Al-Mustaqbal University

College Of Engineering & Technology

Department of Computer Engineering Techniques (Stage: 3)

Digital Control

Lecture 6

Arduino programming

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MQ-2 Gas Sensor

A gas sensor is an electronic device that is used to detect the presence and concentration of specific gases in the air. The most common types of gases that are detected by these sensors include carbon monoxide (CO), hydrogen (H2), methane (CH4), and propane (C3H8).

Gas sensors work by measuring changes in electrical resistance, conductivity, or voltage that are caused by the presence of a target gas. Each type of gas sensor is designed to detect a specific gas, and the output signal of the sensor will vary depending on the concentration of the target gas in the air.

In Arduino projects, gas sensors can be used to monitor indoor air quality, detect gas leaks in homes or buildings, or monitor the levels of specific gases in industrial environments. By connecting the gas sensor to an Arduino board, the output signal from the sensor can be read and used to trigger an alarm or other response in the event of a gas leak or other hazardous situation.

the relationship between voltage and gas concentration is the following:

- The greater the gas concentration, the greater the output voltage
- The lower the gas concentration, the lower the output voltage

An MQ2 gas sensor has a wide array of applications such as:
- Domestic gas leakage detector
- Portable gas leakage detector
- Industrial Combustible gas detector
-

MQ2 Gas Sensor specifications

- Operating Voltage: 5V
- Operating Current: 150mA
- Concentration: 300-10000ppm

The MQ-2 Gas detection sensor module has four pins VCC, GND, Aout, and Dout that can be used to get the needful information out of the sensor, The **pinout of the MQ-2 Gas detection sensor** is given below:
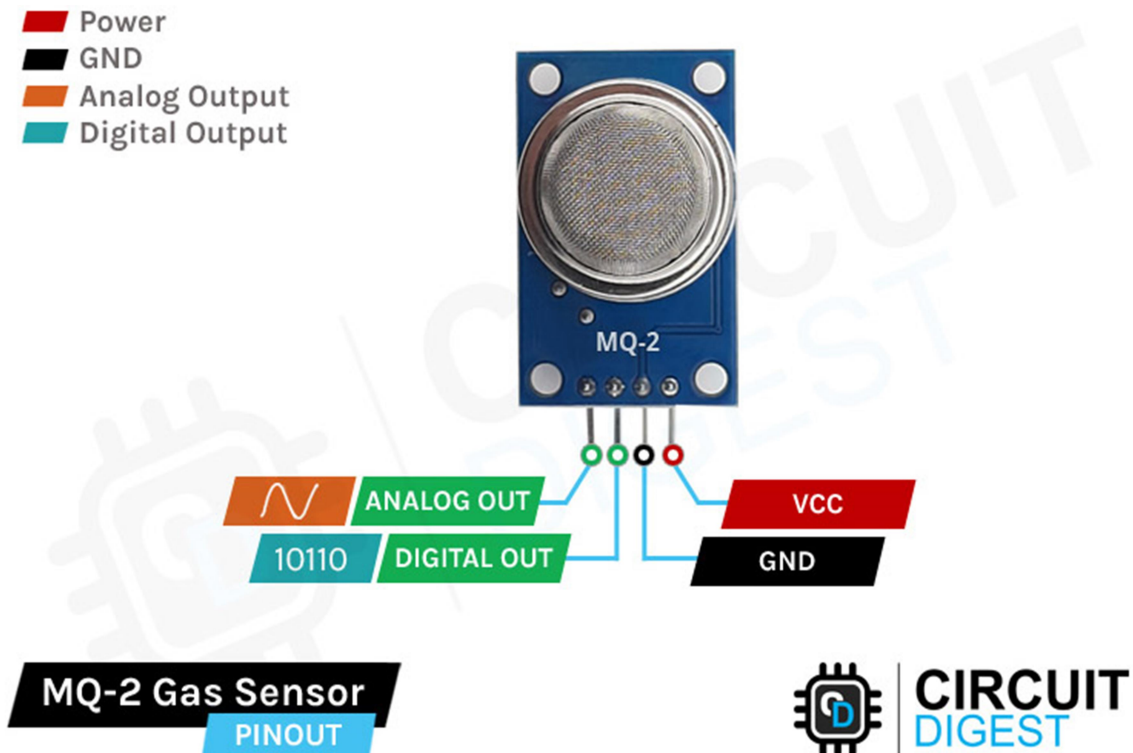
VCC is the power supply pin of the Gas Detection Sensor that can be connected to 5V of the supply.

GND is the ground pin of the board and it should be connected to the ground pin of the Arduino.

DOUT is the Digital output pin of the board, output low indicates gas or smoke is not present in the atmosphere and output high indicates gas or smoke is present in the atmosphere.

AOUT is the Analog output pin of the board that will give us an analog signal which will vary between vcc and ground based on the gas level detected.

