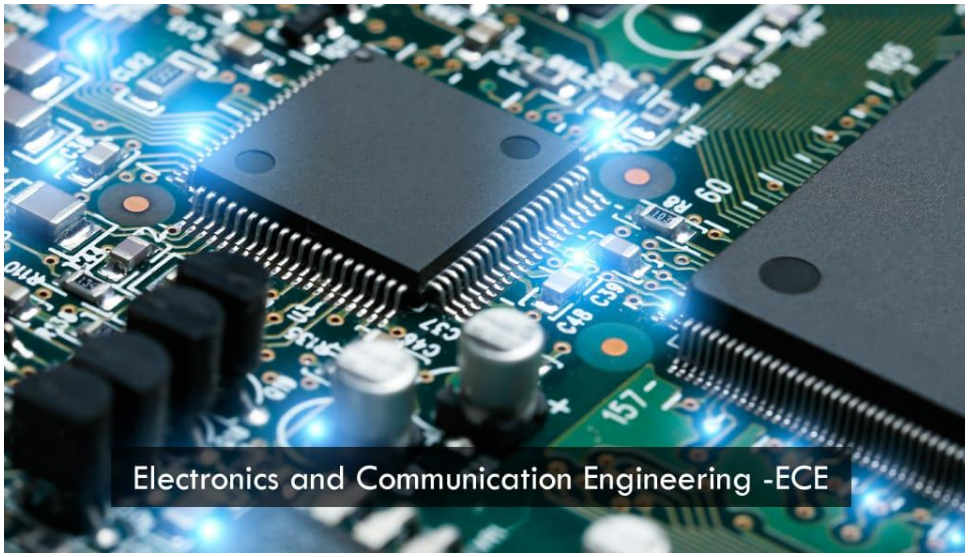
SRI VENKATESWARA COLLEGE OF ENGINEERING &TECHNOLOGY
(Autonomous)



MICROCONTROLLER BASED INDUSAPPLICATIONS

Project (Batch No:01)

INDUSTRIAL FIRE SAFTY SYSTEM

INDUSTRIAL FIRE SAFTY SYSTEM

ABSTRACT

This industrial safety system project aims to decrease the damage caused by fire outbreaks in industries due to leakage in petroleum, chemicals, and kerosene oil, which results in human loss and property damage. It is important to have a system in every place that can keep locations secure and appropriately give an alert in case of an emergency. It can also send the information to the Occupational Safety (OSH) team so that they can save and help the people in the workplace. The Arduino (UNO) system is built in such a way that it can detect hydrogen sulfidic using MQ-136 gas and fire using a flame sensor. The MQ-2 gas sensor is used to detect smoke and methane, while the DHT-11 sensor is used to record temperature and humidity. If harmful gases get leaked the sensors get active and send the information to the Arduino and the buzzer gets active and gives an alert to the people nearby

INTRODUCTION

Industrial safety system was developed to protect those working people from danger. chemical reactions are protected by the industrial safety system, which also secure the environment and the plant itself. The manufacturing sector contributes significantly to injury morbidity and mortality. This project helps to reduce the risk to the workers working in the industry. If any harmful gas is leaking or a fire accident may happen then this device gives an alert to the worker so that they can save their lives. The main advantage of this industrial safety system project is that accidents can be avoided, and immediate action is taken by the people.

ABOUT THE PROJECT

This project is based on “Industrial fire safety system this project is developed on software Arduino IDE (Integrated development environment) is software that is used to dump the program into board. Arduino IDE’s primary use is to build electronics-related projects. Arduino is an open-source platform simple and easy-to-understand platform for coding.

