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DBMS

- (1) * 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 in alphabetical manner.
- * Using empid as a clustered index is possible considering everyone already has a unique id assigned to them. The tuples will be organized according to empid.
- * Using both empname & empid as a clustered indexes may not be possible but it is possible to have one clustered index and non-clustered index.

(2)

~~representing~~

- 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.

(3) True. DBMS interleaves the actions of different transactions instead of executing transactions one after the other.

A DBMS is typically shared among many users. Transactions from these users can be interleaved to improve the execution time of user's queries. Due to interleaving queries, users do not have to wait for other user's transaction to complete fully before their own transaction begins.

Had there been no interleaving, if user A begins a transaction that will take 5 seconds to complete, and another user B wants to begin a transaction, user B would have to wait an additional 5 seconds for user A's transaction to complete before the database would begin processing user B's request.

For instance, consider the IRCTC website. Because of interleaving, users are able to book tickets and pay easily. Otherwise, it would take every single user many hours.

(4) (a) With respect to a transaction and database consistency, a user should ensure that his / her transaction does not corrupt data. It does not insert nonsense in the database.

In a banking database, a user must guarantee that a cash withdrawal transaction accurately models the amount a person removes from his / her account. A database application is worthless if a person withdraws 1000 rupees from an ATM but the transaction set their balance to 0.

(b) A DBMS must guarantee that transactions are executed fully and independently of other transactions. It 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. (see fig).

Basically, it should ensure the ACID properties. (Atomicity, Consistency, Isolation, Durability)

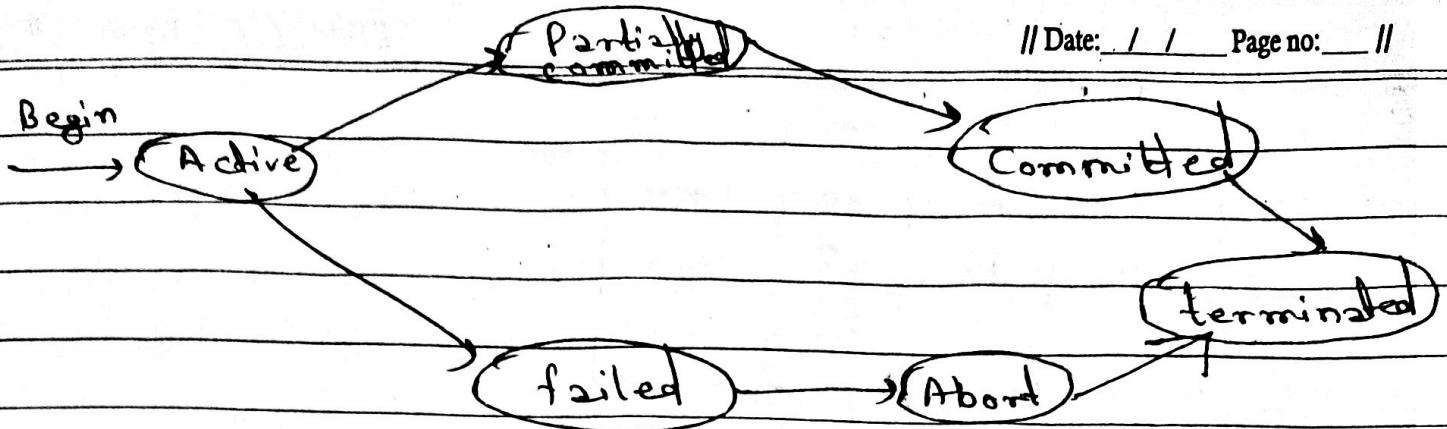


Fig: -

(5) Yes, it is possible to determine a primary key of a relation given only one instance. Only if we have the idea of the attributes that would be surely unique and NOT NULL beforehand itself. Consider a database for a school. So we know registration no. would be unique & NOT NULL even if there is just one student that ~~has~~ has been admitted. That can be chosen as the primary key rather than name or age.

However, it is advised to have many instances of the relation to correctly analyze the database and draw proper insights from it to check which field is unique and NOT NULL and then decide the primary key.

(6)

(a) CREATE CLUSTERED INDEX

IX-empname-index ON STUDENT
TABLE (Student Name DESC)

" SELECT Email FROM
STUDENT TABLE ".

The query displays all emails in descending order of student Name. first the table gets sorted based on student Name in DESC order then the select query displays the emails in that order.

(b)

Student ID	Student Name	Email	Age
1005	Krishna	Krishna@gmail.com	22
1030	John	Null	23
1020	John	Jh@xyz.com	22

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Sid	sname	address
1	A	Delhi
2	B	Patna
3	C	Bengaluru

Suppliers.

pid	pname	color
01	a	red
02	b	green
04	c	blue

Parts

Sid	pid	cost.
1	01	2000
2	02	500
3	04	200

Catalog

Relational: — $P(R_1, \text{Catalog})$

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

$\pi_{R_1.pid \circ R_1.pid} = R_2.pid \wedge R_1.sid | =$

$R_2.sid (R_1 \times R_2)$

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)

(8) 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 the same ~~to~~ will not return anything.

(9)

eid	ename	age	salary
1	A	30	1000
2	B	28	2000
3	C	28	3000

Emp

eid	did	pct time
1	21	3
2	24	4
3	26	6

works

did	budget	managerid
1	500	4
4	400	5
6	300	6

Dept

View Query:-

CREATE VIEW SeniorEmp (eid,ename,
age,salary) AS SELECT
E.eid, E.ename, E.age, E.salary
FROM Emp E WHERE
E.age > 20.