

Lê Đình Tùng

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## LAB 1.2: Mô phỏng điều khiển LED qua HTTP bằng Framework Flask

```
C:\WINDOWS\system32\cmd. x + v
Microsoft Windows [Version 10.0.26100.4061]
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C:\Users\ADMIN>python iot_led_sim_image.py
python: can't open file 'C:\\Users\\ADMIN\\iot_led_sim_image.py': [Errno 2] No such file or directory

C:\Users\ADMIN>"F:\Mang_MTVTSL\chuong_4\project_folder"
"F:\Mang_MTVTSL\chuong_4\project_folder" is not recognized as an internal or external command,
operable program or batch file.

C:\Users\ADMIN>python "F:\Mang_MTVTSL\chuong_4\project_folder\iot_led_sim_image.py"
* Serving Flask app 'iot_led_sim_image'
* Debug mode: off
WARNING: This is a development server. Do not use it in a production deployment. Use a production WSGI server instead.
* Running on all addresses (0.0.0.0)
* Running on http://127.0.0.1:5000
* Running on http://192.168.2.123:5000
Press CTRL+C to quit
```

LED is currently: ON



Turn ON

Turn OFF

```
C:\WINDOWS\system32\cmd. x + v
127.0.0.1 - - [18/May/2025 22:34:45] "GET /static/led_on.png HTTP/1.1" 200 -
127.0.0.1 - - [18/May/2025 22:34:46] "GET /?led=off HTTP/1.1" 200 -
127.0.0.1 - - [18/May/2025 22:34:46] "GET /static/led_off.png HTTP/1.1" 304 -
127.0.0.1 - - [18/May/2025 22:34:46] "GET /?led=on HTTP/1.1" 200 -
127.0.0.1 - - [18/May/2025 22:34:46] "GET /static/led_on.png HTTP/1.1" 304 -
127.0.0.1 - - [18/May/2025 22:34:46] "GET /?led=off HTTP/1.1" 200 -
127.0.0.1 - - [18/May/2025 22:34:46] "GET /static/led_off.png HTTP/1.1" 304 -
127.0.0.1 - - [18/May/2025 22:34:47] "GET /?led=on HTTP/1.1" 200 -
127.0.0.1 - - [18/May/2025 22:34:47] "GET /static/led_on.png HTTP/1.1" 304 -
127.0.0.1 - - [18/May/2025 22:34:47] "GET /?led=on HTTP/1.1" 200 -
127.0.0.1 - - [18/May/2025 22:34:47] "GET /static/led_on.png HTTP/1.1" 304 -
127.0.0.1 - - [18/May/2025 22:34:47] "GET /?led=off HTTP/1.1" 200 -
127.0.0.1 - - [18/May/2025 22:34:47] "GET /static/led_off.png HTTP/1.1" 304 -
127.0.0.1 - - [18/May/2025 22:34:48] "GET /?led=on HTTP/1.1" 200 -
127.0.0.1 - - [18/May/2025 22:34:48] "GET /static/led_on.png HTTP/1.1" 304 -
```

