$ python
Python 2.7.13 (default, Nov 24 2017, 17:33:09)
[GCC 6.3.0 20170516] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>>
ist90700@sigma02:~$ python3
Python 3.5.3 (default, Jan 19 2017, 14:11:04)
[GCC 6.3.0 20170118] on linux
Type "help", "copyright", "credits" or "license" for more information.
>>> |
```

- 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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Automatically fix C++ issues related to code readability, language semantics, performance & more. Always free!

ADS VIA CARBON

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.

```
1 #include <GPL>
2 #include <free_software>
3
4 void Notepad4ever()
5 {
6     while (true)
7     {
8         Notepad++ ;
9     }
10 }
```

Visual Studio Code: (Python) IDE

<https://code.visualstudio.com>



Version 1.71 is now available! Read about the new features and fixes from August.

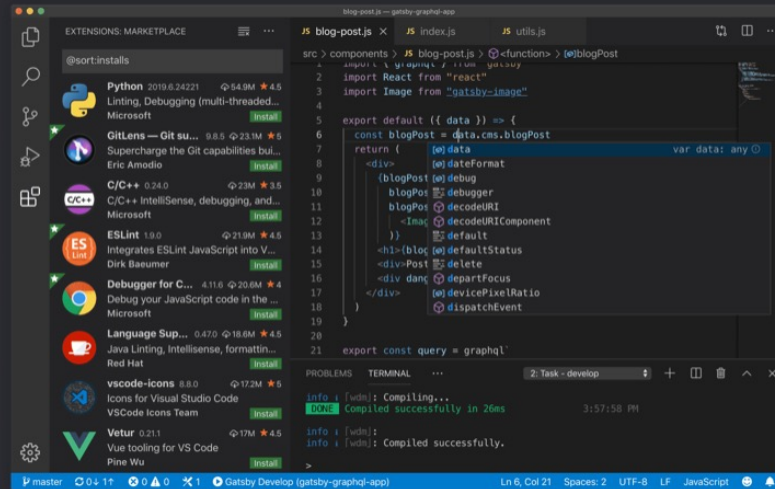
Code editing.
Redefined.

Free. Built on open source. Runs everywhere.

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Stable Build

Web, Insiders edition, or other platforms

By using VS Code, you agree to its
license and privacy statement.



IntelliSense



Run and Debug



Built-in Git



Extensions

PyCharm: Python IDE

<https://www.jetbrains.com/pycharm/>



The image shows the top portion of the PyCharm website. At the top is a dark navigation bar with the JetBrains logo on the left and links for Tools, Languages, Solutions, Support, and Store on the right, along with user and search icons. Below this is a secondary navigation bar with the PyCharm logo on the left, links for 'Coming in 2018.3', 'What's New', 'Features', 'Docs & Demos', and 'Buy', and a 'Download' button on the right. The main hero section features a large, stylized 'X' graphic composed of yellow, green, and teal geometric shapes. Overlaid on this graphic is the PyCharm logo (a black square with 'PC' and a horizontal line) followed by the text 'PyCharm' in a large, bold, black font. Below this, the text 'Python IDE for Professional Developers' is displayed in a smaller, black font. A black button with the text 'DOWNLOAD NOW' is positioned below the text. Underneath the button, the text 'Full-fledged Professional or Free Community' is visible. At the bottom of the hero section, the text 'Fundamentos da Programação' is written in a teal color.

PyCharm

Python IDE
for Professional Developers

DOWNLOAD NOW

Full-fledged Professional or Free Community

Fundamentos da Programação

WING: Python IDE

<https://wingware.com>



Wing 101 - Version 8.0.4 - Released 2021-09-28

Wing 101 is a very simple free Python IDE designed for teaching beginning programmers. It omits most features found in Wing Pro. [Compare Products](#)

If you are new to programming, check out the book [Python Programming Fundamentals](#) and accompanying screen casts, which use Wing IDE 101 to teach programming with Python.

