CSCI E-55 HW4 Yang Chen

1. Why does the NO_LOCKING test succeed for one thread and fail for 2-20 threads? (It is possible that you will see some successes for larger number of threads. But if you see no failures, then something is amiss.)

When there is only one thread, the account is being accessed and modified by only one operation. However, when there are more than one thread, one account could be accessed and modified by several different operations at the same time. When more than one operations are updating account information at the same time without locking the account, some updates could be lost. Therefore, the test shows broke for 2-20 threads.

2. How do you explain the change in performance for LOCK_BANK as threads increase from 1 to 20.

The transaction speed went down as the thread number went up.

The whole operation is locked into one synchronized block. Therefore, each thread has to wait for the previous thread to completely finish the transaction in order to start. There is no really synchronize in the operation. So 1 thread or 20 threads should have the same speed. However, I think, with more threads, the program need to use time to schedule the threads, therefore, slowdown the transaction.

3. How does the performance of LOCK_BANK compare to that of LOCK_ACCOUNTS? How do you explain this?

The speed of LOCK_ACCOUNTS is faster than LOCK_BANK except when there is only one thread.

When there are multiple threads, LOCK_ACCOUNTS only locks the individual accounts involved in the transaction, therefore, different threads, if they are dealing with different accounts, won’t be blocked and can perform the operation simultaneously. LOCK_BANK on the other hand, locks the whole operation, when one thread is operating, all the other threads are blocked. Therefore, when there are multiple threads, LOCK_ACCOUNTS is faster.

When there is only one thread, the two operation should be the same. But LOCK_ACCOUNTS takes more time to synchronized two accounts, compared to LOCK_BANK only synchronized one whole operation. Therefore, LOCK_ACCOUNTS is slower with only one thread.