

แนวทางการใช้งานอินเทอร์เน็ตของสรรพสิ่งในระบบการผลิต

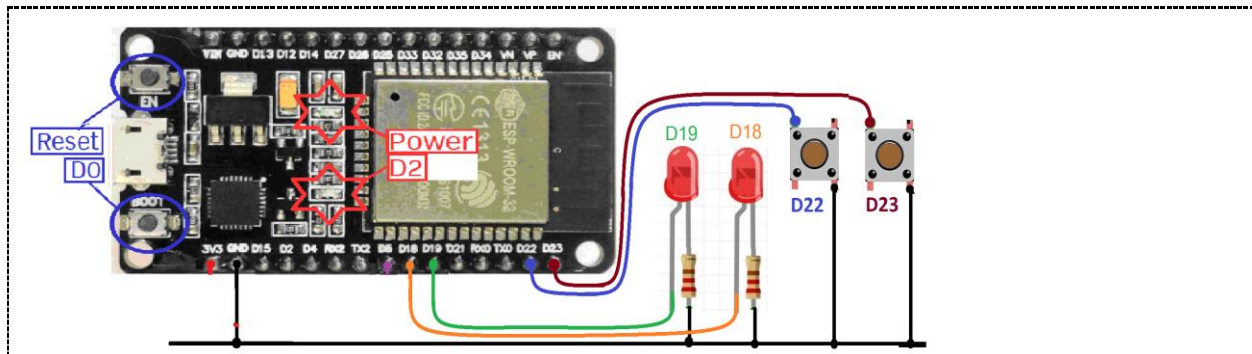
IoT Approaches to Manufacturing System

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4/4. คำถามท้ายบทเพื่อทดสอบความเข้าใจ

Quiz_101 - กดติด กดดับ 2 ชุด

- หากต้องการให้ใช้ 1 สวิตช์ ควบคุม 1 LED แบบกดติด-กดดับ จำนวน 2 วงจรจะต้องวงจรและเขียนโปรแกรมอย่างไร {SW-D22 -- LED-D19, SW-D23 -- LED-D18}



< Test Code >

```

Quiz101 | Arduino 1.8.19
File Edit Sketch Tools Help

Quiz101
#define Button1 22
#define LED1 19
#define Button2 23
#define LED2 18

int buttonState1 = 0;
int buttonState2 = 0;

void setup() {
  Serial.begin(115200);
  pinMode(Button1, INPUT_PULLUP);
  pinMode(LED1, OUTPUT);
  pinMode(Button2, INPUT_PULLUP);
  pinMode(LED2, OUTPUT);
}

void loop() {
  if (digitalRead(Button1) == LOW) {
    delay(20);
    buttonState1 = 1 - buttonState1;
    digitalWrite(LED1, buttonState1);
    while (digitalRead(Button1) == LOW);
    delay(20);
  }

  if (digitalRead(Button2) == LOW) {
    delay(20);
    buttonState2 = 1 - buttonState2;
    digitalWrite(LED2, buttonState2);
    while (digitalRead(Button2) == LOW);
    delay(20);
  }
}

```

```

#define Button1 22
#define LED1 19
#define Button2 23
#define LED2 18

```

```

int buttonState1 = 0;
int buttonState2 = 0;

void setup() {
  Serial.begin(115200);
  pinMode(Button1, INPUT_PULLUP);
  pinMode(LED1, OUTPUT);
  pinMode(Button2, INPUT_PULLUP);
  pinMode(LED2, OUTPUT);
}

void loop() {

  if (digitalRead(Button1) == LOW) {
    delay(20);
    buttonState1 = 1 -buttonState1;
    digitalWrite(LED1, buttonState1);
    while (digitalRead(Button1) == LOW);
    delay(20);
  }

  if (digitalRead(Button2) == LOW) {
    delay(20);
    buttonState2 = 1 -buttonState2;
    digitalWrite(LED2, buttonState2);
    while (digitalRead(Button2) == LOW);
    delay(20);
  }
}

