REPORT

PROBLEM STATEMENT:

Develop a microcontroller based prototype which alert the user to clean the water tank as the sludge level is more

SCOPE OF THE SOLUTION:

This microcontroller-based prototype aims to automate sludge level monitoring in water tanks to ensure timely cleaning. Using an ultrasonic sensor, it measures the distance to the sludge layer and compares it to a predefined threshold. When the sludge exceeds this threshold, the system triggers an LED indicator and an optional buzzer to alert the user. The solution helps eliminate the need for manual inspections, saving time and effort. It is ideal for residential, industrial, and agricultural applications. The system can be scaled for different tank sizes and environments. The integration of IoT modules like Wi-Fi or GSM can enable remote notifications for users. The system also ensures improved water quality by notifying users when maintenance is needed. Limitations include sensor accuracy in challenging conditions and occasional maintenance of the hardware. This affordable, automated solution improves efficiency and reduces operational costs for tank management.
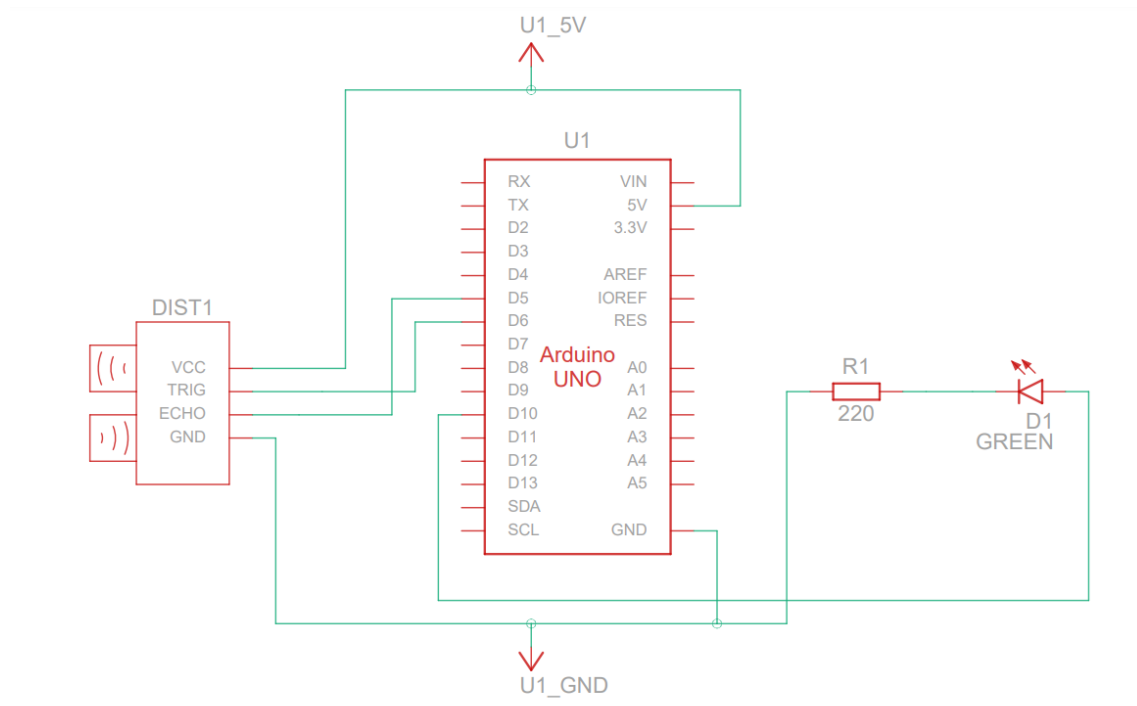
REQUIRED COMPONENTS :

