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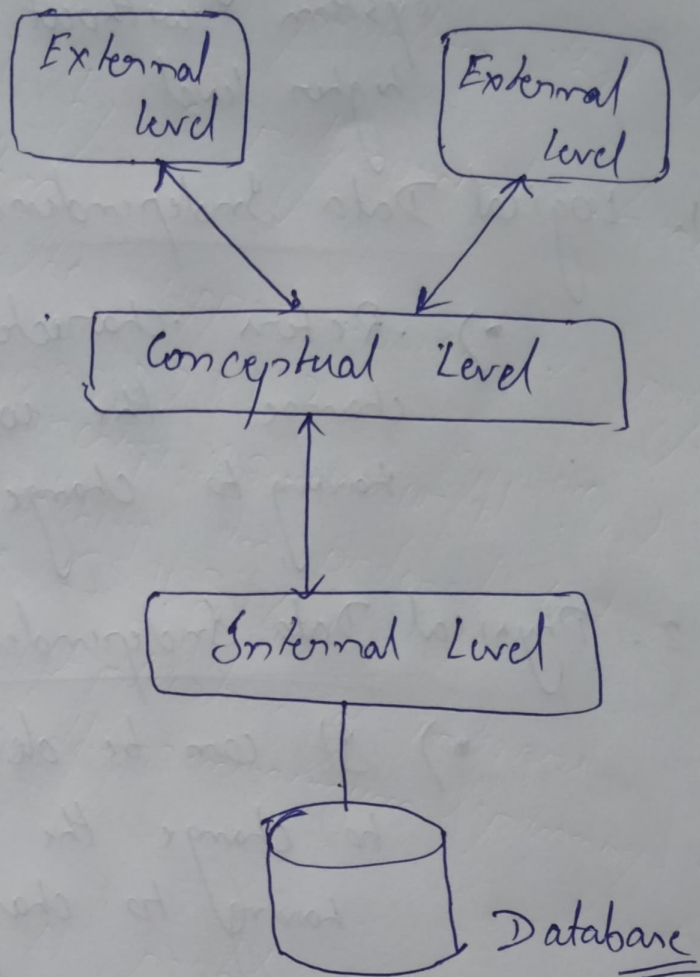
Answers

1. A)

External
Schema

Conceptual
Schema

Internal
Schema



⇒ Internal level :-

- It has an internal schema which describes the physical storage structure of database
- Also known as physical schema

⇒ Conceptual level

- It describes design of database at logical level

⇒ External level :-

- It describes view schema that describes

Data Independence

→ Refers characteristic of being able to modify schema at 1 level of database system without altering schema at next higher level.

1. Logical Data Independence

•) Refers characteristics of being able to change the conceptual schema without having to change external schema.

2. Physical Data Independence

•) It can be defined as the capacity to change the internal schema without having to change the conceptual schema.

2. A) ACID properties of Transaction

- It has 4 properties. These are used to maintain consistency in a database before & after the transaction.

1. Atomicity :-

- It states that all operations of transaction take place at once.
- It involves 2 operations :-
 - o) Abort :- If a transaction aborts, then all changes made are not visible.
 - o) Commit :- If a transaction commits, then all changes are visible.

2. Consistency :-

- It states that every transaction sees a consistent database instance.
- It is used to transform database from 1 consistent state to another.

