แนวทางการใช้งานอินเทอร์เน็ตของสรรพสิ่งในระบบการผลิต

IoT Approaches to Manufacturing System

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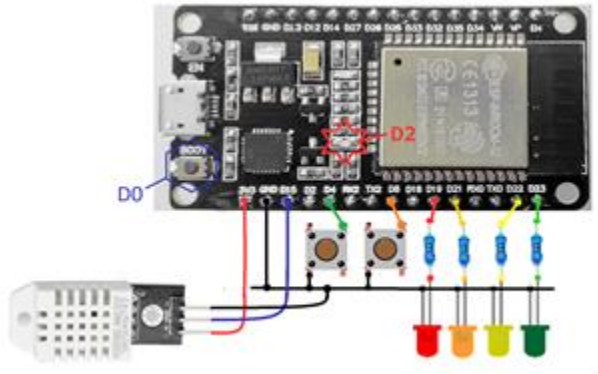
5/5. คำถามท้ายบทเพื่อทดสอบความเข้าใจ

Quiz_401 – Ubidots: Monitor DHT22, Monitor Digital Switch and Control 4 LED




```
#include <WiFi.h>

#include <PubSubClient.h>

#include "DHTesp.h"

const char *My_SSID = "105/766-2.4G";

const char *My_Pass = "0999128910";

const char *MQTT_Server = "things.ubidots.com";

const char *MQTT_User = "BBFF-7CfZiYPIr8CDn3s7OZQtcnw0GbzH76";

const char *MQTT_Pass = "BBFF-7CfZiYPIr8CDn3s7OZQtcnw0GbzH76";

const char *PTopic1 = "/v2.0/devices/gg007test";

const char *STopic1 = "/v2.0/devices/gg007test/humid";

const char *STopic2 = "/v2.0/devices/gg007test/tempp";

const char *STopic3 = "/v2.0/devices/gg007test/led1";

const char *STopic4 = "/v2.0/devices/gg007test/led2";
```

```
const char *STopic5 = "/v2.0/devices/gg007test/led3";

const char *STopic6 = "/v2.0/devices/gg007test/led4";

const char *STopic7 = "/v2.0/devices/gg007test/sw1";

const char *STopic8 = "/v2.0/devices/gg007test/sw2";

#define MQTT_Port 1883

#define Test_LED1 2

#define Test_LED2 4

#define Test_LED3 5

#define Test_LED4 18

#define Test_SW1 22

#define Test_SW2 23

#define Pin_DHT22 15

DHTesp dht;

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(My_SSID);

  WiFi.begin(My_SSID, My_Pass);
```

```
  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());
}
void reconnect()
{ while (!client.connected()) // Loop until we're reconnected
  { Serial.print("Attempting MQTT connection...");
    String clientId = "ESP32 Client-";
    clientId += String(random(0xffff), HEX); // Create a random client ID
    if (client.connect(clientId.c_str(), MQTT_User, MQTT_Pass)) // Attempt to connect
    { Serial.println("connected"); // Once connected, publish an announcement...
      client.subscribe(STopic1);
      client.subscribe(STopic2);
      client.subscribe(STopic3);
      client.subscribe(STopic4);
      client.subscribe(STopic5);
      client.subscribe(STopic6);
      client.subscribe(STopic7);
      client.subscribe(STopic8);
```

```
    } else
    { Serial.print("failed, rc=");
      Serial.print(client.state());
      Serial.println(" try again in 5 seconds");
      delay(5000);
    }
  }
}
void callback(char *topic, byte *payload, unsigned int length)
{ Serial.print("Message arrived [");
  Serial.print(topic);
  Serial.print("] ");
  for (int i = 0; i < length; i++)
  { Serial.print((char)payload[i]);
  }
  if (topic[24] == STopic3[24]) {
    Serial.print(" -LED1->> ");
    Serial.print((char)payload[10]);
    if (payload[10] == '1')
      digitalWrite(Test_LED1, HIGH);
    else
      digitalWrite(Test_LED1, LOW);
  }
  if (topic[24] == STopic4[24]) {
```

