School: **Engineering and Technology** Campus: **CUTM - AP**

Academic Year: **2024** Subject Name: **IIOT** Subject Code: **CUTM -1017**

Semester: **3rd** Program: **B-Tech** Branch: **ECE** Specialization: ...**EII**....

Date: .....

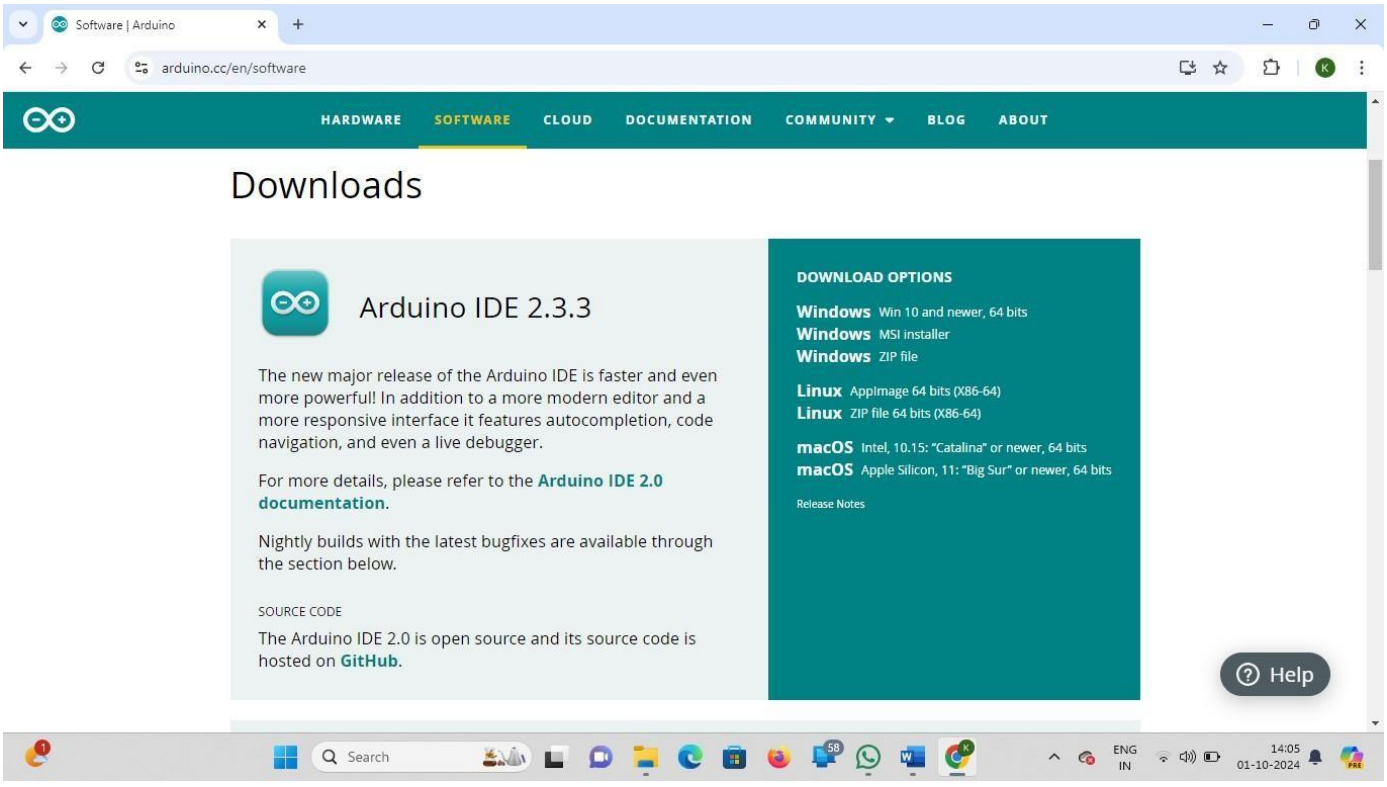
# Applied and Action Learning

(Learning by Doing and Discovery)

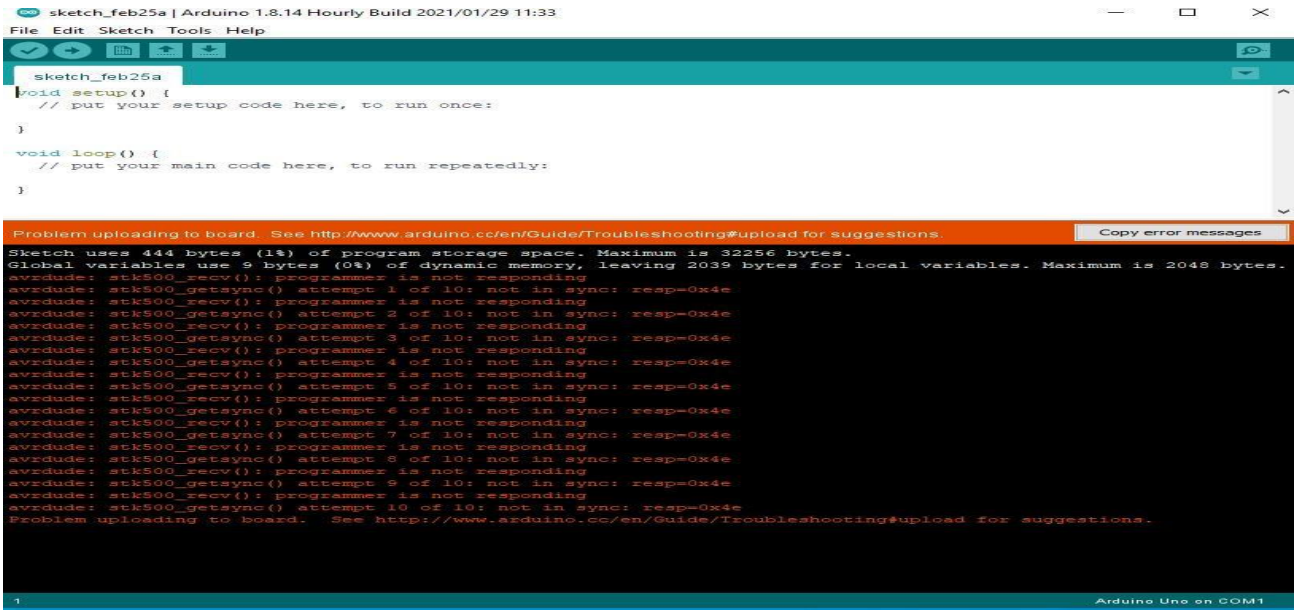
**Name Of the Experiment: 1. Familiarization with Arduino and perform necessary software installation**

