LIGHT SENSOR INTERFACING WITH ARDUINO

Light Dependent Resistor (LDR) Introduction

LDR is a resistor whose resistance changes with change in the light intensity.

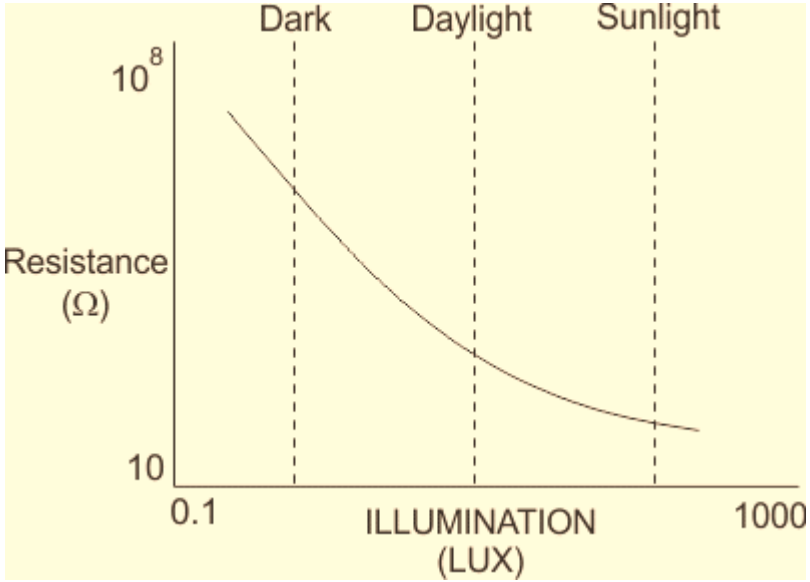
The resistance value increases with decrease in the light intensity.

Under good light conditions in the vicinity of the LDR, the resistance of LDR will be low.

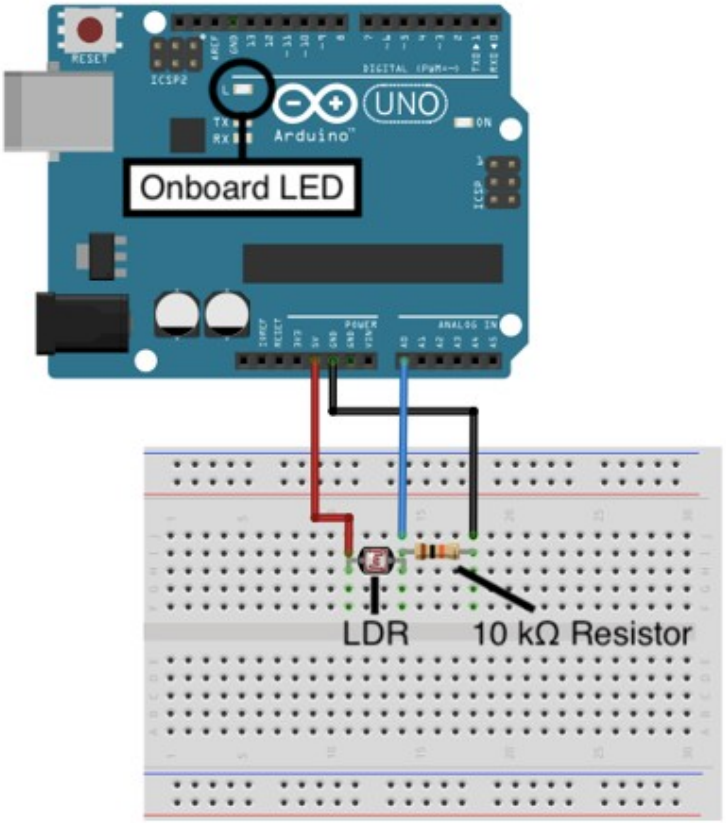
The change in the resistance with light intensity is the basic fundamental behind this sensor.

Cadmium Sulphide is one of the most widely used semiconductor material that is used for manufacturing the LDR.

Light Dependent Resistor (LDR)