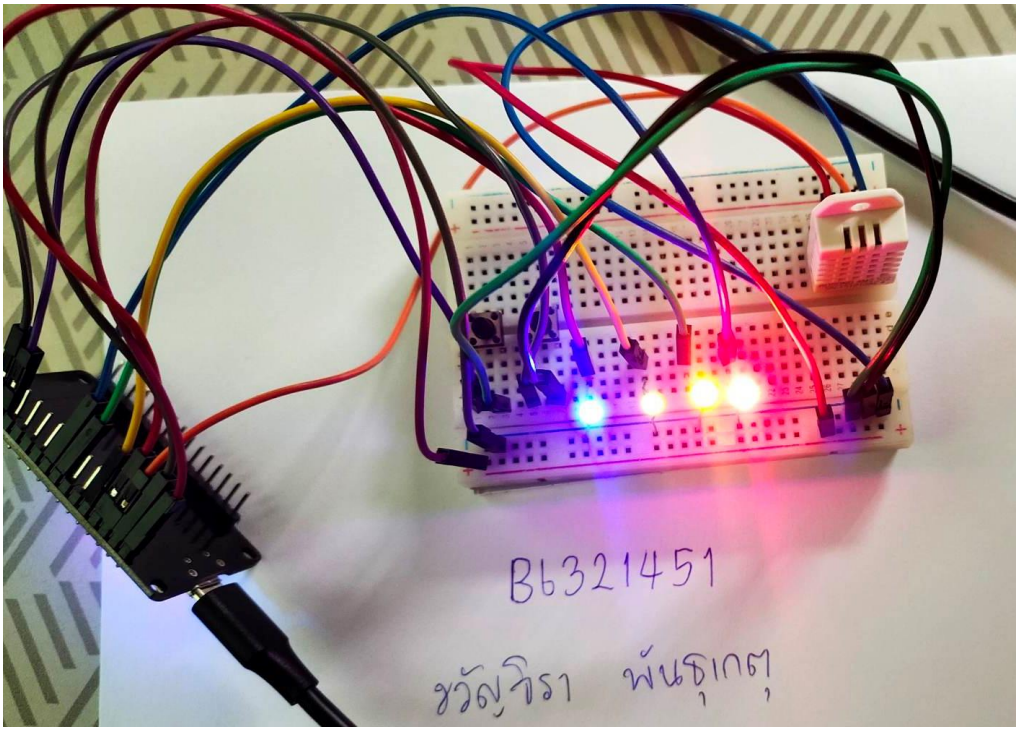
```
  Serial.print(" -LED2->> ");
  Serial.print((char)payload[10]);
  if (payload[10] == '1')
    digitalWrite(Test_LED2, HIGH);
  else
    digitalWrite(Test_LED2, LOW);
}
if (topic[24] == STopic5[24]) {
  Serial.print(" -LED3->> ");
  Serial.print((char)payload[10]);
  if (payload[10] == '1')
    digitalWrite(Test_LED3, HIGH);
  else
    digitalWrite(Test_LED3, LOW);
}
if (topic[24] == STopic6[24]) {
  Serial.print(" -LED4->> ");
  Serial.print((char)payload[10]);
  if (payload[10] == '1')
    digitalWrite(Test_LED4, HIGH);
  else
    digitalWrite(Test_LED4, LOW);
}
```

```
  Serial.println();
}
void setup()
{ pinMode(Test_LED1, OUTPUT);
  pinMode(Test_LED2, OUTPUT);
  pinMode(Test_LED3, OUTPUT);
  pinMode(Test_LED4, OUTPUT);
  pinMode(Test_SW1, INPUT_PULLDOWN);
  pinMode(Test_SW2, INPUT_PULLDOWN);
  dht.setup(Pin_DHT22, DHTesp::DHT22);
  Serial.begin(115200);
  Setup_Wifi();
  client.setServer(MQTT_Server, MQTT_Port);
  client.setCallback(callback);
}
void loop()
{ if (!client.connected()) reconnect();
  client.loop();
  long now = millis();
  float humidity = dht.getHumidity();
  float temperature = dht.getTemperature();
  int SW1 = 0;
  int SW2 = 0;
```

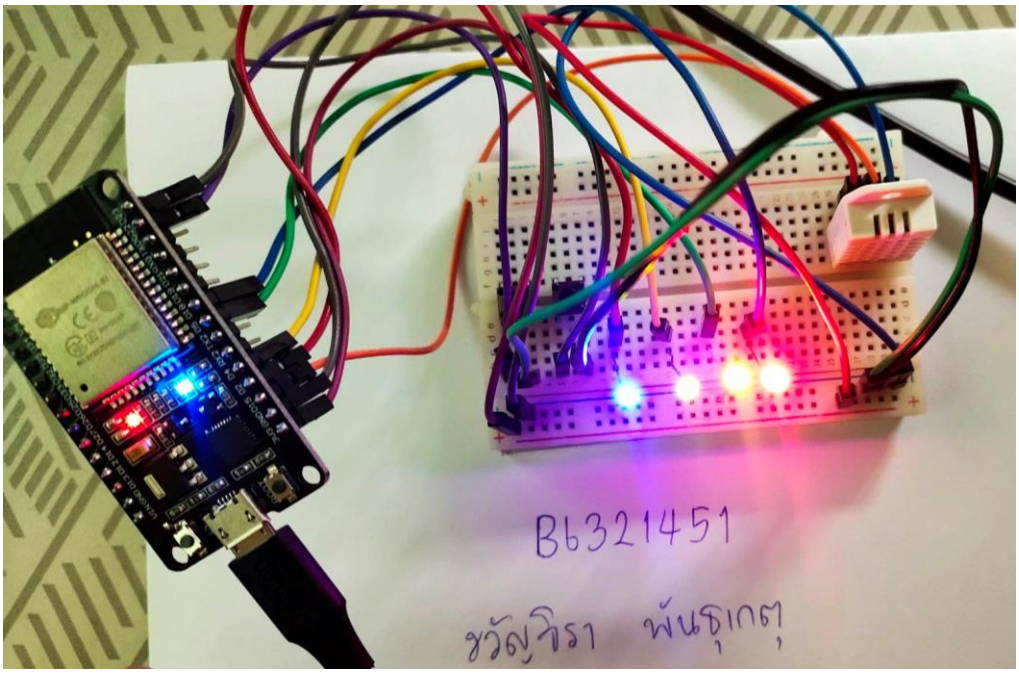
```
  if (digitalRead(Test_SW1) == HIGH) SW1 = 1;

  else SW1 = 0;

  if (digitalRead(Test_SW2) == LOW) SW2 = 1;

  else SW2 = 0;

  if (now - lastMsg >= 5000)

  {

    snprintf (msg, 75, "{ \"humid\" : %.2f, \"tempp\": %.2f, \"sw1\": %d, \"sw2\": %d }",
humidity, temperature, SW1, SW2);

    Serial.print("Publish message: ");

    Serial.println(msg);

    client.publish(PTopic1, msg);

    lastMsg = now;

    delay(1000);

  }


}
```

