

**Lab Exercise 3****IT4030 - Internet of Things (IoT)****2024****Lab 3: Using a Light Dependent Resistor (LDR) with an Arduino****Objectives:**

- Studying about the Ohm's Law, resistors, and voltage divider rule
- Creating a circuit in Tinkercad to get the readings from the Light Dependent Resistor (LDR) using the Arduino

**Background:**

**Ohm's law** states that the voltage across a conductor is directly proportional to the current flowing through it, provided all physical conditions and temperature remain constant. The mathematical equation that describes this relationship is as follows.

$$V = I R$$

V = Voltage (V)

I = Current (A)

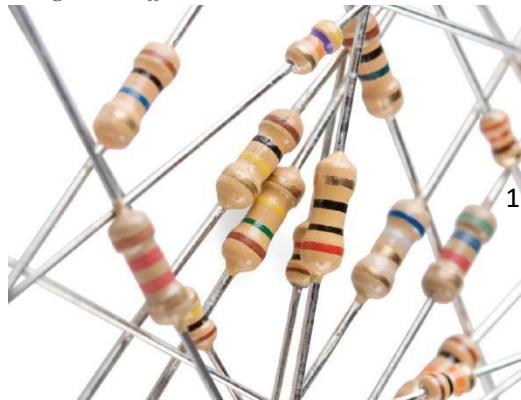
R = Resistance ( $\Omega$ )

A **resistor** is a passive two-terminal electrical component that limits the current that flows through a circuit. The symbol of a resistor and resistors with different resistance values are shown in Figure 1 and Figure 2 respectively.

Figure 1: Symbol of a resistor



Figure 2: Different resistors



The **resistor color code chart** in Figure 3 shows how to determine the resistance and tolerance of the resistors. This can also be used to specify the color of the bands when the values are known.

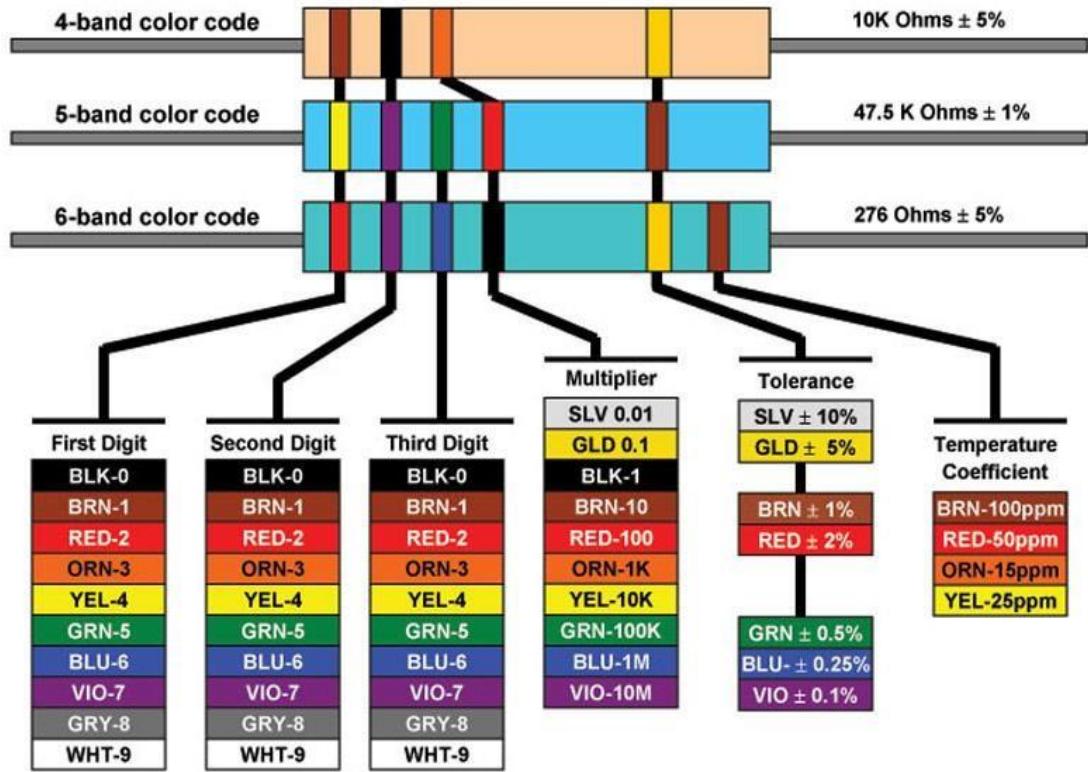


Figure 3: The resistor color code chart

In electronics, the **voltage divider circuit** (potential divider) which is depicted in Figure 4, is a passive linear circuit that produces an output voltage ( $V_{out}$ ) as a fraction of its input voltage ( $V_{in}$ ).

