CPSC 304 Project Proposal

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By typing our names and student numbers in the above table, we certify that the work in the attached assignment was performed solely by those whose names and student IDs are included above. In addition, we indicate that we are fully aware of the rules and consequences of plagiarism, as set forth by the Department of Computer Science and the University of British Columbia.

1   Project Description

The domain of the application is the management of data related to tournaments that take place in the online rhythm game "osu!" (game-specific information can be found in Section 5). A significant aspect of the game's culture has to do with competition and seeing "who's the best" — while the osu! website and by extension the game's underlying systems provide an *overall* leaderboard and ranking system (based only on individual performance), no such thing exists specifically for those who compete in *tournaments*. The system aims to provide tools for the tracking, filtering, and ranking of tournament data such as players, matches, beatmaps, and other such auxiliary information.

The database models several key aspects of osu! tournaments:

- **Player Information**: This includes general player information such as name, overall rank, and country, in addition to tourney-specific information such as scores set, badges won, and match win/loss. As a result, users can query things such as "who is the newest player to have won a badge?".

- **Tournament Catalog**: The database keeps a record of tournament data including rank bounds, name, and badged-status. Given the grass-roots nature of osu! tournaments, it has been hard historically to find information about older or smaller tournaments online without word-of-mouth. This provides an easily manageable aggregate of that data.

- **Score Data**: The system stores info on plays that have been set in tournament matches; for example, the achieved score, the date set, and any mods used. As a result it will be easy to ask a question like, "what is the best score that has been set on map X during a tournament match?".

- **Mappools and Beatmaps**: Information about beatmaps, songs, and artists will be stored. The set of tourney-appropriate beatmaps is relatively small, but at the same time mappoolers want to avoid reusing beatmaps between tournaments for the sake of variation. This will give them tools to enforce these guidelines.

2   Database Specifications

The database will store statistics and data related to osu!, providing efficient access. Users will be able to access their own and other player's scores pertaining to specific beatmaps, songs, and artists. Users will be able to access the country a player is from, any beatmaps/beatmapsets they may have made in a specific gamemode, as well as the song + artist associated with the beatmapsets. Additionally, they can access tournament and match history associated with certain players.

3 Application Platform

We will be using SQL*PLUS/Oracle for our DBMS. Frontend and backend development will be done using Type-Script and Node.js.

4 Entity-Relationship Diagram

The full ER diagram can be found on the last page.

5 Additional Information

osu! is an online rhythm game where players click circles to the beat of songs (video here for example). Like most rhythm games, your score is related to how accurately you play a "beatmap". For all intents and purposes, a "beatmap" or "map" simply represents a song in combination with its circles/notes. All beatmaps are player-created and player-curated. The interesting part of the game is that it provides global player leaderboards — maps are given "pp" (performance point) values based on their difficulty. As such, improving your global rank necessitates that you set high scores on difficult beatmaps. Leaderboards also exist for each beatmap, which allow users to see "who set the best play on this map?".

There are two things of note here. Firstly, although global leaderboards exist, osu! is fundamentally a *single-player game*. Your rank improves by setting individual scores, in contrast to, say, a game like chess, where it improves by defeating other players. Secondly, osu!'s pp system has *flaws*. While the game's concept seems simple at face-value, there is in reality such a wide variety of ways one can arrange circles on a screen that it gives way to skillsets/specializations; some players may be better at tapping fast ("speed") and some may be better at cursor movement ("aim"), just to name two very basic examples. The result is that it is nearly impossible to accurately weight the difficulty of every beatmap in relation to each other.

