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## CS 97 Project Final Report: The Online Arcade

### The App's Purpose:

The Online Arcade's main purpose is to be a fun and friendly place for users to experience classic arcade games such as Tetris, all the while being able to interact with other users that share the same interests. Interaction consists of posting on a forum page, and topics can range anywhere from discussion of gameplay and ranking of games, to personal interests.

### Architecture and Technologies Used:

Our Arcade Project is built using React and Node.js, and it implements a MySQL database. Our User Interface, including the Tetris Game and Pages were built using React. JSX is used to produce React elements and to manipulate the Document Object Model, or DOM. As for the backend, we used Express, Node.js, and MySQL. Express handles read/writes to the SQL Database, and is built on top of Node.js. Node.js handles client requests with a non-blocking, single-thread event loop. We also used Ngrok.io so that our project can be accessed publicly from a public address. It does this by tunneling the server to a public address.

As for the architecture of this project, we used React Browser-Router. This essentially makes our project look like a website with multiple pages. It let us configure routes that show only the components we wanted depending on the route.

### Features:

Our Project has three pages: The Homepage, the Tetris game page, as well as the Forum.

The Homepage has a menu bar that you can use to navigate around the website. There are also reviews on the front page that you can check out for Game Reviews. Our Tetris page has a few features such as the game itself, as well as a high score table that stores users' high scores. If the user scores in the top 20, they automatically get added to the scoreboard and key values in the database are updated.

Our Forum page is a place for interactive conversation, so it has the main tools of creating a new comment, sorting messages (for an easier time finding things), and seeing messages. A thread is created by going to the top add comment place and typing in a message along with a name. To the right are more buttons that users can use to do the other functions of the forum

like sorting. Since this is in a forum format, there can be multiple threads (or conversations) that can happen on different topics. Thus, reply to a thread is another feature in our Forum. Timestamps exist to show when messages were posted. Users can also like other comments that they think are worthy.

### Individual Contribution:

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I was in charge of the homepage and overall aesthetic of the website. My main job was to create the homepage, about page, as well as header and footer across the pages. For the homepage, I coded in JavaScript. It was mainly CSS and HTML that I had to write, and filled out about.js and home.js, as well as connected the buttons in the Tetris game to the actual algorithm in tetris.js.

I also did the styles in the .CSS files, focusing mainly on making the website look natural and not badly contrasted or too bright or dark. I went with a soft blue palette (famously known as Nord), and tried to imitate the style as best as I could in my code. In the App.js file, I coded the skeleton for the footer and header, as well as made the elements in the top menu bar links to other pages.

I structured most of the pages as tables, as those were the most intuitive. Also, for an Arcade Website, where reviews are very similar to each other, Game options are very similar to each other, and everything is somewhat blocky and classic, tables were a good fit. I decided to use this rather than single columns or just have them consecutively in a row.

### Notable Difficulties or Challenges

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The main challenge I faced throughout this project was learning how to code in HTML/CSS and JavaScript. I have never coded in HTML/CSS before, and it was very different from anything I was used to, so I had to spend a while learning how this language was structured. It was a really amazing experience though, as not only was I able to code something that worked, but I was able to play around with new functions that I searched online to make the formatting of the pages a lot nicer. Ning helped me a lot with getting to understand HTML/CSS, as I'm a really slow learner, but in the end, I was able to put together an aesthetically acceptable website, and even put my own spin on the standard buttons/tables format of many websites.

The skeleton of HTML was easy to pick up for me, but many of the details, such as classes were difficult for me. I had to open up a separate project and try a lot of stuff out in online interpreters for HTML/CSS to see what would happen when I tried different things together. I actually did this so much that I essentially created enough pages to make a whole new site from just HTML/CSS!

Our group faced a few challenges, too, such as the coding logic of the Tetris game, and bugs with our Forum. I remember trying to figure out how to rotate a piece in Tetris faster, as for some reason there was a bug in our code where rotation would delay one cycle before dropping. This seemed like a small bug, but to the user experience, playing the game just didn't feel entirely right. We had a really big problem with our Forum where when we reloaded, it would become blank as well.

## Improvements and Additional Features

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There is always lots of room for improvement, and one of the things I've been wishing I could do on the front page of the application is to put interactive ratings/reviews (not just in the Forum). Users would be able to choose from a list of games, not just Tetris (we would have to code the other games, too), and there would be 5 empty stars next to the name, where the user could select either 1, 2, 3, 4, or 5 stars depending on how good they thought the game was. I would use buttons to do this, with 5 buttons representing each star, and whichever star was pressed, it would automatically fill in the stars to the left. I would also add more onHover event handlings because that makes websites more interactive because when someone moves their mouse around and sees the page change in some way or another it is more interactive than having feedback only when the mouse is clicked.

I was able to make the header and footer stationary while scrolling, which I think is what most websites prefer, as it makes navigation, one of the most important parts of UI, easier. I think adding a side navigation bar would be cool as well, as I've seen a lot of arcade sites use that, with a small area on the right side of the screen with a few boxes showing "Similar Games." This way, it would be easier to switch to a different game if we got bored. I would also draw icons (256x256 maybe?) and put them in front of the game page on the front page. Right now, it's only reviews because we only have one game, but in the future, when we make more games, I'd add a list of games on top of the reviews, in row format. I'd also add small icons I drew for each game in front to make it more friendly to new users.

Games such as Pac-Man, Space Invaders, or Donkey Kong would be perfect fits for our website, and hopefully will be added in the future!

As for things I would have done differently, I would have studied a course on HTML/CSS instead of trying things out in an online interpreter, because I think that would have saved more time in the development process. Getting to know a language a lot better and then implementing it all at once would have been more efficient, less stressful, and also probably would have made my code look a lot neater.