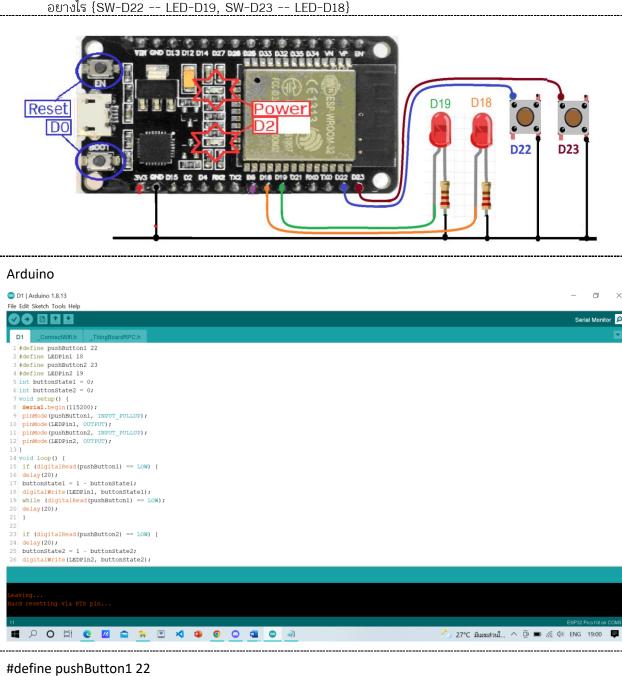
# การใช้งาน ThingsBoard IoTs Platform เพื่อสร้างและจัดการระบบอัฉริยะ ThingsBoard IoTs Platform for smart system

ขื่อ-สกุล : นางสาวณัฐชยา ผ<sup>่</sup>องกุศล B6226718

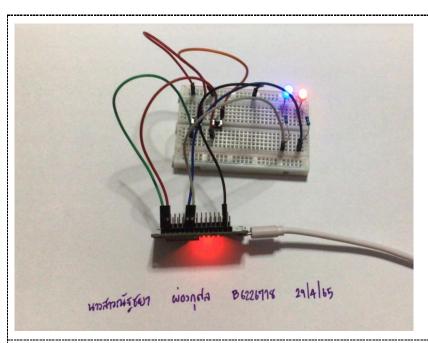
# 6/6 -- คำถามท้ายบทเพื่อทดสอบความเข้าใจ

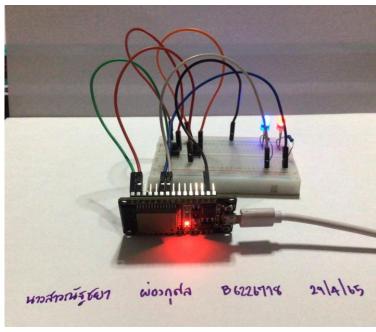
## Quiz\_101 – กดติด กดดับ 2 ชุด

• หากต้องการให้ใช้ 1 สวิตซ์ ควบคุม 1 LED แบบกดติด-กดดับ จำนวน 2 วงจรจะต่อวงจรและเขียนโปรแกรม อย่างไร {SW-D22 -- LED-D19, SW-D23 -- LED-D18}



