

Recursion:

1. What does the following recursive function do?

```
public int function(int[] array, int n) {  
    if (n == 0)  
        return 0;  
    else  
        return function(array, n-1) + array[n-1];  
}
```

Try running the line below as the computer would:

```
int[] array = {5, 8, 2};  
int x = function(array, array.length);
```

What is x ?

2. Write a recursive function to compute the factorial function: $n! = n(n - 1)(n - 2) \cdots 1$.

3. The Fibonacci numbers are a sequence of integers where each entry is the sum of the previous two entries, starting with 1 and 1:

n	0	1	2	3	4	5	6	7	...
$F(n)$	1	1	2	3	5	8	13	21	...

Write a recursive function to compute the n^{th} Fibonacci number.

4. Write a recursive function to compute the greatest common divisor (GCD) of two numbers n and m . For example, $\text{GCD}(16,12) = 4$.

5. Redo each of the previous examples using tail recursion.