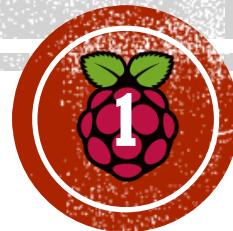
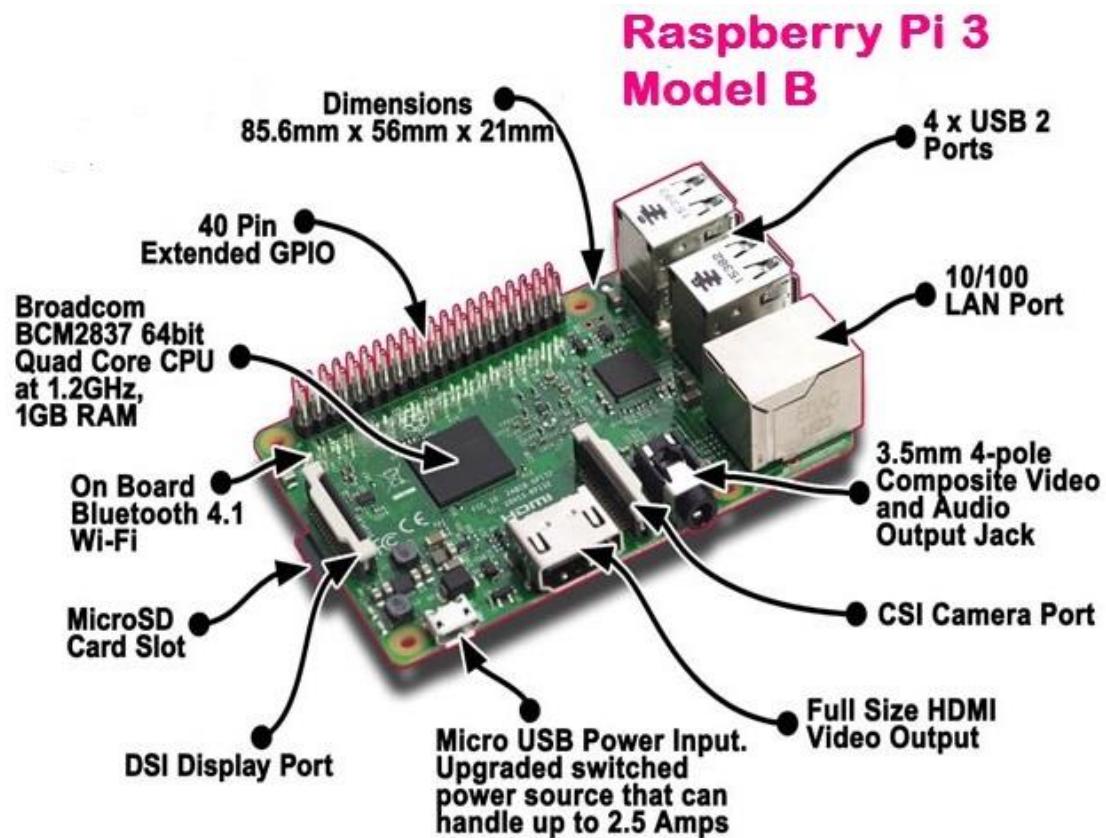


RASPBERRY PI



INTRODUCTION

- Raspberry Pi as a world's most inexpensive and powerful Single Board Computer.**



FEATURES

- **CPU:** Broadcom BCM2837 **SOC** 64-bit quad-core ARM Cortex A53 with 512KB shared L2 cache.
- **Memory:** Provided with 1 GB of RAM
- **Wi-Fi Support:** 802.11n Wireless LAN
- **Bluetooth:** Supports Bluetooth 4.1 Bluetooth Low Energy (BLE)
- **USB Ports:** 4-USB ports.
- **Ethernet Port:** It is useful when we want to setup raspberry pi for the first time without a monitor.
- **GPIO Pins:** Raspberry Pi 3 supports 40 GPIO Pins General Purpose Input Output. Pins can be used to drive LED, Switches, and Sensors.
- **Full HDMI Port:** Support HDMI port (High-Definition Multimedia Interface) which can be used to quickly connect raspberry pi to HDMI Monitor. With HDMI Cable and Monitor we can add Screen to Raspberry Pi.
- **Micro SD card slot:** This Card will hold the operating system which will boot while we power on Raspberry Pi 3.
- **Audio/Video:** Combined 3.5mm audio jack and composite video.
- **Camera interface (CSI):** enable us to interface Camera Module.

RPI INSTALLATION

**Install Raspbian in SD Card Using
NOOBs (New Out of Box Software)**

4

WHAT ALL DO YOU NEED?

- Raspberry Pi
- HDMI Monitor
- HDMI Cable
- USB Keyboard and Mouse
- MicroSD Card
- Power Supply



PREPARE SD CARD WITH NOOBS

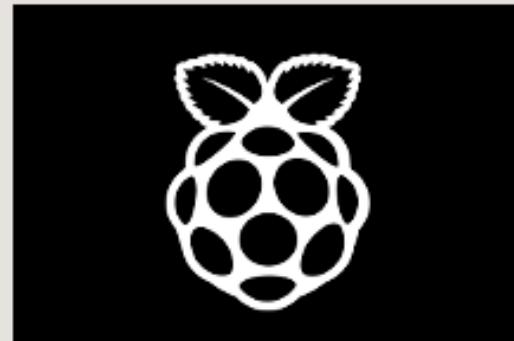
- Insert your SD card into the computer or use SD card reader.
- Download NOOBs (New Out of Box) . From

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

[HTTPS://WWW.RASPERRYPI.ORG/DOWNLOADS/](https://www.raspberrypi.org/downloads/)

DOWNLOADS

Raspbian is our official operating system for **all** models of the Raspberry Pi. Download it here, or use **NOOBS**, our easy installer for Raspbian and more.



NOOBS



RASPBIAN

Select NOOBS



NOOBS

Beginners should start with NOOBS – New Out Of the Box Software. You can purchase a pre-installed NOOBS SD card from many retailers, such as [Pimoroni](#), [Adafruit](#) and [The Pi Hut](#), or download NOOBS below and follow the [software setup guide](#) and [NOOBS setup guide video](#) in our help pages.

NOOBS is an easy operating system installer which contains [Raspbian](#) and [LibreELEC](#). It also provides a selection of alternative operating systems which are then downloaded from the internet and installed.

NOOBS Lite contains the same operating system installer without Raspbian pre-loaded. It provides the same operating system selection menu allowing Raspbian and other images to be downloaded and installed.

