CSE 202: Fundamentals of Database Systems
Winter 2018
Home Assignment 4
Due Date: 19th April 2018 (No extension will be allowed)

Instructions:

- Write the programs in **Java** only.
- **Only one submission per group.**
- The naming convention for the files: filename_rollnumber.extension like program1_2016001_2016002.java.
- **The assignment can be done individually or in groups of maximum 2 students.**
- **Compress all the input/output files along with the programs as tar.gz. Your submission (.tar.gz) must contain a text file with your group details (name and roll number of student). Your submission must contains files only with no folder hierarchy created.**

Required Components in a Project

● Application design that requires extensive use of database access and data manipulation.
● ER diagram representing the database design
● Maintain a relational database in MySql- consisting of at least 5 tables
● Front end of your application- consisting of forms. You may make use of any GUI framework.
● Use of any API (JDBC in case of Java) for communication between front-end and MySQL database.
● Use of 12 to 15 SQL queries supporting the application features involving database access and manipulation

Project report should have the following details:

● Name and roll number of Team Members(team size should be at most 2)
● Project Description- - Objective and features supported by your application
● Mention at least 10 queries that you have implemented.
● Out of 10, at least 5 complex queries should be there. An example of a simple query is ”Select instructor-name from Instructor”. A complex query can retrieve data from multiple relations using joins or can use some aggregate operation like GroupBy etc.

Some Project topics for reference

● PhD admission System - candidate information, educational qualifications, publications.
● NBA Accreditation system - department information (Faculty and Infrastructure), academic details of different programmes, activities of faculty in terms of research, project and publications.
● Career prospects System for +2 Graduates
● Blood Bank Management- - map requirement and availability using Donor record, recipient record, Stock Summary, Centers, Camps etc.
● Gym Management- - customer information, equipments, staff, membership plans etc.
● Parking Management- - real time availability of parking in popular hangout places
● PWD Complaint System- - to register, track and resolve complaints related to maintenance of roads, sanitation, subways etc. in a locality
● Agricultural Information Management- - data on crop production, profits and losses incurred in a crop yield in a region/duration, cause of loss(if any) etc. Such details aid in shaping policies and introducing schemes for agricultural development.
● Applicant shortlisting system- - to find top contenders for recruitment/admission etc. based on criteria(could be academic record, experience etc.)
● Crime Record Info- - By maintaining crime data, the application provides statistics and support to retrieve details such as top 5 crimes(by frequency) in a locality, number of cases of a particular crime in a duration in a locality etc.
● Events Info. - -Register event details; find about ongoing events by locality, category, relevant age-group, community etc.
● Medical records system

Project Deliverable 1 - ER Diagram and Relational Schema [1+1=2 marks]

Design an ER diagram for the database design. Also, specify the cardinality and participation constraints in the relationships. Transform this ER diagram into relational schema. Describe the relation - attributes and the constraints on the relations thus obtained.

Submit the ER diagram and relational schema in a single PDF file.

Project Deliverable 2 - Functional Dependency and Normalization for database

[1+1=2 marks]

Write the functional dependencies on the relational schema of the database of your project. Then show the normalized form of your schema. Prefer your relational design follows the third normal form. Your relational design must follow the second normal form.

Submit the FDs along with mentioning the normal form of your schema in a single PDF file.

Project Deliverable 3 - Design and Implement

You will design and implement user interacting forms using any language for GUI. Based on the user provided parameter values in the form, you will form an SQL query which will be submitted to MySQL DBMS using API (depends on your language used for GUI). Query result should be displayed back to the user. In case of multiple tuples result, it is suggested to show 10 result records at a time. You have to implement all queries mentioned in the project report. Each form would be considered as one query. Populate your database with some meaningful data while demonstration.

You have to submit SQL queries, code for designing forms and displaying results, and snapshots (forms+results) of your application. Also, give sample inputs and submit output for each form.

[GUI + JDBC Connectivity - 0.5 mark]

[Five Complex SQL Queries - 5 x 1.5=7.5 marks, If a query is not complex - give 0.5 marks per query only.]

[Subtract 3.6 marks if the application is not Android or Java like PHP.]