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Doubt Clearing Session

Complete Course on Database Management System

Vishvadeep Gothi • Lesson 20 • July 13, 2023

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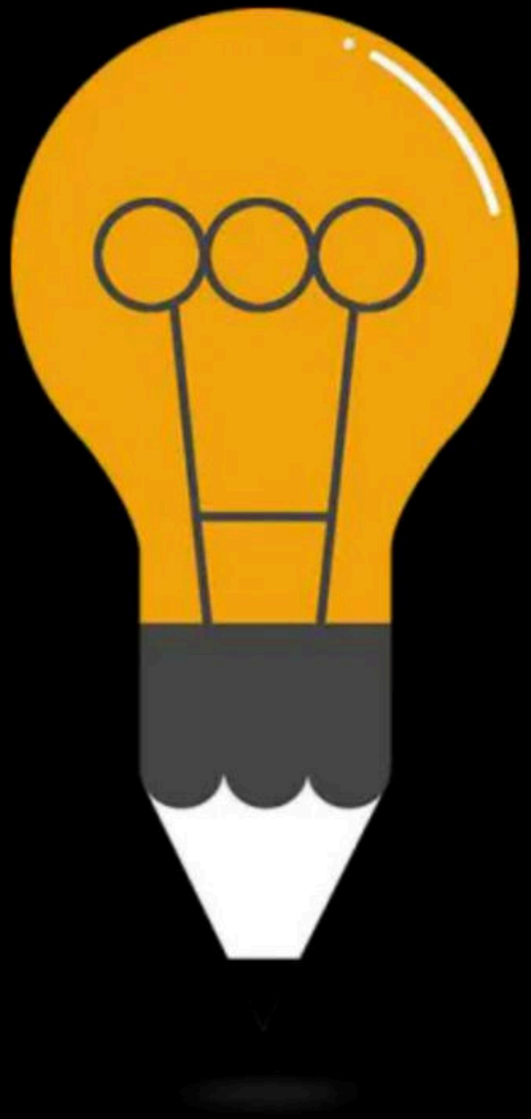

DBMS

Doubts & Relational Algebra 4

By: Vishvadeep Gothi

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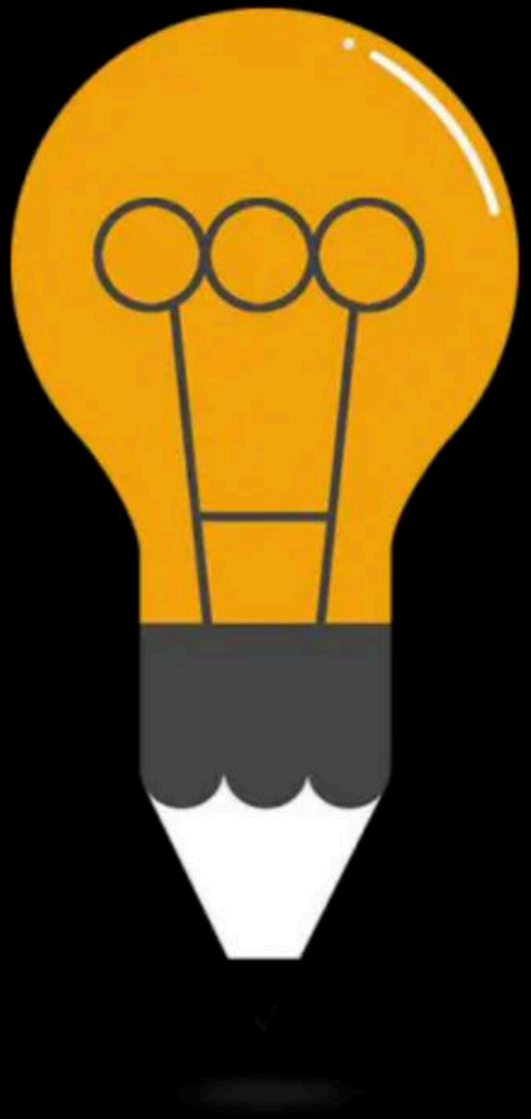

DPP: RA

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Customers Table

CustomerID	CustomerName	ContactName	Address	City	PostalCode	Country
1	Alfreds Futterkiste	Maria Anders	Obere Str. 57	Berlin	12209	Germany
2	Ana Trujillo Emparedados y helados	Ana Trujillo	Avda. de la Constitución 2222	México D.F.	05021	Mexico
3	Antonio Moreno Taquería	Antonio Moreno	Mataderos 2312	México D.F.	05023	Mexico
4	Around the Horn	Thomas Hardy	120 Hanover Sq.	London	WA1 1DP	UK
5	Berglunds snabbköp	Christina Berglund	Berguvsvägen 8	Luleå	S-958 22	Sweden
6	Blauer See Delikatessen	Hanna Moos	Forsterstr. 57	Mannheim	68306	Germany
7	Blondel père et fils	Frédérique Citeaux	24, place Kléber	Strasbourg	67000	France
8	Bólido Comidas preparadas	Martín Sommer	C/ Araquil, 67	Madrid	28023	Spain

