CS & IT ENGINEERING

Database Management System

Query Language

Relational Algebra

DPP – 01

Discussion Notes

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01 Question

02 Discussion

[MCQ]

Q.1 Consider the following statements:

S_1: $\pi_{\text{List N}}(\pi_{\text{List N-1}}.....(\pi_{\text{List 1}}(R))$ L.H.S

Not Correct

$\equiv \pi_{\text{List 1}}(\pi_{\text{List 2}}.....(\pi_{\text{List N}}(R))$

S_2: $\sigma_{c_n}(\sigma_{c_{n-1}}.....(\sigma_{c_1}(R))) \equiv \sigma_{c_1}(\sigma_{c_2}.....(\sigma_{C_N}(C)))$

Which of the following statement(s) is/are correct?

A. S_1 only

B. S_2 only ✓

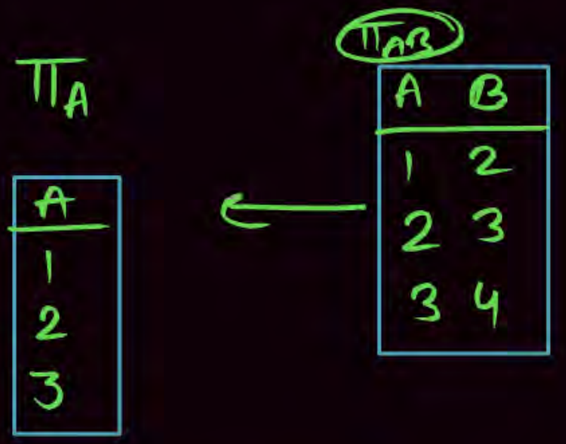
Ans (b)

C. Both S_1 and S_2 only

D. Neither S_1 nor S_2

L.H.S

$\Pi_A [\Pi_{AB}(R)]$



R(ABC)

A	B	C
1	2	4
2	3	8
3	4	9

$\Pi_{AB}(\Pi_A(R))$

Π_{ABC}

A
1
2
3

→ Not possible.

C_1 B>3

C_2 C>4

$\sigma_{C_2}[\sigma_{C_1}(R)]$

$\sigma_{C>4}[\sigma_{B>3}(R)]$

C>4 3 4 9

o/p

3 4 9 Ans

$\sigma_{C_1}[\sigma_{C_2}(R)]$

$\sigma_{B>3}[\sigma_{C>4}(R)]$

$\not[\begin{matrix}2 & 3 & 8\\ 3 & 4 & 9\end{matrix}]$

3 4 9 Ans

$$\Pi_B\left[\Pi_{BC}(R)\right] \neq \Pi_{BC}\left[\Pi_B(R)\right]$$

R

A	B	C	D
1	5	2	1
2	6	3	4
3	7	5	8
4	8	6	9

Π_B

B
5
6
7
8

Π_{BC}

Not Possible

Q.2

[NAT]

Consider the following relations-

Enroll (CandidateID, Papercode) with 5000 tuples and

Count(Papercode, Number_of_appearing_candidates) with 29 tuples.

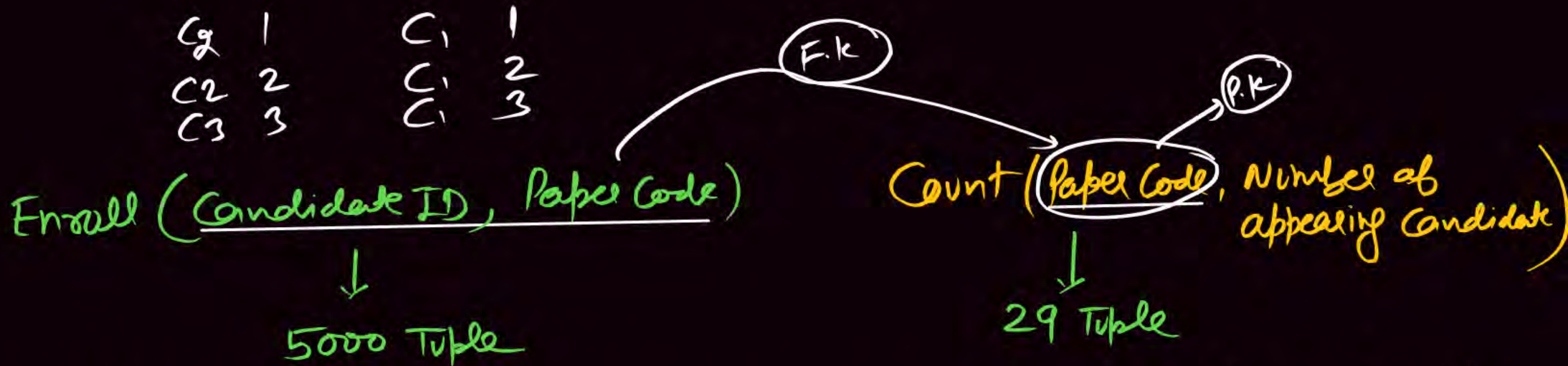
Assume, one candidate can enroll for multiple Papercode. Let p and q be the maximum and minimum number of records in Count ⋈ Enroll then the value of p + q is 10,000. Ans

