Experiment 3.1

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Subject Code: 20CSP-358

1. Aim:

Interfacing Air Quality Sensor (MQ-135), displays data on Serial Monitor.

2. Objective:

- Learn about interfacing.
- Learn about IoT programming.

3. Requirements:

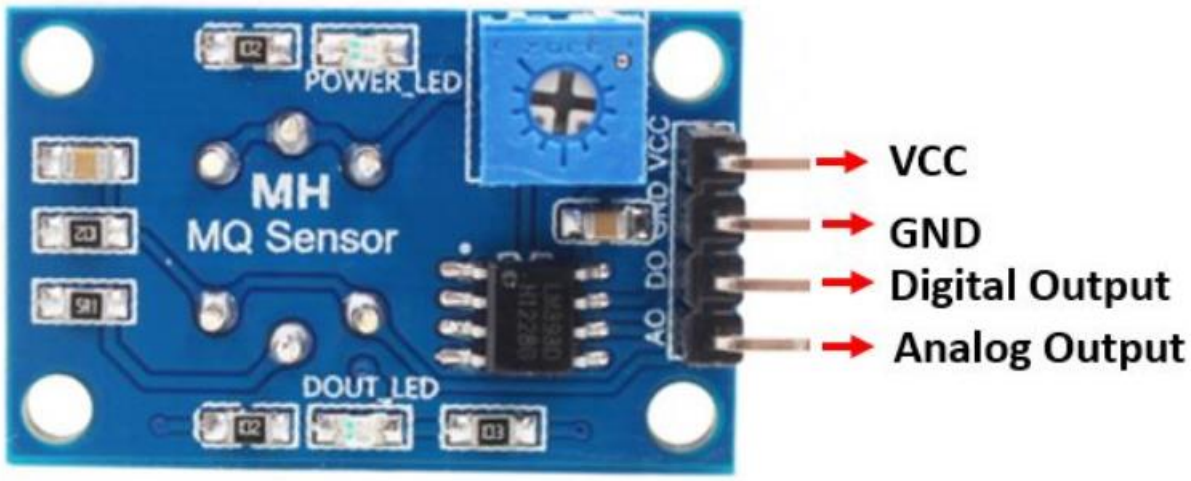
- 1 x MQ-135 Air Quality Sensor
- 3 x Male to Female jumper wires
- 1 x Arduino Uno R3

4. Procedure:

About Air Quality Sensor:

MQ-135 sensor belongs to the MQ series that are used to detect different gasses present in the air. The MQ-135 sensor is used to detect gases such as NH3, NOx, alcohol, Benzene, smoke,CO2 ,etc. steel exoskeleton houses a sensing device within the gas sensor module.

Pinout



MQ-135 Sensor Pinout

This sensor has 4 pins:

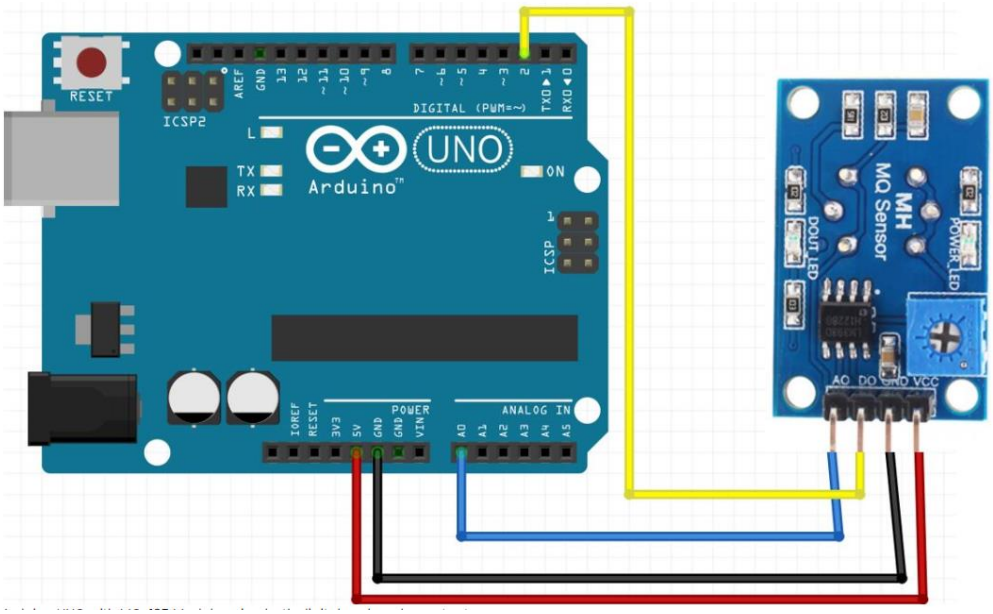
- 5V: Module power supply – 5 V
- GND: Ground
- DOUT: Digital output
- AOUT: Analog output

Circuit

The following circuit shows how you should connect Arduino to MQ-135 module. Connect wires accordingly.

The MQ-135 sensor module consists of four pins namely VCC, GND, DO, and DO. The table below gives a brief description of them.

