Initial Setup
Lab-session 0

Computer Vision and Image Processing

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Working on your computer

Requirements

These slides will teach you how to configure and install the required libraries in your computer. Requirements:

- Windows or Linux-Ubuntu (macOS and other Linux distributions are not in this guide but they should work too.)
- Internet connection

We will install:

- Python
- Pip
- Python-Libraries: OpenCV, Matplotlib, Numpy
- Jupyter Notebook

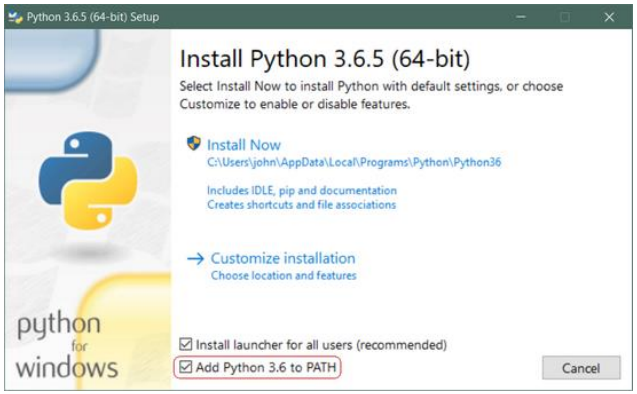
Step 1: Installing Python 3.x

Two main versions of Python: Python 2.x and Python 3.x are available.

The two version have several features in common, but they are not fully compatible: a Python 2.x program may not work in Python 3.x and vice versa.

Installing on Windows:

- Download the Python3 latest release from: https://www.python.org/downloads/
- Run the installer. **Remind to Add Python to PATH**



Installing on Ubuntu:

- Ubuntu already comes with Python installed. If you want to update it to the latest version open your terminal and run: ***sudo apt-get install –upgrade python3***

Step 2: Install Python Libraries with pip

Installing on every OS:

Open your terminal (Windows PowerShell for Windows) and run the following commands:

- Install numpy (For array operations) :

  pip3 install numpy

- Install matplotlib (For plotting and visualization)

  pip3 install matplotlib

- Install OpenCV (Computer Vision Library):

  pip3 install opencv-python

  pip3 install opencv-contrib-python

Step 4: Install and run Jupyter Notebook

The Jupyter Notebook is an open-source web application that allows you to create and share documents that contain live code, equations, visualizations and narrative text. It is useful to explain how to code and to visualize interactively the results of an algorithm or code.

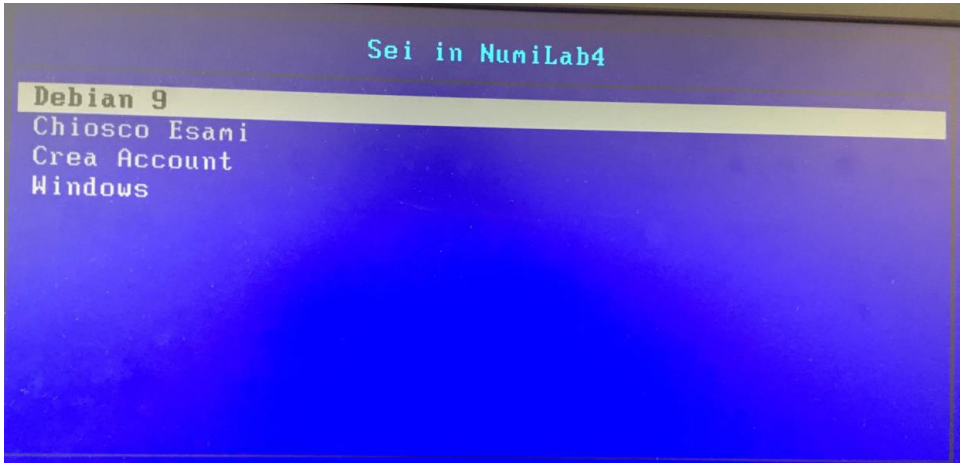
Installing on every OS:

