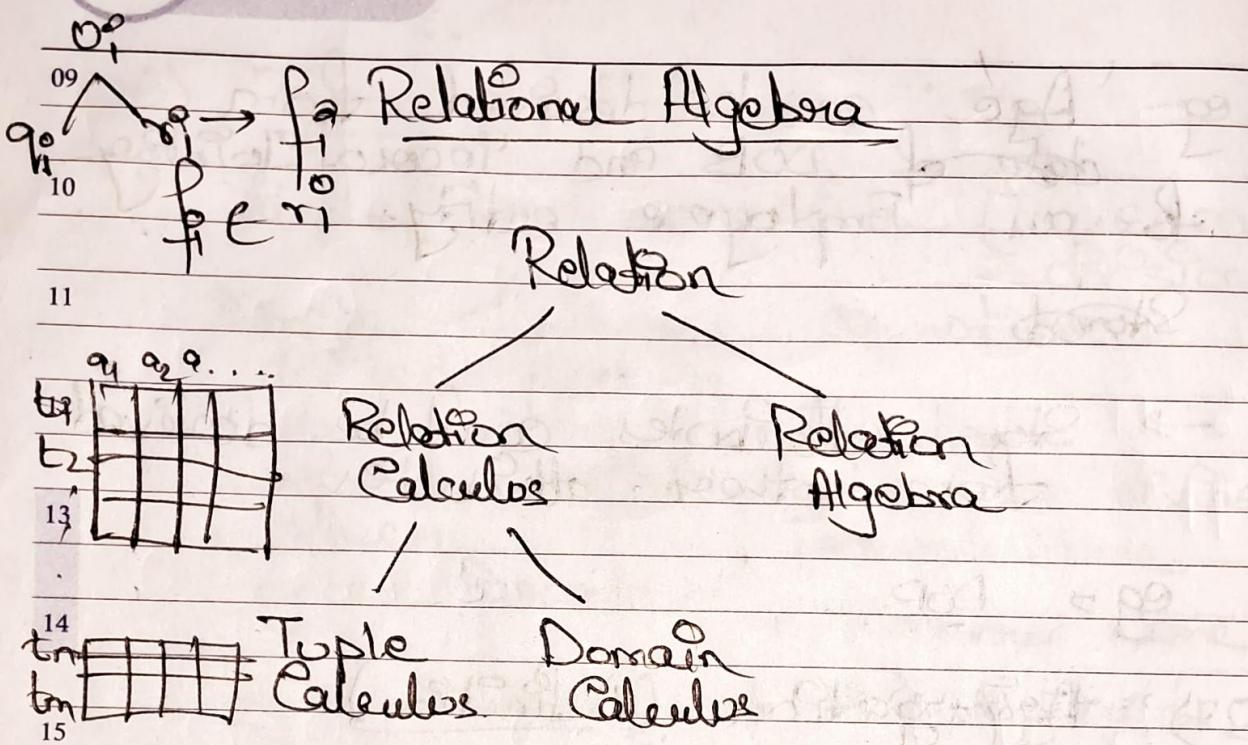


26

APRIL  
FRIDAY  
Week 17

19

16 Relational  $\rightarrow \sigma \in R$ 17 Algebraic Operation  $\rightarrow \text{Op}(\bullet)$ 

- Set Operation  $\rightarrow \cup, \cap, \sim, -$
- Logical Operation  $\rightarrow \text{AND}/\wedge, \text{OR}/\vee,$   
 $\text{NOT}/\sim$
- Comparison  $\rightarrow =, \neq, \geq, \leq, >, <$
- External  $\rightarrow \times, \bowtie, \bowtie^*, \bowtie^{\text{rel}}$

APRIL'19

Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

APRIL  
SATURDAY  
Week 17

27

19

09

10

11

12

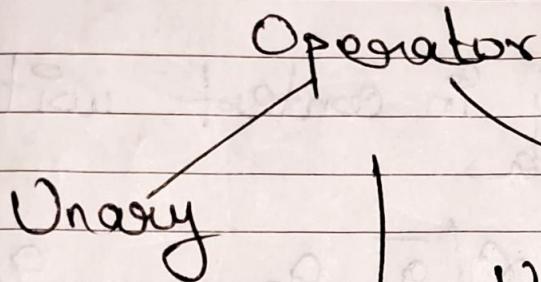
13

14

15

16

17



Binary

$\cup, \cap, - \div, \times, \bowtie \dots$

## Relational Data Model

- Definition

- Explain PS of RDB

- Write the different integrity constraints in RDBMS.

