

# Introduction to Internet of Things -assignment 1

Members : 109550164 徐聖哲 & 109550073 陳宥安

Demo Video Link: <https://youtu.be/0u5dZqqTH00>

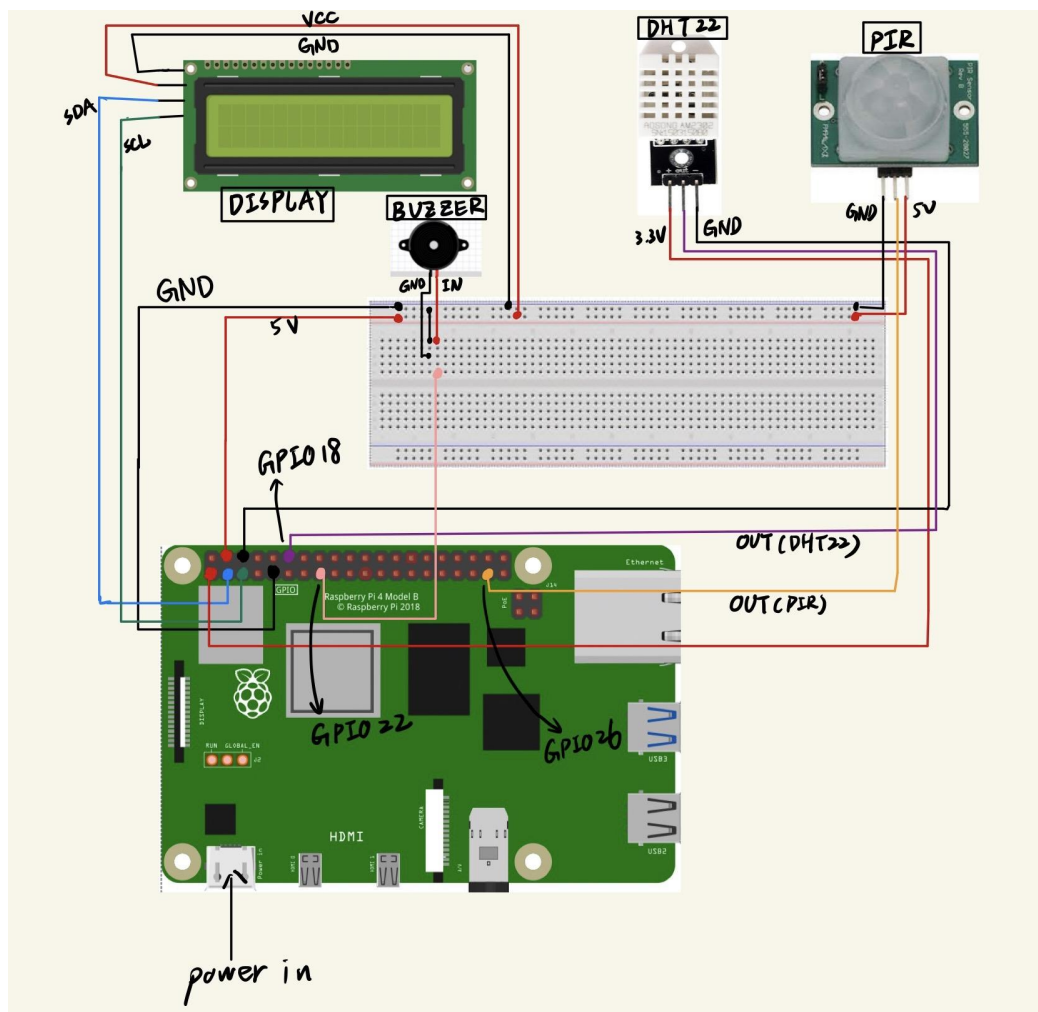
Objectives :

- Get to know Raspberry Pi
- Capable to install the Raspbian operating system
- Connecting sensors and actuators to Raspberry Pi
- Writing the code to run the sensors and actuators

Hardware Components:

- Raspberry Pi 4
- Display
- DHT-22
- PIR
- LED
- Buzzer

System Design:



