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DBMS-EndSem-Exam

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1A)

- Using empname as a clustered index is possible only when every employee will have a unique name. If this is ensured, the tuples will be organized according to empname alphabetically.
- Using empid as a clustered index is definitely possible considering everyone already has a unique id assigned to them. The tuples will be organized according to empid.
- Using both empname & empid as clustered indexes may not be possible. But we can have one clustered and other as non-clustered index.

2A)

- DDL is important in representing information in DBMS because it is used to describe external and logical schemas.
- DML is used to access and update data; it is not important for representing data.

3A) The given statement is TRUE. A DBMS is typically shared among many users. Transactions from these users can be interleaved to improve the execution time of user's queries. By interleaving queries, users do not have to wait for other user's transactions to complete fully before their own transaction begins. Without interleaving, if user₁ begins a transaction that will take 5 seconds to complete, and user₂ wants to begin a transaction, user₂ would have to wait an additional 5 seconds for user₁'s transaction to complete before the database would begin processing user₂'s request.

4A) .

AA) A user must guarantee that his or her transaction does not corrupt data or insert nonsense in the database. For example, in a banking database, a user must guarantee that a cash withdraw transaction accurately models the amount a person removes from his or her account. A database application would be worthless if a person removed 20 dollars from an ATM but the transaction set their balance to zero!

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bA) A DBMS must guarantee that transactions are executed fully and independently of other transactions. An essential property of a DBMS is that a transaction should execute atomically, or as if it is the only transaction running. Also, transactions will either complete fully, or will be aborted and the database returned to its initial state. This ensures that the database remains consistent.

7A) Let the two suppliers be R_1, R_2 :

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

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

$$\pi_{R_1.Pid} \sigma_{R_1.Pid = R_2.Pid \wedge R_1.Sid \neq R_2.Sid} (R_1 \times R_2)$$

using the following:

SID	PID	Cost
1	1	1000
2	1	2000
2	3	3000
3	1	4000

$R_1 \times R_2$ gives us:

SID	PID	Cost	SID	PID	Cost
1	1	1000	1	1	1000
1	1	1000	2	1	2000
1	1	1000	2	3	3000
1	1	1000	3	1	4000
2	1	2000	1	1	1000
2	1	2000	2	1	2000
2	1	2000	2	3	3000
2	3	3000	3	1	4000
2	3	3000	1	1	1000
2	3	3000	2	1	2000
2	3	3000	2	3	3000
2	3	3000	3	1	4000
3	1	4000	1	1	1000
3	1	4000	2	1	2000
3	1	4000	2	3	3000
3	1	4000	3	1	4000

$R_1 \cdot PID = R_2 \cdot PID$ gives us:

SID	PID	Cost	SID	PID	Cost
1	1	1000	1	1	1000
1	1	1000	2	1	2000
1	1	1000	3	1	4000
2	1	2000	1	1	1000
2	1	2000	2	1	2000
2	1	2000	3	1	4000
2	3	3000	2	3	3000
3	1	4000	1	1	1000
3	1	4000	2	1	2000
3	1	4000	3	1	4000

SQL:-

```

SELECT C.Sid
FROM Catalog C
WHERE EXISTS (SELECT C1.Sid
               FROM Catalog C1
               WHERE C1.Pid = C.Pid AND
                  C1.Sid ≠ C.Sid)

```

8A) Invalid query.

Explanation:- 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 some will not return anything.

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9A) The following view on Emp can be updated automatically by updating Emp:

```
CREATE VIEW SeniorEmp (eid, name, age, salary)
```

```
AS SELECT E.eid, E.ename, E.age, E.salary
```

```
FROM Emp E
```

```
WHERE E.age > 50.
```