- Write five rules of Codd-Theorem

## Unary Relational Operators with Constraints

1. Selection ( $\sigma$ )

2. Projection ( $\pi$ )

3. Renaming ( $\rho$ )

28 Sunday

MAY'19

Mo	Tu	We	Th	Fr	Sa	Su
	1	2	3	4	5	
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

29

APRIL  
MONDAY  
Week 18

'19

09

Definition of query in context with  
 10 Relational Algebra

$$11 q_0 \in Q$$

$$\delta^r(q_1, q_2, \dots, q_n)$$

$$12 \Rightarrow q_4 \in R.$$

$$e_i^0 \in \infty \quad e_p \rightarrow \text{No. of tuples.}$$

13

 $\theta \Rightarrow \text{Condition.}$ 

14

some

 $\delta_{\theta_1 \wedge \theta_2 \dots \theta_n} \rightarrow \text{query}$ 
 $16 q - \delta_{q_2 \geq 10^3 \wedge q_5 = "Den"} (\text{Emp})$ 

17

Employee

$q_1$	$q_2$	$q_3$	$q_4$	$q_5$	$q_6$
1	$10^3$	A	36	Den	A1
2	$10^6$	B	90	Prog	A2
3	:	C	42	DEN	A3
4	:	D	39	Prog	A4

APRIL'19

Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

09 Q → Find all employee which age > 36  
and less 42. And work on  
sales-dept

11  $\{q_4 > 36 \wedge q_4 < 42\} \wedge q_5 = "sales" (\text{Employee})$

12 13  $q = \sigma_{(36 \leq q_4 \leq 42)} \wedge q_5 = "sales" (\text{Employee})$

14 General form of Projection

15  $q_i : \Pi_{q_i} (\cdot)$

16 Q → Find some employee which work on  
Project A

17 Ans  $q \in \Pi_{q_6} = "A1" (\text{Employee})$

Composition of Operators

$\Pi_{q_2 > 10^3} (\{q_3 \leq q_4 \leq 42\} (\text{Employee}))$

MAY 19

Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5		
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

01

MAY  
WEDNESDAY  
Week 18

'19

09 Renaming ( $\delta$ )10  $P_0(x) \in \gamma$ .

$$\theta \triangleq q_0(x)$$

11  $\Rightarrow P_0(x) \in \gamma$ .12  $P_{\alpha} = "Age"(\gamma)$ 13 Selection Queries

14 Q1) Find all students belongs to computer science department

Q2) Find all the students who are studying Pol. Sci.

Q3) Find all records of student whose age is greater than 18 and less than 23

Q4) Find the student whose score is highest in all department.

APRIL'19

Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30					

19

09 Solution

① 10  $\sigma_{DEPT = "CS"} (Student)$

② 11  ~~$\sigma_{DEPT}$~~   $\sigma_{DEPT = "Pol. Sci"} (Student)$

③ 12  ~~$\sigma_{DEPT}$~~   $\sigma_{18 \leq AGE \leq 23} (Student)$

④ 13  ~~$\sigma_{GPA}$~~   $\sigma_{\text{Max}(GRADE)} (Student)$

14

## Projection Queries

15

Q1) Find all names of the students of the given relation.

Q2)  $\pi_{Age}$

Q3)  $\pi_{Name \wedge Age}$

Q4) GRADE. and Name

Q5) Dept and Student.

Q6) Grade and dept.

JUNE'19

Mo	Tu	We	Th	Fr	Sa	Su
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

03

MAY  
FRIDAY  
Week 18

19

09 Projection - Q (Selection) queries

10 (Q1) Find all students studying in CS dept

11 9%  $\Pi_{NAME} (\sigma_{DEPT = "CS"} (Student))$

13 (Q2) Find all students name, whose age are  $> 22$ .

