

# The Labyrinth of Limitations

**All the Things You Are**

phrase 1

vi — ii — V — I — V — I — iiø — V — I — I

AbMajor: DbMajor: CMinor: CMajor:

Version 1.0  
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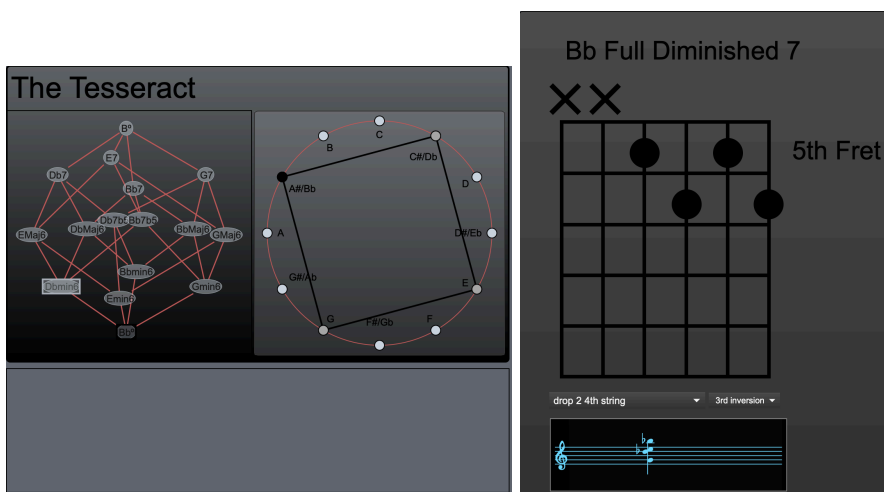
# Welcome to the Labyrinth

Thank you for your subscription to The Labyrinth of Limitations! The Labyrinth is an application for exploring harmonic improvisation. It uses the nuanced and innovative ideas of Dr. Barry Harris to play over harmonic progressions, even being able to convincingly play over entire jazz standards. While the main focus of the Labyrinth is educational, it also functions as a “sound art” installation of sorts, and a creative collaborator. The Labyrinth is also a living educational document. It serves as an interactive compliment to my Youtube channel by the same name, where I explore the implementation of Barry Harris’s teachings on the guitar. The Labyrinth will be periodically updated with new songs, and lessons exploring the essential concepts, and serves as a way for me to meaningfully engage with the LoL audience. Additionally, this is the beginning of a new suite of creative and educational apps that will all be eventually available under the same subscription.

This manual will go over the main features and workflow. Feel free to explore the app right away without reading ahead, but I’d suggest holding off on using the options in the Repertoire menu until you’ve read about them here.

## Quick Start

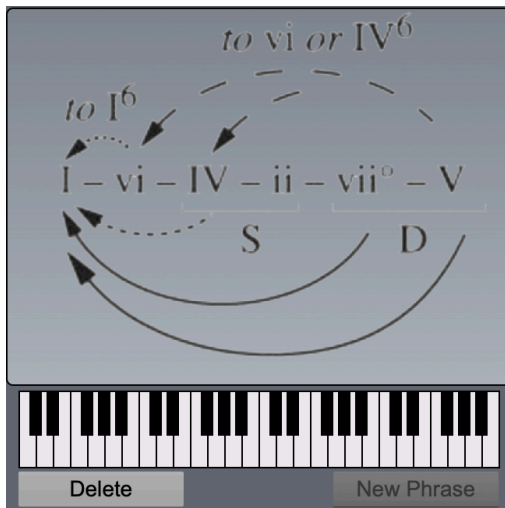
The Labyrinth might take a moment to engage with your speakers when first opening (possibly 20 seconds). After it has opened, you will see two windows:



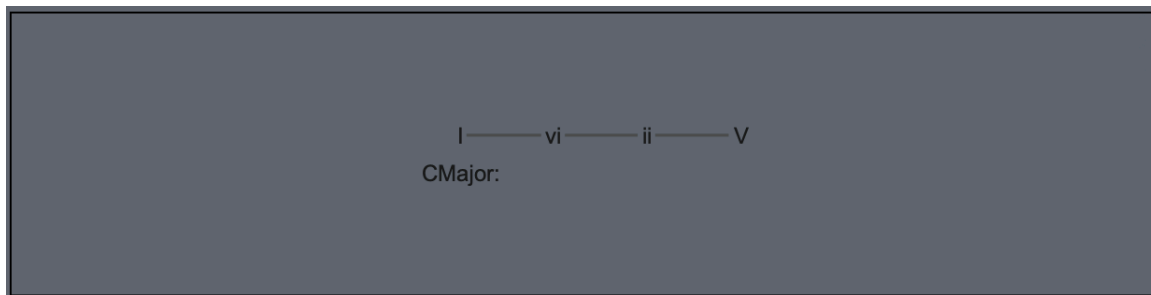
## First Moves

Use the **right** and **left** arrows on your keyboard to explore the range of the guitar fretboard while listening to the sound of the synthesis engine. Use the **up** and **down** arrows and watch the tesseract labels change (this is the web-like object in the left window). **Click on one of vertices** of the tesseract (where the chord labels are) and notice how the fretboard moves to that chord by the smoothest possible voiceleading (each note moves by the smallest amount possible). These are the essential “moves”, though there are other moves that are equally accessible. Let’s try some more!

**Click on the empty rectangular space** (I call it the “harmonic canvas”) beneath the tesseract (alternatively, you can go to the “labyrinths” menu, found at the top of the screen on mac and at the top of the window on windows, and select “progressions”). You should see a window that looks like this:



**Click on the Roman Numerals** and notice how the harmonic canvas becomes populated. **Type “c”** and notice how the progression is cleared, leaving the canvas blank. Now select the following from the “progressions” selector: **I-vi-ii-V**. The canvas should now look like this:



**Press the spacebar** and watch/hear the app move through the progression. You can also **press “p”** to start the sequencer, which plays through the progression until you **press “p” once more**. In this version, when playing progressions, the app stays on the same set of strings, unless otherwise directed. However, if you play through this progression enough, you will notice how it explores the full fretboard of the guitar, eventually returning to the same place. This improvisatory behavior is brought about by the fact that the app chooses among several different possible “substitutions” any time it sees a “V” chord. In addition to following the musical score and fretboard, you can verify which choice is made in the top right hand corner of the main window:



Some of these descriptors might seem strange to anyone who is unfamiliar with Barry Harris’s concepts. They are all explained in detail in Episodes 1-10 of the [“Labyrinth of Limitations”](#) Youtube series, with accompanying pdfs on my [website](#). For now, the most important thing to understand is that these substitutions represent different ways of improvising over a “V” chord, each of which lends a different coloration to the music.

Using the **spacebar**, sequence forward until you are on the V chord. Now, **click on the label in the top right corner** and notice that it turns red:



This means that the substitution choice is “latched”: in the example above, every time I come upon the V chord in this progression, the app will play the “tritone’s minor”. In this case, it will also make the progression stay in the same position of the fretboard (though this is not always true), as long as the chord is latched. Once you’ve played through the sequence and arrived at the V chord again, you can click on the red label to unlatch it. Sometimes you’ll find it preferable to always play a particular substitution over part of a tune. This allows you to do just that!

Now that you’ve gone through the essential moves in the Labyrinth, read ahead to learn about other features of the app. To start, we’ll go over the process for saving and recalling tunes from memory.

## Memories in the Labyrinth

Now, go the “Repertoire” menu at the top of the screen (or top of the main window on windows machines). Select “All the Things You Are” and see how the app loads the progression for the first 8 bars of this jazz standard into the canvas. Press “p”

and take a listen! Once it gets to the end of the progression, it just goes back to the beginning. We're going to work together to enter the rest of the progression into the canvas. . .

