

# TP 5: computing with large integers

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## 1 Addition

Implement in C language the big integer addition algorithm. You can use the structure:

```
typedef struct {  
    int sign;  
    int size;  
    int *tab;  
} bignum;
```

## 2 Suite de Fibonacci

We define the Fibonacci sequence  $u_0 = 1$ ,  $u_1 = 1$ ,  $u_n = u_{n-1} + u_{n-2}$  for  $n \geq 2$ . Write a program that computes the  $n$  terms of the Fibonacci sequence, for a given  $n$ , using the previous addition algorithm. You can use base  $B = 10$ .

Check that  $u_{100} = 573147844013817084101$ . What is the value of  $u_{101}$  ?

## 3 Multiplication

Implement in C the multiplication algorithm on big integers.

## 4 Factorial

We define  $n! = n \cdot (n - 1) \dots 2 \cdot 1$ . Write a program computing  $n!$  for a given  $n$ , using the previous multiplication algorithm.

Check that  $30! = 265252859812191058636308480000000$ . What is the value of  $40!$  ?