

DBMS (CS-210) ENDSEM EXAM

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1) Using empname as a clustered index is possible only when every employee will have a unique name. If this happens, then the tuples will be organized according to empname alphabetically.

Using empid as a clustered index is definitely possible considering everyone already having a specific unique id assigned. The tuples will be organized according to empid.

Using both empname and empid as clustered indices may not be possible but it is possible to have a clustered index and one non-clustered index.

2)

- DDL is important in representing information in DBMS because it is used to describe external and logical schemas.

- DML is used to update and manipulate data. It is not important for representing data.

3) True, A DBMS is typically shared among many users. Transactions from these members (users) can be interleaved to improve the execution time. By interleaving queries, users do not have to wait for other user's transaction to be completed before their own transactions start.

For example, if there is no interleaving, User A starts a transaction which takes 10-15 seconds, and another user wants to do a transaction, they have to wait until user A completes.

4) a) A user must guarantee that their transaction does not corrupt data or insert malware into the respected database.

For Example, in a banking database, a user must guarantee that a cash withdraw transaction models the amount a person removes from their account. The database would be worthless if a person withdrew 200 ₹ from a balance of 10000 ₹ but the transaction shows ~~the~~ the balance wrong (like nil or 5000).

b) A DBMS must guarantee that transactions are executed safe/securely and independent of other transactions. The main property of a DBMS is that a transaction should execute atomically. Also, transactions will either complete or be aborted. And returned to its initial state.

This makes sure that the database remains consistent.

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5) Yes, we can determine the key of relation with the help of instance. For example, In a one to many relation we can consider the column/attribute with unique values as a primary key.

7) Query in Relational Algebra

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$P(R_1, \text{Catalog})$

$P(R_2, \text{Catalog})$

$\pi_{R_1.pid} \sigma_{R_1.pid = R_2.pid \wedge R_1.sid \neq R_2.sid} (R_1 \times R_2)$

SQL Query

SELECT C.sid

FROM Catalog C

WHERE EXISTS (SELECT C1.sid

FROM Catalog C1

WHERE C1.pid = C.pid AND

C1.sid \neq C.sid).

8) It is an invalid query. This relational algebra statement does not return anything because of the sequence of projection operators. Once the sid is projected, it is the only field in the set. Therefore, projecting on same will not return anything.