ARDUINO SESSION 3

Topics:

Arduino Sensors

Types of Sensors

Examples

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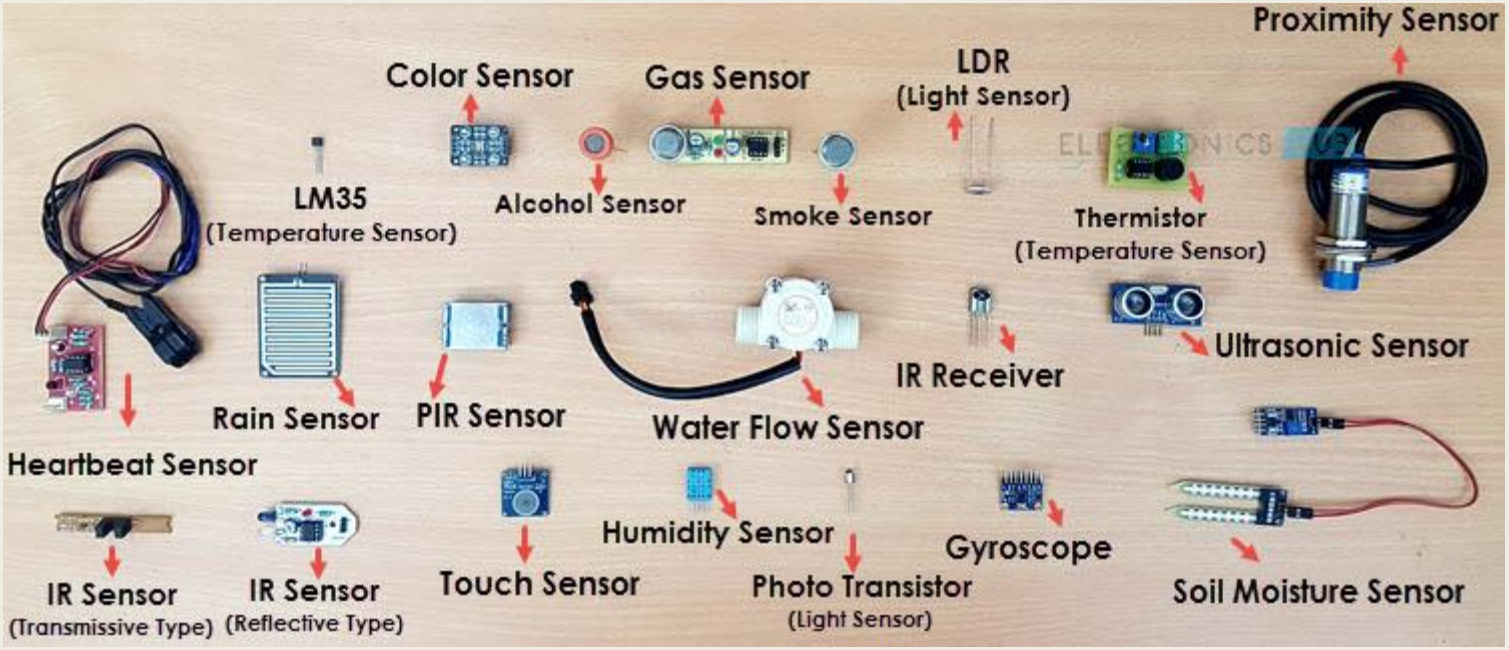
What is a Sensor?



- input device which provides an output (signal) with respect to a specific physical quantity (input).
- It is a device that converts signals from one energy domain to electrical domain.

Types of Sensors

Active and Passive.

Active Sensors are those which require an external excitation signal or a power signal.

Passive Sensors, on the other hand, do not require any external power signal and directly generates output response.

Analog and Digital Sensors.

Analog Sensors produce an analog output i.e. a continuous output signal with respect to the quantity being measured.

