Kat Greinke
kgreinke@pdx.edu

Synthesize THIS!

Vision:

I have a brother that has recently started producing music with DAWs, specifically FL Studio, for a few years now and I would like to make a synthesizer for him as a gift. I am aware that making one that can be used inside of a DAW would be far beyond what this project would really entail as I am pretty sure it would require a license and I have no idea how making a graphical design for it would work, but this is more just something to mess around with a little and maybe add the wav file into the track if anything good comes out of it.

The synthesizer will utilize fundamental synthesis techniques such as subtractive, additive, and frequency modulation synthesis to produce diverse timbres. It will feature a user-friendly interface allowing users to manipulate parameters like oscillators, filters, envelopes, and effects in real-time.

Specifications:

- *Oscillators:* Implement multiple oscillator types (sine, square, sawtooth, triangle) with adjustable frequency and waveform modulation capabilities.
- *Filters:* Include various filter types (low-pass, high-pass, band-pass) with adjustable cutoff frequency, resonance, and modulation options.
- *Envelopes:* Provide ADSR (Attack, Decay, Sustain, Release) envelopes for controlling the amplitude, filter cutoff, and other parameters.
- *Effects:* Integrate effects modules such as reverb, delay, chorus, and distortion to enhance sound design possibilities.

Concerns:

- *Performance Optimization:* Developing a synthesizer in Python poses challenges in terms of real-time performance, especially when handling complex signal processing tasks. Optimizing the codebase for efficiency while maintaining flexibility and ease of use will be a critical concern.
- *Latency:* Achieving low-latency audio processing is essential for providing a responsive and immersive user experience. Minimizing audio latency would require careful consideration of buffer sizes, threading, and optimization techniques.
- *User Interface Design:* Balancing functionality with simplicity while providing sufficient control over synthesis parameters will require thoughtful design decisions.
- *Compatibility and Portability:* Ensuring compatibility across different operating systems and Python versions may present challenges.

Repo URL:

https://gitlab.cecs.pdx.edu/kgreinke/synthesize-this