# **RecursiveExercise01**

In this exercise you should learn some basic about using recursion:

* how to implement a recursive defined math function keeping the recursive aspect in the program
* how the recursion is working in the running program (using debug to follow the running program)

For this exercise you will have at startup solution with some code already implemented:  
- [RecursiveSolution01.zip](http://bjoerks.net/klasser/SK2016F_dm15abc/RecursiveSolution01.zip)

**The next two exercises must be performed with a person from another class, so go find someone.**

## **1. ExerciseFactorial (**[**Wikipedia**](https://en.wikipedia.org/wiki/Recursion_(computer_science)#Recursive_programs)**):**

A classic example of a recursive procedure is the function used to calculate the [factorial](https://en.wikipedia.org/wiki/Factorial) of a[natural number](https://en.wikipedia.org/wiki/Natural_number):

 \operatorname{fact}(n) =
 \begin{cases}
 1 & \mbox{if } n = 0 \\
 n \cdot \operatorname{fact}(n-1) & \mbox{if } n > 0 \\
 \end{cases}


1. Now implement the Factorial method in the solution (**chief-secretary**)
2. Debug step by step through each of the test call of your method and try to explain for each other how the program is working.
3. When done, your group find another group of 2 person and exchange your experience.

## **2. ExerciseFibonacci (**[**Wikipedia**](https://en.wikipedia.org/wiki/Fibonacci_number#Use_in_mathematics)**):**

The next is also a calcic example of a recursive math definition. An interesting sequence actually as it is often seen in nature.

In mathematical terms, the sequence *Fn* of Fibonacci numbers is defined by the [recurrence relation](https://en.wikipedia.org/wiki/Recurrence_relation)

F_n = F_{n-1} + F_{n-2},\!\,

with seed values[[1]](https://en.wikipedia.org/wiki/Fibonacci_number" \l "cite_note-FOOTNOTEBeckGeoghegan2010-1)[[2]](https://en.wikipedia.org/wiki/Fibonacci_number#cite_note-FOOTNOTEB.C3.B3na2011180-2)

F_1 = 1,\; F_2 = 1

or[[5]](https://en.wikipedia.org/wiki/Fibonacci_number" \l "cite_note-FOOTNOTELucas18913-5)

F_0 = 0,\; F_1 = 1.

1. Now implement the Fibonacci method in the solution (**chief-secretary** – switch!).
2. Debug step by step through each of the test call of your method and try to explain for each other how the program is working.
3. When done, your group find another group of 2 person and exchange your experience.  
   Then diskuss if there is any problem in using the recursion for Fibonacci
4. If time try to make another Fibonacci method not using recursion but instead a loop.