

1.

Make the rotation of the DC motor adjustable with a potentiometer. The direction and speed is set with the potentiometer. When the potentiometer is centered the motor should be stationary (have a little deadzone). Use the L293D to drive the motor. **Do not connect the motor straight to 5V as the inducted voltage spikes may damage the electronics.** (1p)

2.

Make a stroboscope to measure the speed of the motor (with the fan attached to it). Use a rotary encoder to make to set the frequency of an LED and LCD to display it. Have three modes for frequency control of the LED: when the rotary encoder is turned the frequency is incremented/decremented in small steps (0.1 Hz?), large steps (5 Hz?) and doubled/halved (to detect alializing). The mode is selected by the rotary encoder's button and the active mode should be indicated on the screen. Is the motor speed linearly proportional to the duty cycle? (1p)

3.

Make an "ultrasonic radar". Mount the ultrasonic distance sensor on the servo, make it rotate and measure the distance in each direction (one degree intervals). Write a script on your PC which reads the data from Arduino and plots it on a polar plot in real time. (3p)