Criterion A: Planning

Defining the Problem

My client, F, a teammate from my football team, has consistently had memory, reaction time, and hand-eye coordination issues that could now affect how he plays football. He often needs to make quick decisions, react quickly, have a good memory, and have strong hand-eye coordination. He needs help remembering his job in the play and often has to ask players around him if they know or ask the coaches, which could slow down practices and possibly lose games **(refer to Appendix 1 for interview)**. Overall, this problem could be detrimental to him since he wants to be able to play as best he can, and an issue like this could lead to him getting removed from the team.

Rationale for Solution

A solution for this problem would be creating a macOS application as it doesn't need to be used on the go, but at home. After asking F, he said he has a Macbook so it would also be compatible with his computer, and it is still compatible with Windows computers if F were to switch. I've chosen to use Godot to make the application because although it's labeled as a game engine it still has many easily accessible and learnable ways to create applications **(refer to Appendix 2 for interview)**.

The application must provide F with exercises to test/ improve reaction time, hand-eye coordination, and memory. The application will give F 5 separate exercises/ tests that will either improve, reaction time, hand-eye coordination, or memory, and in some cases multiple. This is because the client said 5 exercises would be sufficient to keep him from getting bored and provide some variety **(refer to Appendix 2 for interview)**. Godot has its built coding language called GDScript, which is very similar to Python, a language that I'm already very familiar with. Therefore, I will use GDScript as the application's coding language. Godot is also helpful because it is free and open-source, unlike other game engines (Rock Milk). To download Godot you also only need 30 megabytes (MB), and it has a massive API so that any object I'd need, I wouldn't have to make from scratch (Rock Milk). My advisor for this application will be the head coach of the football team since he is relatively knowledgeable in coding and understands the details of the problem.

Success Criteria

1. The application should have 5 functioning exercises to test hand-eye coordination, memory, and reaction time.
2. Calculate the scores for each of the tests/ exercises and display them.
3. User must be able to save/ load/ delete the data from their exercises.
4. The reaction time test must accurately measure the amount of time it takes for a user to react and find the average of five tests in milliseconds.

5. The sequence memory test must use a random pattern of buttons every time and with every level of the test the length of the sequence must increase.
6. The aim trainer must provide a certain amount of targets appearing one after another when the user clicks on it, provide an accurate measurement of the time taken for each target, and determine the average time taken, in milliseconds.
7. The language memory test must use an array of at least 500 words and provide a random word from that array approximately ½ of the time and create a new array of all the words the user has already been shown and show a random word from that list approximately ½ of the time. The user should be given 3 lives, and the test will end when the user runs out of lives.
8. The number memory must be able to show the user a random number whose amount of digits increases as the level increases. It must allow the user to input the number they think is the answer, use the return key to enter their answer and use the delete key to delete the most recently inputted number. The user must only be able to input numbers.

Bibliography (also in Appendix 5):

Rock Milk. "Why we choose Godot Engine." *Medium*,

medium.com/rock-milk/why-godot-engine-e0d4736d6eb0. Accessed 20 Dec. 2024.

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