///ยังติดปัญหา LED ทั้ง 4 ดวง on off พร้อมกัน

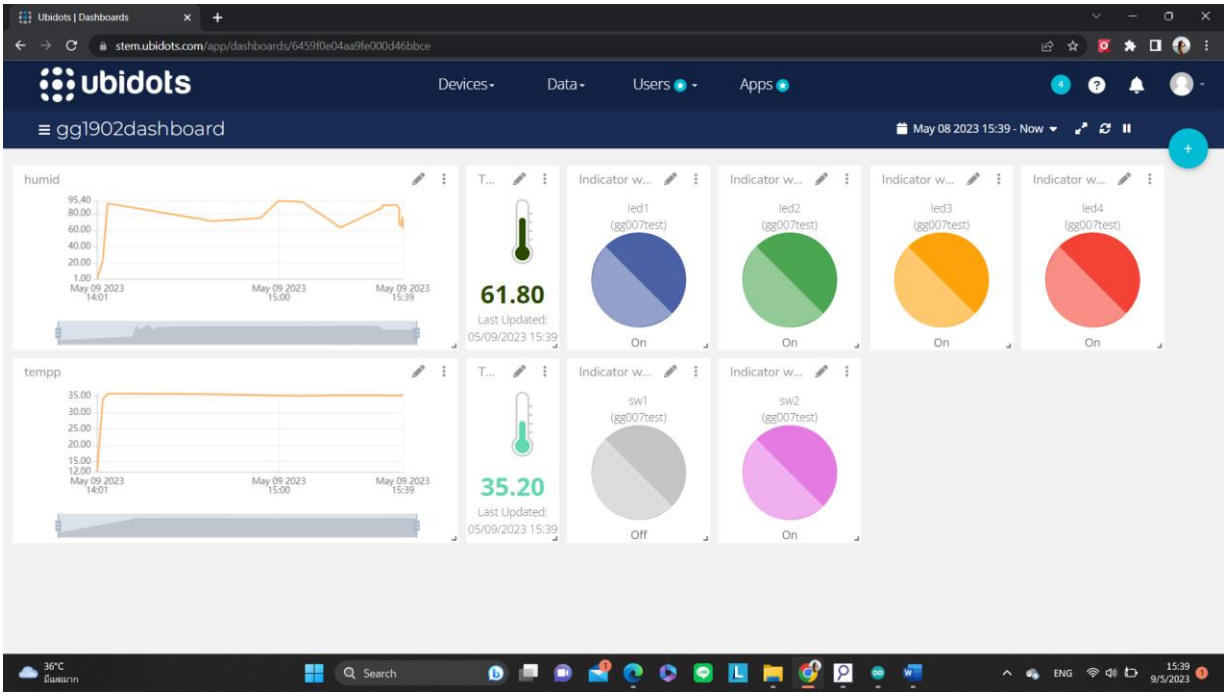
รูปการต่อวงจร – 1

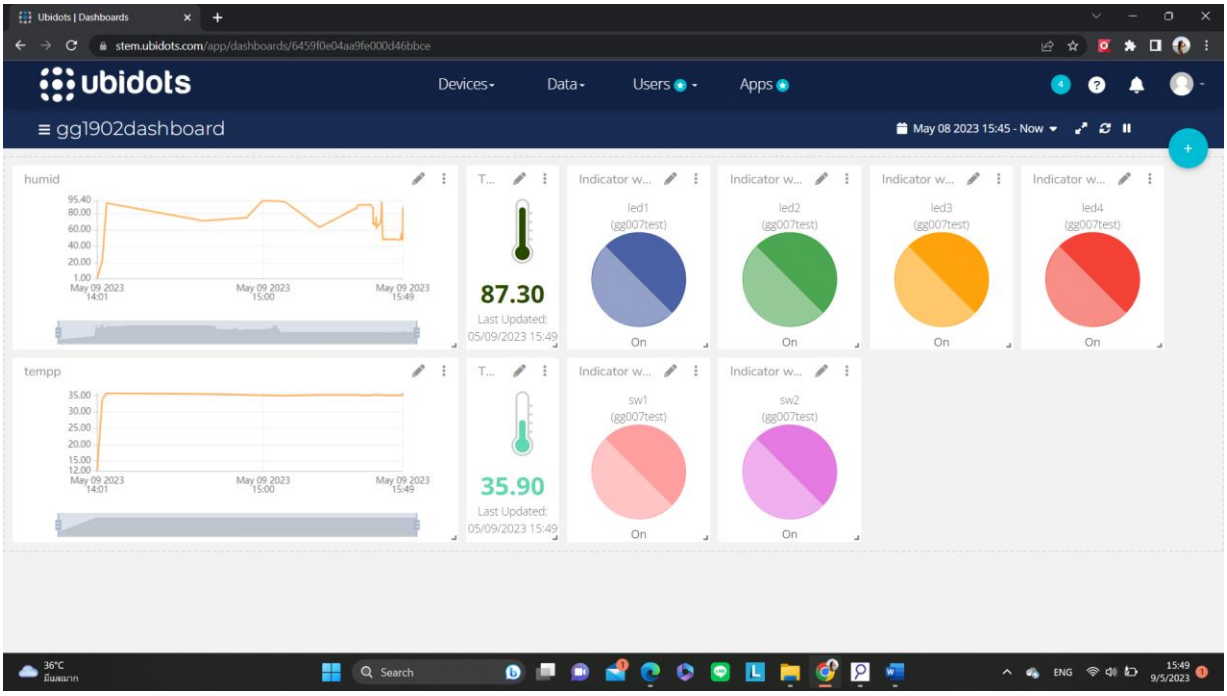


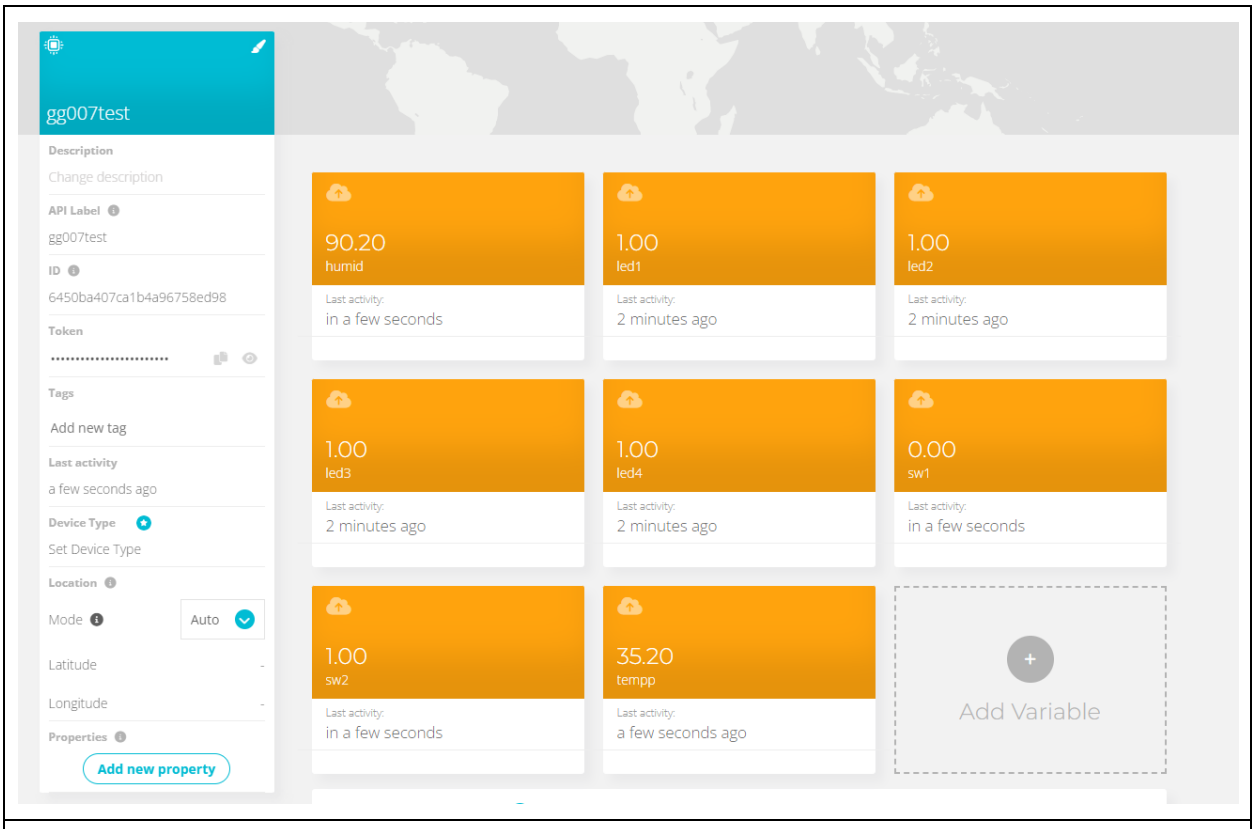
รูปการต่อวงจร – 2



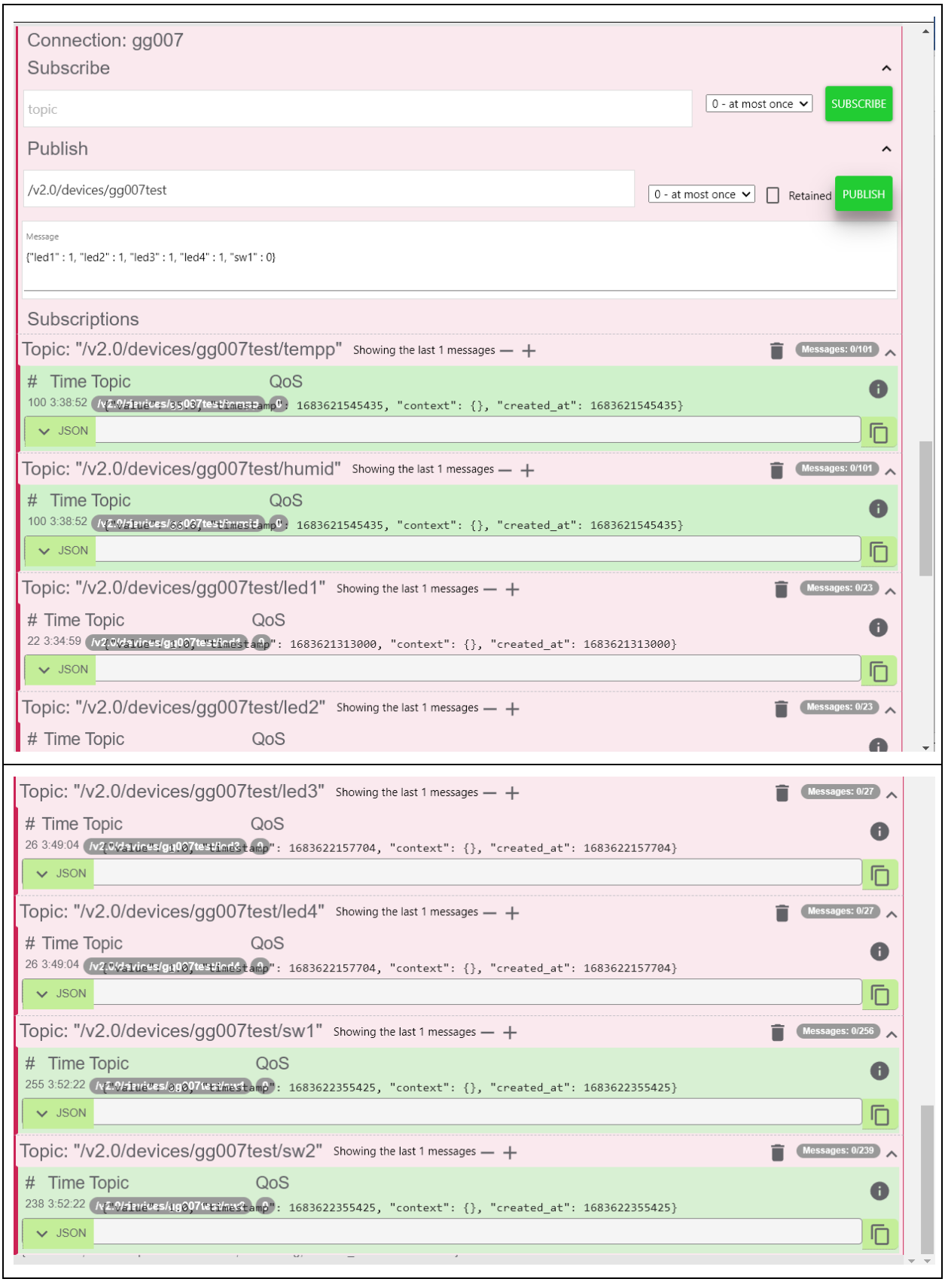
รูปหน้าจอ **Ubidot Dashboard**





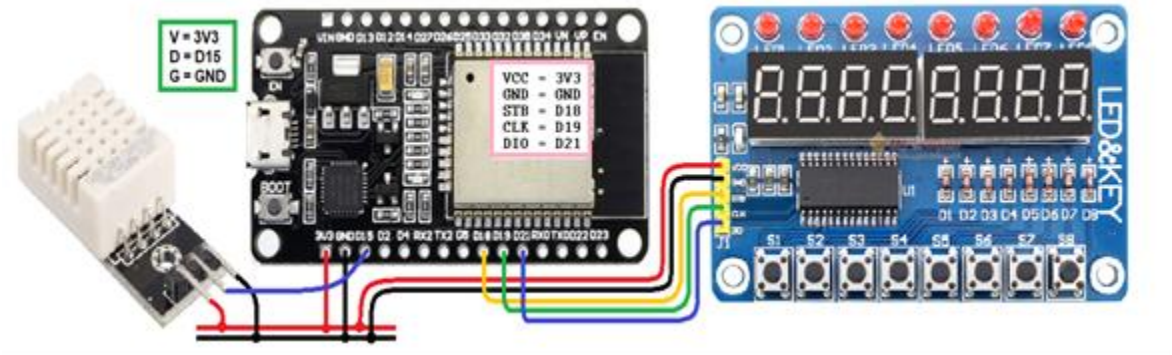

gg007test
Description
Change description
API Label
gg007test
ID
6450ba407ca1b4a96758ed98
Token
Tags
Add new tag
Last activity
a few seconds ago
Device Type
Set Device Type
Location
Mode
Auto
Latitude
Longitude
Properties
Add new property
90.20
humid
Last activity:
in a few seconds
1.00
led1
Last activity:
2 minutes ago
1.00
led2
Last activity:
2 minutes ago
1.00
led3
Last activity:
2 minutes ago
1.00
led4
Last activity:
2 minutes ago
0.00
sw1
Last activity:
in a few seconds
1.00
sw2
Last activity:
in a few seconds
35.20
tempp
Last activity:
a few seconds ago
Add Variable


COM3
Message arrived [/v2.0/devices/gg007test/sw1] {"value": 0.0, "timestamp": 1683621300453, "context": {}, "created_at": 1683621300453}
Message arrived [/v2.0/devices/gg007test/sw2] {"value": 1.0, "timestamp": 1683621300453, "context": {}, "created_at": 1683621300453}
Message arrived [/v2.0/devices/gg007test/tempp] {"value": 35.2, "timestamp": 1683621300453, "context": {}, "created_at": 1683621300453}
