doubt, question

My class @
3:30pm daily
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2021/22

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NET 2021

MHSET- 26 SEP 2021

1 month

The **schedule of UGC-NET June 2021** is as follows:

Online registration and submission of Application Form (complete in all respect) through NTA Website: https://ugcnet.nta.nic.in	10 August to 05 September, 2021 (upto 11:50 pm)
Last date for successful transaction of Examination fee	06 September, 2021 (upto 11:50 pm)
Correction in the Particulars in the Application Form (online only)	07 September to 12 September, 2021
Downloading of Admit Card from NTA Website	To be announced later on website
Dates of Examination	06 October to 11 October 2021
Timing of Examination	First Shift: 09.00 am to 12.00 pm
	Second Shift: 03.00 pm to 06.00 pm
Website	ugcnet.nta.nic.in, www.nta.ac.in

Paper → ICT

DBMS- "One Liner Notes-1"

CMN

Rdbmu join

Fig. 4 : DBMS Structure

DML
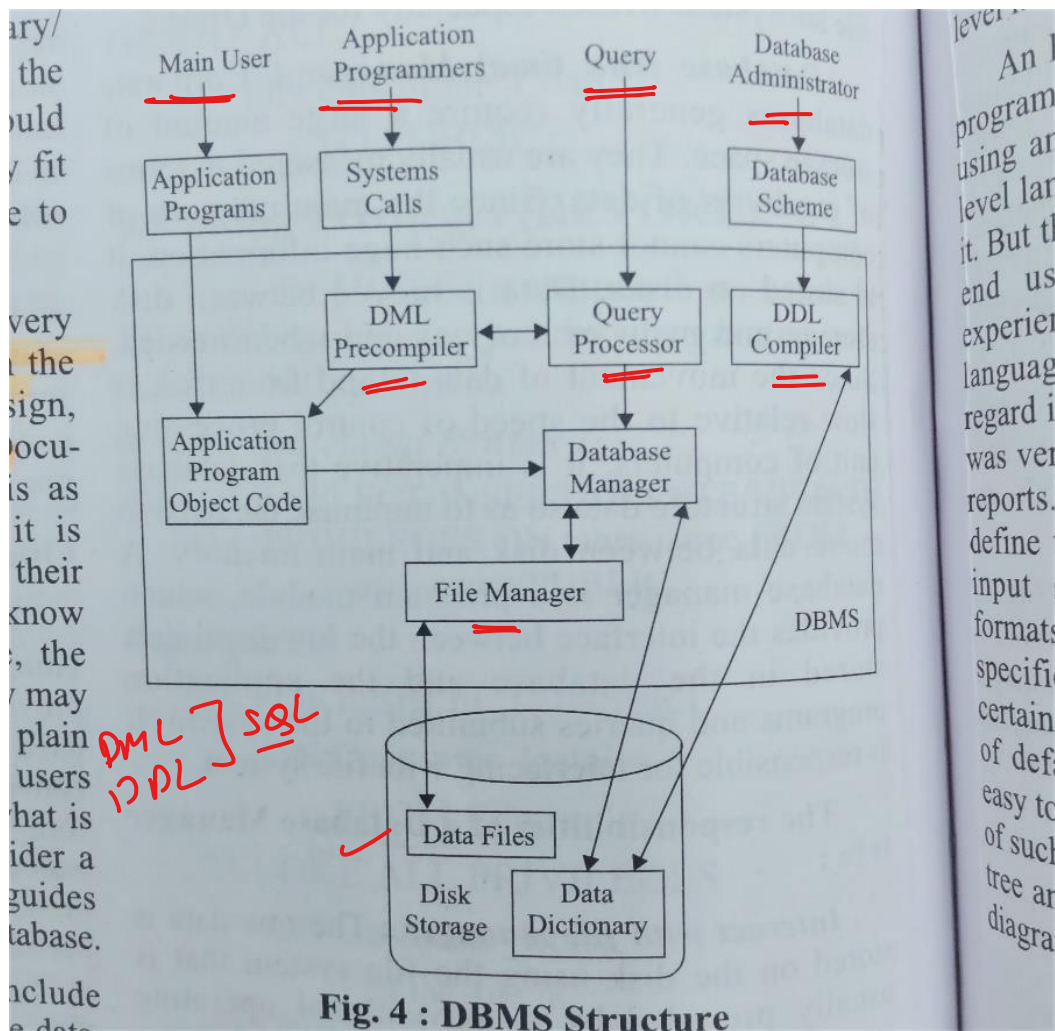DDL] SQL

The DBMS (or Database Management System) is a kind of system software used for several operations such as creating tables/databases, storing data, managing databases. It also allows modifying the data stored in the database as well.

Pyα

A table is known as the relation in the SQL, consist of rows & columns

Pyα

rows are called the tuples/Entity

Latest PYQ

the numbers of columns are known as the attributes/Domain/Arity/Fields

PYQ

cardinality represents the number of tuples (rows) in a relation (table).
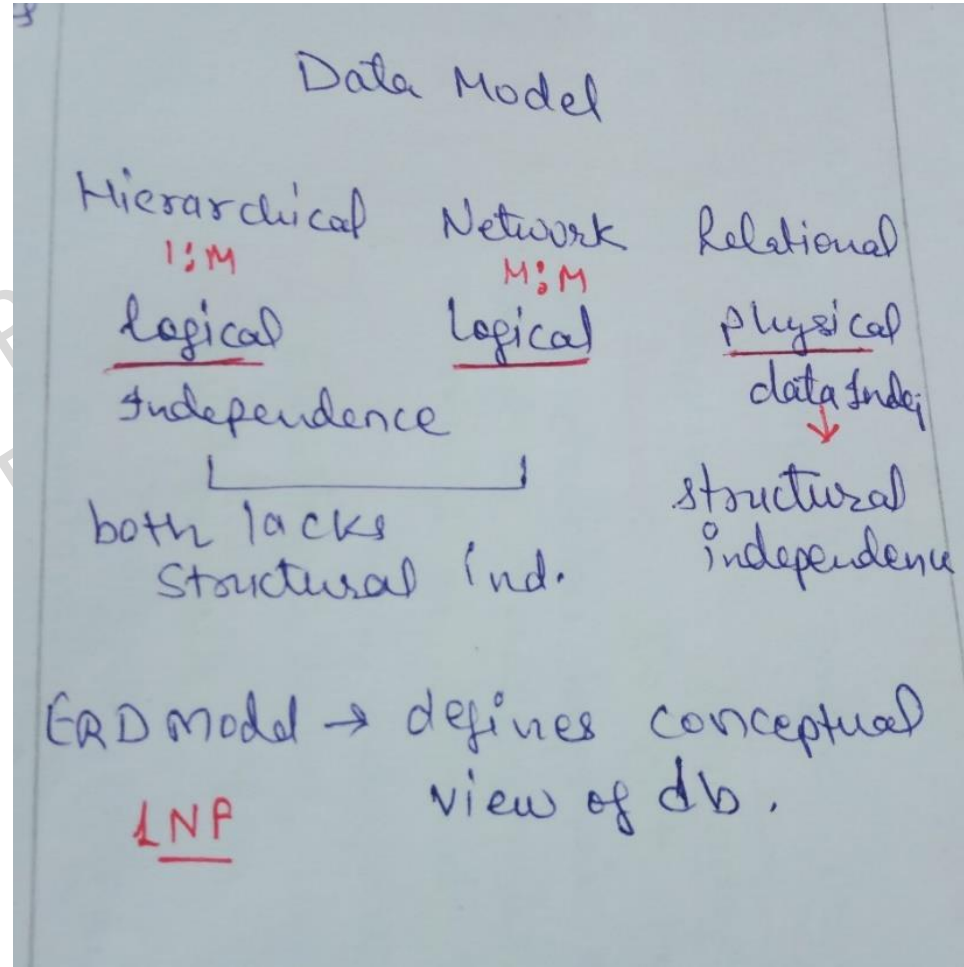
External Level

Conceptual Level

Physical Level

Logical Data
Independence

Physical Data
Independence

Data Model

Hierarchical   Network   Relational
   1:M   M:M
logical   logical   physical
                              data Inde
Independence
                              structural
both lacks   independence
Structural Ind.

