

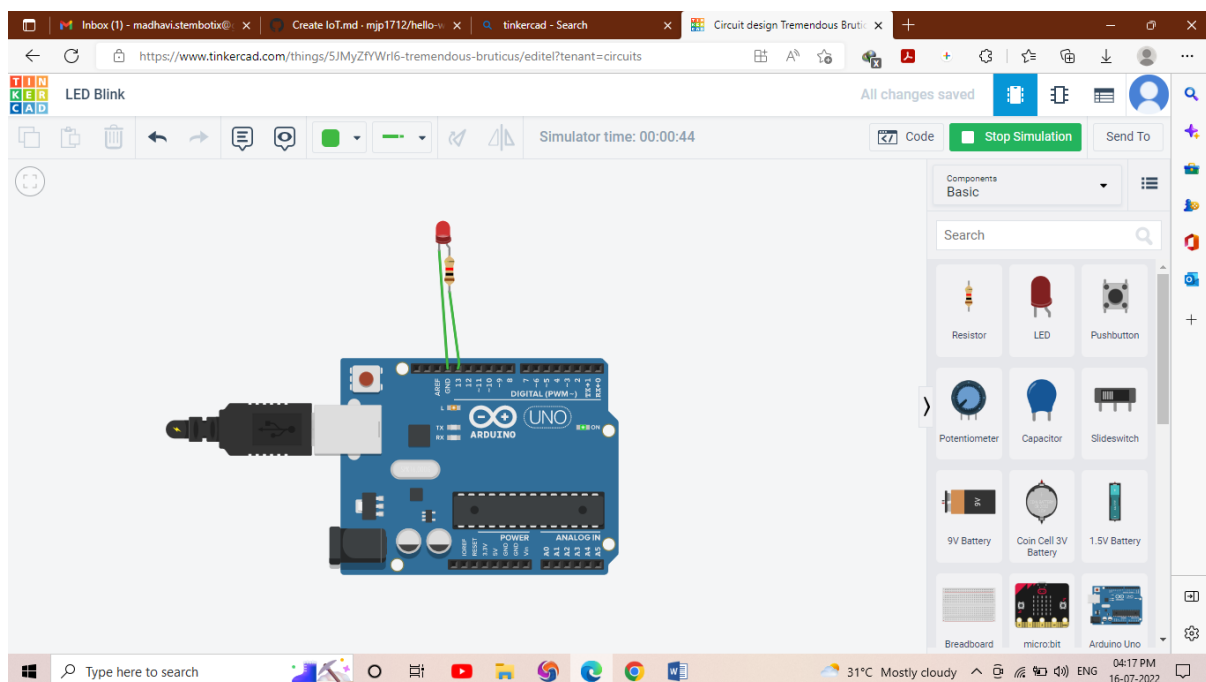
## 1. LED Blink

### Code:

```
void setup()
{
  pinMode(13, OUTPUT);
}

void loop()
{
  digitalWrite(13, HIGH);
  delay(1000); // Wait for 1000 millisecond(s)
  digitalWrite(13, LOW);
  delay(1000); // Wait for 1000 millisecond(s)
}
```

