

# FPGAautotune 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)