

## 1 Calcul de $\pi$

---

```
1 # -*- coding: utf-8 -*-
2
3 from math import *
4
5 #-----
6 def calculPi(n):
7     """
8     y = calculPi(n)
9     calcul de pi à l'ordre n
10
11     >>> from math import fabs, pi
12     >>> fabs(pi - calculPi(1)) < 1.
13     True
14     >>> fabs(pi - calculPi(1000000)) < 1.e-6
15     True
16     """
17     assert type(n) is int and n >= 0
18
19     y = 0
20     for k in range(1,n+1):
21         u = 1./(k*k)
22         y = y + u
23     return sqrt(6*y)
24
25 #-----
26 if __name__ == "__main__":
27     import doctest
28     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

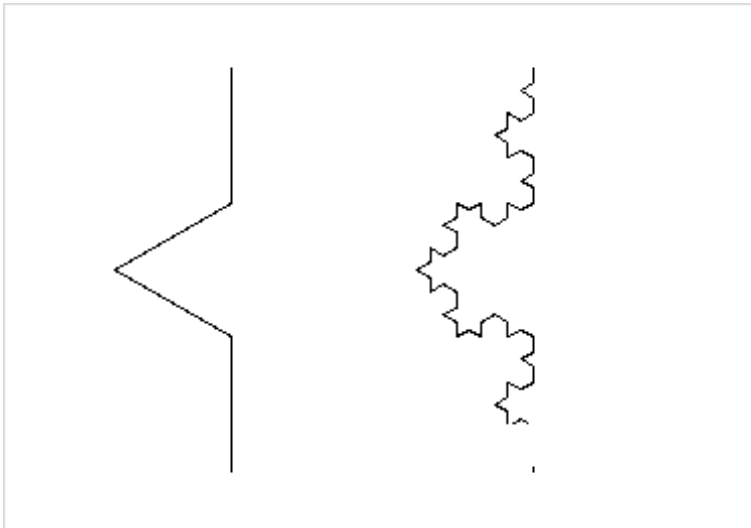
```

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 Courbes fractales



## 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 18
2
```

```
>>> t = h(x)
>>> print(x)
f 6
f 18
g 54
h 162
2
```

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

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

```
>>> x = g(x)
>>> print(x)
f 18
g 54
54
```

```
>>> x = h(x)
>>> print(x)
f 162
f 486
g 1458
h 4374
4374
```

## 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
```