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Question

Write query for all below questions on table Customers

UK

1. Select all customers which are from country "Germany", "[redacted]"
2. Fetch that customers' name, address city, postal code and country who has contact name 'Yang Wang'
3. Fetch all customers information till customerID 19
4. Fetch all customers information except from Country 'Germany', 'UK', 'USA'

1. $\sigma_{country='Germany' \vee country='UK'}(customers)$

2) $\Pi_{\text{customername, address, city, postalcode, country}}\left(\sigma_{\text{contactname} = \text{'King Wang'}}\left(\text{customers}\right)\right)$

---

3) $\sigma_{\text{customerid} \leq 19}\left(\text{customers}\right)$

---

4) $\sigma_{\text{country} \neq \text{'USA'} \wedge \text{country} \neq \text{'UK'} \wedge \text{country} \neq \text{'Germany'}}\left(\text{customers}\right)$

4.) $(\text{customers}) - (\sigma_{\text{country}='USA' \vee \text{country}='UK' \vee \text{country}='Germany'}(\text{customers}))$

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Products Table

ProductID	ProductName	SupplierID	CategoryID	Unit	Price
1	Chais	1	1	10 boxes x 20 bags	18
2	Chang	1	1	24 - 12 oz bottles	19
3	Aniseed Syrup	1	2	12 - 550 ml bottles	10
4	Chef Anton's Cajun Seasoning	2	2	48 - 6 oz jars	22
5	Chef Anton's Gumbo Mix	2	2	36 boxes	21.35
6	Grandma's Boysenberry Spread	3	2	12 - 8 oz jars	25
7	Uncle Bob's Organic Dried Pears	3	7	12 - 1 lb pkgs.	30
8	Northwoods Cranberry Sauce	3	2	12 - 12 oz jars	40
9	Mishi Kobe Niku	4	6	18 - 500 g pkgs.	97
10	Ikura	4	8	12 - 200 ml jars	31
11	Queso Cabrales	5	4	1 kg pkg.	21
12	Queso Manchego La Pastora	5	4	10 - 500 g pkgs.	38
13	Konbu	6	8	2 kg box	6
14	Tofu	6	7	40 - 100 g pkgs.	23.25
15	Genen Shouyu	6	2	24 - 250 ml bottles	15.5

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Question

Write query for all below questions on table Products

1. Select all products which are supplied by suppliers with Id 1 or 2 or 3
2. Fetch the name of all such products which have price in range 5 to 25
3. Find all suppliers who supply the products of category 2?
4. Find all products which are supplied by supplier of ID 2 with price more than 30?
5. Find all products which have price more than 50 but not supplied by supplier with ID 6?
6. Find all products which have price less than 30 but not supplied by supplier with ID 2 or 6?

1. $\overline{\text{supplierId} = 1 \vee \text{supplierId} = 2 \vee \text{supplierId} = 3}$ (Products)

2) $\Pi_{\text{Productname}} \left(\sigma_{\text{Price} \geq 5 \wedge \text{price} \leq 25} (\text{Products}) \right)$

3) $\Pi_{\text{SupplierId}} \left(\sigma_{\text{categoryid} = 2} (\text{Products}) \right)$

⇒ if supplier details needed, then use suppliers relation

$\Pi_{\text{suppliername, address, city}} \left(\sigma_{\text{categoryid} = 2} (\text{Product} \bowtie \text{suppliers}) \right)$

4) $\sigma_{SupplierId = 2 \wedge Price > 30}$ (Products)

5) $\sigma_{SupplierId \neq 6 \wedge Price > 50}$ (Products)

6) $\sigma_{Price < 30 \wedge SupplierId \neq 2 \wedge SupplierId \neq 6}$ (Products)

