

## Introduction:

One of the most important products of global addiction demand is an alcoholic beverage. The most commonly used alcoholic beverages are beer, wine, whiskey, rum, vodka, gin and brandy and locally brewed beverages like arrack and toddy. Alcohol consumption becomes a problem when the individual engages in problematic drinking pattern that puts him at the risk of developing adverse health events. In developing countries like India, alcohol consumption tends to be a major problem because of Gastrointestinal (GI) complications, Cancer, Changes in the genitourinary system, Muscular changes, Neurological complications, Psychiatric complications. Alcohol consumption impacts also on social consequence, economical and family finances, Legal Problem and main is Road Accident.

According to reports, about 1.5% of total 4.64 lakh road accidents are caused by Drunken driving under the influence of Alcohol resulting into Injuries to 6,295 people. Moreover, in India, teenagers are more attracting to Alcohol, and specially the arrogance in them after consuming of Driving is dangerous. In order to overcome this government has made many tough rules. So, we need device which can detect a measure Alcohol Level in Human Respiration.

## Objective:

- To Detect and Measure Alcohol Level in Human Respiration.
- To show alert, if is more.
- To design a user-Friendly design
- Low-cost model with More efficiency.
- Cheaper Installation
- To develop programmed false-less Output.

## Problem Statement:

To develop Efficient, less priced Alcohol Detector and Measurer with Elegant Outputs

## Expected Outcome:

- Most accurate Detector and Measurer of Alcohol, which should also show alert by RED Light.

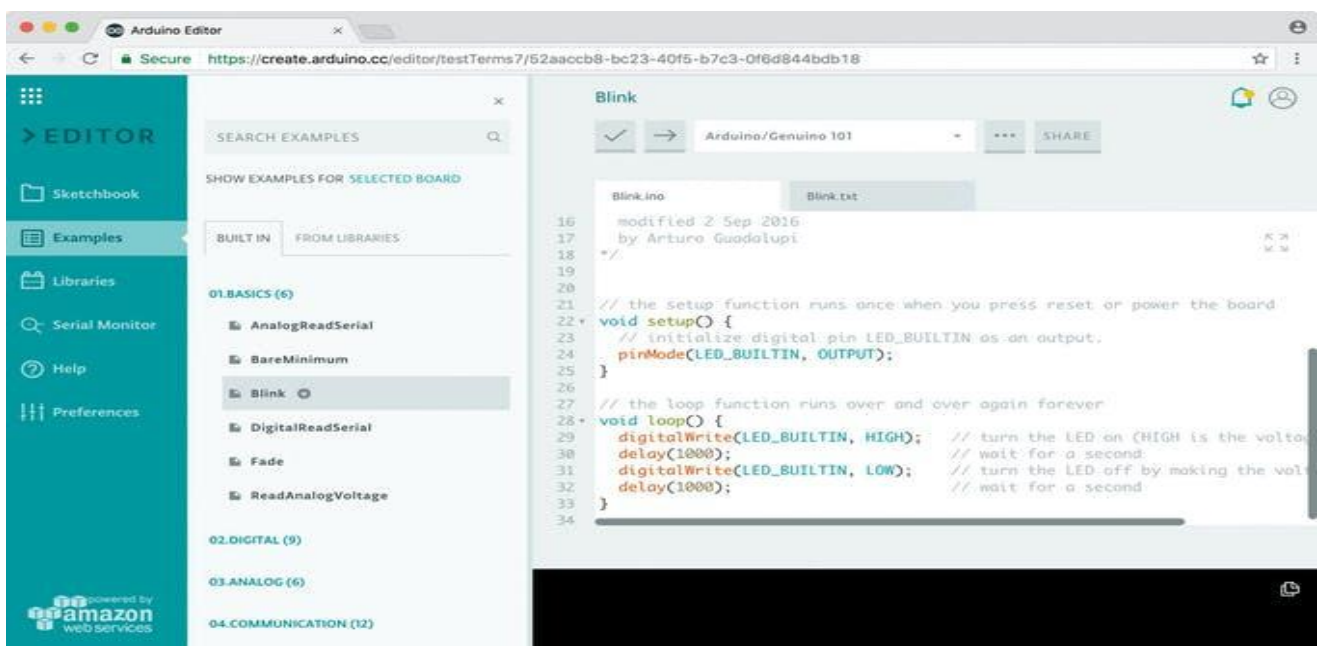
## Requirement Specification:

For this type of project, we need IDE to run and also Component which works according to the Instruction given in to Code. So, we require both Software and Hardware Component.

## Software Requirement:

### Arduino IDE:

Arduino IDE (Integrated Development Environment) is the software for Arduino. It is a text editor like a notepad with different features. It is used for writing code, compiling the code to check if any errors are there and uploading the code to the Arduino. It is a cross-platform software which is available for every Operating System like Windows, Linux, macOS. It supports C/C++ language. It is open-source software, where the user can use the software as they want it to. They can also make their own modules/functions and add them to the software. It supports every available Arduino board including Arduino mega, Arduino Leonardo, Arduino Ethernet and more Word file is called a Document similarly, Arduino file is called a **Sketch** where the user writes code. The format of Arduino is saved as .ino



**Working of Arduino IDE:** When a user writes code and compiles, the IDE will generate a Hex file for the code. (Hex file are Hexa Decimal files which are understood by Arduino) and then sent to the board using a USB cable. Every Arduino board is integrated with a microcontroller, the microcontroller will receive the hex file and runs as per the code written.

