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Normalization for Relational Database Part-4

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Content :-
1. Binary Operations
a. Union
b. Intersection
c. Set Difference
d. Cartesian Product
2. Joins

UNION : The result of this operation , denoted by R U S, is a relation that includes all the tuples that are either in R or in S or in both R and S. Duplicate tuples are eliminated .

Table R

Name	Address
Ram	U.P.
Shaym	Haryana
Mohan	Delhi

Table S

Name	Mobile No.
Ram	9999999393
Shyam	9999999563
S.K.	8899999393
Shruti	9999779393

∏ NAME (R) ∪ ∏ NAME (S)

Name
Ram
Shaym
Mohan
S.K.
Shruti

Intersection :-The result of this operation , denoted by R ∩ S is a relation that includes all the tuples that are common in both R and S.

∏ NAME (R) ∩ ∏ NAME (S)

Name
Ram
Shaym

Set Difference (or MINUS):- The result of this operation , denoted by R-S , is relation that includes all the tuples that are in R but not in S.

∏ NAME (R) - ∏ NAME (S)

Name
Mohan

Cartesian product:- It is also known as cross product or cross join which is denoted by X . It is used to combine each row of one table with the each row of other table .

Employee :

Name	Salary

Ram	10000
Shaym	20000
Mohan	5000

Department :-

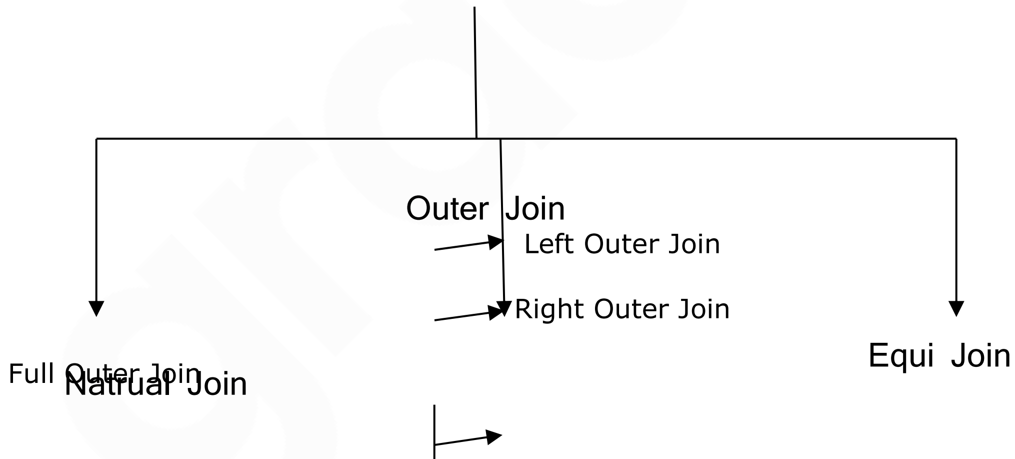
Dprt_No.	**Dprt_Name**
1	H.R.
2	Management
3	IT

Employee X Department

Name	**Salary**	**Dprt_No.**	**Dprt_Name**
Ram	10000	1	H.R.
Ram	10000	2	Management
Ram	10000	3	IT
Shaym	20000	1	H.R.
Shaym	20000	2	Management
Shaym	20000	3	IT
Mohan	5000	1	H.R.
Mohan	5000	2	Management
Mohan	5000	3	IT

Join Operations:A Join operation combines related tuples from different relations, if and only if a given join condition is satisfied. It is denoted by ⋈.

Join Operation



Employee :-

Emp_Code	**EMP_Name**
001	**Sam**
002	**Jerry**
003	**Hack**

Salary :-

Emp_code	Salary
001	50000
002	60000
003	35000

1. Natural Join:

A natural join is the set of tuples of all combinations in R and S that are equal on their common attribute names.

It is denoted by ⋈.

Example: Let's use the above EMPLOYEE table and SALARY table:

∏EMP_NAME, SALARY (EMPLOYEE ⋈ SALARY)

2. Outer Join :

The outer join operation is an extension of the join operation. It is used to deal with missing information.

EMPLOYEE

EMP_NAME	STREET	CITY
Riya	Civil Line	Delhi
Suman	M.G. Street	Bengaluru
Shyam	Nehru Nagar	Mumbai
Ravi	Park street	Chennai

FACT_WORKERS

EMP_NAME	BRANCH	SALARY
Riya	HCL	15000
Suman	WIPRO	20000
Shyam	INFOSYS	30000
Kulbir	TCS	10000

EMPLOYEE ⋈ FACT_WORKERS

EMP_NAME	STREET	CITY	BRANCH	SALARY
Riya	Civil Line	Delhi	HCL	15000
Suman	M.G. Street	Bengaluru	WIPRO	20000
Shyam	Nehru Nagar	Mumbai	INFOSYS	30000

An outer join is basically of three types:

a. Left outer join

b. Right outer join

c. Full outer join

Left Outer Join:

- ○ Left outer join contains the set of tuples of all combinations in R and S that are equal on their common attribute names.
- ○ In the left outer join, tuples in R have no matching tuples in S.
- ○ It is denoted by ⟕.

Example: Using the above EMPLOYEE table and FACT_WORKERS table.
EMPLOYEE ⟕ FACT_WORKERS

EMP_NAME	**STREET**	**CITY**	**BRANCH**	**SALARY**
Riya	Civil Line	Delhi	HCL	15000
Suman	M.G. Street	Bengaluru	WIPRO	20000
Shyam	Nehru Nagar	Mumbai	INFOSYS	30000
Ravi	Park street	Chennai	NULL	NULL

Right Outer Join

- ○ Right outer join contains the set of tuples of all combinations in R and S that are equal on their common attribute names.
- ○ In right outer join, tuples in S have no matching tuples in R.
- ○ It is denoted by ⟖.

