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ECE 1895: Junior Design Fundamentals

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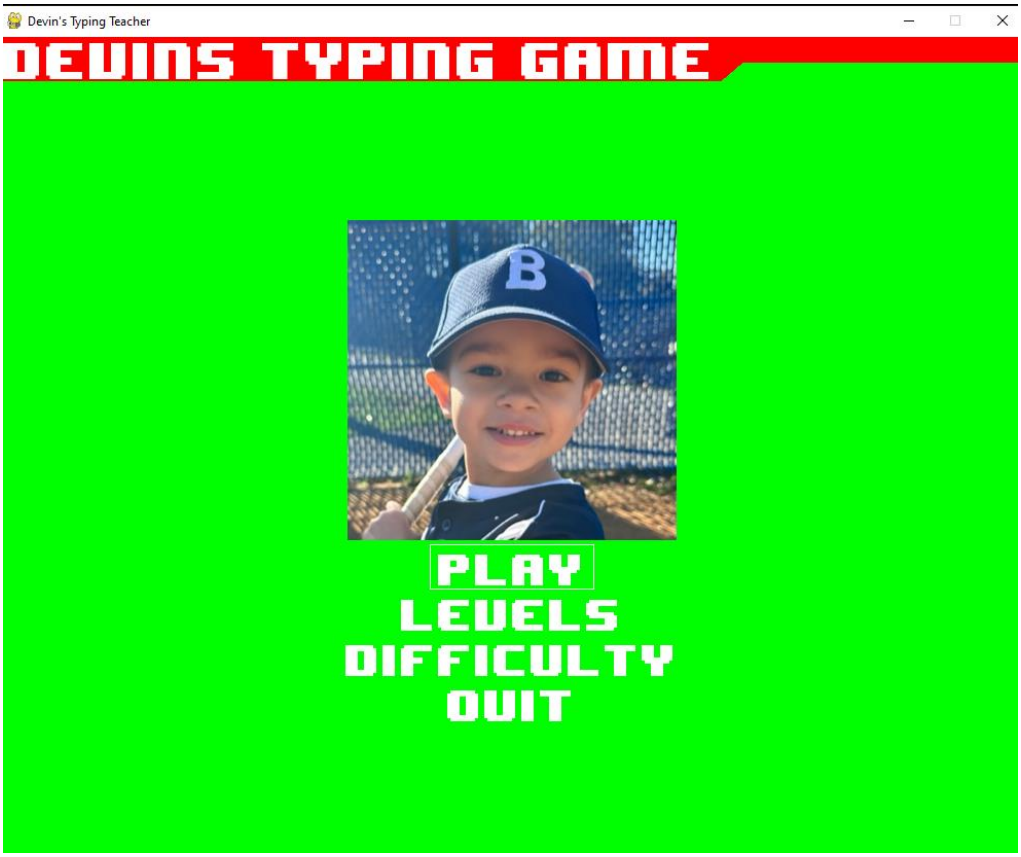
Final Project Report