### How to Use?

- Open Web Browser and search for "Arduino UNO".
- Select Online IDE editor (Sketch Book) from Result page of Official Website.
- Signin through your Email-Id.
- Open Sketch Book
- Write code and Compile.
- Select Port and Upload the Code on UNO Board.
- When Power supply is given, Project runs.

### Hardware Requirement:

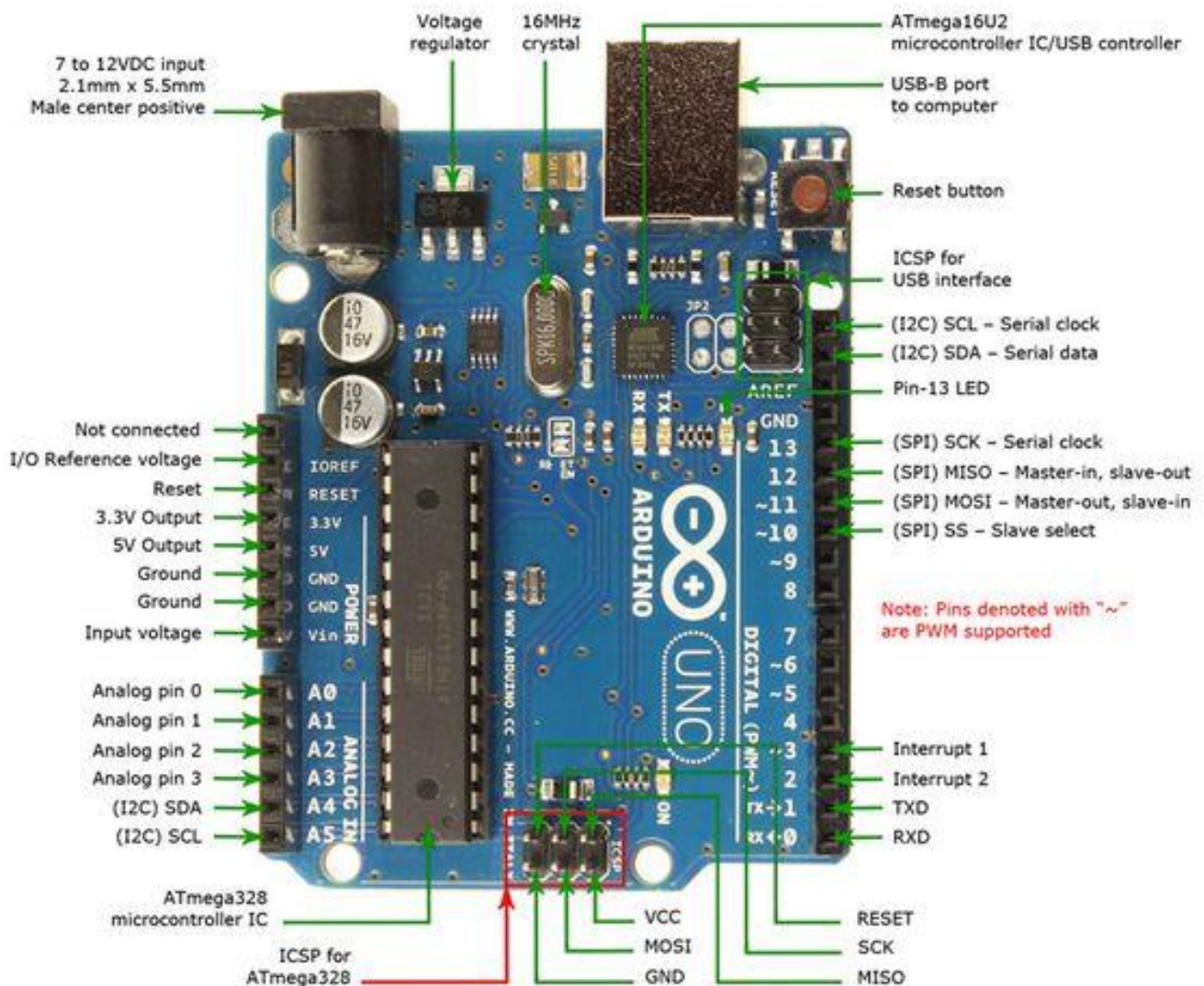
We need some Hardware Electric Component, they are:

#### Arduino Uno Board:

Arduino/Genuino Uno is a microcontroller board based on the ATmega328P (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz quartz crystal, a USB connection, a power jack, an ICSP header and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with an AC-to-DC adapter or battery to get started. You can tinker with your UNO without worrying too much about doing something wrong, worst-case scenario you can replace the chip for a few dollars and start over again.

