M.Sc. in High-Performance Computing
5613 - C programming
Assignment 0

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Rules

This is a non-assessed assignment. For your exercise, try to do the homework by **Wednesday October 13th**. There will be no marks given and possible solutions will be discussed in class on Wednesday. In case of any questions or doubts, please email `mmarina@maths.tcd.ie`.

Question

1. write a `C` function

   ```
   int fib(int k)
   ```

   which writes the k^{th} entry in the Fibonacci sequence to the terminal using `printf`. `fib` should compute the sequence by recursive calls to itself. The Fibonacci sequence f_k is defined by the recursion

   $$f_{k+1} = f_k + f_{k-1} \quad \text{for } k = 1, 2, 3, \ldots$$

   and with $f_0 = f_1 = 1$. Test the function with a few values and then evaluate f_{42}. Why does your program take as long as it does? What is the order of the algorithm (in k)? Write a second version of the function

   ```
   int fib2(int k)
   ```

   which has the same functionality as `fib` but which uses an $\mathcal{O}(k)$ method to evaluate f_k instead of recursion.