

## **Database Design, CSCI 340, Spring 2016 DB Application**

Updated: Jan. 25, 2016

### Submissions:

- Feb. 12 – Application description - mission statements and high level objectives
- Feb.19– Application overview, list of tasks that the application must perform, scope of the application, and description of the user(s) of the application
- March 4 – Conceptual data model
- March 11 – Logical data model, draft of user interface and CRUD matrix
- April 1 – Prototype presentation to class, draft report
- April 1-15 – Prototype presentation to client
- April 29 – Project presentation to clients
- May 2 – Final report and application

Working in a group, you are to develop a database application, for an external client. Your group will meet with the client to develop requirements for the database application, develop a data model, create the tables, and a user interface (forms and reports) for the application. You will meet with the clients throughout the semester to ensure that the system that you are building is the system that the users want. Each group must establish a weekly meeting time and record minutes for all meetings - meeting with the clients, your group meetings, and times you meet with me. Use the 'Meeting Minute Template'.

Get a ringed binder for your project and keep all materials in it, old and new. Your binder should at least have a section for current materials, one for past materials, and one meeting minutes. There are sample projects from the spring 2014 offering of this course are under the Resources tab.

### Application Description - Mission Statement and High Level Objectives

Establish a weekly meeting time and meet with your client to create a mission statement (Figure 11.8, page 303, gives an example mission statement) and objectives (Figure 11.9, page 308, gives example objectives, but I suggest that your objectives be at a higher level. The details shown in Figure 11.9 are more appropriate as the list of tasks) for the project.

Turn in: Binder containing minutes from your meeting (which states your established meeting time), the project mission statement, objectives and any other information which will be useful to you in creating the database application.

## Application Overview, List of Tasks that the Application Must Perform, Scope of the Application, and Description of the User(s) of the Application

Develop a high level overview of the application. Include the scope of the system, a description of the types of users of the system and a list of the tasks that the application is to perform.

This overview document should be in paragraph form, typed and should contain the following:

- A name for the database application
- Who the application is being developed for
- Who is developing the application
- Mission statement for the application (from previous deliverable, updated if needed)
- List of high level objectives (from previous deliverable, updated if needed)
- Systems boundary (see Figure 11.10, page 309)
- Description of the expected user(s) of the system.

This document should have been accepted by the clients (client feedback and acceptance must be documented in meeting minutes).

Turn in: Binder containing overview, task list, meeting minutes, updated versions of previous information, old versions of previous information and any feedback which I have given your group. Labeled separators should be used to organize your binder.

## Conceptual Model

Develop a conceptual model (attributes which are foreign keys are not included in the UML diagram and join tables are not included). Working with the clients, walk through the tasks that the database is to perform, making certain that all needed data is present in your conceptual model.

The conceptual model should have been accepted by the clients (client feedback and acceptance must be documented in meeting minutes). The conceptual model must be typed. This diagram should contain entities, relationships, attributes, keys and cardinalities. If there are constraints on the data these should be noted on the data model.

Turn in: Binder containing overview (updated if needed), conceptual model, meeting minutes, other useful information, all items turned in previously and any feedback which I have given your group.

## Logical Model, Draft of User Interface and CRUD Matrix

Develop a logical model containing foreign keys and join tables, and a user interface for the application. Working with the clients, walk through the tasks that the database is to perform, using your suggested user interface and making certain that functionality is

included for all tasks listed, and that the logical data model supports all queries needed for the user interface.

The logical model should have been accepted by the clients (client feedback and acceptance must be documented in meeting minutes). The logical data model must be typed.

The sample forms and reports for the database can simply be sketched on paper. Have your users look over these forms and reports and tell you if they look right. Document this in the minutes.

