NORTHEASTERN UNIVERSIY
MIE Department
IE3425 Engineering Databases

PROJECT

Assigned 9/6/23

Due: 11/13/23 by 11:59 p.m. in your course folder.

Late submission, 50% till 11/15, zero afterwards.

Instructions:

A. **Work individually, however you can brainstorm with you fellow students.**

Goal:

Design and implement a database system for an application of your choice

Description:

You need to design and build a database for an application of your choice. Some possible databases could include: tracking sales and growth for a small company, monitoring book use at a library, serving a student group (such as IIE), serving community organizations, etc.

Write a "simplified" business plan for your project. The business plan includes the business description of your company, and explains why a database would be a good tool to use in this situation.

Design and implement both the backend and frontend of the database system. Follow the DB design principles of the backend to ensure that your DB design is sound and robust:

- **perform normalization (to show dependencies) on ALL your DB tables. Normalize ALL the tables that need it.**
- **Draw the ERD for your database. Include the relationships between tables / entities, as well as the connectivity and cardinalities. Use Visio or PPT to draw the ERDs.**
- **Draw the relational schema for your database.**
- **Create the Data Dictionary for all tables in your Database. This will help you to identify any mistakes or changes that need to be made before implementing your DB design.**
- **Implement your Database design in the form of SQLite Database.**

If you make changes to the original design, that is OK! Simply go back and change your original design accordingly. Hopefully the use of ERD's and Normal Forms will help you to see any mistakes or relationships that were present in the original draft or which do not follow common business practices. The final Database should be in correct business form.

Once done with the backend design and implementation, design and implement the frontend of the database system, typically known as the user graphical interface or GUI of the DB system. You use HTML to design the DB frontend by creating a website and Web pages to support your DB functionality. Your users interact with this frontend to add new data to DB and/or extract information from it. You use Python to connect the front and back ends.

Specs and Requirements

Each project should include (below are the minimum requirements. However, your DB design should be complete):

Backend Design

- **At least 4 tables; each table has at least 10 records**
- **You are free to choose your own attribute data types**
- **Appropriate relationships of 1:M and/or 1:1. If needed, use a bridge table.**
- **As you know, your final DB design should NOT have M:N relationships in it.**

Frontend Design (Web based GUI)

- **Use a home Webpage with links to open a new Webpage that corresponds to the link content**
- **Use all HTML elements we covered: text, links, colors, images, and forms**
- **Use at least two forms to add data to your MySQL DB**
- **Use at least two forms that extract information from your database**
- **Use at least two reports (a report here is a Web page with formatted output). You must use SQL queries and Python to create the reports. You must create all reports dynamically using Python.**

Please create a report in Word to document your database design and implementation and answer all questions in the grading rubric, and submit screenshots as outlined by the attached rubric of your database.