PROJECT REPORT

LNT EDUTECH

TEAM MEMBERS

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AIM: DEVELOP A MICROCONTROLLER BASED PROTOTYPE FOR SLUDGE LEVEL MONITORING IN WATER TANKS.

PROBLEM STATEMENT

Objective: To design and develop a microcontroller-based prototype that monitors the sludge level in a water tank and alerts the user when the sludge level exceeds a predefined threshold, ensuring timely cleaning and maintenance of the tank.

Background: Water tanks are widely used for storing water in residential, commercial, and industrial settings. Over time, sludge and sediment can accumulate at the bottom of these tanks, leading to contamination and reduced water quality. Regular cleaning of the tank is essential to maintain water hygiene. However, manually checking the sludge level can be inconvenient .

SCOPE OF THE SOLUTION

The prototype should be able to:

Accurately measure the sludge level in the water tank using the ultrasonic sensor.
Trigger an alert (LED or buzzer) when the sludge level exceeds the predefined threshold.
Provide a reliable and user-friendly solution for timely maintenance of water tanks.

SYSTEMS NEEDED:

MICROCONTROLLER SELECTION

SENSOR INTEGRATION

ALERT MECHANISM

TESTING

DOCUMENTATION

REQUIRED COMPONENTS TO DEVELOP SOLUTIONS

- **ARDUINO UNO 3**

- **ULTRASONIC DISTANCE SENSOR HC-SR04**

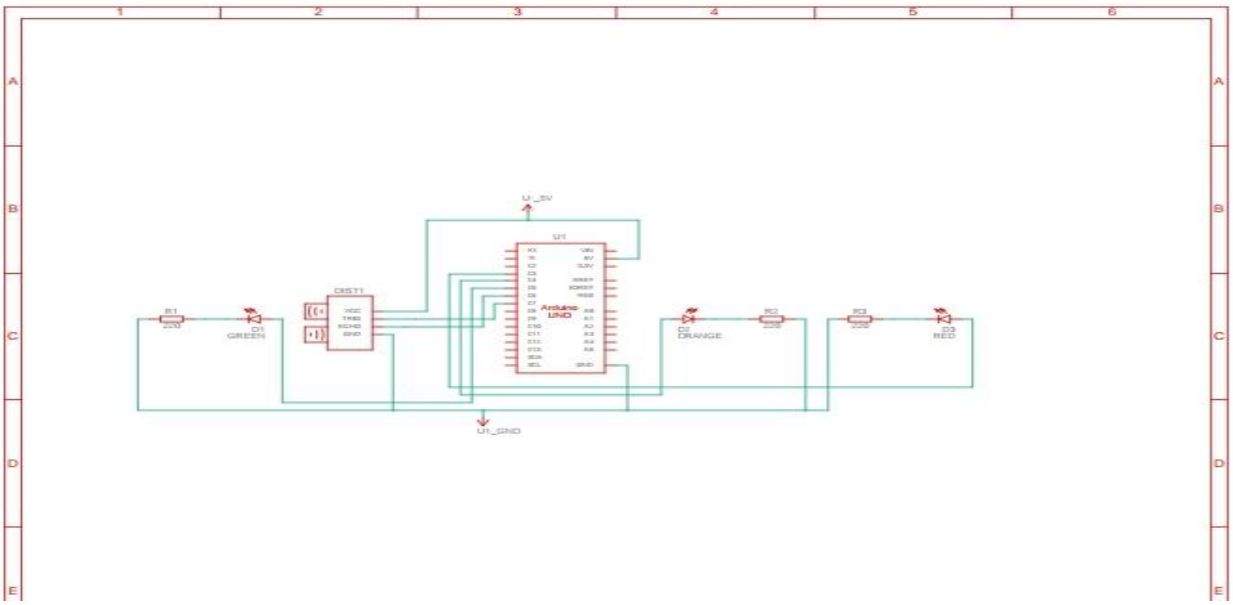
- **LED s QTY.3**

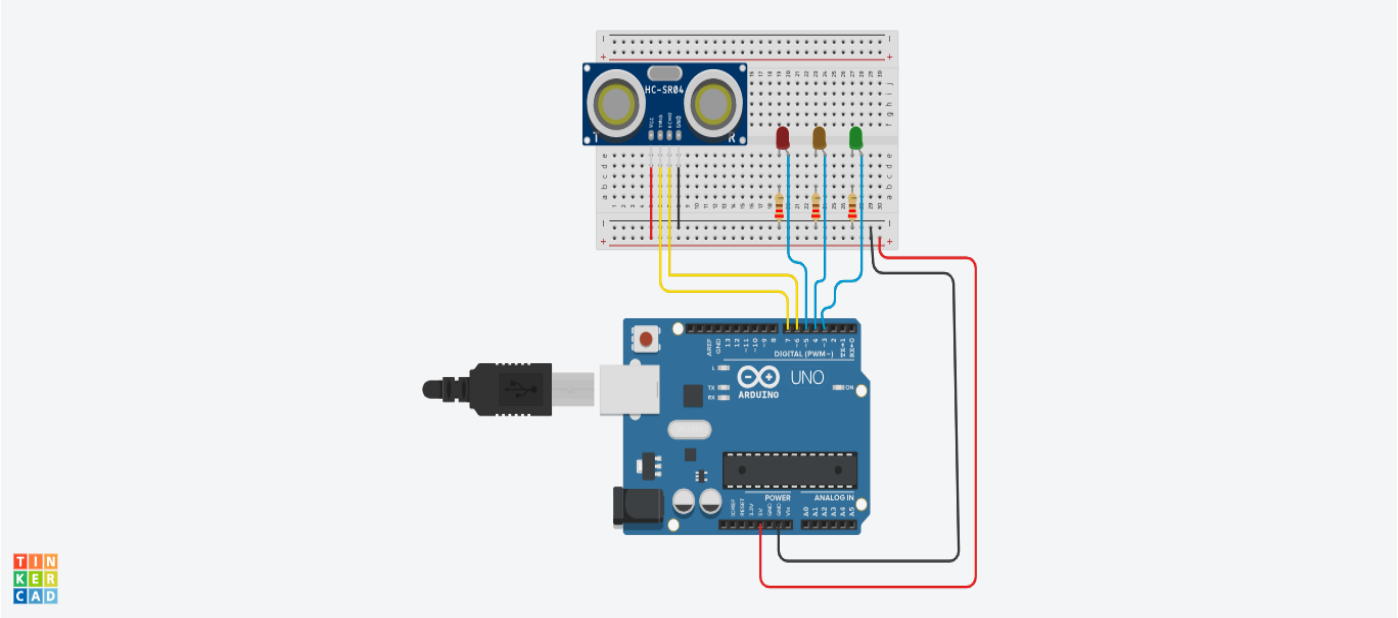
- **RESISTORS QTY. 3**

- **JUMPER WIRES**

- **SOFTWARE – TINKERCAD**

SIMULATED CIRCUIT (TINKERCAD)





STEPS TO BUILD

1. Prepare the Components:
Gather all the components listed above.
2. Connect the LEDs to the Breadboard:
Place the LEDs on the breadboard. The longer leg (anode) is the positive side, and the shorter leg (cathode) is the negative side.
Connect one end of the 220 ohm resistor to the anode (longer leg)of the LED.
Connect the other end of the resistor to a separate row on the breadboard.
3. Connect the LED to the Arduino:
Use a jumper wire to connect the .Connect the other end of the resistor to a separate row on the breadboard.
Place the ultrasonic sensor on the breadboard.
5. Wiring the Ultrasonic Sensor to the Arduino:
VCC: Connect the VCC pin of the sensor to the 5V pin on the Arduino.
GND: Connect the GND pin of the sensor to the GND pin on the Arduino. Echo: Connect the Echo pin of the sensor to digital pin on the Arduino.

CODE FOR THE SOLUTION

```
const int trigPin =7;
const int echoPin =6;

void setup() {
  Serial.begin(9600);
  pinMode(trigPin,OUTPUT);
  pinMode(echoPin,INPUT);

  pinMode(3,OUTPUT);
  pinMode(4,OUTPUT);
  pinMode(5,OUTPUT);
}

long readUltrasonicDistance(int trigger, int echo) {
  digitalWrite(trigger,LOW);
  delayMicroseconds(2);
  digitalWrite(trigger,HIGH);
  delayMicroseconds(10);
  digitalWrite(trigger,LOW);

  long duration=pulseIn(echo,HIGH);
  long distance= (duration*0.034)/2;

  Serial.println(duration);
  return distance;
}

void loop() {
  long cm= readUltrasonicDistance(trigPin,echoPin);

  Serial.print(cm);
  Serial.println("cm");
```

```
 if(cm>250){
  digitalWrite(3,LOW);
  digitalWrite(4,LOW);
  digitalWrite(5,LOW);
 }

 if(cm<250 && cm>175){
  digitalWrite(3,HIGH);
  digitalWrite(3,LOW);
  digitalWrite(3,LOW);
 }

 if(cm<=175 && cm>100){
  digitalWrite(3,HIGH);
  digitalWrite(4,HIGH);
  digitalWrite(5,LOW);
 }

 if(cm<=100) {
  digitalWrite(3,HIGH);
  digitalWrite(4,HIGH);
  digitalWrite(5,HIGH);
 }


 delay(100);
}
```