Relational Algebra

- Unary operator (Single Table)
  - Selection
  - Projection
  - Rename
- Binary operator (2 Table)
  - Set
    - union
    - intersection
    - Difference
    - Cartesian Product
  - Natural Join

Set union (∪)

Relation :- A

Roll No.	Name	Total
1	Sayani	850
3	Som	800
4	Swarup	900

Relation :- B

Roll no.	Name	Total
1	Sayani	850
2	Disha	780
4	Swarup	900

Syntax :- A ∪ B

Output :-

Roll No.	Name	Total
1	Sayani	850
2	Disha	780
3	Som	800
4	Swarup	900

Set intersection (∩)

Syntax :- A ∩ B

Output :-

Roll No.	Name	Total
1	Sayani	850
4	Swarup	900

Set Difference (−)

Syntax :- A − B

Roll No.	Name	total
3	Som	800

Syntax :- B − A

RollNo.	Name	Total
2	Disha	780

Cartesian product (X)

RollNo.	FName	Gender
1	Sayani	F
2	SOM	M

Relation:- A

RegNo.	LName	Address
1.	Chandra	Kestopur
2	Mondal	Kestopur
3	Pakil	Saltlake

Relation:- B

Syntax:- A X B

i)

RollNo.	FName	Gender	RegNo.	LName	Address
1	Sayani	F	1	Chandra	Kestopur
1	"	"	2	Mondal	"
1	"	F.	3	Paul	Saltlake
2	SOM	M	1	Chandra	Kestopur
2	"	M	2	Mondal	"
2	"	M	3	Paul	Saltlake

Natural Join (⋈)

1. Cartesian product
2. Selection
3. Projection

ii) Selection

Output

RollNo.	FName	Gender	RegNo.	LName	Address
1	Sayani	F	1	Chandra	Kes
2	Som	M	2	Mondal	"

iii) Projection

Syntax:- A ⋈ B

RollNo.	FName	LName	Gender	Address
1	Sayani	Chandra	F	Kesto
2	Som	Mondal	M	"

Unary operator

Selection (σ)

(Sigma)

সব row আসবে না, সব column আসবে।

Relation :- Student

Roll No.	Name	Total	Degree
1	Disha	800	B.Tech
2	Som	700	B.Sc
3	Roopam	750	B.Com
4	Shib	780	B.Tech, M.Tech

Show all records of Student table whose total is more than equals to 750.

Syntax ⇒

$\sigma_{(Total >= 750)}$ (Student)

output :-

Roll No.	Name	Total	Degree
1	Disha	800	B.Tech
3	Roopam	750	B.Com
4	Shib	780	B.Tech, M.Tech

Logical operator

AND ($\wedge$) OR ($\vee$) NOT ($\neg$)

Show all the records of those student whose total is more than 750 and Degree is 'B.Tech'

$\sigma_{(Total > 750 \wedge Degree = 'B.Tech')}$ (Student)

(and)

output :-

Roll	Name	Total	Degree
1	Disha	800	B.Tech
4	Shib	780	B.Tech, M.Tech

Show all the records of those student whose degree is either B.Tech or M.Tech

σ (Degree = 'B.Tech' (V) Degree = 'M.Tech')

output :-

Roll	Name	Total	Degree
1			
4			

Show all the records of those student whose Degree is ~~not~~ except 'B.Tech' (student)

σ (Degree ≠ 'B.Tech')

output :-

Roll	Name	Total	Degree
2			B.Sc
3			B.Com

Projection (Π)

(যেটা ও কোন দরকার সেটা column দরকার তা।)

Relation :- Student

1 Roll No.	2 Name	3 Stream	4 DOB
1	Sayani	BA	04/04/04
2	Som	B.Com	05/05/05
3	Disha	B.Sc	06/06/06
4	Roopam	B.Tech	07/07/07

Show Name, Stream, DOB of all students.

Syntax.

$\Rightarrow \Pi_{(Name, Stream, DOB)}$ (student)

or

$\Pi_{(2, 3, 4)}$ (student)

output :-

Name	Stream	DOB
Sayani	BA	04/04/04
Som	B.Com	05/05/05
Disha	B.Sc	06/06/06
Roopam	B.Tech	07/07/07

Selection with Projection

Show Name, stream DOB of those student whose DOB after 05/05/05

(student)

$\Pi_{(Name, Stream, DOB)} \sigma_{(DOB > 05/05/05)}$

Name	Stream	DOB
Disha	B.Sc	06/06/06
Roopam	B.Tech	07/07/07

Rename (ρ)

(rho)

(change the Name of the table or column)

Syntax:-

$\rho_{(New\ table\ Name)}^{(old\ table\ name)}$

* change the Name of that table from 'student' to 'stu'

(student)

$\rho_{(stu)}$

change the Name of the column from Name to FullName & Name of the table from student to .stu

(student)

$\rho_{(stu)} \Pi_{(FullName)}^{(Name)}$