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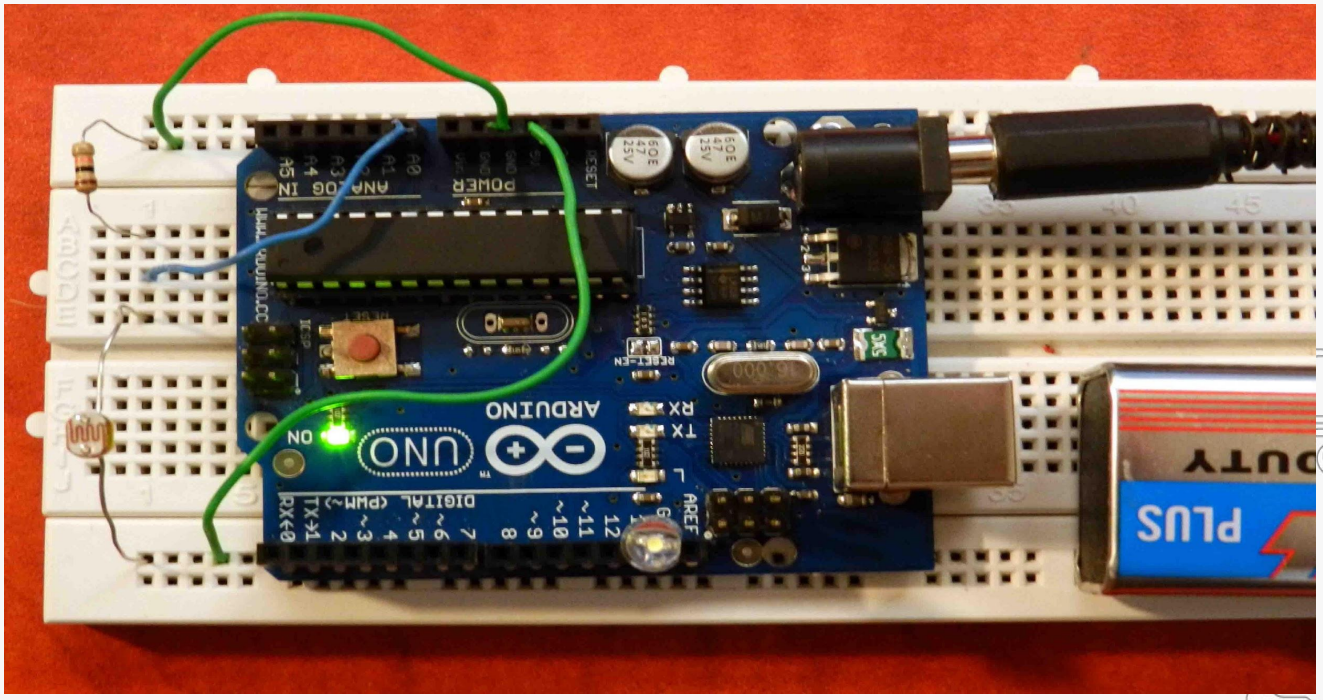
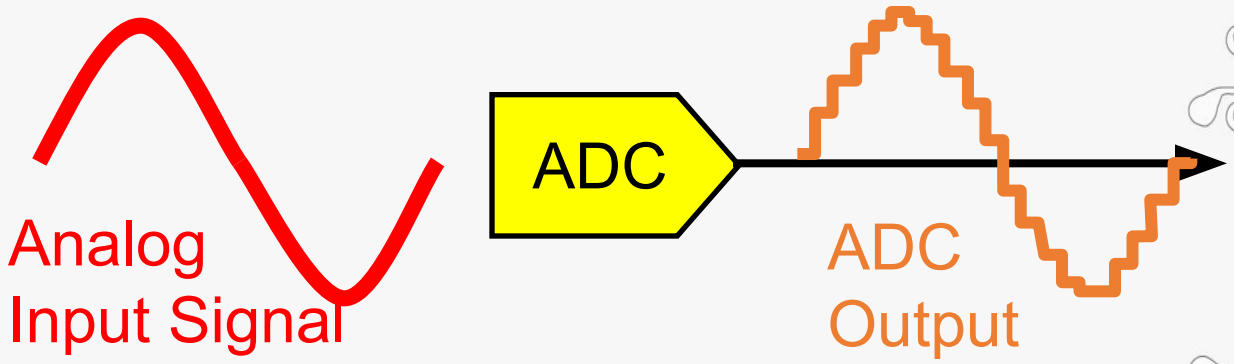
ADC Interfacing



