Lab: Advanced SQL Queries

Preamble

We consider in this lab the database of some company. The schema of the database is as follows:

EMP(EID, ENAME, JOB, #MGR, HIRED, SAL, COMM, #DID) *MGR references EMP(EID)*
DEPT(DID, DNAME, DLOC)
MISSION(MID, #EID, CNAME, MLOC, ENDD)

Instructions

Download and run the SQL script provided on Campus in order to create and populate the database. Next, write in SQL the queries below. Run them against your database and check the results.

Guidelines

Here are some general rules to write SQL queries:

- When no specific attribute is requested, output them all (* character). Otherwise, output the requested attribute and these only, in the specified order.
- When performing some computation (+, string concatenation, etc.) in the select clause, rename the corresponding column for clarity.

1 Null values

1. Find the employees whose commission is specified (i.e. including 0.0 commissions).
2. Find the number of employees whose commission is specified (2 methods).
3. Find the number of employees whose commission is not specified (2 methods).
4. Find the lowest, average and highest commission over all the employees (nulls ignored).
5. Find the average commission over all the employees (nulls counted as 0.0).
6. Find the name and commission, expressed in Euro (1 € = $ 1.2) of all the employees.
7. Find the name and total salary (including commission) of all the employees.
8. Find the name of the company's top managers (i.e. who don't have a manager).
9. Find the employees whose commission is less than 25% (nulls excluded).
10. Find the employees whose commission is less than 25% (nulls counted as 0.0).

2 SQL92 Join Queries

Please answer the following questions using SQL92 joins only.

1. Display (a) the product of tables EMP and DEPT, (b) the theta-join of EMP and DEPT on DID, and (c) the natural join of EMP and DEPT. Compare the schema and the population of the resulting tables.
2. Find the name and the department of the employees who work in New-York.
3. Find the name of the employees who did a mission in the city they work in.
4. Find the name of the employees along with the name of their manager.
5. Find the name of the employees who have the same manager as Allen.
6. Find the name and hire date of the employees who were hired before their manager; also display the manager's hire date.
7. Find the name of the employees in the Sales department who were hired the same day as an employee in the Research department.
8. Find the departments that do not have any employee.
9. Find the name of the employees with the highest salary.
10. Find the name of the employees who were hired before *all* the employees of the Accounting department.

3 Subqueries

For each question below, please indicate whether you are using a standalone or a correlated subquery.

1. Find the employees with the highest salary (2 methods).
2. Find the employees who earn less than all managers (2 methods).
3. Find the employees who earn more than some analyst (2 methods).
4. Find the employees who work in the Research or Sales departments.
5. Find the departments without any employee (3 methods).
6. Find the departments with at least 3 employees.
7. Find the name of the employees who did a mission.
8. Find the employees who did a mission in the city they work in.
9. Find the employees who did a mission in the same city Blake did a mission.
10. Find the employees who did a mission in all the cities listed in MISSION (2 methods).

4 Grouping

By default, MySQL allows you to write group-by queries that are illegal. Please make sure you answer the following questions with the ONLY_FULL_GROUP_BY mode activated:

```
set session sql_mode = 'ONLY_FULL_GROUP_BY' ;
```

This will force MySQL to adhere to standard SQL regarding goup-by queries.

1. For each employee who did at least one mission, display their ID and the number of missions they did.
2. For each employee who did at least one mission, display their name and the number of missions they did.
3. For each employee listed in EMP, display their name and the number of missions they did.
4. Find the number of employees each manager (i.e. an employee listed in the MGR column) manages, along with the manager's name.
5. For each department, display the name of the department, the number of employees and the highest salary in the department.
6. Find the average salary per department and per job, along with department and job names.
7. Find the highest of the per-department average salary (2 methods).
8. Find the departments with the highest of the per-department average salary.
9. Find the name of the departments with at least 5 employees and no salary less than 900.
10. Find the name of the departments with at least 5 employees and located in Chicago.

5 Miscellaneous

1. Find the departments with *no* employee earning less than 1,000.
2. Find the departments with *some* employees earning less than 1,000.
3. Find the departments with *only* employees earning less than 1,000.
4. Find the departments with *all* of the employees earning less than 1,000.
5. Find (a) the cities listed in tables DEPT or MISSION, (b) the cities listed in both DEPT and MISSION and (c) the cities listed in DEPT but not in MISSION.
6. For each city listed in DEPT or MISSION, display the city, the number of employees working in the city (DLOC), the number of employees who did a mission in the city (MLOC).
7. For each department and for each job listed in EMP, display the department's name, the job, and the number of employees in that department with that job.