

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 (**Ω**)

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.

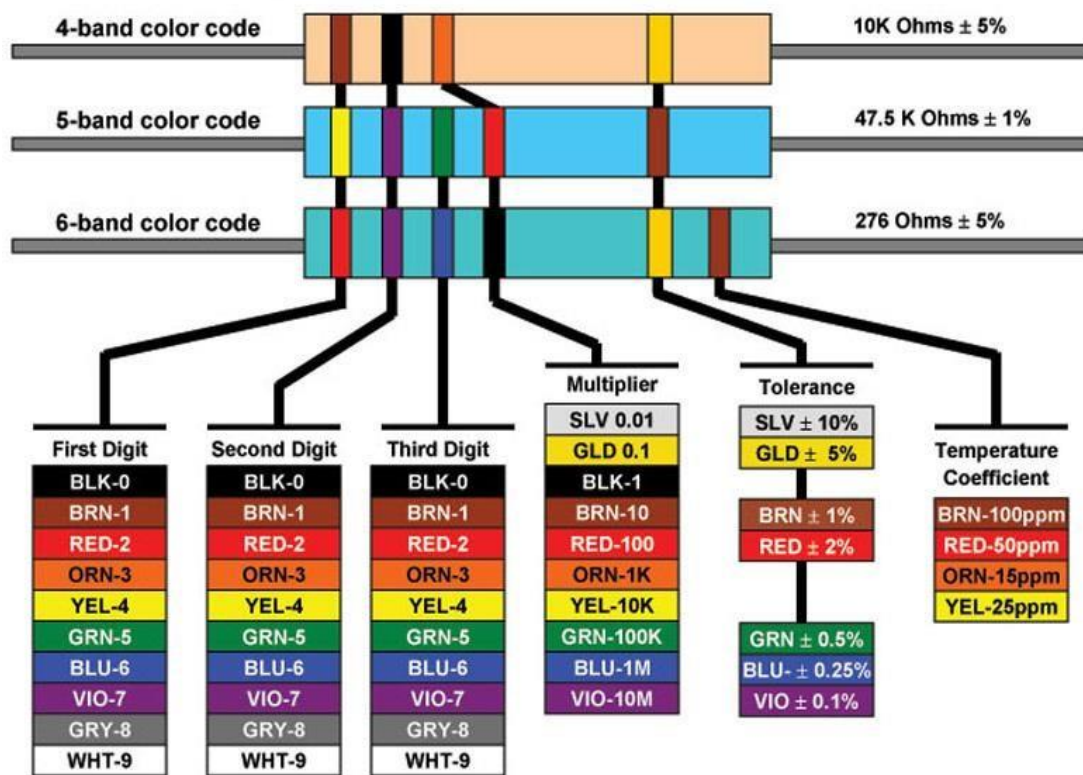


Figure 3: The resistor color code chart

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}).

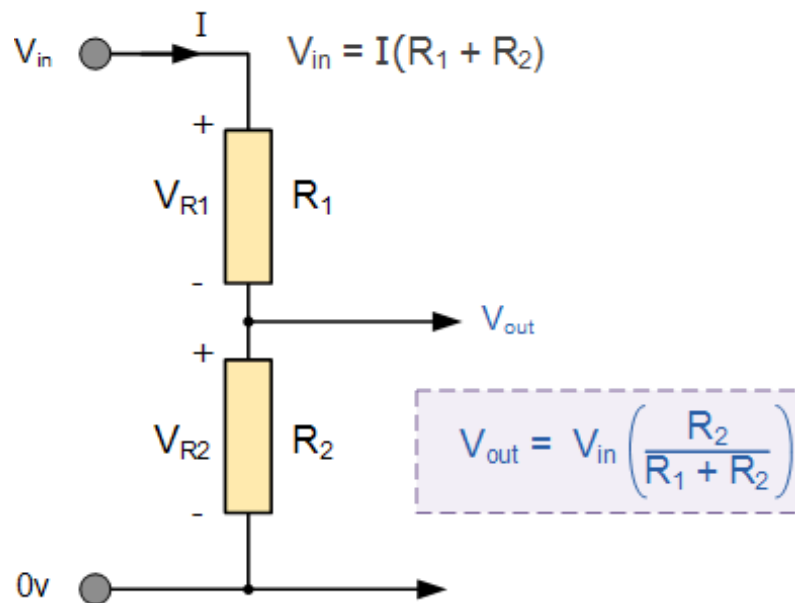


Figure 4: Voltage divider circuit

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.