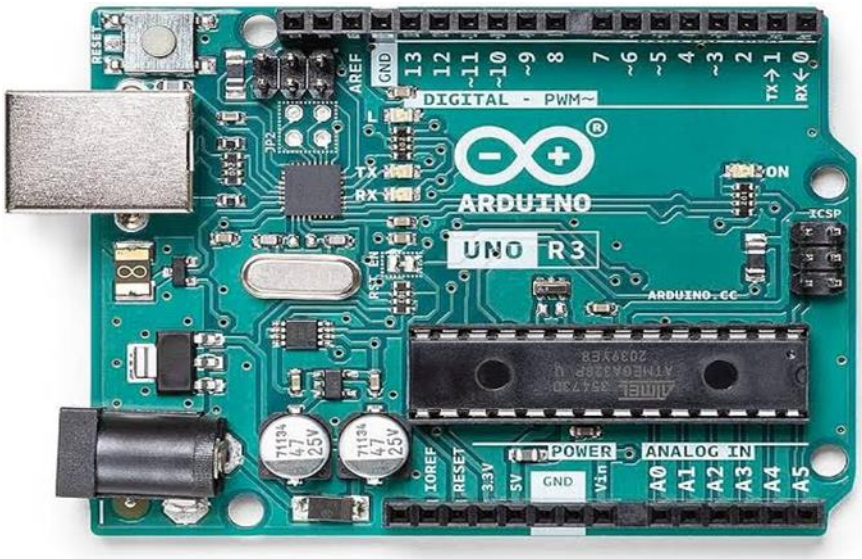
COMPONENTS REQUIRED

- Arduino Uno
- DHT11
- Flame Sensor
- Buzzer
- Led (light emitting diode)
- Gas Sensor

ARDUINO UNO:

Arduino Uno is a microcontroller from Arduino Family, a friendly board based on the

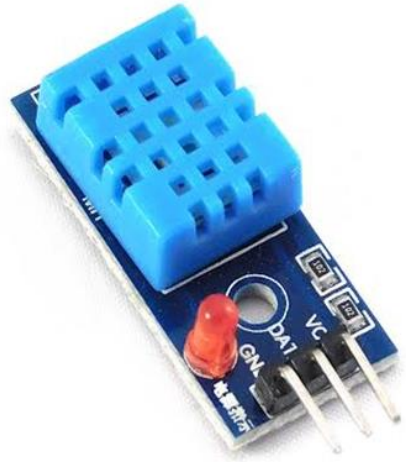
AT mega 328



- DHT11: DHT sensor is used to measure the temperature and humidity. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air.
- Flame sensor: it detects the flame and responds to the presence of the flame.
- Gas sensor (mq2, mq136): There are many MQ sensors but the best for alcohol detection is Mq-2,136. This sensor provides both digital and analogy output.
- Buzzer: The buzzer is an electric-sounding device that generates sounds.
- LED: A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it.

DHT11:

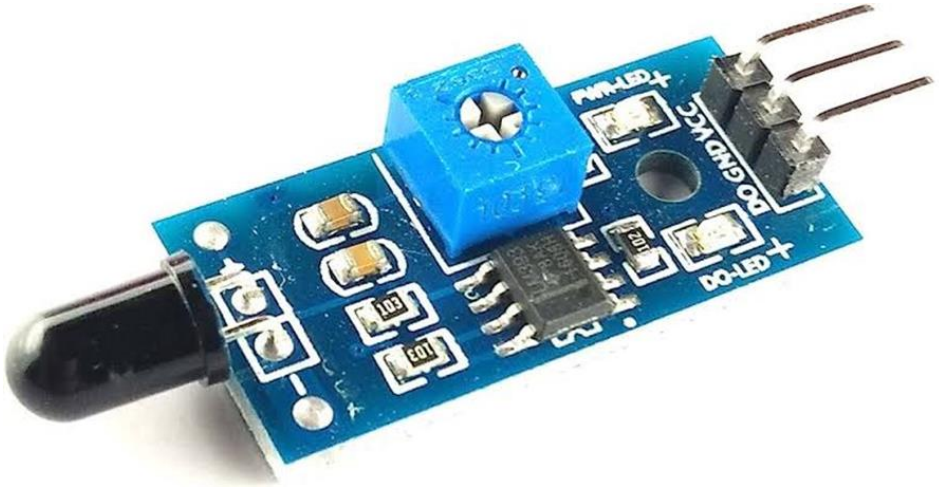
DHT11 has 4 pins



The following pin connection is about the connection of the gas sensor with Arduino Uno. The gas sensor has 4 pins, the MQ-2 is connected to 5v of Arduino Uno, the analog pin is connected to A0, and the Ground (GND) is connected to the GND of Arduino UNO.

