Embedded Systems Lab 7

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Q1. Interface two 7-segment display with Arduino Uno board. Implement
a) odd counter

b) even counter

Display the values in the seven segment display.

Aim:

To interface two 7-segment display with Arduino Uno board by implementing odd counter and even counter and displaying the values in the seven segment display.

Link: https://www.tinkercad.com/things/k5WfFFrjNf5

Code:

```
unsigned const int A = 13;
unsigned const int B = 12;
unsigned const int C = 11;
unsigned const int D = 10;
unsigned const int E = 9;
unsigned const int F = 8;
unsigned const int G = 7;
unsigned const int H = 6;
unsigned const int btn = 4;

void setup(void)
{
  pinMode(A, OUTPUT);
  pinMode(B, OUTPUT);
  pinMode(C, OUTPUT);
  pinMode(D, OUTPUT);
  pinMode(E, OUTPUT);
  pinMode(F, OUTPUT);
  pinMode(G, OUTPUT);
  pinMode(H, OUTPUT);
  pinMode(btn, INPUT);
}
int pins[] = {A,B,C,D,E,F,G,H};
```

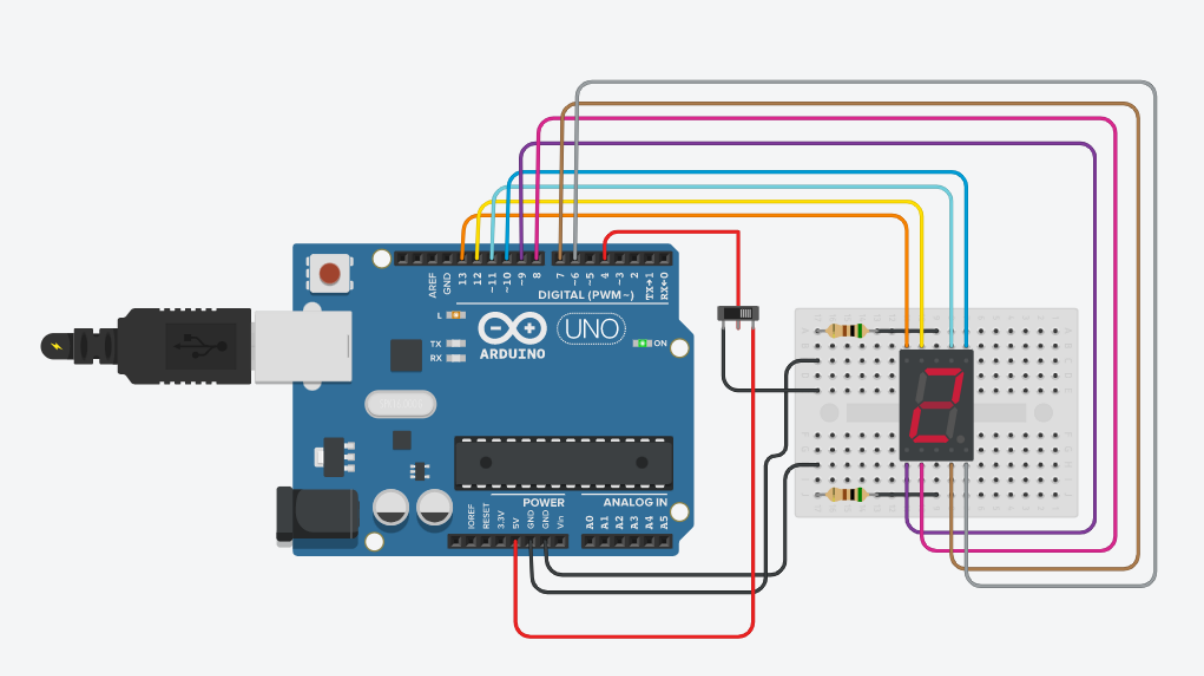
```
void zero(void) {
  digitalWrite(A, LOW);
  digitalWrite(B, HIGH);
  digitalWrite(C, HIGH);
  digitalWrite(D, HIGH);
  digitalWrite(E, HIGH);
  digitalWrite(F, HIGH);
  digitalWrite(G, HIGH);
  digitalWrite(H, LOW);
}

void one(void) {
  digitalWrite(A, LOW);
  digitalWrite(B, LOW);
  digitalWrite(C, LOW);
  digitalWrite(D, HIGH);
  digitalWrite(E, LOW);
  digitalWrite(F, LOW);
  digitalWrite(G, HIGH);
  digitalWrite(H, LOW);
}

void two(void) {
  digitalWrite(A, HIGH);
  digitalWrite(B, LOW);
  digitalWrite(C, HIGH);
  digitalWrite(D, HIGH);
  digitalWrite(E, HIGH);
  digitalWrite(F, HIGH);
  digitalWrite(G, LOW);
  digitalWrite(H, LOW);
}

void three(void) {
  digitalWrite(A, HIGH);
  digitalWrite(B, LOW);
  digitalWrite(C, HIGH);
  digitalWrite(D, HIGH);
```

