PES UNIVERSITY

**END SEMESTER ASSESSMENT (ESA) B.TECH.
(CSE)
IV SEMESTER**

**UE18CS256 – MICROPROCESSOR AND COMPUTER
ARCHITECTURE LABORATORY**

MINI PROJECT REPORT

ON

HOME AUTOMATION SYSTEM

SUBMITTED BY

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ABSTRACT OF THE PROJECT:

This project is done using Tinkercad. We have tried to implement a Home Automation system which attempts to automate basic home appliances in order to increase the user's safety and convenience for. Day to day house hold activities. These devices include:

1. Automated fans
2. Doorbell
3. Lights
4. Smart gas monitoring
5. Temperature Regulation

With the help of basic code, we connected household devices with certain sensors such as:

- Automatic door(doorbell) using ultrasonic sensor.
- Automatic lights with the help of PIR Motion sensor.
- Automatic fan if temperature crosses a particular limit.
- Gas sensor which shows toxic gas concentrations on LED.

CIRCUIT DIAGRAM:
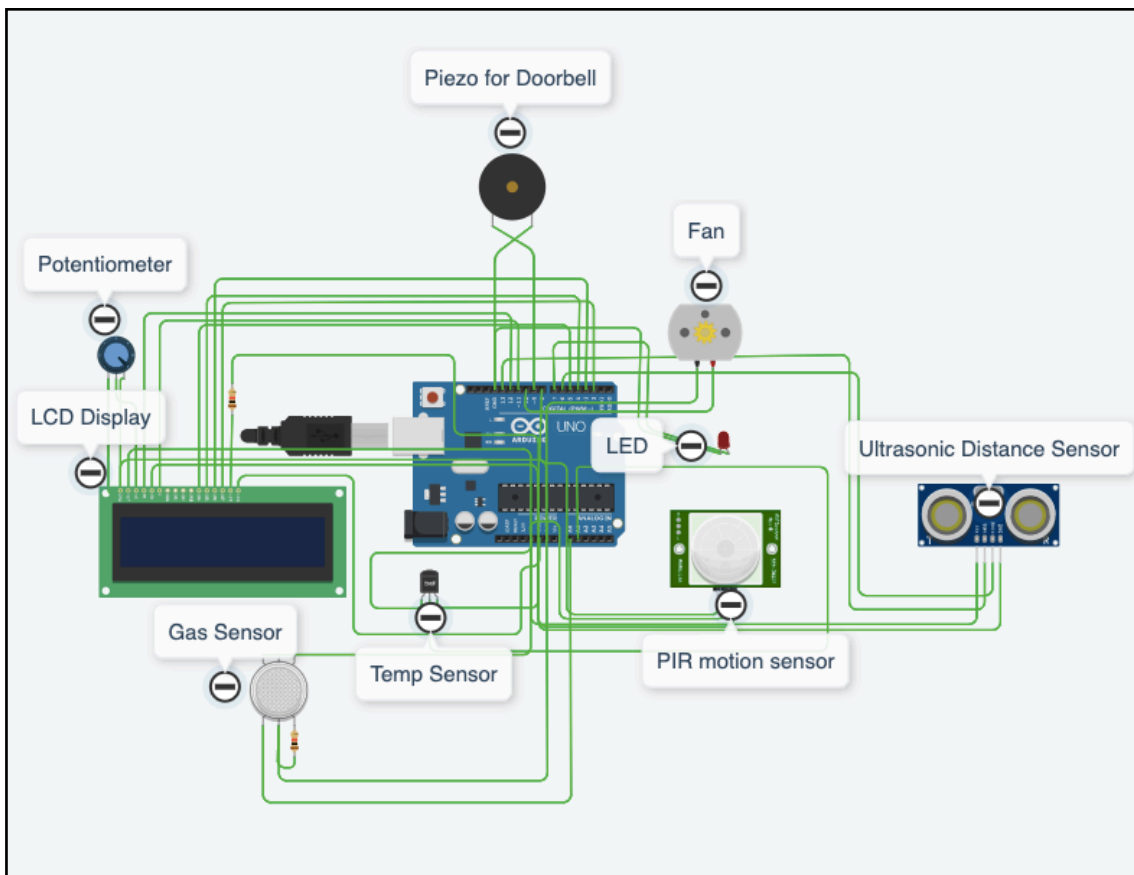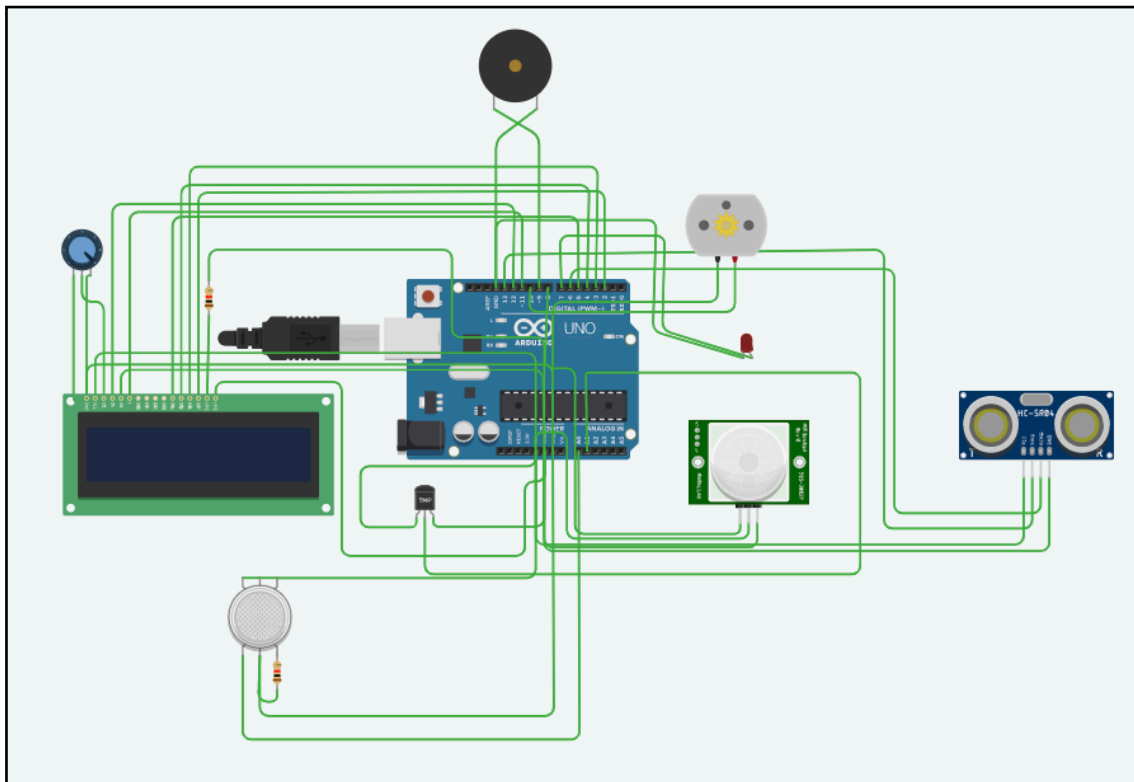
ARDUINO CODE:

```
#include <LiquidCrystal.h>
const int rs = 12, en = 11, d4 = 5, d5 = 4, d6 = 3, d7 = 2;
LiquidCrystal lcd(rs, en, d4, d5, d6, d7);
