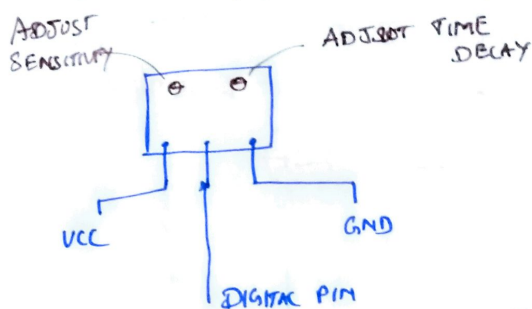31/1/19

OTHER SENSORS

1) **IR Sensor** : Detects presence of a person/animal, based on body heat
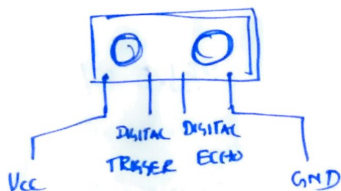
HCSR501 → Range = 10 m at 120° angle

ADJUST SENSITIVITY

ADJUST TIME DELAY

VCC

GND

DIGITAL PIN

2) **ULTRASONIC DISTANCE SENSOR** : × Measures distance of an object by sending ultrasonic waves

HCSR04 →

× Can work upto distance range of 400 cm

Vcc

DIGITAL TRIGGER

DIGITAL ECHO

GND

WORKING : (i) Sensor sends a trigger by setting trigger pin to HIGH for 10 μS

(ii) If object is present, Echo p' Echo pin will be high. The duration of HIGH on Echo determines the distance of an object

10 MS

TRIGGER

ECHO

$\leftarrow t \rightarrow$
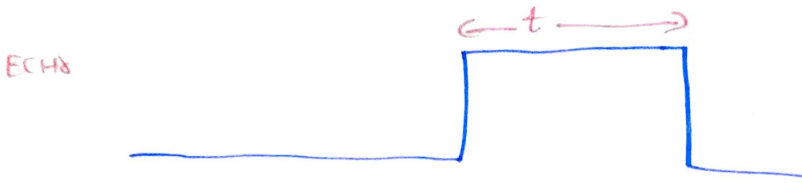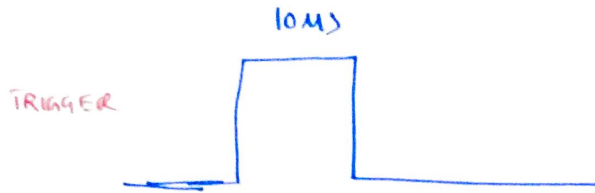
Distance =

$f(t)$

t is measured with pulse in (fn)

pulse in (PIN)

In Arduino IDE

$t = $ pulseIn $\left(\overset{\text{ECHO}}{PIN}, HIGH\right)$

↳ gives duration of Echo

CACULATING DISTANCE

Speed of Sound (SOS) depends on temperature.

$$SOS_{0°c} = 331.5 \, m/s$$

$$SOS_{20°c} = 343.5 \, m/s$$
(my room temp)

We need to convert J cm/us

$$\Rightarrow \boxed{SOS_{20°c} = 0.03435 \, cm/us = \frac{1}{29.1} \, cm/us}$$

For sound travells for t * us

The signal
should travel
back to sensor
from object

$$\boxed{distance = \frac{t}{29.1} \, cm}$$

distance ⇒ Round trip
to & from
object

The time to object is $t/2$

$\Rightarrow$ $\boxed{\text{distance} = \dfrac{t/2}{29.1} \quad cm}$

3) <u>SOUND Sensor</u> (microphone
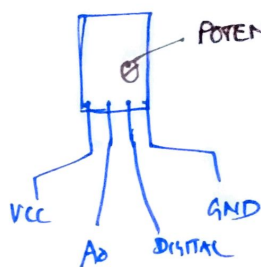
POTENTOMETER TO adjust sensitivity of
digital pin response

Vcc   GND
    Ao   DIGITAL

○ Es:

Adjust sensitivity s.t
when a person starts
talking, DIGITAL PIN
will be HIGH & read
the analog values &
                  print them

○ You can also <u>get a</u>
<u>Version</u> of sound sensor
without <u>digital pin</u>

Vcc Ao GND