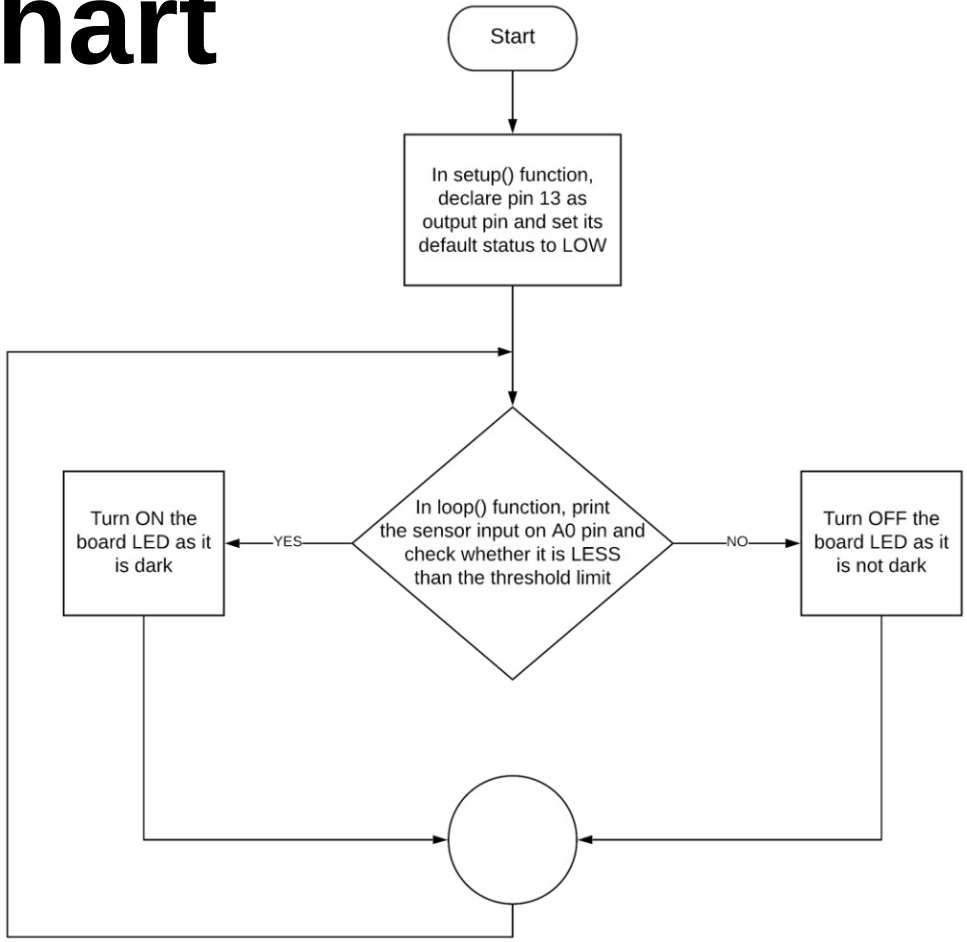


Circuit Diagram



During darkness, the resistance of LDR will be high and voltage drop across LDR will also be high. This will cause voltage across 10 K ohm resistance to decrease and it is this voltage that is getting fed to analog channel A0.

Flow Chart

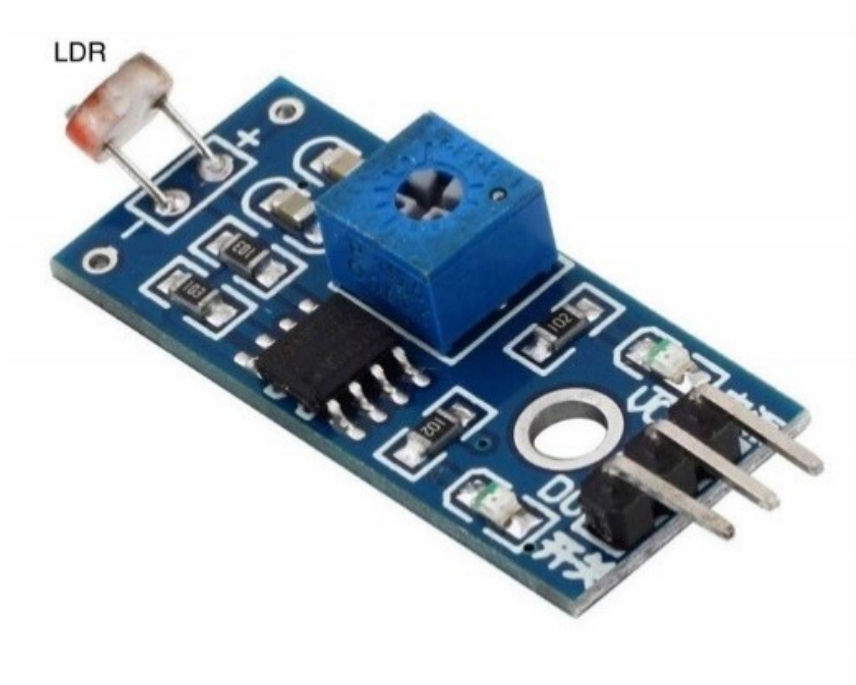

Start
In setup() function, declare pin 13 as output pin and set its default status to LOW
In loop() function, print the sensor input on A0 pin and check whether it is LESS than the threshold limit
YES
NO
Turn ON the board LED as it is dark
Turn OFF the board LED as it is not dark

