

Lab Assignment 11 - 04/09/2009

Name: _____

Section: 8:00 11:00 12:30 6:30

Problem 1: Basic Recursion

Use recursion to calculate the greatest common divisor of two numbers, a and b , using the following pseudocode:

```
gcd(a, b)
    if b is zero, return a
    else return gcd(b, a % b)
```

Implement the method with prototype `int gcd(int a, int b)` in a source file `gcd.c` and write a `main` method to input a and b and output `gcd(a,b)`. The table below includes a few sample inputs and outputs.

a	b	gcd(a,b)
4	6	2
24	5	1
35	7	7

Problem 2: Double Recursion

Write a recursive method `int lucas(int n)` to take an integer n and output the value of $L(n)$, where the recursion is defined as:

$$L(n) = \begin{cases} 2 & \text{if } n = 0 \\ 1 & \text{if } n = 1 \\ L(n-1) + L(n-2) & \text{otherwise} \end{cases}$$

The value $L(n)$ is called the n th Lucas number, after some dead French guy.

Write your implementation in a file `lucas.c` including a `main` method that inputs a value n and outputs the value `lucas(n)`.

The table below lists the first eleven values of $L(n)$.

n	0	1	2	3	4	5	6	7	8	9	10
$L(n)$	2	1	3	4	7	11	18	29	47	76	123