UNIVERSITY OF REGINA
Department of Computer Science

CS 215 – Web & Database Programming
Winter 2022

Assignment #4: Database Design & Implementation

Due: Monday March 14, 2022 by 11:55 PM

This is the fourth in the series of assignments for building a **collaborative note-taking** application. In the previous assignments, you designed and built the interface for the website. For this assignment, you will design and implement the database. The last two assignments will have you will use PHP and MySQL to implement the server-side programming (Assignment #5), and perform AJAX-based dates of the website (Assignment #6). Because the assignments build upon each other, you may wish to made modifications to your previous assignment submission before starting this assignment.

A critical element of many Web-based applications is the ability to save and retrieve data. As a result, it is necessary to design an appropriate database structure to hold the data, construct the database in MySQL, and write the queries to save and retrieve the data.

This assignment is divided into three different components:

A. ERD and Database Specification

Your task here is to create an appropriate Entity Relationship Diagram (ERD) for the data associated with your online application. This ERD must document the data model for the entire system, and should conform to the second normal form (2nf) specification for the data model.

Based on this ERD, provide the SQL statements that build the table structure for your database. Ensure that you have specified primary keys and foreign key relationships.

Note that you should carefully read through the next two sections of this assignment and the previous assignment requirements so that you fully understand what data is to be saved and retrieved. This will help you to make important design decisions for the database.

Hint: As each note and contribution is linked to a user through their role (owner, contributor), you may consider this role as an entity. If access is revoked, rather than deleting the role, it should be marked as "none".

B. Data Storage Queries

There are several forms in this web-based application that will require that data be stored in the database. Your task here is to write test queries to verify that the data storage is working correctly.

1. Sign-up Page
   - save the new user information in the database
   - for the avatar image/graphic, you can assume that the file has been saved on the server already and that you have constructed its URL to store in the database

2. Create Note Page
   - save a new note
   - save the role (owner) of the note and link things together

3. View/Contribute Note Page
   - save a contribution, including linking it to who made it

4. Grant/Revoke Access Page
   - grant access to a user to contribute to a specific note
   - revoke access from a user to no longer contribute to a specific note

C. Data Retrieval Queries

There are several pages in this web application that require that data be extracted from the database. Your task here is to write sample queries to verify that the data is being extracted correctly.

1. Login Form
   - given the username and password, retrieve the matching user ID, screenname, and avatar image/graphic
   - if the username and password pair do not match any records in the database, return an empty result set

2. Note List Page
   - retrieve all the notes that the logged-in user has access to (owner, contributor), ordered with most recently created first
   - this should include the title of the note, the date/time it was created, the date/time of the last contribution, the total number of contributions, the screenname of the owner, the avatar of the owner, and the role of the logged-in user with respect to the specific note

3. View/Contribute Note Page
   - given a specific note ID, retrieve the primary data for this note (title, date/time created, owner screenname, owner avatar)

- given a specific note ID, retrieve all the contributions made to this note (contribution, date/time it was added, contributor screenname, contributor, contributor avatar), with the most recent last

   4. Grant/Revoke Access Page
       - retrieve all the users in the system, along with their current role (if any) for a give note ID

Hint: Some of these queries may be complex, requiring the joining of multiple tables. Do this carefully and incrementally, testing as you go.

Grading Scheme

This assignment will be graded out of 10 marks, based on the following criteria:

2 marks: Entity Relationship Diagram
2 marks: SQL statements to build the table structure and keys
3 marks: Data storage queries
3 marks: Data retrieval queries

Submissions

Your database on the Department of Computer Science database server should include all of the tables for this assignment. You should provide the ERD in a single PDF file, and the SQL statements in a simple text file (.txt), numbered accordingly. These should be zipped together and uploaded to UR Courses

A simple submission log file should be provided that includes your name, student number, class number, and the username/password for your MySQL account on the Department of Computer Science database server.

Failure to provide these support documents will result in delays in the grading of your assignment and possibly a deduction in your grade.

Late submissions (up to 12 hours) will be accepted with an automatic 20% grade deduction (-2 marks). If there are exceptional circumstances that kept you from submitting your assignment on-time, you should consult with your instructor as soon as you are able to do so. See the syllabus for more details on the late policy for this class.