Quiz 3, CSCI 210, Spring 2004

Name: _____

1. [8 pts] At right, complete the Java program so that it runs two threads. One thread should execute the following code to continually update. `total`

```
for(int i = 1; true; i++) total += i;
```

The other thread should execute the following code to periodically display the current `total`.

```
while(true) {
    System.out.println(total);
    try { Thread.sleep(40);
    } catch(InterruptedException e) {}
}
```

Hint: The `main` method runs in its own thread. After it initiates a thread for one of the tasks, `main` can continue on to perform the the other task in its own thread.

```
public class Counter extends Thread {
    static int total = 0;

    public static void main(String[] args) {

    }
}
```

2. [7 pts] How is a D flip-flop's behavior different from a D latch's behavior?

3. Using a JK flip-flop, design a circuit that takes as inputs, in addition to a clock, two wires a and b representing two buttons. Each button input is 1 when the button is pressed and 0 at other times. The circuit should "remember" which of a and b was most recently pressed. That is, when the user presses a during a clock's change, the circuit should continue emitting 0 until the user presses b during the clock's change, at which time its output should change to 1. When the user presses both buttons simultaneously, your circuit should treat this as if neither button were being pressed.

Show your intermediate work.

a	b	old Q	new Q	J	K
0	0	0			
0	0	1			
0	1	0			
0	1	1			
1	0	0			
1	0	1			
1	1	0			
1	1	1			
expressions					

transition table

J	K	new Q
0	0	old Q
0	1	0
1	0	1
1	1	$\overline{\text{old } Q}$

activation table

old Q	new Q	J	K
0	0	0	d
0	1	1	d
1	0	d	1
1	1	d	0