Ultra sonic sensor, Arduino uno board , Resistor , LED , Breadboard

Software: Arduino IDE, Tinkercad , Fritzing

SIMULATED CIRCUIT :
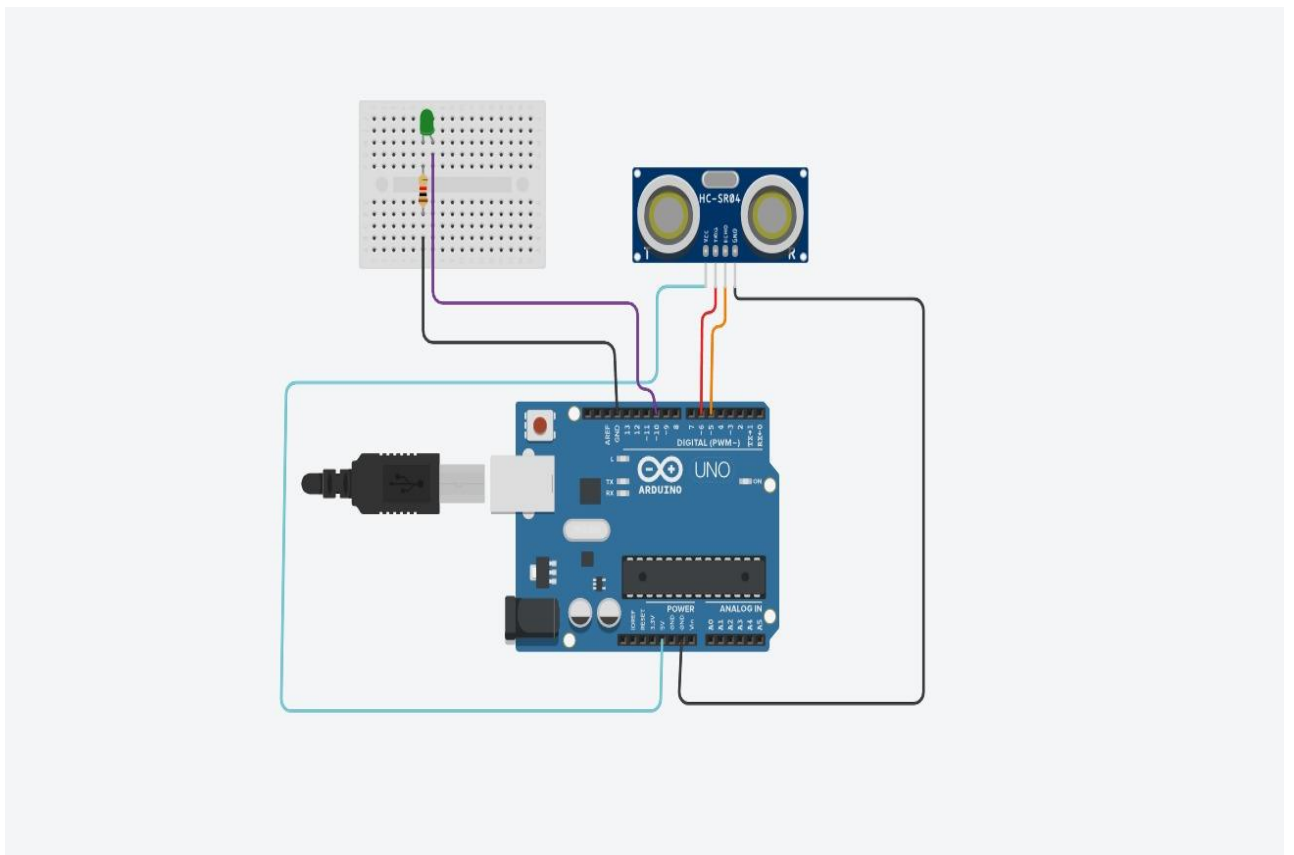
SCHEMATIC VIEW:

CODE:

```
#define TRIG_PIN 6

#define ECHO_PIN 5

#define LED_PIN 10


void setup() {

  pinMode(TRIG_PIN, OUTPUT);

  pinMode(ECHO_PIN, INPUT);

  pinMode(LED_PIN, OUTPUT);

  Serial.begin(9600);  // For debugging

}


void loop() {
```

```
  // Send a trigger pulse
  digitalWrite(TRIG_PIN, LOW);
  delayMicroseconds(2);
  digitalWrite(TRIG_PIN, HIGH);
  delayMicroseconds(10);
  digitalWrite(TRIG_PIN, LOW);

  // Measure the echo time
  long duration = pulseIn(ECHO_PIN, HIGH);

  // Calculate distance in cm
  float distance = (duration / 2.0) * 0.0343;

  // Print distance to Serial Monitor
  Serial.print("Distance: ");
  Serial.print(distance);
  Serial.println(" cm");

  // Check if distance is below the threshold
  if (distance < 10) {  // Set threshold as 10 cm
    digitalWrite(LED_PIN, HIGH); // Turn on LED
  } else {
    digitalWrite(LED_PIN, LOW);  // Turn off LED
  }
  delay(500); // Wait before next measurement
}
```

LINK FOR GERBER FILES AND VIDEO OF THE DEMO:

https://drive.google.com/drive/folders/11y9lH7IyZVQVAhK1sn16oTWOc3RHnWzn