Musical Feet: Checklist

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- Tempo generator and pedometer input modules
    - These modules process the input signal from the input and convert it to a tempo_period value
    - Can be tested by using Labkit switches/buttons as inputs and viewing output on hex display
    - Estimated date of completion: Tuesday, 11/18

- Tonality generator module
    - This module uses the output of the tempo generator to produce a single-bit tonality signal
    - Can be tested by using Labkit switches as inputs and viewing output and state on hex display
    - Estimated date of completion: Tuesday, 11/18

- Beat generator module
    - This module converts the tempo_period into an appropriate single-cycle enable signal
    - Can be tested by using Labkit switches as inputs and viewing output through LED
    - If time permits, the beat generator can be modified to produce an enable signal that asserts every half tempo_period
    - Estimated date of completion: Tuesday, 11/18

- Chord generator and note generator modules
    - These modules produce a set of four notes for a string quartet based on the tonality
    - Chord generator can be tested by using Labkit switch as tonality input and viewing the FSM state on the hex display
    - Note generator can be tested by using switches for the chord input and viewing the note values on the hex display
    - Estimated date of completion: Saturday, 11/22

- Random number generator module
    - This module produces pseudo-random numbers
    - Can be tested by displaying output on hex display
    - Estimated date of completion: Wednesday, 11/19

- Audio synthesis modules
    - These modules produce the electrical signals corresponding to the instruments' sound waveforms

- The BRAMs store the sound samples and the oscillators use the BRAMs to generate the given input pitches
- The envelope generators change the amplitude of the samples and pass them into the mixer, which outputs them into the AC97 to be converted into an analog output signal
- The oscillators and BRAMs can be tested by using the Labkit's switches as inputs to the oscillator and displaying the BRAM output through the logic analyzer
- The envelope generator can be tested by feeding in a flat-level voltage or sine wave and sending the output to the AC97 to be viewed on an oscilloscope
- If time permits, the tempo_period can be sent to the envelope generator to control the output volume
- Estimated date of completion: Tuesday, 11/25

- Video output modules
  - These modules produce video output that shows either the music information (tempo, tonality, chord) or a visualization of the input footsteps
  - Can be tested by feeding it inputs through switches on the Labkit
  - If time permits, the visualization effects can be made more complex (gradually varying colors, random ripples, etc.)
  - Estimated date of completion: Saturday, 11/22

- Complete system
  - The final product will improvise music played by a string quartet based on the speed of the footsteps
  - As the speed of the footsteps increases or decreases rapidly, the music will be minor; otherwise, it will be major
  - Visualizations will show either the status of the music or display a pattern whenever a footstep is taken
  - Estimated date of completion: Saturday, 12/6