A CRUD matrix, standing for Create, Read, Update and Delete, should be included. In the CRUD matrix each major data model object should appear on one axis, Create, Read, Update, Delete and List should appear on the other axis. An “X” in the appropriate cell indicates that the application will include that capability. Explain the CRUD matrix to your users and have them look over yours and tell you if it looks right. Document this in the minutes. (The CRUD matrix looks similar to the Cross-Referencing Transactions and Relations, Table 18.1, page 481, except that Table 18.1 is showing CRUD operations for transactions A through F, whereas you only need one set of CRUD for the whole system.)

Turn in: Binder containing overview (updated if needed), conceptual data model, logical data model, possible user interface, meeting minutes, other useful information, all items turned in previously and any feedback which I have given your group.

### Prototype Presentation to Class, Draft Report

Create a logical data model for the data (foreign keys and join tables are included); create the tables in the chosen DBMS; and draft the entire database application. Turn in a copy of the logical data model, each table, populated with realistic sample data, screen shots of your application, and the application itself. Your application should include:

- Tables with referential integrity enforced for the relationships amongst the tables and with realistic sample data, at least three records per table.
- Data entry screens. These do not need to be the final forms that will be used in the application. They should be used to facilitate placing realistic data into the tables. Look directly at the tables to determine if the data is stored as expected.
- Reports or other screens needed in your final application. As with the forms, these can be primitive looking.

One easy way to get paper copies of the forms and other screens is to press the *printscreen* button when the information is being displayed on the screen. You can then paste the screen image into another document for printing.

The tables, forms and reports/other screens should have been shown to the clients and meeting minutes should document their feedback.

Present a prototype of the application to the class. Begin your presentation by telling who is in the group, the name of your application, who the application is being developed for, the mission statement of the application, its system boundary, major objectives, types of users, characterization of the user types, the list of tasks, conceptual model and/or logical model, data in the tables, and the user interface. This presentation should be a 6-8 minutes long, not counting questions and answers.

Turn in:

- Binder containing the new and previous items. Be sure to include clean copies of the overview, etc. Also, update any items that need updating.
- Application or tell me how to access the application.
- Deliver the application to the client so he/she can enter more realistic data into the tables for the final deliverable.

#### Prototype Presentation to Client

Subsequent to the class prototype presentation, and within the next two weeks, present the prototype to the clients. Document the user observations during the prototype presentation in the meeting minutes.

#### Project Presentation to Clients

Invite the clients to class to see the final project. Begin your presentation with an overview of the application as in the previous presentation. By now the application should have realistic (or real) data. Demonstrate **all functionality** of the application, including any reports. The presentation should be divided so that all members of the group present something. You will be graded on this presentation. This presentation should be a 10-15 minutes long, not counting questions and answers.

#### Final Report and Application

Complete the database application and create a report for your clients. The completed application should contain realistic data which your clients have entered. Discuss with your clients what they would like in their report. At minimum, give them the overview, list of tasks, and screen shots of the application.

The final application will receive a grade that will count three times as much as the previous grades.

If it appears that a member of a group is not contributing adequately, and if there is an indication by the other group members that a member is not contributing adequately, that member will receive a lower grade for the project than the other members of the group.

Turn in:

- Binder containing updates of all of the screen shots and other information.
- Report for the clients (I'll just look it over)
- Application or tell me how to access the application

The final application will be graded as follows:

- Functionality - the application does all of the items in the objectives.
- Appearance and usability - is it attractive, the layout of the screens and reports make it easy to comprehend the information, all portions of the system are easily accessible, tab orders correct, labels are helpful, auto-number fields are not displayed unless the user specifically requested that they be displayed.
- Coding – code is well commented and efficient, and object names are descriptive.

Here is a possible organization for your binder:

- Current items: Overview with the mission statement, objectives, list of tasks, and other current items. This could be what is seen when the binder is opened. It does not need to be in a tab. Make this section flow smoothly from item to item, don't make it look like a series of separate deliverables by putting each item on a separate page.
- Database - The conceptual data model, logical data model and a copy of each table with some realistic sample data.
- Application user interface – A sample copy of each screen in your applications.
- Meeting minutes – including relevant emails.
- Additional materials - This is probably materials that the client has given you as the project progressed.
- Old copies of items