Algorithms Lab – Recursion

Overview

Use recursion to implement some methods.

Part 1

Implement methods using recursion. Make sure to call the methods in main to demonstrate that they work. Here are the methods (make them all static methods):

1. Factorial.

4! = 4 * 3 * 2 * 1

2. Fibonacci

Here are the Fibonacci numbers: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55,...

The function you write should return the nth Fibonacci number. For example:

 $Fib(0) \rightarrow 0$

 $Fib(3) \rightarrow 2$

 $Fib(6) \rightarrow 8$

Fib(9) → 34

3. Power

2⁵ = 32

Hint: Power can be done using multiplication.

- 4. Write a recursive function that prints the numbers 1 to n. It should take n as a parameter.
- 5. Summation Get the sum of all numbers from 1 to n.

Sum(4) = 10

6. arrayAdd – Given an array of int and an index. Write a recursive method that will add all of the elements of the given array up to the given index. You will need to declare an array of int in main to pass into this method. The method signature is:

static int addArray(int[] a, int index)

6. Write a recursive method to multiply two numbers together (do not worry about negative numbers). The function signature is:

static int mult(int a, int b)

Hint: Multiplication can be done using addition. For example, think about what 2 * 5 means.