



# INTRODUCTION AU LANGAGE python™



# PYTHON EST ...

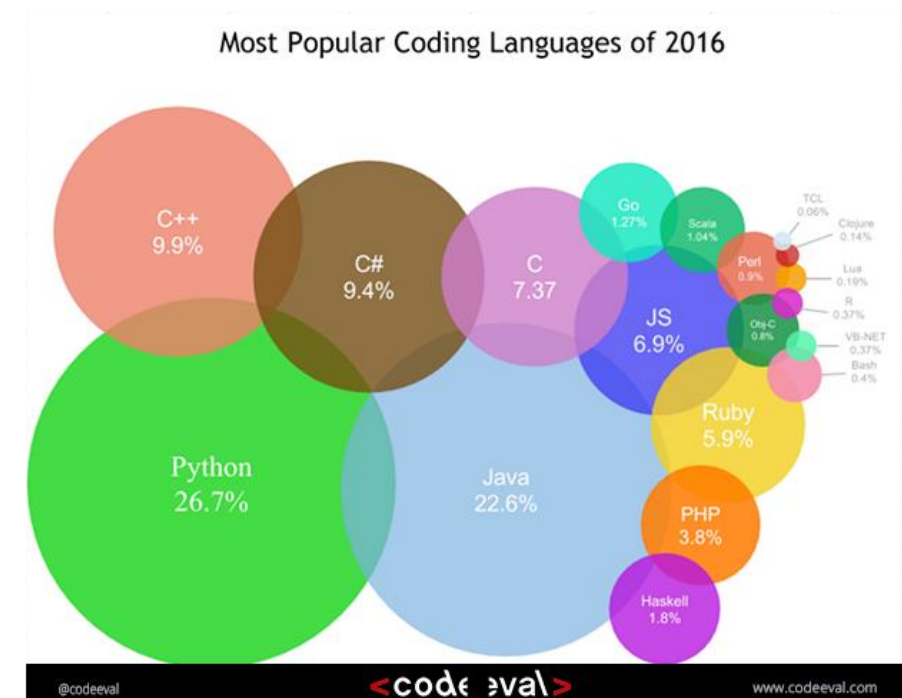
## Simple

- Python est un langage simple, de haut-niveau et minimaliste par nature
- Sa nature proche du pseudo-code permet de mieux se concentrer sur le problème à résoudre plutôt que le langage

## Facile à apprendre

## Libre & Open source

## Portable

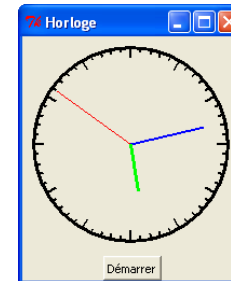
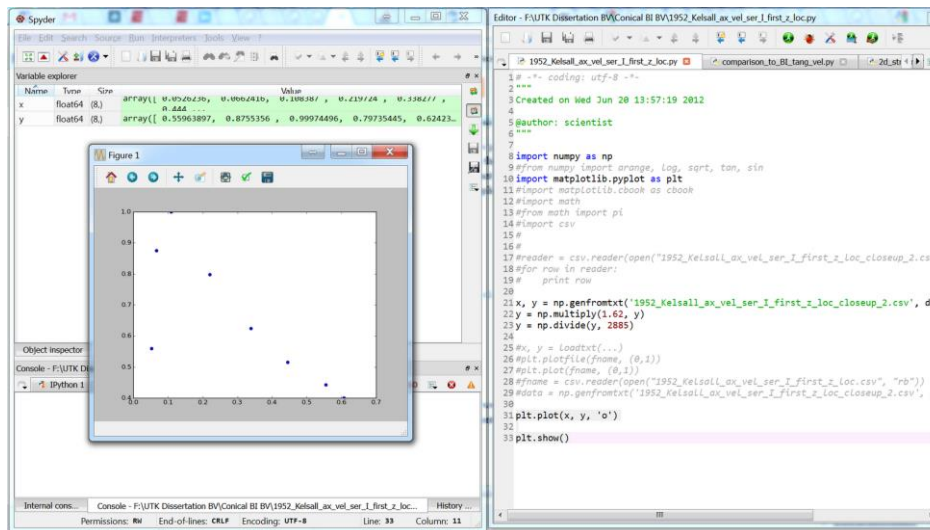


# PYTHON EST ...

Un langage **interprété**

**Extensible** avec de nombreuses bibliothèques

- Réseau, image, son, cryptographie, calcul numérique – numpy, scipy, ... - etc. **Mais aussi** des bibliothèques graphiques - wxPython, tkinter, kivy, ...



