

Normal forms

- * 1 NF → multivalued attribute not allowed
- | | | | |
|------|---------|----|-----------------|
| 1001 | Math | 30 | (Not contain |
| 1001 | Physics | 32 | more than one |
| 1002 | English | | entry in single |
| | | | shelf) |

* 2 NF - Non key attributes fully functionally dependent on candidate key & should also belong to 1NF

Ex: A \textcircled{B} C D E F

↳ candidate key

$BC \rightarrow E$ (\checkmark)

$B \rightarrow E$ (\times)

Only Both (BC) can refer any non key attribute (not any single one)

* 3NF => Should exist in 1NF & 2NF & not be transitive dependency

Ex. $X \rightarrow \textcircled{1} \rightarrow \textcircled{2}$ when it is non-unique.
↳ when it is non-unique.

* BCNF (Boyce Codd Normal form):-

$$X \rightarrow Y$$

V

Candidate key
Superkey (for every FD)

* 4NF = Multivalued dependency not allowed.

* 5NF = Decompose into tables as many as possible

<p><u>Oct 03, 2023</u></p> <p><u>Q805</u></p> <p><u>APCO</u></p> <p>Date: / /</p> <p><u>Create DBF structure</u></p>	<p>SVSU Roll No., _____</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>Enroll</td><td>0</td></tr> <tr> <td>Op</td><td>0</td></tr> <tr> <td>On</td><td>0</td></tr> <tr> <td>0</td><td>0</td></tr> </table>	Enroll	0	Op	0	On	0	0	0
Enroll	0								
Op	0								
On	0								
0	0								
<p><u>Armstrong Axioms</u></p>									
<p>① Reflexive rule:- If 'y' is subset of 'x'</p>	<p>If $x \rightarrow y$ (exist) Then $x_1 \rightarrow y_1$ (Also exist)</p>								
<p>$x \notin \text{Roll-no., Name, Class marks} \rightarrow y \in \{\text{Name, Class}\}$</p>	<p>$x \rightarrow y$ (FID exist)</p>								
<p>② Augmentation rule:-</p>	<p>If $x \rightarrow y$ (exist) Then $x_1 \rightarrow y_2$ (Also exist)</p>								
<p>$x \notin \text{Roll-no., Name, Class marks} \rightarrow y \in \{\text{Name, Class}\}$</p>	<p>$x \rightarrow y$ $x \rightarrow z$ (#will also exist)</p>								
<p>③ Transitive rule:-</p>	<p>Let $x \rightarrow y$ & $y \rightarrow z$ (exist)</p>								
<p>$x \rightarrow z$ (#will also exist)</p>	<p>$x \rightarrow y$</p>								
<p>④ Union rule:-</p>	<p>If $x \rightarrow y_1$, $x \rightarrow y_2$ (exist) Then $x \rightarrow y_1 \cup y_2$ (Also exist)</p>								
<p>$x \rightarrow y_1 \cup y_2$ (exist)</p>	<p>$x \rightarrow y_1$</p>								
<p>⑤ Decomposition rule:-</p>	<p>If $x \rightarrow y_1 \cup y_2$ (exist) Then $x \rightarrow y_1$ & $x \rightarrow y_2$ (Also exist)</p>								
<p>$x \rightarrow y_1 \cup y_2$ (exist)</p>	<p>$x \rightarrow y_1$</p>								
<p>⑥ Pseudo transitive rule:-</p>	<p>If $x \rightarrow y$ & $y \rightarrow z$ (exist) Then $x \rightarrow z$ (Also exist)</p>								
<p>$x \rightarrow y$ (exist)</p>	<p>$y \rightarrow z$</p>								



Roll No. - 22 ETC-35732
 Name - Lalit Sharma,
DBMS

Roll No, Course = Name, Classmate,
 UG (Fayha)

पृष्ठ / Page 7

vivo Y51A

Dec 05, 2023, 11:54

Aug. 15, 2023.

Database Management Systems (DBMS)

APCO

Date: / /

- Database - Collection of related data.
 - DBMS → Table.
 - Structured - IITCT, University, → Give similar data.
 - Unstructured - Webpage → Unsimilar data → Photo, Text etc.

DBMS - To manage operations in database.
 Ex: SQL Server, Oracle, MySQL etc.

File system vs DBMS

- For file system if we need any information of 1kb & the file storing this information is of 25 GB, then we have to import the whole file.
- But in DBMS, I can directly access that information of 1kb.

(Means wastage of memory in file system)

- We need authority for that 1 kb information like where it is stored. (Path of text file)
- No such problem in DBMS.
- (Time & effort saving), (Easy step of instruction)

- Concurrency → multiple usage at same time.
- No protocols for concurrency in file system.
- protocols for concurrency in DBMS

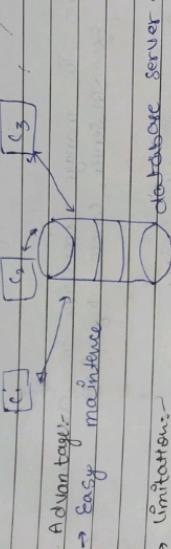
- Security → Role based security.
- multiple views/Role based access control.

- File System → X (No security)
- DBMS → ✓ (Security)

APCO
Date: / /

→ Data redundancy helpful in DBMS.

2 - Tier architecture :-



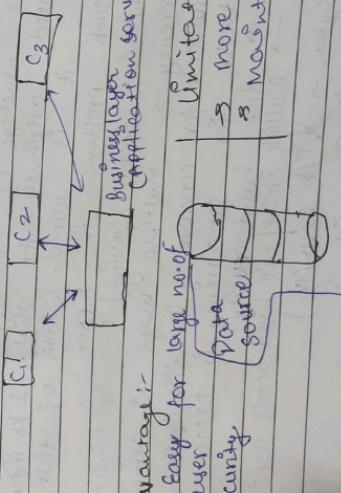
Advantages:-

- Scalability (multiple users, 24x7)
- Security
- More load on database server.

→ Limitations:-

- Scalability (multiple users, 24x7)
- Security
- More load on database server.

3 - Tier architecture:-



Advantages:-

- Easy for large no. of user
- Data source
- Security
- Unite or
- More complex
- Maintenance hard.



Roll No. - 22 ETC 35752
Name - Lalit Sierra
DBMS.

vivo Y51A

Dec 05, 2023, 11:55

पृष्ठा / Page 7

APCO
Date: / /

DBMS

* Schema :- logical representation of database.

Ex:- Student → Table to name,
RollNo. Name Contact

3- Schema - architecture -

User → Multi views =
External Schema (View level)
Database → Conceptual Schema (ER model) (logical level)

Server .

Physical schema (Internal) Physical level



Admin → Database (Disk)

Highest Data independence :-
Provides Java transparency,
Dependence 148

Server .

Logical data independence = If one is
modified change at conceptual schema, then it
will not effect at external schema (View
level)

Physical data independence -

If one is modified
at physical schema then it will not
effect at conceptual schema.

On -
Complex
since hard.

August 16, 2023.

Karthik
Almora
APCO
Date: / /

Key

Primary key (unique + Not NULL)

Foreign key =>

It is an attribute set of attributes that references to primary key of some table or another table (relationship).

- Maintain referential Integrity.

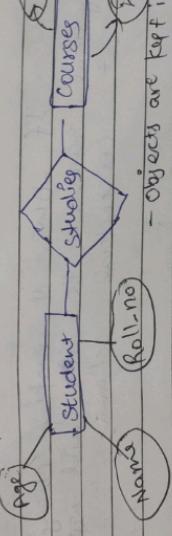
ER model (Entity relationship model):-

→ Relationship between two objects.

