Useful_libraries

November 25, 2015

```
In [1]: # Just to know last time this was run:
        import time
        print time.ctime()

Mon Sep 21 16:28:14 2015

In [13]: import numpy as np
```

1   F Some useful libraries that make life easier

This is part of the Python lecture given by Christophe Morisset at IA-UNAM. More informations at:
http://python-astro.blogspot.mx/

This lecture will give some insights to the most useful python libraries. It is NOT exhaustive, you
have to read the corresponding manual pages to find the best use you can have of them. The list of all
python-included libraries is here: https://docs.python.org/2/library/

1.0.1   time, datetime and timeit

- https://docs.python.org/2/library/time.html
- https://docs.python.org/2/library/datetime.html

```
In [2]: import time
        import datetime

In [3]: print time.ctime() # current time, in a string format

Mon Sep 21 16:29:25 2015

In [4]: lt = time.localtime()
        print lt

time.struct_time(tm_year=2015, tm_mon=9, tm_mday=21, tm_hour=16, tm_min=29, tm_sec=34, tm_wday=0, tm_yday=

In [6]: time.strftime("%a, %d %b %Y %H:%M:%S",lt)

Out[6]: 'Mon, 21 Sep 2015 16:29:34'

In [7]: print datetime.datetime.today()

2015-09-21 16:31:40.917883

In [8]: today = datetime.date.today()
        philae_landing = datetime.date(2014, 11, 11)

In [9]: time_to_landing = philae_landing - today
```

```
In [11]: if philae_landing > today:
             print('Philae landing in {} days.'.format(time_to_landing.days))
         else:
             print('Philae landed since {} days.'.format(-time_to_landing.days))
```

Philae landed since 314 days.

```
In [14]: start = time.time()
         for i in np.arange(1000):
             t = np.math.factorial(i)
         end = time.time()
         print('1000 factorials done in {0:.3f} secs.'.format(end-start))
```

1000 factorials done in 0.280 secs.

```
In [15]: from timeit import Timer
         command = """\
         for i in np.arange(1000):
             t = np.math.factorial(i)
         """
         t = Timer(command, setup='import numpy as np')
         print t.timeit(number=1)
```

0.285327196121

in ipython, one can use the magic timeit function:

```
In [16]: %timeit np.math.factorial(50)
```

100000 loops, best of 3: 7 μs per loop

or for the whole cell:

```
In [17]: %%timeit
         for i in np.arange(1000):
             t = np.math.factorial(i)
```

1 loops, best of 3: 284 ms per loop

1.0.2   os

https://docs.python.org/2/library/os.html This module provides a portable way of using operating system dependent functionality. If you just want to read or write a file see open(), if you want to manipulate paths, see the os.path module, and if you want to read all the lines in all the files on the command line see the fileinput module. For creating temporary files and directories see the tempfile module, and for high-level file and directory handling see the shutil module.

```
In [18]: import os
```

```
In [16]: # os.environ is a dictionnary containing the environment variables and values
         print os.environ['HOME']
```

/Users/christophemorisset

```
In [19]: # if variable doesn't exists, getenv returns None
         print os.getenv('HOME2')
```

None

```
In [20]: # get current working directory
         cwd = os.getcwd()
         print cwd
```

/Users/christophemorisset/Google Drive/Pro/Python-MySQL/Notebooks

```
In [21]: new_dir = '/tmp/test3456'
         if not os.path.exists(new_dir):
             os.mkdir(new_dir)
             print('Dir {} created'.format(new_dir))
         else:
             print('Dir {} exists'.format(new_dir))
```

Dir /tmp/test3456 exists

```
In [24]: # list all the files from a directory
         os.listdir(new_dir)
```

```
Out[24]: []
```

```
In [25]: os.chdir(cwd)
         os.getcwd()
```

```
Out[25]: '/Users/christophemorisset/Google Drive/Pro/Python-MySQL/Notebooks'
```

```
In [27]: # Renaming files in a directory
         cwd = os.getcwd()
         os.chdir(new_dir)
         for filename in os.listdir('./'):
             print filename
             base_file, ext = os.path.splitext(filename)
             #print base_file, ext
             if ext == '.exe':
                 newname = base_file + '.txt'
                 os.rename(filename, newname)
                 print('file {0} renamed to {1}'.format(filename, newname))
         os.chdir(cwd)
```

```
pro1.exe
file pro1.exe renamed to pro1.txt
pro2.exe
file pro2.exe renamed to pro2.txt
pro2.tralala
pro3.txt
```

1.0.3 sys

https://docs.python.org/2/library/sys.html This module provides access to some variables used or maintained by the interpreter and to functions that interact strongly with the interpreter. It is always available.

