

IOT based Home Automation using Raspberry pi

Project report submitted in partial fulfilment of requirement of the degree of bachelor of technology

In

Computer science and engineering / information technology

By

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Under the supervision of

Dr. Ruchi Verma

to



Department of Computer Science & Engineering and Information Technology

Jaypee University of Information Technology Waknagat, Solan-173234,

Himachal Pradesh

Certificate

Candidates Declaration

I hereby declare that the work represented in this report is entitled “IOT based Home Automation using Raspberry Pi” in partial fulfillment of the requirements for the award of the degree of **Bachelor of Technology of Computer Science and Engineering** submitted in department of Computer Science & Engineering and Information Technology, Jaypee University of Information Technology Waknaghat is an authentic record of my own work carried out over a period from January 2018 to May 2018 under the supervision of **Dr.Ruchi Verma**,Computer Science Department.

The matter embodied in the report has not been submitted for the award of any other degree or diploma.

Student Signature

Sahil Kakkar,141303

This is to certify that the above statement made by the candidate is true to the best of my knowledge.

(Supervisor Signature)

Dr. Ruchi Verma

Computer Science Department

Dated:

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LIST OF ACRONYMS AND ABBREVIATIONS

ABBREVIATIONS	FULL FORM
AIS	Automatic Irrigation Sysem
T&H	Temperature and Humidity
I/O	Input,Output
Hz	Hertz
V	Volts
IDE	Integrated Development Environment
KHz	Kilo-Hertz
IDC	Insulation Displacement Connector

Acknowledgement

It is a pleasure that we find ourselves penning down these lines to express our sincere thanks to the people who helped us along the way in completing the project our project. We find inadequate words to express our sincere gratitude towards them.

First and foremost we would like to express our gratitude towards my training guide Dr. Ruchi Verma for placing complete faith and confidence in our ability to carry out this project and for providing me her time, inspiration, encouragement, help, valuable guidance, constructive criticism and constant interest. She took personal interest inspite of numerous commitments and busy schedule to help us complete this project. Without the sincere and honest guidance of my respected project guide I would have not been able to reach the present age.

We are thankful to Retd. Brig. S.P.Ghrera (H.O.D, CSE dept) and Mr Punit Gupta (Project Coordinator) for their support in guiding me and giving me the right direction every time I need.

SAHIL KAKKAR(141303)

ABSTRACT

- Home automation is a vital step in achieving smart grid and is ever exciting field that has blasted over past few years.
- Development in technologies have made homes more suitable, well-organized and even more protected.
- Low cost platform for joining electronic devices and various types of sensors in a home using the internet network is provided by Raspberry pi.
- Designing a smart home which can be easily controlled and monitored by the Raspberry Pi via Internet of Things is the main objective of present work.

This provides home owners a very simple, reliable and fast way to automate the environment..

Chapter -1

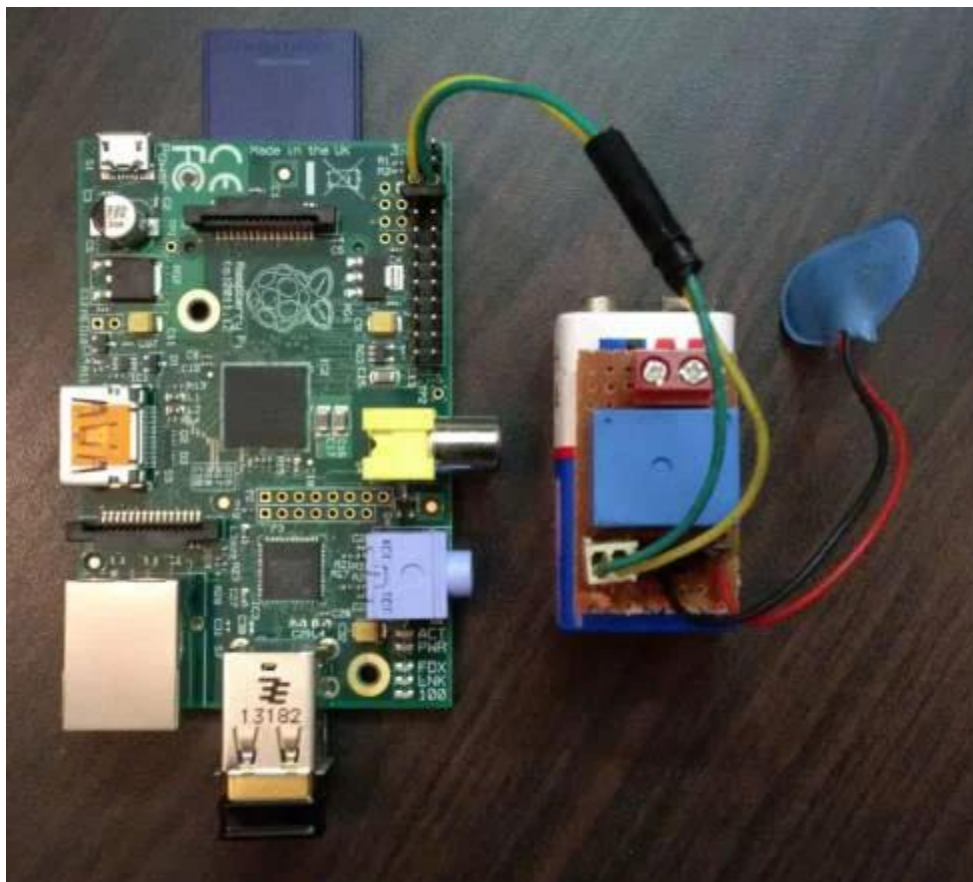
Introduction Of Project

This is an IoT based project for home automation using raspberry pi system.

It includes automation of housework,home or household activity.

It may include merged control of lighting,HVAC,machines,security locks of gates and doors and other systems.

It is used to deliver better convenience, comfort, energy efficiency and security.



Problem Statement:-

The focus of my project is on helping users to operate home appliances with their own smartphones and to help elderly or handicapped people live a more independent life as long as possible. The objective of our system is to take care of several domestic systems that may normally be difficult for those who are handicap or elderly to take care of. The proposed idea will allow a user with any android enabled device to run a piece of downloadable software on any mobile device such as a smartphones. This application will allow the user to control a device that is connected to any home appliance that is Pi enabled. The focus of this application will be to direct a security system with webcam surveillance, door sensor notification and a light control system. Sensors will be connected to the home appliances with Pi so that they can be monitored and controlled.

Suppose an employee who has gone to work and during this period a thief sneaks up into the house breaking through a window. The proposed system would enable the client to monitor his home when a door or a window sensor triggers the alarm. Client monitors his home with webcam and could immediately inform local authority or a policeman. The Client could also check the status of the outside light and turn on and off the light without the need to get out of bed. These devices would also benefit users with limited mobility that may have a difficult time getting to or even reaching their light switch. These objectives require a large amount of technology. The user interface must be as simple and powerful as possible and operate in a selforganized way.

Objective of project:-

This device uses Raspberry Pi

This is list of devices we used in system which are as follows

- 1 wifi microcontroller (Raspberry pi)
- 2 Power source is used
- 3 DS18B20 sensor
- 4 RGB led module are also used
- 5 temperature/humidity module(DST11 sensor)
- 6 light sensor
- 7 PIR Sensor
- 8 jumper wires
- 9 magnets

Methodology

Following steps are used to make this project.

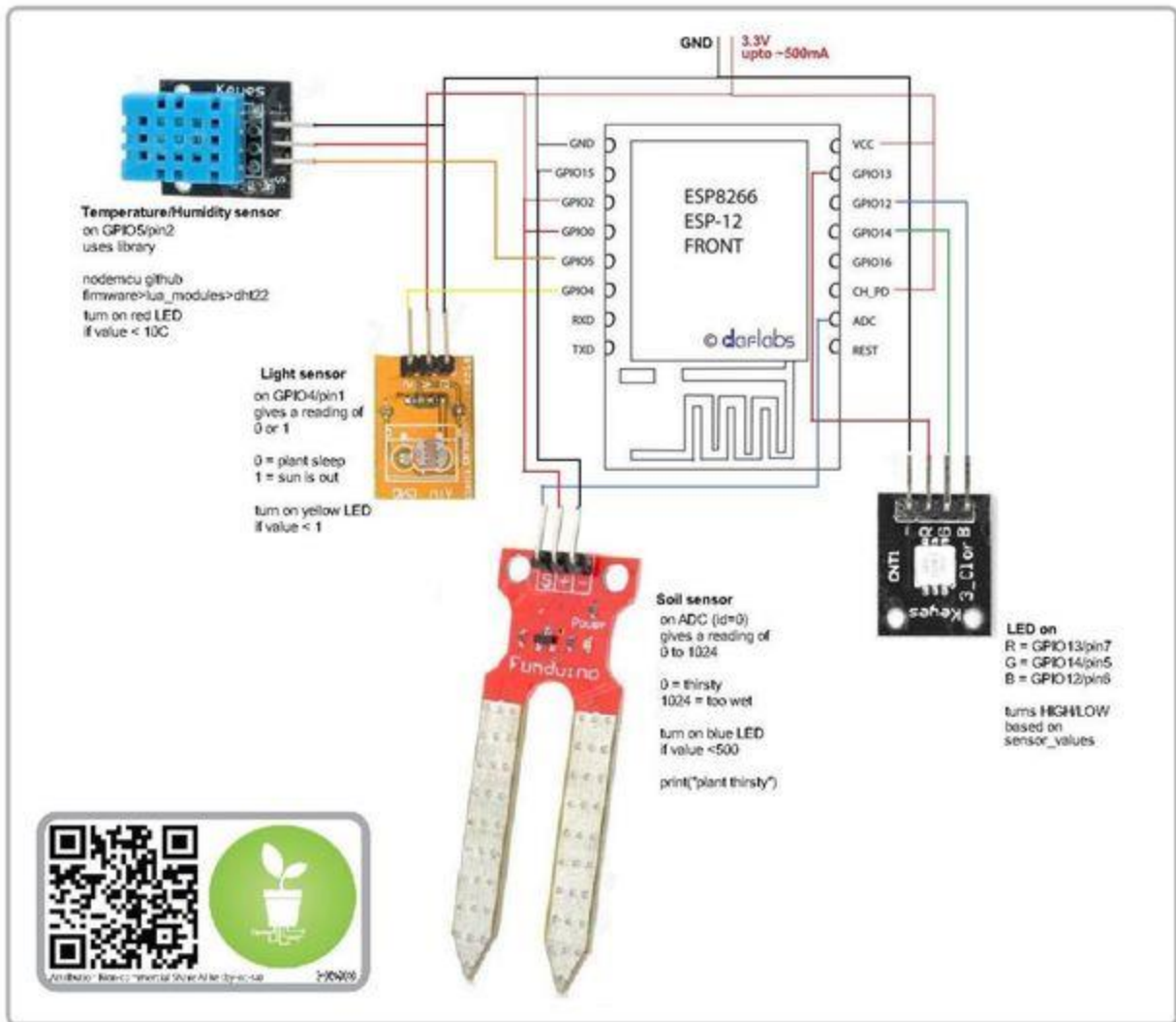
Step 1: Design

First we have to prepare design of the pot so that we can place the circuit in a different section in the pot to save it from water or any other damage.

Plant pot can be;

- hand made with clay
- cut out of existing plastic pot
- can be 3D printed (last step for updates)

2 Circuit Diagram



Step 3: Updates

This system give signals which seems that it is natural process.

If it shows green light means every condition is necessary for plant for which we are making test.

If Yellow appears, it means no light (Sleeping mode).

Read signals means plant is cold or hot all these depends upon the environment condition at that time.

If device shows blue signal it means plant is thirsty.

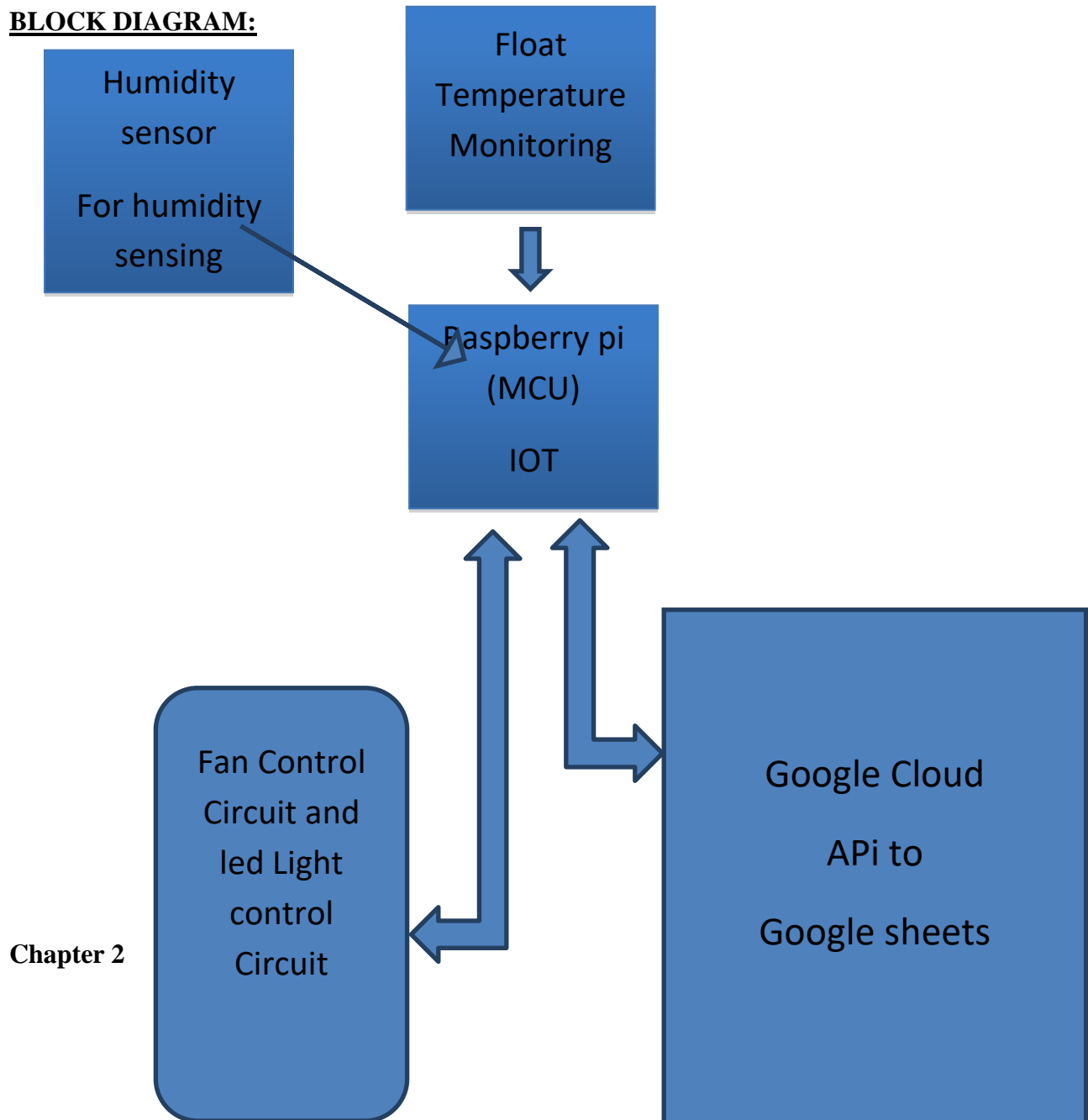
Using the app, we can always be alert on your garden.