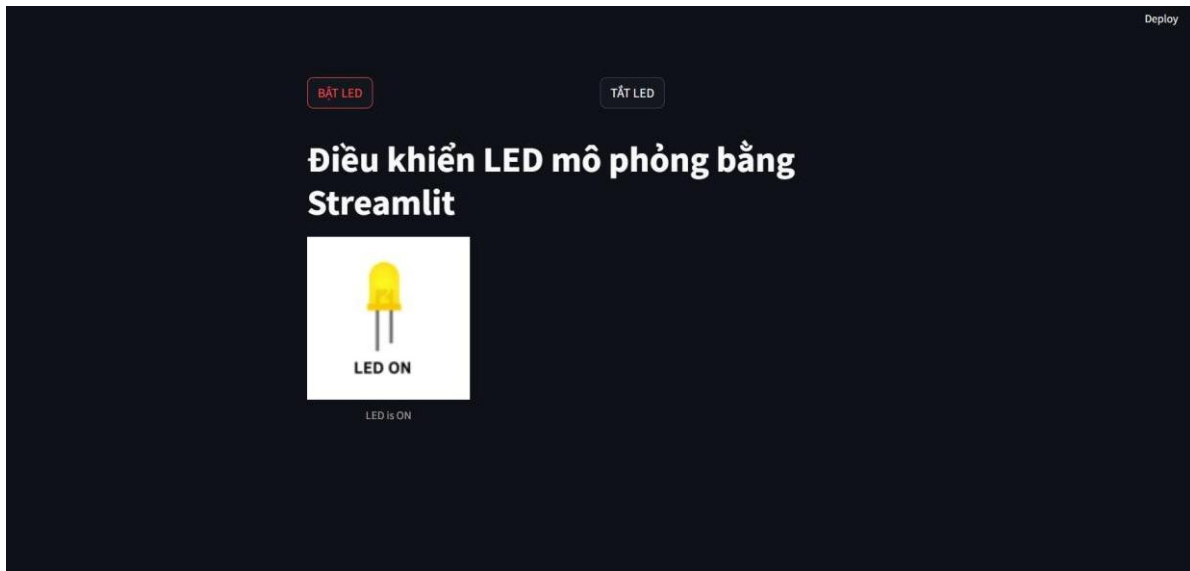
LED is currently: OFF

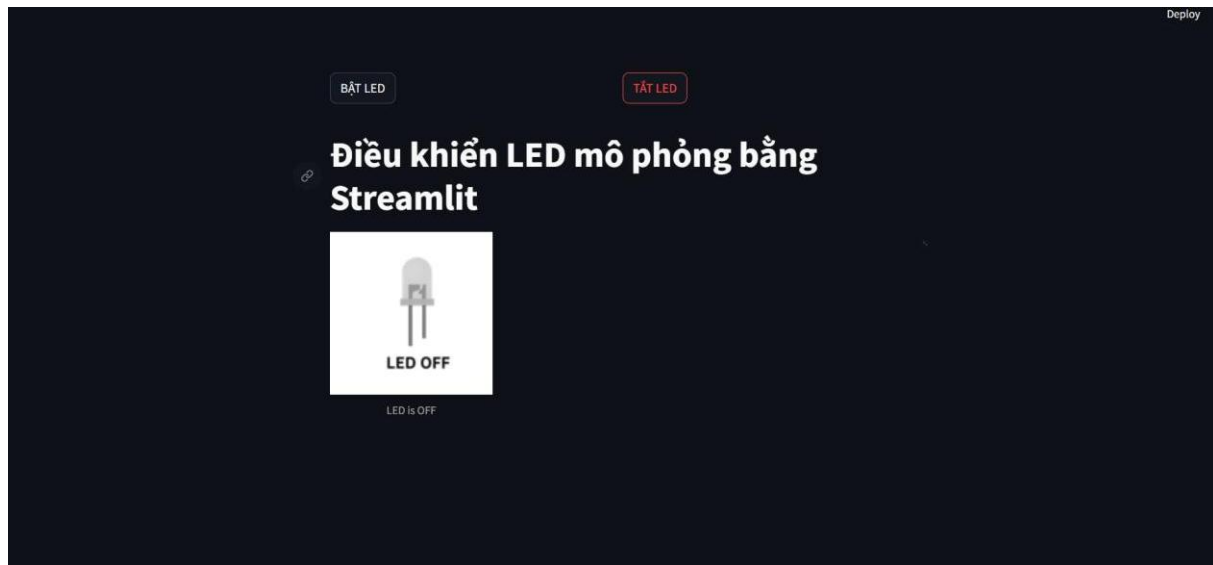


Turn ON Turn OFF

```
C:\WINDOWS\system32\cmd. X + -
127.0.0.1 - - [18/May/2025 22:34:45] "GET /static/led_on.png HTTP/1.1" 200 -
127.0.0.1 - - [18/May/2025 22:34:46] "GET /?led=off HTTP/1.1" 200 -
127.0.0.1 - - [18/May/2025 22:34:46] "GET /static/led_off.png HTTP/1.1" 304 -
127.0.0.1 - - [18/May/2025 22:34:46] "GET /?led=on HTTP/1.1" 200 -
127.0.0.1 - - [18/May/2025 22:34:46] "GET /static/led_on.png HTTP/1.1" 304 -
127.0.0.1 - - [18/May/2025 22:34:46] "GET /?led=off HTTP/1.1" 200 -
127.0.0.1 - - [18/May/2025 22:34:46] "GET /static/led_off.png HTTP/1.1" 304 -
127.0.0.1 - - [18/May/2025 22:34:47] "GET /?led=on HTTP/1.1" 200 -
127.0.0.1 - - [18/May/2025 22:34:47] "GET /static/led_on.png HTTP/1.1" 304 -
127.0.0.1 - - [18/May/2025 22:34:47] "GET /?led=on HTTP/1.1" 200 -
127.0.0.1 - - [18/May/2025 22:34:47] "GET /static/led_on.png HTTP/1.1" 304 -
127.0.0.1 - - [18/May/2025 22:34:47] "GET /?led=off HTTP/1.1" 200 -
127.0.0.1 - - [18/May/2025 22:34:47] "GET /static/led_off.png HTTP/1.1" 304 -
127.0.0.1 - - [18/May/2025 22:34:48] "GET /?led=on HTTP/1.1" 200 -
127.0.0.1 - - [18/May/2025 22:34:48] "GET /static/led_on.png HTTP/1.1" 304 -
127.0.0.1 - - [18/May/2025 22:35:11] "GET /?led=off HTTP/1.1" 200 -
127.0.0.1 - - [18/May/2025 22:35:11] "GET /static/led_off.png HTTP/1.1" 304 -
```

LAB 1.2 phiên bản mô phỏng điều khiển led qua http bằng streamlit