# HISTOIRE DE Python

Python a été conçu fin 1989 par Guido Van Rossum (code rendu public en 1991)

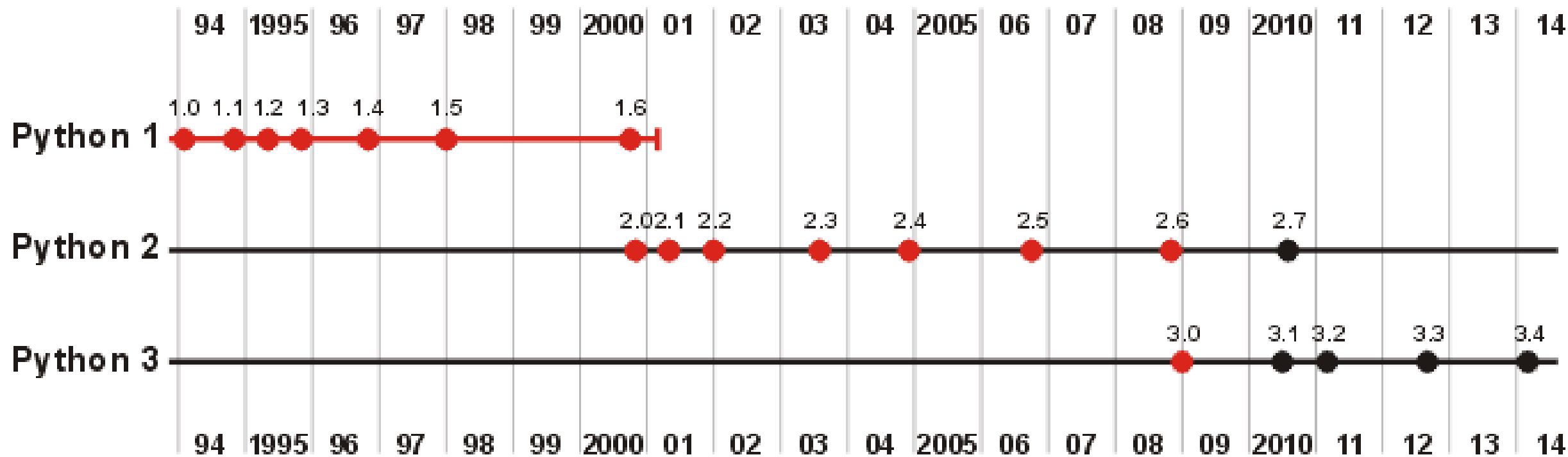
En Janvier 1994 sort Python 1.0. Avec la version 1.4, Python s'enrichit de nouvelles fonctionnalités dont notamment la gestion des nombres complexes.

Lance l'initiative "**Computer Programming for Everybody - CP4E**" (financé par le DARPA)

- L'objectif est de rendre accessible la programmation au plus grand nombre notamment à ceux qui ne font pas de grandes études.



# HISTOIRE DE PYTHON



# HISTOIRE DE PYTHON

En 2008, apparition de Python 3.0 (a.k.a. “Py3k”)

- **Incompatible** avec les versions 2.x (**un premier problème**)

Aujourd’hui (**Mars 2017**) : 2 branches actives distinctes incompatibles

- Python **2.7.13**
- et Python **3.6.0**

Les différentes améliorations et conventions du langage sont accessibles via les PEPs, **Python Enhancement Proposals** (<http://legacy.python.org/dev/peps>)

- PEP 8 : **Style Guide for Python Code** (<https://www.python.org/dev/peps/pep-0008>)
- PEP 20 : **The Zen of Python** (<https://www.python.org/dev/peps/pep-0020>)
- ...

# PYTHON EST UTILISÉ ... (PARTOUT)

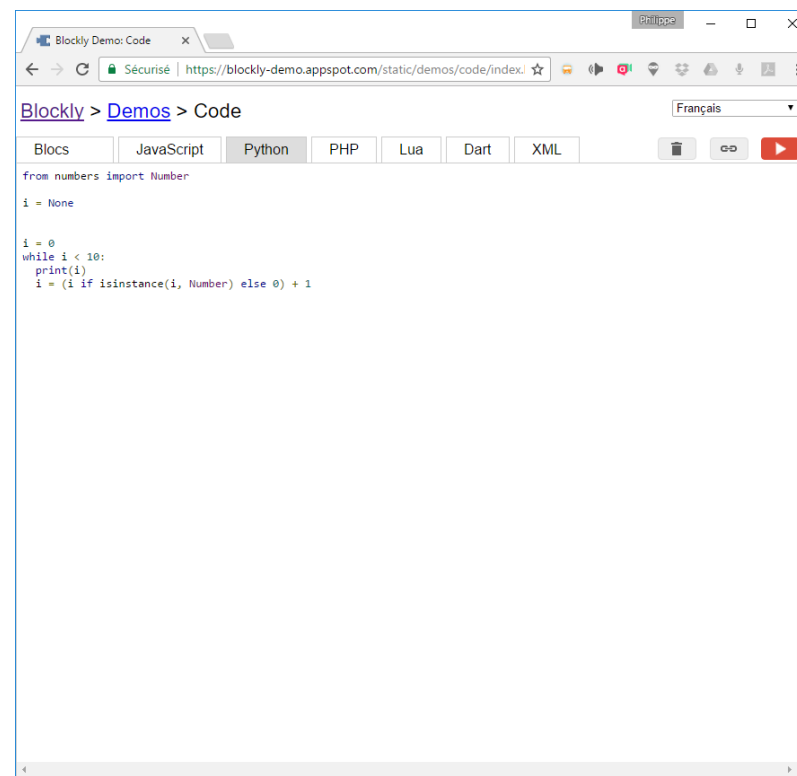
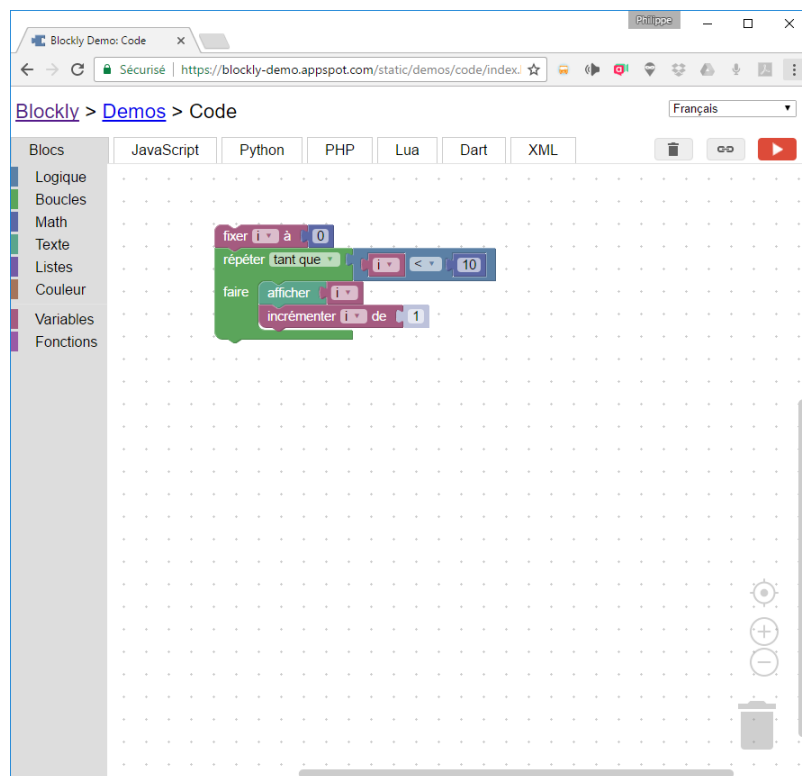
Dans des projets divers comme :

