CS164 – Worksheet Week 13: Recursion

Name:_____

1. What this program does? Write down each recursive call, its parameter and return for number = 3.

```
import java.util.Scanner;
public class Recursion {
    public static void recursiveCall(int number, int lowVal, int highVal) {
        int midVal;
        midVal = (highVal + lowVal) / 2;
        System.out.print(number);
        System.out.print(" ");
        System.out.print(midVal);
        if (number == midVal) {
            System.out.println(" f");
        }
        else {
            if (number < midVal) {
                System.out.println(" l");
                recursiveCall(number, lowVal, midVal);
            }
            else {
                System.out.println(" h");
                recursiveCall(number, midVal + 1, highVal);
            }
        }
    }

    public static void main(String[] args) {
        Scanner scnr = new Scanner(System.in);
        int number;
        number = scnr.nextInt();
        recursiveCall(number, 0, 10);
    }
}
```

2. Write a method that calculates the Fibonacci of n. Knowing that Fibonnacci of 0 or negative number returns 0, Fibonacci of 2 or 1 returns 1, and Fibonacci of a number greater than 2 is the sum of the two previous Fibonacci values.

3. How can we change the stringManipulator method to reverse the string backwards, meaning that we start from the end instead of the begin?

```
public static String stringManipulator(String str) {
    if (str.isEmpty()) return str;
    return stringManipulator(str.substring(1)) + str.charAt(0);
}
```

4. Write a recursive method that verifies if a String is a palindrome or not. A word is a **palindrome** if the letters in the word are symmetric.

5. Write exactly what is going to be printed in the program below. Draw the recursive calls to make sure that your answer is correct.

```
public class Recursion {
    public static void function1(int n)
    {
        if (n > 0) {
            function1(n - 1);
            System.out.print(" "+ n);
        }
    }

    public static void function2(int n)
    {
        if (n > 0)
        {
            System.out.print(n + " ");
            function2(n - 1);
        }
    }
   public static void main(String[] args)
    {
        int x = 3;
        function1(x);
        System.out.println();
        function2(x);
    }
}
```