CCT College Dublin

Assessment Cover Page

Module Title:	Databases, Web Dev.
Assessment Title:	Data Manipulation and Validation
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Declaration

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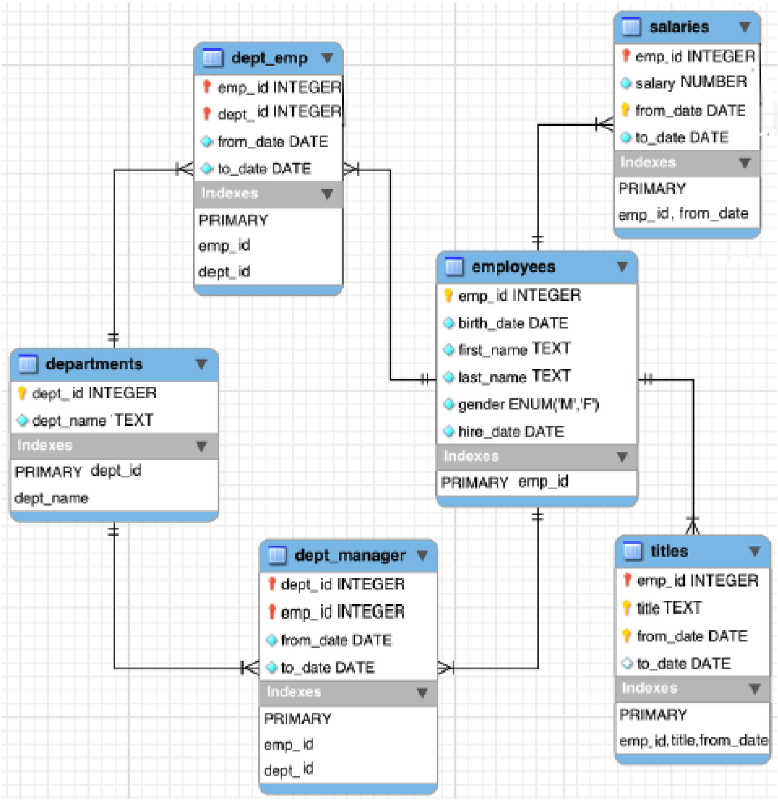
Assignment Introduction

In this assignment, the **employees sample database** (created by Fusheng Wang and Carlo Zaniolo at Siemens Corporate Research), a large base of data spread over six separate tables and consisting of 4 million records in total that was created for system testing purposes. The following diagram provides an overview of the structure of the **employees.db**:



employees.db Schema

1.1 Databases CA Part 1 (20%)

1. List all attributes present in the **departments** relation. [4 marks]
2. List all **employee IDs** of all past/current employees, their **first** and **last names**. [4 marks]
3. List all department **titles** present in the database. [4 marks]
4. List all **unique job titles** found in the database, and **order them alphabetically.** [4 marks]
5. List all past/current **employees' names ordered alphabetically** in ascending order, i.e. first name and last name in alphabetical order. [4 marks]

Answers

1. SELECT dept_id,dept_name FROM departmens
2. SELECT first_name,last_name FROM employees
3. SELECT dept_name FROM departments
4. SELECT * FROM titles GROUP BY title
5. SELECT first_name || ' ' || last_name as fullname FROM employees ORDER BY fullname ASC

1.2 Database CA Part 2 (40%)

1. The number of all employees that started on **1991-05-01**. [4 marks]
2. List all **emp_no** who have had strictly **more than 2 titles** and display **the total number of the titles** they
have had. [4 marks]
3. List **female employees** (past/current) together with all other relation attributes. [4 marks]
4. List past/current **employees** hired prior to **1986-01-01** with the surname **Simmel** [4 marks]
5. How many past/current **employees' last name** begins with the capital letter **B**?
Use a column alias **total with B** to output your results. [4 marks]
6. Create a new table called **emp_training** with 3 columns:
- **trainer_no**: this should be the primary key and is of type integer and is an auto-increment.
- **first_name**: this data type is **varchar(30)** and should not be **NULL**
- **last_name**: this data type is **varchar(30)** and should not be **NULL**
- **t_module**: this data type is **varchar(20)** [4 marks]

7. Insert 2 new rows into the **emp_training** table:

Row 1: fname: **Joe**
lname: **Bloggs**
module: **Google Docs**

Row 2: fname: **Fred**
lname: **Bloggs**
module: **Google Sheets**
[4 marks]

8. The organisation no longer wishes to record the employees training within the database. Therefore, delete the newly created **emp_training** table. [4 marks]
9. Alter the **employees** table to include an **email_address** field of type **varchar(20)**. [4 marks]
10. Update the email address of **Georgi Facello** to **gfacello@gmail.com**, where **emp_no** equals to **10001**.
[4 marks]

