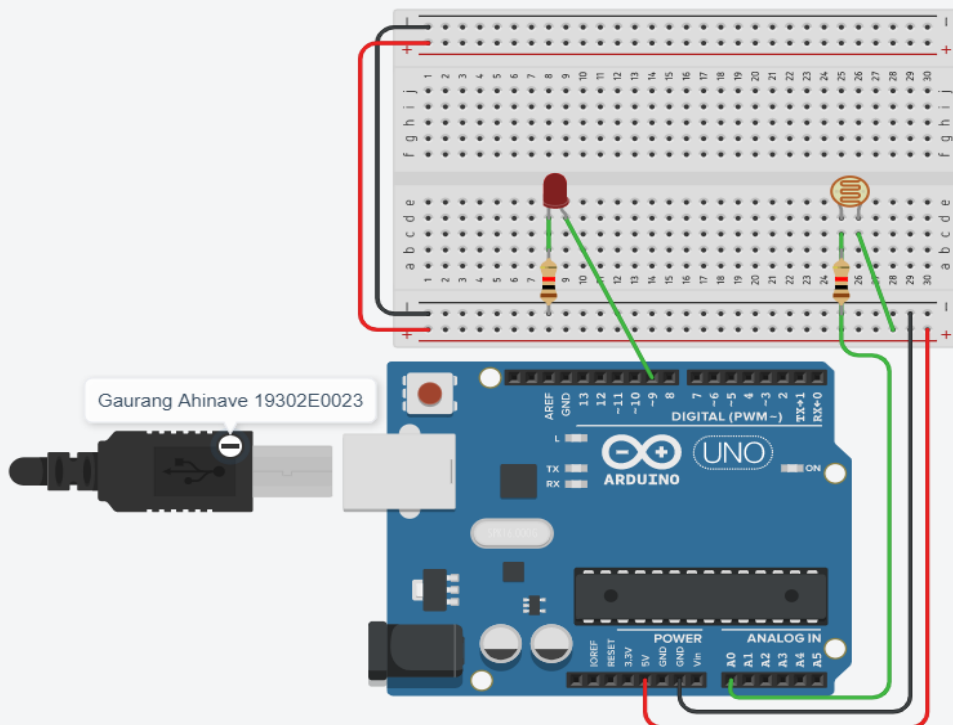
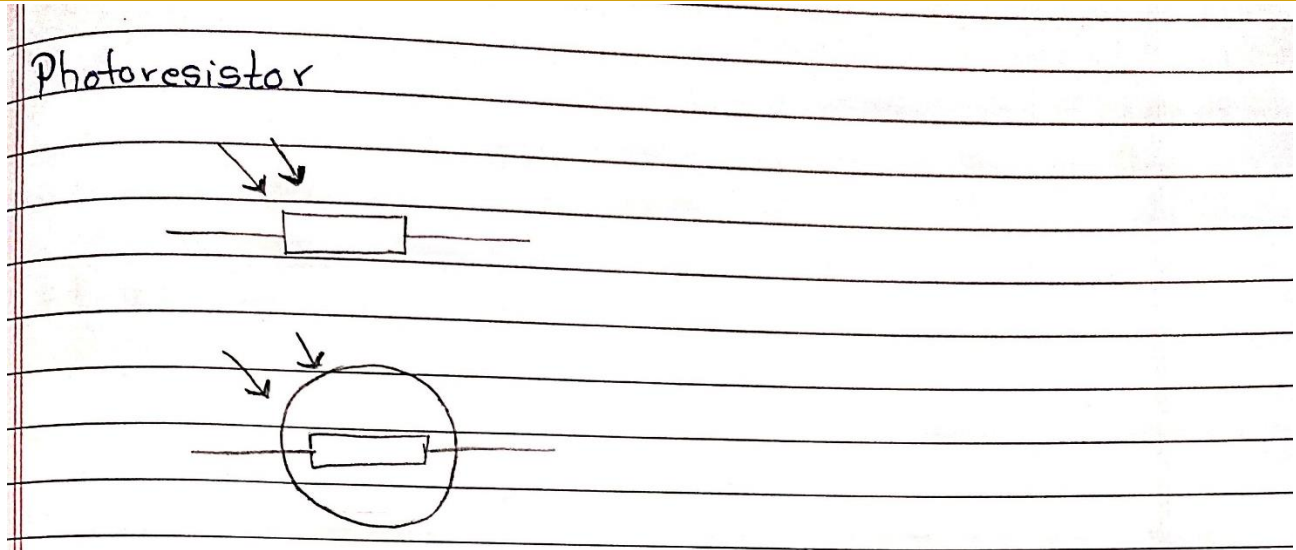


Name	Gaurang Ahinave	Division	C
Class	T.Y.B.Sc.(I.T.)	Roll Number	19302E0023
Practical 1	Sensors used in IoT – LDR / PIR / TMP36		
Objective	To understand the working and connection of Sensors when connected to Arduino		

Circuit Diagram – LDR / Photo Resistor Sensor.






