Midterm Examination 2
CS170: Introduction to Computer Science

Name (print): ___________________________

Observe the Emory College Honor Code while taking this test.

INSTRUCTIONS:
1. Do NOT communicate with anyone other than the professor / proctor for ANY reason in ANY language in ANY manner.
2. This exam is closed notes, closed books, and no calculator.
3. Turn all mobile devices off and put them away now. You cannot have them on your desk.

TIME:
This exam has 6 questions on 7 pages including the title page. Please check to make sure all pages are included. You will have 60 minutes to complete this exam.
Question 1. (15 pts)
Read the following programs, write the values that will be printed to the console:

```java
public class Test1 {
    public static void main(String[] args) {
        int a = 3, b = 4;
        int[] arrayA = { 0, 1, 2 };

        System.out.println("1 => " + compute(a, b));
        System.out.println("2 => " + compute(a, b, compute(a, b)));
        update(a);
        System.out.println("3 => " + a);

        int[] arrayB = arrayA;
        update(arrayB);
        System.out.println("4 => " + arrayA[0]);
        System.out.println("5 => " + arrayB[0]);
    }

    public static int compute(int x, int y, int z) {
        return x + y - z;
    }

    public static int compute(int x, int y) {
        return x + y;
    }

    public static int update(int a) {
        a = a + 10;
        return a;
    }

    public static void update(int[] x) {
        x[0] = x[1] + 3;
    }
}
```
**Question 2.** (15 pts)
Read the following programs, write the values that will be printed to the console:

```java
public class Test2 {
    static int a = 10;
    static boolean b = true;
    static double c = 2.5;

    public static void main(String[] args) {
        System.out.println("1 => " + a);
        print1(c);
        print2(a);
    }

    public static void print1(double a) {
        System.out.println("2 => " + a);
        b = false;
        int c = 1;

        if (b) {
            System.out.println("3 => " + (c + 1));
        } else {
            System.out.println("3 => " + (c - 1));
        }

        System.out.println("4 => " + Test2.b);
    }

    public static void print2(int a) {
        System.out.println("5 => " + Test2.c);
        System.out.println("6 => " + c);
    }
}
```
Question 3. (15 pts)
Read the following programs, write the values that will be printed to the console:

```java
public class Test3 {
    public static void main(String[] args) {
        int[] array = { 1, 2, 3, 4, 5, 6 };

        for (int i = 0; i < array.length / 2; i++) {
            array[i] = array[array.length / 2 + i];
            System.out.println(i + " => " + array[i]);
        }

        int i = array.length - 1;

        while (i >= 0) {
            if (array[i] % 2 == 1) {
                System.out.println(i + " => " + array[i]);
            }
            i--;
        }
    }
}
```
**Question 4.** (15 pts)

Read the following programs, write the values that will be printed to the console:

```java
public class Test4 {
    public static void main(String[] args) {
        int[][] array = new int[3][3];
        processArray(array);
    }

    public static void processArray(int[][] thisArray) {
        int x = 1;
        for (int i = 0; i < 3; i++) {
            for (int j = 0; j < 3; j++) {
                if (x % 2 == 1) {
                    System.out.println(x + "=>" + i + "," + j);
                }
                x++;
            }
        }
    }
}
```
**Question 5.** (20 pts)

Write a class method so that it reads three integer parameters, and then outputs the numbers in ascending order. This method will be invoked using this following syntax (20 pts)

For example:

```java
String outputString = sortThree(3, 1, 2);
System.out.println(outputString); // outputs string “1 2 3”
```
Question 6. (20 pts)
Write a class method so that it reads two string arrays, A and B. It outputs a string array as output.

This method compares pairs of strings at each position:

If the length of A[i] is bigger than the length of B[i], fill output[i] with “>”.
If the length of A[i] is smaller than the length of B[i], fill output[i] with “<”.
If the length of A[i] equals the length of B[i], fill output[i] with “=”.

The size of A and B could be different. If an array element doesn’t have corresponding element in the other array, fill output[i] with “?”.
This method will be invoked using this following syntax (20 pts)

For example:

String[] a = {“a”, “bb”, “ccc”};
String[] b = {“aaa”, “bb”, “c”, “a”};

String[] c = compareArray(a, b); // c -----> { “<”, “=”, “>”, “?” }