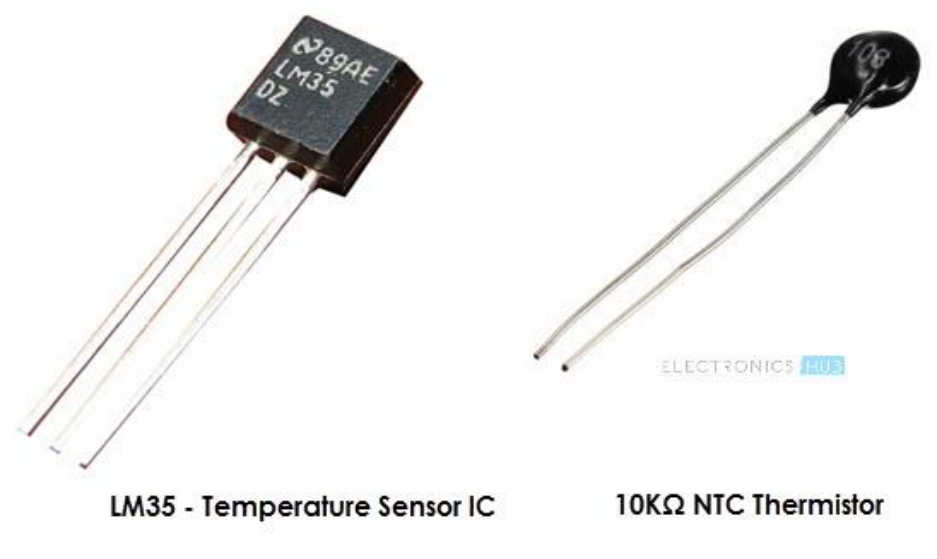
Digital Sensors, work with discrete or digital data.

Sensors used in Applications

- Temperature Sensor
- Proximity Sensor
- Accelerometer
- IR Sensor (Infrared Sensor)
- Pressure Sensor
- Light Sensor
- Ultrasonic Sensor
- Smoke, Gas and Alcohol Sensor
- Touch Sensor
- Color Sensor
- Humidity Sensor
- Tilt Sensor
- Flow and Level Sensor

Temperature Sensor

- senses the temperature i.e. it measures the changes in the temperature.
- Temperature Sensor ICs (like LM35), Thermistors, Thermocouples, RTD (Resistive Temperature Devices), etc.
- Temperature Sensors are used everywhere like computers, mobile phones, automobiles, air conditioning systems, industries etc.

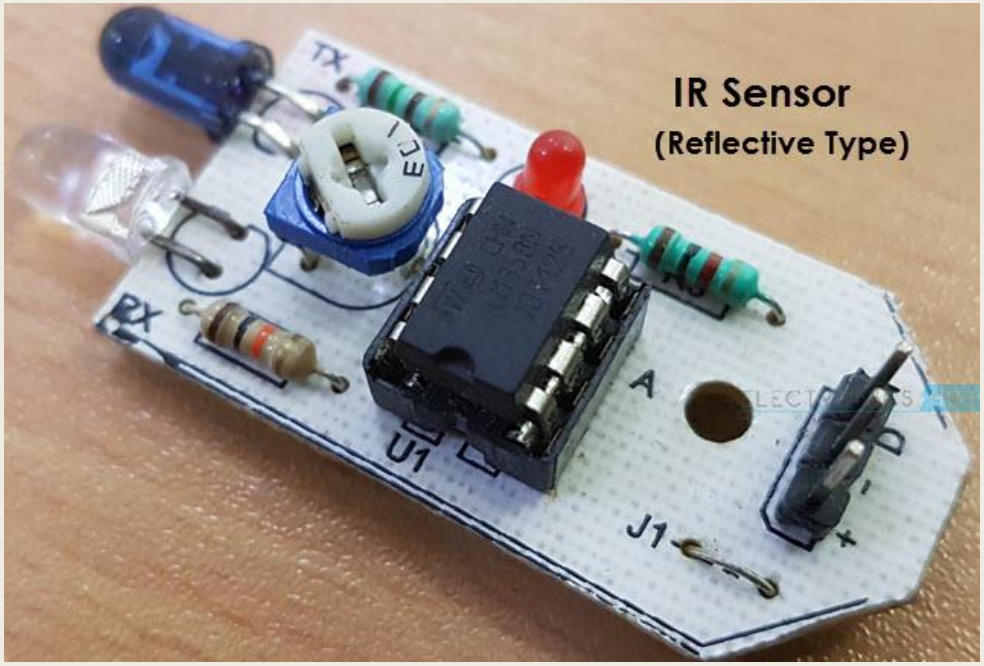


Proximity Sensor

A Proximity Sensor is a non-contact type sensor that detects the presence of an object. Proximity Sensors can be implemented using different techniques like Optical (like Infrared or Laser), Ultrasonic, Hall Effect, Capacitive, etc.

IR Sensors

- Infrared Sensor are light based sensor that are used in various applications like Proximity and Object Detection.
- IR Sensors are used as proximity sensors in almost all mobile phones.
- Different applications where IR Sensor is implemented are Mobile Phones, Robots, Industrial assembly, automobiles etc.