const int PIR = 8;
const int bulb = 7;
const int tempPin = A1;
const int fan = 10;
int const PINO_SGAS = A0;
//Temp
int temp;
int tempMin = 30;
int tempMax = 60;
//fan
int fanSpeed;
//PIR
int PIRState = 0;
//DoorBell
int trigger_pin = 13;
int echo_pin = 6;
int buzzer_pin = 9;
int time;
int distance;

void setup() {
  pinMode(PIR, INPUT);
  pinMode(bulb, OUTPUT);
  pinMode(fan, OUTPUT);
  pinMode(tempPin, INPUT);
  lcd.begin(16, 2);
  //Ultrasound
  Serial.begin (9600);
  pinMode (trigger_pin, OUTPUT);
  pinMode (echo_pin, INPUT);
  pinMode (buzzer_pin, OUTPUT);

}

void loop()
{
 //Using PIR to automate lights
  PIRState = digitalRead(PIR);
  if (PIRState == HIGH)
```

```
{
  digitalWrite(bulb, HIGH);
}

if (PIRState == LOW)
{
  digitalWrite(bulb, LOW);
}
```
//Using Temp sensor to automate fan
```
if
(temp = readTemp());

if (temp < tempMin)
{
  fanSpeed = 0;
  analogWrite(fan, fanSpeed);
  digitalWrite(fan, LOW);
}
if ((temp >= tempMin) && (temp <= tempMax))
{
  fanSpeed = temp;
  fanSpeed = 1.5 * fanSpeed;
  analogWrite(fan, fanSpeed);
}

lcd.setCursor(0, 0);
lcd.print("TEMP:");
lcd.print(temp);
lcd.print(" C ");

delay(200);
```
//Gas sensor to detect leaks
```
