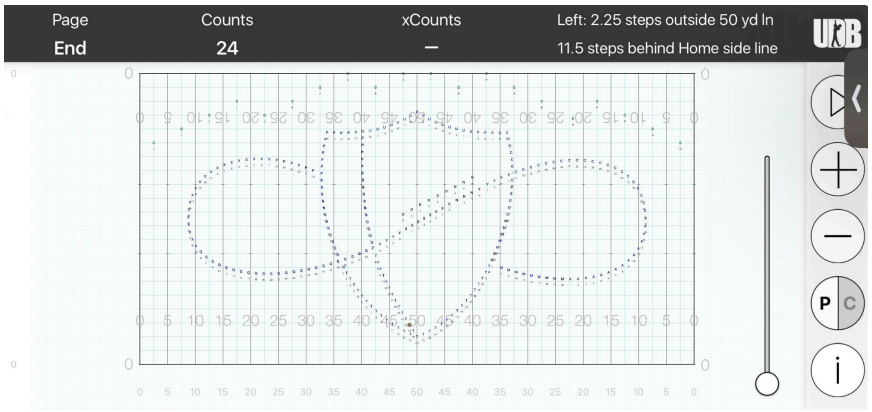
Final Project Report

Matthew McMahon | mcmahoma@oregonstate.edu

Project description:
For this project, I plan on replicating the 2D marching drill app ‘UDBapp Pro,’ or UDB, which is used by the Oregon State University Marching Band. The goal is to incorporate and animate 268 players, or ‘dots,’ on a football field plane in 3D space. Each dot will be animated proportionally to an example drill. Additional features that will be implemented that differentiate it from the original version will include different camera angles (including but not limited to birds-eye view, box view, and sideline view. Different assets needed will include 3D models and textures for the field plane and the players. User interaction will remain the same with the sample code for scaling and rotating the scene, but will also include keybinds for changing the camera perspective, and locking rotation (such as in Project #2). External files for determining each player’s X and Z positions will be used to set each player’s coordinates.

Below is an example of a ‘set’ from UDB, featuring the OSUMB logo:



Enhancement goals:
Plans for expanding functionality and enhancements depending on time constraints include parsing and using real drill used in the OSUMB 2024 season for the show titled Take the Field 2024, adding MIDI/MP3 functionality to play a song during and lined up with the animation, and including slightly more defined player models and unique instrument models imported as .obj files.

How to implement this proposal in a weeks time:
Given approximately 7 days time to work on the project, plans for each day will be the following:
Day 1: Setting up the environment, camera positions, initial planes, testing initial animations.
Day 2: Map textures, parsing real drill.
Day 3: Parsing real drill.
Day 4: Working on setting up midi/mp3 functionality and parsing real drill.
Day 5: Finishing midi/mp3 functionality and adding unique models.
Day 6: Final testing and bug fixing.
Day 7: Writing the final report and submitting the project.

Final Project Description

In the final version of the project, I replicated the 2D marching drill app UDB in 3D, as mentioned in the original project proposal. I incorporated all 268 dots, each with their respective keytime animations and timed to follow along to the music playing. Several preset camera angles were implemented including the regular camera, a front sideline view, a birds-eye view, and the box view and are each selectable through the right-click menu or through keybinds. OpenAL (Open Audio Library) was used alongside the graphics to add sound to the program.

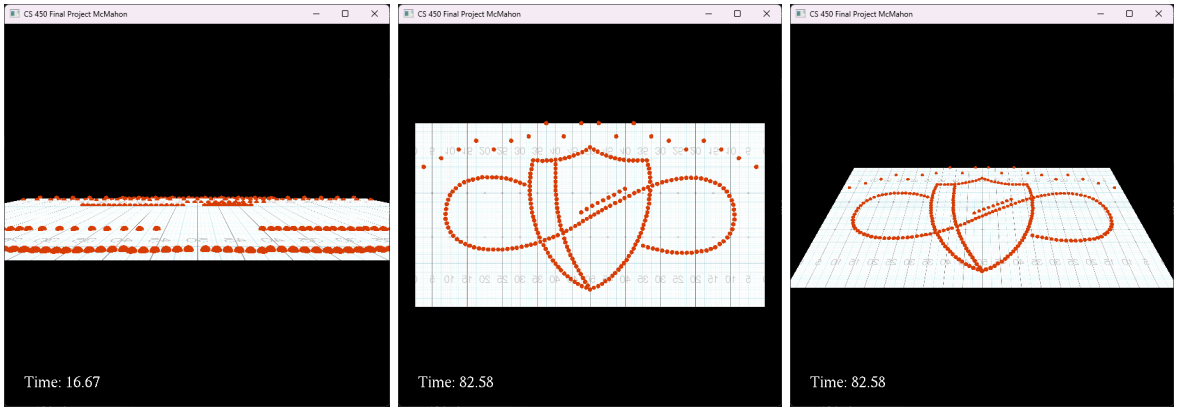
Differences from the Proposal

In the proposal I had planned to include 3D models for each of the dots with textures, though this was not implemented in the final version due to time constraints. Other than this, all other features were implemented.

Learning Results

The main thing that I learned was how to use OpenAL to read a .wav file and play sound while an animation was playing in the background of the sample project. Using Enigma Tutorials' video on YouTube and AudioFile.h file, link found here, and the OpenAL documentation, I was able to play music within the program. A few of the things that I got more experience with were keytime animation when programming each of the 268 dots, and texture mapping when mapping a texture to a plane rather than a sphere.

Here are some images of the project:



Link to showcase video:
https://youtu.be/PnHi0mqXNJY

Sources are on following page →

Sources:
How to setup and use OpenAL for game audio in C++ (Using Visual Studio) tutorial
https://youtu.be/WvND0djMcfE?si=KT7H1F-AZm9yBTIA

OpenAL Documentation
https://www.openal.org/documentation/