FLAME SENSOR:

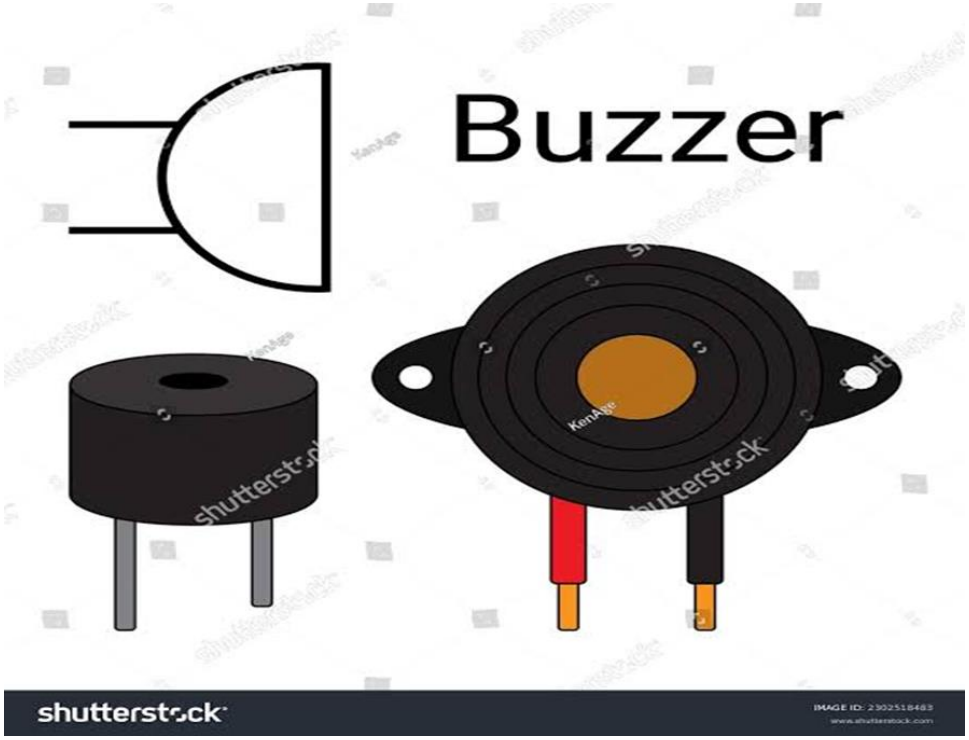
Flame Sensor has 4 pins



The following pin connection is about the connection of the gas sensor with Arduino UNO. The flame sensor has 4 pins, the flame is connected to 5v of Arduino UNO, the analog pin is connected to A5, and the Ground (GND) is connected to the GND of Arduino Uno and the digital pin is connected to d11 of Arduino UNO.

BUZZER:

Buzzer has 2 pins



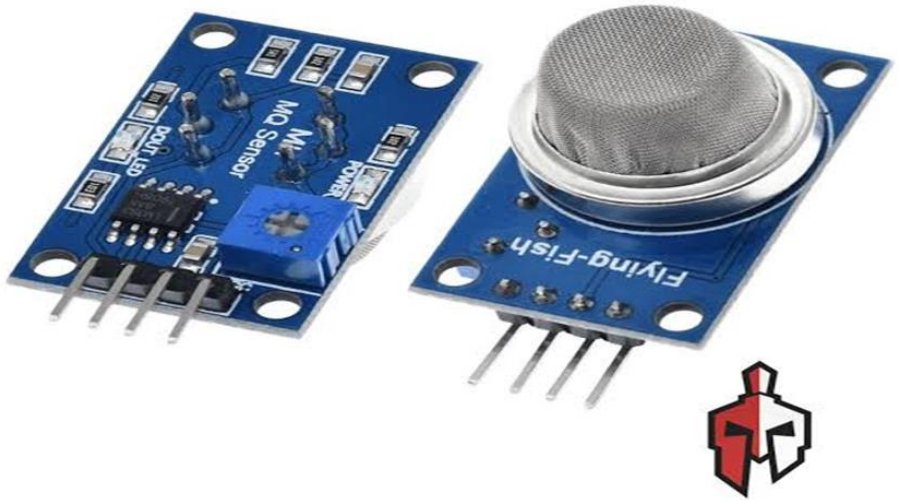
The below pin connection is about the connection of the buzzer with Arduino Uno. The buzzer has 2 pins, the Buzzer is connected to the GND of Arduino Uno. The other pin is connected to D13 of the Arduino nano.

LED

LED has 2 pins

The pin connection is about the connection of the led with the Arduino Uno. LED has 2 pins; the LED is connected to 5v of Arduino UNO. And the other pin is connected to digital pin D11 of Arduino UNO.