int color = analogRead(PINO_SGAS);

lcd.setCursor(0,1);
//lcd.print("");
if(color <= 85){
  lcd.print("Gas:Low ");
} else if(color <= 120){
  lcd.print("Gas:Med ");
} else if(color <= 200){
  lcd.print("Gas:High ");
} else if(color <= 300){
  lcd.print("Gas:Ext ");
```

```
    }

  delay(250);

  //Using ultrasound to automate door opening and doorbell
   digitalWrite (trigger_pin, HIGH);
   delayMicroseconds (10);
   digitalWrite (trigger_pin, LOW);
   time = pulseIn (echo_pin, HIGH);
   distance = (time * 0.034) / 2;

  if (distance <= 10)
      {
      Serial.println (" Door Open ");
      Serial.print (" Distance= ");
      Serial.println (distance);
      digitalWrite (buzzer_pin, HIGH);
      delay (500);
      }
  else {
      Serial.println (" Door closed ");
      Serial.print (" Distance= ");
      Serial.println (distance);
      digitalWrite (buzzer_pin, LOW);
      delay (500);
      }
}

  int readTemp()
  {
   temp = analogRead(tempPin);
   return temp * 0.48828125;
  }
```
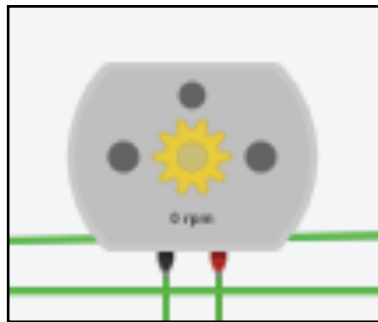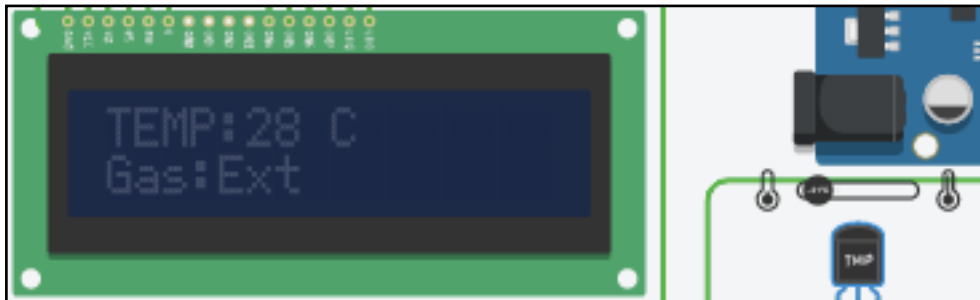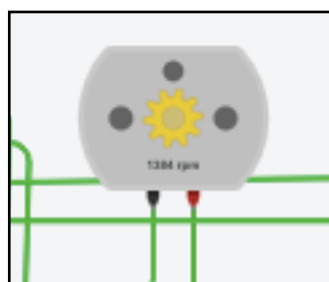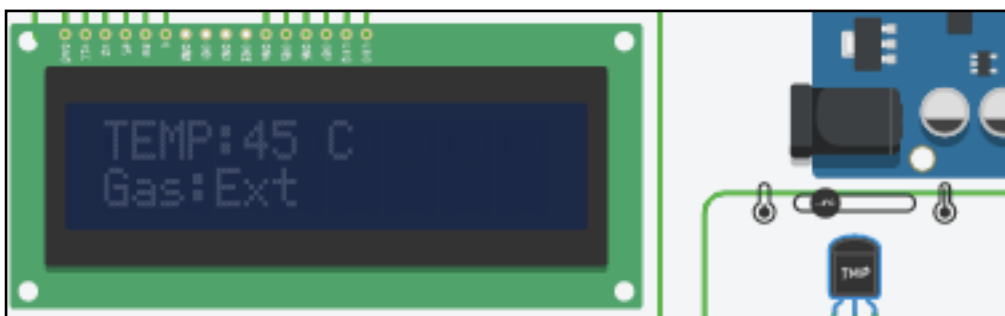
SCREENSHOTS OF THE OUTPUT:

