

ENVIRONMENTAL MONITORING USING RASPBERRY-Pi

INTRODUCTION:

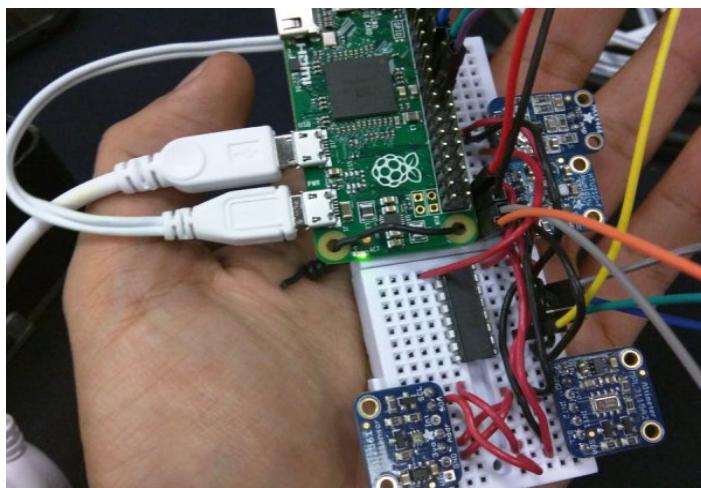
To read temperature and humidity data from a DHT11 or DHT22 sensor using raspberry.pi. Here is a python program using the Adafruit DHT library to accomplish this.

STEPS:

1. First, you'll need to install the Adafruit DHT library if you haven't already. Open a terminal on your Raspberry Pi and run the following command:

bash

CIRCUIT :



Preparing the Raspberry Pi



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Installing the OS

1.- Download the latest Raspbian.

<https://www.raspberrypi.org/downloads/raspbian>

2.- Follow the instructions to install the Raspbian in your micro SD card.

if you are using Linux you can follow these steps to install Raspbian Lite on your micro SD card:

- Check the device name for your micro SD by running :

```
[james@fedora22 mnt] $ df -h
Filesystem      Size  Used Avail Use% Mounted on
/devtmpfs        3.8G   0    3.8G  0% /dev
tmpfs           3.8G  79M  3.7G  3% /dev/shm
tmpfs           3.8G  1.5M  3.8G  1% /run
tmpfs           3.8G   0    3.8G  0% /sys/fs/cgroup
/dev/sdal       451G  175G  253G  41% /
tmpfs           3.8G  408K  3.8G  1% /tmp
tmpfs           769M  8.0K  769M  1% /run/user/42
tmpfs           769M  28K  769M  1% /run/user/1000
/dev/mmcblk0     7.4G  4.0K  7.4G  1% /run/media/james/3980-8C72
```

- Unmount your device with the following command

```
[james@fedora22 mnt] $ sudo dd bs=4M if=/home/james/Downloads/2015-11-21-raspbian-jessie-lite.img of=/dev/mmcblk0
[sudo] password for james:
347+1 records in
347+1 records out
1458569216 bytes (1.5 GB) copied, 218.893 s, 6.7 MB/s
[james@fedora22 mnt] $
```

1.- Expand the Filesystem and Enable I2C



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- Login as user: pi password: raspberry
- Execute the command sudo raspi-config in the terminal
- Select Expand Filesystem and press Enter
- Select OK and you will return to the main menu
- Select Advanced Options
- Select I2C and press Enter
- Select Yes and press Enter
- Select OK and press Enter
- Select Yes and press Enter
- Select OK and you will return to the main menu
- Select Finish and press Enter
- Select Yes and press Enter to reboot the Raspberry pi

2.Create a Python script (e.g., temperature_humidity.py) and add the following code:

```
import Adafruit_DHT
import time

# Set the GPIO pin where your sensor is connected
DHT_SENSOR = Adafruit_DHT.DHT22
DHT_PIN = 4 # Replace with the actual GPIO pin number

try:
    while True:
        humidity, temperature = Adafruit_DHT.read(DHT_SENSOR, DHT_PIN)
        if humidity is not None and temperature is not None:
            print("Temperature: {:.2f}°C, Humidity: {:.2f}%")
        else:
            print("Failed to retrieve data from the sensor. Check the wiring.")
        time.sleep(2) # You can adjust the sleep duration as needed
except KeyboardInterrupt:
    print("Program terminated by user.")
except Exception as e:
    print(f"Error: {str(e)}")
```

3.Save the script and run it:

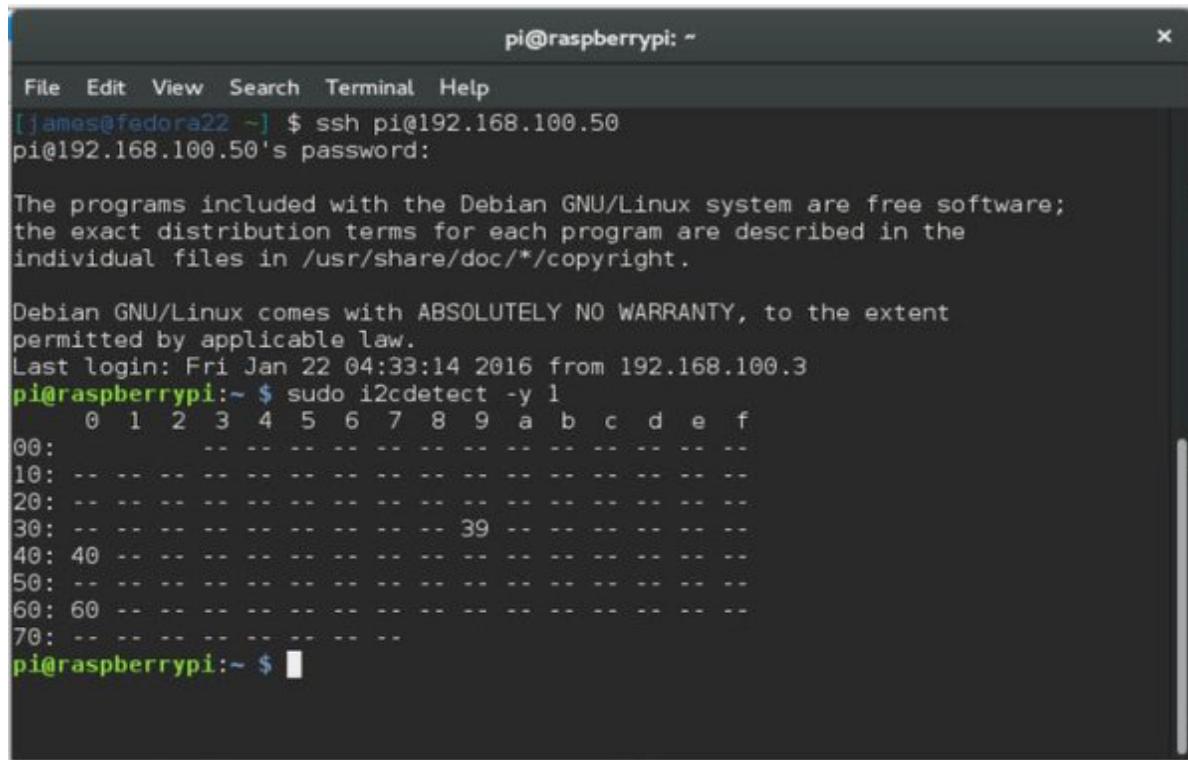


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The script will continuously read the temperature and humidity values from the DHT sensor and print them to the terminal. Press **Ctrl+C** to stop the program.

Remember that the DHT11 and DHT22 sensors may have different pinouts and require different parameters, so make sure to adjust the code accordingly. Additionally, double-check your wiring and make sure you have the necessary permissions to access GPIO pins (usually, you need to run the script with superuser privileges or add your user to the group)

You should see the following output



A screenshot of a terminal window titled "pi@raspberrypi: ~". The window shows the following text:

```
File Edit View Search Terminal Help
[james@fedora22 ~] $ ssh pi@192.168.100.50
pi@192.168.100.50's password:

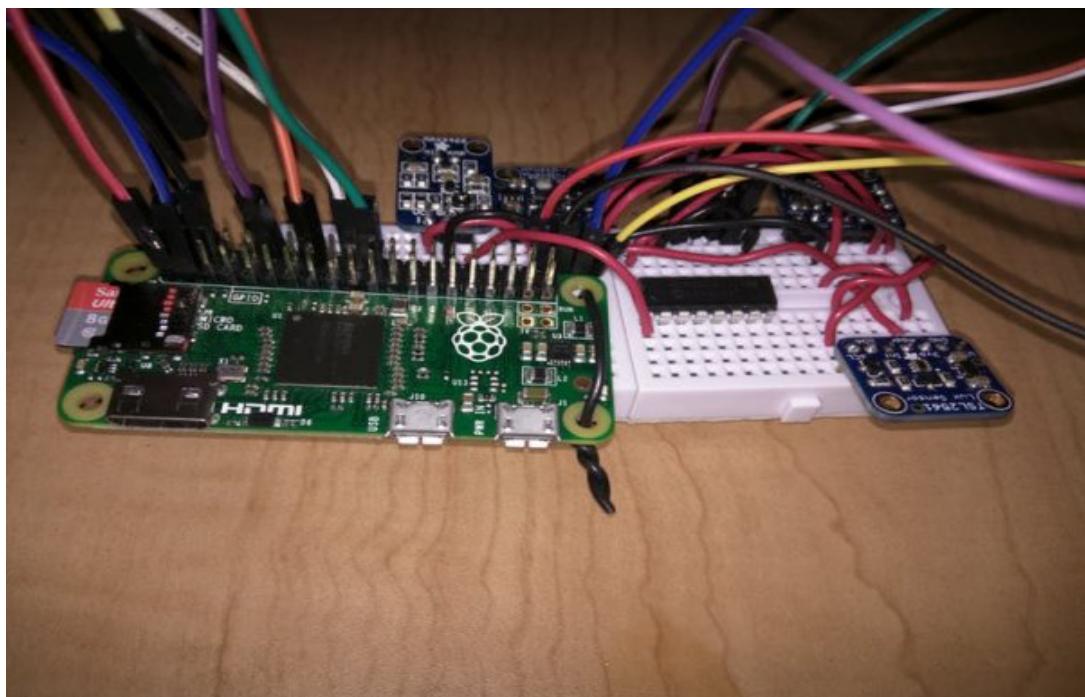
The programs included with the Debian GNU/Linux system are free software;
the exact distribution terms for each program are described in the
individual files in /usr/share/doc/*copyright.

Debian GNU/Linux comes with ABSOLUTELY NO WARRANTY, to the extent
permitted by applicable law.
Last login: Fri Jan 22 04:33:14 2016 from 192.168.100.3
pi@raspberrypi:~ $ sudo i2cdetect -y 1
  0  1  2  3  4  5  6  7  8  9  a  b  c  d  e  f
00: --
10: --
20: --
30: --          - - - - 39 - - - -
40: 40 - - - - - - - - - - - - - - - - - - - - - -
50: --
60: 60 - - - - - - - - - - - - - - - - - - - - - -
70: --
pi@raspberrypi:~ $
```