- blender
- SoftBank Robotics (Nao, Pepper, ...)
- micro Python pour micro-contrôleurs
- SciPy.org, (mathématiques et ingénierie)
- Cybersécurité et réseaux (<http://www.secdev.org/projects/scapy> ..., ... )



# PASSER DU ~~SCRATCH~~ (BLOCKLY) AU PYTHON

<https://blockly-demo.appspot.com/static/demos/code/index.html?lang=fr>





# DES SHELLS INTERACTIFS EN LIGNE

<https://www.python.org>

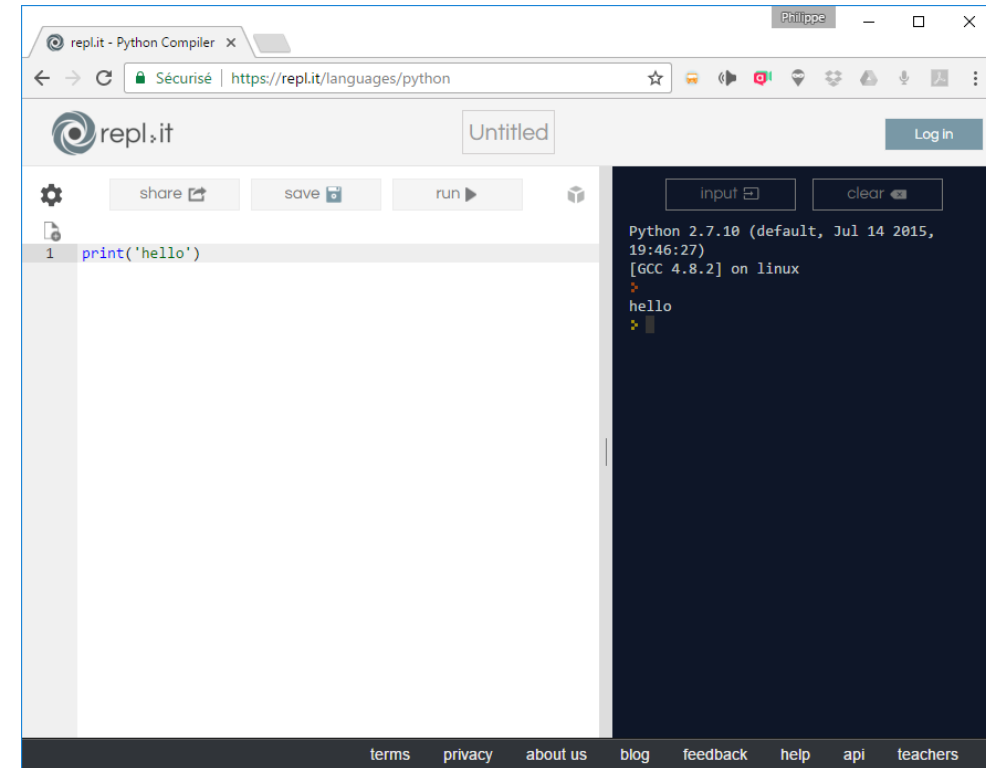
<https://repl.it/languages/python>

<https://repl.it/languages/python3>

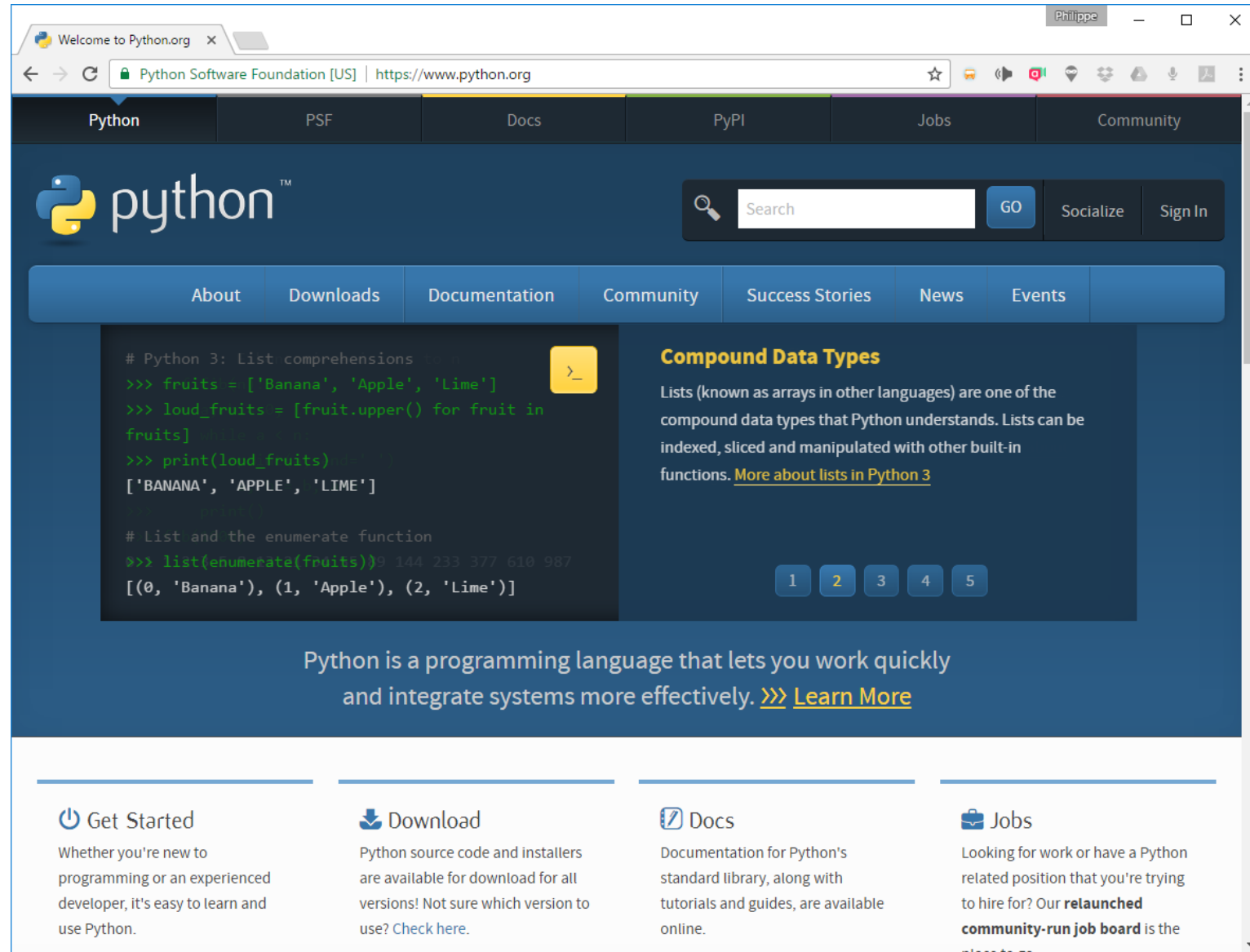
<http://www.pythontutor.com/visualize.html#mode=edit>

<https://www.pythonanywhere.com>

...



# INSTALLER PYTHON



The screenshot shows the Python.org website. The browser address bar displays "Python Software Foundation [US] | https://www.python.org". The navigation menu includes "Python", "PSF", "Docs", "PyPI", "Jobs", and "Community". The main content area features the Python logo, a search bar, and a secondary navigation menu with "About", "Downloads", "Documentation", "Community", "Success Stories", "News", and "Events". A code snippet is displayed in a dark-themed box, showing Python code for list comprehensions and the enumerate function. To the right of the code is a yellow button with a prompt character. Below the code is a section titled "Compound Data Types" with a sub-heading "Lists (known as arrays in other languages) are one of the compound data types that Python