1. Automated Fan:

When the temperature > 30°C, the temperature sensor automatically turns the fan on.

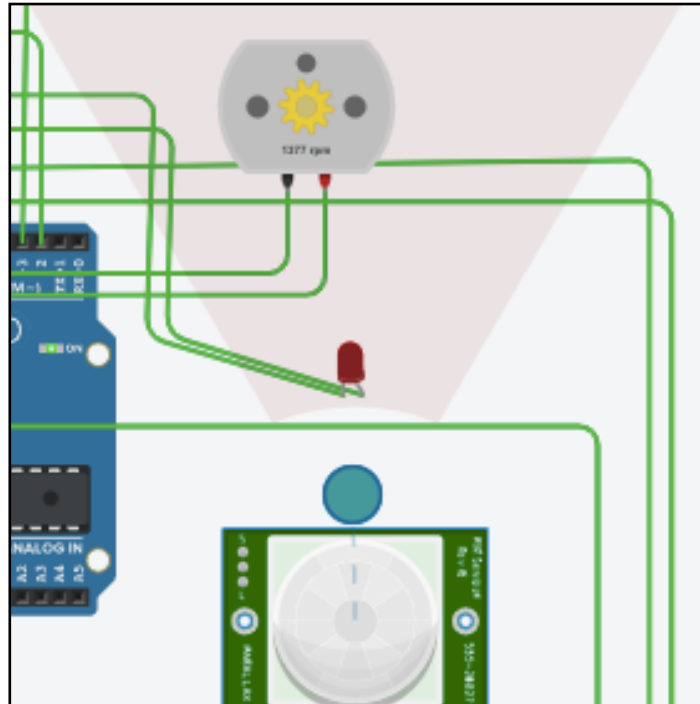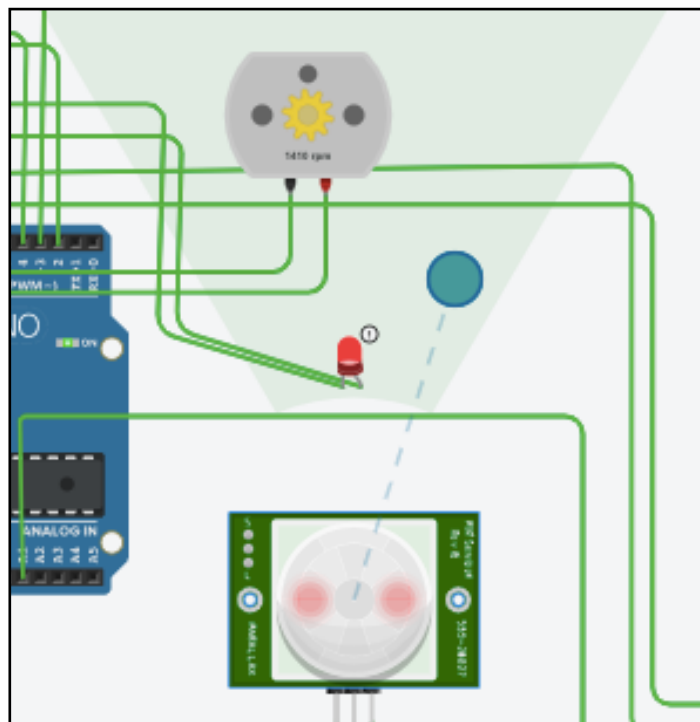• Fan is OFF (temp < 30°C):

