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MAY
FRIDAY
Week 21

19

09

Relational Algebra

10 * Came in 1970, given by E. F. Codd

11 * Also called as Procedural Query Language OR Formal Query Language

12 Language

* What to do & How to do?

13

14

Operators

15

Basic Operators

16

Projection (π)

17

Selection (δ)Cross Product (\times)Union (\cup)Rename (ρ)

Set Diff. (-)

Derived Operator

Join (\bowtie)Intersection (\cap) $(x \cap y) = x - (x - y)$ Division (\wr, \div)

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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		

Basic Operators

9/09 Projection (Π)

10	Roll no.	Name	Age
11	1	A	20
12	2	B	21
13	3	A	19

14) Query :- Retrieve the roll no. from table (Student)

Ans. Π Rollno (Student)

15) Query . - Retrieve the roll no and name from table (Student)

Ans. Π Rollno, Name (Student)

* Projection always give unique output ie. table components with unique record value.

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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

27

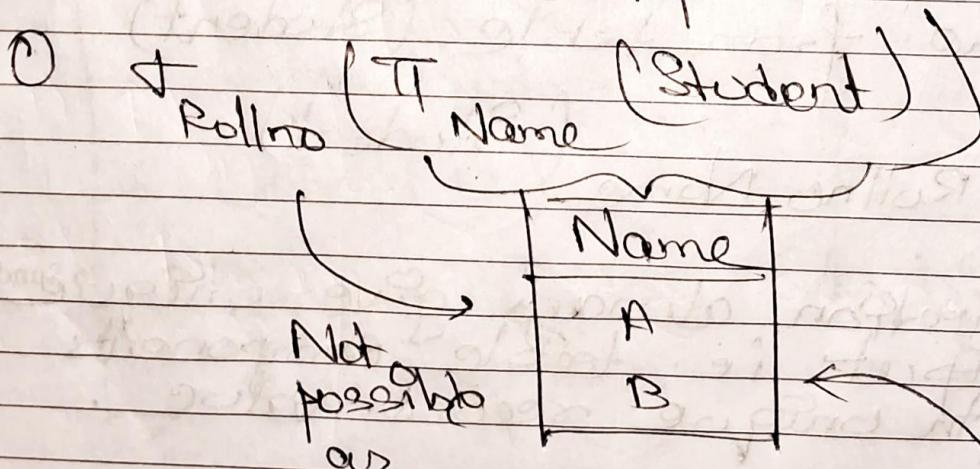
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09 b) Selection Operator (\uparrow)

	Roll no	Name	Age
10	1	A	20
11	2	B	21
12	3	A	19
13			

14 Query :- Retrieve the name of student whose Rollno = '2'

15 $\Pi_{\text{name}} (\uparrow : \text{Rollno} = 2 \text{ Student})$ 16 \uparrow works on tuples.

Rollno attribute
isn't present in table

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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
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19

09 Π works on columns / Attributes
 & δ works on tuples / rows.

10 c) Cross Product (\times)

	A	B	C	In $R_1 \times R_2$
R_1	1	2	3	No. of Columns
	2	1	4	$= m+n$
14				

	C	D	E	No. of Rows
R_2	3	4	5	$= m \times n$
	2	1	2	
17				
16				

Cross Product ($R_1 \times R_2$)

A	B	C	C	D	E
1	2	3	3	4	5
1	2	3	2	1	2
2	1	4	3	1	5
Mo	Tu	We	Th	Fr	Sa
3	4	5	6	7	8
10	11	12	13	14	15
17	18	19	20	21	22
24	25	26	27	28	29

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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

29

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09 d) Set Difference (-)
 $A - B \neq B - A$ $A - B = A \text{ but not } B - A \cap B$

10	Roll	Name	Emp No.	Name	
11	1	A	7	E	
12	2	B	1	A	
13	3	C			
14	Student			Employee	
15					
16					
17					

15	Roll No.	Name
16	2	B
17	3	C

1) No. of columns must be same in no.

2) Domain of every column, must be same,

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1	2	3	4	5		
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20	21	22	23	24	25	26
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Q9. Find the name of person who is a student but not employee

10	$\pi_{name}(\text{Student}) - \pi_{name}(\text{Employee})$
11	π_{name}
12	B
13	C

14 e) Union Operator (U)

15 Roll no.	16 Name
1	A
2	B
3	C

(Student)

17 Employee	18 Name
7	F
1	A

(Employee)

- 1) No. of columns must be same
- 2) Domain of every column must be same.

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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
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09 (Student) U (Employee)

10

	<u>Rollno.</u>	<u>Name</u>
11	1	A
12	2	B
13	3	C
14	7	E

15

Also possible

16

TT Name (Student) U TT name (Employee)

17

<u>Name</u>
A
B
C
D

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27	28	29	30	31		

09) Division Method. ($, \div$)

	Sid.	Cid.
10	s_1	c_1
11	s_2	c_1
12	s_1	c_2
13	s_3	c_2

Enrolled.

	Cid.
10	c_1
11	c_2

Course

15) Query: - Retrive Sid of Students who enrolled in every Course

16) $A(x, y) / B(y)$ if results x values for that there should be tuple (x, y) for every y value of relation B.

Step - 1 find $\Pi_{\text{Sid}}(\text{Enrolled}) \times \Pi_{\text{cid}}(\text{Course})$

s_1	c_1	s_1	c_1
s_2	c_1	s_1	c_2
s_3	c_2	s_2	c_1

2 Sunday

JULY'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				

s_1	c_1
s_2	c_2
s_3	c_1
s_2	c_2
s_3	c_2

03

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10	s_1	c_1
11	s_1	c_2
12	s_2	c_1
13	$\checkmark s_2$	c_2
14	$\checkmark s_3$	c_1
15	$\checkmark s_3$	c_2

s_1	c_1
s_2	c_1
s_1	c_2
s_3	c_2

$$\pi_{\text{std}}(\text{Enrolled}) \times (\pi_{\text{std}}(\text{Course}) - \pi_{\text{std}}(\text{Enrolled}))$$

Step 3) Err

$$\pi_{\text{std}}(\text{Enrolled}) - \pi_{\text{std}}(\text{Err})$$

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24	25	26	27	28	29	30

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09

g) Rename (S)

10

Query), Rename attribute age to
DOB

11

Ex - ~~Age~~ Page = "DOB" (Student).

13

14

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16

17