```

รูปการต่อวงจร - 1



รูปการต่อวงจร - 2



Quiz_102 – ปรับการแสดงผลที่ Serial Monitor เป็นดังนี้

Temperature: 23.0C / 74.7F. Humidity: 24.9%

Temperature: 23.0C / 74.7F. Humidity: 24.9%

Temperature: 23.0C / 74.7F. Humidity: 24.9%

< Test Code >



```

Quiz102 | Arduino 1.8.19
File Edit Sketch Tools Help
Quiz102
#define DHT22_Pin 15
#include "DHTesp.h"
DHTesp dht;

void setup() {
  Serial.begin(115200);
  Serial.println();
  Serial.println("Status\tHumidity (%) \tTemperature (C)\t(F)\tHeatIndex (C)\t(F)");
  dht.setup(DHT22_Pin, DHTesp::DHT22); // Connect DHT sensor to GPIO 15
}

void loop() {
  delay(dht.getMinimumSamplingPeriod());
  float humidity = dht.getHumidity();
  float temperature = dht.getTemperature();
  Serial.print("Temperature: ");
  Serial.print(temperature, 1);
  Serial.print("C / ");
  Serial.print(dht.toFahrenheit(temperature), 1);
  Serial.print("F ");
  Serial.print("Humidity: ");
  Serial.print(humidity, 1);
  Serial.print("% ");
  Serial.println(" ");
  delay(2000);
}

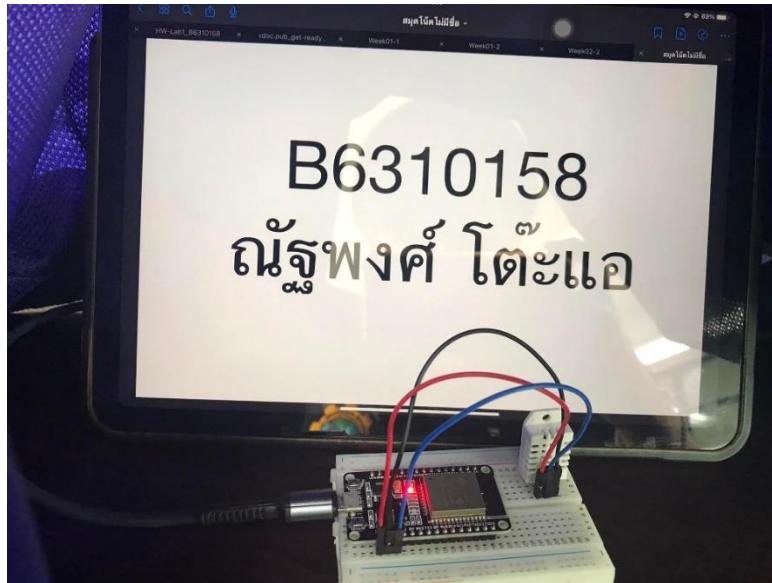
```

```

#define DHT22_Pin 15
#include "DHTesp.h"
DHTesp dht;
void setup() {
  Serial.begin(115200);
  Serial.println();
  Serial.println("Status\tHumidity (%) \tTemperature (C)\t(F)\tHeatIndex (C)\t(F)");
  dht.setup(DHT22_Pin, DHTesp::DHT22); // Connect DHT sensor to GPIO 15
}
void loop() {
  delay(dht.getMinimumSamplingPeriod());
  float humidity = dht.getHumidity();
  float temperature = dht.getTemperature();
  Serial.print("Temperature: ");
  Serial.print(temperature, 1);
  Serial.print("C / ");
  Serial.print(dht.toFahrenheit(temperature), 1);
  Serial.print("F ");
  Serial.print("Humidity: ");
  Serial.print(humidity, 1);
  Serial.print("% ");
  Serial.println(" ");
  delay(2000);
}