# Technical specs

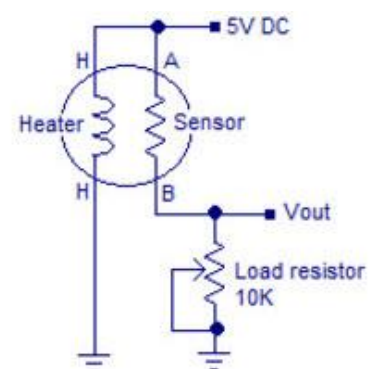
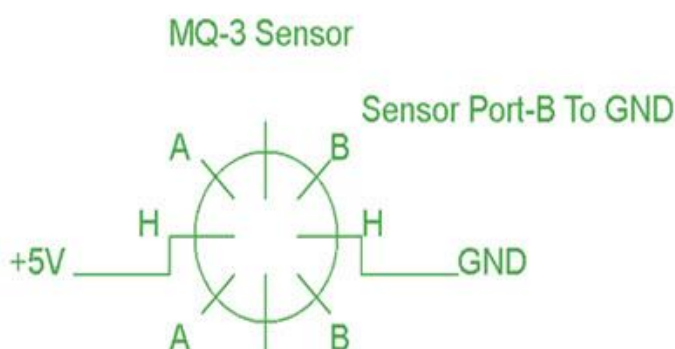
Microcontroller	ATmega328P
Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
PWM Digital I/O Pins	6
Analog Input Pins	6
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328P) of which 0.5 KB used by bootloader
SRAM	2 KB (ATmega328P)
EEPROM	1 KB (ATmega328P)
Clock Speed	16 MHz
LED_BUILTIN	13
Length	68.6 mm
Width	53.4 mm
Weight	25 g



## MQ 135 Sensor:



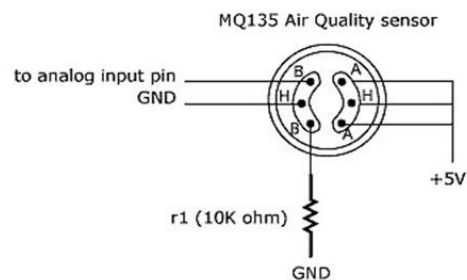
The MQ series of gas sensors utilize a small heater inside with an electrochemical sensor. These sensors are sensitive to a range of gases and are used at room temperature. MQ135 alcohol sensor is a  $\text{SnO}_2$  with a lower conductivity of clean air. When the target explosive gas exists, then the sensor's conductivity increases more increasing more along with the gas concentration rising levels. By using simple electronic circuits, it converts the change of conductivity to correspond output signal of gas concentration. The MQ135 gas sensor has high sensitivity in ammonia, sulphide, benzene steam, smoke, and in other harmful gas. It is low cost and suitable for different applications. There are different types of alcohol sensors like MQ-2, MQ-3, MQ-4, MQ-5, MQ-6, etc.



## MQ 135 as Air Quality Sensor:

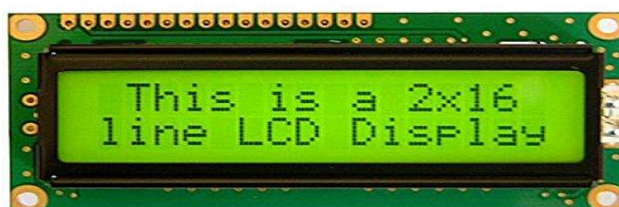
The air quality sensor is also an MQ-135 sensor for detecting venomous gases that are present in the air in homes and offices. The gas sensor layer of the sensor unit is made up of tin dioxide ( $\text{SnO}_2$ ); it has lower conductivity compared to clean air and due to air pollution, the conductivity is increased. The air quality sensor detects ammonia,

nitrogen oxide, smoke, CO<sub>2</sub>, and other harmful gases. The air quality sensor has a small potentiometer that permits the adjustment of the load resistance of the sensor circuit. The 5V power supply is used for air quality sensor.



## LCD:

LCD (Liquid Crystal Display) is a type of flat panel display which uses liquid crystals in its primary form of operation. LEDs have a large and varying set of use cases for consumers and businesses, as they can be commonly found in smartphones, televisions, computer monitors and instrument panels. LCDs were a big leap in terms of the technology they replaced, which include light-emitting diode (LED) and gas-plasma displays. LCDs allowed displays to be much thinner than cathode ray tube (CRT) technology. LCDs consume much less power than LED and gas-display displays because they work on the principle of blocking light rather than emitting it. Where an LED emits light, the liquid crystals in an LCD produces an image using a backlight. As LCDs have replaced older display technologies, LCDs have begun being replaced by new display technologies such as OLEDs.



## Potentiometer:

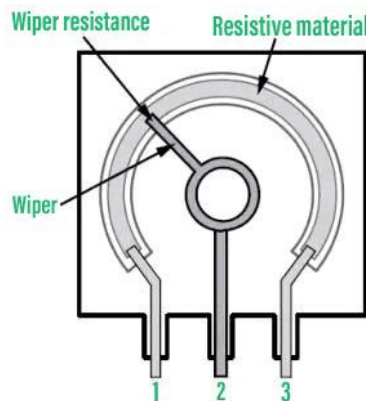
A potentiometer is an electronic device that measures the EMF (electromotive force) of a cell as well as the cell's internal resistance. It's also used to compare the EMF



s of various cells. In most applications, it may also be used as a variable resistor. These potentiometers are widely employed in the production of electronics equipment that allows users to alter electrical circuits to achieve the desired outputs. Although its most obvious application must be for volume controls on radios and other audio-related electronic equipment.