## Circuit Diagram / Components

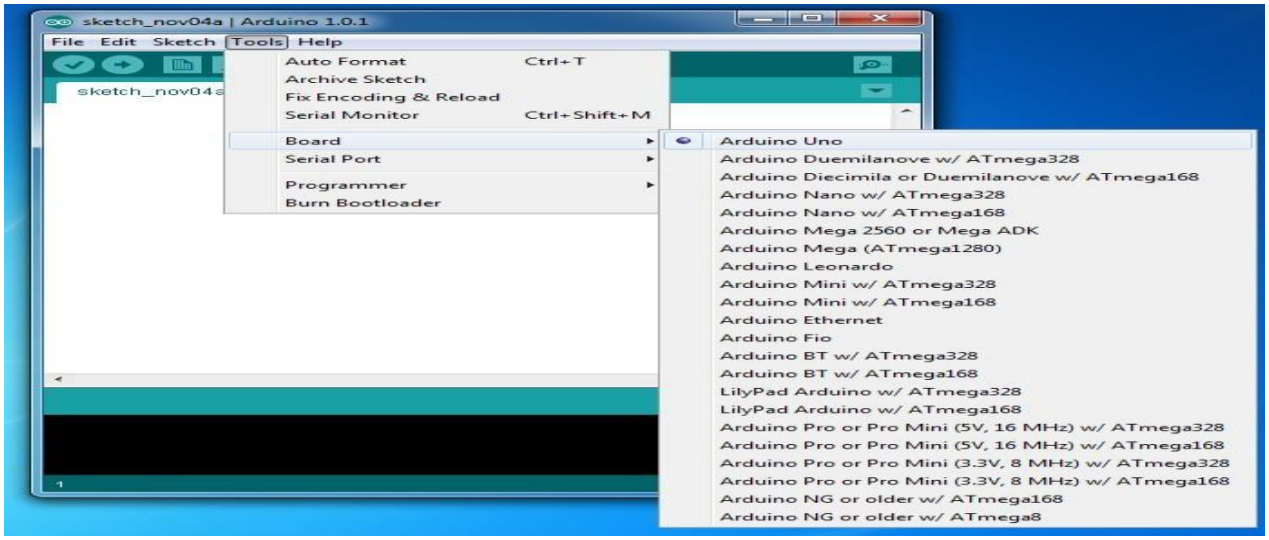
1. Firstly we have to go through this website (https://www.arduino.cc/en/software)
2. And next we have to select the download options as require to your system requirments.
3. And next we have to select the download option.



# Implementation Phase: Final Output (no error)




This is the interface opened and we have to implement the code.




And this interface opened next and we have to select the board by using this.

## ASSESSMENT

| Rubrics | Full Mark | Marks Obtained | Remarks |
|---|---|---|---|
| Concept | 10 | | |
| Planning and Execution/ Practical Simulation/ Programming | 10 | | |
| Result and Interpretation | 10 | | |
| Record of Applied and Action Learning | 10 | | |
| Viva | 10 | | |
| **Total** | **50** | | |

***Signature of the student:***

***Name :***

***Regn.No.***

***Signature of the Faculty***

School: **Engineering and Technology** Campus: **CUTM - AP**

Academic Year: **2024** Subject Name: **IIOT** Subject Code: **CUTM -1017**

Semester: 3rd Program: **B-Tech** Branch: **ECE** Specialization: .....**EII**....

Date: .....

# Applied and Action Learning

(Learning by Doing and Discovery)

**Name Of the Experiment: 8. To interface MQ -2 Gas Sensor with Arduino and write a program to Display the readings in Arduino IDE.**

## Coding Phase: Pseudo Code / Flow Chart / Algorithm

- The positive ends of two LED's green and red are connected to Arduino UNO R3 to ports 11 and 12 respectively.
- The positive end of Buzzer is connected to port 10 of Arduino UNO R3.
- MQ-2 sensor is connected to power and Analog IN of Arduino UNO R3 as shown in circuit diagram below.
- Three resistors each of 2.2Ohm are connected negatives of both the LED's and buzzer to ground.

## Required Components

### Hardware Components

1.Breadboard

2.LED's

3.Resistors

4.Jumper wires

5.MQ-2 gas sensor

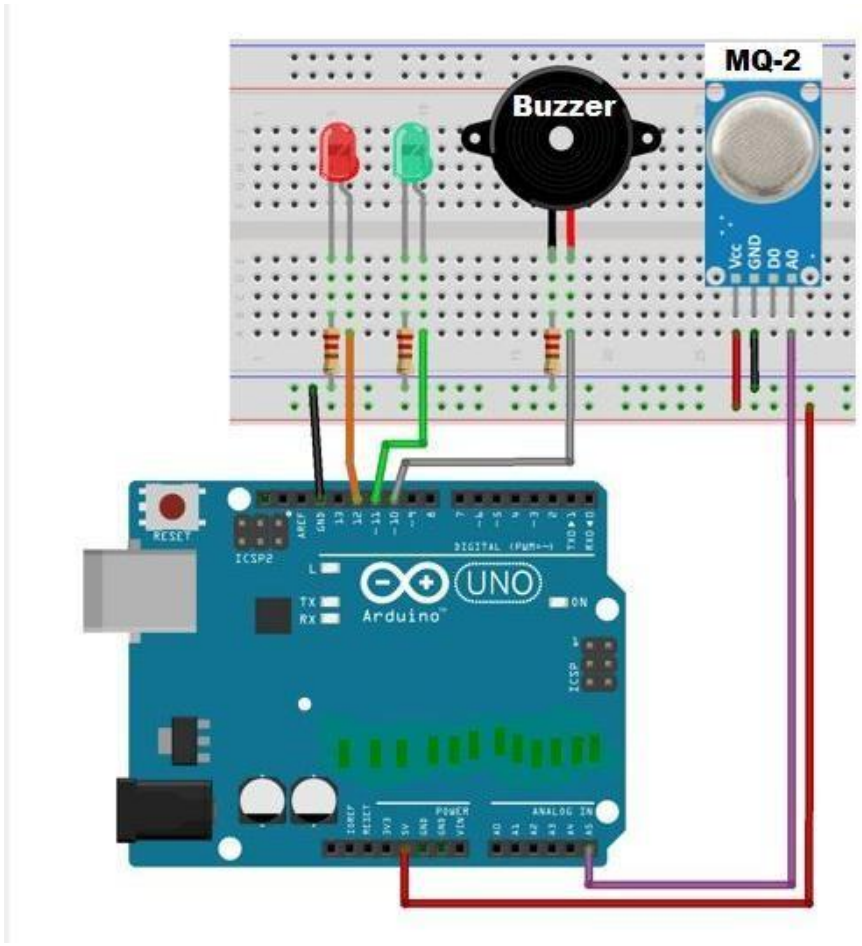
6.Buzzer

### Software Required

Arduino IDE

```
#define sensorPin A0
#define buzzerPin 12

int gasSensorValue = 0;
int threshold = 500;

void setup() {
  Serial.begin(9600);
  pinMode(buzzerPin, OUTPUT);
}

void loop() {
  gasSensorValue = analogRead(sensorPin);

  Serial.print("Gas Sensor Value: ");
  Serial.println(gasSensorValue);

  if (gasSensorValue > threshold) {
    Serial.println("Gas Detected!");
    digitalWrite(buzzerPin, HIGH);
  } else {
    digitalWrite(buzzerPin, LOW);
  }

  delay(1000);
}
```

## Implementation Phase: Final Output (no error)




## ASSESSMENT

| Rubrics | Full Mark | Marks Obtained | Remarks |
|---|---|---|---|
| Concept | 10 | | |
| Planning and Execution/ Practical Simulation/ Programming | 10 | | |
| Result and Interpretation | 10 | | |
| Record of Applied and Action Learning | 10 | | |
| Viva | 10 | | |
| **Total** | **50** | | |

***Signature of the student:***

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***Signature of the Faculty***

School: **Engineering and Technology** Campus: **CUTM - AP**

Academic Year: **2024** Subject Name: **IIOT** Subject Code: **CUTM -1017**

Semester: **3rd** Program: **B-Tech** Branch: **ECE** Specialization: .....**EII**....

