



**FACULTY OF ENGINEERING AND TECHNOLOGY  
DEPARTMENT OF COMPUTER ENGINEERING**

**ENCS4380 -INTERFACING TECHNIQUES**

**Second semester 2022/2023**

**ARDUINO UNO With Ultrasonic sensor**

**HW#2**

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## Abstract

The focus of this assignment is on utilizing the Ultra Sonic Sensor to detect objects positioned in front of it and display the distance on an LCD screen. Additionally, a buzzer has been linked to the circuit which will sound an alarm when the object is 30 cm away or closer. As the object gets closer, the buzzer should beep more quickly to indicate the proximity.

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## 1. Components used

- BreadBoard.
- Buzzer.
- Arduino Uno.
- Wires.
- LCD.
- UltraSonic Sensor.
- Resistor 220 ohm.
- Potentiometer.

## 2. Building the circuit on Tinkercad

As expected, the buzzer didn't work for a distance more than 30cm.

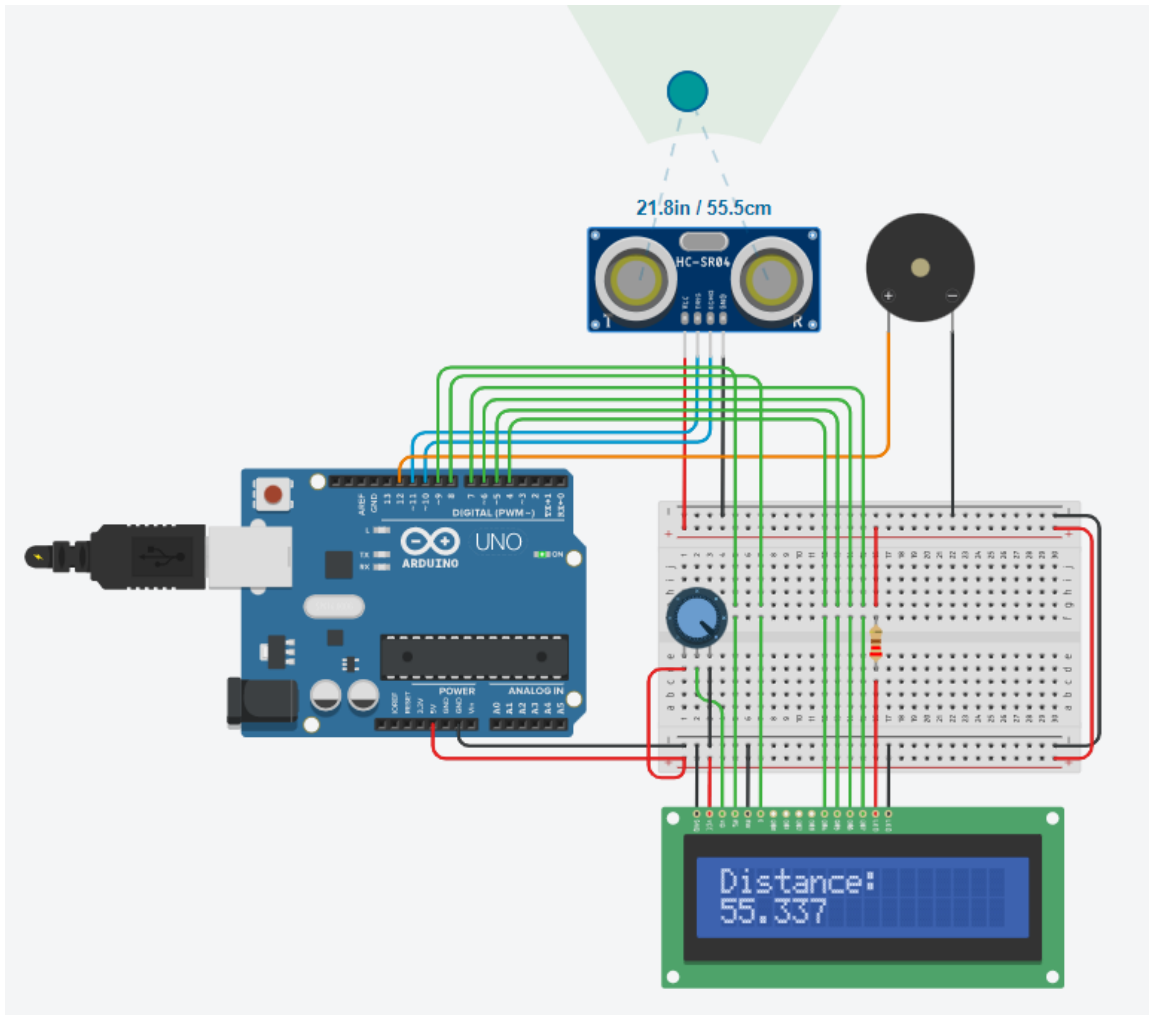


Figure 2-1: Full Circuit (Distance 55.3cm)

After the distance was reduced to less than 30 cm, the buzzer functioned as demonstrated:

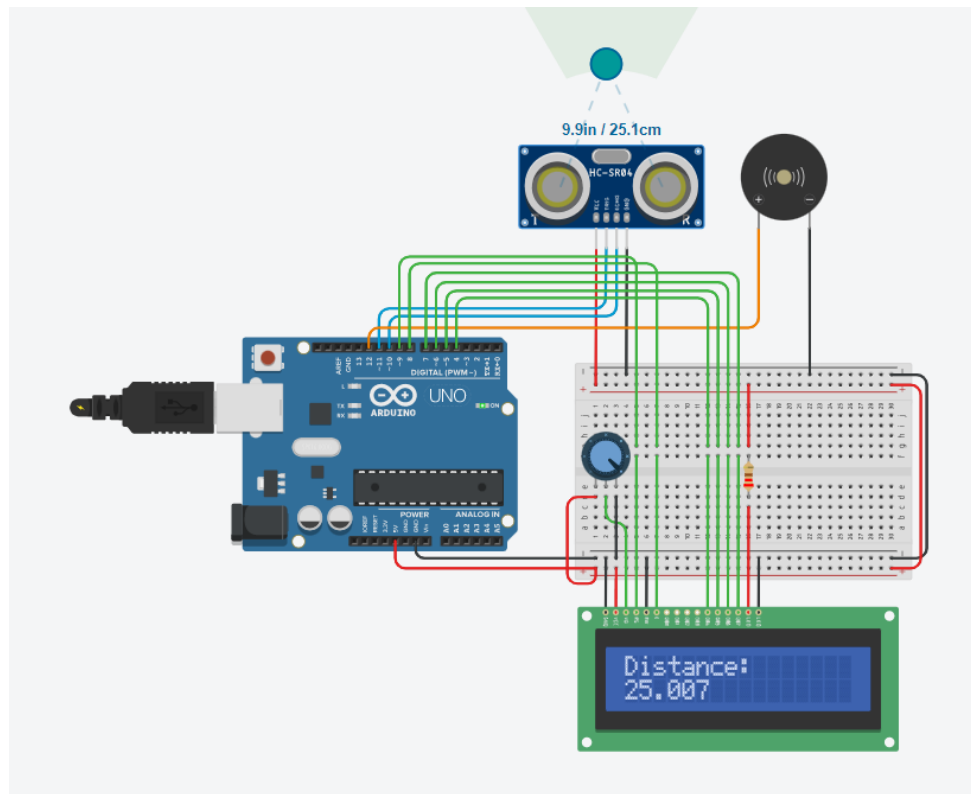


Figure 2-2: Full Circuit (Distance 25cm)

### 3. Building the circuit

The circuit we simulated on Tinkercad was connected as shown:

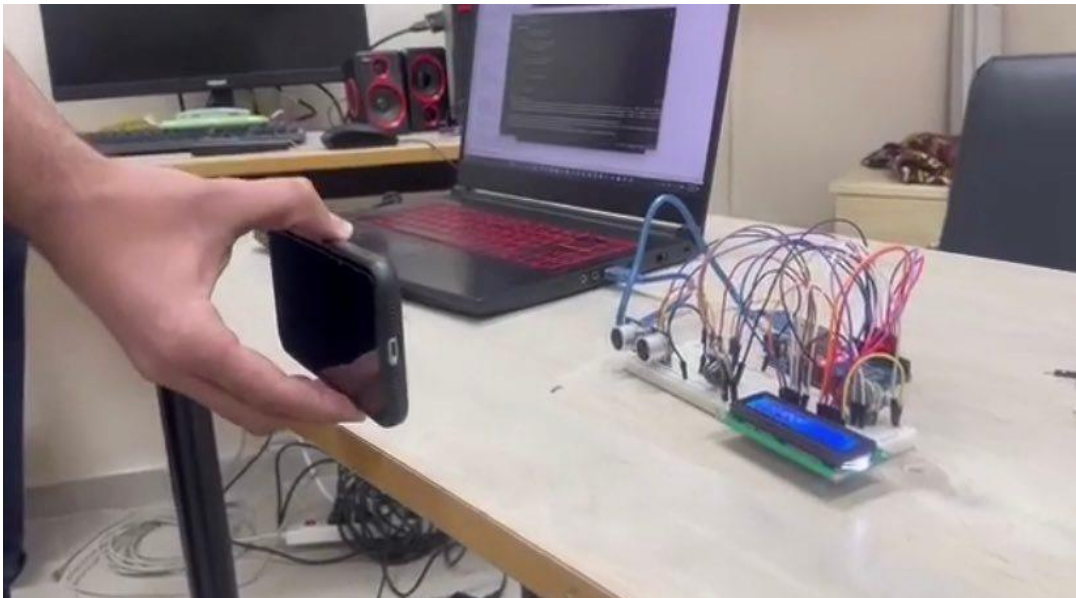


Figure 3-1: Full Circuit Connection

## 4. Links

- [The video tests our connection part1.](#)
- [The video tests our connection part2.](#)
- [The video tests our connection - \(with the guest\).](#)
- [The simulated circuit using Tinkercad.](#)

## 5. Conclusion

In summary, this assignment showcases the potential of using an Arduino UNO microcontroller and an ultrasonic sensor to detect objects in front of the device and deliver both visual and audible alerts when an object approaches within a certain distance. Through linking the ultrasonic sensor to the Arduino and programming the device to exhibit the distance on an LCD screen and activate a buzzer with a frequency that correlates with the proximity of the object, we successfully developed a practical object detection and proximity warning system. This task emphasizes the flexibility and capability of the Arduino platform in producing straightforward yet efficient electronic devices.

## 6. Appendix

```
#include <LiquidCrystal.h>

const int rs = 9, en = 8;
const int d4 = 4, d5 = 5, d6 = 6, d7 = 7;
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);

int echoPin = 10;
int trigPin = 11;
int buzzPin = 12;
double distance = 0;
double distanceThreshold = 30;
unsigned long traveltime = 0;
int frequency;
int beepDuration;
int beepDelay;
```

```

//-----
void setup() {
  Serial.begin(9600 );
  lcd.begin(16, 2);
  lcd.print("Distance:");
  pinMode(echoPin, INPUT);
  pinMode(trigPin, OUTPUT);
  pinMode(buzzPin, OUTPUT);
}
//-----
void loop() {
  pinMode(trigPin, OUTPUT);
  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);
  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(trigPin, LOW);
  pinMode(echoPin, INPUT);

  travelttime = pulseIn(echoPin, HIGH);
  distance= (travelttime/2)*(0.0343);
  Serial.print(distance);
  //The fire alarm will be triggered if the distance is below the threshold.
  if (distance <= distanceThreshold) {
    digitalWrite(buzzPin,HIGH);
    delay(distance*20);
  }
  //Turn off alarm if the distance exceeds the threshold.
  else {
    digitalWrite(buzzPin,LOW);
  }
  lcd.setCursor(0, 1);
  lcd.print(distance);
}

```