

Name

CWID

Test Questions

Nov 26th

CS425 - Database Organization

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1.1 1.2 1.3 1.4

Sum

Part 1.1 Normalization and Functional Dependencies (Total: 0 Points)

Consider the following relation $R(A, B, C, D)$ and functional dependencies F that hold over this relation.

$$F = A \rightarrow B, D$$

$$C, D \rightarrow B$$

$$C \rightarrow D$$

$$B \rightarrow D$$

Question 1.1.1 (0 Points)

Determine all candidate keys of R .

Question 1.1.2 (0 Points)

Compute the attribute cover of $X = \{C, B\}$ according to F .

Question 1.1.3 (0 Points)

Compute the canonical cover of F . Show each step of the generation according to the algorithm shown in class.

Question 1.1.4 (0 Points)

In which normal form is relation R (recall that a relation can be in multiple normal forms).

- 2NF
- 3NF
- BCNF

Question 1.1.5 (0 Points)

If R is not in 3NF then decompose it.

Question 1.1.6 (0 Points)

If you have composed R in the previous step then determine the candidate keys for each relation created during the decomposition.

Part 1.2 Concurrency Control (Total: 0 Points)

Question 1.2.1 (1 Point)

For each of the following schedules determine which properties this schedule has. E.g., a schedule may be *recoverable* and *cascade-less (strict)* or *conflict-serializable*. Consider the following notation for operations of transactions:

$w_1(A)$ transaction 1 wrote item A
 $r_1(A)$ transaction 1 read item A
 c_1 transaction 1 commits
 a_1 transaction 1 aborts

$$S_1 = r_1(A), w_2(A), r_1(B), c_1, w_3(B), r_3(B), w_3(A), c_3, r_2(C), c_2$$

$$S_2 = r_1(A), w_2(B), r_1(B), c_1, c_2$$

$$S_3 = r_1(A), w_2(B), c_2, r_1(B), w_1(B), c_1$$

$$S_4 = w_1(A), w_2(A), c_2, w_1(A), c_1$$

- S_1 is recoverable
- S_1 is cascade-less
- S_1 is conflict-serializable
- S_2 is recoverable
- S_2 is cascade-less
- S_2 is conflict-serializable
- S_3 is recoverable
- S_3 is cascade-less
- S_3 is conflict-serializable
- S_4 is recoverable
- S_4 is cascade-less
- S_4 is conflict-serializable

Question 1.2.2 Create a Strict Schedule (8 Points)

Consider the following set of transactions:

$$T_1 = r_1(A), w_1(A), c_1$$

$$T_2 = r_2(B), r_2(A), w_2(B), w_2(A), c_2$$

$$T_3 = r_3(B), w_3(B)$$

1. Write a cascade-less history involving these three transactions.

Question 1.2.3 (1 Point)

Check all correct statements below

- In a cascade-less schedule if a transaction T_j read a data item written by transaction T_i then the commit of T_i has to be before this read operation of T_j
- A recoverable schedule is also cascade-less
- Not all conflict-serializable schedules are also 2PL
- Under 2PL a transaction is split into three phases, a first growing phase, a shrinking phase, and a second growing phase
- Every SS2PL schedule is also 2PL