Date: .....

# Applied and Action Learning

(Learning by Doing and Discovery)

**Name Of the Experiment: PIR sensor with using Arduino IDE**

## Coding Phase: Pseudo Code / Flow Chart / Algorithm

- The positive ends of two LED's white and red are connected to Arduino UNO R3 to ports 4 and 7
- The positive end of Buzzer is connected to port 13 of Arduino UNO R3
- three resistors each of 1Ohm are connected negatives of the LED 's to ground.
- PIR sensor third pin is connected to arduino UNO R3 to port 2. 1 and 2 pins are connected to ground
-

## Required Components

### Hardware Components

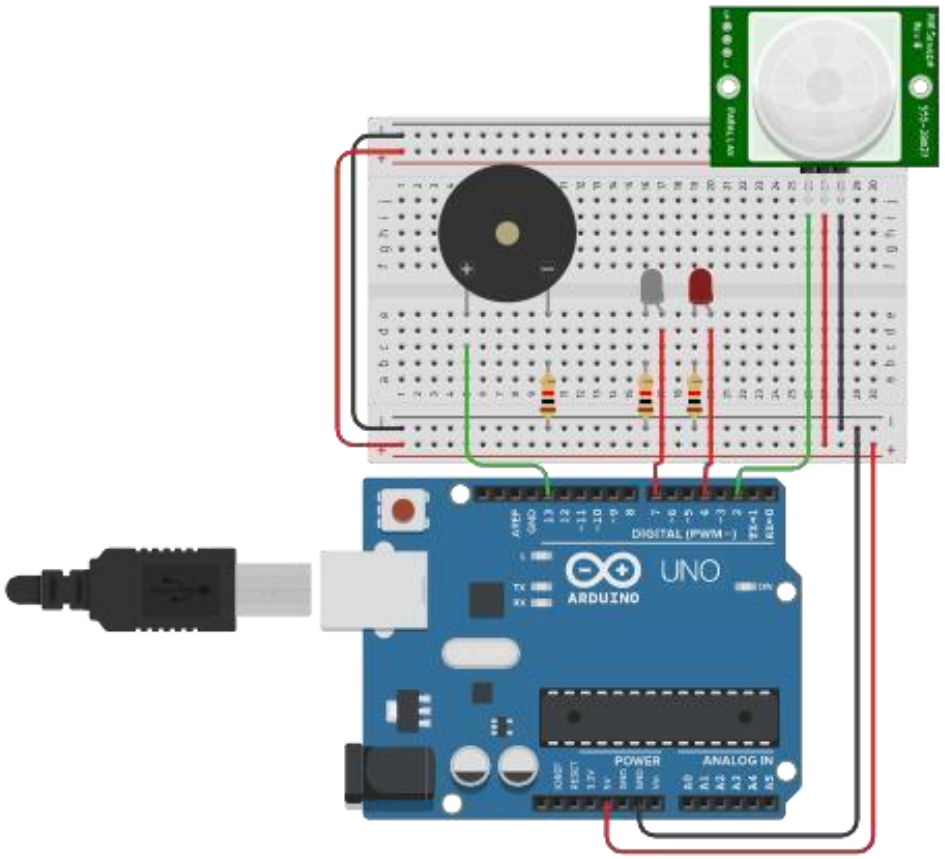
1. Breadboard
2. LED's
3. Resistors
4. Jumper wires
5. Buzzer
6. PIR sensor
7. Arduino uno R3

### Software Required

Arduino IDE

```
#define pirPin 2
#define ledPin 13
#define buzzerPin 12

void setup() {
pinMode(pirPin, INPUT);
pinMode(ledPin, OUTPUT);
pinMode(buzzerPin, OUTPUT);
}

void loop() {
int pirState = digitalRead(pirPin);

if (pirState == HIGH) {
digitalWrite(ledPin, HIGH);
digitalWrite(buzzerPin, HIGH);
} else {
digitalWrite(ledPin, LOW);
digitalWrite(buzzerPin, LOW);
}

delay(100);
}
```

## Implementation Phase: Final Output (no error)




## ASSESSMENT

| Rubrics | Full Mark | Marks Obtained | Remarks |
|---|---|---|---|
| Concept | 10 | | |
| Planning and Execution/ Practical Simulation/ Programming | 10 | | |
| Result and Interpretation | 10 | | |
| Record of Applied and Action Learning | 10 | | |
| Viva | 10 | | |
| **Total** | **50** | | |

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Date: .....

# Applied and Action Learning

(Learning by Doing and Discovery)

**Name Of the Experiment: To interface Ultrasonic sensor with using Arduino write a program to print Ultrasonic sensor readings in Arduino IDE.**

## Coding Phase: Pseudo Code / Flow Chart / Algorithm

- The positive ends of three LED's green,yellow and red are connected to Arduino UNO R3 to ports 2,3 and 4.
- three resistors each of 220Ohm are connected negatives of the LED's to ground.
- Ultrasonic sensor ground pin is connected to Arduino uno R3 to port ground.
- Ultrasonic sensor VCC pin is connected to Arduino uno R3 to port 5v.
- Ultrasonic sensor Trig pin is connected to Arduino uno R3 to port 10.and Echo pin is connected to Arduino uno to port 9.

