

CIS 9340 – Spring 22 Principles of Database Management

Class Projects

Groups will consist of 6 members. Groups are responsible for:

1. Develop a proposal for the project.

First, groups should submit for approval their project ideas. This proposal should include:

- o A separate cover page indicating the title of your project, the full names of the group members (with e-mail), the course number and course section.
- o A narrative description of the business used for the project or application being created. This should also include a description of the problem or opportunity being addressed.
- o Identification of the information needs - what information would help solve the problem or allow one to take advantage of the opportunity.
- o Initial list of entities (tables) that have been identified. This should come naturally from the above discussions.
- o Distribution of duties for the project. List the names of each group member and what their primary role will be (e.g., systems analyst, application developer, documentation writer).

Please contact the professor if you have any questions; groups should not continue working on the project unless it has been approved by the instructor.

2. Systems Analysis

The next step is for the group to take the requirements from the "users" and draw an [Entity Relationship](#) diagram using UML notation.

The E-R Diagram should then be submitted to the professor for approval before proceeding.

Students may use a specific E-R modeling tool such as [MS Visio](#), [LucidChart](#), drawing tools available in MS Word or MS Powerpoint.

Note: The "Relationship View" in MS Access *is not an E-R modeling tool*.

3. Logical and Physical Modeling

Given the E-R diagram and sets of attributes for each entity, the next step is to convert the E-R model into a [relational model](#) and go through the process of

[normalization](#). This step will require the group to list all of the functional dependencies.

The normalized relations should be approved by the professor before proceeding.

4.

Database Implementation

Groups should then implement the database tables from the normalized set of relations created in the previous step.

For each normalized relation, write a SQL CREATE TABLE statement. Write separate ALTER TABLE statements to add PRIMARY KEY and FOREIGN KEY constraints to the tables. Data should be supplied for each table by writing SQL INSERT statements. The amount of data should be such that the need for a database is clear. In other words, provide enough examples to demonstrate why a database was required in the first place.

Application Implementation

The application (forms, reports, queries, menus or navigation form) can then be created on top of the tables. In general, a simple data entry form should be created for each table. However, for the core business processes the group should create appropriate master/detail/lookup forms that guide the user through carrying out a business process. For example, if the business takes orders from customers, I am expecting a form with Orders and Order items with lookups for customer and products (or services).

At least two reports that reflect the core of the business should also be created.

For Queries, provide the associated SQL statements and a description of what the queries are used for.

For Access 2016/9 and later create a [Navigation Form](#) that provides a starting place with access to all of the forms and reports in logical groupings.

Write Up Final Report

The final step is to prepare a formal report and brief presentation. This report should include:

- o A separate cover page indicating the GROUP Number, the title of your project, the full names of the group members (with e-mail), the course number and course section.
- o An introduction section similar to the [proposal](#).
- o Entity Relationship Model diagram.
- o The collection of normalized relations and functional dependencies, and a brief discussion as to the normal form(s) achieved, the methods used to achieve these normal forms, and reasons why any de-normalization was done.
- o The SQL DDL used to create the tables and add primary key and foreign key constraints.
- o An example printout of each of the forms, reports and queries accompanied by a description of the function of each. Along with each form, include any VBA code that was written to embellish the form.
- o A picture of the Navigation form showing the organization of the different Forms and reports in the application.
- o A narrative conclusion section that describes:

5.

6.

a) the group's experience with the project (which steps were the most difficult? Which were the easiest? what did you learn that you did not imagine you would have? if you had to do it all over again, what would you have done differently?) b) if the proposed benefits can be realized by the new system

c) any final comments and conclusions

7. Groups will periodically submit status updates and inter-group rankings of participation. Project Milestones

Each group will submit an update and one or more [group meeting outline](#) on each of the following project milestones.

- March 26th, Groups assigned and project deliverables reviewed in class
- April 2nd, Groups are formed and Project Proposals submitted
- April 16th, 2021: Systems Analysis and E-R Model completed
- April 23rd, 2022: Logical Modeling and Normalization
- May 7th , 2021: Physical Database Implementation (using SQL) completed
- May 14th, 2022: Final Project report due

Project Ideas

You are encouraged to come up with projects of your own. The project ideas listed below can serve as a guide or as inspiration for a slightly different project.

1. Scheduling Application - A consulting company has a lunch room, 12 conference rooms, 6 LCD projectors, 3 portable PCs, etc. They need to be able to schedule each of these resources for a given day and time period and avoid conflicting use of resources. Also, management would like reporting on resource utilization per week, month, year. They are also considering renting out resources to other companies if resource utilization is low. Queries might include:

- When is the next day resource X is free between 1:00 and 5:00.
- How many hours per week on average is conference room X occupied.

2. Supply Cabinet - A company centrally maintains supplies for each of its branch offices.

They need a database to keep track of what they have in stock, requests from branch offices for supplies and purchasing of supplies from vendors. Should keep track of the vendor with the best price for a particular supply. They would also like to minimize shipping costs by shipping several supplies at one time to a given branch office. Queries might include:

- When should supply X be replenished
- How many shipments, on average, go out to the branch offices per week ?

3. Baseball Statistics (or other sports team) - A professional baseball team would like to maintain a database that records player statistics on all team members and complete records of every game (on an inning-by-inning basis). Each player would have a set of offense and defense statistics. Queries include:

- What is the batting average for player X
- Who is the best relief pitcher to use against a left-handed batter

4. Portfolio Management System - a small hedge fund would like to track its investment portfolios.

Bad Project Ideas (Not accepted)

You **may not** choose any of the following as project ideas:

- Restaurant (Customer/Menu/Order/Food)
- Hotel (Guest/Room/Reservation)
- Pizza Delivery (Customer/Order/Delivery)
- E-Commerce (Customer/Order/Product)