SIMPLE ALARM USING ARDUINO UNO AND ULTRASONIC SENSOR

SQA ASSIGNMENT-2

-BY

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Project Objective and Scope

Objective:

Design and build a basic alarm system using an Arduino Uno and an ultrasonic sensor. The system will detect objects within a specified range and activate an alarm buzzer when an object is detected.

Scope:

- **Hardware**: Arduino Uno, ultrasonic sensor (e.g., HC-SR04), buzzer or LED, resistors, connectors, and a breadboard.
- **Software**: Arduino IDE for coding, which will manage distance measurement, threshold detection, and alarm activation.
- **Functionality**: Measure distance using the ultrasonic sensor, compare it to a set threshold, and trigger the alarm if the object is within range.
- **Limitations**: Sensor accuracy and environmental factors may affect performance. Distance threshold adjustments require code modification.
- **Future Enhancements**: Optional features like a display module or wireless notifications for expanded functionality.

Requirements Hardware Components:

1. Arduino UNO board
2. USB cable for Arduino UNO
3. Jumper wires male to male
4. Bread Board
5. 9v Hi-Watt Battery

CIRCUIT DIAGRAM:
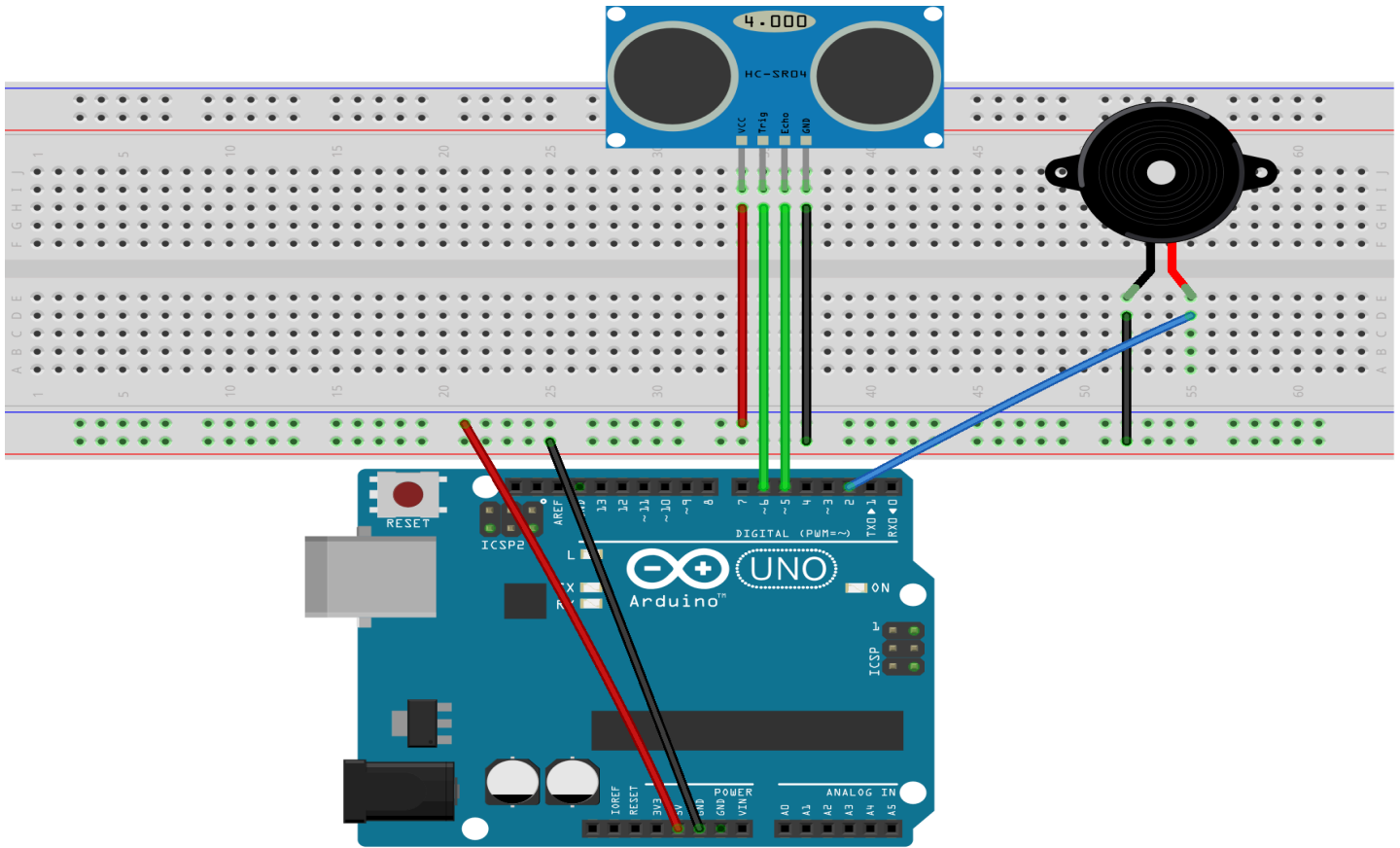
CODE:

```
#define trigPin 6
#define echoPin 5
#define buzzer 2
float new_delay;
void setup()
{
  Serial.begin (9600);
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(buzzer,OUTPUT);


}
```

```
void loop()
{
 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;
 new_delay= (distance *3) +30;
 Serial.print(distance);
 Serial.println("  cm");
 if (distance < 50)
 {
  digitalWrite(buzzer,HIGH);
  delay(new_delay);
  digitalWrite(buzzer,LOW);

 }
 else
 {
   digitalWrite(buzzer,LOW);

 }

 delay(200);
}
```