14 15 9%  $\Pi_{NAME} (\sigma_{AGE > 22} (Student))$

16 Renaming Q queries

17 (Q) Rename attribute age to DOB

$P_{AGE = "DOB"} (Student)$  :

MAY'19

Mo	Tu	We	Th	Fr	Sa	Su
					1	2
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

MAY  
SATURDAY  
Week 18

04

22/03/24

## DBMS

### Set Operations

- 10 1) Union ( $\cup$ )  $\Rightarrow$  Logical ( $\vee$ ) OR
- 11 2) Intersection ( $\cap$ )  $\Rightarrow$  Logical ( $\wedge$ ) AND
- 12 3) set diff ( $\setminus$ )  $\Rightarrow$  ( $\neg$ ) Negation
- 13 4) Cartesian Product ( $\times$ )

### UNION

$$14 A, B \subseteq X$$

$$15 x \in A, y \in B \quad ? \quad y \in X$$

$$16 \therefore A \cup B = \{ \{x, y\} \mid x, y \in A, B \}$$

$$17 \text{ eg- } A = \{1, 2, 3\}$$

$$B = \{2, 3, 4\}$$

$$A \cup B = \{1, 2, 3, 4\}$$

for relational algebra  $n(A) = n(B)$  Sunday  
 For set theory  $n(A) = n(B)$  or  $n(A) \neq n(B)$

JUNE'19

Mo Tu We Th Fr Sa Su

1 2

3 4 5 6 7 8 9

10 11 12 13 14 15 16

17 18 19 20 21 22 23

24 25 26 27 28 29 30

06

MAY  
MONDAY  
Week 19

'19

09

INTERSECTION

10

$$A, B \subseteq X$$

11

$$x \in A, y \in B \quad x, y \in X$$

12

$$\therefore A \cap B = \{ z \mid z \in A, B \text{ } \wedge \text{ } z \in X \}$$

13

$$A = \{ 1, 4, 9 \}$$

$$\therefore A \cap B = \{ 4 \}$$

14

$$B = \{ 2, 4, 6, 7 \}$$

15

DIFFERENCE.

16

$$A - B = \{ a \mid a \in A \wedge a \notin B \}$$

$$B - A = \{ b \mid b \in B \wedge b \notin A \}$$

CARTESIAN PRODUCT

$$\begin{cases} |A| = n & |B| = m \\ |A \times B| = (m \times n) \end{cases}$$

$$\text{where } A \times B = \{ (x, y) \mid x \in A, y \in B \}$$

MAY 19						
Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5		
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

09 eg -  $A = \{1, 2, 3\}$

10  $B = \{4, 6, 7\}$

11  $A \times B = \{(1, 4), (1, 6), (1, 7), (2, 4),$

12  $(2, 6), (2, 7), (3, 4), (3, 6)\}$

13  $(3, 7)\}$

14 Applications of Set Operations in Rel. Algebra

15 CSE

STNAME	RNO
Ram	02
Mohan	02
Jay	13
Greta	17

MATH

STNAME	RNO
Sunit	13
Greta.	17
Shyam	21
Rohan	25

$\pi_1 \rightarrow \text{CSE}(\text{STNAME}, \text{RNO})$

$\pi_2 \rightarrow \text{MATH}(\text{STNAME}, \text{RNO})$

08

MAY  
WEDNESDAY  
Week 19

'19

name

- (1) <sup>109</sup> Find all students of both departments.

10

$$(r_1 \cup r_2) \cap STNAME$$

12

$$\Rightarrow \Pi(r_1 \cup r_2) STNAME$$

13

$$\Rightarrow \Pi_{STNAME}(r_1) \cup \Pi_{STNAME}(r_2)$$

14

$$\Leftrightarrow \Pi_{STNAME}(CSE) \cup \Pi_{STNAME}(MATH)$$

15

- (2) Find the name of students, whose roll no same from both department

16

$$\Pi_{STNAME} \cap \Pi_{STNAME}$$

$$\Leftrightarrow \Pi_{ROLLNO}(CSE) \cap \Pi_{ROLLNO}(MATH)$$

MAY'19

Mo	Tu	We	Th	Fr	Sa	Su
	1	2	3	4	5	
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

MAY  
THURSDAY  
Week 19

09

'19

- (3) Find the student name who belong to both department.