• Fan is ON (temp > 30°C):

2. Automated Lights:

If the room detects any movement (here, green dot) using the PIR sensor, the LED will automatically turn on else it will remain off.
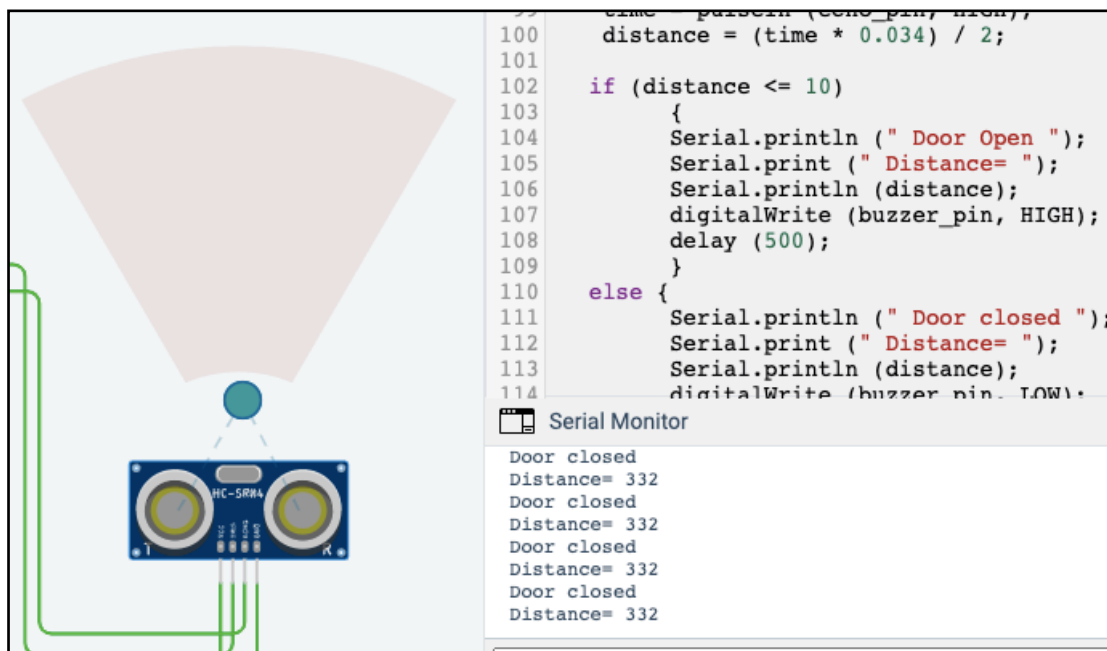
- LED OFF (no movement detected):
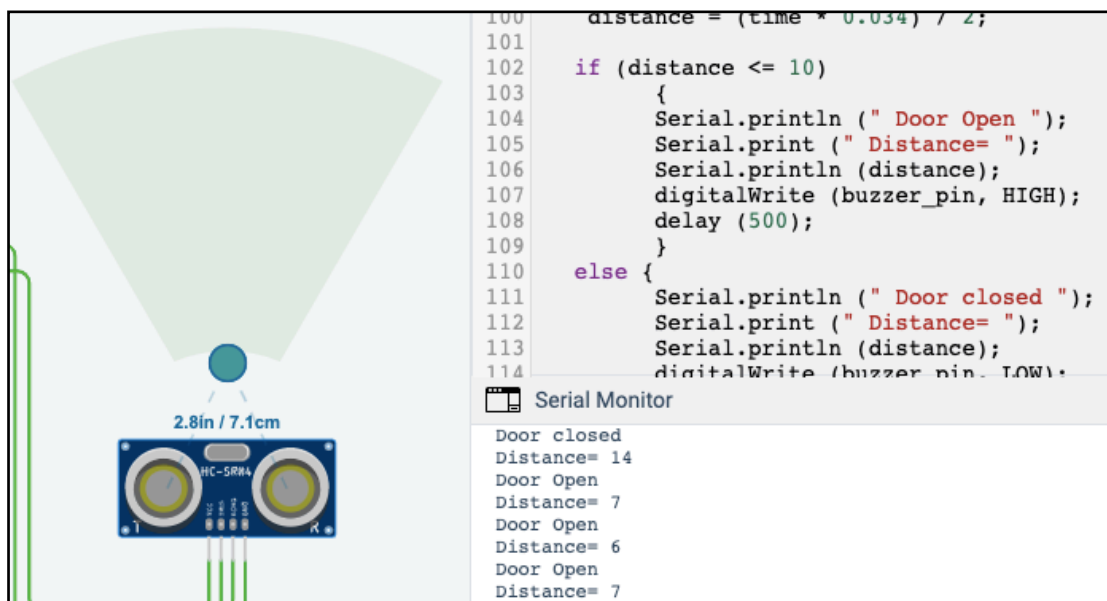

