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Normalization for Relational Database Part-3

Content :-
1. Anomalies
2. Relation Algebra
3. Operation Of Relation Algebra

Anomalies : There are basically three type of anomalies : Insert , Delete and update.
Insert Anomaly :- If we want to insert the tuple in referencing relation and referencing attribute value is not present in referenced attribute , it will not allow inserting in referencing relation.
Delete and Updation Anomaly:-Ifdeletion or updation of tulple from referenced relation and referenced attribute value is used by referencing attribute in referencing relation, it will not allow deleting the tuple from referenced relation.

Relational Algebra :- It is a procedural query language **,** which takes the instance of a relation as an input and yields the relation as an output. Queries are performed by the operator , these operator are either **Unary or binary .**
There are following fundamental operators that are used in relational algebra:-
- Select
- Project
- Union
- Set difference
- Cartesian product
- Rename

Select Operation: The SELECT operation is used for selecting a subset of the tuples according to a given selection condition. Sigma(σ)Symbol denotes it. It is used as an expression to choose tuples which meet the selection condition. Select operator selects tuples that satisfy a given predicate.

Consider the Tutorial table :-

Roll No.	Topic	Author	Cost
1	Database	Navate	500
2	OS	Puneet Kaur	1000
3	Graphic	Saurbh Jain	1205
4	TOC	Naveen	1234
5	DS	N.K.Sharma	650

a. Select the topic whose name is database.
$\sigma_{topic="Databse"}$ (Tutorial)

b. Select the book whose price is greater than 1000.
$\sigma_{cost>1000}$(Tutorial)

Project Operation :- The select operation selects some of the rows from the table while discarding other rows , the PROJECT operation on the other hand , select certain columns from the table and discard the other columns . If we are interested in certain attribute of relation , we use the RPOJECT operation to project the relation over these attribute only .

Consider the following table:-

CustomerID	CustomerName	Status
1	Amazon	Active
2	Apple	Active
3	Alibaba	Inactive
4	Google	Inactive

Π CustomerName, Status (Customers)

Rename (ρ)

It is used for renaming the attributes in a relation

ρ (x/y)R will rename the attribute 'y' of relation by 'x'.

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

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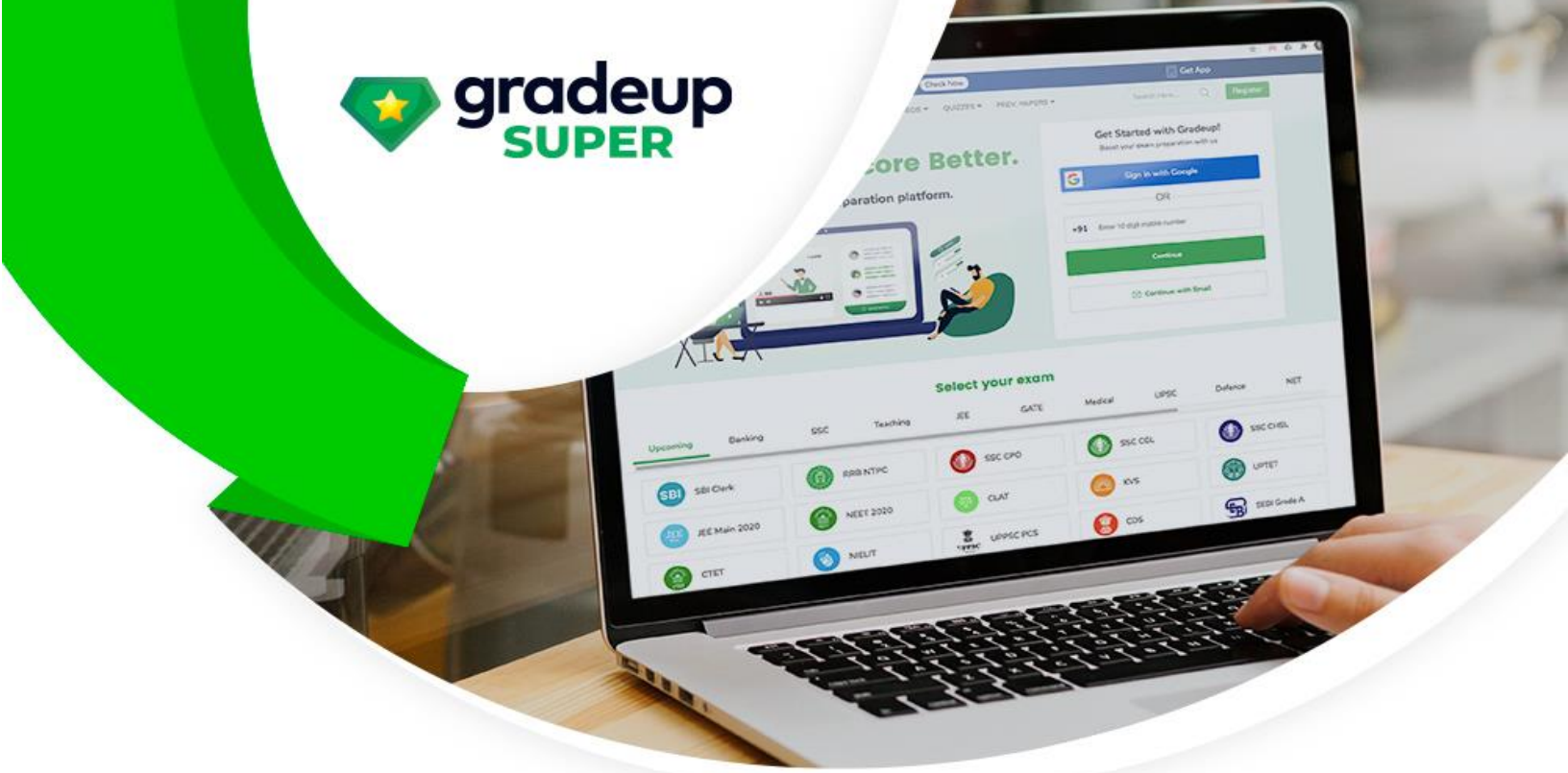

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