### 1.Display

// Library for display

```
import drivers
```

// display initiation

```
display = drivers.Lcd() // display initiation
```

// print on display while on the first line

```
display.lcd_display_string("Temp={0:0.2f}*C".format(temperature), 1)
```

// print on display while on the first line

### 2.DHT-22

//Library for DHT-22

```
import adafruit_dht // Library for DHT-22
```

// DHT-22 initiation

```
dht_device = adafruit_dht.DHT22(board.D18, use_pulseio = False)
```

// DHT-22 初始化

// get humidity

// get temperature

```
humidity= dht_device.humidity // get humidity
```

```
temperature = dht_device.temperature // get temperature
```

### 3.PIR

“i” means GPIO.input();

when i = 0, the intruder doesn't get information

when i = 1, the intruder receive information

```
if i==0:
```

```
    display.lcd_display_string ("No intruders " +str(i), 3)
```

```
    GPIO.output(22, GPIO.LOW)
```

```
elif i==1:
```

```
    display.lcd_display_string ("Intruders detected! " +str(i), 3)
```

```
    GPIO.output(22, GPIO.HIGH)
```


### 4.Buzzer

“i” means GPIO.input();

when i = 0, the buzzer will remain silent

when i = 1, the buzzer will make noise

## Source Code:

```
practice >  iot.py > ...
1  import drivers
2  from time import sleep
3  import adafruit_dht
4  import board
5  import time
6  import RPi.GPIO as GPIO
7
8  display = drivers.Lcd()
9
10 dht_device = adafruit_dht.DHT22(board.D18, use_pulseio = False)
11
12 GPIO.setwarnings(False)
13
14 GPIO.setup(26, GPIO.IN)
15 GPIO.setup(22, GPIO.OUT, initial=GPIO.LOW)
16
17 try:
18     while True:
19         GPIO.output(22, GPIO.LOW)
20         i=GPIO.input(26)
21         print("Writing to display")
22         try:
23             humidity= dht_device.humidity
24             temperature = dht_device.temperature
25         except(RuntimeError):
26             print("no new data this loop!")
27
28         if humidity is not None and temperature is not None:
29             display.lcd_display_string("Temp={0:0.2f}*C".format(temperature), 1)
30             display.lcd_display_string("Humidity="+str(humidity)+"%", 2)
31         else:
32             print("Failed to retrieve data from HDT22 sensor")
33         if i==0:
34             display.lcd_display_string ("No intruders " +str(i), 3)
35             GPIO.output(22, GPIO.LOW)
36         elif i==1:
37             display.lcd_display_string ("Intruders detected! " +str(i), 3)
38             GPIO.output(22, GPIO.HIGH)
39             display.lcd_display_string("I am a display!", 4)
40             sleep(1)
41             GPIO.output(22,GPIO.LOW)
42             display.lcd_clear()
43             sleep(2)
44     except KeyboardInterrupt:
45         print("Cleaning up!")
46         GPIO.output(22,GPIO.LOW)
47         display.lcd_clear()
48
49
```

## Thoughts & comments:

From this assignment, we knew how to setup raspberry pi and code python by using online resources and libraries.

First, we ran into some problems about making empty txt. From that time on, we realized that the assignment wouldn't be easy. Then, we started to put the sensor and actuator on the board. The wires were often awkward to connect, it took time to successfully finish the bread board and the equipment.

Second, the code of the actuator and sensor was not a big deal. We followed the instruction of raspberry pi, write the python on the vs code, and understand some function.

However, some actuators are not that sensitive, we have to find a way to enhance its sensitivity. But, from assignment 1, we have learned how to use raspberry pi, actuators and sensors, meanwhile, using python to control the whole system.

## Packedge Installation Reference:

1. LCD display : <https://github.com/the-raspberry-pi-guy/lcd>
2. DHT-22 : [https://github.com/adafruit/Adafruit\\_CircuitPython\\_DHT](https://github.com/adafruit/Adafruit_CircuitPython_DHT)

