CHAPTER 2

RAIN SENSOR MODULE

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2.1 Introduction

Rain sensor module is a printed circuit board with exposed line traces. The principle behind the traces are conductivity of the board surface. When there is a water drops on the surface, the conductivity of the board increases or the resistance decreases.

2.2 Operation Circuitry

The rain sensor has two PCB boards namely, the electronic board and the collector sensor board.

This module has two outputs, analog and digital output. For simplicity, in this tutorial, digital output is use. The digital output is based on LM393 comparator op-amp to provide high signal for low resistance or high conductivity and low signal for no conductivity or high resistance.

Figure 1: Rain Sensor Module
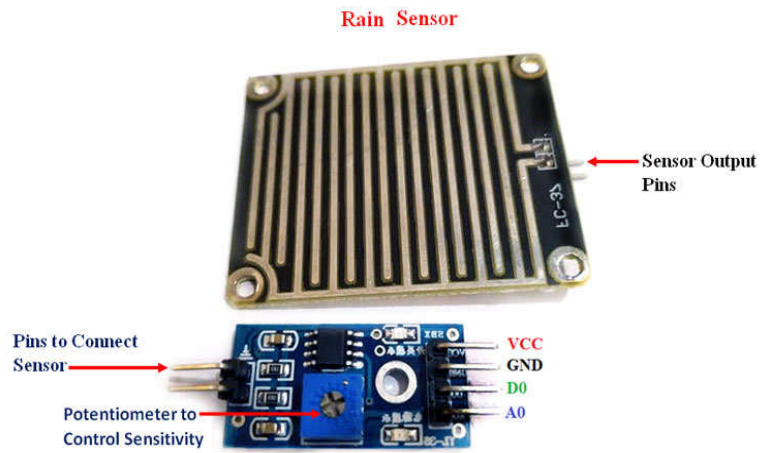
Figure 3: Pinouts for Rain Sensor Module

2.3 Specifications

- Operating Voltage: 5VDC
- PCB Dimensions of Sensor: 5cm x 4cm
- LM393 Op-amp Comparator: 15mA current driver
- Outputs: Digital and Analog

2.4 Bill of Materials

COMPONENTS	QUANTITY
Rain Sensor Module	1pc
Arduino/Gizduino Uno	1pc
Alphanumeric LCD 16x2	1pc
Bread Board	1pc
5k Potentiometer	1pc
Jumper Wires	20pcs
USB Cable to program/power Arduino Uno	1pc
Buzzer Module	1pc