NOOBS

Offline and network
install

Click on
Download ZIP



NOOBS

Offline and network install

Version: 2.9.0

Release date: 2018-10-11

[Download Torrent](#)

[Download ZIP](#)



NOOBS LITE

Network install only

Version: 2.9

Release date: 2018-10-11

[Download Torrent](#)

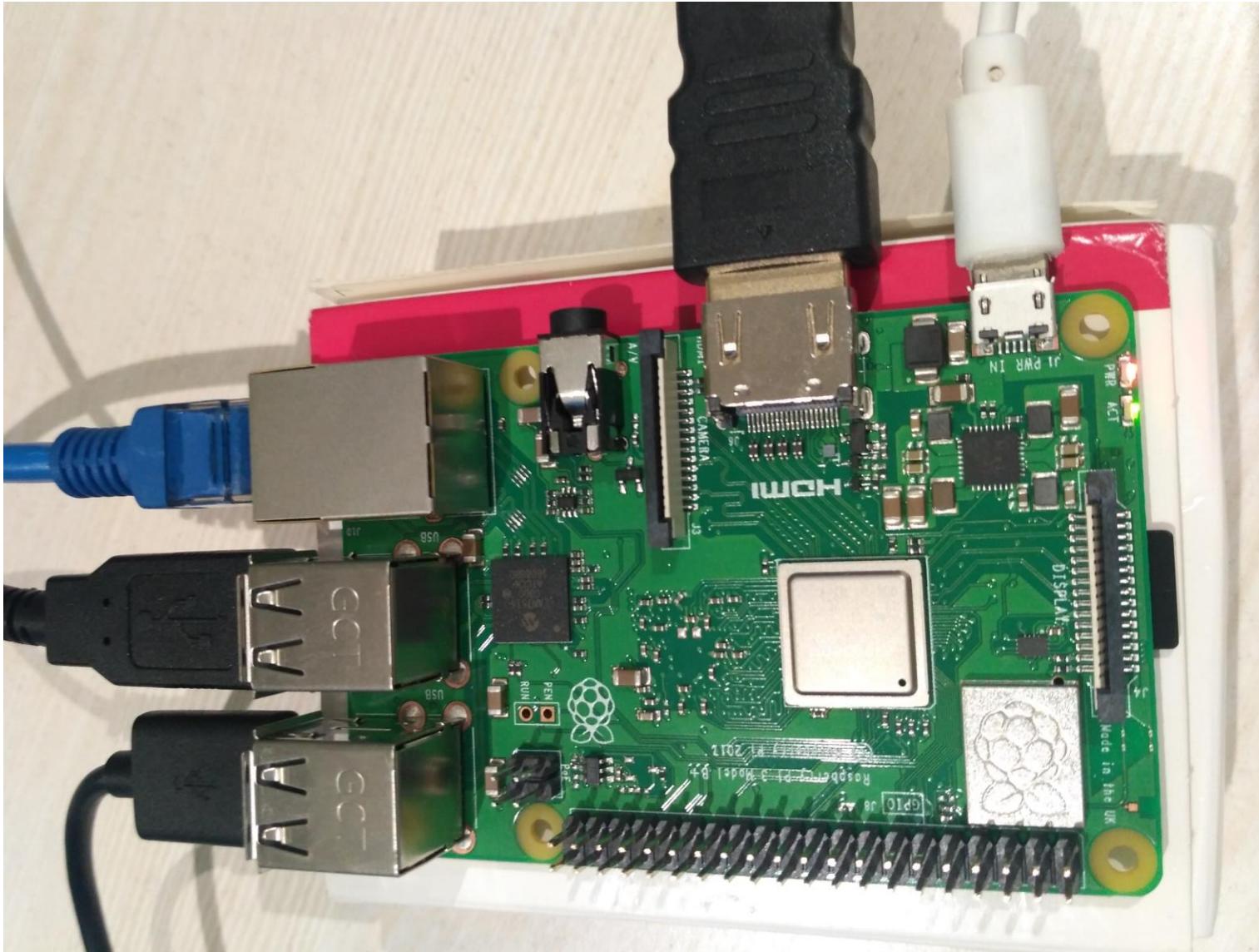
[Download ZIP](#)

INSTALLATION CONT...

- Format your SD card before copying NOOBs file.
- After formatting, extract the zip file of NOOBs in your computer and copy all the files onto your SD card.
- Once completed, remove the SD card and insert it into your Pi board.

MAKING CONNECTIONS

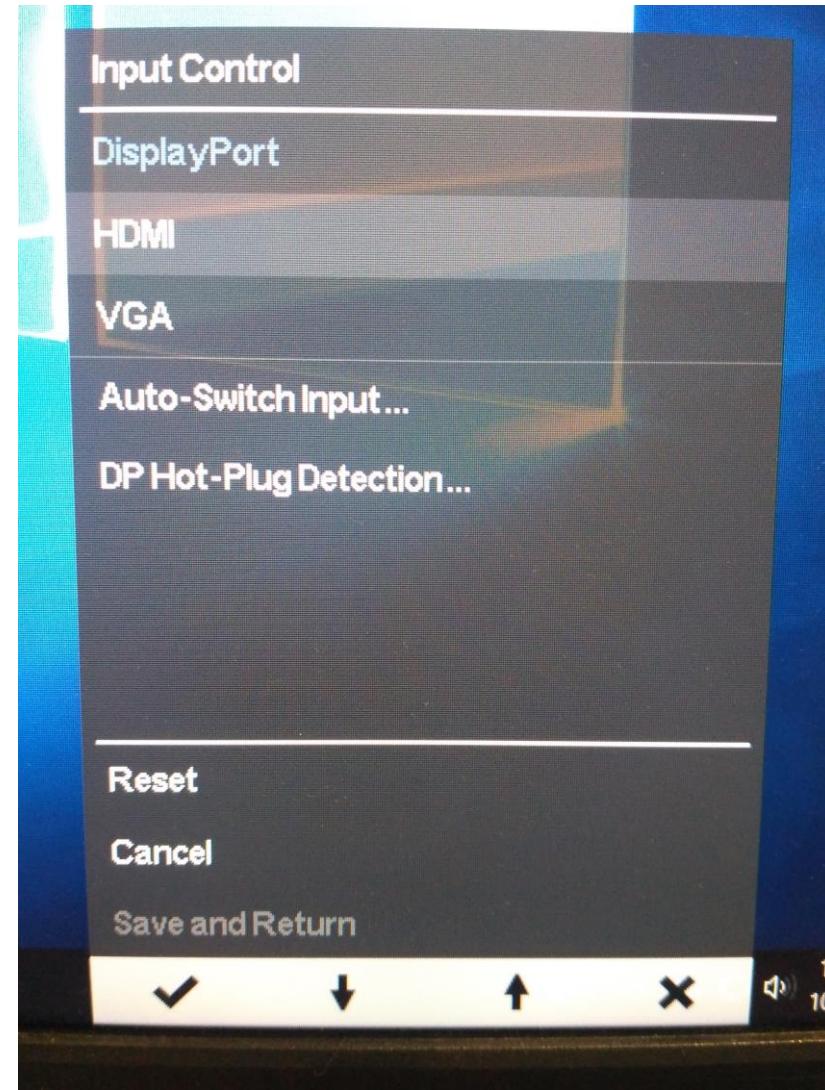
- First of all, connect your HDMI cable to your Raspberry Pi and your Monitor.
- Then, connect all your USB devices.
- If you are using ethernet cables connected to your router; connect it to your Raspberry Pi as well.
- When everything is connected, plug in your power adapter and you are good to go.
- No switch in Raspberry Pi to switch it on/off.