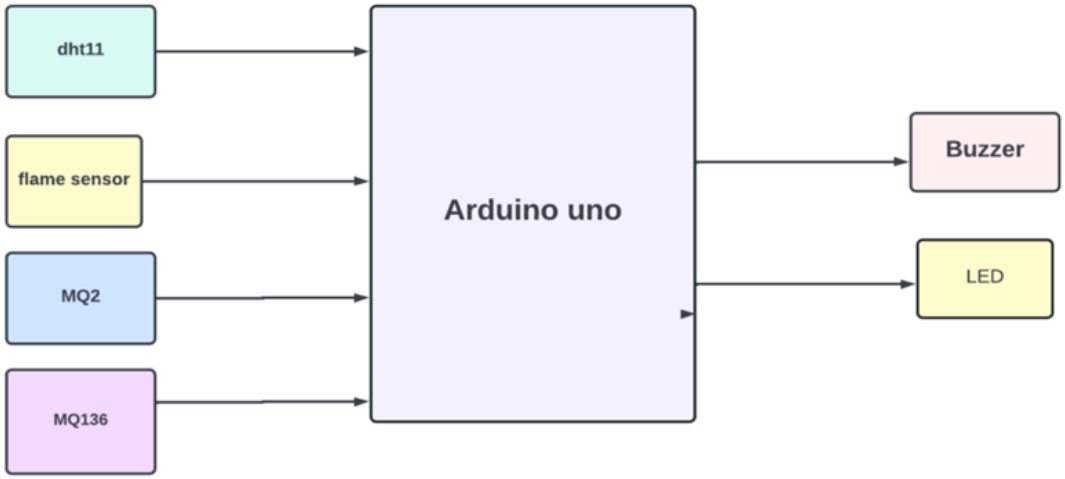
GAS SENSOR:



The following pin connection is about the connection of the gas sensor with Arduino Uno. The gas sensor has 4 pins, the MQ-136 is connected to 5v of Arduino Uno, the analog pin is connected to A0, and the Ground (GND) is connected to the GND of Arduino Uno.

BLOCK DIAGRAM

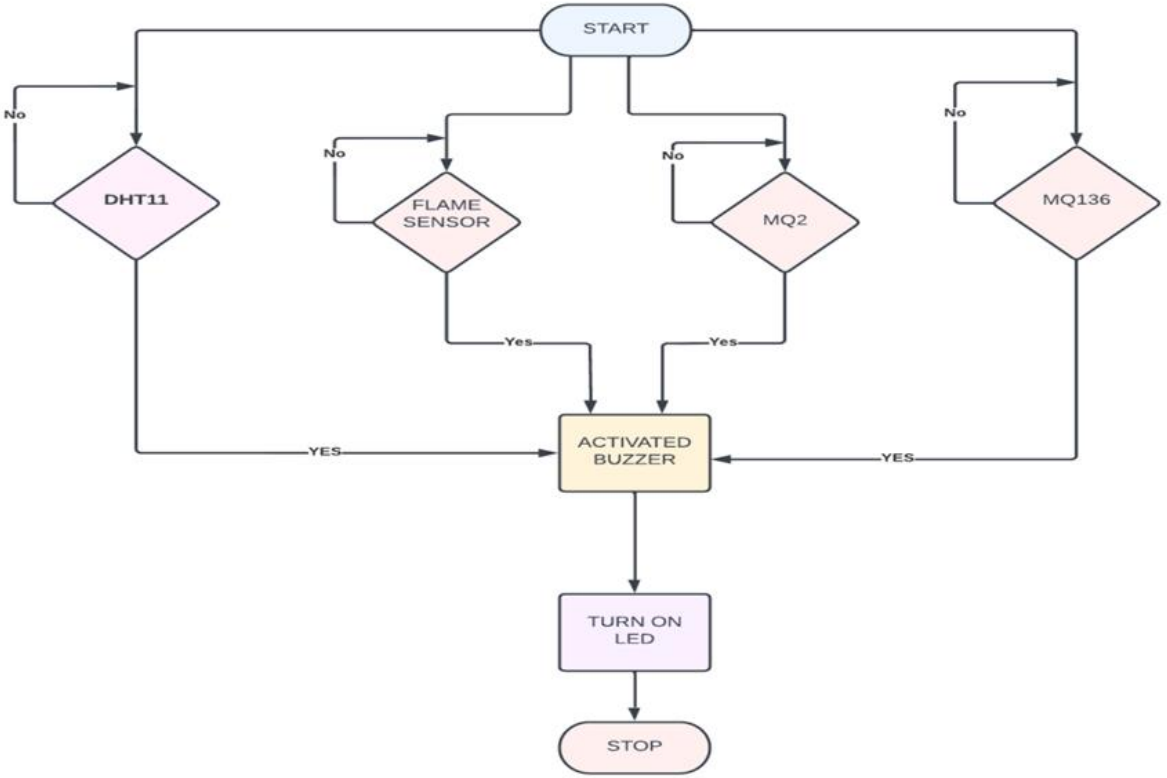
The following block diagram, dht11, flame sensor, the gas sensor is an input device that sends data to Arduino. Buzzer and led are output devices that receive information from the Arduino



