414 Section 7 Worksheet

1. Consider a concurrency control manager that uses strict two phase locking that schedules three transactions:

- *T1 : R1(A), R1(B), W1(A), W1(B), Co1*
- *T2 : R2(B), W2(B), R2(C), W2(C), Co2*
- *T3 : R3(C), W3(C), R3(A), W3(A), Co3*

Each transaction begins with its first read operation, and commits with the *Co* statement. Answer the following questions for each of the schedules below:

- Is this schedule possible under a strict 2PL protocol?
- If strict 2PL does not allow this schedule because it denies a read or write request, is the system in a deadlock at the time when the request is denied?

Note: A common question is if conflict serializability implies the schedule is possible under a strict 2PL protocol, and the answer is Conflict Serializable -/-> strict 2PL but strict 2PL → Conflict Serializable

a. <u>Schedule 1:</u>
R2(B), W2(B), R3(C), W3(C), R3(A), W3(A), Co3, R2(C), W2(C), Co2, R1(A), R1(B), W1(A), W1(B), Co1

i. Is it possible under strict 2PL?

ii. Does strict 2PL lead to a deadlock?

b. <u>Schedule 2:</u>
R2(B), W2(B), R3(C), W3(C), R1(A), R1(B), W1(A), W1(B), Co1, R2(C), W2(C), Co2, R3(A), W3(A), Co3

i. Is it possible under strict 2PL?

ii. Does strict 2PL lead to a deadlock?

2. A read-only transaction is a transaction that only reads from the database, without writing/inserting deleting. Answer the questions below by circling the correct answer.

i. If all transactions are read-only, then every schedule is serializable.

TRUE or FALSE

ii. Only one transaction can hold a shared lock on the same item at any time.

TRUE or FALSE

iii. Only one transaction can hold an exclusive lock on the same item at any time.

TRUE or FALSE