Step 4: Temperature & Humidity Sensor

In the project, DHT11 and DHT22 digital temperature and humidity sensors are used, which is a new model for measurement. In this, temperature is displayed in C, it shows humidity in %.

The DHT11 shows 20% to 80% reading, which is 2-5% accurate, and -40 to 80 degree C temperature, which is ± 0.5 accuracy, it may increase or decrease.

BLOCK DIAGRAM:



Chapter 2

Dashboard - Netmax Te x Edit Campaign - indus x Downloads x Inbox (131) - er.rohitr... x 300Mbps Wireless N US... x My Drive - Google Drive x MIET Agriculture Cloud x

Secure | https://docs.google.com/spreadsheets/d/1jGRta3b9Ng2Py53l-6k6wd_F4CQhkgvW8mY00TQRV/edit#gid=0

MIET Agriculture Cloud Project

File Edit View Insert Format Data Tools Add-ons Help All changes saved in Drive

er.rohithosia@gmail.com

Comments Share

123 - Arial - 12 - B I U - [Icons]

	B	C	D	E	F	G	H	I	J	K	L
1	MIET Cloud Agriculture Control using Google cloud										
2	Temp	Humidity	Soil moisture Detect (1 full 0 require pump)	Human Detection	Pump On						
3	25	30	1	0	0						
4	27	31	0	0	0						
5	27	29	1	0	0						
6	27	31	1	0	0						
7	27	32	0	0	0						
8	25	30	0	0	0						
9	27	35	0	0	0						
10	27	30	1	0	0						
11	27	35	1	0	0						
12	25	33	0	0	0						
13	27	30	0	0	0						
14	27	29	1	0	0						
15	27	31	1	0	0						
16	27	33	0	0	0						
17	27	34	0	0	0						
18	27	36	0	0	0						
19	25	29	0	0	0						
20	26	34	0	0	0						
21	25	33	0	0	0						
22	27	32	0	1	0						

Chart title

Left vertical axis title

Horizontal axis title

Legend: MIET Cloud Agricult (blue bars), Humidity (red line)

Sheet1

14:38 03-05-2017

CHAPTER 2

LITERATURE SURVEY

Literature Survey 1

Authors:-

Magnusson,Lennart | Hanson,Elizabeth Borg

Abstract:-

This writing study focused on the utilization of data and correspondence innovation (ICT) as a help for delicate more established individuals living at home and their family carers. Various worldwide maturing thinks about analyzed more established individuals' demeanors towards new innovation and the impacts of preparing on mentalities and openness towards technology.In specific, there are imaginative cases of concentrates that inspect the utilization of a scope of data and emotionally supportive networks in the home.

Literature Survey 2

Author:-

Manish Yadav

Abstract:-

The HomeAutomation is a remote home computerization framework that should be executed in existing home environments,without any adjustments in the foundation. HomeAutomation let the client to control the home from his or her PC and relegate activities that ought to happen contingent upon time or other sensor readings, for example, light, temperature or sound from any gadget in the HomeAutomation organize.

Literature Survey 3

Author:-

Neha Malik, Yogita Bodwade

Abstract:-

One of the most famous topics nowadays is Home Automation System because of its many advantages. Home automation means remotely monitoring and controlling of home appliances. With the endless growth of the Internet and its applications, there is a wide scope of controlling devices remotely. This paper deals with argument of different intelligent home automation systems and technologies from a various types viewpoint. The effort targeted on the home automation concept of where the controlling and monitoring operations are expediting through smart devices. Wide-ranging home automation systems and technologies considered in review with central controller based (Arduino or Raspberry pi), cloud-based, Bluetooth-based, SMS based, ZigBee based, mobile-based, RF Module based, web based and the Internet eith performance.

Literature Survey 4

Author:-

Arun Cyril Jose and Reza Malekian

Abstract:-

This paper gives a detail about different home automation systems and technologies from a security point of view. This tells about the various security problems in existing home automation systems. It tells us that how the problem of security an meaning of the word intruder has grown over time. The challenges in home automation security are examined from the homeowner and security engineer's point of view. It tells us why Home automation can be easily attacked by attackers. It points out the role of user interfaces in security. In the conclusion, it explains in which future directions, Home Automation Security Research could ake place.

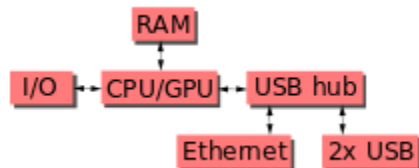
Chapter 3 SYSTEM ANALYSIS AND DESIGN

HARDWARE

Micro controller: micro controller is single integrated system used in project. It is like a small computer. we use one or more cpu along with microcontroller to handle the input and output in the system. Microcontroller are used in automatic products and devices, i.e. electronic devices such as to control Tv, fans etc. First microcontroller was built with 4-bit Intel 4004 in year 1971.



Raspberry pi:- Raspberry pi is a small computer device which is used to learn programming, it is basically a machine learning system. i.e. to connect hardware with a computer using different programming languages such as Python, Java etc.



There are many kinds of Raspberry pi versions available like

first version was released in february 2012 (Raspbeery pi 1 Modal b)

This model was very simple.

in the year 2014 new model B+ was released with board ,this was thmodified version of A and B model ,it was called "compute" model.

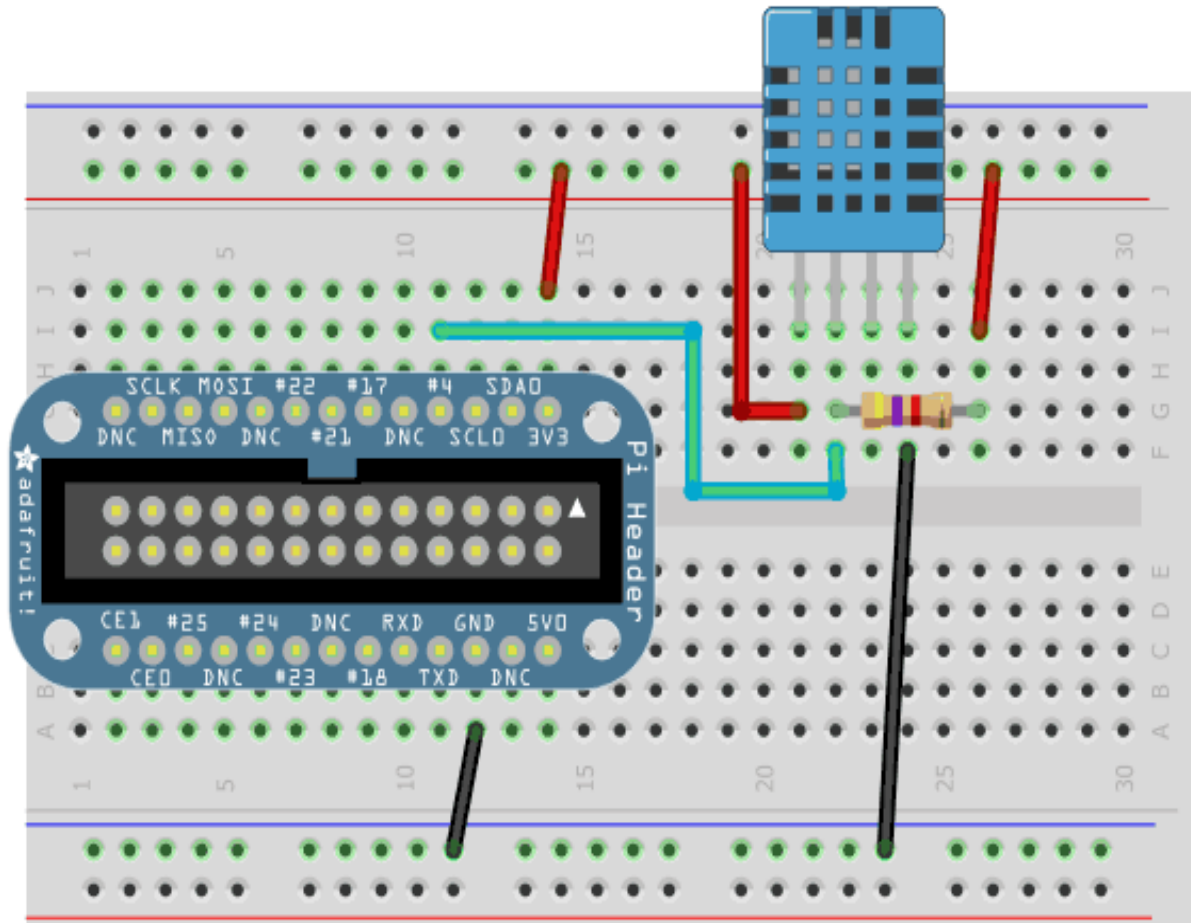
Raspbeery Pi 2 was reasled in 2015 which added more Rams in the system.

Then year 2016 new Raspbeery Pi 3 was realed which is newest model in series with 20- 35 ameriacn dollar prices.

In February 2016, the Raspbeery Pi company declared that they sold 8 million devices, it show that our products is best selling personal computer.



Ram Used in Raspberry Pi



Random access memory which store the data and machine code.

Software Uses In the project:-

Python:-

Python was developed By Guido van Rossum in late eighties and early year of nineties in the country Netherlands.

Python is combination of many other languages like c, c++,Modula 3 etc.

Python is copyright under GNU(General Public Lincence(GPL)).

Python language has many features over other languages like

Python is simple language, it has simple syntax.

Python is easy to learn.

It is easy to maintain the python source code.

we can import librarires in pyhton like mathematical function, science function, and database functions.

Python is now uss Machine learing program bordaaly i.e to intreact with hardware devices like microcontroller and othet computer system .

Python language is portable i.e we can execute python source code on different machine i.e 32-bit or 64-bit operating system.

It can be run on differnt opearting system like on window,linux etc.

Python is an machine independt lanague.

Its execution is fast.

We can use GUI(graphical user interface) programing to design the software according to user requirement.

Python is scalable language.

It supports automatic grabge collection from program to remove unused memory references.

I.e it uses exeception handling i.e we can use following clauses to check errors in the program

try{}

catch()

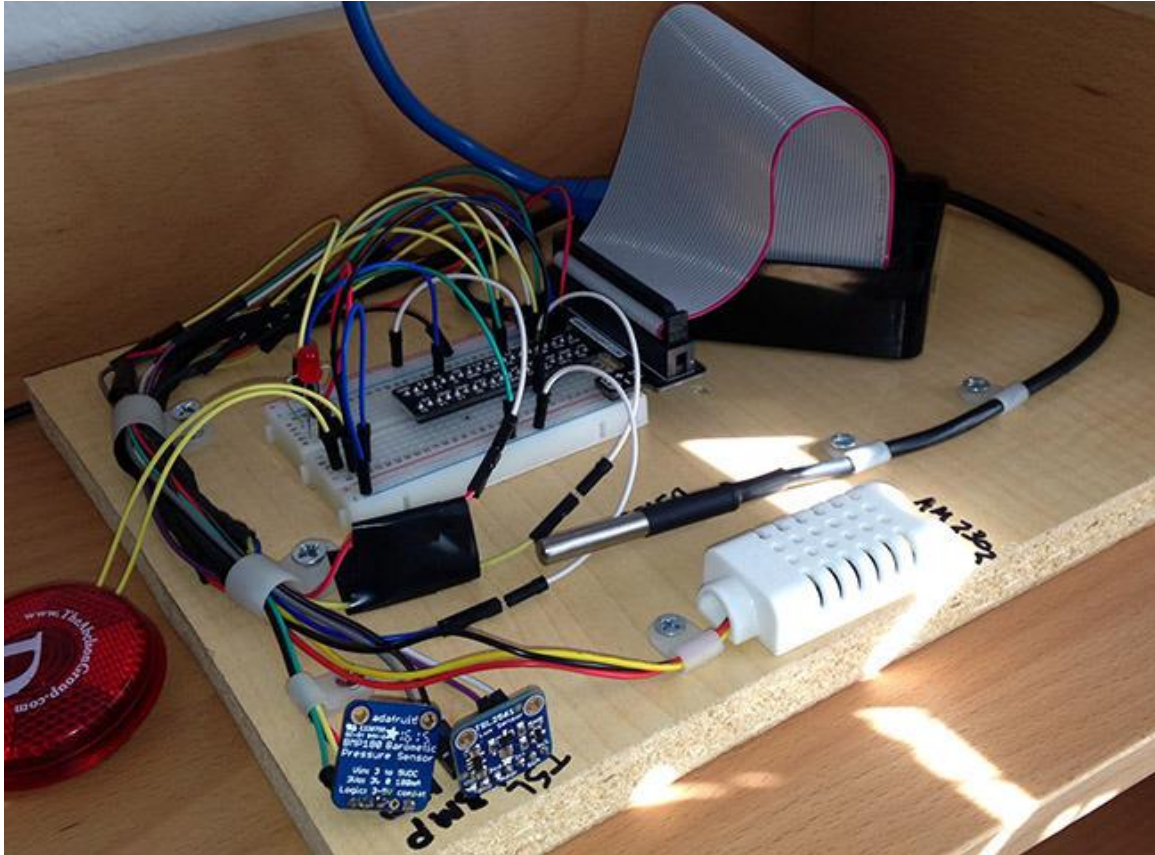
thorw

throws

finnally block.

Python can be used in web application also

we use Dganjo and Flask framework to develop web application.



