PYTHON G3 - DAD

TP1   -   Introduction to Python + Anaconda

1 Python, Anaconda and install

The main purpose of this work is to introduce you to **Python** language within the framework called **Anaconda** (which is an integrated distribution of Python and tools for programming). Python is an interpreted language, much alike Matlab. It is freeware and handles vectorial data easily. Anaconda provides a programming environment dedicated to Python within a friendly graphical interface, either using **Spyder** (for programming) or **Jupyter** (within your web browser for interacting programming)

You shall use **Python 3.6**, as well as **Jupyter notebooks**, and useful libraries are `numpy`, `pylab`, `scikit-learn` and `pandas` among others. Python is pretty much used in many fields including data science, both in companies and in the academic world: this is a good investment.

Python and Anaconda are installed at Centrale, nearly everywhere... You can download and install Anaconda with Python 3.6 on your own laptop from

    https://www.continuum.io/downloads

Anaconda comes with all essential libraries we may need. The documentation is here:

    https://docs.continuum.io

Once intalled, you can launch a variety of applications including:

- **Spyder**: Matlab like environment for programming in Python ;

- **Notebook**: to open interactive code within your web Browser ;

2 First steps

To motivate the use of Python, read this brief introduction:

- Python is simple to use,

- Python is freeware,

- Python allows you to split your program into reusable modules,

- Python saves time since it is an interpreted language,

- Python is extensible,...

See   `https://docs.python.org/3.6/tutorial/appetite.html`

1) You can simply type `python` in a terminal window: your terminal becomes an inline python interpreter.

2) Another more friendly possibility, is to launch `Spyder` and recognize its various components such as `Editor, Console, Object inspector, Variable explorer, File explorer...`

TO DO: create a `TP1_Nom1_Nom2.py` file within Spyder and make your first steps there !

3) Follow the online tutorial:

    https://docs.python.org/3.6/tutorial/introduction.html

TO DO: go through the first 3 pages at least. Note that there are no 'end' markers when using `if, for` or `while`: indentation makes it all: be careful !

4) Go to the description of `Modules`:

> `https://docs.python.org/3.6/tutorial/modules.html`

TO DO: have a special look at section *6.2 Standard Modules*.

To use functions, you will often need to import libraries first (this is a main difference with Matlab) to access sophisticated functionalities. Examples of such libraires are at

> `https://docs.python.org/3.6/tutorial/stdlib.html#mathematics`

For applied mathematics, one often needs to use the library `numpy` so that a python program often starts by: `import numpy as np`

You will find a short introductive tutorial to `numpy` at

> `https://docs.scipy.org/doc/numpy-dev/user/quickstart.html`

TO DO: make your first steps with Python using NumPy, read sections 1.2 to 1.4 at

> `http://www.scipy-lectures.org/index.html`

3   Notebooks

Notebooks are a very useful framework to develop Python code in an interactive manner.

To launch a notebook in Linux/Mac OSX:
You can open a Jupyter Notebook by typing "`jupyter notebook`" in a terminal window.

To launch a notebook in Windows:

1. Go to your directory `E:\DAD\TP1_Nom1_Nom2\` and "Shift+ Right click" + select "Ouvrir une fenêtre de commande ici"

2. Type : `jupyter notebook` *or* `jupyter notebook mon_premier_notebook.ipynb`

3. Your browser opens a notebook page *Jupyter*

4. Choose "File → New Notebook" : save it in file `essai.ipynb`

5. Then try various things of your choice...(build a matrix, a vector, make the product, plot a function, add text comments with latex formulas...)

You're in ! You can write and evaluate python code in your notebook. There are *code cells* and *text cells*.

Type "`Shift+Return`" to evaluate a cell after entering your code there.

Choose "`Cell>Cell type>Markdown`" to type text in place of code in the cell.

Another starting point : `https://www.codecademy.com/fr/learn/python`

To go further: `https://docs.python.org/3/tutorial/whatnow.html`