INFO/CS 2300 Final Project

The final project is designed to give you a chance to use what you have learned from the class and apply it to a real-world setting of building a user-centered website. In this project, you will be working in a group consisting of 3 or 4 people. Your group will find a client, then design and build an innovative and interactive website for them. There are more details on finding clients later in this project description.

The website you design should demonstrate your understanding of course material, and should have a reasonable scale that shows the work of 3 or 4 people. Since the scale of the project is much larger than your previous projects, the project is broken down into five phases to facilitate the completion of all your tasks.

The five phases and their deadlines are sketched out below.

- Phase 1: Client selection, initial design journey, work distribution. Due April 14 at 5:00pm.
- Phase 2: Design plan: database design, website layout, code layout. Due April 21 at 5:00pm.
- Phase 3: Draft implementation. Initial navigation, database schema, code flow. Due April 28 at 5:00pm.
- Phase 4: Final presentation, about 3 minutes, either May 4 or May 6 in lecture.
- Phase 5: Final implementation. Fully functional site, final design rationale. Due May 12 at 5:00pm.

Each phase is described in more detail in its own document.

We will grade each phase of the project independently, though the majority of the project grade will be reserved for the finished product created in the last phase. The grading criteria for each phase is listed with its description. Additionally, at the end of the project you will be describing in detail your particular contribution to the project and evaluating all of your group members to ensure that everyone in the group did their fair share of the work. Your grade for the project will be based not only on the overall grade given to the project, but also on how your other group members viewed your contributions. These will be submitted separately from other project materials and accessible only by Professor Mohlke and head TAs, Xiying and Nitesh. Your individual grade may be higher or lower than the overall project grade depending on the feedback of your group.

Please note that while we want you to create a successful project for your client, the main grading criterion for the project is to show that you have learned the course material and can use it developing a site. It is worth keeping this in mind as you choose a client since you may need to find an appropriate balance.

A Note on Javascript, Libraries, and Frameworks:

There is a general question about how much Javascript you can use for the project. For this final project, you can use Javascript, but remember to display a message that *Javascript is required for this site* to let the users know (avoid the situation that Javascript is turned off and nothing works).

Another general question is about how many Javascript libraries you can use for the final project. You can use Javascript to accomplish specific tasks like image sliders, editor.js for editing text areas, jQuery, and jQuery Cookie for managing cookies, but not entire frameworks such as bootstrap. If you use a library, you need to explain what you had to do to incorporate it, and how much of your own code is used to satisfy the project requirements. Details will be provided later.

Phase 1: Design Journey Part 1 (Due April 14 at 5:00pm)

Introduction

This is the first piece of your final project. In this phase, you are expected to find a client, discuss the requirements and expectations for the website, plan your site design, and distribute the work equally among your group members.

In this project, we introduce a new concept called a **design journey**. It is a four-part document that outlines all the design and programming decisions your group will need to discuss. It is important to keep record of all these activities when you are designing a website for a client. For instance, you can use these documents in your portfolio to show new clients how well you worked with clients in the past. We have created a design journey skeleton document for you. Instead of writing a design rationale, we ask you to fill out the design journey step by step.

The **Design Journey Part 1** outlines basic information about your client and the client's requirements, and sketches out how you intend to meet them. Solid work done here will alleviate many difficulties later on. It will also make sure that your group and your client agree on what you are expected to do.

Required Elements

In this milestone, you need to fill out the first part of the design journey - **Design Journey Part 1**. It is comprised of three parts: Client Selection, Project Requirements, and Work Distribution.

1. Client Selection

What is a client?

A client is someone who will give you the specifications for your project. While it is important to make a website that meets the client's needs, your first priority is to build a website with at least the following:

1. A database that allows users to perform some practical queries (like viewing all photos in an album)
2. An adequate amount of user interaction demonstrating your skills with PHP as well as your creativity
3. Web pages that are rich in content
4. A login system that allows certain users to access extra content and functionality

You might find that a client is interested in having you redesign a pre-existing site. You are allowed to do this for your final project, but you will still need to demonstrate the same amount of work as if you were creating a site from scratch. Specifically, if you are redesigning a pre-existing site you will need to include the following:

1. The URL of the original site
2. Screenshots of all major pages that you plan to change

It would not be wise to select a client that only requires a few pages of content. If your prospective client does not have a broad vision for their website, your group can inform them of the wide range of things you've learned how to do in this class. In doing so, your client's list of requirements should grow, enabling you to put together a more advanced project. You might need to be creative in how you satisfy both our requirements and the needs of your client.

