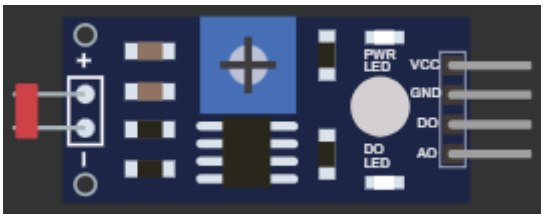
Tutorial 3: Photoresistor

In this tutorial, we will learn how to use a photoresistor module with an Arduino board. A photoresistor (also known as a light-dependent resistor or LDR) is a component that changes its resistance based on the amount of light falling on it. When connected to an Arduino, we can use it to detect light levels and create projects like automatic night lights, light-sensitive alarms, and more.

Hardware:

1. **Arduino Board Uno**
2. **Breadboard**
3. **Photoresistor**



Photoresistor module

From the name we can understand that it is also a type of resistor whose resistance values change as the light intensity is changed in its surroundings. However, when the light intensity increases the current starts to flow which causes the resistance to decrease and, in this way, the photoresistor works.

Step 1: Connect the Photoresistor to the Arduino

1. Connect the VCC leg of the photoresistor module to the 5V pin on the Arduino.
2. Connect the GND leg of the photoresistor module to the GND pin on the Arduino.
3. Connect the Analog Output leg (AO) to an analog pin on the Arduino. In this tutorial, we will use A0.

Step 2: Write the Arduino code:

1. We start by declaring a constant integer variable photoresistorPin and assigning it the value A0. This tells the Arduino that we are using the analog input pin A0 to read data from the photoresistor.

```
1   // Photoresistor Module with Arduino
2   const int photoresistorPin = A0; // Define the photoresistor pin
3   int sensorValue; // Variable to store the sensor reading
```

2. Inside the setup() function, we initialize the serial communication with a baud rate of 9600. This baud rate should match the baud rate set in the Serial Monitor. Next, we will set the photoresistorPin as an INPUT using the 'pinMode( )' command.

```
void setup() {
  Serial.begin(9600); // Initialize serial communication at 9600 baud rate
  pinMode(PhotoresistorPin, INPUT);
}
```

3. In void loop( ), we use the analogRead() function to read the analog value from the photoresistor connected to the A0 pin. The analogRead() function returns a value between 0 and 1023, representing the voltage at the pin.

```
void loop() {
  // Read the analog value from the photoresistor
  sensorValue = analogRead(photoresistorPin);
```

4. Finally, we print out the value of the reading using Serial.println( ) command. The items in quotation marks will be displayed as is while no quotation marks will be displayed as the value that it contains.

```
  Serial.print("Sensor Value: ");
  Serial.print(sensorValue);
  delay(1000); // Add a delay to avoid rapid serial prints and make the output readable
}
```

5. A delay of 1 second (or 1000 millisecond) is added to slow down the code slightly.

Step 3: Upload the Code

1. Connect your Arduino board to your computer using a USB cable, select the appropriate board and port in the Arduino IDE, and upload the code to the board.
2. Select the appropriate board and port under the "Tools" menu in the Arduino IDE

3. Click on the "Upload" button to compile and upload the code to the Arduino.

4. Once the upload is complete, open the Serial Monitor by clicking on the magnifying glass icon in the Arduino IDE's toolbar or by going to "Tools" -> "Serial Monitor".

5. Set the baud rate in the Serial Monitor to 9600.

6. You will now see the potentiometer value and button state printed in the Serial Monitor.

   Exercise:
   Get the readings of all 3 photoresistors at the same time.