## LAB 2.2 – gửi dữ liệu cảm biến lên mqtt broker

main.py

```

6 import dht # thư viện cảm biến dht22
7 # === Khởi tạo cảm biến DHT22 trên chân GPIO15 ===
8 sensor = dht.DHT22(Pin(15))
9 # === Thông tin Wi-Fi (mô phỏng trên wokwi) ===
10 ssid = "wokwi-GUEST"
11 password = ""
12 # === Kết nối Wi-Fi ===
13 def connect_wifi():
14     wlan = network.WLAN(network.STA_IF)
15     wlan.active(True)
16     wlan.connect(ssid, password)
17     print("Đang kết nối Wi-Fi...")
18     for _ in range(10):
19         if wlan.isconnected():
20             break
21         time.sleep(1)
22     if wlan.isconnected():
23         print("Wi-Fi OK:", wlan.ifconfig())
24     else:
25         print("Kết nối Wi-Fi thất bại.")
26 # === Cấu hình MQTT Broker ===
27 MQTT_CLIENT_ID = "16A1-weather-01" # Tên thiết bị (không trùng)
28 MQTT_BROKER = "mqtt.eclipseprojects.io" # Broker công cộng
29 MQTT_TOPIC = b"16A1-demo/temp" # Chủ đề gửi dữ liệu
30 # === Kết nối MQTT Broker ===
31 def connect_mqtt():
32     try:
33         client = MQTTClient(MQTT_CLIENT_ID, MQTT_BROKER, port=1883)
34         client.connect()
35         print("Đã kết nối MQTT tới:", MQTT_BROKER)
36         return client
37     except Exception as e:
38         print("Lỗi MQTT:", e)
39         return None

```

Simulation

01:17.406 82%

Đang kết nối Wi-Fi...

Kết nối Wi-Fi thất bại.

Kết nối Wi-Fi thất bại.

Wi-Fi OK: ('10.10.0.2', '255.255.0.0', '10.0.0.1', '10.0.0.1')