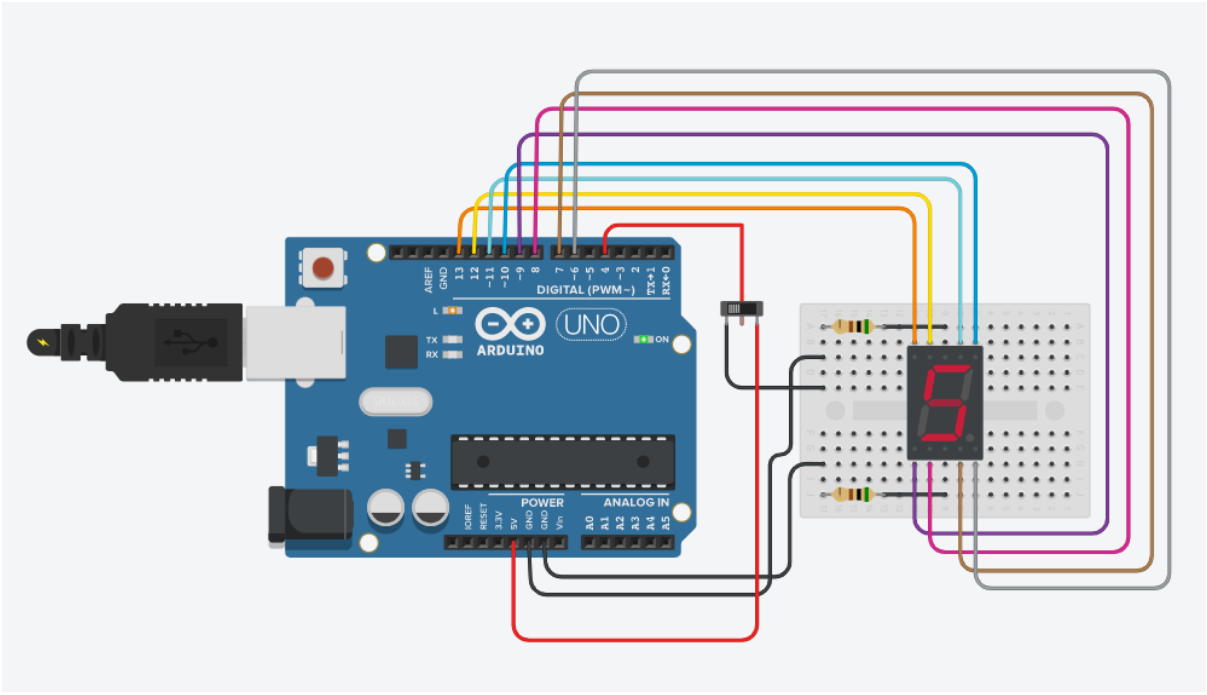
```
  digitalWrite(E, LOW);
  digitalWrite(F, HIGH);
  digitalWrite(G, HIGH);
  digitalWrite(H, LOW);
}

void four(void) {
  digitalWrite(A, HIGH);
  digitalWrite(B, HIGH);
  digitalWrite(C, LOW);
  digitalWrite(D, HIGH);
  digitalWrite(E, LOW);
  digitalWrite(F, LOW);
  digitalWrite(G, HIGH);
  digitalWrite(H, LOW);
}

void five(void) {
  digitalWrite(A, HIGH);
  digitalWrite(B, HIGH);
  digitalWrite(C, HIGH);
  digitalWrite(D, LOW);
  digitalWrite(E, LOW);
  digitalWrite(F, HIGH);
  digitalWrite(G, HIGH);
  digitalWrite(H, LOW);
}

void six(void) {
  digitalWrite(A, HIGH);
  digitalWrite(B, HIGH);
  digitalWrite(C, HIGH);
  digitalWrite(D, LOW);
  digitalWrite(E, HIGH);
  digitalWrite(F, HIGH);
  digitalWrite(G, HIGH);
  digitalWrite(H, LOW);
}
```

```
void seven(void) {
  digitalWrite(A, LOW);
  digitalWrite(B, LOW);
  digitalWrite(C, HIGH);
  digitalWrite(D, HIGH);
  digitalWrite(E, LOW);
  digitalWrite(F, LOW);
  digitalWrite(G, HIGH);
  digitalWrite(H, LOW);
}

void eight(void) {
  digitalWrite(A, HIGH);
  digitalWrite(B, HIGH);
  digitalWrite(C, HIGH);
  digitalWrite(D, HIGH);
  digitalWrite(E, HIGH);
  digitalWrite(F, HIGH);
  digitalWrite(G, HIGH);
  digitalWrite(H, LOW);
}

void nine(void) {
  digitalWrite(A, HIGH);
  digitalWrite(B, HIGH);
  digitalWrite(C, HIGH);
  digitalWrite(D, HIGH);
  digitalWrite(E, LOW);
  digitalWrite(F, HIGH);
  digitalWrite(G, HIGH);
  digitalWrite(H, LOW);
}

void (*nums[])() ={zero,one,two,three, four,
five,six,seven,eight,nine};

// Start
```

```
void loop(void)
{
  if(digitalRead(btn)==HIGH){
    for(int i=0;i<10;i+=2){
      nums[i]();
      delay(1000);
    }
  }else{
    for(int i=1;i<10;i+=2){
      nums[i]();
      delay(1000);
    }
  }
}
```

