

Weather Monitoring System

Batch: 10

Members:

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Description:

In this project, we are going to use different sensors and make a weather monitoring system. This system will tell us about changes in temperature, pressure, impurities in the air, and intensity of the light. It will display different data based on the condition. If there is not present sufficient amount of light then it will display this on the LCD. And for extremely bad conditions like poor air quality or high temperature, it will enable the alarm. We can easily access the data from a distant area also using the WIFI module and thingspeak. Due to security issues, we are unable to use the WIFI module in Tinker Cad so we display the result in the LCD module.

Components:

Sr. No.	Name	Quantity
1.	Arduino UNO	1
2.	LCD (16x2)	1
3.	Temperature Sensor	1
4.	Photoresistor	1
5.	Pressure Sensor	1
6.	Gas Sensor	1

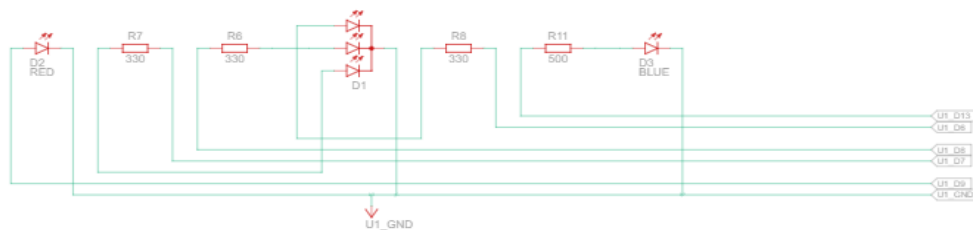
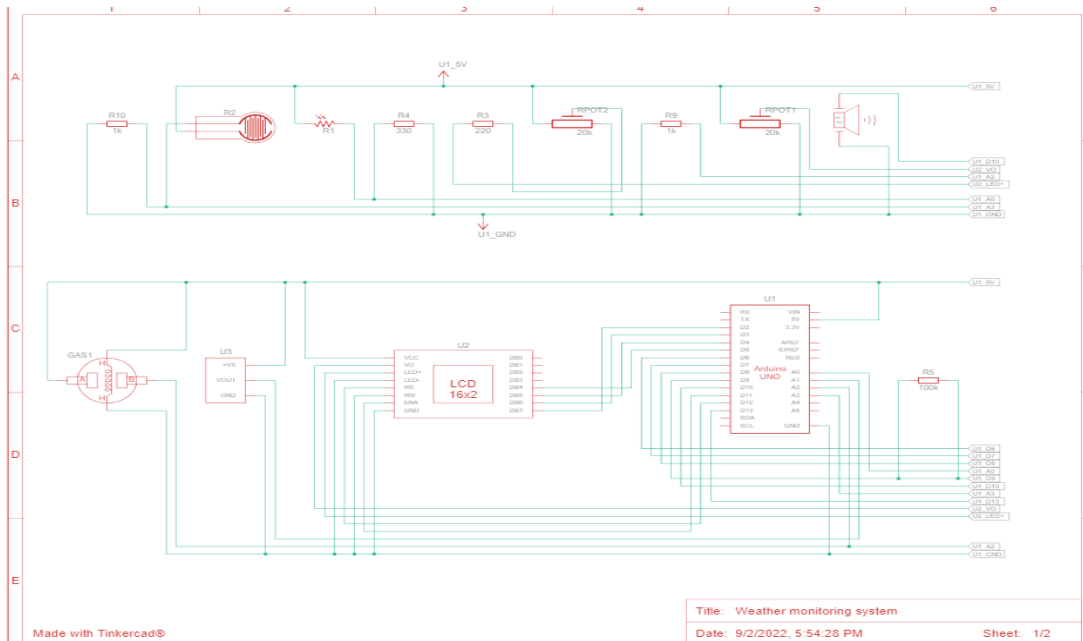
7.	Buzzer	1
8.	RGB LED	1
9.	Red LED	1
10.	Blue LED	1
11.	Potentiometer	2
12.	Resistors (of different value)	9

Description of Components:

- Arduino UNO: It is the major component of the circuit and programmable we use it to make other components work accordingly.
- LCD (16x2): It is used to show the status of the weather according to the reading of the different sensors. In the first row we show the temperature condition i.e., we display the value of temperature sensor. In the second row we show the value of photoresistor and gas sensors.
- Temperature Sensor: It is used to measure temperature and as per the temperature value it will send data to Arduino board and display it in the 1st row of LCD module.
- Photoresistor: It is used to detect the presence of light. Using this sensor, we will be going to know whether it is day or night or some cloudy surrounding.
- Pressure Sensor: It is used to gauge the pressure of the environment. Here it does not have any important function in this project.
- Gas Sensor: It is used to check the quality of the air and accordingly it will display the result in the 2nd row of LCD module.
- Buzzer: Used to alert about bad weather condition. That bad weather condition includes variation of temperature, air quality.

- RGB LED: Used to know about the temperature condition.
 - OFF – Normal Temperature
 - Red – Hot Temperature
 - Blue – Cold Temperature
- Red LED: Used as light source.
- Blue LED: Used as the indicator for abnormal pressure.
- Potentiometer: Used to control contrast of the LCD.
- Resistors (of different values): Used for providing resistance.