ERD model → defines conceptual
                    view of db.
↓NP

Q5) A file is basically a collection of all related_____.

a)   Rows & Columns
b)   Fields
c)   Database
d)   Records

Q5) A file is basically a collection of all related_____.   Pyt

a) Rows & Columns – Table/Relation 2021

b) Fields – attributes/ column

c) Database – collection of records

d) **Records**

ERD Minimum no. of tables

	1:1	1:M	M:1	M:M
Minimum Table	2	2	2	3
Maximum Table	3	3	3	3
Reduce	Yes	Yes	Yes	No
Primary Key	Participation check	Many Side	Many Side	Both Combine

Multivalued attribute + 1

E-R-D
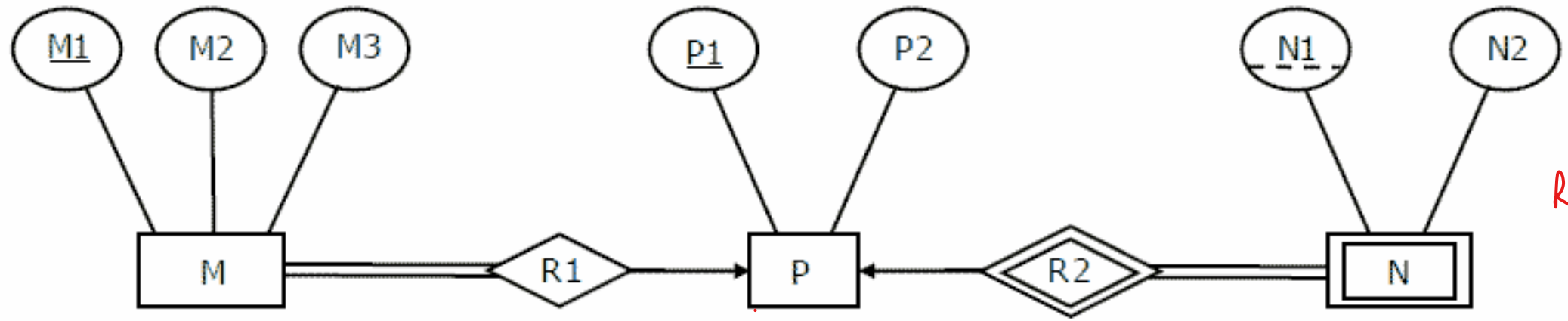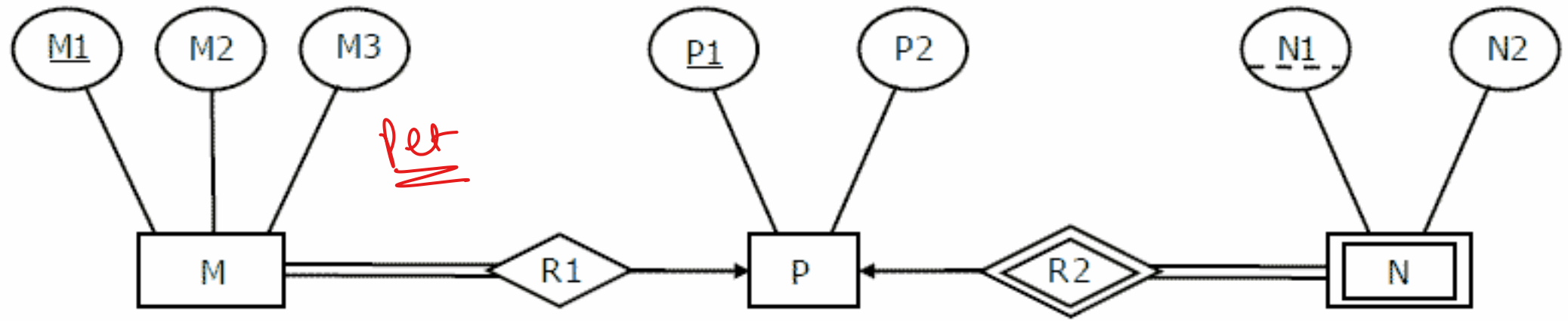

