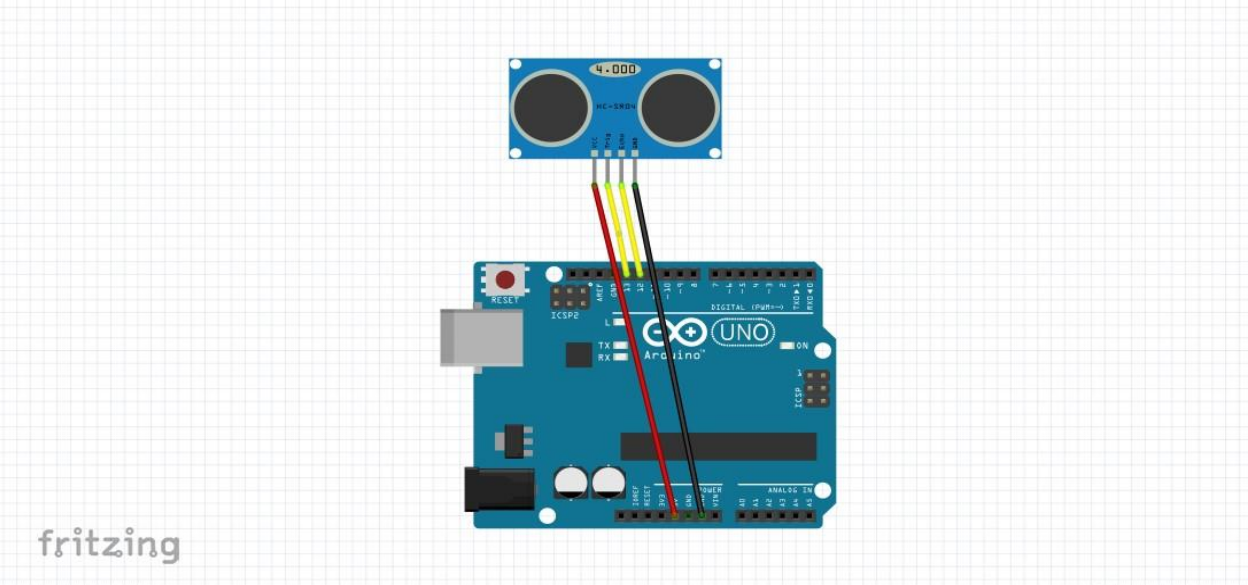
Lab 6 | **Arduino**

In this experiment, we will learn to program simple applications using an Ultrasonic sensor, led, Gas sensor and RGB led attached to the Arduino board.

Components Needed: Arduino UNO and USB cable, Breadboard, HC-SR04 ultrasonic sensor, Buzzer, RGB LED, Gas Sensor, connecting jumper wires.

TASK 1 : Connect the circuit as given in Fig. 1: Echo pin connected to pin 12, Trigger pin connected to pin 13, Vcc to 5v and Gnd to gnd. Use the attached code for HC-SR04 and test the obstacle distance using a small scale (Put the obstacle at 1 inches, 2 inches, 3 inches) and read the values to validate. Point the set up towards the ceiling and see what happens (Note down the reading from Serial Monitor).



TASK 2 : Now hook up a LED (replace buzzer with a LED in circuit diagram) and modify your circuit and code as shown in Fig.2.This code should work to get warning cross the LED when something be closer than 0.5 meter.

