Quiz 4: Transaction Management [40pts]

1. [10pts] For the following questions, clearly circle True or False.

1. Using 2PL guarantees that there will be no deadlocks during a concurrent execution of transactions.
   
   True [ ] False [X] 

2. All four SQL isolation levels guarantee that there will be no dirty reads during a concurrent execution of transactions.
   
   True [ ] False [X] 

3. The database is allowed to become temporarily inconsistent in the middle of a transaction execution.
   
   True [X] False [ ] 

4. Serializability of a transaction schedule implies recoverability.
   
   True [X] False [ ] 

5. WW conflicts cannot arise if all transactions perform blind writes.
   
   True [X] False [ ] 

2. [10pts] Consider the following two transactions and the given interleaved schedule:

   T1 : R(A), W(A), R(B), W(B), Commit
   T2 : R(B), R(C), W(C), W(B), Commit

R_{T_1}(A), R_{T_2}(B), R_{T_2}(C), W_{T_1}(A), R_{T_1}(B), W_{T_1}(B), W_{T_2}(C), W_{T_2}(B), Commit_{T_1}, Commit_{T_2}

Is the schedule serializable? If you claim yes, write an equivalent serial (non-interleaved) execution of the two transactions. If you claim no, explain why it is not serializable.

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3. [10pts]: Give a clear example of an interleaved schedule with three transactions on a database with three distinct data objects A, B, and C such that the schedule has some concurrency but still satisfies Strict 2PL. Both of your transactions should have at least 2 write actions on at least two distinct data objects.

4. [5pts]: In terms of the ACID properties, explain briefly why recoverability of a schedule is important.

5. [5pts]: Out of WW, WR, and RW(R) conflicts, which ones are avoided by the READ COMMITTED isolation level of SQL?