Jing Kappes
rkappes@pdx.edu

Project name: Ear-Training

Topic Area/Description: The goal is to create a program that can be used for ear training. For many musicians, it's important to be able to identify different musical intervals and chord types (and their inversions) by ear. This program would work for 13 different interval types, and 9 different chord types and their inversions (tables below for details).

Planned Functionality: For interval training this program would play two pitches and the user would need to guess what interval it is. Or the user could choose the starting pitch and specify the interval they want to hear from that pitch. Similarly for ear training with chord types, the program would play one of the chords and the user would guess which type it was and the inversion. Or the user could specify a chord and ask to hear it in a specific inversion or key.

Program Specifics: There are existing crates in Rust for music theory, such as *rust_music_theory*, that I plan to use to help generate the notes for the specified interval, or generate the notes of a chord. Using this crate would also be helpful for generating a chord within a specific key. I plan to use the *cpal* Rust crate to be able to play the notes/chord back to the user.

Plan:
Week 5: Familiarize myself with the crates and figure out how to create a note and chords, and how to play it back
Week 6/7: Create functionality to randomize playing different intervals for the user to guess, and creating a second note of a specified interval from a starting pitch
Week 7/8: Create functionality for generating chords of different types - and in different keys
Week 8/9: Create functionality for inverting chords
Week 9/10: Finishing touches/buffer time

Potential Issues/Concerns: I am guessing that I *will* run into issues (since things never go smoothly the first time). I am wondering how it will go to take notes created using the music_theory crate as input for audio playback (using cpal).

Intervals, Chords and Inversions:

Interval Types
Octave
Minor 2nd
Major 2nd
Minor 3rd

Major 3rd
Perfect 4th
Perfect 5th
Minor 6th
Major 6th

Minor 7th
Major 7th
Diminished
Augmented

Chord Types
Major
Minor
Diminished
Augmented
Major seven
Minor seven
Dominant seven
Diminished seven
Half-Diminished seven

Chord Inversions
Root
First
Second
Third (only for seven chords)