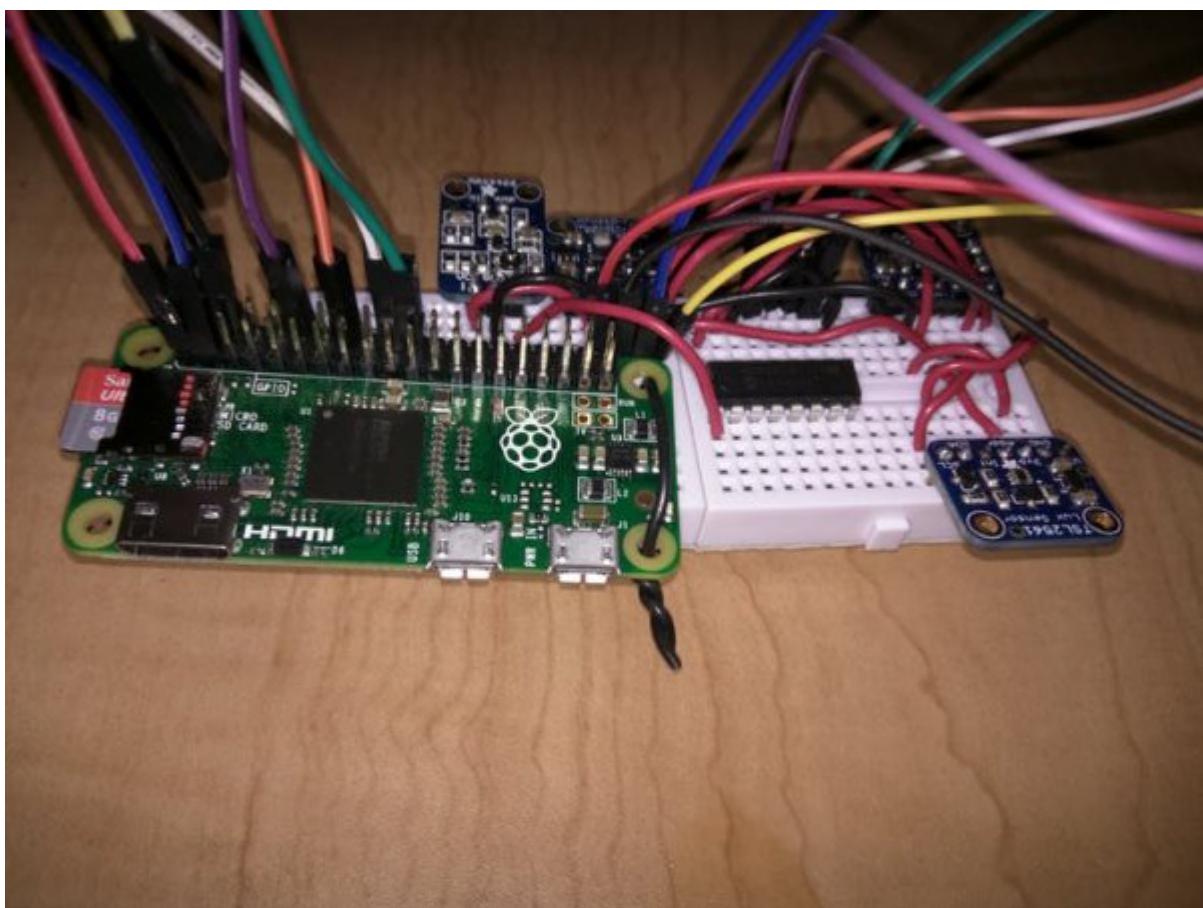
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Once you finish the wiring and sensor placement your device should look something like this.



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