Working of LDR / Photo Resistor Sensor.

Working :

- When light is incident on the photoresistor, photons get absorbed by the semiconductor material. The energy from the photon gets absorbed by the electrons.
- When these electrons acquire sufficient energy to break the bond, they jump into the conduction band.
- Due to this, the resistance of the photoresistor decreases, with the decrease in resistance, conductivity increases.
- In the absence of light, the photoresistor can have resistance value in megaohms ($M\Omega$).
- In the presence of light, its resistance can decrease to a few hundred ohms (Ω).

Program – LDR / Photo Resistor Sensor.

Text ▼



1 (Arduino Uno R

```
1  int sensorValue = 0;
2  void setup()
3  {
4      pinMode(A0, INPUT);
5      Serial.begin(9600);
6      pinMode(9, OUTPUT);
7  }
8  void loop()
9  {
10     sensorValue=analogRead(A0);
11     Serial.println(sensorValue);
12     analogWrite(9, map(sensorValue, 0, 1023, 0, 255));
13     delay(100);
14 }
15
```

```
int sensorValue = 0;
void setup()
{
pinMode(A0,INPUT);
Serial.begin(9600);
pinMode(9,OUTPUT);
}
void loop()
{
sensorValue=analogRead(A0);
Serial.println(sensorValue);
analogWrite(9, map(sensorValue,0,1023,0,255));
delay(100);
}
```

Output – LDR / Photo Resistor Sensor.

Simulator time: 00:00:04.100

Photoresistor
Name 3

Gaurang Ahinave 19302E0023

```
1 int sensorValue;
2 void setup()
3 {
4   pinMode(A0, INPUT);
5   Serial.begin(9600);
6   pinMode(9, OUTPUT);
7 }
8 void loop()
9 {
10  sensorValue = analogRead(A0);
11  Serial.print(sensorValue);
12  analogWrite(9, map(sensorValue, 0, 1023, 0, 255));
13  delay(100);
14 }
15
```

Serial Monitor

6
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6
6
6
6

Photoresistor
Name 3

Gaurang Ahinave 19302E0023

```
1 int sensorValue = 0;
2 void setup()
3 {
4   pinMode(A0, INPUT);
5   Serial.begin(9600);
6   pinMode(9, OUTPUT);
7 }
8 void loop()
9 {
10  sensorValue = analogRead(A0);
11  Serial.println(sensorValue);
12  analogWrite(9, map(sensorValue, 0, 1023, 0, 255));
13  delay(100);
14 }
15
```

