Grading Rubric

Commitment:

Transimpedance Amplifier Filter attenuates all unwanted frequencies at >= 60 db/Decade
Low noise filter output; non harmonic frequencies are of magnitude less than 0.1X the desired frequency's magnitude
Designed PWM with a 555 timer
Class-D Amplifier Power efficiency > 50%
PWM can output square wave at frequency >= 400KHz
Class-D amplifier maximum voltage swing > 8Vpp
Class-D Amplifier used gate driver IC
The audio output has volume control
Created a circuit to produce a sine wave at a convenient testing tone

Expected Goal:

Designed PWM sawtooth with comparators
Class-D Amplifier Power efficiency > 70%
Class-D amplifier maximum voltage swing > 10Vpp
When our device laser is pointed at a mirror attached to a speaker, the device produces a distortion of less than 10%
When our device laser is pointed at a window, the device produces a total harmonic distortion of less than 10%

Stretch Goal:

Designed PWM with transistors (no comparators)
Class-D Amplifier Power efficiency > 85%
Class-D Amplifier uses custom gate driver
When our device laser is pointed at a mirror attached to a speaker, the device produces a distortion of less than 5%
When our device laser is pointed at a window, the device produces a total harmonic distortion of less than 5%
Laser is amplitude modulated
Receiver demodulates and filters a modulated laser signal
Able to communicate audio laser to receiver
Transmit audio and output it with less than 10% distortion

Efficiency will be measured as power output/power input
We will measure distortion as the RMS voltage of the noise / RMS signal voltage