

COMP 3450

Phase Four: High Fidelity Prototype



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Prototype Components

Based on the feedback provided by the users in the previous phase and further research we have conducted, our high-fidelity prototype interface consists of:

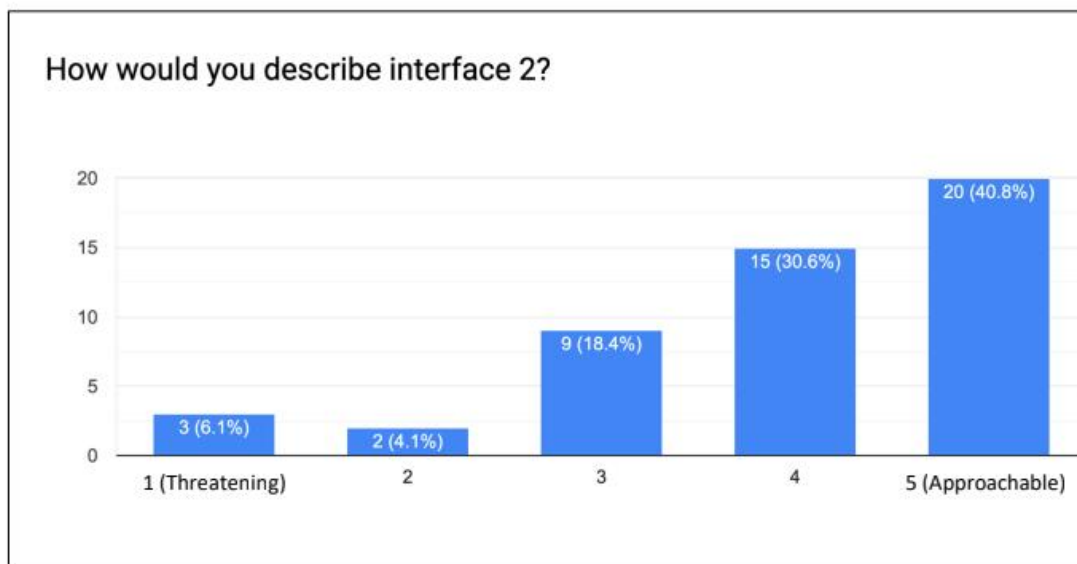
1. One master pitch slider
2. One master volume dial
3. Four radio buttons for selecting waveforms
4. Two filter cut-off and resonance knobs
5. Four knobs for master ADSR (Explained further below)
6. Four knobs for filter ADSR
7. One knob for filter ADSR amount

Setting up the program

1. Extract all the files from the zipped synth project.
2. Open the project in an IDE of your choice.
3. When you run the project, the IDE should ask you to resolve an issue.
 - a. Navigate to the root of the project folder and point the resolve wizard to “jsyn-20171016.jar”
4. Open the “EZSynth_Mk1.java” file
5. Run the file!

