



Quelques problèmes issus du site : <https://projecteuler.net>

1. Problème 25

The Fibonacci sequence is defined by the recurrence relation:

$$F_n = F_{n-1} + F_{n-2}, \text{ where } F_1 = 1 \text{ and } F_2 = 1.$$

Hence the first 12 terms will be:

$$F_1 = 1 ; F_2 = 1 ; F_3 = 2 ; F_4 = 3 ; F_5 = 5 ; F_6 = 8 ; F_7 = 13 ; F_8 = 21 ; F_9 = 34 ; \\ F_{10} = 55 ; F_{11} = 89 ; F_{12} = 144$$

The 12th term, F_{12} , is the first term to contain three digits.

What is the index of the first term in the Fibonacci sequence to contain 1 000 digits?

- boucle pour
- conversion de type, chaîne / entier
- affectation en parallèle

2. Problème 16

$$2^{15} = 32768 \text{ and the sum of its digits is } 3 + 2 + 7 + 6 + 8 = 26.$$

What is the sum of the digits of the number 2^{1000} ?

- liste en compréhension
- conversion de type
- puissance

3. Problème 34

145 is a curious number, as $1! + 4! + 5! = 1 + 24 + 120 = 145$.

Find the sum of all numbers which are equal to the sum of the factorial of their digits.

Note: as $1! = 1$ and $2! = 2$ are not sums they are not included.

- liste
- boucle
- conversion de type
- définir une fonction par récurrence ?

4. Problème 14

The following iterative sequence is defined for the set of positive integers:

$$n \rightarrow n/2 \text{ (} n \text{ is even)} \\ n \rightarrow 3n + 1 \text{ (} n \text{ is odd)}$$

Using the rule above and starting with 13, we generate the following sequence: $13 \rightarrow 40 \rightarrow 20 \rightarrow 10 \rightarrow 5 \rightarrow 16 \rightarrow 8 \rightarrow 4 \rightarrow 2 \rightarrow 1$

It can be seen that this sequence (starting at 13 and finishing at 1) contains 10 terms.

Although it has not been proved yet (Collatz Problem), it is thought that all starting numbers finish at 1.

Which starting number, under one million, produces the longest chain?

- liste
- fonctions
- ...



5. Problème 22

names.txt, a 46K text file containing over five-thousand first names, begin by sorting it into alphabetical order.

Then working out the alphabetical value for each name, multiply this value by its alphabetical position in the list to obtain a name score.

For example, when the list is sorted into alphabetical order, COLIN, which is worth $3 + 15 + 12 + 9 + 14 = 53$, is the 938th name in the list. So, COLIN would obtain a score of $938 \times 53 = 49714$.

What is the total of all the name scores in the file?

- boucle
- lecture dans un fichier texte
- chaînes de caractères