FPGA autotune Checklist

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● The Commitment: (all modules work separately and not in real time)
  ○ Spectrogram (Kika)
    ■ Visualization of the STFT on the monitor
    ■ Will be tested by visualizing a signal of known frequency
  ○ STFT (Elaine)
    ■ Short time fourier transform of the input audio signal
    ■ Will be tested by using the spectrogram visualization on a test signal of known frequency
  ○ Peak Detection (Kika)
    ■ Detects the note onsets in the STFT
    ■ Detects the main frequencies in the STFT
    ■ Tested visually by using the Spectrogram (peaks will be colored differently than the rest of the graph)
  ○ Frequency Shift (Elaine)
    ■ The signal will be reconstructed in sine tones at the correct frequencies
      ● To the nearest note on the Western scale
    ■ This will be tested by outputting the corrected audio and also visually with the spectrogram visualizer
  ○ Input audio (Kika)
    ■ This module takes in audio from an external microphone.
    ■ This will be tested by outputting audio on headset
  ○ Output Audio (Kika)
    ■ This module outputs the audio to an external headset or speaker
    ■ This will be tested by listening to the audio

● The Goal:
  ○ Integration (Elaine + Kika):
    ■ All modules in the commitment working together
  ○ Output a recording of pitch corrected audio 30 seconds long (Elaine)
  ○ Uses SD Card for memory (Kika)

● Stretch Goal:
  ○ Different voice effects (Elaine + Kika)
    ■ Make voice sound like a chipmunk or Darth Vader
    ■ This module will be tested by applying the effect on test signals and listening to the output
  ○ Saving and loading audio (up to 1 minute long) (Kika)
  ○ Frequency Shift (Elaine)
    ■ This module generates the filter and takes its IFFT and multiplies the filter in the time domain
- This will be tested using test signals of known frequencies that will be played to the system
  - Real time autotune (Elaine + Kika)