Operators uses in the python:-

+-----> This operator is used to add the two values like

a=10

b=10

c=a+b

_ This is used to subtract the values

*-----> Multiplication operators

/ division opeartors

% Modulas -- to get remainder of the 2 values

//--> floor division results into whole number adjusted to the left in the number line

Comparision operators

< less than

> greater than

<= less than equal

>= greater than equal

!= not equal operators

== equal to operators

For examples

```
a = input("Enter the first number: ")
```

```
b = input("Enter the second number: ")
```

```
c=input("enter the third number ")
```

```
# if a is b: - Compares id's, and can cause inconsistencies. Use == instead.
```

```
if a > b and a>c:
```

```
    print ("Both inputs are equal")
```

```
elif (b>c):
```

```
    print ("B is greater")
```

```
else:
```

```
    print("c is greater")
```

Logical operator to combine the condition

And

Or

Not

bitwise operators

& This is bitwise and

!- This is bitwise or

~ This is bitwise not

^--- This is bitwise xor operators

are used to compare the digital values

Membership operators are also used.

Python has five standard data types -

```
def greet(name):
```

```
    """This function greets to
    the person passed in as
    parameter"""
    print("Hello, " + name + ". Good morning!")
```

```
import pymysql
```

```
connection = pymysql.connect(
```

```
    host='localhost',
```

```
    user='root',
```

```
    password="",
```

```
    db='myphp8',
```

```
)
```

```
try:
```

```
    with connection.cursor() as cursor:
```

```
        sql = "INSERT INTO todos (title,desc1,date) VALUES('aa','daa','date')";
```

```
        try:
```

```
            cursor.execute(sql)
```

```
            print("Task added successfully")
```

```
        except:
```

```
            print("Oops! Something wrong")
```

```
connection.commit()
```

finally:

```
connection.close()
```

```
print('Hello {name}, {greeting}'.format(greeting = 'Goodmorning', name = 'John'))
```

Numbers----- for represnation integer values

String----- it is use to handles string values

List---- it is used to hanles arrays[1,33]

```
list1 = ['physics', 'chemistry', 1997, 2000];
```

```
list2 = [1, 2, 3, 4, 5, 6, 7 ];
```

```
print("list1[0]: ", list1[0])
```

```
print ("list2[1:5]: ", list2[1:5])
```

Tuple it also used to handles array list like(33,55,66,)

Dictionary

Python supports four different numerical types -

int (signed integers)

long (long integers, they can also be represented in octal and hexadecimal)

float (floating point real values)

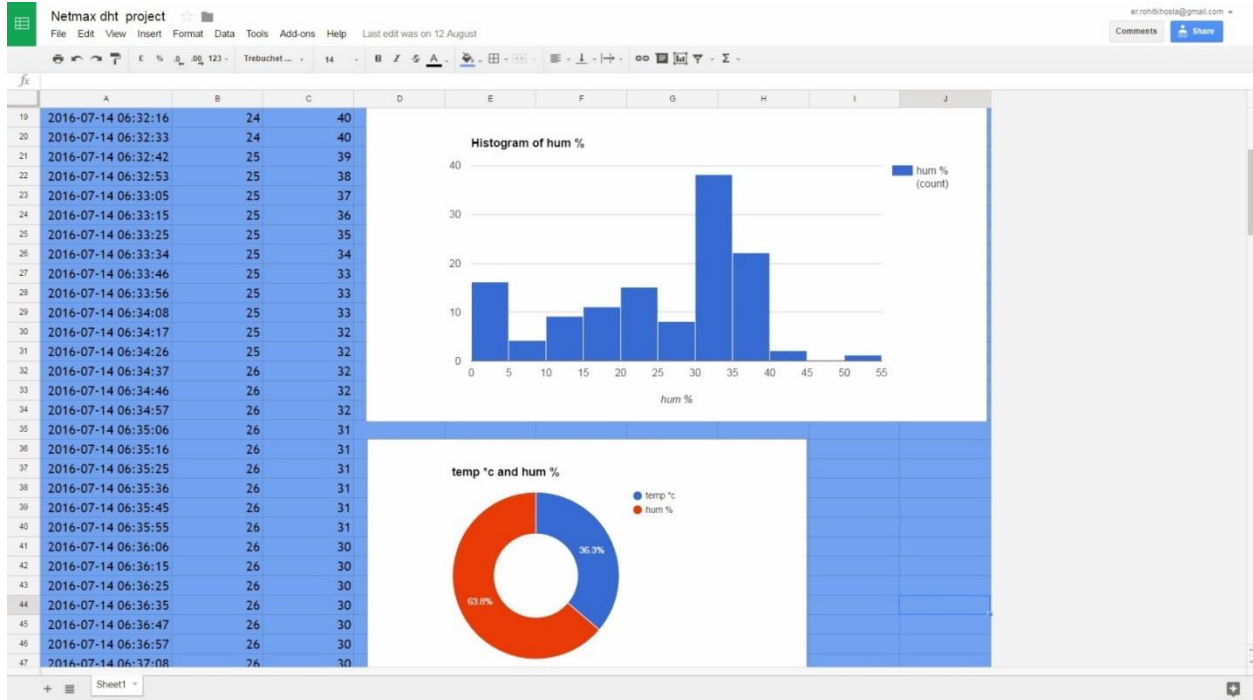
```
def printme( a,b ):
```

```
    print (a+b)
```

```
    return
```

Now you can call printme function

```
printme(4,5)
```



To connect with cloud through google

First create a console in google developers console like as

Create or choose an app

App name

Food Delivery App ▼



A new project with Android support will be created for you in the [Google Developers Console](#).

Android package name

com.my.package.name ▼

- Share your [Google Mobile Developer Services](#) data with Google to help improve Google's products and services. This includes sharing with Google technical support, account specialists, and anonymous data for benchmarking. If you disable this option, data can still flow to other Google products that are explicitly added.

Your country/region: ▼

CONTINUE TO
Choose and configure services →

Then in secondly click here

Choose and configure services

✓ You are configuring the **Food Delivery App** app with package name `com.my.package.name`.

Select which Google services you'd like to add to your app below.



Google Sign-In



Cloud Messaging



Analytics

Google Sign-In

Get users into your app quickly and securely

[LEARN MORE](#)

To use Google Sign-In, you'll need to provide the SHA-1 of your signing certificate so we can create an OAuth2 client and API key for your app.

Android Signing Certificate SHA-1

62:ED:38|7E:85:D3:86:A8:DF:EE:6B:86:4B:D8:5B:0B:FA:A5:AF:82

[How do I find my SHA-1?](#)

ENABLE GOOGLE SIGN-IN

3 now select a project as

Select or create a project

The Google Developers Console uses projects to manage resources. To get started, select an existing project or create a new one.

Select a project

Food Delivery App (food-delivery-app-449a0)

Continue

Go directly to google developers console

API Manager

Credentials

Overview

Credentials

Create credentials Delete

Create credentials to access your enabled APIs. Refer to the API documentation for details.

API keys

Name	Creation date	Type	Key
Android key for com.my.package.name (auto created by Google Service)	Jan 31, 2016	Android	AlzaSyCLa3zkW0FTWbS3B-LTr79xV08EPx0Kcc

OAuth 2.0 client IDs

Name	Creation date	Type	Client ID
Web client	Jan 31, 2016	Web application	566578178937-j2rod98x71e11cfv4bre1j69aho93s.apps.googleusercontent.com
Android client for com.my.package.name	Jan 31, 2016	Android	566578178937-d0ak11cd5p61e68qc0tr2ul1acr9ilt.apps.googleusercontent.com

Web server OAuth client (auto created by the setup wizard if applicable)

Click to download the JSON configuration for your server

Now enter project credentials like

Google Cloud Platform

RPI API Manager

Credentials

Overview
Endpoints
Credentials

1. Create additional OAuth client id

API key
Identifies your project using a simple API key to check quotas and access. For APIs like Google Translate.

OAuth client ID
Requests user consent so your app can access the user's data. For APIs like Google Calendar.

Service account key
Enables server-to-server, app-level authentication using robot accounts. For use with Google Cloud APIs.

Help me choose

OAuth 2.0 client IDs

Name	Creation date	Type	Client ID
Web client	Jan 31, 2018	Web application	944578178907j2odf8r7i1cfr4abx1j99ho93s.apps.googleusercontent.com
Android client for com.my.package.name	Jan 31, 2018	Android	354578178907-80sk71cd8p61ebbc0x12u1aon9ft.apps.googleusercontent.com

Your first Android OAuth client created by the Getting Started setup wizard

Circuit connection of Raspberry pi

Now use

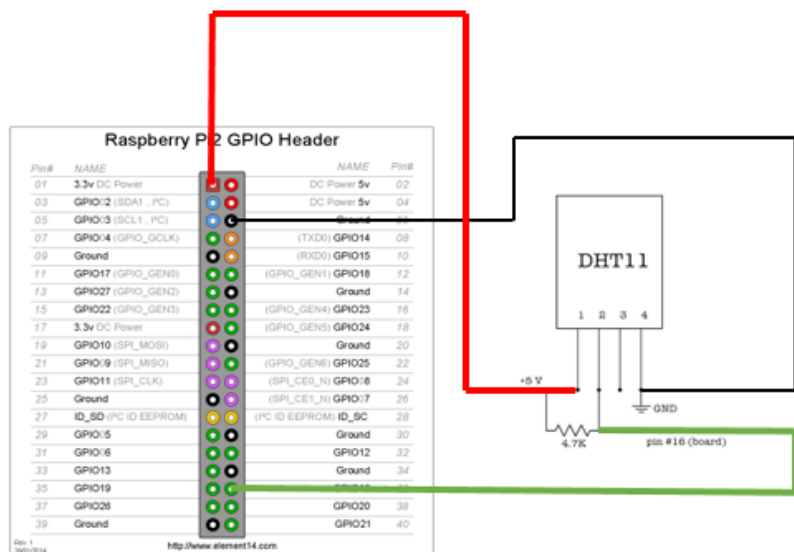


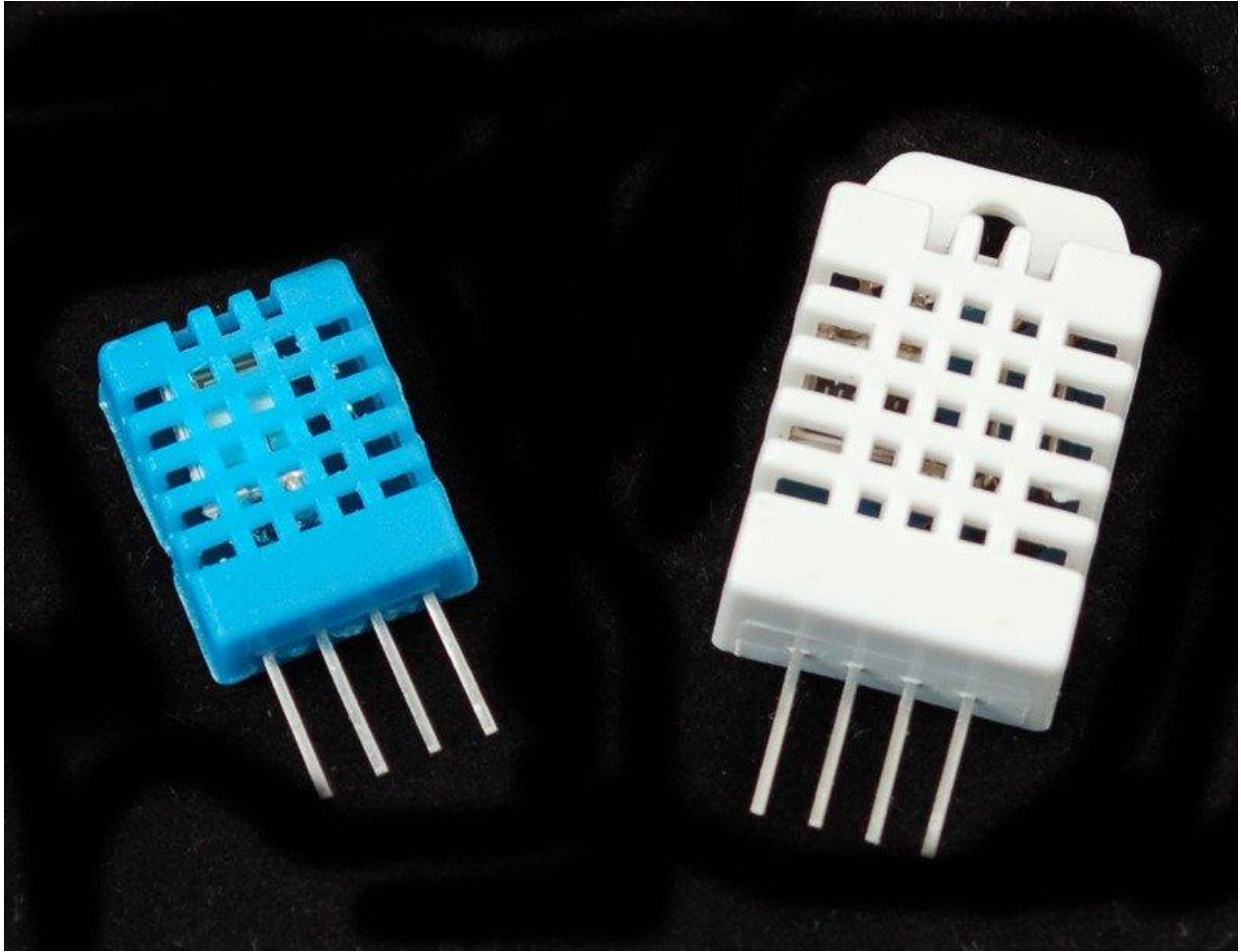
Figure 1 Schematic Diagram



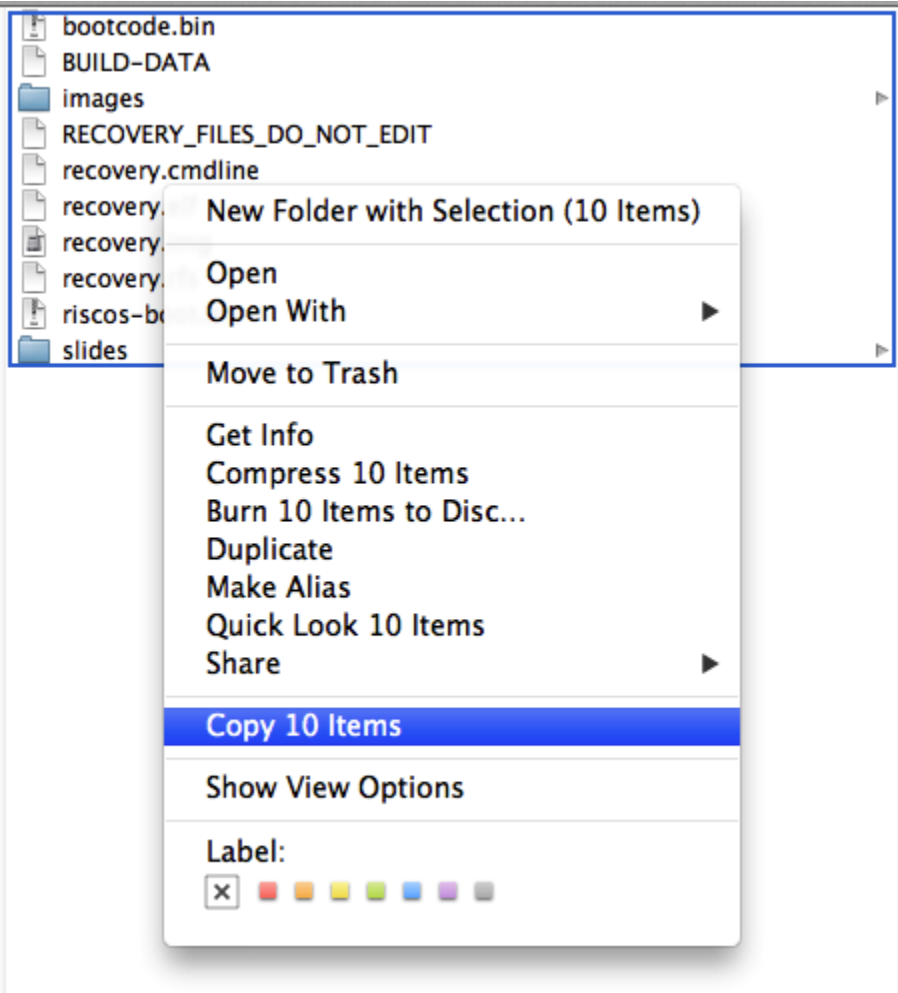
dht11 and dht22 digital temperature and humidity sensor are used which is new model for measurement .