Design explanation

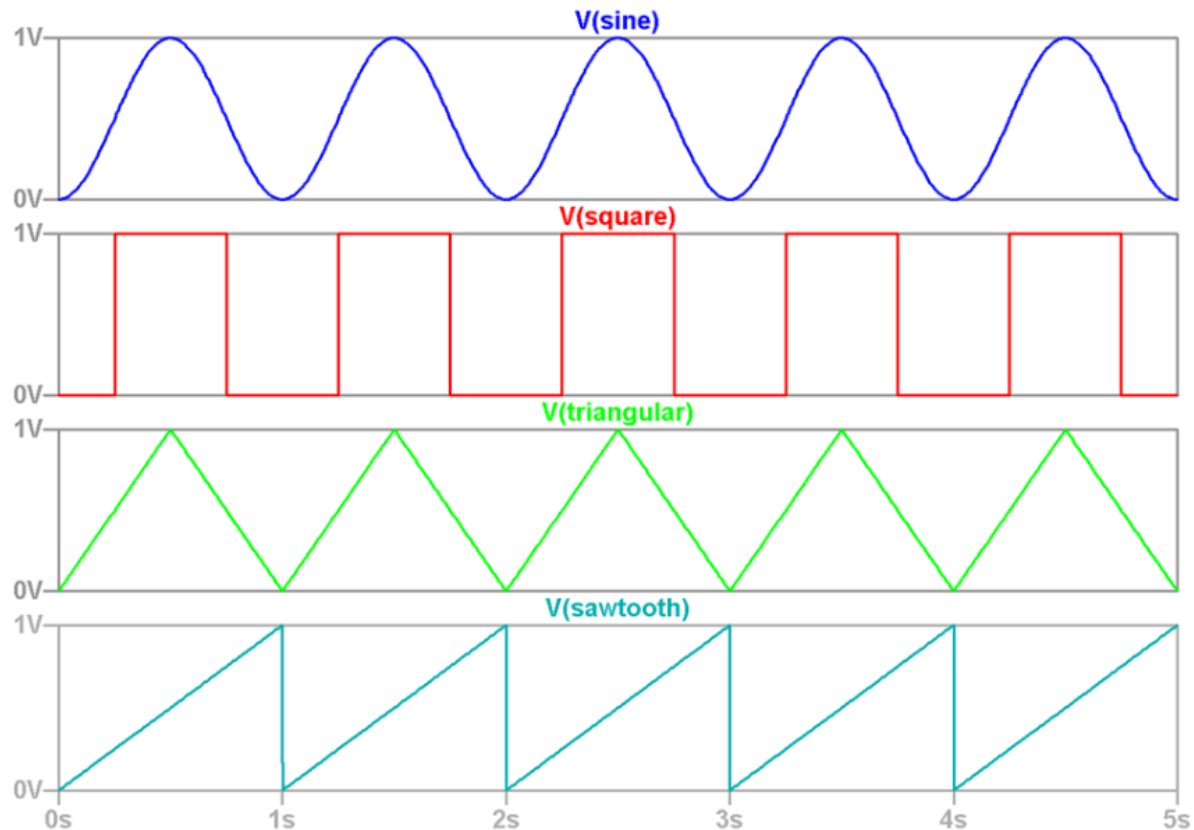
The research gathered during the information gathering phases clearly indicated simplicity over anything else. The following infographic shows that out of 49 individuals surveyed, 35 selected this interface as the most appealing. Considering the fact that this interface is actually still quite complicated, we decided to strip back even more functionality in lieu of providing a better learning platform. The selected knobs, sliders and buttons still provide new users with many sound modulation possibilities and countless hours of testing and playing. Each of the knobs and dials have tooltips explaining what they are and how they work as well! Don't forget to read them!



(Figure 1) – 35 out of 49 test users selected this interface as the most appealing and approachable.