ADC Overview

Analog-to-Digital Converter Module

- 6 multiplexed single ended input channel.
- Converts analog input signal into 10-bit binary value.
- return integers from 0 to 1023.



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- While the main function of the analog pins for most Arduino users is to read analog sensors.

- The analog pins also have all the functionality of general purpose input/output (GPIO) pins (the same as digital pins 0 -13).

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Pin mapping

- The analog pins can be used identically to the digital pins, using the aliases A0 (for analog input 0), A1, etc.
- For example , the code would look like this to set analog pin 0 to an output , and to set it HIGH.

- pinMode(A0,OUTPUT);
- digitalWrite(A0,HIGH);

Programming :

They are enabled by issuing a command such as :

pinMode(A0,INPUT);

digitalWrite(A0,HIGH); //set pullup on analog pin 0 while the pin is an input.

analogRead(pin) – read an analog pin.

analogWrite(pin, value) – Once a pin is set to output it can be given any analog value between 0 to 255.

Note : There are only 6 Analog pins in Arduino Uno from A0 TO A5.

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Example : 1

```
int ledPin = 13; // LED connected to digital pin 9
int LDR = A0; // LDR is connected pin analog pin A0
int LDRval = 0; // variable to store the read value

void setup()
 {
   pinMode(ledPin , OUTPUT); // sets the pin as output
}
void loop()
 {
    LDRval = analogRead(LDR); // analogRead values go from 0 to
1023
}
```

Example : 2

```
int analogPin = 3;   // use pin 3 as analog pin
int val = 0;         // variable to store the value read
void setup()
 {
  Serial.begin(9600);     // setup serial
}
 void loop()
{
  val = analogRead(analogPin);       // read the input pin
Serial.println(val);                 // debug value
 }
```

Light Dependent Resistor

An **LDR** is a component that has a (variable) resistance that changes with the light intensity that falls upon it. This allows them to be used in light **sensing** circuits. A Light Dependent **Resistor** (**LDR**) or a photo **resistor** is a device whose resistivity is a **function** of the incident electromagnetic radiation. Hence, they are light sensitive devices. They are also called as photo conductors, photo conductive cells or simply photocells.

Working of project

- The LDR gives out an analog voltage when connected to VCC (5V), which varies in magnitude in direct proportion to the input light intensity on it. That is, the greater the intensity of light, the greater the corresponding voltage from the LDR will be.

- Since the LDR gives out an analog voltage, it is connected to the analog input pin on the Arduino. The Arduino, with its built-in ADC (analog-to-digital converter), then converts the analog voltage (from 0-5V) into a digital value in the range of (0-1023).

- When there is sufficient light in its environment or on its surface, the converted digital values read from the LDR.

