Lab 5: Advanced SQL

CSL303: Database Management Systems

Objective

To gain proficiency in writing advanced SQL queries involving subqueries, date manipulation, set operations, and data modification. This lab uses a new database schema for a small company.

Setup

First, create the SQLite database from the provided SQL script. Run the following command in your terminal:

```
sqlite3 company.db < lab5_data.sql
```

This will create a file named `company.db` containing the schema and data for the exercises. To start querying, run:

```
sqlite3 company.db
```

Exercises

Part 1: Subqueries and Advanced WHERE clauses

1. Find the names of all employees who work in the 'Marketing' department.
2. Find the names and salaries of employees who earn more than the company's average salary.
3. Find the names of all employees who are assigned to 'Project Phoenix'.
4. Find the names of all employees who are **not** assigned to any project.
5. Find the names of employees who earn more than **any** employee in the 'Marketing' department.
6. Find the names of employees who earn more than **all** employees in the 'Marketing' department.

Part 2: Date Functions, NULLs, and Pattern Matching

1. Find the names and hire dates of all employees hired in 2023.
2. Find the names of all employees who do not have a manager.
3. Find the names of all employees whose last name is 'Smith' or 'Williams'.
4. Find all employees who were hired in the last 2 years from today's date.

Part 3: Correlated Subqueries and Set Operations

1. For each department, find the employee with the highest salary. List the department name, employee name, and salary.
2. Find the names of all employees who work in the 'Engineering' department but are not assigned to 'Project Neptune'.
3. **(Challenge)** Find the departments where the average salary is greater than the overall average salary of the entire company.

Part 4: DDL and DML

1. Add a new column named `email` of type `TEXT` to the `Employees` table.
2. Update the `email` for all employees in the 'Engineering' department. Set the email to be their name (lowercase, spaces removed) followed by `engineering.com`. For example, 'Alice Johnson' becomes 'alicejohnsonengineering.com'. (Hint: Use the `LOWER` and `REPLACE` string functions).
3. Create a new table called `HighEarners` with columns `emp_id` and `emp_name`. Insert into this table all employees who earn more than $95,000.