UNIVERSITY OF WESTMINSTER🎓

5COSC020W DATABASE SYSTEMS
2022-2023 Tutorial 05
Querying Relational Databases – Simple SQL Queries
Model Answer

Case Study

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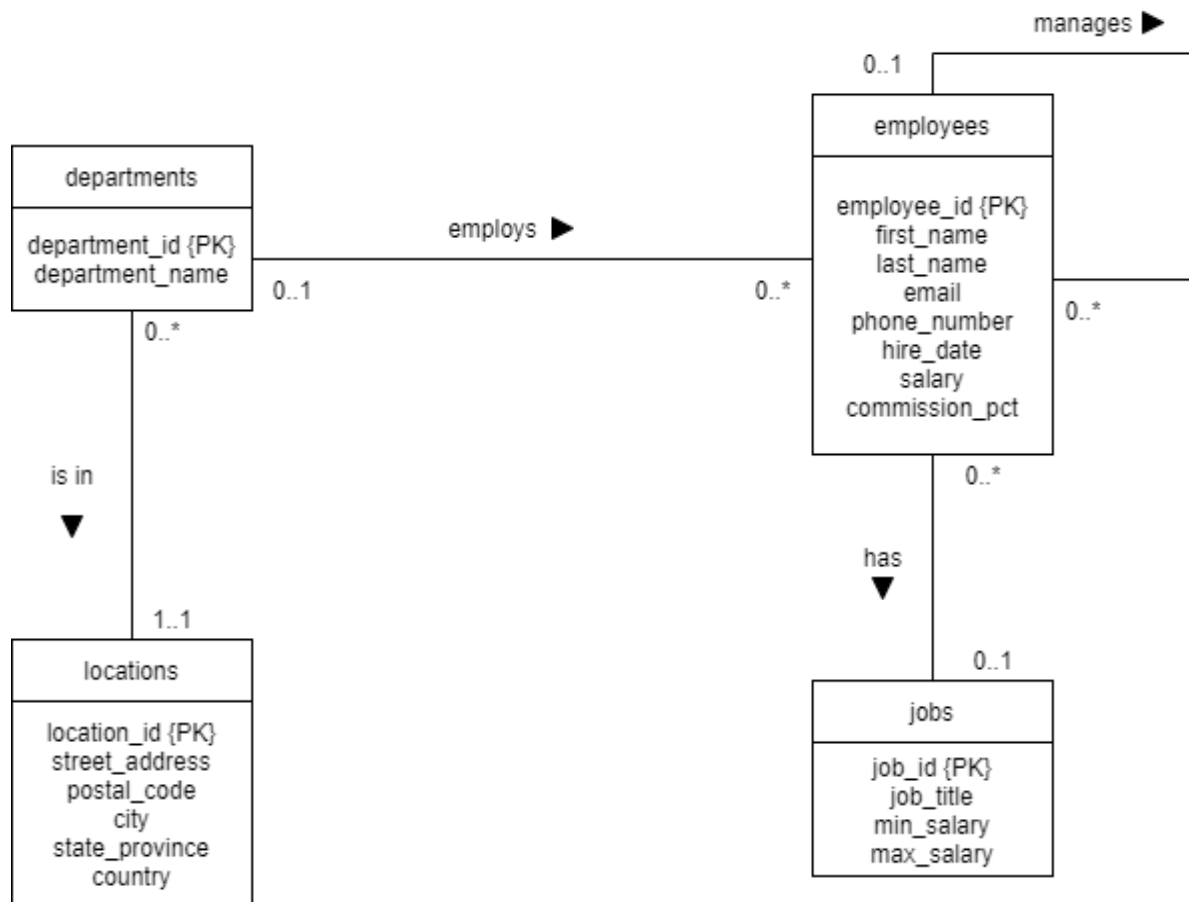

Figure 1: MegaFirm Conceptual ERD

Tutorial 04 Task 01: Logical Mapping

Quickly map this conceptual EERD into a full **logical ERD (i.e. a relational schema)**.

- To do this, resolve all the relationships one by one and derive the associated relations (i.e. tables) with all the attributes, primary keys and foreign keys. Your solution should consist of a complete logical ERD.

