Toronto Metropolitan University

CIND-110
Data Organization for Data Analysts

Assignment I
Design and Maintain Relational Databases

Assignment Context:

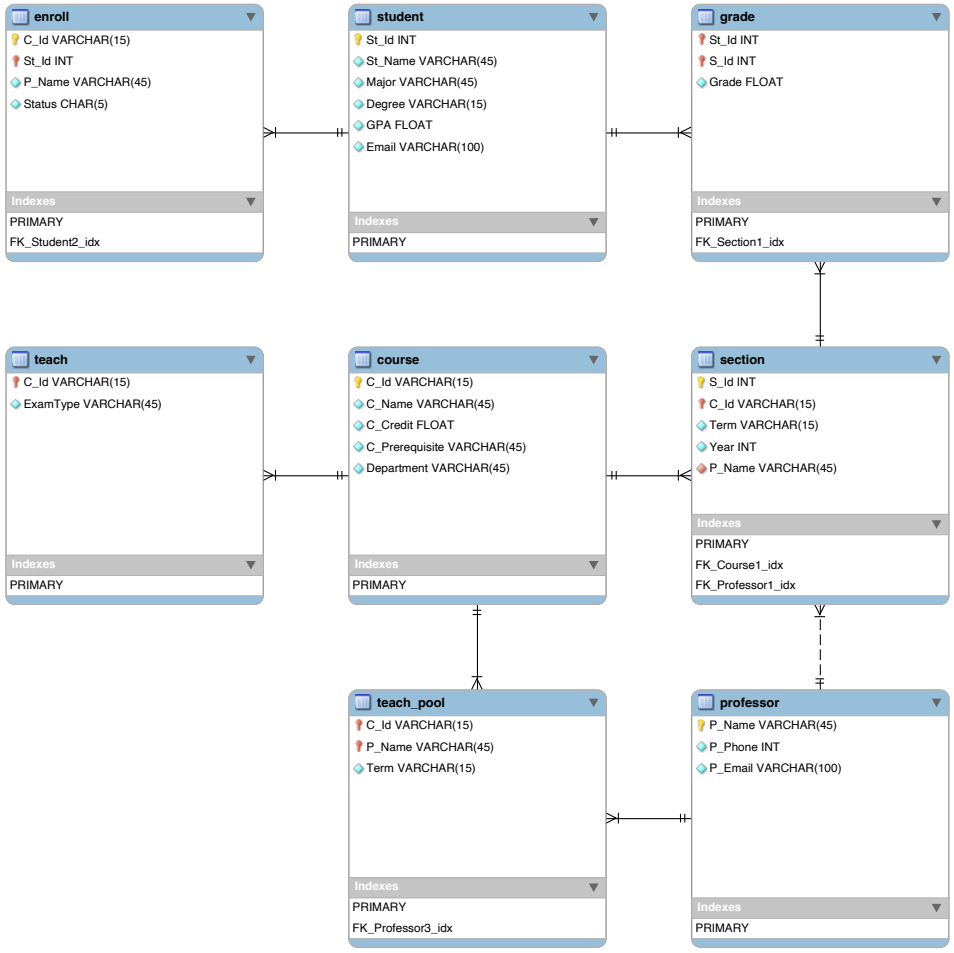
- A department would like to move its local servers to a computational cloud platform. The administration asked each unit DBA to secure the migration process of their respective databases to the new platforms.
- A data analyst is asked to extract and analyze some data from an existing database with an outdated logical model stored on a particular server.
- A data analyst needs to check the most recent logical model of the existing database to start extracting the required data.
- A department unit would like to maintain its local database with more information and ensure its alignment with the information on the main central database.

Starts: Wednesday, September 14, 2022, 11:59 PM
Due: Wednesday, October 19, 2022, 11:59 PM
This assignment counts for 15% of the total grade

General Instructions:

- This assignment aims to help you practice the forward/reverse engineering processes, and constructing/implementing basic and complex `MySQL` queries to retrieve data using the `RegistrarDB` dataset, that can be found as an `SQL` file on the course shell, under the `Assignment_1` tab.

- The design of the `RegistrarDB` database schema, including the names of entities, the data types of the attributes, and the types of the relationships, is shown in the following Entity-Relationship (ER) diagram.



- Download then execute the `RegistrarDB.sql` file using the `MySQL Workbench` tool to load the database to the remote desktop. Ensure saving every step of your work onto your Google Drive.

- Use the `MySQL Workbench` tool to define the *primary* and *foreign* keys, according to the ER diagram shown above, and that to describe the required entity and referential integrity constraints.

- For each relationship, specify the cardinality ratios and their directions: one-to-many, one-to-one, or many-to-many.

Part I: [**Total Points: 30**]

1. [**15 Pts.**] Use the `MySQL Workbench` tool to **reverse engineer** the whole database - including all the eight tables along with their cardinality ratios - into a logical data model, then save it as an `MWB` file.

2. [**15 Pts.**] Use the `MySQL Workbench` tool to **forward engineer** the generated logical data model, and save the output script, as an `SQL` file.

Part II: [**Total Points: 70**]

1. [**10 Pts.**] List the names, ids and major of students who are majored in Computer Engineering (CE)

2. [**10 Pts.**] List the grade of students who passed the course id 'CPS510' with this format:
`<StudentName StudentId SectionId CourseId Term Year ProfName Grade>`

3. [**10 Pts.**] List the student id, student name, course id and course name for all students enrolled in Fall 2021; sort the output in ascending order by student id

4. [**10 Pts.**] List the name, id, major, degree, and gpa of all students who have a GPA between 3.0 and 4.0 inclusively.

5. [**10 Pts.**] List the name of all Professors who can teach 'CIND110', from the Teach_pool table, along with the course id, but haven't taught the course, from the Section table

6. [**10 Pts.**] Create a View as 'Report_Winter_2022' from all attributes of potential Professors who will be available to teach in the Winter term along with their course ids, sort the output in ascending order based on names; Display Report_Winter_2022

7. [**10 Pts.**] Find the Minimum, Maximum, Average, Variance, and Standard deviation of the GPA of all students and display them.

What to submit?

Part I: [Total Points: 30]

1. **Submit** the generated logical data model in `MWB` format along with a screenshot either in `JPG` format. The logical model should represent all the database entities, attributes, keys, entity constraints, and referential integrity constraints.

2. **Submit** the output script in `SQL` format. The script should include the structure of the entities in addition to the data stored in these entities.

Part II: [Total Points: 70]

1. For each of the listed questions: Write your answer as an `SQL` query statement, take a screenshot of the execution results, then paste the answer and the respective screenshot into your assignment answer sheet with the question number.

2. **Submit** your answer sheet either in `PDF` or `DOCX` file format

How to submit?

Here is a link where you can find more details on submitting your work to the course shell. https://www.torontomu.ca/courses/students/tutorials/assignments/

This is the end of the assignment