### Circuit Diagram:

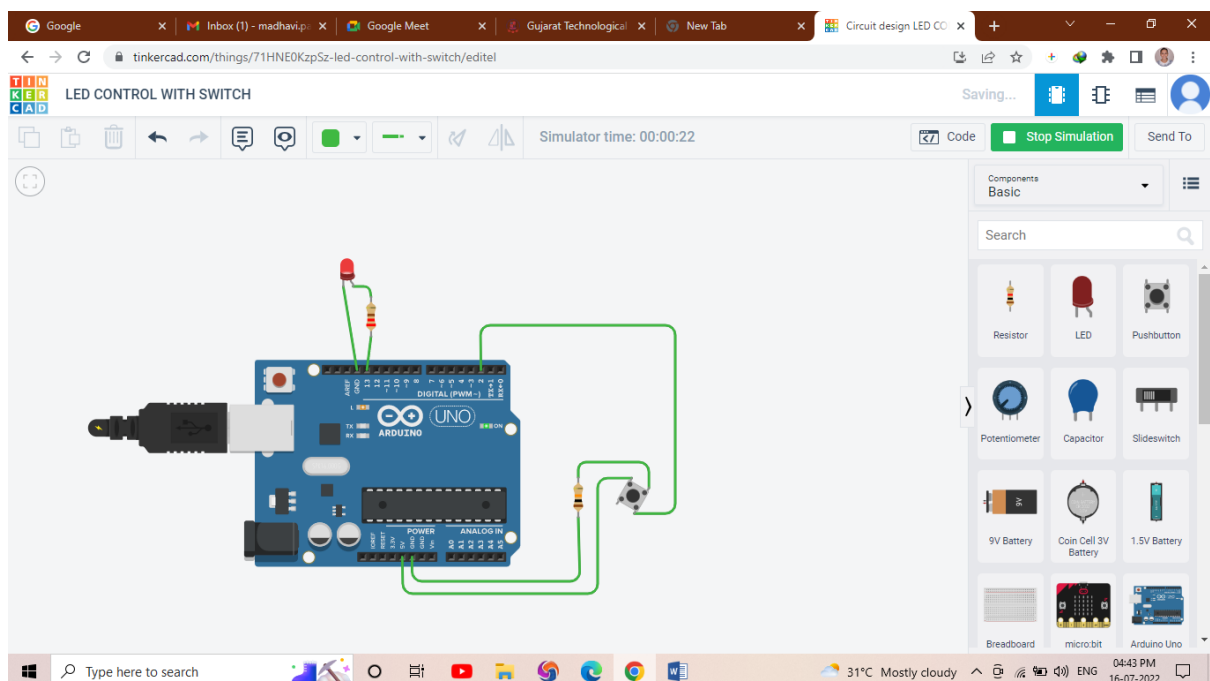


In this circuit, we will blink the LED which is connect to the digital pin 13 of the Arduino.

**2. LED Control with switch****Code:**

```
void setup()
{
  pinMode(13, OUTPUT);
}

void loop()
{
  digitalWrite(13, HIGH);
  delay(1000); // Wait for 1000 millisecond(s)
  digitalWrite(13, LOW);
  delay(1000); // Wait for 1000 millisecond(s)
}
```

**Circuit Diagram**

In this circuit we are going to take input from a digital pin 2 using push button and by using this we will control the LED which is connected as output to the digital pin 13 of the Arduino. The push button has four terminals namely 1a,1b,2a,2b.

Terminal 2a to pin 2 of Arduino

Terminal 2b to one terminal of resistor, while resistor second terminal is connected to GND pin of Arduino

