CS5250 Advanced Operating Systems

Pop Quiz 8

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Consider the following piece of pseudo code:

```
…
R1 ← <var X in memory>
R1 ← R1 + 1
<var X in memory> ← R1
…
```

Suppose there are two threads executing this code in parallel. Show what can go wrong. Then suppose there is a lock that is used locked before these three lines and unlocked afterwards. Show how the problem is fixed.

Thread 1	Thread 2
R1 ← X	
R1 ← R1 + 1	
	R1 ← X
	R1 ← R1 + 1
X ← R1	
	X ← R1

in the case above, even though we add R1 2 times, we only add the value by one in the end. This happens because thread 1 write is overwrite by thread 2.

If we have a lock, thread 1 write will happen before thread 2 read, or the other way around. That way, whichever reading later will read the value which already been incremented