Coding Part

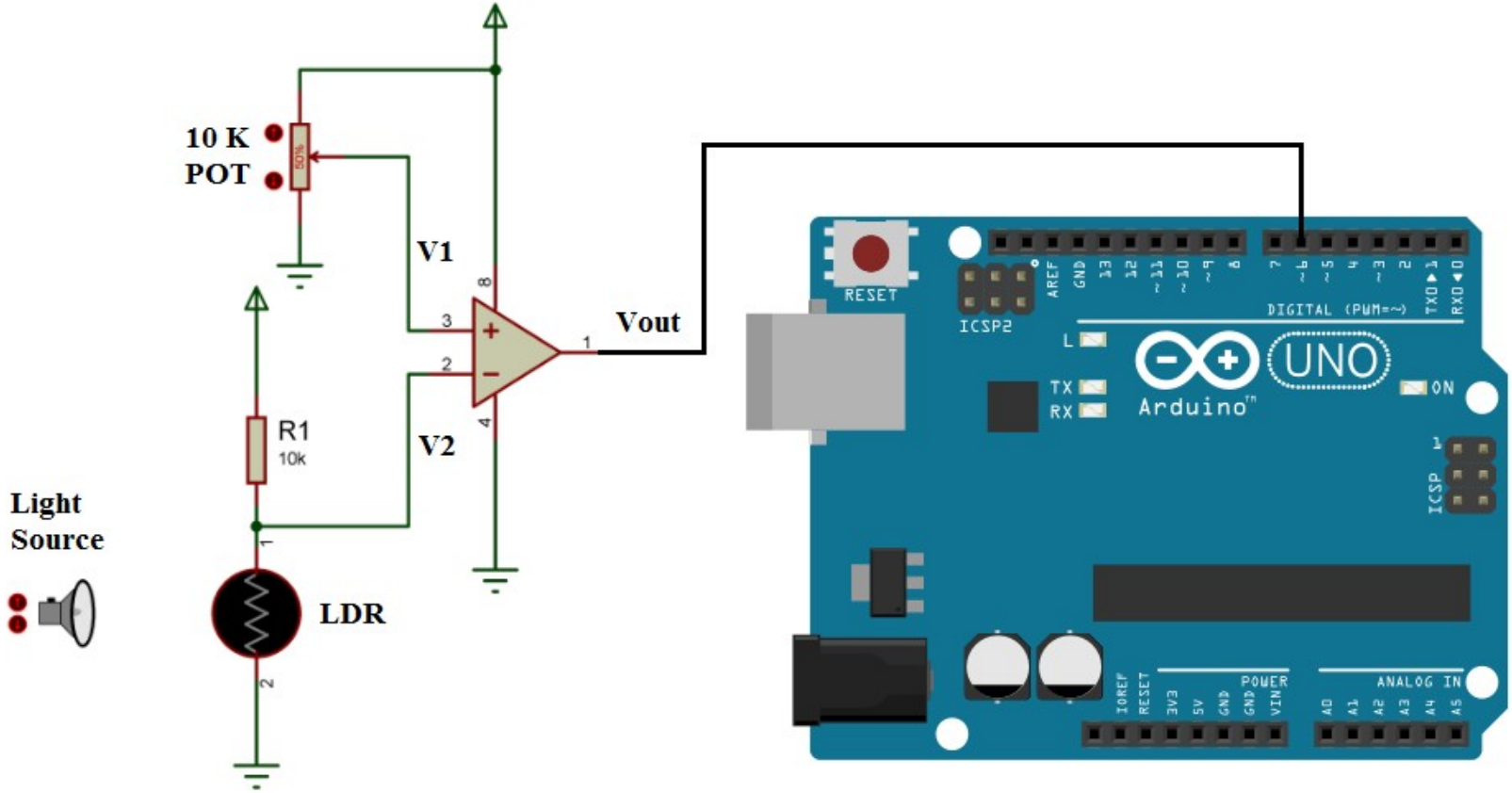
```
int var;
// Creating a variable named 'var'
void setup() {
// put your setup code here, to run once:
Serial.begin(9600);
// serial communication at 9600 bps baud rate
pinMode(13, OUTPUT);
// Configuring built in LED on pin 13 as Output
digitalWrite(13, LOW);
// LED is OFF in the beginning
}
```

```
void loop() {
var = analogRead(A0);
Serial.println(var);
if (var<=200)
// change this value by testing your surrounding
{
digitalWrite(13, HIGH);
}
else
{
digitalWrite(13, LOW);
}
delay(1000);
}
```