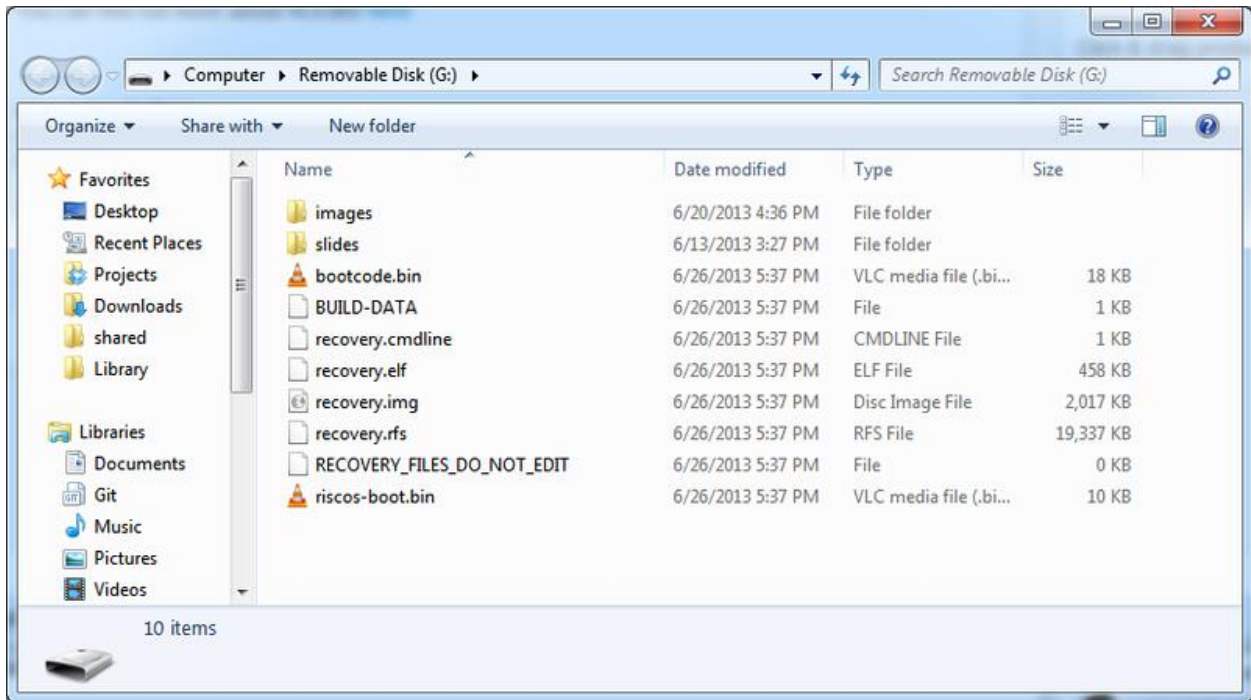
In this temprature is displayed in C.

it show humidity in %

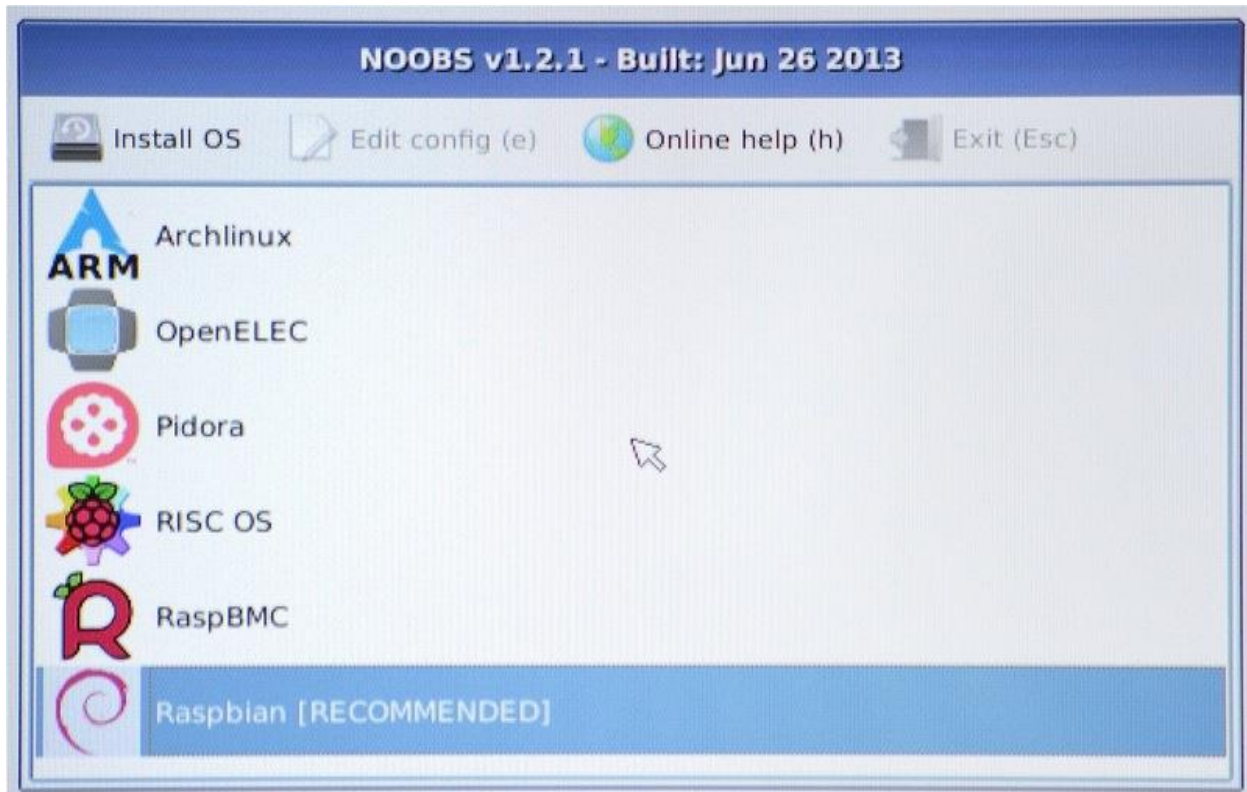


SD Card uses like





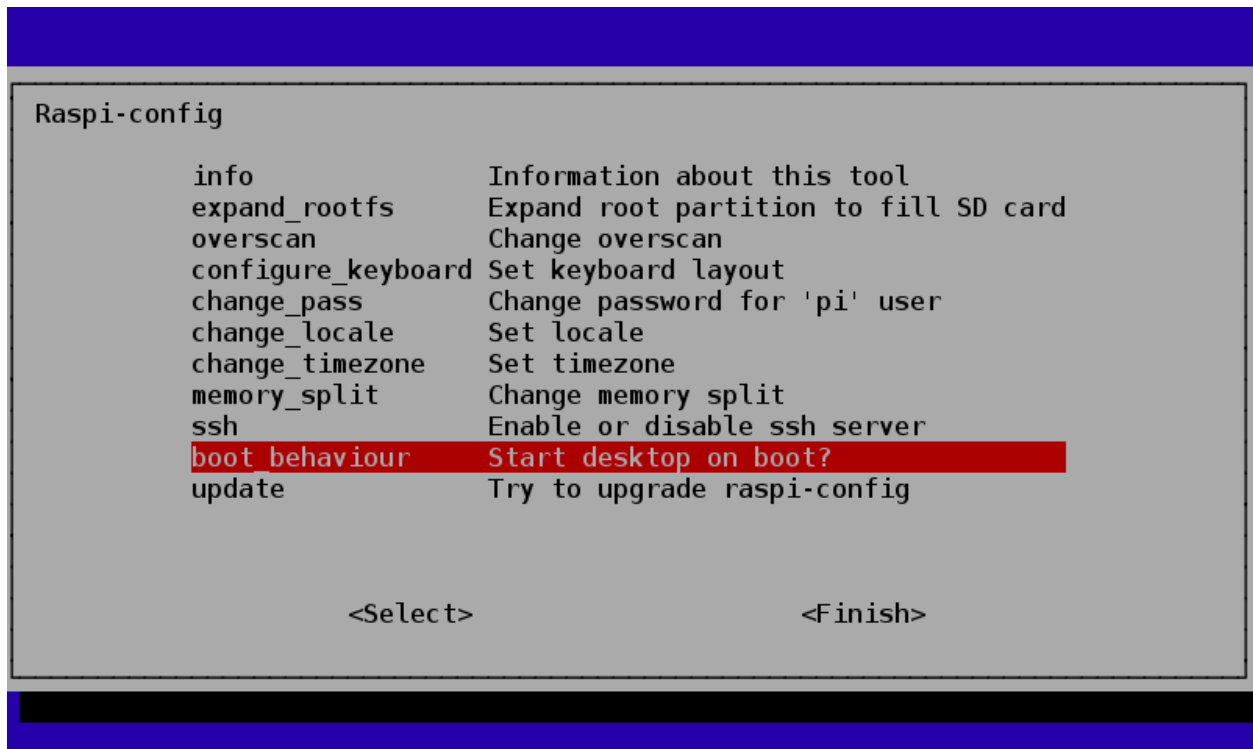
Then boot your Raspberry pi like



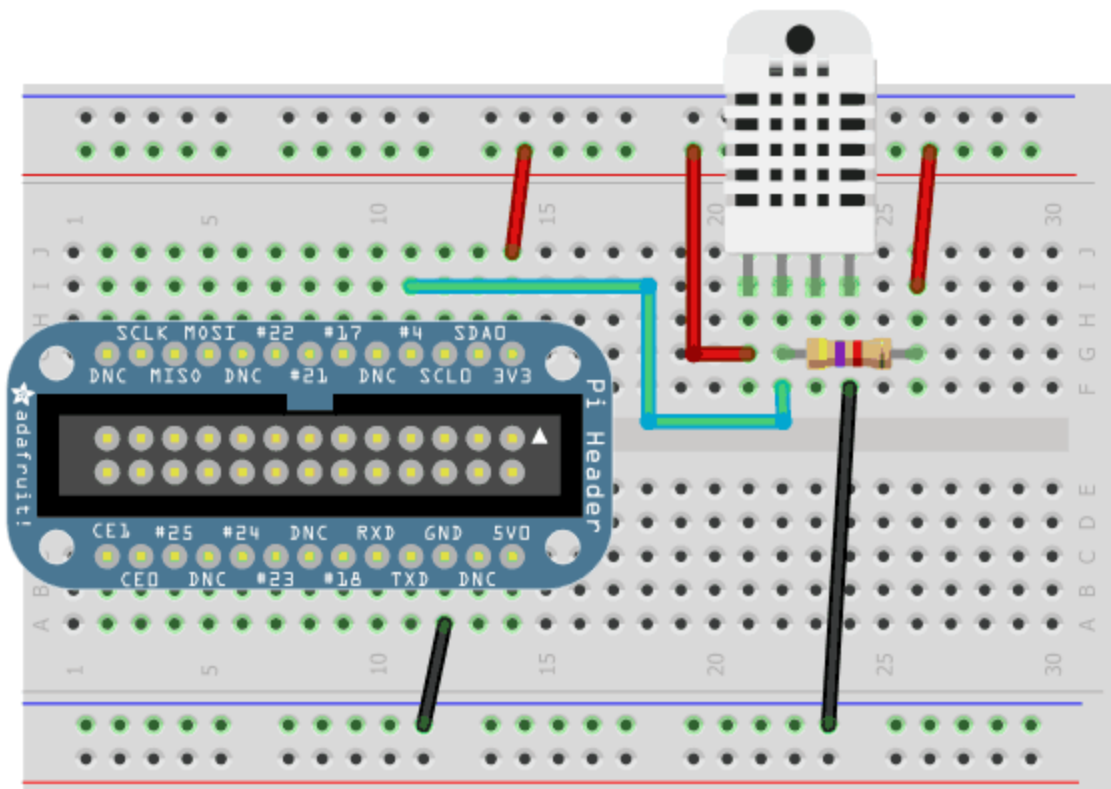
Then welcome screen will be shown like



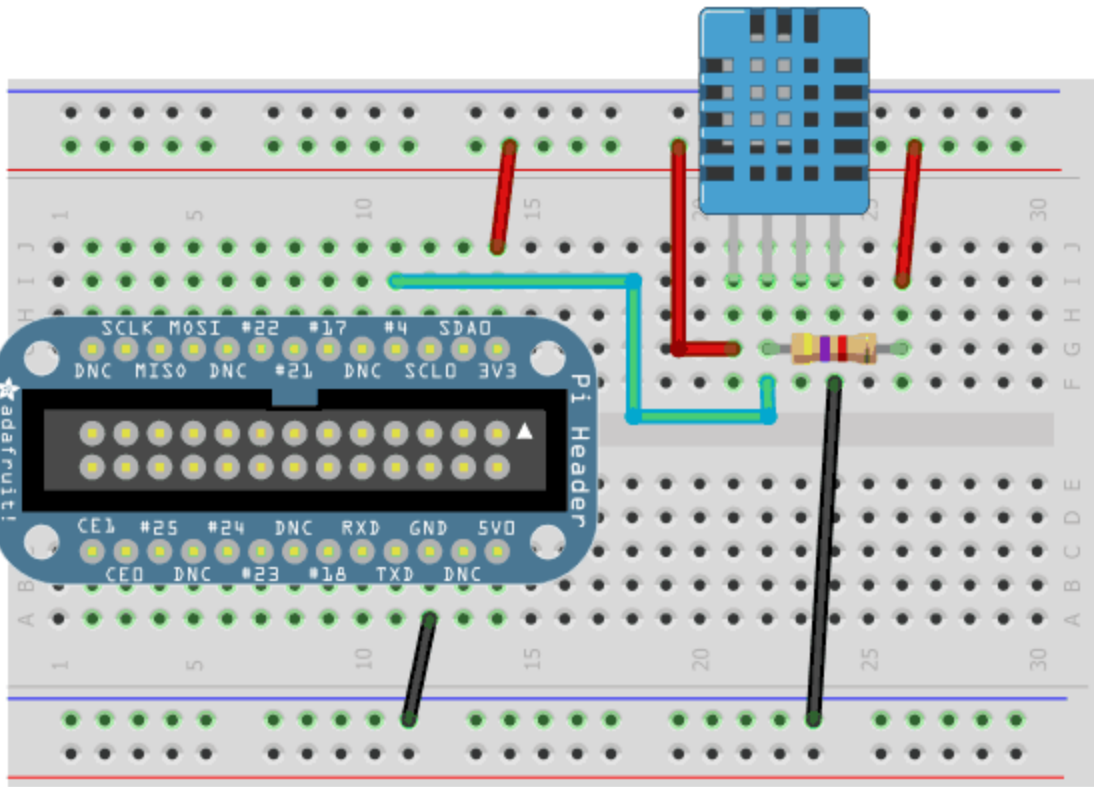
Once it copy data than image shows like than next step