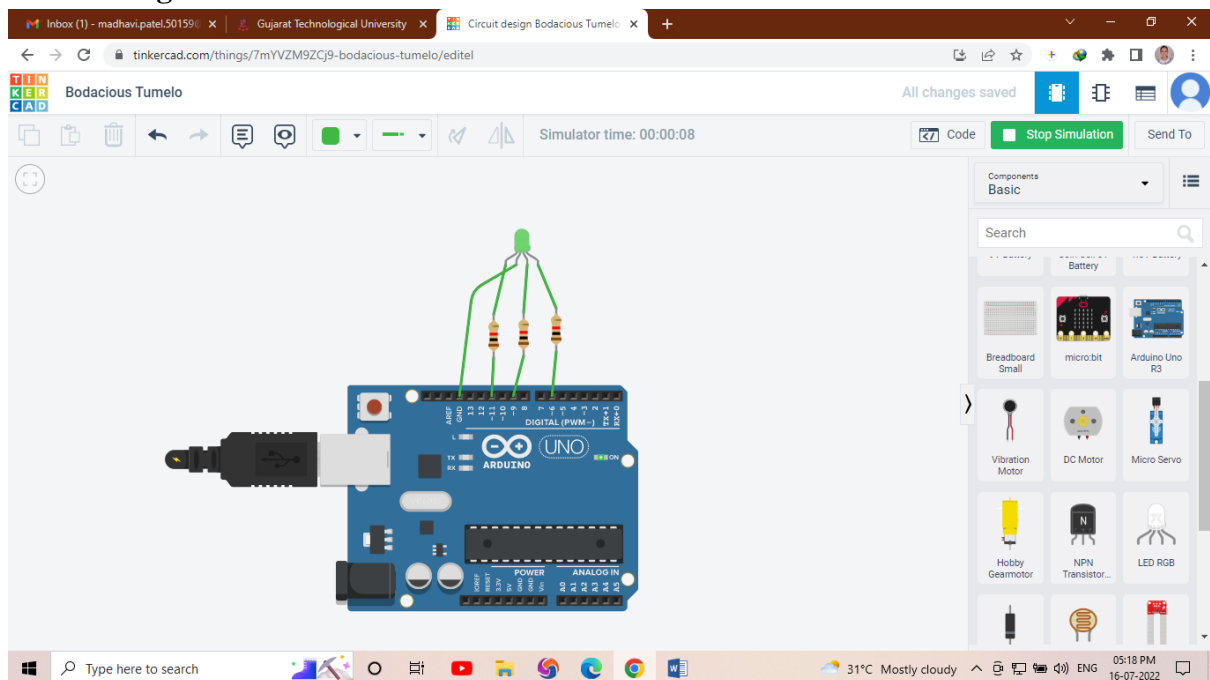
Terminal 1a is not connected

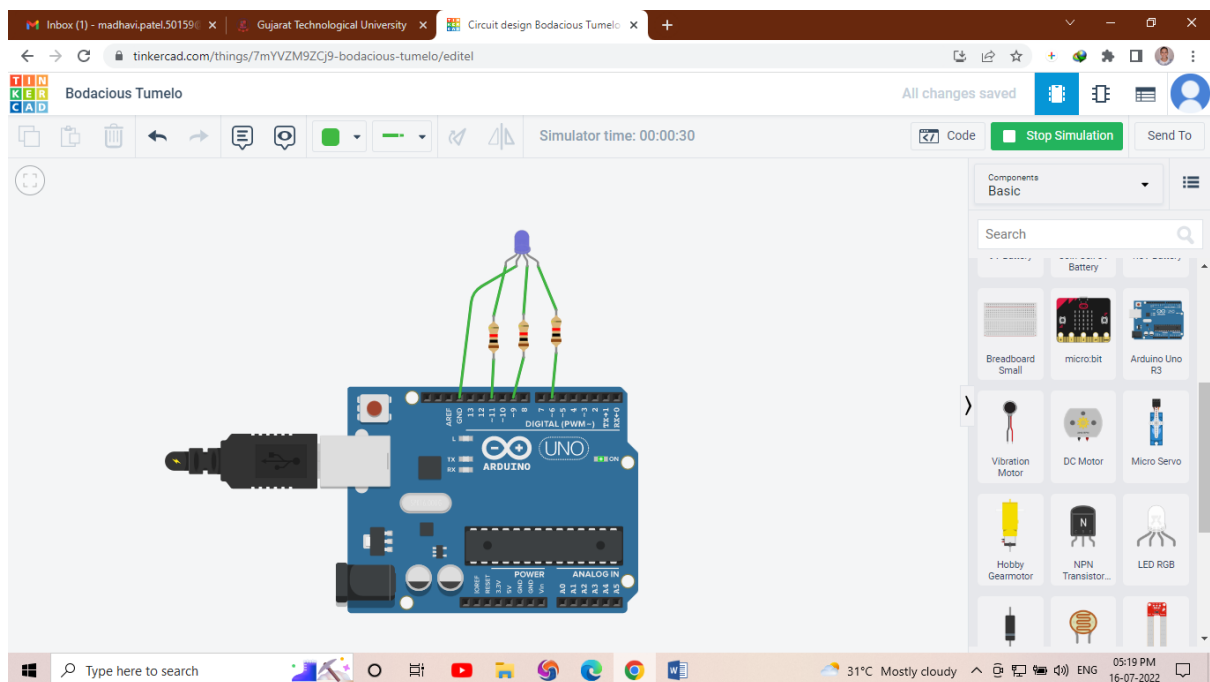
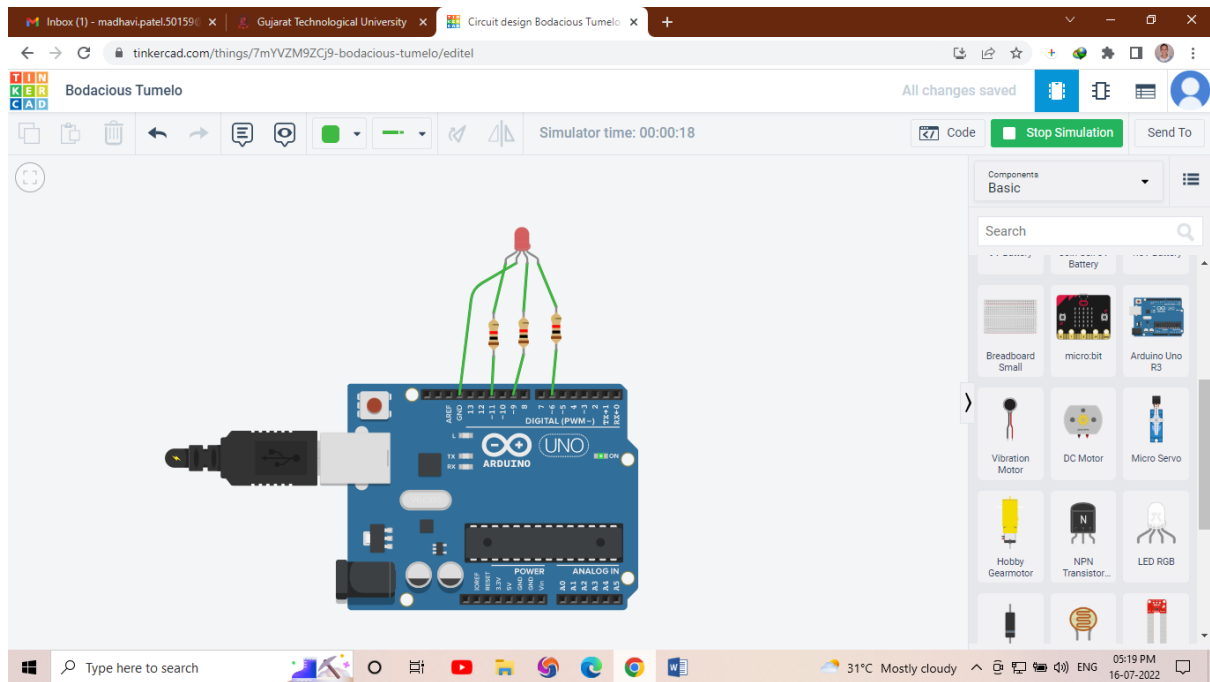
Terminal 1b is connected to 5V of Arduino