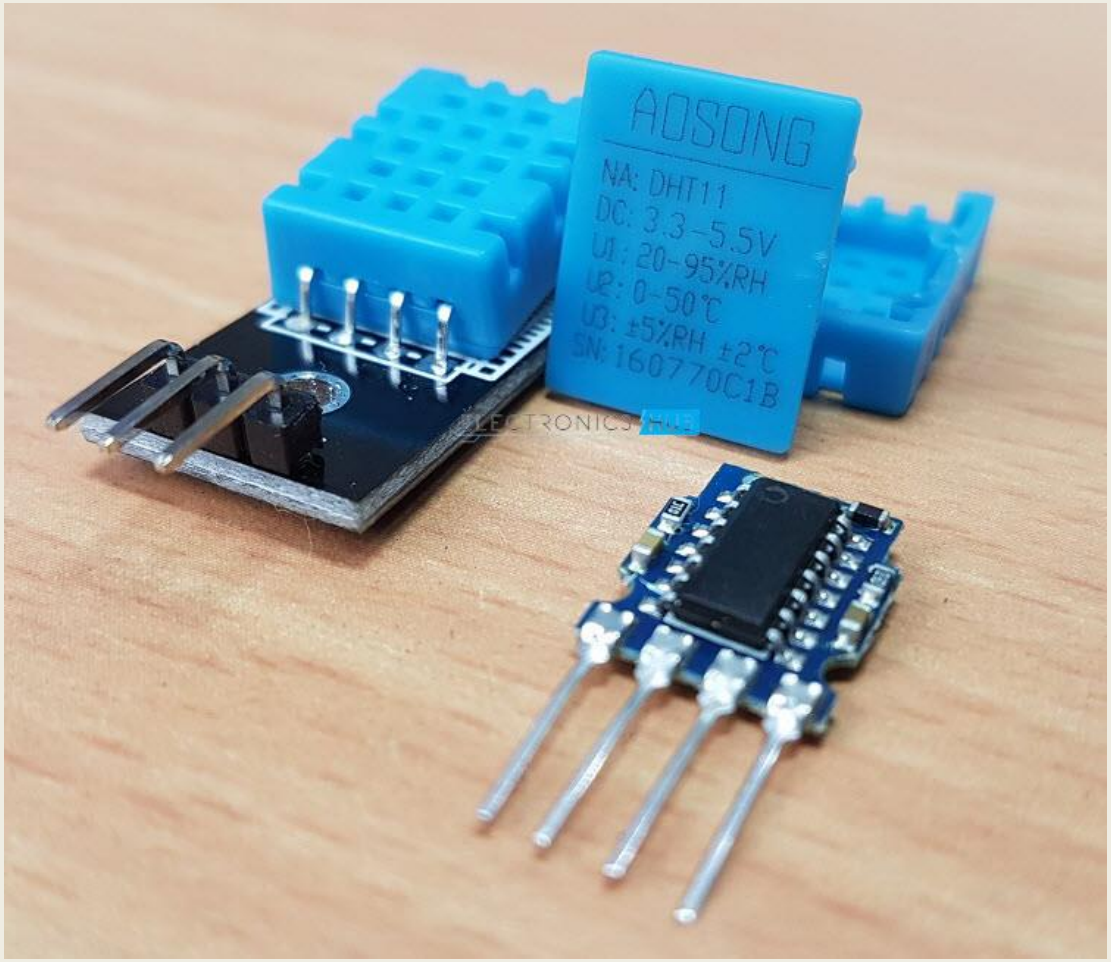


Ultrasonic Sensor

- An Ultrasonic Sensor is a non-contact type device that can be used to measure distance as well as velocity of an object.
- An Ultrasonic Sensor works based on the properties of the sound waves with frequency greater than that of the human audible range.

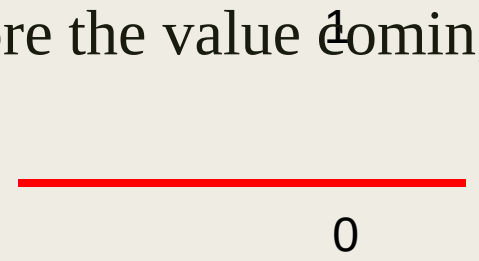
Humidity Sensor

One of the main applications of connecting DTH11 sensor with Arduino is weather monitoring.



LDR Usage

```
#include <SoftwareSerial.h>

int sensorPin = A0; // select the input pin for the LDR

int sensorValue = 0; // variable to store the value coming from the sensor

int led = 13;

int piezoPin = 8;


void setup()

{ // declare the ledPin as an OUTPUT:

pinMode(led, OUTPUT);

Serial.begin(9600);

}
```



```
void loop()
{
        Serial.println("Welcome to IoT Class ");
        sensorValue = analogRead(sensorPin);
        Serial.println(sensorValue);
        delay(5000);

if (sensorValue<20)
{
  digitalWrite(led,HIGH);
  tone(piezoPin, 1000, 500);
}
else
{
  noTone(piezoPin);
  digitalWrite(led,LOW);
}
}
```