Corrigé du TP Informatique 18

Exercice 1

1. On saisit :

```
def taille(P):
    Q=Pile()
    while not P.vide():
        Q.empiler(P.depiler())
    res=0
    while not Q.vide():
        P.empiler(Q.depiler())
        res+=1
    return res
```

2. On saisit :

```
def cut(P):
    if not P.vide():
        Q=Pile()
        while not P.vide():
            Q.empiler(P.depiler())
        Q.depiler()
        while not Q.vide():
            P.empiler(Q.depiler())
```

Exercice 2

1. On saisit :

```
from ClassePile import *
import numpy as np, matplotlib.pyplot as plt

image=[[0]*8 for k in range(8)]
contour=[[1,2],[1,3],[2,4],[3,5],[4,6],[5,6],[6,5],
         [6,4],[6,3],[5,2],[4,1],[3,1],[2,1]]
for pt in contour:
    image[pt[0]][pt[1]]=1
plt.imshow(np.array(image),cmap='Greys',interpolation='nearest')
plt.show()
```
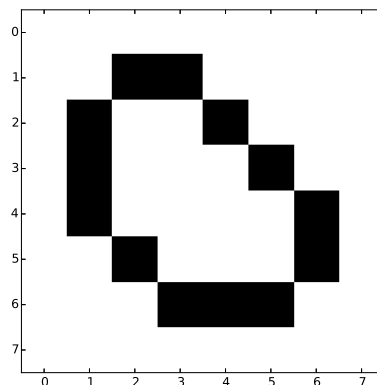
On obtient :

FIGURE 1 – Remplissage d'un contour

2. On saisit :

```python
def est_blanc(image,pt):
    i,j=pt
    return image[i][j]==0
```

3. On saisit :

```python
def noircit(image,pt):
    i,j=pt
    image[i][j]=1
```

4. On saisit :

```python
def remplir(image,pt):
    P=Pile()
    if est_blanc(image,pt):
        P.empiler(pt)
    while not P.vide():
        pt=P.depiler()
        noircit(image,pt)
        if est_blanc(image,haut(pt)):
            P.empiler(haut(pt))
        if est_blanc(image,bas(pt)):
            P.empiler(bas(pt))
        if est_blanc(image,gauche(pt)):
            P.empiler(gauche(pt))
        if est_blanc(image,droite(pt)):
            P.empiler(droite(pt))
```

5. On saisit :

```python
remplir(image,[3,4])
plt.imshow(np.array(image),cmap='Greys',interpolation='nearest')
plt.show()
```
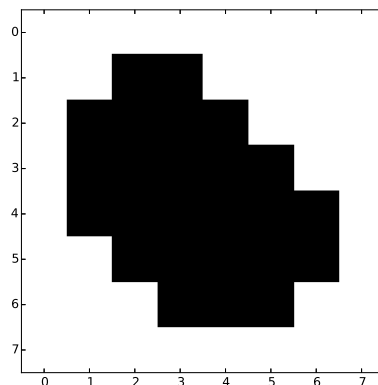
On obtient :

FIGURE 2 – Remplissage d'un contour

6. On saisit :

```
def remplir2(image,pt):
    P=Pile()
    if est_blanc(image,pt):
        P.empiler(pt)
        taille_pile=[1]
    while not P.vide():
        pt=P.depiler()
        nb=-1
        noircit(image,pt)
        if est_blanc(image,haut(pt)):
            P.empiler(haut(pt))
            nb+=1
        if est_blanc(image,bas(pt)):
            P.empiler(bas(pt))
            nb+=1
        if est_blanc(image,gauche(pt)):
            P.empiler(gauche(pt))
            nb+=1
        if est_blanc(image,droite(pt)):
            P.empiler(droite(pt))
            nb+=1
        taille_pile.append(taille_pile[-1]+nb)
    return taille_pile
```
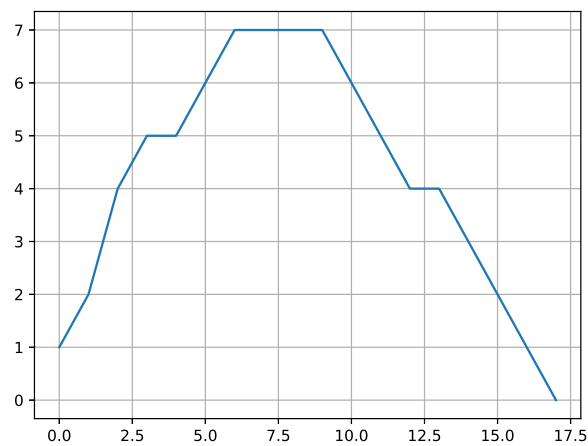

FIGURE 3 – Taille de pile durant au cours du remplissage

Exercice 3

1. On saisit :

```
def parenth1(expr):
    P=Pile()
    for x in expr:
        if x=="(":
            P.empiler(x)
        elif x==")":
            if P.vide():
                return False
            P.depiler()
    return P.vide()
```

2. On saisit :

```
def parenth2(expr):
    P=Pile()
    for x in expr:
        if x in "([{":
            P.empiler(x)
        elif x in ")]}":
            if P.vide() or not P.depiler()+x in ["()","[]","{}"]:
                return False
    return P.vide()
```