TinkerCad Arduino Project

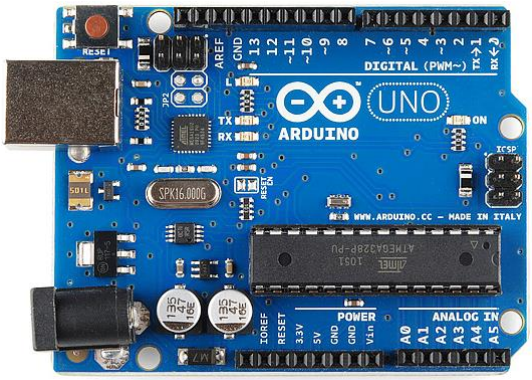
- Shreyas Guduri

Fire Alarm System by Interfacing Arduino with Temperature & Gas Sensor using TinkerCad

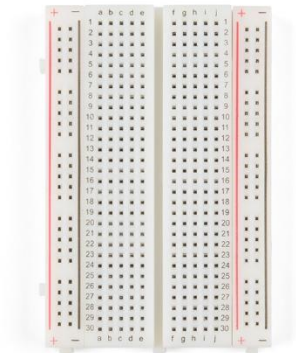
Hardware Requirements:

1. Arduino UNO Board

Arduino board is a microcontroller that is used to accept inputs from sensors connected and provide an output action on the desired device connected to it. The sensor inputs can be from light-detecting sensors, motion sensors (Ultrasonic or IR), temperature sensors, etc. The output from this device can be received through other output devices such as LED, Buzzer, Serial monitor, etc.

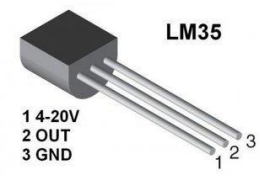


2. Breadboard



The breadboard is the basic component of any circuit building process. All components, be it input sensors or output display devices are connected to the power supply, microcontroller using wired connections through a breadboard. The holes in the breadboard are in series.

3. Temperature Sensor



LM-35 Temperature Sensor gives an analog output based on the instantaneous temperature value. This analog output is proportional to the instantaneous input.

4. Gas Sensor

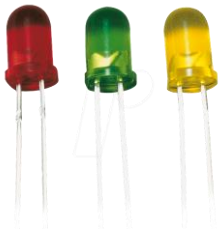
The gas sensor is used to measure the concentration or presence of gas in the atmosphere. It is also used to detect smoke in the air. Based on the gas, a potential difference is generated by changing the resistance of the material present inside the sensor.

5. Resistors

Resistors are passive devices that restrict the flow of current or divide the voltage through the circuit. The input power passes through these resistors and then to the sensors to avoid damage.

6. LED

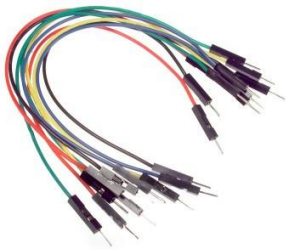
Light Emitting Diode is a commonly used light source. It is a semiconductor that emits light when current flows through it.



7. Piezo Buzzer

It is an electrical component that generates a beep sound on receiving an input. It works on the principle of piezo crystal.