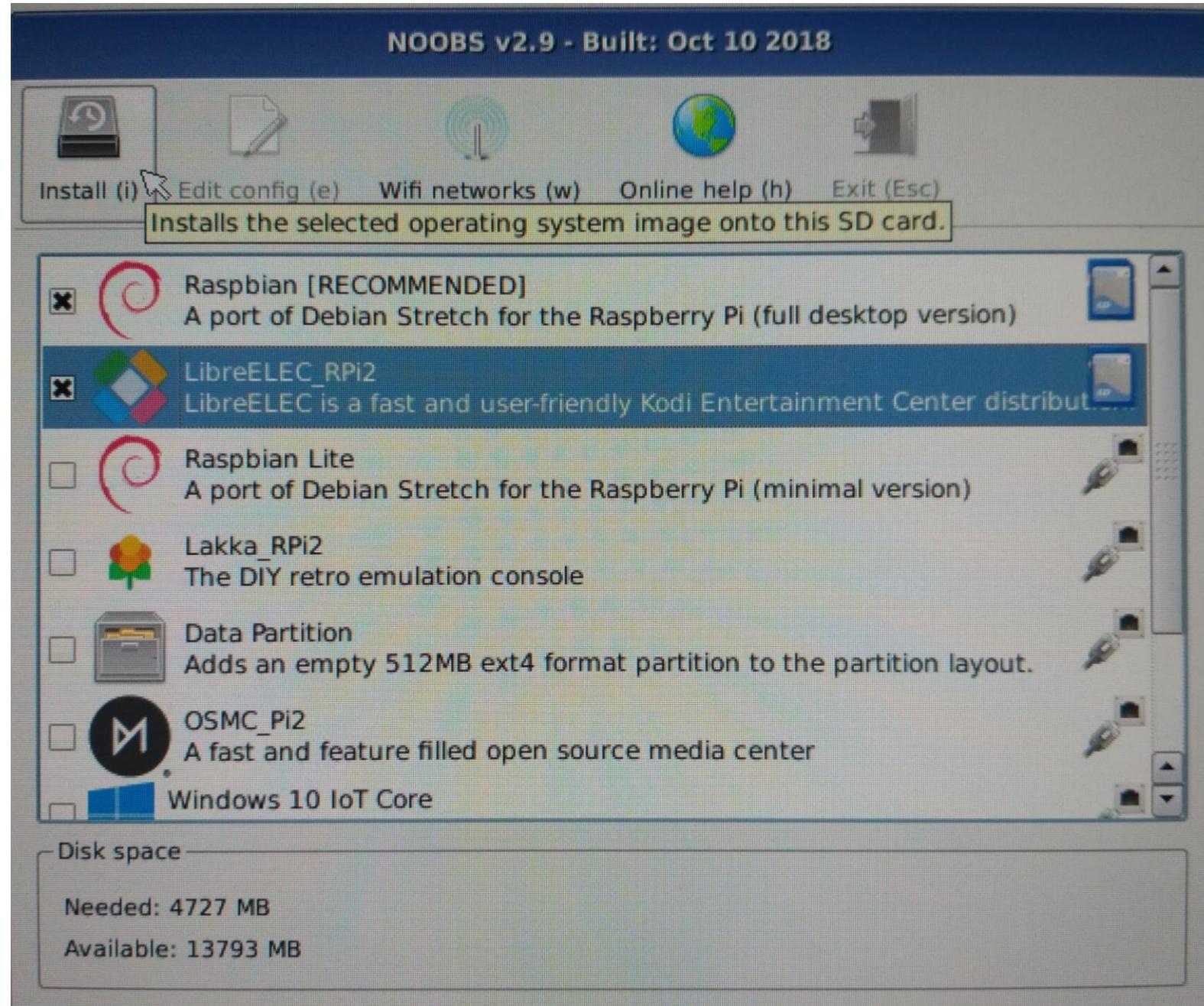


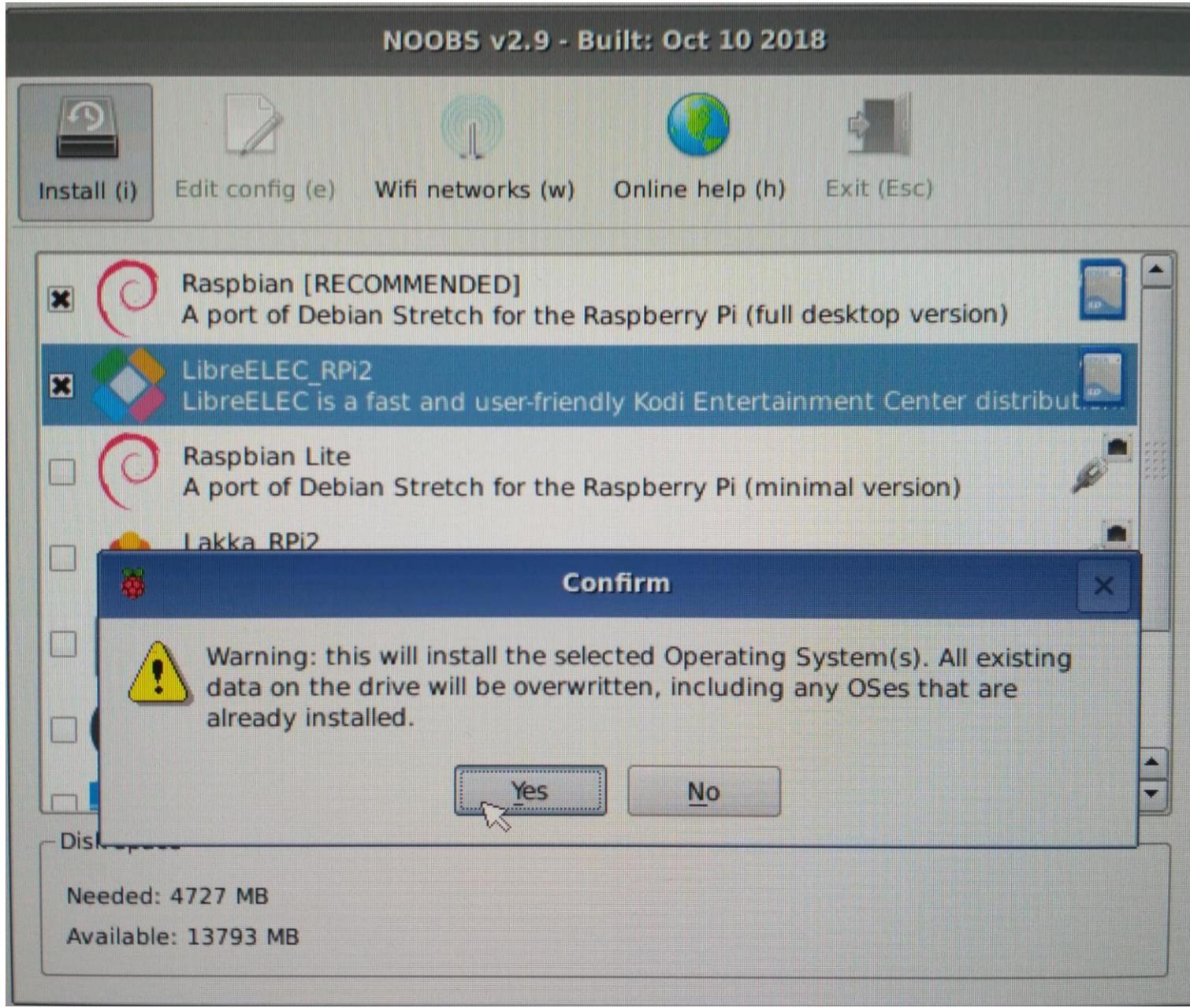
Gaurav Singal

INSTALLATION CONT...

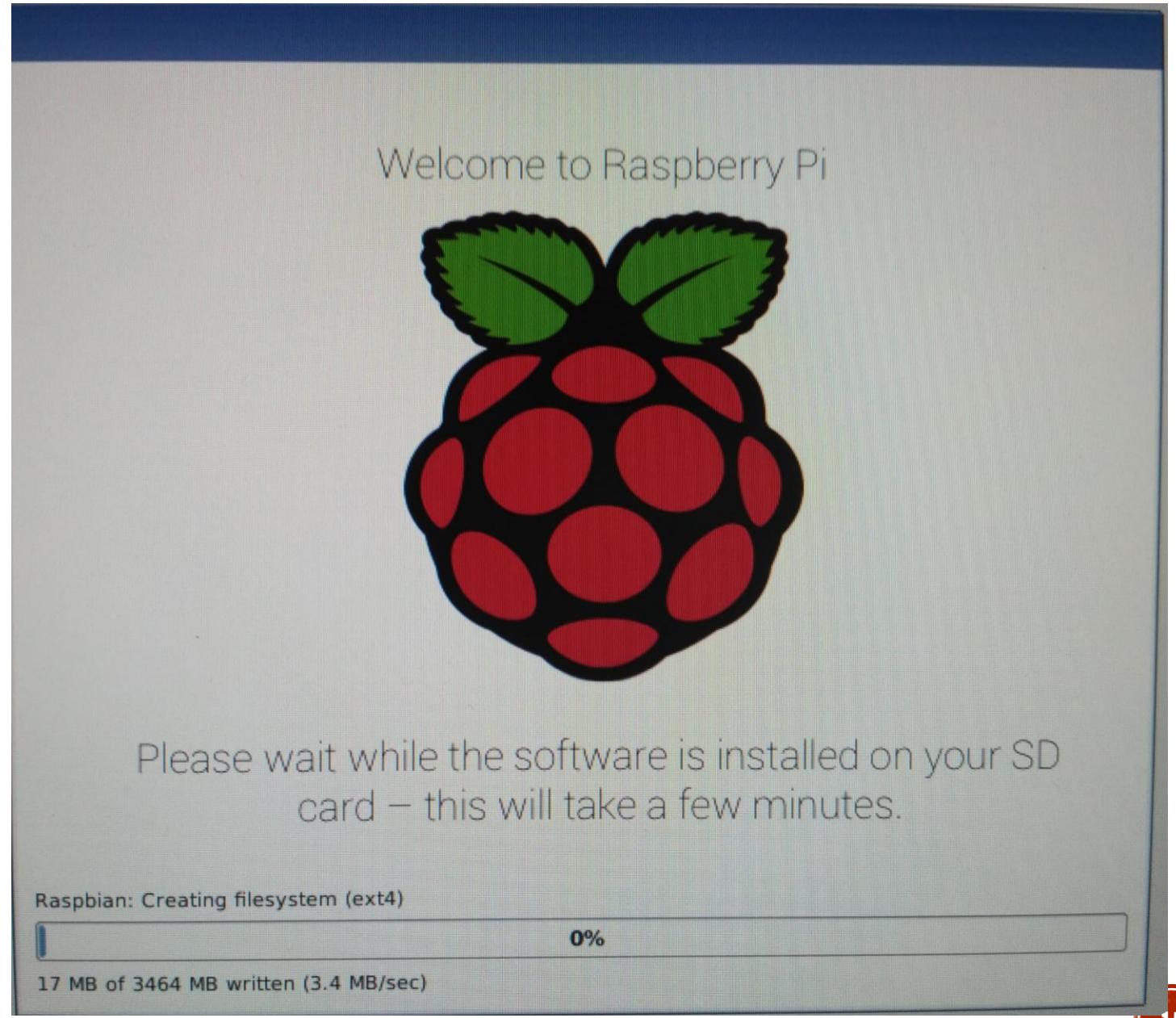