- LED ON (movement detected):

3. Doorbell:

   The doorbell rings (piezo) if the distance of the person in front of the door using an Ultrasonic Distance Sensor is equal to less than 10 units or-else it remains closed.

• Door CLOSED (motion not close enough):

```
100     distance = (time * 0.034) / 2;
101
102     if (distance <= 10)
103             {
104                 Serial.println (" Door Open ");
105                 Serial.print (" Distance= ");
106                 Serial.println (distance);
107                 digitalWrite (buzzer_pin, HIGH);
108                 delay (500);
109             }
110     else {
111                 Serial.println (" Door closed ");
112                 Serial.print (" Distance= ");
113                 Serial.println (distance);
114                 digitalWrite (buzzer_pin, LOW);
```

Serial Monitor

```
Door closed
Distance= 332
Door closed
Distance= 332
Door closed
Distance= 332
Door closed
Distance= 332
```

• Door OPEN (motion is close enough):

```
100     distance = (time * 0.034) / 2;
101
102     if (distance <= 10)
103             {
104                 Serial.println (" Door Open ");
105                 Serial.print (" Distance= ");
106                 Serial.println (distance);
107                 digitalWrite (buzzer_pin, HIGH);
108                 delay (500);
109             }
110     else {
111                 Serial.println (" Door closed ");
112                 Serial.print (" Distance= ");
113                 Serial.println (distance);
114                 digitalWrite (buzzer_pin, LOW);
```