**3.RGB LED interfacing****Code:**

```
void setup()
{
  pinMode(11, OUTPUT);
  pinMode (9, OUTPUT);
  pinMode (6, OUTPUT);
}

void loop()
{
  analogWrite (11,255);
  analogWrite(9,0);
  analogWrite(6,0);
  delay(1000);
  analogWrite(11,0);
  analogWrite(9,153);
  analogWrite(6,0);
  delay(1000);
  analogWrite(11,0);
  analogWrite(9,0);
  analogWrite(6,153);
  delay(1000);
}
```

**Circuit diagram:**



The RGB LED has four terminals. Three anodes and one cathode that are Red(+), Cathode (-), Blue(+) and Green(+) and it is a common cathode type LED.

Here its Red ,Cathode, Blue, and Green terminals are connected to pin 11,GND, pin 9 and pin 8 of Arduino respectively.

Here we have a resistor connected between the LED anode(+) pin and Arduino output pins 11,9,6.

#### 4. Temperature sensor interfacing

**Code:**

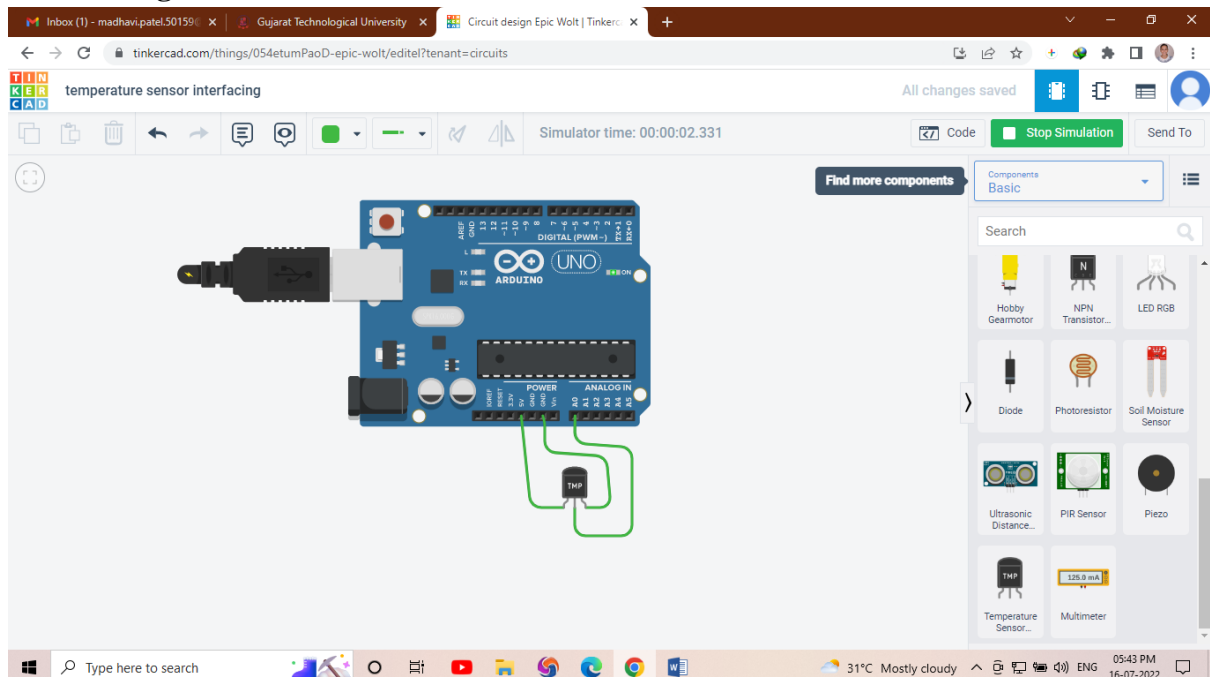
```
int sensePin = A0;
int sensorInput;
double temp;

void setup()

{
  Serial.begin(9600);
}

void loop()
{
  sensorInput=analogRead(A0);
  temp =(double)sensorInput/1024;
  temp=temp*5;
  temp=temp-0.5;
  temp=temp*100;
}
```

