Homework 4

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Question 1:
Explain what the following queries compute in English.
Answer:
a. List the name for the faculties that have classes in all the rooms that the classes are hosted.
b. List the name of all the students who enrolled in the most number of classes.
c. List the name of the classes that are hosted in room R128 or have not less than 5 students.
d. List the name of the students who have not enrolled in any classes.
e. List every level and the average age of the students in that level, except the level 'JR'.

Question 2:
Write an SQL query equivalent to the following Algebraic Expression tree.
Answer:
The following is the equivalent SQL query,

```
SELECT starName, MIN(year) minYear
FROM StarsIn
GROUP BY starName
HAVING COUNT(title)>=3
```

Question 3:
For each of the following descriptions, write two different SQL queries. Write each query in two significantly different ways. You should use at least one subquery in your answer (e.g., using different sets of the operators EXISTS, IN, ALL, and ANY). These queries address the Spy database.
a. Find the countries whose agents have the maximum salary.
b. Find the countries where at least one agent speaks English.
Answer:
a.

SQL query 1:	SELECT country FROM agent WHERE salary = (SELECT MAX(salary) FROM agent)
SQL query 2:	SELECT country FROM agent WHERE salary >= ALL (SELECT salary FROM agent)
Number of rows:	1 row(s)
The first 10 rows:	country USA

b.

SQL query 1:	SELECT DISTINCT country FROM agent,languagerel,language WHERE agent.agent_id=languagerel.agent_id AND languagerel.lang_id=language.lang_id AND language.language='English'
SQL query 2:	SELECT DISTINCT country FROM agent WHERE agent_id IN (SELECT agent_id FROM languagerel,language WHERE languagerel.lang_id=language.lang_id AND language.language='English')
Number of rows:	6 row(s)
The first 10 rows:	country England Poland Iraq Japan USA Austrailia

Question 4:

Write SQL queries that address the following database schema:

Employee(first, last, ssn, gender, salary, super_ssn, dnum)

Answer:

1.

SQL query:	SELECT first,last FROM employee WHERE dnum = (SELECT dnum FROM employee WHERE salary = (SELECT MAX(salary) FROM employee))
Number of rows:	1 row(s)
The first 10 rows:	first: James last: Borg

2.

SQL query:	SELECT first,last FROM employee WHERE super_ssn IN (SELECT ssn FROM employee WHERE super_ssn = 123456789)
Number of rows:	0 row(s)
The first 10 rows:	No rows found.

3.

SQL query:	SELECT first,last FROM employee WHERE salary > (10000 + (SELECT MIN(salary) FROM employee))
Number of rows:	4 row(s)
The first 10 rows:	first | last franklin | wong Jennifer | Wallace Ramesh | Narayan James | Borg

4.

SQL query:	SELECT f.dnum FROM (SELECT dnum,gender,COUNT(*) amount FROM employee GROUP BY dnum,gender HAVING gender='F') f FULL JOIN (SELECT dnum,gender,COUNT(*) amount FROM employee GROUP BY dnum,gender HAVING gender='M') m ON f.dnum = m.dnum WHERE f.amount>m.amount OR m.amount IS NULL AND f.amount IS NOT NULL
Number of rows:	1 row(s)
The first 10 rows:	dnum 4