

Name _____	ID _____	Final Score _____	
		Extra Credit _____	
Section (circle one):	MW 8:30-9:50	TTh 9:30-10:50	TTh 11:00-12:20

CSCI 201L Final – Written
Spring 2017
12% of course grade

1. Servlets – Explain the difference between a GET and POST form submission. Give one reason why a programmer would choose to use a GET and one reason why a programmer would choose to use a POST. **(0.5% + 0.5% + 0.5%)**

Difference

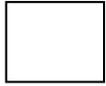
Why programmer would choose to use GET

Why programmer would choose to use POST

2. Software Engineering – The Mythical Man-Month by Fred Brooks claims that it takes 9 times as long to create a software product system compared to just creating a program. Give two reasons why it takes significantly longer to create a software product system. **(0.5% + 0.5%)**

Reason #1

Reason #2



3. **AJAX and Web Sockets** – AJAX and Web Sockets both allow a web page to be updated without needing to refresh the page. Explain what AJAX is and what Web Sockets are. Why would a programmer choose to use one over the other? (**0.5% + 0.5% + 0.5%**)

Define AJAX

Define Web Sockets

Why programmer would choose AJAX

Why programmer would choose Web Sockets



4. **Concurrent Programming** - What is the primary goal of each of the three types of concurrent programming? (**0.5% + 0.5% + 0.5%**)

Multi-threading

Parallel

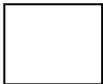
Distributed



5. Networking Theory – Assume you are given the following IP address and subnet mask.

IP – 120.192.168.50
IP – 0111 1000 1100 0000 1010 1000 0011 0010
Subnet Mask – 255.255.248.0
Subnet Mask – 1111 1111 1111 1111 1111 1000 0000 0000

- a. What class IP address is given? What is the network address? **(0.5%)**
- b. Is the IP address public or private? **(0.5%)**
- c. How many hosts can be on the subnetwork? **(0.5%)**
- d. What is the network and subnetwork combination? **(0.5%)**



6. Synchronization – Explain how the following code can throw a `ConcurrentModificationException`. **(0.5%)**

```
1 class Question6 extends Thread {
2     private static Set<Integer> hashSet =
3         Collections.synchronizedSet(new HashSet<Integer>());
4     private static Lock lock = new ReentrantLock();
5     public Question6(int num) {
6         hashSet.add(num);
7     }
8     public void run() {
9         lock.lock();
10        try {
11            Iterator<Integer> iterator = hashSet.iterator();
12            while (iterator.hasNext()) {
13                System.out.print(iterator.next() + " ");
14            }
15        } finally {
16            lock.unlock();
17        }
18    }
19 }
```



7. **Locks** – In the following code, assume a thread calls the method `foo()`. Answer the questions that follow the code. (0.25% + 0.25% + 0.25% + 0.25%)

```
1 import java.util.concurrent.locks.Lock;
2 import java.util.concurrent.locks.ReentrantLock;
3 public class Question7 {
4     private Lock lock = new ReentrantLock();
5     public void foo() {
6         try {
7             lock.lock();
8             System.out.println("foo 1");
9             bar();
10            System.out.println("foo 2");
11        } finally {
12            lock.unlock();
13        }
14    }
15
16    public void bar() {
17        try {
18            lock.lock();
19            System.out.println("bar");
20        } finally {
21            lock.unlock();
22        }
23    }
24
25    public static void main(String [] args) {
26        Question7 q7 = new Question7();
27        q7.foo();
28    }
29 }
```

- a. Does `foo 1` get printed? Yes No
- b. Does `bar` get printed? Yes No
- c. Does `foo 2` get printed? Yes No
- d. If yes, explain why `foo 2` is printed. If not, what happens?



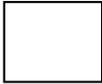
8. **Multi-Threaded Programming** – Look at the following code then answer the questions below. (0.5% + 0.5%)

```
1 import java.util.concurrent.locks.Lock;
2 import java.util.concurrent.locks.ReentrantLock;
3
4 public class Question8 {
5     private Lock lock = new ReentrantLock();
6     public synchronized void foo() {
7         try {
8             lock.lock();
9             System.out.println("foo");
10        } finally {
11            lock.unlock();
12        }
13    }
14    public void bar() {
15        try {
16            lock.lock();
17            synchronized(this) {
18                System.out.println("bar");
19            }
20        } finally {
21            lock.unlock();
22        }
23    }
24 }
```

- a. Is there a chance of deadlock? Yes No
- b. If yes, explain how? If no, what are all the possible outputs?



9. **Conditions** – There are two ways to wake up a thread that is waiting on a condition – `signal()` and `signalAll()`. Since we don't have control over the order threads are switched into the CPU from the Ready state, why would we ever call `signal()` instead of `signalAll()`? (0.5%)



10. 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 represent jenny checking out the book Happy Birthday, Bad Kitty. (0.5%)

- b. Draw the table that is returned from the following query **after** the SQL statement from part a has executed. (0.5%)

```
SELECT b.title, co.numCheckedOut
FROM Book b, CheckedOut co
WHERE b.bookID=co.bookID;
```

Extra Credit Questions

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

Extra Credit – For the final project, we required weekly meetings with your assigned CP. **(0.25%)**

Did you think these meetings were beneficial? Yes No

Please explain.

Extra Credit – This is the first semester we have included web development in the course. **(0.25%)**

Do you think this was a positive change? Yes No

How do you think we can improve on this change?