Table 1: Bill of Materials for Rain Sensor Project

2.5   Schematic Diagram

The schematic diagram is shown in Figure 3 below. The rain sensor projects is easy to construct using Arduino or Gizduino Uno.
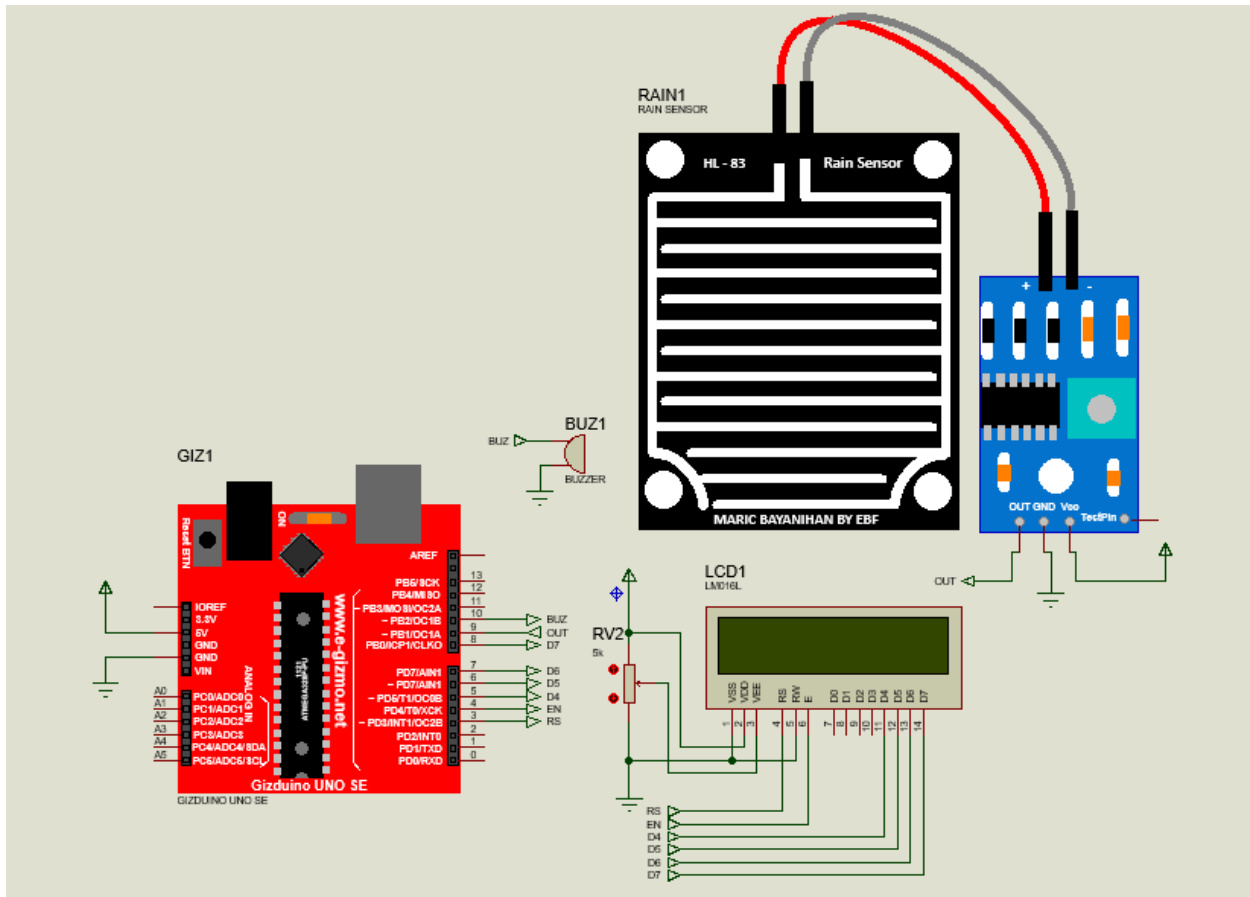

