**Hocking Final Narrative (W7)**

CS 499 has provided me with the opportunity to show proficiencies in a wide variety of computer science subjects while also creating portfolio worthy pieces of software. The course itself presented size major course outcomes that I showed proficiency in throughout the work I did on both of my artifacts and during supplementary work. This final narrative will outline how each of the five required course outcomes were met throughout my work in this course.

**Course Outcome 1:**

Course outcome one was initially only cited to be met by the jukebox artifact, but I showed proficiency in the outcome throughout both artifacts. Creating collaborative environments requires taking steps to ensure that any developer can open a project for the first time and quickly get an idea of how the project functions. This course goal was met via in-depth documentation that has the specific focus of giving any developer a good idea of what a specific function/group of lines does. Alongside this, I also implemented a significant number of comments with a WHY basis as opposed to just WHAT (Why something does something as opposed to just what it does). Additionally, I implemented categories for functions that allow developers to easily figure out what that part of the file is dedicated to. If a set of functions is labeled “Artist”, then the developer knows that part of the file is dedicated to functions related to the artist class. This level of documentation extends outward from just the codebase as well. I created an in-depth document that goes with the jukebox application thats specifically designed to list out the different functions of the database and UI alongside the categories that they are associated with. All of these enhancements make the jukebox application much more suited for a collaborative environment and show completion of this objective.

**Course Outcome 2:**

Course outcome two was met via a significant amount of supplementary work that accompanied the enhancements alongside the improved documentation within the specific enhancements. The jukebox application was accompanied by a document that goes over every component of the project ranging from the database tables to the different functions of the UI. I also delivered each enhancement with a video that provided additional context on the changes made of showed them off both in code and in action. This combination of extensive documentation and targeted supplementary material shows proficiency with a multitude of communication platforms, therefore fulfilling this course objective.

**Course Outcome 3:**

Course outcome three was a major focus of both artifacts due to their diverse nature. Both proposed enhancements included a rather open-ended goal (database migration/chess AI) that included a large number of different options for me to choose from. I specifically reached this course outcome by taking the time to research my different options and weigh each of their individual pros and cons to pick the best possible solution for each project that aligned with computer science standards.

Specifically, I chose a Minmax chess AI due to the ease of expandability and how diverse the AI is even with a low ply count. The major downside of this algorithm is how resource-heavy it becomes as additional plys are added, but I ensured that there are methods that can be used to reduce the number of paths explored in these situations, therefore mitigating this issue.

I also reached this goal via my choice of using an SQL-based database to migrate the jukebox data. Although SQL poses additional challenges via how ridged it is with data amount, it also provides much faster query times that are more reliable under heavy loads. This means that the MySQL-based DB is a much better choice for an application that may greatly expand (such as a music platform).

**Course Outcome 4:**

Course outcome four was met via my use of modern and innovative techniques to solve the enhancement I proposed for the chess project. I ensured that the chess AI algorithm I found (Minmax) was modern and well-developed. The algorithm itself and its derivatives are used frequently by modern chess AI models. In many cases, either Minmax or heuristic neural net models are used to create modern chess AI. Although the Minmax algorithm I implemented is relatively simple, it shows a great deal of proficiency in working with modern innovative techniques, therefore meeting this requirement.

**Course Outcome 5:**

Course outcome five was specifically targeted during the addition of a login system in the jukebox application. This feature prevents users from using the application without being registered and limits the playlists each user can see to their own. Alongside this, I also ensured to use SHA hashing to fully secure each user's credentials. This emphasis and targeting of security features to protect the user show that I met this security-based course outcome.

Overall, both of my artifacts show that I met each of the required course goals while exploring a variety of tools within computer science.