Output:




DIGITAL (PWM~)
UNO
ARDUINO
POWER
ANALOG IN

Q2. Interface the ambient light sensor with Arduino Uno board. Check the light value from the sensor, and switch on/off the bulb (based on the threshold value).

Aim: To interface the ambient light sensor with Arduino Uno board. To check the light value from the sensor, and switch on/off the bulb (based on the threshold value).

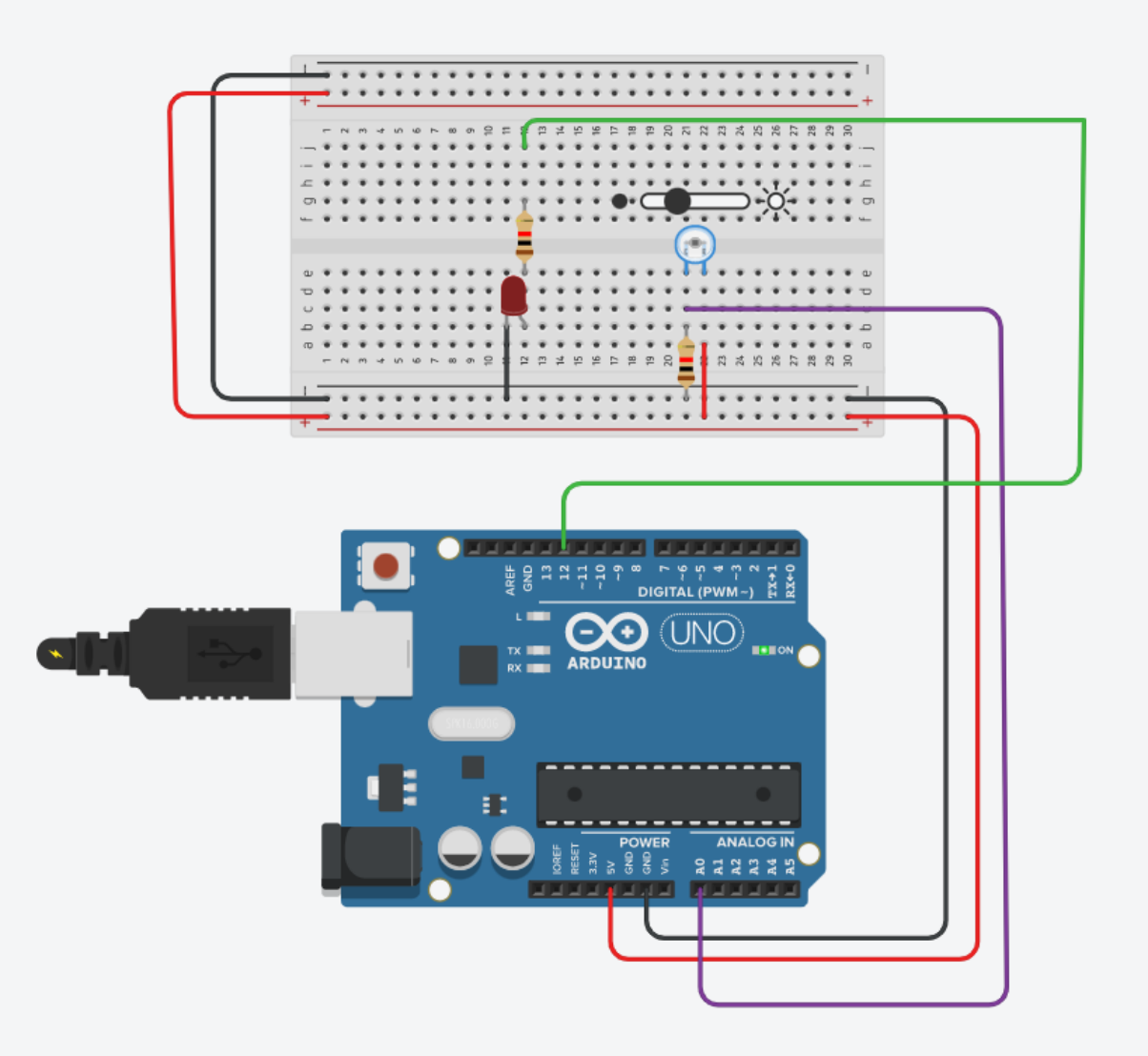
Link: https://www.tinkercad.com/things/63Otg3iarr1