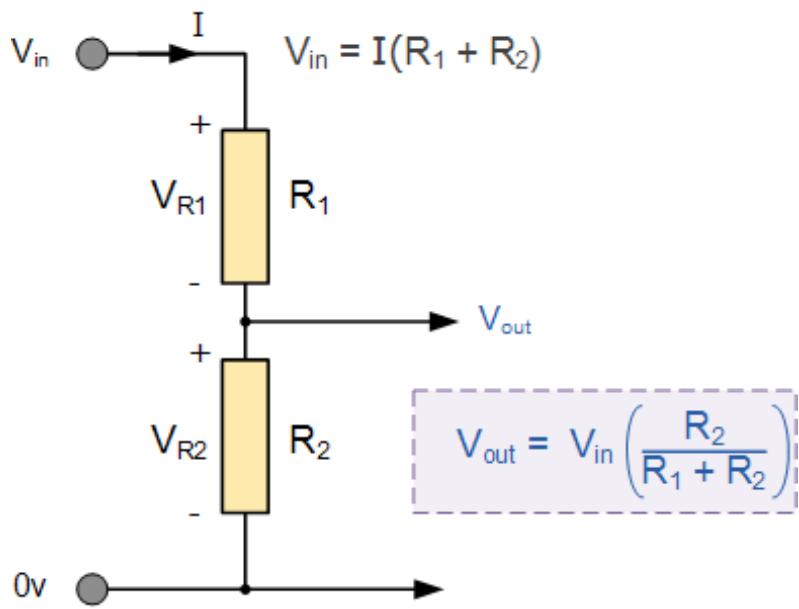


Figure 4: Voltage divider circuit

A **Light Dependent Resistor** (LDR) which is also known as a photoresistor is a passive component that decreases its resistance with respect to the luminosity (light) that falls onto the component's sensitive surface. An LDR is shown in Figure 5.

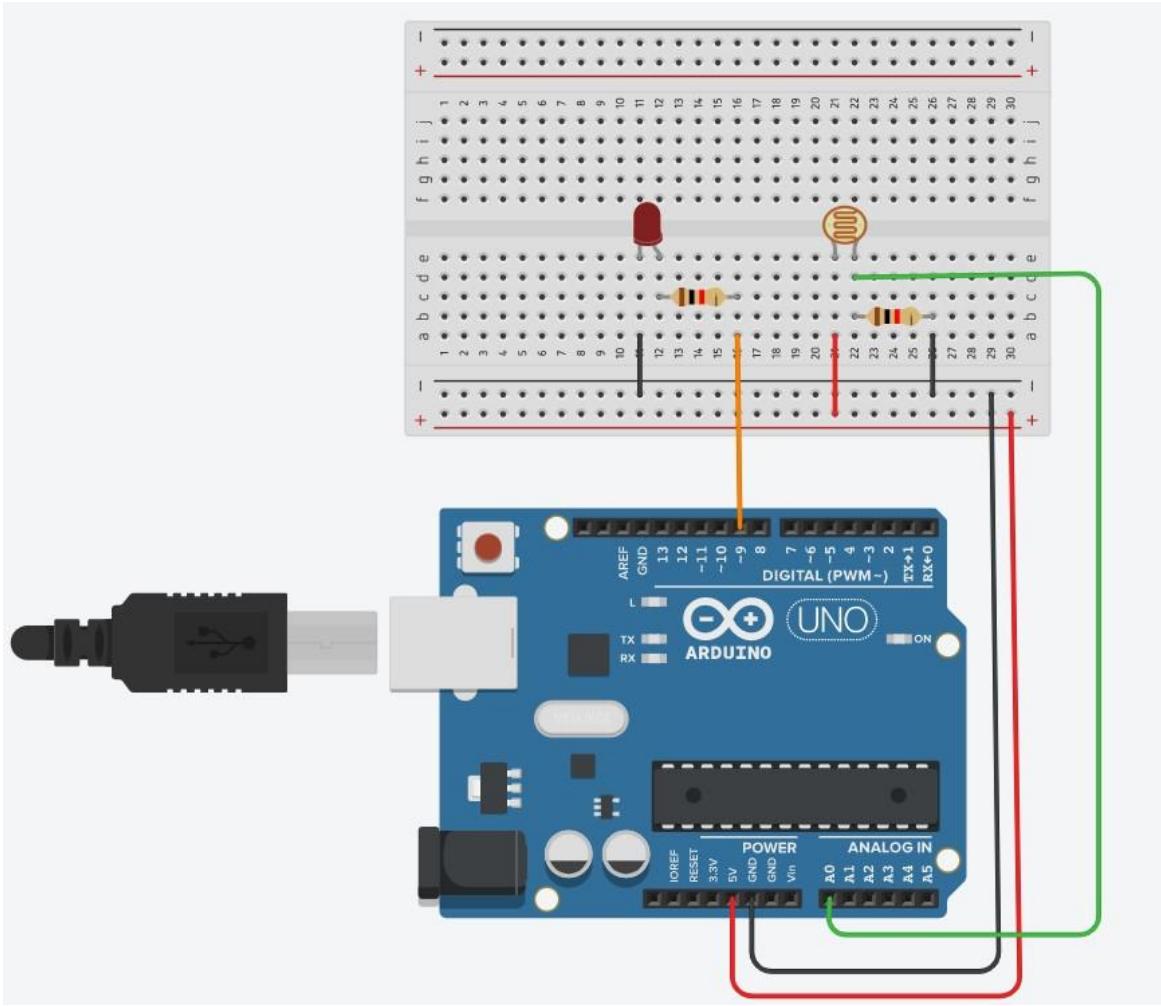


Figure 5: An LDR

## Procedure:

1. Using Tinkercad, create the following circuit to get the readings from an LDR using the Arduino.

## Circuit



## Code

```
int value = 0;  
  
void setup()  
{  
    pinMode(A0, INPUT);  
    pinMode(9, OUTPUT);  
    Serial.begin(9600);  
}  
  
void loop()  
{  
    value = analogRead(A0);  
    analogWrite(9, value);  
    Serial.print("Value: ");  
    Serial.println(value);  
}
```

```
void loop()
{
    // read the value from the LDR
    value = analogRead(A0);
    // print the LDR reading
    Serial.println(value);
    // map the reading to a range for the LED
    analogWrite(9, map(value, 0, 1023, 0, 255));
    delay(100); // Wait for 100 millisecond(s)
}
```

[Video](#)



Screen Recording  
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