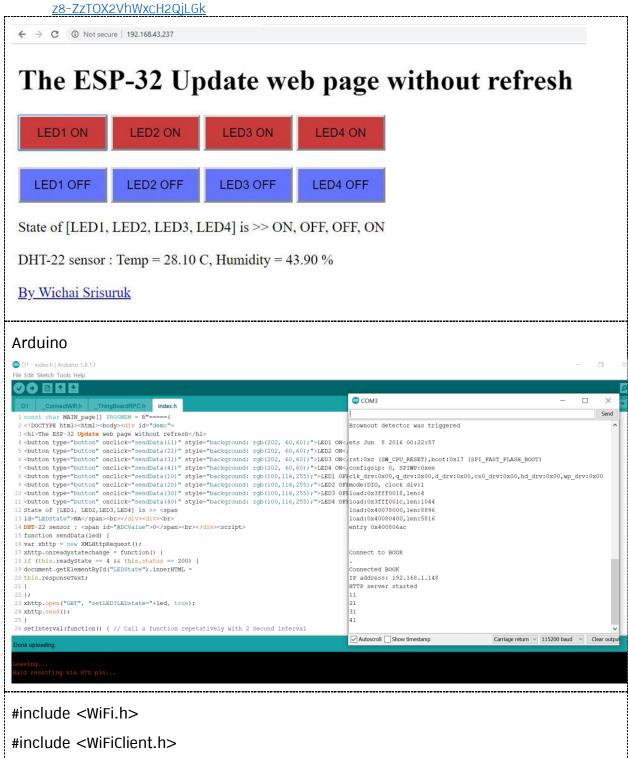
```
#define LEDPin1 18
#define pushButton2 23
#define LEDPin2 19
int buttonState1 = 0;
int buttonState2 = 0;
void setup() {
Serial.begin(115200);
pinMode(pushButton1, INPUT_PULLUP);
pinMode(LEDPin1, OUTPUT);
pinMode(pushButton2, INPUT_PULLUP);
pinMode(LEDPin2, OUTPUT);
void loop() {
if (digitalRead(pushButton1) == LOW) {
delay(20);
buttonState1 = 1 - buttonState1;
digitalWrite(LEDPin1, buttonState1);
while (digitalRead(pushButton1) == LOW);
delay(20);
}
if (digitalRead(pushButton2) == LOW) {
delay(20);
buttonState2 = 1 - buttonState2;
digitalWrite(LEDPin2, buttonState2);
while (digitalRead(pushButton2) == LOW);
delay(20);
}
```





