1. This is possible in DBMS due to physical data independence and logical d.i It insulates users from changes in the physical storage. of the data. Logical data independence means that users are shielded from changes in the logical structure of data. We could store tuples in a heap file with clustered index etc.

5. No, it is not possible to determine the key of a relation given only one instance of the relation. The instance can be just a possible snapshot of the relation. The same relation may have an instance that contains a totally different set of tuples and we cannot make predictions about those instances based only upon the instance given to us.

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2.

- The data definition language is important in representing information in DBMS because it is used to describe external and logical schemas.

- The DML is used to access and update data; it is not important for representing the data.

3. TRUE.

A DBMS is shared among many users. Transactions from these users can be interleaved to improve the execution time of users' queries and increase the transaction throughput. By interleaving queries, users do not have to wait for other users transactions to complete fully before their own transaction begins. Isolation property is maintained.

4. a) User must guarantee correct credentials, should be honest, law abiding, not borrowing or lending credentials to others. It will check for exact and semantically duplicate transactions.

b) The database must guarantee atomicity, isolation, consistency and durability. It should have absolute consistency of data and 100% guaranteed safety of committed atomic multistep transactions along with sufficient concurrency to permit the level of concurrent use. The sum of money before and after the transaction should be same, guaranteeing consistency. It should be atomic — the entire transaction takes place at once or doesn't happen at all. The changes occur even if system fails (durability). Multiple transactions occur independently without interference (isolation).

7. Relational algebra:

$$\pi_{R1.pid} \left(\sigma_{R1.pid=R2.pid \wedge R1.sid \neq R2.sid} (\rho_{R1} \, Catalog \times \rho_{R2} \, Catalog) \right)$$

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7. SQL :

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. The names of suppliers who supply some red part at price cost less than 100.

9. The following view 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;
```