Student Studies Courses
Object Relationship Object

Student (Roll no, Name, Age);
Courses (Course-ID, duration);
Attributes

↳ Representation of above data in ER model:



- Objects are kept in rectangles
- Relationship in diamond
- Attribute in circles

Rollno, Semister, Name, Classmate, etc.
Upc (Roll no, Classmate, etc.)

Data Definition language (DDL):-

```
CREATE student_table(Roll-no, ID, Name VARCHAR(20), DOB DATE)
    Date: / /, / /
    - Domain constraint
    - Referential integrity
    - Authorization
    - Authentication
```

Data manipulation Language (DML):-

INSERT INTO student_table (214, Kunal, NULL);

Data Query language (DQL):-

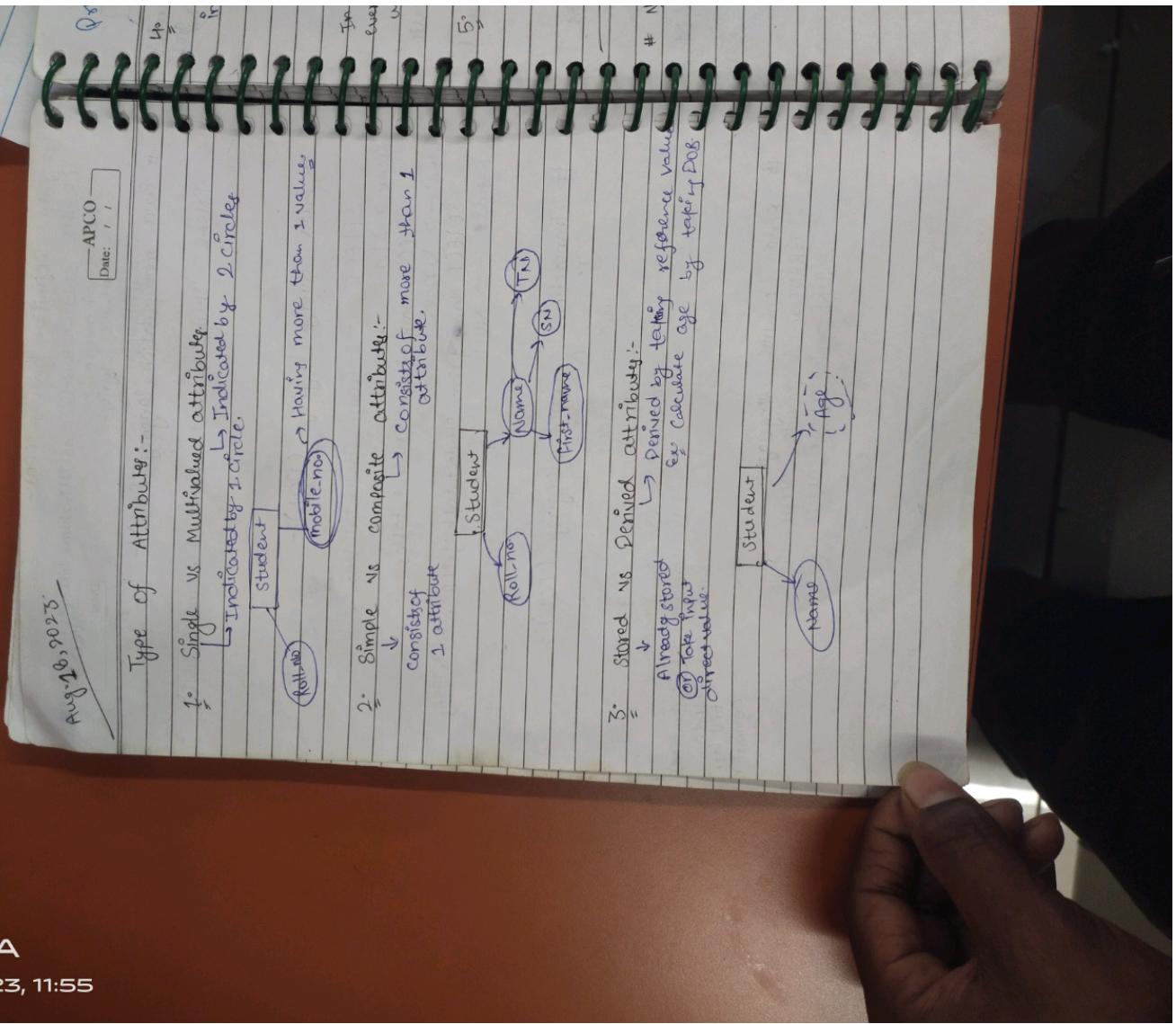
```
SELECT * from student_table;
Result → 214 Kunal NULL.
SELECT Name from student_table;
Result → Kunal.
SELECT Name from student_table if DOB = 07-07-1996;
Result → NULL.
```

Transaction control language (TCL):-

```
T: A → B
④ X = X - 1000
⑤ update(x)
commits; ③ Y = Y + 1000
          ⑥ update(y) (System failure)
          = Roll back; Undo
          Commit;
```

Data control language :-

GRANT → To provide access rights.
REVOKE → To release access rights.





vivo Y51A

Dec 05, 2023, 11:55

Roll No - 22BTECS5332
Name - Lalit Sharma,
2 BMS.

Topic - Database Classification
Page / Page 7

Ques:- Any Statement which is
either true or false

APCO

Date: / /

No Key is Non-Key Attribute:-
↳ Unique may have more than 1 same
in whole database.

Student

↳ Roll-No → 2 students may be
in any university under 1 solo
every student has
more than 1 values

more than 1 values

↳ 2 circles

5' Complex attribute :- Composite + multivalued.

↳ 2 address are there & each has
2 values

↳ TN

↳ 2. mobile no.

↳ *

Normalization - It is a technique to remove or
reduce redundancy from a table.
by taking D.O.S

↳ 1. 1NF
↳ 2. 2NF
↳ 3. 3NF
↳ 4. BCNF
↳ 5. 4NF
↳ 6. 5NF

APCO
Date: / /

QPR: 10/10/23

Suppliers (SId, Pid, Sname, Varchar(50), Address, ~~at~~ Varchar(50))
parts (pid int, Pname, Varchar(50), Color, Int(10, 2))
Catalog (SId int, Pid int, Cost decimal(10, 2)),
2)

① Name of suppliers who supply some red parts:

R₁ = $\Pi_{pid} (\sigma_{color = Red}) [Parts]$

R₂ = $\Pi_{pid} ([catalog] \bowtie R_1)$

R₃ = $\Pi_{Sname} ([suppliers] \bowtie R_2)$

② Sids of suppliers who supply some red & green parts.

R₁ = $\Pi_{pid} (\sigma_{color = Red}) \bowtie \Pi_{pid} (\sigma_{color = Green}) [parts]$

R₂ = $\Pi_{sid} ([catalog] \bowtie R_1)$

③ Sids of suppliers who supply some red parts
~~at~~ at 2nd position.
To solve sids of suppliers who supply red part.