- Select HDMI output on monitor.
- You will see screen as:

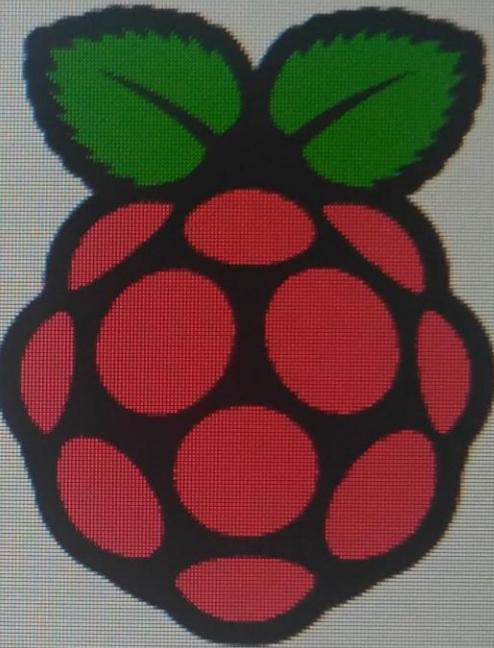
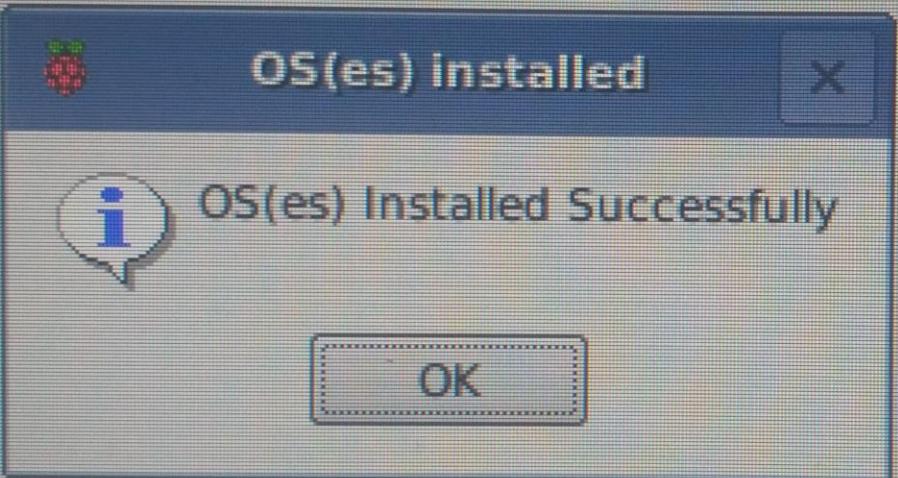


