

Project 9
CMSC 362
Marmorstein
Due: Apr. 20, 2009 by 5pm

Introduction:

The purpose of this project is to put together everything we have learned this semester. This project will be worth 150 points -- the equivalent of about three labs. It has three parts: a design phase, a database implementation phase, and an interface implementation phase. Each of these phases is worth 50 points.

In order to do this, you will implement a web application that uses a database as a backend. You may choose which application to create, but it must satisfy the requirements of the project. Because this is such an involved project, you will need to start early. I have provided "checkpoint" dates for each phase of the project. These are not hard due dates, but are recommendations for when I feel you should have each step completed.

Design Phase (50 pts) Checkpoint: April 10, 2009

A. Entity Relationship Diagram

Draw an ER diagram for a database which will act as the backend to a web application. You can choose absolutely any application you want, but your diagram must have the following features:

1. At least three entities.
2. At least two relations.
3. At least one WEAK entity.

Your diagram **MUST** show the cardinality of each relation. You must list **ALL** of the attributes of each entity and underline the ones that belong to a primary key.

B. Normal Forms

Write out a schema for your database. Include tables for both entities and relations. Construct a list of functional dependencies which should hold in your database. Then compose a 3NF version of the schema.

C. Queries

Come up with a set of at least four queries (in informal English) which your database should be able to answer. For instance if you chose to implement an application which manages library checkouts, a query might be "Who has outstanding overdue books?"

Database Implementation Phase (50 pts) Checkpoint: April 17, 2009

Create one or more SQL files to implement your database. In addition to creating all the tables, your implementation must:

1. Use appropriate indexing to speed up queries.
2. Use primary and foreign key constraints to ensure data integrity.

Interface Implementation Phase (50 pts) Checkpoint: April 20, 2009

Create a web interface for your application. Your interface should provide web pages for entering data into each table and for executing each of the four queries you designed in the first phase.

I have provided a template cgi file at <http://narnia.homeunix.com/~robert/Fall2009/362/template.cgi> which you can download and modify. The cgi file is a python script which the web server can execute. It creates a web page from data in a database and allows the user to change the information in the database. In order for the web server to find your script, it must be located in a directory named "cgi-bin" inside the "public_html" folder of your account in the lab. Make sure it has execute permissions.