Serial Monitor

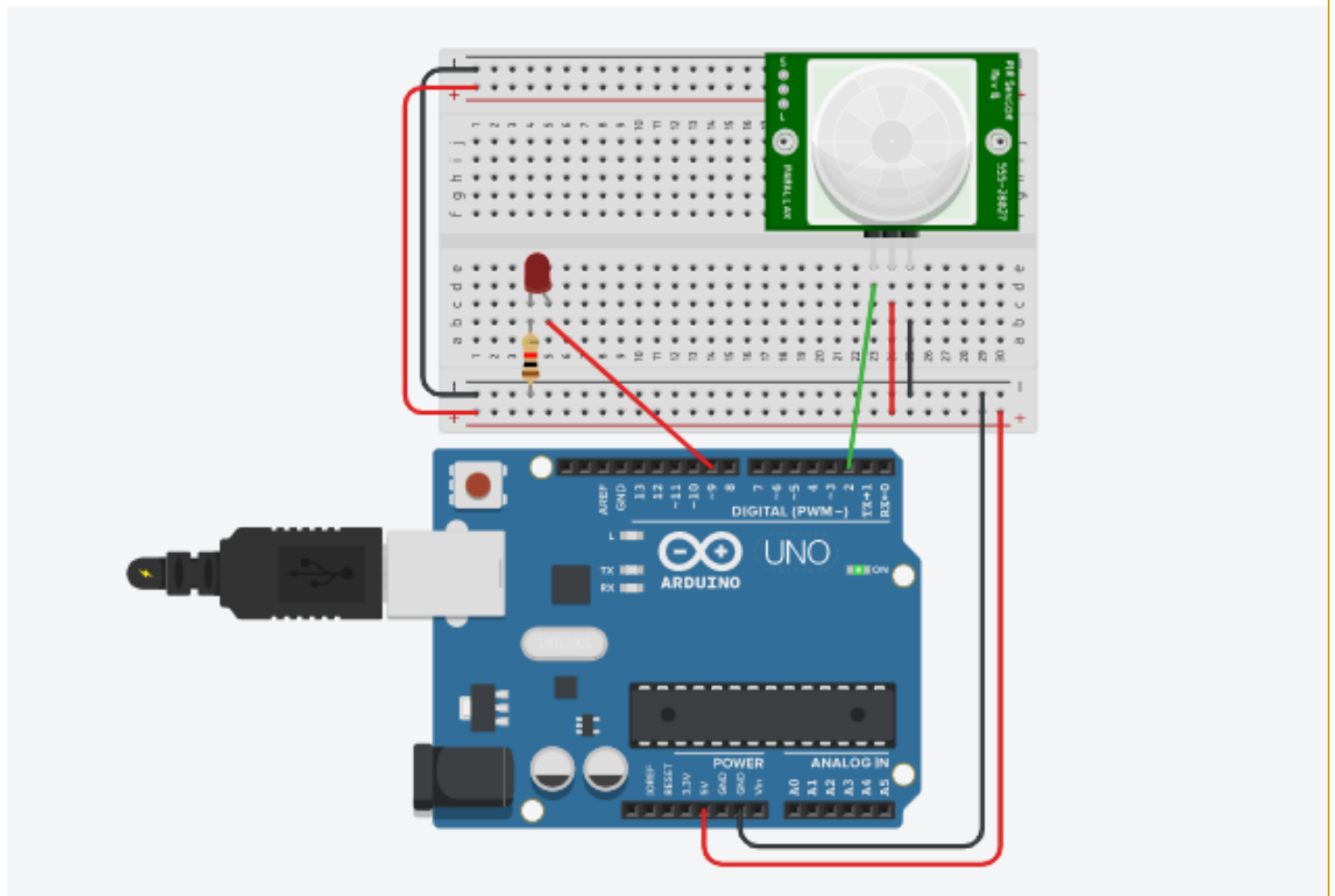
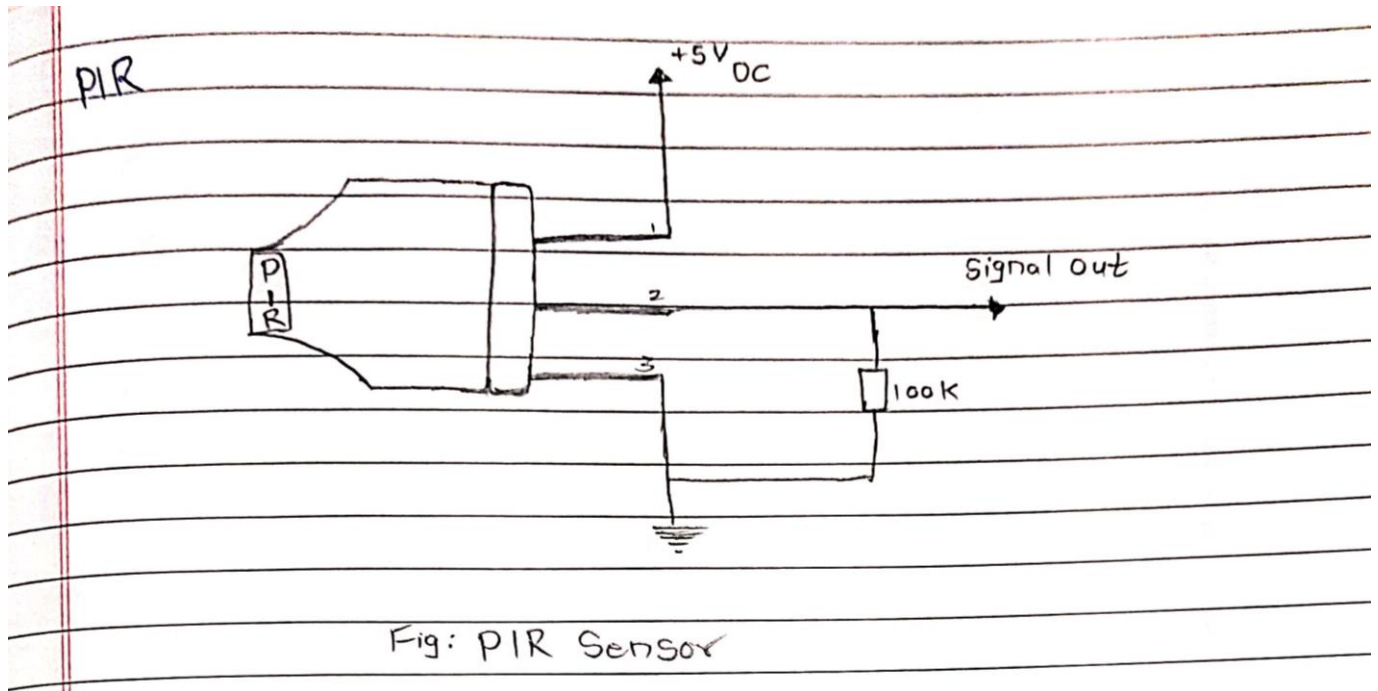
679
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Application of LDR in real life

Applications:

- It can be experienced in daily life, circuit of automatic street light.
- Turning on Street light as it gets dark and turning off again in the morning.
- It can also be used in some of the consumer items like light meter in camera, clock radios etc.
- To Measure the intensity of light.
- It's also used in ~~audi~~ Night light and photography light meter.
- Their latency property is used in audio compressors and outside Sensing.