### Potentiometer Pin Configuration:

- **Pin 1 (Fixed End):** This fixed end can be connected to one of the resistive path's ends.
- **Pin 2 (Variable End):** This changeable end can be connected to the wiper to give variable voltage.
- **Pin 3 (Fixed End):** This second fixed end can be connected to the resistive path's other finish.



### LED:

In the simplest terms, a light-emitting diode (LED) is a semiconductor device that emits light when an electric current is passed through it. Light is produced when the particles that carry the current (known as electrons and holes) combine together within the semiconductor material. Since light is generated within the solid semiconductor material, LEDs are described as solid-state devices. The term solid-state lighting, which also encompasses organic LEDs (OLEDs), distinguishes this lighting technology from other sources that use heated filaments (incandescent and tungsten halogen lamps) or gas discharge (fluorescent lamps).



### Single strand Wires:

This type of wiring is typically less expensive to manufacture than a multi-stranded wire as it does not require as much processing. Single stranded wire is not as flexible as the alternative. This lack of flexibility can increase the likelihood of metal fatigue and the wire snapping as a result. Because of this, single stranded wires are best suited for products that won't encounter much movement. This type of wiring is often only used in smaller gauge wiring applications as it can be difficult to manoeuvre and utilize a heavy gauge, single conductor wire.

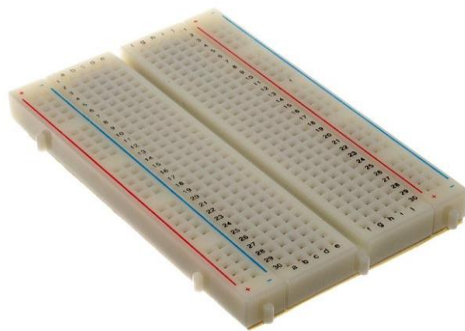


### Breadboard:

A breadboard is used to build and test circuits quickly before finalizing any circuit design. The breadboard has many holes into which circuit components like ICs and resistors can be inserted. A typical breadboard is shown below: The bread board has strips of metal which run underneath the board and connect the holes on the top of the board. The metal strips are laid out as shown below. Note that the top and bottom rows of holes are connected horizontally while the remaining holes are



connected vertically. To use the bread board, the legs of components are placed in the holes. Each set of holes connected by a metal strip underneath forms a node. A node is a point in a circuit where two components are connected. Connections between different components are formed by putting their legs in a common node. The long top and bottom row of holes are usually used for power supply connections. The rest of the circuit is built by placing components and connecting them together with jumper wires. ICs are placed in the middle of the board so that half of the legs are on one side of the middle line and half on the other.



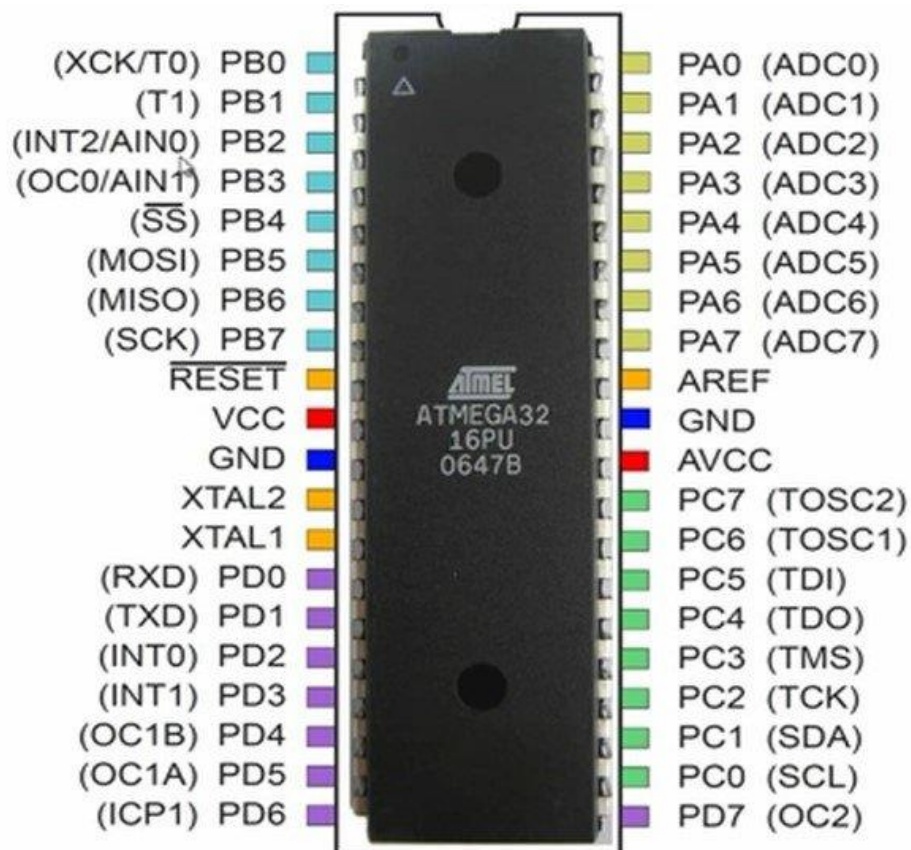
### **USB Type- B:**



The B style connector is designed for USB peripherals, such as printer, upstream port on hub, or other larger peripheral devices. The primary reason for the development of USB B connectors were to allow the connection of peripheral devices without running the risk of connecting two host computers to one another. USB B type connector is still used today, though it is slowly being phased out in favour of more refined us connector types.

