Python:
Introduction to AI, Python and Colab

AAA-Python Edition

Plan

- 1- What is AI ?
- 2- AI Branches
- 3- AI Applications
- 4- Introduction to Python
- 5- Jupyter NoteBook
- 6- Google Colab

1- What is AI ?

- The definition of AI (Artificial Intelligence) depends on how it has been approached by the researchers through history.
- These approaches concern developing intelligent software taking into consideration **2** aspects: “**how do we think**” and “**how do we act**”.
- So in AI, we develop software that let machines be able to:
  - Think like a **human** intelligibly
  - Or Act like a **human** intelligibly
  - Or Think **Rationally**
  - Or Act **Rationally**

- If we want a more formal definition, we can select these 4 definitions :

	Human	Rational
Think	"[The automation of] activities that we associate with human thinking, activities such as decision-making, problem solving, learning ..." (Bellman, 1978)	"The study of the computations that make it possible to perceive, reason, and act." (Winston, 1992)
Act	"The art of creating machines that perform functions that require intelligence when performed by people." (Kurzweil,1990)	"Computational Intelligence is the study of the design of intelligent agents." (Poole et al., 1998)

Selected from (Stuart J Russell and Peter Norvig. Artificial intelligence: a modern approach. Pearson Education, Inc, 2010.).

- For example, we can find these involved techniques:

	Human	Rational
Think	Cognitive Science	Logic Programming
Act	Natural Language Processing	Rational Agents

- It doesn’t mean that each technique relate to only one category. For example, agents may need natural language processing skills.
- The categorization means, that the research will focus in a particular aspect related to the category it belongs to.

2- AI Branches

- From the AI categories, many field emerged:

Machine Learning	Learn from data
Logic Based AI	Logic programming paradigm
Search	Select the optimal solution
Knowledge Representation	Efficient formal representation of Knowledge
Planning	Generate the most optimal plan to achieve a goal

- From the AI categories, many field emerged:

Heuristics — Making estimations from the knowledge of a specific problem

Genetic Programming — Use biological processes in software to find answers to a large problem

3- AI Applications

- We can use AI in:

Expert Systems

Speech recognition

Games

Robotics

Computer vision

Natural Language Processing

- Python
  - Programming language (The syntax Rules)
  - Interpreter (Perform source code instructions)

The programming language

- Is easy to learn and powerful
- It has efficient high-level data structures
- It has a simple approach to object-oriented programming.
- It is ideal for scripting and rapid application development in many areas on most platforms.

The interpreter

- Is freely available in source or in binary form.
- It is available for all major platforms

- Major versions
  - 2.* (many project compatibles only with python2)
  - 3.* (not backward compatible with python 2)
- In major of our code we will use Python 3 (unless we specify an other version)
- Right now, the latest version is 3.7.0

5- Jupyter Notebook

- It is :
  - An “Open-Source” web application
  - Allows you to create and share documents that contain :
    - Live code
    - Equations
    - Visualizations
    - Narrative Text

  - It runs code in many programming languages
  - For installation, it requires: python > =3.3 , >=2.7
  - To run with additional languages, you have to install additional Kernels
  - The list of all available Kernels can be found in Jupyter website (**https://github.com/jupyter/jupyter/wiki/Jupyter-kernels**)