Đã kết nối MQTT tới mqtt.eclipseprojects.io

Đã gửi (#1): {"humidity": 40.0, "count": 1, "temperature": 24.0}

Đã gửi (#2): {"humidity": 40.0, "count": 2, "temperature": 24.0}

Đã gửi (#3): {"humidity": 40.0, "count": 3, "temperature": 24.0}

Đã gửi (#4): {"humidity": 40.0, "count": 4, "temperature": 24.0}

Đã gửi (#5): {"humidity": 40.0, "count": 5, "temperature": 24.0}

Đã gửi (#6): {"humidity": 40.0, "count": 6, "temperature": 24.0}

Đã gửi (#7): {"humidity": 40.0, "count": 7, "temperature": 24.0}

Đã gửi (#8): {"humidity": 40.0, "count": 8, "temperature": 24.0}

Đã gửi (#9): {"humidity": 40.0, "count": 9, "temperature": 24.0}

Đã gửi (#10): {"humidity": 40.0, "count": 10, "temperature": 24.0}

Đã gửi (#11): {"humidity": 40.0, "count": 11, "temperature": 24.0}

Đã gửi (#12): {"humidity": 40.0, "count": 12, "temperature": 24.0}

Đã gửi (#13): {"humidity": 40.0, "count": 13, "temperature": 24.0}

Đã gửi (#14): {"humidity": 40.0, "count": 14, "temperature": 24.0}

## LAB 2.2b - subscribe dữ liệu cảm biến từ mqtt bằng python trên pc

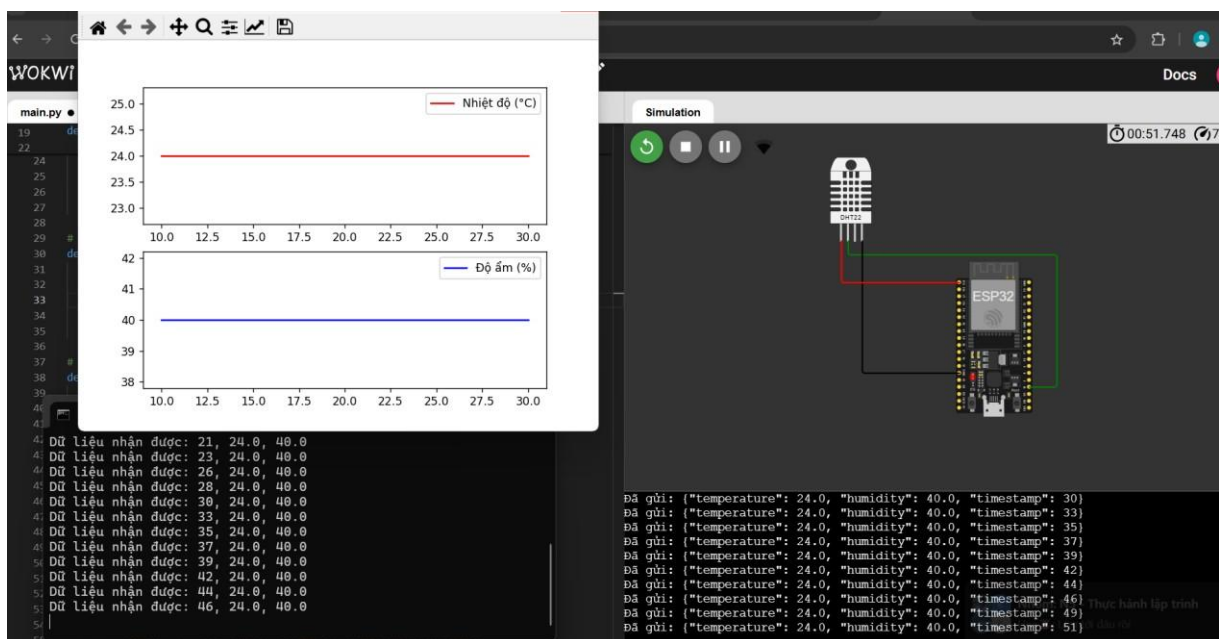
```
Microsoft Windows [Version 10.0.26100.4061]
(c) Microsoft Corporation. All rights reserved.

C:\Users\ADMIN>python "F:\Mang_MTVTSL\chuong_4\lab_2.2b\lab_2.2b.py"
F:\Mang_MTVTSL\chuong_4\lab_2.2b\lab_2.2b.py:13: DeprecationWarning: Callback API version 1 is deprecated, update to lat
est version
  client = mqtt.Client()