## ATMEL ATMEGA 328P:

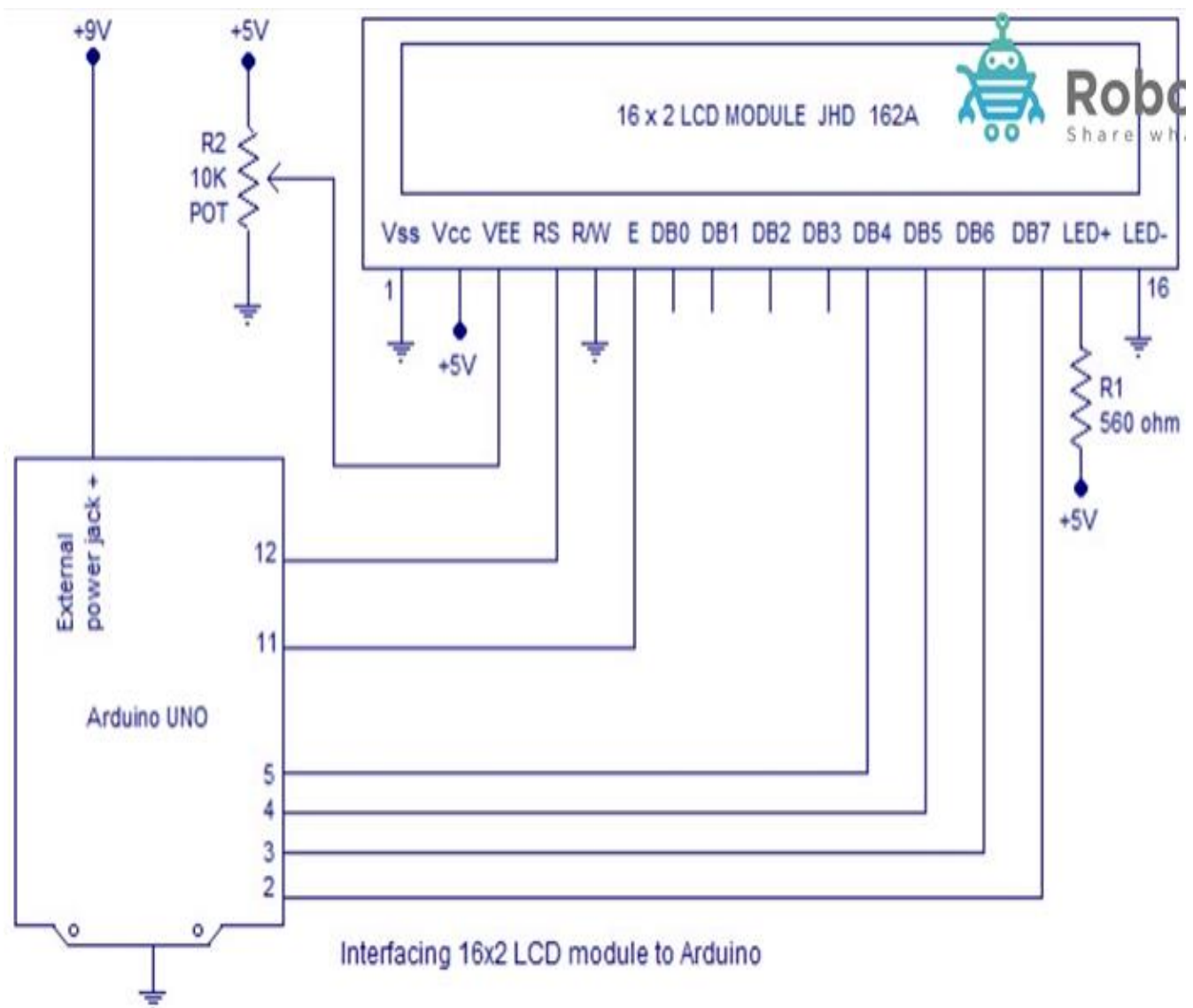
ATmega328 is an Advanced Virtual RISC (AVR) microcontroller. It supports 8-bit data processing. ATmega-328 has 32KB internal flash memory. ATmega328 has 1KB Electrically Erasable Programmable Read-Only Memory (EEPROM). This property shows if the electric supply supplied to the micro-controller is removed, even then it can store the data and can provide results after providing it with the electric supply. Moreover, ATmega-328 has 2KB Static Random-Access Memory (SRAM). Other characteristics will be explained later. AT mega 328 has several different features which make it the most popular device in today's market. These features consist of advanced RISC architecture, good performance, low power consumption, real timer counter having separate oscillator, 6 PWM pins, programmable Serial USART, programming lock for software security, throughput up to 20 MIPS etc.