The sys.argv list contains the arguments passed to the script, when the interpreter was started. The first item contains the name of the script itself.

```
In [28]: %%writefile sys_text.py
         import sys
         for arg in sys.argv:
             print arg
```

```
Overwriting sys_text.py

In [29]: ! python sys_text.py tralala

sys_text.py
tralala

In [30]: %%writefile fact.py
         import sys
         import numpy
         print numpy.math.factorial(int(sys.argv[1]))

Overwriting fact.py

In [31]: ! python fact.py 6

720
```

A more complete managment of the argument (especially those like –v) is available using the argparse library. https://docs.python.org/2/library/argparse.html

1.0.4   Talking to the OS subprocess

The os.popen method is deprecated, subprocess is prefered. A good tutorial is here: http://pymotw.com/2/subprocess/

```
In [32]: import subprocess

In [33]: ls -l

total 53120
-rw-------   1 christophemorisset  staff     89353 Oct  1  2014 0040000_6.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     85600 Oct  1  2014 0050000_6.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff    339687 Sep 30  2014 0050000_7.00_33_50_02_15.bin_0.1
-rw-------   1 christophemorisset  staff     86018 Oct  1  2014 0050000_7.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     86018 Sep 30  2014 0050000_7.00_33_50_02_15.bin_0.2.gz
-rw-------   1 christophemorisset  staff     86741 Oct  1  2014 0060000_6.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     88843 Oct  1  2014 0070000_6.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     89360 Oct  1  2014 0080000_6.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     89971 Oct  1  2014 0090000_6.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     89722 Oct  1  2014 0100000_5.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     90544 Oct  1  2014 0100000_6.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     91192 Oct  1  2014 0100000_7.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     91475 Oct  1  2014 0100000_8.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     90430 Oct  1  2014 0110000_6.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     90960 Oct  1  2014 0110000_7.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     89525 Oct  1  2014 0120000_6.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     89899 Oct  1  2014 0130000_6.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     89170 Oct  1  2014 0140000_6.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     89263 Oct  1  2014 0150000_6.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     88929 Oct  1  2014 0160000_6.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     88991 Oct  1  2014 0170000_6.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     88780 Oct  1  2014 0180000_6.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     89075 Oct  1  2014 0180000_7.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff     88591 Oct  1  2014 0190000_6.00_33_50_02_15.bin_0.1.gz
-rw-------   1 christophemorisset  staff    466800 Sep 18 17:54 BPT1.pdf
-rw-------   1 christophemorisset  staff     45181 Sep 18 17:54 BPT1.png
```

```
-rw-------    1 christophemorisset   staff   4229587 Sep  9 16:50 CALIFA_ah7.dat.gz
-rw-------    1 christophemorisset   staff     19199 Oct  9  2014 Calling Fortran.ipynb
-rw-------    1 christophemorisset   staff       384 Sep  7 16:45 Demo.pickle
-rw-------    1 christophemorisset   staff   2224036 Sep  7 16:48 Demo2.pickle
-rw-------    1 christophemorisset   staff      7717 Sep  9 17:53 Ex1.ipynb
-rw-------    1 christophemorisset   staff    381664 Sep 18 17:58 Ex1_done.ipynb
-rw-------    1 christophemorisset   staff    315341 Sep 14 10:20 Ex1_with_res.ipynb
-rw-------    1 christophemorisset   staff    383903 Sep  7 19:06 Fig1.pdf
-rw-r--r--@   1 christophemorisset   staff         0 Mar 28 15:35 Icon?
-rw-------    1 christophemorisset   staff    172213 Sep 14 13:13 Interact with files.ipynb
-rw-------    1 christophemorisset   staff    688464 Oct  2  2014 OOP.ipynb
-rw-------    1 christophemorisset   staff    295013 Oct  9  2014 Optimization.ipynb
-rw-------    1 christophemorisset   staff     57604 Sep 21 17:07 Useful_libraries.ipynb
-rw-------    1 christophemorisset   staff    185469 Nov 13  2014 Using_PyMySQL.ipynb