R₁ = $\Pi_{sid} ([catalog] \bowtie R_2)$

R₂ = $\Pi_{pid} ([parts] \sigma_{color = Red})$

Now solve for Address -

R₃ = $\Pi_{sid} ([suppliers] \sigma_{address = 221\text{ Parker Ave}})$

R₃ = $\Pi_{sid} ([suppliers] \sigma_{2\text{ D suppliers}})$

$\Rightarrow R_2 \cup R_3$

APCO

Date: / /

left outer join (Δ) \rightarrow left outer join

\Rightarrow 2 cases :-
 (R)

Student Rollno.	Course name	Batch
1012	DBMS	2012
3012	COA	2019
4013	CN	2023
3014	Sar	2021
		NULL

(S)

Batch	ID
12	101
19	102
82	103

left outer join. (~~right outer join~~ (R DS))

St. Rollno	C. name	Batch	ID
1012	DBMS	12	101
3012	COA	19	102
4013	CN	23	NULL
3014	Sar	21	NULL

Right Outer Join - (R DS)
Batch
12
19
7 22
101
102
103
1012
1012
1012
COA
NULL
NULL



Collage

卷之三

APCO

B-1111 employee DEP
Flight center [unclear]
Catering

Relati

Expenditure	C/P	Entertainment	Education	Prod.	Drama
1	Aavin	50,000	1	Production	
3	Hansel	70,000	2	Sale	
5	Sarthak	85,000	3	Marketing	
6	Saurabh	60,000	4	Accounts	
	Null	Nil	5		

Employee M Date:

id	name	salary	did	dearne
1	Anur	\$10,000	1	Production.
2	Sachin	\$4,000	NUL	NUL
3	Mahesh	\$0,500	2	Sale
4	Ajrun	\$0,000	NUL	NUL
5	Santosh	\$5,000	3	Marketing
6	Gaurav	\$0,000	4	IT

#	Employee ID	First Name	Last Name	Department	Job Title	Hire Date	Salary	Commission %	Total Production	Net Profit	Sales
1	Eid	Umer	Azam	Sales	Sales Executive	2023-01-01	50,000	1%	100,000	10,000	100,000
2	Firdaus	Mohsin	Hassan	Marketing	Marketing Executive	2023-01-01	64,000	1.5%	120,000	12,000	120,000
3	Rehan	Haris	Farhat	Customer Service	Customer Service Representative	2023-01-01	48,000	0.5%	80,000	8,000	80,000
4	Riaz	Mujahid	Khan	IT Support	IT Support Specialist	2023-01-01	40,000	0.2%	60,000	6,000	60,000

Employee DEPT(full master)

#	Employee Name	Employee ID	Phone No.	Productivity	Production
1	Arun	Arun	50,000	1	Productivity
2	Sachin	Sachin	64,000	NUL	NUL
3	Harsheel	Harsheel	76,000	2	Sold
4	Arijun	Arijun	90,000	NUL	NUL
5	Gauthier	Gauthier	35,000	3	Motivation
6	Saurabh	Saurabh	60,000	4	Attention
7	NULL	NULL	NULL	5	Efficiency

Our crew stated that plane
had been flying at 50,000 ft.

vivo Y51A

Dec 05, 2023, 11:56



Roll No. - 225TC35732
Name - Lalit Sharma,
DBMS.

D B M S. —
Rolling, C — Sharma

IA

Dec 05, 2023, 11:56

APCO
Date: / /

water (join)

Relational Algebra

Plane $\#$ Rowan (e) $e_{(ab)}(R_1)$
Production.

vivo Y51A

Dec 05, 2023, 11:56



Ref No.: - 22-B57-35752
 Name - Lalit Sharma
 Rollno, Institute - Lalit Sharma
 Dept (Faculty) - DMS.

vivo Y51A

Dec 05, 2023, 11:55 AM

Chaitanya
 Date: / /

पृष्ठ / Page 7

APCO
 Date: / /

Q: Name of all customers who have a loan & and account at bank.

$\exists t \exists s \exists e \text{ depositor}(t[\text{customer_name}] = s[\text{customer_name}])$

$\wedge \exists u \in \text{borrower}(t[\text{customer_name}] = u[\text{customer_name}])$

Q: find name of all customers having a loan & at ABC branch.

$\exists t \exists s \exists e \text{ borrower}(t[\text{customer_name}] = s[\text{customer_name}])$
 $\wedge \exists u \text{ loan}(u[\text{branchname}] = "ABC")$

~~set of rows~~ functional dependency \rightarrow ~~partial~~ \rightarrow ~~partial~~ \rightarrow ~~partial~~ \rightarrow ~~partial~~ \rightarrow ~~partial~~
~~answering attributes~~

① Trivial FD ($Y \subseteq X$)

Ex: $S \text{ Rollno}; S \text{ Name}, S \text{ Name} \rightarrow S \text{ Name}$

② Non-Trivial FD ($Y \not\subseteq X$)

Ex: $S \text{ Rollno}, S \text{ Name}, S \text{ Name} \rightarrow S \text{ Counterparty}$
 $\Rightarrow S \text{ Rollno}, S \text{ Name}, S \text{ Name} \rightarrow S \text{ Counterparty}$

③ Completely non-trivial FD ($X \cap Y = \emptyset$)
 $\Rightarrow S \text{ Rollno}, S \text{ Name} \rightarrow S \text{ Counterparty}$

④ Multivalued FD

$\{S \text{ Rollno}\} \rightarrow \{S \text{ Name}, S \text{ Counterparty}\}$

4. Some FDs

(e.g., SO, PO, B)

APCO

Date: / /

Database - Collection of interrelated related data.

- DBMS - database + software to access and do operations on the database.
- Database systems are designed to manage large bodies of information.
- # Database
- File system disadvantages:-
- Data Redundancy → Repetition of same data in various files.
- Data inconsistency → Variation of data in different file. e.g. Variation of address in Maths & English department table file.
- Difficulty in accessing data - Not allowing to retrieve in efficient & convenient manner.
- Data Isolation → To retrieve all data from various files is like impossible.
- Integrity problem:-
- # Q =
- Account 'A' credited with 500Rs but Account 'B' not credited with some because of power off. This is not atomic.
- Concurrency - access problem:-
- Like 2 users are using data from the file system & it is updating of one user



Roll no. - 2257235732
Name - Lalit Sharma,
D6MS.

College - Savitri Chhatrapati
Pimpri, Pune.

vivo Y51A
Dec 05, 2023, 11:56

APCO
Date: / /

APCO
Date: / /

related data
→ security problem: Everyone is able to access
everything from file system

not to manage
Data model:- Collection of conceptual tools,
for describing data, data relationships, data
semantics & consistency constraints
→ Relational model
→ ER Entity Relationship model:
of same data
→ semi-structured data model.
of data
→ object based data model.
of address
table(file)

Not allows
convenient number
all data
like impossible

Data Abstraction
⇒ To retrieve the data every
SDR but

with SDRs
is not
useful

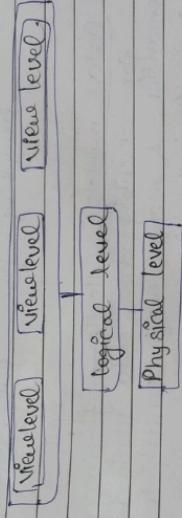
useful
as registrar can see how much every
faculty is getting or salary & other
many more.

from
one or
of

Three rights for accessing & retrieving
of data from database are provided

APCO
Date: / /

By data abstraction.



View level :- Many users on database need only few information, so they need to access only a part of database. View level of data abstraction exists to simplify their interaction with system. System may provide many views for the same database.

Logical level :- Decides what data to store in database, & what relationships exist among those data. Logical level describes the logical database in terms of a small number of relatively simple structures. Although implementation of simple structures may involve complex physical-level structures, the user of logical level does not need to be aware of this complexity. They is referred as physical data independence. Database administrators, who must decide what information to tap in database.

Physical level :- Lowest-level of abstraction determines how the data are actually stored. Shows data-structures in detail.



Roll No. - 2257235752
Name - Lalit Sharma,
D B M S.

28M.S.

Rolling, Course - Land, Cleavage
W.E. (Favorable) S.

vivo Y51A

Dec 05, 2023, 11:56

AP(O)
Date: / /

view level.

Instance \Rightarrow Database change over time
an information is inserted & deleted.
The collection of information stored in
database at a particular moment is
Called instance.

