L&T EduTech

Microcontroller based Industrial Applications - Project

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PROBLEM STATEMENT :

Develop a Arduino-UNO based automatic water level detecting system for dam and indication of water level in dam .

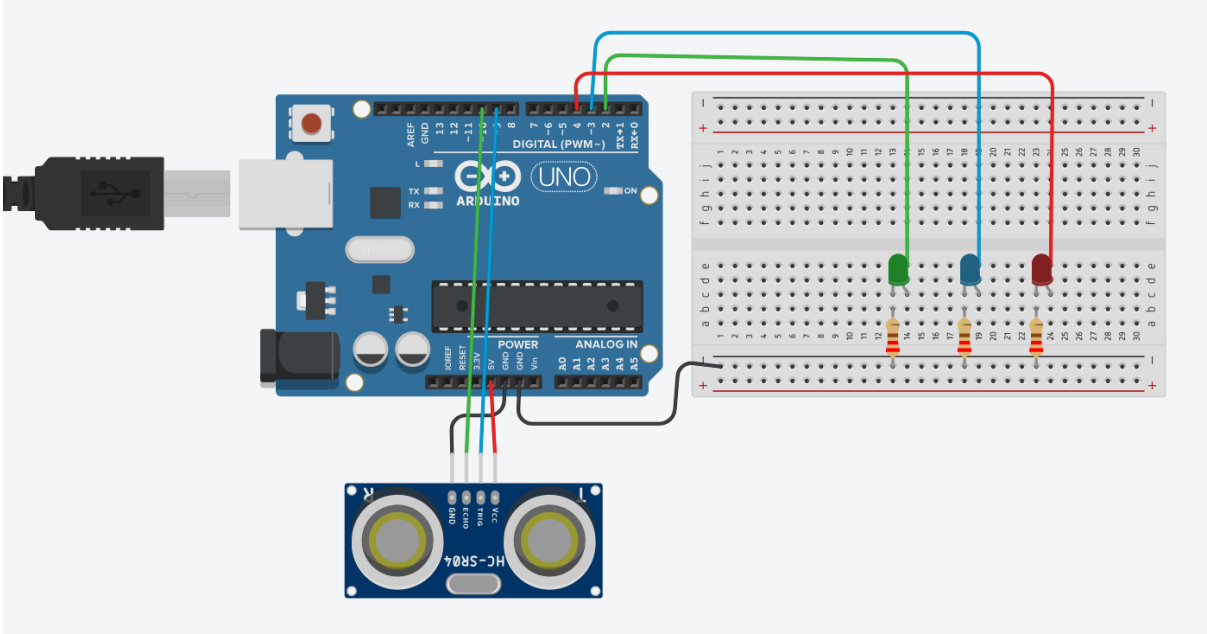
SCOPE OF SOLUTION :

Basically making a connection with ultrasonic sensor and RGB LEDs with Arduino Uno so that the ultrasonic sensor can detect the water level by distance calculation and makes a indication by LEDs . the Arduino UNO acts as a intermediator for communication between LEDs and sensors.

