~~Robotic Arm~~ Micro Sounded Sensor

By Ali Alzarra

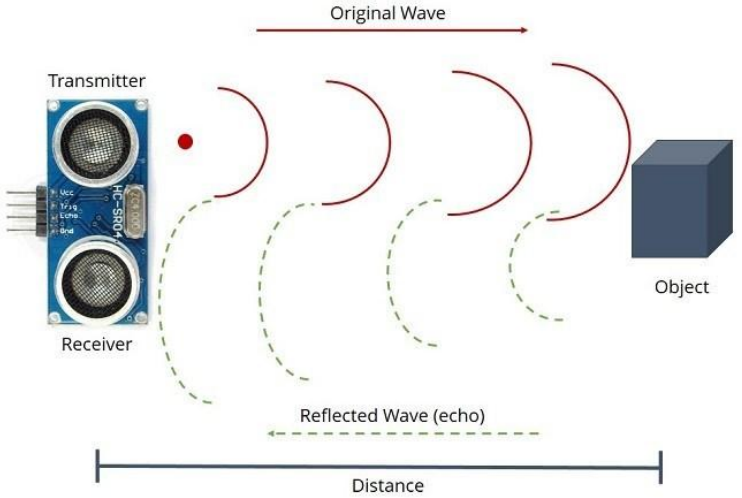
Intro

- Story about the other final project
- Why this project
- Expectation

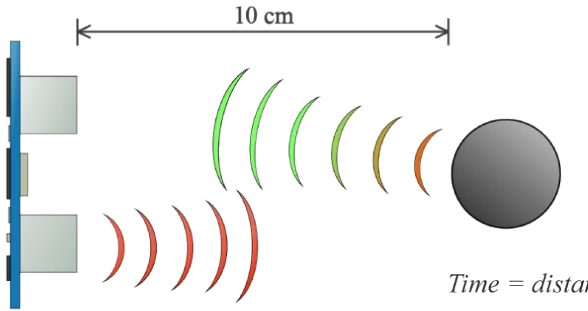
Challenges

- Come up with an idea with limited supply
- Coding // not really
- A lot of writing
    - Limited extra ideas

In depth



- Trig. send ultrasound wave
- Echo. receive it
  - Calculation made based on the time resulting to know the distance between the device and the target.
- Buzzer will change tone based on how close Is the object



speed of sound:

$v = 340\ m/s$

$v = 0{,}034\ cm/\mu s$

Time = distance / speed:

$t = s / v = 10 / 0{,}034 = 294\ \mu s$

Distance:

$s = t \cdot 0{,}034 / 2$

Code

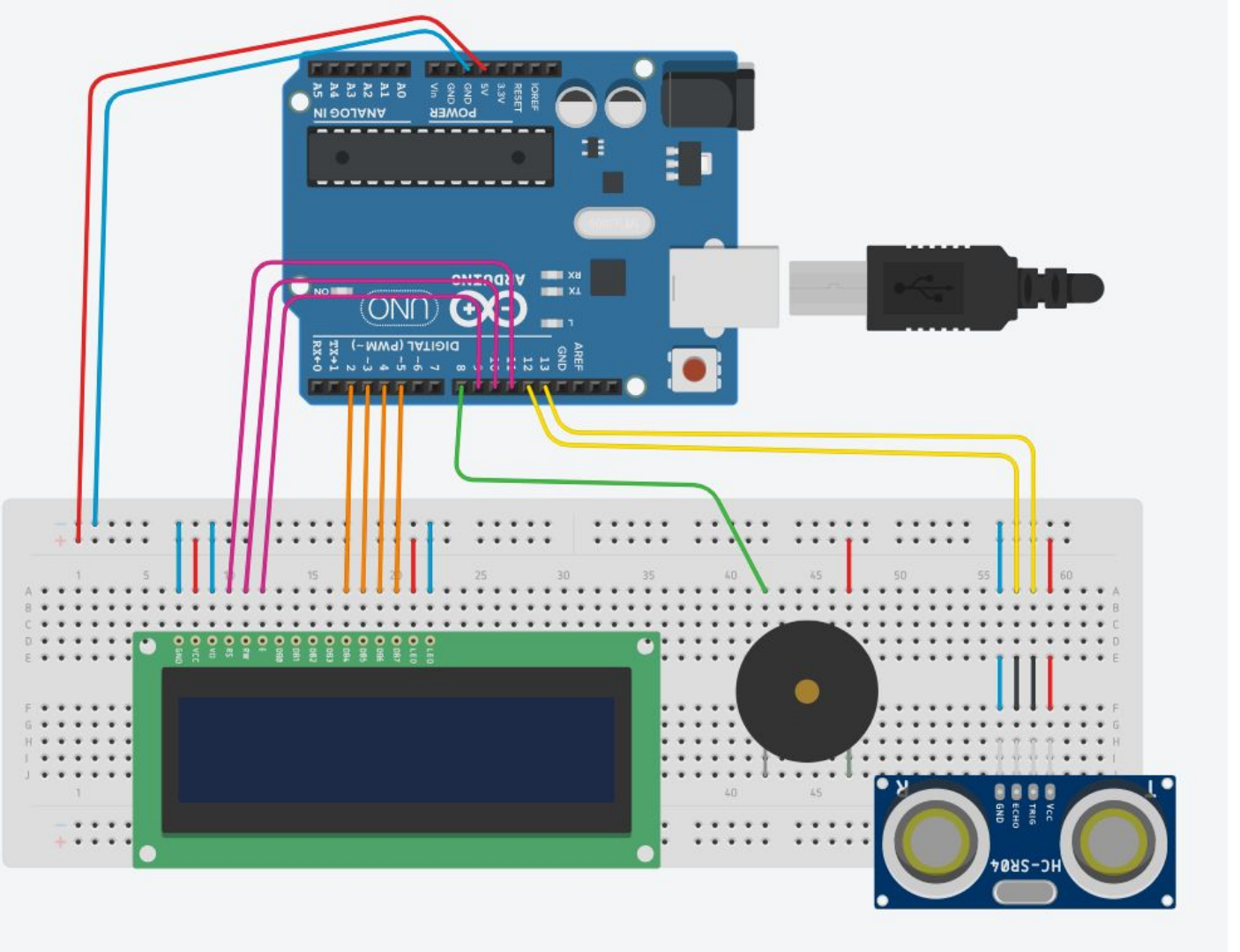
```
#include <LiquidCrystal.h> //Load Liquid Crystal Library
LiquidCrystal LCD(11,10,9,2,3,4,5);  //Create Liquid Crystal Object called LCD
#define trigPin 13 //Sensor Echo pin connected to Arduino pin 13
#define echoPin 12 //Sensor Trip pin connected to Arduino pin 12
int buzzer = 8;

void setup()
{
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);

  LCD.begin(16,2); //Tell Arduino to start your 16 column 2 row LCD
  LCD.setCursor(0,0);  //Set LCD cursor to upper left corner, column 0, row 0
  LCD.print("Target Distance:");  //Print Message on First Row
}

void loop() {
  // Sensors
  long duration, distance;
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  duration = pulseIn(echoPin, HIGH);
  distance = (duration/2) / 29.1;
  //LCD
  LCD.setCursor(0,1);  //Set cursor to first column of second row
  LCD.print("                "); //Print blanks to clear the row
  LCD.setCursor(0,1);   //Set cursor again to first column of second row
  LCD.print(distance); //Print measured distance
  LCD.print(" cm");  //Print your units.
  delay(100); //pause to let things settle
  //Buzzer
  tone(buzzer, distance * 100); // Buzzer, the distance multipy by 100 to determind the tone
  delay(100);
  noTone(buzzer);
  delay(100);
}
```

Design


ANALOG IN
POWER
DIGITAL (PWM~)
UNO
ARDUINO
HC-SR04
VCC
TRIG
ECHO
GND

Demo