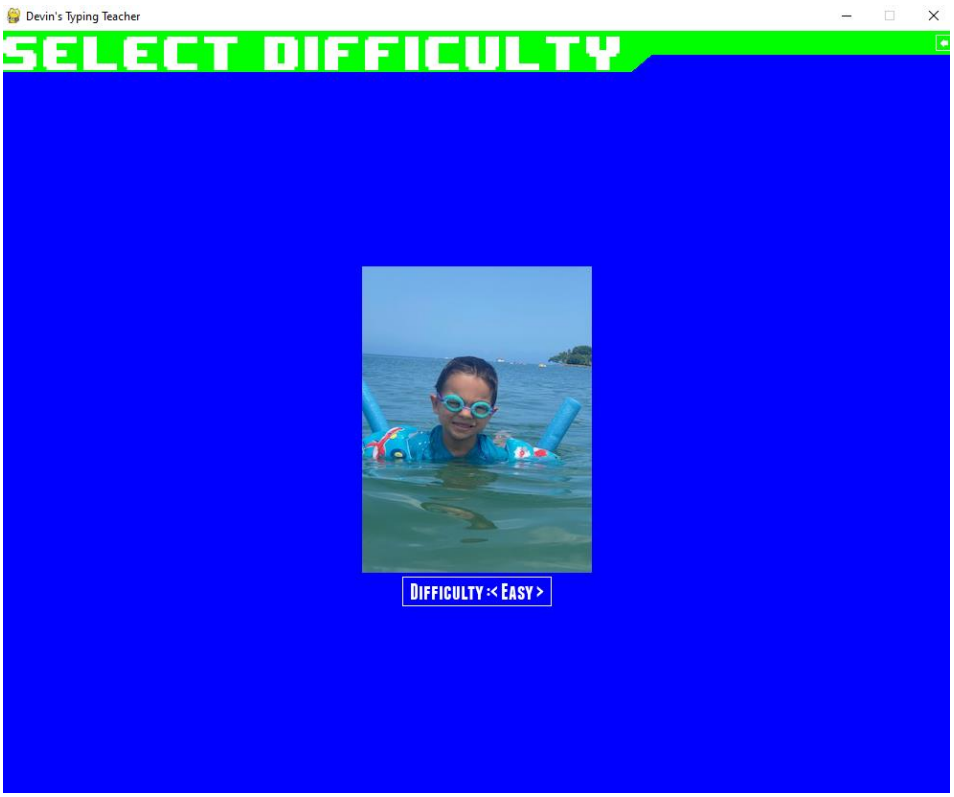
Design Overview

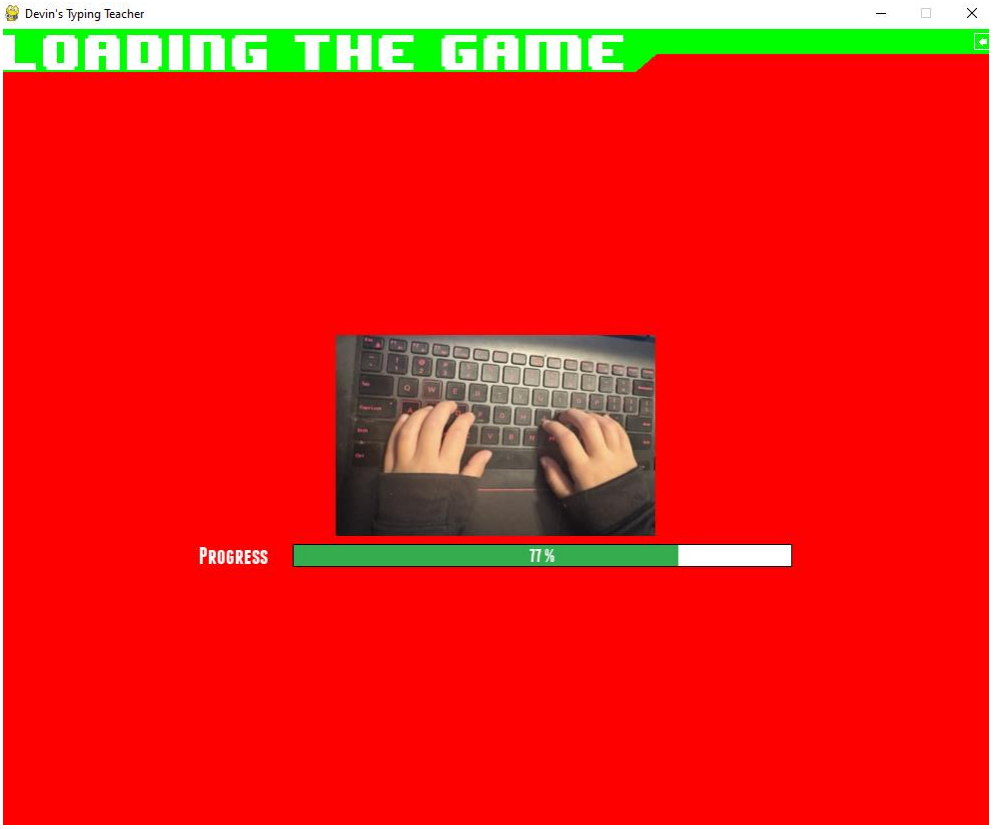
For my final project I decided to do a software-based project. I got the idea when I was trying to find a typing tutor for my son and couldn't find one that I liked. So, for my project I decided to make one for him. My son is soon to be 5 years old, and I wanted to do something that would help him recognize letters as well as their location on the keyboard. With the need to be able to type being such a necessity, I felt like the earlier I got him started the better.