Publish message: { "humid" : 89.90, "tempp": 35.20, "sw1": 0, "sw2": 1 }
Message arrived [/v2.0/devices/gg007test/humid] {"value": 89.9, "timestamp": 1683621305595, "context": {}, "created_at": 1683621305595}
Message arrived [/v2.0/devices/gg007test/tempp] {"value": 35.2, "timestamp": 1683621305595, "context": {}, "created_at": 1683621305595}
Message arrived [/v2.0/devices/gg007test/sw1] {"value": 0.0, "timestamp": 1683621305595, "context": {}, "created_at": 1683621305595}
Message arrived [/v2.0/devices/gg007test/sw2] {"value": 1.0, "timestamp": 1683621305595, "context": {}, "created_at": 1683621305595}
Publish message: { "humid" : 90.00, "tempp": 35.20, "sw1": 0, "sw2": 1 }
Message arrived [/v2.0/devices/gg007test/humid] {"value": 90.0, "timestamp": 1683621310519, "context": {}, "created_at": 1683621310519}
Message arrived [/v2.0/devices/gg007test/sw1] {"value": 0.0, "timestamp": 1683621310519, "context": {}, "created_at": 1683621310519}
Message arrived [/v2.0/devices/gg007test/sw2] {"value": 1.0, "timestamp": 1683621310519, "context": {}, "created_at": 1683621310519}
Message arrived [/v2.0/devices/gg007test/tempp] {"value": 35.2, "timestamp": 1683621310519, "context": {}, "created_at": 1683621310519}
Message arrived [/v2.0/devices/gg007test/led2] {"value": 1.0, "timestamp": 1683621313000, "context": {}, "created_at": 1683621313000} -LED1->> 1 -LED2->> 1 -LED3->> 1 -LED4->> 1