Repeated

The minimum number of tables
needed to represent M, N, P, R1, R2 is
(A) 2
(B) 3
(C) 4
(D) 5

The minimum number of tables needed to represent M, N, P, R1, R2 is **3**

(handwritten annotations)
Pet
ERD → 2020 Symbols
2021→ Attribute
weak/strong
Participation
Total/ partial

M, P are strong entities hence they must be represented by separate tables.
Many-to-one and one-to-many relationship sets that are total on the many-side can be represented by adding an extra attribute to the "many" side, containing the primary key of the "one" side. (This way no extra table will be needed for Relationship sets)
M table is modified to include primary key of P side(i.e. P1). N is weak entity, and is modified to include primary key of P (i.e.

Q1- dbms
Q2 → ERD

Normalization

Why we do Normalize

if x, then y
X → Y dependent on x

TRICK → Time

Types of Anomalies

Functional dependencies

Normal Forms

Their

theoretical

R.g.
P.k — f.k

Insert

Up

Delete

set

XY → Y

a – b
c

Y, if X

| Insertion |
| Update |
| Deletion |

| Trivial |
| Non- Trivial |
| Transitive |

reduce

| 1 NF |
| 2 NF |
| 3 NF |
| BCNF |

nTa

Normalization → 1 month → UGC net
                                    set
                                    Phd

Case2 $R(A, B, C, D)$

f
1. Functional Dependency check $x \Rightarrow y$

2. Attribute closure find A^+ tash $\widehat{E}$ extra
                                                                                     attribute

3. Find Highest form

4. Keys→ c.k | s.k | A.k | P.k → MCS   SQL   Create table

5. Constraint Gate P4B   R.I   Unique.   NOT NULL, $\leq$ Rule   database

                                         2.2

6. Equivalence of FDs   Gate   closure   case $R(A, B, C, D)$
                                                                                      γ

7. Minimal Cover   FD1   FD3   decompositive
                    FD2   Redundant FD → remove R_1 R_2
                                                                      (A, B)   (A, C)

8. Lossless Decomposition $\sqsubseteq$ lossy → attribute del'
                                                    extra attribute ⇒ $R_1 \cup R_2 = R / A, B, C$)
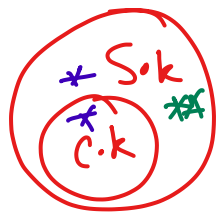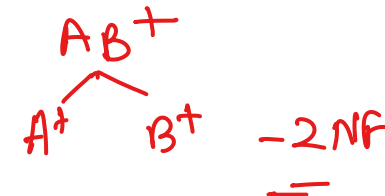
Keys of a relation:

(1) •Candidate Key: The minimal set of attributes which can determine a tuple uniquely. There can be more than 1 candidate key of a relation and its proper subset can't determine tuple uniquely and it can't be NULL.

(2) •Super Key: The set of attributes which can determine a tuple uniquely. A candidate key is always a super key but vice versa is not true.

•Primary Key and Alternate Key: Among various candidate keys, one key is taken primary key and others are alternate keys.

•Foreign Key: Foreign Key is a set of attributes in a table which is used to refer the primary key or alternative key of the same or other table.

LMN

B1/B2/B3

Venn dia.

Keys

a) C·K = minimal S·K

Table

AB⁺
A⁺   B⁺   -2NF

ABC
ABD   S·K
AB =

∅

S·K ──is──→ C·K ?
   always

NO

Super set

Normal Forms

(handwritten: LMN → practicals → tricky → Dec 2019 Comprehension, MCQ)

• **First Normal Form:** A relation is in first normal form if it does not contain any multi-valued or composite attribute. (Atomic Value)

(handwritten right margin: → Prime, C.k, AB⁺, A⁺, B⁺)

• **Second Normal Form:** A relation is in second normal form if it does not contain any partial dependency. [A dependency is called partial dependency if any proper subset of candidate key determines non-prime (which are not part of candidate key) attribute.]