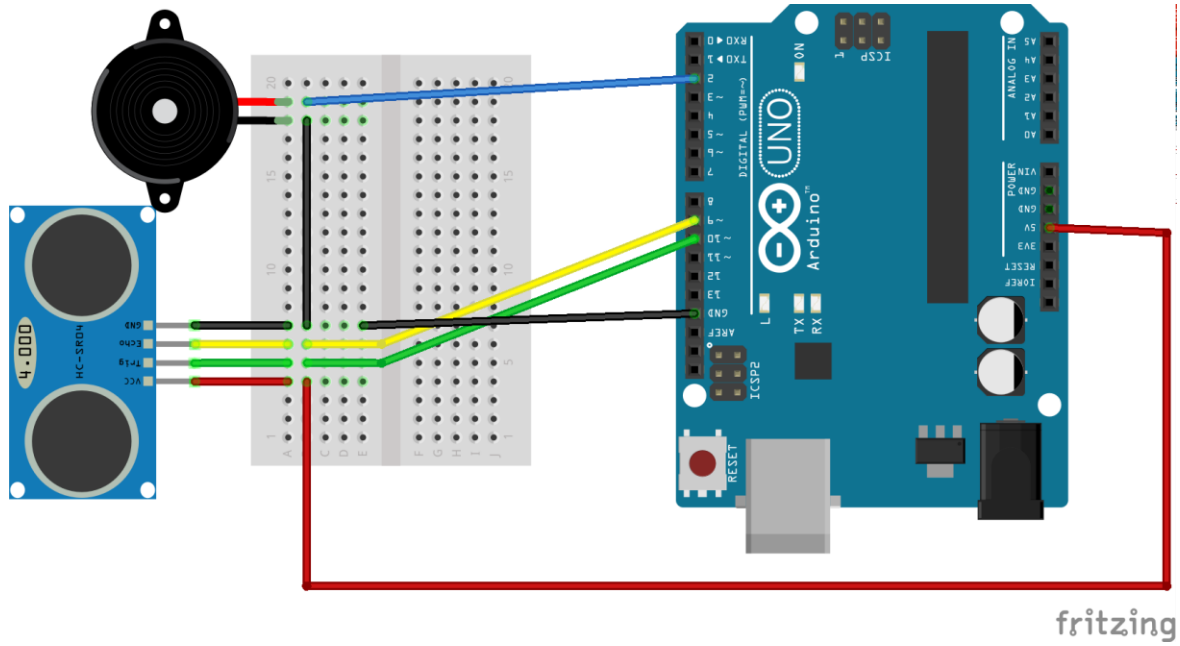


Fig 2

Task 3:- ***MQ-2 Smoke Sensor***

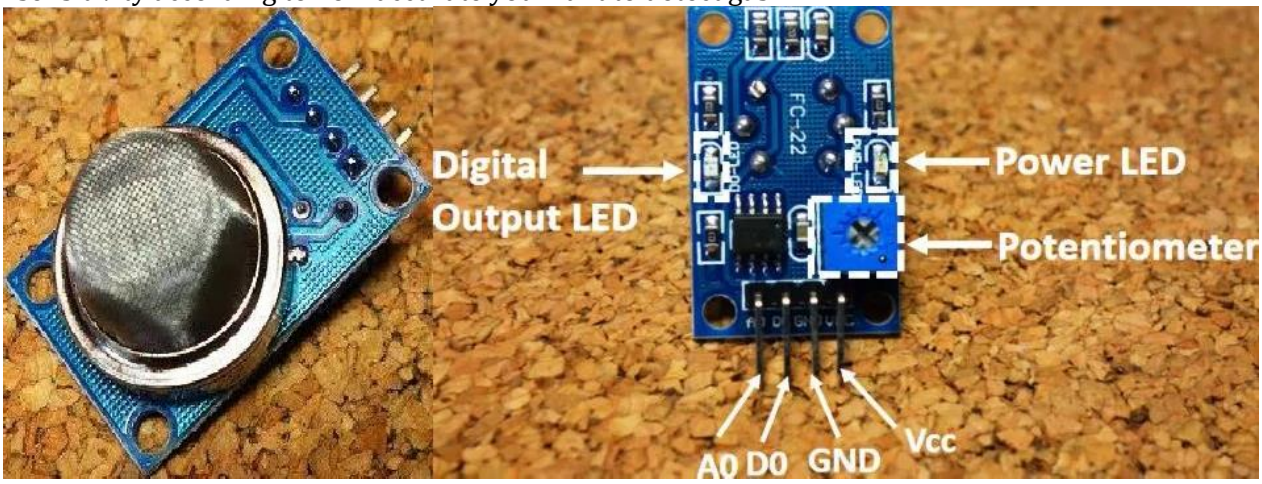
What is an MQ-2 Smoke Sensor?