Schema \Rightarrow Overall design of database is called Schema of database.

database need so they need to database. Your level needs to simplify system. System may the same database.

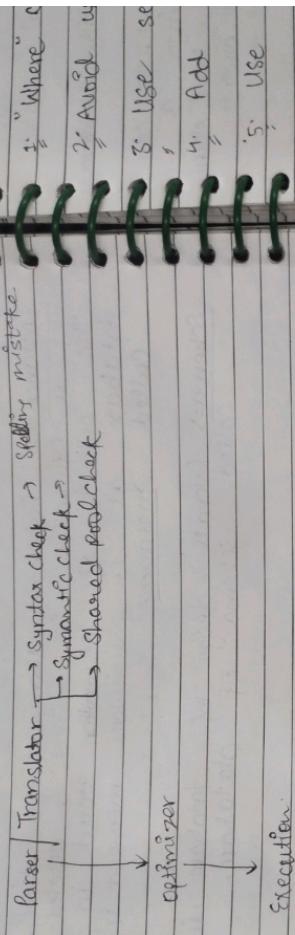
- + data to & what relationship
- Logical level
- in terms of
 - Simple structure
 - Simple Structure
 - Level structure
- o not need the only they is source. Database decide what

Instruction der Vibes
red. Shouts

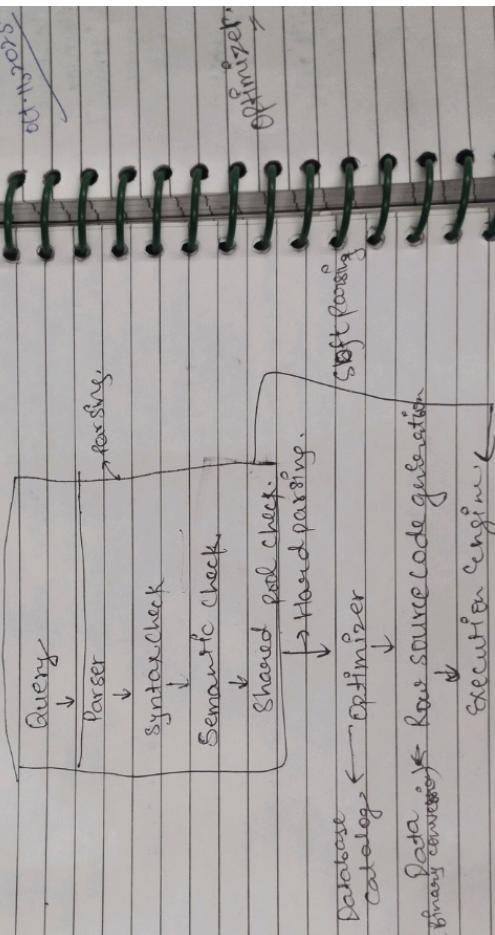
Oct-187073

APCO _____
Date: / /

Mystic River



Execution.





vivo Y51A

Dec 05, 2023, 11:56

60/1/16 -- 20 BTC-35132
Name - Lalit Sharma
D.B.M.S.

Roll No., Source Language, Date, Collection Name, etc.

पुस्तक / Page 7

How to load data from Textfiles in SQL
→ Query Equivalence Relation
→ Query Optimization:

- 1. "Where" clause instead of "Having Clause"
- 2. Avoid using SQL queries inside loops
- 3. Use select instead of Select *
- 4. Add "explain" to beginning of SQL Queries
- 5. Use "exists" instead.

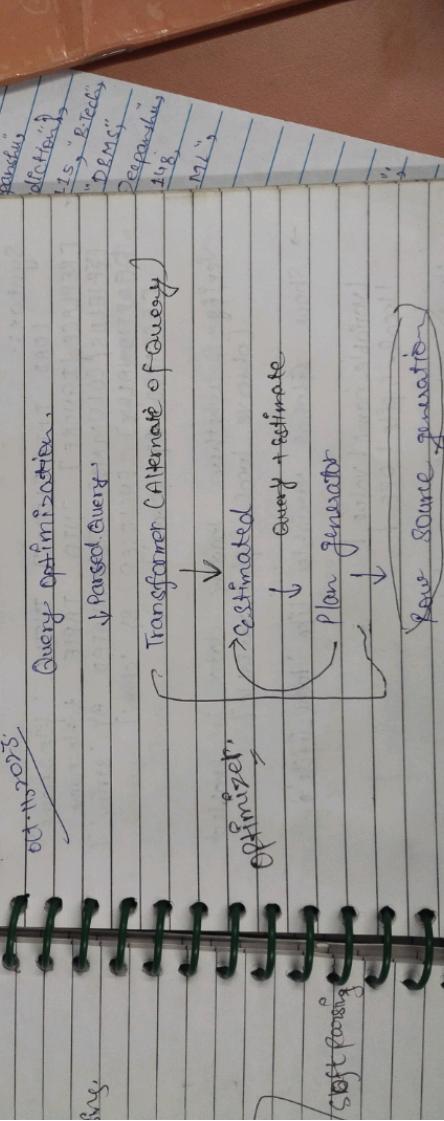
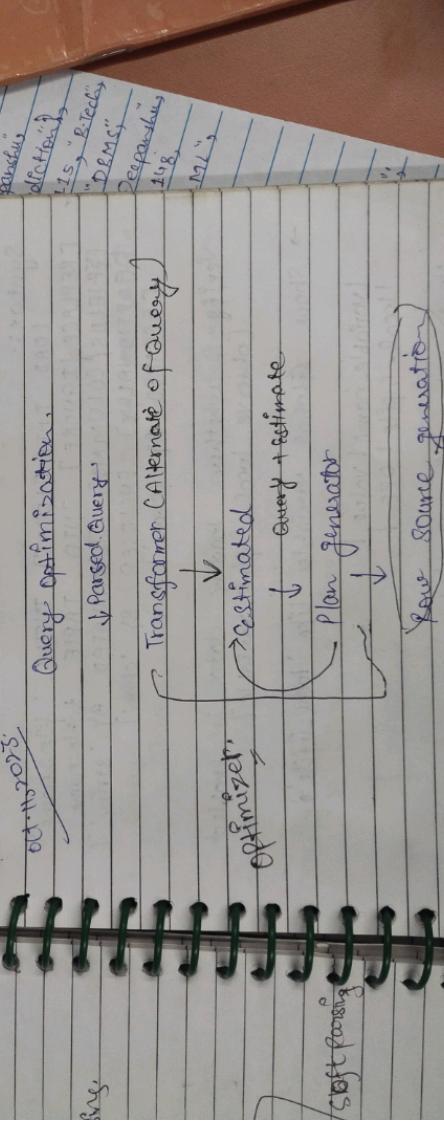
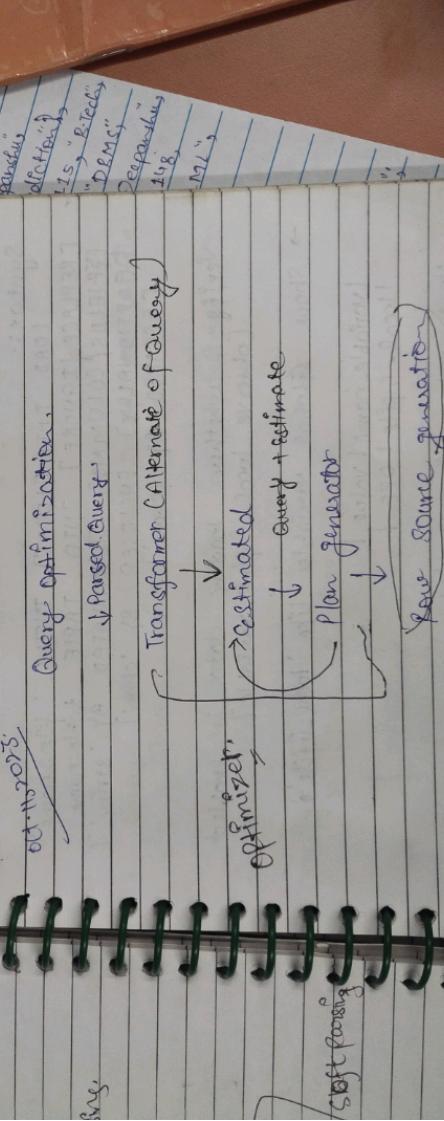
Any mistake.