P: 5000

q: 5000

P+q = 5000 + 5000

= 10000 Ans



When Two Tables (Relations) are Joined (Natural Join) w.r.t Primary key & foreign key then maximum No. of Tuples in the Resulting Relation is equal to Tuples in the Referencing Relation

Referencing Rel^{n} → Enroll ⋈ Count ⇒ maximum ⇒ **5000 Tuple = P**

- Paper Code is Primary key of Count Table so Not Contain NULL & Paper Code Used as Foreign key in the Enroll Table & Candidate ID & Paper Code is a key for enrolled Relation

Minimum = 5000

Q.3

Let R_1 and R_2 be two relations which are union compatible with the same set of attributes. [MCQ]

Correct ← S_1: $R_1 \cap R_2 = T_1 \bowtie T_2$

Incorrect ← S_2: $R_1 \cup R_2 = T_1 \bowtie T_2$

Which of the above statement(s) are INCORRECT?

S_1: $R_1 \cap R_2 = \phi$

$T_1 \bowtie T_2 = \phi$

$T.Sid = T_2.Sid \wedge T_1.Sname = T_2.Sname\ (T_1 \times T_2)$

T_1

Sid	Sname
1	A
2	B

T_2

Sid	Sname
3	C
4	D

S_2: $R_1 \cup R_2 \neq T_1 \bowtie T_2 = \phi$

O/P →

Sid	Sname
1	A
2	B
3	C
4	D

A. S_1 only

B. S_2 only — Ans(B)

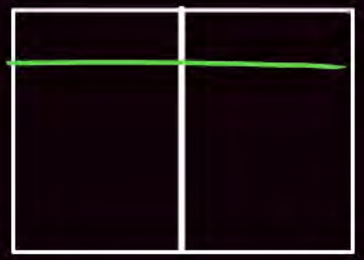
C. Both S_1 and S_2 only

D. Neither S_1 nor S_2

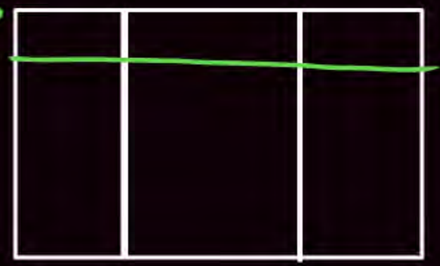
R & S ibb

① Arity of R & S must be same (# of Attribute)

Arity: 2



Arity: 3



Not bossible

② Range of Attribute Must be Similar.

Not bossible.

Now Possible.

Q.4 [MSQ]

Consider the following relations:

Enroll (Sid, Papercode), Paper(Papercode, Desc) Which of the following relational algebra displays the sid's who only enrolled for Papercode having descriptions (Desc) as "CS"?

A. π_{sid} (Enroll ⋈ Paper)
Desc = CS

A & C Ans

B. π_{sid} (Enroll) − π_{sid} ((Enroll ⋈ σ (Paper))
Desc = CS

Non CS

Sid of student who enrolled in CS.

C. π_{sid} (Enroll) − π_{sid}((Enroll ⋈ σ (Paper))
Desc <> CS

Sid of student who enrolled in Non CS. OR Not enrolled in CS

D. None

Sid who enrolled in CS

Not equal

Q.5 [MCQ]

Consider a relations work (EmpiD, Project ID)

E P

ρ → Rename operator

The suitable relational algebra expression that projects the employee ids who work exactly in one project is-

A. $\pi_{Empid}(Work) - \pi_{Empid}(Work \bowtie_{Empid = E \wedge Project\ Id = P} \rho_{E,P}(work))$

Eid → work in One Project

Total − Not work in One Project (More than One Project)

B. $\pi_{Empid}(Work \bowtie_{Empid = E \wedge Project\ ID \neq P} \rho_{E,P}(work))$

E1

Eid Who Working More than One Project

C. $\pi_{Empid}(work) - \pi_{Empid}(work \bowtie_{Empid = E \wedge Project\ ID \neq P} \rho_{E,P}(work))$

E1
E2 − E1

E1 (101P)

Ans(C).

eid	Pid
E_1	P_1
E_1	P_2
E_2	P_L

D. None

E_2

Q.6

Consider two relations R and S with x and y number of distinct record. Let p and q be the minimum and maximum number of records in the resultant R/S, then-

[MCQ]

minimum = p maximum = q

A. $p = 0,\ q = x + 1$

B. $p = 0,\ q = \left\lfloor \frac{x}{y} \right\rfloor$

C. $p = x,\ q = y$

D. $p = x,\ q = \left\lfloor \frac{x}{y} \right\rfloor$

R/S

Minimum = 0

$\left\lfloor \frac{x}{y} \right\rfloor$

$\Pi_{sid, Pid}(R)$ / $\Pi_{Pid}(S)$

s_1	p_1
s_2	p_1
s_3	p_1
s_1	p_2
s_3	p_4

p_1 p_2 p_4

0

Avg (R)

Q.7 [MCQ]

Let R_1 and R_2 be two relations with n and m tuples.