#### Circuit diagram

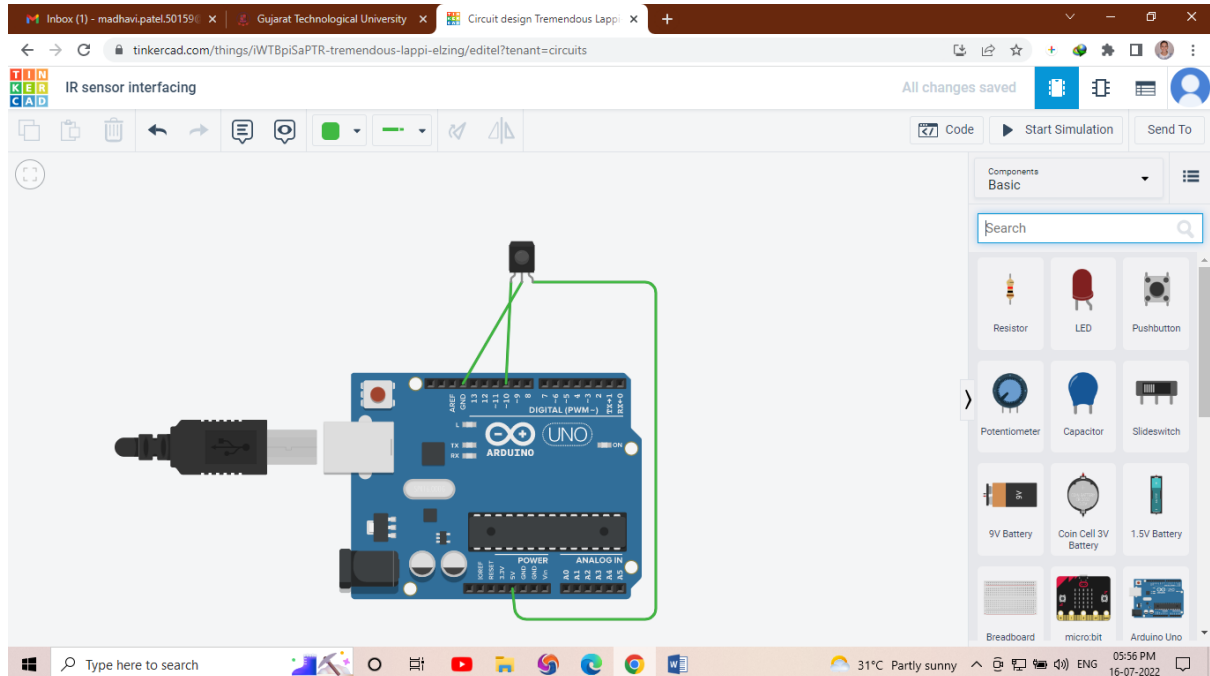


Temperature sensor is an electronic device which is used to detect temperature. In this I have used TMP36 temperature sensor. It is a low voltage precision centigrade temperature sensor.

