Question bank -2

Set 1

(3) Given the relations PROFESSOR(PID,PNAME, DEPT, SALARY) and STUDENT(ROLLNO, NAME, CLASS, ADVISER) where ADVISER is a foreign key to PROFESSOR, write *one* equivalent relational algebra expressionfor *each* of the following:

i. $\pi_{PNAME}(\sigma_{SALARY>30000}(PROFESSOR))$

ii. $\pi_{SNAME}(\sigma_{DEPT='CSE'}(STUDENT \underset{ADVISER=PID}{\bowtie} PROFESSOR))$

One possibility

$$(\pi_{PNAME}(\pi_{PID,PNAME}(\sigma_{SALARY>30000}(PROFESSOR))),$$

Answer -ii

Some possible equivalences are,

$\pi_{NAME}(\sigma_{DEPT='CSE' \text{ and } ADVISER = PID}(STUDENT X PROFESSOR))$

$\pi_{NAME}(\sigma_{ADVISER = PID}(\sigma_{DEPT='CSE'}(PROFESSOR) X\ STUDENT))$

Set-3

- SALESPERSON (SSN, Name, start_year, Dept_no)
- TRIP (SSN, From_city, To_city, Departure_Date, Return_Date, Trip_ID)
- EXPENSE(TripID, Account#, Amount) Specify the following queries in relational algebra: (4x3 =12)
- (i) Give the details (all attributes of TRIP) for trips that exceeded $2000 in expenses.
- (ii) Print the SSN of salesman who took trips to ‘Honolulu’
- iii) Print the trip expenses incurred by the salesman with SSN= ‘234-56-7890’. Note that the salesman may have gone on more than one trip. List them individually

Ans:

- (i) πTRIP.* (σ amount > 2000 (TRIP * EXPENSE))

- (ii) π SSN (σ to_city = ‘Honolulu’ (TRIP))

- (iii) πEXPENSE.tripid, amount (σ SSN = ‘234-56-7890’ (TRIP* EXPENSE))

Set-4

- The following relations (3 x 3) Vehicle (Reg_no, make, colour)
- Person(eno, name, address)
- Owner(eno, reg_no)
- Write expressions in the relational algebra to answer the following queries:-

(i) List the reg_no of vehicles owned by John

(ii) List the names of persons who own maruti cars.

(iii) List all the red coloured vehicle.

(I) π reg_no (σ name=’John’ (PERSON* OWNER))

- (ii) π name (σ make=’maruti’ (PERSON* OWNER * VEHICLE))

- (iii) σ colour=’red’ (VEHICLE)

Set-5

- Consider the following relations
- RENTER(rno, fname, lname, address, tel_no, pref_type, max_rent)
- VIEWING(rno, pno, date, comment)
- PROPERTY_FOR_RENT(pno, street, area ,city, pcode, type, rooms, rent)
- Express the following queries in relational algebra.

(i) List the name and comments of all renters who have viewed a property.

(ii) (ii) Identify all renters who have viewed all properties with three rooms.

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(i) $\Pi f_{name,lname,comment}$(RENTER *VIEWING)

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- (ii) $\Pi_{fname,lname}$ ($\sigma_{rooms=3}$ (PROPERTY_FOR_RENT)*RENTER *VIEWING)

Set-6

- Consider the relations
- City (city_name, state)
- Hotel (name, address)
- City_hotel (hotel_name, city_name, owner)
- Answer the following queries in relational algebra
- (i) Find the names and address of hotels in Agra.
- (ii) List the names of cities which have no hotel.
- (iii) List the names of the hotels owned by ‘Taj Group’
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- Ans: (i) Π name, address (σ city_name= ‘Agra’ (Hotel name=city_name*City_hotel))

- (ii) Π city_name (City) – Π city_name(City_hotel)

- (iii) Π hotel_name (σ owner=’Taj Group’ (City_hotel))

Set-7

The relational schema for a library describing members, books and issue information is given below. Foreign keys have the same name as primary keys.

BOOKS(ACC-NO, ISBN, TITLE, EDITION, YEAR)

MEMBERS(MEMBERID, MEMBERNAME, MEMBERTYPE)

ISSUEDTO(ACC-NO, MEMBERID, DATE OF ISSUE)

Write relational algebra expressions for the following queries:

a) Accession Number(s) and Name(s) of third edition books published in 2018. (2)

b) Names and dates of issue of books taken by a member with name 'PRIYA'. (3)

c) Names of books *not* taken by any member. (4)