3. Isolation :-

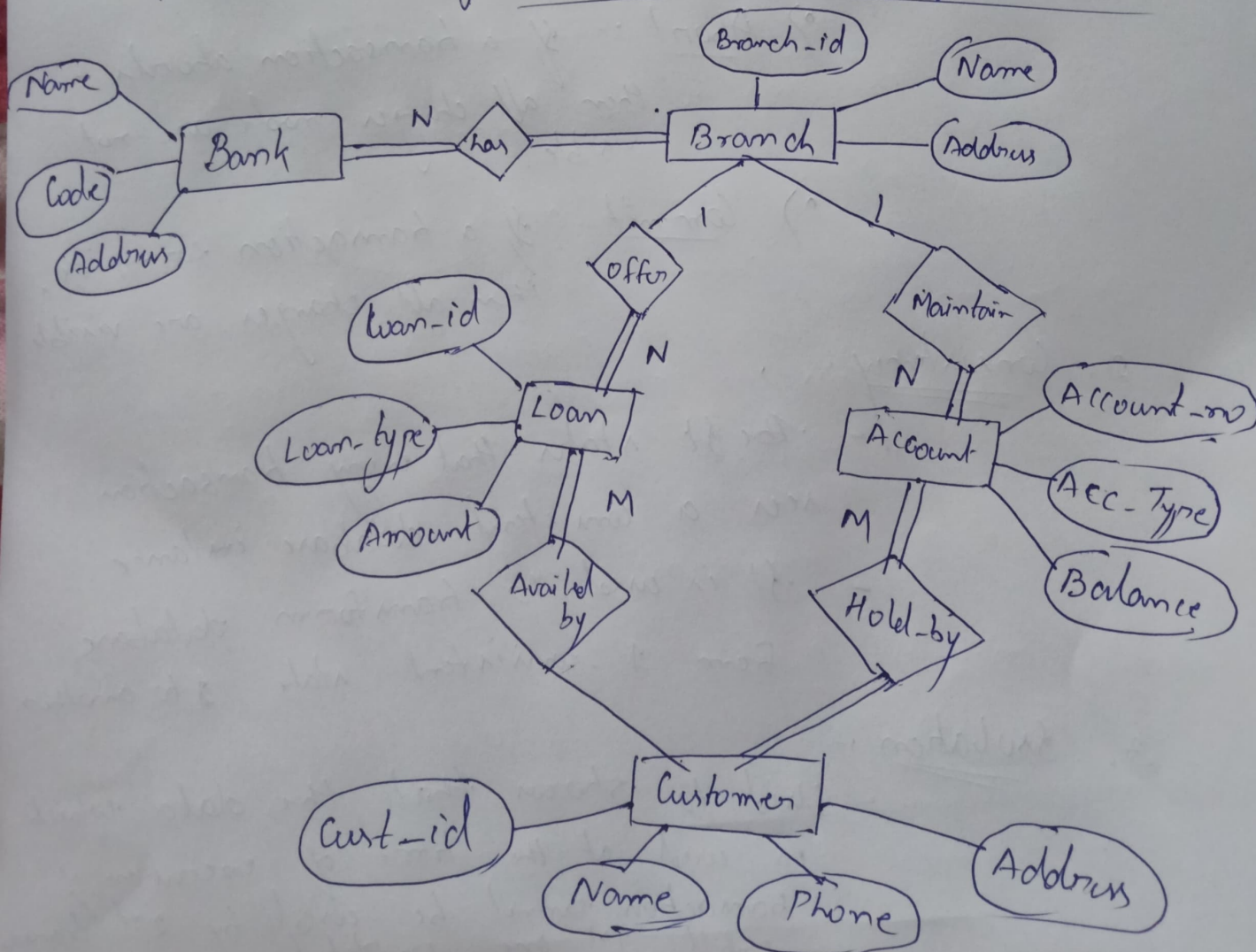
- Used to show that the data which is used at the time of execution of transaction cannot be used by 2nd trans until 1st one completed.

- Concurrency control subsystem of DBMS enforced the isolation property.

4. Durability -

- Used to indicate performance of database consistent state.
- States that transaction made permanent change.