- Open your terminal and run:

pip3 install jupyter

Working on Lab Computer

Working on Lab computer



All the packages you need are already installed. If it is your first time in lab, perform the following steps:

1. Create your account
2. Login into **Debian 9** (only Linux will be supported in lab PCs) with username and password
3. run ***startx*** in the terminal to run the GUI

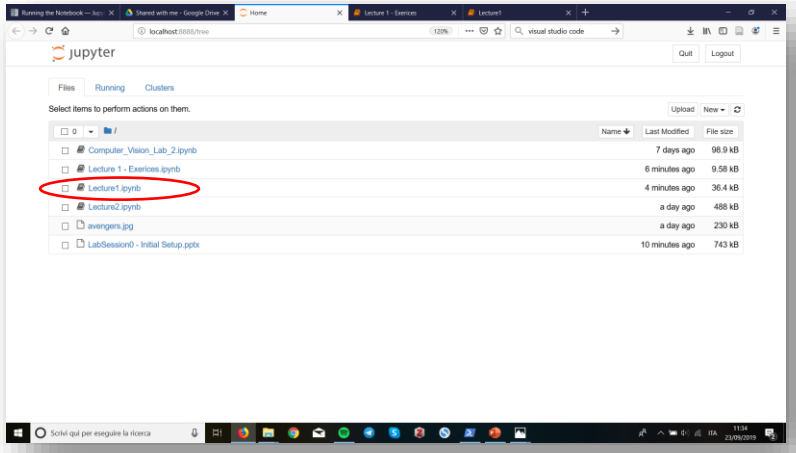
After Initial Setup

Jupyter Notebook: An overview

Run Jupyter Notebook:
Navigate to the folder containing the lab-session notebooks and **launch** the notebook server in a terminal (**do not close it!)** with the following command:

