

# Spring 2007 CS186 Discussion Section: Week 7, 10/08 - 10/12

Your Friendly TAs

October 8, 2007

## 1 SQL

Consider the following schema on table 1:

```
Flights(flight_num, source_city, destination_city)
Departures(flight_num, date, plane_type)
Passengers(passenger_id, passenger_name, passenger_address)
Bookings(passenger_id, flight_num, date, seat_number)
```

Table 1: Schema for the supply chain database.

The key fields are underlined. Express the following queries in SQL (feel free to abbreviate relation and attribute names and to use INTERSECT and EXCEPT if you need to):

1. Find the `passenger_id` of all passengers who have a seat booked on a plane of type "747" from San Francisco to Washington. *Do not return any duplicate values.*

```
SELECT DISTINCT B.passenger_id
FROM Flights F, Departures D, Bookings B
WHERE B.flight_num = D.flight_num
      AND B.date = D.date
      AND F.flight_num = D.flight_num
      AND F.source_city = 'San Francisco'
      AND F.destination_city = 'Washington'
      AND D.plane_type = '747';
```

2. Find the cities that have direct (non-stop) flights to both Honolulu and Newark.

```
SELECT DISTINCT source_city
FROM Flights F
WHERE F.dest_city = 'Honolulu'
      AND F.source_city IN
      (SELECT source_city
       FROM Flights F2
       WHERE dest_city = 'Newark');
```

Alternatively, we could use the Intersect operator or self-join the Flights relation. Here is how the query should look like:

```
SELECT DISTINCT source_city
FROM Flights F1, Flights F2
WHERE F1.dest_city = 'Honolulu'
      AND F2.dest_city = 'Newark'
      AND F1.source_city = F2.source_city;
```

or

```
(SELECT DISTINCT source_city
FROM Flights F
WHERE F.dest_city = 'Honolulu')
INTERSECT
(SELECT DISTINCT source_city
FROM Flights F
WHERE F.dest_city = 'Newark')
```

3. Find the flight\_num and date of all flights for which there are no reservations.

```
SELECT flight_num, date
FROM Departures D
WHERE NOT EXISTS
  (SELECT *
   FROM Bookings B
   WHERE B.flight_num = D.flight_num
        AND B.date = D.date);
```

4. Find the passenger\_name of all passengers who have a seat booked on at least one plane of *every* type.

```
SELECT DISTINCT passenger_name
FROM Passengers P
WHERE
  (SELECT COUNT(DISTINCT D.plane_type)
   FROM Departures D, Bookings B
   WHERE D.flight_num = B.flight_num
        AND D.date = B.date
        AND B.passenger_id = P.passenger_id) =
  (SELECT COUNT(DISTINCT D.plane_type)
   FROM Departures D);
```

or

```
SELECT DISTINCT passenger_name
FROM Passengers P
WHERE NOT EXISTS
  (SELECT D.plane_type
   FROM Departures D
   WHERE NOT EXISTS
     (SELECT *
      FROM Departures D2, Bookings B
      WHERE D2.flight_num = B.flight_num
            AND D2.date = B.date
            AND B.passenger_id = P.passenger_id
            AND D.plane_type = D2.plane_type));
```

or

```
SELECT DISTINCT passenger_name
FROM Passengers P
WHERE NOT EXISTS
  ((SELECT D.plane_type
   FROM Departures D)
  EXCEPT
  (SELECT D2.plane_type
   FROM Departures D2, Bookings B
   WHERE D2.flight_num = B.flight_num
        AND D2.date = B.date
        AND B.passenger_id = P.passenger_id));
```

5. Print an ordered list of all source cities and the number of distinct destination cities that they have direct (non-stop) flights to, with airplanes of type "747". The list should be ordered in decreasing number of destinations and should contain only those source cities that have flights to 25 or more distinct destinations.

For example, the output should look like:

source_city	NumDestinations
Chicago	228
Atlanta	100
...	
San Francisco	25

```
SELECT source_city, COUNT(DISTINCT destination_city) AS NumDestinations
FROM Flights F, Departures D
WHERE F.flight_num = D.flight_num
      AND D.plane_type = '747'
GROUP BY source_city
HAVING NumDestinations >= 25
ORDER BY NumDestinations DESC;
```