Wing 101 is free to use for any purpose and does not require a license to run.

[Tutorial](#)
[Quick Start Guide](#)
[What's New](#)

Other OSes: [Windows](#) [Linux](#)

Other Versions: [7.2.9](#) [7.1.3](#) [7.0.4](#) [6.1.5](#) [5.1.12](#) [4.1.14](#) [3.2.13](#) [all versions](#)

Other Products: [Wing Pro](#) [Wing Personal](#) — [Compare Product Features](#)

Download Wing 101:

MacOS Installer
Intel 64-bit

SHA1: b11d8114e62321576fae85eb7594fef0aab98697

MacOS Installer
Apple Silicon

SHA1: 53b3b253bb1aa991d3e003df93424b2cab278ff9

[Supported OSes](#)

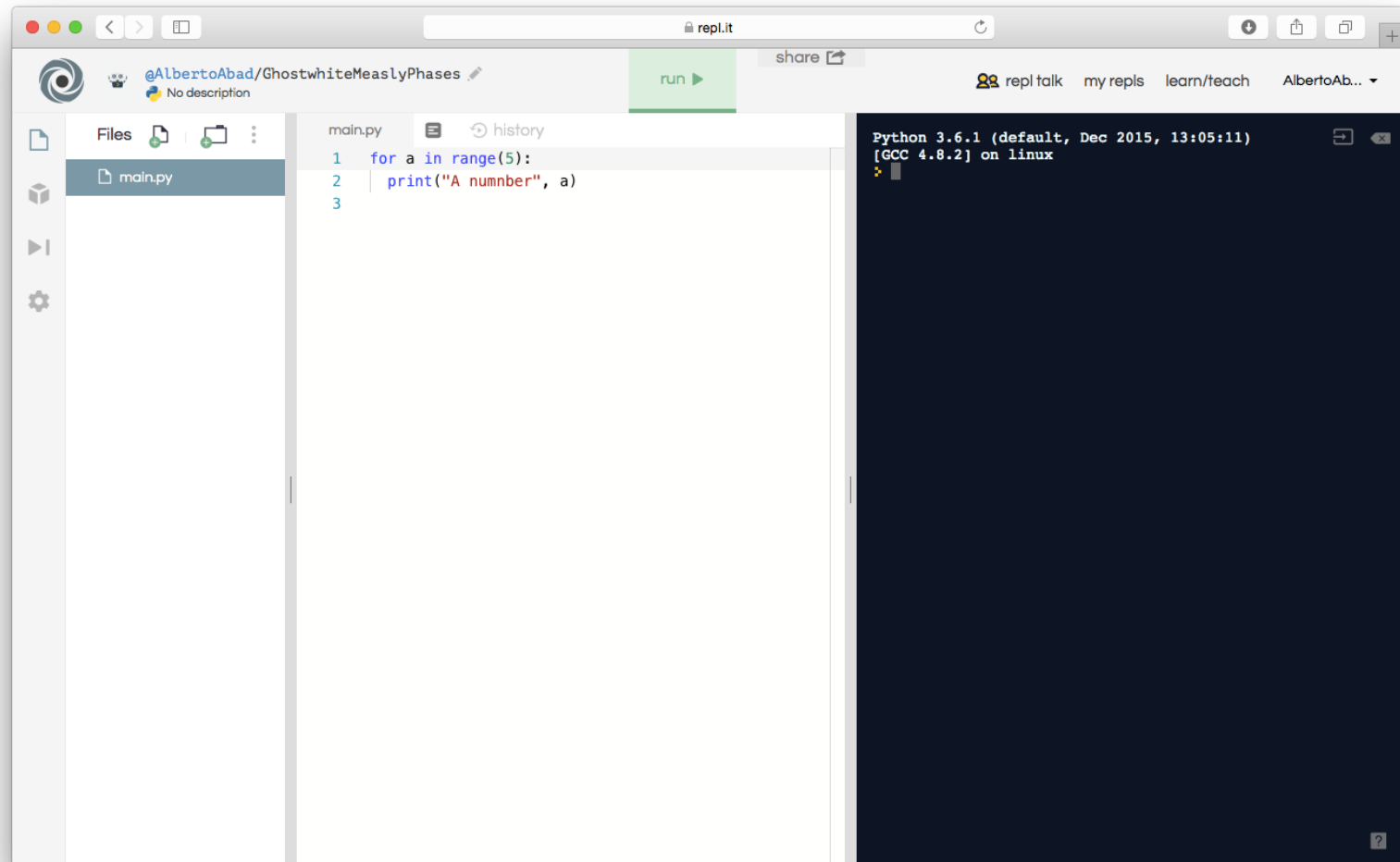
[Supported Python Versions](#)

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Quickstart	HTML	US Letter	A4
Tutorial	HTML	US Letter	A4
Manual	HTML	US Letter	A4
How-Tos	HTML	US Letter	A4