## Required Components

### Hardware Components

1.Breadboard

2.LED's

3.Resistors

4.Jumper wires

5.Ultrasonic sensor

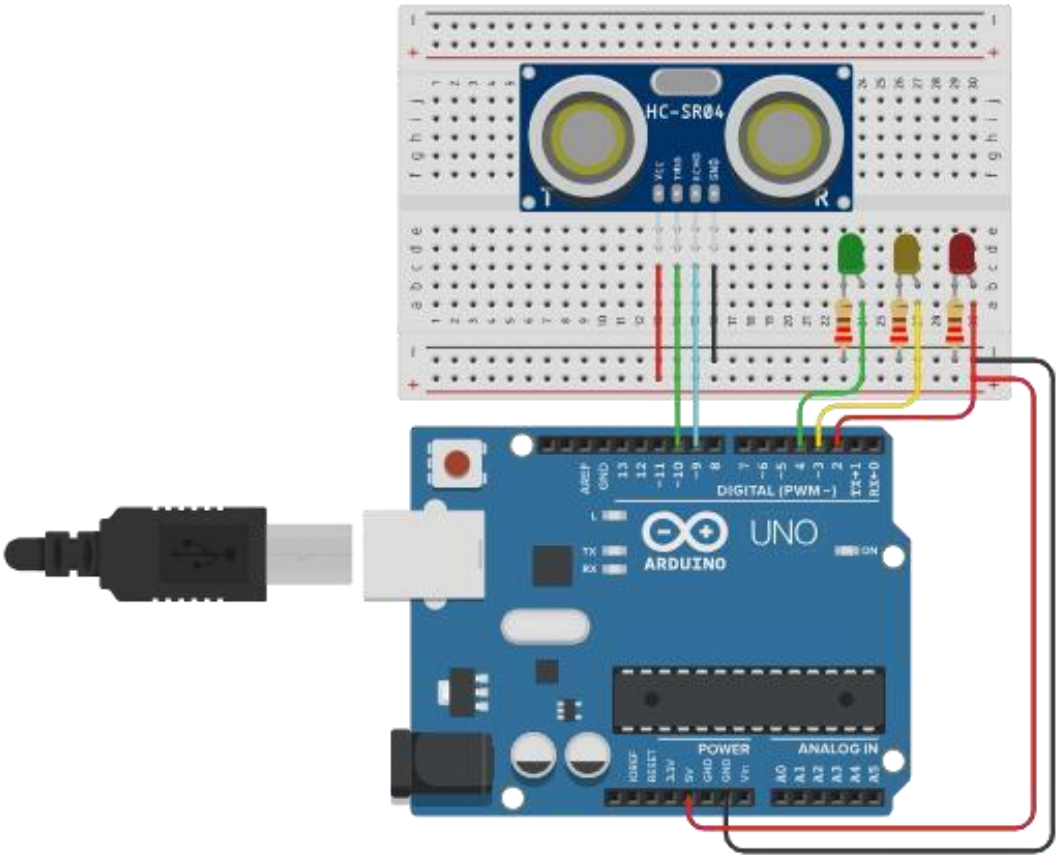
6.Arduino uno R3

### Software Required

Arduino IDE

```
#define trigPin 12
#define echoPin 13
#define redLedPin 11
#define yellowLedPin 10
#define greenLedPin 9

void setup() {
  pinMode(trigPin, OUTPUT);
  pinMode(echoPin, INPUT);
  pinMode(redLedPin, OUTPUT);
  pinMode(yellowLedPin, OUTPUT);
  pinMode(greenLedPin, OUTPUT);
}

void loop() {
  long duration, distance;

  digitalWrite(trigPin, LOW);
  delayMicroseconds(2);

  digitalWrite(trigPin, HIGH);
  delayMicroseconds(10);

  digitalWrite(trigPin, LOW);

  duration = pulseIn(echoPin, HIGH);

  distance = duration * 0.034 / 2;

  if (distance <= 20) {
    digitalWrite(redLedPin, HIGH);
    digitalWrite(yellowLedPin, LOW);
    digitalWrite(greenLedPin, LOW);
  } else if (distance <= 40) {
    digitalWrite(redLedPin, LOW);
    digitalWrite(yellowLedPin, HIGH);
    digitalWrite(greenLedPin, LOW);
  } else {
    digitalWrite(redLedPin, LOW);
    digitalWrite(yellowLedPin, LOW);
    digitalWrite(greenLedPin, HIGH);
  }
  delay(100);
}
```

## Implementation Phase: Final Output (no error)




## ASSESSMENT

| Rubrics | Full Mark | Marks Obtained | Remarks |
|---|---|---|---|
| Concept | 10 | | |
| Planning and Execution/ Practical Simulation/ Programming | 10 | | |
| Result and Interpretation | 10 | | |
| Record of Applied and Action Learning | 10 | | |
| Viva | 10 | | |
| **Total** | **50** | | |

***Signature of the student:***

***Name :***

***Regn.No.***

***Signature of the Faculty***

School: **Engineering and Technology** Campus: **CUTM - AP**

Academic Year: **2024** Subject Name: **IIOT** Subject Code: **CUTM -1017**

Semester: **3rd** Program: **B-Tech** Branch: **ECE** Specialization: .....**EII**....

Date: .....

# Applied and Action Learning

(Learning by Doing and Discovery)

**Name Of the Experiment: To interface Rain sensor with the help of Arduino IDE and write a program to print Rain sensor readings in Arduino IDE.**

## Coding Phase: Pseudo Code / Flow Chart / Algorithm

- The positive ends of three LED's green,yellow and red are connected to Arduino UNO R3 to ports 8,9 and 10.
- The positive end of Buzzer is connected to port 13 of Arduino UNO R3.And the negative end of buzzer is connected to ground.
- Four resistors each of 1Ohm are connected negatives of the LED's to ground.
- TMP36 Analog out (middle) pin is connected to Arduino uno R3 to port A0.And vcc(first) pin is connected to Arduino unoR3 to port 5v.
- TMP36 ground(third) pin is connected to port ground.

## Required Components

### Hardware Components

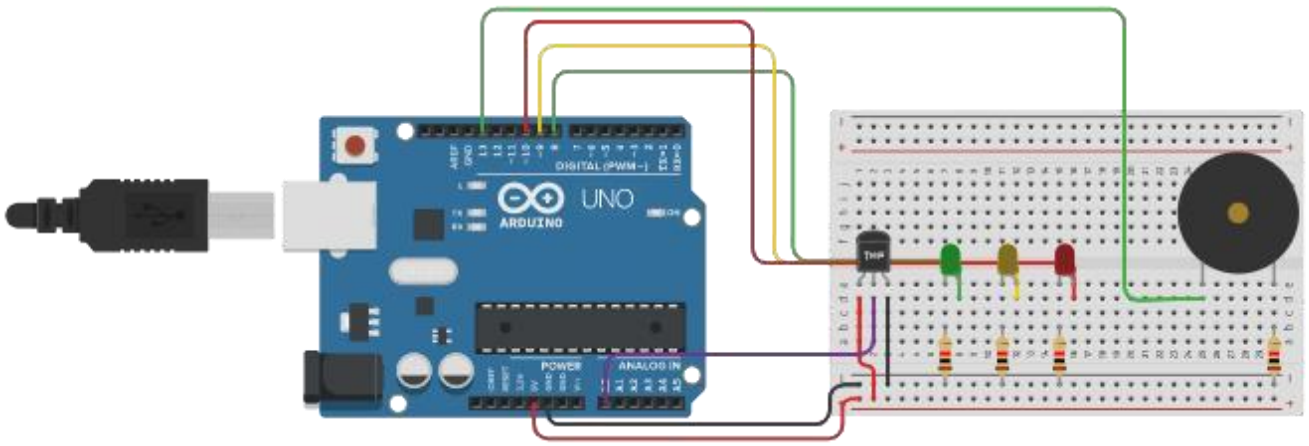
1. Breadboard
2. LED's
3. Resistors
4. Jumper wires
5. Buzzer
6. Temperature sensor[TMP36]
7. Arduino uno R3