Figure 3: Schematic Diagram of Rain Sensor Project

2.6   Pictorial Diagram

Pictorial diagram is shown in Figure 4 below to facilitate the user to build the projects in point to point connection using bread board and jumper wires.
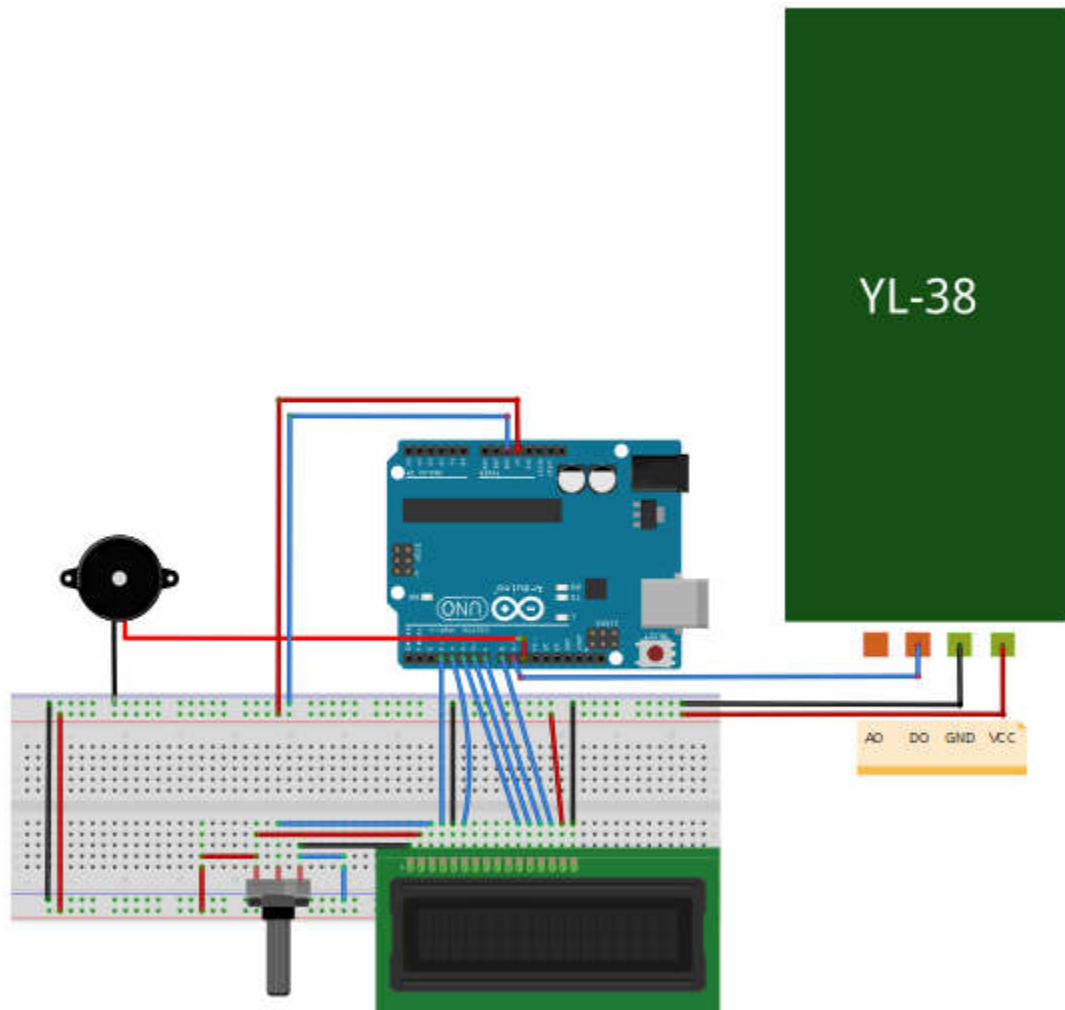
Figure 4: Pictorial Diagram of Rain Sensor Project

2.7 Circuit Construction

To construct the circuit for the DS1302 project, we can use a Bread Board to mount the LCD and potentiometer as shown in the Figure 5 below.
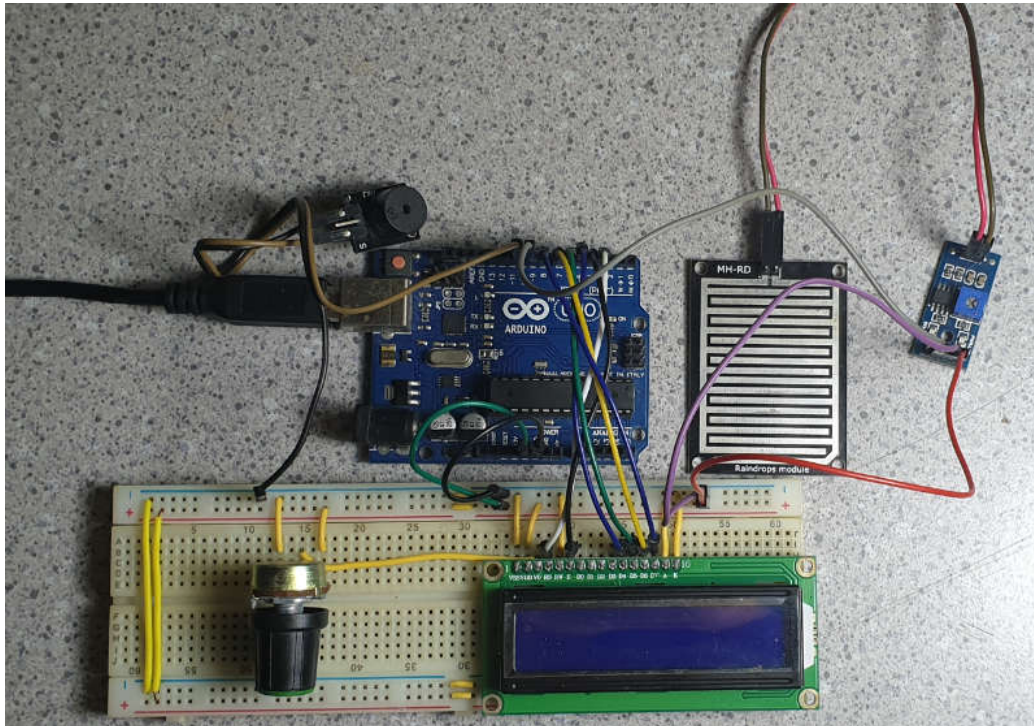

Figure 5: The sample circuit construction of Rain Sensor Project

2.8 Source Code

This is the last procedure to make this project working using the Arduino IDE (Integrated Development Environment) to flash the Arduino Uno using the source code listing below.