Answers

1. SELECT Count(emp_id) FROM employees WHERE hire_date = '1991-05-01'
2. SELECT emp_id,title,COUNT(title) as amountofCount From titles Group by emp_id HAVING amountofCount > 2
3. SELECT * from employees WHERE gender='F'
4. SELECT * from employees WHERE hire_date<'1986-01-01' and last_name='Simmel'
5. SELECT Count(emp_id) as totalwithB from employees where last_name like 'B%'
6. CREATE TABLE emp_training (trainer_no integer PRIMARY KEY AUTOINCREMENT,

first_name varchar(30) Not NULL,last_name varchar(30)NOT NULL,t_module varchar(20));

7. INSERT INTO emp_training (first_name,last_name,t_module) VALUES ('Joe','Bloggs','Google Docs');

INSERT INTO emp_training (first_name,last_name,t_module) VALUES ('Fred','Bloggs','Google Sheets');

8. DROP TABLE emp_training;
9. ALTER TABLE employees ADD email_address varchar(20);
10. UPDATE employees SET email_address="gfacello@gmail.com" WHERE emp_id=10001

1.3 Database CA Part 3 (40%)

1. List the number of male managers and female managers who work for each department. Make sure to display the gender, the number of employees (renamed as num_empGender) and dept_no, ordered by department number in an ascendant order. [4 marks]

2. List the average salary of male and female employees whose title is "Technique Leader". In your result table should appear, gender, average salary named as avg_salary and title. [4 marks]

3. The number of employees that have a current salary (i.e., **to_date** equals to **9999-01-01**) between **90000** and **90040**. [4 marks]

4. List all unique employees' last and first names (using **GROUP BY** method) that have a current salary (i.e., **to_date** equals to **9999-01-01**) greater than **90000**, outputting both names in descending order (sort by the last name first and then the first name) and also displaying their current salaries (using the **INNER JOIN** method). [4 marks]

5. First name, last name, all salary dates and related amounts for the employee with employee number **10012**. [6 marks]

6. In relation to the table named salaries in **Figure 1** above. Answer in text:

a) What is the **degree** of this table?

b) What column(s), if any, make(s) up the **primary key**?

c) What column(s), if any, make(s) up the **foreign key**? [6 marks]

7. In the given schema, the tables **dept_emp**, **dept_manager**, **salaries**, **titles** have **composite** keys. Explain for each relation why this is the case? Support your answer with appropriate references [12 marks]

Answers

1. SELECT d.dept_id, e.gender, COUNT(e.emp_id) AS num_empGender FROM departments AS d JOIN dept_manager AS dm ON dm.dept_id=d.dept_id JOIN employees AS e ON dm.emp_id=e.emp_id GROUP BY d.dept_id, e.gender ORDER BY d.dept_id ASC

2.SELECT e.gender, AVG(s.salary) AS avg_salary, t.title FROM employees AS e JOIN titles AS t ON e.emp_id=t.emp_id JOIN salaries AS s ON e.emp_id=s.emp_id WHERE t.title="Technique Leader" GROUP BY gender

3.SELECT COUNT(*) AS current_employees FROM employees AS e JOIN salaries AS s ON e.emp_id=s.emp_id WHERE CURRENT_DATE < s.to_date and s.salary > 90000 and s.salary < 90040

4.SELECT e.last_name, e.first_name, s.salary FROM employees AS e INNER JOIN salaries AS s ON e.emp_id=s.emp_id WHERE CURRENT_DATE < s.to_date and s.salary > 90000 GROUP by e.last_name, e.first_name ORDER by e.last_name DESC, e.first_name DESC

5.SELECT e.first_name, e.last_name, s.from_date, s.to_date, s.salary FROM employees AS e JOIN salaries AS s ON e.emp_id=s.emp_id WHERE e.emp_id=10012

6.The degree of the table is 4

The primary key is emp_id and from_date

The foreıgn key is emp_id.

7.At the same time we dont want to one employee should be a manager of two departmens.

SELECT Count(employees.emp_id) as total_no,title,first_name,last_name,employees.emp_id

from employees INNER join titles ON employees.emp_id=titles.emp_id

GROUP by employees.emp_id

GitHub Repository

All the materials we use can be accessed from this repo: GitHub Repo

References

1. https://github.com/googlearchive/code-prettify
2. https://codemirror.net/
3. https://getbootstrap.com/
4. https://www.geeksforgeeks.org/bootstrap/
5. https://www.w3schools.com/bootstrap/bootstrap_ver.asp
6. https://sql.js.org/#/
7. https://sql.js.org/examples/GUI/
8. https://stackoverflow.com/

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1. https://github.com/googlearchive/code-prettify
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