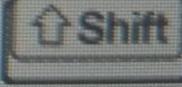


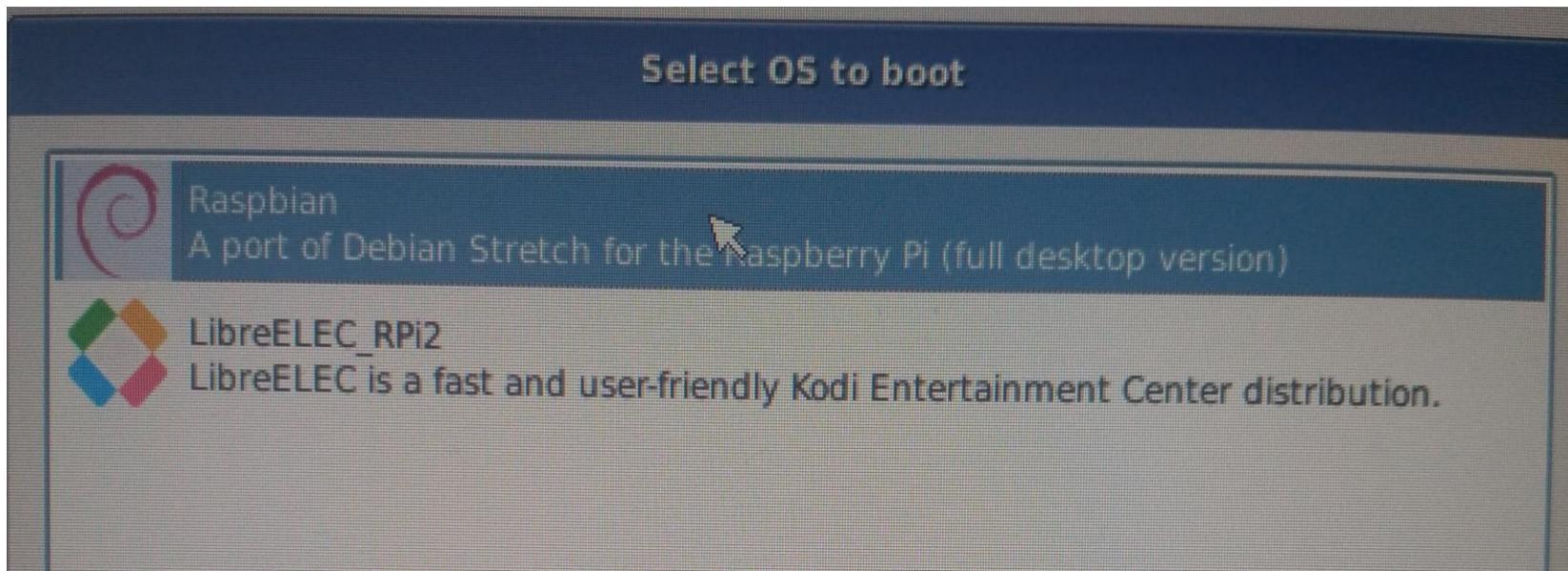


**WAIT FOR
15-20
MINUTES**

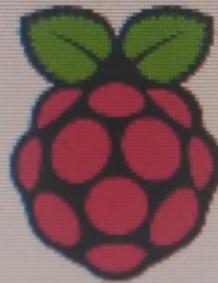




For recovery mode, hold  Shift



Welcome to Raspberry Pi



Welcome to the Raspberry Pi Desktop!

Before you start using it, there are a few things to set up.

Press 'Next' to get started.

IP : 169.254.224.241

Cancel

Next

Set Country

Enter the details of your location. This is used to set the language, time zone, keyboard and other international settings.

Country:

India

Language:

English

Timezone:

Kolkata

Use US keyboard

Press 'Next' when you have made your selection.

Back

Next

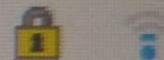
Welcome to Raspberry Pi



Select WiFi Network

Select your WiFi network from the list.

iMAC LAB



Press 'Next' to connect, or 'Skip' to continue without connecting.

Back

Skip

Next

Update Software

The operating system and applications will now be checked and updated if necessary. This may involve a large download.

Press 'Next' to check and update software, or 'Skip' to continue without checking.



Back

Skip

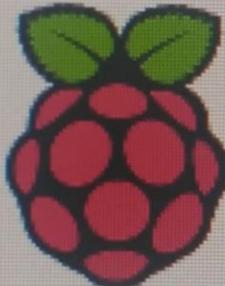
Next



Setup Complete

Your Raspberry Pi is now set up and ready to go.

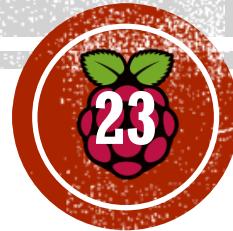
Press 'Reboot' to reboot your Pi for the new settings to take effect.



Back

Reboot

LED BLINKING



Gaurav Singal

<https://tejalal.wordpress.com/2018/10/16/led-blinking-using-raspberry-pi-and-python/>

WHAT YOU NEED ?