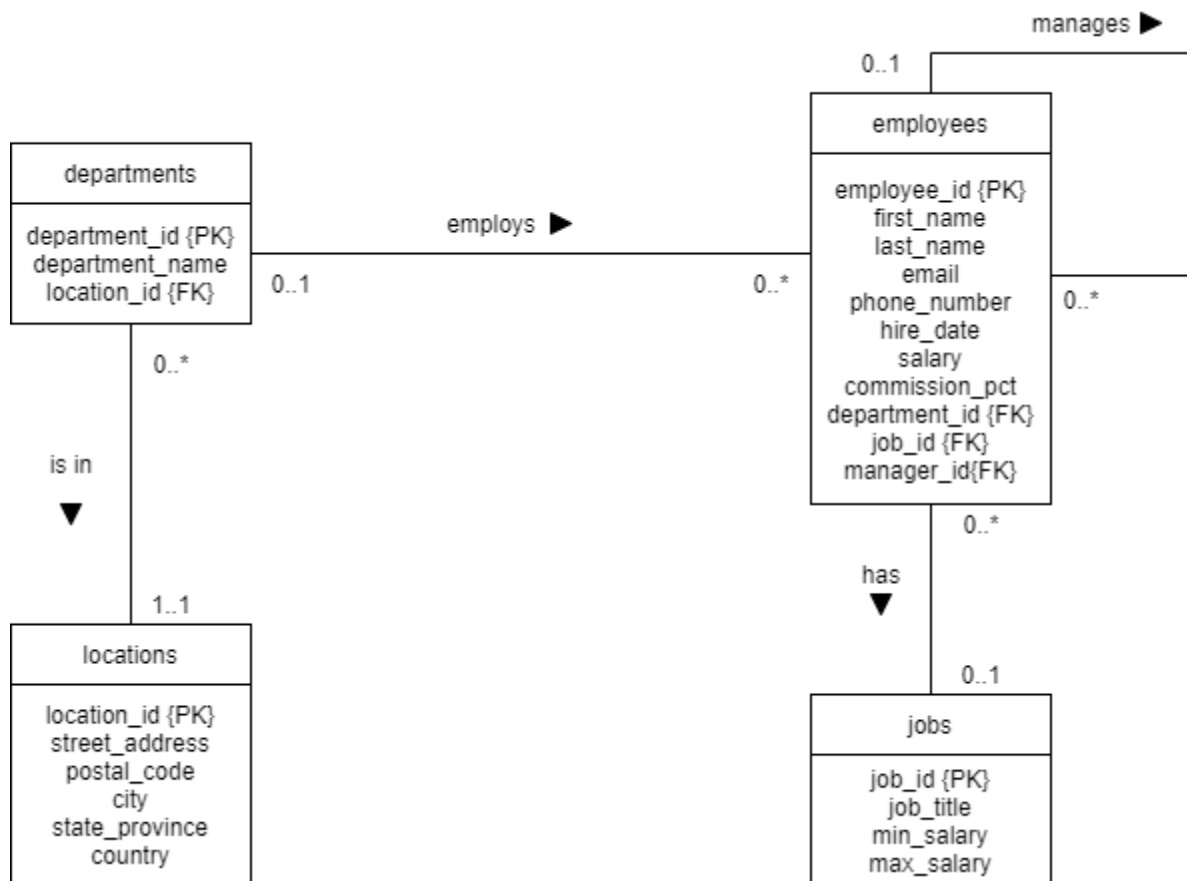- Create your logical ERD using draw.io, export your ERD as a PNG and insert it below.

Figure 2: MegaFirm Logical ERD

Tutorial 04 Task 02: Accessing an IDE and MySQL via PHPMyAdmin

2.1. 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

2.2. 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

Follow Instructions

Tutorial 04 Task 03: Creating and Populating the MegaFirm Tables in MySQL

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

- 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.

3.2. 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.

   Follow Instructions

Tutorial 04 Question 01

1.1. Write a simple SQL query to display the content of the employees table.

```
SELECT *
FROM   employees;
```

1.2. Write a simple SQL query to display the content of the departments table.

```
SELECT *
FROM   departments;
```

1.3. Write a simple SQL query to display the employee number, last name, job code, hire date and department id for each employee.

```
SELECT employee_id, last_name, job_id, hire_date
FROM employees;
```

1.4. Write a simple SQL query to display the department id and department name for each department.

```
SELECT department_id, department_name
FROM departments;
```

Tutorial 04 Question 02

2.1. Create a query that displays the last name and salary of employees earning more than £45,000.

```
SELECT  last_name, salary
FROM    employees
WHERE   salary >= 45000;
```