understands. Lists can be indexed, sliced and manipulated with other built-in functions. [More about lists in Python 3](#)". Below this text are five numbered buttons (1-5). At the bottom of the main content area, a blue banner reads "Python is a programming language that lets you work quickly and integrate systems more effectively. >>> [Learn More](#)". The footer contains four columns: "Get Started" (with a power icon), "Download" (with a download icon), "Docs" (with a document icon), and "Jobs" (with a briefcase icon). Each column contains a brief description of the respective section.

```
# Python 3: List comprehensions
>>> fruits = ['Banana', 'Apple', 'Lime']
>>> loud_fruits = [fruit.upper() for fruit in
fruits]
>>> print(loud_fruits)
['BANANA', 'APPLE', 'LIME']

# List and the enumerate function
>>> list(enumerate(fruits))
[(0, 'Banana'), (1, 'Apple'), (2, 'Lime')]
```

## Compound Data Types

Lists (known as arrays in other languages) are one of the compound data types that Python understands. Lists can be indexed, sliced and manipulated with other built-in functions. [More about lists in Python 3](#)

1 2 3 4 5

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

### Get Started

Whether you're new to programming or an experienced developer, it's easy to learn and use Python.

### Download

Python source code and installers are available for download for all versions! Not sure which version to use? Check here.