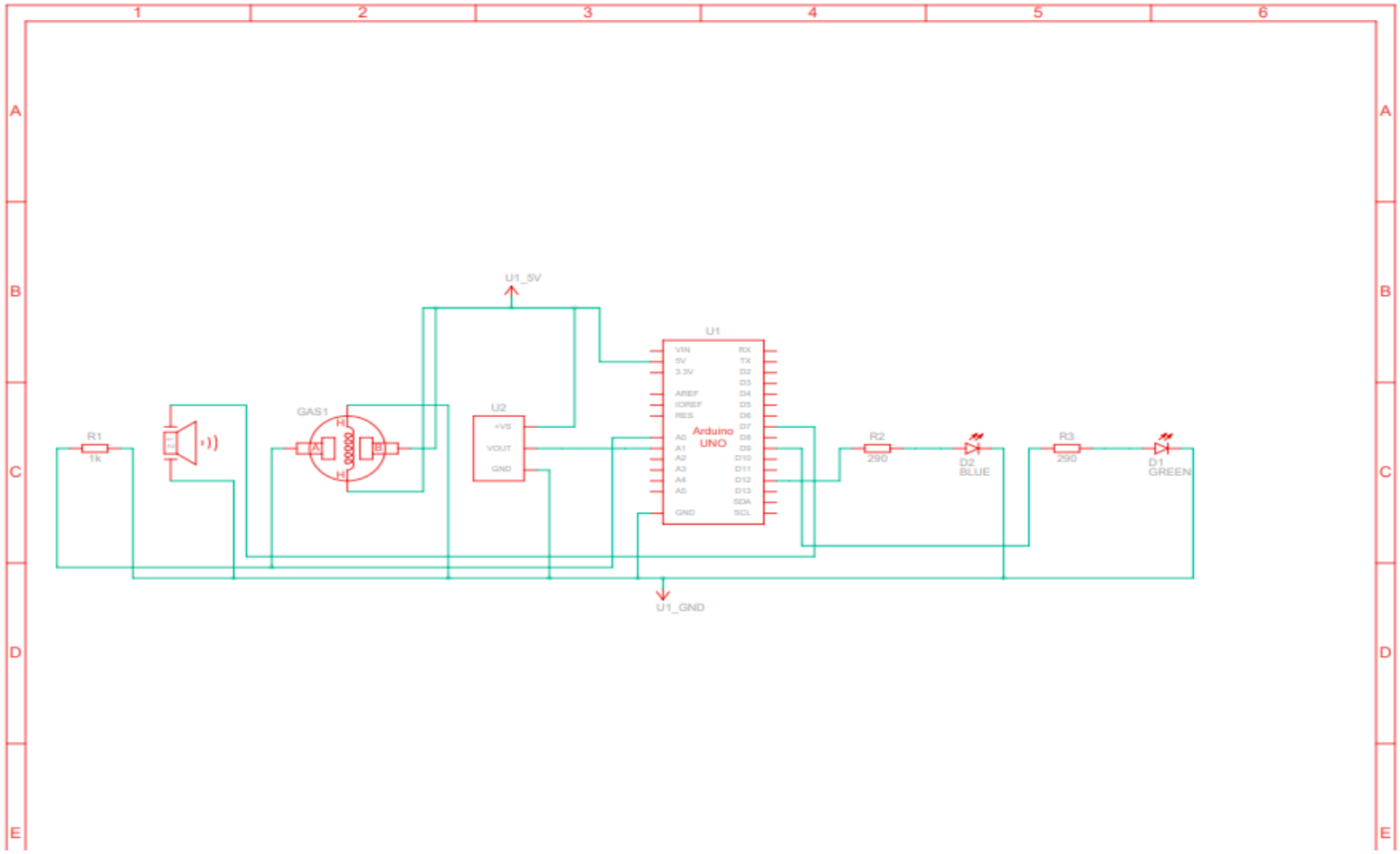
FLOW CHART

A flowchart is a diagram that shows a process's steps in proper order. Similarly, the following flowchart talks about the steps involved in the project and the sequential flow of the code also. So, as it starts, first, the flame sensor, dht11, mq2, and mq136 detect the presence of harmful chemicals, high levels of humidity, and the

presence of fire. If the sensor detects any of this then the led and buzzer get activated. Else the buzzer and led are turned off



