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To prove the correctness of my solution, three items need to be shown to be true:

- 1) Mutual exclusion
- 2) Progress
- 3) Bounded waiting

- 1) Mutual exclusion is preserved because counter->value is only modified when it enters the critical section when &mutex is unlocked (if (pthread\_mutex\_trylock(&mutex) == 0)) and locks while either thread 1 or thread 2 is manipulating the global values. Once the values are updated then the mutex is released with pthread\_mutex\_unlock(&mutex) and the other thread can grab the lock and enter the critical section. Therefore only 1 thread can enter the critical section at a time.
- 2) Progress is made as both threads attempt to grab the lock with (pthread\_mutex\_trylock(&mutex) == 0) and if the lock is available (ie. == 0) then the thread enters the critical section and therefore progress is made.
- 3) Bounded waiting is achieved when Thread1 exits the critical section and releases the mutex. Thread 2 can now grab the mutex and proceed to the critical section.

Therefore the solution that I have provided fits the criteria for a correct solution to the critical section problem.