-rw-------    1 christophemorisset   staff    208832 Sep 25  2014 Using_astropy.ipynb
-rw-------    1 christophemorisset   staff       136 Sep  9 16:08 data1.dat
-rw-------    1 christophemorisset   staff        14 Sep  7 16:35 data10.dat
-rw-------    1 christophemorisset   staff        32 Sep  7 16:39 data11.dat
-rw-------    1 christophemorisset   staff        88 Sep  7 16:42 data12.dat
-rw-------    1 christophemorisset   staff       147 Aug 31 18:25 data2.dat
-rw-------    1 christophemorisset   staff       166 Aug 31 18:58 data3.dat
-rw-------    1 christophemorisset   staff      1189 Aug 31 19:02 data4.dat
-rw-------    1 christophemorisset   staff      1185 Aug 31 19:06 data5.dat
-rw-------    1 christophemorisset   staff       136 Sep 14 10:16 data_ex1.dat
-rw-------    1 christophemorisset   staff       298 Oct  8  2014 dcumsum.f
-rw-------    1 christophemorisset   staff     33408 Oct  8  2014 dcumsum.so
-rw-------    1 christophemorisset   staff      1358 Aug 24 16:59 ex1.html
-rw-------    1 christophemorisset   staff       154 Aug 24 16:46 ex1.py
-rw-------    1 christophemorisset   staff       284 Aug 24 16:48 ex1.pyc
-rw-------    1 christophemorisset   staff         8 Sep 18  2014 ex1.txt
-rw-------    1 christophemorisset   staff        68 Sep 21 17:07 fact.py
-rw-------    1 christophemorisset   staff        49 Oct  8  2014 hello.py
-rw-------    1 christophemorisset   staff      1090 Oct  8  2014 hellofortran.c
-rw-------    1 christophemorisset   staff       178 Oct  8  2014 hellofortran.f
-rw-------    1 christophemorisset   staff     33976 Oct  8  2014 hellofortran.so
-rw-------    1 christophemorisset   staff   1981544 Sep 14 16:51 intro_Matplotlib.ipynb
-rw-------    1 christophemorisset   staff     15200 Aug 28  2014 intro_Python.aux
-rw-------    1 christophemorisset   staff    326924 Aug 28  2014 intro_Python.html
-rw-------    1 christophemorisset   staff         0 Aug 28  2014 intro_Python.idx
-rw-------    1 christophemorisset   staff    117765 Aug 28  2014 intro_Python.log
-rw-------    1 christophemorisset   staff      1818 Aug 28  2014 intro_Python.out
-rw-------    1 christophemorisset   staff    142753 Aug 28  2014 intro_Python.pdf
-rw-------    1 christophemorisset   staff    178049 Aug 28  2014 intro_Python.tex
-rw-------    1 christophemorisset   staff      2047 Aug 28  2014 intro_Python.toc
-rw-------    1 christophemorisset   staff    179449 Aug 28  2014 intro_Python_2.pdf
-rw-------    1 christophemorisset   staff    103229 Aug 28  2014 intro_Python_3.pdf
drwxr-xr-x  116 christophemorisset   staff      3944 Mar 28 18:46 intro_Python_files/
-rw-------    1 christophemorisset   staff    692283 Sep 15 10:00 intro_Scipy.ipynb
-rw-------    1 christophemorisset   staff     97895 Sep 14 13:09 intro_numpy.ipynb
-rw-------    1 christophemorisset   staff   8830080 Sep  3  2014 n10017o.fits
-rw-------    1 christophemorisset   staff      5760 Sep  7 17:09 new.fits
-rw-------    1 christophemorisset   staff    435801 Nov 11  2014 query_res.dat
-rw-------    1 christophemorisset   staff   1059840 Sep  3  2014 swp04345.mxhi
-rw-------    1 christophemorisset   staff        45 Sep 21 17:05 sys_text.py
```

```
-rw-------    1 christophemorisset   staff       352 Sep 25   2014 tab1.dat
-rw-------    1 christophemorisset   staff       763 Sep 25   2014 tab_cds1.ascii
-rw-------    1 christophemorisset   staff     43200 Sep 25   2014 tab_cds1.fits
-rw-------    1 christophemorisset   staff      1265 Sep 25   2014 tab_cds1.tex
-rw-------    1 christophemorisset   staff      1826 Sep 25   2014 tab_cds2.ascii
-rw-------    1 christophemorisset   staff    176673 Oct 16   2014 test_1-po
-rw-------    1 christophemorisset   staff    176673 Oct  8   2014 test_1-prof.png
-rw-------    1 christophemorisset   staff    237787 Oct  8   2014 test_1_prof.prof
-rw-------    1 christophemorisset   staff      6804 Oct  8   2014 test_1_prof.py
-rw-------    1 christophemorisset   staff      6824 Oct  8   2014 test_2_prof.py
-rw-------    1 christophemorisset   staff       374 Oct  8   2014 test_2_prof.py.lprof
-rw-------    1 christophemorisset   staff      6566 Oct  8   2014 test_3_prof.py
-rw-------    1 christophemorisset   staff      6469 Oct  8   2014 test_5_pdb.py
```

```python
In [34]: subprocess.call(['ls -l'], shell=True)
         # The results is not visible in Notebook. In command line, the files are listed
```