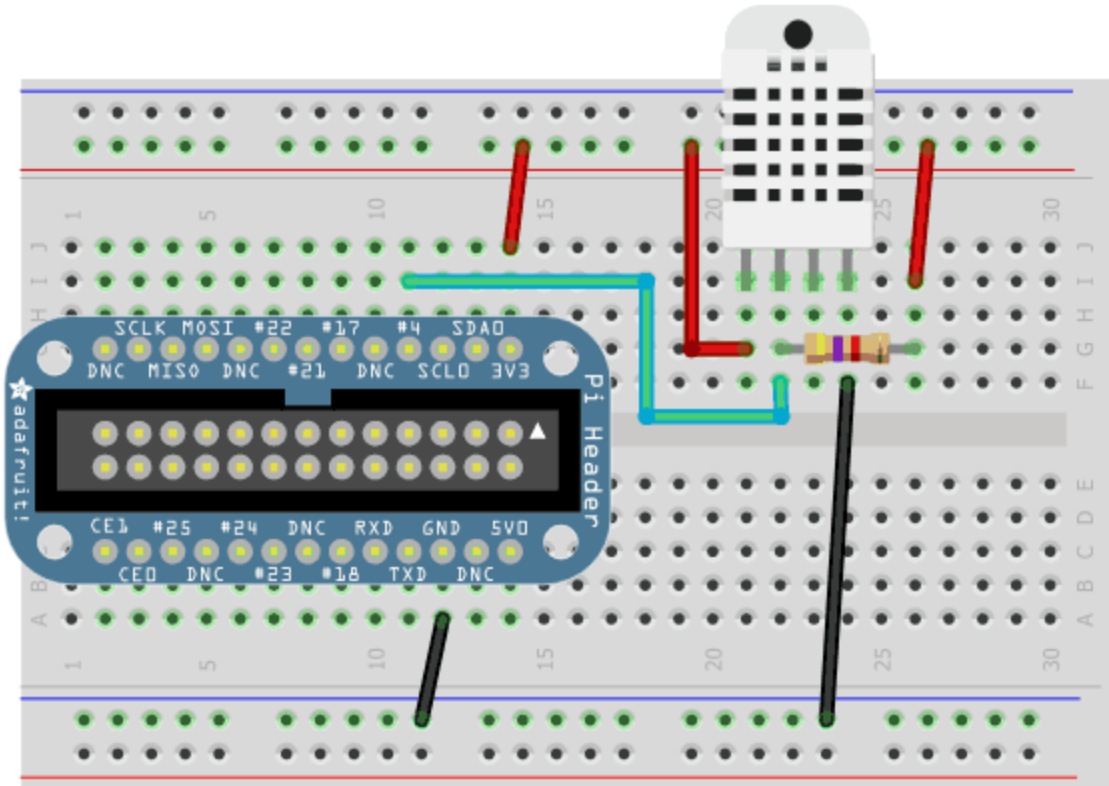
On noobs it look like



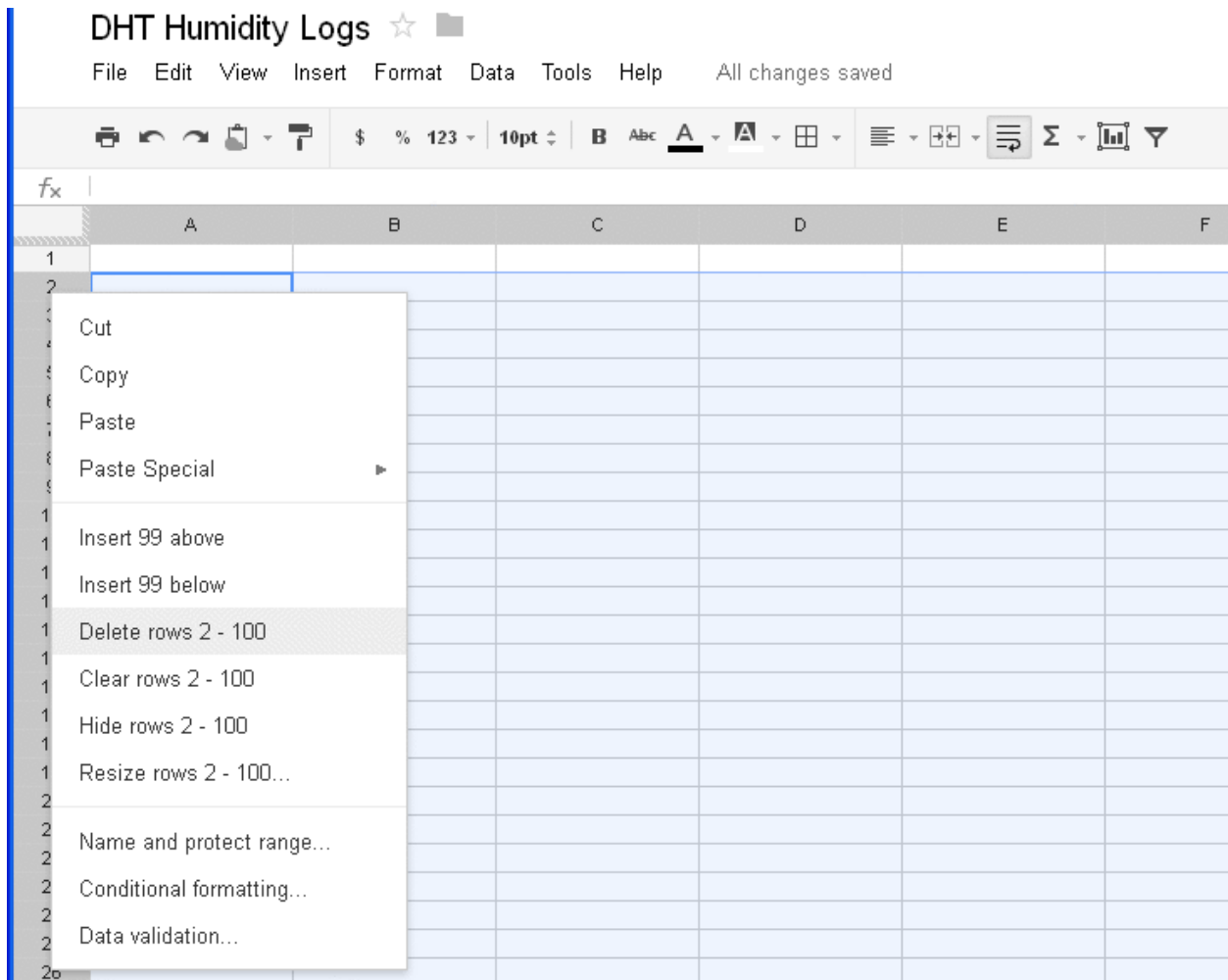
It is easy to connect Raspberry pi with Sensor like



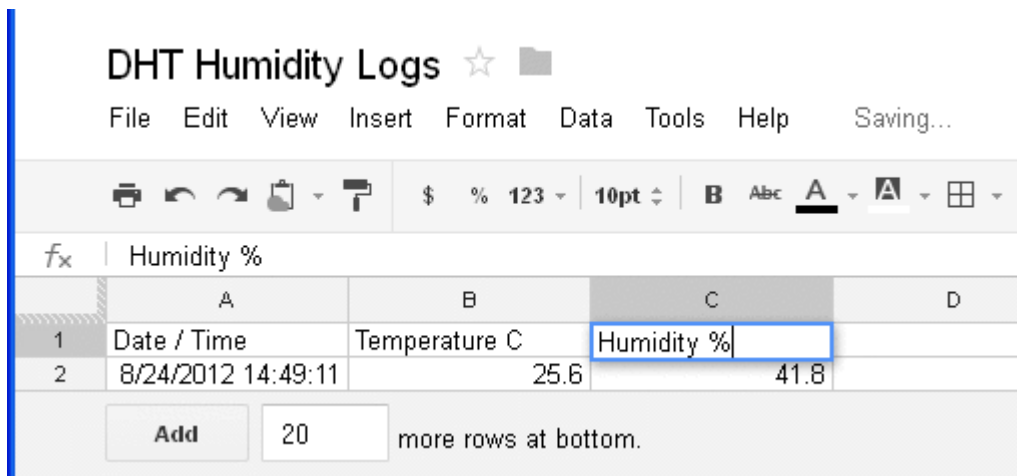
Than it works like



Now after install python libraries from the internet make google spreadsheet like



Then select header row and it will select like this



Then go to auth companets

Get OAuth2 credentials

After you take after the means in the record above you ought to have downloaded a .json document, as SpreadsheetData-(gibberish).json. Place this .json record in an indistinguishable catalog from the google_spreadsheet.py example. If you don't put this document in a similar index then validation will come up short and you won't have the capacity to refresh your spreadsheet!

One final advance that must be completed is to share your Google spreadsheet to the email address related with the OAuth2 certifications. Open the .json document and scan for the "client_email": line that resembles this (however with an alternate email address):

```
"client_email": "149345334675-  
md0qff5f0kib41meu20f7d1habos3qcu@developer.gserviceaccount.com",
```

Observe that email deliver esteem and go to your Google spreadsheet in a web program. Utilizing the File - > Share... menu thing share the spreadsheet with read and compose access to the email address found above. Make a point to share your spreadsheet or you won't have the capacity to refresh it with the content!

Run Python Code

In the first place up we should introduce the gspread python library, which will do the hard work of interfacing with google docs and refreshing the spreadsheet! With your board associated and on the web, run the accompanying:

```
sudo apt-get update  
sudo apt-get install python-pip  
sudo pip install gspread oauth2client
```

Next, in the examples directory again, edit google_spreadsheet.py and adjust the configuration values towards the top of the file:

```
# Type of sensor, can be Adafruit_DHT.DHT11, Adafruit_DHT.DHT22, or  
Adafruit_DHT.AM2302.
```

```

DHT_TYPE = Adafruit_DHT.DHT22

# Example of sensor connected to Raspberry Pi pin 23
DHT_PIN = 23
# Example of sensor connected to Beaglebone Black pin P8_11
#DHT_PIN = 'P8_11'

# Google Docs OAuth credential JSON file. Note that the process for authenticating
# ...
GDOCS_OAUTH_JSON = 'your SpreadsheetData-*.json file name'

# Google Docs spreadsheet name.
GDOCS_SPREADSHEET_NAME = 'your google docs spreadsheet name'

```

Make sure **DHT_TYPE** is set to the type of sensor you are using (either **Adafruit_DHT.DHT11**, **Adafruit_DHT.DHT22**, or **Adafruit_DHT.AM2302**), and **DHT_PIN** is set to the GPIO pin number which is connected to your DHT sensor.

In the example above a Raspberry Pi GPIO pin #23 is shown, however commented below it is an example of a Beaglebone Black using GPIO pin P8_11.

Next make a point to set the GDOCS_OAUTH_JSON to the name of the SpreadsheetData-*.json document in an indistinguishable index from the google_spreadsheet.py record. On the off chance that you don't have a SpreadsheetData-*.json document then you unintentionally missed the means above. Backpedal and painstakingly take after the OAuth2 accreditation ventures to get an OAuth2 qualification .json document before proceeding!

Finally set GDOCS_SPREADSHEET_NAME to the name of your spreadsheet, like 'DHT Humidity Logs'.

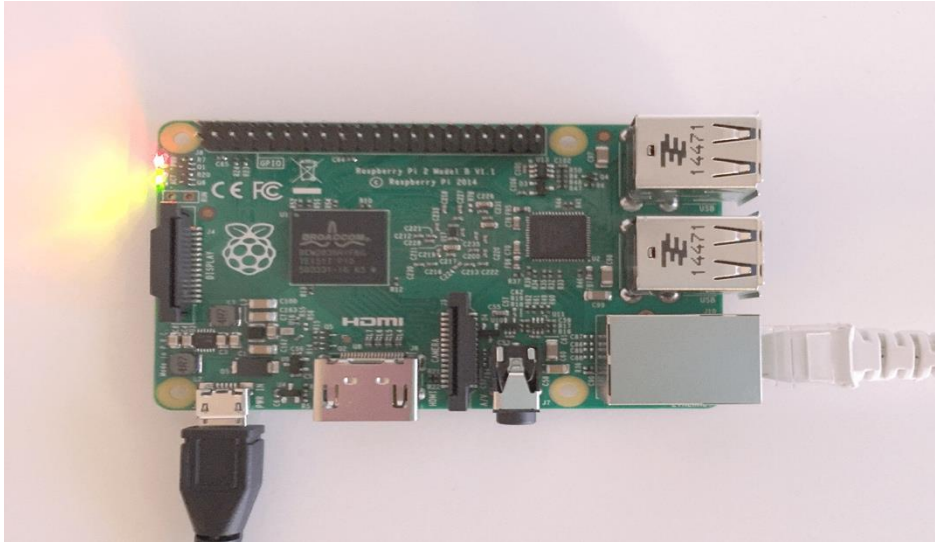
Save the file and execute the Python script by running:

```
sudo ./google_spreadsheet.py
```


AFTER SETUP ALL THESE

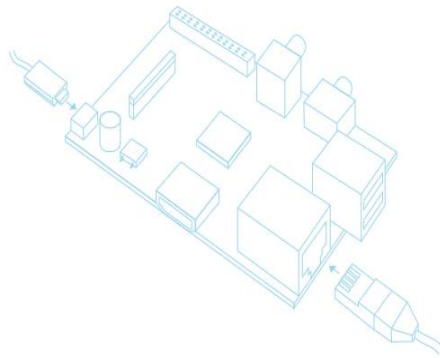
Letsus start the Raspberry Pi in miutes

First install Cayenne



Than Before installing Raspberry pi from web

Step 2 of 3: Set up your Raspberry Pi



Make sure your Pi is powered on and connected to the Internet.