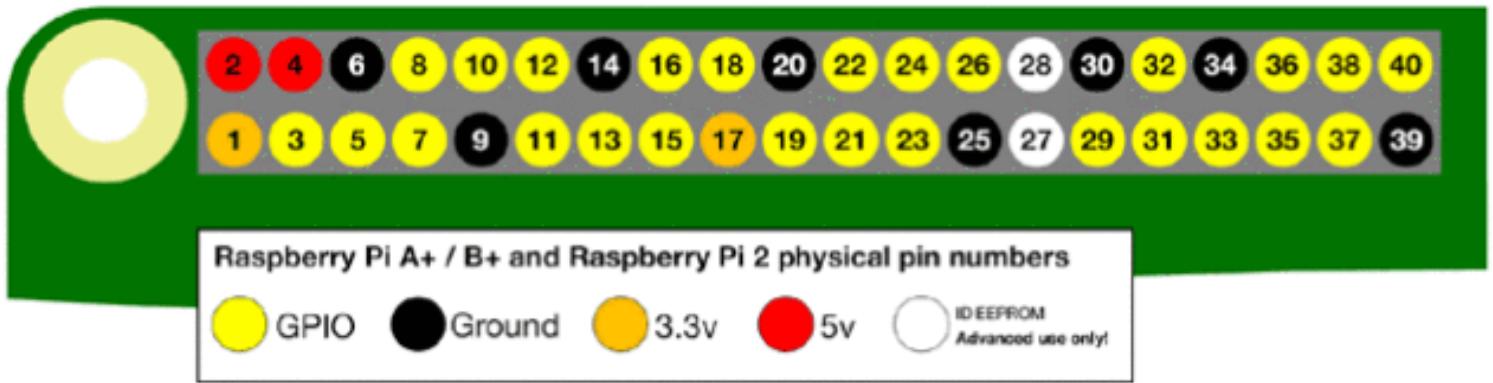
- Raspberry Pi
- Keyboard, HDMI, Mouse
- MicroSD Card
- Power Supply
- LED
- Jumper Wire
- Register 1000 om
- Breadboard

STEP 1

- Connect all the components
 - HDMI Cable, Power supply,
 - Mouse, Keyboard
 - As show in the diagram.