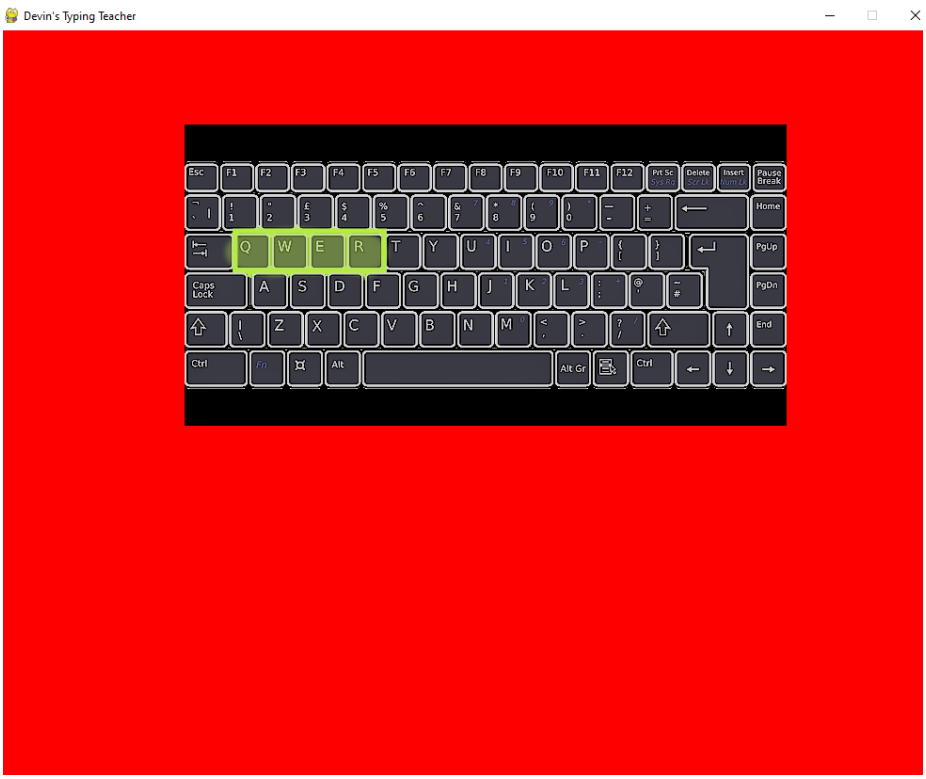
My overall design consists of a main menu, submenus to select difficulty and levels. Once the difficulty and level are selected, you can select play and a loading screen pops up. After the loading screen finishes the level begins with an audio clip with a description of the keys that will be used during the level. Depending on the difficulty setting you will have up to 5 second to push the correct button. If the 5 seconds passes or an incorrect key is pushed the screen will display a nice try message. After a designated amount of attempts a score will pop up on the screen and the game will revert to the main menu. Below are some screenshots of the different states of the game.