Circuit Diagram – PIR Sensor.



Working of PIR Sensor.

Working

- The PIR Senses the motion of a human body by the change in surrounding ambient temperature when the human body passes across.
- Then it turns on the lighting load to which is connected
- The lighting load remain on until it senses motion.
- Once the motion is seized it switches off the lighting load.

Program – PIR Sensor.

Text



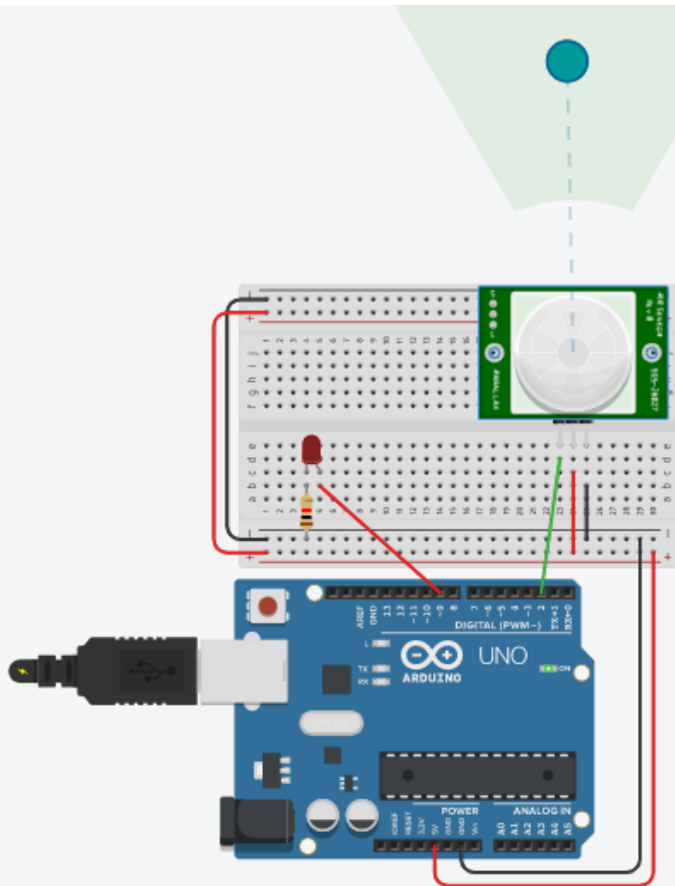
1 (Arduino Uno R3) ▼

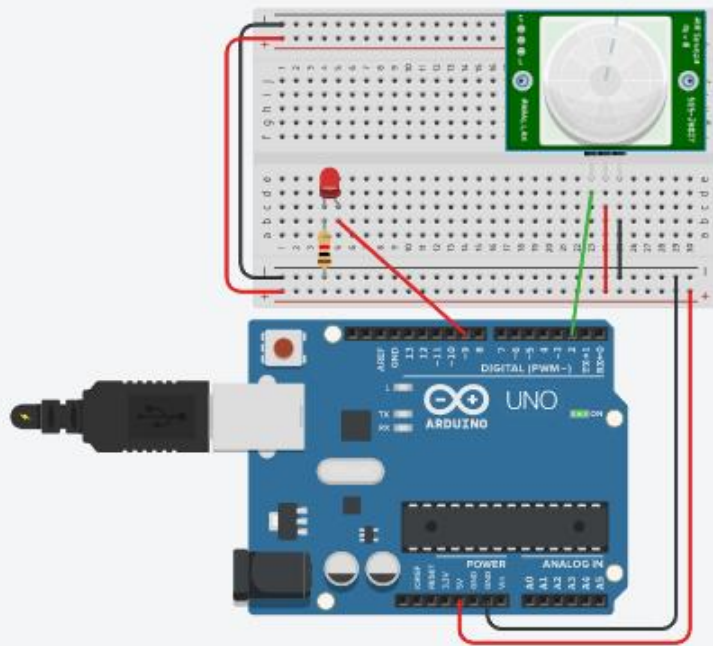
```
1  int buttonState = 0;
2  void setup()
3  {
4      pinMode(2, INPUT);
5      pinMode(9, OUTPUT);
6  }
7  void loop()
8  {
9      buttonState=digitalRead(2);
10     if(buttonState == HIGH)
11     {
12         digitalWrite(9,HIGH);
13         delay(2000);
14     }
15     else
16     {
17         digitalWrite(9,LOW);
18     }
19     delay(10);
20 }
21
```

```
int buttonState = 0;
void setup()
{
    pinMode(2,INPUT);
    pinMode(9,OUTPUT);
}
void loop()
{
    buttonState=digitalRead(2);
    if(buttonState == HIGH)
    {
        digitalWrite(9,HIGH);
        delay(2000);
    }
    else
    {
        digitalWrite(9,LOW);
    }
    delay(10);
}
```


Output – PIR Sensor.

