

TORONTO METROPOLITAN UNIVERSITY

CIND-110 DATA ORGANIZATION FOR DATA ANALYSTS

Assignment I

Design and Maintain Relational Databases

Assignment Context:

- A department is planning to migrate its local servers to a computational cloud platform, and the administration has requested each unit's DBA to ensure the secure migration of their respective databases to the new platform.
- A data analyst has been tasked with extracting and analyzing some data from an existing database with an outdated logical model stored on a particular server.
- To extract required data, a data analyst needs to check the most recent logical model of the existing database.
- A department unit aims to maintain its local database with more information and ensure its alignment with the information on the main central database.

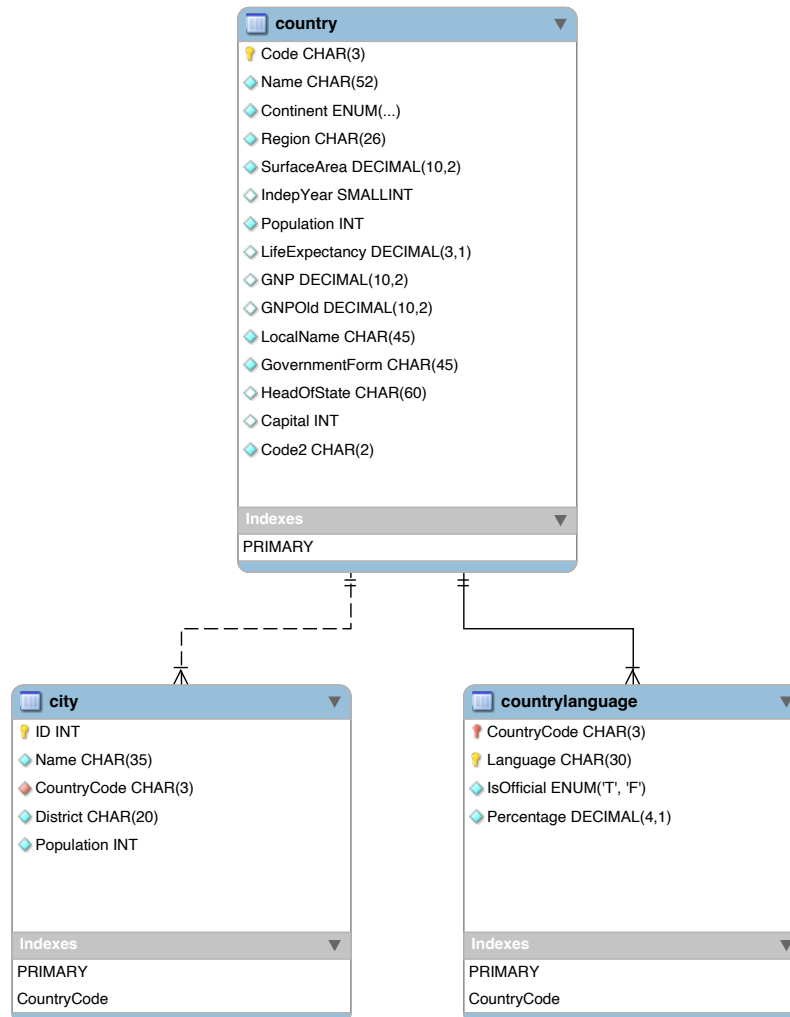
Starts: Saturday June 24, 2023, 11:59 PM

Due: Saturday 15, 2023, 11:59 PM

This assignment counts for 15% of the total grade

General Instructions:

- The aim of this assignment is to provide you with practical experience in the forward and reverse engineering processes, as well as constructing and implementing basic and complex queries using the WorldDB dataset. You can find the dataset as an SQL file under the **Assignment_1** tab on the course shell.
- The Entity-Relationship (ER) diagram below illustrates the design of the WorldDB database schema, including the names of the entities, the attribute data types, and the types of relationships.



- Download the WorldDB.sql file and execute it using the MySQL Workbench tool to load the database to your virtual desktop environment or local machine.
- Using the MySQL Workbench tool, identify and establish the primary and foreign keys based on the ER diagram provided above. Ensure you retain the entity and referential integrity constraints of the WorldDB database.
- After identifying the cardinality ratios and their directions for each relationship (whether they are one-to-many, one-to-one, or many-to-many), create them and synchronize the new ER model to the WorldDB database source.

Part I: [Total Points: 30]

• Question 1 [15 Pts.]

Use the MySQL Workbench tool to perform a **reverse engineering** process on the entire database, including the three tables and their cardinality ratios. Save the resulting logical data model as an MWB file and store it on your TMU Google Drive.

Notes

1. To **reverse engineer** the database, please follow the instructions provided in the official MySQL Workbench documentation at the following link:
<https://dev.mysql.com/doc/workbench/en/wb-reverse-engineer-live.html>
2. **Submission:** Submit the resulting logical data model in MWB format along with a screenshot in either JPG or PNG format. The logical model should represent all the database entities, attributes, keys, entity constraints, and referential integrity constraints.

• Question 2 [15 Pts.]

Use the MySQL Workbench tool to **export** the entire database and save the output script as an SQL file onto your TMU Google Drive.

Notes

1. To **export** data using MySQL Workbench, please follow the instructions provided in the official MySQL Workbench documentation at the following link:
<https://dev.mysql.com/doc/workbench/en/wb-admin-export-import-management.html>
2. **Submission:** 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]

Notes

- For each of the following 7 questions: Write your answer as a **MySQL** query statement, execute it, and take a screenshot of the results. If the query result has more than 10 records, limit the output to the top 10 before taking the screenshot. Then, paste the answer and the respective screenshot into a Word or Google document file with the question number.
- **Submission:** Submit your answer sheet for this part either in **PDF** or **DOCX** file format.

Questions

1. [10 pts.] Retrieve all country languages that are official and spoken in either Spain or France.
2. [10 pts.] Retrieve all country languages where the percentage of speakers is unknown (NULL).
3. [10 pts.] Retrieve all country languages that are spoken in countries where the official language is not English.
4. [10 pts.] Retrieve all country languages that are not official languages of any country.
5. [10 pts.] Retrieve all countries with their corresponding capital city and official language.
6. [10 pts.] Show the number of countries in each continent.
7. [10 pts.] Which cities have a population greater than the average population of their corresponding countries? List the cities along with their corresponding countries and populations in descending order of their populations.

Here is a link for more details on **how to submit your assignment** to the course shell:
<https://www.torontomu.ca/courses/students/tutorials/assignments/>

This is the end of the assignment