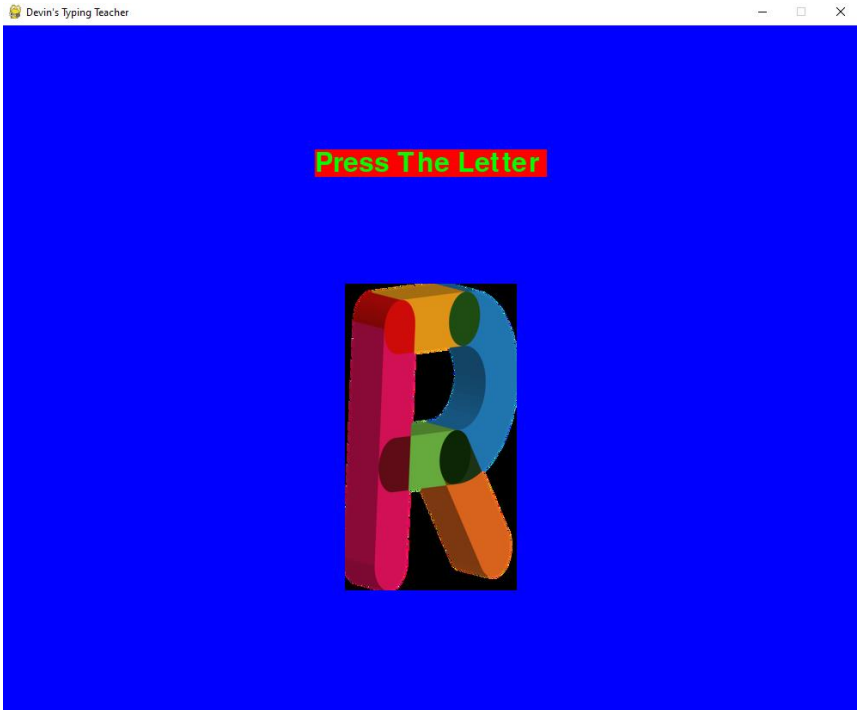

Devin's Typing Teacher
SELECT A LEVEL
LEVEL :< TOP ROW LEFT HAND >


Devin's Typing Teacher
DEVINS TYPING GAME
PLAY
LEVELS
DIFFICULTY
QUIT


Devin's Typing Teacher
SELECT DIFFICULTY
DIFFICULTY :< EASY >


Devin's Typing Teacher
LOADING THE GAME
PROGRESS
77 %


Devin's Typing Teacher


Devin's Typing Teacher
Press The Letter


Devin's Typing Teacher
GREAT JOB!


Devin's Typing Teacher
You got a score of 8 out of 10

Preliminary Design Verification

Because this is solely a software project there was not much verification that needed to be done. The main thing for me was learning the libraries that were available to me in python and coming up with a plan to complete the project in time. My test plan involved me designing each state of the game and testing the functionality of it.

Design Implementation

For my implementation I was able to design multiple menus. Each menu transitions from the main menu into each sub menu and you can then go back to the main menu. From the main menu you can then launch the selected level and play the game.

My project is fully coded in python a language that I am not too familiar with but helps with graphic design. Initial work was to design the menus and getting them to interact with each other. Once I was confident that the menus interacted properly with each other I went onto level design.

For the level design I wanted each level to introduce itself with a brief description of the keys that are being used in the level as well as a visual helper to show the keys in level. After the description is completed, the game begins. An image will be displayed on the screen with the key that should be pressed. The user will have a certain amount of time to press the key depending on the difficulty that was selected. Once a key is pressed it will display a message depending on if the correct key is pressed. If an incorrect key is pressed or the timer runs out a message will display. Once the level is complete a score will be displayed and the game will go back to the main menu.

The level design was particularly challenging for me. Ensuring that the screen transitions and shows the proper image or menu took a lot of trial and error. I was able to fix theses issues and complete the design of the project.

Design Testing

For my testing plan I decided to test each menu and level one at a time for proper functionality. Creating the menus and ensuring they interact with each other required me to use tests to see if proper information was being passed back to the main menu from the submenus. Once this functionality was confirmed, I went into level testing. Initial testing involved just testing to see if a blank screen would appear after the loading screen completed. After some testing and debugging I was able to get the screen to appear properly. I then wanted to make sure that sounds played when I wanted them to. Initially I had an issue where the main music loop would immediately cut off the level description and resume playing. I found a way to allow the music to continue playing while the level description played on a separate channel.

Then I went into actual game design. The game itself is simple in layout but was difficult to implement. The game randomly assigns a letter to be pressed from a designated pool of letters depending on the level. I had to ensure that the game was detecting the proper keystrokes and if any other key was pressed it would show a failure state. Once the state is selected it will display the proper message. Most of my bug issues occurred during this part of the process. When testing each keystroke, I was again having issues with the game reverting to the wrong screen. I had to figure out the proper syntax to ensure transitions exactly when and how I wanted them. A video of the finished product will be included in the final demonstration.

Summary, Conclusion, and Future work

This project was my first attempt at designing a program that has several transitional graphic states and in a programming language that I am not familiar with. This project is personal to me, because I feel like it is something that not only I can be proud of but my son as well. I plan on continuing to expand and refine this project. I soon plan on adding numbers and other keys. I would also like to do more graphic design on the project to make it more visually appealing.