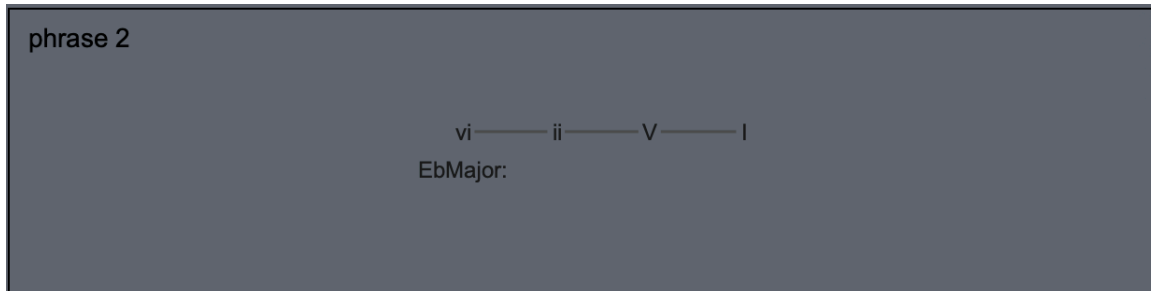
Click on the blank space in the canvas (or go to Labyrinths > Progressions from the menus) so that we are again looking at the progression selector. Click on the button that says "New Phrase":



The Canvas should now be empty again. From the keyboard (found directly above the "phrase" menu) select Eflat:



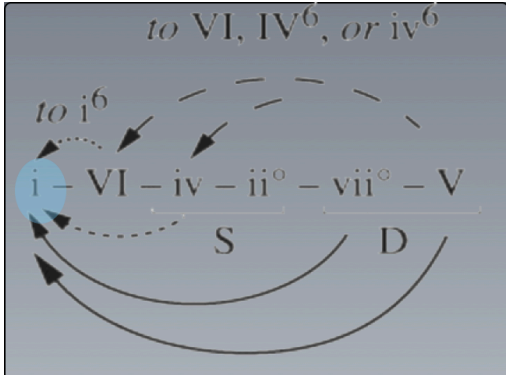
Now select the following sequence from the Roman Numerals: vi-ii-V-I. Your canvas should look like this:



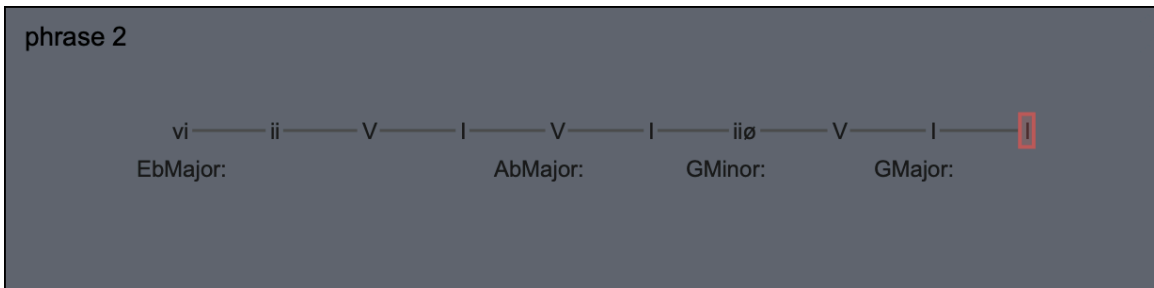
Now, we'll change keys again by selecting A-flat from the keyboard. Select this:

V - I

Then Change keys by selecting G from the keyboard. Press the "m" key on your computer keyboard to change to the minor mode. The harmonic selector should look like this now:



Select “ii°” and then “V”, then press “m” once again, switching the selector back to the major mode. Select “I” and then “I” once again. This is how your harmonic canvas should look:



If you made any mistakes, you can hit the delete button, which will delete everything EXCEPT for the first chord in this phrase. If you need to delete that one, you would need to reload the song. Since we haven’t saved this phrase yet.