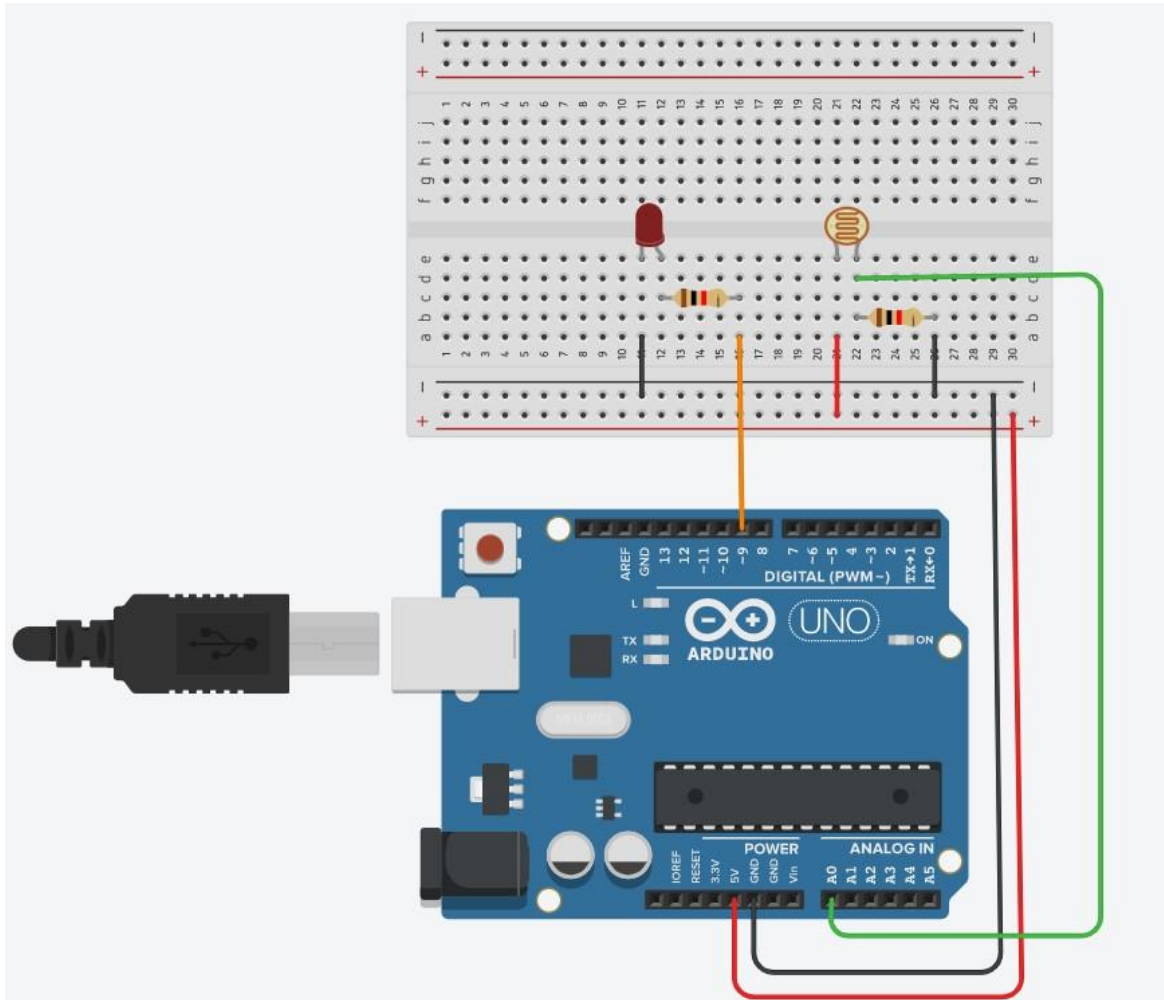


Figure 5: An LDR

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()
{
  // 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
(07-09-2024 12-41-04)