UNIVERSITY OF WESTMINSTER

5COSC002W DATABASE SYSTEMS

2021-2022 Tutorial 05

Querying Relational Databases – Join SQL Queries

Model Answer

Case Study

Carefully consider the **Logical ERD** shown below for the ***MegaFirm*** organisation (figure 1)**.**

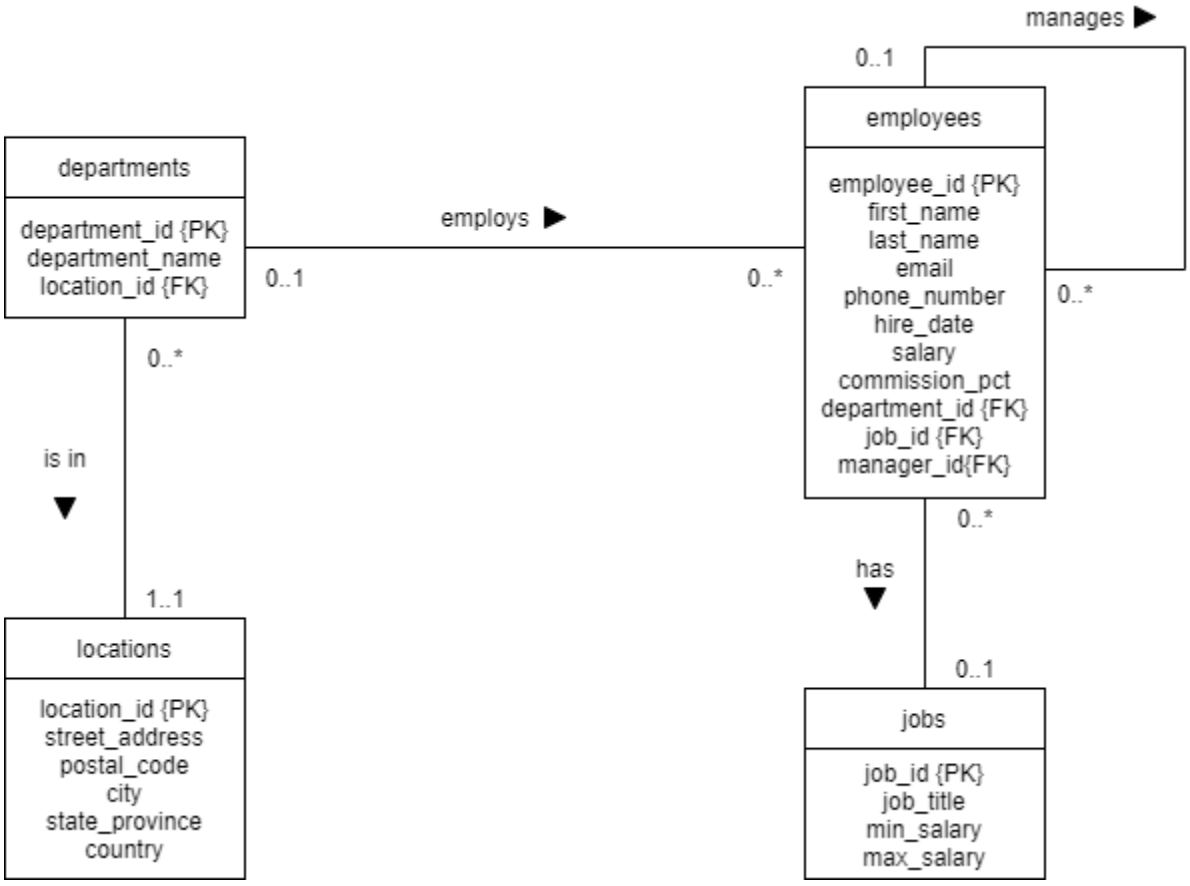

Figure 1: MegaFirm Logical ERD

Tutorial 05 Task 01: Accessing an IDE and MySQL via PHPMyAdmin

Simple reminder of how to open an IDE and access PHPMyAdmin to interact with MySQL and write your SQL queries.