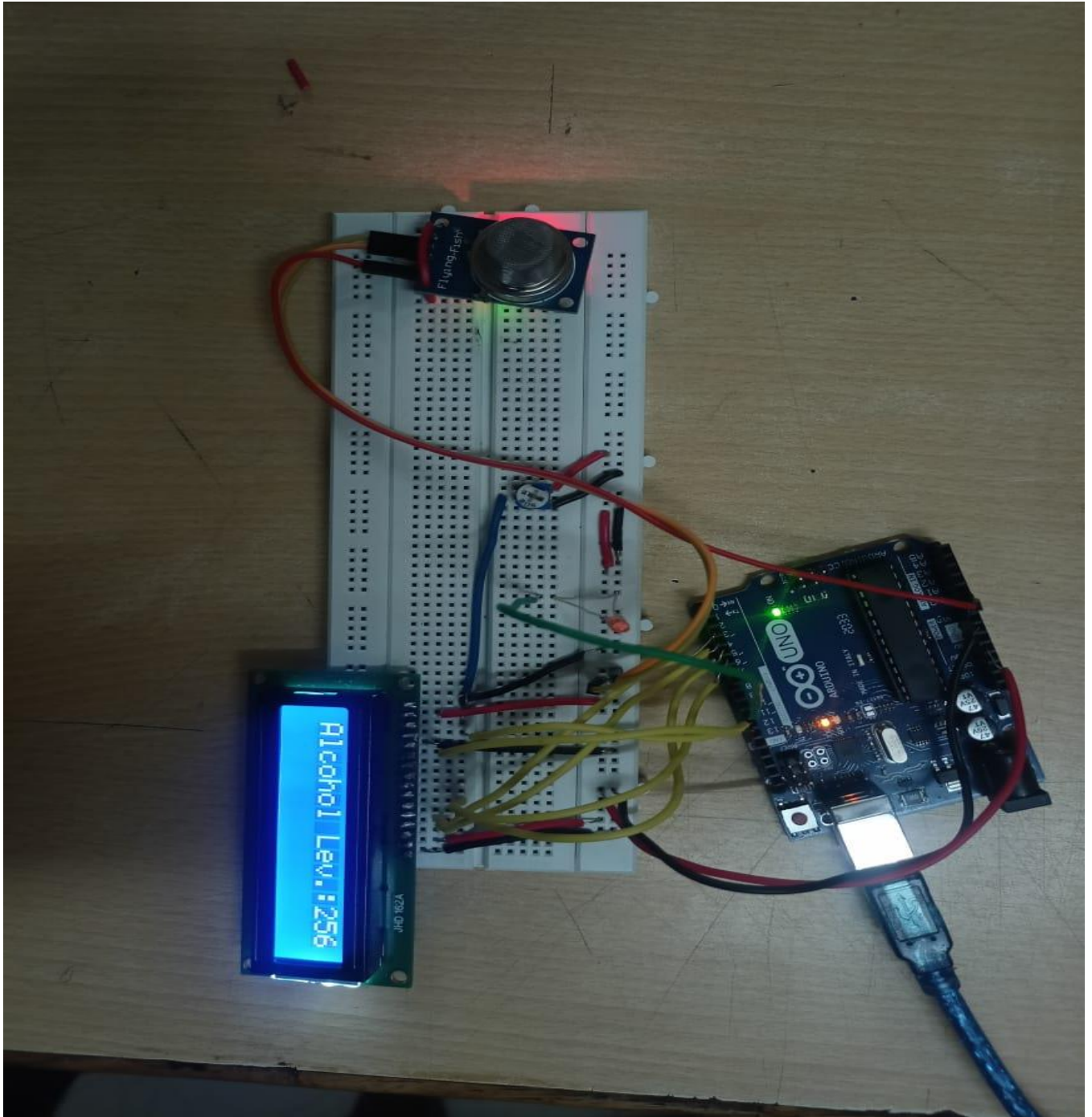
## Design and Implementation:

Using Hardware Component and Software for controlling results into Successful Model. We assembled all components and integrated or connected each other with Single strand wires. Here MQ 135 takes input and Results i.e., will displayed in LCD and RED LED as Alert. Variable Resistor i.e., Potentiometer will be LCD Brightness Controller.

### Circuit Diagram:



## Final Circuit:



## Code Snippet:

```
#include<LiquidCrystal.h>

LiquidCrystal lcd(12,11,5,4,3,2);

int ledPin = 10;
int sensorPin = A0;
int value;

void setup()
{
    Serial.begin(9600);
    lcd.begin(16, 2);
    pinMode(ledPin, OUTPUT);
}

void loop()
{
    int Value = analogRead(sensorPin);
    value = analogRead(A0);
    lcd.print("Alcohol Lev.:");
    lcd.print(value - 50);
    Serial.print(value);
    if (value - 50 > 550)

    {
        digitalWrite(ledPin, HIGH);
        lcd.setCursor(0, 2);
        lcd.print("Alert....!!!");
        Serial.print ("Alert");
    }
    else {
        digitalWrite(ledPin, LOW);
        lcd.setCursor(0, 2);
        lcd.print(".....Normal.....");
        Serial.print("Normal");
    }

    delay(500);
    lcd.clear();
}
```

