

Final Project

In this class, you are expected to complete an individual final project. This project will cover conceptual modeling by ER or EER, logical modeling, normalization, and functional dependencies.

*As you are working on this project, it is important to regularly discuss your progress with the professor. **Each step should be approved by the professor before you continue to the next one.** You can always come to the office hours with your work so that we can discuss it.*

Project Requirements and Description(The Mini world or UOD):

The Mathematics and Computer Science Learning Center (MCSLS) commonly called the Math Lab wants to build a database for maintaining its records. You are invited as a database architect to develop a database schema for keeping track of their data. The database requirements are summarized as follows:

- The Math Lab has employees, each employee has an emplid, first name, last name, email, phone number, address, hourly rate, total amount of weekly working hours, and title. An employee title can be coordinator, or tutor. They also have a list of courses they tutor.
- The Math Lab allows students to visit the lab for tutoring services. Each tutee has emplid, first name, last name, phone, email and address.
- The database keeps track of each tutee's visit including the date of visit, time in and time out, and the course the tutee is vising for. Each tutee is assigned a tutor. A tutor can tutor up to 5 students.
- The Math Lab also loans books to students for their use in the lab. A book contains book id, title and authors. A book can have multiple authors.
- The Math Lab also loans calculators and laptops to students for their use in the lab to complete their assignments and course work. Both the laptops and calculators contain serial number, name, manufacturer.

You are allowed to make assumptions to complete the requirements provided above and those assumptions should be discussed in your project write up.

Now as part of your project in response to the requirements presented above, you are required to:

- I. (30 points) Conceptual Modeling: Create a conceptual model for the above requirements using the ER Model (Specify your relationship types). You can use drawing tools to create your ER models.
- II. (30 points) Logical Modeling: Convert your ER model to a relation model
- III. (40 points) Normalize your relations. Specify all the functional dependencies.
- IV. (50 points) Database Implementation: Based on the normalized database relations above, create the following SQL queries.
 - Write SQL queries to create the Math Lab database and all your relations for the database. Add primary keys for your relations and foreign keys where necessary.
 - Write queries that insert 3 or more records in all your relations you have created above
 - Write simple select statements that retrieves records from the tables without any condition. (1 Select statement per table)

- Write 1 simple select statements that retrieves records from all the tables using some simple condition. (1 Select statement per table)
- Write 2 advanced select statements that select data from two or more of your tables. You can use exists, and , join etc.
- Write a query that retrieves students who have visited the Math Lab more than others.
- Write a query that retrieves tutors who get paid more than any other tutor per hour
- Write 3 update statements that update certain records based on some conditions
- Write 1 statement that deletes a record from a table based on some condition

V. (50 points) Application implementation: You can do this part as an extra credit. Using a programming language of your choice (Such as PHP, JavaScript) write a web application that interfaces with the database you created above. Refer to chapter 10 or 11 for help. Note that the extra credit can only be done if you have completed all the requirements for the project including writing your report. The Application implementation can be added to the report later. Your applications should make sure that it achieves the following conditions:

- Able to insert data into any of the database tables
- Update some data in a relation
- Delete some data
- Updates data

(This forms a CRUD Application). CRUD stand for Create, READ Update and Delete)

- VI. (50 points) Final Report Write up: Your report should include the following:
- A cover page with the project name(title), your name, course number and date
 - Introduction. You can use the project description and make sure you state any assumptions here.
 - Entity Relationship Model Diagram(ER diagram). Explain what you did. And add your diagram also
 - Map(Convert) the ER model into a relational model. Explain the steps that you followed to convert your ER model to relational model.
 - Normalization: Normalize your relations. As you are normalizing each relation, explain the process. Make sure you list all the functional dependencies.
 - Write SQL queries to create all your relations. (You take the queries from the database implementation and place the here.
 - Application implementation: add the pictures and images of your application interface. Discuss your application.
 - Conclusion:
 - What was your experience? What was easy about this project for you? What was difficult about this project for you? Did you ask anyone for help? Did anyone do your work? Did you take someone work, modify it and submit it?
 - What are your future plans about this project? What are your future plans about databases? What would you have done different if you had more time?

○ Any final comments and conclusions
(20 extra credit points) For a very nicely written and edited report. This includes nicely done diagrams.

Submission Details:

- **Your work must be submitted on Blackboard. No any other forms of submission will be accepted.**
- You are required to submit a zipped folder that contains your project write up, queries, pictures and images, pdf or word documents or any other files of your work. If you also do the extra credit, please include your code in the folder.
- **You must submit your own work.** Please refer to Lehman College's Handbook for more information about plagiarism and academic dishonesty. **You cannot copy someone else's work. While you are allowed to discuss ideas, you are not allowed to complete this work as a group project or to copy someone's work.**
- Project Due date: **Monday June 22, 2020 by 11:59 pm.**