Sometimes a client's needs are far too advanced to be completed in one month. Make sure that your client understands that the website you make must be of an appropriate level of complexity for your project.

How do I find a client?

An assortment of possible clients from the Ithaca community will be posted on Piazza. The pinned post, **Final Project Client Selection Instructions**, will explain how you can go about selecting a client.

If you are unable to select a client from the list we provide, you may have to do some searching on your own. Possible clients could be an Ithaca nonprofit organization, a local business, a Cornell department project, etc.

Your client should not be a member of your final project group. It is okay for a member of your group to be part of the client's organization, but the client giving you the specifications must be someone outside of your group.

It is important to note that most Cornell Student Organizations no longer fit the criteria for this project as they are hosted on OrgSync, which does not support PHP.

If you have a unique client or situation that is not adequately addressed by the above guidelines, please ask a member of the course staff to be sure that your client is suitable.

Where will the site be hosted?

Although you can work off of the course server during the development stages of your project, you need to make sure your client understands that if they plan to use your site after the semester ends, they will need to find and use another hosting service that supports PHP and MySQL.

What should be discussed with the client?

Once you have selected your client, your group needs to schedule meetings with them to understand their requirements and expectations for the site. In the meetings, your group should gather the following information:

- Who is the target audience of the site?
- What is the purpose of the site?
- What is the primary content?
- What are the interactive elements that the client wants implemented?
- What is your client's need? Will the client need to be able to directly modify the website content without reading through your code? How will you accommodate this?
- What is the hosting plan? Let the client know that the course server will not be available after the semester ends, so if they want to continue to use the website, they have to pay for their own hosting service.
- How much complexity does the client want? Let the client know that the project must be feasible in one month's time.

You will use this information to fill out the Client Selection part of your **Design Journey Part 1** document, and to guide your design for the final project. It may be beneficial to bring a printed copy of the document to your meeting so you can fill in as many of the details as possible. In particular, you will need:

- A description of your client
- Your client's requirements and expectations for the site (answering the questions above)
- A prioritized list of your design options that describes which expectations are most critical to meeting both our requirements and the client's needs, and which expectations might need to be compromised for the sake of completing the project on time
- Your client's plans for hosting the site once the semester ends

2. Project Requirements

After getting all the requirements and expectations from your client, you should transition into the design phase of your project. To complete the second part of your **Design Journey Part 1** document, you should break down the requirements into smaller tasks and work out the details for each. After careful thought about various design options, your group should hand in a description of what the website should be like when it is finally delivered, including:

- **Content:** What is the content of the website? What are the goals of the website?
- **Design**: What design elements should be utilized?
- **Interactivity**: What types of interactivity will your site support?
    - At the very least, you need to implement a login system (for site admins, user comments, etc.)
- **Database:** How will you use a database to improve the functionality of the website? Describe a possible database schema that will meet your client's needs
- **Scale:** How large will the site be (approximate number of pages) and how many hours of work will it require to finish the site?
- **Client's Edits:** Does the client need the ability of editing the site after the course ends? How does your site accommodate your client's need?
- **Use of Existing Libraries** (e.g., editor.js, jQuery Cookie, image sliders, jQuery): Do you plan on using any JavaScript libraries for your site? If so, which ones and what for? What do you have to do to incorporate those libraries? How much of your own code will satisfy the project requirements?

Keep in mind that the most successful rationales will:

- Describe every design decision effectively and thoroughly, such that the reader can visualize the website without opening it in a browser
- Make coherent arguments for major design decisions based on the goals of the site
- Take themselves seriously, and are vigorous in their opinions and analysis

3. Work Distribution

When all the requirements are identified, your group should divide up the work among the group members. We also suggest that your group think about version control (e.g., Git, GitHub) to manage the final project. Your submission should include a short description with the following information:

- **Team members**: For each team member, describe their strengths and weaknesses. For example, A is good at PHP programming, but writes messy code. B has a good design sense, but has difficulty communicating with others.
- **Work distribution**: For each team member, describe their assigned duties and work expectations

Each group member is expected to put in her/his fair share of effort. Each member will assess the levels of effort contributed by each individual in the group, and will also write up a description of his/her own contributions to the project. Your individual grade will be scaled from the initial project grade based on the assessments done on you by you and your group members.

