Python : langage homogène, explicite, et efficace

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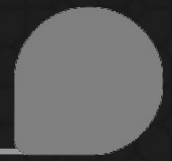

1. Avertissement
2. Homogène
3. Explicite
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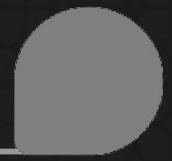
Avertissement

Avertissement



- Compare Python aux langages que je connais
- Compare le langage et non la bibliothèque standard
- Utilise les autres langages comme illustration

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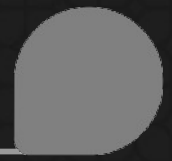
Mon parcours



- QBASIC
- Turbo Pascal, assembleur Intel x86
- Turbo C, Borland C++ Builder, Delphi
- PHP, HTML, Javascript
- Bash, Python
- *What else?*

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Homogène

Orienté objet

- C
  - `fgets(buffer, size, file)`
- C
  - `read(file, buffer, size)`
- PHP
  - `trim(" abc ")`

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Orienté objet

- Python
  - `file.readline()`
  - `file.read(size)`
  - `" abc ".strip()`

item in set

- PHP
  - `in_array($a, $b)`
  - `array_key_exists($a, $b)`
- C
  - `strstr(a, b)`
- Python
  - `a in b`

item in set

- PHP
  - `in_array($set, $item)`
  - `array_key_exists($item, $set)`
- C
  - `strstr(set, item)`
- Python
  - `item in set`

item in set

- PHP : `isset($set[$item])`
- Python
  - `item in list`
  - `item in tuple`
  - `item in dict`
  - `item in set`
  - `item in obj    # obj.__contains__(item)`
  - …

for x in y (foreach)

- C++

```
std::vector<int> liste;
std::vector<int>::const_iterator it;
for (it=liste.begin(); it != liste.end(); ++it)
    std::cout << *it << std::endl;
```

- Python

```
for item in liste:
    print(item)
```

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for x in y (foreach)

- C++0x

```
int liste[5] = {1, 2, 3, 4, 5};
foreach(int x: liste)
  ...
foreach(int &x: liste)
  x *= 2;
```

- Python : tuple, list, dict, set, fichier (ligne par ligne), ... (__iter__, __next__)

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Module, classe, attribut

- Perl
  - `Module::fonction, $objet->attribut`
- C
  - `objet.attribut, reference->attribut`
- C++
  - `Classe::methode, objet->attribut`
- Python
  - `Module.fonction, Classe.methode, objet.attribut`

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Callback

- PHP
  - `func($data)`
  - `process('func', $data) : $func($data)`
- Perl
  - `func($data)`
  - `process(&$func, $data) : $func->($data)`
- Python
  - `func(data)`
  - `process(func, data) : func(data)`

Explicite

Variables magiques

- Bash, Perl et Ruby : conventions
- Perl

```
if( $texte ~= /cle=(.*)/ )
    $valeur = $1;
```

- Bash

```
echo "pid=$$"
```

- Bash

```
$command = $1
$filename = $2
```

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Variables magiques

- Python : explicite

```
import re
m = re.match("cle=(.*)")
if m:
    valeur = m.group(1)

import os
print(“pid=%s” % os.getpid())

import sys
command = sys.argv[1]
filename = sys.argv[2]
```

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Formattage chaîne

- Bash, Perl, PHP

```
"Bonjour $prenom"
```

- Python

```
"Bonjour %s" % prenom
"Bonjour {}".format(prenom)
```

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Pas d'ASCII Art

- C, PHP

```
test ? a : b
```

- Bash, C

```
a && b, a || b, !a
```

- Perl

```
$entier, @liste, %hash
```

- PHP

```
dico = Array('cle' => 'valeur')
```

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Pas d'ASCII Art

- Python
  - `a if test else b`
  - `a and b, a and b, not a`
  - `entier, liste, hash`
  - `dico = {'cle': 'valeur'}`
- Python
  - `@decorateur`
- PHP 5.4
  - `liste = [1, 2, 3, 4, 5]`

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Gestion d'erreur

- Perl, PHP

```
f = open("file.txt") or die("Aaaarg");
content = f.read();
```

- C, PHP

```
$f = @fopen("file.txt");
if (isset($f))
     $content = stream_get_contents($f);
else
     echo "impossible d'ouvrir file.txt\n";
```

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Gestion d'erreur

- Python

```
try:
    f = open("file.txt")
    content = f.read()
except IOError, err:
    print("impossible d'ouvrir file.txt")
```

Gestion d'erreur

- C

```
f = fopen("file.txt", "r");
content = fread(f);
# plantage !
```

- Python

```
f = open("file.txt")
# lève une exception IOError
content = f.read()
```

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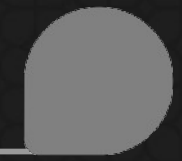
Efficace

List comprehension



- ```
  pairs = (x for x in xrange(1000000)
           if (x % 2) == 0)
  ```
- ```
  doubles = (x*2 for x in pairs)
  ```
- ```
  for x in doubles:
      if x > 1000:
          break
      print(x)
  ```
- Un seul élément en mémoire
- Rapide

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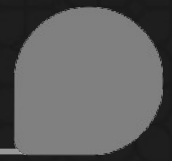
  ```

List comprehension



```
for x in (x*2 for x in xrange(1000000)
          if (x % 2) == 0):
    if x > 1000:
        break
    print(x)
```

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Générateur

```
def fibonacci():
    u, v = 0, 1
    while True:
        yield u
        u, v = v, u+v

for n in fibonacci():
    if n > 100:
        break
    print(n)
```

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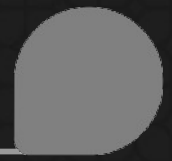
Générateur



- Condition d'arrêt gérée par le consommateur
- Code simple
- Un seul élément en mémoire
- Rapide

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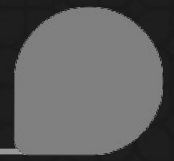
Bonus

Défauts de Python



- `a = "abc",` # a est un tuple
- `print "abc",` # sans retour à la ligne
- `func((a,))` # pas très lisible
- Pas d'enum -> bibliothèques
- Pas de constante

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Mot clé with

- Fichier

```
with open("document.txt") as f:
    content = f.read()
    # f.close()
```

- Verrou

```
lock = threading.Lock()
with lock:
    # lock.acquire()
    ... # section critique
    # lock.release()
```

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Argument par mot clé

- Python

```
def open(filename, mode="r",
         encoding="utf-8",
         errors="strict"):
    ...

open("document.txt")
open("document.txt", encoding="latin1")
open("document.txt", "w", errors="replace")
```

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Argument par mot clé

- PHP

```
function open($filename, $args)
{
    $defaults = Array(
        "mode" => "r",
        "encoding" => "utf-8",
    );
    $args = array_merge($defaults, $args);
    ...
}
open("document.txt",
      Array("encoding"=>"latin1"));
```

Questions & Discussion

Contact:
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http://dmalcolm.livejournal.com/