Components Required

- Arduino UNO
- LDR sensor
- LED
- Resistor (10 kohms)
- Breadboard
- Jumper Wires

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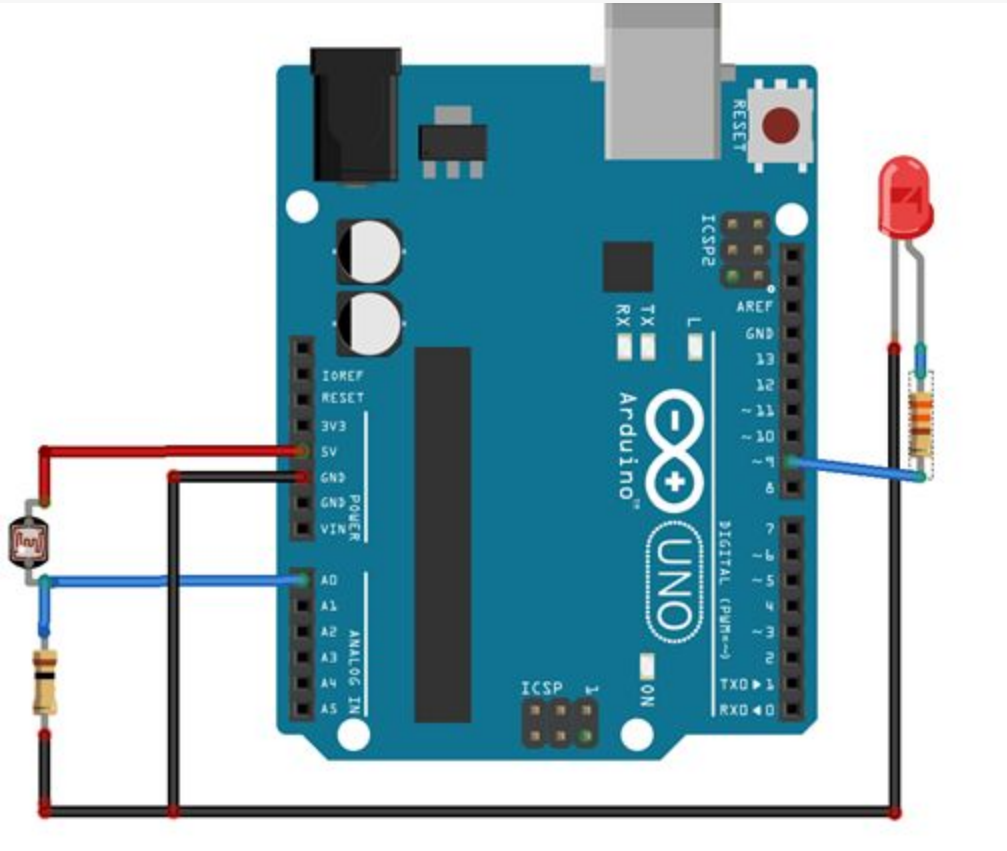
Connection Diagram



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Connections :-

1. Connect 1st pin of LDR sensor with Ao pin of Arduino.
2. Connect resistor(10k) with 1st pin of LDR sensor.
3. Then connect resistor's another end with GND pin of Arduino.
4. Connect 2nd pin of LDR sensor with (+5V) of Arduino.
5. Connect LED's positive on 9 pin of Arduino and its negative pin at GND pin of Arduino.

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Code

ADC_Interfacing_Program | Arduino 1.8.19

File Edit Sketch Tools Help

ADC_Interfacing_Program

```
int LDR = A0;     //analog pin to which LDR is connected, here we set it to 0 so it means A0
int LDRValue = 0;      //that's a variable to store LDR values
int light_sensitivity = 500;    //This is the approx value of light surrounding your LDR

void setup()
  {
    Serial.begin(9600);          //start the serial monitor with 9600 buad
    pinMode(9, OUTPUT);     //we mostly use 13 because there is already a built in yellow LED in arduino which shows output when 13 pin is enabled
  }

void loop()
  {
    LDRValue = analogRead(LDR);      //reads the ldr's value through LDR
    Serial.println(LDRValue);       //prints the LDR values to serial monitor
    delay(1000);        //This is the speed by which LDR sends value to arduino(1 second)

    if (LDRValue < light_sensitivity)
      {
        digitalWrite(9, HIGH);
      }
    else
      {
        digitalWrite(9, LOW);
      }
  }
```

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Project Link : https://youtu.be/OLrejU8mrfs