The MQ-2 smoke sensor is sensitive to smoke and to the following flammable gases:

- LPG
- Butane
- Propane
- Methane
- Alcohol
- Hydrogen

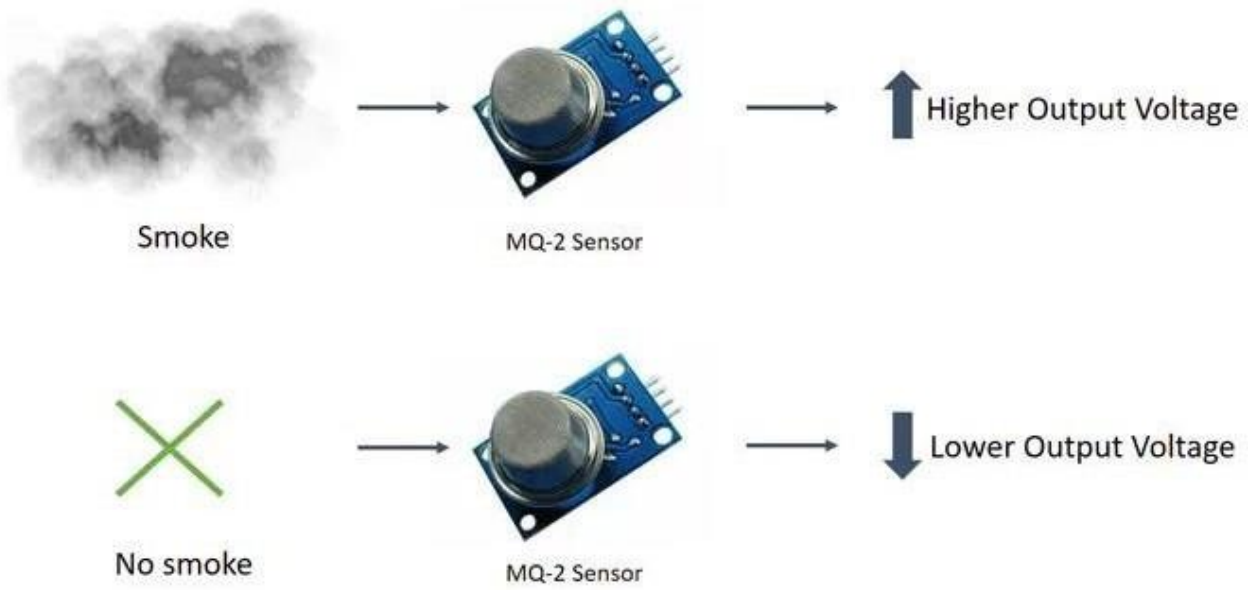
The resistance of the sensor is different depending on the type of the gas.

The smoke sensor has a built-in potentiometer that allows you to adjust the sensor sensitivity according to how accurate you want to detect gas.



How does it Work?
The voltage that the sensor outputs changes accordingly to the smoke/gas level that exists in the atmosphere. The sensor outputs a voltage that is proportional to the concentration of smoke/gas. In other words, 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



The output can be an analog signal (A0) that can be read with an analog input of the Arduino or a digital output (D0) that can be read with a digital input of the Arduino.

Componenets required

- Arduino uno.
- MQ-2 Smoke detection sensor.
- Male and Female jumper wires.
- 2 leds
- Buzzer
- Resistors.(220)

Pin Wiring

The MQ-2 sensor has 4 pins.

