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Course Outline

Lectures

Timetable: Q slot in A-LH2

Syllabus

CSE-IITH UG Core Courses

1. Database Introduction
2. Relational Model
3. Basic SQL
4. Intermediate SQL
5. Database Design using ER Model
6. ~~Formal Relational Query Languages~~

Textbooks

Course Textbook

Database Systems Concepts, A. Silberschatz, H. Korth and S. Sudarshan, McGraw Hill, 7th Edition

Others

Database Management Systems, R. Ramakrishnan and J. Gehrke, 3rd Edition

Fundamentals of Database Systems, R. Elmasri and S. B. Navathe, Addison Wesley, 7th Edition

Database Systems: The Complete Book, H. Garcia, J. Ullman, J. Widom, 3rd Edition

Evaluation

Assignment: 40-50%

Exam: 50-60%

TAs

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Getting Started

Download and install the latest version of PostgreSQL from here. For interactions with the PostgreSQL server, you can use the command line client (psql) or the GUI client (pgadmin). See here documentation for how to use Postgres.

Download data from here. Use DDL.sql file to create the tables for the first time. Use DDL+DROP.sql if you wish to recreate the database after dropping existing tables. Use DATA.sql to insert data to your database. It contains random data about university academics as described in the textbook generated using a data generator. The file contains SQL insert statements to load data into all the tables, after first deleting any data that the tables currently contain.

After installing PostgreSQL, follow the following steps.

1. Add psql to your OS's PATH

2. Download the provided dataset to a folder. Using terminal or CMD move to the folder containing your dataset.

3. Login into PostgreSQL
   ```
   psql -U username
   ```

4. Create a database named univdb
   ```
   CREATE DATABASE univdb;
   ```

5. You can see the list of all databases by using the command: `\l`

6. Connect to the created database univdb by using the command: `\c univdb`

7. Create the tables using the given DDL file:
   `\i 'DDL.sql'`
   `\i 'DDL+DROP.sql'` (to delete and recreate the tables)

8. Insert data in the tables using the command
   `\i 'DATA.sql'`

9. Perform basic exploration of your data using commands such as:
   `\dt` (see tables)
   `\dt+` (see tables)

```
SELECT * FROM tablename;
SELECT COUNT(*) FROM tablename;
```

10. You can delete your database using the command

```
DROP DATABASE databaseName;
```

Assignment 1 [Due on 20/11/2023, 11:59 PM]

Instructions

1. This assignment must be done individually.
2. Total marks for this assignment is 100. Each question is worth 10 points.
3. Google classroom is set to not accept any submission after the deadline.
4. If we find cases of copying, then all those who are involved will be given either FR grade or 0 marks for the assignment. Please don't share your code or report with anyone.
5. Some useful commands:
    a. ORDER BY LIMIT

Exercises

1. Find the top-3 instructors who have have taught most number of distinct courses from
    a. Across all departments
    b. Statistics department

2. Print teaching record of the instructor who has the highest salary, showing the instructor department name, course identifier, course title, section number, semester, year and total enrollment. Sort your result by course_id, year, semester in ascending order.

3. Print history of the course with course_id = 362. For each offering of the course, print course id, course title, course department name, instructor name, number of registered students, section id, semester, year and timetable slot. Sort your result by year in descending order.

4. For the course_id 319 that was offered in 2003, find the count of out of department student registration.

5. Find top-3 students who have registered for the highest number of course credits. Order by total credits and name. Print student id, name, department and total credits (Compute it from the takes and course tables. Do not use tot_credit in the student table.)

6. Find the distinct set of courses that were not offered during 2003 and 2004. Print the course id and title. Sort your result by course id in ascending order.

7. Find the courses that were offered for the first time most recently in terms of year. Print the course id, title, instructor, year. Sort your result by course id in ascending order. [Find the most recent year when a course was offered for the first time. If there are more than one course offered that year for the first time, then print all of them.]

8. Find all the courses whose title has more than 15 characters and have a ‘sys’ as substring in the title. Consider case insensitive matching. 'sys', 'Sys', etc are all fine. Print the course id and title. Sort result by course id.

9. Find the department that offers the highest average salary to instructors.

10. Find all instructors who taught at most once in 2003. (Didn’t teach any course in 2003 or taught just one course in 2003). Print instructor id, name and department. Sort your result by instructor id.

How to submit?

- rollnumber_query.sql: SQL queries for exercises 1-10.
- rollnumber_report.pdf: SQL queries along with their outputs as a report.
- Upload the above 2 files in Google classroom. No need to zip them.