

Project Proposal

This term I will be developing a virtual synthesizer in C++ with the help of JUCE, a powerful framework/library for audio app development. JUCE will allow me to easily create a GUI for the synth, therefore most of my time will be spent working on the internal mechanics of audio processing and handling MIDI input. My synthesizer will be playable via MIDI-enabled instruments as well as through the computer keyboard.

I will be developing this synth in stages. So far, I have written code for a simple white noise generator. The next step will be to develop a wavetable oscillator, capable of efficiently generating tones. By the midterm I will have the white noise generator and an oscillator incorporated into the synth, with the capability of controlling pitch, duration, and velocity via MIDI. The next stage in the development of this synth will be to add effects. Currently I am envisioning either a Bitcrusher (reduces the bit-rate of the output to give it a crunchier, 8-bit feel) or a simple distortion algorithm. I am considering adding a reverb effect. The remainder of my time will be spent polishing the GUI, making sure everything interacts seamlessly, and debugging. If time permits, I plan on adding a second, identical oscillator that may be pitched up or down independent of the other oscillator.

Audio app development is an extremely tedious and lengthy process. I am anticipating that the learning curve will be substantial for this project, since this is my first term working with C++. Luckily, the JUCE framework was designed to do some of the heavy lifting with regards to the user interface and hardware i/o. I am minoring in music and am fascinated by the intersection between computer science and music. I have used a handful of software synths and have always wondered how they worked. While my synth will not be nearly as shiny or robust as those products, developing it will provide an enjoyable and informative experience.