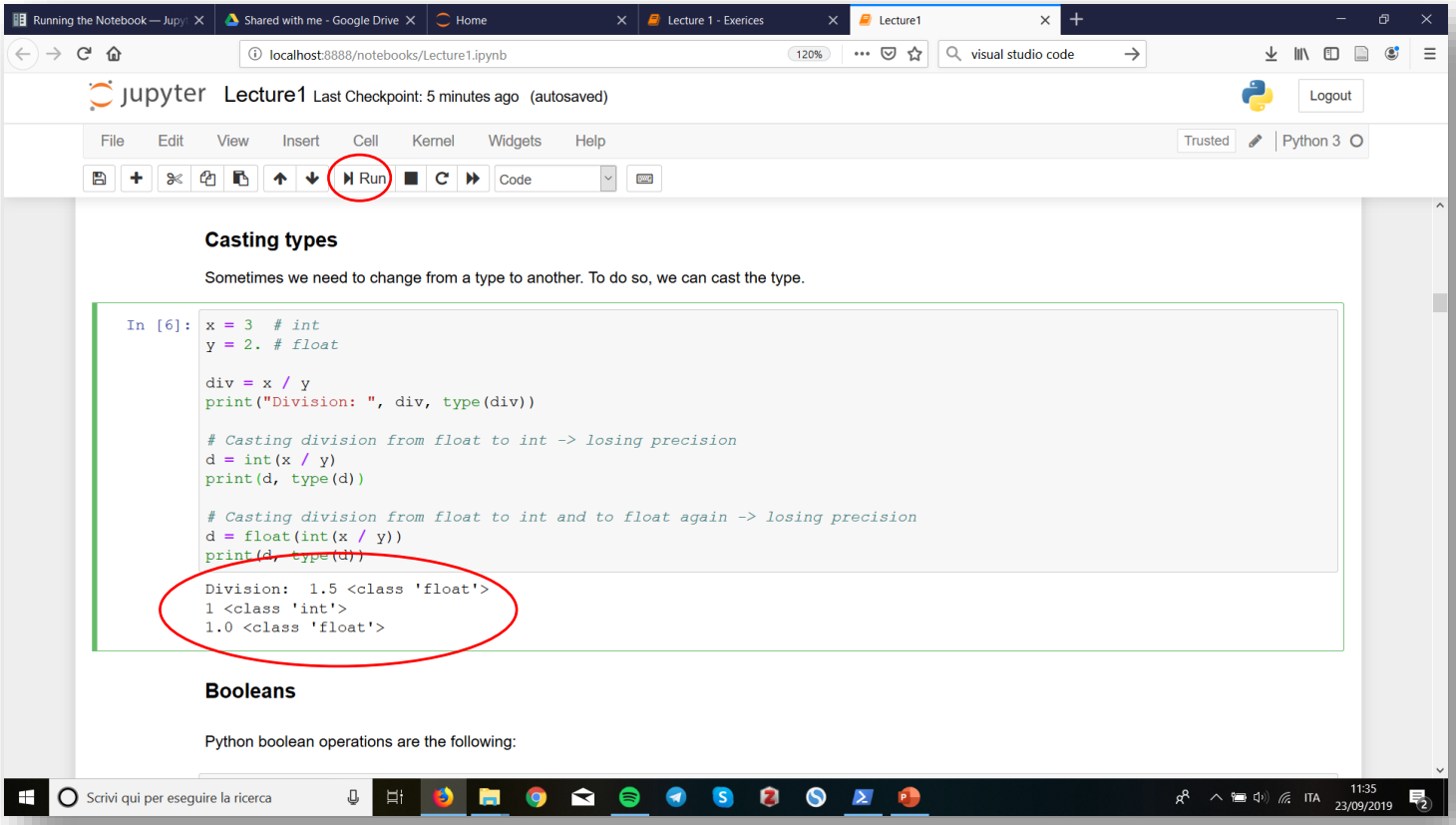
jupyter notebook

You should see the notebook open in your browser. If this is not the case, just point your browser to the URL printed on the terminal (default: **http://localhost:8888**)



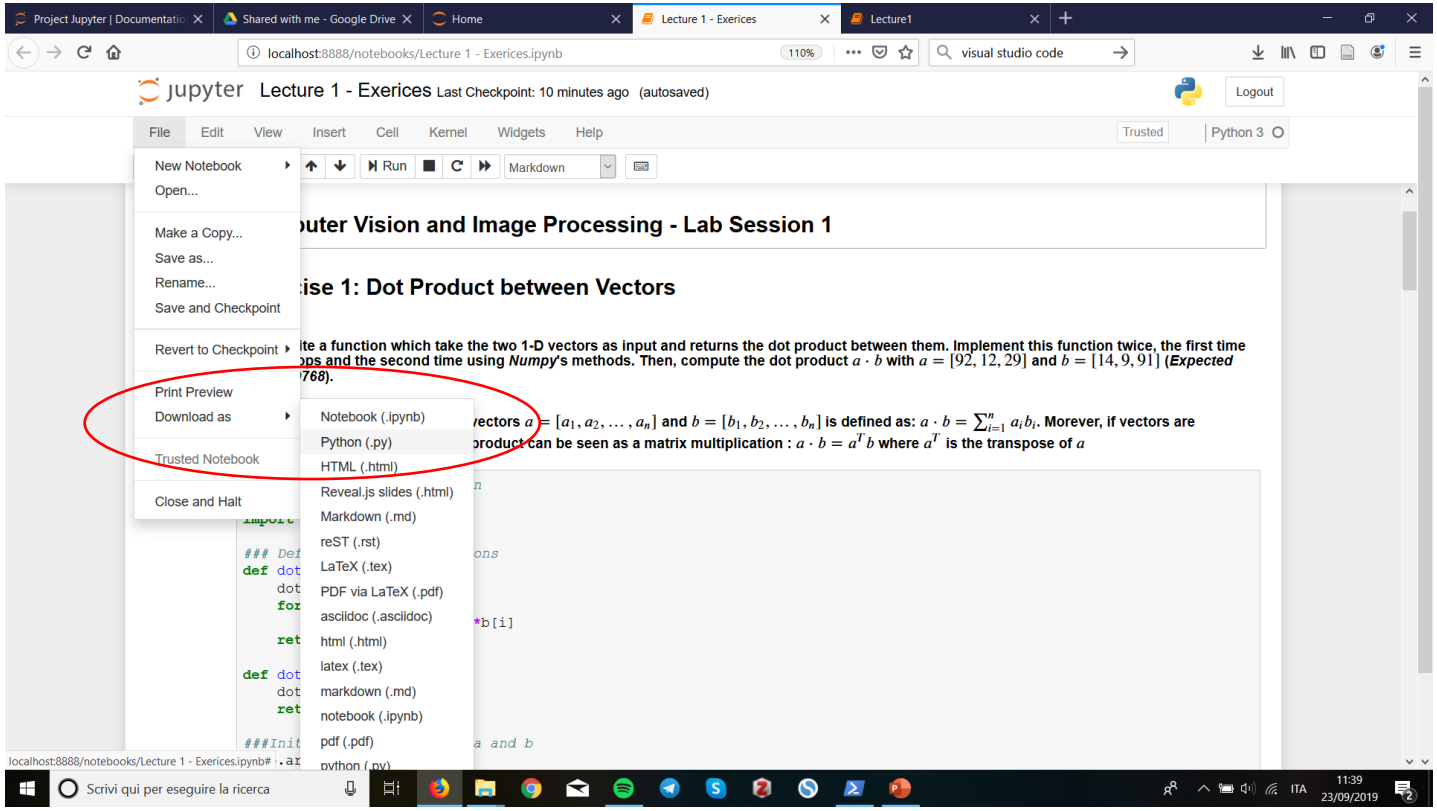
Notebook dashboard. Navigate to your notebook (.ipynb file) and open it