### Software Required

Arduino IDE

```
#define buttonPin 2
#define redLedPin 13
#define yellowLedPin 12
#define greenLedPin 11
#define buzzerPin 10

void setup() {
  pinMode(buttonPin, INPUT_PULLUP);
  pinMode(redLedPin, OUTPUT);
  pinMode(yellowLedPin, OUTPUT);
  pinMode(greenLedPin, OUTPUT);
  pinMode(buzzerPin, OUTPUT);
}

void loop() {
  int buttonState = digitalRead(buttonPin);

  if (buttonState == LOW) {
   digitalWrite(redLedPin, HIGH);
   digitalWrite(yellowLedPin, HIGH);
   digitalWrite(greenLedPin, HIGH);
   digitalWrite(buzzerPin, HIGH);
   delay(5000);

    digitalWrite(redLedPin, LOW);
    digitalWrite(yellowLedPin, LOW);
    digitalWrite(greenLedPin, LOW);
    digitalWrite(buzzerPin, LOW);
  }
}
```

## Implementation Phase: Final Output (no error)




## ASSESSMENT

| Rubrics | Full Mark | Marks Obtained | Remarks |
|---|---|---|---|
| Concept | 10 | | |
| Planning and Execution/ Practical Simulation/ Programming | 10 | | |
| Result and Interpretation | 10 | | |
| Record of Applied and Action Learning | 10 | | |
| Viva | 10 | | |
| **Total** | **50** | 50 | |

***Signature of the student:***

***Name :***

***Regn.No.***

***Signature of the Faculty***

School: **Engineering and Technology** Campus: **CUTM - AP**

Academic Year: **2024** Subject Name: **IIOT** Subject Code: **CUTM -1017**

Semester: **3rd** Program: **B-Tech** Branch: **ECE** Specialization: .....**EII**....

Date: .....

# Applied and Action Learning

(Learning by Doing and Discovery)

**Name Of the Experiment: 2. To interface LED with Arduino and write a program to turn ON LED for 1sec after every 2 seconds.**

## Coding Phase: Pseudo Code / Flow Chart / Algorithm

- The circuit has a LED connected to digital pin 11 of the Arduino and a resistor connected to the other leg of the LED.
- The positive leg of the LED is connected to the pin 11, the negative leg of the LED is connected tothe resistor is connected to the ground on the Arduino.
- The positive leg of the LED is connected to pin 11.

## Required Components

### Hardware Components

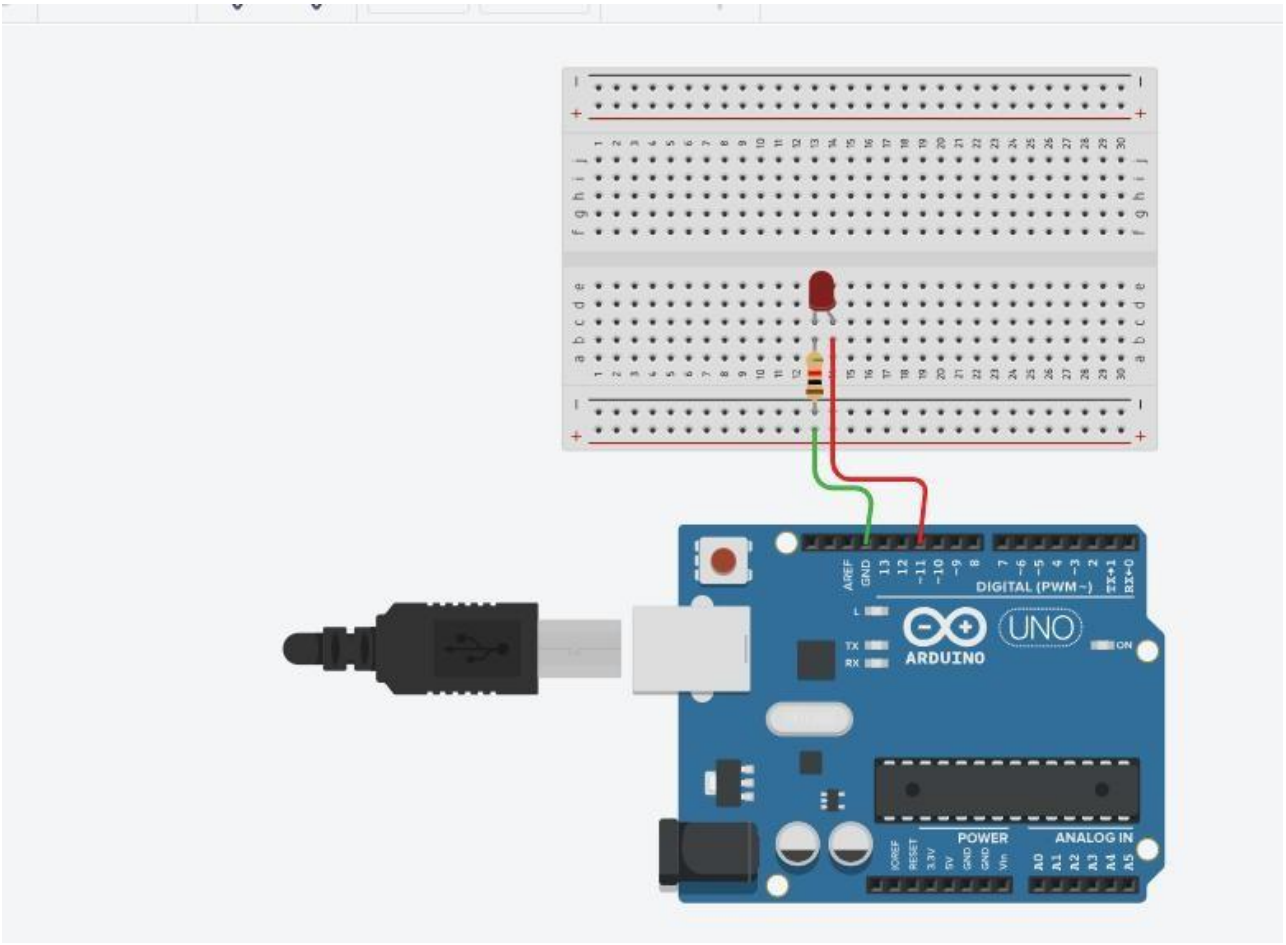
1. Breadboard
2. LED's
3. 1ohm resistor
4. Jumper wire
5. Arduino uno R3

