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Level: 1st year(Mathematics+CS (MI)) **Date:** 15/05/2025

Module: Algorithmic and Data Structures 2 **Duration:** 1h30m

Exam

Exercice n°01: **(10 points)**

A prime number is a positive integer that has only two distinct divisors (1 and himself):

1. Write a function *Nbr_Div* that calculates the number of divisors of *n*.
2. Write a *P_Prime* procedure, which uses the *Nbr_Div* function and indicates whether *n* is prime or not.
3. Transform this procedure into a Boolean function *F_Prime.*
4. Write the main program in which we call the previous sub algorithms.
5. Specify local and global variables, formal and effective parameters.

Exercice n°02: **(10 points)**

F is a numerical function defined by **F**(X) = X! . We want to construct an array of values of this function. The user enters the number N of values as well as the values of X. Write a C program that matches this processing (the solution must include subprograms, and F must be calculated by a recursive function).

Example : Enter an integer between 1 and 50: **5**

Enter 5 real numbers: |4 | 3 | 2 | 1 | 6 |

X : | 4 | 3 | 2 | 1 | 6 |

F(X): |24 | 6 | 2 | 1 | 720 |

Good luck