Object Controlled Laser
6.101 Final Project Checklist

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Project Checklist

1) Driving the Servos- Create the 555 timer circuit that can drive the servo to the full range of motion. Use potentiometers to check if the full range of motion can be acquired. Use the function generator to show that I can cover all the ranges of the plane the laser is projecting on.

2) Ultrasonic testing- Understand the way the Ultrasonic sensors work. Test and demonstrate whether amplitude detection or phase detection is the best way to go. Fundamentally, phase detection allows for more range in the detection but it may not be necessary for this application. If the 24 kHz sine wave that is created at the receiver has enough difference in amplitude for about 1 foot in distance it may be enough for this application. Amplitude detection will require a band pass filter for the 24 khz wave, a gain stage, and another phase of modification before connecting to the Servo Drivers.

3) Ultrasonic interference testing- Test the measurements of the ultrasonic sensors when positioning both sets of sensors to make sure they do not interfere with each other. Test different objects, sizes, distances and orientations to see what is the best way to locate the object. Different objects may reflect the ultrasound signal in different ways, intensity and direction. The size of the object may help block interference between both groups of sensors. Different distances between the location of the ultrasound and the object will be vital for optimizing the strength of the return signal.

4) Setup the Demo- Create and set up a demo with the chosen object and the ultrasonic sensors positioned how our optimization determined. The setup will be used to gather exact measurements and determine the angle change necessary for the laser to match the location of the object.

5) Complete the project- Have the full system running. Move the object across the plane and watch the laser move to match it. Check for precision and consistency in the readings and the angle change.

Goal 1: Show that independent voltages can move the servos across the range.

Goal 2: Output of the ultrasound is a voltage that is proportional to the distance of the object.
Goal 3: Put both parts together so that the ultrasound sensors drive the laser.