#### Quiz\_102 - Web Control 4 LED and Monitor Humid/Temperature

- เพิ่มเติมจาก Q202 อยากได้ปุ่มสำหรับคุมปิด-เปิด หลอดไฟ LED 4 ดวง
- อยากมีกด Link ไปที่หน้า FB ของตัวเอง
- https://www.colorhexa.com/oo8cba?fbclid=IwAR3dIZ\_gRgDWmREmnzuknLbMxV3pOHy4YIPuLEz8-ZzTOX2VhWxcH2QjLGk



```
#include <WebServer.h>
#include "DHTesp.h"
#include "index.h" //Our HTML webpage contents with javascripts
#define DHT_Pin 4
#define testLED1 18
#define testLED2 19
#define testLED3 22
#define testLED4 23
//SSID and Password of your WiFi router
const char* ssid = "BOOK";
const char* password = "book1017";
WebServer server(80); //Server on port 80
DHTesp dht;
String ledState1 = "NA";
String ledState2 = "NA";
String ledState3 = "NA";
String ledState4 = "NA";
// This routine is executed when you open its IP in browser
void handleRoot() {
String s = MAIN_page; //Read HTML contents
server.send(200, "text/html", s); //Send web page
void handleADC() {
float h = dht.getHumidity();
float t = dht.getTemperature();
```

```
String tmpValue = "Temp = ";
tmpValue += String(t) + " C, Humidity = ";
tmpValue += String(h) + " %";
server.send(200, "text/plane", tmpValue); //Send value to client ajax request
void handleLED() {
String t_state = server.arg("LEDstate"); //Refer xhttp.open("GET",
"setLED?LEDstate="+led, true);
Serial.println(t_state);
if (t_state == "11") {
digitalWrite(testLED1, HIGH); //Feedback parameter
ledState1 = "ON";
if (t_state == "10") {
digitalWrite(testLED1, LOW); //Feedback parameter
ledState1 = "OFF";
}
if (t_state == "21") {
digitalWrite(testLED2, HIGH); //Feedback parameter
ledState2 = "ON";
if (t_state == "20") {
digitalWrite(testLED2, LOW); //Feedback parameter
ledState2 = "OFF";
}
if (t_state == "31") {
digitalWrite(testLED3, HIGH); //Feedback parameter
ledState3 = "ON";
}
```

```
if (t_state == "30") {
digitalWrite(testLED3, LOW); //Feedback parameter
ledState3 = "OFF";
}
if (t_state == "41") {
digitalWrite(testLED4, HIGH); //Feedback parameter
ledState4 = "ON";
if (t_state == "40") {
digitalWrite(testLED4, LOW); //Feedback parameter
ledState4 = "OFF";
server.send(200, "text/plane", ledState1 + ", " + ledState2 + ", " + ledState3 + ", " +
ledState4):
//Send web page
void setup(void) {
Serial.begin(115200);
dht.setup(DHT_Pin, DHTesp::DHT22); // DHT_Pin D4, DHT22
pinMode(testLED1, OUTPUT);
pinMode(testLED2, OUTPUT);
pinMode(testLED3, OUTPUT);
pinMode(testLED4, OUTPUT);
Serial.print("\n\nConnect to ");
Serial.println(ssid);
WiFi.begin(ssid, password);
while (WiFi.status() != WL_CONNECTED) {
delay(500); Serial.print(".");
}
```

```
Serial.print("\nConnected "); Serial.println(ssid);
Serial.print("IP address: "); Serial.println(WiFi.localIP());
server.on("/", handleRoot);
server.on("/setLED", handleLED);
server.on("/readADC", handleADC);
server.begin();
Serial.println("HTTP server started");
}
void loop(void) {
server.handleClient(); //Handle client requests
}
//index.h
const char MAIN_page[] PROGMEM = R"=====(
<!DOCTYPE html><html><body><div id="demo">
<h1>The ESP-32 Update web page without refresh</h1>
<button type="button" onclick="sendData(11)" style="background: rgb(202,</pre>
60,60);">LED1 ON</button>
<button type="button" onclick="sendData(21)" style="background: rgb(202,</pre>
60,60);">LED2 ON</button>
<button type="button" onclick="sendData(31)" style="background: rgb(202,</pre>
60,60);">LED3 ON</button>
<button type="button" onclick="sendData(41)" style="background: rgb(202,</pre>
60,60);">LED4 ON</button><br>
<button type="button" onclick="sendData(10)" style="background:</pre>
rgb(100,116,255);">LED1 OFF</button>
<button type="button" onclick="sendData(20)" style="background:</pre>
rgb(100,116,255);">LED2 OFF</button>
<button type="button" onclick="sendData(30)" style="background:</pre>
rgb(100,116,255);">LED3 OFF</button>
```

```
<button type="button" onclick="sendData(40)" style="background:</pre>
rgb(100,116,255);">LED4 OFF</button><br>
State of [LED1, LED2, LED3, LED4] is >> < span
id="LEDState">NA</span><br></div><div><br>
(The challenge didn't tell me to do it.)DHT-22 sensor : <span
id="ADCValue">0</span><br></div><script>
function sendData(led) {
var xhttp = new XMLHttpRequest();
xhttp.onreadystatechange = function() {
if (this.readyState == 4 && this.status == 200) {
document.getElementById("LEDState").innerHTML =
this.responseText;
}
};
xhttp.open("GET", "setLED?LEDstate="+led, true);
xhttp.send();
setInterval(function() { // Call a function repetatively with 2 Second interval
getData();
}, 2000); //2000mSeconds update rate
function getData() {
var xhttp = new XMLHttpRequest();
xhttp.onreadystatechange = function() {
if (this.readyState == 4 && this.status == 200) {
document.getElementById("ADCValue").innerHTML =
this.responseText;
}
};
xhttp.open("GET", "readADC", true);
```





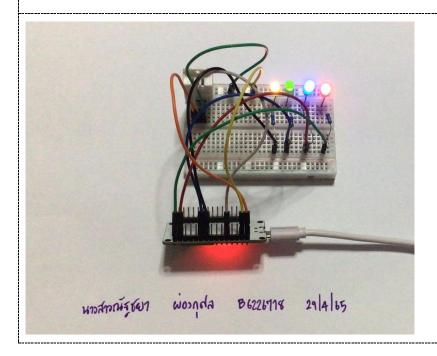
# The ESP-32 Update web page without refresh