Name 2



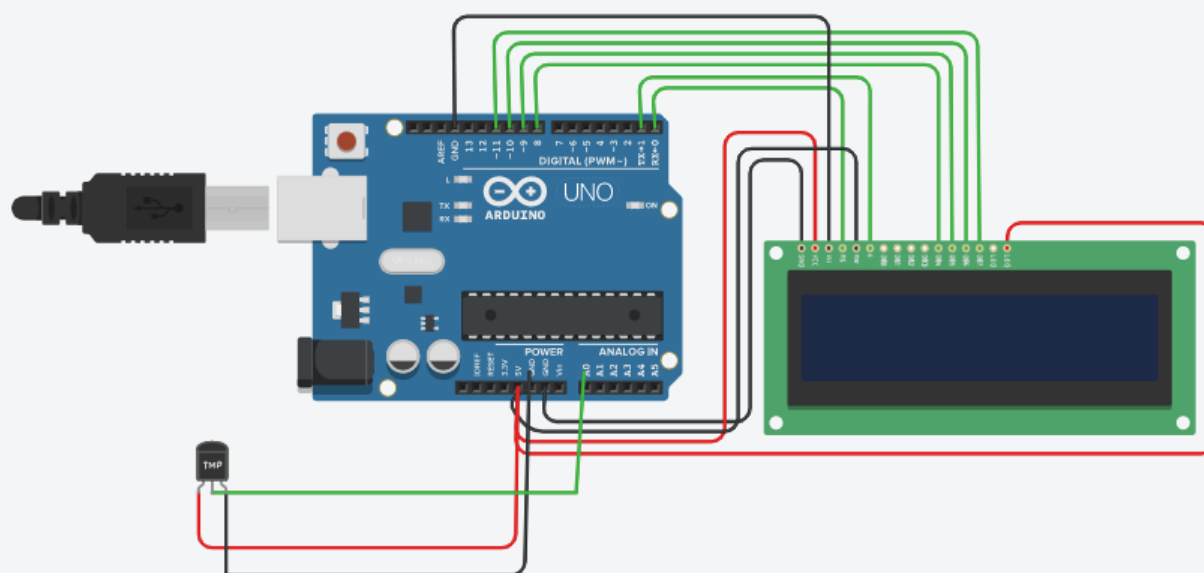
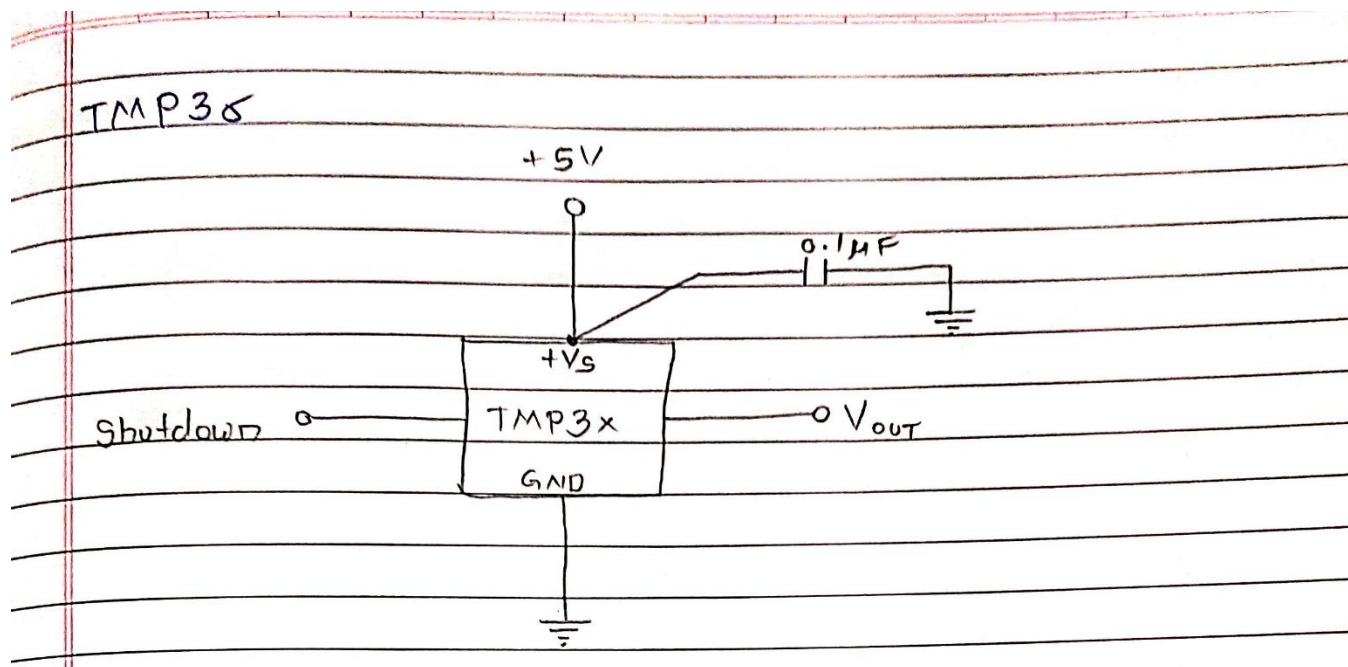


