I. Commitment

- A preamplifier capable of cleanly boosting a small audio signal to line level (5Vp-p) with LED indicators for clipping and outputting above line level.
- A state filter for the auto-wah will have simultaneous band, low, and high pass outputs with cutoff frequency controllable by a voltage.
- An envelope follower for the auto-wah will turn an input waveform into voltage with a time constant that allows it to accurately follow the contour of the input.
- A Phaser module that demonstrates phase shifting of the input waveform, with the characteristic frequency response dips of the summed output.
- The delay line will have a working bucket brigade IC with a clean output. The delay of this output will change noticeably as the clock signal is varied.
- The LFO of the Flanger will be able to output a triangle waveform with an adjustable frequency.
- The VCO of the Flanger will be able to output an adjustable sawtooth waveform.
- There will be two clock signals for the Flanger’s variable time delay. One CLK is the inverse of the other.
- A sample and hold stage that demonstrates signal sampling.
- A working 3-bit ADC that demonstrates the decrease of waveform resolution.
- An working OverDrive module that demonstrates hard clipping of the waveform.
- The output amplifier will be an implementation of a previous lab.

II. Expected Goal

- The modules of the auto-wah will work together to allow the user to control the cutoff of the filters with the dynamics of playing.
- The modules of the Flanger will be working together to provide a noticeable flanger-like sound.
- The BitCrusher will produce a noticeable decrease in audio resolution, producing a retro bitmapped sound.
- All of the module will work interchangeably with a Bass guitar after being passed through the preamp. The modules will work in any ordering with any combination.

III. Stretch Goal
- A 3 band EQ (adjustable gain low, band, and high pass filter) will be added to the pre-amp stage.
- Soft Clipping will be added to the overdrive module.
- The ADC of the bit crusher will have more resolution. This will be achieved by adding in more comparators or changing ADC topology.
- An LFO will be added to the Phaser to allow the amount of phase change to vary over time with the rate controllable by the user.
- The resonance of the auto-wah state filter will be user controllable and optionally dynamic controllable (using a voltage controlled resonance scheme and the output of the envelope follower).