COSC2006 Lab 3 – Recursion, Part 2

Coding – Upload all java files to the LMS.

The Fibonacci Sequence, Part 1. One of the most famous number sequences in mathematics, the Fibonacci sequence, has a recursive definition. Write a recursive method to calculate the nth Fibonacci number. In your main method, ask for n, and call your method to calculate it. Your method signature must be ***public static int fib(int n)***.
The formula for the Fibonacci sequence is: fib(n) = fib(n – 1) + fib(n – 2), fib(1) = 1 and fib(2) = 1.

The Fibonacci Sequence, Part 2. In a new class, modify your main method code from part 1 to create an array of the first n Fibonacci numbers. You will need a loop for this, but do not change the recursive method! Your main method should ask for the value of n, and calculate all values from fib(1) to fib(n). Note: fib(1) = 1 and fib(2) = 1, but you're using array indexes!

Recursive Printing. Create a recursive method, printUp(int n) to print the following pattern for any n>0 rows: (this shows n=5).

```
*
* *
* * *
* * * *
* * * * *
```

Also create a recursive method, printDown(int n) to print the following pattern for any n>0 rows: (this shows n=5)

```
* * * * *
* * * *
* * *
* *
*
```

You will need loops in your recursive methods for this question, but only to print the number of asterisks. Your main method should ask for the value of n and call each method in order.

Discussion: is it possible to write a third recursive method, if possible, called printBoth(int n) to print both patterns at the same time, **without calling printUp or printDown, or any other method**? The output should look like this for n=5:

```
*
* *
* * *
* * * *
* * * * *
* * * * *
* * * *
* * *
* *
*
```

Your methods in this lab must be recursive. If they are not, you will receive a zero.