**5.IR sensor interfacing**

**Code:**

**Circuit digram:**

**6.Ultrasonic sensor interfacing**

**Code:**

```
int centimeter = 0;
```

```
int inches = 0;
```

```
int cm = 0;
```

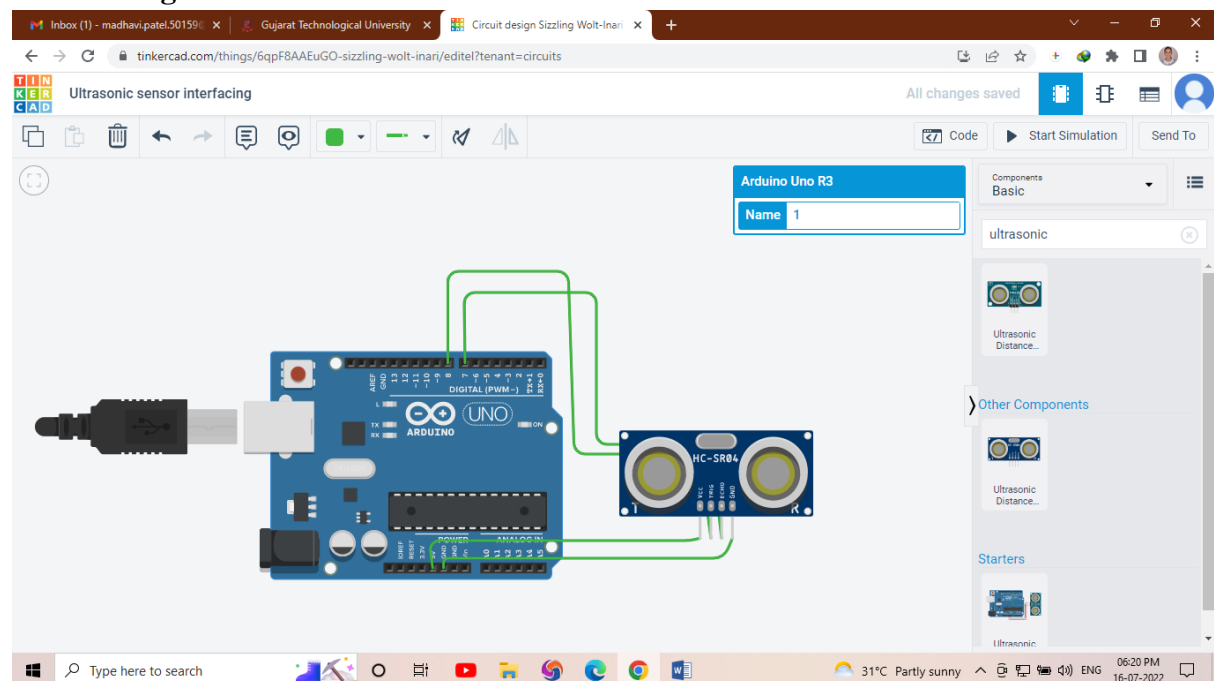
```
long readUltrasonicDistance(int triggerPin, int echoPin)
{
    pinMode(triggerPin, OUTPUT); // Clear the trigger
    digitalWrite(triggerPin, LOW);
    delayMicroseconds(2);
    // Sets the trigger pin to HIGH state for 10 microseconds
    digitalWrite(triggerPin, HIGH);
    delayMicroseconds(10);
    digitalWrite(triggerPin, LOW);
    pinMode(echoPin, INPUT);
    // Reads the echo pin, and returns the sound wave travel time in microseconds
}
```

```
    return pulseIn(echoPin, HIGH);
}

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

    centimeter = 0.01723 * readUltrasonicDistance(8, 7);
    inches = (centimeter / 2.54);
    Serial.print(inches);
    Serial.print("in, |");
    Serial.print(cm);
    Serial.println("cm");
    delay(1000); // Wait for 1000 millisecond(s)
}

void loop()
{
    delay(10); // Delay a little bit to improve simulation performance
}
```

**Circuit diagram:**

An ultrasonic sensor is an electronic component used to find the range of a targeted object by emitting ultrasonic waves (sound waves). It has a high pitch of the sound that human cannot hear and it sends a sound that has a frequency of about 40 KHz. This sensor mainly consists of two parts, a transducer that produces ultrasonic sound waves and another that listens for its echo.

