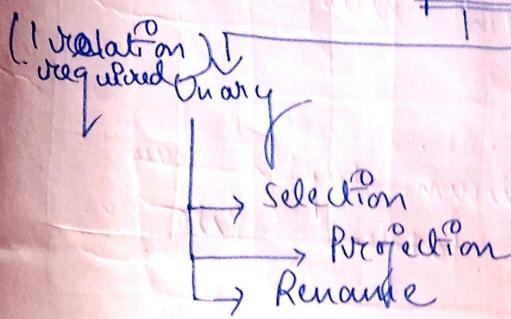


F.R.

Date :- 20.7.21

## Relational Algebra

### operator



Binary (Min. 2 relation required)

- Union
- Intersection
- Sel - difference
- Cartesian product
- Natural join

#### • Sel - union :-

Example :-

Roll	Name	Total
1	Avi	700
2	Shreyan	695
3	Jordan	697

Relation : A

Roll	Name	Total
1	Avi	700
3	Jordan	<del>695</del>
5	Sayani	699

Relation : B

Syntax :-  $A \cup B$

Relation : C

Roll	Name	Total
1	Avi	700
2	Shreyan	695
3	Jordan	697
5	Sayani	699

Definition :- It is a binary operator in which minimum two tables are required where all the columns and attributes must be same in both the tables.

- Here, common and uncommon tuples can be retrieved from both the tables into a separate table.
- In case of union operation, common tuple will be retrieved only once.

### Sel - Intersection

Example :-

Reg. No	Name	Rank
701	Johnny	1
501	Avi	2
301	Sayam	3

Relation : Student —

in which  
where all  
be same

can be  
into a

Reg. No.	Name	Rank
101	Sampurna	4
702	Subha	5
701	Johnny	1
301	Sayan	3
401	Samarpana	6

tuple  
me) :- Syntax :- Student  $\rightarrow$  Stud &

Reg. No.	Name	Rank
701	Johnny	1
301	Sayan	3

Relation :-  
Stud - States .

Definition :- It is a binary operation in  
which two relations are required.

- Here, a specific tuple of foreign with a parent-  
table must be connected with a set specific  
tuple of child table.
- After self-intersection ~~is~~ is done, the  
new relation will consist of only common  
tuples of both relations.

Set-Difference :-

Example :-

Reg. No.	Name	Rank
701	Johnny	1
501	Avi	2
301	Sayan	3

Relation : A

Reg. No.	Name	Rank
101	Sampoor	4
702	Subha	5
701	Johnny	1
301	Sayan	3
401	Samar-pita	6

Roll	F
1	✓
2	
3	

Syntax :-

A - B

Reg. No.	Name	Rank
501	Avi	2

~~It is a binary operation~~

B - A :-

Reg. No.	Name	Rank
101	Sampoor	4
702	Subha	5
401	Samar-pita	6

Definition :- It is a binary operation in which two relations are required.

- Here, common tuples must be discarded. <sup>may</sup> have to be selected.
- Both the valuation and uncommon tuples from any one of the relation.

Cartesian Product - (X)

Roll	F_Name	Sex
1	Jayanta	M
2	Debjit	M
3	Roopam	M

Reg. No.	L_Name	Grade
1	Chakrabarty	A
2	Sathpathi	B
3	Roy	C

Syntax :-  $A \times B$

Roll	F_Name	L_Name	Sex	Reg. No.	Grade
1	Jayanta	Chakrabarty	M	1	A
1	Jayanta	Sathpathi	M	2	B
1	Jayanta	Roy	M	3	C
2	Debjit	Chakrabarty	M	1	A
2	Debjit	Sathpathi	M	2	B
2	Debjit	Roy	M	3	C
3	Roopam	Chakrabarty	M	1	A
3	Roopam	Sathpathi	M	2	B
3	Roopam	Roy	M	3	C

### Definition :-

- It is a binary operation in which minimum two relations are required.
- Here, each tuple of parent-table must be connected with each and every tuple of child-table via cross product.

### Natural Join ( $\bowtie$ )

#### Rules :-

- Cartesian product
- Selection
- Projection

#### Example :-

• Selection

Roll	F-Name	L-Name	Sex	Reg.Nr	Grade
1	Jayanta	Chakrabarty	M	1	A
2	Delyit	Satapa-thi	M	2	B
3	Roopam	Ray	M	3	C

③ Projection :- A  $\bowtie$  B

Roll	F-Name	L-Name	Sex	Grade
1	Jayanta	Chakrabarty	M	A
2	Dipjita	Sathiapati	M	B
3	Roopam	Roy	M	C

Definition :-

- To discard common tuple and attribute and differentiate a new relation with all the records as <sup>an</sup> unique record is the ~~feature~~ feature of natural join.