Message arrived [/v2.0/devices/gg007test/led1] {"value": 1.0, "timestamp": 1683621313000, "context": {}, "created_at": 1683621313000} -LED1->> 1 -LED2->> 1 -LED3->> 1 -LED4->> 1
Message arrived [/v2.0/devices/gg007test/led3] {"value": 1.0, "timestamp": 1683621313000, "context": {}, "created_at": 1683621313000} -LED1->> 1 -LED2->> 1 -LED3->> 1 -LED4->> 1
Message arrived [/v2.0/devices/gg007test/sw1] {"value": 0.0, "timestamp": 1683621313000, "context": {}, "created_at": 1683621313000}
Message arrived [/v2.0/devices/gg007test/led4] {"value": 1.0, "timestamp": 1683621313000, "context": {}, "created_at": 1683621313000} -LED1->> 1 -LED2->> 1 -LED3->> 1 -LED4->> 1
Publish message: { "humid" : 90.00, "tempp": 35.20, "sw1": 0, "sw2": 1 }
Message arrived [/v2.0/devices/gg007test/sw1] {"value": 0.0, "timestamp": 1683621315436, "context": {}, "created_at": 1683621315436}
Message arrived [/v2.0/devices/gg007test/humid] {"value": 90.0, "timestamp": 1683621315436, "context": {}, "created_at": 1683621315436}
Message arrived [/v2.0/devices/gg007test/sw2] {"value": 1.0, "timestamp": 1683621315436, "context": {}, "created_at": 1683621315436}
Message arrived [/v2.0/devices/gg007test/tempp] {"value": 35.2, "timestamp": 1683621315436, "context": {}, "created_at": 1683621315436}
Autoscroll
Show timestamp
No line ending
115200 baud
Clear outpu