APCO
Date: / /

Oct 10/2023

Query optimization.

By



Part-2Date:
Oct. 13, 2023.APCO
Date: / /Make
databaseAssignment:

How to load a text file with SQL server

All

Example

Using the "Load data" statement, one can insert the contents of a file into a MySQL table. If you use the "Local" clause, you can upload the local file contents into a table.

Syntax:-

```
LOAD DATA [LOCAL] INFILE 'file-name'  
[REPLACE | IGNORE] INTO TABLE table-name  
[FIELDS | COLUMNS] TERMINATED BY 'string'  
[OPTIONALLY] ENCLOSED BY 'char'  
[ESCAPED BY 'char'] ;
```

Verify whether loading data is enabled
[Observe local_infile variable]

→ Show Global Variables like 'local_infile'

```
Variable_name | Value  
local_infile | off
```

No we make it enable:
mysql> Set global local_infile = 'ON';



vivo Y51A

Dec 05, 2023, 11:56

Roll No. - 22-BTC-35732
Name - Lalit Jigawat
DMS:
Syllabus, Software Labo.
Year (2nd Year)
(Raviprakash, Sridhar)

APCO
Date: / /

APCO
Date: / /

Make you grant file (or, all) privileged to

database in which your table exist -

All on test.* To 'root' @ 'localhost';

Example:-

Assume we have created a table.
> Create table DEMO (NAME VARCHAR(20));

Contents of file "test.txt":

```
'Raju'  
'Sajani'  
'Ram'  
'Deva'
```

* Query to load contents of test.txt file

in above created table.

is selected

>> load data infile "path/of/test.txt" into

table DEMO;

call infile;

Verify >> select * from DEMO;

	NAME
1	Raju
2	Sajani
3	Ram
4	Deva

Date:Assignment:-
Oct 11/2023APCO
Date: / /Equivalence Rules of Relations:-

$$1. \quad \sigma_{\Theta_1 \cap \Theta_2}(E) = \sigma_{\Theta_2}(E) [\text{Cascade of } \sigma]$$

$$2. \quad \text{Commutative:} \quad \sigma_{\Theta_1}(\sigma_{\Theta_2}(E)) = \sigma_{\Theta_2}(\sigma_{\Theta_1}(E))$$

$$3. \quad \text{Cascade of } \Pi : \quad \Pi_{L_1}(\Pi_{L_2}(\dots(\Pi_{L_n}(E)))) = \Pi_{L_1 \cup L_2 \cup \dots \cup L_n}(E)$$

$$4. \quad a. \quad \sigma_E(E_1 * E_2) = E_1 * \sigma_E(E_2) \quad \{ \text{theta join} \}$$

$$b. \quad \sigma_{\Theta_1}(E_1 * E_2) = (\sigma_{\Theta_1} E_1) * E_2 \quad \{ \text{theta join} \}$$

$$5. \quad \text{Tacita joins are commutative:} \quad E_1 \bowtie_1 E_2 \equiv E_2 \bowtie_1 E_2$$

$$6. \quad \text{Natural joins operations are associative:} \quad (E_1 \bowtie_1 E_2) \bowtie_2 E_3 \equiv E_1 \bowtie_1 (E_2 \bowtie_2 E_3)$$

The theta joins are associative in manner:

$$(E_1 \bowtie_1 E_2) \bowtie_2 \Theta_3 E_3 \equiv E_1 \bowtie_1 (\Theta_2 \bowtie_3 E_3)$$

$$7. \quad \sigma_{\Theta_1}(E_1 * E_2) = (\sigma_{\Theta_1}(E_1)) * E_2$$

$$\sigma_{\Theta_1 \cap \Theta_2}(E_1 * E_2) = (\sigma_{\Theta_1 \cap \Theta_2}(E_1)) * E_2$$



$$\frac{N_{\text{H}_2} - N_{\text{H}_2\text{O}}}{N_{\text{H}_2\text{O}}} = \frac{2.65 \times 357.52}{1.00 \times 357.52} = 2.87 \text{ g H}_2\text{O}$$

Robert Devereux
Devereux, Robert
Wife (Lorraine)
Children (2)

vivo Y51A

Dec 05, 2023, 11:57

APC(O)
Date: / /

—APCO—

$$\frac{g}{\varepsilon} = \frac{\Pi_{t_1 \cup t_2}(E, M_0, F_2) - (\Pi_{t_1}(E_1) - M_0(\Pi_{t_2}(E_2))}{\varepsilon}$$

of Relations:-

(E1) []

$$g: \pi_i(E_1 \vee E_2) \equiv (\pi_i(E_1)) \cup (\pi_i(E_2))$$

10. $E_1 \times E_2 \cong E_3$ $\times E_4$

$\sigma_2(\sigma_0, (E))$

14. $\text{G} \otimes (\mathbb{C}[F] \otimes \mathbb{C}[G]) \cong \mathbb{C}[FG]$

$$C_{L_n} \subseteq L_1(C_E)$$

$$T_1 = T_2 = \dots = T_n = T$$

$\text{NO}_2 \text{ F}_2$

native:

E4

Associative :-

10

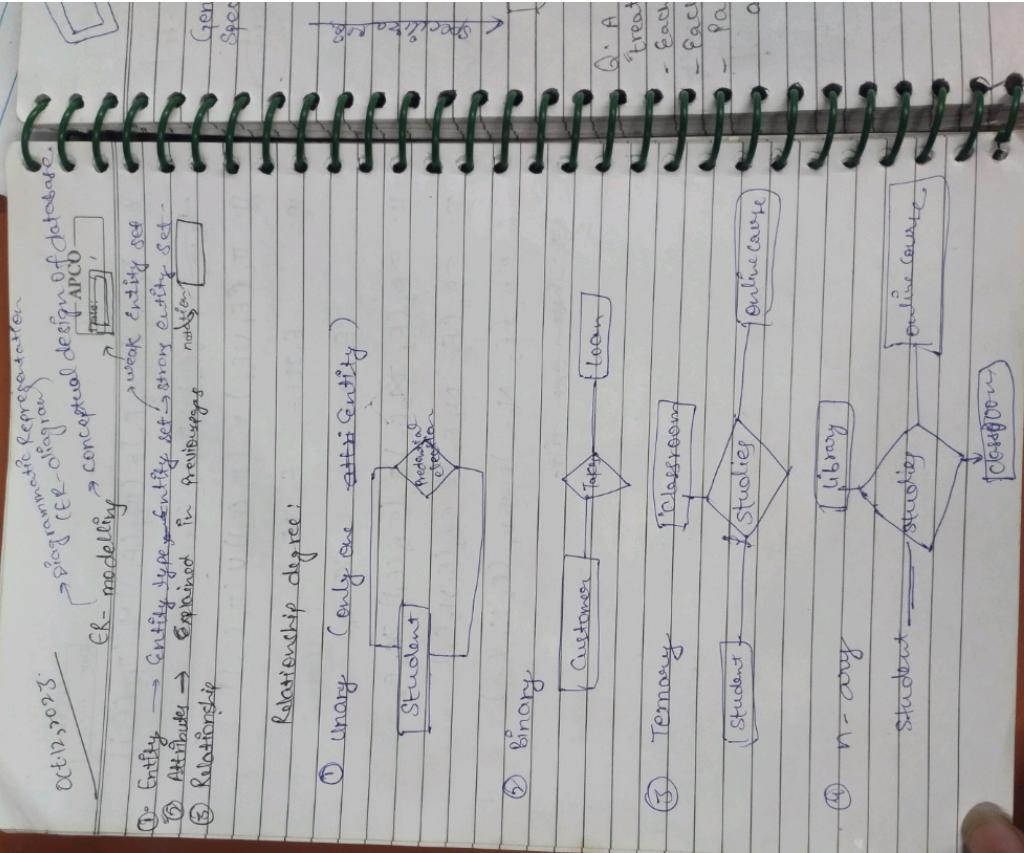
the branched $\text{C}_2\text{H}_5\text{Cl}$

