Relational Algebra Question:

Q) Consider the following schema:

Suppliers (sid : integer, sname : string, address : string)

Parts (pid : integer, pname : string, color : string)

Catalog (sid : integer, pid : integer, cost : real)

The key fields are underlined, and domain of each field is listed after the field

Name

CONVENTION USED : $ AS NATURAL JOIN

1) Find the name of suppliers who supply some red parts

2) Find the sids of suppliers who supply some red or green parts

3) Find the sids of suppliers who supply some red part or are at 221 packer Ave Sids of suppliers who supply some red part

4) Find the sids of suppliers who supply some red part and some green part

5) Find the sids of suppliers who supply every part

6)Find the sids of suppliers who supply every red part

7)Find the sids of suppliers who supply every red or green part

Link for solution:

https://www.iitg.ac.in/awekar/teaching/cs344fall11/lecturenotes/august%2016.pdf

Consider the following relational database schema consisting of the four relation schemas:

passenger (pid, pname, pgender, pcity)

agency (aid, aname, acity)

flight (fid, fdate, time, src, dest)

booking (pid, aid, fid, fdate)

Answer the following questions using relational algebra queries.

a) Get the complete details of all flights to New Delhi.

b) Get the details about all flights from Chennai to New Delhi.

c) Find only the flight numbers for passenger with pid 123 for flights to Chennai before 06/11/2020.

d) Find the passenger names for passengers who have bookings on at least one flight

e) Find the passenger names for those who do not have any bookings in any flights.

f) Find the agency names for agencies that located in the same city as passenger with passenger id 123.

g) Get the details of flights that are scheduled on both dates 01/12/2020 and 02/12/2020 at 16:00 hours.

h) Get the details of flights that are scheduled on either of the dates 01/12/2020 or 02/12/2020 or both at 16:00 hours.

i) Find the agency names for agencies who do not have any bookings for passenger with id 123.

j) Find the details of all male passengers who are associated with Jet agency.

Solution:

a) Get the complete details of all flights to New Delhi.

$$\sigma_{dest = \text{“New Delhi”}} (\text{flight})$$

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b) Get the details about all flights from Chennai to New Delhi.

$$\sigma_{src = \text{“Chennai”} \wedge dest = \text{“New Delhi”}} (\text{flight})$$

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c) Find only the flight numbers for passenger with pid 123 for flights to Chennai before 06/11/2020.

$$\Pi_{fid} (\sigma_{pid = 123} (\text{booking}) \bowtie \sigma_{dest = \text{“Chennai”} \wedge fdate < 06/11/2020} (\text{flight}))$$

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d) Find the passenger names for passengers who have bookings on at least one flight.

$$\Pi_{pname} (\text{passenger} \bowtie \text{booking})$$

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e) Find the passenger names for those who do not have any bookings in any flights.

$$\Pi_{pname} ((\Pi_{pid} (\text{passenger}) - \Pi_{pid} (\text{booking})) \bowtie \text{passenger})$$

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f) Find the agency names for agencies that located in the same city as passenger with passenger id 123.

$$\Pi_{aname}(\text{agency} \bowtie_{acity = pcity} (\sigma_{pid = 123}(\text{passenger})))$$

[**Hint:** ***we performed a theta join on equality conditions (equi join) here. This is done between details of passenger 123 and the agency table to get the valid records where the city values are same. From the results, aname is projected.***]

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g) Get the details of flights that are scheduled on both dates 01/12/2020 and 02/12/2020 at 16:00 hours.

$$(\sigma_{fdate = 01/12/2020 \wedge time = 16:00}(\text{flight})) \cap (\sigma_{fdate = 02/12/2020 \wedge time = 16:00}(\text{flight}))$$

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h) Get the details of flights that are scheduled on either of the dates 01/12/2020 or 02/12/2020 or both at 16:00 hours.

$$(\sigma_{fdate = 01/12/2020 \wedge time = 16:00}(\text{flight})) \cup (\sigma_{fdate = 02/12/2020 \wedge time = 16:00}(\text{flight}))$$

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i) Find the agency names for agencies who do not have any bookings for passenger with id 123.

$$\Pi_{aname}(\text{agency} \bowtie (\Pi_{\text{aid}}(\text{agency}) - \Pi_{\text{aid}}(\sigma_{pid = 123}(\text{booking}))))$$

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j) Find the details of all male passengers who are associated with Jet agency.

$$\Pi_{passengers.pid,\ pname,\ pcity}(\sigma_{pgender = \text{“Male”}}(\text{passengers} \bowtie \text{booking} \bowtie \text{agency}))$$

Link for relational algebra questions:

https://practicepaper.in/gate-cse/relational-algebra?