

## EXERCISE on machine precision.

- Execute the following code

```
import sys
help(sys.float_info)
print(sys.float_info)
```

and understand the meaning of *max*, *max\_exp* and *max\_10\_exp*.

- Write a code to compute the machine precision  $\epsilon$  in (float) default precision with a WHILE construct. Compute also the mantissa digits number.
- Import NumPy ( `import numpy as np` ) and exploit the functions *float16* and *float32* in the while statement and see the differences. Check the result of `print(np.finfo(float).eps)`

In [ ]:

```
my_eps = 1
counter = 0

while
```

## EXERCISES with matplotlib

### 1. Explore the matplotlib library.

Matplotlib is a plotting library for the Python programming language and its numerical mathematics extension NumPy, from <https://matplotlib.org/> \ Create a figure combining together the cosine and sine curves, from 0 to 10:

- Add a legend
- Add a title
- Change the default colors

### 1. Fibonacci and approximation

- Write a script that, given an input number n, computes the numbers of the Fibonacci sequence that are less than n.
- Write a code computing, for a natural number k, the ratio  $r_k = \frac{F_{k+1}}{F_k}$ , where  $F_k$  are the Fibonacci numbers.

- Verify that, for a large k,  $\{r_k\}_k$  converges to the value  $\varphi = \frac{1+\sqrt{5}}{2}$
- create a plot of the error (with respect to  $\varphi$ )

In [ ]: