Jacob Collier Vocal Synth

**1: Pass-through**

* Make a program that reads a specific audio input channel and writes the data to a specific audio output channel.
* Determine the overall latency and attempt to minimize it if it is significant. If not possible, give up.

**2: Fourier Transform**

* Make a program that reads an audio input channel and generates a Fourier transform.
* Create a GUI that displays the frequency spectrum data.
* Determine the overall latency (excluding the GUI) and attempt to minimize it if it is significant. If not possible, give up.

**3: Monophonic pitch-detection**

* Make a program that reads an audio input channel and uses frequency spectrum data to determine the fundamental frequency of the note that it being sung.
* Determine the overall latency and attempt to minimize it if it is significant. If not possible, give up.

**4: Monophonic pitch-correction**

* Make a program that performs the pitch detection from step **3** and uses the information to replicate the input audio using a fixed fundamental and write the generated audio to a specific audio output channel.
* Determine the overall latency and attempt to minimize it if it is significant. If not possible, give up.

**5: Homophonic pitch-correction**

* Modify the previous program to generate multiple channels of pitch-corrected source audio.
* Determine the overall latency and attempt to minimize it if it is significant. If not possible, give up.

**6: MIDI input**

* Make a program which reads MIDI information from an external MIDI device and displays the live MIDI data.

**7: Homophonic pitch-correction using MIDI input**

* Modify program **5** to use the live MIDI input notes as target fundamental frequencies.
* Add a simple GUI to allow the user to select audio input device, audio output device, MIDI input device, and MIDI channel(s).
* Determine the overall latency. If significant, weep.