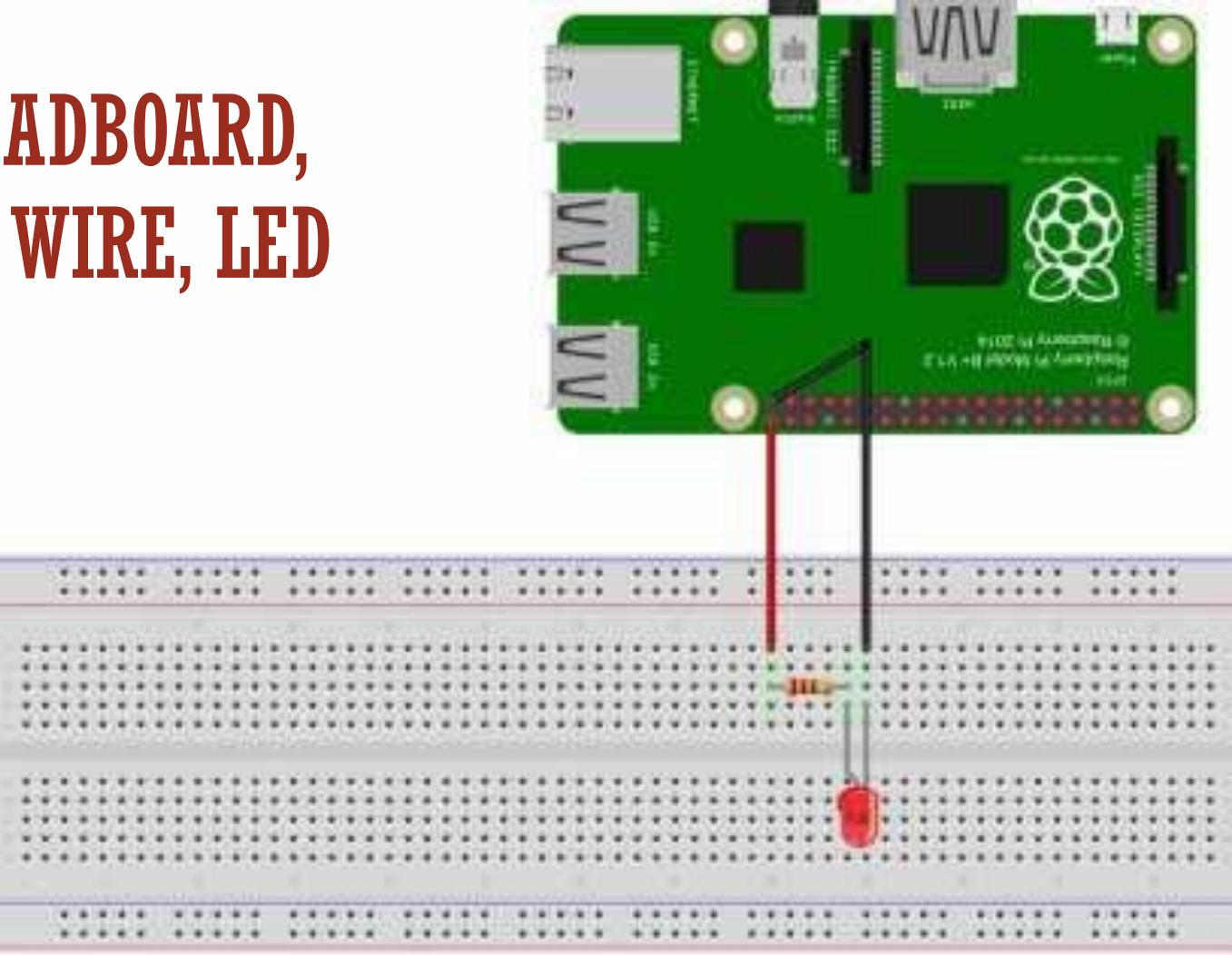
PIN LAYOUT ON PI



Gaurav Singal

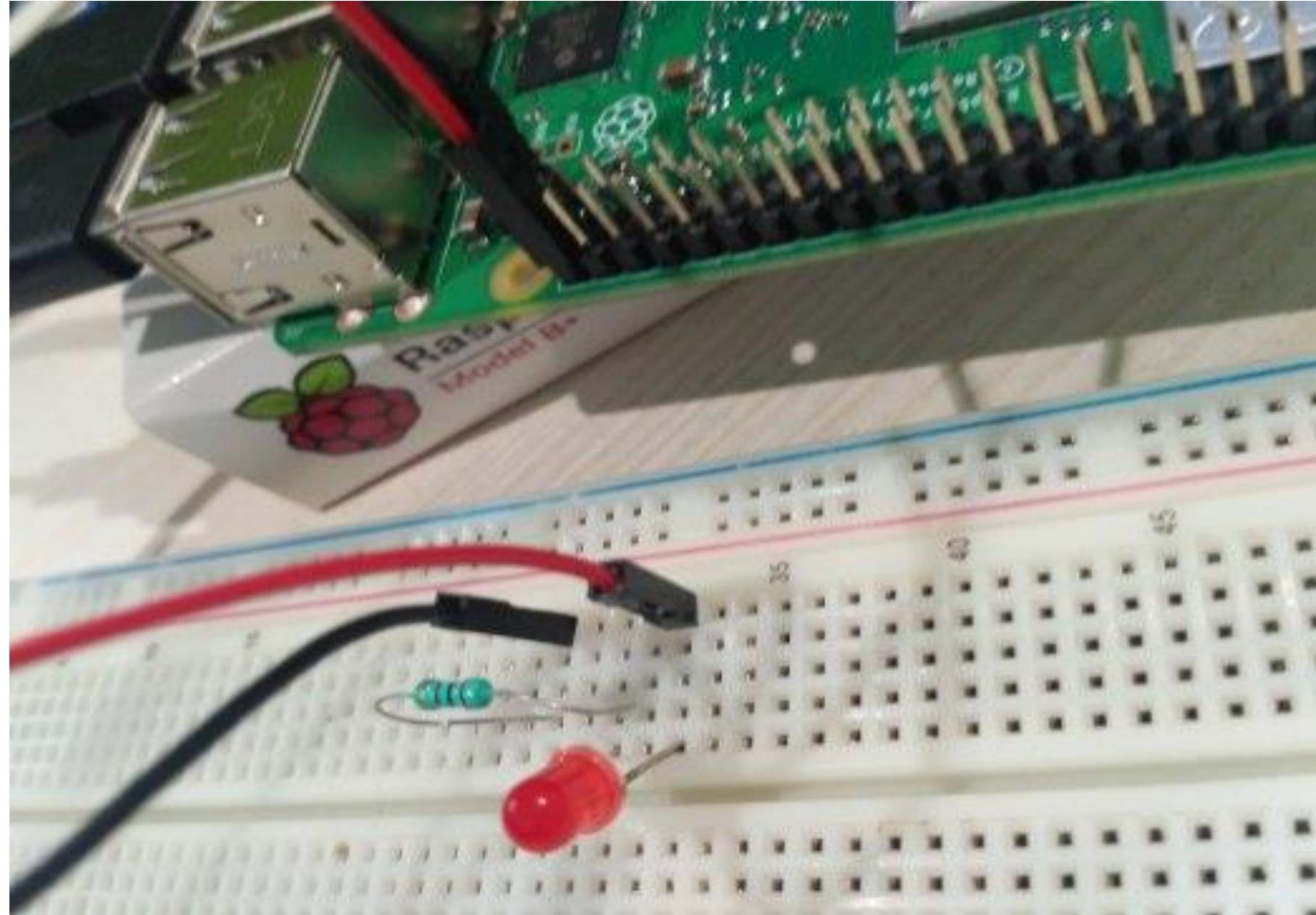
Pi Model B/B+	
3V3 Power	1 2
5V Power	3 4
5V Power	5 6
Ground	7 8
GPIO4	9 10
Ground	11 12
GPIO17	13 14
Ground	15 16
GPIO22	17 18
3V3 Power	19 20
GPIO10 SPI0_MOSI	21 22
GPIO9 SPI0_MISO	23 24
GPIO11 SPI0_SCLK	25 26
Ground	27 28
ID_SD I2C ID EEPROM	29 30
GPIO5	31 32
GPIO6	33 34
GPIO13	35 36
GPIO19	37 38
GPIO26	39 40
Ground	5V Power
5V Power	Ground
GPIO14 UART0_TXD	GPIO15 UART0_RXD
GPIO18 PCM_CLK	Ground
GPIO24	GPIO23
Ground	GPIO25
GPIO28 SPI0_CE0_N	GPIO27 SPI0_CE1_N
GPIO7 SPI0_CE1_N	ID_SC I2C ID EEPROM
Ground	GPIO12
Ground	GPIO16
GPIO20	GPIO19
Ground	GPIO21

STEP 2 : CONNECT BREADBOARD, REGISTER, WIRE, LED



- Connect **GPIO 21** (Physical **Pin 40** (5V: red wire))
- Connect **PIN 39** (**Ground**: Black)

ACTUAL CONNECTIONS



PYTHON CODE 1

```
import RPi.GPIO as IO          # calling header file for GPIO's of PI
import time                   # calling for time to provide delays in program
IO.setmode (IO.BOARD)         # programming the GPIO by BOARD pin numbers.
IO.setup(40,IO.OUT)            # initialize digital pin40 as an output.
IO.output(40,1)                # turn the LED on (making the voltage level HIGH)
time.sleep(1)                  # sleep for a second
IO.output(40,0)                # turn the LED off
time.sleep(1)                  # sleep for a second

#loop is executed second time
IO.output(40,1)
time.sleep(5) # let the LED be on for 5 second
IO.cleanup()
time.sleep(1)
```

PYTHON CODE 2

```
import RPi.GPIO as GPIO
import time
LedPin = 40
def setup():
    GPIO.setmode(GPIO.BOARD)
    GPIO.setup(LedPin, GPIO.OUT)      # Set pin mode as output
    GPIO.output(LedPin, GPIO.HIGH)    # Set pin to high(+3.3V) to off the
1
def loop():
    while True:
        print ('LED is on')
        GPIO.output(LedPin, GPIO.LOW)    # led on
        time.sleep(.5)                  # wait 0.5 sec
        print ('LED is off')
        GPIO.output(LedPin, GPIO.HIGH)   # led off
        time.sleep(.5)                  # wait 0.5 sec
```

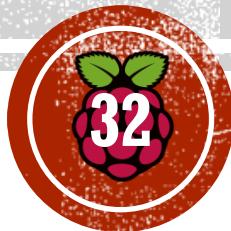
CODE 2 (CONT..)

```
def destroy():

    GPIO.output(LedPin, GPIO.HIGH)      # led off
    GPIO.cleanup()                      # Release resource

setup()
try:
    loop()
except KeyboardInterrupt: # When 'Ctrl+C' is pressed, the destroy()
will be executed.
    destroy()
```

FACE DETECTION



WHAT IS FACE DETECTION?

Face detection refers to identifying a human face in a given frame. The detection is done using a classifier which is trained to detect a face.

HOW IT CAN BE DONE?

1. Initialise a classifier trained for detecting human frontal face.
2. Read the video frame by frame.
3. Using the classifier detect each face in the frame.
4. Draw a rectangle with the obtained parameters, around the face.

WHY USE RASPBERRY PI?

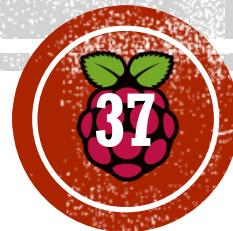
- ❑ Raspberry pi is portable, which gives the advantage of enabling face detection on portable devices.
- ❑ As face detection is the first step towards face recognition (identifying the name of person from database using facial features),
- ❑ hence it also builds up to face recognition which has wide and varied applications.

