Al-Mustaqbal University

Science College

Dep. Medical Physics

Medical Physics

Second Stage

Lab5

Computer 4

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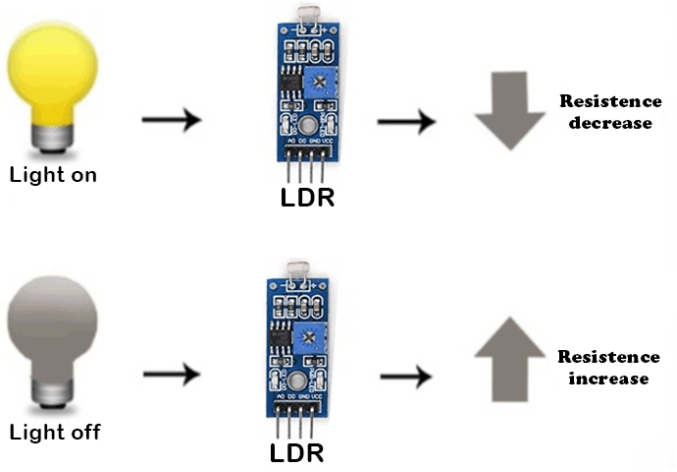
3- Light Sensor LDR (Light Dependent Resistor): Also called photoresistor, Is a light-controlled variable resistor. Works by sensing the intensity of light in its environment. This sensor has an Integrated circuit which contains a built in potentiometer and resistor.

How does it Work:

The LDR gives out an analog voltage when connected to VCC (5V), which varies in magnitude in direct proportion to the input light intensity on it. That is, the greater the intensity of light, the greater the corresponding voltage from the LDR will be. Since the LDR gives out an analog voltage, it is connected to the analog input pin on the Arduino. The Arduino, with its built-in ADC (analog-to-digital converter), then converts the analog voltage (from 0-5V) into a digital value in the range of (0-1023). When there is sufficient light in its environment or on its surface, the converted digital values read from the LDR through the Arduino will be in the range of 800-1023.

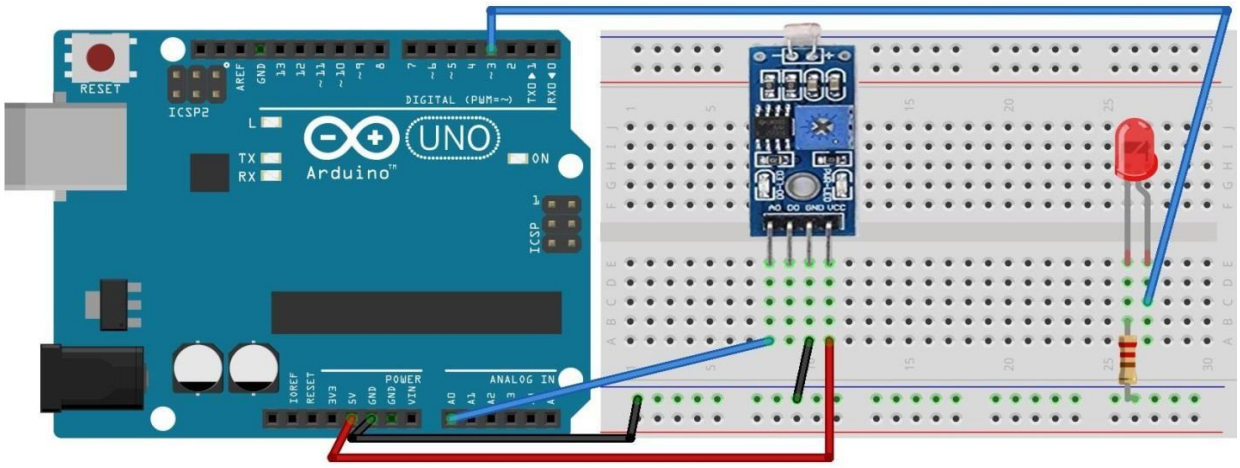


Example

(Measurement of intensity of light)

Requirements: Arduino, BreadBoard, Resistor, LDR Sensor, Led, wires.

Connection map:



Code:

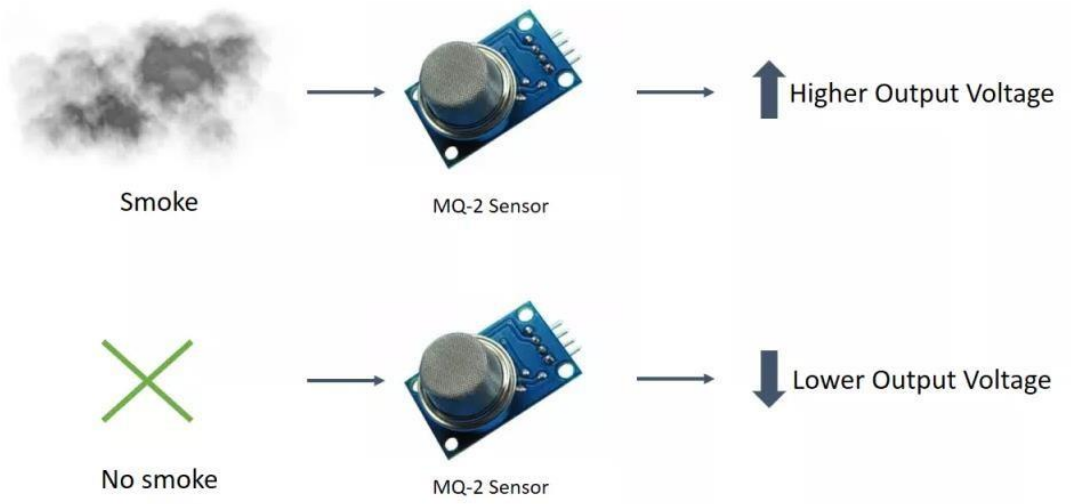
```
int LDR =A0;

void setup(){
 pinMode(LDR,INPUT);
 pinMode(3,OUTPUT);
 Serial.begin(9600);
}
void loop(){
  intLDRvalue=analogRead(LDR)
  ;Serial.println(LDRvalue);
  if(LDRvalue >= 900){
  digitalWrite(3,HIGH);
  }else{
    digitalWrite(3,LOW);
  }
}
```

4- MQ sensor: is a gas sensor. There are different types of it such as **MQ2** for Combustible Gas and Smoke, **MQ3** for Alcohol Vapor, **MQ5** for LPG and Natural Gas and Town Gas, **MQ9** for Carbon Monoxide and Coal Gas and Liquefied Gas, and so on…

We will use the MQ2 type.

How does it Work:

Use a small heater inside with an electro-chemical sensor. They are sensitive for a range of gasses and are used indoors at room temperature. The output is an analog signal and can be read with an analog input of the Arduino.

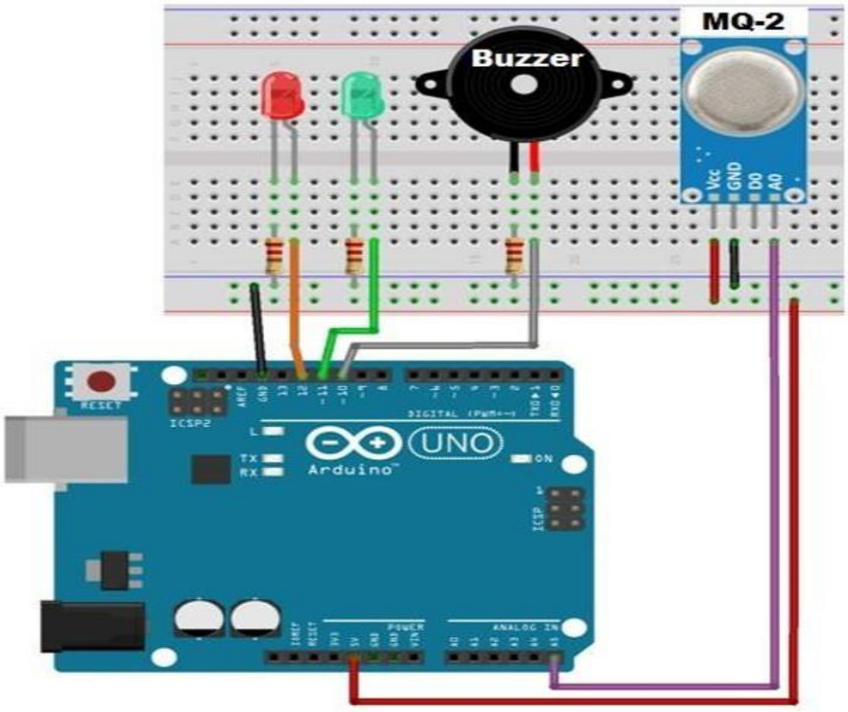


Example

(Measurement of qaz)

Requirements: Arduino, BreadBoard, Resistor, LDR Sensor, Led, wires.

Connection map:



Code:

```
int redLed = 12;
 int greenLed = 11;
int buzzer = 10;
int smoke = A5;

void setup() {
pinMode(redLed, OUTPUT);
  pinMode(greenLed, OUTPUT);
  pinMode(buzzer, OUTPUT);
  pinMode(smoke, INPUT);
  Serial.begin(9600);
}
```

```
void loop() {
 int analogSensor = analogRead(smoke);

 Serial.print("Qaz: ");
 Serial.println(analogSensor);
 if (analogSensor > 120)
 {
  digitalWrite(redLed, HIGH);
   digitalWrite(greenLed, LOW);
  tone(buzzer, 1000);
 }
 else
 {
  digitalWrite(redLed, LOW);
   digitalWrite(greenLed, HIGH);
  noTone(buzzer);
 }
 delay(100);
}
```

THANK YOU