M 1000

$\Delta E_0 (E_2 - E_1)$

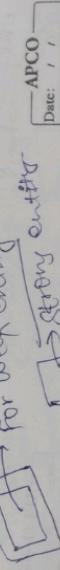
1000

卷之三



Name - Lailat Sharmin
Roll No - 10
Course - Computer Science
University - Pabna University of Science & Technology
D.B.M.S.

Page / Page ,

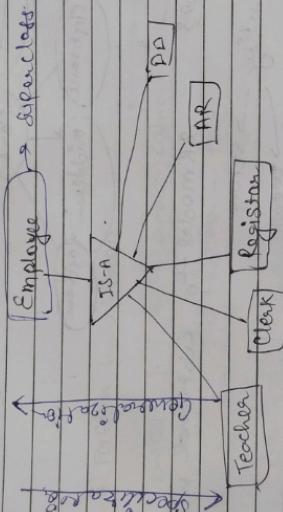


APCO

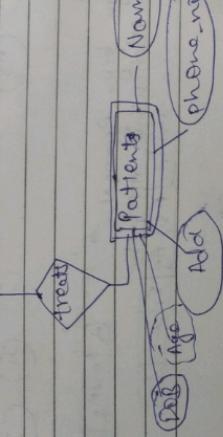
Date: / /

Enhanced ER model,

Generalization (Schema size reduced)
Specialization (Inheritance)



- Q: A doctor has one or more patients to treat
- Each doctor has a unique doc. Id.
- Each patient has name, phone no, add. & doc.
- Patient is weak entity, age is derived attribute.



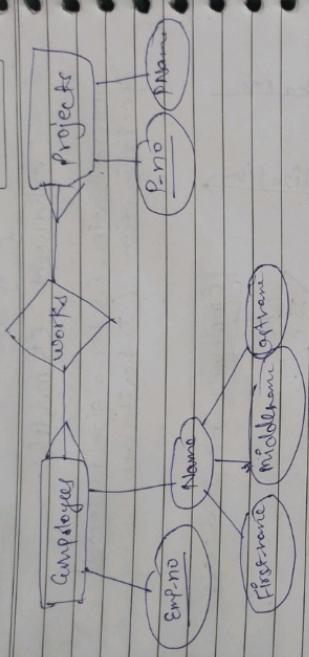
Unique attribute

Unique attribute

Q. ABC Company:

APCO

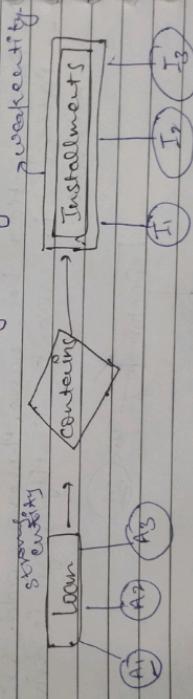
Date: / /



~~Rate: 1003~~ ~~out of 5~~ ER model to relational model.

① Entity → strong
 → weak

② Relationship → 1: many / many to 1
 → many : many

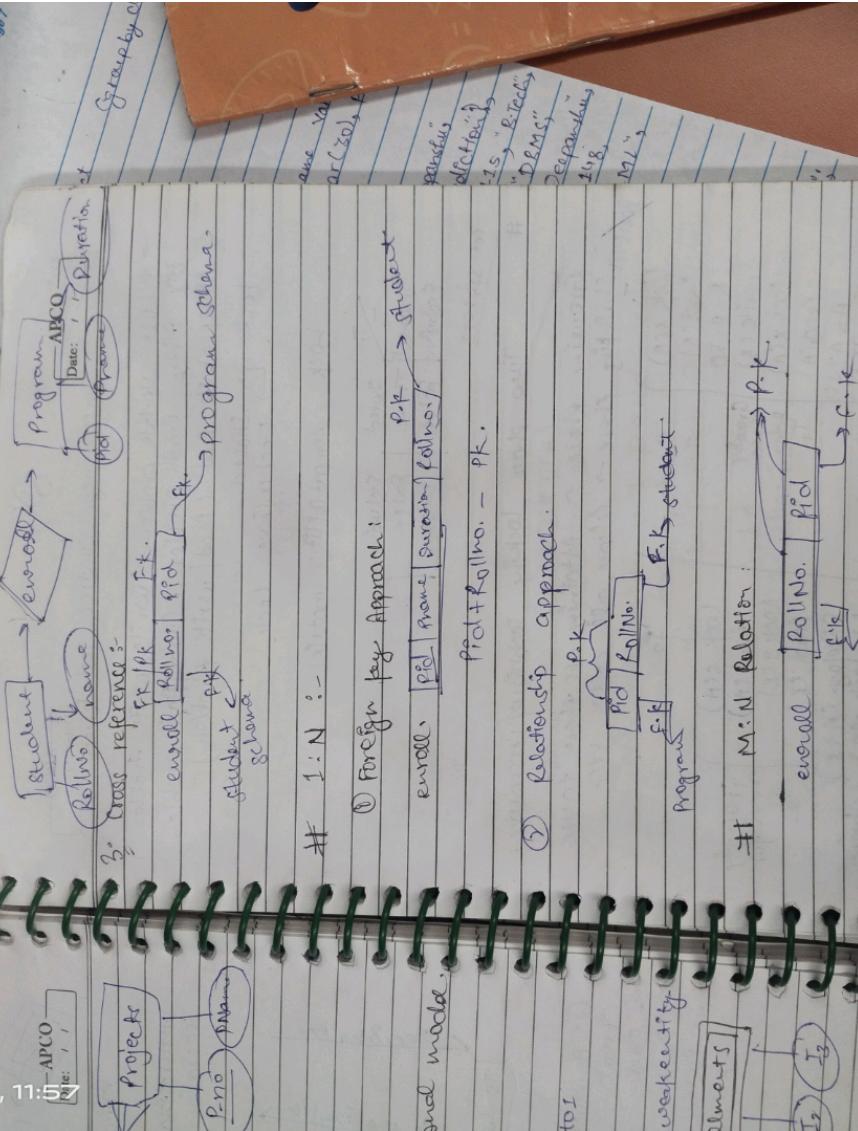


1:1
→ Foreign key Approach → ~~Approach~~ ~~Approach~~ HK.
③ Merged relationship Approach.
 Contains [A1 A2 A3 I1 I2 I3]



vivo Y51A

Dec 05, 2023, 11:57 Date



SVSU Name - Lalit Sharma Date - Dec 05, 2023, 11:57 AM Page No. - 7

1. **3rd Normal Form (3NF)**

Diagram illustrating 3rd Normal Form:

- Entity 1:** Student (Primary Key: RollNo.)
- Entity 2:** Program (Primary Key: PROG)
- Relationship:** Cross Reference (Student → Program, Program → Student)
- Attributes:** Enroll (RollNo., PROG), Pid.
- Diagram:** A box labeled "Cross reference" contains "Enroll" and "Pid.". "Enroll" has arrows pointing to "RollNo." and "PROG". "Pid." has an arrow pointing to "PROG".