Kết nối MQTT thành công!
iot/khdi/esp32: {"temperature": 24.0, "humidity": 40.0, "timestamp": 25}
iot/khdi/esp32: {"temperature": 24.0, "humidity": 40.0, "timestamp": 27}
iot/khdi/esp32: {"temperature": 24.0, "humidity": 40.0, "timestamp": 30}
iot/khdi/esp32: {"temperature": 24.0, "humidity": 40.0, "timestamp": 32}
iot/khdi/esp32: {"temperature": 24.0, "humidity": 40.0, "timestamp": 34}
iot/khdi/esp32: {"temperature": 24.0, "humidity": 40.0, "timestamp": 36}
iot/khdi/esp32: {"temperature": 24.0, "humidity": 40.0, "timestamp": 39}
iot/khdi/esp32: {"temperature": 24.0, "humidity": 40.0, "timestamp": 41}
iot/khdi/esp32: {"temperature": 24.0, "humidity": 40.0, "timestamp": 43}
iot/khdi/esp32: {"temperature": 24.0, "humidity": 40.0, "timestamp": 46}
iot/khdi/esp32: {"temperature": 24.0, "humidity": 40.0, "timestamp": 48}
iot/khdi/esp32: {"temperature": 24.0, "humidity": 40.0, "timestamp": 50}

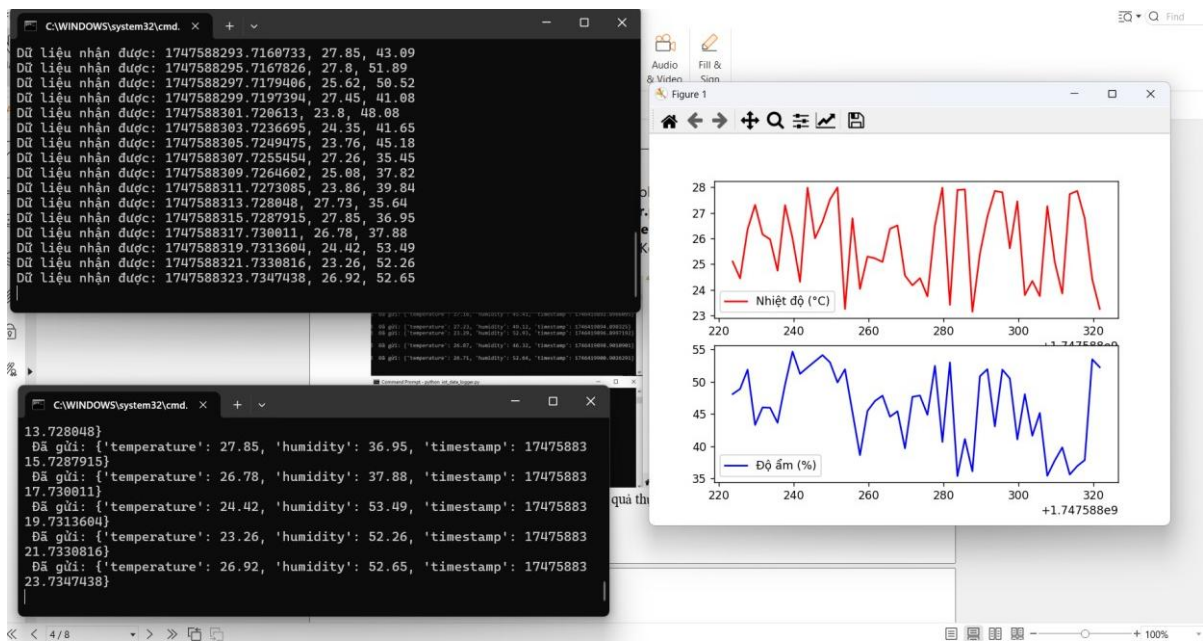
Đã gửi: {"temperature": 24.0, "humidity": 40.0, "timestamp": 39}
Đã gửi: {"temperature": 24.0, "humidity": 40.0, "timestamp": 41}
Đã gửi: {"temperature": 24.0, "humidity": 40.0, "timestamp": 43}
Đã gửi: {"temperature": 24.0, "humidity": 40.0, "timestamp": 46}
Đã gửi: {"temperature": 24.0, "humidity": 40.0, "timestamp": 48}
Đã gửi: {"temperature": 24.0, "humidity": 40.0, "timestamp": 50}
```

## LAB 2.4: lưu trữ và trực quan hóa dữ liệu iot

a)



b)



d)