(handwritten: Fully F.D, PYQ Gate, 2NF नहीं, 2NF)
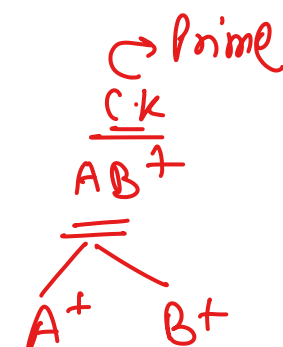
• **Third Normal Form:** A relation is in third normal form if it does not contain any transitive dependency. For a relation to be in Third Normal Form, either LHS of FD should be super key or RHS should be prime attribute.

(handwritten: 4 star PYQ, LHS S.k, R.H.S Prime)

• **Boyce-Codd Normal Form:** A relation is in Boyce-Codd Normal Form if LHS of every FD is super key.

The relationship between Normal Forms can be represented as: **1NF ⊃ 2NF ⊃ 3NF ⊃ BCNF**

(handwritten: atmost, atleast → false, may or may not)

4 NF – No multivalued Dependency

5 NF – Join Dependency

(handwritten: strict → 5NF, NF, loose → 1NF)

(handwritten diagram: nested ovals labeled 5NF, 4NF, BCNF, 3NF, 2NF, 1NF)
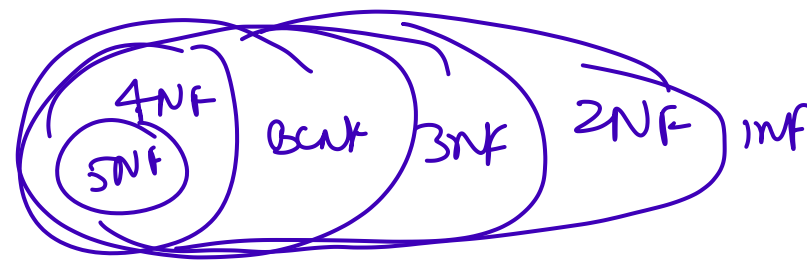
- **Candidate Key:** The minimal set of attribute which can uniquely identify a tuple is known as candidate key. For Example, STUD_NO in STUDENT relation.

- The value of Candidate Key is unique and non-null for every tuple.

- There can be more than one candidate key in a relation. For Example, STUD_NO is candidate key for relation STUDENT.

- The candidate key can be simple (having only one attribute) or composite as well. For Example, {STUD_NO, COURSE_NO} is a composite candidate key for relation STUDENT_COURSE.

Primary Key: There can be more than one candidate key in relation out of which one can be chosen as the primary key.

Super Key: The set of attributes which can uniquely identify a tuple is known as Super Key. For Example, STUD_NO, (STUD_NO, STUD_NAME) etc.

- Adding zero or more attributes to candidate key generates super key.

- A candidate key is a super key but vice versa is not true.

Alternate Key: The candidate key other than the primary key is called an alternate key.

1NF –
singled valued attribute/atomic
No multivalue attribute
No composite attribute

2NF – *always hold Full Functional dependency*
No Partial Dependency

3NF –
No transitive dependency
A -> B
A must be super key or else
B must be Prime Attribute

BCNF –
X -> Y
X must be Super key

No
4NF – Multivalued attribute
No
5NF – Join Dependency

Own notes

Relational Algebra: Procedural language with basic and extended operators.

σ(Selection)   Select rows based on given condition

∏(Projection)   Project some columns

X (Cross Product)   Cross product of relations, returns **m*n** rows where m and n are number of rows in R1 and R2 respectively.

U (Union)   Return those tuples which are either in R1 or in R2. Max no. of rows returned = **m+n** and Min no. of rows returned = **max(m,n)**

−(Minus)   R1-R2 returns those tuples which are in R1 but not in R2. Max no. of rows returned = **m** and Min no. of rows returned = **m-n**

ρ(Rename)   Renaming a relation to other relation.

