

Simulations numériques de marches aléatoires : programmes en Python

Génération de nombres aléatoires

```
<sxh python; title : 01_Random.py> #!/usr/bin/env python #!/usr/bin/python
```

```
from random import * # cf. documentation cf http://docs.python.org/library/random.html # random number generation - génération de nombres aléatoires # functions of interest : choice, randint, seed
```

```
facepiece=['pile','face'] valeurpiece=[0.01,0.02,0.05,0.1,0.2,0.5,1.,2.]
```

```
#for i in range(1):
```

```
    # choice : random choice of an element from a list
    #print choice(facepiece), choice(valeurpiece)
    # randint : return a random integer number between 2 values (including limits)
    #print randint(0,10)          # imprime un nombre aléatoire entre 0 et 10
    #print choice(range(0,11,1)) # same function, using choice and range to create the list
```

```
# seed(ANY_DATA) : seeding of the random number generator with any (constant) data # in order to generate reproducible random sequences. # seed() - without data - uses internal clock value to "randomly" initiate the generator !
```

```
for j in range(3):
```

```
    #seed('ma chaîne personnelle') # reproducible initialization
    seed() # to randomly initiate the generator
    for i in range(10):
        print randint(1000,9999)
    print " "
```

```
</sxh>
```

Histogrammes de nombres aléatoires

```
<sxh python; title : 02_random_histogram.py> #!/usr/bin/env python # -*- coding: utf-8 -*-
```

```
from random import * # cf. documentation cf http://docs.python.org/library/random.html import numpy as np import matplotlib.pyplot as plt #
```

```
http://matplotlib.sourceforge.net/api/pyplot\_api.html#module-matplotlib.pyplot import matplotlib.mlab as mlab #
```

```
http://matplotlib.sourceforge.net/api/mlab\_api.html#module-matplotlib.mlab
```

```
#seed('ma chaîne personnelle') # reproducible initialization seed()

rval=[] for j in range(10000):

    rval.append(randint(0,99)) # append to the list a random (integer)
    number between 0 and 99

# print rval # uncomment just to see the list of random numbers

# analysis - histogram - see http://matplotlib.sourceforge.net/examples/api/histogram\_demo.html #
http://fr.wikipedia.org/wiki/Histogramme xh=np.array(rval) # see
http://www.scipy.org/Cookbook/BuildingArrays transforme une liste en un tableau numérique de
Numpy # print xh

fig = plt.figure() ax = fig.add_subplot(111)

n, bins, patches = ax.hist(xh, 10, facecolor='green', alpha=0.75) print n # les nombres d'occurences
par classe print bins # les classes, de largeur identique

# modifier le nombre de nombres générés, les nombres de classes-bins,

plt.show() </sxh>
```

Représenter le déplacement d'un objet

```
<sxh python; title : 03_tkinter_simple_move.py> #!/usr/bin/python # -*- coding: utf-8 -*-

from Tkinter import * import time

window = Tk() sizex=400 sizey=100 canvas = Canvas(window, width = sizex, height = sizey)
canvas.pack() x = 100 # initial left-most edge of first ball y = 30 # initial top-most edge of first ball
r=20 # ball diameter depx=2 # displacement at each move in x direction depy=0 # displacement at
each move in y direction

ball=canvas.create_oval(x,y,x+r,y+r,fill="blue")

#moves no_moves=10 for j in range(no_moves):

    canvas.move(ball, depx, depy)
    canvas.after(10) # time delay in milliseconds
    canvas.update()

time.sleep(5) # on attend quelques secondes window.destroy()

</sxh>
```

Représenter le déplacement de nombreux points

From:

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Last update: **2013/11/13 16:52**