Connection: gg007
Subscribe
topic
0 - at most once
SUBSCRIBE
Publish
/v2.0/devices/gg007test
0 - at most once
Retained
PUBLISH
Message
{"led1" : 1, "led2" : 1, "led3" : 1, "led4" : 1, "sw1" : 0}
Subscriptions
Topic: "/v2.0/devices/gg007test/tempp" Showing the last 1 messages
Messages: 0/101
Time Topic QoS
100 3:38:52 {"value": 95.06, "timestamp": 1683621545435, "context": {}, "created_at": 1683621545435}
JSON
Topic: "/v2.0/devices/gg007test/humid" Showing the last 1 messages
Messages: 0/101
Time Topic QoS
100 3:38:52 {"value": 66.06, "timestamp": 1683621545435, "context": {}, "created_at": 1683621545435}
JSON
Topic: "/v2.0/devices/gg007test/led1" Showing the last 1 messages
Messages: 0/23
Time Topic QoS
22 3:34:59 {"value": 0, "timestamp": 1683621313000, "context": {}, "created_at": 1683621313000}
JSON
Topic: "/v2.0/devices/gg007test/led2" Showing the last 1 messages
Messages: 0/23
Time Topic QoS
Topic: "/v2.0/devices/gg007test/led3" Showing the last 1 messages
Messages: 0/27
Time Topic QoS
26 3:49:04 {"value": 0, "timestamp": 1683622157704, "context": {}, "created_at": 1683622157704}
JSON
Topic: "/v2.0/devices/gg007test/led4" Showing the last 1 messages
Messages: 0/27
Time Topic QoS
26 3:49:04 {"value": 0, "timestamp": 1683622157704, "context": {}, "created_at": 1683622157704}
JSON
Topic: "/v2.0/devices/gg007test/sw1" Showing the last 1 messages
Messages: 0/256
Time Topic QoS
255 3:52:22 {"value": 0, "timestamp": 1683622355425, "context": {}, "created_at": 1683622355425}
JSON
Topic: "/v2.0/devices/gg007test/sw2" Showing the last 1 messages
Messages: 0/239
Time Topic QoS
238 3:52:22 {"value": 0, "timestamp": 1683622355425, "context": {}, "created_at": 1683622355425}
JSON

Quiz_402 – Ubidots: Monitor DHT22 with TM1638 Display and LINE Alert

- ส่งข้อมูลอุณหภูมิไปยัง Ubidots
- หากอุณหภูมิที่อ่านได้เกิน 28'C ให้แจ้งเตือนผ่าน LINE และบอกด้วยว่าอุณหภูมิเท่าใด (ขอแก้เป็น > 25'C เพราะนั่งทำในห้องแอร์ค่ะ)
- แสดงอุณหภูมิที่ 7_Segment Display TM1638 Board




```
#include <WiFi.h>

#include <PubSubClient.h>

#include <HTTPClient.h>

#include <TM1638plus.h>

#include "DHTesp.h"

#include <TridentTD_LineNotify.h>

const char *My_SSID = "Gg";

const char *My_Pass = "0935463156";

const char *MQTT_Server = "things.ubidots.com";

const char *MQTT_User = "BBFF-7CfZiYPIr8CDn3s7OZQtcnw0GbzH76";

const char *MQTT_Pass = "BBFF-7CfZiYPIr8CDn3s7OZQtcnw0GbzH76";

#define LINE_TOKEN "mMQFHYzlN2RsoAbVq5zQlNMHr1HA3cGzEDfjbuN0Njo"

const char *PTopic1 = "/v2.0/devices/gg007test";

const char *STopic1 = "/v2.0/devices/gg007test/humid";

const char *STopic2 = "/v2.0/devices/gg007test/temppp";

#define Brd_STB 18 // strobe = GPIO connected to strobe line of module

#define Brd_CLK 19 // clock = GPIO connected to clock line of module

#define Brd_DIO 5 // data = GPIO connected to data line of module
```

```
bool high_freq = true; //default false,, If using a high freq CPU > ~100 MHZ set to true.

TM1638plus tm(Brd_STB, Brd_CLK , Brd_DIO, high_freq);

#define MQTT_Port 1883

#define Pin_DHT22 15

DHTesp dht;

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(My_SSID);

  WiFi.begin(My_SSID, My_Pass);

  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());

}

void reconnect()

{ while (!client.connected()) // Loop until we're reconnected

  { Serial.print("Attempting MQTT connection...");

    String clientId = "ESP32 Client-";
```

