CS164: Recursion and Sorting Worksheet
Name(s):_____

1. 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 function3(int n)
    {
        if (n > 0) {
            System.out.print(" "+ n);
            function3(n - 1);
            function3(n - 1);
        }
    }
    public static void funA(int n)
    {
        if (n > 0) {
            System.out.print(" " +n);
            funB(n - 1);
        }
    }
    public static void funB(int n)
    {
        if (n > 1) {
            System.out.print(" "  +n);
            funA(n / 2);
        }
    }
    public static void main(String[] args)
    {
        int x = 3;
        function1(x);
        System.out.println();
        function2(x);
        System.out.println();
        function3(x);
        System.out.println();
        funA(20);
    }
}
```

2. Write exactly what is going to be printed in the program below. Use paper and pencil to do a trace code, so you understand what is happening.

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```
public class Sort {
    public static void sort(int [] numbers) {
        int i;
        int j;
        int temp;
        for (i = 1; i < numbers.length; ++i) {
            j = i;
            while (j > 0 && numbers[j] > numbers[j - 1]) {
                temp = numbers[j];
                numbers[j] = numbers[j - 1];
                numbers[j - 1] = temp;
                --j;
            }
        }
    }

    public static void main(String [] args) {
        int [] numbers = {7, 4, 1, 7, 11};
        int i;
        System.out.print("Original: ");
        for (i = 0; i < numbers.length; ++i) {
            System.out.print(numbers[i] + " ");
        }
        System.out.println();
        sort(numbers);
        System.out.print("New: ");
        for (i = 0; i < numbers.length; ++i) {
            System.out.print(numbers[i] + " ");
        }
        System.out.println();
    }
}
```

3. What the method something does? Write exactly what is going to be printed in the program below. Use paper and pencil to do a trace code, so you understand what is happening.

```
public class Q3 {

public static int something(int a[], int i, int j)
{
    if (i == j)
        return i;
    int k = something(a, i + 1, j);
    return (a[i] < a[k])? i : k;
}
public static void main(String [] args) {
    int [] numbers = {7, 4, 1, 7, 11};
    System.out.println(something(numbers, 0, 4));
}
}
```