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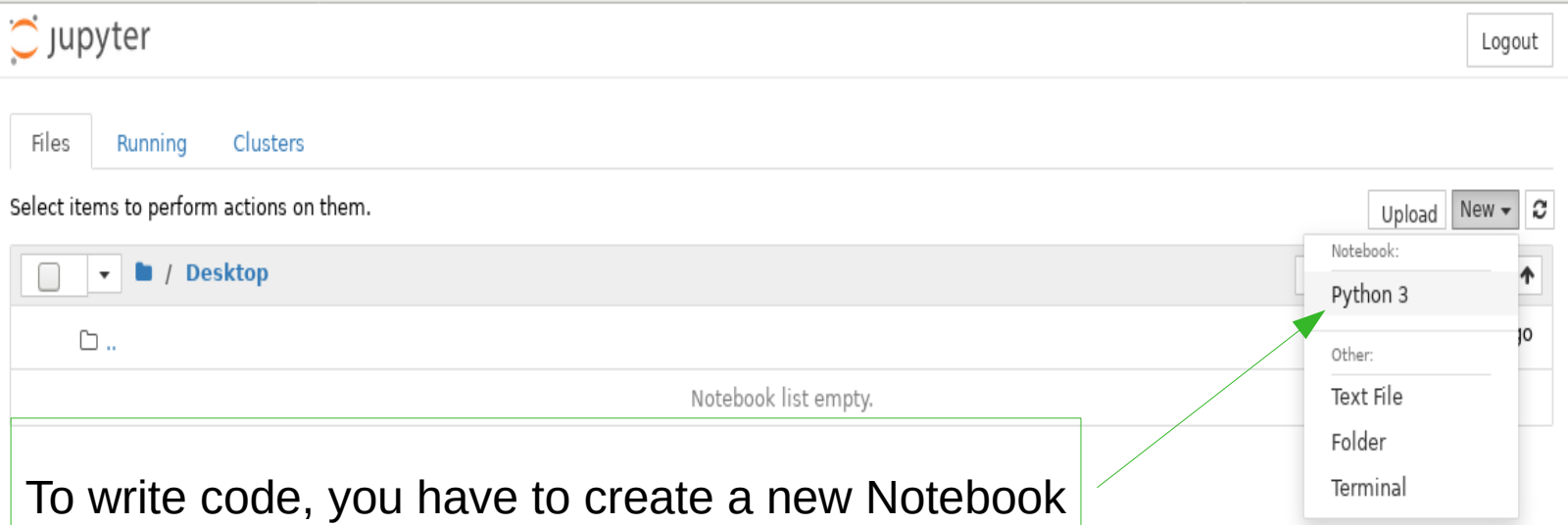
5- Jupyter Notebook



To write code, you have to create a new Notebook

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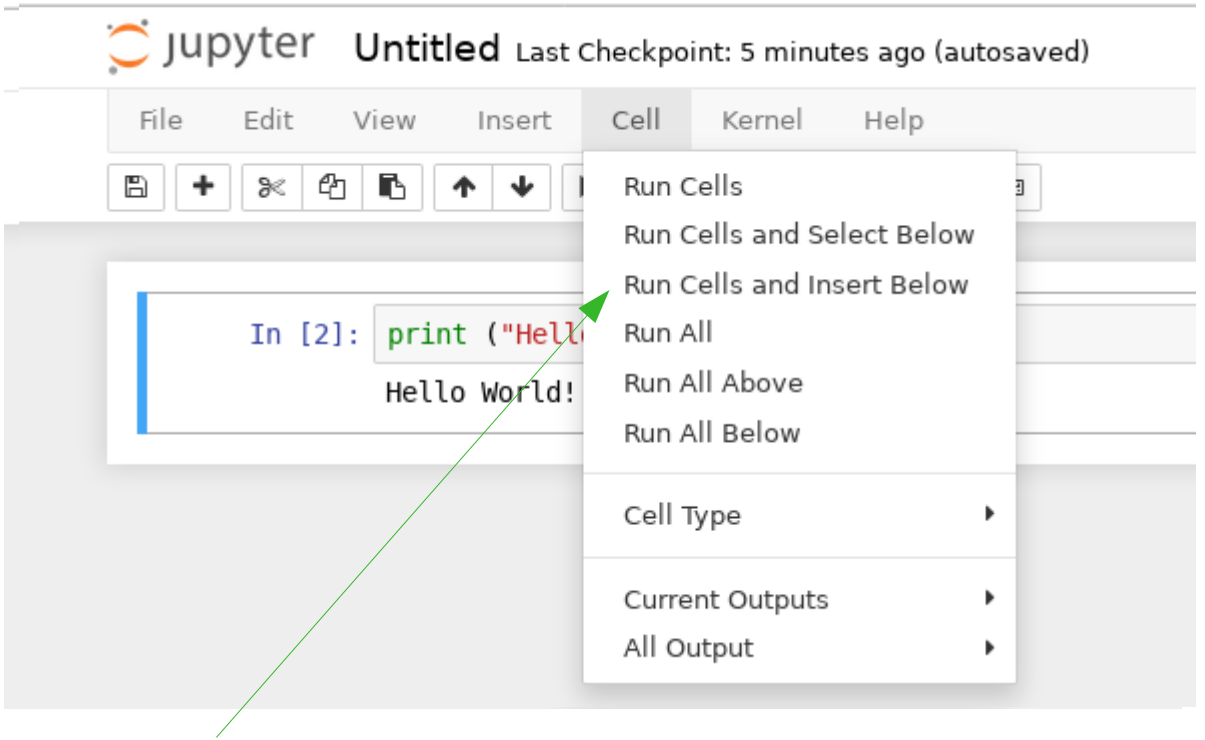
5- Jupyter Notebook