Steps are follows below:

1. Open the Arduino IDE then select Arduino Uno/Genuino in Tools->Board->Arduino/Genuino Uno then select the COM Port using Tools->Port-> and select name of the COM Port.

2. Copy the code listing below then click the Verify button then after compiling the sketch it should be Done compiling appears on the status bar.

3. After compiling the sketch, press the Upload button so that the sketch will be upload in Arduino Uno. Test the circuit if it is working.

```
// include the library code:
#include <LiquidCrystal.h>

#define rainfall 9
#define buzzer 10
boolean value;

// initialize the library by associating any needed LCD
interface pin
// with the arduino pin number it is connected to
```

```
const int RS = 3, EN = 4, D4 = 5, D5 = 6, D6 = 7, D7 =
8;
LiquidCrystal lcd(RS, EN, D4, D5, D6, D7);


void setup()
 {

   Serial.begin(115200);
   pinMode(buzzer,OUTPUT);
   pinMode(rainfall,INPUT);

   lcd.begin (16,2); //Initialize the LCD
   lcd.setCursor(0,0);
   lcd.print("MARIC RAINSENSOR");
   lcd.setCursor(0,1);
   lcd.print("USING GIZDUINO");
   delay(3000);


   }

void loop() {

 lcd.clear();
 value = digitalRead(rainfall);
 Serial.println(value);


 if(value == LOW){
   Serial.println("Rain Detected!!!");
```

```
  lcd.setCursor(0,0);
  lcd.print("Rain Detected!!!");

  digitalWrite(buzzer,HIGH);
  delay(1000);
  digitalWrite(buzzer,LOW);
  delay(1000);
 }
 else{
  Serial.println("No Rain Detected");
  digitalWrite(buzzer,LOW);

  lcd.setCursor(0,0);
  lcd.print("No Rain");

 }
 delay(500);
}// Code Listing 2.8 RainSensor_LCD1602.ino
```

