LAB 4: Functions, for loops, and recursion

In this lab, you will learn to use loops and recursions.

Your program will calculate $0 + 1 + 2 + 3 + \ldots + n$, where $n$ is an integer entered by the user. My template code already handles input and output, so you don't need to worry about how to get $n$ from user or how to print the result. Instead, you should focus on how to calculate the result and return it from your function.

Please download the template code from http://cs-people.bu.edu/qmma/sum.cpp. Please do not change anything in the main function.

PART I: calculate $0 + 1 + 2 + \ldots + n$ iteratively

In this first part of the lab, you need to complete the function “sumIterative().” Please calculate the sum using a “for” loop, and return the result from your function.

This part should be relatively easy if you understand how loops work.

PART II: calculate $0 + 1 + 2 + \ldots + n$ recursively

In the second part of this lab, you need to complete the function “sumRecursive().” Please calculate $0 + 1 + 2 + \ldots + n$ recursively. That means you should not use a loop. Instead, your function should keep calling itself until it reaches the base case.

Hints:
- A base case is a case in which your function stops calling itself and returns a single output. What’s the base case in this problem?
- What’s the relationship between $f(x)$ and $f(x-1)$?
- If you are not sure about something, do the math on paper before you start coding.
- It’s not as hard as you think. It can be done in 5 lines of codes.

Sample output

Please enter n: 100
The output of your iterative sum function is 5050
The output of your recursive sum function is 5050