Gerber file


1
2
3
4
5
6
A
B
C
D
E
U1_5V
U1
VIN
5V
3.3V
AREF
IOREF
RES
A0
A1
A2
A3
A4
A5
GND
RX
TX
D2
D3
D4
D5
D6
D7
D8
D9
D10
D11
D12
D13
SDA
SCL
Arduino
UNO
R1
1k
GAS1
H
A
B
H
U2
+VS
VOUT
GND
R2
290
D2
BLUE
R3
290
D1
GREEN
U1_GND

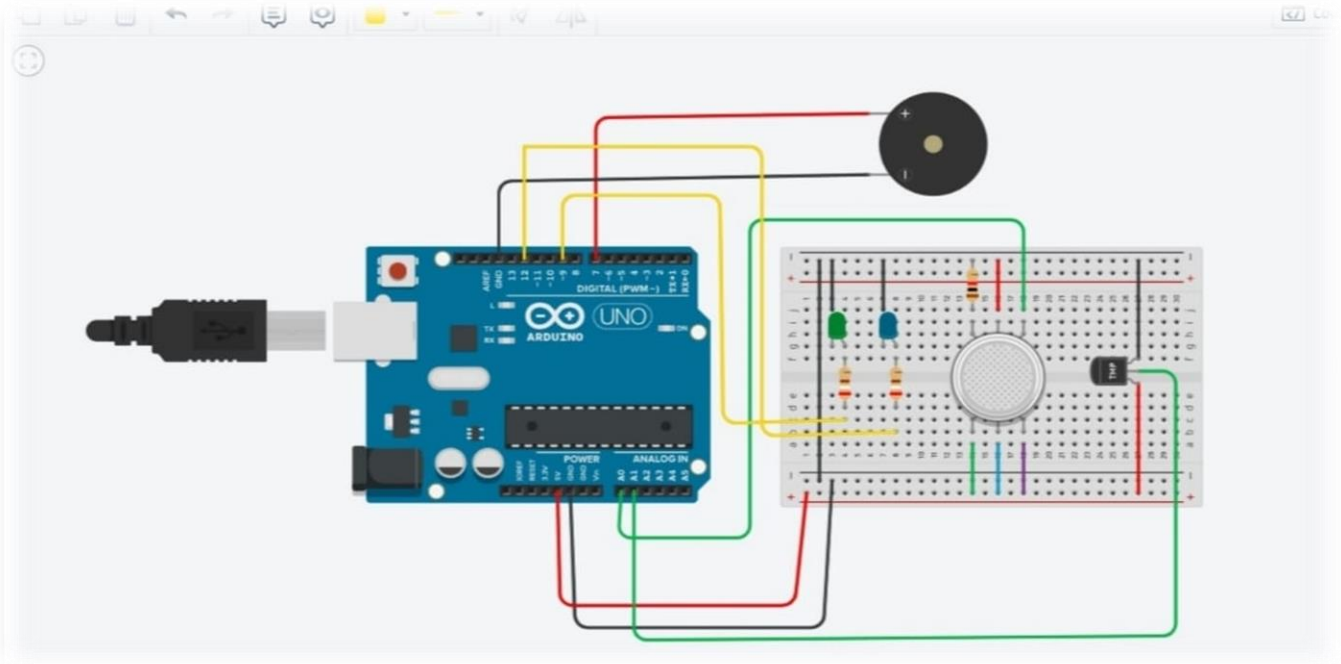
SOURCE CODE

```
//AE CODE
int V_GasSen=0;
int V_TempSens=0;

void setup ()
{
  pinMode(A0, INPUT);
  pinMode(7, OUTPUT);
  pinMode(4,  OUTPUT);
  pinMode(A1, INPUT);
  pinMode(2, OUTPUT);

}

void loop()
{
```

