Final Score _____

Name _____   ID _____   Extra Credit _____

Section (circle one):   MW 8:30-9:50   TTh 9:30-10:50   TTh 11:00-12:20

CSCI 201L Final – Written
Fall 2016
10% of course grade

1. **Inner Classes** – Anonymous inner classes are very commonly used with event-driven programming in Java. There is no requirement to use them though.
   a. Give two reasons why using anonymous inner classes are beneficial. **(0.5% + 0.5%)**
   Reason #1

   Reason #2

   b. Give one situation when using anonymous inner classes is not recommended. **(0.5%)**

2. **Software Engineering** – Many project managers may oppose the idea of pair programming as costing more than individual programming for producing the same number of features. Give two reasons why pair programming would not cost the company more than individual programming. **(0.5% + 0.5%)**

   Reason #1

   Reason #2

3. **Networking Theory** – For some odd reason, you decide to have Bruce Bruin, a UCLA student, as a roommate. Bruce tells you that you need to call the ISP to get another public IP address because there is only one public IP address right now, which is on his computer. As you start to explain how DHCP works, he asks you the following questions.

```
IP –   143.208.14.212
IP –   1000 1111  1101 0000  0000 1110  1101 0100
```

    a. "My IP address is 143.208.14.212. Could that be the external IP address on the router?" **(0.5%)**

    b. "What is the network address?" Provide this in the dotted IP notation, not in binary. **(0.5%)**

    c. "What will the subnet mask be for our internal network?" Assume that you are given one public IP address from your ISP, and you are using DHCP with private IP addresses internally for the two computers. Provide this in the dotted IP notation AND slash notation, not in binary. **(0.5% + 0.5%)**

4. **Databases and SQL** – Answer the following questions concerning the database below.

Here is the Book table.

bookID	title	author	isbn	numCopies
1	Tonight on the Titanic	Mary Pope Osborne	978-0-606-16894-6	3
2	Afternoon on the Amazon	Mary Pope Osborne	978-0-679-86372-9	1
3	Balto of the Blue Dawn	Mary Pope Osborne	978-0-553-51085-0	2
4	Happy Birthday, Bad Kitty	Nick Bruel	978-0-545-29863-6	2
5	Bad Kitty Does Not Like Candy	Nick Bruel	978-1-62672-230-9	1
6	Bad Kitty Drawn to Trouble	Nick Bruel	978-1-62672-117-3	2

Here is the User table.

userID	username
1	jimmy
2	joannie
3	johnny
4	jenny

Here is the CheckedOut table.

checkedOutID	bookID	userID	numCheckedOut
1	3	4	1
2	3	3	1
3	1	1	2
4	2	2	1

a. Write the SQL code to insert 4 copies of <u>Moby Dick</u> by Herman Melville with an ISBN of 978-8-124-80048-5 into the Book table. **(0.5%)**

b. Draw the table that is returned from the following query **after** the insert statement from part a has executed. **(0.5%)**
```
SELECT b.title, co.numCheckedOut
  FROM Book b, CheckedOut co
  WHERE b.bookID=co.bookID;
```

5. **JDBC –** Give two advantages to using prepared statements with JDBC instead of just using statements. **(0.5% + 0.5%)**

   Advantage #1

   Advantage #2

6. **Concurrent Computing –** What is the major difference between parallel computing and distributed computing with respect to memory? **(0.5%)**

7. **Multi-Threading and Parallel Programming** – In class we talked about the primary *purpose* of multi-threading and parallel programming. What are they? **(0.5% + 0.5%)**

   Primary purpose of multi-threaded programming

   Primary purpose of parallel programming

8. Multithreading – Give two rules that will always be true about the output of the following program. **(0.5% + 0.5%)**

```java
import java.util.ArrayList;
import java.util.concurrent.Semaphore;

public class Problem8 extends Thread {
    public static ArrayList<Integer> al = new ArrayList<Integer>();
    public static Semaphore sem = new Semaphore(4);
    private int num;
    public Problem8(int num) {
        this.num = num;
    }
    public void run() {
        try {
            sem.acquire();
            System.out.println(num + " starting ");
            for (int i=0; i < al.size(); i++) {
                System.out.println(al.get(i));
            }
        } catch(InterruptedException ie) {

        } finally {
            System.out.println(num + " ending ");
            sem.release();
        }
    }
    public static void main(String[] args) {
        for (int i=0; i < 5; i++) {
            al.add(i);
        }
        for (int i=0; i < 100; i++) {
            Problem8 p8 = new Problem8(i);
            p8.start();
        }
    }
}
```

Rule #1

Rule #2

9. Distributed Programming – RMI requires a security policy to be set on both server and client RMI programs. Explain why client RMI programs need to have a security policy set. **(1.0%)**

Extra Credit Questions
Extra credit is applied after the curve so does not affect other students.

10. Extra Credit – This is the first semester that we assigned students in the group project in an attempt to more accurately mimic the real world. Do you think that was a good decision or do you think it would have been better for students to be able to select their own groups? Explain your answer. **(0.5%)**