**Design and Maintain Relational Databases**

**Project 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• A data analyst has been tasked with extracting and analyzing some data from an existing database with an outdated logical model stored on a particular server.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.

**General Instructions:**

• The aim of this Project is to demonstrate 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 in this project repository.

• 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**

Question 1

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. The logical model should represent all the database entities, attributes, keys, entity constraints, and referential integrity constraints.

• Question 2

Use the MySQL Workbench tool to export the entire database and save the output script as an SQL file. The script should include the structure of the entities in addition to the data stored in these entities.

**Part II**

• 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.

Questions:

1. Retrieve all country languages that are official and spoken in either Spain or France.

2. Retrieve all country languages where the percentage of speakers is unknown (NULL).

3. Retrieve all country languages that are spoken in countries where the official language is not English.

4. Retrieve all country languages that are not official languages of any country.

5. Retrieve all countries with their corresponding capital city and official language.

6. Show the number of countries in each continent.

7. 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.