Transaction Practice Questions

Question:

Draw the serializability (precedence) graphs for schedules given below, and state whether each schedule is serializable or not. If a schedule is serializable, write down the equivalent serial schedule(s).

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S1: r1 (X); r2 (Z); r1 (Z); r3 (X); r3 (Y); w1 (X); w3 (Y); r2 (Y); w2 (Z); w2 (Y); S2: r1 (X); r2 (Z); r3 (X); r1 (Z); r2 (Y); r3 (Y); w1 (X); w2 (Z); w3 (Y); w2 (Y); S3:r1(X); r3(X); w1(X); r2(X); w3(X);
```

Question:

Consider schedules S3, S4, and S5 below. Determine whether each schedule is strict, cascadeless, recoverable, or nonrecoverable. (Determine the strictest recoverability condition that each schedule satisfies.)

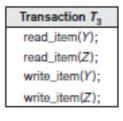
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S3: r1 (X); r2 (Z); r1 (Z); r3 (X); r3 (Y); w1 (X); c1; w3 (Y); c3; r2 (Y); w2 (Z); w2 (Y); c2; S4: r1 (X); r2 (Z); r1 (Z); r3 (X); r3 (Y); w1 (X); w3 (Y); r2 (Y); w2 (Z); w2 (Y); c1; c2; c3; S5: r1 (X); r2 (Z); r3 (X); r1 (Z); r2 (Y); r3 (Y); w1 (X); c1; w2 (Z); w3 (Y); w2 (Y); c3; c2;
```

Question:

How many *serial* schedules exist for the three transactions in Figure given below? What are they? What is the total number of possible schedules?

Transaction T ₁
read_item(X);
write_item(X);
read_item(Y);
write_item(Y);

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read_item(Z);
read_item(Y);
read_item(Y);
write_item(X);
read_item(X);
write_item(X);
```



Question:

Why is an explicit transaction end statement needed in SQL but not an explicit begin statement?

Question:

Prove that the basic two-phase locking protocol guarantees conflict serializability of schedules. (*Hint*: Show that if a serializability graph for a schedule has a cycle, then at least one of the transactions participating in the schedule does not obey the two-phase locking protocol.)

Question:

What is the two-phase locking protocol? How does it guarantee serializability?

Question:

What are some variations of the two-phase locking protocol? Why is strict or rigorous two-phase locking often preferred?

Question:

Describe the wait-die and wound-wait protocols for deadlock prevention.