EE5178
112-2 Homework 3

End of lecture 6
20240404

Homework 3

Based on the ER model and relational database you built in Homework 1 and 2 , we design SQL statements to extract useful or interesting information in this homework. We will use 'MySQL Command line client - Unicode'. For your homework, please design:

Basic select

Write a SELECT statement on one table that contains three or more conditions connected by AND, OR, and NOT comparison operators. You must use AND, OR, NOT each at least once. (5%)

Basic projection

Write a SELECT statement on one table to show the effect of projection (show less attributes than there are attributes in the table.) (5%)

Basic Rename

Write a SELECT statement that selects some tuples from a table, and uses rename to make the names for all the attributes easier to read. (5%)

Equijoin

Write a SELECT statement that performs an equijoin between two tables. (5%)

Natural join

Write a SELECT statement that performs a natural join between two tables. (5%)

Theta join

Write a SELECT statement that performs a theta join between two tables which is not a equijoin. (5%)

- Hint: for the last 3 problems, you need clearly understand the definition of equijoin, natural join and theta join.

Three table join

Write a SELECT statement that performs joins among three tables. (5%)

Homework 3 (2)

Aggregate Write a SELECT statement that demonstrates aggregate functionality by using GROUP BY and MAX, MIN, and COUNT (5%)

Aggregate 2 Write a SELECT statement that uses aggregate with GROUP BY and HAVING clauses and AVG, SUM, and COUNT (5%)

IN Write a SELECT statement that uses IN operator and explicit set value (5%)

IN 2 Write a SELECT statement that uses IN operator and dynamic set value (5%)

Correlated nested query Write a SELECT statement that implements a correlated nested query using the IN operator (5%)

Correlated nested query 2 Write a SELECT statement that implements a correlated nested query using the EXIST operator (5%)

Correlated nested query 3 Write a SELECT statement that implement correlated nested query using the NOT EXIST operator. (5%)

- You are give the following two tables:

```
CREATE TABLE t1 (a INT, b INT);
INSERT INTO t1 VALUES ROW(4,2), ROW(3,4);
CREATE TABLE t2 (a INT, b INT);
INSERT INTO t2 VALUES ROW(1,2), ROW(3,4);
```

UNION Write a SQL statement to get the union of these two tables (5%)

Intersect Write a SQL statement to get the intersection of these two tables (5%)

Difference Write a SQL statement to get the difference of t1 and t2 (i.e. t1 - t2). (5%)

- Hint: You are responsible to find out how to do these correctly in MySQL

Homework 3 (3) - Advanced

For these problems, you may need to do research on MySQL documentation and think a little bit

Advanced

You are give the following tables:

```
CREATE TABLE student(ID INT, YEAR INT);
INSERT INTO student VALUES ROW(11, 3), ROW(12,3), ROW(13,4), ROW(14,4) ;
CREATE TABLE staff(ID INT, RANKING INT);
INSERT INTO staff VALUES ROW(15,22), ROW(16,23);
```

Write one single SQL statement to achieve the effect of outer union of these two tables. (10%)

Hint: You result should look like:

```
+------+------+---------+
| ID   | YEAR | RANKING |
+------+------+---------+
|   11 |    3 |    NULL |
|   12 |    3 |    NULL |
|   13 |    4 |    NULL |
|   14 |    4 |    NULL |
|   15 | NULL |      22 |
|   16 | NULL |      23 |
+------+------+---------+
```

- Write a SQL statement to print out all information for staff members who are not also students (5%)

Homework 3 (4)

- Note:
  - For you to get points for each problem in this homework, you need to make sure the result of each of your SQL statement is not an empty relation. For this, you may need to insert additional rows into your table. You do not need to show these insert statements in your homework submission. Just insert the necessary row to ensure that none of your statement result is empty.
  - If one of your SQL statement returns an empty relation, you will not get points for that problem, even if the syntax of your SQL statement is correct.
- Hint:
  - For your get good points for this homework, the best way is to ensure you fully understand the definitions of all related SQL operators, clauses, and commands before you start to solve each of your homework problems.
  - You can/should MySQL documentation for correct syntax of SQL statement

HW3 submission

- Deadline: **04/18 Thu. 23:59 (GMT+8)**
- File name: hw3_{student_id}.sql, **ex. hw3_r11012345.sql** (直接上傳sql檔)
- Submission: **NTU COOL 作業區**
- Delay
  - One day: original score * 0.8
  - More than two days: get no points (只能遲交一天)
- TA hour: Tue. 16:20-17:00 at BL113 (原教室)
- TA mail: ntudb2024.ta@gmail.com
- Teacher’s email: mllo2003@ntu.edu.tw

HW3 submission (others)

- 若因作業需求可以小幅更動，此次不用再將更動部份額外打成pdf，交程式碼即可
- 請參照NTU Cool 作業區之example.sql
- 請將SQL command 依照下列段落排列整齊，每段以註解開頭
- 程式碼不能跳error， 一個扣10 分
- 只要交程式碼,不需交執行結果