Light Sensor Module



LDR Sensor Module Internal Circuit



Circuit Description

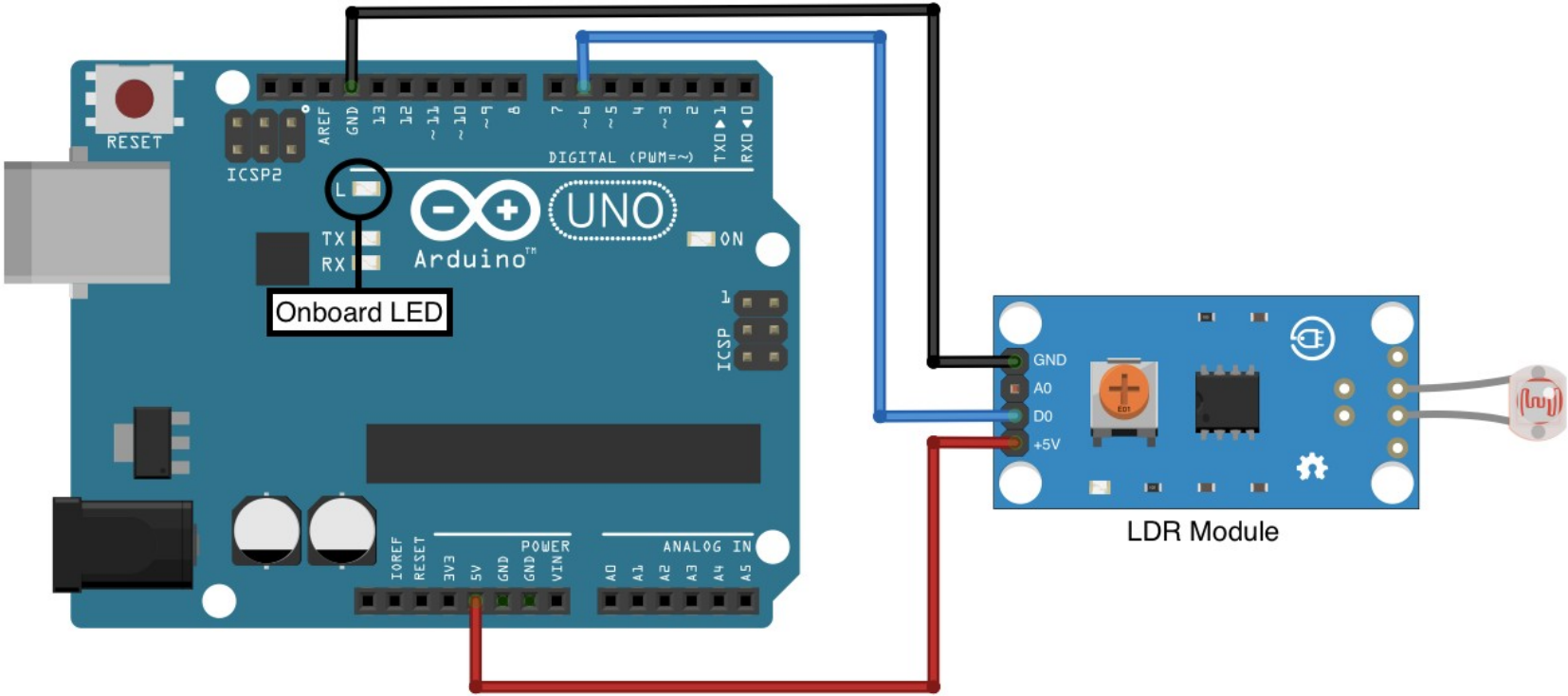
When the light intensity is less, then the resistance of the LDR will be high and the voltage at the non-inverting terminal of LM358 IC will become higher than the reference voltage that is set using 10 K ohm potentiometer. The output of the comparator will go to logic LOW.

In case of sufficient light falling on LDR, the resistance of LDR will be low and hence during good lighting conditions the voltage at the noninverting terminal will be lower than that of the noninverting terminal. The output of the comparator IC in this case will be logic HIGH.

Coding Exercise

The onboard LED is controlled on the basis of the external lighting condition i.e. the amount of light falling on the sensor. Onboard LED will turn to the ON state when the light intensity falls below the threshold value. The threshold value of light is equivalent to the preset voltage that is set using 10 K ohm potentiometer.

Light Sensor Interfacing with Arduino



Coding

```
int var;
// Creating a variable named 'var'
void setup() {
// put your setup code here, to run once:
Serial.begin(9600);
// Configuring serial communication at 9600 bps baud rate
pinMode(6, INPUT);
// configuring pin 6 as Input
pinMode(13, OUTPUT);
// Configuring built in LED on pin 13 as Output
digitalWrite(13, LOW);
// LED is OFF in the beginning
}
```

```
void loop() {
// put your main code here, to run repeatedly:
var = digitalRead(6);
// assigning the input value to var
Serial.println(var);
// printing the value of var in the Serial Monitor
if (var==0)
{
digitalWrite(13, HIGH);
// the LED should turn ON when it is dark
}
else
{
digitalWrite(13, LOW);
// the LED should turn OFF when it is bright
}
delay(1000);
}
```