Submission

Fill out the **Design Journey Part 1** document. It should be submitted as a PDF to **both CMS and the server**.

CMS provides a way for you to define your group, and your group cannot submit anything through CMS until the group has been created. Only one person in the group needs to submit the file, and it will automatically be submitted for the whole group.

Grading (100 points total, 6% of the final project grade)

Client Description (25 points total)

Are all questions in the Design Journey Part 1 document answered appropriately?

- Client Description
- Target Audience
- Purpose and Content
- Needs and Wants

Project Requirements (55 points total)

Design (25 points)

- (5 points) Does the content of the website match the goals for its target audience?
- (5 points) Are all design elements identified? What are the design elements?
- (10 points) Does it explain why certain design choices are made?
- (5 points) How does your site fit all of your client's stated needs? If you chose not to accommodate a need, why did you make that decision?

Interactivity (15 points)

- (10 points) Is the proposed interactivity creative? Do interactions add something more interesting to the site or make the site more functional?
- (5 points) Plans and explanations of use of existing libraries?

Database (10 points)

- (5 points) Is the design of the database necessary to the site?
- (5 points) How will the use of a database improve the functionality of the site?

Scale (5 points): Is the identified scale of the website well-suited to the scope of the project?

Work Distribution (20 points)

- (10 points) Is the distribution of work well thought out? Does it include thoughts about how each person's work will interface with that of the others? Does it assess whether or not the goals of the project are met with this work distribution?
- (5 points) Is the work required for each person reasonably equal?
- (5 points) Is each person's work well-suited to each team member's strength?

Phase 2: Design Journey Part 2 (Due April 21 at 5:00pm)

Introduction

For Phase 2, you will develop a specification for your project based on the information you gathered in Phase 1. This specification will make it easier for you to implement your project later on. In particular, you will outline the three main components of your project: **Database Design**, **Website Layout**, and **Interactive Functionality**.

Required Elements

1. Database Design

Using the database description you wrote in your **Design Journey Part 1**, create an ER diagram for your database design. Recall the ER diagram entities and relationships from Lectures 17 and 18. Read over your design journey before you begin, and list the information required to make your website functional. Use this list to decide which entities you need and what kinds of relationships should exist between them. Then create a conceptual ER diagram to describe the database you designed. Make sure the relationships between each entity are clear and well thought-out.

In addition, write one or two paragraphs to describe what the database does. Make sure that you include enough detail so that we are able to understand what is going on in your conceptual ER diagram. In particular, please describe the meaning of the different arrows (that is, describe the type of relationship each arrow represents-- see slide 13 of Lecture 17). Your ER diagram and accompanying description should be added to the Database Design section of your **Design Journey Part 2** document.

2. Website Layout

In the Website Layout section of your **Design Journey Part 2** document, organize the client's desired content into categories and subcategories. This is similar to how your pages will be organized in navigational structures such as menubars and sidebars.

Start by looking at the information you gathered in Phase 1, then figure out the most efficient way to present the information to your users. Fill in the navigation table with information about each of your categories. For each category, tell us the name of the category (column 1), a description of what kind of information a user can expect to find in it (column 1), and any sub-categories that belong to it (column 2). Justify why you assigned certain types of content to different categories (column 3).

Next, map each category to individual pages that you plan to have on your website. In the section underneath your categories table, explain how users will move between pages. What kind of navigational aids will you have? Will there be a menu bar? A drop-down menu? Tabs? Will you have this available across all your pages?

Finally, describe how the content in each of your categories will be broken into different pages. You will need to justify why you chose a particular navigation scheme over other possible choices. Then write 2-3 paragraphs explaining how the overall navigation of your site will work, and how the various pages will be linked. You may find it helpful to draw a diagram of your site map, that shows the different categories, pages, and content connected by arrows that represent page links.

3. Interactive Functionality

Using your description of interactive features in your Design Journey Part 1, come up with a list of specific pieces of code that you plan to write in order to implement those features. For each piece of interaction that you plan to

implement, describe what the interaction is, how you will implement it, and whichpieces of code are required to complete it.