Out[34]: 0

```python
In [38]: output = subprocess.check_output(['ls', '-l'])
         print output
         print type(output)
```

```
total 53120
-rw-------    1 christophemorisset   staff     89353 Oct  1   2014 0040000_6.00_33_50_02_15.bin_0.1.gz
-rw-------    1 christophemorisset   staff     85600 Oct  1   2014 0050000_6.00_33_50_02_15.bin_0.1.gz
-rw-------    1 christophemorisset   staff    339687 Sep 30   2014 0050000_7.00_33_50_02_15.bin_0.1
-rw-------    1 christophemorisset   staff     86018 Oct  1   2014 0050000_7.00_33_50_02_15.bin_0.1.gz
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```

```
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-rw-------    1 christophemorisset   staff    208832 Sep 25  2014 Using_astropy.ipynb
-rw-------    1 christophemorisset   staff       136 Sep  9 16:08 data1.dat
-rw-------    1 christophemorisset   staff        14 Sep  7 16:35 data10.dat
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-rw-------    1 christophemorisset   staff       147 Aug 31 18:25 data2.dat
-rw-------    1 christophemorisset   staff       166 Aug 31 18:58 data3.dat
-rw-------    1 christophemorisset   staff      1189 Aug 31 19:02 data4.dat
-rw-------    1 christophemorisset   staff      1185 Aug 31 19:06 data5.dat
-rw-------    1 christophemorisset   staff       136 Sep 14 10:16 data_ex1.dat
-rw-------    1 christophemorisset   staff       298 Oct  8  2014 dcumsum.f
-rw-------    1 christophemorisset   staff     33408 Oct  8  2014 dcumsum.so
-rw-------    1 christophemorisset   staff      1358 Aug 24 16:59 ex1.html
-rw-------    1 christophemorisset   staff       154 Aug 24 16:46 ex1.py
-rw-------    1 christophemorisset   staff       284 Aug 24 16:48 ex1.pyc
-rw-------    1 christophemorisset   staff         8 Sep 18  2014 ex1.txt
-rw-------    1 christophemorisset   staff        68 Sep 21 17:07 fact.py
-rw-------    1 christophemorisset   staff        49 Oct  8  2014 hello.py
-rw-------    1 christophemorisset   staff      1090 Oct  8  2014 hellofortran.c
-rw-------    1 christophemorisset   staff       178 Oct  8  2014 hellofortran.f
-rw-------    1 christophemorisset   staff     33976 Oct  8  2014 hellofortran.so
-rw-------    1 christophemorisset   staff   1981544 Sep 14 16:51 intro_Matplotlib.ipynb
-rw-------    1 christophemorisset   staff     15200 Aug 28  2014 intro_Python.aux
-rw-------    1 christophemorisset   staff    326924 Aug 28  2014 intro_Python.html
-rw-------    1 christophemorisset   staff         0 Aug 28  2014 intro_Python.idx
-rw-------    1 christophemorisset   staff    117765 Aug 28  2014 intro_Python.log
-rw-------    1 christophemorisset   staff      1818 Aug 28  2014 intro_Python.out
-rw-------    1 christophemorisset   staff    142753 Aug 28  2014 intro_Python.pdf
-rw-------    1 christophemorisset   staff    178049 Aug 28  2014 intro_Python.tex
-rw-------    1 christophemorisset   staff      2047 Aug 28  2014 intro_Python.toc
-rw-------    1 christophemorisset   staff    179449 Aug 28  2014 intro_Python_2.pdf
-rw-------    1 christophemorisset   staff    103229 Aug 28  2014 intro_Python_3.pdf
drwxr-xr-x  116 christophemorisset   staff      3944 Mar 28 18:46 intro_Python_files
-rw-------    1 christophemorisset   staff    692283 Sep 15 10:00 intro_Scipy.ipynb
-rw-------    1 christophemorisset   staff     97895 Sep 14 13:09 intro_numpy.ipynb
-rw-------    1 christophemorisset   staff   8830080 Sep  3  2014 n10017o.fits
-rw-------    1 christophemorisset   staff      5760 Sep  7 17:09 new.fits
-rw-------    1 christophemorisset   staff    435801 Nov 11  2014 query_res.dat
-rw-------    1 christophemorisset   staff   1059840 Sep  3  2014 swp04345.mxhi
-rw-------    1 christophemorisset   staff        45 Sep 21 17:05 sys_text.py
-rw-------    1 christophemorisset   staff       352 Sep 25  2014 tab1.dat
-rw-------    1 christophemorisset   staff       763 Sep 25  2014 tab_cds1.ascii
-rw-------    1 christophemorisset   staff     43200 Sep 25  2014 tab_cds1.fits
-rw-------    1 christophemorisset   staff      1265 Sep 25  2014 tab_cds1.tex
-rw-------    1 christophemorisset   staff      1826 Sep 25  2014 tab_cds2.ascii
```