What is Transaction?

Usenet 2014/2017

A set of logically related operations is known as transaction. The **main operations** of a transaction are:

a) **Read(A):** Read operations Read(A) or R(A) reads the value of A from the database and stores it in a buffer in main memory.

b) **Write (A):** Write operation Write(A) or W(A) writes the value back to the database from buffer.

c) **Commit:** After all instructions of a transaction are successfully executed, the changes made by transaction are made permanent in the database.

d) **Rollback:** If a transaction is not able to execute all operations successfully, all the changes made by transaction are undone.

Properties of a transaction

ACID *Example → Applicative*

a) Atomicity   : All or nothing rule
b) Consistency : before or after
c) Isolation   : No interference
d) Durable   : permanent

Atomicity two operations *whole*

1. Abort: If a transaction aborts, changes made to database are not visible.
2. Commit: If a transaction commits, changes made are visible.

Consistency *Diff.*

✓ It refers to the correctness of a database
✓ integrity constraints must be maintained

What is a Schedule?

A schedule is a series of operations from one or more transactions.

A schedule can be of **two types:**

Serial Schedule: When one transaction completely executes before starting another transaction, the schedule is called serial schedule.

Properties :-
1. always consistent
2. low throughput and
3. less resource utilization

Consistent

System performance low

COB → COA

pipeline

Concurrent Schedule: When operations of a transaction are interleaved with operations of other transactions of a schedule, the schedule is called Concurrent schedule.

Properties :-
1. lead to inconsistency in the database
2. High throughput and
3. high resource utilization

system performance high

Schedules in DBMS

- Serial Schedules
- Non-Serial Schedules
  - Serializable
    - Conflict Serializable
    - View Serializable
  - Non-Serializable
    - Recoverable
      - Cascading Schedule
      - Cascadeless Schedule
      - Strict Schedule
    - Non-Recoverable

diff.

Recent Net 2018-2020

① Dirty Read / Uncommitted Read

RAW

T_1	T_2
$r(A)$	
$w(A)$	
	$r(A)$ 10
	$w(A)$ 11
	C
Fail	
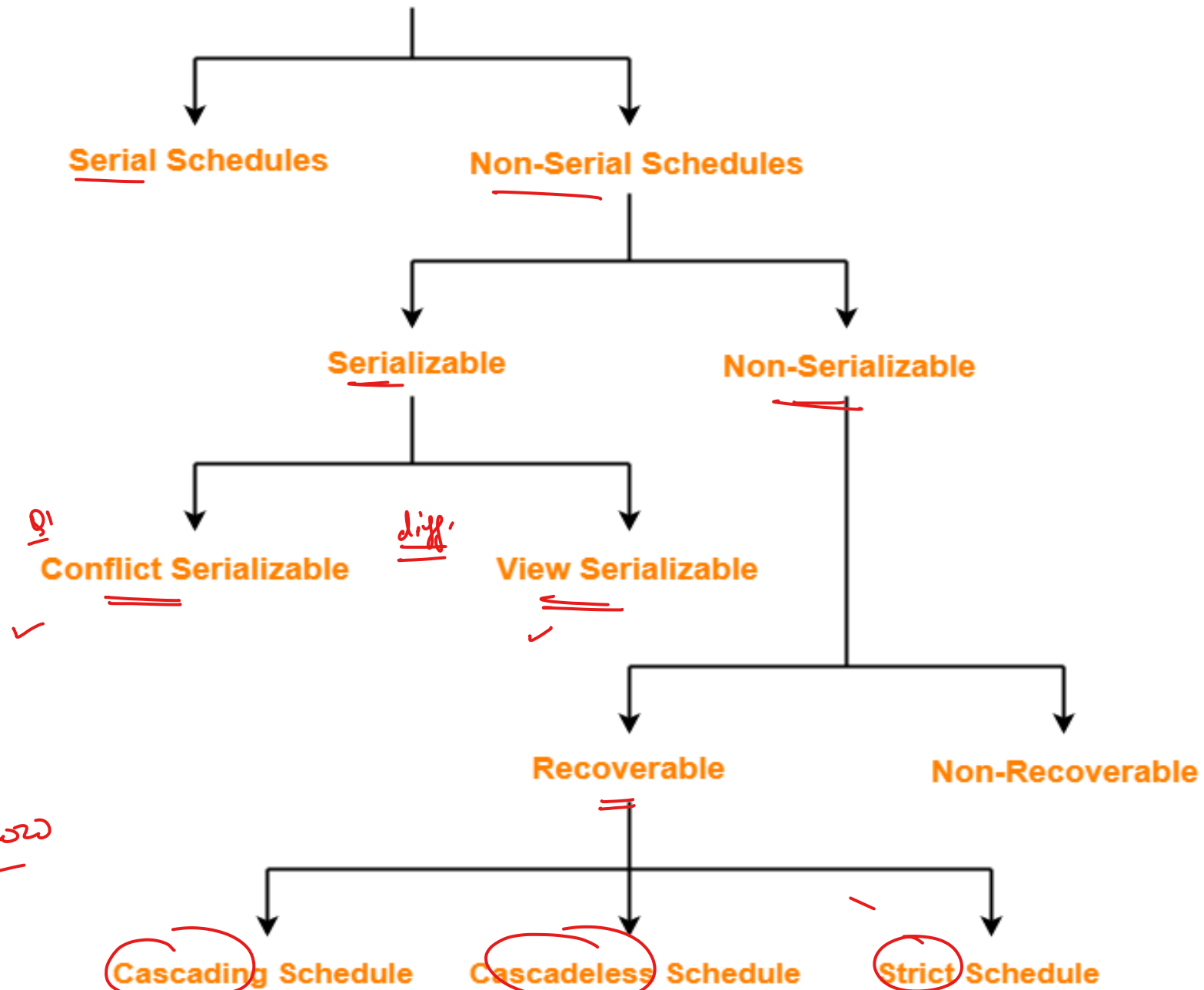
rollback ↑