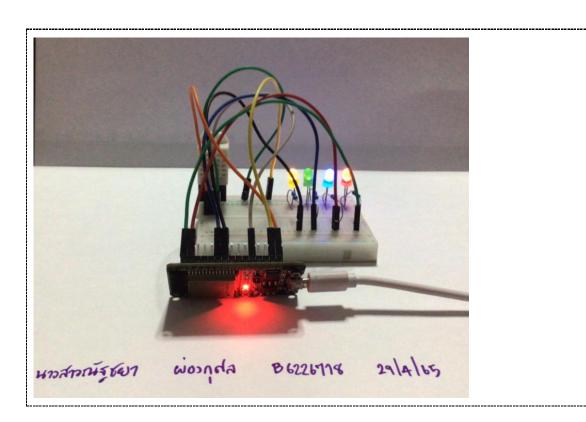


State of [LED1, LED2, LED3, LED4] is >> ON, ON, ON, ON

DHT-22 sensor : Temp = 29.30 C, Humidity = 99.90 %

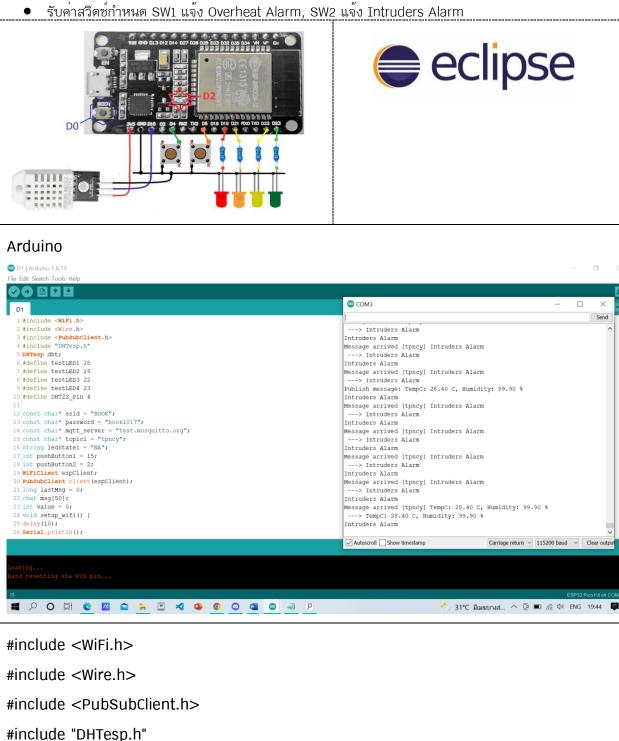
Natchaya Phongkuson





## Quiz 103 - Pub/Sub Data from (DHT22 + 4 LED + 2 Switch)

- อ่านค่า DHT-22 แล้วส่งไปยัง MQTT Broker ทุกๆ 5 วินาที
- กำหนดให้ใช้ mqtt.eclipse.org เป็น Broker
- ควบคุมการปิดเปิด 4 LED

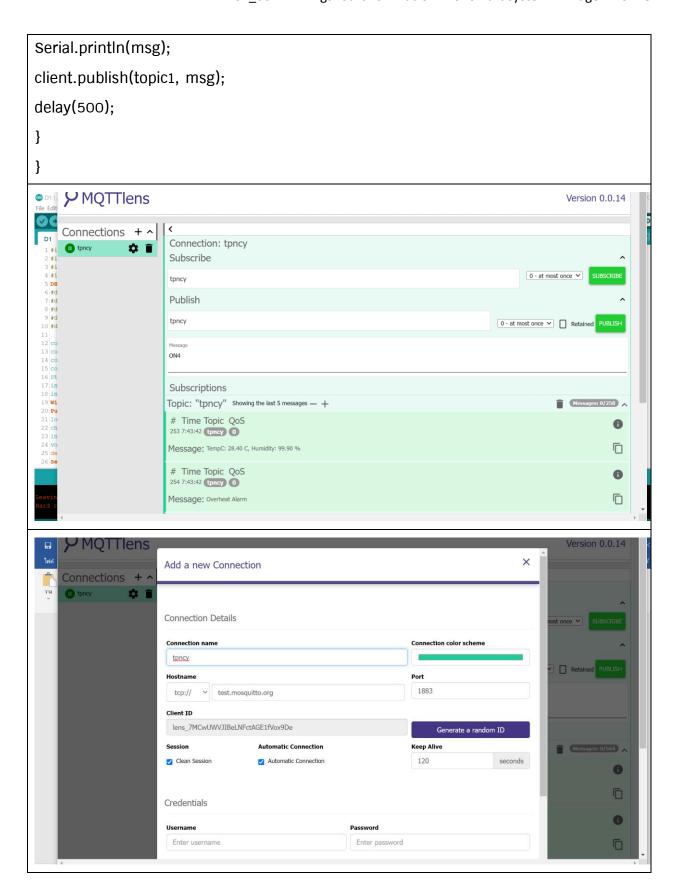


```
DHTesp dht;
#define testLED1 18
#define testLED2 19
#define testLED3 22
#define testLED4 23
#define DHT22_Pin 4
const char* ssid = "BOOK";
const char* password = "book1017";
const char* mqtt_server = "test.mosquitto.org";
const char* topic1 = "tpncy";
String ledState1 = "NA";
int pushButton1 = 15;
int pushButton2 = 2;
WiFiClient espClient;
PubSubClient client(espClient);
long lastMsg = 0;
char msg[50];
int value = 0;
void setup_wifi() {
delay(10);
Serial.println();
Serial.print("Connecting to ");
Serial.println(ssid);
WiFi.begin(ssid, password);
while (WiFi.status() != WL_CONNECTED) {
delay(500); Serial.print(".");
```

