INT105 Basic SQL Practice #2 (Aggregate Queries/Outer Joins/ORDER BY clause)

Part I: Given the following table schema, write SQL queries to find the answers to the following questions.จากโครงสร้างข้อมูลด้านล่างนี้ ให้เขียน query เพื่อหาคำตอบของคำถามต่อไปนี้

```
EMPLOYEES (
    ID              INTEGER         PRIMARY KEY,
    FULLNAME        VARCHAR (60),
    DEPT            INTEGER         REFERENCES DEPARTMENTS,
    LOCATION        INTEGER         REFERENCES CITIES,
    SALARY          DECIMAL (8,2));
DEPARTMENTS (
    CODE            INTEGER         PRIMARY KEY,
    TITLE           VARCHAR (50),
    LOCATION        INTEGER         REFERENCES CITIES,
    MANAGER         INTEGER         REFERENCES EMPLOYEES);
CITIES (
    CITYCODE        INTEGER         PRIMARY KEY,
    CITYNAME        VARCHAR (60),
    COUNTRYCODE     INTEGER         REFERENCES COUNTRIES);
COUNTRIES (
    COUNTRYCODE     INTEGER         PRIMARY KEY,
    COUNTRYNAME     VARCHAR (60));
-- NULL can be in any of the above columns except PRIMARY KEY.
```

1. What is the average salary of managers? เงินเดือนเฉลี่ยของผู้จัดการเป็นเท่าไหร่

    SELECT avg(e.salary)
    FROM employees e
    JOIN department d ON e.id = d.manager;

2. How many employees are there in each country? List the country code, country name, and the number of employees. แต่ละประเทศ มีพนักงานอยู่กี่คน ให้แสดงรหัสประเทศ ชื่อประเทศ และจำนวนพนักงานที่มี (โดยพิจารณาจาก LOCATION ของพนักงาน)

    SELECT co.countrycode, co.countryname, count(e.id) FROM employees e
    JOIN cities c ON e.location = c.citycode
    JOIN countries co ON c.countrycode = co.countrycode
    GROUP BY co.countrycode, co.countryname;

3. What is the maximum salary of employees in each department? List the department code, title, and the maximum salary of employees. เงินเดือนสูงสุดของพนักงานในแต่ละแผนก (department) เป็นเท่าไหร่ ให้แสดงรหัสและชื่อแผนก และเงินเดือนสูงสุดของพนักงานในแผนกนั้น

    SELECT d.code, d.title, max(e.salary)
    FROM employees e
    JOIN department d ON e.dept = d.code
    GROUP BY d.code, d.title;

4. Find the maximum salary of managers of departments in each country. Consider only the country that has more than 5 departments. List the code and name of the countries and the maximum salary of the managers. ให้หาเงินเดือนสูงสุดของผู้จัดการของแผนกในแต่ละประเทศโดยพิจารณาเฉพาะประเทศที่มีแผนกมากกว่า 5 แผนก ให้แสดงรหัสและชื่อประเทศด้วย

```
SELECT co.countrycode, co.countryname, max(e.salary)
FROM employees e
JOIN department d ON e.id = d.manager
JOIN cities c ON d.location = c.citycode
JOIN countries co ON c.countrycode = co.countrycode
GROUP BY co.countrycode, co.countryname
HAVING count(d.code) > 5;
```

5. List the code and the name of the country and the number of departments in that country. Count only the department that has more than 10 employees. ให้แสดงรหัสและชื่อประเทศ และจำนวนแผนกในประเทศนั้น โดยนับเฉพาะแผนกที่มีจำนวนพนักงานมากกว่า 10 คน

```
SELECT co.countrycode, co.countryname, count(d.code)
FROM employees e
JOIN department d ON e.dept = d.code
JOIN cities c ON d.location = c.citycode
JOIN countries co ON c.countrycode = co.countrycode
GROUP BY co.countrycode, co.countryname
HAVING count(e.id) > 10;
```

Part II: Write SQL statements to answer the following questions.

```sql
CREATE TABLE COUNTRIES (  -- countries
  CNTCODE  INTEGER      PRIMARY KEY,
  CNTNAME  VARCHAR (12)
);
CREATE TABLE CITIES (     -- cities
  CITCODE  INTEGER      PRIMARY KEY,
  CITNAME  VARCHAR (12),
  CNTCODE  INTEGER      NOT NULL REFERENCES COUNTRIES
);
CREATE TABLE DEPTS (      -- departments
  CODE     INTEGER      PRIMARY KEY,
  TITLE    VARCHAR (12),
  LOC      INTEGER      REFERENCES CITIES,
  MGR      INTEGER      -- REFERENCES EMPS
);
CREATE TABLE EMPS (       -- employees
  ID       INTEGER      PRIMARY KEY,
  FNAME    VARCHAR (12),
  DEPT     INTEGER      REFERENCES DEPTS,
  LOC      INTEGER      REFERENCES CITIES,
  SALARY   DECIMAL (8,2)
);
ALTER TABLE DEPTS ADD FOREIGN KEY (MGR) REFERENCES EMPS;
```

6. List department title and its manager name. If the department does not have a manager, just write 'No Manager'.

   SELECT d.title, coalesce(m.fname, 'No Manager')
   FROM emps e
   RIGHT JOIN depts d ON e.id = d.mgr;

7. List all city name, country name, and the number of departments in that city/country. If there is no department in that city/country, write 0.

   SLECT c.citname, co.cntname, count(d.code)
   FROM depts d
   RIGHT JOIN cities c ON c.citcode = d.loc
   JOIN countries co ON c.cntcode = co.cntcode
   GROUP BY c.citname, co.cntname;

8. List the country name and the number of departments in that country (including the country that has no departments). Show the answers in descending order of the number of departments and then ascending order of the country name.

   SELECT ct.cntname, count(d.code)
   FROM depts d
   RIGHT JOIN cities c ON c.citcode = d.loc
   JOIN countries co ON c.cntcode = co.cntcode
   GROUP BY co.cntname
   ORDER BY count(d.code) DESC, co.cntname;

9. List all employee names and their department's titles. If there is no employee or no department, just write 'No Employee' for that department or 'No Department' for the employee.

```
SELECT e.fname, coalesce(d.titlte, 'No Department')
FROM emps e
LEFT JOIN depts d ON e.dept = d.code
UNION
SELECT coalesce(e.fname, 'No Employee'), d.titlte, 'No Department'
FROM emps e
RIGHT JOIN depts d ON e.dept = d.code;
```