COMP-3150	Final Project V2	Winter 2023

A significant part of this course is a database systems team project. In this project, you are expected to design and implement a relational database management system. The project involves working in teams of 3 students. Each group member is required to 'produce' an equitable share of the 'product'. Each group will be assessed independently. Each group needs to know that:

- Not all team members may get the same grade on the project!
- You must bring teamwork issues to the attention of the instructor.

Each project has a **minimum set of requirements** that can be derived directly from the project description. However, this can get you **only up to 80% of the project marks**. In order to earn more, you need to be innovative! and come up 'extra' innovative features, complex queries, etc.

You are provided with a set of specifications. This project represents a mimicry of a 'real world' database system design and delivery process such that the client is giving you a project, and you have only a few opportunities to clarify and deliver the 'product'. Do NOT assume that the client is available 24-7 to answer your emails and requires certain components of the project to be delivered (or completed) by specific deadlines to make sure the project is completed and delivered within the stipulated time.

Following is a description of 3 different projects with a similar level of complexity. Up to 8 groups are allowed to work on the same project. Project allocation will be on a First-come-first-allocated basis. One of the 3 GA will be in-charge of handling each of the 3 projects. Names of GA for each project will be announced later. For any question/clarification about the project, you should be approaching the in-charge GA for that project.

1. HOSPITAL MANAGEMENT SYSTEM DATABASE PROJECT

Summary: The project is to implement a hospital/patient database management system for a network of hospitals.

Hospitals: Assume that the hospital has 3 different locations (just like Windsor Regional Hospital). A patient can beadmitted to any of the hospital locations or can be **relocated** to any other location for 'some' medical condition. Each hospital location can be identified **independently** of others. Assume that at any given point of time, each hospital can handle 10 admissions (a total of 30 patients altogether).

Pharmacies: Each pharmacy has its individual identification/name. Any of the hospitals can reach any of the three pharmacies for delivery of prescription drugs. Pharmacy will bill directly to the hospital and will get paid directly by the hospital.

Patients: Each patient on his/her admission is allocated a unique Patient ID. Full description about the patient about personal detail and phone number, and then Disease and what treatment is going on. Patients will be billed on the number of days they are admitted. A patient will remain admitted until a doctor discharges the patient from the hospital.

Doctors: There are multiple doctors – limit them to a total of 9 doctors such that each doctor has a unique ID and there are 3 doctors in each of the three hospitals. Each doctor will treat more than one patient and depending on the type of patient, a patient can have more than one attending doctor but ONLY one of them will be patient's primary doctor during admission in the hospital.

Nurses: There are multiple nurses – limit them to a total of 15 nurses such that each nurse has a unique ID and there are 5 nurses in each of the three hospitals. Each nurse will be responsible of taking care of at most 2 patients.

2. UTILITY SERVICE PROVIDER:

Assume that a number of independent utility service provider are allowed to market and sell utility products at competitive prices to residential customers. Each provider offers all of the products listed below, but consumers

are allowed to choose different type of utility services from different providers. Following is a list of utility services:

- Natural Gas
- Hydro
    - Electric
    - Water
    - Sewerage

Create a database that maintains all of the necessary information about the utilities, customers, income/sale from utility services, billing (paid / default), etc. For the sake of simplicity, you can assume followings:

- Number of providers = 3
- Number of Customers = 100
- Total Time for record = 6 months
- Payment overdue time = more than 30 days after bill

You can search and find rates for any of these types of utilities. Make sure that billing also includes fixed component, i.e., meter rate for all types of above mentioned utilities.

3. ENERGY PROVIDER:

A private company has a monopoly of providing energy in the form of Crude oil, solar, Nuclear or Natural gas to the customers and generates significant revenues. The company needs to maintain a database to monitor customer footprints and import-export expenses. Besides the usual information (such as customers, sales, product purchase/import, maintenance, cost, billing, etc.), the company also maintains a record of its money that is at risk and hence, may also send reminders to such customer for payments for payment of outstanding dues beyond a given time limit.

Create a database that maintains all of the necessary information. However, For the sake of simplicity, you can assume followings:

- Number of Regions/provinces = 3
- Number of Customers = 300 (100 per region/province)
- Total Time to record = 6 months
- Payment overdue time = more than 30 days after bill

4. COVID-19 DATA

In recent times, not too many discussions are complete without COVID-19. We are all tired of COVID-19 and associated issues and may know someone among friends/family who has been identified as COVID-19 positive. However, a COVID-19 project seems to fit well into this theme.
This project involves creating a database for COVID-19-related cases in the province of Ontario. All the raw provincial data can be obtained from the governmental website: https://data.ontario.ca/dataset?keywords_en=COVID-19 . The database should support providing the following set of information:

- _COVID-19 Hospitalization and ICU information (both provincial and according to health regions)
- _COVID-19 testing (including positivity rate)
- **_COVID-19 age-wise breakdown of the positive cases**
- _COVID-19 vaccine data (ONLY adults but age-wise)

The database should be able to support different types of queries according to any of the above-mentioned types of data. To make your life easy, you may choose to develop appropriate applications to populate the database with the downloaded data.

Grading criteria (Please note that some more details will be added later on)

This project will be graded by the following criteria and guidelines:

1. **Database design**:
    a. A well-developed database.

b. a set of an appropriate **ER diagrams**.
c. Complete **Schema.**
d. a collection of **normalized tables** obtained through a **normalization process.**
e. **The efficiency** of the overall design.
f. appropriate information about **keys** / **foreign keys** consistent with the set of well-chosen and defined **integrity constraints**.
g. a discussion of triggers if any.
h. a discussion of **limitations**.

2. **Queries**:

   A collection of **non-trivial** and application-oriented queries and/or triggers, addressing users' needs and correct implementation.

Milestones:

1.	Complete ER Diagram (5% of project points) timeSubmission: ER Diagram	Due: Feb. 17, 2022, before the start of class
2.	Complete Schema (5% of project points) timeSubmission: Complete Schema	Due: Mar. 10, 2022, before the start of class
3.	Final Submission	Due: As indicated on the course outline.

What to hand in... (Final Submission)

1. You have to submit a **working** project. In the absence of a working project, the maximum credit will be limited to ONLY 50% of the 80% of project marks.
2. Hand in a general description of the project, the **database design**, ER diagrams, schemas, the source code (a hyperlink when applicable), and any other supporting material at the project due date as described in the course outline.
3. **Presentation**: A 5-minutes **video** containing a clear, cohesive, and complete description/explanation and understanding of all aspects of the project from the beginning till the end. There should be **equal participation** by **every group member**. Please note that, as indicated in the course outline, you may be asked for a personal oral presentation.
4. **Actual Database submission:** All modalities involved in submission/permissions will be provided later.
5. **Extra features** and/or **complicated** queries can make you earn **additional points** to make it a **total of 100%** of projects points.

Working in Teams

- Each team members have to take the lead on some aspect of the project.
- Workload distribution is important. Please make sure and document it. If there are issues, please bring them to the attention of the lead GA for the project discuss it with the instructor.
- Grades for team members can vary based on the project evaluation of each aspect of the "product" that you will be producing.