CSC 337 (Fall 24): Web Programming

Final Project

Online Game and Leaderboard

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1 Overview

Our overall goal for this project is to create an interactive website for users that are interested in video games and competing against other players. The vision for the website is to feel like a mix of old-school video game forums (think of speedrun.com) and web browser gaming sites (think of coolmathgames.com) but for the game we will be designing for our website. We plan to have various pages you can navigate to with each serving their own purposes to help users understand the functionality of our webpage.

The features of the website we want to focus on the most are the social and interactable elements. We plan to have a page where users can make attempts at our game and compete for the highest scores. This will be accompanied by an additional webpage that will show high scores for all users that have played the game on the site. We plan to include an area where users can interact with one another by leaving comments on the game and scores that others are achieving. We are going to implement these using techniques learned in class, along with additional modules to aid in our game design.

2 Frontend

The frontend will have a focus on four main areas:

2.1 – Login Screen

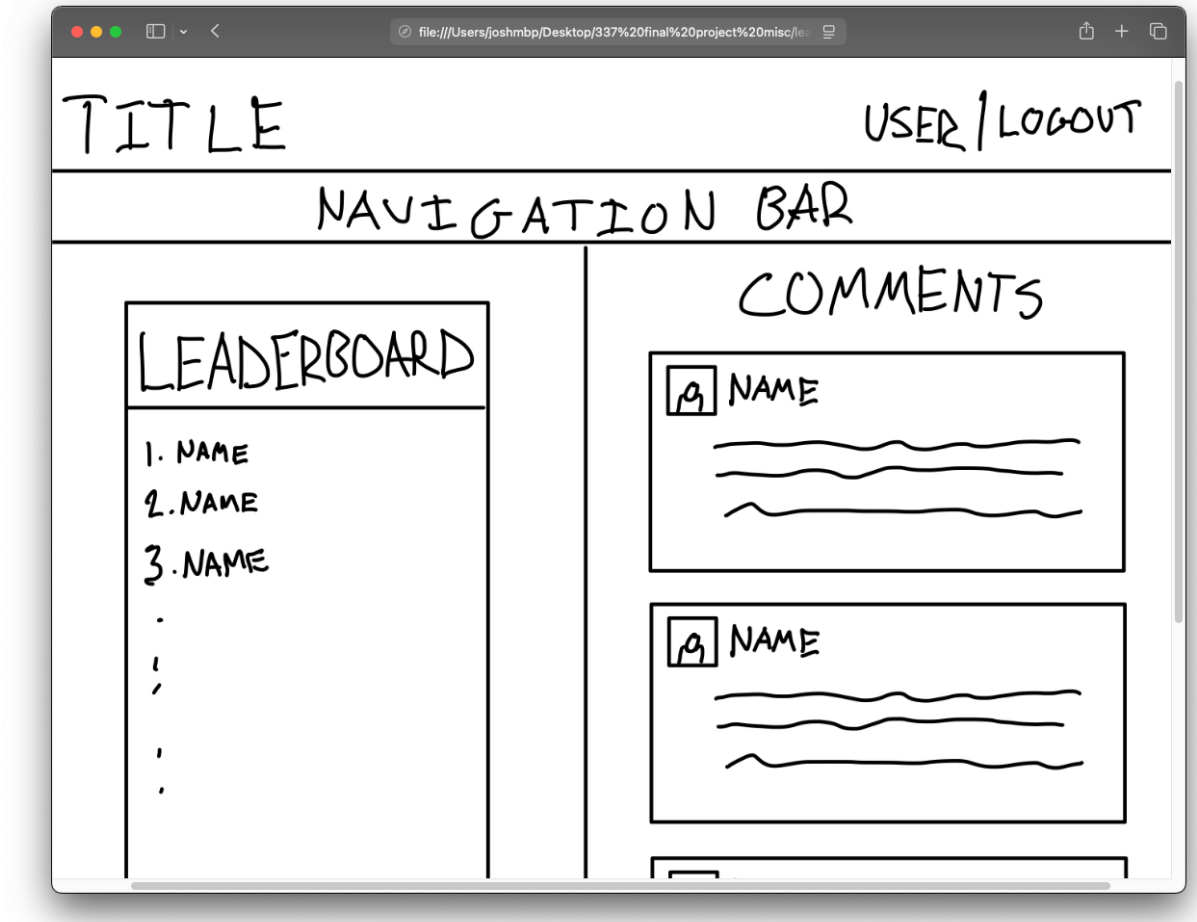
The login screen is intended to be simple. When you visit the page, it will immediately prompt you to login. It will prompt you with a brief welcome message, explains the benefits of creating an account, and urges you to log in or create an account. The login screen portion of the website will also include all account creation elements.

