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Academic year: 2023-2024

Level: 1<sup>st</sup> year "Computer Science & Mathematics"

Module: Algorithmic and Data Structures 2

TP n°3

**Pedagogic objective**

→ Handle recursive procedures & functions in C;

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**Exercise n°1**

- Write in C a recursive function allowing you to calculate  $X^n$  for  $X$  real and  $n$  natural integer.
- Write a recursive function in C to calculate  $X!$  for integer  $X$ .

**Exercise n°2**

We consider the mathematical Ackermann function  $F$  of two real variables  $x$  and  $y$ , defined as follows:

$$F(x, y) = y+1 \quad \text{if } x=0 ;$$

$$F(x, y) = F(x-1, 1) \text{ if } x > 0 \text{ and } y = 0 ;$$

$$F(x, y) = F(x-1, F(x, y-1)) \text{ if } x \text{ and } y \text{ are different of } 0.$$

Write a recursive program in C which requests the two values  $x$  and  $y$  and displays the value of  $F(x, y)$ .

**Exercise n°3**

We consider the mathematical Fibonacci function  $F$  defined as follows:

$$F(0) = 0; F(1) = 1$$

$$F(n) = F(n-1) + F(n-2) \text{ For } n > 1$$

Write a recursive program in C that asks for an integer value  $n$  and displays the value of  $F(n)$ .