```
-rw-------     1 christophemorisset   staff     176673 Oct 16   2014 test_1-po
-rw-------     1 christophemorisset   staff     176673 Oct  8   2014 test_1-prof.png
-rw-------     1 christophemorisset   staff     237787 Oct  8   2014 test_1_prof.prof
-rw-------     1 christophemorisset   staff       6804 Oct  8   2014 test_1_prof.py
-rw-------     1 christophemorisset   staff       6824 Oct  8   2014 test_2_prof.py
-rw-------     1 christophemorisset   staff        374 Oct  8   2014 test_2_prof.py.lprof
-rw-------     1 christophemorisset   staff       6566 Oct  8   2014 test_3_prof.py
-rw-------     1 christophemorisset   staff       6469 Oct  8   2014 test_5_pdb.py


<type 'str'>
```

In [36]: command = 'ls -l'
         popen = subprocess.Popen(command, shell=True)
         # The same apply here, no output in Notebook
         print popen

```
<subprocess.Popen object at 0x10411e990>
```

In [39]: popen = subprocess.Popen(command, stdout=subprocess.PIPE, shell=True)
         res = popen.communicate()[0]
         print res
         print type(res)

```
total 53120
-rw-------     1 christophemorisset   staff      89353 Oct  1   2014 0040000_6.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      85600 Oct  1   2014 0050000_6.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff     339687 Sep 30   2014 0050000_7.00_33_50_02_15.bin_0.1
-rw-------     1 christophemorisset   staff      86018 Oct  1   2014 0050000_7.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      86018 Sep 30   2014 0050000_7.00_33_50_02_15.bin_0.2.gz
-rw-------     1 christophemorisset   staff      86741 Oct  1   2014 0060000_6.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      88843 Oct  1   2014 0070000_6.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      89360 Oct  1   2014 0080000_6.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      89971 Oct  1   2014 0090000_6.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      89722 Oct  1   2014 0100000_5.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      90544 Oct  1   2014 0100000_6.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      91192 Oct  1   2014 0100000_7.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      91475 Oct  1   2014 0100000_8.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      90430 Oct  1   2014 0110000_6.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      90960 Oct  1   2014 0110000_7.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      89525 Oct  1   2014 0120000_6.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      89899 Oct  1   2014 0130000_6.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      89170 Oct  1   2014 0140000_6.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      89263 Oct  1   2014 0150000_6.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      88929 Oct  1   2014 0160000_6.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      88991 Oct  1   2014 0170000_6.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      88780 Oct  1   2014 0180000_6.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      89075 Oct  1   2014 0180000_7.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff      88591 Oct  1   2014 0190000_6.00_33_50_02_15.bin_0.1.gz
-rw-------     1 christophemorisset   staff     466800 Sep 18 17:54 BPT1.pdf
-rw-------     1 christophemorisset   staff      45181 Sep 18 17:54 BPT1.png
-rw-------     1 christophemorisset   staff    4229587 Sep  9 16:50 CALIFA_ah7.dat.gz
-rw-------     1 christophemorisset   staff      19199 Oct  9   2014 Calling Fortran.ipynb
-rw-------     1 christophemorisset   staff        384 Sep  7 16:45 Demo.pickle
-rw-------     1 christophemorisset   staff    2224036 Sep  7 16:48 Demo2.pickle
-rw-------     1 christophemorisset   staff       7717 Sep  9 17:53 Ex1.ipynb
```

