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3.) True, A DBMS is typically shared among many users. Transactions from these users can be interleaved to improve the execution time of users queries. By interleaving queries, users do not have to wait for other user's transactions to complete fully before their own transactions begins. Without interleaving, if user A begin a transcation that will take 10 seconds to complete, and user B would have to wait an additional 10 seconds to complete before the database would begin processing user B's request.

7). P (R₁, Catalog)
P (R₂, catalog)

$\pi \ R_1.pid \ \sigma_{R_1.pid = R_2 \ pid \ \wedge \ R_1.sid! = R_2.sid} (R_1 \times R_2)$

Using the following

SID	PID	cost
1	1	$10.00
2	1	$9.00
2	3	$34.00
3	1	$11.00

$R_1 \times R_2$ gives :-

SID	PID	Cost	SID	PID	Cost
1	1	$ 10.00	1	1	$ 10.00
1	1	$ 10.00	2	1	$ 9.00
1	1	$ 10.00	2	3	$ 34.00
1	1	$ 10.00	3	1	$ 11.00
2	1	$ 9.00	1	1	$ 10.00
2	1	$ 9.00	2	1	$ 9.00
2	1	$ 9.00	2	3	$ 34.00
2	1	$ 9.00	3	1	$ 11.00
2	3	$ 34.00	1	1	$ 10.00
2	3	$ 34.00	2	1	$ 9.00
2	3	$ 34.00	2	3	$ 34.00
2	3	$ 34.00	3	1	$ 11.00
3	1	$ 11.00	1	1	$ 10.00
3	1	$ 11.00	2	1	$ 9.00
3	1	$ 11.00	2	3	$ 34.00
3	1	$ 11.00	3	1	$ 11.00

$\sigma_{R_1 . PID = R_2 . PID}$ gives :-

SID	PID	Cost	SID	PID	Cost
1	1	$ 10.00	1	1	$ 10.00
1	1	$ 10.00	2	1	$ 9.00
1	1	$ 10.00	3	1	$ 11.00
2	1	$ 9.00	1	1	$ 10.00
2	1	$ 9.00	2	1	$ 9.00
2	1	$ 9.00	3	1	$ 11.00
2	3	$ 34.00	2	3	$ 34.00
3	1	$ 11.00	1	1	$ 10.00
3	1	$ 11.00	2	1	$ 9.00
3	1	$ 10.00	3	1	$ 11.00

$$\sigma R_1 \cdot Pld = R_2 \cdot Pld \wedge R_1 \cdot Sld! = R_2 \cdot Sld \quad gives :-$$

SID	PID	Cost	SID	PID	Cost
1	1	$ 10·00	2	1	$ 9·00
1	1	$ 10·00	3	1	$ 11·00
2	1	$ 9·00	1	1	$ 10·00
2	1	$ 9·00	3	1	$ 11·00
3	1	$ 11·00	1	1	$ 10·00
3	1	$ 11·00	2	1	$ 9·00

Projecting on PID gives us a single part number - 1 (eliminating the duplicates)

4 (a) A user must guarantee that his or her transaction does not corrupt data or intersept non sense 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.

(b) 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, transaction will either complete fully, or will be aborted and the database returned to its initial state. This ensures that the database remains same

9) The following view on emp can be updated automatically by updating ~~emp~~:
Emp: CREATE VIEW Senior Emp (eid, name, age, salary)
AS SELECT E.eid, E.ename, E.age, E.salary
FROM EmpE
WHERE E.age > 50

2) • The data definition language is important in representing information because it is used to describe external and logical schemas.
• The data manipulation language is used to access and update data, it is not important for representing the data.

1) Using EmpName as a clustered index n is possible only when every employee will have a unique name. If this is ensured, the temples will be organised according empname alphabetically.
Using Empid as a clustered index is definetely possible considering everyone already has a unique id assigned to them, the tuples will be organised according to Empid.
Using both empid and Empname as determined index may not be possible but it is possible two have one clustered index and one-non clustered index.

8) Πsname $(\pi$ sid $((\sigma$color $=\sigma$red0 (parts)) * (σcost <100 (catalog)$) *$ &upp-
liers))

invalid query.

Explanation: The relation algebra statement doesnot return
anything because of the sequence of projection operators.
Therefore on same will not return anything.