Before playing the progression, let’s add a couple of rhythmic details. Click on the 4<sup>th</sup>, 5<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> chords in the progression. You will see that it says “short” in the top right corner of the window (you can click the same chord twice to switch from “short” to “long”):



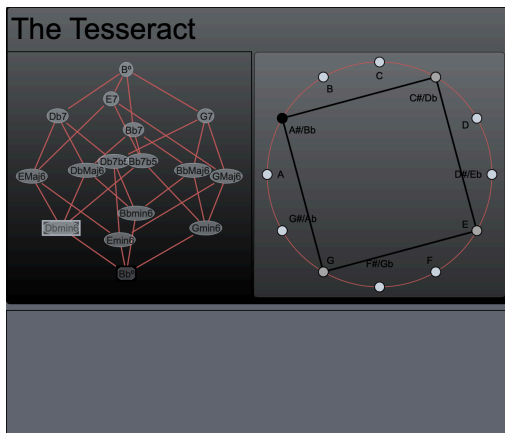
Once you’ve done this, the progression is now ready to be played! Press “p” and notice that the second phrase has the same harmonic rhythm as the first phrase. These are the second 8 measures of the tune.

Now let's save what we've done! Just in case you want to keep the shorter version, which could be handy if you just want to practice playing over the beginning, for example. Go to the "Repertoire" menu and select "Save Into New Slot". Give the new tune a name – "All the Things You Are 2" or whatever you find useful. You can always rename a song by selecting "Overwrite Current Slot" which will also save any changes you made in the song itself. Please take note: **deleting and overwriting songs is permanent**, though you can always download and reinstall the current version of ensemble class. In one of the next versions, there will be implementation for importing songs and lessons into the app, without the need to update the app itself.

## Overview of Modules

The Labyrinth is comprised of several modules that interact in important ways. This section gives a general description of each module, along with shortcut key commands when available.