net definition
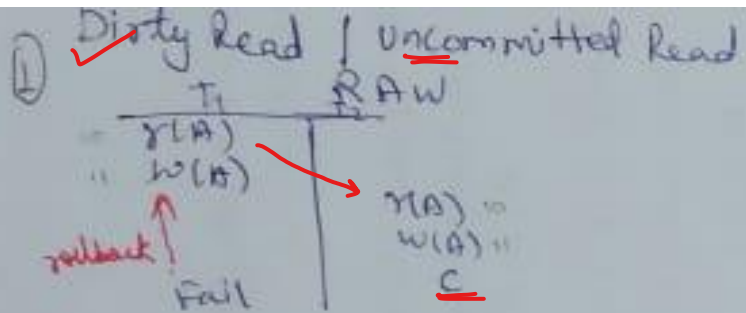
Dirty Read → reading uncommitted data.

* It may cause problem but not always.

Case 1: T_2 transaction, commits data & T_1 rollback → causes Dirty Read.

Resolve: T_2 commit always after T_1

T_1	T_2
$r(A)$	
$w(A)$	
	$r(A)$
	$w(A)$
C	

② Unrepeatable Read

T_1	T_2
10 $r(x)$	
	$r(x)$ 10
11 $w(x)$	
	$r(x)$ 11 unrepeatable read
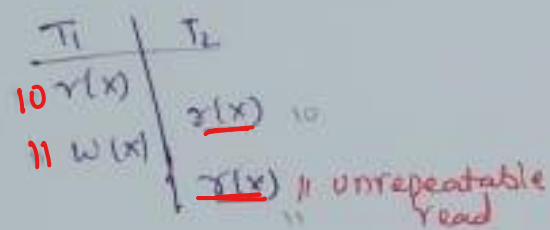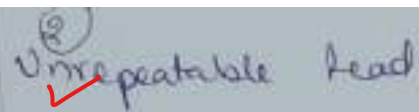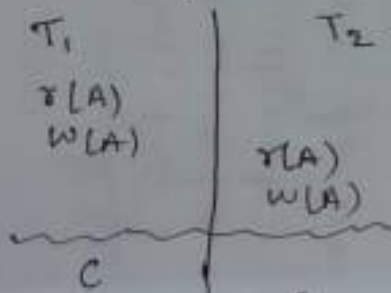
when we are reading two different values of read