```
-rw-------    1 christophemorisset   staff     381664 Sep 18 17:58 Ex1_done.ipynb
-rw-------    1 christophemorisset   staff     315341 Sep 14 10:20 Ex1_with_res.ipynb
-rw-------    1 christophemorisset   staff     383903 Sep  7 19:06 Fig1.pdf
-rw-r--r--@   1 christophemorisset   staff          0 Mar 28 15:35 Icon
-rw-------    1 christophemorisset   staff     172213 Sep 14 13:13 Interact with files.ipynb
-rw-------    1 christophemorisset   staff     688464 Oct  2  2014 OOP.ipynb
-rw-------    1 christophemorisset   staff     295013 Oct  9  2014 Optimization.ipynb
-rw-------    1 christophemorisset   staff      57809 Sep 21 17:13 Useful_libraries.ipynb
-rw-------    1 christophemorisset   staff     185469 Nov 13  2014 Using_PyMySQL.ipynb
-rw-------    1 christophemorisset   staff     208832 Sep 25  2014 Using_astropy.ipynb
-rw-------    1 christophemorisset   staff        136 Sep  9 16:08 data1.dat
-rw-------    1 christophemorisset   staff         14 Sep  7 16:35 data10.dat
-rw-------    1 christophemorisset   staff         32 Sep  7 16:39 data11.dat
-rw-------    1 christophemorisset   staff         88 Sep  7 16:42 data12.dat
-rw-------    1 christophemorisset   staff        147 Aug 31 18:25 data2.dat
-rw-------    1 christophemorisset   staff        166 Aug 31 18:58 data3.dat
-rw-------    1 christophemorisset   staff       1189 Aug 31 19:02 data4.dat
-rw-------    1 christophemorisset   staff       1185 Aug 31 19:06 data5.dat
-rw-------    1 christophemorisset   staff        136 Sep 14 10:16 data_ex1.dat
-rw-------    1 christophemorisset   staff        298 Oct  8  2014 dcumsum.f
-rw-------    1 christophemorisset   staff      33408 Oct  8  2014 dcumsum.so
-rw-------    1 christophemorisset   staff       1358 Aug 24 16:59 ex1.html
-rw-------    1 christophemorisset   staff        154 Aug 24 16:46 ex1.py
-rw-------    1 christophemorisset   staff        284 Aug 24 16:48 ex1.pyc
-rw-------    1 christophemorisset   staff          8 Sep 18  2014 ex1.txt
-rw-------    1 christophemorisset   staff         68 Sep 21 17:07 fact.py
-rw-------    1 christophemorisset   staff         49 Oct  8  2014 hello.py
-rw-------    1 christophemorisset   staff       1090 Oct  8  2014 hellofortran.c
-rw-------    1 christophemorisset   staff        178 Oct  8  2014 hellofortran.f
-rw-------    1 christophemorisset   staff      33976 Oct  8  2014 hellofortran.so
-rw-------    1 christophemorisset   staff    1981544 Sep 14 16:51 intro_Matplotlib.ipynb
-rw-------    1 christophemorisset   staff      15200 Aug 28  2014 intro_Python.aux
-rw-------    1 christophemorisset   staff     326924 Aug 28  2014 intro_Python.html
-rw-------    1 christophemorisset   staff          0 Aug 28  2014 intro_Python.idx
-rw-------    1 christophemorisset   staff     117765 Aug 28  2014 intro_Python.log
-rw-------    1 christophemorisset   staff       1818 Aug 28  2014 intro_Python.out
-rw-------    1 christophemorisset   staff     142753 Aug 28  2014 intro_Python.pdf
-rw-------    1 christophemorisset   staff     178049 Aug 28  2014 intro_Python.tex
-rw-------    1 christophemorisset   staff       2047 Aug 28  2014 intro_Python.toc
-rw-------    1 christophemorisset   staff     179449 Aug 28  2014 intro_Python_2.pdf
-rw-------    1 christophemorisset   staff     103229 Aug 28  2014 intro_Python_3.pdf
drwxr-xr-x  116 christophemorisset   staff       3944 Mar 28 18:46 intro_Python_files
-rw-------    1 christophemorisset   staff     692283 Sep 15 10:00 intro_Scipy.ipynb
-rw-------    1 christophemorisset   staff      97895 Sep 14 13:09 intro_numpy.ipynb
-rw-------    1 christophemorisset   staff    8830080 Sep  3  2014 n10017o.fits
-rw-------    1 christophemorisset   staff       5760 Sep  7 17:09 new.fits
-rw-------    1 christophemorisset   staff     435801 Nov 11  2014 query_res.dat
-rw-------    1 christophemorisset   staff    1059840 Sep  3  2014 swp04345.mxhi
-rw-------    1 christophemorisset   staff         45 Sep 21 17:05 sys_text.py
-rw-------    1 christophemorisset   staff        352 Sep 25  2014 tab1.dat
-rw-------    1 christophemorisset   staff        763 Sep 25  2014 tab_cds1.ascii
-rw-------    1 christophemorisset   staff      43200 Sep 25  2014 tab_cds1.fits
-rw-------    1 christophemorisset   staff       1265 Sep 25  2014 tab_cds1.tex
-rw-------    1 christophemorisset   staff       1826 Sep 25  2014 tab_cds2.ascii
```