Jupyter Notebook: An overview



Run single code instruction and see the result interactively!

Export python .py from notebook file



You can download all the code cells of a notebook as a single **.py file.** After that, you can run it as a standard Pyhton script.

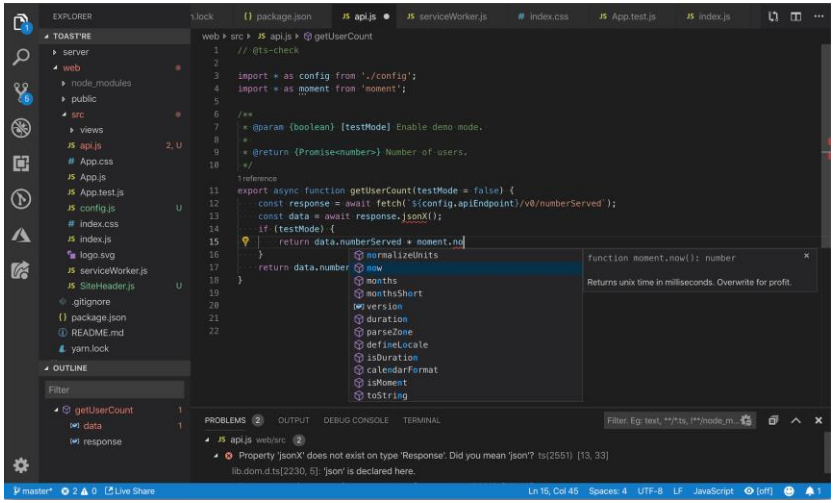
Working from home: IDE and terminal

When you work with python you typically do not program directly on Jupyter Notebook but it is common to use a Source Code Editor such as

Visual Studio Code:
https://code.visualstudio.com/

or **Pycharm:**

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



Visual Studio Code

When you finish writing your script, navigate in your terminal to your script folder and run:

python my_script.py

References

- Python3 documentation:

  https://docs.python.org/3/c-api/index.html

- Jupyter documentation:

  https://jupyter.readthedocs.io/en/latest/

- Numpy documentation:

  https://docs.scipy.org/doc/numpy/reference/index.html

- Matplotlib documentation:

  https://matplotlib.org/3.1.1/api/index.html

- OpenCV documentation:

  https://docs.opencv.org/trunk/d6/d00/tutorial_py_root.html