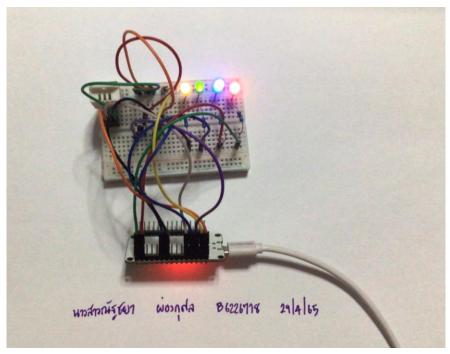
```
randomSeed(micros());
Serial.println("");
Serial.println("WiFi connected");
Serial.println("IP address: ");
Serial.println(WiFi.localIP());
pinMode(testLED1, OUTPUT);
pinMode(testLED2, OUTPUT);
pinMode(testLED3, OUTPUT);
pinMode(testLED4, OUTPUT);
}
void callback(char* topic, byte* payload, unsigned int length)
{ char myPayLoad[50];
Serial.print("Message arrived [");
Serial.print(topic1);
Serial.print("] ");
for (int i = 0; i < length; i++)
{ Serial.print((char)payload[i]);
myPayLoad[i] = payload[i];
mvPavLoad[i + 1] = '\0'; // End of String
}
Serial.print("\n ---> "); Serial.println(myPayLoad);
myPayLoad[4] = '\0'; // String lessthan 4 Charector
if ((String)myPayLoad == "ON1") digitalWrite(testLED1, HIGH);
if ((String)myPayLoad == "OFF1") digitalWrite(testLED1, LOW);
if ((String)myPayLoad == "ON2") digitalWrite(testLED2, HIGH);
if ((String)myPayLoad == "OFF2") digitalWrite(testLED2, LOW);
if ((String)myPayLoad == "ON3") digitalWrite(testLED3, HIGH);
if ((String)myPayLoad == "OFF3") digitalWrite(testLED3, LOW);
```

```
if ((String)myPayLoad == "ON4") digitalWrite(testLED4, HIGH);
if ((String)myPayLoad == "OFF4") digitalWrite(testLED4, LOW);
}
void reconnect()
{ while (!client.connected()) // Loop until we're reconnected
{ Serial.print("Attempting MQTT connection...");
String clientId = "ESP8266Client-";
clientId += String(random(oxffff), HEX); // Create a random client ID
if (client.connect(clientId.c_str())) // Attempt to connect
{ Serial.println("connected"); // Once connected, publish an announcement...
client.publish(topic1, "Hello World Pk007"); // ... and resubscribe
client.subscribe(topic1);
} else
{ Serial.print("failed, rc=");
Serial.print(client.state());
Serial.println(" try again in 5 seconds");
delay(5000);
}
}
void setup()
{ Serial.begin(115200);
setup_wifi();
dht.setup(DHT22_Pin, DHTesp::DHT22);
pinMode(pushButton1, INPUT_PULLUP);
pinMode(pushButton2, INPUT_PULLUP);
client.setServer(mqtt_server, 1883);
client.setCallback(callback);
```

```
pinMode(testLED1, OUTPUT);
pinMode(testLED2, OUTPUT);
pinMode(testLED3, OUTPUT);
pinMode(testLED4, OUTPUT);
}
void loop()
if (!client.connected()) reconnect();
client.loop();
long now = millis();
if (now - lastMsg > 5000)
{ lastMsg = now;
++value;
float h = dht.getHumidity();
float t = dht.getTemperature();
sprintf (msg, "TempC: %.2f C, Humidity: %.2f %%",t,h);
Serial.print("Publish message: ");
Serial.println(msg);
client.publish(topic1, msg);
}
if (digitalRead(pushButton1) == 0) {
sprintf (msg, "Overheat Alarm");
Serial.println(msg);
client.publish(topic1, msg);
delay(500);
if (digitalRead(pushButton2) == 0) {
sprintf (msg, "Intruders Alarm");
```

