# Lesson 9 Temperature Sensor

Introduction

In this tutorial we'll be showing how to install a DHT sensor Python library which utilizes C for high-speed GPIO polling to handle bit-banged sensor output. Many low-cost sensors have unusual output formats, and in this case, a "Manchester-sequel" output that is not SPI, I2C or 1-Wire compatible must be polled continuously by the Pi to decode. Luckily, the C GPIO libraries are fast enough to decode the output.

Principle

They consist of a humidity sensing component, an NTC temperature sensor (or thermistor) and an IC on the back side of the sensor.

For measuring humidity, they use the humidity sensing component which has two electrodes with moisture holding substrate between them. So as the humidity changes, the conductivity of the substrate changes or the resistance between these electrodes' changes. This change in resistance is measured and processed by the IC which makes it ready to be read by a microcontroller.
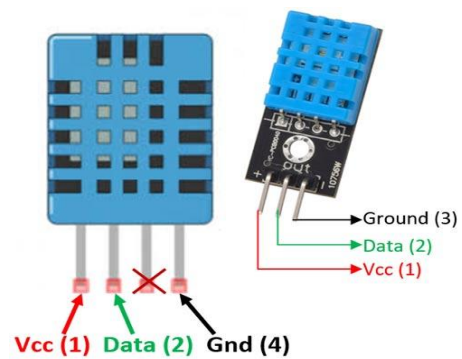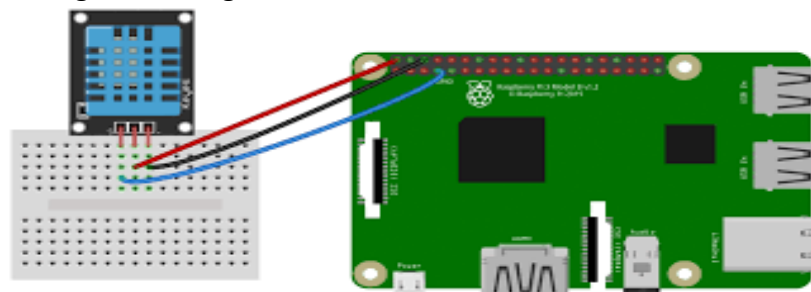

Hardware Required

- Raspberry Pi 3 Model B
- DHT11 Module
- Connecting Jumpers
- Power Supply

Hardware Setup

If you have a three pin DHT11 and want to output the humidity and temperature, then connect asper the connection given in diagram.

Python Coding

```python
import Adafruit_DHT

sensor=Adafruit_DHT.DHT11  # Set sensor type : Options are DHT11,DHT22 or AM2302

# Set GPIO sensor is connected to

gpio=7

# Use read_retry method. This will retry up to 15 times to

# get a sensor reading (waiting 2 seconds between each retry).

humidity, temperature = Adafruit_DHT.read_retry(sensor, gpio)

# Reading the DHT11 is very sensitive to timings and occasionally

# the Pi might fail to get a valid reading. So check if readings are valid.

if humidity is not None and temperature is not None:

  print('Temp={0:0.1f}*C  Humidity={1:0.1f}%'.format(temperature, humidity))

else:

  print('Failed to get reading. Try again!')
```

Output

Once you connected all equipment correctly and coding well you will see the temperature and moisture in the given below format. -

You should see an output similar to this:
 Temp=22.0* Humidity=68.0%

Application

DHT11 Temperature and Humidity Sensor is one of the popular sensor modules used by hobbyists for implementing in a lot of IoT Projects. This sensor along with Raspberry Pi can also be used in:

- HVAC Systems
- Thermostats
- Home and Office Climate Control
- Weather Station