8. Jumper Wires

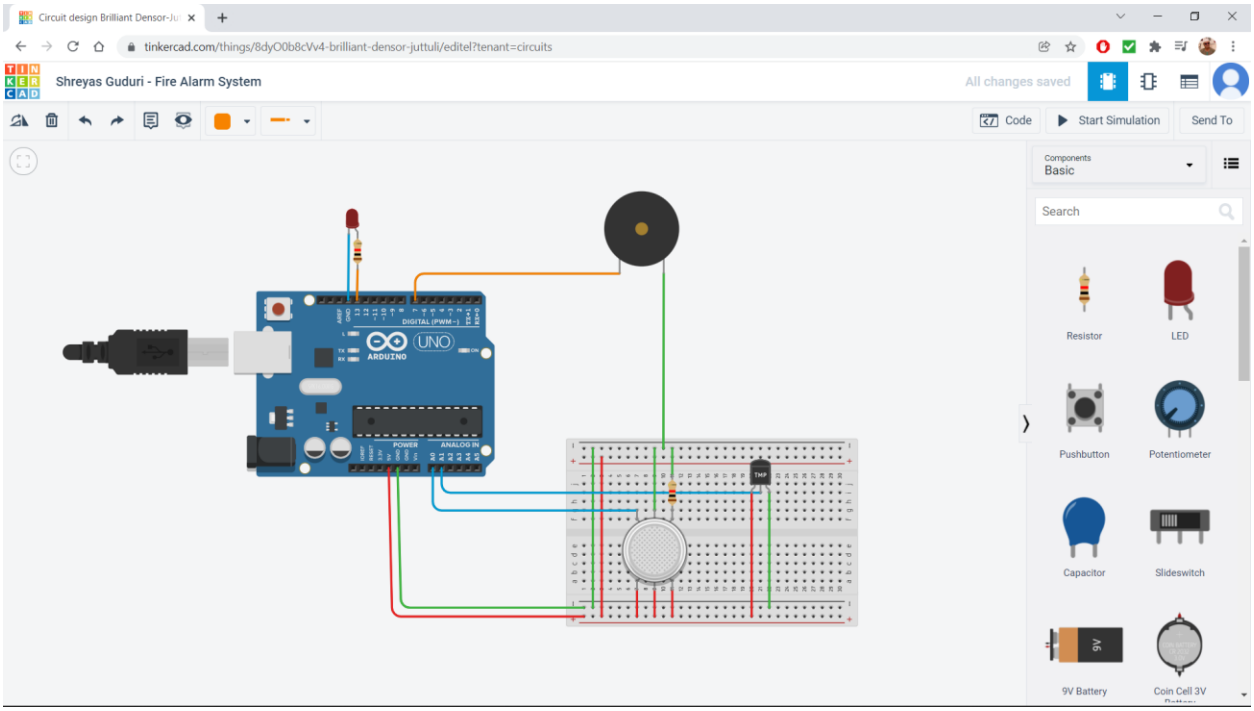


These are the main components that are used to establish the connections between different devices of the circuit.

Software Requirement:

It is an online simulation software used for circuit design. It has all the electrical components required to build circuits and run them.

Circuit Connections:



https://www.tinkercad.com/things/8dyO0b8cVv4-brilliant-densor-juttuli/editel?sharecode=OVdp5RNx94KfzmDQWJwXUuHBk3VujedP54Kwc_FU1rk

Code:

```
float temp;
float vout;
float vout1;
int LED = 13;
int gasSensor;
int piezo = 7;
void setup()
{
```

```
pinMode(A0,INPUT);
pinMode(A1, INPUT);
pinMode(LED,OUTPUT);
pinMode(piezo,OUTPUT);
Serial.begin(9600);
}
void loop()
{
vout=analogRead(A1);
vout1=(vout/1023)*5000;
temp=(vout1-500)/10;
gasSensor=analogRead(A0);
if (temp>=80)
{
digitalWrite(LED,HIGH);
}
else
{
digitalWrite(LED,LOW);
}
if (gasSensor>=100)
{
digitalWrite(piezo,HIGH);
}
else
{
digitalWrite(piezo,LOW);
}
Serial.print("in DegreeC= ");
```

```
Serial.print(" ");
Serial.print(temp);
Serial.print("\t");
Serial.print("GasSensor= ");
Serial.print(" ");
Serial.print(gasSensor);
Serial.println();
delay(1000);
}
```

Working:

Part 1: Gas sensor and its output

A gas sensor is used to detect smoke along with the concentration of gases. Based on the type of gas present in the atmosphere, a potential difference is developed by changing the Resistance of the material present inside the sensor and the same is measured as output.