## Test Cases:

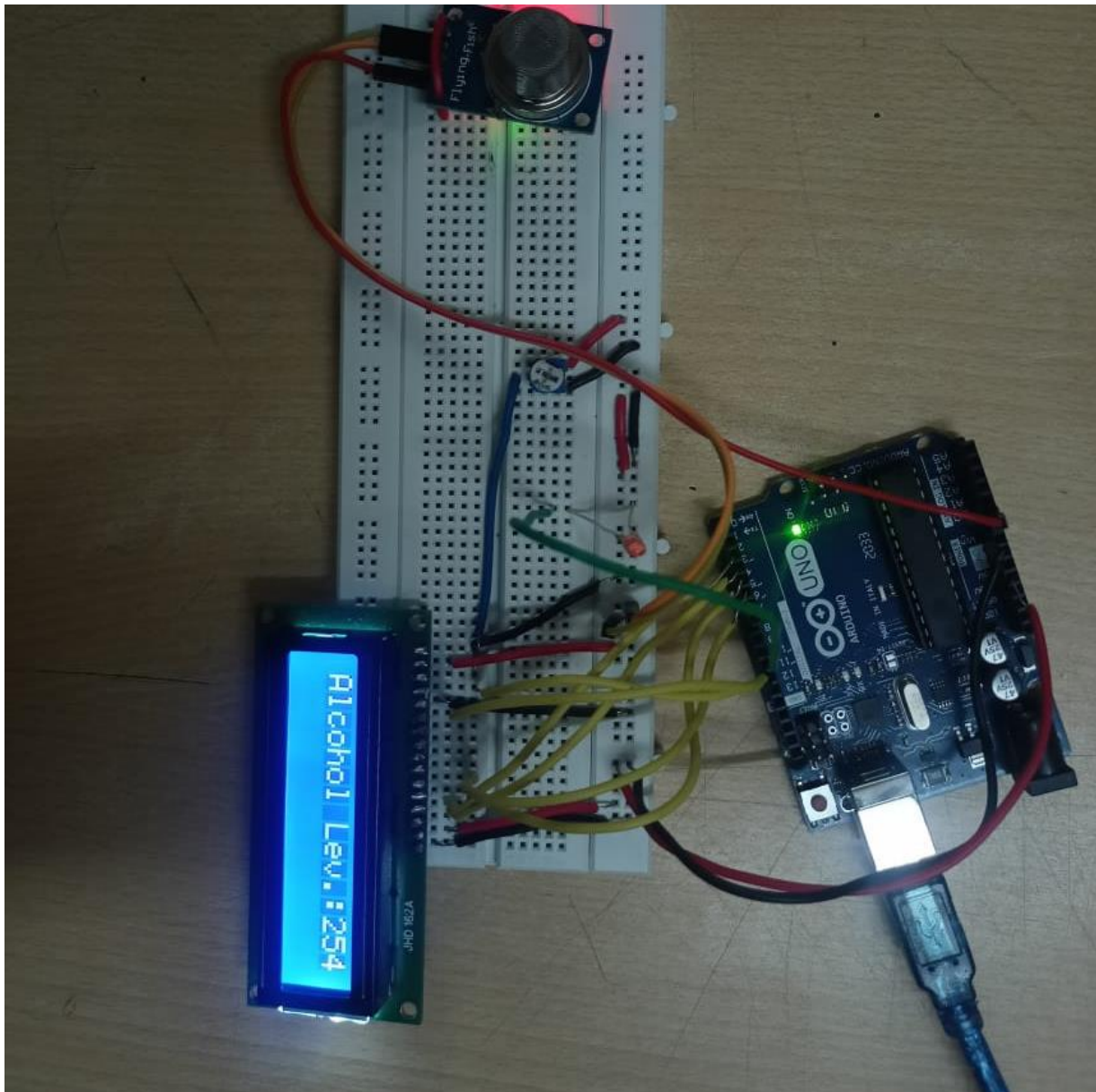
Different Test cases the model must come through. They are

- Circuit should be connected as in Circuit Diagram. It should be properly connected Input.
- Other than alcohol it will Detect and Measure. But Alert LED will be in OFF mode.
- If Alcohol is found, it will detect and Measure. If it found High then LED will glow.
- It takes less than 1second to detect and measure, also to glow LED.
- To comeback to initial mode, it takes 3seconds.
- Output in LCD is only level count and LED is for Alert if it found High.
- We can set limit for both High and Low.