Application of PIR Sensor in real life

Application

- It can be used in home automation e.g.-using this in wash-rooms to automatically turn on and off lights by sensing the motion.
- Automatic Door opening System
- Security Alarm System Based on PIR Sensor.
- Object detection System in cars.
- For Common escalator.

Circuit Diagram – TMP36 Temperature Sensor.



Working of TMP36 Temperature Sensor.

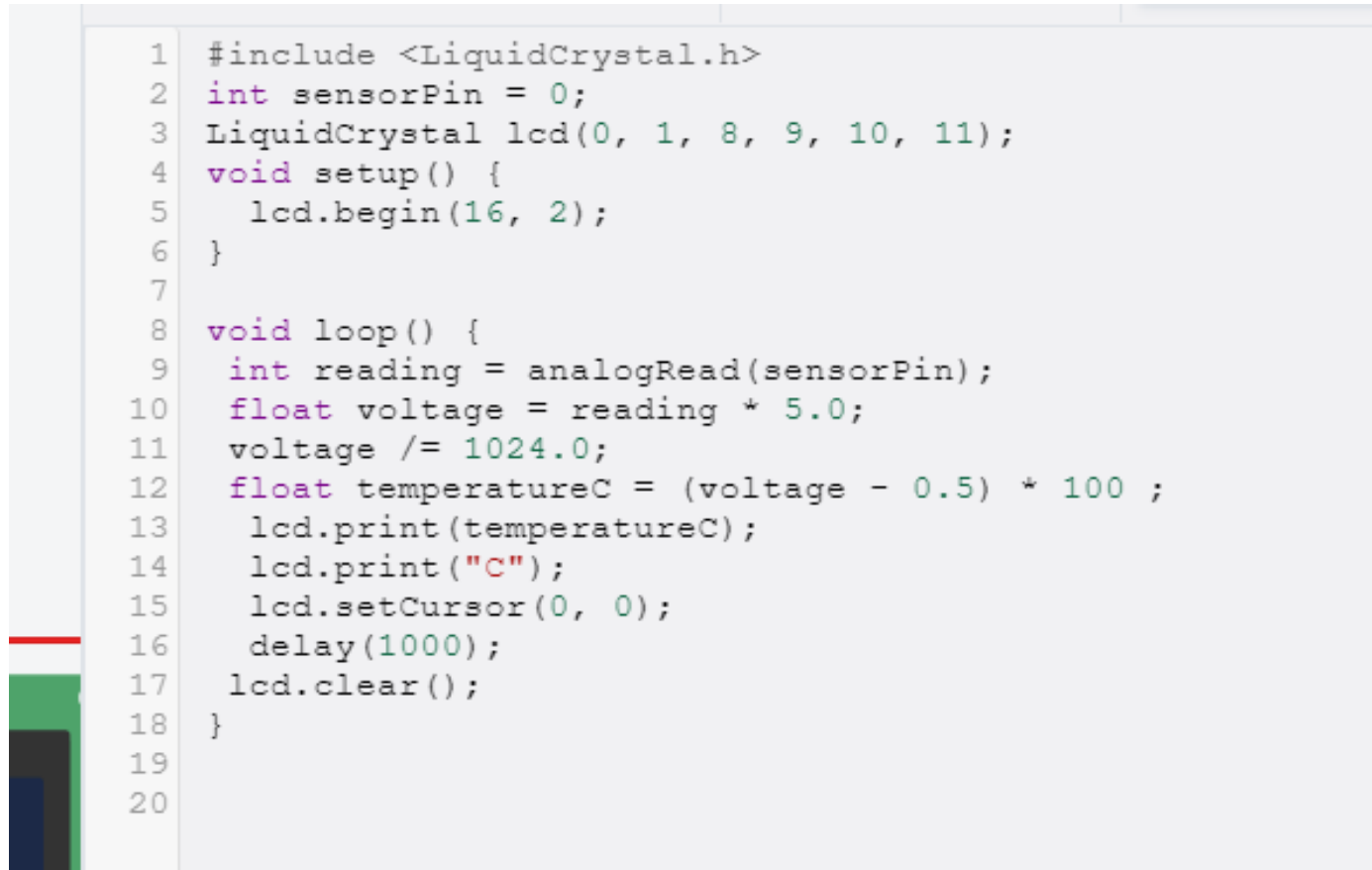
Working :

- These sensors use a solid-state technique to determine the temperature.
- All that complex calculations is done inside the chip - It just spit out the temperature, ready for us to use.
- They are precise, never wear out, don't need calibration.