3. A) ER Diagram of Bank Management System

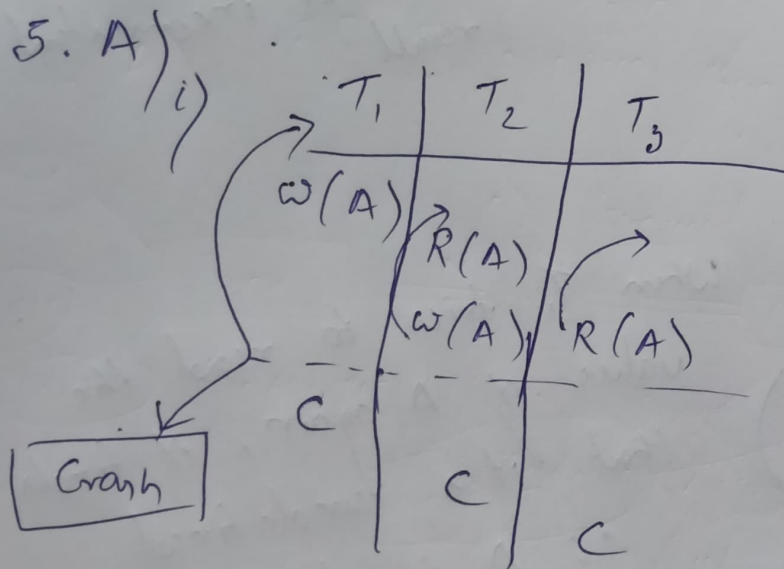


⇒ Entities used are

-) Bank Entity
-) Customer Entity
-) Branch Entity
-) Account Entity
-) Loan Entity