### Software Required

Arduino IDE

```
int ledPin = 9;

void setup() {
    pinMode(ledPin, OUTPUT);
}

void loop() {
    for (int brightness = 0; brightness <= 255; brightness++) {
        analogWrite(ledPin, brightness);
        delay(5);
    }
    for (int brightness = 255; brightness >= 0; brightness--) {
        analogWrite(ledPin, brightness);
        delay(5);
    }
}
```

## Implementation Phase: Final Output (no error)




## ASSESSMENT

| Rubrics | Full Mark | Marks Obtained | Remarks |
|---|---|---|---|
| Concept | 10 | | |
| Planning and Execution/ Practical Simulation/ Programming | 10 | | |
| Result and Interpretation | 10 | | |
| Record of Applied and Action Learning | 10 | | |
| Viva | 10 | | |
| **Total** | **50** | | |

***Signature of the student:***

***Name :***

***Regn.No.***

***Signature of the Faculty***

School: **Engineering and Technology** Campus: **CUTM - AP**

Academic Year: _____ Subject Name: **IIOT** Subject Code: **CUTM -1017**

Semester: **3rd** Program: **B-Tech** Branch: **ECE** Specialization: .....**EII**....

Date: .....

# Applied and Action Learning

(Learning by Doing and Discovery)

**Name Of the Experiment: 3. To interface LDR-Light Dependent Resistance with Arduino and write a program to print LDR readings in Arduino IDE**

## Coding Phase: Pseudo Code / Flow Chart / Algorithm

- **Power Supply:** The Arduino Uno board is powered by a USB cable connected to a computer or a power adapter.
- **LED Connection:** The anode (longer leg) of the LED is connected to digital pin 9 of the Arduino. The cathode (shorter leg) is connected to a resistor and then to ground on the breadboard.
- **Resistor:** The resistor is used to limit the current flowing through the LED. The value of the resistor determines the brightness of the LED.
- **Arduino Control:** The Arduino board generates a pulse-width modulated (PWM) signal on digital pin 9. This signal controls the duty cycle of the LED, effectively adjusting its brightness.

## Required Components

### Hardware Components

1.Breadboard

2.Photoresistor

3.Resistors

4.Jumper wires

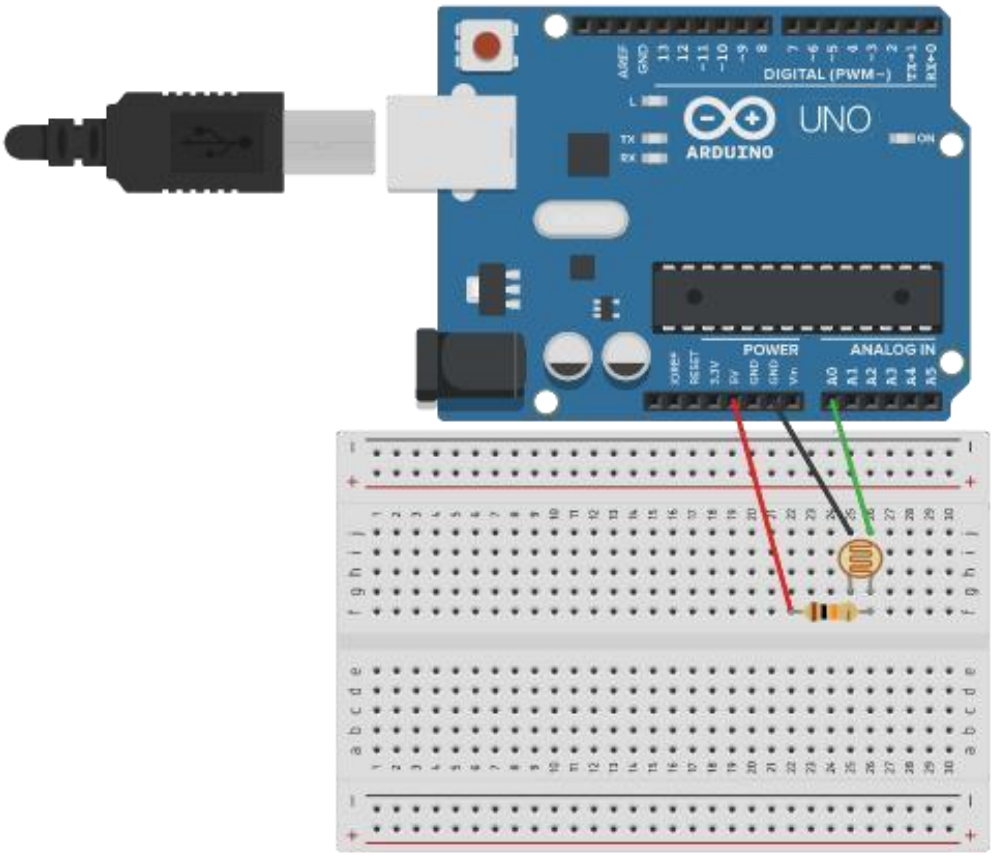
5.Arduino uno board

### Software Required

Arduino IDE

```
int ledPin = 9;

void setup() {
    pinMode(ledPin, OUTPUT);
}

void loop() {
    for (int brightness = 0; brightness <= 255; brightness++) {
        analogWrite(ledPin, brightness);
        delay(5);
    }

    for (int brightness = 255; brightness >= 0; brightness--) {
        analogWrite(ledPin, brightness);
        delay(5);
    }
}
```

## Implementation Phase: Final Output (no error)




## ASSESSMENT

| Rubrics | Full Mark | Marks Obtained | Remarks |
|---|---|---|---|
| Concept | 10 | | |
| Planning and Execution/ Practical Simulation/ Programming | 10 | | |
| Result and Interpretation | 10 | | |
| Record of Applied and Action Learning | 10 | | |
| Viva | 10 | | |
| **Total** | **50** | | |

***Signature of the student:***

***Name :***

***Regn.No.***

***Signature of the Faculty***

School: **Engineering and Technology** Campus: **CUTM - AP**

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Semester: **3rd** Program: **B-Tech** Branch: **ECE** Specialization: .....**EII**....

Date: .....

# Applied and Action Learning

(Learning by Doing and Discovery)

**Name Of the Experiment: To interface DHT11 sensor with Arduino and write a program to print temperature and humidity readings in Thingspeak**

**Power Supply:** The Arduino Uno board is powered by a USB cable connected to a computer or a power adapter.

**DHT11 Connection:**

- The data pin (yellow wire) of the DHT11 sensor is connected to digital pin 2 of the Arduino.
- The VCC pin (red wire) of the sensor is connected to the 5V pin of the Arduino.
- The GND pin (black wire) of the sensor is connected to the GND pin of the Arduino.

**Arduino Control:** The Arduino board sends a signal to the DHT11 sensor to initiate a measurement. The sensor then sends back the temperature and humidity data through the data pin. The Arduino reads this data and can display it on a screen, store it in memory, or use it to control other devices.