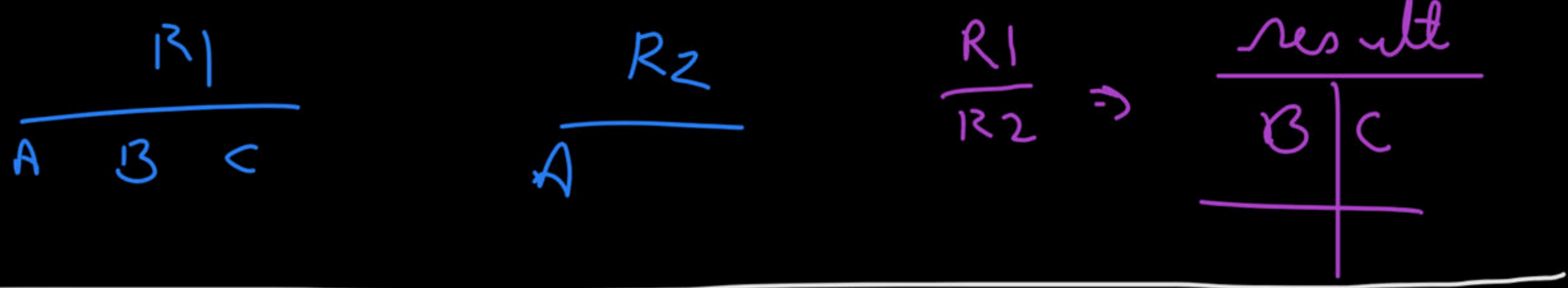
Division Operator

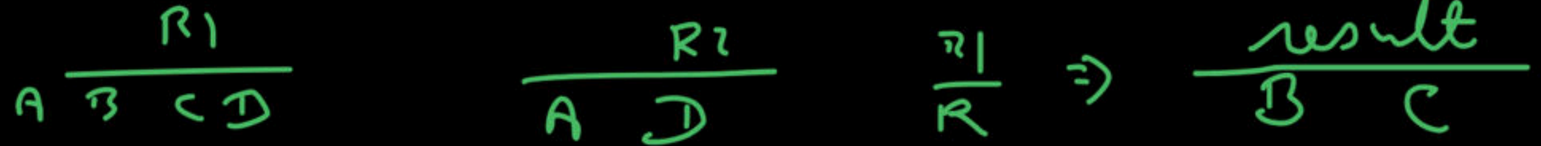
R1 ÷ R2 ⟹ $\frac{R1}{R2}$ ⟹ R1/R2

Possible if:

{Attribute set of R2} ⊂ {Attribute set of R1}

Result attribute set = {Attribute set of R1} – {Attribute set of R2}





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Division Operator

R1 ÷ R2

The relation returned by division operator will contain those tuples from relation R1 which are associated to every R2's tuple

R1

A	B
6	5
2	3
9	4
2	5

R2

A
6
2

$$\frac{R1}{R2} \Rightarrow \frac{B}{5}$$

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Division Operator

R1

A	B
A1	B1
A4	B5
A1	B2
A4	B1
A5	B1
A6	B2

A4 B2

R2

A
A1
A4

$\frac{R1}{R2} = \frac{B}{B1 \\ B2}$

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Division Operator

R1

A	B	C
A1	A2	C1
A4	A5	C2
A1	A2	C3
A4	A5	C1

R2

A	B
A1	A2
A4	A5

$\frac{R1}{R2} \Rightarrow$ Result

C
C1

Person

Pid	Pname	Pdob
1		
2		
3		
4		

Products

Prodid	Prodname
P1	
P2	
P3	

Purchase

Pid	Prodid
1	P1
1	P2
1	P3
2	P1
2	P2
3	P3
3	P2
4	P2

find all persons id who have purchased all products.

$$\frac{\Pi_{Pid,\,Prodid}(Purchase)}{\Pi_{Prodid}(Products)}$$

Result ⇒ Pid

Pid
1
2

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Division Operator

Division can be expressed in terms of Cross Product , Set Difference and Projection

A B

Assume: R1(x, y), R2(y)

Disqualified x values = $\prod_x((\prod_x(A) \times B) - A)$

So, $\frac{A}{B} = \prod_x(A) -$ Disqualified values

$$\frac{A}{B} = \prod_x(A) - \prod_x((\prod_x(A) \times B) - A)$$

Question GATE-2017

Consider a database that has the relation schema CR(StudentName, CourseName). An instance of the schema CR is as given below.

StudentName	CourseName
SA	CA
SA	CB
SA	CC
SB	CB
SB	CC
SC	CA
SC	CB
SC	CC
SD	CA
SD	CB
SD	CC
SD	CD
SE	CD
SE	CA
SE	CB
SF	CA
SF	CB
SF	CC

T1

CourseName
CA
CB
CC

Result

studentName
SA
SC
SD
SF

The following query is made on the database.

- $T1 \leftarrow \pi_{CourseName}\left(\sigma_{StudentName=SA}\left(CR\right)\right)$
- $T2 \leftarrow CR \div T1$

The number of rows in $T2$ is _____ .

