

Knight Foundation School of Computing and Information Sciences

Spring 2022 Senior Design Project

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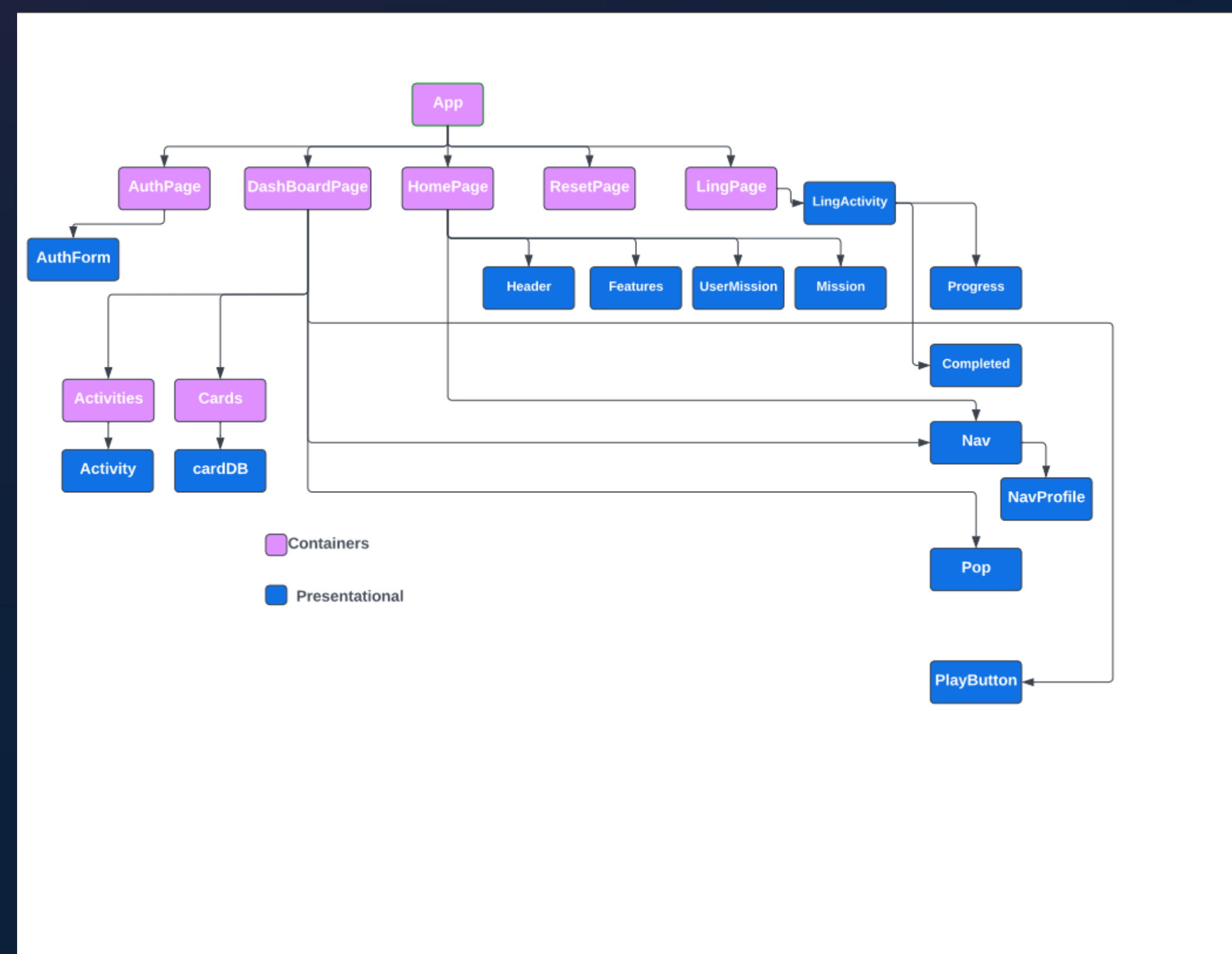
Product Owner: Alliete Alfano

PROBLEM

In the United States, there are over 115,000 adults who have cochlear implants. Unlike children, individuals who receive a cochlear implant in adulthood do not have the advantage of being exposed to how the implants sound during the years where they are most able to develop speech and language skills. As such, these individuals require training in order to adjust to their new methods of hearing because they cannot identify speech when first using their implants.

This web application seeks to help those who need training with their cochlear implants by providing a variety of speech identification lessons. In addition, this application also wishes to provide methods for those who are already more advanced in their training to move as quickly as they would like through the lessons in order to keep them motivated.