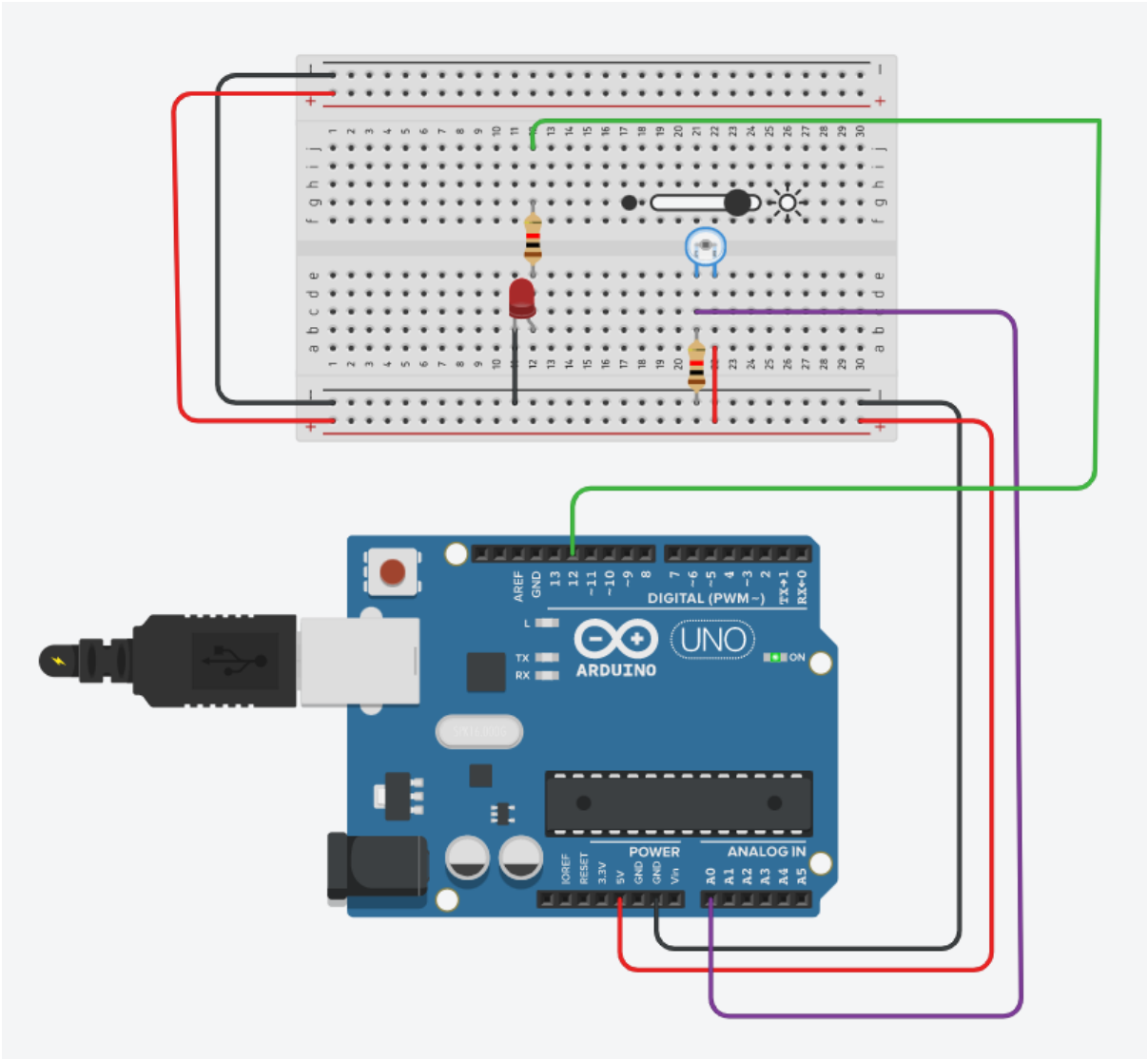
Code:

```
int LED = 12;
int MQ2pin = A0;

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

void loop() {
  float sensorValue;
  sensorValue = analogRead(MQ2pin); // read analog input pin
0

  if(sensorValue >= 10){
    digitalWrite(LED,HIGH);

    Serial.println("\nSensor Value: ");
    Serial.print(sensorValue);
    Serial.println("\nDANGER\n");
  }
  else{
    digitalWrite(LED,LOW);
    Serial.println("\nSensor Value: ");
    Serial.print(sensorValue);

  }
  delay(1000);
}
```

```
float getsensorValue(int pin){
  return (analogRead(pin));
}
```

Output:




DIGITAL (PWM~)
UNO
ARDUINO
POWER
ANALOG IN

Q3. Interface the temperature and gas sensor with Arduino Uno board. Check the temperature and the gas value, if the limit is beyond the threshold, switch on the bulb and make alarm using buzzer.

Aim: To interface the temperature and gas sensor with Arduino Uno board. To check the temperature and the gas value, if the limit is beyond the threshold, switch on the bulb and make alarm using buzzer.