⇒ Relationships are

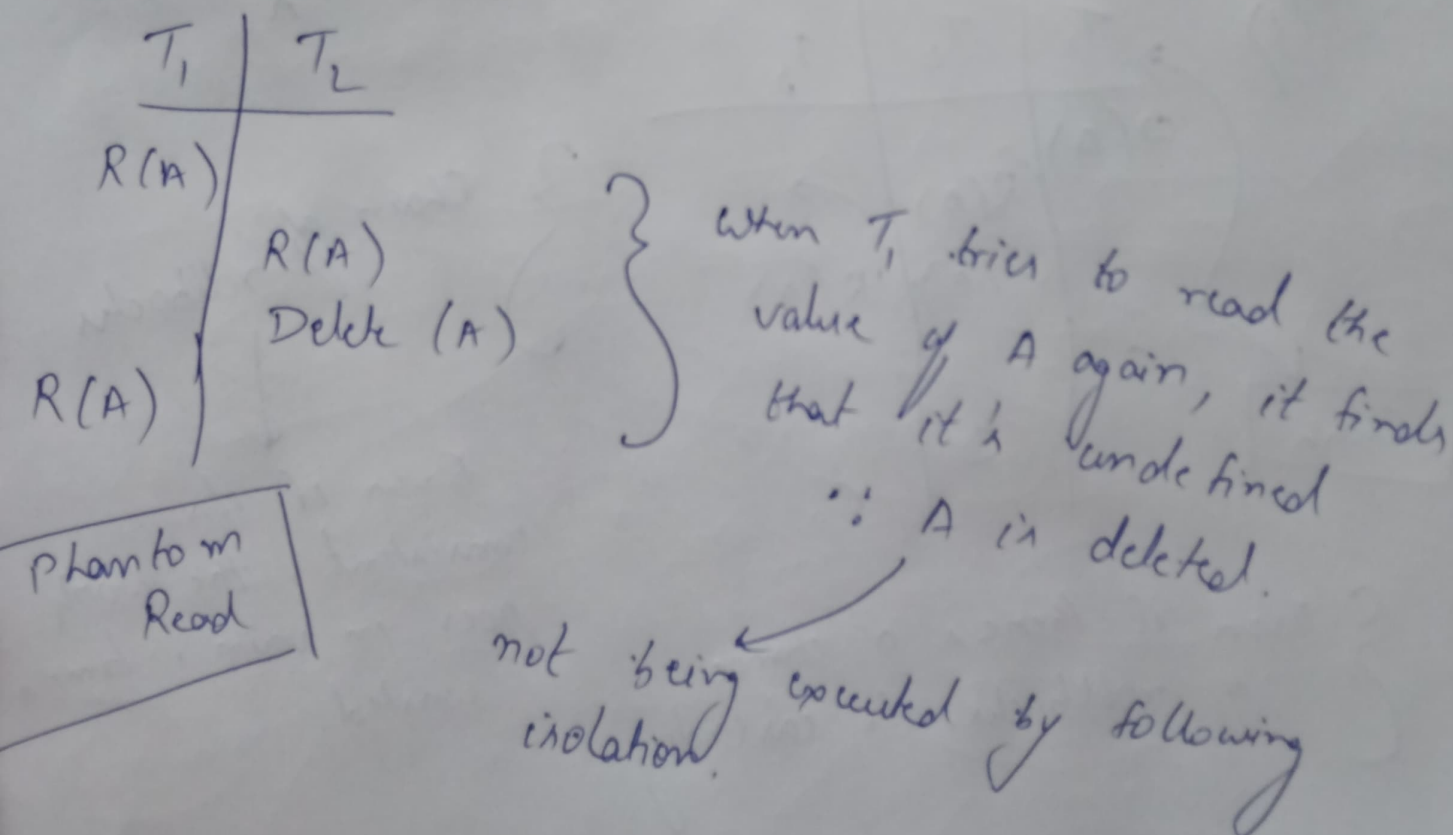
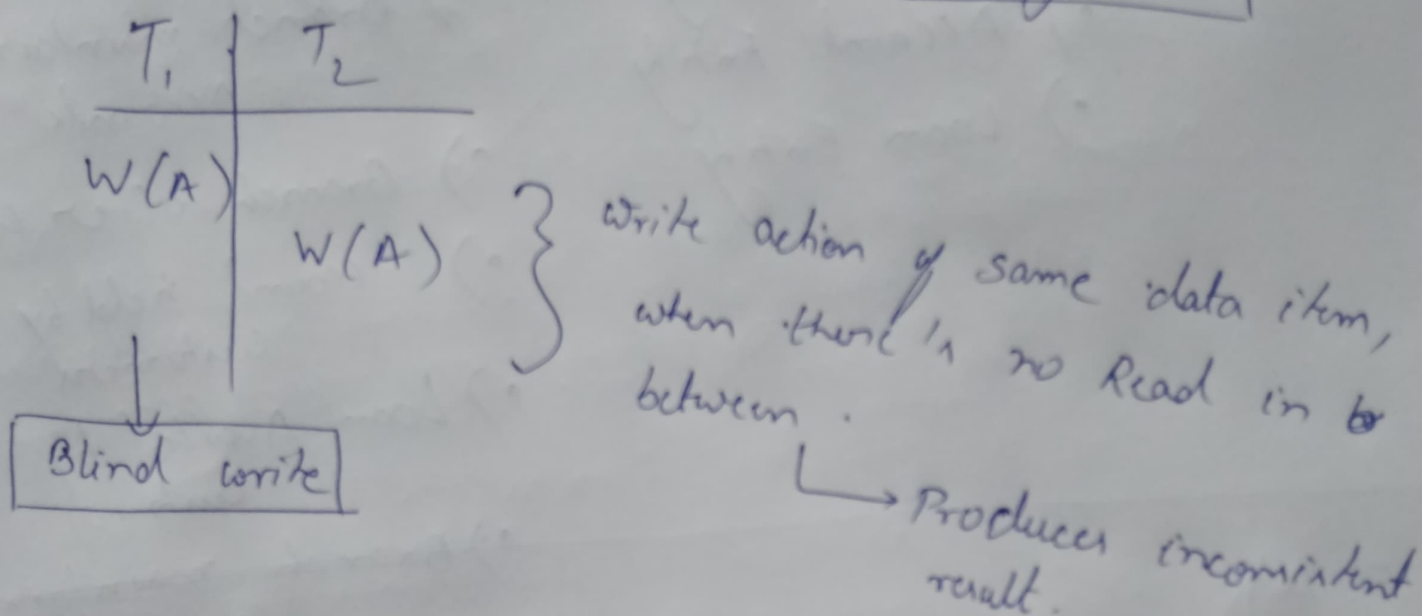
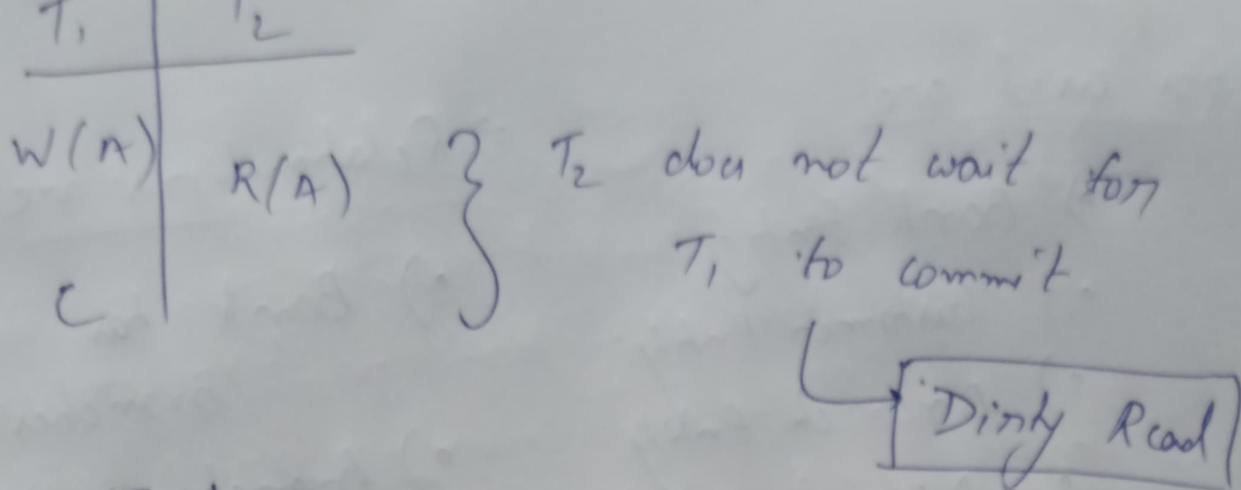
-) Bank has Branches
-) Branch maintain Accounts
-) Branch offer Loans
-) Account held by Customer
-) Loan Availed by Customer
-) ~~Branch maintain~~