SYSTEM DESIGN



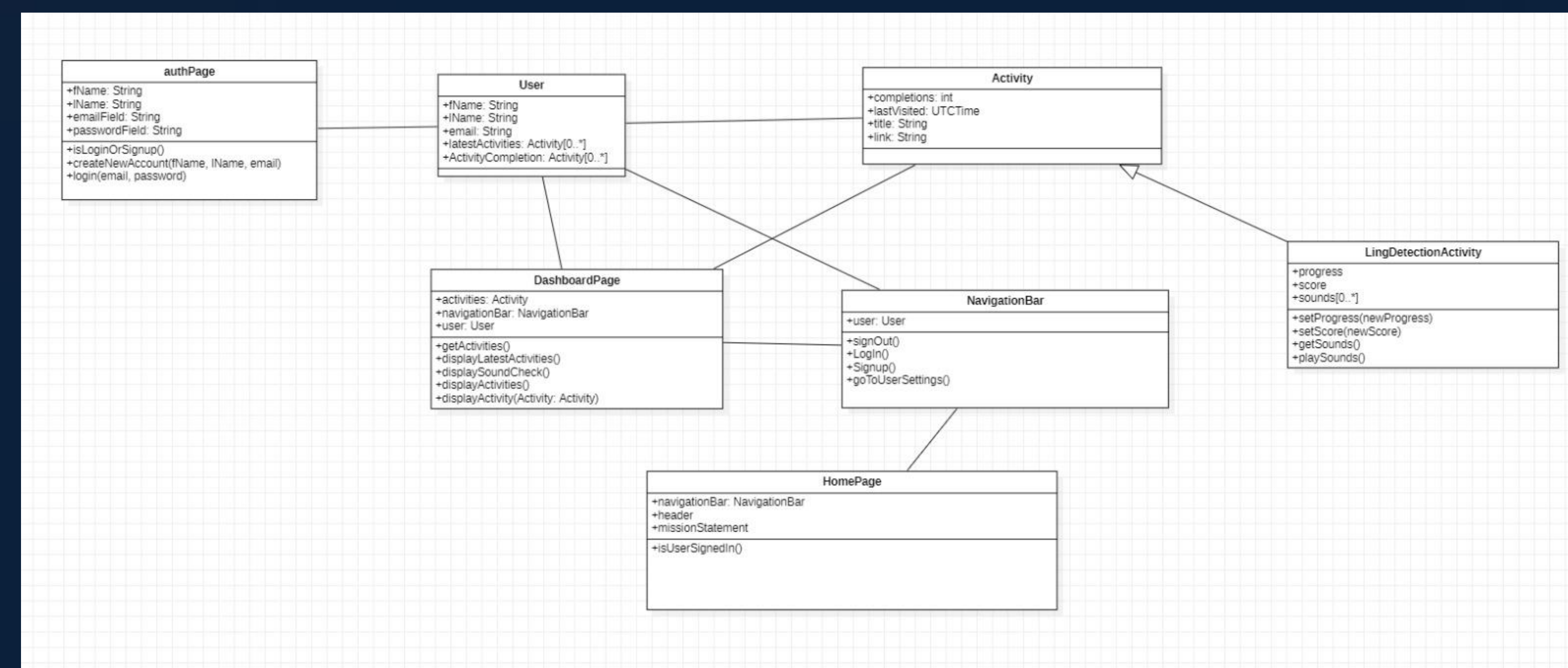
VERIFICATION

There were no automated testing processes used for this application. Any changes were manually tested and reviewed by others in the team via pull requests, which were approved once the changes made in the pull request seemed to work correctly. Future students who wish to undertake and maintain this project should implement UI and regression testing to make verification easier.

CURRENT SYSTEM

There exist several apps for cochlear implant training such as Speech ID 2, Hearoes, and iAngelSound, but these current implementations often have issues allowing those of more advanced levels to move on when they wish and also have issues with user retention. The speech samples that they have also tend to be robotic and do not sound like natural speech. In addition, users of these apps have complained that these apps were boring due to the repetitiveness of the activities and that there were not enough variations on the speech patterns given to practice with, such as accents, male or female voices, and background noises.