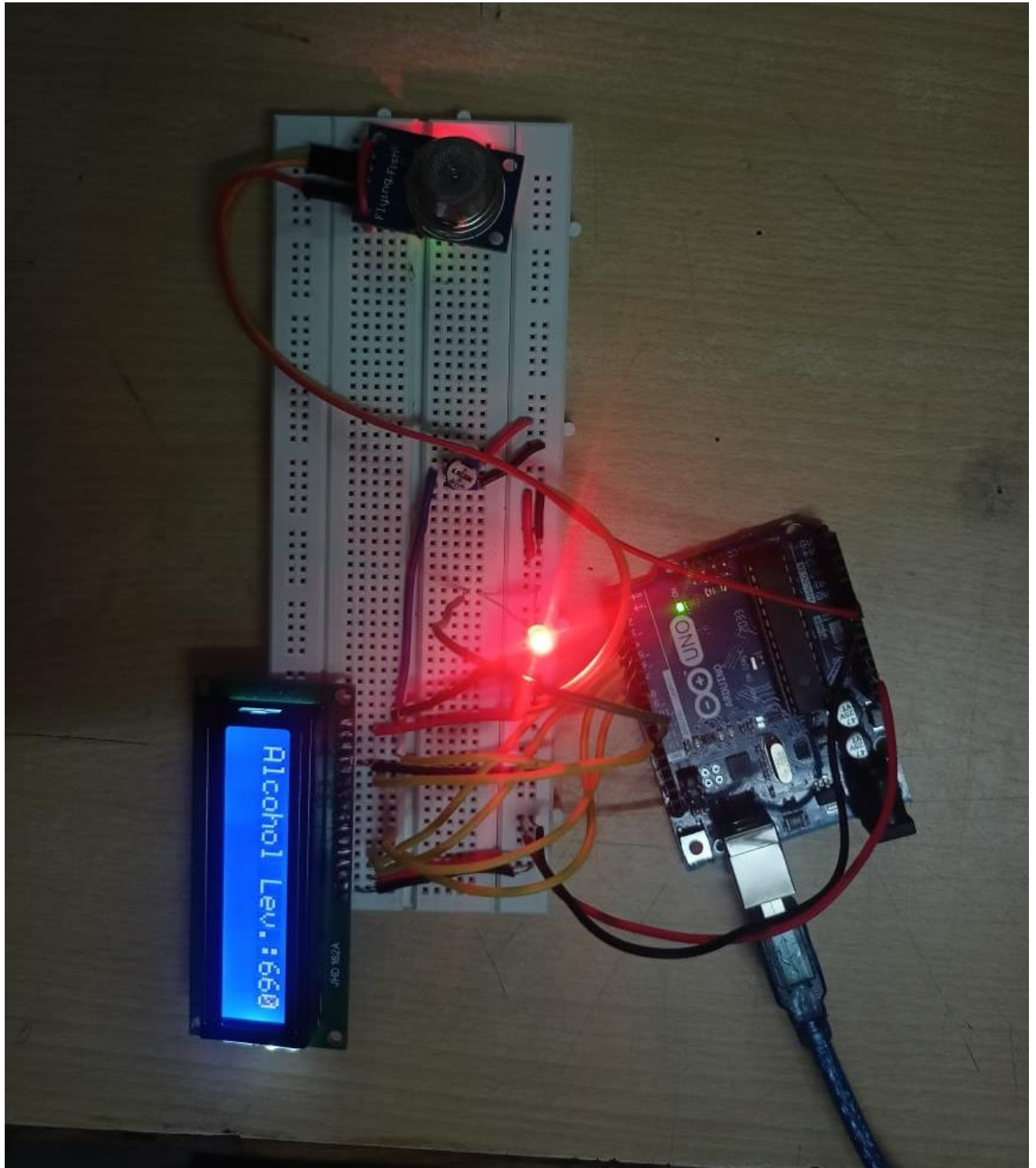


## Results:

i) Before Input



ii) After Input



## **Limitation:**

- Only Alcohol will be Detected and Measured. Otherthan alcohol like Drugs cannot be found.
- Size is bit Larger.
- No proper setup i.e., No Model

## **Future Enhancement:**

- Simplifying Circuit.
- Increasing accuracy.
- Connecting to network i.e., Internet and creating Database.
- User Interface like Website, Mobile Application.

## Conclusion:

In this project, we have designed Alcohol Level Meter using Arduino & MQ-135 Alcohol/Gas Sensor for measuring the level of alcohol in humans breathe. Simply we have interfaced MQ-135 Gas Sensor module with Arduino and 16\*2 LCD module for display. The alcohol/Gas sensor we used is the MQ-135 sensor. This is a sensor that is not only sensitive to alcohol, particularly ethanol, which is the type of alcohol that is found in wine, beer, and liquor. Instead of MQ-135, you can use MQ2, MQ3, MQ5 module as well. Basically, they all have similar functions. This type of sensor circuit can be used as a Breathalyzer to check a person's blood-alcohol level. Just as we exhale carbon dioxide when we breathe out, we also will breathe out some alcohol if we have alcohol in our blood. Any alcoholmeter device can measure this alcohol content. The more ethanol in your blood, the more there is in the air on exhalation. This alcohol content gives a good indication for if a person is drunk and how drunk they are.

The amount of alcohol exhaled into the air is proportional to the amount of alcohol that will be found in a person's blood. Alcometers use a built-in formula to estimate blood alcohol content from the exhaled air alcohol content.

For different countries, the level of alcohol in the blood that defines a person as over the limit for driving varies. The range ranges from 0.01 to 0.10. Most countries have a limit of about 0.05. For example, Greece, Greenland, and Iceland all have limits of 0.05. Canada has a higher limit set at 0.08. For our circuit, it can function as an algometer so that we get an estimate of a person's blood-alcohol level.

## Bibliography:

We have referred few Websites for our Project.

- <https://www.tutorialspoint.com/>
- <https://www.arduino.cc/>
- <https://how2electronics.com/>
- <https://www.youtube.com/>