Program – TMP36 Temperature Sensor.

```
#include <LiquidCrystal.h>
int sensorPin = 0;
LiquidCrystal lcd(0, 1, 8, 9, 10, 11);
void setup() {
  lcd.begin(16, 2);
}

void loop() {
  int reading = analogRead(sensorPin);
  float voltage = reading * 5.0;
  voltage /= 1024.0;
  float temperatureC = (voltage - 0.5) * 100 ;
  lcd.print(temperatureC);
  lcd.print("C");
  lcd.setCursor(0, 0);
  delay(1000);
  lcd.clear();
}
```



```
1  #include <LiquidCrystal.h>
2  int sensorPin = 0;
3  LiquidCrystal lcd(0, 1, 8, 9, 10, 11);
4  void setup() {
5      lcd.begin(16, 2);
6  }
7
8  void loop() {
9      int reading = analogRead(sensorPin);
10     float voltage = reading * 5.0;
11     voltage /= 1024.0;
12     float temperatureC = (voltage - 0.5) * 100 ;
13     lcd.print(temperatureC);
14     lcd.print("C");
15     lcd.setCursor(0, 0);
16     delay(1000);
17     lcd.clear();
18 }
19
20
```

Output – TMP36 Temperature Sensor.

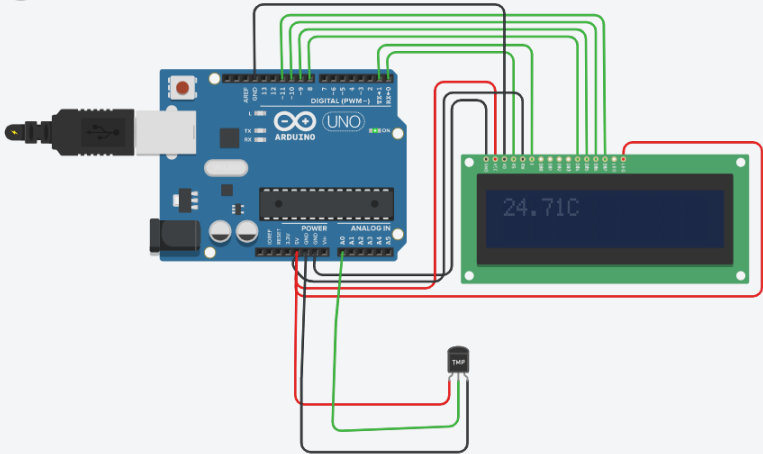
TIN KERCAD TMP36

All changes saved

Simulator time: 00:00:11

Code Stop Simulation Export Share

1 (Arduino Uno R3)



```
1 #include <LiquidCrystal.h>
2 int sensorPin = 0;
3 LiquidCrystal lcd(0, 1, 8, 9, 10, 11);
4 void setup() {
5   lcd.begin(16, 2);
6 }
7
8 void loop() {
9   int reading = analogRead(sensorPin);
10  float voltage = reading * 5.0;
11  voltage /= 1024.0;
12  float temperatureC = (voltage - 0.5) * 100 ;
13  lcd.print(temperatureC);
14  lcd.print("C");
15  lcd.setCursor(0, 0);
16  delay(1000);
17  lcd.clear();
18 }
19
20
```

Serial Monitor

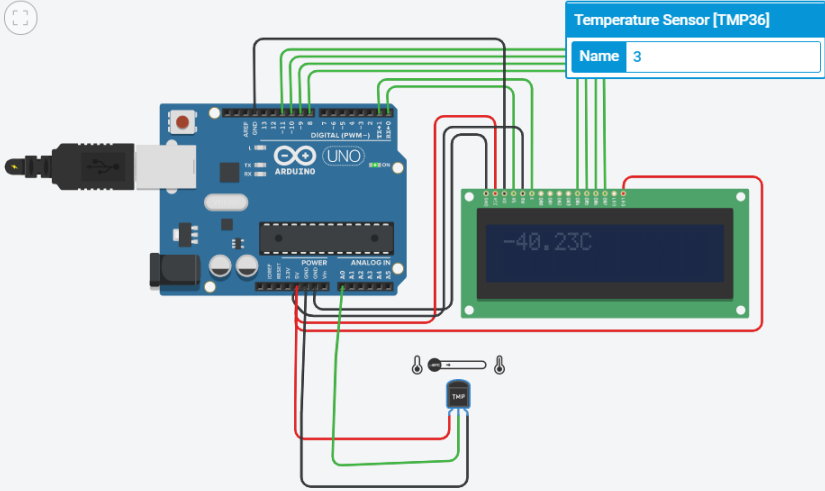
TIN KERCAD TMP36

All changes saved

Simulator time: 00:00:26

Code Stop Simulation Export Share

1 (Arduino Uno R3)

