DBMS ISA

wankhedejanhavi2@gmail.com Switch account

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Email *

☑ Record **wankhedejanhavi2@gmail.com** as the email to be included with my response

PRN *

2141027

Name *

Janhavi Ramesh Wankhede

Consider two transactions T1 and T2, and four schedules S1, S2, S3, S4 of T1 and T2 as given below: * 1 point

T1 = R1[X] W1[X] W1[Y]

T2 = R2[X] R2[Y] W2[Y]

S1 = R1[X] R2[X] R2[Y] W1[X] W1[Y] W2[Y]

S2 = R1[X] R2[X] R2[Y] W1[X] W2[Y] W1[Y]

S3 = R1[X] W1[X] R2[X] W1[Y] R2[Y] W2[Y]

S1 = R1[X] R2[Y]R2[X]W1[X] W1[Y] W2[Y]

Which of the above schedules are conflict-serializable?

- ○ S1 and S2
- ○ S3 only
- ○ S2 and S3
- ◉ S4 only

Consider the following transactions with data items P and Q initialized to zero: * 1 point

T1: read (P) ; read (Q) ; if P = 0 then Q : = Q + 1 ; write (Q) ; T2: read (Q) ; read (P) ; if Q = 0 then P : = P + 1 ; write (P) ;

Any non-serial interleaving of T1 and T2 for concurrent execution leads to

- ○ A serializable schedule
- ◉ A schedule that is not conflict serializable
- ○ A conflict serializable schedule
- ○ A schedule for which a precedence graph cannot be drawn

Which of the following statements are TRUE about an SQL query? * 1 point

P: An SQL query can contain a HAVING clause even if it does not a GROUP BY clause

Q: An SQL query can contain a HAVING clause only if it has a GROUP BY clause

R: All attributes used in the GROUP BY clause must appear in the SELECT clause

S: Not all attributes used in the GROUP BY clause need to appear in the SELECT clause

- ( ) P and R
- (•) P and S
- ( ) Q and R
- ( ) Q and S

Which of the following can be addressed by enforcing a referential integrity constraint? * 1 point

- ( ) All phone numbers must include the area code
- ( ) Certain fields are required (such as the email address, or phone number) before the record is accepted
- (•) Information on the customer must be known before anything can be sold to that customer
- ( ) Then entering an order quantity, the user must input a number and not some text (i.e., 12 rather than ‘a dozen’)

Ensuring atomicity is the responsibility of the ------------------------component * 1 point

- ( ) File Manager
- ( ) Buffer Manager
- ( ) DBA
- (•) Transaction Manager

Consider a relational table R that is in 3NF, but not in BCNF. Which one of the following statements is TRUE? * 1 point

- ( ) A cell in R holds a set instead of an atomic value.
- (•) R has a nontrivial functional dependency X−>A, where X is not a superkey and A is a non-prime attribute and X is a proper subset of some key.
- ( ) R has a nontrivial functional dependency X−>A, where X is not a superkey and A is a non-prime attribute and X is not a proper subset of any key.
- ( ) R has a nontrivial functional dependency X−>A, where X is not a superkey and A is a prime attribute.

The following functional dependencies are given. * 1 point
AB→CD,AF→D,DE→F,C→G,F→E,G→A

Which one of the following options is false?

- ( ) {AB}+ ={ACDEFG}
- ( ) {BG}+={ABCDG}
- (•) {AF}+ = {ACDEFG}
- ( ) {AB}+ = {ABCDG}

Relation R has eight attributes ABCDEFGH. Fields of R contain only atomic values. F = {CH -> G, A -> BC, B -> CFH, E -> A, F -> EG} is a set of functional dependencies (FDs) so that F+ is exactly the set of FDs that hold for R. How many candidate keys does the relation R have? * 1 point

- (selected) 3
- 4
- 5
- 6

Consider the following two statements about database transaction schedules: * 1 point

I. Strict two-phase locking protocol generates conflict serializable schedules that are also recoverable.

II. Timestamp-ordering concurrency control protocol with Thomas Write Rule can generate view serializable schedules that are not conflict serializable.

Which of the above statements is/are TRUE?

- (selected) Both I and II
- I only
- II only
- Neither I nor II

Which of the following concurrency control protocols ensure both conflict serializability and freedom from deadlock? I. 2-phase locking II. Time-stamp ordering * 1 point

- (selected) Both I and II
- I only
- II only
- Neither I nor II

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