If you still need to install the Raspbian Operating System, [click here](#).

Back

Next

Then connect with App store like

Step 3 of 3: Connect your Raspberry Pi



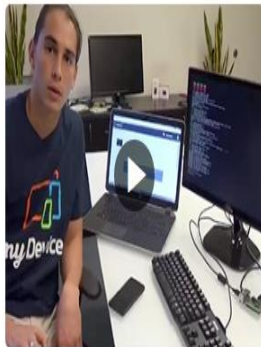
OPTION 1:

Download Cayenne Smartphone App

Our smartphone app can be used to automatically locate and install myDevices Cayenne on your Pi.



OR



OPTION 2:

Terminal / SSH

To download and install myDevices Cayenne on your Pi, use the Terminal on your Pi or SSH. Run the following commands:

```
wget  
sudo sh rpi_sh -v
```

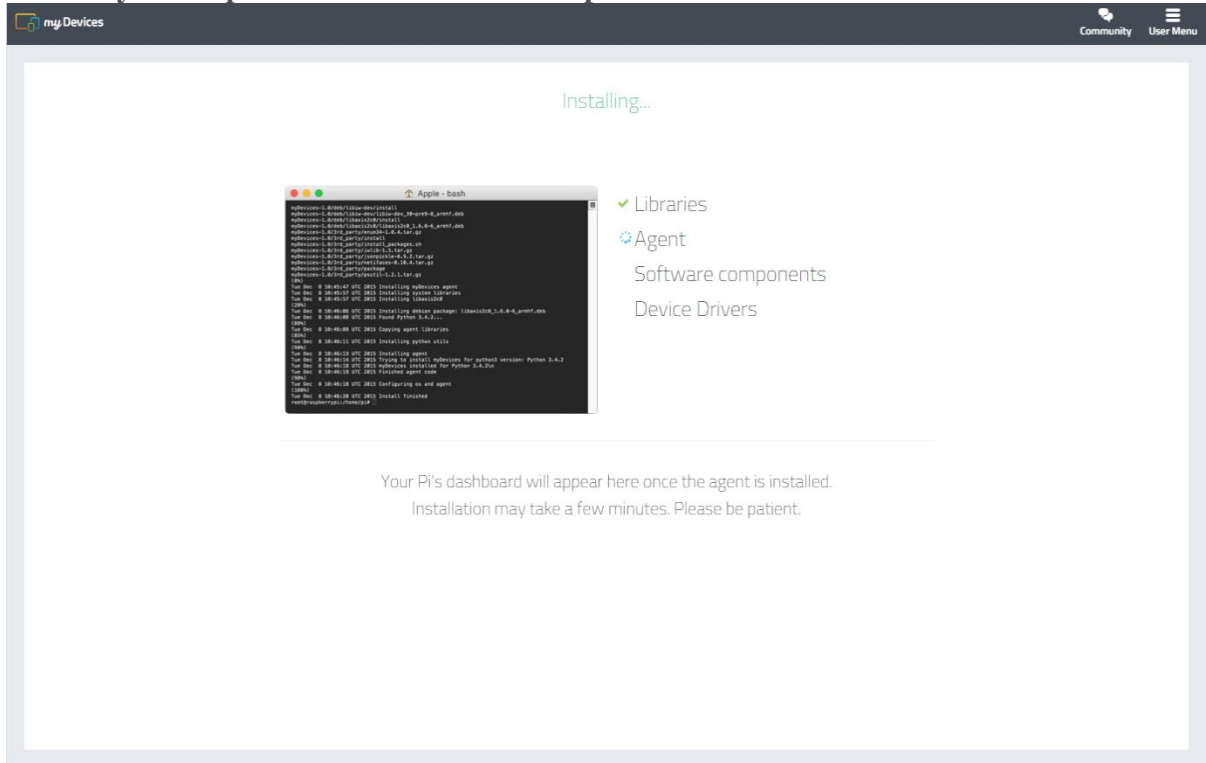
[Back](#)

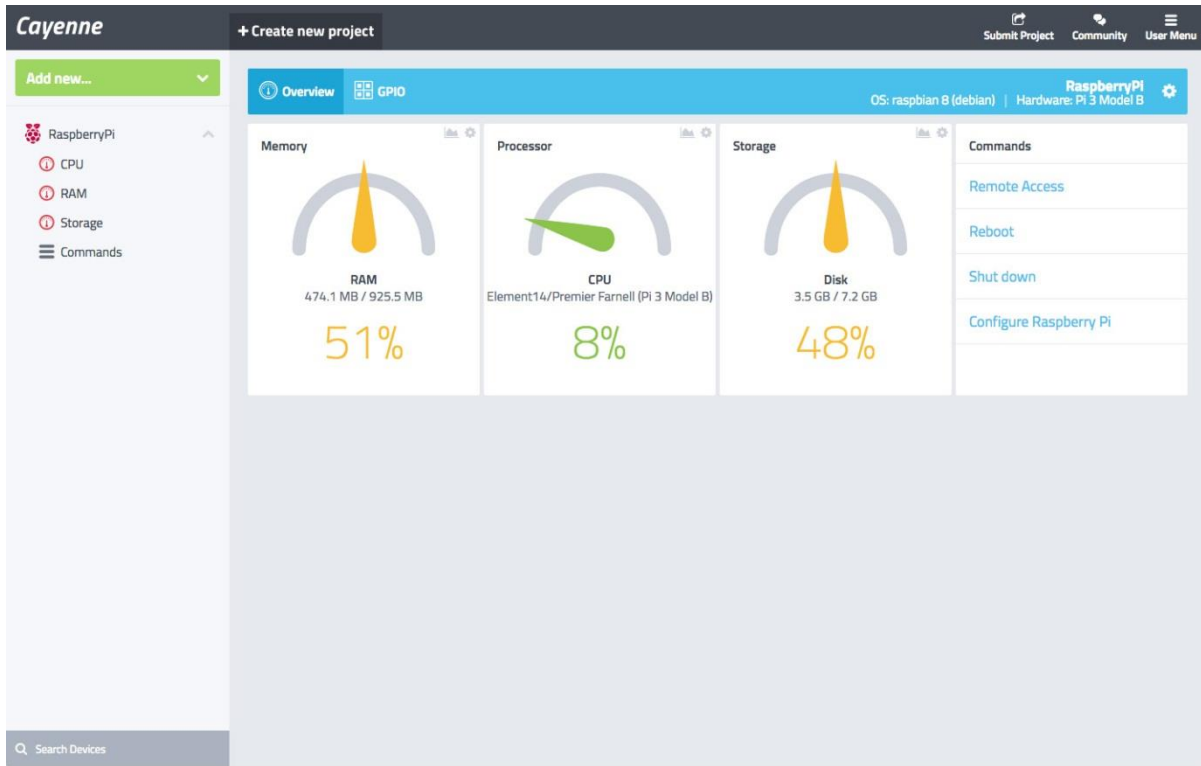
2. When the establishment procedure begins, the Installing screen consequently shows up. From here you can mind the establishment procedure as it finishes.

Cayenne installs on your Raspberry Pi in 4 steps:

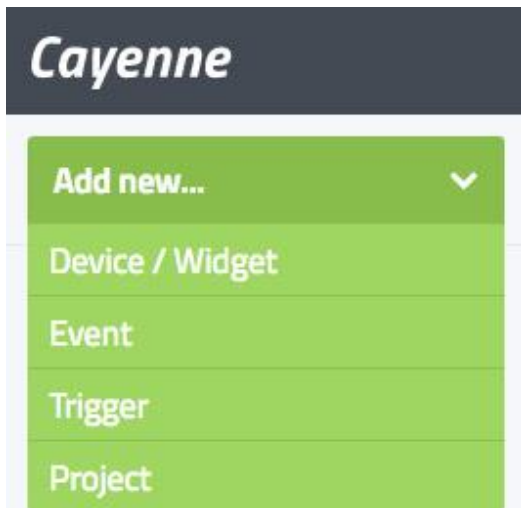
- **Step 1:** Installing libraries
- **Step 2:** Installing agent
- **Step 3:** Installing software
- **Step 4:** Installing drivers

This may take up to 10 minutes. Please be patient.

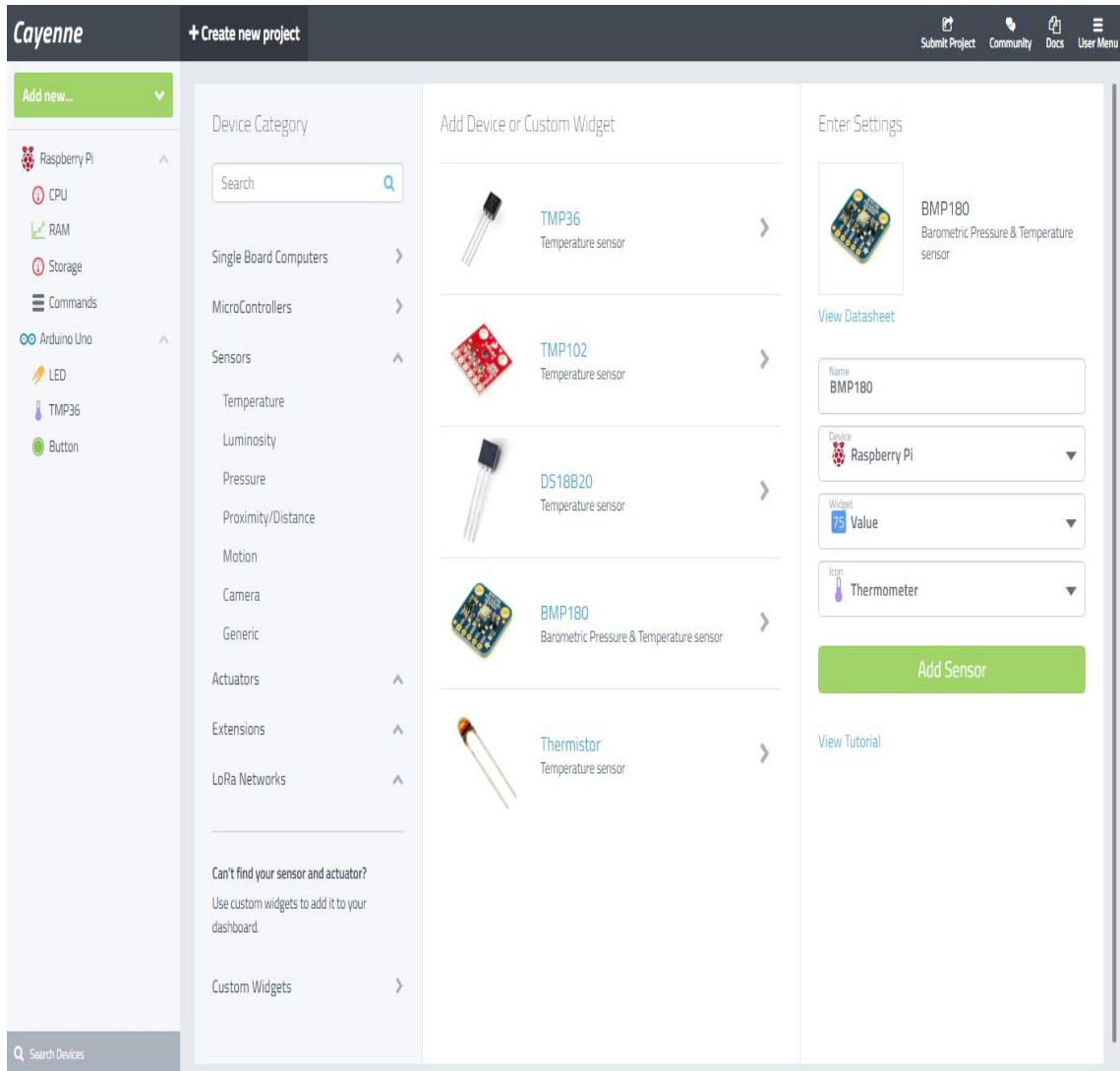




You can connect with sensor to check temperature, humidity like



Then select sensor temperature and Add sensor



Like seen

Cayenne + Create new project Submit Project Community Docs User Menu

Add new...






