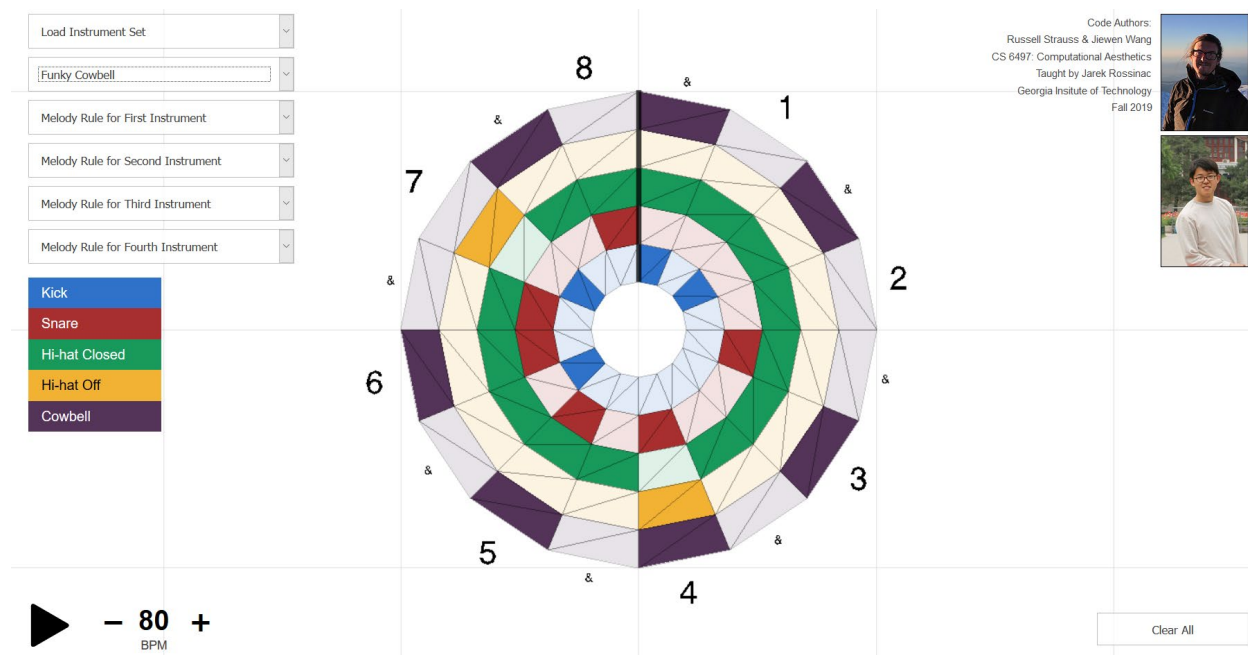


P2 Rhythm Wheel

Demo video part 1, rhythm: <https://youtu.be/eeAbadWr1r4>

Demo video part 2, melody: <https://youtu.be/QEZceh2Hd6U>

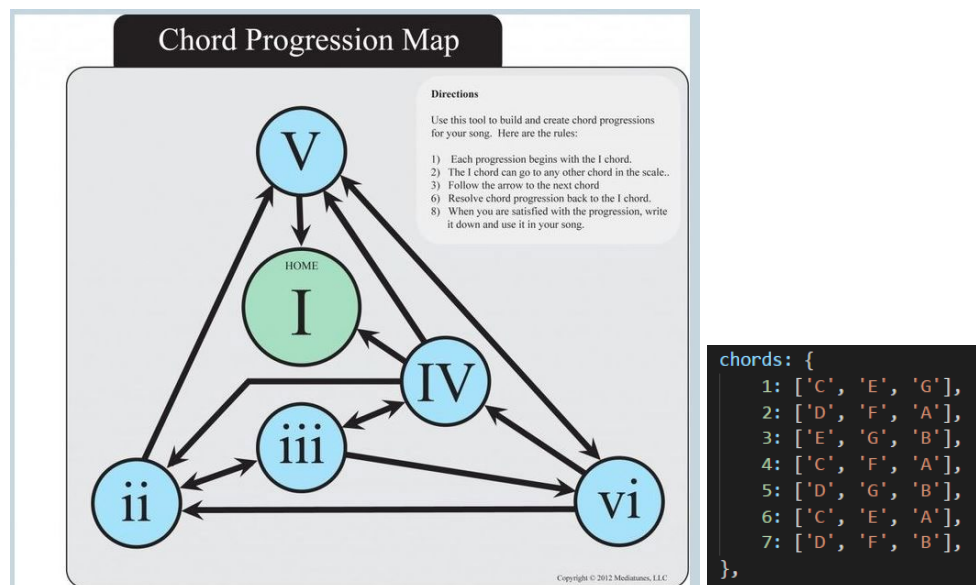
The rhythm wheel gives us an intuitive way to interact and manipulate rhythms. The wheel aligns itself to the structure a clock, a form that many are attuned to represent time. Each angular portion of the wheel represents a beat and the different tracks from the inner to outer wheel represent different instruments. The user interface provides a unique experience to manipulate and interact with the different beats. With an even number of beats on the wheel, the notes appearing opposite from each other on the wheel will play in beat with each other. In technical terms, every beat plays at constant rate, regardless of the condition of the wheel. Yet, by manipulating the length of the wheel and interstitial spacing of the different notes, a pleasant nearly infinite permutations of beats can be formed. The visual relationship of the wheel also provides the user with a mechanism in which to interact and expect beats to be either on, slightly-on, or off rhythm beats, which is highly important when interacting with time-based user interfaces.



The next part of this project is creating a melody to follow the percussion beats. We translate the beat tracks to melody tracks to be played by digital synthesizers. For each of the track, user can select from 3 genres of translation rules: Replicate, Shift and Interval, and there are a couple of permutations to each rules. There are 13 rules in total:

- Replicate: Just play melody notes with exactly same timing and duration
- Replicate Long: Same timing but each note is twice longer
- Replicate Monotone: Always play the lowest note in a chord.
- Shift 1 Beat: Play the melody note 1 beat ahead of time
- Shift 2 Beats
- Shift 3 Beats
- Shift 1 Beat Monotone
- Shift 2 Beats Monotone
- Shift 3 Beats Monotone
- Interval: Play one beat and then skip one beat
- Interval Shifted: First skip one beat and then play one beat. Do it alternatively.
- Interval Monotone
- Interval Shifted Monotone

In order to determine the pitch of generated melody notes with some variety yet being harmonious, we adopt the idea of randomizing chord progression. This example of chord progression map¹ describes possible modes of progression that people find common in various music genres. Composer can start with any chord and follow the arrows, and eventually resolve chord progression back to the I chord.



We simplified the graph to one-dimensional randomized chord progression line for easier implementation. The progression is like this:

1,4,(5),3,(1),6,2,5,(3)

Every time the beats finish a circle around the wheel, the algorithm changes the chord to the next one in the array. The chords in parenthesis is played at 50% probability. They may or may not be played. This algorithm can generate some well-known chord progressions that are widely used in pop music like 1453, 1625 and 143625.

A chord contains 3 notes as the screenshot above. Currently we only implemented C major scale. Every single notes that are played along beats are within the same chord.

¹ <https://music.stackexchange.com/questions/43420/chord-progressions>