} Chain of rollbacks

Even if it's consistent, the work goes in vain, time's wasted.

{ Even if there's a chance of rollbacks, its cascading



4. A) Yes,

a) The key from Teacher is formed by a single column i.e. Teacher-name. If all attributes of Teacher can be determined uniquely by Teacher-name, then only Teacher-name attribute forms the key. And, there are no possibilities for partial key dependencies. Hence, Teacher is in 2NF.

b) No,

For a table in 3NF, it ~~must~~ should be in 2NF & non-key attribute dependencies (transitive dependencies) must not present.

6.A)

$R(A, B, C, D, E)$

FD : $A \rightarrow BC, B \rightarrow E, CE \rightarrow D$

$(A)^+ \rightarrow ABCE D$

$A \rightarrow BC$
 $\quad \quad \quad \searrow \rightarrow D$
 $\quad \quad \quad \swarrow \rightarrow B \rightarrow E$

$(AB)^+ \rightarrow$
 $\quad \quad \quad \swarrow \quad \downarrow \quad \searrow$
 $\quad \quad \quad AB \quad C \quad \quad \quad \searrow \rightarrow D$
 $\quad \quad \quad \quad \quad \quad \swarrow \rightarrow E$
 $\quad \quad \quad \quad \quad \quad \quad \quad \rightarrow ABCE D$

So,

Candidate Key = $\{A, AB\}^+$

7. B) T_1 : lock S(A)

read (A)

lock - X(B)

read (B)

if $A = 0$

then $B := B + 1$

write (B)

unlock (A)

unlock (B)

T_2 : lock - S(B)

read (B)

lock - X(A)

read (A)

if $B = 0$

then $A := A + 1$

write (A)

unlock (B)

unlock (A)

~~Q~~ :

Q) Consider the following partial schedule :-

T_1	T_2
lock - S(A)	lock - S(B)
	read (B)
read (A)	
lock - X(B)	lock - X(A)

The transactions are now deadlocked.