**Assignment 1 - Nbonacci Numbers**

* Due Sep 4 by 11:59pm
* File Types cpp

**Introduction**

The purpose of this assignment is to help familiarize you with writing and running simple programs using C++.

One of my favorite YouTube channels is Numberphile.  An idea I have is to create a series of videos that demonstrate writing programs that perform the computations described in the Numberphile series.  Thinking about this inspired this first assignment.  You will write a program that computes the n-bonacci numbers and ratios.  The following YouTube video explains...

**Assignment**

Write a program that produces the following console output using the specifications that follow the output example.

--- Fibonacci Sequence ---

1 1 2 3 5 8 13 21 34 55 89 144 233 377 610 987 1597 2584 4181 6765

--- Tribonacci Sequence ---

1 1 1 3 5 9 17 31 57 105 193 355 653 1201 2209 4063 7473 13745 25281 46499

--- Fourbonacci Sequence ---

1 1 1 1 4 7 13 25 49 94 181 349 673 1297 2500 4819 9289 17905 34513 66526

--- Fivebonacci Sequence ---

1 1 1 1 1 5 9 17 33 65 129 253 497 977 1921 3777 7425 14597 28697 56417

Fibonacci ratio approaches 1.61803 after 18 iterations

Tribonacci ratio approaches 1.83929 after 20 iterations

Fourbonacci ratio approaches 1.92756 after 22 iterations

Fivebonacci ratio approaches 1.96595 after 24 iterations

* Write a ***recursive***function with the following signature: long nbonacci(unsigned int series, unsigned int n)
  + This function computes the n'th number in the series sequence.  For example, a series of 2 is the Fibonacci sequence, a series of 3 is the Tribonacci sequence.
* Write a function with the following signature: void computeNbonacciRatio(std::string title, unsigned int series)
  + This function iteration to approximate and report the n-bonacci ratio (F(n) / F(n-1)).
  + The ratio must be computed until a difference from the previous estimate and the current estimate is less than 0.000001.  This means you'll need a while loop that continues computing the ratio until a difference less than the specification is met.

The first part of your program is a series of for loops that report the four difference sequences.  The second part computes the ratios.

**Coding Notes**

* std::string is part of the <string> library (header file).  We'll be covering it in more detail later, but for now, it is enough to know you can use it as you expect.  The following code shows how to call the computeNbonacciRatio function with the various string titles.

computeNbonacciRatio("Fibonacci", 2);

computeNbonacciRatio("Tribonacci", 3);

computeNbonacciRatio("Fourbonacci", 4);

computeNbonacciRatio("Fivebonacci", 5);

* You can use std::abs(...some number...) to get the absolute difference between two (in this case, floating point) numbers.
* Division of two integral data types results in an integral result (just like Java).  Therefore, it is necessary to cast one of the n-bonacci results to a floating point type in order to get a floating point result in the division.  A numeric cast is performed as: double a = static\_cast<double<(b); (where b is an integral type).