### The Main Window (the Tesseract)

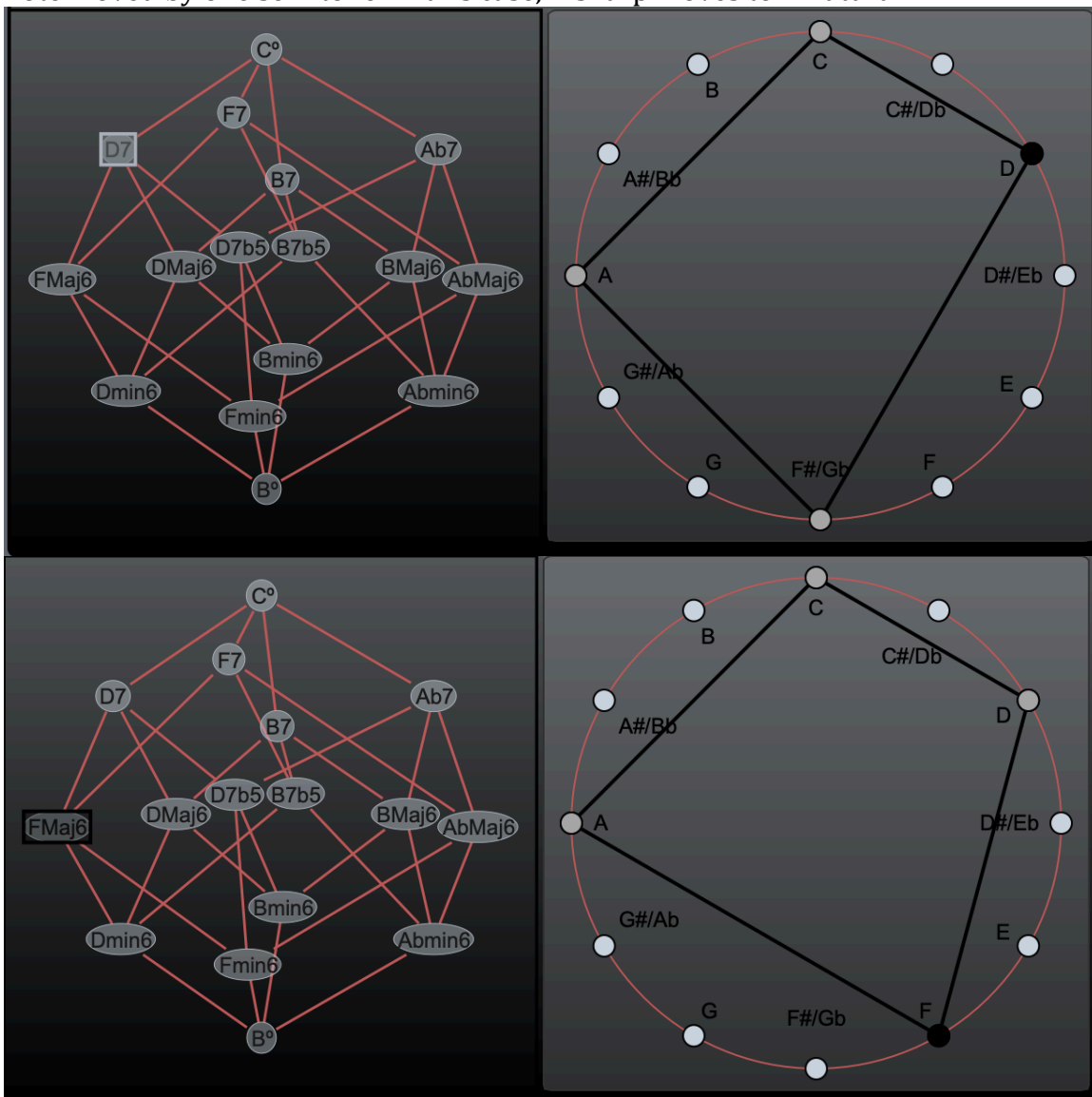


The tesseract is a 4 dimensional cube that maps chromatic voiceleadings (how each note in one chord moves to each note in the next chord) between different types of 4-note chords. The musical relevance of geometries of this sort were discovered by Dmitri Tymoczko, and are explained, in detail, in his wonderful book "[A Geometry of Music: Harmony and Counterpoint in the Extended Common Practice](#)". While a first look at this shape can be confounding, there are a few things that you can come to see fairly quickly that will significantly help you to explore the labyrinth. Notice that there is a fully diminished 7<sup>th</sup> chord at the top of the tesseract, and another at the bottom. Now, take note that the one on top is one semitone above the lower one. Press the **up arrow key once** and notice how the diminished chord that *was* at the



top is now at the bottom (you can **press the down arrow** to double check that this is true). Continue to press the upward arrow and notice the continuing pattern as you move chromatically upward through a lattice (like a beaded necklace) of tesseracts. Once you “move” upward 12 times, you will find yourself back at the beginning again, with the original diminished chord at the top.

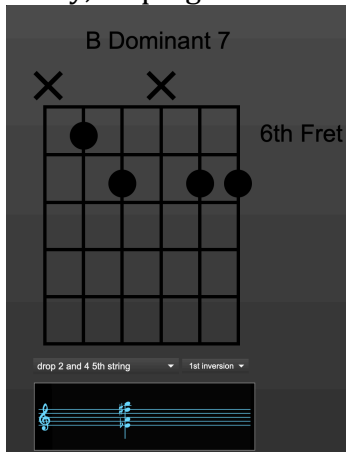
Looking within the shape, it is important to understand that each line that connects one vertex to the next represents one note in a chord moving by one semitone, so that we are now on a different chord that is the result of this motion. For example, in the first image below, I have clicked on the vertex containing D dominant 7. In the second image, I have selected Fmajor 6, which is *directly connected within the tesseract* to D7. You can see in the circle on the right side of each image that one note moved by one semitone: in this case, F-sharp moves to F-natural.



The tesseract represents the various pathways that we can follow to gradually transpose a diminished chord down by one semitone. As can be seen in the 16 vertices of this geometry, we have 4 dominant 7<sup>th</sup> chords, 4 Major 6 chords, 4 minor 6 chords, 2 dominant 7<sup>th</sup> flat 5 chords, and 2 diminished chords. I encourage you to click on each of the vertices and explore the connections. Future updates will have in-depth lessons, and there will be new episodes of “The Labyrinth of Limitations” that will focus in on this in detail.