- Raspberry Pi
 - CPU
 - RAM
 - Storage
 - Commands
- Arduino Uno
 - LED
 - TMP36
 - Button

Device Category


Search

- Single Board Computers >
- MicroControllers >
- Sensors ^
 - Temperature
 - Luminosity
 - Pressure
 - Proximity/Distance
 - Motion
 - Camera
 - Generic
- Actuators ^
- Extensions ^
- LoRa Networks ^
- Custom Widgets >

Add Device or Custom Widget

-  **TMP36**
Temperature sensor >
-  **TMP102**
Temperature sensor >
-  **DS18B20**
Temperature sensor >
-  **BMP180**
Barometric Pressure & Temperature sensor >
-  **Thermistor**
Temperature sensor >

Enter Settings

 **BMP180**
Barometric Pressure & Temperature sensor

[View Datasheet](#)

Name:

Device:

Widget:

Icon:

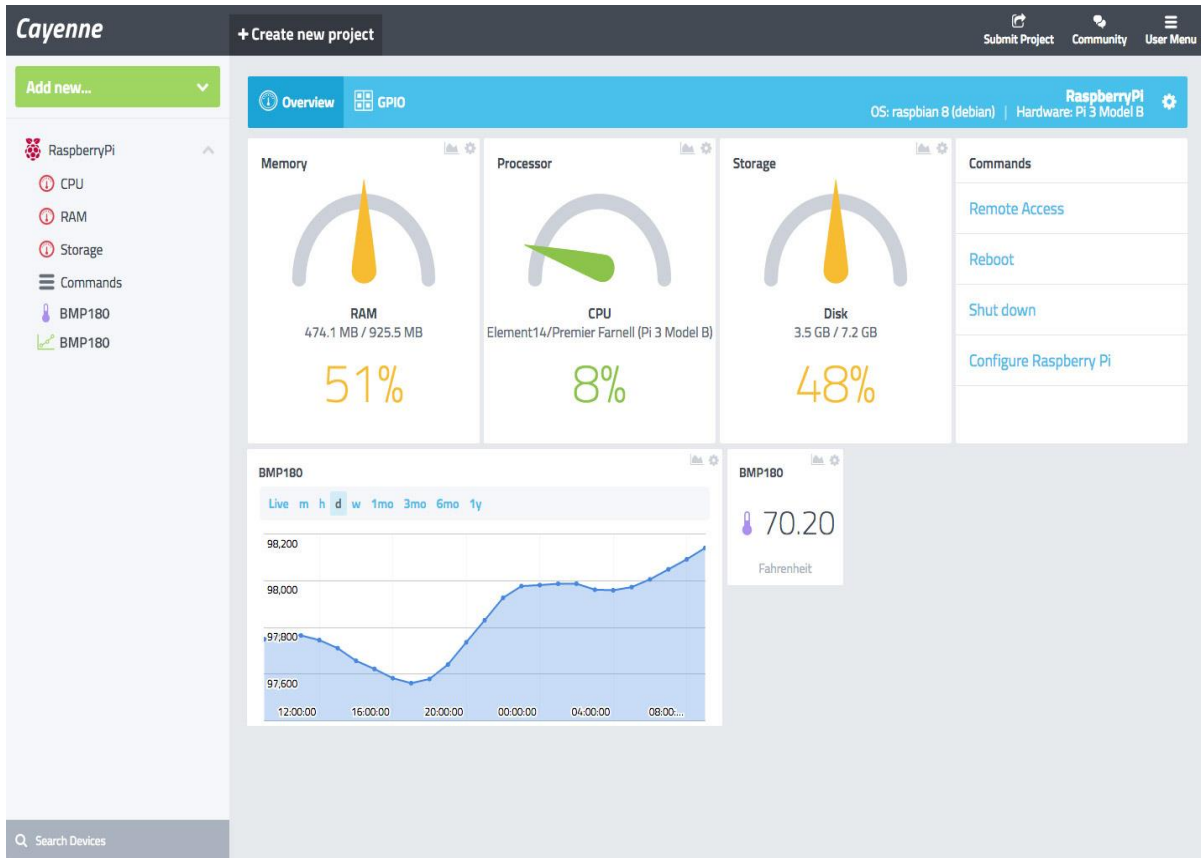
Add Sensor

[View Tutorial](#)

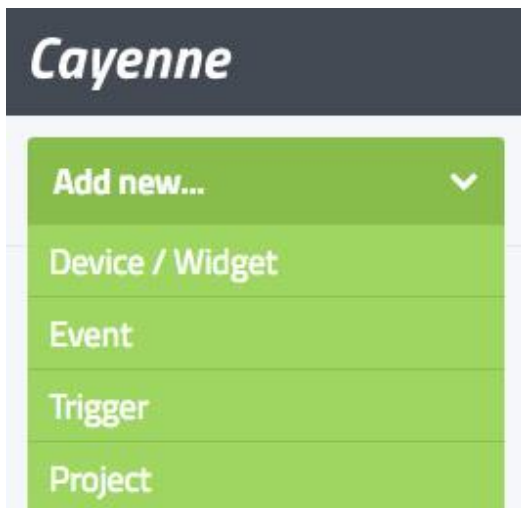
Can't find your sensor and actuator?
Use custom widgets to add it to your dashboard.

Search Devices

Read your sensor reading



To add switch of light and fan than click



Than see IEd

Cayenne + Create new project Submit Project Community User Menu

Add new...

RaspberryPi
CPU
RAM
Storage
Commands
BMP180
BMP180

Device Category

Search

Single Board Computers >
MicroControllers >
Actuators ^
Light
Motor
Valve
Relay
Generic
Extensions v
Sensors v

Can't find your sensor and actuator?
Use custom widgets to add it to your dashboard.
Custom Widgets >

Search Devices

Add Device or Custom Widget

Light Switch
Turn On/Off a Light

Luminosity
Change Light Brightness

Enter Settings

Light Switch
Turn On/Off a Light
[View Tutorial](#)

Widget Name
Light Switch

Select Device
RaspberryPi

Select GPIO
Integrated GPIO

Select Channel
Channel 23

Invert Logic
No

Choose Widget
Button

Choose Icon
Light

Add Actuator

Widget The LED

Cayenne + Create new project Submit Project Community User Menu

Add new...

- RaspberryPi
 - CPU
 - RAM
 - Storage
 - Commands
 - BMP180
 - BMP180
 - LED

Overview | GPIO RaspberryPi OS: raspbian 8 (debian) | Hardware: Pi 3 Model B

Memory

RAM
474.1 MB / 925.5 MB

51%

Processor

CPU
Element14/Premier Farnell (Pi 3 Model B)

8%

Storage

Disk
3.5 GB / 7.2 GB

48%

Commands

- Remote Access
- Reboot
- Shut down
- Configure Raspberry Pi

BMP180

Live m h d w 1mo 3mo 6mo 1y

BMP180

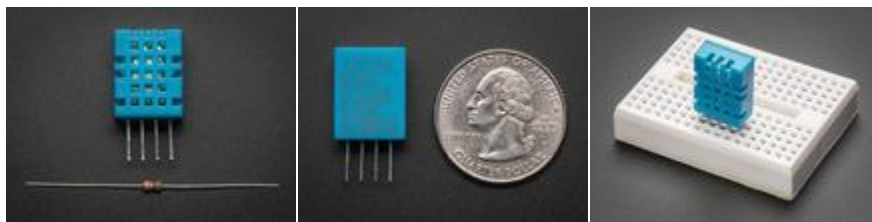
70.20

Fahrenheit

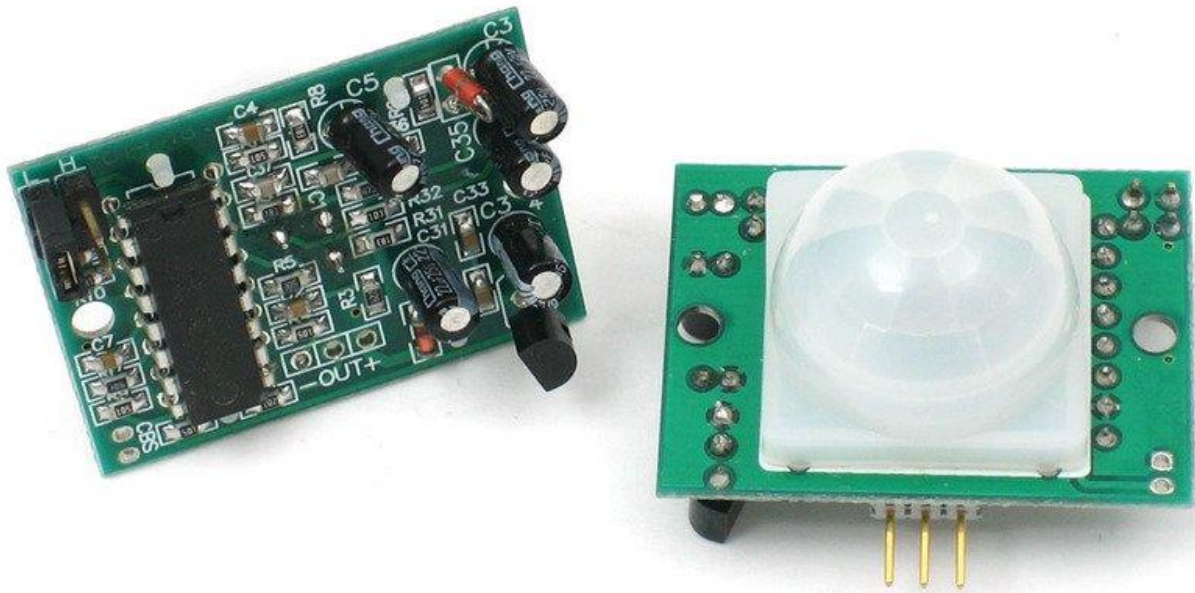
LED

Search Devices

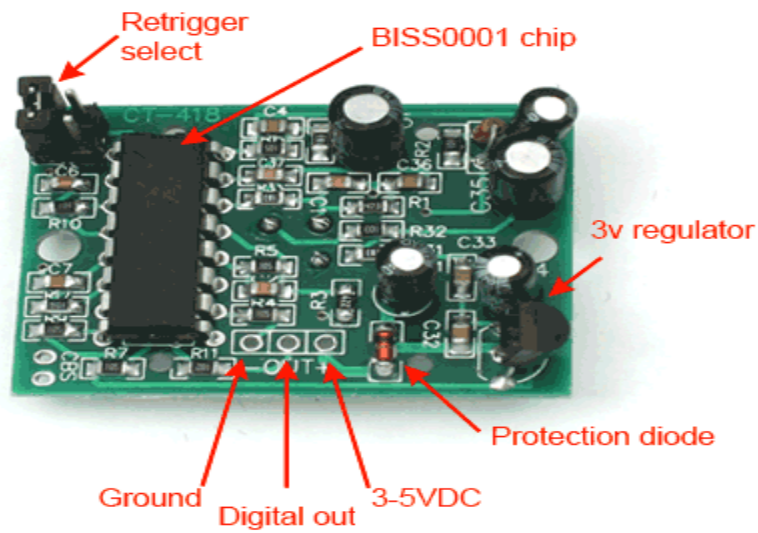
DHT11:



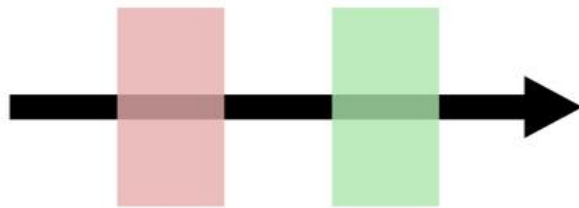
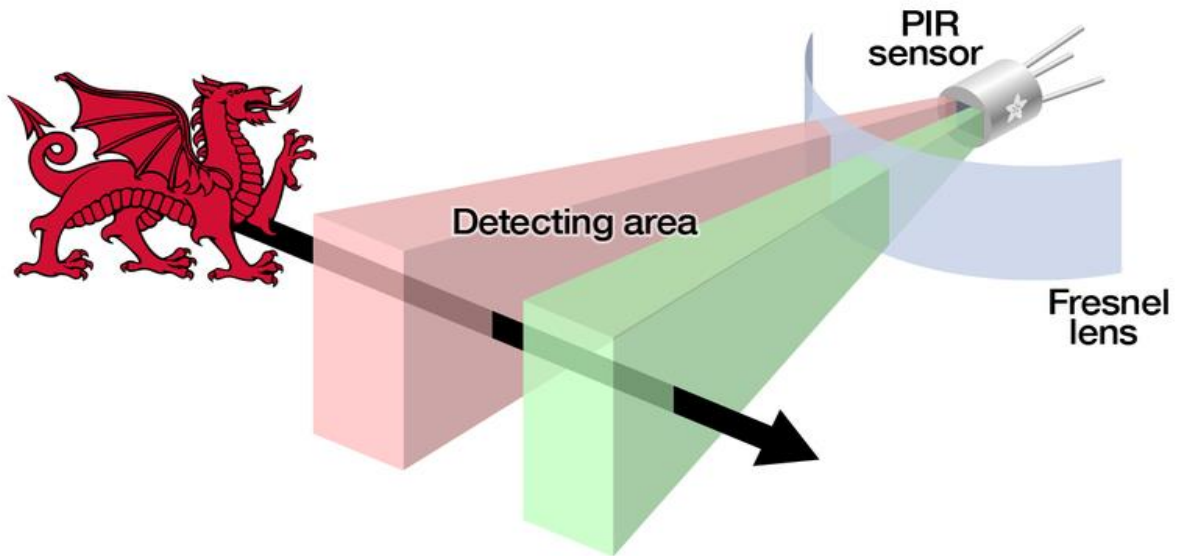
PIR Motion Sensor



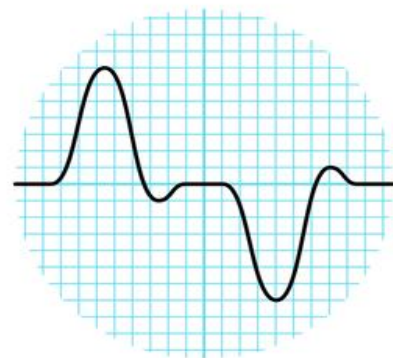
This is detector IC:- This chip is used to take output of sensor