Example: Using the above EMPLOYEE table and FACT_WORKERS Relation
EMPLOYEE ⟖ FACT_WORKERS

EMP_NAME	**BRANCH**	**SALARY**	**STREET**	**CITY**
Riya	HCL	15000	Civil Line	Delhi
Suman	WIPRO	20000	M.G. Street	Bengaluru
Shyam	INFOSYS	30000	Nehru Nagar	Mumbai
Kulbir	TCS	10000	NULL	NULL

Full Outer Join:

- ○ Full outer join is like a left or right join except that it contains all rows from both tables.
- ○ In full outer join, tuples in R that have no matching tuples in S and tuples in S that have no matching tuples in R in their common attribute name.
- ○ It is denoted by ⟗.

Example: Using the above EMPLOYEE table and FACT_WORKERS table
EMPLOYEE ⟗ FACT_WORKERS

EMP_NAME	**STREET**	**CITY**	**BRANCH**	**SALARY**
Riya	Civil Line	Delhi	HCL	15000
Suman	M.G. Street	Bengaluru	WIPRO	20000
Shyam	Nehru Nagar	Mumbai	INFOSYS	30000
Ravi	Park street	Chennai	NULL	NULL
Kulbir	NULL	NULL	TCS	10000

Equi Join:-It is also known as an inner join. It is the most common join. It is based on matched data as per the equality condition. The equi join uses the comparison operator(=)

Example :-
Customer

C_ID	**NAME**
1	Heena
2	Reena
3	Hari

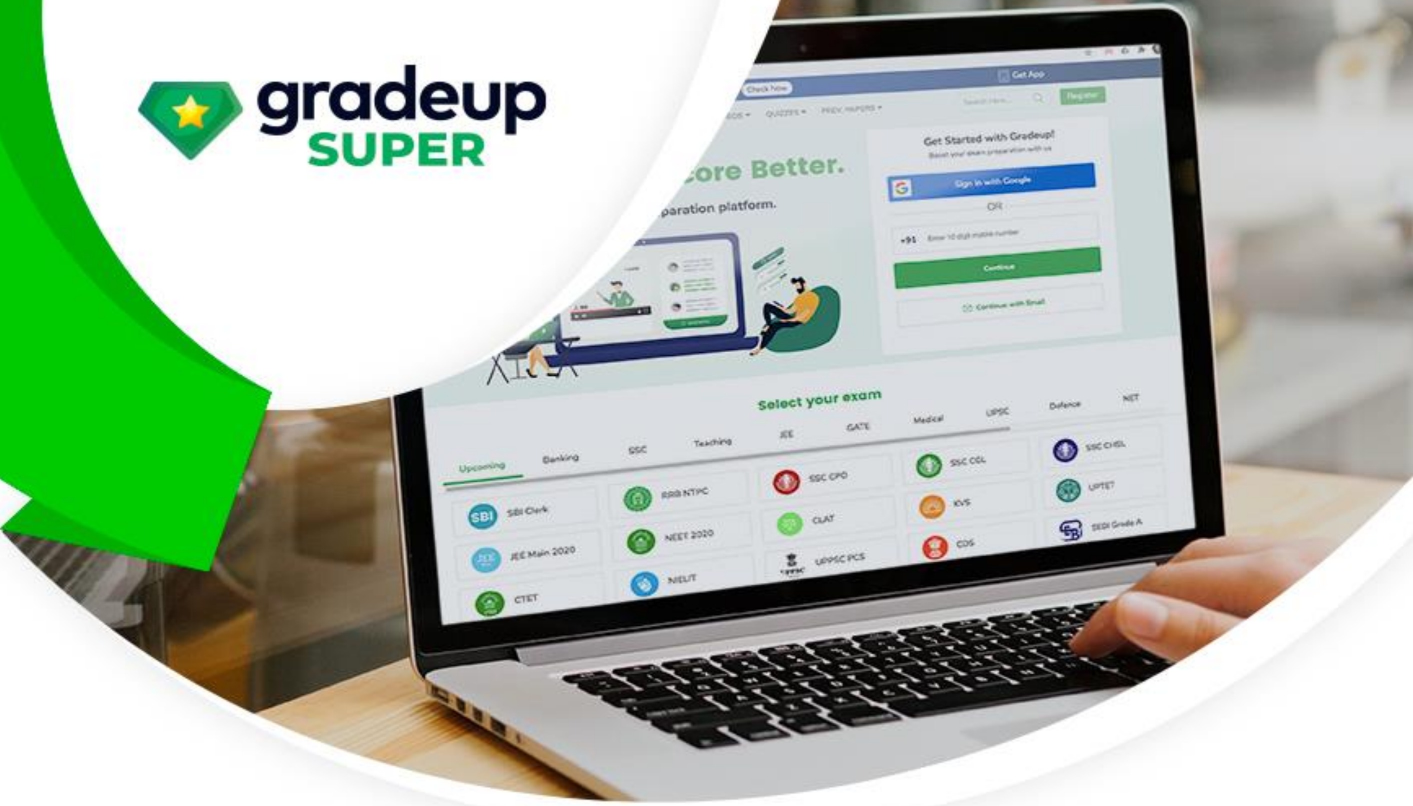
4	Saurbh

Product

Product_ID	**City**
1	Delhi
2	Mumbai
3	U.P.
4	H.P.

Customer ⋈ Product

C_ID	**NAME**	**Product_ID**	**City**
1	Heena	1	Delhi
2	Reena	2	Mumbai
3	Hari	3	U.P.
4	Saurbh	4	H.P.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CDS
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