Introduction in Python — Part 3

Advanced Technics (Lambda, Filter & List Comprehension)

Exercise 1 (Sorting Points) Write a script which creates a list containing 100 random `Point` objects using your *Point module*. Print all Points sorted by their norm.

Try to use the function **sorted**() and the *Lambda* function if possible!

Exercise 2 (Sieve of Eratosthenes) The *Sieve of Eratosthenes* is an algorithm to find all prime numbers in the range from 2 to a given number n. Starting with the lowest number (2, prime) all multiples of it will be marked (deleted). In the next step the multiples of the next smallest number (3, prime) will be also marked (deleted), and so on.

Write a program, which will ask for a number (n) and will return all primes from 2 to n.

```
Get the prime numbers from 2 to N, N=20
[2, 3, 5, 7, 11, 13, 17, 19]
```

Tools

Exercise 3 (IPython) Try out some features of *IPython*

- What is your working directory (shell command: `pwd`)?
- Import your *Factorial* script (exercise 7 in part 1).
  - Try out object introspection ('**?**' and '**??**').
  - Measure execution time of different `factotrial` calls.
- Take a look at the *IPython* documentation and test at least two more 'magic' commands. `http://ipython.readthedocs.org/en/stable/index.html`

Exercise 4 (virtualenv & pip) For the next exercises we want to use a Python virtual environment. Therefore create your own virtual environment using `virtualenv` and activate it. Search for the Python packages `pylint` and `pytest` and install them.

Exercise 5 (Code style) Look at your `Point` module and use `pylint` to optimize your code style (`pylint` rating at least +5.0).

Exercise 6 (Testing) Use `pytest` to implement a test environment for your `Point` module. Write at least one test function for each defined method. Use the `parametrize` feature to call methods with different parameters.

Regular Expression

Exercise 7 Read the file '`/etc/passwd`' and print out the user ID (1st column) and the comment (5th column) from each user.

Exercise 8 Write a filter program which will delete all html tags in a html file. (html tags are surrounded by *angle brackets*, e.g. `<body>`, `</body>`.)

Exercise 9 Create **one** RegExp to match any kind of floating point number in a string. Examples for a floating point numbers are: 0.1, .2, -5e6, 5e-6, 5E+6, ...

Hint: Use a online RegExp editor, e.g. *http://pythex.org/* or *http://www.pyregex.com/*.

Not enough? More exercises:

`http://www.pythonchallenge.com`