Algorithms and Computational Thinking

TP-4: Loops, Recursion and Functions

Objective: The objective of this TP is to get comfortable with the concepts learned during the lecture, such as loops, recursion and functions.

Exercise-I: Odd numbers

Objective: Understanding the concept of loop and function in Python, Scala and Swift.

Problem Statement: Create a function that prints all odd numbers between 0 and a limit number provided by the user (this limit is a parameter of the function). For Swift the limit can be a constant.

Hint: Use a modulo computation to determine if a number is odd or even.

Sample Output: **Odd numbers between 0 and 10: 1 3 5 7 9**

Exercise–II: Factorial

Objective: Understanding the concept of function and recursion by taking a well-known mathematical problem, i.e., the factorial.

Problem Statement: Define a function that prints the result of factorial n, i.e., n! (n must be given by the user and is a parameter of the function). The recursion must be used to compute the result. For Swift n can be a constant.

Sample Output :

4! = 24

Exercice–III: Fibonacci sequence

Objective: Understanding the concept of recursion by taking a well-known mathematical problem which is the Fibonacci sequence.

Problem Statement: Define a function that prints the first n numbers of the Fibonacci sequence. The rule is that every number after the first two is the sum of two previous numbers. The length of the sequence, i.e., n must be given by the user. The recursion must be also used to compute the sequence. For Swift n can be a constant.

Sample Output: **First 10 numbers of Fibonacci sequence: 0 1 1 2 3 5 8 13 21 34**