To run the code, you have to Run the Cells

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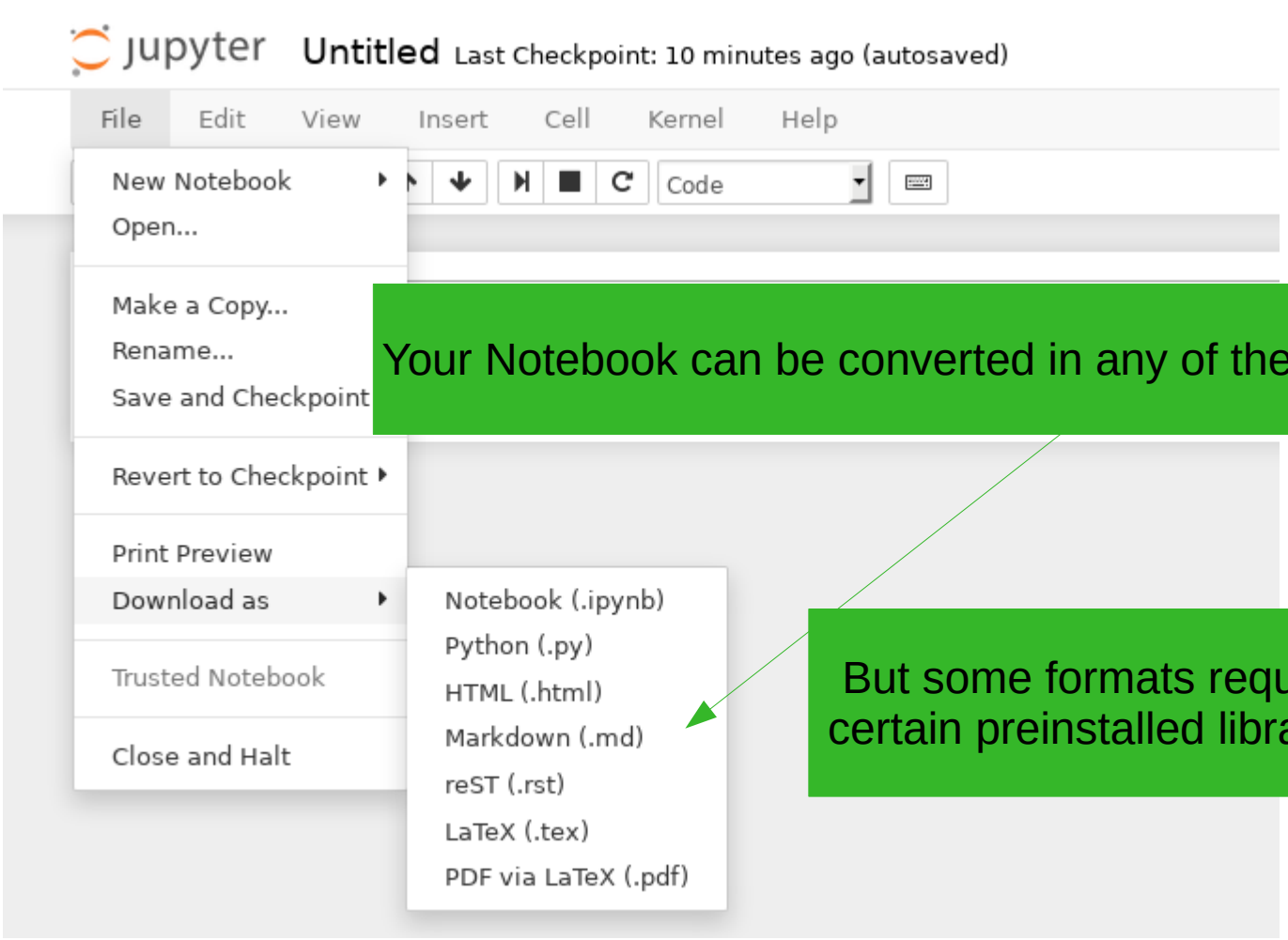
5- Jupyter Notebook