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Question

Consider following relations:

Cars (cid, cmodel, ccolor)

Drives (Did, cid, dateofRace)

Write a query to find all such drivers id who have driven all cars?

$$\frac{\pi_{did,cid}(Drives)}{\pi_{cid}(Car)}$$

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Question

Consider following relations:

Cars (cid, cmodel, ccolor)

Drives (Did, cid, dateofRace)

Write a query to find all such drivers id who have driven all cars in a day?

$$\frac{\pi_{did,\ cid,\ dateofrace}(drives)}{\pi_{cid}(cars)} \Rightarrow \begin{array}{|c|c|}\hline Did & Day \\ \hline 1 & 12\ Jul \\ \hline \end{array}$$

Cars
Cid
1
2
3

Drives		
Did	Date	Cid
1	12 Jul	1
1	12 Jul	2
1	12 Jul	3
2	12 Jul	1
2	13 Jul	2
2	12 Jul	3

find driver id of all such drivers who have driven cars all the race days.

$$\frac{\pi_{\text{did, dayofrace}}(\text{drives})}{\pi_{\text{dayofrace}}(\text{drives})}$$

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Happy Learning.!

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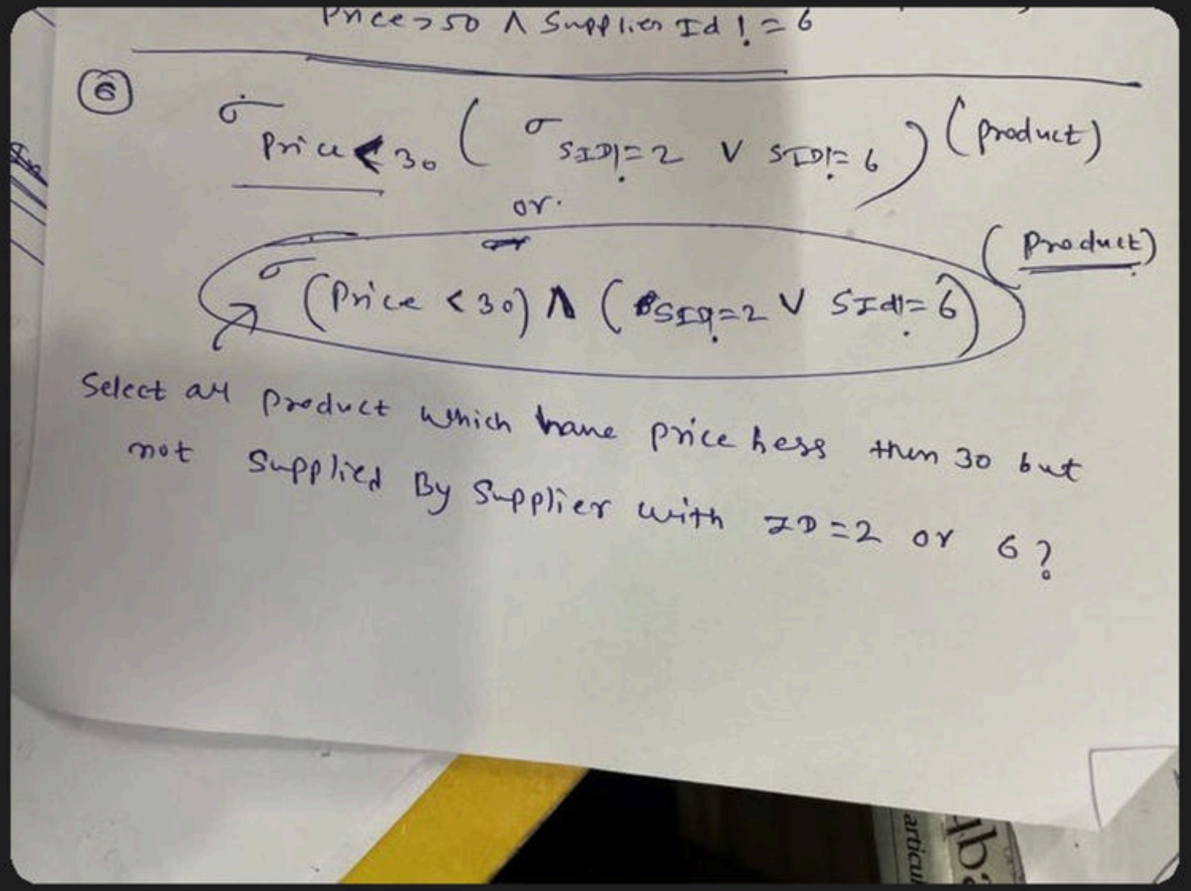
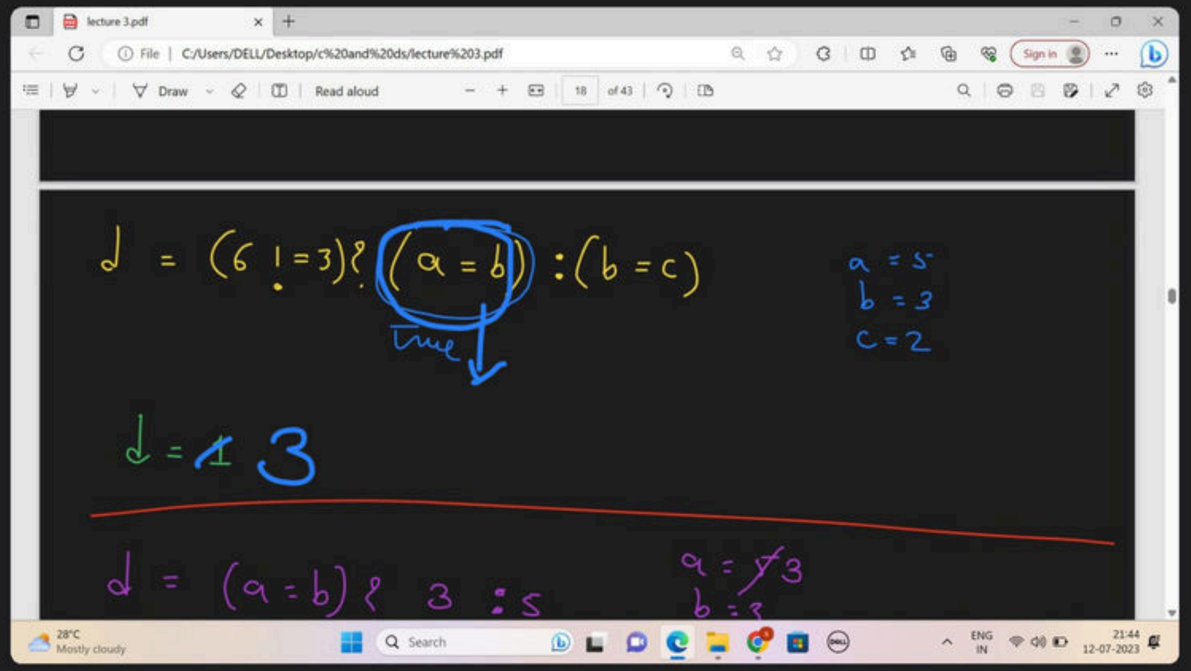
▲ 1 • Asked by Anil