The piezo buzzer indicates the output of the Gas sensor.

```
if (gasSensor>=1000) {
digitalWrite(piezo,HIGH); }
else {
digitalWrite(piezo,LOW); }
```

A set of "if" conditions check the input from the gas sensor. If the input value goes above 1000, the Piezo Buzzer buzzes (HIGH) and if the value is less than 1000, the value sent to the buzzer remains LOW.

Part 2: Temperature sensor and its output

The Temperature sensor takes in input and when the temperature increases, the voltage increases, and hence the output initiates the functioning of the Buzzer.

The LED is going to be the output indicator for the Temperature sensor.

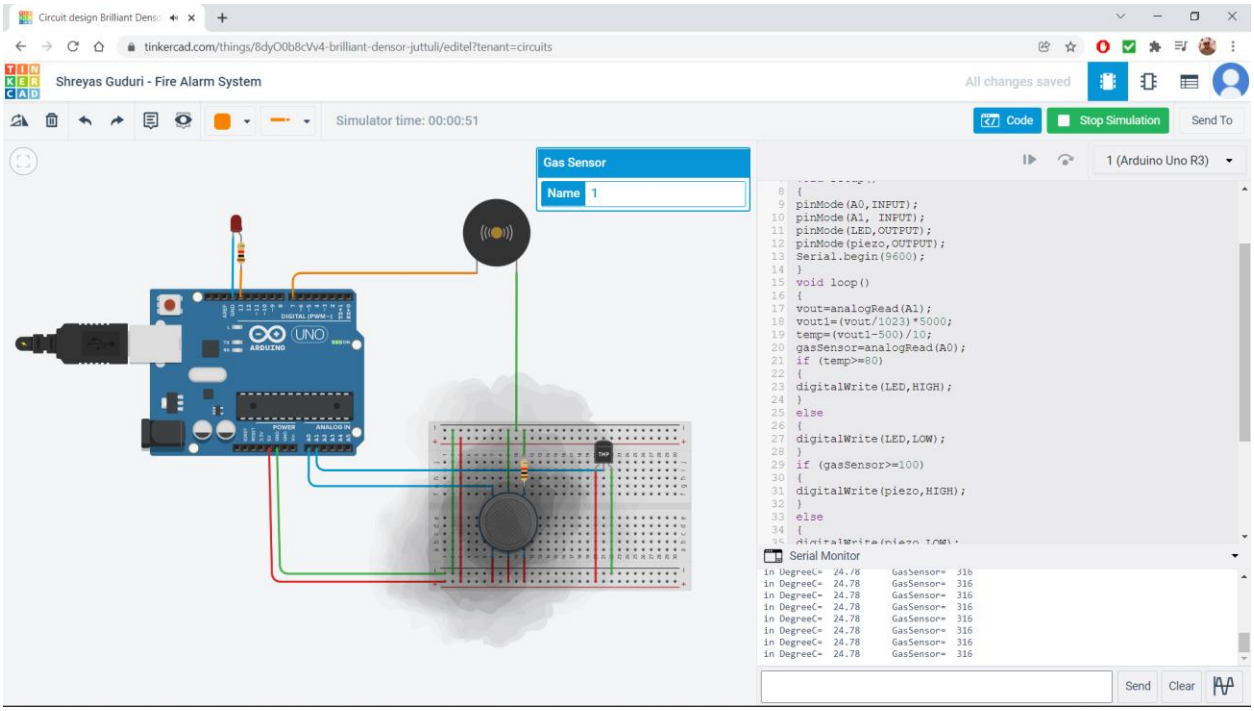
```
if (temp>=80) {
digitalWrite(LED,HIGH); }
else {
digitalWrite(LED,LOW); }
```

The "if" condition checks if the input temperature is Greater than 80 C. If the temperature goes above 80, the LED is HIGH and it glows. Otherwise, the LED remains OFF (LOW).

Simulation:

https://drive.google.com/file/d/1mQ_W2FI_IcMW1zvkOqT9B6AZxExHtLNc/view?usp=sharing

Piezo buzzing when smoke is brought near the sensor.



LED glowing when Temperature rises above 80 C