Joins, Physical Storage, BTREES November 17th, 2023

Lab Exercises

SQL Statements

SportsClub:

1. Which trainers that manage an area have a trainer‘s license? Display trainer name, area and licence.

2. Return a list of all trainers that teach at least one course. List needs to contain only trainer name. No duplicate names.

3. Return a list of all trainers that do not teach a course. List only to contain trainer name. No duplicate names

4. Which trainers teach more than 2 courses? Show trainer name, amount of courses they teach and whether they have a licence or not

5. Let us look at the family of Figaro who is a member himself and has two children in the Club: Display the names, DoB, age and gender of Figaro’s children. Also display the father’s name and father’s age.

6. What courses are the children of figaro enrolled in? Display a list with course number, course name and name of child

University Database:

1. Return the name of the professor that teaches ethics.

2. Display an enrollment list with stud.ID and student name, courseID and course title. Sort by student name ascending.

3. Which professor teaches what course(s)?
   Display only name of professor and course title.

4. Return a list that shows profID and profName of all professors and the number of courses they teach, between 0 and n. 0 for those that do not teach at all.

5. Let’s assume that the university has a School of Philosophy and the School of Philosophy has two professors: Sokrates and Kant. How many contact hours does the School of Philosophy teach? (That is the contact hours of Sokrates and Kant together.)?

6. What course(s) does courseID 5049 require as predeccessor course(s)? Display course ID(s) and course title(s)

7. Which students are together in course 5001? Show the student names

8. Display a list with IDs and names of all faculty (professors and assistants).

9. Display list with those students (stud.ID and student name) that take less than 8 contact hours.

Central Exercises

1. Natural Join (Sportsclub):
    a. Make sure that in table area the FK to table trainer and in table course the FK to table trainer have the same name, so that they can je joined with a natural join. area.trainerName=trainer.trainerName = course.trainerName

       Also, make sure that you have some courses that are not assigned to an area and some courses that do not have trainers.

    b. Run the natural join between table area and course.
    c. Run the 3 options using "using" Keyword. Which option is equivalent to the natural join? You get 3 different return tables.
    d. Write down the 3 queries that would output the 3 return tables of (c) .

2. ER model and mapping

A farm that does horse breeding stores the family trees of the horses in a database. The database stores the name of each horse, the DoB and gender and the name of the father and the name of the mother.

Do an ER model and map your model into a relational schema.

3. Index Statistics in mysql.innodb_index_stats: Explain the result tables of the following commands:

```
SELECT * FROM `innodb_index_stats`
where `database_name`= 'sportsclub' and `table_name` = 'member'

SELECT * FROM `innodb_index_stats`
where `database_name`= 'bank_test' and `table_name` = 'bank'
```

4. BTREE

Build a BTREE with the following keys. Add the keys in the given order into an initially empty BTREE. The BTREE has the order of 5.

Keys: 34, 1, 12, 3, 15, 6, 21, 13, 41, 20,16,4, 25, 10, 50