## 7. PIR sensor interfacing

### Code:

```
int sensorState = 0;
```

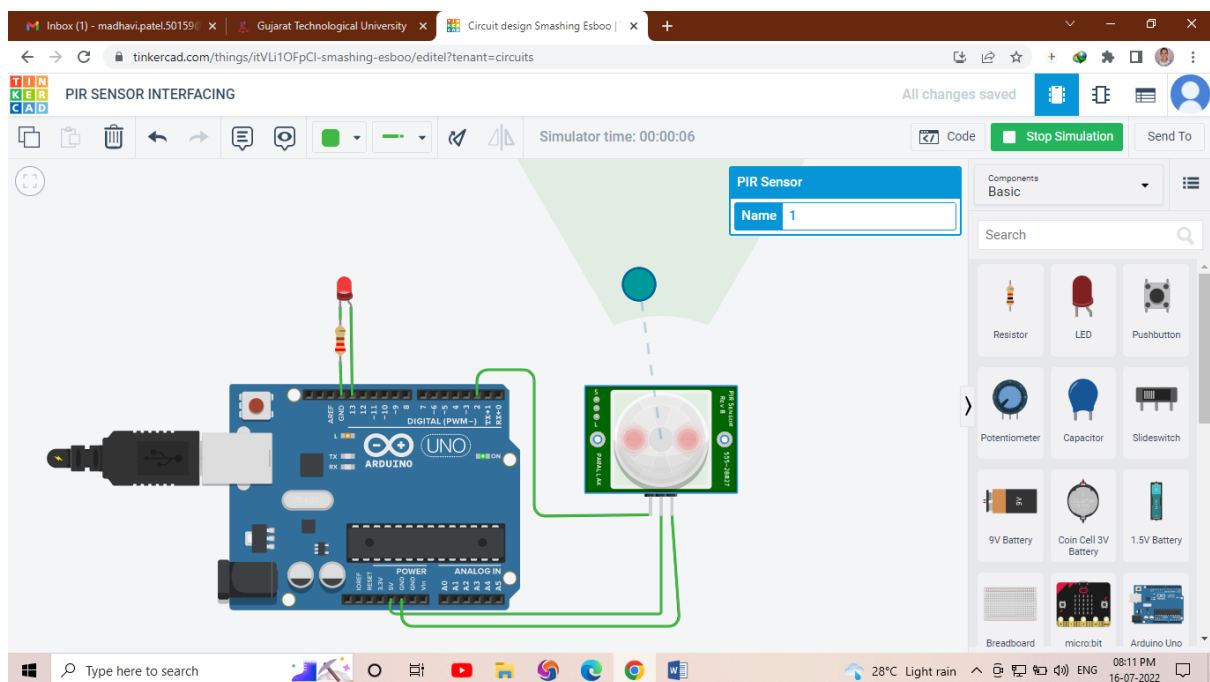
```
void setup()
```

```
{
  pinMode(2, INPUT);
  pinMode(LED_BUILTIN, OUTPUT);
  Serial.begin(9600);
}
```

```
void loop()
```

```
{
  // read the state of the sensor/digital input
  sensorState = digitalRead(2);
  // check if sensor pin is HIGH.if it is,set...
  if (sensorState == HIGH) {
    digitalWrite(LED_BUILTIN, HIGH);
    Serial.println("Sensor activated");
  } else {
    digitalWrite(LED_BUILTIN, LOW);
  }
  delay(10);
}
```

### Circuit diagram:





PIR stands for Passive Infrared, which describes the technology inside it passively detects infrared light levels.