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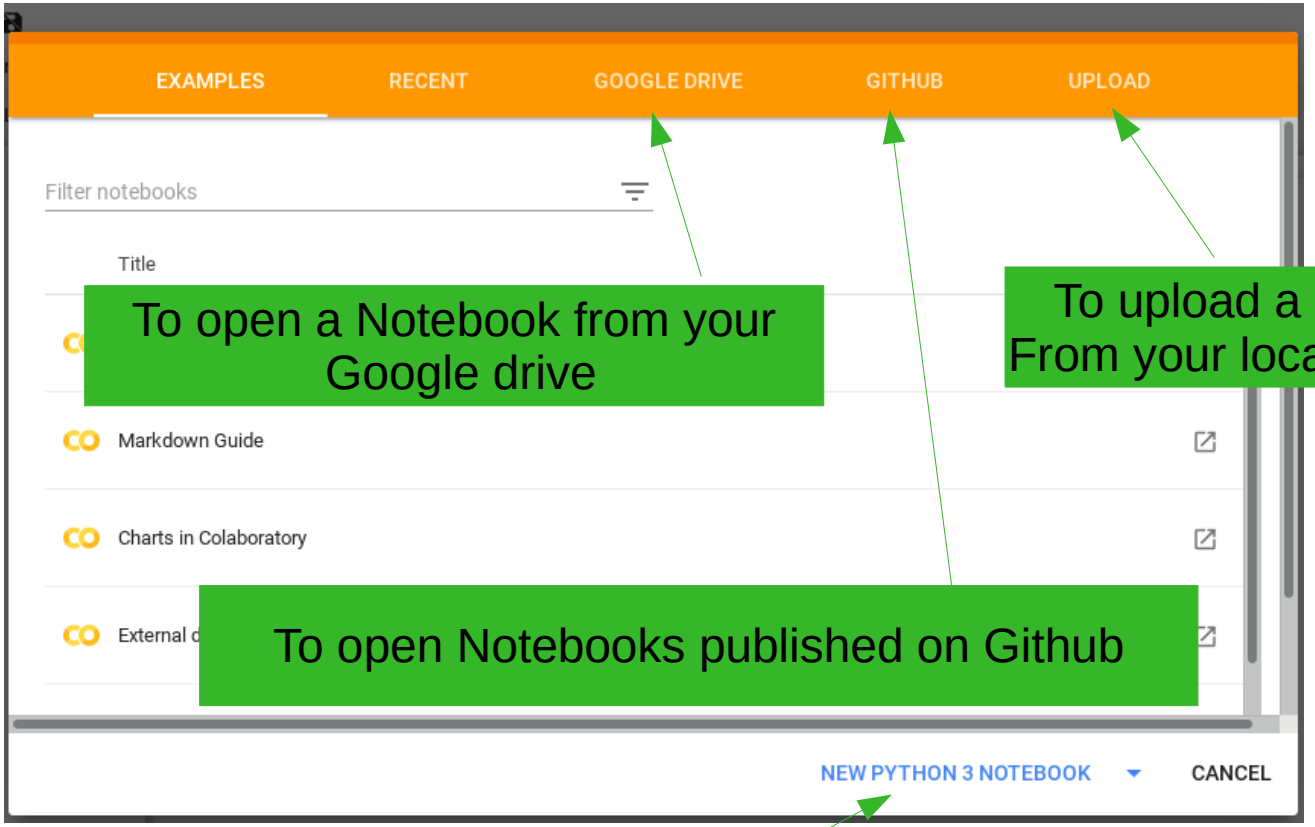
6- Google Colab

- Google Colaboratory is :
  - A Jupyter notebook environment that requires no setup to use.
  - It is a research a free tool for machine learning education and research
  - The Notebooks are stored in Google Drive
  - It supports Python 2.7 and Python 3.6
  - It doesn’t support other kernels (for now)
  - The code is executed in a virtual machine dedicated to a user account.
  - To use it, go to(**https://colab.research.google.com**)