Circuit Diagram:



Code:

```
#include <LiquidCrystal.h>

LiquidCrystal lcd(12, 11, 5, 4, 3, 2);// for the LCD

int wLED = 9;
int rLED = 6;
int bLED = 7;
int gLED = 8;
int pLED = 13;
int piezo=10;

int LDR = A0;
int LsensorValue = 0;

int TMP = A1;
int TsensorValue=0;

int GAS = A2;
int GsensorValue = 0;

int PRS = A3;
int PsensorValue = 0;

void setup()
{
  Serial.begin(9600);
  lcd.begin (16, 2);
  pinMode(wLED, OUTPUT);
  pinMode(rLED, OUTPUT);
  pinMode(bLED, OUTPUT);
  pinMode(gLED, OUTPUT);
  pinMode(piezo, OUTPUT);
  pinMode(pLED, OUTPUT);
}

void loop()
{

  TsensorValue = analogRead(TMP);

  float voltage = TsensorValue * 5.0;
  voltage /= 1024.0;

  float temperatureC = (voltage - 0.5) * 100 ;
  Serial.print("The temperature is=");
  Serial.print(temperatureC);
  Serial.println(" degrees C");
  lcd.setCursor(0,1);
```

```

lcd.print(temperatureC);
lcd.clear();
lcd.setCursor(0, 0);

if (temperatureC < 2)
{
    digitalWrite(bLED, HIGH);
    digitalWrite(rLED, LOW);
    lcd.print("Cold temp");
    tone(10, 300);
}
else
    if (temperatureC >= 2 && temperatureC < 45 )
    {
        digitalWrite(bLED, LOW);
        digitalWrite(rLED, LOW);
        lcd.setCursor(0, 0);
        lcd.print("Normal temp");
        noTone(10);
    }
else
    {
        digitalWrite(rLED, HIGH);
        digitalWrite(bLED, LOW);
        lcd.setCursor(0, 0);
        lcd.print("Hot temp");
        tone(10, 300);
    }

LsensorValue = analogRead(LDR);
Serial.print("The light value is= ");
Serial.println(LsensorValue);

if (LsensorValue < 50)
{
    digitalWrite(wLED, HIGH);
    lcd.setCursor(0, 1);
    lcd.print("Dark");
}

else if(LsensorValue>=50 && LsensorValue<250)
{
    digitalWrite(wLED, LOW);
    lcd.setCursor(0, 1);
    lcd.print("Cloudy");
}
else
{
    digitalWrite(wLED, LOW);
    lcd.setCursor(0, 1);
    lcd.print("Sunny");
}

```

```

}

GsensorValue = analogRead(GAS);
Serial.print("Gas Sensor Value= ");
Serial.println(GsensorValue, DEC);
if (GsensorValue > 100)
{
    tone(10,700);
    lcd.setCursor(5,1);
    lcd.print("& polluted");
}
PsensorValue = analogRead(PRS);
Serial.print("pressure Sensor Value= ");
Serial.println(PsensorValue, DEC);
if (PsensorValue > 100)
{
    digitalWrite(pLED, HIGH);
    Serial.println("air pressure is high");
}
else
{
    digitalWrite(pLED, LOW);
}

Serial.println();
Serial.println();
Serial.println();

delay (5000);

}

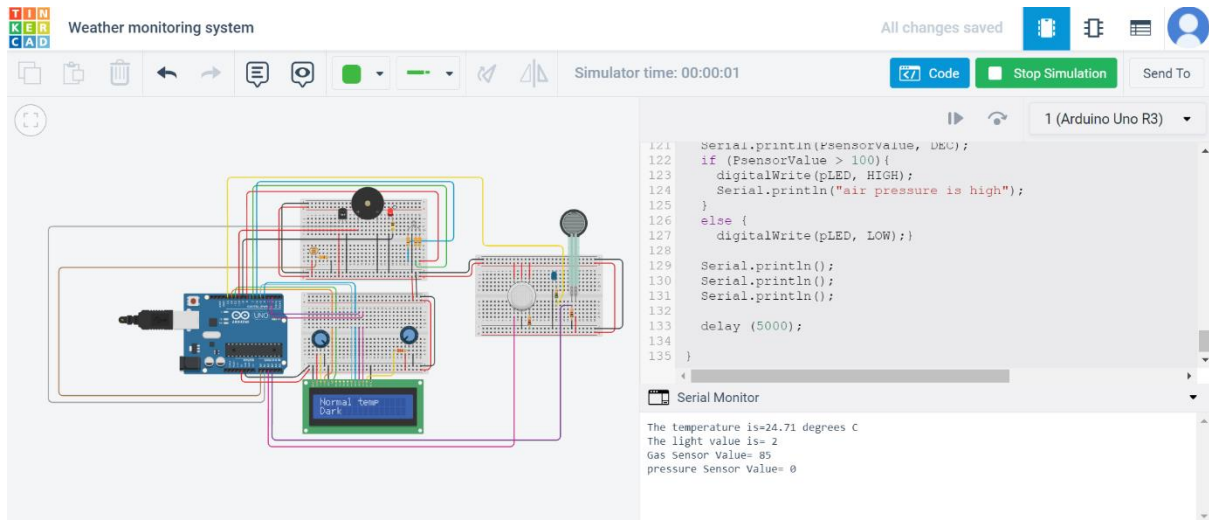
```

Simulation Result:

depending upon the value send by the sensors result will be display in the lcd module.

Simulation Link:

https://www.tinkercad.com/things/5tV2FslGYll-weather-monitoring-system/editel?sharecode=cY4iPjAZDwAya_zn2m2ATeZQztDlzMu-iDx5vsa2lQQ



Conclusion:

We have learned about Arduino, various sensors, and their use with Arduino. With the help of all this successfully made a weather monitoring system.

THANK YOU