INTRODUCTION TO ALGORITHMS (CELEN086)
EXTRA PRACTICE PROBLEMS

TOPIC: *Recursive functions*

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Note: ALL algorithms must come with proper headings!!

1. Write a recursive algorithm called **`isEven(n)`** that takes a positive integer *n* and returns True if it is even and False otherwise.

2. Write a recursive algorithm **`fakeLog(x,y)`** that takes two positive integers *x, y* and returns a positive integer *k* such that $x^k \leq y$. For example: **`fakeLog(3,81)=4,`** **`fakeLog(2,10)=3,`** **`fakeLog(5,2)=0`**

3. Write a recursive algorithm **`sumDigits(n)`** that takes a positive integer and returns the sum of its digits. For example: **`sumDigits(11)=2,`** **`sumDigits(548)=17=5+4+8,`** **`sumDigits(8)=8`**

4. Fibonacci numbers is a well-known sequence in mathematics. The following is a Fibonacci sequence:

   0, 1, 1, 2, 3, 5, 8, 13, 21, …

   Every number in the sequence is the sum of previous two numbers. The sequence begins with 0 and 1 and then progresses forward. Fibonacci numbers can be developed recursively. Write out a recursive algorithm called **`Fibo(n)`** that returns the nth Fibonacci number. For example: **`Fibo(3)=1, Fibo(6)=5.`**

   Trace your algorithm for **`Fibo(10)`** and show all the intermediate steps.

5. Write a recursive algorithm **`sumL(myList)`** that takes a list of numbers and returns the sum of all its elements.

   For example: **`sumL([4,5,9,0])=18=4+5+9+0,`** **`sumL([])=0`**