Create two separate lists for the Interactive Functionality section of your **Design Journey Part 2**; one for PHP interactions and another for JavaScript interactions. If a PHP interaction and a Javascript interaction overlap, describe the code in both lists.

Submission Instructions

Fill out the **Design Journey Part 2** document and submit it as a **pdf** file to **both CMS and the server**. Each group only needs to submit one file.

Grading (100 points total, takes up 6% of the final project grade)

Initial Database Design (30 points total)

Conceptual ER Diagram (12 points)
- (6 points) Are the entities identified and do they have appropriate fields?
- (6 points) Are there appropriate relationships?

Database Description (18 points)
- (6 points)Is there a description of what the database will do?
- (6 points)Is it well described?
- (6 points)Does it match the conceptual ER diagram?

Website Layout (40 points total)

Content Organization (5 points per item)
- Is the content of the site clearly divided into categories?
- Do the categories make sense from a user's perspective?
- Is the choice of categories justified?
- Is the content of each category clearly described?
- Is the page structure of each category clearly described?

Navigational Structure
- (7 points) Is the navigational structure of the site clearly described?
- (8 points) Is there a justification for the choice of navigational structure?

Interactive Functionality (30 points)

PHP Interactivity (10 points)
- (5 points) Is the functionality of each piece of code clearly explained?
- (5 points) Is the breakdown of PHP code reasonable and well-designed?

Javascript Interactivity (10 points)
- (5 points) Is the functionality of each piece of code clearly explained?
- (5 points) Is the breakdown of Javascript code reasonable and well-designed?

Overall Interactivity (10 points)
- (10 points) Do the listed PHP & Javascript code pieces cover all of the needed interactivity of the site?

Phase 3: Draft Implementation (Due April 28 at 5:00pm)

Introduction

For Phase 3, you will implement the first prototype of your website using the design plan you wrote in Phase 2. Your goal for this phase is to focus on the look and feel of your website during the first iteration. Upon its completion, you will reflect on your design to decide on the deliverables needed for the next iteration.

This phase is broken into the same three categories as the previous phase: **Website Layout**, **Database Revision and Implementation**, and **Interactive Functionality**. In addition, you will also develop a plan for **User Testing**.

Required Elements

Website Layout

For this deliverable, create a skeleton of your website. This skeleton should be scalable-- it should take little to no effort for the admin to add new pages or modify/remove existing pages. As always, your design should be consistent and pleasant to look at, and your navigation should be intuitive and free of dangling pages. Since this is just a skeleton site, you don't need to add any content just yet, but you can if you want to.

Database Revision and Implementation

1. Revisit your conceptual ER diagram from Phase 2 and address any feedback you received, making updates to your diagram as necessary.

2. Transform your conceptual ER diagram into a physical ER diagram by incorporating tables, fields, and keys. In lecture 17, you can find an example of a physical ER diagram on slide 21, and a table showing the differences between conceptual and physical diagrams on slide 10.

3. Implement your physical ER diagram in phpMyAdmin. You just need the table structures and relationships implemented for this milestone, so you don't need to populate your database just yet.

Interactive Functionality

For this milestone, create dummy PHP and JavaScript files with commented pseudocode describing the code that you plan to implement. Ideally, these pseudocode comments should be written in the exact location/files where you plan to implement your code. You should have pseudocode comments that walk through each of the features you listed in the Interactive Functionality section of your Design Journey Part 2.

In addition to the pseudocode comments, you should also fully implement the required login system for your website. It is important to do this now, while all the other code pieces remain as comments, so that it is easier for you to test to correctness of your login system.

User Testing

User testing is a necessary step on the way towards a pleasant user experience. While you probably have not yet implemented enough to do truly rigorous user testing, you should still have your site navigation tested by two users, each from different backgrounds. These users should be members of your site's target audience, not members of your own team.

You should follow these steps for user testing:

1. Create a *testing protocol*: a list of tasks that you would like users of your site to be able to accomplish
2. Recruit users to test your site (at least two)
3. Explain your goals of the test to your users, reminding them that it is not to test them, but to test your site
4. Guide the users through the tasks in your protocol, asking them to "think out loud"
5. Take notes on what the users do and say, and record this in your **Design Journey Part 3**

Once all your users have tested the site, take note of what worked and what didn't. In your **Design Journey Part 3**, describe the feedback you received from your users and what changes you will make based on this feedback.