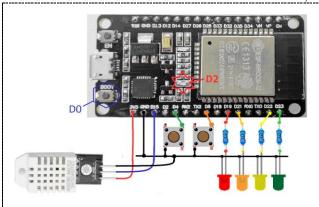




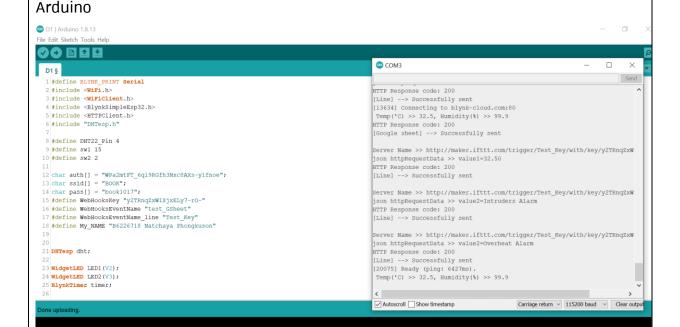


### Quiz\_104 - Blynk and LINE from (DHT22 + 4 LED + 2 Switch)

- ควบคุมการปิดเปิด 4 LED
- อ่านค่า DHT-22 แล้วส่งไปยัง Blynk ทุกๆ 5 วินาที
- บันทึกค่าไปยัง Google Sheet
- หากอุณหภูมิเกิน 28'C ให้แจ้งไปยัง LINE
- รับค่าสวิตซ์กำหนด SW1 แจ้ง Overheat Alarm, SW2 แจ้ง Intruders Alarm ไปยัง LINE







