

Solution 6

October 5, 2005

Total score: 25 points

1. Problem 5.20 (10 points)

Relational expression (5 points)

$$\pi_{StudId, ProfId}(Transcript \bowtie Teaching) / \pi_{ProfId}(\sigma_{Dept='MUS'}(Professor))$$

SQL (5 points)

```
SELECT R.StudId
FROM Transcript R
WHERE NOT EXISTS (
    (SELECT P.ProfId
     FROM Professor P
     WHERE P.Dept = 'MUS')
    EXCEPT
    (SELECT T.ProfId
     FROM Teaching T
     WHERE T.CrsCode = R.CrsCode
     AND T.Semester = R.Semester)
)
```

2. Problem 5.22 (10 points)

Relational algebraic expression (5 points)

Define

$$LoosingAccounts = \pi_{Acct\#, BrokerId}(Account) - \pi_{Acct\#, BrokerId}(\sigma_{Gain > 0}(Account))$$

The answer is then

$$\sigma_{Name}(Broker \bowtie (\pi_{Id}(Broker) - \pi_{BrokerId}(LoosingAccounts)))$$

SQL (5 points)

```
SELECT B.Name
FROM Broker B
WHERE NOT EXISTS (
    SELECT A.Acct#
    FROM Account A
    WHERE A.BrokerId = B.Id AND A.Gain <= 0)
)
```

3. Problem 5.24 (10 points)

a) (5 points)

```
SELECT C.Id
FROM Customer C
WHERE
  NOT EXISTS (
    (SELECT H.Address                                (i)
     FROM House H
     WHERE H.AgentId = '007' AND
     NOT EXISTS
      (
        (SELECT P.Feature                            (ii)
         FROM Preference P
         WHERE P.CustId = C.Id)
        EXCEPT
        (SELECT A.Feature                            (iii)
         FROM Amenity A
         WHERE A.Address = H.Address)
      )
    )
  )
```

Note: I took the view that a person is interested in a house if all of his preferences are listed in the features of the house.

The SELECT (starting in line (iii)) gets all the features of the house at the address 'H.Address';

The SELECT (starting in line (ii)) gets all the features preferred by the customer C.Id;

The set difference of the above two selects gives us the features that are not offered by the house but are preferred by the customer.

The result of the SELECT (starting in line (i)) is all the houses that are listed with 007 and are not interested by the customer. If this set is not empty then the customer is not interested in some houses listed with 007 and hence should not be included in the final answer.

b) (5 points)

```
CREATE VIEW ClientOf007(CustId) AS
SELECT C.Id
FROM Customer C
WHERE
  NOT EXISTS (
    (SELECT H.Address
     FROM House H
     WHERE H.AgentId = '007' AND
     NOT EXISTS
      (
        (SELECT P.Feature
         FROM Preference P
         WHERE P.CustId = C.Id)
        EXCEPT
        (SELECT A.Feature
         FROM Amenity A
         WHERE A.Address = H.Address)
      )
    )
  )
```

)

```
SELECT P.Feature, COUNT(*)  
FROM Preference P, ClientOf007 C  
WHERE P.CustId = C.CustId  
GROUP BY P.Feature  
HAVING COUNT(*) > 3
```