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CS Senior Design 1

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Binturong Game Individual Capstone Assessment

This project is about creating a game that is fun to play and helps students effectively learn material. I personally find competition to be fun and expect that a competitive game would be an effective way to review material. AI tools on the internet are not great, so developing a self-hostable solution is import for my use. The goal is to create a standalone hostable game platform that students and teachers can use to cover material. The idea covers many skills that I have acquired during my degree and will be a great opportunity to demonstrate my understanding. I hope to provide an elegant solution to classroom or small group study sessions.

I have acquired many relevant skills during my coursework at UC. First, the project will be using docker which requires understanding of Operating Systems and containers. Additionally, docker permits users to outline networking device setups to deploy applications via docker-compose. Networking will be required to ensure performance adequate to keep up with real time a gameplay loop. Given that the project will need to keep up with the game server in real time, client-code will need to be written with performance in mind. Since the client is a browser, some users may be using limited hardware. Both knowledge from Data Structures () and Design and Analysis of Algorithms () will be important to keep the game playable for a range of devices.

I have acquired many relevant skills during my COOP experiences, all of which were done at Etegent Technologies. I plan to write the backend using FastAPI which I have experience in while building various REST APIs. The game server and client will be written in Typescript which I have experience in with my time developing web applications. I have no professional experience using Three.js, the graphic framework I plan to use; however, it has a similar API to the browser canvas. I have experience 3D modelling for game development outside of work. My experience using package tooling and docker at Etegent will be helpful for creating reproduceable setup steps.

The motivation for this project is that I have tried other LLM-powered study games and never found myself having fun. They are typically running games with low engagement. While researching I found the open-source technology anki. There doesn't seem to be any projects that are exactly like this that use anki card packages. The primary feature to anki is that it provides a proprietary file format that can be easily parsed as a sqlite file. This will be an extremely helpful feature for data serialization. I plan to provide anki file generation features from both PDFs and YouTube videos.

A key issue that I find with existing tools like Kahoot, where games are points-based, is that it is very difficult to comeback after just missing a single question. As a design decision the individual matches of Binturong Games will be much shorter. The total number of wins will be counted on a leaderboard. There are tools online used for generating anki card packages via LLMs. Nearly all online services require payment to use LLM features. There are no great self hosting options exist, so I decided to build one. I expect to be able to develop 5 survival game scenarios that users can play.