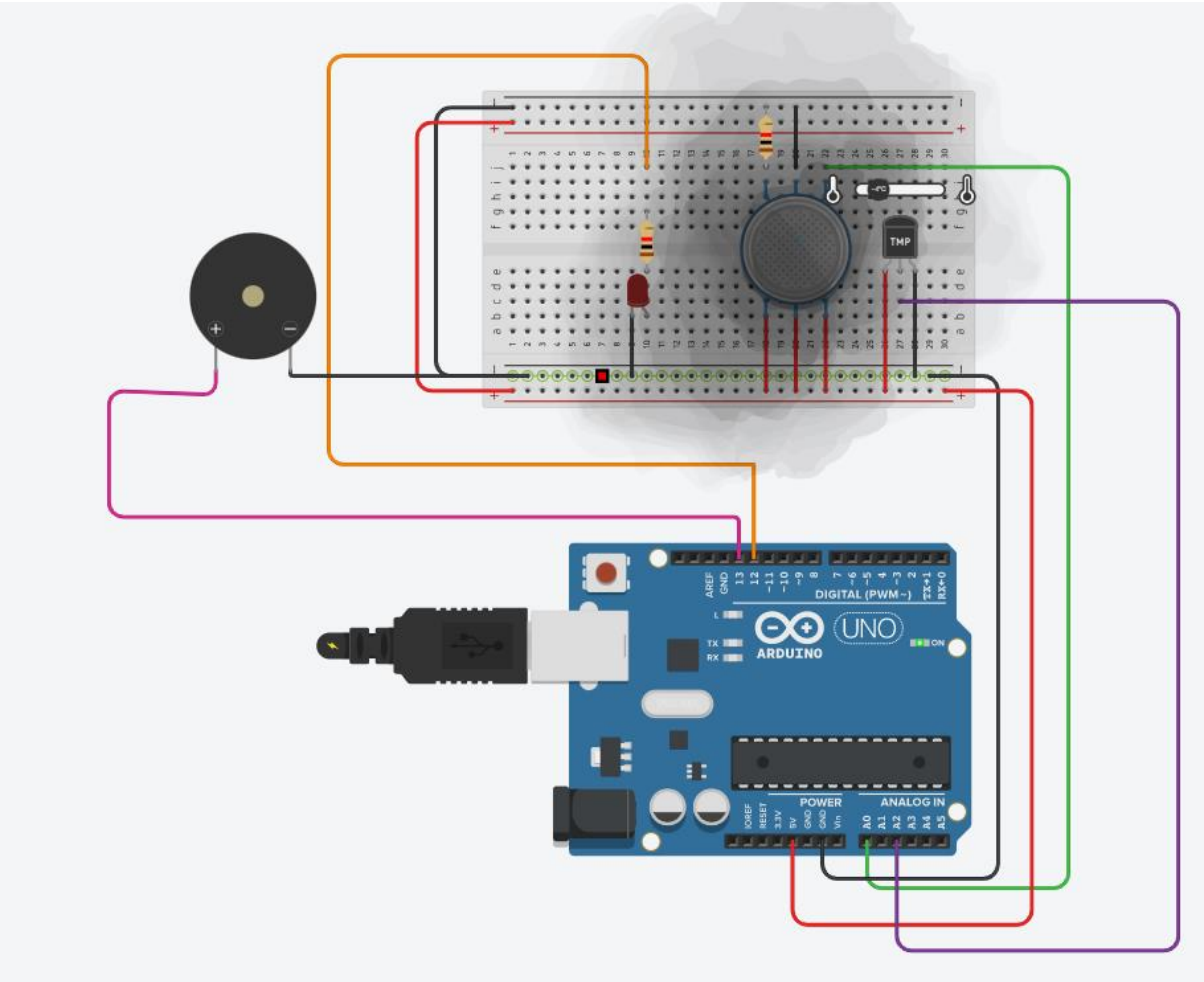
Link: https://www.tinkercad.com/things/4MS7bQ1jXbW

