

# 1\_Introduction

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## 1 Introduction to scientific programming

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```
In [1]: # This gives the last run:  
import time  
print(time.ctime())
```

Tue May 16 14:30:43 2017

### 1.1 Python language

[Python] (<http://www.python.org/>) is a modern object oriented programming language dedicated to general use.

General characteristics of Python:

- **Simple:** Easy to read and easy to learn with a minimalist syntax.
- **Concise and expressive:** less lines of code with less bugs and easier to sustain.

Technical details:

- **Dynamically Typed Language:** No need to define the variable types, the argument types or the function types.
- **Automatic Memory Management:** No need to explicitly allocate or deallocate the memory for variables and arrays. Python automatically manage bugs.
- **Interpreted:** No compilation needed, Python interprets and runs directly line codes.

#### 1.1.1 Advantages

- The main advantage is the easy of programming and flexibility of use that minimize the time needed to develop, debug and maintain the code.
- Language well conceived that push the developer toward the good programming practices:
  - Modular, oriented object, allows the encapsulation and the reuse of the codes. This often results in a more transparent, maintainable and bug-free code.
  - Documentation and command helps well implemented
- Many standard libraries and packages add-on.

### 1.1.2 Disadvantages

- Since Python is a dynamically typed and interpreted programming language, execution of python code can be slow compared to other languages such as C and Fortran. This could be bypassed by generating the app.
- Global contributors make it highly decentralized with many libraries, environments and documentations. This could make it difficult to start.

## 1.2 Installing Python environment

[Anaconda CE](#). Anaconda Community Edition is free.

## 1.3 Documents and websites for Python

- [Python](#) : The official Python website.
- [Python tutorials](#) : The official Python tutorials.
- [Think Python](#) : "How to Think Like a Computer Scientist" by Allen B. Downey (free book).
- [Python Course](#) : This website contains a free and extensive online tutorial by Bernd Klein, well suited for self-learning.

## 1.4 Github lessons

- ["Scientific Python Lectures"](#) by Robert Johansson
- ["Anatomy Of Matplotlib"](#) by Benjamin Root
- ["Python-lectures-Notebooks"](#) by Christophe Morisset

## 1.5 Python version and libraries

```
In [2]: print ("\t\t Current System")
import sys
print ("System :\t\t",sys.platform)
import platform
print (platform.platform())
print ("Computer:\t\t",platform.machine())
print ("Python version:\t",sys.version)
import IPython
print ("IPython version:\t",IPython.__version__)
import numpy
print ("Numpy version:\t",numpy.version.version)
import scipy
print ("Scipy version:\t",scipy.version.version)
import matplotlib
print ("Matplotlib version:\t",matplotlib.__version__)
```

```

                Current System
System :                darwin
Darwin-13.4.0-x86_64-i386-64bit
Computer:                x86_64
Python version:         3.5.1 |Anaconda 4.1.0 (x86_64)| (default, Jun 15 2016, 16:1
```

```
[GCC 4.2.1 Compatible Apple LLVM 4.2 (clang-425.0.28)]
IPython version:      4.2.0
Numpy version:       1.11.0
Scipy version:       0.17.1
Matplotlib version:  1.5.1
```

```
In [ ]:
```