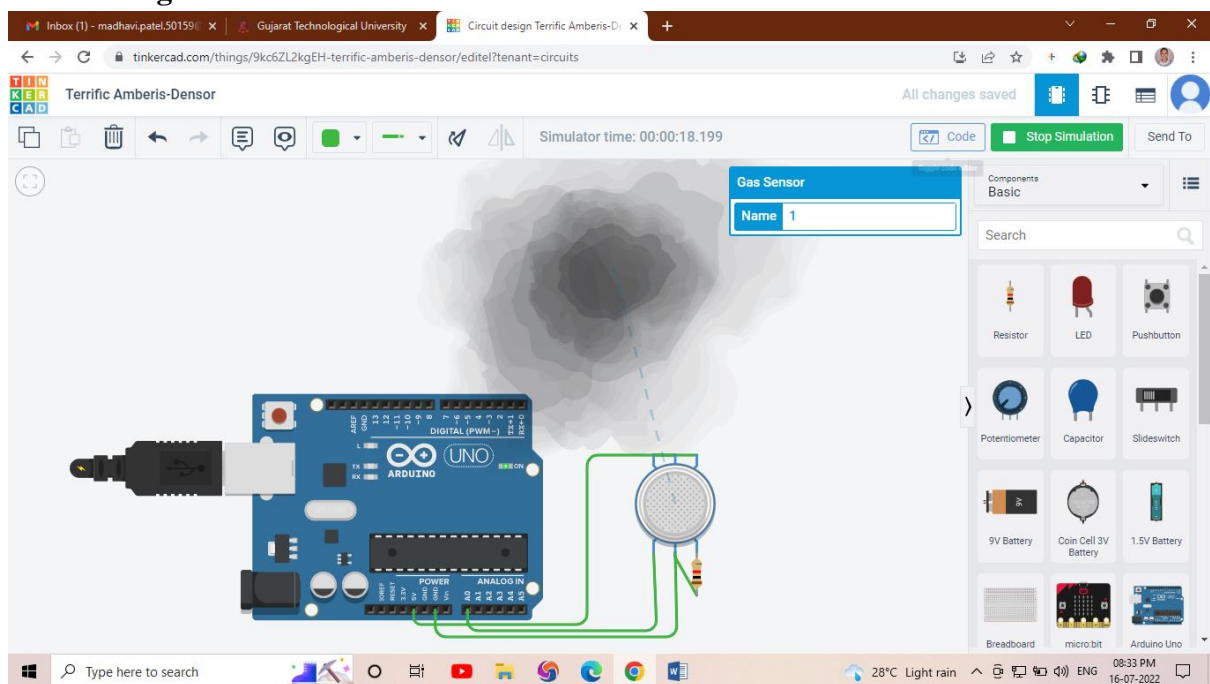
## 8. Gas sensor interfacing

### Code:

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

void loop()
{
  int a=analogRead(A0);
  int b=map(a,0,1023,0,255);
  Serial.println(b);
}
```

### Circuit diagram:



The Gas Sensor is a sensor which detects gas and smoke with concentration between 300ppm and 10000ppm.

It can detect butane, propane, methane, alcohol, hydrogen and smoke. It can be only used Inside, at ambient temperature.

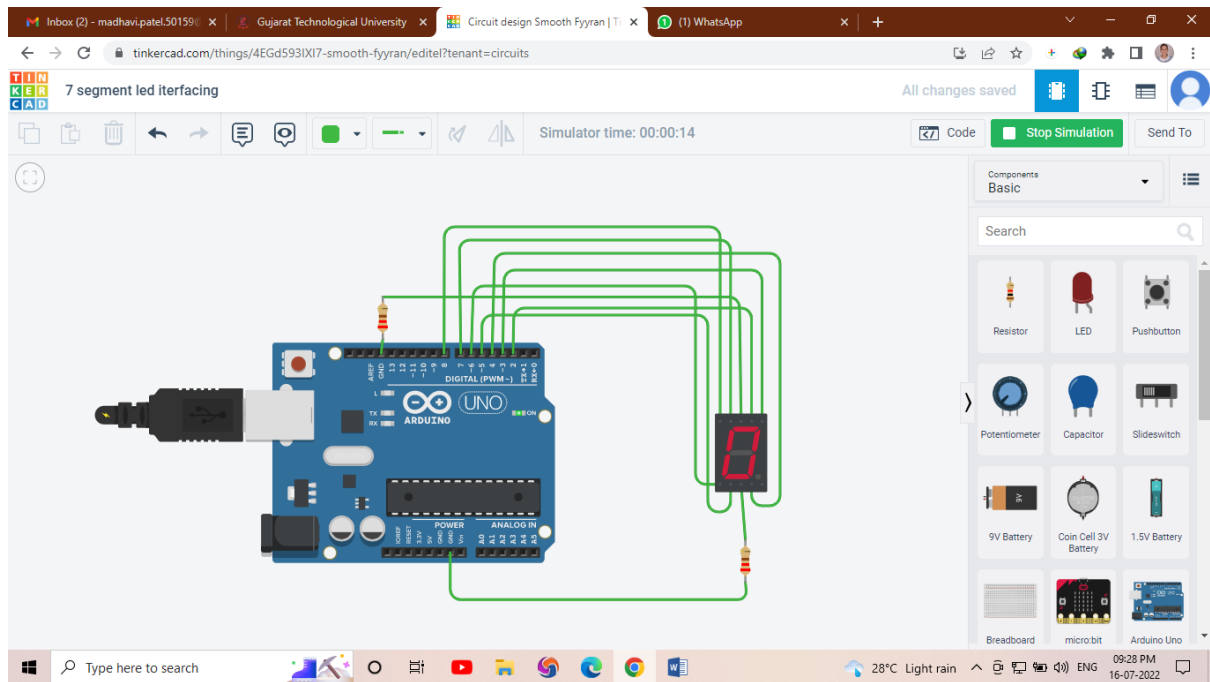
It has 2 pins for the power, 1 pin for the analogic value and 1 pin for the digital value.

**9. 7 segment LED interfacing****Code:**

```
void setup()
{
  pinMode(2, OUTPUT);
  pinMode(3, OUTPUT);
  pinMode(4, OUTPUT);
  pinMode(5, OUTPUT);
  pinMode(6, OUTPUT);
  pinMode(7, OUTPUT);
  pinMode(8, OUTPUT);
}

void loop()
{
  // zero
  digitalWrite(2, HIGH);
  digitalWrite(3, HIGH);
  digitalWrite(4, HIGH);
  digitalWrite(5, HIGH);
  digitalWrite(6, HIGH);
  digitalWrite(7, HIGH);
  digitalWrite(8, LOW);
  delay(1000); // Wait for 1000 millisecond(s)
  // one
  digitalWrite(2, LOW);
  digitalWrite(3, HIGH);
  digitalWrite(4, HIGH);
  digitalWrite(5, LOW);
  digitalWrite(6, LOW);
  digitalWrite(7, LOW);
  digitalWrite(8, LOW);
  delay(1000); // Wait for 1000 millisecond(s)
}
```

**Circuit diagram:**



A seven-segment display is a form of electronic display device for displaying decimal numerals that is an alternative to the more complex dot matrix displays.

Seven-segment displays are widely used in digital clocks, electronic meters, basic calculators, and other electronic devices that display numerical information