

I211 Information Infrastructure II

Final Project

Designing a Web Application with MVC

Fall 2018

■ General Description

This comprehensive project requires you to create a data-driven, interactive Web application with PHP and MySQL. This project will allow you to convey a system from idea phase to implementation. The project will provide you with experience in designing and developing a Web application using the most popular software design pattern -- MVC. Furthermore, this team project will create a collaborative learning environment and will enrich your teamwork experience.

Start the project by identifying a real-world system and then create a software system (a PHP Web application in this project) to model the real-world system. You will need to use OOP objects to model the system's underlying business logic. The system's presentation layer and business logic should be separated. The data layer of the application should be implemented with a MySQL database. The project makes up 30% of your final course grade.

■ Team Composition

This is intended to be a team project. It is also acceptable if you would prefer to complete the entire project by yourself. Each team may freely choose up to three members from the same course section.

■ Project Topics

My intention in this project is to make it as open-ended as possible. I'd like you to choose a topic that you will find exciting. You need to extensively research the Internet or other media and decide what information to be included in the application. However, **you should not duplicate the PHP Bookstore web site you studied in I210 or the Movie Library System you studied in I211.** Following are several example topics that you may choose to use. You are free to modify the features I suggested. You may certainly choose the topic of your own.

Example applications

- 1) Shopping cart
 - a. Maintaining inventory
 - b. Searching products
 - c. Adding products into the shopping cart
 - d. Removing products from the shopping cart
 - e. Adminstrating user accounts
- 2) Online inventory system
 - a. Opening and closing accounts
 - b. Listing/searching items
 - c. Adding items to favorite list
 - d. Updating favorite list of items

- e. Deleting items from the favorite list
- 3) DVD and CDs rentals
 - a. Maintaining inventory
 - b. Checking in and out
 - c. Searching inventory
 - d. Viewing rent history
 - e. Displaying currently checked out items
 - f. Administrating user accounts
- 4) Online banking system
 - a. Opening and closing accounts
 - b. Depositing, withdrawing, and transferring money
 - c. Displaying transaction
 - d. Searching transaction
 - e. Administrating user accounts
- 5) Library lending system
 - a. Maintaining inventory
 - b. Checking in and out
 - c. Searching inventory
 - d. Viewing borrowing history
 - e. Displaying currently checked out items
 - f. Administrating user accounts

■ Web Site Organization

- a. Name the home page file *index.php*.
- b. Display a common banner and logo on every page. Link the logo *index.php*. Make your site look consistent.
- c. Build a clear and efficient navigation system for the site.
- d. For any page requiring a login, provide the login information (userid/password) in the HTML or PHP comments of the script file containing the login.
- e. Organize files in folders. Create separate folders for models, controllers, and views. All client-side script files (css, javascript, and images) should be stored in a folder named **www** or **public**.
- f. Make sure you do not use absolute paths for hyperlinks and images because they are not portable.

■ Minimum Technical Requirements

- a. Program the application with the OOP programming approach.
- b. Design the system with the MVC pattern.
- c. Handle exceptions caused by invalid user inputs, data manipulation failures, and other false operations. Please note this is more than simply checking errors with IF statements. This topic is covered in Unit 5.

- d. Enhance interactivity and usability with AJAX.
- e. Store data in a MySQL database system.
- f. Support appropriate data manipulation operations for creating, displaying, and searching content.
- g. Handle at least two distinct types of real-world objects. For example, “book” and “user” are considered distinct types of object; however “book” and “movie” are not considered “distinct” objects unless you implement very different features for them.
- h. Use an external style sheet to format a common style for the site.

■ Tentative Schedule

Stage	Due date and time	Deliverable
I: initial plan	Thursday, Nov. 1, 10pm	Proposal uploaded in Canvas.
II: first draft	Thursday, Nov. 15	Present the first draft of your website in class.
III: second draft	Thursday, Nov. 29	Present the second draft of your website in class.
IV: third draft	Thursday, Dec. 6	Present the third draft of your website in class.
V: final version	Saturday, Dec 8, 10pm	Upload all files, including the .sql file, in Canvas.
Peer evaluation	Saturday, Dec 8, 10pm	Complete the peer evaluation online at https://www.iu.edu/~i211/finalproject/evaluation.php