1.1. Access an IDE.

- Access AppsAnywhere on https://appsanywhere.westminster.ac.uk and locate your preferred IDE (code editor) to write your SQL statements.
- You can choose any from the following list among others: Notepad++, Atom, Brackets, Visual Studio Code, Programmer's Notepad or Emacs.
- For more info, see https://support.ecs.westminster.ac.uk/w/index.php/Title:Text_Editors

1.2. Access the MySQL DBMS (via the PHPMyAdmin admin tool).

- Go to https://support.ecs.westminster.ac.uk/mysql/index.php to authenticate yourself and generate your MySQL database account details (you may need to enter your University login details first to access it).
- Access phpMyAdmin on https://phpmyadmin.ecs.westminster.ac.uk/ and enter the MySQL database account details just generated.
- Access your default database by clicking on your database name on the left hand-side.
- For more info, see the 'Database Systems Module Software Guide' accessible on Blackboard

Tutorial 05 Task 02: Creating and Populating the MegaFirm Tables in MySQL

Simple reminder of how to create and populate the tables for MegaFirm, as covered in Tutorial 04.
If you already have created and populated the locations, departments, employees and jobs table, please skip this task.

2.1 Access and run the table creation and population SQL script from Blackboard

- If you have not done already, get the "Tutorial 04 – SQL Tables Script" under 'Learning Resources and 'Section 02 – SQL'.
- Open the script in your IDE and copy and paste the code in the SQL area of phpMyAdmin (2nd tab 'SQL') and run it by clicking on "Go".
- Alternatively, import the script (6th tab 'Import') and execute it.

2.2. Check the structure and content of your MegaFirm Database

- You should see your tables as successfully created appearing in the list of tables on the left hand-side.
- Click on the 'Structure' tab at the top to verify the structure of the table.
- Click on the 'Browse' tab at the top to verify the content of the table.

Tutorial 05 Question 01

Write a query that displays a list of department names alongside the cities and countries where these departments are located, for all departments in Cambridge.

```
SELECT d. department_name, l.city, l.country
FROM locations l JOIN departments d
ON l.location_id =d.location_id
AND l.city ='Cambridge';
```

Tutorial 05 Question 02

Write a query that displays a list of department names alongside the full names and salaries of the employees who work in those departments, but only for the employees who earn more than 45K and for the departments whose name start with the letter M. To avoid the issue of the capitalisation of the letter M, use UPPER to convert from lower-case to upper-case.

```
SELECT e.first_name, e.last_name, e. salary, d. department_name
FROM employees e JOIN departments d
ON d.department_id =e.department_id
AND e.salary>=45000
AND UPPER(d. department_name) LIKE UPPER('m%');
```

Tutorial 05 Question 03

Display a list of countries, cities, department names alongside the full names and salaries of the members of staff who work in those departments and cities. Do this for staff that were either hired after 2 March 2015 or who earn less than £46000. Order your output by country, city, and department name.

```
SELECT l.country, l.city, d. department_name, e.first_name, e.last_name, e.salary
FROM  employees e
JOIN  departments d     ON d.department_id=e. department_id
JOIN  locations l ON l.location_id =d.location_id
AND   (e.hire_date >= '2015-03-02' OR e.salary < 46000)
ORDER BY l.country, l.city, d.department_name;
```

Tutorial 05 Question 04

Write a query that displays a list of departments alongside the full names, hire dates and salaries of the employees who work in those departments but only for the employees whose surname starts with a P and those employees whose surname starts with a S.

```
SELECT e.first_name, e.last_name, e.hire_date, e.salary, department_name
FROM departments d JOIN employees e
ON d.department_id =e.department_id
AND (e.last_name LIKE 'P%' OR e.last_name LIKE 'S%');
```

Tutorial 05 Question 05

Write a query that displays a list of IDs, first names and surnames of the employees who manage other employees with the IDs, first names and surnames of the employees that they manage. Rename the headers of the columns related to the managers and the columns related to the employees to differentiate between them by using aliases.

```
SELECT m.employee_id AS "Mgr Id ", m.first_name AS "Mgr F Name ", m.last_name AS "Mgr L
Name ", e.employee_id AS "Emp Id", e.first_name AS "Emp F Name ", e.last_name AS "Emp L
Name "
FROM employees m JOIN employees e
ON m.employee_id = e.manager_id;
```