yeh wala class discuss krenge esa bole the aap



▲ 1 • Asked by Saloni

sorry sir c prog ka doubt yha pooch rhi hu but ess ques me 6 is not equal to 3 true hai toh a=b aaega so 3 ans aana chahiye na 1 kyu aaya



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▲ 1 • Asked by Vaishnavij...

Sir i have doubt in a concept of exists and not exists where inner query will have null value how will it affect the final result of query?

A	B
1	NULL

select B from R where A = 2

Simple subQuery

sel — where

exists (—— || —)

—— || ——

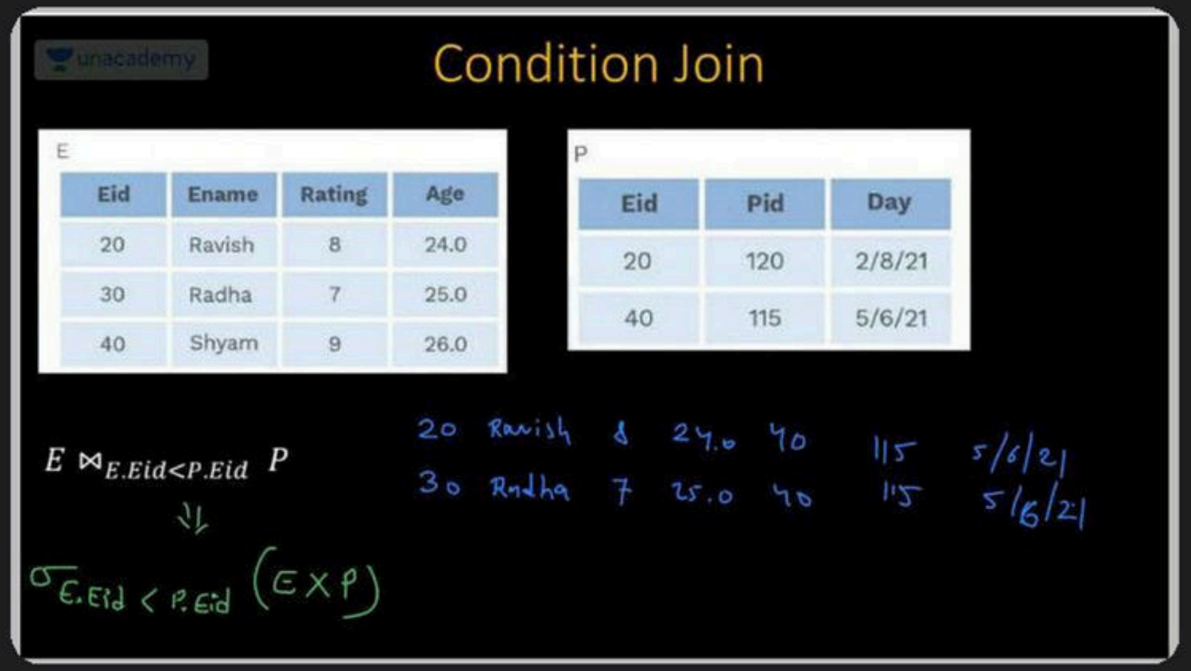
not exists (—— || ——)

