ECS 165A
Database Systems

Discussion Session 5

Structured Query Language (Chap. 5, 6)

Outline

- Sample aggregate queries and hints on Homework 3

- Review Homework2- Part 2 Solutions

- Midterm Sample 2

Example. Relational Schema

- BOAT (name, owner → OWNER, size, color, price)

- CONTACT (owner a → OWNER, owner b → OWNER)

- OWNER (<u>ownerID</u>, name, age)

1- For each owner, find the boat with the large size.

SELECT B1.owner, B1.name

FROM BOAT B1

WHERE B1.size =

(SELECT MAX(B2.size)

FROM BOAT B2

WHERE B2.owner = B1.owner

);

Another Solution

1- For each owner, find the boat with the large size.

SELECT owner, name

FROM BOAT

WHERE (owner, size)

IN

(SELECT owner, MAX(size)

FROM BOAT

GROUP BY owner

);

2- List each owner with the number of contacts to him/her

SELECT owner_a, count(*)

FROM CONTACT

GROUP BY owner_a;

3- Which owner (owners) have at least 2 contacts, show the result in descending order.

SELECT owner_a, count(*) as num_of_contacts

FROM CONTACT

GROUP BY owner_a

HAVING count(*) >= 2

ORDER BY num_of_contacts DESC;

4- For each boat, list its color, and the total number of boats which have same color.

```
SELECT B1.name, B1.color,
(SELECT count(*)
FROM BOAT B2
WHERE B2.color = B1.color
GROUP BY B1.name)
FROM BOAT B1;
```

5- List all Boats that a Owner have, where the owner is not contact with anyone.

SELECT DISTINCT B1.name

FROM BOAT

WHERE NOT EXIST (SELECT *

FROM CONTACT

WHERE BOAT.owner = CONTACT.owner_a);

Hint on Extra Credit question

- A tribal chief of Khartoum is inviting his fellow chiefs to a meeting. He invites all chiefs from <u>African countries</u> that are reachable from Khartoum by <u>crossing the border twice</u>, however <u>excluding neighboring countries</u>. We assume that <u>for each 100,000 inhabitants there is one chief</u>.

Hint on Extra Credit question

- One first needs to find the country C in which Khartoum lies.

- Then you can compute (maybe in a view) the countries C' that directly border C.

- Then you find all neighboring countries C" of C' and subtract the C' countries themselves.

- Then you need the populations of those remaining countries to find how many chiefs will be invited

Solution to Homework 2

4- List all African capital cities together with their city population and the country they are located in.

SELECT cityId, CITY.pop, countryCode

FROM COUNTRY, CITY, country_continent

WHERE capital = cityId

AND CITY.country = country_continent.country

AND continent = 'Africa';

5. What countries have at least two borders with another country?

SELECT B1.country_a

FROM borders B1, borders B2

WHERE B1.country_a = B2.country_a

AND B1.country_b <> B2.country_b;

6. What countries have no border with another country?

```
SELECT countryCode
FROM COUNTRY
EXCEPT
SELECT country_a
FROM borders;
```

```
SELECT countryCode
FROM COUNTRY
WHERE countryCode NOT IN (
SELECT country_a
FROM borders
);
```

8- List all countries that are located in both Europe and Asia.

SELECT country

FROM country_continent

WHERE continent = 'Europe'

INTERSECT

SELECT country

FROM country_continent

WHERE continent = 'Asia';

8- List all countries that are located in both Europe and Asia.

```sql
SELECT countryCode
FROM COUNTRY
WHERE countryCode IN (
SELECT country
FROM country_continent
WHERE continent = 'Europe'
)
AND countryCode IN (
SELECT country
FROM country_continent
WHERE continent = 'Asia'
);
```

10- Find the city (or cities) with the largest population.

SELECT cityId
FROM CITY
WHERE pop IS NOT NULL

EXCEPT

SELECT C1.cityId
FROM CITY C1, CITY C2
WHERE C1.pop IS NOT NULL
AND C2.pop IS NOT NULL
AND C1.pop < C2.pop;

10- Find the city (or cities) with the largest population.

```sql
SELECT cityId
FROM CITY
WHERE pop IS NOT NULL
AND pop >= ALL (
SELECT pop
FROM CITY
WHERE pop IS NOT NULL
);
```

12- What countries have all the religions that are in the UDEF RELIGION relation?

```sql
SELECT CR1.country
FROM country_religion CR1
WHERE NOT EXISTS (
SELECT *
FROM UDEF_RELIGION UR
WHERE NOT EXISTS (
SELECT *
FROM country_religion CR2
WHERE CR1.country = CR2.country
AND CR2.religion = UR.religion
)
);
```

12- What countries have all the religions that are in the UDEF RELIGION relation?

SELECT CR.country

FROM country_religion CR, UDEF_RELIGION UR

WHERE CR.religion = UR.religion

GROUP BY CR.country

HAVING COUNT(*) = (

SELECT COUNT(*)

FROM UDEF_RELIGION

);