Tutorial 05 Question 06

Modify the previous query to output only one column displaying the details of the managers and their respective employees. For every employee, this column should display something like “Jenny Bloggs (ID: 1234) manages John Smith (ID: 5678)”. Give it an appropriate header like “Management Report”.

```
SELECT  CONCAT(m.first_name,'  ',  m.last_name,'  (ID:  ',m.employee_id,')  manages  ',
e.first_name,' ', e.last_name,' (ID: ', e.employee_id, ')')
AS " Management Report"
FROM employees m JOIN employees e
ON m.employee_id = e.manager_id;
```

Tutorial 05 Question 07

Write a query that displays a list of employee surnames, salaries and job roles for those employees who work in the IT department.

Answer 1:

```
SELECT e.last_name, e.salary, j.job_title, d.department_name
FROM departments d
JOIN employees e  ON d.department_id = e.department_id
JOIN jobs j       ON j.job_id=e.job_id
AND d.department_name='IT';
```

Answer 2:

```
SELECT e.last_name, e.salary, j.job_title, d.department_name
FROM departments d
JOIN employees e  ON d.department_id = e.department_id
JOIN jobs j       ON j.job_id=e.job_id
AND d.department_name LIKE'%IT%';
```

Tutorial 05 Question 08

Write a query that displays a list of employee surnames, first names, salaries, job roles with the names of the departments where they work and the cities and countries where these departments are located.

```
SELECT e.last_name, e.first_name, e.salary, j.job_title, d.department_name, l.city,
l.country
FROM locations l
JOIN departments d      ON l.location_id=d.location_id
JOIN employees e        ON d.department_id = e.department_id
JOIN jobs j             ON j.job_id=e.job_id;
```

Tutorial 05 Question 09

Write a query that displays a list of employee surnames, salaries, job roles, hire dates and their department names and cities for those employees who work in London, who were hired before the 25th April 2019 and whose salary is not between 40,000 and 50,000.

```
SELECT e.last_name, e.salary, e.hire_date, j.job_title, d.department_name, l.city
FROM locations l
JOIN departments d      ON l.location_id=d.location_id
JOIN employees e        ON d.department_id = e.department_id
JOIN jobs j             ON j.job_id=e.job_id
AND (l.city='London' AND e.hire_date < '2019-04-25')
AND (e.salary < 40000 or e.salary > 50000);
```

Tutorial 05 Question 10

Write a query that displays a list of employee surnames, salaries, job roles and department names along with the surnames, salaries, job roles and department names of those staff who manage them.

```
SELECT e.last_name, e.salary, je.job_title, de.department_name,
         m.last_name, m.salary, jm.job_title, dm.department_name
FROM employees e
JOIN jobs je            ON je.job_id = e.job_id
JOIN departments de     ON de.department_id = e.department_id
JOIN employees m        ON m.employee_id = e.manager_id
JOIN jobs jm            ON jm.job_id = m.job_id
JOIN departments dm     ON dm.department_id = m.department_id;
```

Tutorial 05 Question 11

Write a query that displays a list of departments alongside the full names, hire dates and salaries of the employees who work in those departments. To this list add the names of the departments who do not have any employees.

```
SELECT e.first_name, e.last_name, e.hire_date, e.salary, d.department_name
FROM departments d LEFT OUTER JOIN employees e
ON d.department_id = e.department_id;
```

Tutorial 05 Question 12

Write a query that displays a list of departments alongside the full names, hire dates and salaries of the employees who work in those departments. To this list add the names of the employees who do not work in a department.

```
SELECT e.first_name, e.last_name, e.hire_date, e.salary, d.department_name
FROM departments d RIGHT OUTER JOIN employees e
ON d.department_id = e.department_id;
```

Tutorial 05 Question 13

Write a query that displays the surnames and salaries of employees who have jobs and their job titles. To this list, add the employees who do not have jobs and the jobs for which there are no employees who have these jobs.

```
SELECT e.last_name, e.salary, j.job_title
FROM
employees e LEFT OUTER JOIN jobs j
ON j.job_id = e.job_id
UNION
SELECT e.last_name, e.salary, j.job_title
FROM employees e RIGHT OUTER JOIN jobs j
ON j.job_id = e.job_id;
```