

2A Pre-Lab Assignment (due by Mon/Tue Lab)

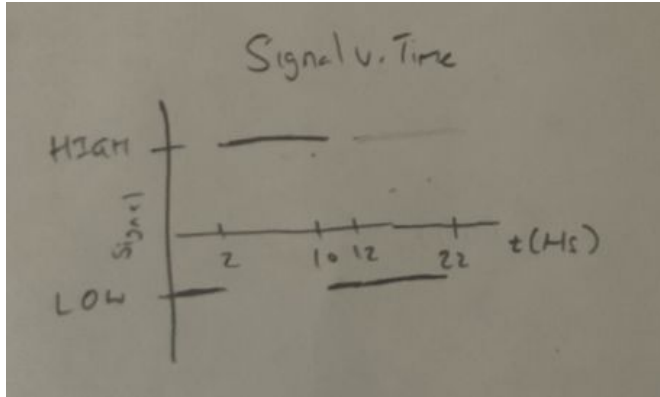
Submit answers to Slides 6 & 7 on Gradescope.

Ultrasonic sensor

- For the next lab we will be using an ultrasonic sensor. This works by emitting a sound wave from a speaker and bouncing it off an object. The delay between the sending and retrieval of this sound wave allows us to determine the distance to the object. Assuming a speed of sound of 343 m/s, answer the questions below.
 - How far in centimeters does a sound wave travel in 3000 microseconds?
 - 102.9cm
 - How long in microseconds does it take a sound wave to travel 30 cm? Truncate your answer to the first decimal place.
 - 874.6 microseconds
 - How long in microseconds does it take for a sound wave generated to bounce and get back from an object 50 cm away?
 - 2915.45 microseconds

Ultrasonic sensor code

To the right is the code you will be using to send out the sound pulse. Below, paste a plot of the signal as a function of time with the time axis in microseconds. This plot may be hand-drawn.



```
//----- UltraSound -----  
digitalWrite(trigPin, LOW);  
delayMicroseconds(2);  
digitalWrite(trigPin, HIGH);  
delayMicroseconds(10);  
digitalWrite(trigPin, LOW);
```

Ruler/reference length

Lab 2A requires a ruler or any other distance measuring apparatus. If you do not have a ruler, please identify objects in your place of stay with known reference lengths. Lab 2A will require at least six reference lengths.