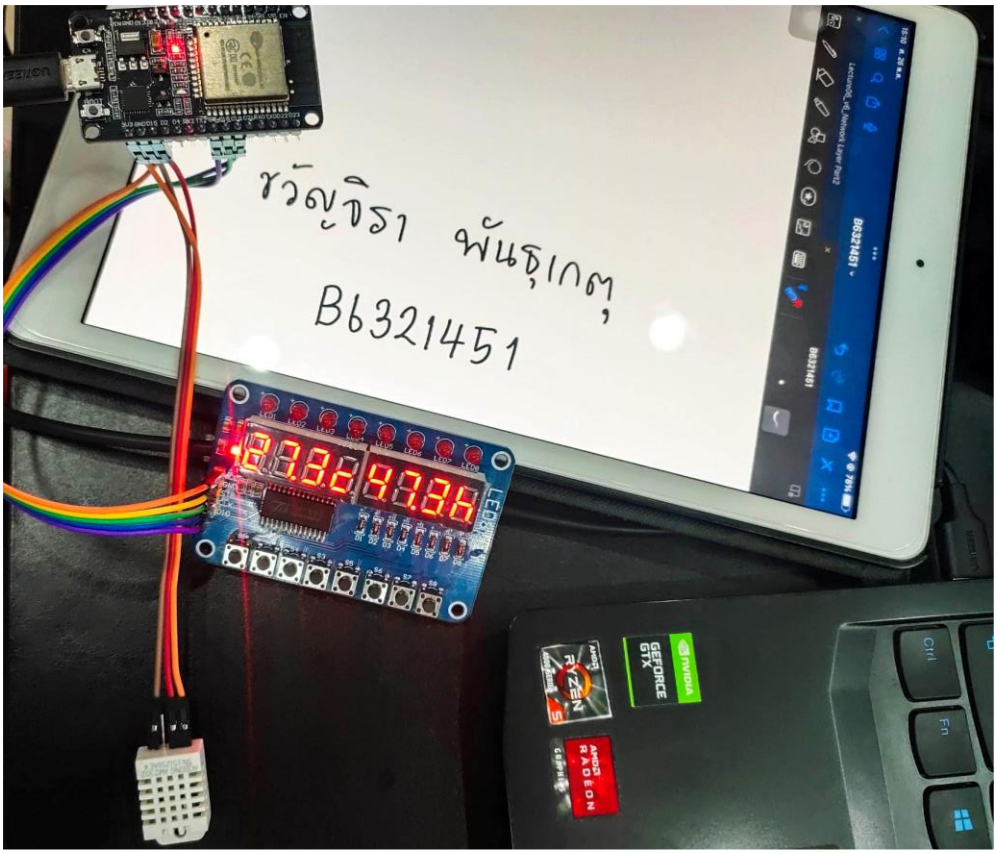
```
    clientId += String(random(0xffff), HEX); // Create a random client ID
    if (client.connect(clientId.c_str(), MQTT_User, MQTT_Pass)) // Attempt to connect
    { Serial.println("connected"); // Once connected, publish an announcement...
      client.subscribe(STopic1);
      client.subscribe(STopic2);
    } else
    { Serial.print("failed, rc=");
      Serial.print(client.state());
      Serial.println(" try again in 5 seconds");
      delay(5000);
    }
  }
}
void setup()
{
  tm.displayBegin();
  dht.setup(Pin_DHT22, DHTesp::DHT22);
  Serial.begin(115200);
  Setup_Wifi();
  client.setServer(MQTT_Server, MQTT_Port);

  Serial.println(LINE.getVersion());
  Serial.println(WiFi.localIP());
  LINE.setToken(LINE_TOKEN);
}
void loop()
{ if (!client.connected()) reconnect();
  client.loop();
  long now = millis();
```

```
if (now - lastMsg > 5000)
{ lastMsg = now;
 float humidity = dht.getHumidity();
 float temperature = dht.getTemperature();
 snprintf (msg, 75, "{ \"humid\" : %.2f, \"tempp\": %.2f}", humidity, temperature);
 Serial.print("Publish message: ");
 Serial.println(msg);
 client.publish(PTopic1, msg);

 Serial.println();
 Serial.print("\nTemperature('C) = ");
 Serial.print(temperature, 1);
 Serial.print("\tHumidity(%) = ");
 Serial.print(humidity, 1);
 Serial.println();
 if (WiFi.status() == WL_CONNECTED) {
  HTTPClient http;
  http.addHeader("Content-Type", "application/x-www-form-urlencoded");
  Serial.print("HTTP Response code: ");
  http.end();
 }
 /// if temp > 28 C send notifications >> line
 if (temperature > 25) {
  Serial.println(LINE.getVersion());
  Serial.println(WiFi.localIP());
  LINE.setToken(LINE_TOKEN);
  LINE.notify("อุณหภูมิ เกินกำหนด");
  LINE.notify("Temperature");
  LINE.notify(temperature);
```

