Recursion

Example: Summing from $n$ to $k$ Let's write a recursive function that does simple math. Given two integers, $n$ and $k$, where $n \leq k$, find the sum of integers from $n$ to $k$, inclusive (e.g., if $n = 2$, and $k = 4$, our program will add $2 + 3 + 4$)

```c
int mySum (int n, int k) {

}
```

Problem 1: Computing the $n^{th}$ Fibonacci number
Translate the following into a recursive MIPS function.

```c
int fib (int n) {
    if (n <= 1)
        return n;
    else
        return fib (n - 1) + fib (n - 2);
}
```

```mips
fib: 
    bgt $a0, 1, fib recurse
    move $v0, $a0
    jr $ra

fib recurse
    sub $sp, $sp, 12
    sw $ra, 0($sp)
    sw $s0, 4($sp)
    sw $s1, 8($sp)
    move $s50, $a0
    sub $s50, $s50, 2
    jal fib
    move $s51, $v0
    sub $s90, $s50, 1
    jal fib
    add $v0, $v0, $s1
    lw $s51, 8($sp)
    lw $s50, 4($sp)
    lw $ra, 0($sp)
    add $s50, $s50, 12
```