- a. Stage I – initial plan: Write a short proposal that describes your team members, the content of your site, Web pages, and features.
 - Your proposal should start with the problem statements, which describe what problems or challenges you are trying to address with the site.
 - You then propose your solutions and describe the pages and features you plan to create. In addition, you will need to explain what makes your site unique/different from other similar sites.
 - The proposal should end with an introduction to the members in the team and each member’s responsibilities.
 - The proposal should also address how the technical requirements will be fulfilled by the web site you are proposing.
 - The proposal should be, at a minimum, two full pages in length in addition to the cover page. When writing, use proper conventions of English language, including grammar, spelling, punctuation, etc. Style your proposal as a professional document. Set the margins of your document to 1 inch on all sides.

Double-space the text of your proposal and use a legible font (e.g. Times new Roman). The font size should be 11 or 12-point.

- b. Stage II – the first draft of your Web site: Minimum requirements include:
 - File organization: organize files in models, views, and controllers. Store client-side script files in separate folders. You may not have all files created yet, but you must create at least one model, one controller, and one view.
 - A dynamic page that shows your inventory from a database table. This page must be programmed with OOP approach and designed with MVC.
- c. Stage III – the second draft of your Web site: Minimum requirements for the second draft include design and implementation of the “search” and “create” features with MVC.
 - The search feature allows a user to search for products with one or more terms in one or more data fields.
 - The create feature allows an admin to add new data to the database.
- d. State IV – the third draft of your Web site: This is the last presentation of the final project. All required features should be completely implemented and working. In particular, you need to demonstrate:
 - All potential exceptions should be handled properly.
 - AJAX is used to improve usability of your application.
 - Two types of real-world objects.
- e. Stage V – the final version of your Web application: Be sure you turn in all files of your Web site, and the .sql file for the database.

■ Assessment and Peer Evaluation

Assessment of the project focus on two aspects: the team’s products (the proposal, the web site, and the documentation) and the group processes (e.g. individual member’s ability to meet deadlines, quality and quantity of contributions, and effective communication). The table below shows the schema for grading a team’s products. The team’s products will be evaluated for their professionalism, functionality, and completeness.

Activities	Points
Project proposal	10
First draft	10
Second draft	10
Third version	10
Final version	60
Total	100

The group processes are evaluated with a peer evaluation. Each member will evaluate his/her peers for the following 5 items using a 5.0 scale. Please see a sample form in Canvas for reference. To submit the peer evaluation, please go to <https://www.iu.edu/~i211/finalproject/evaluation.php>.

- The member contributed fair share of workload.
- The member made good quality of contribution.
- The member was reliable and well prepared for group meetings.
- The member met deadlines set forth by the team.
- The member showed great degree of cooperation with other group members.

There are three scores: team score, peer score, and individual score. Each team will receive a score at each stage of the project. The sum of all scores received at all stages is the team score. Based on the peer evaluation results, a peer score (positive or negative) is assigned to each team member. The individual score of each member is the sum of the team score and the peer score. An individual score cannot exceed 100.

Here is a hypothetical example. Team A received 90 points for the team score. Team member Luke, Lucy, and Linda received 20, 24, and 22 points, respectively, from peer evaluations so the team's average of peer evaluation scores is 22. Therefore, the peer scores assigned to Luck, Lucy, and Linda would be $(20/22*90 - 90) = -8$, $(24/22*90 - 90) = 8$, and $(22/22*90 - 90) = 0$, respectively. Therefore, the individual scores would be 82, 98, and 90 for Luke, Lucy, and Linda, respectively.

***** *A Bit of Warning* *****

This project will provide you with the opportunity to apply everything you have learned over the semester to a real-world project. You will be building a comprehensive and complex Web application. It will demand dedication and will take you many weeks to complete. You may feel overwhelming and may worry that you don't have enough knowledge to complete the project. You may also dislike the fact that this is a group project. All these feelings are normal, and many students had them in the past semesters. Feedback from past students indicates the majority likes the project and agrees this is an excellent learning experience.

There are many advantages of working on a group project. By working in a team, members will be able to play to their strengths and support the others on their weak points. A group setting also better simulates a real-world experience since most professional Web sites or other professional projects require a team working together.

To help you manage the project, the project is broken into several stages, so you won't feel it as a whole too daunting.