Pin connection of MQ2 Gas Sensor with Arduino

- Connect the VCC pin of the sensor to the 5V pin of the Arduino UNO board
- Connect the GND pin of the sensor to the GND pin of the Arduino UNO board
- Connect the AO pin of the sensor to the A3 pin of the Arduino UNO board
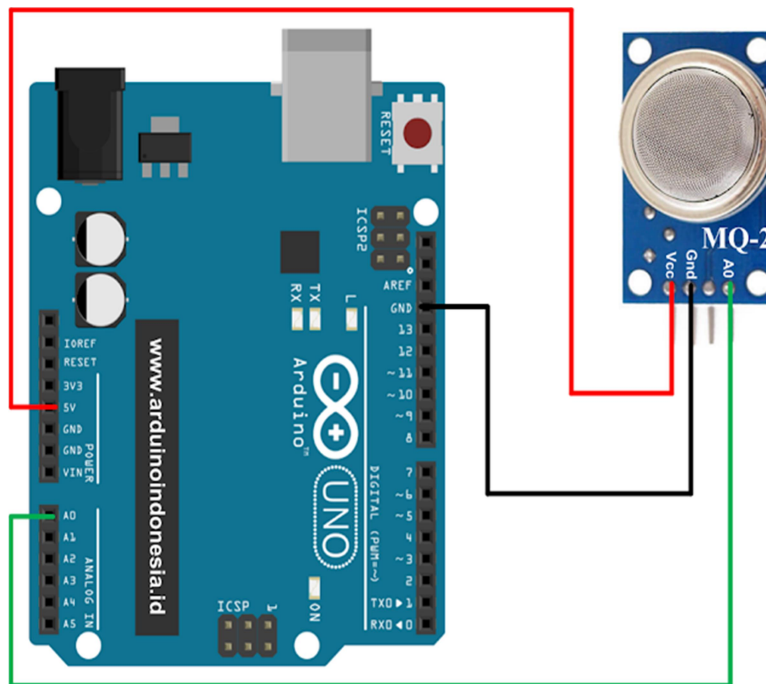
Arduino Code

```
int sensorPin=A0;

int sensorData;

void setup()

{

Serial.begin(9600);

pinMode(sensorPin,INPUT);

}

void loop()

{

sensorData = analogRead(sensorPin);

Serial.print("Sensor Data:");

Serial.println(sensorData);

delay(100);

}
```
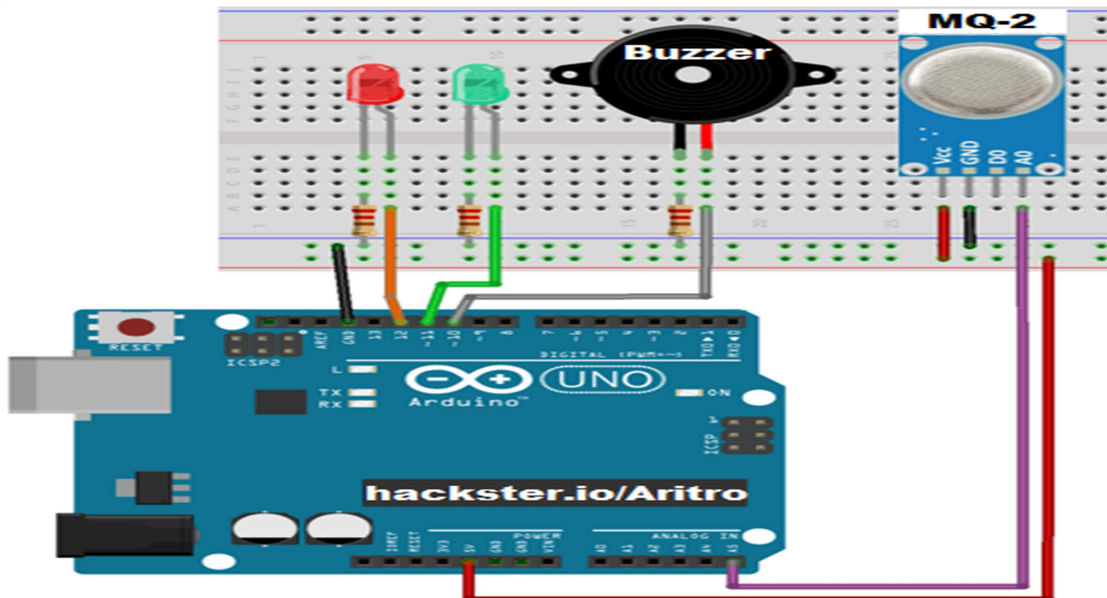
Arduino Code

```
int redLed = 12;
int greenLed = 11;
int buzzer = 10;
int smokeA0 = A5;
// Your threshold value
int sensorThres = 400;
void setup()
{
pinMode(redLed, OUTPUT);
pinMode(greenLed, OUTPUT);
pinMode(buzzer, OUTPUT);
pinMode(smokeA0, INPUT);
Serial.begin(9600);
}
void loop()
{
int analogSensor = analogRead(smokeA0);
Serial.print("Pin A0: ");
Serial.println(analogSensor);
// Checks if it has reached the threshold value
if (analogSensor > sensorThres)
{
digitalWrite(redLed, HIGH);
digitalWrite(greenLed, LOW);
tone(buzzer, 1000, 200);
Serial.print("Sensor Data: ");
Serial.print (sensorData);
Serial.println("   |   Smoke: Detected ! ");
```

```
}
else
{
digitalWrite(redLed, LOW);
digitalWrite(greenLed, HIGH);
noTone(buzzer);
Serial.print("Sensor Value:  ");
Serial.print (sensorData);
}
delay(100);
}
```