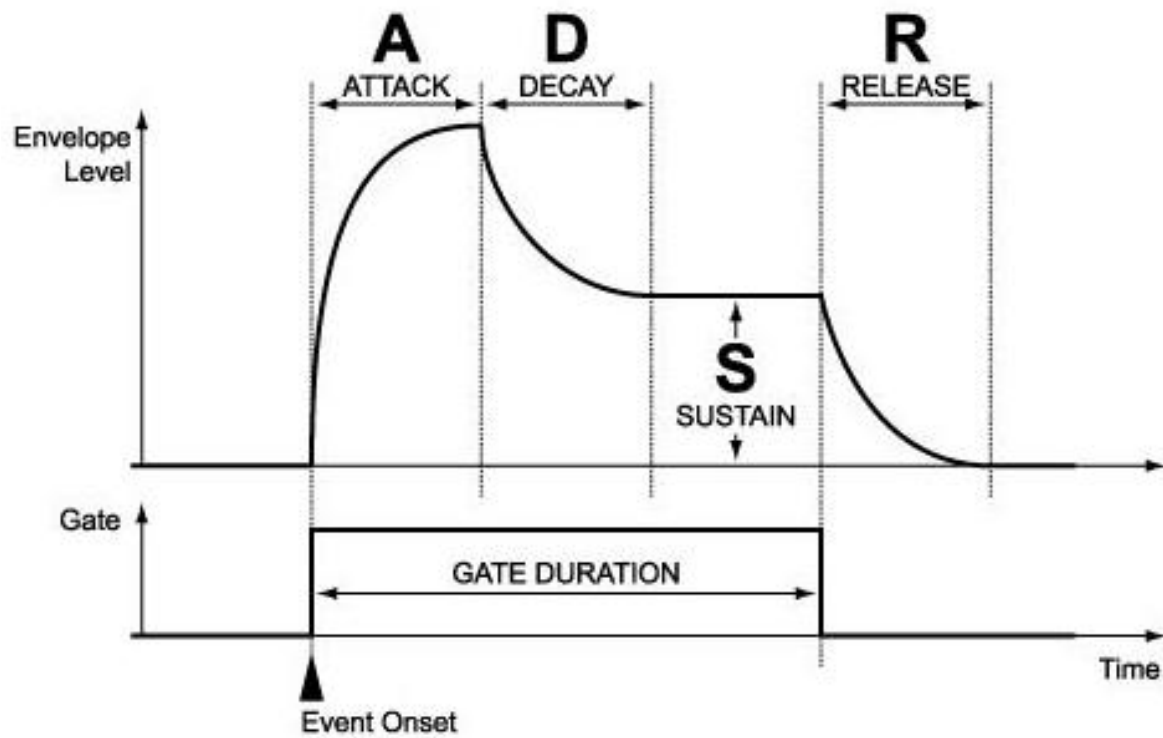
How to use the interface

Upon running the program, the entire interface opens up. Piano keys are replicated along the computer keyboard. Simply start pressing some keys and find out what sound they make! Everything about our prototype is discovery based. Once you have found a sound that you like try changing the waveform from the selection of radio buttons. You will notice that a square wave has a “squarer” sound as compared to a smoother sine wave.

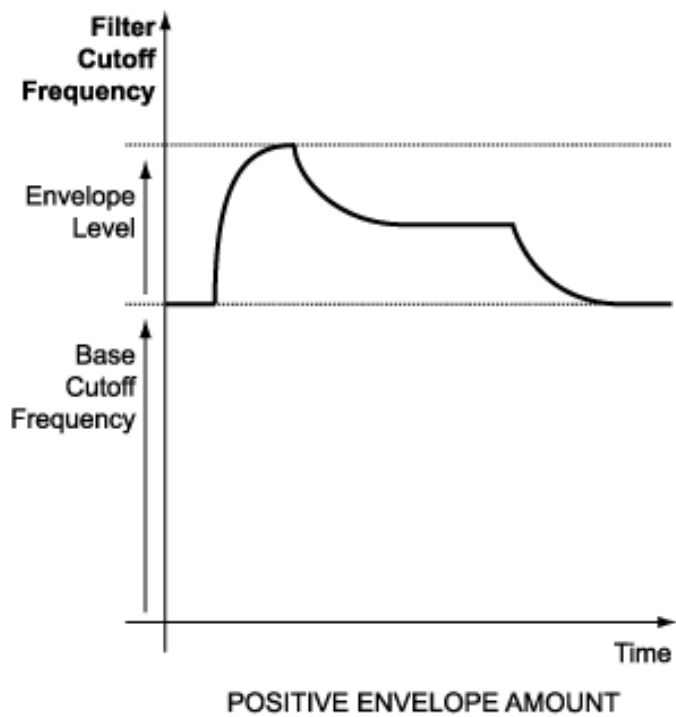


(Figure 2) – Visual representation of different waveforms. See how the square wave differs from the sine wave.

We suggest playing around with different sounds and waveforms before trying other options. You can choose to follow this advice or completely disregard it and try everything! How you learn is completely up to you. Once you have some idea of the waveforms work try changing the filter cut-off and resonance. The filter cutoff is the frequency parameter that cuts sound off below a given threshold. You can change this if you only want the first third of a sound and so on. The filter resonance is a parameter based off of the cutoff filter that creates secondary peaks within the cutoff sound. You can create sounds within sounds by modulating frequencies with these parameters.



(Figure 3) – A standard ADSR envelope.



(Figure 4) – A filter ADSR envelope.

Like the images above suggest, the filter and amplifier ADSR knobs adjust the envelopes over time. Consider Figure 3. If we increase the sustain of a note we play, it will persist for longer until we release the key. If we lengthen the height of the attack, the note will take longer to reach full volume. ADSR envelopes allow musicians and producers to fine tune their sounds to exactly what they need. Sometimes the filter and AMP ADSR's can overlap and create distortions. We added a filter amount knob as a final touch to limit the affects the filter ADSR has on the overall note frequency.