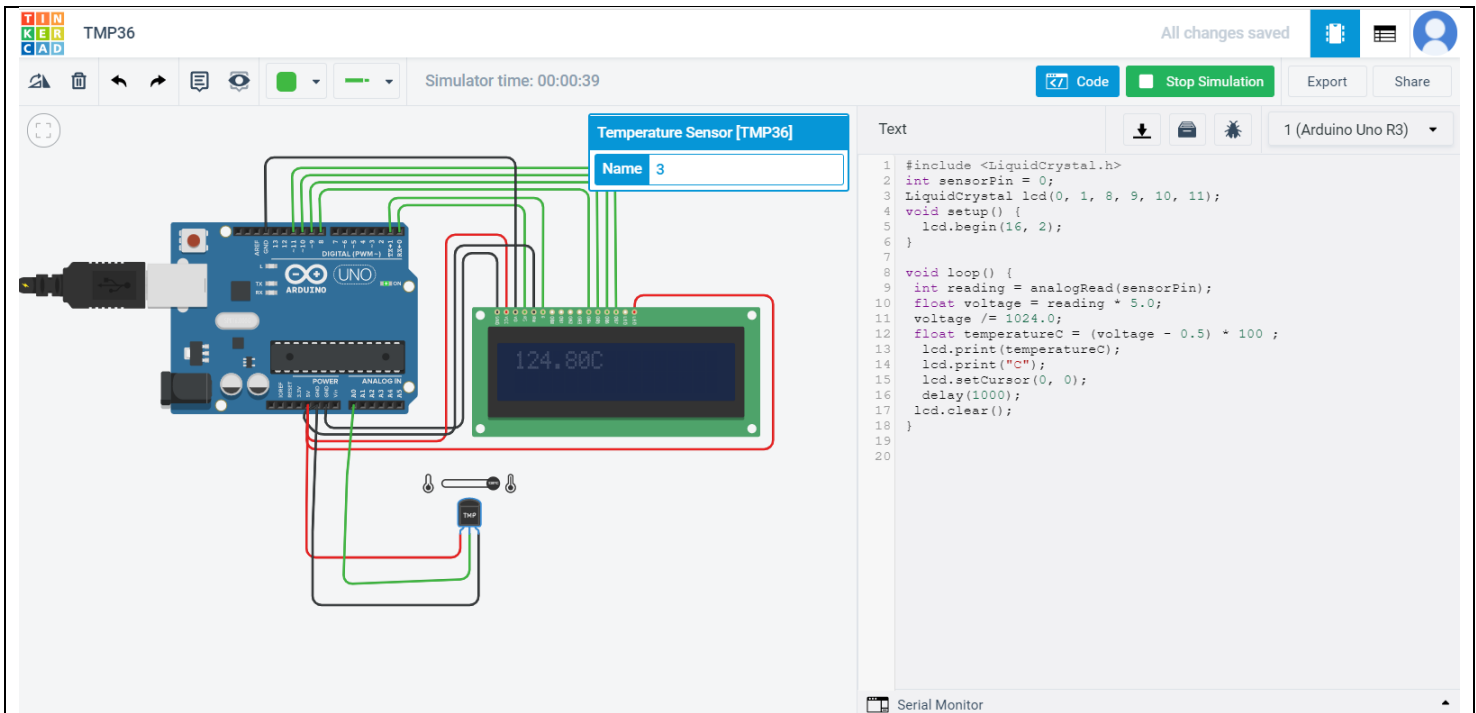


Temperature Sensor [TMP36]

Name 3

```
1 #include <LiquidCrystal.h>
2 int sensorPin = 0;
3 LiquidCrystal lcd(0, 1, 8, 9, 10, 11);
4 void setup() {
5   lcd.begin(16, 2);
6 }
7
8 void loop() {
9   int reading = analogRead(sensorPin);
10  float voltage = reading * 5.0;
11  voltage /= 1024.0;
12  float temperatureC = (voltage - 0.5) * 100 ;
13  lcd.print(temperatureC);
14  lcd.print("C");
15  lcd.setCursor(0, 0);
16  delay(1000);
17  lcd.clear();
18 }
19
20
```

Serial Monitor



Application of TMP36 Temperature Sensor in real life

[Handwritten]

Application:

- Thermal protection
- Industrial process control.
- Fire alarm
- CPU Thermal management