④ lost Update (Write-Write) conflict

T_1	T_2
$r(x)$	
$w(x)$ → $w(x)$	
	C
C	

Blind write

③ Phantom Read

T_1	T_2
$R(x)$	
	$R(x)$
Delete (x)	
	$r(x)$
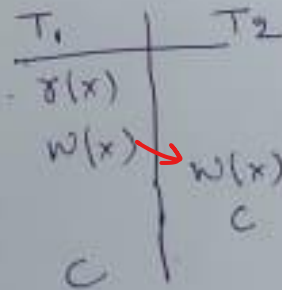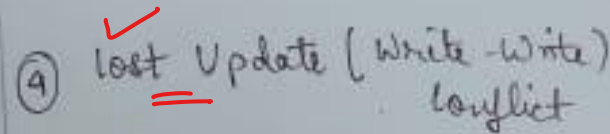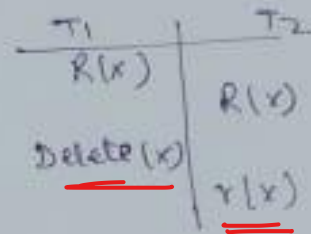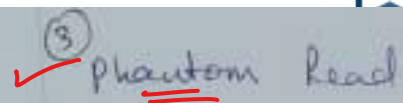
variable (x) is deleted by T_1 transaction, every transa -n is running in isolati So, T_2 transaction was expecting to read value o (x), But variable doesn't exist in database.

Irrecoverable Schedules: For a transaction pair $<T_i, T_j>$, if T_j is reading the value updated by Ti and Tj is committed before commit of Ti, the schedule will be irrecoverable.

Recoverable Schedules: For a transaction pair $<T_i, T_j>$, if T_j is reading the value updated by Ti and Tj is committed after commit of Ti, the schedule will be recoverable.

Cascadeless Recoverable Schedules: For a transaction pair $<T_i, T_j>$, if value updated by Ti is read by Tj only after commit of T_i, the schedule will be cascadeless recoverable.

Strict Recoverable: For a transaction pair $<T_i, T_j>$, if value updated by Ti is read or written by Tj only after commit of T_i, the schedule will be strict recoverable

Strict $\subset$ Cascade less Recoverable $\subset$ recoverable $\subset$ all schedules

Conflict serializable and Conflict Equivalent: A schedule is conflict serializable if it is conflict equivalent to a serial schedule.

Checking for Conflict Serializability
find all **conflicting operations pair**s of a schedule and draw precedence graph.
If graph does not contain cycle, the schedule is conflict serializable else it is not conflict serializable.

$S_1 :$ $r_1(x)\ r_2(t)\ w_1(t)$

achieve 100% → consistent $S_2 :$
state

Schedule

① equivalent

② Safe sequence

③ cycle

④ consistent

⑤ conflict seriali-zable

2020
① r w ② diff trans
w r
w w ③ same data item

2021   If cycle present → Not C.S

T2

LS(A)

r(A)

L ls (A

r(B)

*

Unloc

r(A)

e, the

←(A)

→ ensure serializability

ensure ↳ deadlock

Derivation

	Shared (R) Exclusive (W)	2PL	Strict 2PL	Rigorous 2PL	Conservative 2PL	Timestamp
serializable	X	✓				
Deadlock	X	✗			✓	✓
Recoverable	X		✓	✓		✓
Cascadeless	X		✓	✓		

description - live class

Q) Recoverable ≃ Ir-recoverable

Q) Cascadeless ≃ No Cascade Rollback

dbms → phd
set
net
gate

feedback → enhancement

Share
support

(SQL)

Join — Full →
Inner = common
Outer [left
       Right

Theory

SQL → Syntax

T1
⊓
2

T2
⊓
R

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