### Docs

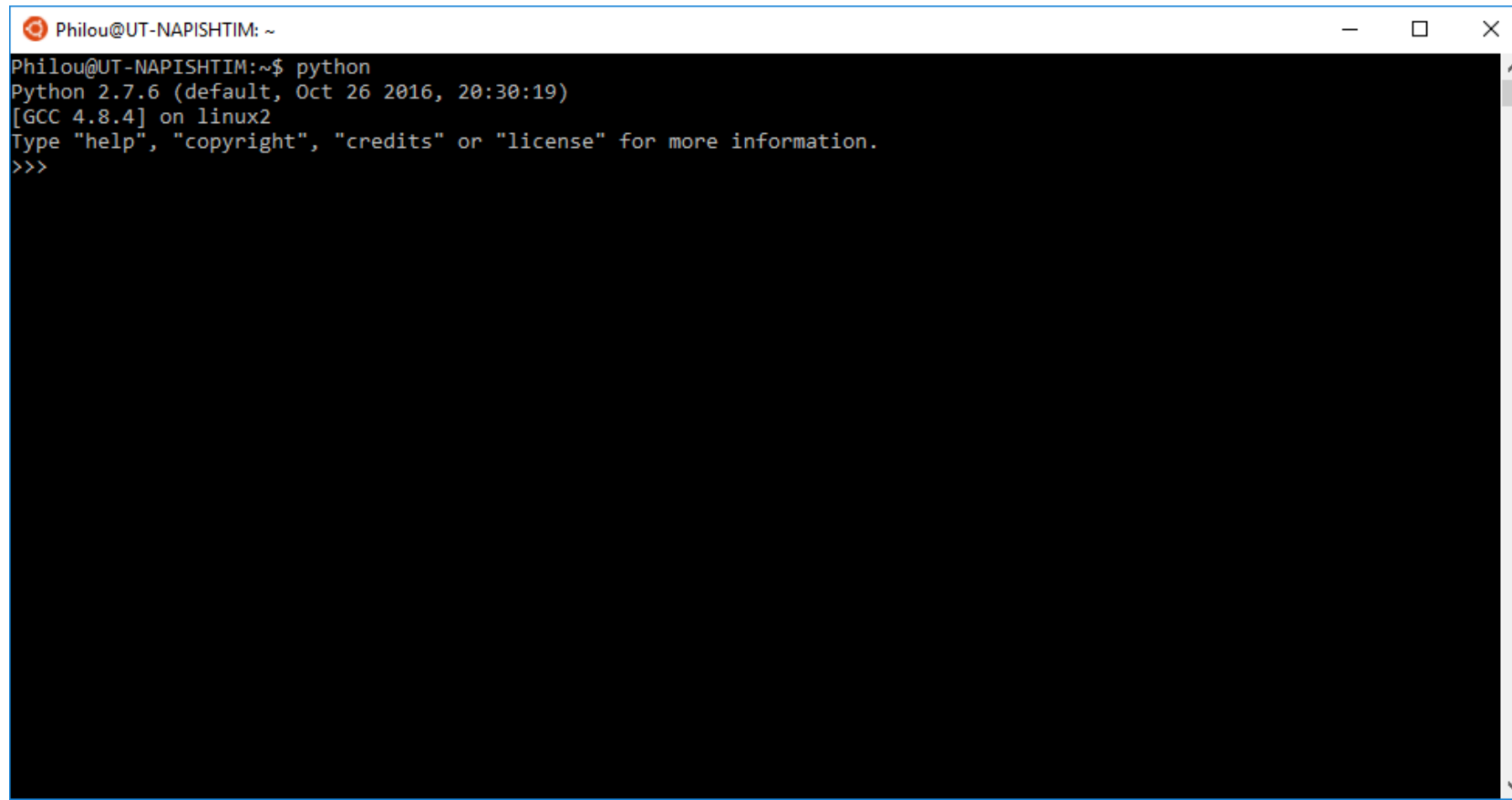
Documentation for Python's standard library, along with tutorials and guides, are available online.

### Jobs

Looking for work or have a Python related position that you're trying to hire for? Our **relaunched community-run job board** is the place to go.

# LANCER PYTHON

Il faut juste taper « **python** » ou « **python3** » (suivant les OS) dans un terminal

A terminal window with a black background and white text. The window title is "Philou@UT-NAPISHTIM: ~". The terminal shows the command "python" being executed, followed by the output: "Python 2.7.6 (default, Oct 26 2016, 20:30:19)", "[GCC 4.8.4] on linux2", and "Type 'help', 'copyright', 'credits' or 'license' for more information.". The prompt ">>>" is visible at the end of the output.

```
Philou@UT-NAPISHTIM: ~  
Philou@UT-NAPISHTIM:~$ python  
Python 2.7.6 (default, Oct 26 2016, 20:30:19)  
[GCC 4.8.4] on linux2  
Type "help", "copyright", "credits" or "license" for more information.  
>>>
```

# EXERCICE 0

Ouvrir un terminal, taper « **python** »

Taper « **import this** » puis « *touche entrée* »