Submission Instructions

Fill out the **Design Journey Part 3** document as a **PDF** file and submit it to both CMS and the INFO2300 server. Don't forget to include the **username** and **password** for logging into the site.

Put all your code files (html, css, php, js) into the **FP** folder on the INFO2300 server. If you are developing your website on a different server, copy your files to the **FP** folder on the INFO2300 server and add a text file **url.txt** that contains the complete web address of your development site. NOTE: your site needs to function correctly on the INFO2300 server.

Grading (100 points total, takes up 6% of the final project grade)

Website Layout (25 points total)
- (5 points) Is overall design creative?
- (5 points) Is the site clean and user-friendly?
- (5 points) Are there good choices for color and fonts?
- (5 points) Do HTML and CSS validate?
- (5 points) Will the site allow for easy maintenance of the look and feel?

Database Design (20 points total)
- (10 points) Does the physical ER diagram match the conceptual ER diagram from Phase 2? If not, are the differences explained?
- (10 points) Is the physical ER diagram implemented in the group's phpMyAdmin on the INFO2300 server?

Interactive Functionality (30 points)
- (10 points) Does the commented psuedocode cover all of the interactivity of the site?
- (5 points) Is there a login system?
- (15 points) How well does the login work? (15 works perfect, 12 mostly works without too much consideration on security, 8 sometimes works/some errors/poor consideration of security, 3 barely works/no consideration of security/lots of errors)

User testing (25 points)
- (5 points) Are there at least two different kinds of users described testers listed?
- (5 points) Is there a user testing protocol, and is it detailed enough to collect usable data?
- (5 points) Does the testing plan include a script of how to speak with the users during testing?
- (5 points) Did the team test at least two users?
- (5 points) Is there a description of how the team plans to respond to the feedback from user testing?

Phase 4: Final Presentation (Either Mon. May 4 or Wed. May 6, in class)

This phase is a chance for you to showcase your current website to other teams and see other teams' websites.

Prepare a 3 minute presentation of your work-in-progress website. Your presentation should include the following points:

- An overview of your project
- Something special about the website
    - What is unique, exciting, or interesting?
    - What you are proud of?
    - What do you consider to be particularly successful?

Be diplomatic in the words you choose. If you are replacing an existing site, don't say things like "this site sucks." Say something more specific and useful like "we improved the use of white space so the design now highlights ___" If it helps, imagine that the person who created the site you are replacing is sitting in the audience. That person has moved up in the organization, knows the site needs improving and even played a role in hiring you to update the site. You need to find a way to discuss what you've done without putting down another person.

Each team will be assigned to a presentation timeslot during one of the following sessions:

- Monday, May 4th 2:30pm - 3:20pm Uris G01
- Monday, May 4th 3:35pm - 4:25pm Uris G01
- Wednesday, May 6th 2:30pm - 3:20pm Uris G01
- Wednesday, May 6th 3:35pm - 4:25pm Uris G01

Presentation timeslot assignments will be announced soon. You are required to attend the session at which your group presents.

Note that this 3-min presentation is worth 6% of the final project grade.

Submission Instructions

If your website is far enough along that it can be presented live in a browser, your presentation can simply be walking us through your website while you describe what you've done. Otherwise, you will need to put together some presentation slides describing your project.

Submit your presentation slides to Professor Mohlke (smohlke@cornell.edu) by 8:00am on the morning of your assigned presentation timeslot. Your presentation slides need to be in the form of a PowerPoint or Google Slides presentation, or a PDF in landscape orientation.

Grading (100 points in total, 6% of the final project)

- (50 points) Attendance (all team members need to show up at the presentation)
- (10 points) Overview of the project
- (20 points) Some unique / special / exciting things about the website
- (10 points) The presentation was reasonably organized
- (5 points) The presenters could be heard
- (5 points) The presenters looked at the audience at least some of the time

Phase 5: Final Implementation (Due May 12 at 5:00pm)

Introduction

Congratulations, you are close to the finish line. At the end of this phase you will have a fully functional, interactive, dynamic, database driven website.

