TP 01: Basic Programming Exercises

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1   Factorial

Write a program `fact` that computes $n! = n \cdot (n-1) \cdots 2 \cdot 1$. For example, $5! = 120$.

2   Binary Decomposition

Write a program that outputs the binary decomposition of an integer, starting with the least significant bit.

3   Divisor

Write a program that outputs the list of divisors of an integer n given as input.

```
$ divisor 24
1 2 3 4 6 8 12 24
```

4   Prime

Write a program that determines whether an integer is prime or not. Modify your program to output the list of prime integers between 1 and 100.

5   Fibonacci Sequence

We define the sequence $u_0 = 1$, $u_1 = 1$, $u_n = u_{n-1} + u_{n-2}$ fir $n \geq 2$. Write a program that computes the n first terms of the Fibonacci sequence.

6   Euclid's Algorithm

Write a program `gcd` taking as input 2 integers and outputting their gcd, using Euclid's algorithm.

```
$ gcd 12 15
3
```

7   Decomposition

Write a program `factor` taking as input an integer n and outputting its factorization, using the naive algorithm. For example, for $150 = 2^1 \cdot 3^1 \cdot 5^2$:

```
$ factor 150
(2,1) (3,1) (5,2)
```