Aberystwyth Robotics Club - Arduino Tutorials - Light Dependent Resistor Tutorial

Introduction

In order to detect the intensity of light or darkness, we use a sensor called an LDR (Light Dependent Resistor). The LDR is a special type of resistor which allows higher to pass through it (low resistance) whenever there is a high intensity of light, and passes a low voltage (high resistance) whenever it is dark.

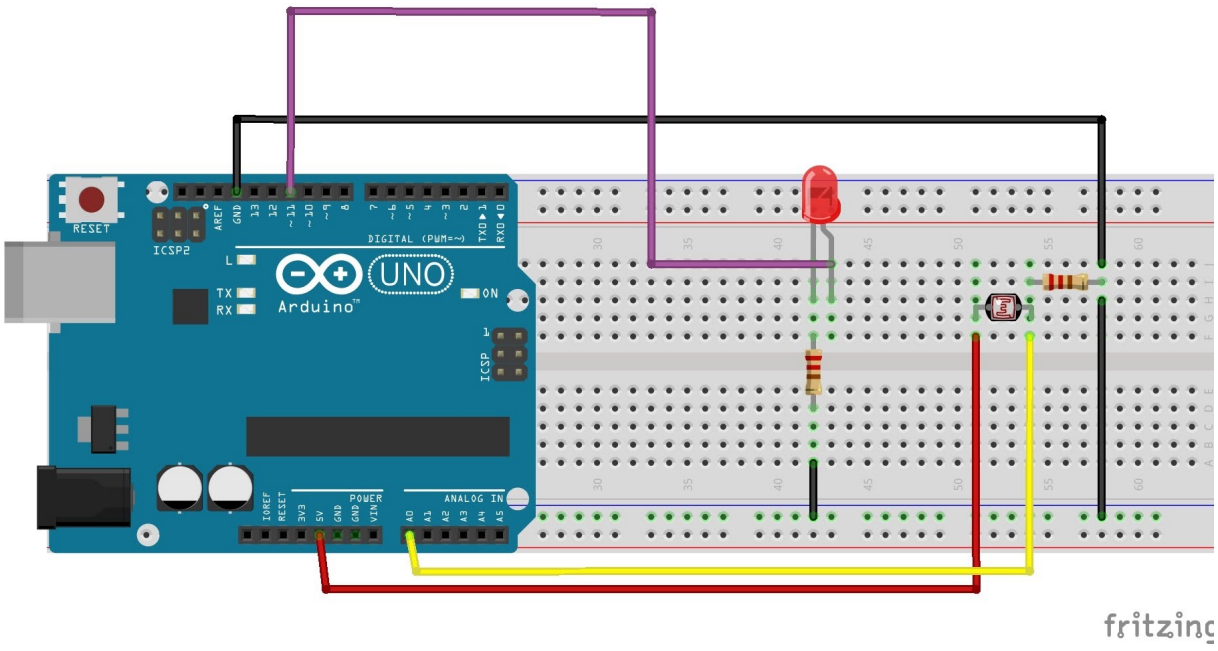
Hardware Required

- Arduino
- LED
- LDR
- Jumper Wires
- 100K resistor
- 220 ohm resistor
- Breadboard

Circuit

You have to use a voltage divider configuration to connect the LDR. The connection diagram for the Arduino is given below, using a breadboard.

1. **Connect one leg of the LDR to VCC (5V) on the Arduino.**
2. **Connect the other leg of the LDR to the analogue input pin A0 on the Arduino.**
3. **Connect the 100K resistor to the same leg and ground.**
4. **Connect the power/long leg of the LED straight to pin 11 on the Arduino.**
5. **Connect the ground/short leg of the LED to the 220 ohm resistor.**
6. **Connect the 220 ohm resistor to ground.**



Connecting a LDR sensor and LED to an Arduino via a bread-board

Code

The first lines of code will let the Arduino know which pins are used in the code.

1. **Assign the pin values.**

```
int LDR = A0; //LDR pin is connected to A0
int LED = 11; //LED pin is connected to 11
```

2. **Create a variable to store data from the LDR called LDRvalue.**

```
int LDRvalue = 0; //a place to store the LDR value
```

3. **In the setup function, begin serial communications, at 9600 bits of data per second, between your board and the computer.**

```
Serial.begin(9600); //set up data connection speed
```

4. **In the setup function, initialise the LDR as an input.**

```
pinMode(LDR, INPUT); //set LDR pin (A0) as input
```

5. **In the setup function, initialise the LED as an output.**

```
pinMode(LED, OUTPUT); //set LED pin 11 as output
```

6. **In the loop function, store values read from the analogue input in the variable LDRvalue.**

```
LDRvalue = analogRead(LDR); //LDRvalue will equal values from the LDR
    pin
```

   Once we have the value from the LDR, we can then use it to control the brightness of the LED.

7. **Use the value of the LDR to change the LED's brightness.**

```
analogWrite(LED, LDRvalue; //LDRvalue will determine intensity of LED
    brightness
```

8. **Use the serial line to print the information stored in the LDRvalue variable to the "Serial Monitor".**

```
Serial.print("LDR reading is: "); //print out everything between the
    quotes
Serial.println(LDRvalue); //print out data in LDRvalue
delay(10); //delay the code for 10 milliseconds so we can keep up with
     the readings
```

   You should expect to see values between 0 and 1023 on teh computer when you cover and uncover the LDR. The brightness of the LED should also change slightly.

Example Code

```
int LDR = A0;
int LED = 11;
int LDRvalue = 0;

void setup{
  Serial.begin(9600);
  pinMode(LDR, INPUT);
  pinMode(LED, OUTPUT);
}

void loop() { //the loop function runs over and over again forever
  LDRvalue = analogRead(LDR);
  Serial.print("LDR␣reading␣is:␣");
  Serial.println(LDRvalue);
  delay(10);
}
```