2.2 – Game Area

The game area is intended to be reminiscent of flash games of the 2000's and 2010's, with a window being on the page for the gameplay. It will also have the base webpage elements like the header and the page navigation bar. We expect the webpage to look similar to the following image:

2.3 – Leaderboard/Social

The leaderboard area is planned to be a split leaderboard/social forum page. On one part of the page, there will be the leaderboard table with users' names, positions and scores. Another part of the page will be similar to a YouTube comment board where users can leave comments and interact with them. Certain ways you could interact with another user is by liking comments, commenting on other comments, and interacting with a user's profile. Users will also be able to filter or sort comments as they choose. A rough visual of the expected layout of the leaderboard social page is shown on the next page.



2.4 – "Realism" Elements

"Realism" elements are what we are describing as pages or page elements and general professionalism that make the project feel more like a live website and not just a class project. Things like "About" pages, "Game Controls" instructions and other elements that help users, add context and that you would expect from a business or personal website. These could be in the form of an additional page, or a new segment on an additional page.

3 Backend

3.1 – Database/Server

The server will be implemented using NodeJS and express. The database of the server will be set up using the "mongoose" module. Our database will be structured to support at least the following filetypes. "User" filetypes will contain users login information along with other identifying user information that they provide when signing up for an account. "Leaderboard"

filetypes will store information about leaderboards in the database such as player positions, statistics and scores. Then we will also be supporting “Social” filetypes which store things like comments, post interactions, and other elements used in the social aspect of the website.

3.2 – Game

We are considering using additional modules, if we do this we will clear with the instructor before we do so, we have yet to decide on exactly what game we would like to make, and modules needed could vary and/or not be necessary.

We are going to use JavaScript to implement our game. We want to create a game with “infinite” replay potential like arcade games like Galaga or Super Mario Bros. We want progression to be linear and measurable by score and/or time spent so that we can effectively track and display it on our leaderboards. We also want the game to be approachable for many audiences, this means making the controls simple and approachable and maintaining a difficulty that is easy to pick up but gets more difficult as you progress.

3.3 – Social

The social aspect of our website will deal with user interaction through posts and/or comments that users will be able to like, sort, filter and comment on. We will likely have to implement this by using JavaScript to generate HTML elements for our webpage as new posts and comments are created. We will have to store comments and interaction details in the database on the backend, and our server will have to access and display them while the website is running. For features such as sorting and filtering comments and posts, we will likely have to implement some sorting/searching algorithm to do this.

4 Timeline

We currently have a rough idea of our roadmap to finishing the project. The roadmap to completion along with estimated hours per task is as follows:

4.1 – Deliverable 2 (31 Hours)

- **Setup (2 Hours)**
    - Server, hosting, database config, filesystem structure
- **Frontend Initial (10 Hours)**
    - Login page, account setup page, general site tools, navigation, styling choices, HTML and CSS layouts

- **Backend Initial (5 Hours)**
    - Functionality for Frontend Initial, stores information in database, makes any appropriate API calls
- **Game Window (5 Hours)**
    - Frontend for the page that games are played on. Basic interactive "game" within play area where final game will be played. Start developing styles for this page and tie page elements to initial backend
- **Initial Level Design (3 Hours)**
    - Design ideas for what level(s) will look like for the game, including game design choices and player UI layout. Design playable concept level that does not have all elements working (scores, checkpoints, etc.)
- **Begin Level Implementation (5 Hours)**
    - Logic for player and obstacles, scores and other game elements, start building actual level(s)
- **Status Update (1 Hour)**
    - Reflect on progress with team and evaluate how we are doing and adjust based on expected vs. actual progress.

4.2 – Final Submission (36 Hours)

- **Finish Game Implementation (15 Hours)**
    - Continue with game level design
    - Continue with game logic implementation
- **Frontend Social/Leaderboard (2 Hours)**
    - Set up the basic frontend and HTML structure for the social/leaderboard page. This will include an area for comments and navigation for sorting and filtering, and the table layout for the leaderboard, and other necessary elements.
- **Backend Social (5 Hours)**
    - Set up JavaScript to generate HTML elements for new comments and replies.
    - Tie backend to frontend with sorting and filtering, sorting and searching algorithms may need to be implemented.
- **Backend Leaderboard (2 Hours)**
    - Set up leaderboard to work with scores database.
    - Possibly allow sorting/searching leaderboard by certain elements, could reuse prior algorithms.
- **Frontend Polish + "Realism" Elements (5 Hours)**
    - Ensure consistency between pages.
    - Ensure frontend behavior is as expected, fix any bugs that may be found.

- **Backend Polish + Commenting (5 Hours)**
    - Remove unused code and refactor where possible. Make code well organized.
    - Complete code documentation with inline comments, block comments, and headers.
    - Fully test all features considering edge cases
- **Submission (2 Hours)**
    - Compile documents needed for final submission
    - Record video demonstrating website
    - Update project specification
    - Submit