#define BLYNK\_PRINT Serial

#include <WiFi.h>

#include <WiFiClient.h>

#include <BlynkSimpleEsp32.h>

```
#include <HTTPClient.h>
#include "DHTesp.h"
#define DHT22_Pin 4
#define sw1 15
#define sw2 2
char auth[] = "WPa2mtFT_6qi9RGfh3Nxc8AXs-y1fnoe";
char ssid[] = "BOOK";
char pass[] = "book1017";
#define WebHooksKey "y2TRnqZxW1XjxELy7-rO-"
#define WebHooksEventName "test_GSheet"
#define WebHooksEventName_line "Test_Key"
#define My_NAME "B6226718 Natchaya Phongkuson"
DHTesp dht;
WidgetLED LED1(V2);
WidgetLED LED2(V3);
BlynkTimer timer;
void myTimerEvent() {
 float humidity = dht.getHumidity();
 float temperature = dht.getTemperature();
 Blynk.virtualWrite(Vo, temperature);
 Blynk.virtualWrite(V1, humidity);
 if (digitalRead(sw1)) LED1.on();
```

```
else LED1.off();
 if (digitalRead(sw2)) LED2.on();
 else LED2.off();
 Serial.print(" Temp('C) >> "); Serial.print(temperature, 1);
 Serial.print(", Humidity(%) >> "); Serial.println(humidity, 1);
}
void setup() {
 Serial.begin(115200);
 dht.setup(DHT22_Pin, DHTesp::DHT22); // Connect DHT sensor to GPIO 15
 pinMode(sw1, INPUT_PULLDOWN);
 pinMode(sw2, INPUT_PULLDOWN);
 Blynk.begin(auth, ssid, pass);
 timer.setInterval(1000L, myTimerEvent);
 WiFi.begin(ssid, pass);
 Serial.println("Connecting");
 while (WiFi.status() != WL_CONNECTED) {
 delay(500);
 Serial.print(".");
 }
}
void loop(){
 delay(5000);
 float humidity = dht.getHumidity();
 float temperature = dht.getTemperature();
 String serverName = "http://maker.ifttt.com/trigger/" +
```

```
String(WebHooksEventName) + "/with/key/" + String(WebHooksKey);
String httpRequestData = "value1=" + String(My NAME) + "&value2=" +
String(temperature) + "&value3=" +
String(humidity);
if (WiFi.status() == WL_CONNECTED) {
HTTPClient http;
http.begin(serverName);
http.addHeader("Content-Type", "application/x-www-form-urlencoded");
int httpResponseCode = http.POST(httpRequestData);
Serial.print("HTTP Response code: ");
Serial.println(httpResponseCode);
http.end();
if (httpResponseCode == 200)
Serial.println("[Google sheet] --> Successfully sent");
else
Serial.println("[Google sheet] --> Failed!");
}
else {
Serial.println("WiFi Disconnected");
}
/// if temp > 28 C send notifications >> line
if (temperature > 28) {
String serverName = "http://maker.ifttt.com/trigger/" +
String(WebHooksEventName_line) + "/with/key/" + String(WebHooksKey);
String httpRequestData = "value1=" + String(temperature);
Serial.println();
Serial.println("Server Name >> " + serverName);
Serial.println("json httpRequestData >> " + httpRequestData);
```

```
if (WiFi.status() == WL_CONNECTED) {
 HTTPClient http;
 http.begin(serverName);
 http.addHeader("Content-Type", "application/x-www-form-urlencoded");
 int httpResponseCode = http.POST(httpRequestData);
 Serial.print("HTTP Response code: ");
 Serial.println(httpResponseCode);
 http.end();
 if (httpResponseCode == 200)
 Serial.println("[Line] --> Successfully sent");
 else
 Serial.println("[Line] --> Failed!");
 }
 else {
 Serial.println("WiFi Disconnected");
 }
}
if (digitalRead(sw1) == LOW) {
String serverName = "http://maker.ifttt.com/trigger/" +
String(WebHooksEventName line) + "/with/key/" + String(WebHooksKey);
String httpRequestData = "value3=" + String("Intruders Alarm");
Serial.println();
Serial.println("Server Name >> " + serverName);
Serial.println("json httpRequestData >> " + httpRequestData);
if (WiFi.status() == WL_CONNECTED) {
 HTTPClient http;
 http.begin(serverName);
```

```
http.addHeader("Content-Type", "application/x-www-form-urlencoded");
   int httpResponseCode = http.POST(httpReguestData);
   Serial.print("HTTP Response code: ");
   Serial.println(httpResponseCode);
   http.end();
   if (httpResponseCode == 200)
   Serial.println("[Line] --> Successfully sent");
   else
   Serial.println("[Line] --> Failed!");
   }
   else {
   Serial.println("WiFi Disconnected");
   }
}
 if (digitalRead(sw2) == LOW) {
 String serverName = "http://maker.ifttt.com/trigger/" +
 String(WebHooksEventName_line) + "/with/key/" + String(WebHooksKey);
 String httpRequestData = "value3=" + String("Overheat Alarm");
 Serial.println():
 Serial.println("Server Name >> " + serverName);
 Serial.println("json httpRequestData >> " + httpRequestData);
 if (WiFi.status() == WL_CONNECTED) {
   HTTPClient http;
   http.begin(serverName);
   http.addHeader("Content-Type", "application/x-www-form-urlencoded");
   int httpResponseCode = http.POST(httpRequestData);
   Serial.print("HTTP Response code: ");
   Serial.println(httpResponseCode);
```

```
http.end();
if (httpResponseCode == 200)
Serial.println("[Line] --> Successfully sent");
else
Serial.println("[Line] --> Failed!");
}
else {
Serial.println("WiFi Disconnected");
}

Blynk.run();
timer.run(); // running timer every 250ms
}
```