## Required Components

### Hardware Components

1.Breadboard

2.Resistors

3.Jumper wires

4.DHT11 Sensor

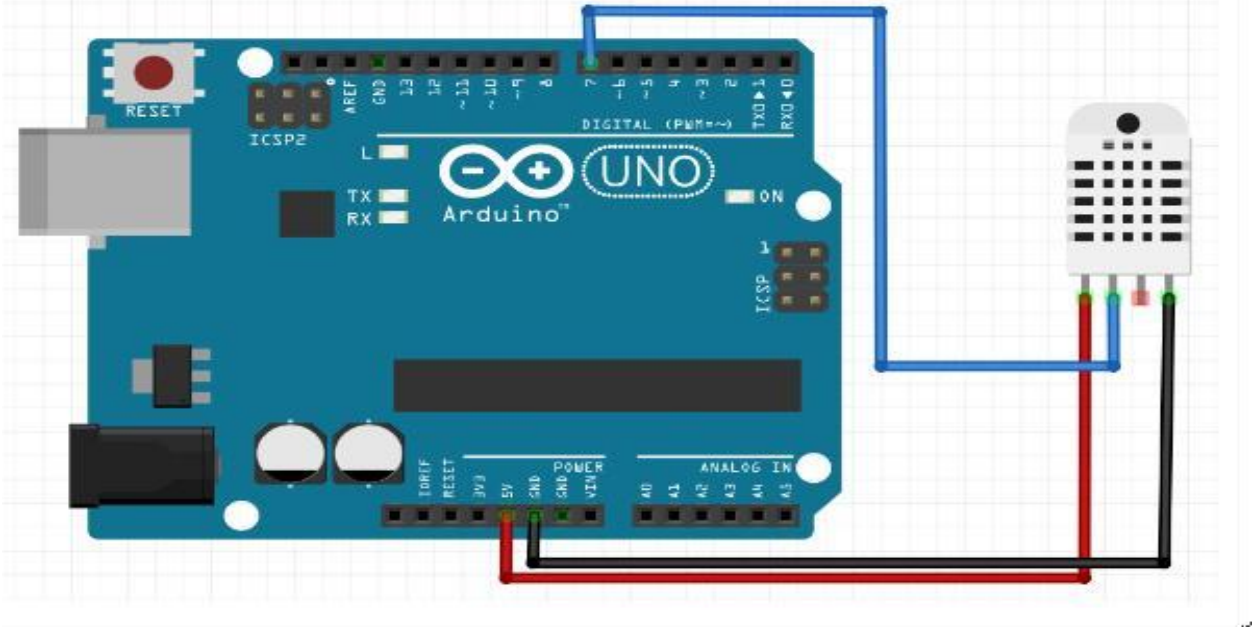
5.Arduino uno board

### Software Required

Arduino IDE

```
#include <DHT.h>

#define DHTPIN 2
#define DHTTYPE DHT11

DHT dht(DHTPIN, DHTTYPE);

void setup() {
    Serial.begin(9600);
    dht.begin();
}

void loop() {
    float h = dht.readHumidity();
    float t = dht.readTemperature();

    if (isnan(h) || isnan(t)) {
        Serial.println("Failed to read from DHT sensor!");
        return;
    }

    Serial.print("Humidity: ");
    Serial.print(h);
    Serial.print(" %\t");
    Serial.print("Temperature: ");
    Serial.print(t);
    Serial.println(" *C ");
    delay(2000);
}
```

## Implementation Phase: Final Output (no error)




## ASSESSMENT

| Rubrics | Full Mark | Marks Obtained | Remarks |
|---|---|---|---|
| Concept | 10 | | |
| Planning and Execution/ Practical Simulation/ Programming | 10 | | |
| Result and Interpretation | 10 | | |
| Record of Applied and Action Learning | 10 | | |
| Viva | 10 | | |
| **Total** | **50** | | |

***Signature of the student:***

***Name :***

***Regn.No.***

***Signature of the Faculty***

School: **Engineering and Technology** Campus: **CUTM - AP**

Academic Year: **2024** Subject Name: **IIOT** Subject Code: **CUTM -1017**

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Date: .....

# Applied and Action Learning

(Learning by Doing and Discovery)

**Name Of the Experiment: 5. To interface 7- Segment Display with Arduino and write a program to Display the**

**readings in Arduino IDE. seven segment sensors with using Arduino IDE**

## Coding Phase: Pseudo Code / Flow Chart / Algorithm

- The positive ends of five LED'S are connected to Arduino UNO R3 to ports 3, 4 ,5, 6 and 7
- six resistors each of 1Ohm are connected negatives of the LED's to ground.
- Six resistors each of 1ohm are connected positive of the LED's

## Required Components

### Hardware Components

1. Breadboard
2. LED's
3. Resistors
4. Jumper wires
5. Arduino uno R3

### Software Required

Arduino IDE

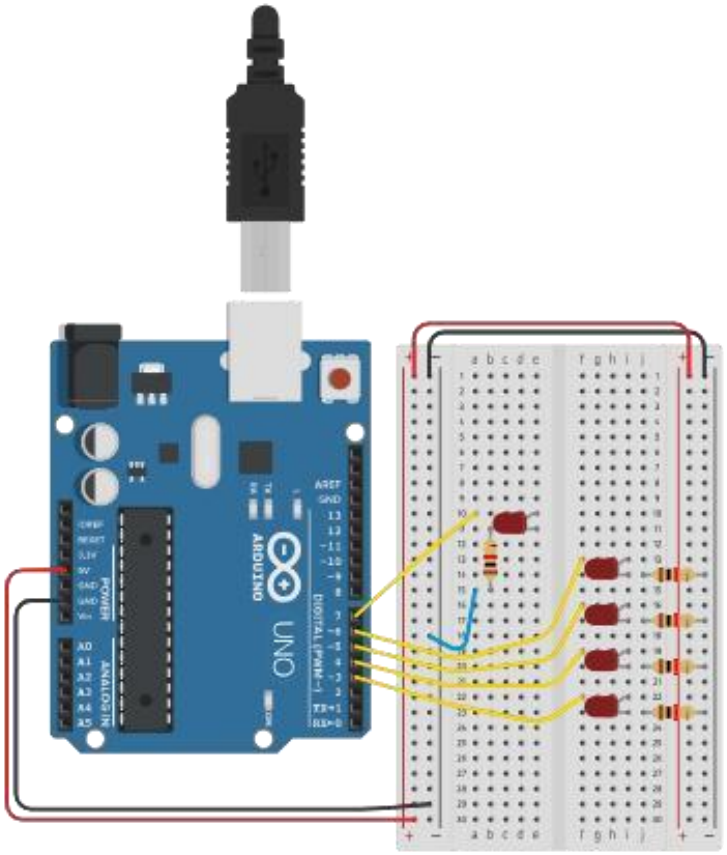
```
int ledPins[] = {2, 3, 4, 5};

void setup() {
    for (int i = 0; i < 4; i++) {
        pinMode(ledPins[i], OUTPUT);
    }
}

void loop() {
    for (int i = 0; i < 4; i++) {
        digitalWrite(ledPins[i], HIGH);
    }
    delay(1000);

    for (int i = 0; i < 4; i++) {
        digitalWrite(ledPins[i], LOW);
    }
    delay(1000);
}
```

## Implementation Phase: Final Output (no error)




## ASSESSMENT

| Rubrics | Full Mark | Marks Obtained | Remarks |
|---|---|---|---|
| Concept | 10 | | |
| Planning and Execution/ Practical Simulation/ Programming | 10 | | |
| Result and Interpretation | 10 | | |
| Record of Applied and Action Learning | 10 | | |
| Viva | 10 | | |
| **Total** | **50** | | |

***Signature of the student:***

***Name :***

***Regn.No.***

***Signature of the Faculty***

School: **Engineering and Technology** Campus: **CUTM - AP**

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Date: .....