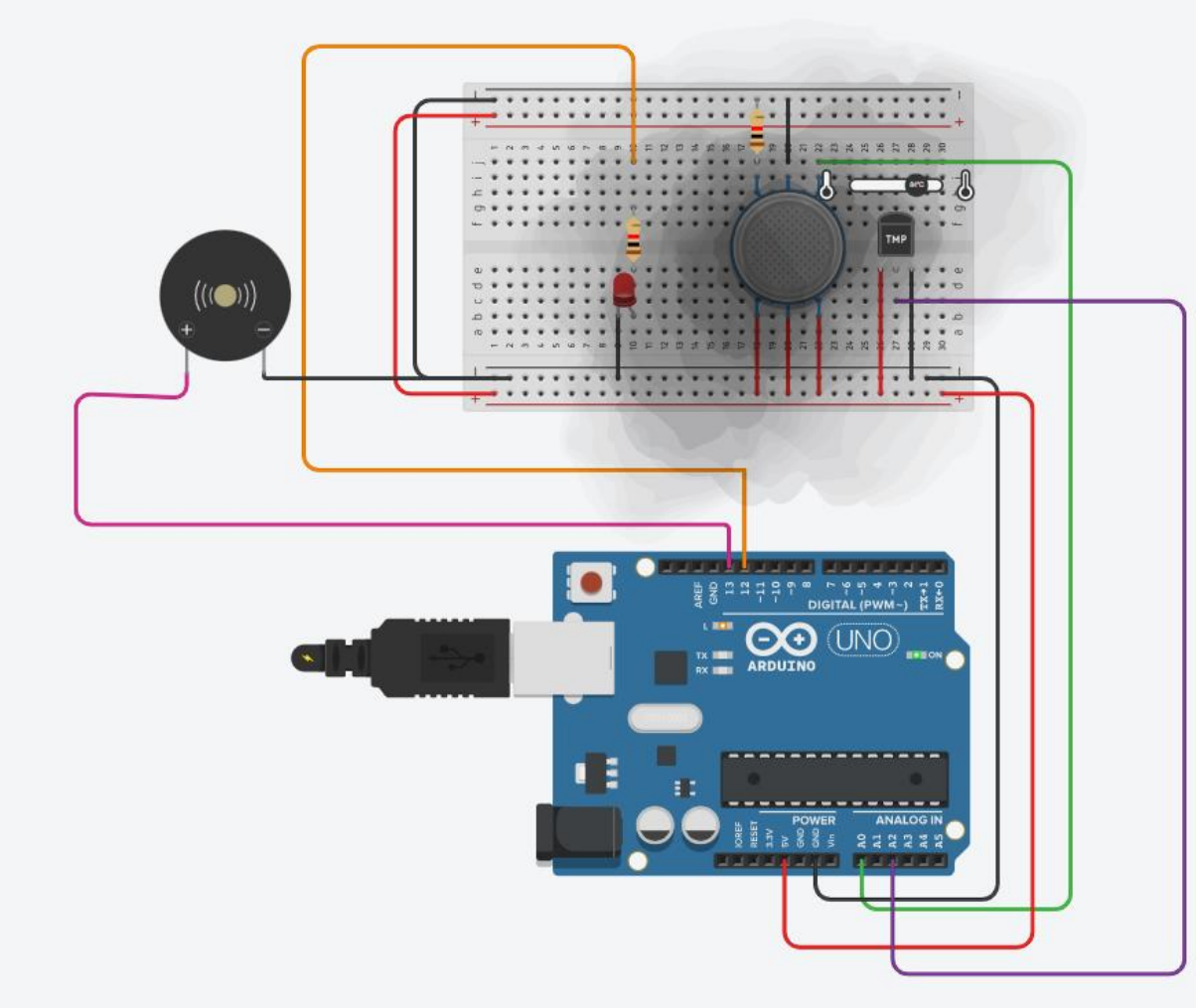
Code:

```
int LED = 12;
int gas = A0;
int tmppin= A2;
int piezo = 13;

void setup() {
  Serial.begin(9600);
  pinMode(LED, OUTPUT);
  pinMode(piezo, OUTPUT);
  pinMode(gas,INPUT);
  pinMode(tmppin,INPUT);

}

void loop() {
  float sensorValue, tempSensor;
  sensorValue = analogRead(gas); // read analog input pin 0

  tempSensor= analogRead(tmppin);

  bool smoke= sensorValue >= 300;
  bool temp= tempSensor >100;

  if(smoke&&temp){
    digitalWrite(LED,HIGH);
    digitalWrite(piezo, HIGH);

    Serial.println("\nSmoke Sensor Value: ");
```

```
    Serial.print(sensorValue);
    Serial.println("\nTemp Sensor Value: ");
    Serial.print(tempSensor);
    Serial.println(" \nDANGER\n");
  }
  else{
    digitalWrite(LED,LOW);
    digitalWrite(piezo, LOW);
    Serial.println("Smoke Sensor Value: ");
    Serial.print(sensorValue);
    Serial.println("\nTemp Sensor Value: ");
    Serial.print(tempSensor);
  }
  delay(1000);
}

float getsensorValue(int pin){
  return (analogRead(pin));
}
```

Output:


TMP
DIGITAL (PWM~)
UNO
ARDUINO
POWER
ANALOG IN


TMP
DIGITAL (PWM~)
UNO
ARDUINO
TX
RX
POWER
ANALOG IN