Concordia University
Dept. of Computer Science & Software Engineering

Comp 353- Databases
Warm-Up Project
Summer 2022

Title: A Simple database for the COVID-19 Non-Profit Health Organization

Maximum Mark: 6%

In this project, you and your group are required to develop a miniature database application system, described below, and evaluate a number of queries and transactions against the database. For this, you should use the faculty MySQL DBMS through the ID assigned to your group, which is a string of the form "xyc353_4 for some letters x and y. The Lab Instructors during the lab sessions will help you resolve possible problems you may have, for instance, connecting or interacting with the DB server.

Project Description

The application is to develop a database system to help a non-profit health organization to develop a system to help researchers, companies, and world population to keep track of the COVID-19 pandemic progress. The system is called Covid-19 Pandemic Progress System C19PPS. The system divides the world into six regions: Africa, Americas, Eastern Mediterranean, Europe, South-East Asia, and Western Pacific. Each region is composed of a set of countries.

For each country, the system maintains information of the total number of populations of the country, the total number of people died from COVID-19 virus, the total number of people who got vaccinated by each type of vaccination, the total number of people who got infected by the COVID-19 virus and have never been vaccinated, for each type of vaccines the total number of people who got vaccinated by that type of vaccine and still got infected by COVID-19 virus, and for each type of vaccines the total number of people who got vaccinated by that type of vaccine and died because of the COVID-19 virus. The type of vaccinations could be Pfizer, Moderna, AstraZeneca, Johnson & Johnson, etc.

People from all over the world can use the system to view information related to the progress of COVID-19 in the world. Users of the system could be either administrators, researchers, organization's delegate, or regular people. Users with administrators' privileges can add/delete/edit any user to the system. Users with researchers's privileges can add/delete/edit articles to the system that other users can see and profit from the researcher's findings. Users with organization delegate privileges can add/delete/edit articles for their organization to the system. Administrator users have the privilege to remove any article from the system or suspend any account in the system.

Each article in the system is identified by its author, major topic, minor topic, summary, the article itself, and the date of publication of the article. The summary of each article should not exceed one hundred characters. The author could be either a researcher's first name and last name, or the organization's name. An organization could be either a company, a research center, or a government agency. Each country has one government agency that uses the system to provide their latest details about the progress of the COVID-19 in the country. Each government agency can add/delete/edit information related to the country alone and not records related to other countries. The historical records of the updates of the progress of COVID-19 are maintained by the system. Each time a new update is provided, the date of the update is recorded with the new record. All users of C19PPS are identified by their first name, last name, citizenship, email address, and phone number. The citizenship value must be a value of a country that already exist in the system.

These are the minimum requirements for your application. More details could be added through more research and investigations from your part.

1. Express the COVID-19 Pandemic Progress System in the E/R model. Use arrows to indicate the constraints on the relationships. Underline the key attributes for the entity and relationship sets.

2. Convert the E/R diagram into at least six relations: Region, Country, User, Organization, Researcher, Article. Other relations might be needed to capture all the requirements.

3. Write SQL scripts to create the C19PPS System database and populate the tables with appropriate data. Also write SQL scripts of the queries and transactions given below. Include at least ten representative tuples in each table so that the result of each query includes at least two tuples. Note that the Graphical User-Interface (GUI) is not required in this project but encouraged.

    i. Get the details of the progress of COVID-19 of all the regions in the system. Details include region name, number of populations in the region, number of people who got vaccinated for COVID-19, number of people who died due to COVID-19. Only the latest statistics provided for each country in the region need to be considered. Results should be displayed sorted in ascending order by region.

    ii. Get the details of the progress of COVID-19 of all the countries in the system. Details include region name, country name, number of populations in the country, number of people who got vaccinated for COVID-19, number of people who died due to COVID-19. Only the latest statistics provided for each country need to be displayed. Results should be displayed sorted in ascending order by region then by country name.

    iii. Get details of all the Vaccines given in the America's region. Details include Vaccine name, Number of people who got vaccinated by the vaccine in the region, number of people who died and have been vaccinated by the vaccine. Results should be displayed in increasing order of the total people who died even they were vaccinated by the vaccine.

iv. Provide a report of all the researchers by region. Report should include the region name, the total number of populations in the region, the total number of researchers in the region, number of articles provided by the researchers in the region, the average number of articles by researcher in the region, and the average number of researchers by the total number of populations in the region. Results should be displayed sorted in ascending order of the average number of researchers by the total number of populations in the region.

v. Get the details of the historical progress of COVID-19 in Canada. Details include date of the report, number of populations in Canada, number of people who got vaccinated for COVID-19, number of people who got infected by COVID-19, and the number of people who died due to COVID-19. Results should be displayed sorted in descending order by date of the report.

vi. Get details of all the articles provided by the researcher Joe Smith. Details include the date of the publication, major topic, minor topic, and a summary of each article. Results should be displayed in ascending order by date of publication.

vii. Get details of the latest article provided by the researcher Joe Smith. Details include the date of the publication, major topic, minor topic, summary, and the article description.

viii. Get a list of all the users in the system. Details include privilege name, user's first name, last name, email address, phone number, date of birth, and citizenship. Results should be displayed in ascending order by privilege name, then by citizenship, then by date of birth. Privilege name could be either administrator, researcher, or organization delegate. In case of organization delegate, you need to provide the organization's name as well.

ix. Get a list of all the researchers in the system who posted the highest number of articles. Details include researchers' first name, last name, email address, phone number, date of birth, citizenship, and the total number of articles posted by the researchers.

x. Get a list of all the researchers in the system who have never posted any article. Details include researchers' first name, last name, email address, phone number, date of birth, and citizenship.

Note: You can use multiple queries to answer any of the ten transaction queries above if necessary.

Project Report: Structure and Contents

Each group should submit their project report through Moodle before the deadline, one report per group. The report should include the following parts:

(1) DESIGN: The E/R diagram of the design of the database given in the project description (or a revised version, if deemed necessary).

(2) The SQL statements formulated and used to create the database. Pick appropriate data types for the attributes and include them in your report.

(3) The SQL statements formulated to express the required queries and transactions mentioned.

(4) Populate each table in the database with at least ten representative and appropriate tuples.

(5) For each relation **R** created in your database, report the result of the following SQL statement:

SELECT COUNT(*) FROM R;

A Final Note: Your report should also include the originality FORM as the cover page that is signed by EVERY member of the group. The cover page should also include the name and ID of every member of the group members together with the "Group Account" assigned by Stan's email confirmation of your group registration.