2. **Foreign key Approach:**

Diagram illustrating Foreign key Approach:

- Entity 1:** Student (Primary Key: RollNo.)
- Entity 2:** Program (Primary Key: PROG)
- Relationship:** program schema.
- Attributes:** Enroll (RollNo., PROG), Pid.
- Diagram:** A box labeled "program schema" contains "Enroll" and "Pid.". "Enroll" has arrows pointing to "RollNo." and "PROG". "Pid." has an arrow pointing to "PROG".

3. **1:N :-**

Diagram illustrating 1:N relationship:

- Entity 1:** Student (Primary Key: RollNo.)
- Entity 2:** Program (Primary Key: PROG)
- Relationship:** Enroll (RollNo., PROG)
- Diagram:** A box labeled "Enroll" contains "RollNo." and "PROG". "RollNo." has an arrow pointing to "Student". "PROG" has an arrow pointing to "Program".

4. **Relationship approach:**

Diagram illustrating Relationship approach:

- Entity 1:** Project (Primary Key: ProjNo.)
- Entity 2:** Student (Primary Key: RollNo.)
- Relationship:** enroll (ProjNo., RollNo.)
- Diagram:** A box labeled "enroll" contains "ProjNo." and "RollNo.". "ProjNo." has an arrow pointing to "Project". "RollNo." has an arrow pointing to "Student".

5. **M:N Relation:**

Diagram illustrating M:N relationship:

- Entity 1:** Project (Primary Key: ProjNo.)
- Entity 2:** Student (Primary Key: RollNo.)
- Relationship:** enroll (ProjNo., RollNo.)
- Diagram:** A box labeled "enroll" contains "ProjNo." and "RollNo.". "ProjNo." has an arrow pointing to "Project". "RollNo." has an arrow pointing to "Student".

APCO																	
Date:	/ /																
15/12/23		Concurrency Control Techniques.															
Oct 05, 2023																	
1) Lost update problem. (Write/Write Problem)		T ₁															
2) Dirty Read Problem. (Write/Read Problem)		lock X(CB)															
3) Unrepeatable Read (Read/Read Problem)		Read (CB)															
Lock T ₂ Shared lock		B = B - S															
T ₂) Exclusive lock		Write (C)															
Lock compatibility matrix.																	
<table border="1"> <thead> <tr> <th></th> <th>T₁</th> <th>T₂</th> </tr> </thead> <tbody> <tr> <td>Shared</td> <td>Shared</td> <td>Exclusive</td> </tr> <tr> <td>Exclusive</td> <td>Exclusive</td> <td>False</td> </tr> <tr> <td>Shared</td> <td>True</td> <td>False</td> </tr> <tr> <td>Exclusive</td> <td>False</td> <td>False</td> </tr> </tbody> </table>				T ₁	T ₂	Shared	Shared	Exclusive	Exclusive	Exclusive	False	Shared	True	False	Exclusive	False	False
	T ₁	T ₂															
Shared	Shared	Exclusive															
Exclusive	Exclusive	False															
Shared	True	False															
Exclusive	False	False															
Oct - 05, 2023.																	
# Two phase locking Technique/Procedure.		T ₁															
Growing Phase → Attaching all objects to use.		lock S(A)															
Panic Shrinking Phase → Release all objects use.		lock X(A)															
T ₁		lock S(B)															
lock X(CB)		lock S(C)															
B = B - 50		lock X(A)															
write (B)		lock S(E)															
lock X(A)		lock S(E)															
Read (A)		lock X(E)															
T ₁		lock X(E)															
A = A + 50		lock S(E)															
write (A)		lock S(E)															
unlock (A)		unlock S(A)															
unlock X(CB)		unlock S(A)															
unlock X(A)		unlock S(E)															
unlock X(E)		unlock S(E)															
strict																	
#		T ₁															
T ₂																	
lock S(A)		T ₁ is															
Growing		for															
phase		basic?															
for		done															
T ₁																	
lock X(A)																	
lock S(E)																	
lock X(E)																	
lock S(E)																	
lock X(E)																	
lock S(E)																	
lock X(E)																	
lock S(E)																	
lock X(E)																	
strict																	
#		Region															

vivo Y51A
Dec 05, 2023 11:57
Task Name: / /

APCO
Date: / /
Page No. 7

(i) Write problem
(ii) Read problem
(iii) Write procedure.

all easier to use
after use.

T₁

lock X(B)

Read (B)

B = B - 50

Write (B)

lock S(M)

Read (M)

lock S(Q) → Deny.

lock X(A) → Deny

A = A + 50

unlock X(P)

unlock X(Q)

strictly

protection

for use for

after use.

T₂

lock X(A)

Read (A)

A = A + 50

Write (A)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(A)

Read (A)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

Read (M)

lock S(P)

Read (P)

lock S(Q)

Read (Q)

lock S(M)

strict API → valid for exclusive lock only.
→ provide column constraint before the lock

Rigorous API :- valid for shared & exclusive lock

→ provide commit before update operation

strict API → valid for exclusive lock only.
→ provide column constraint before the lock

Rigorous API :- valid for shared & exclusive lock

strict API → valid for shared & exclusive lock

→ provide commit before update operation

strict API → valid for shared & exclusive lock

→ provide commit before update operation

strict API → valid for shared & exclusive lock

→ provide commit before update operation

strict API → valid for shared & exclusive lock

APCO
Date: / /
Time Stamp Ordering Consistency Control

Read (v) T_i

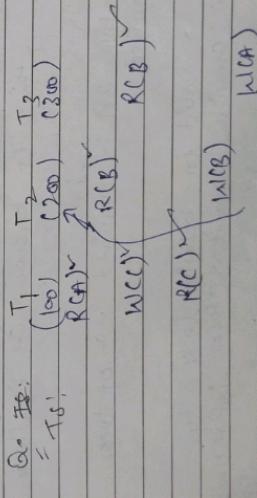
- ① $WTS(v) > TS(T_i)$
rollback.

- ② Execute Read (x)
set $RTS(x) = \max\{RTS(v), TS(T_i)\}$.

Write (v) T_i

- ① $RTS(v) > TS(T_i)$
Rollback

- ② $WTS(v) > TS(T_i)$
rollback
③ execute
set $WTS(v) = TS(T_i)$



Rolling, Course Name: DMS.

Life (Ravinder Singh)

Page No. 7

APCO

Date: / /

vivo Y51A
Dec 05, 2023, 10:57

at Estimated all Value with Zeta

SOLN.	A	B	C
RTS	100	100	100
WTS	0	0	0

WTS(A) = 0

TS(T₁) = 100

WTS(A) < TS(T₁)

→ Execute.

RTS(A) = max{0, 100}

RTS(A) = 100

Similar: RTS(B) = 200

for i ← 1 to C

WTS(T_i)

RTS(C) = 0

TS(T₁) = 100

RTS(C) < TS(T₁)

→ Execute.

RTS(C) = TS(T₁)

WTS(C) = 100

WTS(C) = 0

TS(T₁) = 100

WTS(C) < TS(T₁)

→ Execute.

