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MOTHISHWARAN.C

1) a)

(i) Operations in Relational Algebra

* Selection (σ) selects a subset of rows from relation
* Projection (π) Deletes unwanted columns from relation
* Cross-product ($\times$) Allows us to combine two relation
* Set-difference ($-$) Tuples in relation 1, but not in relation 2.
* Union ($\cup$) Tuples in relation 1 and in relation 2 combination.

ii) Additional Operations *

* Intersection
* join
* division

⇒ Since each operation returns a relation, operations can be composed (Algebra is closed).

Selection:

(student)

sid	sname	rating	age
1	a	8	36
2	b	9	35
3	c	10	35

$\sigma_{rating>8}$ (Student) gives

sid	sname	rating	age
2	b	9	35
3	c	10	35

Union, Intersection & Set Difference :-

S_1

sid	sname
1	a
2	b

S_2

sid	sname
2	b
3	c

$S_1 \cup S_2$ gives ⇒ (Union)

sid	sname
1	a
2	b
3	c

$S_1 \cap S_2$ gives ⇒ (Intersection)

sid	sname
2	b

$S_1 - S_2$ gives ⇒ (Set difference)

sid	sname
1	a
2	b

Projection :-

π

sid	sname	age
1	a	35
2	b	25
3	c	35

$\Pi_{age}(S_1)$ gives ⇒

age
35
25

Cross product:-

Each row of table 1 is paired with each row of table 2

Join:-

Each row of table 1 is paired with rows of table 2 under some common attribute or candidate key

1)

b). ~~Select d.dname from (select d.dname~~

SQL query: Select dname from Dogs where (select dog.dname which never participated) and select age from Dogs where age > 5 years.

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2)

b)

a. $\pi_{(\text{Theater name})}\left(\sigma_{\text{title} = \text{"3 Idiots"} \wedge \text{Time} > 5\text{pm}}(\text{Program})\right)$

b. $\pi_{(\text{producer name})}\left(\sigma_{\text{title}}(\text{produced}) - \sigma_{\text{title}}(\text{liked})\right)$

a)

$R(A, B, C, D)$

$FD_1 = \{A \rightarrow B, B \rightarrow C, D \rightarrow C\}$

$FD_2 = \{A \rightarrow B, B \rightarrow C, A \rightarrow D\}$

In the ~~subset~~ relation of R,

$R_1 = \{A, B, C\}$ &

$R_2 = \{A, B, D\}$.

FD_1 & FD_2 combine gives $R(A, B, C, D)$

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3) FD $X \rightarrow Y$ only if X corresponds Y is same in tuple 1 & tuple 2

a) Quantity → Name

* It holds FD (Functional dependency)

b) Quantity → Model

* It doesn't hold FD

as Quantity, has two record Rolls Royce Ghost and Ferrari Superfast

c) Model → Name

* It ~~doesn't hold~~.

* It holds Functional dependency

d) Model → Quantity

* It holds functional dependency

e) Name → Quantity :-

* It holds functional dependency