# Applied and Action Learning

(Learning by Doing and Discovery)

**Name Of the Experiment: 6. To interface LCD- Liquid Crystal Display with Arduino and write a program to**

**Display the readings in Arduino IDE.**

## Coding Phase: Pseudo Code / Flow Chart / Algorithm

- **Sensor Input:** The Arduino Uno might be connected to sensors that detect the occupancy of parking spots (e.g., ultrasonic sensors, infrared sensors).
- **Data Processing:** The Arduino processes the sensor data to determine the number of available parking spots.
- **LCD Display:** The calculated number of available spots is displayed on the LCD.

## Required Components

### Hardware Components

1.Breadboard

2.Resistors

3.Jumper wires

4.LCD display

5.Potentiometer

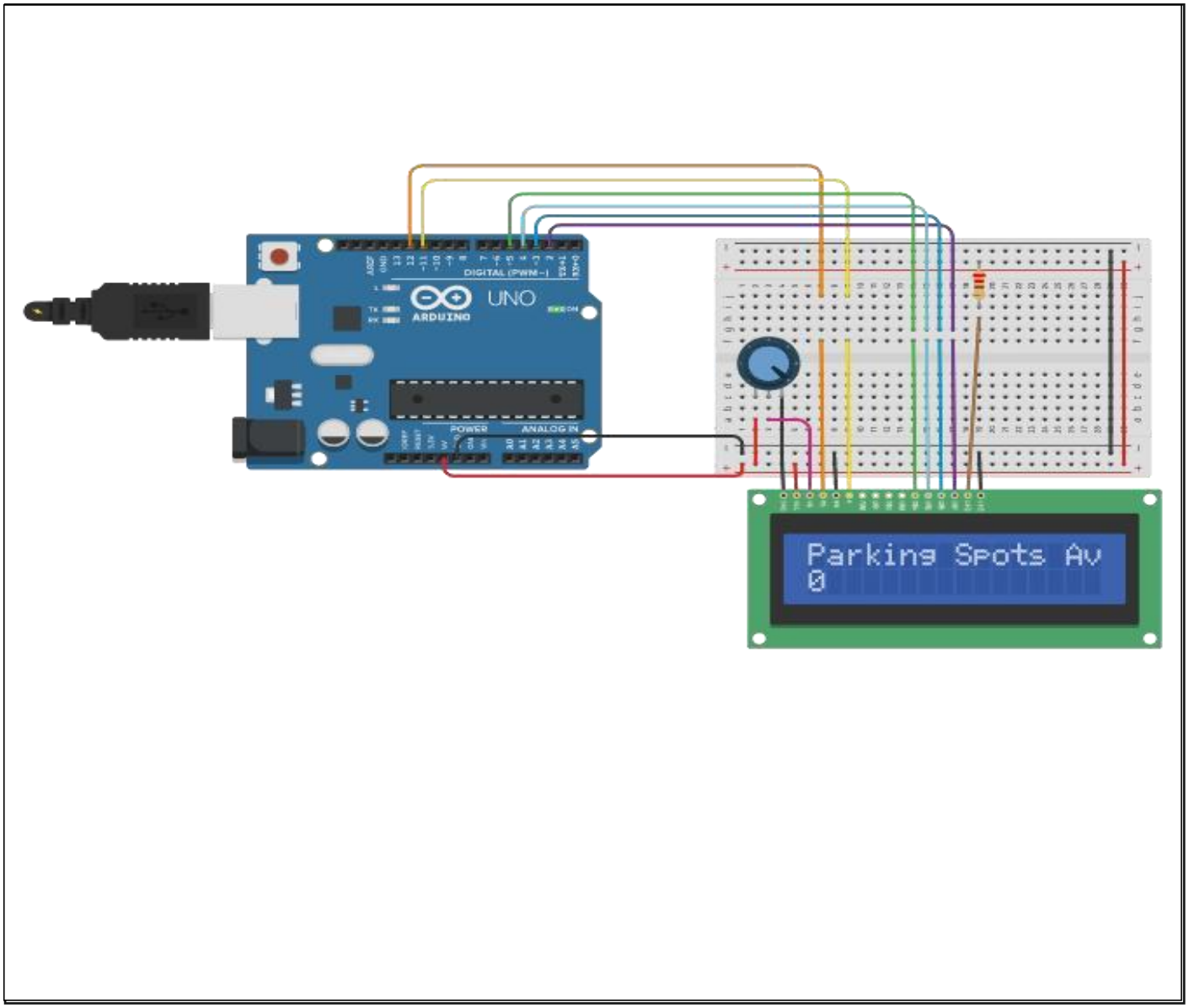
6.Arduino uno board

### Software Required

Arduino IDE

```
#include <LiquidCrystal.h>

const int lcdRs = 12;
const int lcdEn = 11;
const int lcdD4 = 5;
const int lcdD5 = 4;
const int lcdD6 = 3;
const int lcdD7 = 2;

LiquidCrystal lcd(lcdRs, lcdEn, lcdD4, lcdD5, lcdD6, lcdD7);

const int sensorPin = A0;

void setup() {
    lcd.begin(16, 2);
    pinMode(sensorPin, INPUT);
}

void loop() {
    int sensorValue = analogRead(sensorPin);
    int parkingSpots = map(sensorValue, 0, 1023, 0, 100);

    lcd.setCursor(0, 0);
    lcd.print("Parking Spots Av");
    lcd.setCursor(0, 1);
    lcd.print(parkingSpots);
    lcd.print("  %");
}
```

## Implementation Phase: Final Output (no error)




## ASSESSMENT

| Rubrics | Full Mark | Marks Obtained | Remarks |
|---|---|---|---|
| Concept | 10 | | |
| Planning and Execution/ Practical Simulation/ Programming | 10 | | |
| Result and Interpretation | 10 | | |
| Record of Applied and Action Learning | 10 | | |
| Viva | 10 | | |
| **Total** | **50** | | |

***Signature of the student:***

***Name :***

***Regn.No.***

***Signature of the Faculty***