

# Nombres flottants

```
In [1]: float x;
```

```
In [2]: x = 123.45
```

```
Out[2]: 123.45f
        type: float
```

Notation scientifique:

```
In [3]: x = 1.2345e10
```

```
Out[3]: 1.2345e+10f
        type: float
```

```
In [4]: x = 1.2345e20
```

```
Out[4]: 1.2345e+20f
        type: float
```

Représenter des nombres très grands:

```
In [5]: x = 1.2345E38
```

```
Out[5]: 1.2345e+38f
        type: float
```

Mais pas trop:

```
In [6]: x = 1.23E39
```

```
Out[6]: inff
        type: float
```

## Exercices

Refaire les mêmes calculs avec des double. Quelles en sont les limites?

## Instabilité numérique

```
In [7]: x = 1e20
```

```
Out[7]: 1e+20f
        type: float
```

```
In [8]: 1 + x - x
```

```
Out[8]: 0f
        type: float
```

```
In [9]: 1 + (x - x)
```

```
Out[9]: 1f
        type: float
```

L'addition des float n'est pas associative!

## Arithmétique avec les valeurs infinies

```
In [10]: x = 0
```

```
Out[10]: 0f
        type: float
```

```
In [11]: 1 / x
```

```
Out[11]: inff
        type: float
```

```
In [12]: x = 1E100
```

```
Out[12]: inff
        type: float
```

```
In [13]: x+1
```

```
Out[13]: inff
        type: float
```

```
In [14]: -x
```

```
Out[14]: -inff
        type: float
```

## Formes indéterminées

```
In [15]: x - x
```

```
Out[15]: -nanf
        type: float
```

```
In [16]: x / x
```

```
Out[16]: -nanf
        type: float
```

```
In [17]: 0 * x
```

```
Out[17]: -nanf
        type: float
```

```
In [18]: 3 - (x / x)
```

```
Out[18]: -nanf
        type: float
```