## The Fretboard

The fretboard is an interactive interface, not just a display. After exploring the range of the instrument by using the **left and right arrows**, try clicking the “strings” in between various frets. In addition to hearing the change in sound, you can see the musical score notate the changes from the fretboard. Try clicking in the blank space above the frets on each string. Clicking once will create a circle, signifying the open string. Clicking a second time will create an “X”, muting that string. If you mute all the strings, the musical score will go blank. Use the “u” and “d” keys to move up and down the fretboard. In this way, you can see that the fretboard can be explored freely, helping students to learn how guitar music is notated, for example.



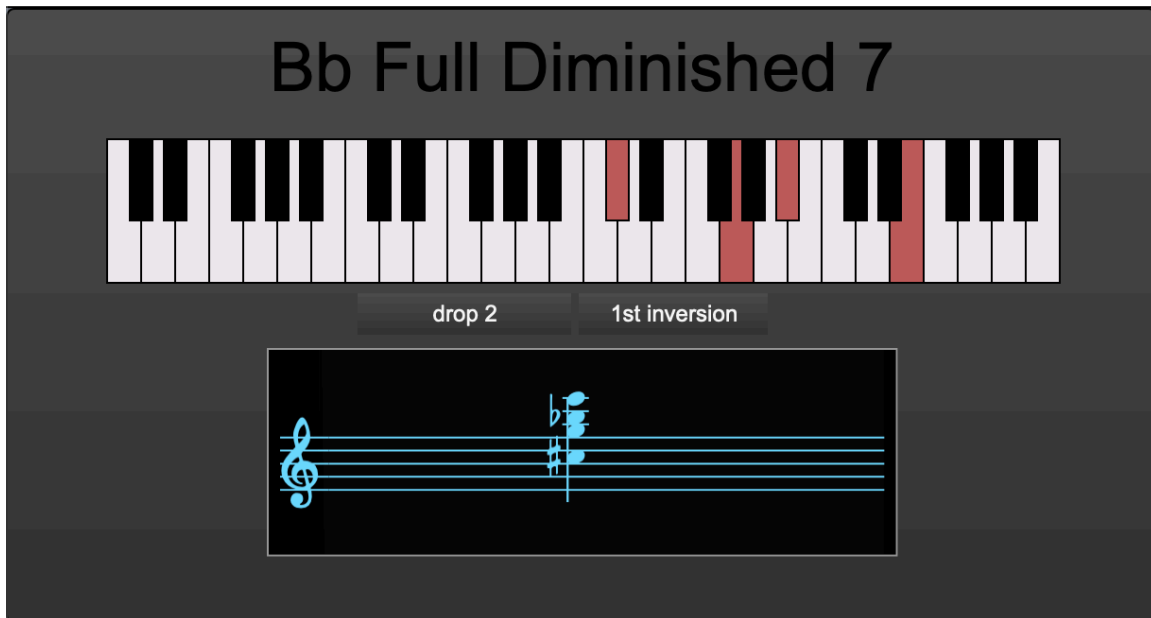
There are menus beneath the fretboard that give some additional options. You can choose between various voicings and inversions as you use the right and left arrows to “improvise”.

While doing this, **press the “s” key** and continue to press the right or left arrows. Notice that you are now skipping through the scale. Just **press “s” again** to go back to the normal, linear scale exploration.

Press the “a” key to switch to arpeggios. As you ascend the scale, notice that the diminished chords are descending, while the “on” chord (as explained in the “Labyrinth of Limitations” youtube series) is ascending.

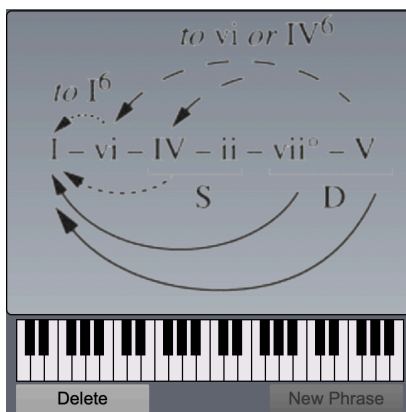
There will be more options in future updates of the Labyrinth, but I hope you'll find these to be fun ways of exploring. Get out your guitar and follow along!