Co-related subQuery

▲ 1 • Asked by Rishabh

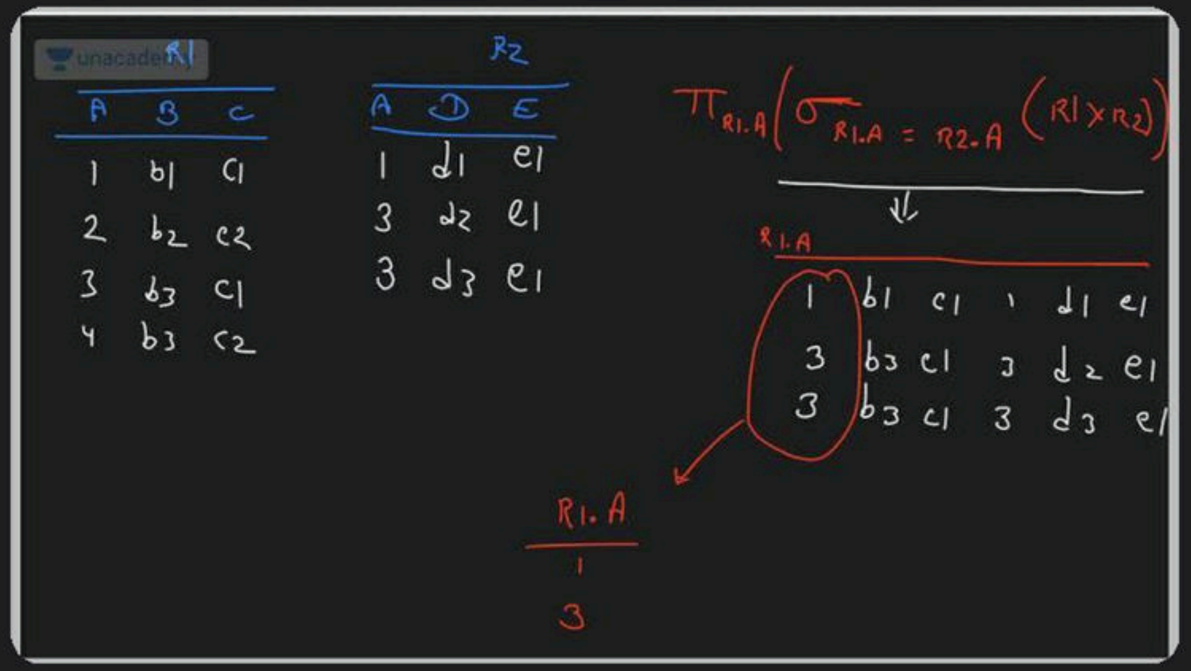
Here cross product will take more time than conditional join ?

Conditional join ke aage sigma nhi lagana hai ?



▲ 1 • Asked by Rishabh

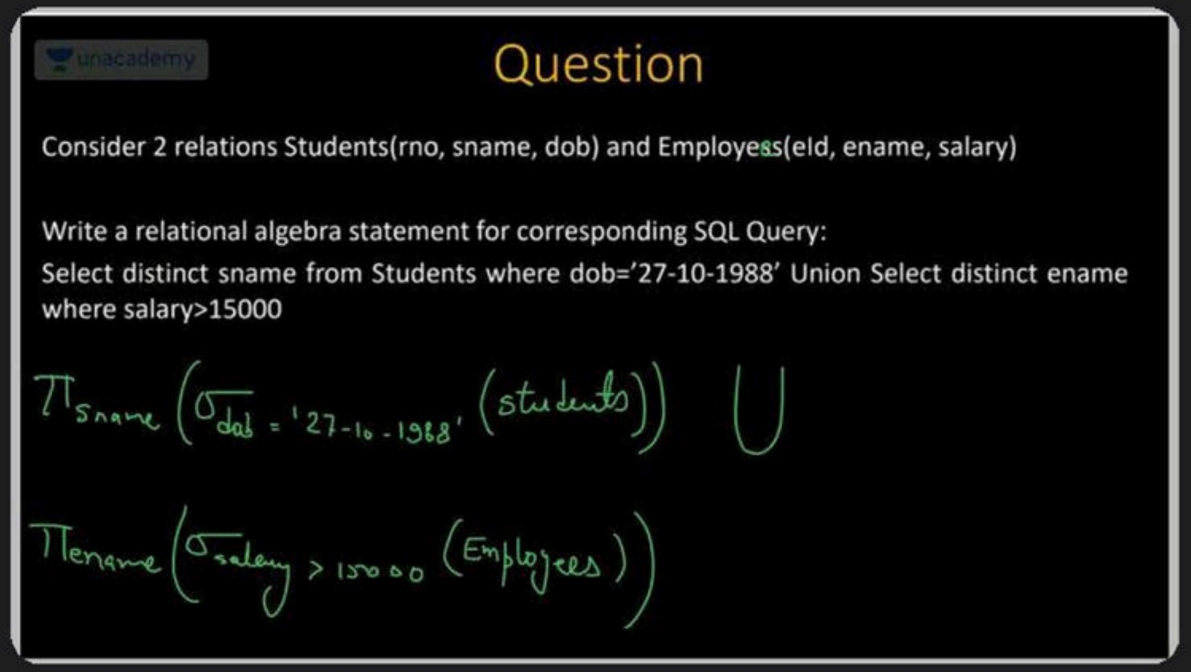
What wilk be the column names in sigma R1.A = R2.A (R1x R2)



