

1 Calcul de π

```
1 # -*- coding: utf-8 -*-
2
3 def calculPi(n):
4     """
5     y = calculPi(n)
6     calcul de pi à l'ordre n
7
8     >>> from math import fabs, pi
9     >>> fabs(pi - calculPi(1)) < 1.
10    True
11    >>> fabs(pi - calculPi(1000000)) < 1.e-6
12    True
13    """
14    assert type(n) is int and n >= 0
15
16    y, s = 1, 1
17    for k in range(1,n+1):
18        s = -s
19        u = s/(2*k+1)
20        y = y + u
21    return 4*y
22
23 #-----
24 if __name__ == "__main__":
25     import doctest
26     doctest.testmod()
```

2 Conversion base $b \rightarrow$ décimal

```
1 # -*- coding: utf-8 -*-
2
3 def conversion(code,b=2):
4     """
5     n = conversion(code,b)
6     entier décimal qui représente le code en base b
7
8     >>> conversion([0,0,1,0,1,1,1],2)
9     23
10    >>> conversion([0, 0, 0, 4, 3],5)
11    23
12    >>> conversion([1,2],21)
13    23
14    >>> conversion([0,0,0,0,0,23],25)
15    23
16    """
17    assert type(b) is int and b > 1
18    assert type(code) is list
19
20    n = 0
21    for i in range(len(code)):
22        n = n + (b**i)*code[len(code)-1-i]
23
24    return n
25
```

```
26 #-----
27 if __name__ == "__main__":
28     import doctest
29     doctest.testmod()
```

3 Polygones réguliers

```
1 # -*- coding: utf-8 -*-
2
3 from turtle import *
4
5 #-----
6 def polygone(n,d,x=0,y=0):
7     """
8     trace un polygone régulier à n côtés de longueur d
9     à partir du point de coordonnées (x,y)
10
11     >>> for i in range(3,10): polygone(i,100,-150,0)
12     """
13     up()
14     goto(x,y)
15     down()
16     for i in range(n):
17         forward(d)
18         left(360./n)
19     return
20
21 #-----
22 if __name__ == "__main__":
23     import doctest
24     doctest.testmod()
```

4 Coefficients de Kreweras

```
1. >>> for n in range(7):
        for m in range(n+1):
            print(g(n,m),end=' ')
        print()

1
0 1
0 1 1
0 1 2 2
0 2 4 5 5
0 5 10 14 16 16
0 16 32 46 56 61 61

2. >>> 12*g(5,5)/g(6,6)
3.1475409836065573
```

5 Portée des variables

```
>>> x = 2
>>> print(x)
2
```

```
>>> y = f(x)
>>> print(x)
f 6
2
```

```
>>> z = g(x)
>>> print(x)
f 6
g 24
2
```

```
>>> t = h(x)
>>> print(x)
f 6
f 18
g 72
h 144
2
```

```
>>> x = 2
>>> print(x)
2
```

```
>>> x = f(x)
>>> print(x)
f 6
6
```

```
>>> x = g(x)
>>> print(x)
f 18
g 72
72
```

```
>>> x = h(x)
>>> print(x)
f 216
f 648
g 2592
h 5184
5184
```

6 Exécution d'une fonction itérative

1. Il s'agit du tableau de Pascal des coefficients du binôme $(x + y)^n$ pour les valeurs de n allant de 0 à 6.

2. c représente le $p^{ième}$ coefficient du binôme $(x + y)^n$:

$$c = C_n^p = \binom{p}{n} = \frac{n!}{p!(n-p)!}.$$

```
>>> for n in range(7):
    f(n)
```

```
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
1 6 15 20 15 6 1
```