## The Piano Keyboard



The keyboard display is not interactive and serves to help pianists learn from the labyrinth. Use the voicing and inversion menus, the left and right arrows, the tesseract, and the harmonic canvas to control the piano keyboard as you follow along . . .

## The Harmonic Selector



The Harmonic selector presents a map of sorts. In addition to giving an interface for selecting harmonies, it gives guidance in constructing “functional” progressions. To form progressions, you can move from left to right in the roman numeral sequence, skipping over any chords freely (for instance, creating the ubiquitous I-vi-ii-V). Arrows backwards show other pathways for conventional progressions. The ii and IV chords are labeled “S” for Subdominant, while the viiø and V chords are labeled “D” for Dominant (we’ll talk about this more in the future as we look through tunes). One aspect of learning to improvise over tunes is being able to analyze a tune in this way, which allows you to see commonalities between different musical situations and express the underlying harmonic qualities of the song.

## The Synthesizer



You can change the sound of the labyrinth by going to Labyrinths > Synthesizer. Click on the Attack dial and drag upwards to turn it up. This will create a slow attack. Dragging it downward will create a fast attack. Decay can be affected in the same way, and there are controls for Reverb that can get pretty extreme, if you wanted to.

Size – This is the size of the virtual “room” that the sound is reverberating within.

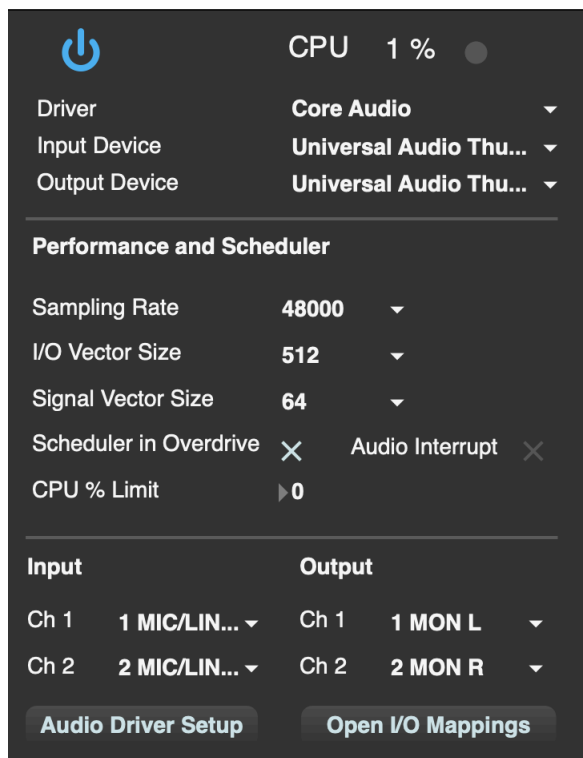
Damp – This changes how hard or soft the walls are in this virtual room.

Decay – This changes how long it takes for the reverberation to end.

Diffusion – This changes how the sound travels throughout this virtual space.

## Audio Setup

This is something that you shouldn't have to use, but it is available just in case the app has trouble connecting with your audio driver. On windows, the standard drivers are ad\_mme or ad\_directsound. On mac, the standard driver is Core Audio. First, **give the app a bit of time** after initiating to do this on its own. If you don't hear any sound after a bit, **make sure that the button in the top left corner is on** (it should be colored blue and not orange or grey). Then, **reselect your driver** and, perhaps, the output speaker as well. It's outside of the realm of this manual to provide audio tech support for individual computers, and the Labyrinth of Limitations has been confirmed to run on all beta test windows and mac machines. There is a lot of information on the internet about audio settings on computers that might come in handy if you've never explored audio applications for your computer that you can check out!



More to Come . . .

This is just the beginning of a new venture, and I have many plans in the works for future releases and lessons. I'm very excited to share this with you, and I would love to hear your feedback.

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