
TP 3 : Utiliser Matplotlib - Corrigé

1 BCPST 2 - TP Informatique

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###

import matplotlib.pyplot as plt
import random as rd

#Q1-Q2

#les points aleatoires:
N = 100
for i in range(N):
    plt.plot(rd.random(),rd.random(),"xr")

#le carre :
plt.plot([0,0,1,1,0],[0,1,1,0,0], "b")
plt.axis("equal")
plt.show()

###

#Q3 Q4
x = 0; p = 0.05
while(x < 1):
    x += p
    #Lignes horizontales :
    plt.plot([0,1],[x,x], "b", linewidth = 0.5)

    #Lignes verticales :
    plt.plot([x,x],[0,1], "b", linewidth = 0.5)

plt.plot([0,0,1,1,0],[0,1,1,0,0], "b")
plt.axis("equal")
plt.show()

###
#Q5
x = 0; p = 0.05
while(x < 1):
    x += p
    plt.plot([1,x],[x,1], "b", linewidth = 0.5)
    plt.plot([0,x],[x,0], "b", linewidth = 0.5)

plt.plot([0,0,1,1,0],[0,1,1,0,0], "b")
plt.axis("equal")
plt.show()
```

```

#%%
import numpy as np
#Q6
X,Y = [],[]
N = 100
for i in range(0,N+1):
    theta = 2*np.pi*i/N
    x = np.cos( theta )
    y = np.sin(theta )

    X.append(x)
    Y.append(y)

plt.plot(X,Y)

#Q7
X,Y = [],[]
n = 409
for i in range(0,n):
    theta = 2*np.pi*i/n
    x = np.cos( theta )
    y = np.sin(theta )

    X.append(x)
    Y.append(y)
    #plt.plot(x,y,"or")

#Q8 (fixer j=2 et n =10)
#Q9 (choisir j quelconque et n quelconque)

j = 112
for i in range(n):
    m = (i*j)%n
    plt.plot([X[i],X[m]], [Y[i],Y[m]], color = "blue", linewidth = 0.2)

plt.axis("equal")
plt.show()

#%%
#Q10 Je fais abscisses et ordonn es dans la m me fonction
def coord(n):
    X = []; Y = []
    for k in range(n+1):
        a = 2*k*np.pi/n
        X.append( np.cos(a) )
        Y.append( np.sin(a) )
    return X,Y

#Q11
def polygone(n):
    X,Y = coord(n)
    plt.plot(X,Y, "-.", linewidth = 1)
    plt.axis("equal")
    plt.title(" n = "+str(n))

    #Pour am liorer l'affichage des titres :
    plt.xticks([])
    plt.yticks([])

```

```

#Q12
plt.subplot(2,2,1); polygone(5)
plt.subplot(2,2,2); polygone(6)
plt.subplot(2,2,3); polygone(8)
plt.subplot(2,2,4); polygone(10)
plt.show()

#%%

#Q13
def coord_etoiles(n, trait_construc = False):
    X,Y = coord(n)
    Xr = []; Yr = []

    for i in range(n+1):
        a = np.pi/n
        Xr.append(3*(np.cos(a)*X[i]-np.sin(a)*Y[i]))
        Yr.append(3*(np.sin(a)*X[i]+np.cos(a)*Y[i]))

    X1 = insere(X,Xr); Y1 = insere(Y,Yr)

    plt.title(" n = "+str(n))
    return X1,Y1

#Q14.1
def insere(L1,L2):
    L = [];
    for i in range(len(L1)):
        L.append(L1[i])
        L.append(L2[i])
    return L

#Q14.2
def etoile(n):
    X,Y = coord_etoiles(n,True)

    plt.xticks([])
    plt.yticks([])
    plt.plot(X,Y, "--")

    plt.axis("equal")

#Q14.3
plt.subplot(2,2,1); etoile(4)
plt.subplot(2,2,2); etoile(5)
plt.subplot(2,2,3); etoile(6)
plt.subplot(2,2,4); etoile(20)
plt.show()

```