Concordia University
Dept. of Computer Science & Software Engineering

Comp 353- Databases
Warm-Up Project
Fall 2021

Title: A Simple database for the COVID-19 Public Health Care Population Vaccination System
Due: October 12, 2021 at 23:55
Maximum Mark: 6%

In this project, you and your group are required to develop a miniature database application system, described below, and evaluate 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 string of the form "xjc353_2", 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 the Public Health Care System with the process of vaccinating the population. The system is called COVID-19 Population Vaccination System (C19PVS).

The application must maintain personal information about the population registered with the public health care system, information about the population involved in the vaccination process against the COVID-19 pandemic, and information about the public health care employees involved in the vaccination process. The personal information for people registered with the public health care system includes first-name, last-name, date of birth, Medicare card number, date of issue of the Medicare card, date of expiry of the Medicare card, telephone-number, address, city, province, postal-code, citizenship and email address. Also, history of infection with COVID-19 for every person including date of infection should be maintained by the system. A person could be infected more than once.
A person could be vaccinated whether she/he is registered with the public health care system or not. A person who gets vaccinated and is registered with the public health care system must provide her/his Medicare card number. Otherwise, a person who gets vaccinated and is not registered with the public care system must provide her/his passport number, first-name, last-name, date of birth, telephone-number, address, city, province, postal-code, citizenship, and email address. Also, the application must maintain information whether the person being vaccinated has been infected in the past or not, and if she/he has been infected the application need to store the date of the infection. A person could be infected more than once.
Also, the application must maintain information about the public health worker who is giving the vaccination, the type of Vaccination that is given and the dose number as well

with the date, location and lot number of each dose given. A person who gets vaccinated outside the country should be able to register her/his vaccination in the system by providing the type of Vaccination she/he has been given and the dose number as well with the date, location, country, and lot number of each dose given. A person could be vaccinated one dose in one country and another dose in the system or vice versa. A person should have a waiting period of at least two weeks between two doses.
The type of vaccinations could be Pfizer, Moderna, AstraZeneca, Johnson & Johnson, etc. Also, the dose number could be 1, 2, or more. For example: Alfred McDonald could have taken the first vaccination dose Pfizer on the 20th of January 2021 at CLSC Montréal South, and the second vaccination dose Moderna on the 25th of April 2021 at Olympic Stadium Montréal. The application must maintain the list of approved vaccinations as well as the date of approval of the vaccination and a description of the vaccination type. A vaccination type could have two statuses: SAFE and SUSPENDED. If status is set to SUSPENDED, then the application must maintain the date of suspension and only vaccination type with SAFE status could be given. The application must maintain information about Public Health facilities where the vaccination is performed. Information about the Public Health facilities could include name, address, phone number, web address, type (Hospital, clinic, or special installment), capacity (Maximum number of people that could be vaccinated at the same time), public health workers assigned to the location and the manager of the location. Each facility can have only one manager at any moment in time.
All public health care employees must be registered with the public health care system. A public health care employee can work at more than one facility. The start date and end date of work for every public health worker must be recorded. A public health worker could be a nurse, a manager, a security, a secretary, or a regular employee (include all other tasks). Only nurses can give vaccinations to people. A nurse must be vaccinated at least one dose of vaccination for COVID-19 before she/he is able to provide vaccination for people.

Other information for people includes Age Group. A person can belong to only one Age Group. The age Group for a person is decided at the date of the vaccination. This is needed to decide who can take a vaccination and who must wait before taking a vaccination. There are 10 Age Groups as follows: Age Group 1 is for people whose age is 80 years old and above; Age Group 2: for people between 70 and 79 years old; Age Group 3: for people between 60 and 69 years old; Age Group 4: for people between 50 and 59 years old; Age Group 5: for people between 40 and 49 years old; Age Group 6: for people between 30 and 39 years old; Age Group 7: for people between 18 and 29 years old; Age Group 8: for people between 12 and 17 years old; Age Group 9: for people between 5 and 11 years old and Age Group 10: for people between 0 and 4 years old. At any moment, only one age group value is set in the application which could be changed over time. A person can be vaccinated if she/he belongs to a group age that is smaller than or equal to the current group age value set in the application.

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 Population Vaccination 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 five relations: Person, Public Health Worker, Vaccination, Vaccination Facility, Group Age. Other relations might be needed to capture all the requirements.
3. Write SQL scripts to create the COVID-19 Vaccination System database and populate the tables with appropriate data. Also write SQL scripts of the queries and transactions given below. Include at least 10 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 details by province of all the people who got vaccinated at least one dose and are of group ages 2 to 10 (first-name, last-name, date of birth, Medicare number if applicable, Passport number if applicable, email, phone, city, date of vaccination, vaccination type, been infected by COVID-19 before or not).
    ii. Get details by province of all the people of 18 years of age and older that are registered with the public care system and have never been vaccinated (first-name, last-name, date of birth, email, phone, city, been infected by COVID-19 before or not).
    iii. Get details of all the Vaccination facilities in Québec (name, address, phone number, web address, type, capacity, manager's first name and last name, total number of employees and total number of nurses).
    iv. Get details of all the people who got vaccinated in Québec and are not registered with the public health care system (first-name, last-name, date of birth, email, phone, citizenship, date of vaccination, vaccination type, been infected by COVID-19 before or not).
    v. Get details of all the nurses that have never been vaccinated with any type of COVID-19 vaccination.
    vi. Provide three different reports of vaccination for three different people: one person with no vaccination, one person with one dose COVID-19 vaccination and one person with two doses of COVID-19 vaccination and one positive COVID-19 infection. The report for every person should include the first name, last name, date of birth, the number of the doses taken, and the number of positive COVID-19 diagnostic.
    vii. Provide a description of all the vaccinations used in Québec (Name of the vaccination, date of approval of the vaccination, status of the vaccination, total number of people vaccinated with the vaccination).
    viii. For a given location, provide a report by nurse indicating the nurse first name, last name, start date of work, and the number of vaccinations given by the nurse.

ix. Provide a report of people who got vaccinated by city in all the cities in the province of Québec. The report should include the city name and the number of people vaccinated in each city.

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 10 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.