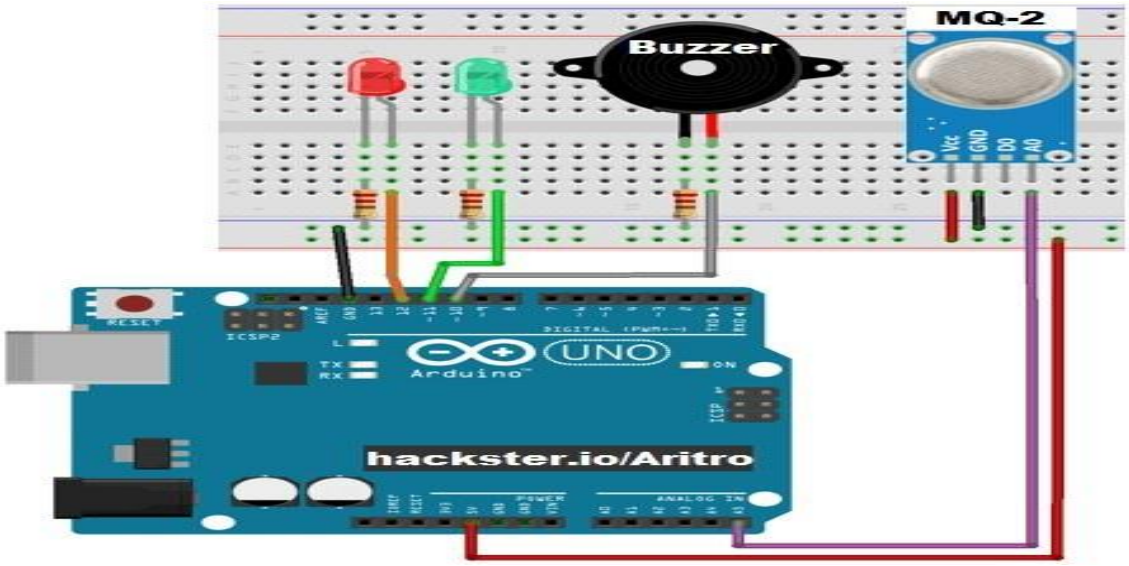
Pin ---------- Wiring to Arduino Uno

A0 ---------- Analog pins

D0 ---------- Digital pins

GND ----------GND

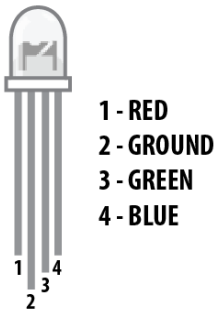
VCC ----------V



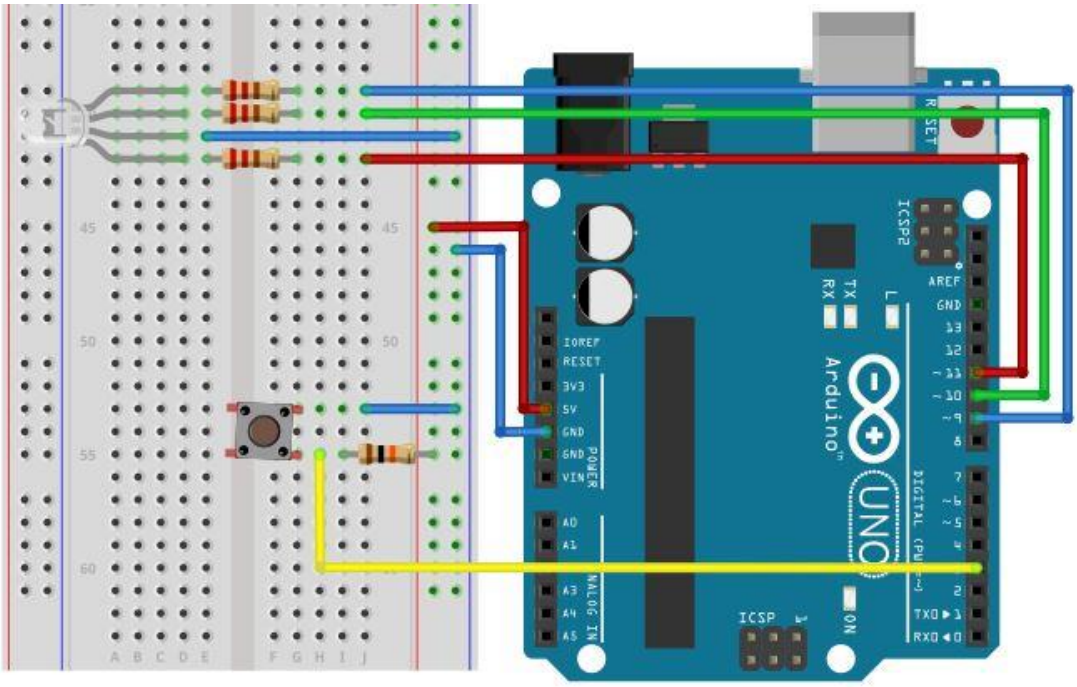
Task 4:- RGB LED control using pushbutton

You have to use pushbutton to control the RGB. For example, if you press the button once, Red LED should glow, next press will give you another color & same pattern should follow.

Pinout of RGB LED (Common Cathode):



Circuit:


RESET
ICSP2
AREF
GND
13
12
~11
~10
~9
8
7
~6
~5
4
2
TXD 1
RXD 0
TX
RX
L
Arduino
UNO
ON
ICSP
IOREF
RESET
3V3
5V
GND
GND
VIN
POWER
A0
A1
A3
A4
A5
ANALOG IN
45
50
55
60
A B C D E
F G H I J