```
-rw-------     1 christophemorisset  staff    176673 Oct 16  2014 test_1-po
-rw-------     1 christophemorisset  staff    176673 Oct  8  2014 test_1-prof.png
-rw-------     1 christophemorisset  staff    237787 Oct  8  2014 test_1_prof.prof
-rw-------     1 christophemorisset  staff      6804 Oct  8  2014 test_1_prof.py
-rw-------     1 christophemorisset  staff      6824 Oct  8  2014 test_2_prof.py
-rw-------     1 christophemorisset  staff       374 Oct  8  2014 test_2_prof.py.lprof
-rw-------     1 christophemorisset  staff      6566 Oct  8  2014 test_3_prof.py
-rw-------     1 christophemorisset  staff      6469 Oct  8  2014 test_5_pdb.py
```

```
<type 'str'>
```

```
In [41]: popen = subprocess.Popen(command, stdout=subprocess.PIPE, shell=True)
         for line in iter(popen.stdout.readline, ""):
             lspl = line.split()
             if len(lspl)> 4:
                 if int(lspl[4]) > 100000:
                     print lspl[8]
```

```
0050000_7.00_33_50_02_15.bin_0.1
BPT1.pdf
CALIFA_ah7.dat.gz
Demo2.pickle
Ex1_done.ipynb
Ex1_with_res.ipynb
Fig1.pdf
Interact
OOP.ipynb
Optimization.ipynb
Using_PyMySQL.ipynb
Using_astropy.ipynb
intro_Matplotlib.ipynb
intro_Python.html
intro_Python.log
intro_Python.pdf
intro_Python.tex
intro_Python_2.pdf
intro_Python_3.pdf
intro_Scipy.ipynb
n10017o.fits
query_res.dat
swp04345.mxhi
test_1-po
test_1-prof.png
test_1_prof.prof
```

1.0.5   glob

https://docs.python.org/2/library/glob.html

No tilde expansion is done, but *, ?, and character ranges expressed with [] will be correctly matched.

```
In [43]: import glob
```

```
In [44]: ipynb_files = glob.glob('*.ipynb')
         print ipynb_files
```

```
['Calling Fortran.ipynb', 'Ex1.ipynb', 'Ex1_done.ipynb', 'Ex1_with_res.ipynb', 'Interact with files.ipyn
```

1.0.6 re

The re module provides regular expression tools for advanced string processing. For complex matching and manipulation, regular expressions offer succinct, optimized solutions:

```
In [48]: import re
         re.findall(r'\bf[a-z]*', 'whifch foot or hand fell fastest')

Out[48]: ['foot', 'fell', 'fastest']

In [37]: re.sub(r'(\b[a-z]+) \1', r'\1', 'cat in the the hat')

Out[37]: 'cat in the hat'
```

More in https://docs.python.org/2/library/re.html

1.0.7 urllib2

```
In [49]: import urllib2

In [58]: for line in urllib2.urlopen('http://dev.on-rev.com/myip.irev'):
             if 'IP' in line:
                 IP = line.split(':')[1][:-5]
         print IP

132.248.1.15
```