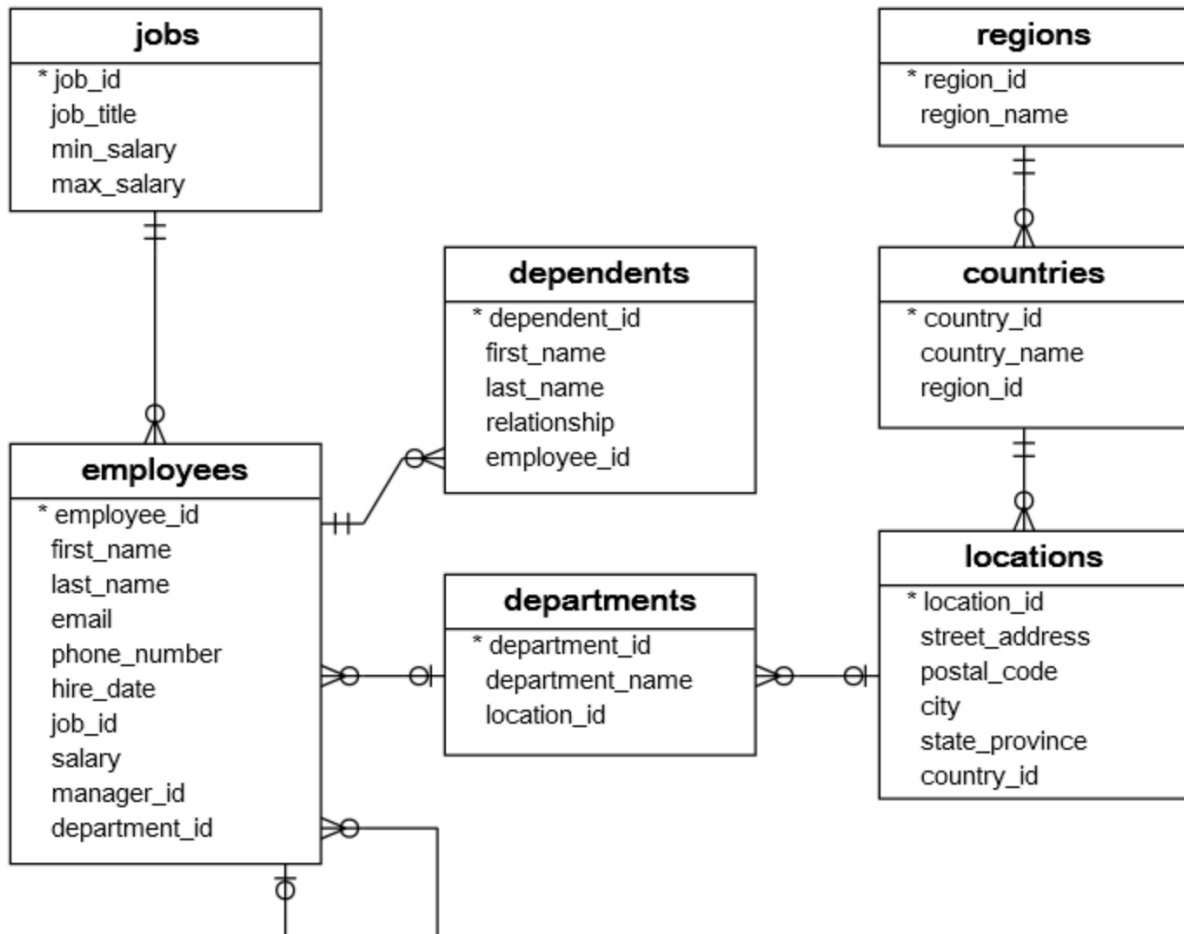


# Last Homework and Final Preparation

You can submit this homework before May 8th. It will replace the lowest homework score. If you submit SQL problems, paste MySQLWorkBench images of the query and the answers into your solution.

## Final Preparation:

Create a schema HR in MySQL work-bench on your computer. Use the sql scripts provided on the website in order to create the tables and the data of HR. Bring this computer to the final.



## **Problem 1:**

Your company creates a new department “AppDev” with offices located in 100 Avda Leonardo da Vinci, Punta del Este, Maldonado, Republica Oriental del Uruguay and location identifier 3200.

On June 1 2023, it hires

- Leonardo Lima as CIO, a new job with salaries between 5000 and 10000, at a salary of 7500 with Stephen King as manager.
- Julio Tejera as programmer with salary 5000.
- and Marcos Robello as administrative assistant with salary 4000.

Leonardo Lima has three children, Mauricio, Fernando, and Mercedes.

Do this in a single, composite statement, ensuring that foreign key relationships are maintained.

## **Problem 2:**

Find the average salary of programmers (after the insertions).

## **Problem 3:**

Find the maximum salary for each job-title.

## **Problem 4:**

Find the employee with the most dependents.

## **Problem 5:**

Find all departments where the maximum salary is smaller than 8000.

## **Problem 6:**

Create a stored procedure that given a department name returns the average salary of the employees belonging to this department.

## **Problem 7:**

Create a function “importance” that takes as input the last name of a manager and returns the sum of the salaries of the employees reporting to this manager.

## **Problem 8:**

Given a database table  $T(A,B,C,D,E,F)$  with FDs  $A, B \rightarrow C$ ;  $A, B \rightarrow E$ ;  $C, D \rightarrow E$ ;  $F \rightarrow A$ ;  $F \rightarrow B$ , determine the closure of all sets of attributes with one or two attributes. There are  $\binom{6}{1} + \binom{6}{2} = 6 + 15 = 21$  such sets. Determine whether one of these sets forms a key.

### Problem 9:

Given  $R(A,B,C,D,E)$  with FDs  $A, B \rightarrow C$ ;  $A, B \rightarrow D$ ;  $E \rightarrow D$  determine whether the relation is in BCNF and if not, decompose it.

### Problem 10:

Given the following histories decide (with proof) for each one whether it is serializable (equivalent to a serial schedule) or not.

$r_1(x)r_2(x)w_2(x)r_3(x)w_1(y)w_3(x)w_1(x)$

$r_2(z)r_1(x)r_1(y)w_2(z)w_1(x)w_1(y)w_2(x)$