Unary operator

Roll	F-Name	L-Name	Sex	Grade
1	Jayanta	Chakraborty	M	A
2	Dipjil	Sathpathy	M	B
3	Rospani	Roy	M	C

Definition :-

- To discard common tuple and attribute and differentiate a new relation with all the records as <sup>an</sup> unique record is the ~~feature~~ feature of natural join.

Unary operation

Selection :-

( $\Sigma$ ) (Sigma) ( $\sigma$ )  
NT column operator, sobs row ashbe na

Roll	Name	Total
1	Avi	700
2	Swayam	600
3	Tanmay	200
4	Rahul	450
5	Sasmil	500
6	Swayam	500

Relation : Student -

Syntax :-

$\{ \text{student} \}$   
 $\{ \text{Total} > 450 \}$

Output :-

Roll	Name	Total
1	Avi	700
2	Swayam	600
5	Sasmil	500
6	Swayam	500

Q :-

Find out the records

who

got - [total  $> 450$ ]

of students

{ (Name = 'stu' 'Swayam'  
V Total = 500  
(and ) )

Output :-

Roll	Name	Total
Q 6	Swayam	500

{ (Name = 'Swayam'  
^ & Total = 500  
(OR ) )

Roll	Name	Total
Q 6	Swayam	500
S	Sasmil	500
Q	Swayam	500

Show the records of those students whose name is except Swayam.

Syntax :-

$\sigma_{\text{Name} \neq \text{Swayam}}$  student-

Output :-

Roll	Name	Total
1	Avi	700
3	Tanmay	200
4	Ratul	450
5	Sakshi	500

Definition :- It is a unary operation, which is used when we want to fetch/retrieve data from a single relation in respect of a specific condition.

• Denoted by ' $\sigma$ ' (Sigma).

↳ relation  
(condition)

Projection

[row as like, column as like]

Example :-

Roll	Name	DOB	Sec	Class
1	Avi <sup>D</sup>	01/01/2001	A	XII
2	Swayam	03/03/2003	B	XI
3	Sayani <sup>D</sup>	04/04/2004	C	XII
4	Soumya	05/05/2005	D	XII

Syntax :-

$\pi_{\{Name, Class, DOB\}}(R(2, 5, 3))$

Name	Class	DOB
Avi <sup>D</sup>	XII	01/01/2001
Swayam	XII	03/03/2003
Sayani <sup>D</sup>	XII	04/04/2004
Soumya	XII	05/05/2005

Definition :-

- $\Pi$  is a unary operator we have to select some attribute within a relation.
- It is a specific attribute not all the tuples. attribute.
- As a desire desired tuples, we will get all the tuples.
- $\Pi$  is denoted by ' $\Pi'$ '.

selection with projection (^)

$\Pi_{(\text{Name}, \text{Class}, \text{DOB})}^{\text{DOB}} = 03/03/03$

Name	Class	DOB
Swayan	XII	03/03/03
Sayani	XII	04/04/04
Somya	XII	05/05/05

Rename (P) :-

Roll	Name	Total
1	Subho	500
2	Tanmay	600
3	Johnny	400

Syntax :- ①

           (old table name)

{ (new table  
name)

Example :-

{ (student - )

{ (student - details )

② → Syntax :-

{ (student )

(Name )

{ (Full Name )

(student )

(Name )

③

{ (student - details )

π (Full name )

## Domain

Roll	Name	Class	Total
R001	Ray	12	700
R002	Shubham	12	600
R003	Bibek	12	850

domain = "Total"  
The property of an attribute is called domain.

domain = "number"

is called

Roll and Name column's value = Total  
So, Domain = "Total"

## Theta Join

Roll	Name	Total
1	Avi	700
2	Sayam	650
3	Sas	600

1:1  
1:1

Reg No	Class	Roll
R1	XII	1
R2	XIP	2
R4	XII	4

Student -

Student -  
~~data~~

II Student - Name

Output :-

Name
Bibek
Sayam

(student -

II Student - Name , Student - Total , Stu . Class o Student - Roll  
stu . Role and  
o Student - total > 10 93

Output :-

Name	Total	Class
Bibek	700	XIP
Sayan	650	XIP