2.2. Modify this query to display the last name and salary for all employees whose salary is not in the range of £47,000 to £57,000.

```
SELECT    last_name, salary
FROM      employees
WHERE     salary < 47000 OR salary > 57000;
```

Or

```
SELECT    last_name, salary
FROM      employees
WHERE     salary NOT BETWEEN 47000 AND 57000;
```

2.3. Create a query that displays the last name, hire date and department id of employees called Matos.

```
SELECT    last_name, hire_date, department_id
FROM      employees
WHERE     last_name = 'Matos';
```

Or

```
SELECT    last_name, hire_date, department_id
FROM      employees
WHERE     last_name LIKE '%Matos%';
```

2.4. Create a query that displays the last name, hire date and salary of employees hired after 1st January 2016.

```
SELECT    last_name, hire_date, salary
FROM      employees
WHERE     hire_date >= '2016-01-01';
```

Tutorial 04 Question 03

3.1. Create a report to display the last name, job id, and start date for the employees with the last names of Matos and Taylor. Order the query in ascending order by start date.

```
SELECT    last_name, job_id, hire_date
FROM      employees
WHERE     last_name IN ('Matos', 'Taylor')
ORDER BY hire_date;
```

Or

```
SELECT    last_name, job_id, hire_date
FROM      employees
WHERE     last_name ='Matos' or last_name = 'Taylor'
ORDER BY hire_date;
```

3.2. Create a query to list the last name, salary and department ids for employees who earn between £37,000 and £57,000 and are in department 20 or 40. Label the columns Employee, Yearly Salary, and DepId respectively.

```
SELECT    last_name "Employee", salary "Yearly Salary", department_id "DepId"
FROM      employees
WHERE     salary  BETWEEN 37000 AND 57000
AND       department_id IN (20, 40);
```

Or

```
SELECT     last_name "Employee", salary "Yearly Salary", department_id "DepId"
FROM       employees
WHERE      (salary  >= 37000 AND salary <= 57000)
AND        (department_id = 20 OR department_id = 40);
```

3.3. Create a query to list the last name, job id, hire date and salary of employees who work in department 40 and who earn more than 41000 as well as those who work in the same department and were hired before the 15th February 2016.

```
SELECT     last_name, job_id, salary, hire_date, department_id
FROM       employees
WHERE      department_id = 40
AND        (salary > 41000
OR         hire_date <'2016-02-15');
```

Or

```
SELECT     last_name, job_id, salary, hire_date, department_id
FROM       employees
WHERE      (department_id = 40 AND salary > 41000)
OR         (department_id = 40 AND hire_date <'2016-02-15');
```

Tutorial 04 Question 04

4.1. Create a query to display all employee last names in which the third letter of the name is a.

```
SELECT     last_name
FROM       employees
WHERE      last_name LIKE '__a%';
```

4.2. Create a query to display the last name of all employees who have both an a and an t in their last name.

```
SELECT     last_name
FROM       employees
WHERE      last_name LIKE '%a%'
AND        last_name LIKE '%t%';
```

4.3. Create a query that displays the last name and hire date for all employees who were hired in 2014.

```
SELECT     last_name, hire_date
FROM       employees
WHERE      hire_date LIKE '%2014%';
```

Or

```
SELECT     last_name, hire_date
FROM       employees
WHERE      hire_date BETWEEN >= '2014-01-01' AND '2014-12-01';
```

Or

```
SELECT     last_name, hire_date
FROM       employees
WHERE      hire_date >= '2014-01-01' AND hire_date <= '2014-12-01';
```

Tutorial 04 Question 05

5.1 Create a query to display the last name, job id, and salary for all employees whose job id is 902 or 903 and whose salary is not equal to £35000, £41000, or £51000.

```
SELECT    last_name, job_id, salary
FROM      employees
WHERE     job_id IN (902,903)
AND       salary NOT IN (35000, 41000, 51000);
```

Or

```
SELECT    last_name, job_id, salary
FROM      employees
WHERE     (job_id = 902 OR job_id = 903)
AND       (salary <> 35000 AND salary <> 41000 AND salary <> 51000);
```

5.2 Create a query to display the last name, job id, salary, hire date for all employees for which, either their job id is 909 or 911 and their salary is less than 45000, or they were hired before 3rd March 2017 and their last names contains the letter 'o' as the one letter before last.

```
SELECT    last_name, job_id, salary, hire_date
FROM      employees
WHERE     (job_id IN (909,911)AND salary<45000)
OR        (hire_date<'2017-01-03' AND last_name LIKE '%n_');
```