

Database Final Project

The purpose of the project is to provide a hands-on experience in the design and development of a relational database. The project provides a realistic experience in which students exercise skills learned in the classroom.

This project will be written up as a TECHNICAL document (not a formal APA paper). It should include the following items.

Cover Page

Your name
N6803 Fall 2011
Personal Health Record Database

Executive Summary (revised as necessary from the draft done in Module 1). What problem would a PHR be intended to address; what is a PHR; what topics will it contain

Time Log

Keep a log of time spent on the project. Include time needed to create design documents, time spent reviewing the design, time for developing the project, and time to complete the queries and reports. You can also include time spent researching the topic, writing papers... **You are not graded on how much time is spent.** The purpose of this log is to provide you with an example of the time necessary for database development. The information will be of use in future projects when planning time frames, expenses, and personnel requirements. I don't grade based on how much or how little time you spent, what you documented, or how you documented it. The purpose is to practice keeping a log of time related to the project.

Design Documents

Analysis: Why do we use a design methodology (the database life cycle)? Approximately 1 paragraph.

User requirements: What is the purpose of user requirements documentation? Note that we represented with the executive summary.

Side note from me (not part of the final paper): In reality the user requirements would be a large complex document. However, many of you are taking or will take a systems analysis course, and user requirements are one of the "deliverables" from systems analysis. So we represent this phase very simplistically through the Executive Summary.

Conceptual Design

What is the definition of conceptual design?

What is the purpose of this design phase?

We use an ERD to represent the conceptual design phase – what is an ERD?

Include your project ERD (revised as necessary)

Logical Design

What is the definition of logical design?

What is the purpose of this design phase?

We use a step by step process to represent the logical design phase. Describe (briefly!) this process

Include your step by step logical design document (revised if necessary)

Physical Design

What is the definition of physical design?

What is the purpose of this design phase?

We use a data dictionary document to represent the physical design phase.

Include your data dictionary document (revised if necessary)

Additional physical design decisions

- Every table should have a primary key identified. Note in your paper the purpose of primary keys and what makes a good primary key attribute (or set of attributes).
- Discuss the purpose for indexing. If you were going to create an index on a non primary key field, how would you decide what field to index?
- Somewhere in your database, please CODE at least one column. Store the code in the “primary” table, and create a lookup table that defines the meaning of the codes. For example, in the Access version of the SNDB I included a code for gender, defined in a ListGender table (M = Male, F = Female). The codes (M and F) are stored in the demog table, and the ListGender table writes out the meaning of the codes. It would have been smart if I’d have coded the “race” codes in the demog table, as some of those choices are not intuitive. You can use number or letter codes. You can use existing coding schemes, if applicable (e.g., SNOMED, LOINC...) or can make up your own codes.
- Describe in the paper why you might code data in your database

Optionally, you may also include a "technical ERD" reflecting the final state of the database.

This **does not** replace the conceptual design phase ERD, however.

Note: you will have already been evaluated on each of the above design documents as individual papers. For the final paper, I will look for those documents to be present, and will look for the discussion points indicated.

Database Build

Create the database according to your data dictionary.

Write a “create table” SQL statement for one of your tables.

Enter Data

Enter fabricated data into the database so that there are at least 5 records in the “main” demographics table (the number of records in other tables can be as appropriate).

Critical Analysis

In your write up, note whether the final database, as you built it, followed your initial design exactly. It’s OK if you ended up needing to make changes. Comment on places where you found that you had to change the structure as you started to build or enter data. For example, you may have found that when you entered data, you needed to make a field larger than you had anticipated. The purpose of this is to help you the next time you build a database. If it all worked out as originally planned, then note that!

Application (user interface)

Design an application (user interface) to support user’s work. It doesn’t have to be functional, but should be designed.

Forms

Design at least 2 forms. One should contain data from a “main” table and the other should contain data from a related table. Those forms might be embedded or linked. An example is the Access SNDB demographics form, with the vital signs subform embedded within it.

The form does not have to be functional (it doesn’t actually need to communicate with the database).

Analysis of form design

- Briefly discuss how your form design meets general usability heuristics.
- Briefly discuss any special considerations you might have for your interface if your database needed to accommodate older adult users.

Queries

Write at least **4 queries**. Illustrate the following with your queries

- join 2 or more tables.
- use a calculation or aggregate function (sum, average, count etc).
- use a group by statement (hint: often combined with an aggregate function)
- sort the data.

A single query can meet more than one of the above requirements – but you still need to create at least 4 queries. Once the requirements have been met, the other queries can be your choice.

In the paper, include the query name (if saved query), **purpose** of the query from the user standpoint, and the **SQL statement**. You may also want to include a couple of rows of the query output for your own reference, like we did in the homework. If you are using Access, save the query and include the **name** of the query in the paper (that will make it easier for you later when you review your work)

For example, in the SNDB database I might create the following as ONE of the 4 queries. This query joins 2 tables, it contains an aggregate function (average), and a “group by” statement.

- Query Name: qryAvgBPperPatient
- User Purpose: I want to review average blood pressure readings. The query shows the ID, name, and average blood pressure for each patient.

- SQL statement

```
Select d.pt_id, name, avg(SBP) as Average_Systolic, avg(DBP) as Average_Diastolic
from demog d, vitals v
where d.pt_id=v.pt_id
group by d.pt_id, name;
```

- Results

pt_id	name	Average_Systolic	Average_Diastolic
1	Nakamori, Akina	120	67
10	Brown, Mike	95.5	59
100	Hall, Arsenio	127.2	80.4
101	Priest, Maxi	101	60
102	Costner, Kevin	140	70

Optional, but encouraged (will depend on how your time goes...and how bored you get)

Create functional forms for data entry (based on your form design above). Demonstrate that the form correctly inserts/updates data

Create a data validation mechanism for at least one attribute, either in the table or in the form. In Oracle, you might do this with a check constraint, in Access you might use a validation rule in the table or on the form. Discuss how the validation mechanism helps promote data integrity.

Create a default value for at least one attribute, either in the table or in the form.

Create one report which uses data from at least 2 tables. Print one page of your report (or do a screen print of the report). Discuss the purpose for the report.

Database Final Project Checklist

Name: _____

- ☐ Cover Page
- ☐ Executive Summary *
- ☐ Time Log
- ☐ Background information.
- ☐ User requirements discussion
- ☐ Conceptual Design discussion
- ☐ ERD *
- ☐ Logical Design discussion
- ☐ Logical Design step-by-step*
- ☐ Physical Design discussion
- ☐ Data dictionary *
- ☐ Discussion of additional physical design decisions
- ☐ Create table SQL statement
- ☐ Database contains data
- ☐ Form DESIGN *
- ☐ Analysis of form design
- ☐ Query 1
- ☐ Query 2
- ☐ Query 3
- ☐ Query 4

This checklist shows the MINIMUM requirements for the final project.

* Items marked with asterisk have been graded as part of modules