S_1: The maximum number of records in $R_1 - R_2$ is n.

S_2: The minimum number of records in $R_1 \cup R_2$ is max (n, m)

A. S_1 only

B. S_2 only

C. Both S_1 and S_2 only

D. Neither S_1 nor S_2

Ans (C).

R_1

n Tuple

(eg 4 Tuple)

A
B
C
D

R_2

R_2 or m Tuples

(eg 5 Tuple)

A
B
C
D
E

P
Q
R
S
T

$R_1 \cup R_2$ = max(m, n) Minimum

5 Tuple to 9 Tuple

m+n Maximum.

minimum $R_1 - R_2 = \phi$

Maximum $R_1 - R_2 = n$

A
B
C
D

R_1: n Tuple R_2: m Tuple	Minimum	maximum
① $R_1 \cup R_2$	$\max(m, n)$	$m+n$
② $R_1 - R_2$	ϕ	n

$R_1 \cap R_2$ ϕ $\min(m, n)$

Q.8 [MCQ]

Consider the following RA expression-

P: π_{sid} (student) $-$ π_{sid} (student $\bowtie$ $\rho_{I, G, M}$ (Student))

Rename

Marks < M

$\wedge$ Gender = G

Less Marks in Respective Gender

On a relation student (sid, Gender, Marks) and $\rho_{I = sid}$, $\rho_{G = Gender}$, $\rho_{M = Marks}$.

The above R.A displays?

A. The sid of the student who obtained the maximum marks.

B. The sids of the male and female students who obtained the maximum marks in their respective gender.

C. The sids of male student who scored higher than all the female students

Avg(R).

D. None

Q.9 [MSQ]

Consider the relation-

Works (Eid Pid) project (Pid, Name)

Division operation

The relational algebra expression that displays the Eids who work in every project Name = 'M ____.

A. $\pi_{Eid, Pid}(works) / \pi_{Pid}(\sigma_{Name = M}(Project))$

B. $\pi_{Eid}(Work) - \underset{Eid}{\pi}\left[\pi_{Eid}(Work) \times \pi_{pid}\left(\underset{Name = m}{\sigma}(Project)\right) - \pi_{Eid\ Pid}(works)\right]$

C. $\pi_{Eid}(Work) - \left[\pi_{Eid}(Work) \times \pi_{pid}\left(\underset{Name <> m}{\sigma}(Project)\right) - \pi_{Eid\ Pid}(works)\right]$

D. None

Ans (A) & (B).

$\Pi_{eid,Pid}(Works) \div \Pi_{Pid}(\rho_{Pname:m}(Project))$

$R \div 1 \Rightarrow$ A, C Ans

$R \div 3$ A, C Ans

(b)

$\Pi_{eid}(Work) - \Pi_{eid}$

eid
A
B
C

—

eid
B

Eid
A
B
C

X

Pid
1
3

eid	Pid
A	1
A	3
B	1
B	3
C	1
C	3

—

eid	Pid
A	1
A	2
A	3
B	2
C	1
C	2
C	3

$\Downarrow$

Π_{eid} B

Output

A
C

Ans

Works (R)

eid	Pid
A	1
A	2
A →	3
B	2
C	1
C	2
C →	3

Project

Pid	Pname
1	M
2	X
3	M

$\Pi_{Pid}(\sigma_{Pname=M}(Project))$

Pname = M

Pid
1
3

Eid
A
B
C

X

3 × 2 = 6 Tuple

1 + 1 ⇒ 2 Attribute

$$\pi_{AB}(R) \,/\, \pi_{B}(S)$$

Expansion

$$\pi_{A}(R) - \pi_{A}\left[\pi_{A}(R) \times \pi_{B}(S) - R\right]$$

Q.10 Consider the two relations R_1 and R_2 such that they have no attributes in common then- **[MCQ]**

S_1: $R_1 \bowtie R_2 = R_1 \times R_2$

S_2: $R_1 \bowtie R_2 \neq \phi$

Incorrect ✗

$R_1(AB)$ $R_2(CD)$

Which of the given statement(s) is/are correct?

A. S_1 only

B. S_2 only

C. Both S_1 and S_2 only

D. Neither S_1 nor S_2

$R \bowtie S =$ Step3 $\Pi_{\text{Distinct Attribute}}$ [Equality Condition on All Common Attribute ($R \times S$)] Step2 Step1

Ans (A)

$R_1 \bowtie R_2 \equiv R_1 \times R_2$

Condition (b) → $R_1 \bowtie R_2 = \phi$ if Any One of the Relation Empty

But in Question R_1 & R_2 Non empty.


THANK YOU GW
SOLDIERS !