2.8in / 7.1cm

Serial Monitor

```
Door closed
Distance= 14
Door Open
Distance= 7
Door Open
Distance= 6
Door Open
Distance= 7
```
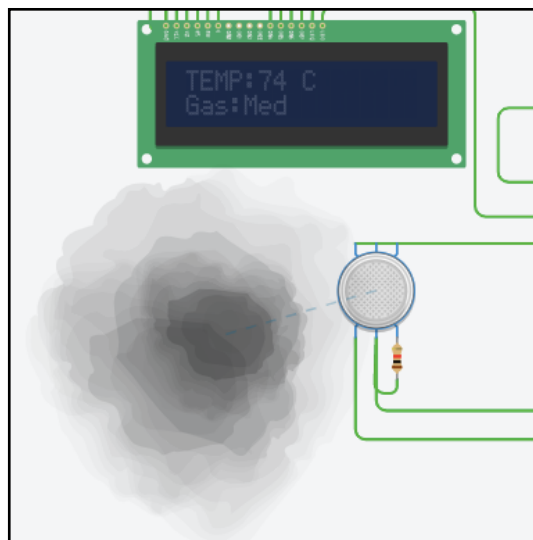
4. Gas Monitor:

It monitors the toxicity of gas concentration levels which increases the safety of our smart home.

• Low toxicity:
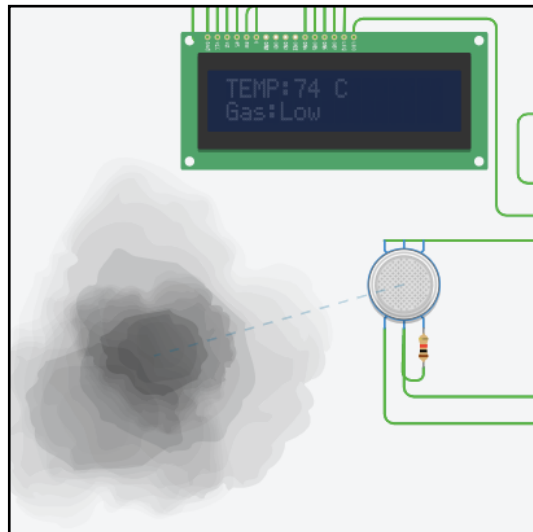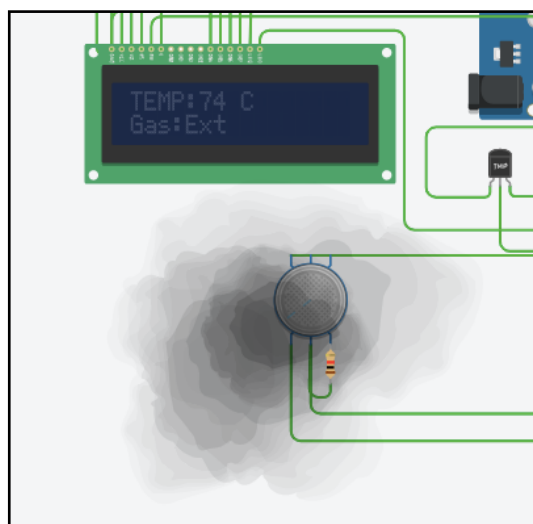

• Medium toxicity:

• Extreme toxicity:

REFERENCES

1. www.youtube.com
2. https://all3dp.com
3. https://www.tinkercad.com/learn/circuits.com

Our project is a home automation system using Tinkercad. We have tried to implement smart solutions to automate basic home appliances in order to provide both safety and convenience to the users in their daily activities in and around their homes.

We have included
1. Automated fans
2. Doorbell
3. Lights
4. Smart gas monitoring
5. Temperature Regulation

With the help of basic code, we connected household devices with certain sensors to achieve a certain level of automation such as:

- ultrasonic distance sensor for an automatic doorbell.
- PIR Motion sensor for Automatic lights
- temperature sensor for an Automatic fan
- Gas sensor which shows toxic gas concentrations on LED.