REQUIREMENTS

- RPi
- Adapter
- Micro SD Card
- Mouse + Keyboard

ALEXA (VOICE-ASSISTANT)

By Amazon



REQUIREMENTS

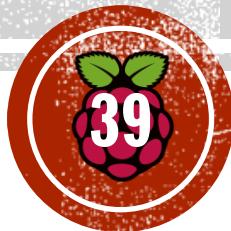
- ❖ RPi with installed OS
- ❖ Microphone and Speaker
- ❖ Adapter and cable for power
- ❖ Micro SD Card
- ❖ Mouse + Keyboard
- ❖ Amazon Developer Account (Free)

Prototyping link:

<https://github.com/alexa/alexा-avs-sample-app/wiki/Raspberry-Pi>

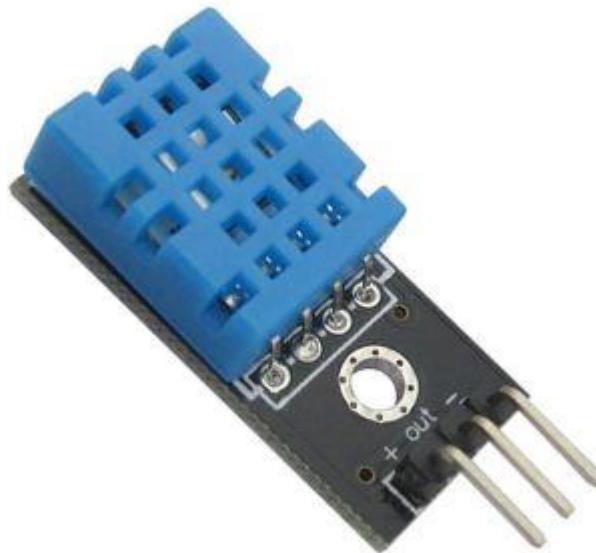
DHT11

TEMPERATURE & HUMIDITY SENSOR



COMPONENTS REQUIRED

1. Raspberry Pi
2. **DHT11 Sensor**
3. HDMI Cable
4. Power Supply
5. SD Card
6. USB Mouse & Keyboard



INSTALL ADAFRUIT LIBRARY

```
$ sudo apt-get update
```

```
$ sudo apt-get install build-essential python-dev
```

```
$ sudo git clone https://github.com/adafruit/Adafruit\_python\_DHT.git
```

```
$ cd Adafruit_python_DHT
```

```
$ sudo python setup.py install
```

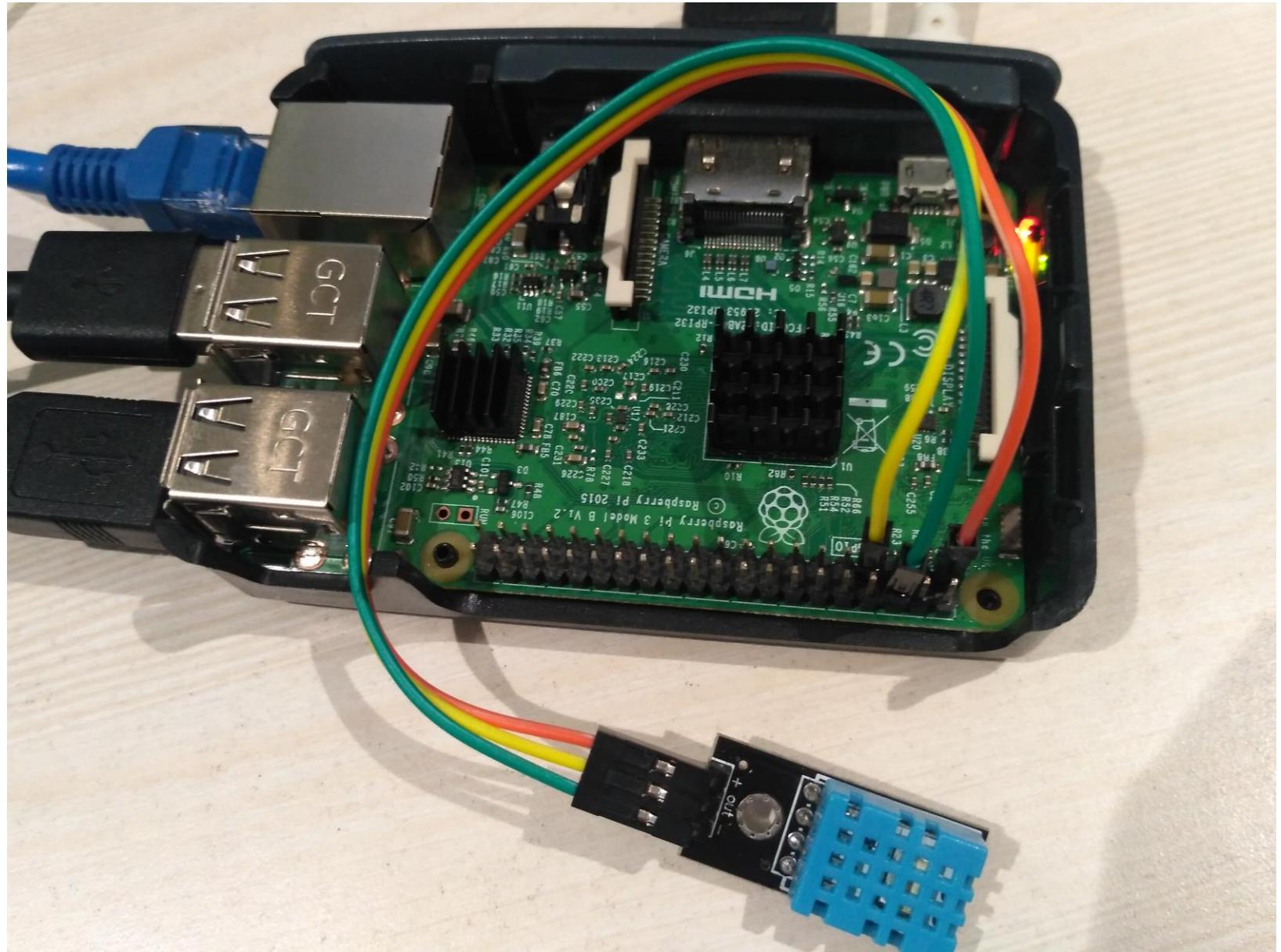
```
import Adafruit_DHT
```

CIRCUIT CONNECTION

VCC (+) -> PIN 1

OUT (Data) -> PIN 7 (GPIO 4)

Ground (-) -> PIN 6



\$ python dht11.py

PYTHON CODE: (DHT11.PY)

```
import Adafruit_DHT
sensor=Adafruit_DHT.DHT11 # Set sensor type : Options are DHT11,DHT22 or AM2302
gpio=4 # Set GPIO PIN for sensor
# 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!')
```

44

THANK YOU

Gaurav Singal