RTS(C) = TS(T₁)

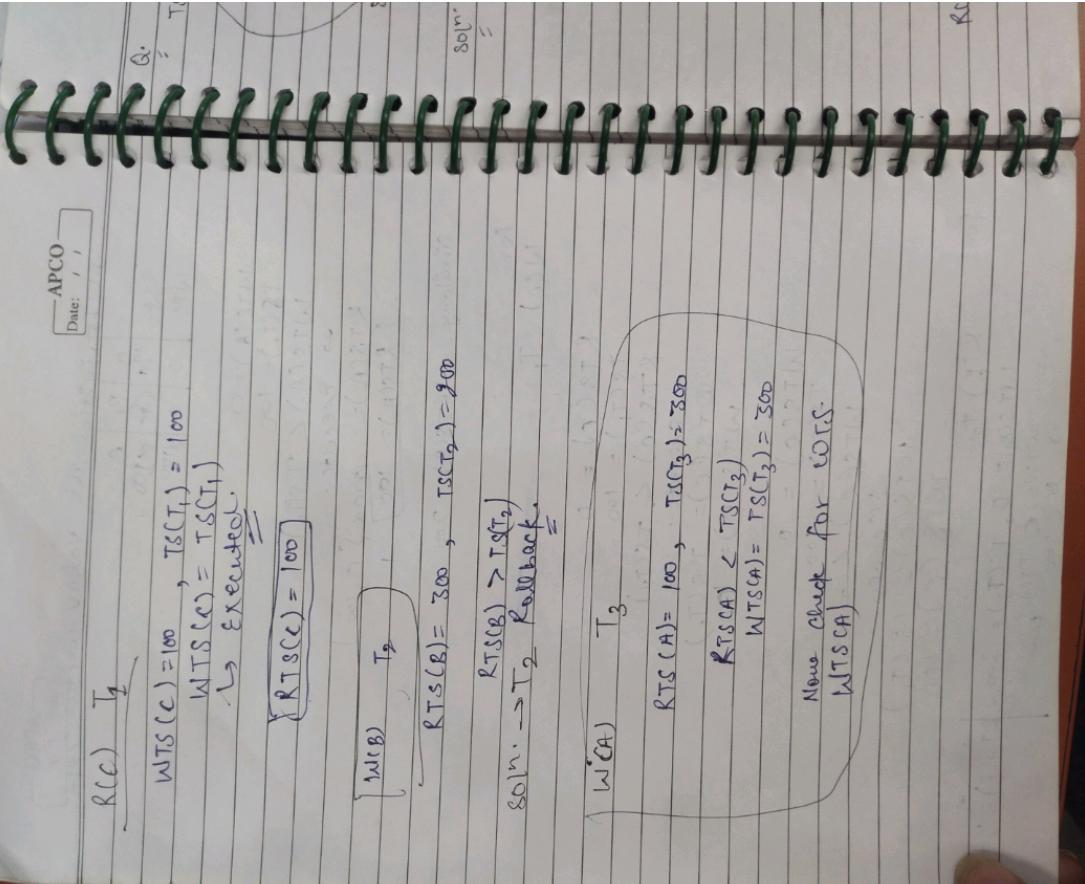
WTS(C) = 100

for: R(B) T₂

WTS(B) = 0, TS(T₂) = 300, RTS(B) = 300

∴ WTS(B) < TS(T₂)

∴ 0 < 300



vivo Y51A

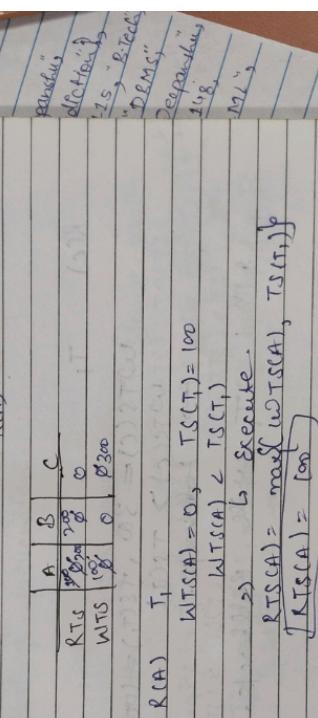
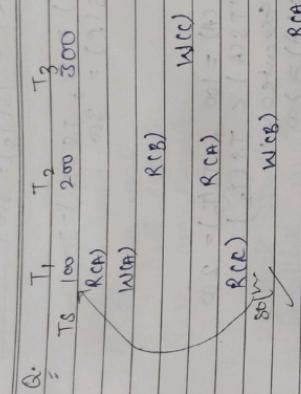
Dec 05, 2023, 11:58

APCO
Date: / /

APCO
Date: / /

No. 144 - 29 Oct-2022
SVSU - Lalit Sheva.
Roll No. Course Name, Class
Date: 18/12/2022

Wife (Lalit Sheva).
Name (Lalit Sheva).
S/o



Page No:
No. 89

$$\begin{array}{ll} W(C) & T_1(A) \\ WTS(C) = 0 & TS(T_1) = 300 \\ WTS(C) = TS(T_2) = 300 & \boxed{\text{APCO}} \\ \boxed{\text{Date: / /}} & \end{array}$$

$$\begin{array}{ll} WTS(A) = 0, TS(T_2) = 300 & \text{Deadline} \\ WTS(R) = 300 & \begin{array}{l} \textcircled{1} \text{ Hold} \\ \textcircled{2} \text{ Acq} \\ \textcircled{3} \text{ Inv} \\ \textcircled{4} \text{ Mu} \\ \textcircled{5} \text{ Inv} \\ \textcircled{6} \text{ Mu} \\ \textcircled{7} \text{ No} \end{array} \\ \boxed{\text{WTS(A)}} & \end{array}$$

$$\begin{array}{ll} WTS(A) = 100 & TS(T_2) = 200 \\ WTS(A) < TS(T_2) & \text{Dead} \\ \rightarrow \text{execute A.} & \begin{array}{l} \textcircled{1} \text{ Read} \\ \textcircled{2} \text{ Read} \end{array} \\ R(TS(A)) = 200 & \end{array}$$

R(A)

T₂

$$\begin{array}{ll} WTS(C) = 300 & \text{Wait-} \\ WTS(C) > TS(T_1) & \begin{array}{l} \textcircled{1} \text{ TS}(T_1) \\ \textcircled{2} \text{ T}_1 \text{ wait} \\ \textcircled{3} \text{ TS}(T_1) \end{array} \\ \rightarrow \text{rollback.} & \end{array}$$

Soln: T₁ will rollback.

R(C)

T₁

$$WTS(C) = 300, TS(T_1) = 100$$

$$WTS(C) > TS(T_1)$$

→ rollback.

Name - Name -
Date - Date -
Place - Place -
DEM's - DEM's -

vivo Y51A
Dec 05, 2023, 11:58

PTO

Date: 05/12/23
Name:

Thomas write Rule.

APCO —
Date: / /

Group

Deadlock Condition :-

- ① Hold & wait
- ② Circles wait
- ③ Mutual exclusion.
- ④ No pre-emption.

Deadlock handling

- ① Deadlock avoidance.
- ② Deadlock prevention.

Dead prevention

Wait - die.

- ① $TSC(T_i) < TS(T_j)$ before receiving. $TSC(T_i) < TS(T_j)$ $\rightarrow T_j$ releases T_i $\rightarrow T_i$ releases T_j $\rightarrow T_i$ waits for T_j $\rightarrow T_i$ waits for T_j $\rightarrow TSC(T_i) < TS(T_j)$
- ② $TSC(T_i) \geq TS(T_j)$ $\rightarrow T_i$ waits for T_j to complete T_j waits for T_i to complete T_j waits for T_i to complete T_j uses T_i $\rightarrow T_i$ uses T_j $\rightarrow T_i$ uses T_j

Around - wait

"TS" "P.T.C."
"TS" "P.T.C."
"TS" "P.T.C."
"TS" "P.T.C."

"

"

"