6- Google Colab



To open a Notebook from your Google drive

To upload a Notebook From your local file system

To open Notebooks published on Github

To create a new Notebook

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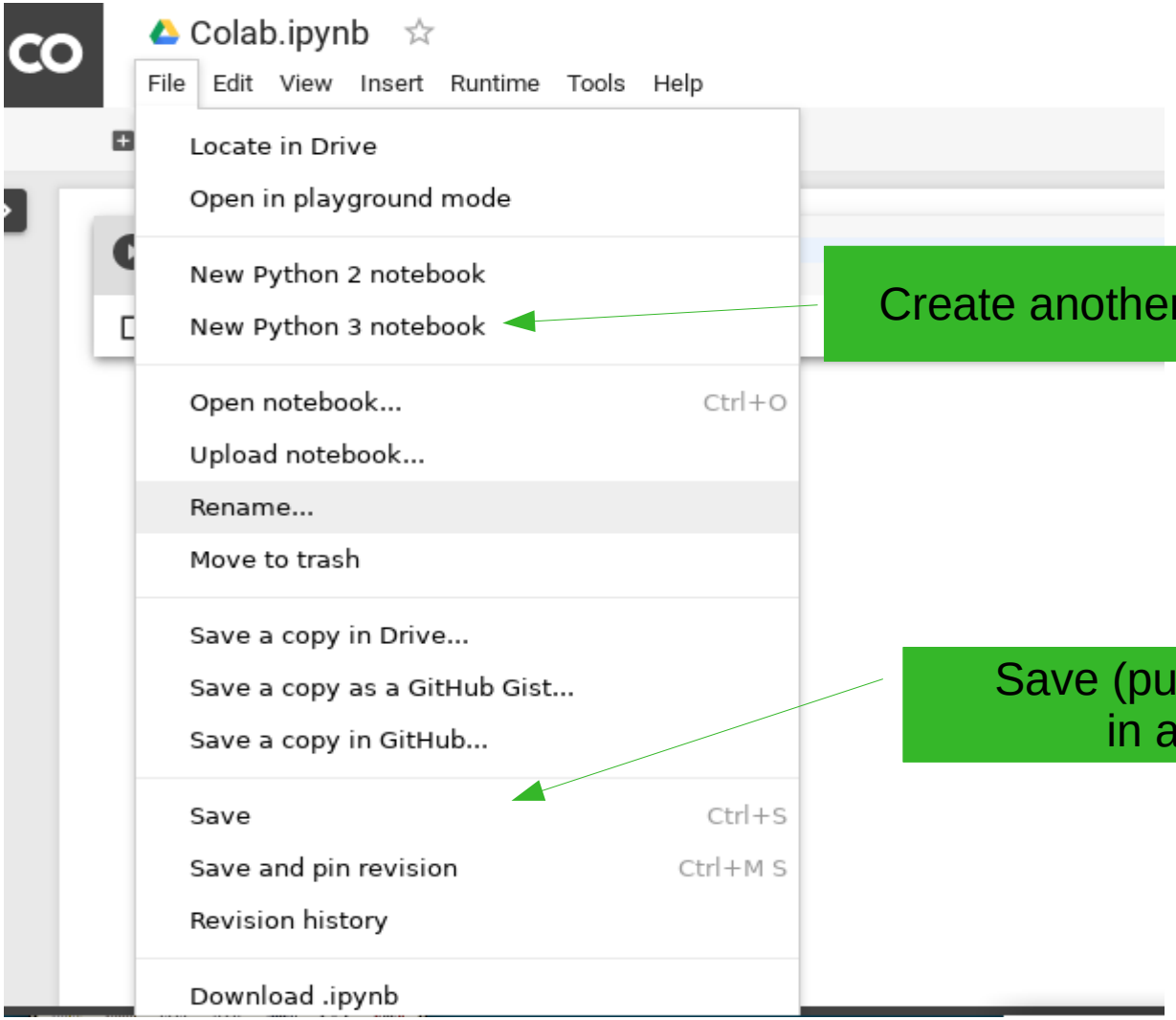
6- Google Colab