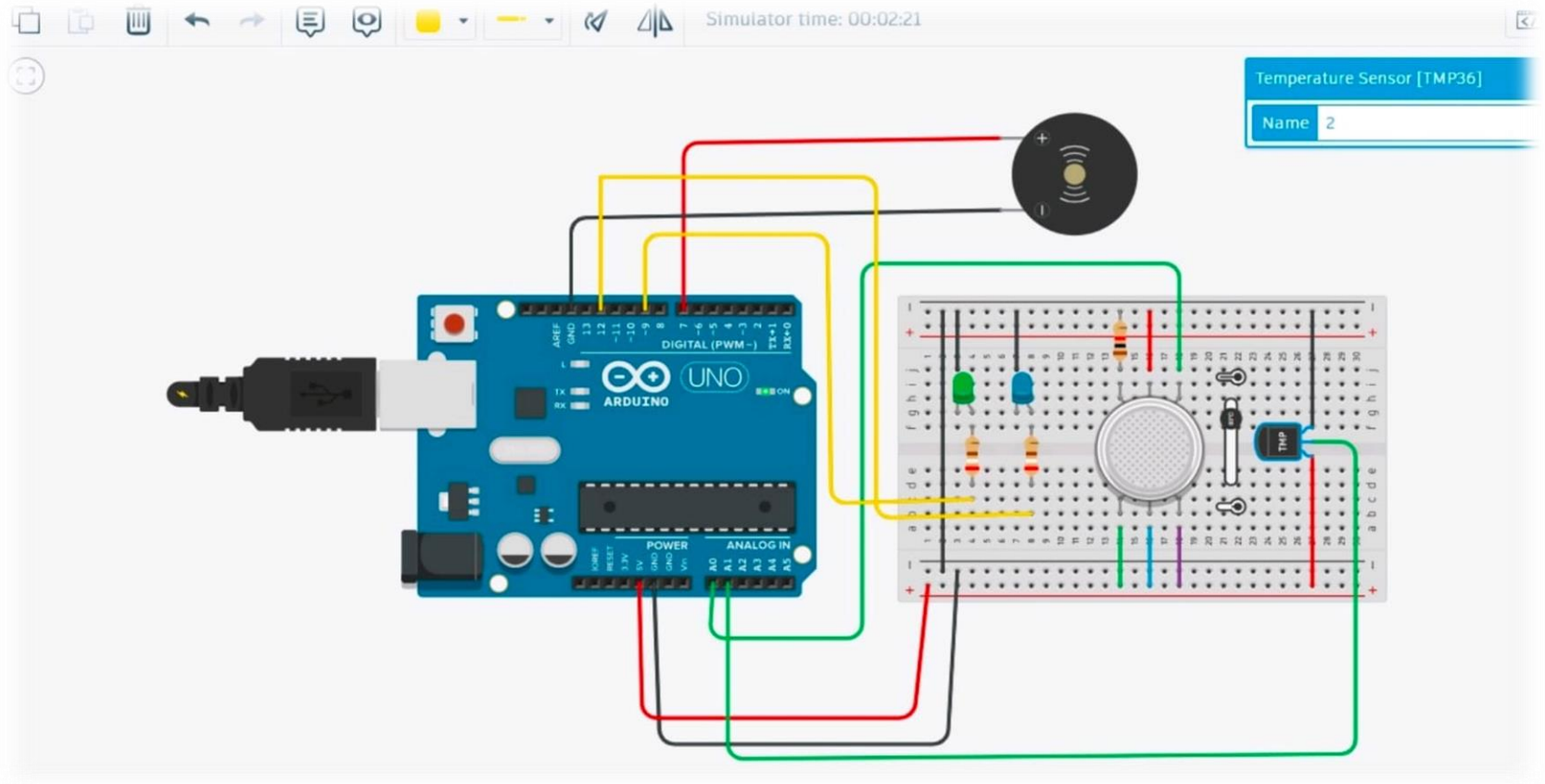
```
  //Smoke Alarm
  V_GasSen=analogRead(A0);
  if (V_GasSen >=250) {
    tone(7, 523, 1000); //play tone 60 (C5 = 523 HZ)
    digitalWrite(9, HIGH);
  }
  V_TempSens =-40 + 0.488155 * (analogRead(A1) - 20);
  if (V_TempSens >=70) {
    tone(7, 523, 1000); //play tone 60 (C5 = 523 HZ)
    digitalWrite(12, HIGH);
  }
  delay(10); // Delay a little bit to improve simulation performand
}
```