▲ 1 • Asked by Rishabh

Can we write -

pie sname (sigma dob = '27-10-1988' v salary > 15,000 (Students))



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▲ 1 • Asked by Shreyas

Sir can we say natural join is Cartesian product followed by selection ? Will redundant tuples generated for this case?

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▲ 1 • Asked by Srishti

sir here, I didn't understand that why (Ccolor='blue' v Ccolor='black') will work but (Ccolor='blue' /\ Ccolor='black') will not?

$\pi_{dname}\left(\sigma_{drivers.did = drives.did \wedge cars.cid = drives.cid \wedge (ccolor = 'blue' \vee ccolor = 'black')}(drivers \times cars \times drives)\right)$

did	car	col
1	1	black
1	1	blue
1	2	black

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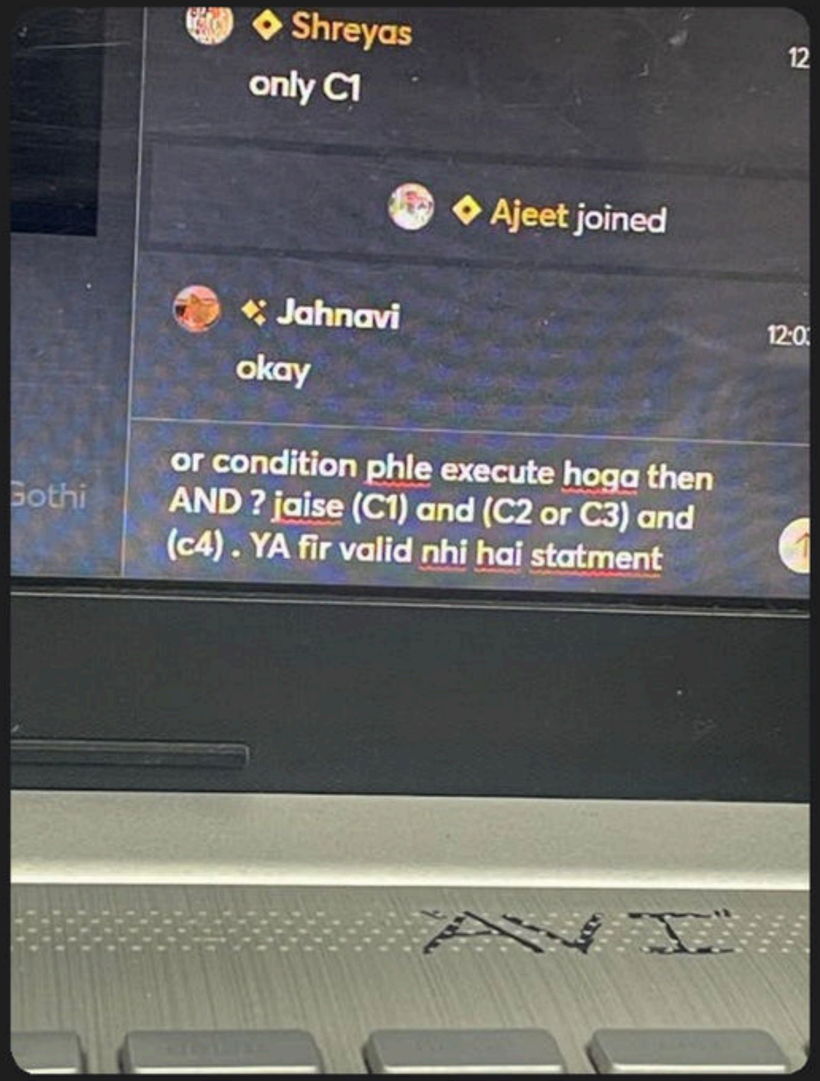
▲ 1 • Asked by Anil