Create another Notebook

Save (publish) a copy in a GitHub

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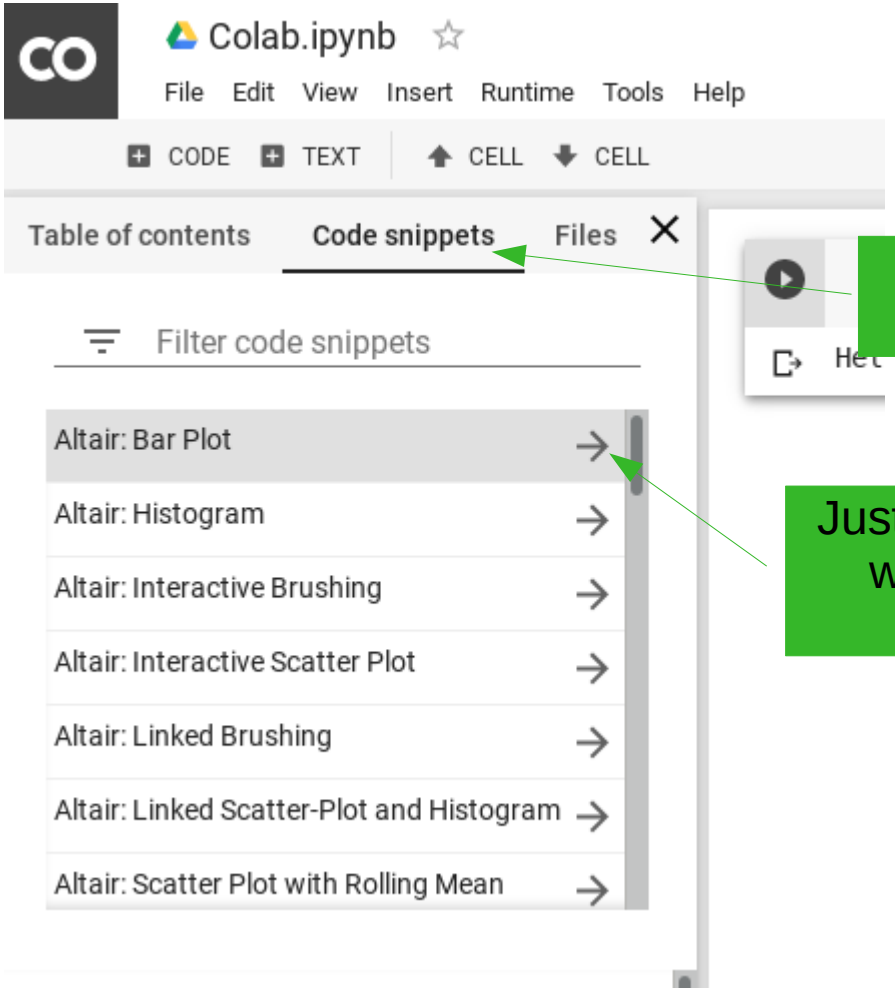
6- Google Colab