Required Elements

Website Design and Layout
If Phase 3 went well then you won't need to do much more for this part. The next thing to do is add all the static content (images, descriptive text, etc.) to the empty pages of your skeleton site. Your goal while doing this is to ensure that everything (navigation, content, and interactivity) conforms to your proposed design. Additionally, you should incorporate any changes needed to address the feedback you received during your Phase 3 user tests.

Database Design and Implementation
Phase 3 should have left you with a fully functional database waiting for precious data. As you hand your project off to your client, the database should be fully populated to allow for the proper functioning of your site.

Interactive Functionality
In this phase you will use your pseudocode comments as a guide for coding the actual PHP and Javascript functionality. If the logic set forth in the comments needs tweaking then by all means fix it. However, any changes should be reflected through updated comments. By the end of this phase your PHP and Javascript should provide the full gamut of functionality described in Phase 2. Make sure that there are no PHP or Javascript errors in your site as these will be penalized very heavily.

Your login feature should already be implemented, but make sure that you are storing the hashed password and not the plaintext password in your database.

The site should function properly on both the INFO2300 course server and your client's host server.

User Testing
In the **Design Journey Part 4** document, come up with a new user testing protocol for your fully functioning website. This time, your test should focus on the interactive aspects of the site in addition to your navigation and design. You will need to get at least three users to test your site for this milestone.

Be sure to test how easy it is to use your website (both as an admin and as a user) and report any changes you decide to make in response to your user feedback. We expect you to make changes in response to user feedback--don't let us find the same problems as your users!

Final Design Journey
Fill out the **Design Journey Part 4** document, including your username and password for both the login system and your database. Then combine all four Design Journey documents into a single Design Journey, **final.pdf**. You should think of this document as a final report that will be submitted both to us and to your client.

Submission Instructions

Upload all website files (HTML, CSS, PHP, JS) to the **final-project** folder on the INFO 2300 server. If you are developing your site on another server, you must copy your files to the INFO 2300 server, and include a text file **url.txt** that contains the complete web address of your site on the other server.

The combined design journey document, **including login information**, should be submitted to CMS. The document should be in PDF format and named **final.pdf**. Each group only needs to submit one of these.

Additionally, you will need to submit two evaluation forms online by **May 13th** (a day after the final project is due). The url for these forms will be announced on **May 11th** (a day before the final project is due). These forms are:

1. Peer Evaluation Form - how was your experience working with your team members? (one per person)
2. Client Evaluation Form - how was your experience communicating with the client? (one per team)

Grading (100 points total, takes up 76% of the final project grade)

Web Design and Layout (25 points)

- (5 points) Content is well organized across pages
- (5 points) Design and layout are appropriate for the site
- (5 points) Navigation is consistent and easy to use
- (5 points) Follows principles of usability (learnability, memorability, efficiency, satisfaction, error recovery)
- (3 points) All HTML and CSS code validates
- (2 points) The site displays reasonably well across Firefox, Chrome, and Safari

Database Design and Implementation (10 points)

- (5 points) Database is populated enough to support all the features of the site
- (5 points) Database is sufficiently complex

Interactive Functionality (40 points)

- (12 points) All interactive features work as expected
- (12 points) Website is sufficiently complex, and only uses external libraries or embedded code within reason
- (6 points) All user input forms prevent erroneous data from being entered
- (10 points) Logins are handled securely, and website is protected against malicious user actions

Final Design Journey (20 points)

- (2 points) Good description of client, client needs, purpose, and target audience
- (3 points) Good description of the design, architecture, and functionality of the site
- (2 points) Explanation of any external libraries or embedded code used, and how much work was involved
- (2 points) Well-defined user testing protocols for both Part 3 and Part 4 of the Design Journey
- (3 points) Well-documented feedback from at least three users who tested the interactive website
- (4 points) Description of user feedback that was used to improve the site before final submission
- (4 points) Good description of how the final site meets the client needs and what the client is expected to do
- (Redesigns will lose 5 points if you have no screenshots or explanation of your changes to the existing site)

WOW Factor (5 points) - These are not bonus points! These count towards the raw score of project!

- Creative functionality and/or design
- Particularly impressive solutions that meet your client's requirements and special needs
- Extensive and appropriate user of Javascript and/or Ajax to enhance the user experience
- Final product goes well beyond the requirements of the project
- Responsiveness (mobile-friendly)