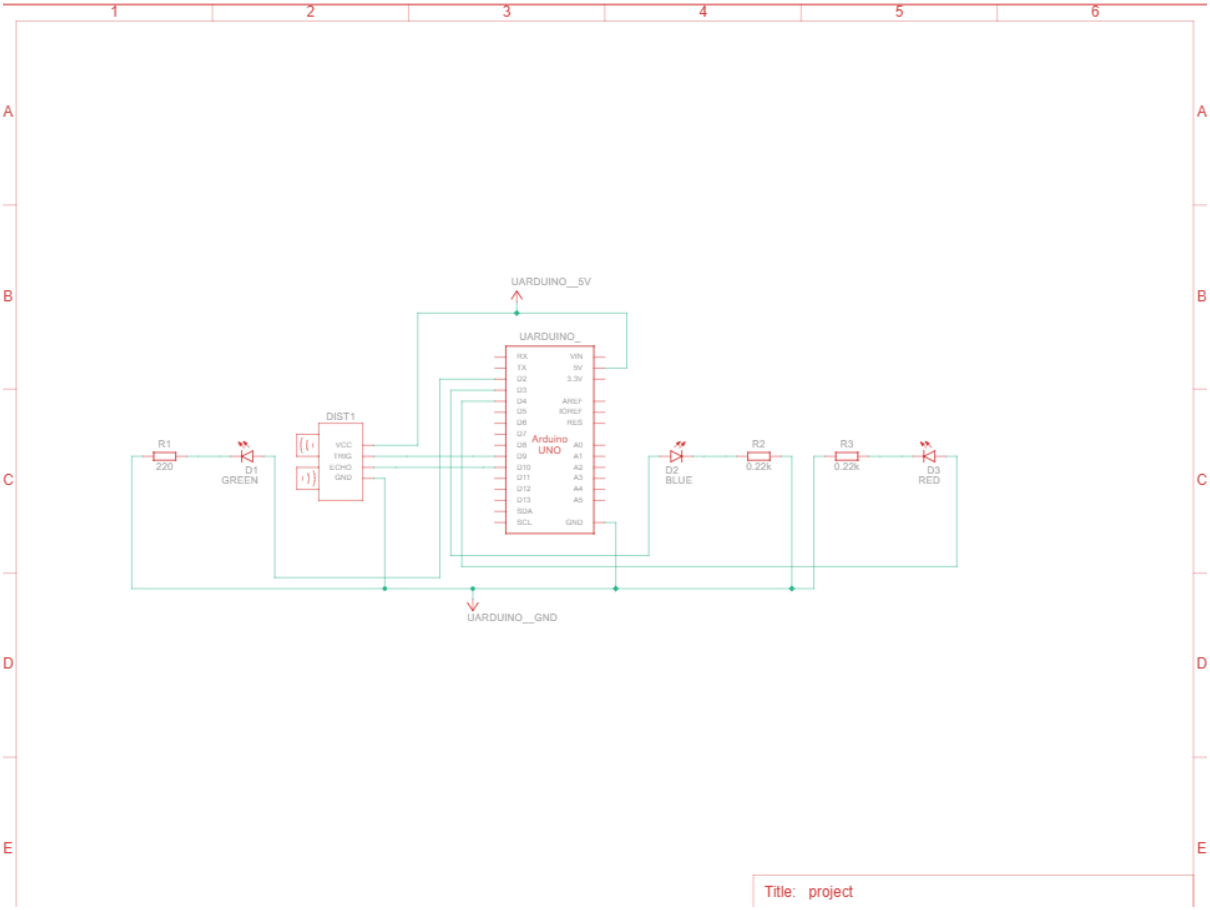
REQUIRED COMPONENTS : (Tinkercad software)

Name	Quantity	Component
Uarduino	1	Arduino Uno R3
DIST1	1	Ultrasonic Distance Sensor (4-pin)
D1	1	Green LED
D2	1	Blue LED
D3	1	Red LED
R1	1	220 Ω Resistor
R2 R3	2	0.22 kΩ Resistor

SIMULATED CIRCUIT :



GERBER FILE :



CODE FOR SOLUTION :

```
// HC-SR04 Pins
#define TRIG_PIN 9
#define ECHO_PIN 10

// LED Pins
#define GREEN_LED 2
#define BLUE_LED 3
#define RED_LED 4

void setup() {
  Serial.begin(9600);

  // Setup sensor pins
  pinMode(TRIG_PIN, OUTPUT);
  pinMode(ECHO_PIN, INPUT);

  // Setup LED pins
  pinMode(GREEN_LED, OUTPUT);
  pinMode(BLUE_LED, OUTPUT);
  pinMode(RED_LED, OUTPUT);
}

void loop() {
```

```
// Triggering the sensor
digitalWrite(TRIG_PIN, LOW);
delayMicroseconds(2);
digitalWrite(TRIG_PIN, HIGH);
delayMicroseconds(10);
digitalWrite(TRIG_PIN, LOW);

// Receiving the echo
long duration = pulseIn(ECHO_PIN, HIGH);
float distance = duration * 0.034 / 2;

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

// Turn off all LEDs first
digitalWrite(GREEN_LED, LOW);
digitalWrite(BLUE_LED, LOW);
digitalWrite(RED_LED, LOW);

// Water Level Indication Logic
if (distance < 20) {
  digitalWrite(GREEN_LED, HIGH);  // High water level
```

```
  } else if (distance >= 20 && distance < 30) {
    digitalWrite(BLUE_LED, HIGH);   // Medium water level
  } else {
    digitalWrite(RED_LED, HIGH);    // Low water level
  }

  delay(1000);  // Wait 1 second before next reading
}
```