REPL: Online Compiler and IDE

<https://repl.it/languages/Python3>



iPython & Jupyter: Advanced interpreter and interactive notebooks

<http://jupyter.org>



```
pip3 install jupyter
```

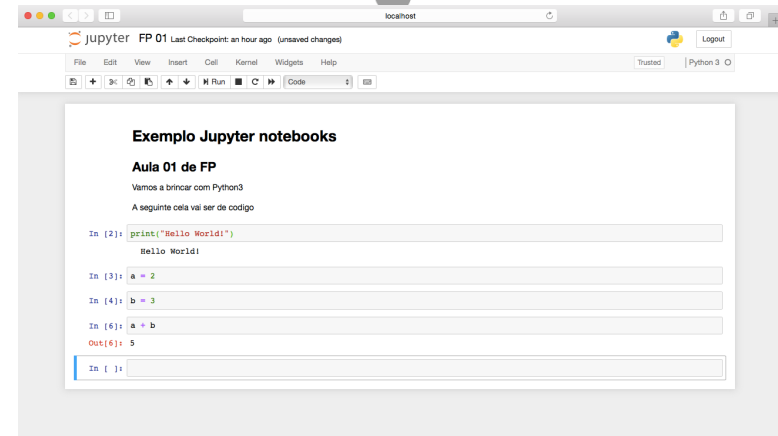
IP[y]: IPython
Interactive Computing



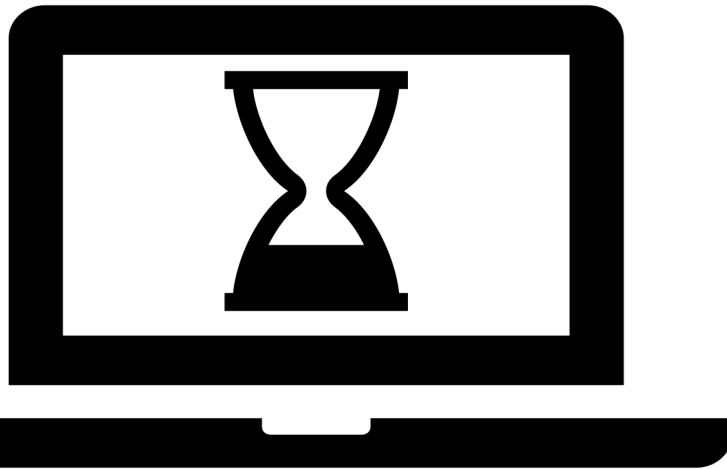
```
1. IPython: Users/alberto (Python)
alberto@DemosAir ~ $ ipython
Python 3.7.0 (v3.7.0:1bf9cc5093, Jun 26 2018, 23:26:24)
Type 'copyright', 'credits' or 'license' for more information
IPython 6.5.0 -- An enhanced Interactive Python. Type '?' for help.

In [1]:
In [1]:
In [1]: print("Hello World!")
Hello World!

In [2]:
```



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
- ...

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)
- Ler o Capítulo 1 do livro da disciplina