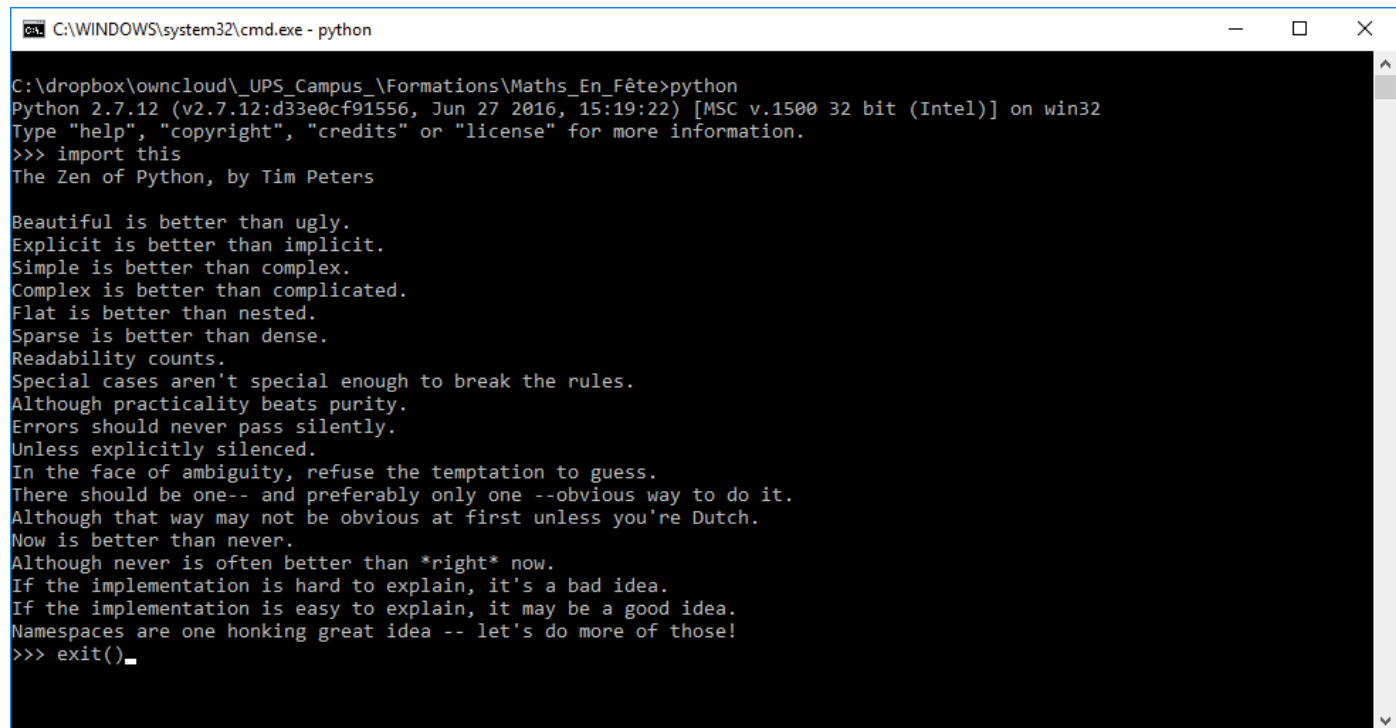
# EXERCICE 0

Ouvrir un terminal, taper « **python** »

Taper « **import this** » puis « *touche entrée* »

Observer « l'easter egg PEP 20 »)

Taper « **exit()** » pour sortir



```
C:\WINDOWS\system32\cmd.exe - python
C:\dropbox\owncloud\_UPS_Campus_Formations\Maths_En_Fête>python
Python 2.7.12 (v2.7.12:d33e0cf91556, Jun 27 2016, 15:19:22) [MSC v.1500 32 bit (Intel)] on win32
Type "help", "copyright", "credits" or "license" for more information.
>>> import this
The Zen of Python, by Tim Peters

Beautiful is better than ugly.
Explicit is better than implicit.
Simple is better than complex.
Complex is better than complicated.
Flat is better than nested.
Sparse is better than dense.
Readability counts.
Special cases aren't special enough to break the rules.
Although practicality beats purity.
Errors should never pass silently.
Unless explicitly silenced.
In the face of ambiguity, refuse the temptation to guess.
There should be one-- and preferably only one --obvious way to do it.
Although that way may not be obvious at first unless you're Dutch.
Now is better than never.
Although never is often better than *right* now.
If the implementation is hard to explain, it's a bad idea.
If the implementation is easy to explain, it may be a good idea.
Namespaces are one honking great idea -- let's do more of those!
>>> exit()
```

# EN RÉALITÉ ...

On utilise un **éditeur de texte** (intégré comme spyder, IDLE, processing.py, ...) ou un éditeur « *basique* » (nano, notepad++, ...)

