

Assignment 2

Aim

The objectives of this assignment include:

- Interpretation, analysis of conceptual schema to implement/modify structures in a relational database.
- Design and implementation of queries and data manipulations in SQL.

Task 1 (5 Marks)

Background

A private institute needs a database to maintain the records of diploma, module, lecturer, etc. The relational schemas are given as follow.

Diploma (code, name)

Primary key: (code)

Candidate key: (name)

Module (code, name, hours, fee)

Primary key: (code)

DipMod (dip-code, mod-code)

Primary key: (dip-code, mod-code)

Foreign key 1: (dip-code) references Diploma(code)

Foreign key 2: (mod-code) references Module(code)

Lecturer (emp-id, name, DOB, gender, email)

Primary key: (emp-id)

Candidate key: (email)

Specialty (emp-id, topic)

Primary key: (emp-id, topic)

Foreign key: (emp-id) references Lecturer(emp-id)

Below is the data dictionary.

Diploma

Attribute	Description	Remarks
code	Unique 5-character diploma code.	DipIT, DipBU, DipEN, etc.
name	Unique diploma name.	Diploma in Engineering, etc.

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Module

Attribute	Description	Remarks
code	Unique 4-character module code.	IT01, IT02, BU01, BU02, etc.
name	Module name.	Marketing, Project Management, etc.
hours	The number of teaching hours.	30 hours and above.
fee	The fee of the module.	

DipMod

Attribute	Description	Remarks
dip-code	Diploma which includes a module.	
mod-code	Module which is part of a diploma.	

Lecturer

Attribute	Description	Remarks
emp-id	Lecturer's employee ID.	E001, E002, etc.
name	Full name.	Low Ting Eng, James Ng, etc.
DOB	Birth date.	
gender		M or F
email	Email account provided by the school.	

Specialty

Attribute	Description.	Remarks
emp-id	Lecturer's employee ID.	
topic	Topic which the lecturer is specialized in.	Database, Machine learning, etc.

Requirements

- A) Based on the relational schemas, provide SQL statements to create the tables. You must choose an appropriate data type and length for each column. You must also include appropriate check constraints and foreign key constraints to ensure data integrity.
- B) To prepare for possible changes in the near future, the institute requests a set of ALTER Table statements to alter the table structure **without** dropping and re-creating the tables.

The changes are stated below.

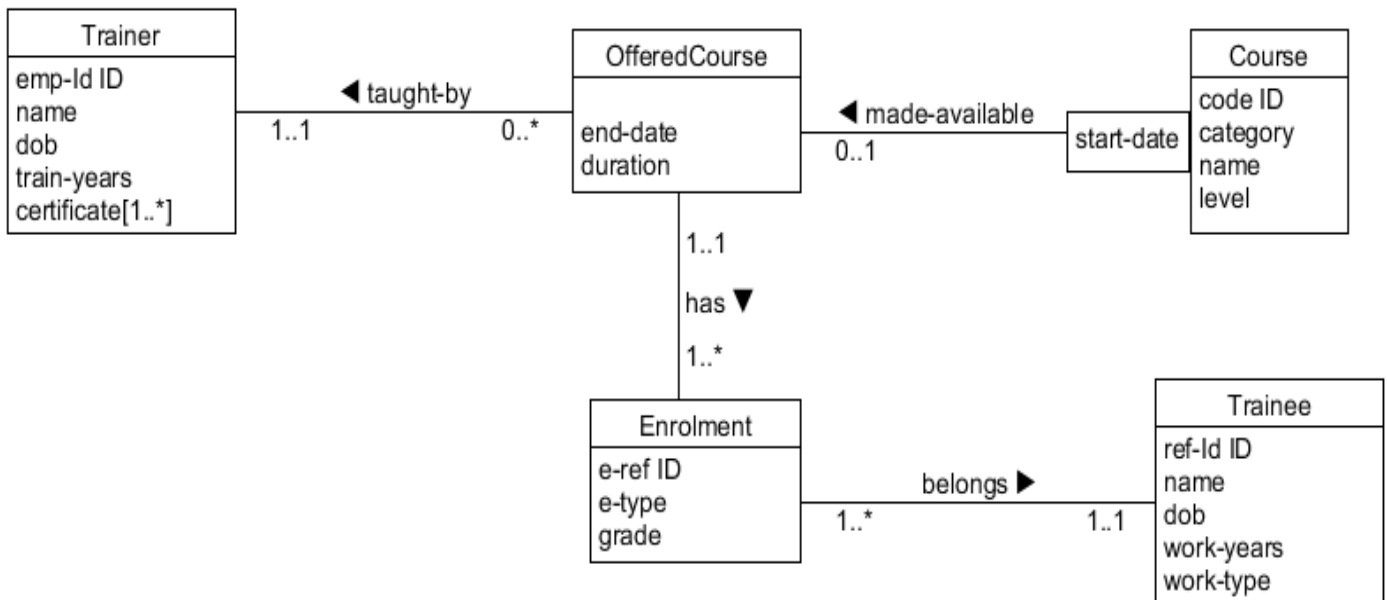
- Add a column called **head** to the **Diploma** table. The column serves as a foreign key to the **Lecturer** table.
- When a lecturer who is the head of a diploma leaves the institute and his record is deleted, **Diploma.head** must be set to null automatically.
- When a lecturer who is the head of a diploma changes his emp-id, **Diploma.head** must be updated automatically.