A lot of sample codes ready to use

Just Click in, and a new cell will be created with the corresponding code

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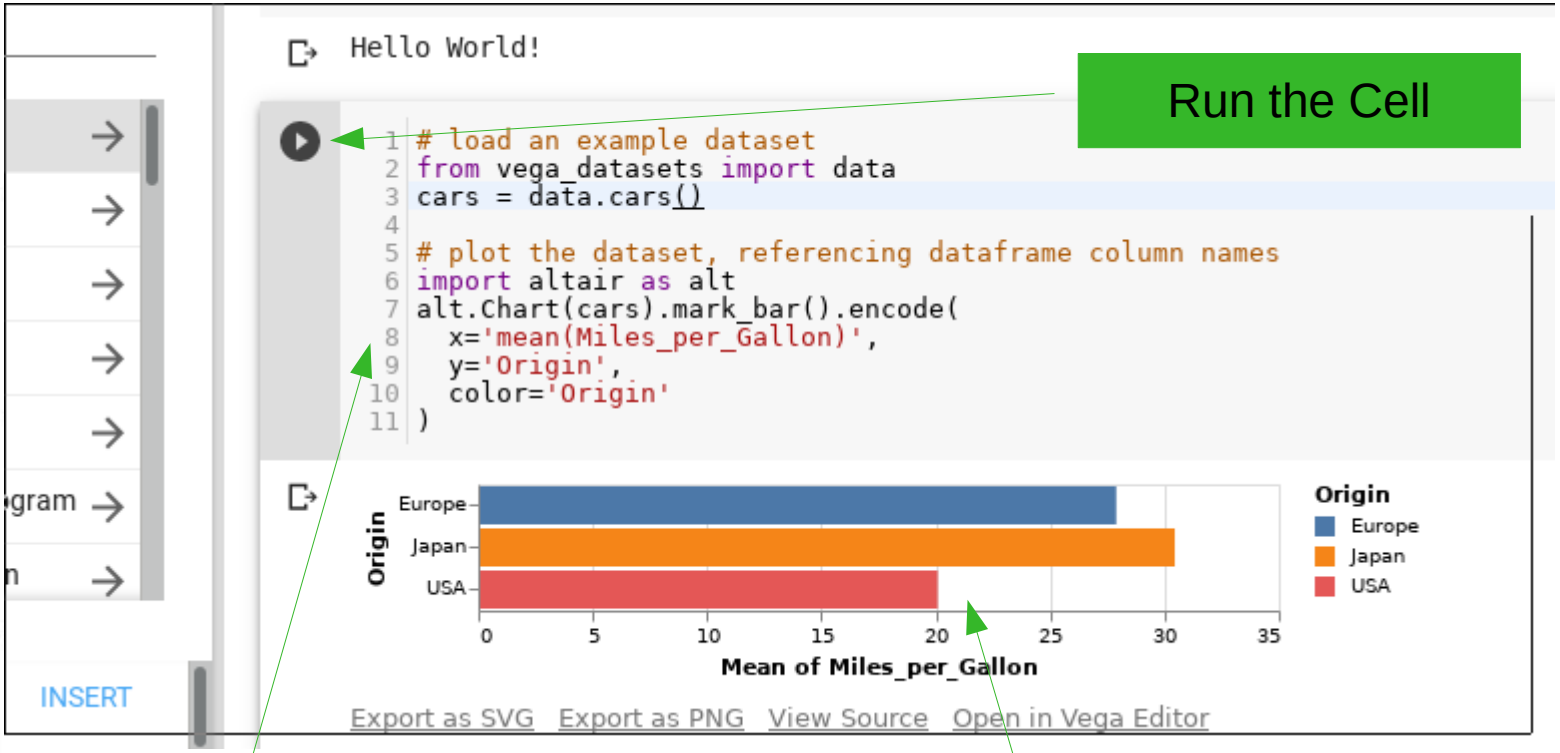
6- Google Colab



This is the code

This is the results after running the Cell

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- Another interesting feature about Google Colab, is that we can install new libraries (we will talk about this later).

```
!pip install gym

Collecting gym
  Downloading https://files.pythonhosted.org/packages/9b/50/ed4a03d2be47ffd043b
    100% |████████████████████████████████| 1.5MB 7.0MB/s
Requirement already satisfied: numpy>=1.10.4 in /usr/local/lib/python3.6/dist-p
Requirement already satisfied: requests>=2.0 in /usr/local/lib/python3.6/dist-p
Requirement already satisfied: six in /usr/local/lib/python3.6/dist-packages (f
Collecting pyglet>=1.2.0 (from gym)
  Downloading https://files.pythonhosted.org/packages/1c/fc/dad5eaaab68f0c21e2f
    100% |████████████████████████████████| 1.0MB 1.2MB/s
Requirement already satisfied: urllib3<1.23,>=1.21.1 in /usr/local/lib/python3.
Requirement already satisfied: certifi>=2017.4.17 in /usr/local/lib/python3.6/d
Requirement already satisfied: chardet<3.1.0,>=3.0.2 in /usr/local/lib/python3.
Requirement already satisfied: idna<2.7,>=2.5 in /usr/local/lib/python3.6/dist-
Requirement already satisfied: future in /usr/local/lib/python3.6/dist-packages
```

- In this course, we will use Google Colab to run our Programs
- Since we program in Python 3, we will use Python 3 Notebook, unless we specify the other version

[By Amina Delali]

References

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- Stuart J Russell and Peter Norvig. Artificial intelligence: a modern approach. Pearson Education, Inc, 2010.
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Thank you!

FOR ALL YOUR TIME