OUTPUT

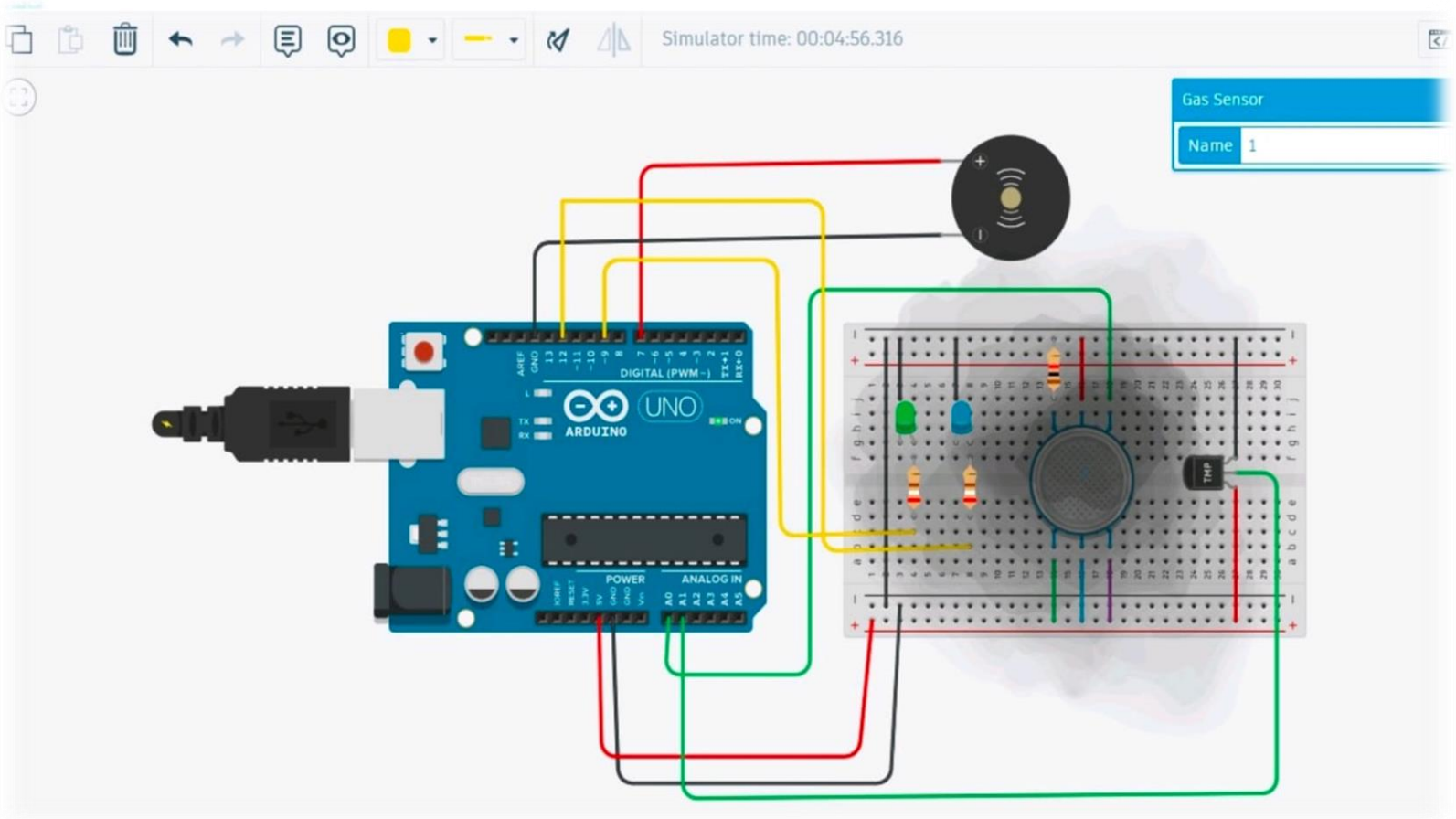
BEFORE SIMULATION:


DIGITAL (PWM~)
UNO
ARDUINO
POWER
ANALOG IN

TEMPERATURE SIMULATION:



SMOKE SIMULATION:



VIDEO DEMO:

Hardware demo:

https://drive.google.com/file/d/1AdPhoYIj3HXYL4hjDvNoG1cKto_Ezpwy/view?usp=drive_link

SOFTWARE DEMO:

https://drive.google.com/file/d/1CDNRkzetHw_a80zaSXIFuEnYy3dXUeRO/view?usp=sharing

Source link:

CONCLUSION:

Hence, we developed the industrial safety system project. Our approach presents that the safety and health of workers should not be sidelined. these aspects are important in product development because they will increase production.