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Task 2 (5 Marks)

Background

A private training institute has employed you to research and implement SQL statements to support their data management operations. The institute offers a variety of short courses for the general public. The company's database also contains information about the trainers, trainees and the enrolment of the offered courses. A conceptual schema of the database is given below.



Please use the files: `A2dbcreate.sql` and `A2dbload.sql` to create the tables and load the records. You should study the statements in the script files as they hold important clues to guide you in your subsequent implementations of SQL statements.

Requirement

For each of the queries (A, B, C) below, use a *single* SELECT statement (join, subquery, derived column, etc.) to retrieve the records. You must not create temporary tables or views.

- A) Retrieve courses which have not been offered. For each record, display the following columns:
- code
 - category
 - name
 - level
- B) Retrieve trainers who have taught more than two times. For each record, display the following columns in descending order of train years.
- empld
 - name
 - dob
 - train years

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- C) Retrieve courses which were offered in the month of June (regardless of year). For each record, display the following columns:
- code
 - category
 - name
 - level

For each of the scenarios (D, E) below, provide a sequence of `INSERT`, `UPDATE`, `DELETE` statements to make the changes. You are not allowed to drop, re-create or alter (disable/enable) consistency constraints during the modifications.

- D) The management has recruited a trainer. Provide the SQL statements in the correct sequence to add the new trainer to the database.

Employee Id	T091
Name	Zha Teck
Date of birth	25 October 1985
Years of training	10
Qualification	Bsc Business MBA

- E) The management has decided to restructure the course on dessert (category). Provide the SQL statement to increase the course level by 1 for all the dessert courses.

Submission

- A) Please submit a single text file which contains the following:
- SQL statements to create the tables for task 1
 - SQL statements to alter the tables for task 1
 - SQL statements to retrieve the records for **task 2 together with the query results**
 - SQL statements to modify the records for task 2
- B) The SQL statements must be arranged in the correct sequence of execution so that the marker can execute them to create, alter the tables and modify the records.
- C) Please name your file as: <Your group>_<UOW ID>_<full name>.txt. For instance, T1_1234567_KangXi.txt.
- D) Late submission penalty (25% per day) will be applied regardless of the reasons: network delay, disconnection, etc. Therefore, you are advised to avoid peak submission period near the submission deadline.
- E) Re-submission (because of incorrect file included in the original submission) will be treated as late submission if it is submitted after the deadline.