```

รูปการต่อวงจร - 1

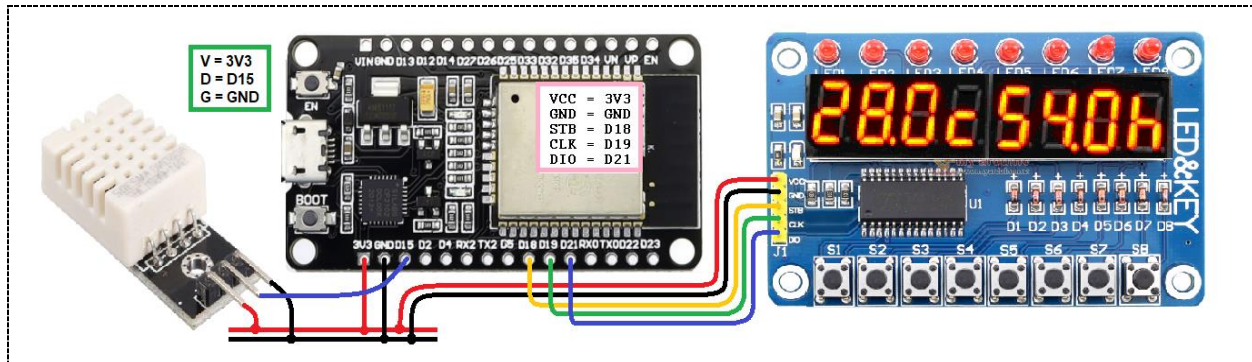


รูปการต่อวงจร - 2



Quiz_103 – Read Sensor and Show

- ตัวอย่างเพิ่มเติม ทดสอบการทำงานด้วยโปรแกรมต่อไปนี้ และปรับแก้ให้ถูกต้อง



< Test Code >

```

sketch_apr04 | Arduino 1.8.19
File Edit Search Tools Help

sketch_apr04.g
#include <TM1638plus.h>
#include "DHTesp.h"
#define Pin_DHT22 15 // D15
#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 21 // 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.
DHTesp dht;
TM1638plus tm(Brd_STB, Brd_CLK, Brd_DIO, high_freq);
void setup() {
  Serial.begin(115200);
  dht.setup(Pin_DHT22, DHTesp::DHT22);
  tm.displayBegin();
}
void loop() {
  int h = dht.getHumidity()*10;
  int t = dht.getTemperature()*10;
  Serial.print("Temperature: ");
  Serial.print(t); Serial.print(" *C\t");
  Serial.print("Humidity: ");
  Serial.print(h); Serial.print(" %\n");
  int Temp2 = t / 100; int Temp1 = (t / 10) % 10; int Temp0 = t % 10;
  int Hum12 = h / 100; int Hum11 = (h / 10) % 10; int Hum10 = h % 10;
  tm.displayOn(0, Temp2);
  tm.displayOn(1, Temp1); // turn on dot
  tm.displayOn(2, Temp0);
  tm.displayOn(3, Hum12); // CodetgTechdu
  tm.displayOn(4, Hum11);
  tm.displayOn(5, Hum10); // turn on dot
  tm.displayOn(6, Hum10);
  tm.displayOn(7, Hum10); // CodetgTechdu
  delay(2000);
}

```

```

#include <TM1638plus.h>
#include "DHTesp.h"
#define Pin_DHT22 15 // D15
#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 21 // 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.
DHTesp dht;
TM1638plus tm(Brd_STB, Brd_CLK, Brd_DIO, high_freq);
void setup() {
  Serial.begin(115200);
  dht.setup(Pin_DHT22, DHTesp::DHT22);
  tm.displayBegin();
}
void loop() {
  int h = dht.getHumidity()*10;
  int t = dht.getTemperature()*10;
  Serial.print("Temperature: ");
  Serial.print(t); Serial.print(" *C\t");
  Serial.print("Humidity: ");

```



```

Serial.print(h); Serial.print(" %\n");
int Tempp2 = t / 100; int Tempp1 = (t / 10) % 10; int Tempp0 = t % 10;
int Humi2 = h / 100; int Humi1 = (h / 10) % 10; int Humi0 = h % 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);
}

```

รูปการต่อวงจร - 1



รูปการต่อวงจร - 2