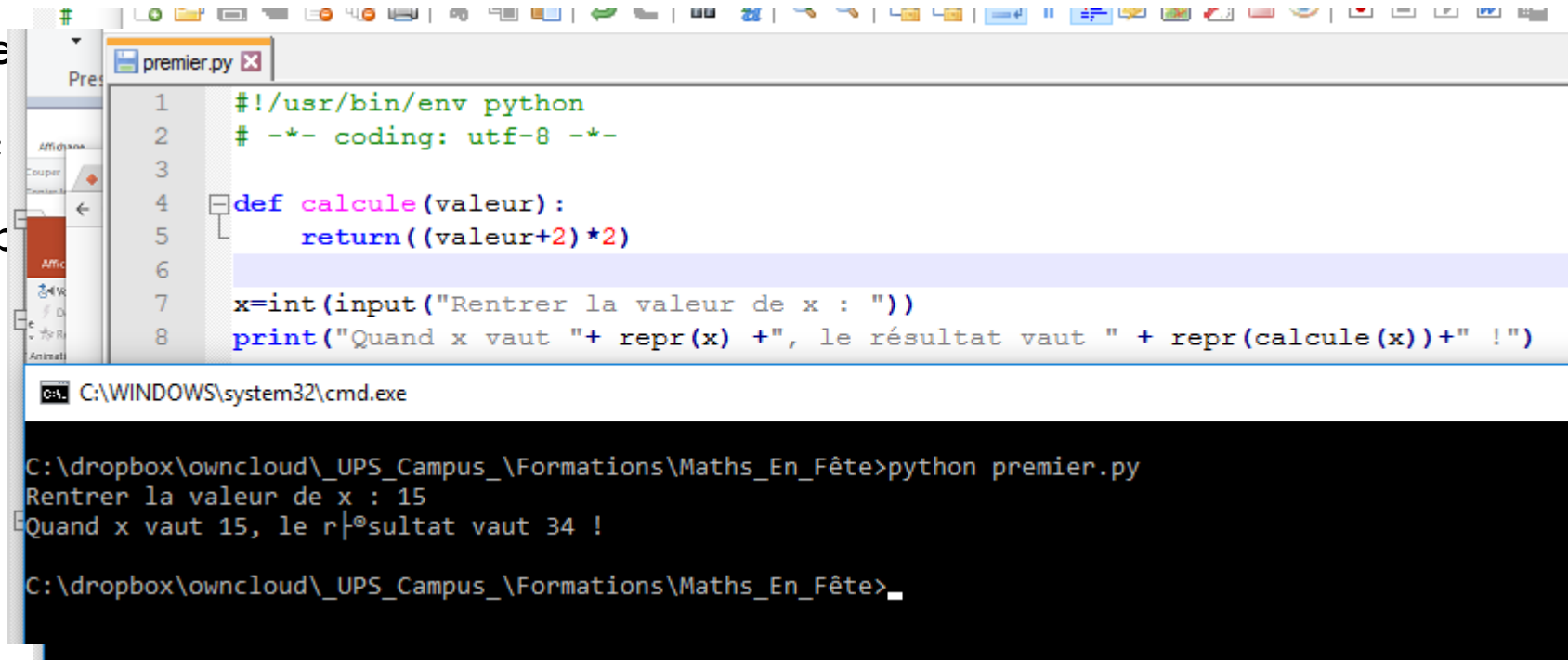
L'extension est **.py** (logique, non ?!)

Et on lance la commande : `python monfichier.py`

# UN PREMIER EXERCICE

On veut simuler un programme comme ceux que l'on rencontre au collège :

- on choisit une
- on ajoute 2 ;
- on multiplie p
- on obtient le



```
#!/usr/bin/env python
# -*- coding: utf-8 -*-

def calcule(valeur):
    return((valeur+2)*2)

x=int(input("Rentrer la valeur de x : "))
print("Quand x vaut "+ repr(x) +", le résultat vaut " + repr(calcule(x))+" !")
```

```
C:\WINDOWS\system32\cmd.exe

C:\dropbox\owncloud\_UPS_Campus_\Formations\Maths_En_Fête>python premier.py
Rentrer la valeur de x : 15
Quand x vaut 15, le résultat vaut 34 !

C:\dropbox\owncloud\_UPS_Campus_\Formations\Maths_En_Fête>
```

# STRUCTURE D'UN PROGRAMME PYTHON

```
C:\dropbox\owncloud\_UPS_Campus_\Formations\Maths_En_Fête\ex1.py - Notepad++
Fichier Édition Recherche Affichage Encodage Langage Paramétrage Outils Macro Exécution Compléments Documents ?
ex1.py
1  #!/usr/bin/env python
2  # -*- coding: utf-8 -*-
3  #
4  # Exercice 1 - encodage / décodage
5  #
6
7  # définir le dictionnaire
8  key = {'a':'n', 'b':'o', 'c':'p', 'd':'q', 'e':'r', 'f':'s', 'g':'t', 'h':'u', 'i':'v', 'j':'w', 'k':'x', 'l':'y', 'm':
9      'z', 'n':'a', 'o':'b', 'p':'c', 'q':'d', 'r':'e', 's':'f', 't':'g', 'u':'h', 'v':'i', 'w':'j', 'x':'k', 'y':'l', 'z':'m', ' ':' '}
10
11 def encode(txt):
12     txt_code = ''
13     # pour chaque lettre de l'alphabet, trouver son correspondant
14     for i in range(len(txt)):
15         txt_code = txt_code + key[txt[i]]
16     # renvoyer le résultat
17     return(txt_code)
18
19 # fonction principale
20 def main():
21     txt = raw_input('texte à encoder : ')
22     txt_coded = encode(txt)
23     print "résultat: " + txt_coded
24
25 # utile pour le futur ;)
26 if __name__ == '__main__':
27     main()
Python file length: 753 lines: 27 Ln: 20 Col: 41 Sel: 0|0
```

Des commentaires

Des structures ...