OUTPUT:
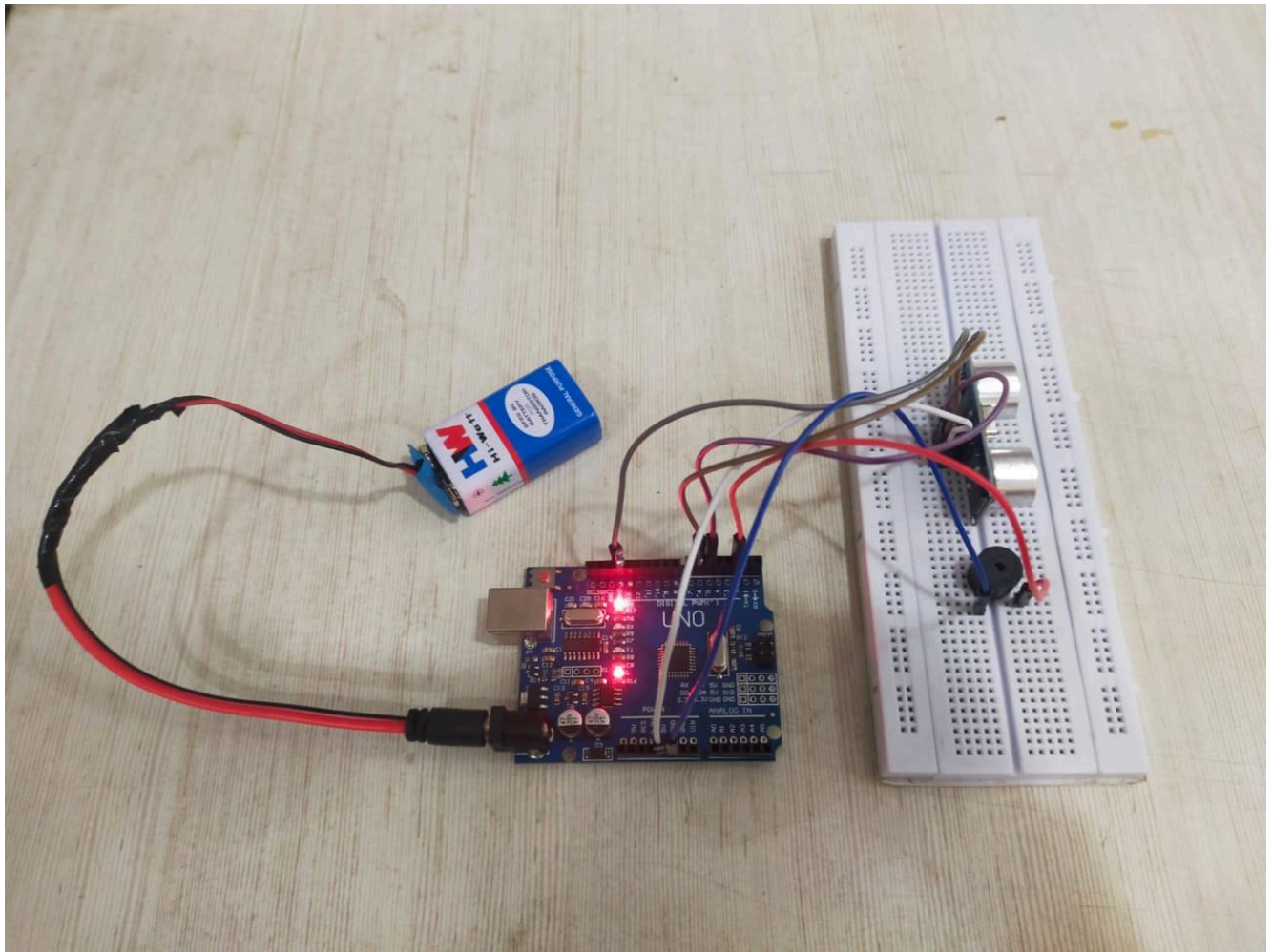
Conclusion

The project successfully developed a basic alarm system using an Arduino Uno and an ultrasonic sensor. It effectively measures distance and triggers an alarm when an object is detected within the set range. This simple system demonstrates key concepts in embedded design and offers a foundation for future enhancements, such as dynamic threshold adjustments or wireless notifications.