OBJECT DESIGN



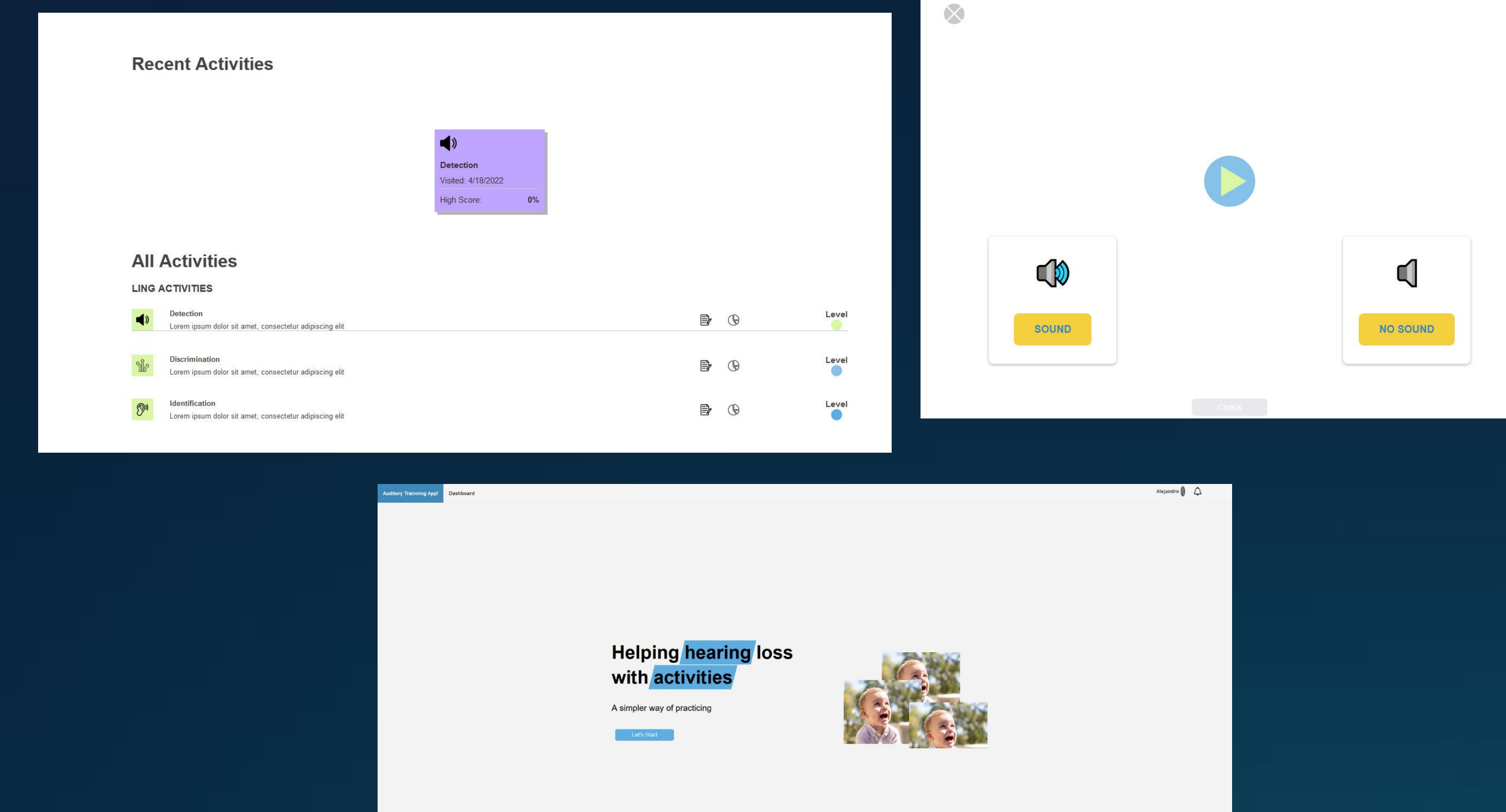
SUMMARY

This project was begun this semester, and as such, getting this project started and laying down the foundation was the hardest part. In addition, much of the work that was done this semester was in design and trying to collaborate with the product owner to see what the best method was to implement the activities that they wanted. However, since much of the groundwork has already been laid down, and foundational implementation work has already been completed, it will likely be easier for those who wish to undertake this project in the future. Authentication work, the dashboard page, and an example activity have already been completed. Future students should attempt to implement games and voiceover work to get this project closer to completion.

REQUIREMENTS

- Listening activities with natural speech
- Use of voice actors with different accents and of different genders to provide variety
- A sound check to make sure that users' implants are working correctly
- Ability to save a user's progress in a lesson
- Games to provide variety to the lessons
- Ability to enable/disable certain sounds, for instance background noise in a sound sample
- A placement test to gauge a user's ability to identify sounds using their implants
- Allow the user to begin their training at a level easier or more difficult than their current hearing level
- A forum to allow users of the app to message either, share progress, or react to others' posts

SCREENSHOTS



TECHNOLOGY USED



ACKNOWLEDGEMENT

The material presented in this poster is based upon the work supported by Dr. Alliete Alfano. I thank Dr. Alliete Alfano for her assistance and mentorship that I received throughout the senior design project.