10

11

$$\text{IT}_{\text{STNAME}} (\text{CS}) \cap \text{IT}_{\text{STNAME}} (\text{MATH})$$

12

13

STNAME	ROLLNO
Geeta	17

15

16

17

- (4) Find the student name of CSF dept who is not belong to another department.

$$\delta = \text{IT}_{\text{STNAME}} (\text{CSF}) - \text{IT}_{\text{STNAME}} (\text{MATH})$$

JUNE'19

Mo	Tu	We	Th	Fr	Sa	Su
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30

10

MAY  
FRIDAY  
Week 19

19

09 R<sub>1</sub>R<sub>2</sub>

10	NAME	AGR	GRN	10	ID	Course
11	RAM	18	M	11	01	MATH
12	SOMA	19	F	12	02	CSE
13	KUMAR	20	M	13	03	PHY.
14	Toma	17	F	14		

15 (R<sub>1</sub> × R<sub>2</sub>) =

16	ENAME	AGR	GRN	16	ID	Course
17	RAM	18	M	17	01	MATH
"	"	"	"	18	02	CSE
"	"	"	"	19	03	PHY
SOMA	19	F	01			MATH
"	"	"	02			CSE
"	"	"	03			PHY

MAY 19

Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5		
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

2024 JANUARY

19

3rd Week • 019-347

Friday

DECEMBER 2023						JANUARY 2024								
W	K	S	M	T	W	F	S	W	S	M	T	W	F	S
49	31				1	2	1	1	2	3	4	5	6	
50	3	4	5	6	7	8	9	2	7	8	9	10	11	12
51	10	11	12	13	14	15	16	3	14	15	16	17	18	19
52	17	18	19	20	21	22	23	4	21	22	23	24	25	26
53	24	25	26	27	28	29	30	5	28	29	30	31		

## Transaction :-

08

09 Transaction is a single logical unit of work that access and modify the content of a database.

10

11 Transaction access data using Read & Write Operation.

12

01 In order to maintain consistency in a database, before and after the transaction certain properties are followed. These 02 are called ACID Property.

03 A → Atomicity

04 C → Consistency

06 I → Isolation

07 D → Durability.

08



	M	I	W	T	F	S	W	S	M	T	W	F	S
5			1	2	3	9	31		1	2			
6	4	5	6	7	8	9	10	10	3	4	5	6	7
7	11	12	13	14	15	16	17	11	10	11	12	13	14
8	18	19	20	21	22	23	24	12	17	18	19	20	21
9	25	26	27	28	29		13	24	25	26	27	28	29
							30						

## Atomicity

It means that either the entire transaction takes place at once or doesn't happen at all. Each transaction is considered as one unit and either succeeds to completion or is not executed at all.

If it involves the following two operations,

- Abort → If a transaction is aborted changes made to the database aren't visible.

- Commit → If a transaction commits changes made are visible.

## Consistency

This means that integrity constraints must be maintained so that the database is consistent before and after the transaction. It refers to the correctness of a database.

## Isolation

This property ensures that multiple transactions can occur concurrently without leading to inconsistency of the database state.

Transactions occur independently. Changes occurring in a particular transaction

2024 JANUARY

21

3rd Week • 021-345

Sunday

08

will not be visible to any other transaction until that particular change in that transaction is written to memory or has been committed.

10

Durability → This property ensures that once the transaction has completed execution the updates and modification to the database are stored in and written to disk and these persists even if a system failure occurs.

03

States of Transaction (H/W)

04

DECEMBER 2023 JANUARY

WK S M T W T F S

WK	S	M	T	W	T	F	S
49	31				1	2	1
50	3	4	5	6	7	8	9
51	10	11	12	13	14	15	16
52	17	18	19	20	21	22	23
53	24	25	26	27	28	29	30

WK S M T W T F S

WK	S	M	T	W	T	F	S
1	1	2	3	4	5	6	
2	7	8	9	10	11	12	13
3	14	15	16	17	18	19	20
4	21	22	23	24	25	26	27
5	28	29	30				

2024