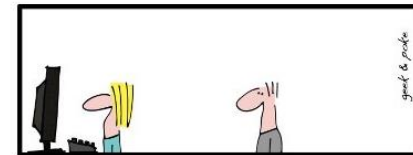
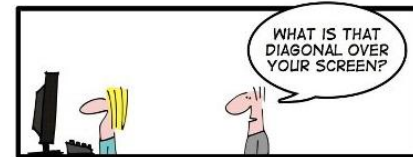
Des fonctions

Des répétitions

Des indentations

Structure de sélection

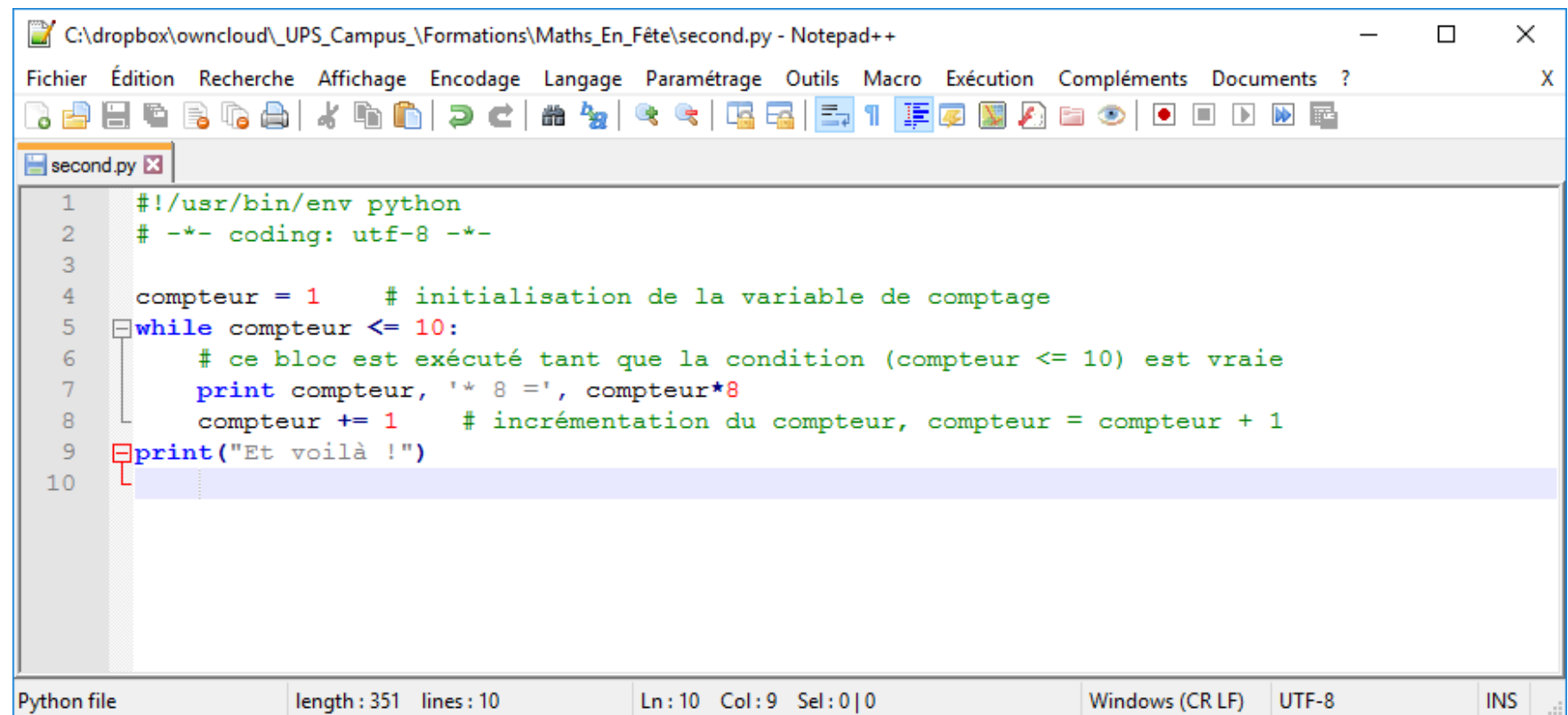
Des particularités





# UN DEUXIÈME EXERCICE

Écrire un programme qui permette d'afficher la table de multiplication de 8



```
C:\dropbox\owncloud\_UPS_Campus_\Formations\Maths_En_Fête\second.py - Notepad++
Fichier  Édition  Recherche  Affichage  Encodage  Langage  Paramétrage  Outils  Macro  Exécution  Compléments  Documents  ?  X
second.py x
1  #!/usr/bin/env python
2  # -*- coding: utf-8 -*-
3
4  compteur = 1    # initialisation de la variable de comptage
5  while compteur <= 10:
6      # ce bloc est exécuté tant que la condition (compteur <= 10) est vraie
7      print compteur, '* 8 =', compteur*8
8      compteur += 1    # incrémentation du compteur, compteur = compteur + 1
9  print("Et voilà !")
10
```

Python file      length : 351    lines : 10      Ln : 10    Col : 9    Sel : 0 | 0      Windows (CR LF)    UTF-8      INS

# ALLER PLUS LOIN ...

Beaucoup de ressources sur le web

- [http://www.info-isn.fr/page\\_python.htm](http://www.info-isn.fr/page_python.htm)
- <http://www.france-ioi.org/algo/chapters.php>

De nombreux aspects du langage sont intéressants à étudier ... et les résultats sont spectaculaires 😊