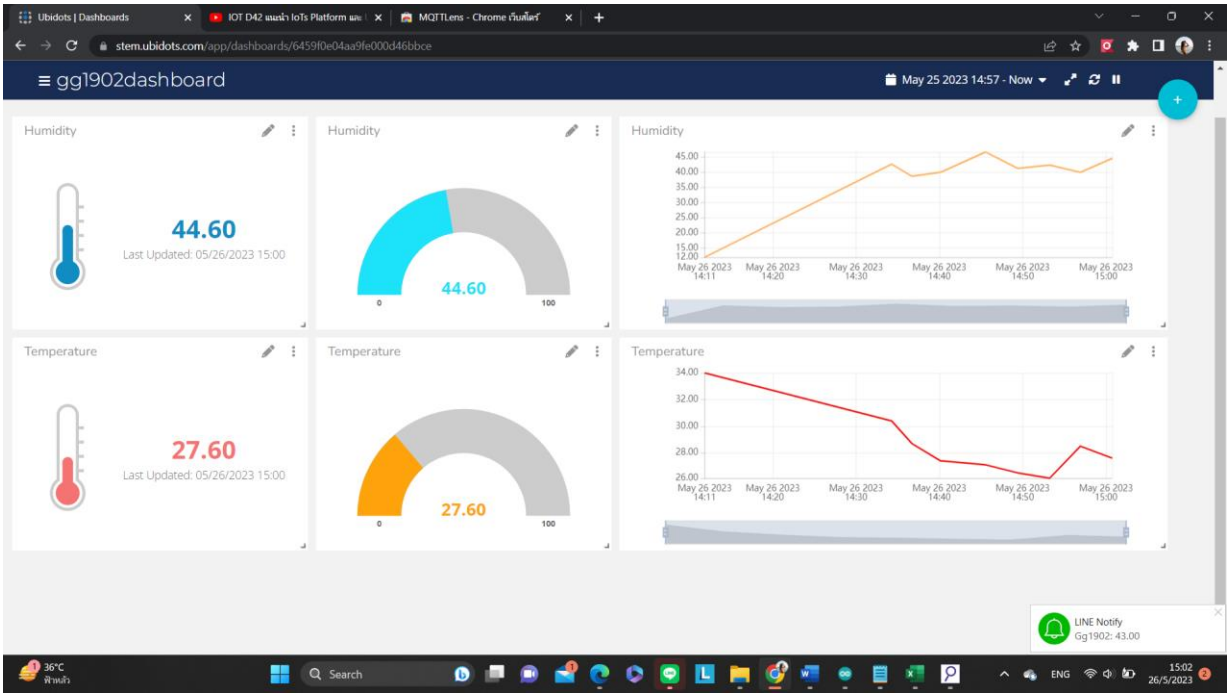
```
    LINE.notify("Humidity");
    LINE.notify(humidity);
   }
   /*Display */
   int t = int(temperature * 100);
   int Tempp2 = (int)temperature / 10; int Tempp1 = (int)temperature % 10; int Tempp0 = (int)(temperature * 10) % 10;
   int Humi2 = (int)humidity / 10; int Humi1 = (int)humidity % 10; int Humi0 = (int)(humidity * 10) % 10;
   tm.displayHex(0, Tempp2);
   tm.displayASCIIwDot(1, Tempp1 + '0'); // turn on dot
   tm.displayHex(2, Tempp0);
   tm.display7Seg(3, B01011000); // Code=tgfedcba
   tm.displayHex(4, Humi2);
   tm.displayASCIIwDot(5, Humi1 + '0'); // turn on dot
   tm.displayHex(6, Humi0);
   tm.display7Seg(7, B01110100); // Code=tgfedcba
   delay(2000);
   int WaitTime = 60;
   Serial.print(" >> Wait for next time --> ");
   for (int i = WaitTime; i >= 0; i -= 5) {
    Serial.print(",");
    Serial.print(i);
    delay(5000);
   }
  }
}
```

รูปการต่อวงจร – 1

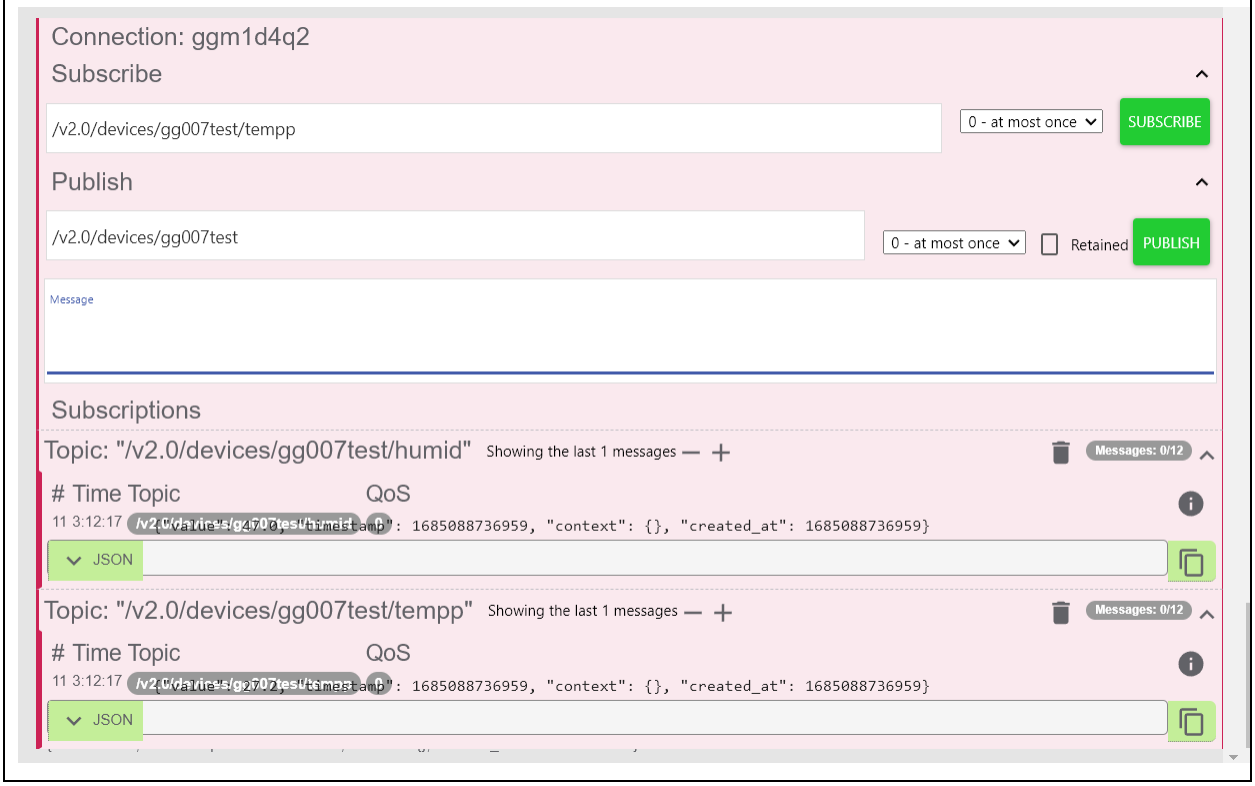
รูปการต่อวงจร – 2



รูปหน้าจอ **Ubidot Dashboard**



MQTT Lens



รูปหน้าจอ LINE ผลการทดสอบ