Now pIR looks like



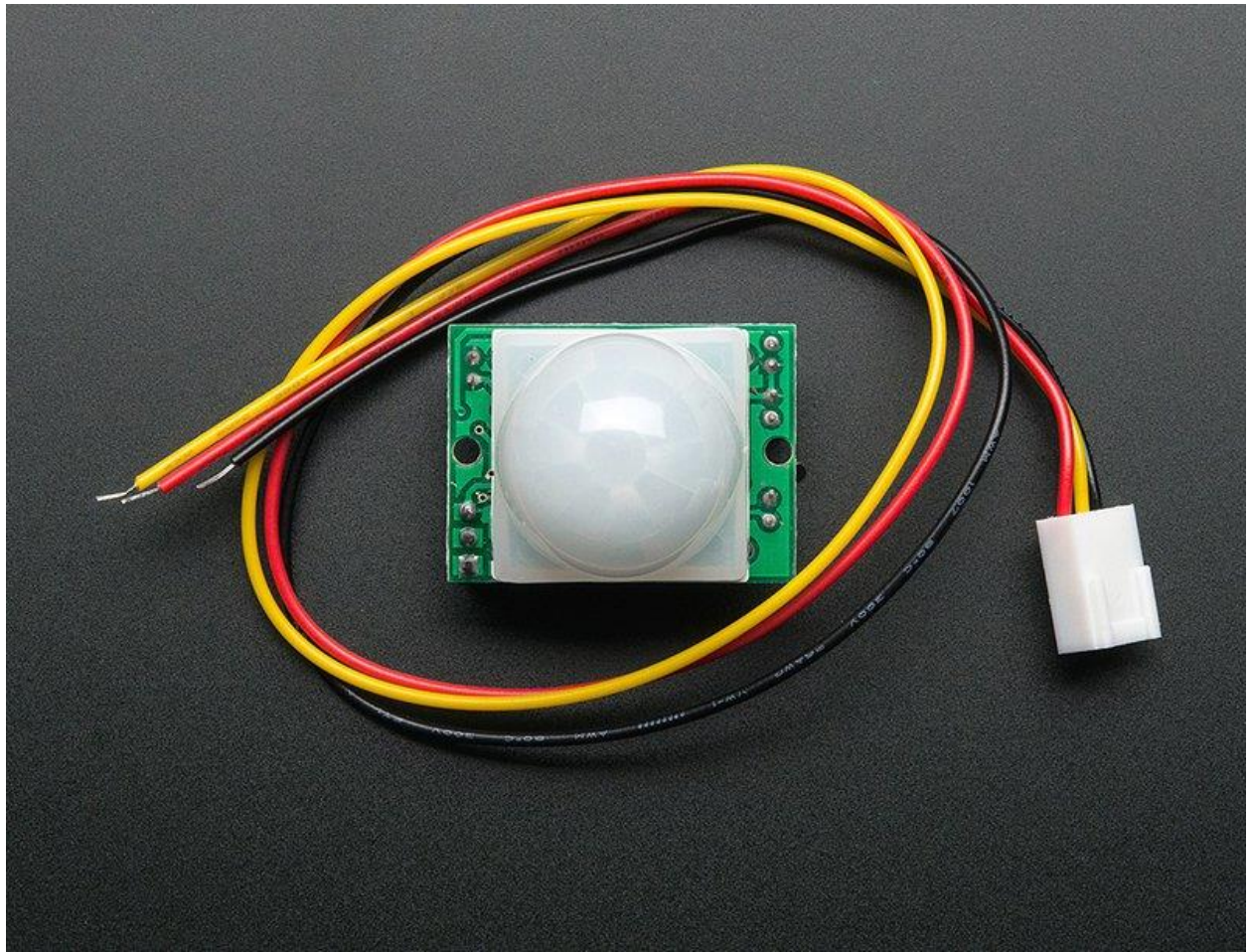
Heat source movement



Output signal

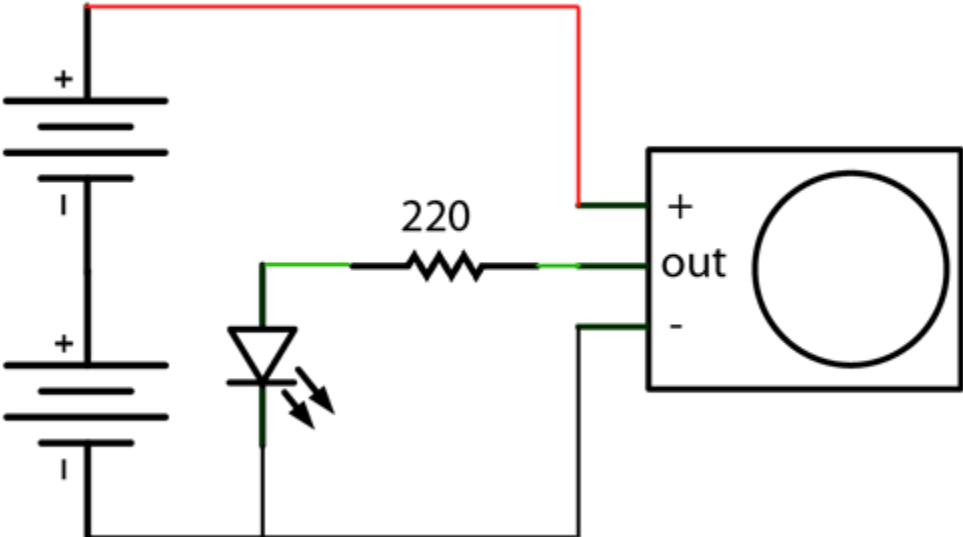
After making all these steps

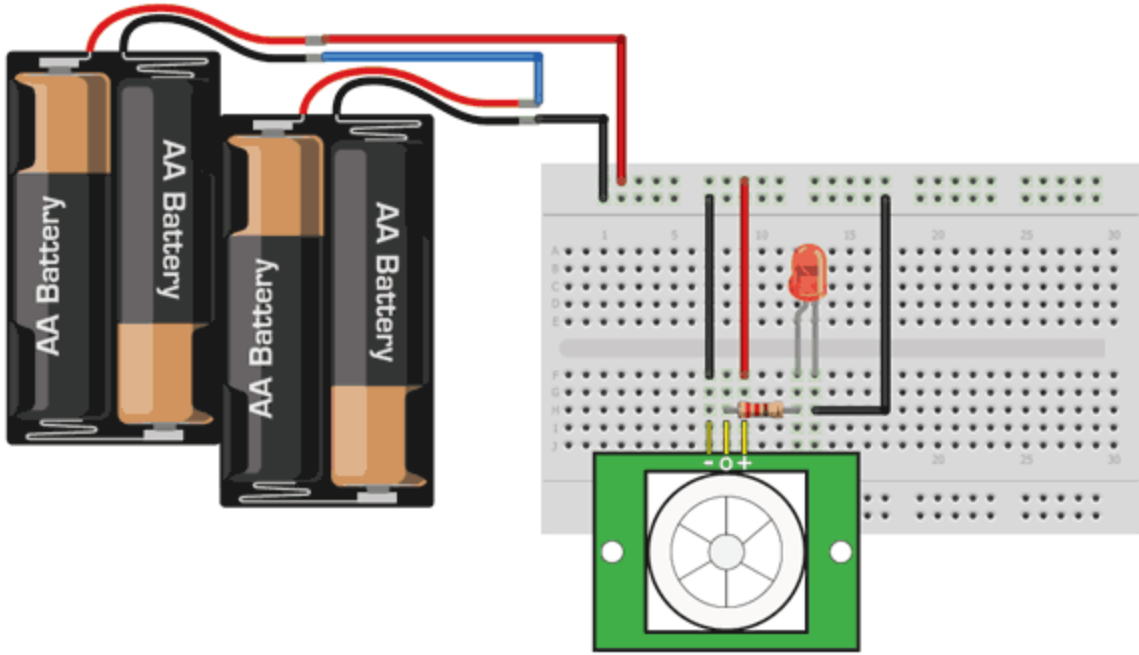
Connecting to PIR:- PIR is used to handle temperature, humidity etc. PIR is a 3-pin connection at the bottom side or right side. One pin should be ground and another pin is signal and the final pin is power given to the circuit.





Testing a PIR





Chapter-4

PERFORMANCE ANALYSIS

This is an IOT based project, which is an automated system to control household items like fans and other electronic devices.

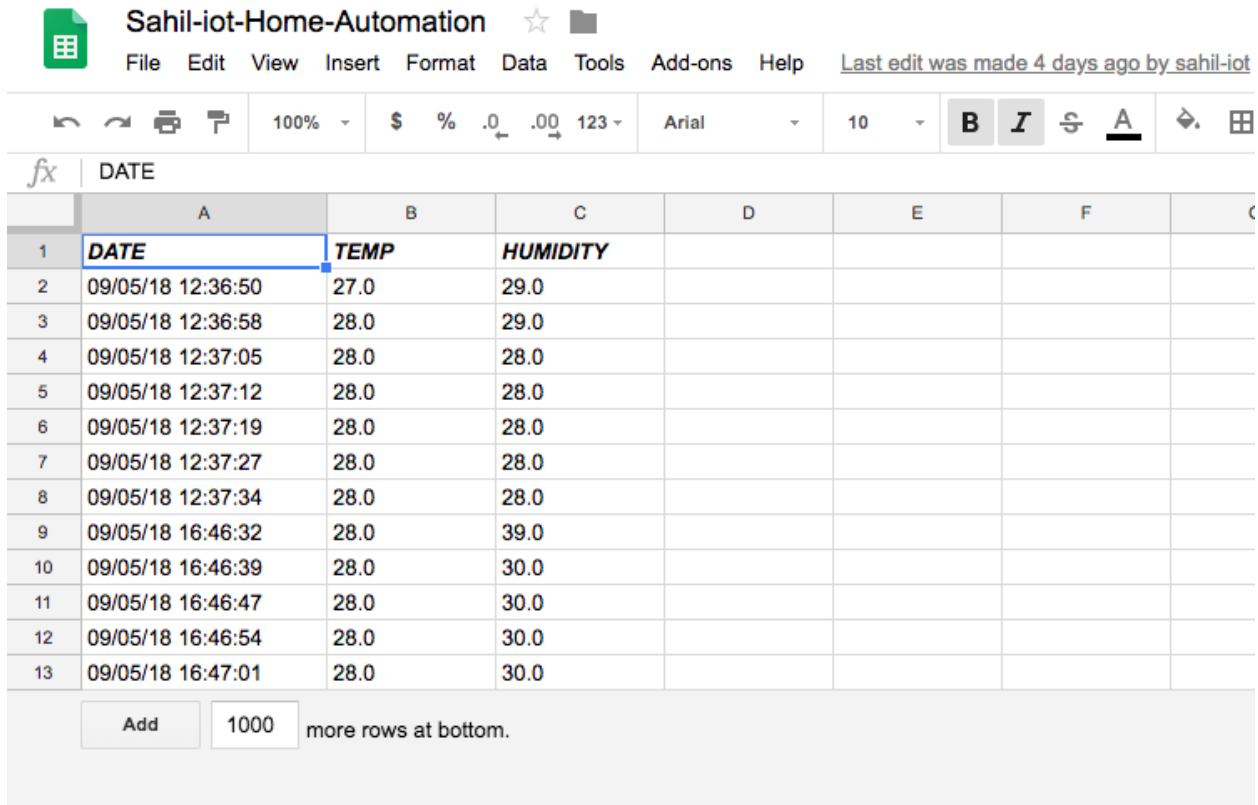
In today's world everything depends upon technology.

Our project uses microcontroller(Raspberry pi) and sensor to assemble all electronic appliances. In the first time when we make a circuit and setup all these things i.e sensor, pi and install python, then system was slow and signals were coming late. So we decide to optimize the application as follows. To check the performance of IOT vases project is a big challenge for us.

We should first check connection of sensor with microcontroller and Pin. Then check connection with Google i.e with cloud, if its ok then our application responds fastly. The connection with our household devices should be correct.

DHT humidity sensors are in good state to pass signals.

Result of DST11 sensor in google sheet is shown below:-



The screenshot shows a Google Sheet with the following data:

	A	B	C	D	E	F	G
1	DATE	TEMP	HUMIDITY				
2	09/05/18 12:36:50	27.0	29.0				
3	09/05/18 12:36:58	28.0	29.0				
4	09/05/18 12:37:05	28.0	28.0				
5	09/05/18 12:37:12	28.0	28.0				
6	09/05/18 12:37:19	28.0	28.0				
7	09/05/18 12:37:27	28.0	28.0				
8	09/05/18 12:37:34	28.0	28.0				
9	09/05/18 16:46:32	28.0	39.0				
10	09/05/18 16:46:39	28.0	30.0				
11	09/05/18 16:46:47	28.0	30.0				
12	09/05/18 16:46:54	28.0	30.0				
13	09/05/18 16:47:01	28.0	30.0				

At the bottom of the sheet, there is a button labeled 'Add' and a text box containing '1000' with the text 'more rows at bottom.'

Chapter -5

CONCLUSIONS

Conclusion:-

In this project, we conclude that by using this home automation system we can make the life of old fragile people very easy as they don't have to stand from their bed and switch off the light or fan or anything else we can control everything through Internet. We can also improve the security system of our home by using IOT for eg- by using PIR sensors, we can detect any human movement inside the house. if we are out of home we can turn on the PIR sensor inside home, if there is any movement inside the house, it can sent signal to raspberry pi via internet. For further advancements, we can attach servo motor to the door and if there is someone inside the house, then servo motor rotates and door gets automatically locked. We can also decrease our electricity bills as we can control the electrical appliances via internet and shut them down when not needed. In this way we can use home automation in many aspects.

Future scope of project:-

There is a great future of Home Automation. Everyone dreams of Luxury and Comfort in his life. Because of people's busy schedule and luxurious lifestyle, people will get more attracted towards Home Automation.

Growth in Automation Market in India (2018-22)

The next phase of Home Automation will be based on few advancements in technology available in automation like improvements in wireless automation solutions and lowering the price as people will start using Home Automation in larger volumes. Some trends that we will see in this phase of industry are:-

- ➔ Some big companies like Philips, Siemens & Schneider are going to bring mass market automation products with convincing user interface but at lower prices than today's price so that more and more people can afford it.
- ➔ Solution offerings shall slowly move towards a better user friendly design so that users can easily use the Automation products without consulting any technical expert.

Commodification of Automation market (2021 onward)

As an industry, if The Home Automation becomes a common place, then there will be many players in the market, multiple product offerings and competitive pricing. Estimation of market of only Home Automation is going to be 3.2 billion dollars by 2020. It means in Indian market, there is a multi billion dollar opportunity.

- ➔ We will see that there are more no of players in market which will lead to competition in prices and lower margins.
- ➔ All the products will be of type 'plug and paly' so that users can just but and use it without consulting any technical expert.
- ➔ Most houses will use Home automation. So it will become common as having a television or fridge at home.

References:-

- ➔ Charles Severence, "Eben Upton: Raspberry Pi", vol. 46, no. 10, pp. 14-16, 2013.
- ➔ Jinsoo Han, Jaekwan Yun, Jonghyun Jang, Kwang-Roh Park, "User-friendly home automation based on 3D virtual world", *IEEE Transactions on Consumer Electronics*, vol. 56, no. 3, pp. 1843-1847, Aug. 2010.
- ➔ Vamsikrishna Patchava, Sonti Dinesh Kumar, Shaik Riyaz Hussain, K. Rama Naidu, "Raspberry PI controlled SMS-Update-Notification (Sun) system", *Proceeding of IEEE International Conference on Electrical Computer and Communication Technologies (ICECCT 2015)*, pp. 1-4, March 2015.
- ➔ M. Gamba, A. Gonella, C.E. Palazzi, "Design issues and solutions in a modern home automation system", *Proceedings of International Conference on Computing Networking and Communications (ICNC 2015)*, pp. 1111-1115, Feb. 2015.
- ➔ Eben Upton, Gareth Halfacree, Raspberry Pi User Guide, A John Wiley and Sons Ltd, 2012.