Name _____ CIS 201 Midterm II: Chapters 4-6

Directions: This is a closed book, closed notes midterm. Place your answers in the provided answer sheet. The point value for each question is indicated. You have 55 minutes for this midterm.

1. (9 pts) **Boolean Expression:**

   a. 3 > 5 + 2 || 4 < 5
   b. !(3 > 5 + 2 && 4 < 5)
   c. !(3 > 5 + 2) && ! (4 < 5)

2. (12 pts) Consider the following method.

```
public static void ifElseMystery(int x, int y) {
    int z  = 4;
    if (z <= x) {
        z = x + 1;
    } else {
        z = z + 9;
    }
    if (z <= y) {
       y++;
    }
    System.out.println(z + " " + y);
}
```

   What is the output of the following four calls?

   a. `ifElseMystery(3, 20);`

   b. `ifElseMystery(4, 5);`

   c. `ifElseMystery(5, 5);`

   d. `ifElseMystery(6, 10);`

3. (15 pts) Write a method called **CountFactors** that returns the number of factors of a given integer `n`. For example, `countFactors(12)` should return 6 because there are 6 values that divide 12 evenly: 1, 2, 3, 4, 6, and 12.

4. **(20 pts) runningSum** Write a static method called runningSum that accepts a string filename as parameter. The file will contain a sequence of real numbers and the method should output the running sum of the numbers followed by the maximum running sum. In other words, the nth number that you report should be the sum of the first n numbers in the file and the maximum that you report should be the largest such value that you had seen so far. For example, if the file contains the following data:
   3.25 4.5 -8.25 7.25 3.5 4.25 -6.5 5.25
   your method should produce the following output:
   running sum = 3.25 7.75 -0.5 6.75 10.25 14.5 8.0 13.25
   max sum = 14.5

5. (15 pts) Consider the following code. What range of values can each variable (`a, b, c, d,` and `e`) have? Specify ranges with a dash i.e. "1 - 10" and separate multiple numbers with commas i.e. "1,2,3,4,5,etc..."

```
Random rand = new Random();

   1. int a = rand.nextInt(100);

   2. int b = rand.nextInt(20) + 50;

   3. int c = rand.nextInt(20 + 50);

   4. int d = rand.nextInt(100) - 20;

   5. int e = rand.nextInt(10) * 4;
```

6. (15 pts) For each of the five points labeled by comments, identify each of the assertions in the table given in the answer sheet as either being *always* true, *never* true, or *sometimes* true / sometimes false.

```
public static int stuff(Random r, int m) {
    int c = 0;
    int t = 0;
    int d = r.nextInt(m);

    // Point A
    while (c <= 3) {
        // Point B
        d = r.nextInt(6) + 1;
        if (d <= m) {
            c++;
            // Point C
        } else {
            c = 0;
            // Point D
        }
        t++;
    }

    // Point E
    return t;
}
```

7. (14 pts) Write a method called WriteFile that takes a string file name as input and writes the contents of the file to another file named output.txt.