This gives rise to the concept of osu! tournaments, where players compete against each other to see how good they are (and sometimes win prizes). This specifically is the domain of our system. Tournament formats vary but are typically similar to a standard sporting event; players are seeded and then face off in rounds (e.g. round of 16, quarterfinals, semifinals, finals, grand finals, for a 32-player tournament). One important caveat is that for each round, a staff member called a "mappooler" picks a set of valid beatmaps that can be played for that round. During each match, players take turns picking and competing on maps from the mappool until somebody wins (e.g. in a best-of-13 match, one would have to achieve better scores than their opponent on 7 maps). In a typical scenario, maps in a mappool test a wide breadth of skillsets, and as a result the winner of a tourney can in theory be understood to be the most well-rounded player out of the ton.
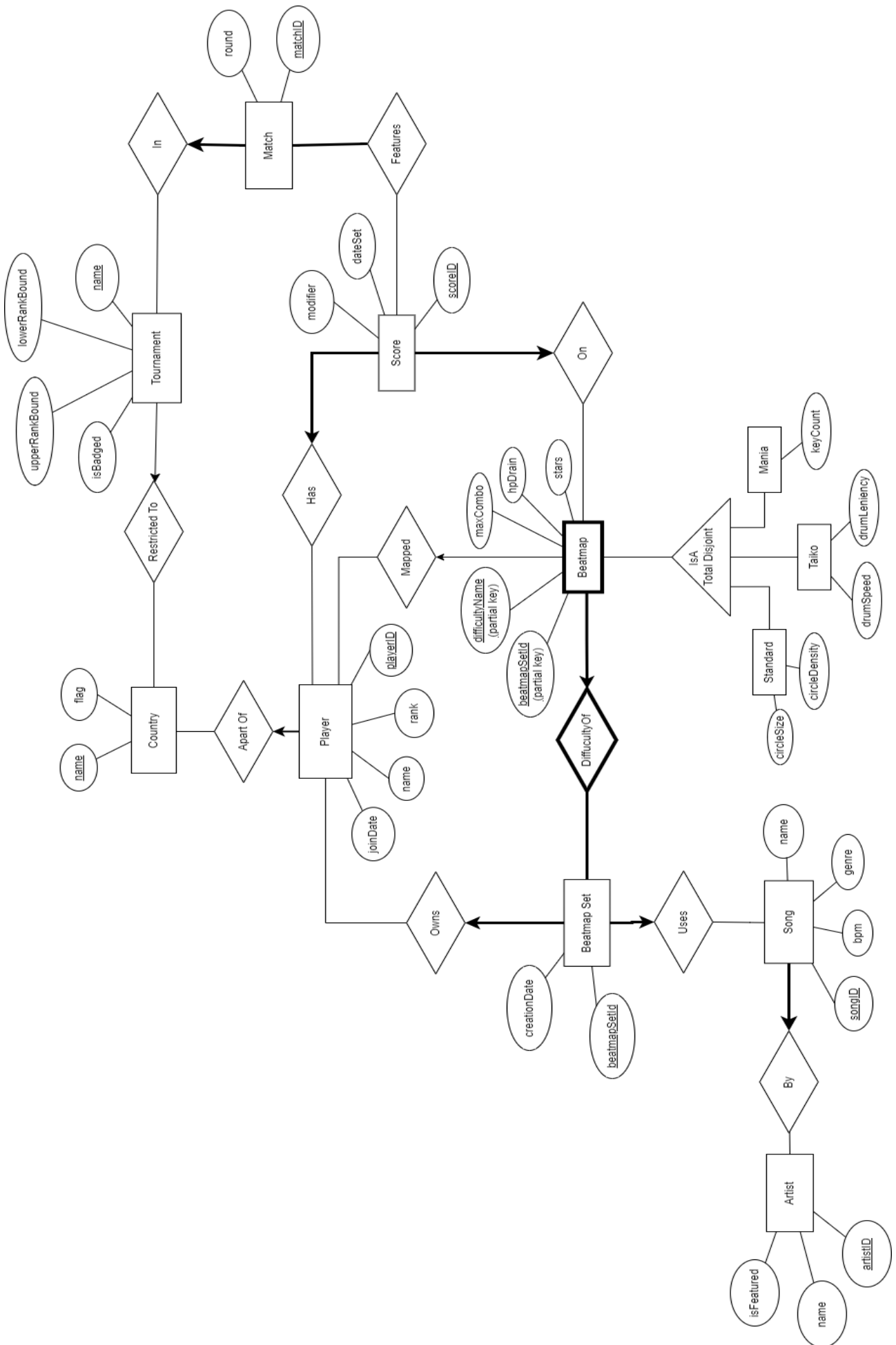
More information about osu! and its tournaments can be found here and here.

Figure 1: Entity-Relationship Diagram.