2.9   Testing the Rain Sensor Project

Test the circuit after building circuit and uploading the sketch in the Arduino Uno. The LCD displays the first introduction screen then goes to the rain sensing operation of the circuitry. If the sensor is not wet, the display in the LCD screen will be "No rain" otherwise when there is a rain and the sensor is wet, the LCD display will produce "Rain Detected!" at the buzzer will sound definitely.
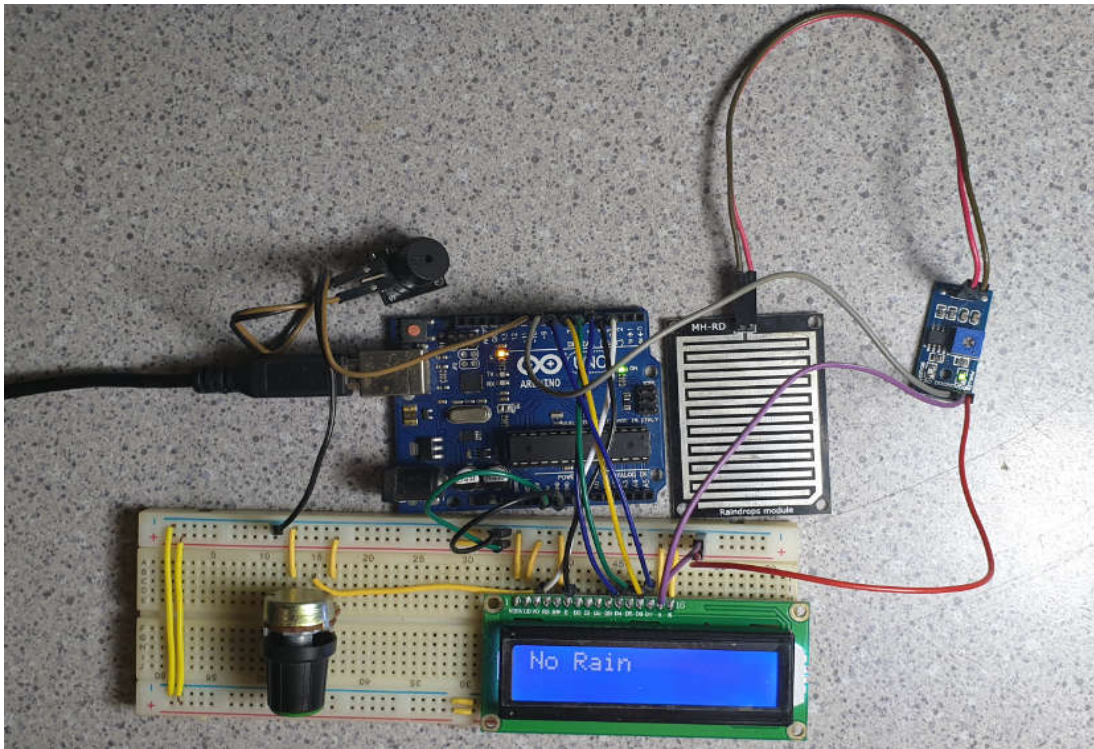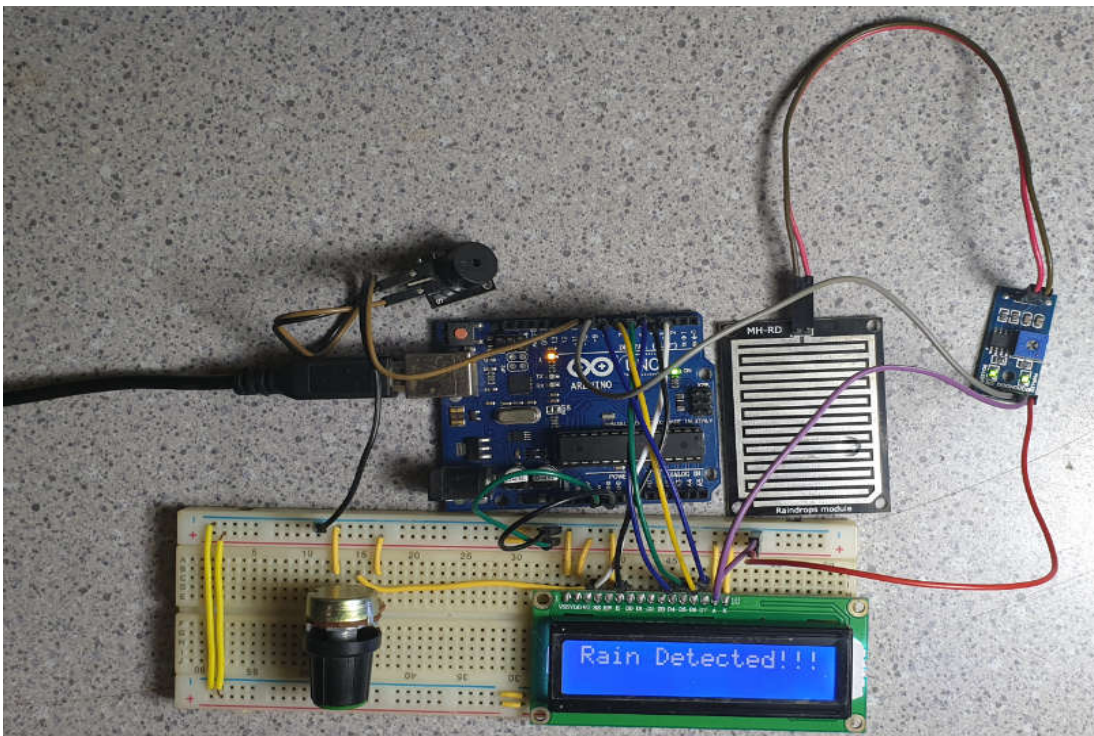
Figure 6: Testing of Rain Sensor Project

Figure 7: LCD Output of Rain Sensor with Rain Detected