Please help me with this doubt



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▲ 1 • Asked by Rishabh

Please help me with this doubt

Table T1 having rows r1, => 5

Table T2 having rows r2, => 6

Table T3 having rows r3, => 3

Table T4 having rows r4 => 10

If r1*r2 = r3*r4

Then will it work ?

select * from t1, t2 union select * from t3, t4

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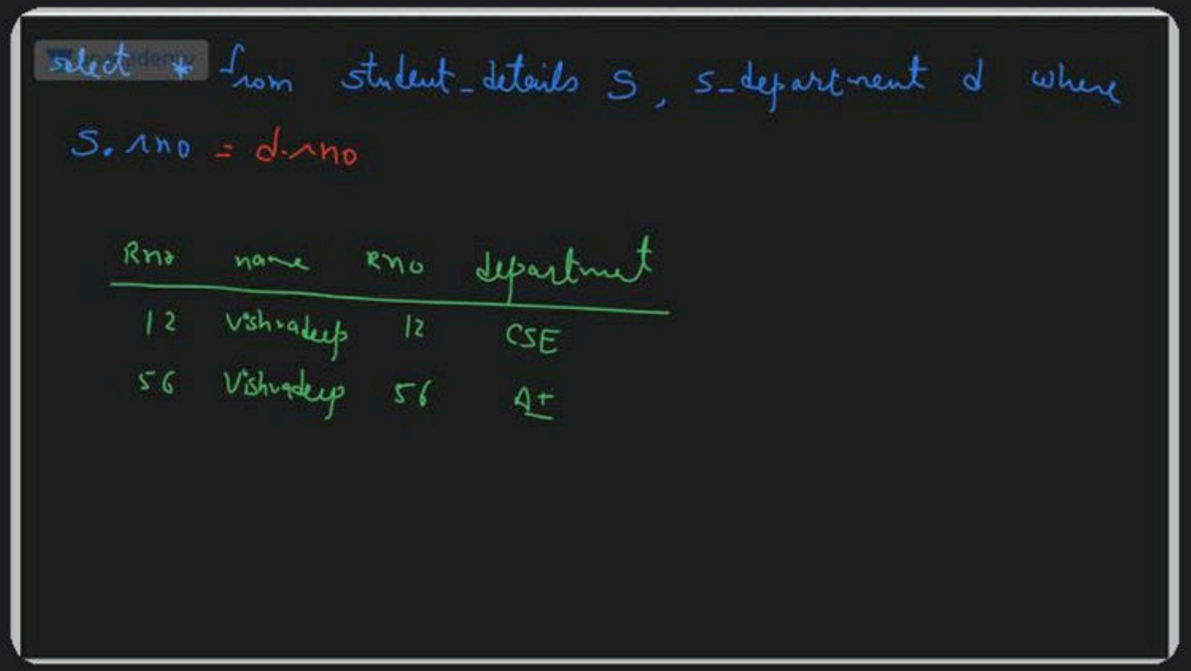
▲ 1 • Asked by Shreyas

Sir is it guarenteed ki every relation will have lossless and dependency preserving 3NF decomposition?

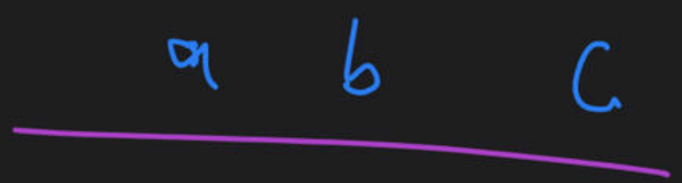
▲ 1 • Asked by Rishabh

Sir yaha inner join hona chahiye tha na ?



▲ 1 • Asked by Shreyas

Sir agar ek tableemcknahi hai toh kya aisa zaruri hai sare attributes milake ck banaye ya fir not possibl.. o considering ki ham ye sql engine pe kar rahe hai



a, b, c

ab, bc, ca, abc

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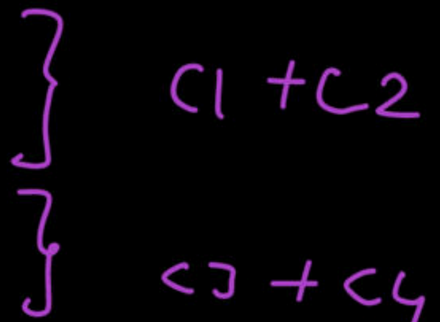
▲ 1 • Asked by Rishabh

Please help me with this doubt

Table T1 having columns c1,
Table T2 having columns c2,
Table T3 having columns c3,
Table T4 having columns c4



If c1+c2 = c3+c4

Then will it work ?

select * from t1, t2 union select * from t3, t4

▲ 1 • Asked by Bhavesh

What is the application of relational algebra in the real world?

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▲ 1 • Asked by Shreyas

Sir how can we write subquery or match some items in relational algebra like if i want shipper name who ships profuct of category 2, without using join?