CS 101 Fall 2006 Midterm 2   Name: _____   Email ID: _____

You only need to write your name and e-mail ID on the first page.

This exam is CLOSED text book, closed-notes, closed-calculator, closed-neighbor, etc. Questions are worth different amounts, so be sure to look over all the questions and plan your time accordingly. Please sign the honor pledge here:

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Note: When an integer type is required use `int`*, when a floating-point type is required use* `double`*. If we don't specify an aspect of the problem, you can choose it.*

Note: If you are still writing on the exam after "pens down" is called – even if it is just to write your name – then you will receive a zero on this exam. No exceptions!

1. [3 points] What lab section are you in?

____ CS 101-E   ____ CS 101-4 (lab 2:00–3:30 p.m. Fri)

____ CS 101-2 (lab 7:00–8:30 p.m. Thu)   ____ CS 101-5 (lab 10:00–11:30 a.m. Fri)

____ CS 101-3 (lab noon–1:30 p.m. Fri)   ____ CS 101-6 (lab 2:00–3:30 p.m. Thu)

2. [15 points. 3 points each]. Consider the following class. This question itself is on the next page, and asks you to answer questions about the behavior of this class.

```java
class Test1 {

    public static void main(String args[]) {
        // line 1
        if ((1==2) && bool1())
            System.out.println("Yeah!");

        // line 2
        if ((.1+.1+.1+.1+.1+.1+.1+.1+.1+.1)==1.0)
            System.out.println("Math works!");
        else
            System.out.println("Math broke.");

        // line 3
        if (bool1() && bool2())
            System.out.println("They're so rad!");

        // line 4
        if (bool2() && bool1())
            System.out.println("They're so bad!");

        // line 5
        if (bool2() || bool1())
            System.out.println("Giants of logic and computatability!");
    }

    public static boolean  bool1() {
        System.out.println("George Boole, my hero! ");
        return true;
    }

    public static boolean bool2() {
        System.out.println("Kurt Godel, never lied, no!");
        return false;
    }

}
```

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Question 2, continued

a. What output is produced when the first `if` statement (line 1) executes?

b. Same question for the second `if` (line 2)?

c. Same question for the third `if` (line 3)?

d. Same question for the fourth `if` (line 4)?

e. Same question for the last `if` (line 5)?

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3. [10 points] Suppose you're given the following class. Your job is to write the code in the indicated place. Be very careful. Your program must compile and work correctly to receive full credit.

```
import java.util.*;
class Test2 {
    public static void main(String args[]) {
        // Your code goes here
    }
}
```

Write the code needed to make the program behave as follows. (1) The program prompts the user to input an integer value; (2) An integer value is read from the standard input; (3) If the value is even, the program outputs the string "Even" otherwise – in the case where the value is odd – (a) if the value is greater than 11, the program outputs "Big and Odd", and (b) if the value is not greater than 11 the program outputs the string "Small and Odd".

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4. [5 points] The following code won't *compile*. Why? Your answers should be 20 words or less!

```
class Test3 {
    public static void doit() {
        while (false) {
            int n = 0;
        }
        System.out.println(n);
    }
}
```

5. [10 points total; 5 points each] Consider the following code then answer the questions below.

```
class Test4 {
    public static void main(String args[]) {
        int n = 0;
        foo(n);
        System.out.println(n);
        // System.out.println(k);
    }

    public static void foo(int x) {
        int n = 2;
        int k = 3;
        ++x;
    }
}
```

a. What does the program print? Explain in one short sentence why.

b. What would happen if we were to remove the comment marker "//" before the second `println` call and then try to compile and run the program? (In other words, what would happen if we included the statement as part of the program?) Explain in one short sentence what happens and why.

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6. [8 points] What output does the following code produce? Show the output as the program would actually format it. Assume the code is in a `main()` method in a class.

```
for (int i = 1; i < 4; i++) {
    for (int j = 1; j < i; j++) {
        System.out.print(" " + i*j);
    }
    System.out.println("");
}
```

7. [10 points] Write a `while` loop that accepts integers from the user until the user enters a zero value. Hint: Consider using the `break` statement.

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8. [15 points] provide the code for the following *dispatch* method. Use a single switch statement. This method takes a single integer value as a parameter. If the value is *1* the method should output "Menu choice 1 entered" and then return. If the value is *2*, the method should output "Menu choice 2 entered" and then return. If the value is *3* the method should output "Menu choice 3 entered" and then return. Otherwise the method should just return.

```
public static void dispatch(int choice) {
    // your code goes here
```

```
}
```

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9. [8 points, 2 points each] What is the value of each of the following expressions?

   a. `((true || false) && (false || true))`

   b. `(3 <= 3)`

   c. `(1 + 2 * 3 / 2 - 1)`

   d. `(new String("I love CS!") == new String("I love CS!"))`

10. [8 points, 4 points each] Consider the method call: `foo(i)`. We'll assume that `foo()` has been properly defined, and that `i` is an integer variable. Your answers should be 20 words or less!

    a. Under what conditions can the value in `i` be changed by the method `foo()`?

    b. Under what conditions can the value in `i` not be changed by the method `foo()`?

11. [8 points, 4 points each] Consider the following code. We'll assume that `bar()` has been properly defined. Your answers should be 20 words or less!

    ```
    Rectangle r = new Rectangle (10, 20, 30, 40);
    bar (r);
    ```

    a. What parts of the parameter `r` can be changed by the method call?

    b. What parts cannot be changed?

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