Pin	Description
VCC	Positive power supply pin that powers up the sensor module.
GND	Reference potential pin.
AO	Analog output pin. It generates a signal proportional to the concentration of gas vapors coming in contact with the sensor.
DO	Digital Output pin. It also produces a digital signal whose limit can be set using the in-built potentiometer.



5. Code/Program:

```
#include "MQ135.h"

int sensorVal, digitalVal;

void setup() {
  // put your setup code here, to run once:
  Serial.begin(9600);
  pinMode(13, OUTPUT);
  pinMode(2, INPUT);
}

void loop() {
  MQ135 gasSensor = MQ135(A0);
  float air_quality = gasSensor.getPPM();
  Serial.print("Air Quality: ");
  Serial.print(air_quality);
  Serial.println("  PPM");
  // put your main code here, to run repeatedly:
  sensorVal = analogRead(0);
  digitalVal = digitalRead(2);
  if(sensorVal > 400)
  {
    digitalWrite(13, HIGH);
  }
  Else
```

```
        digitalWrite(13, LOW);
        Serial.println(sensorVal, DEC);
        Serial.println(digitalVal, DEC);
        delay(500);
}
```

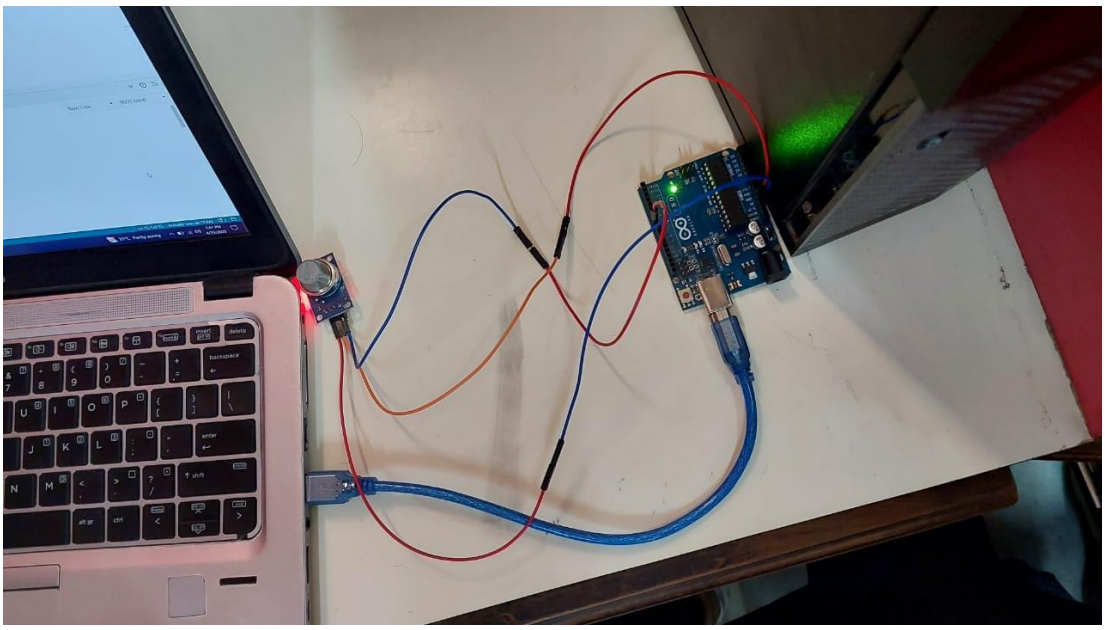


FIGURE: Circuit

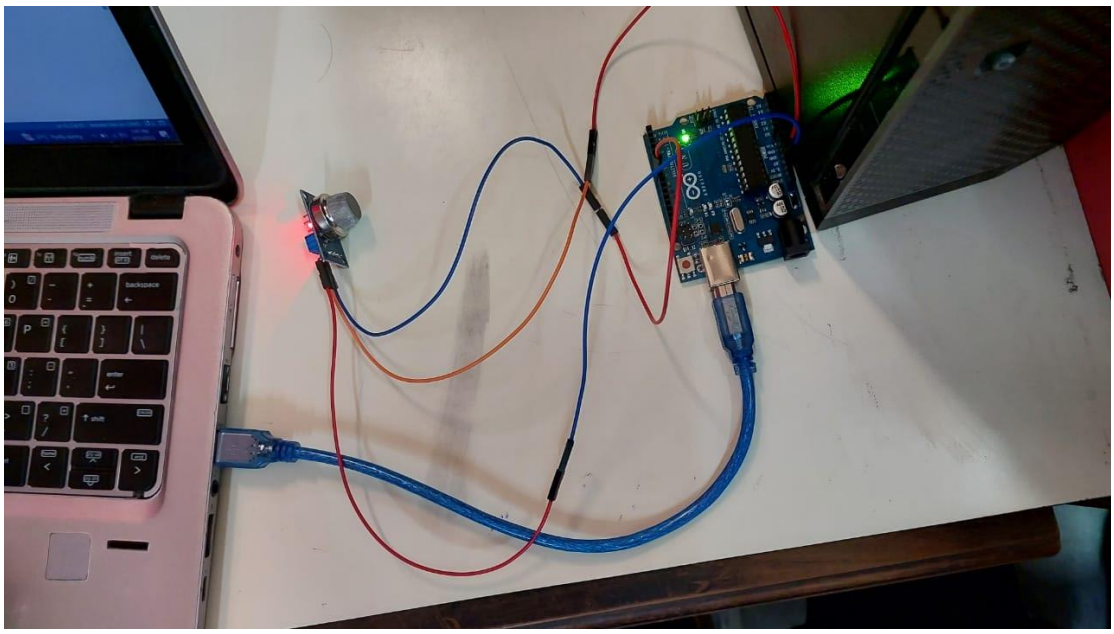


FIGURE: Circuit

Output-

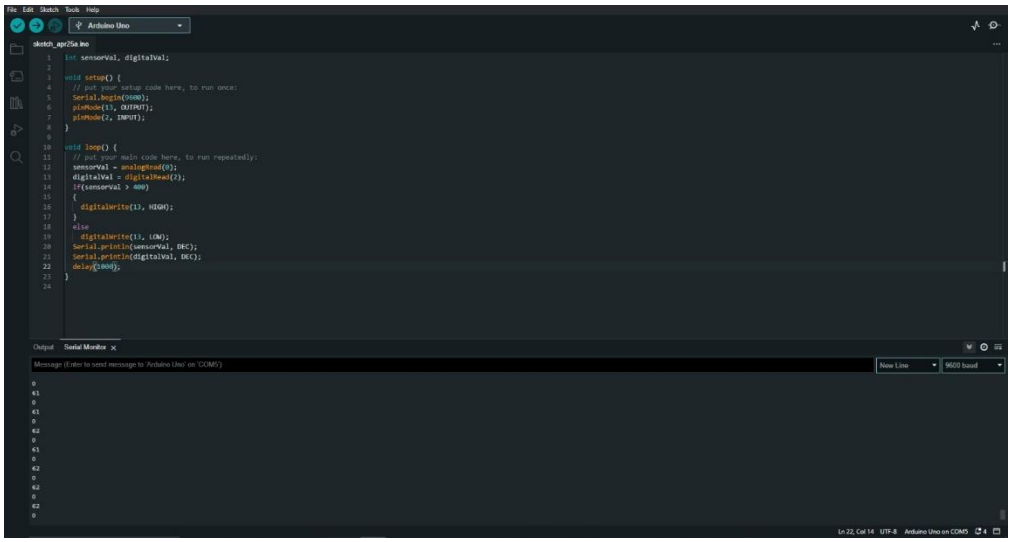


Figure- Analog Output Readings

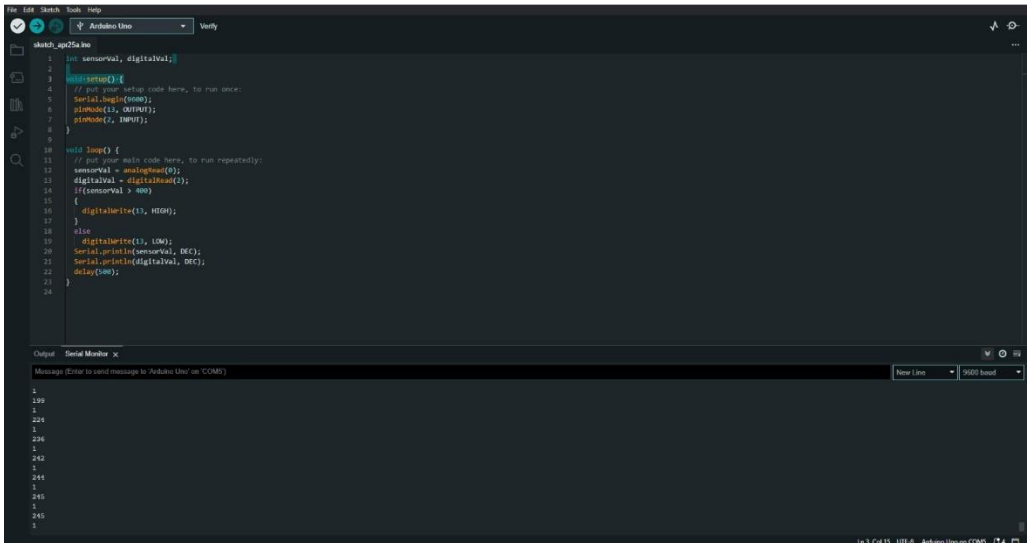


Figure- Digital Output Readings

Result-

In this experiment we learn how to display data generated by MQ-135 sensor on Serial Monitor using Arduino. And we display the readings in Analog and digital forms and the analysis in measures in PPM. MQ-135 is used for measuring air quality in various places.

Learning outcomes (What I have learnt):

- Learnt how to use MQ-135 to display the data on Serial Monitor using Arduino.
- Learnt how to code and read the data from the sensor.
- Leant how to measure readings in digital and analog forms.