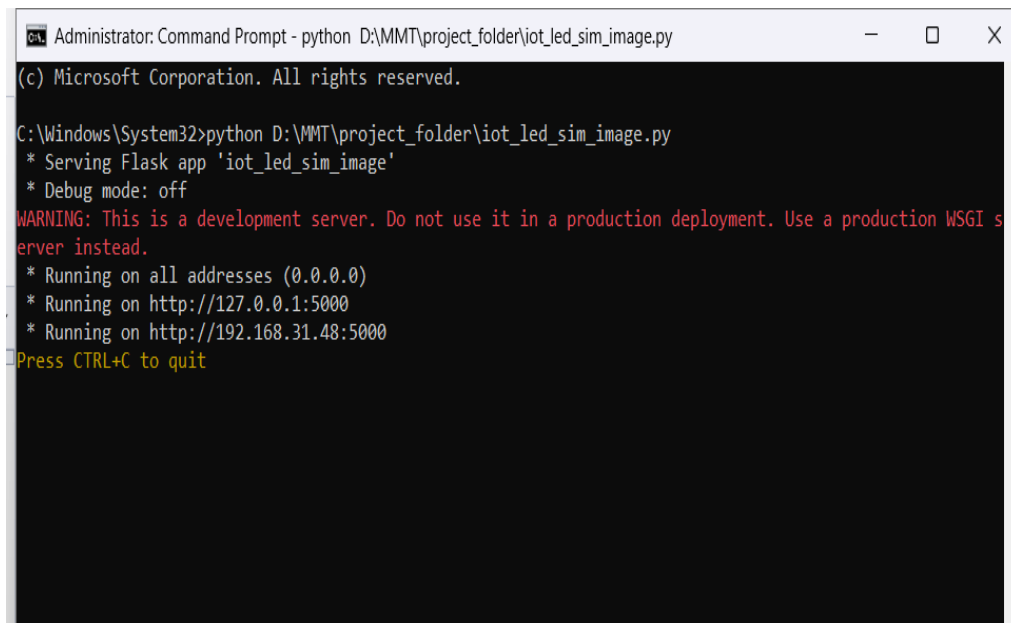


LAB 1.2: Mô phỏng điều khiển LED qua HTTP bằng Framework Flask

- Tạo thư mục có cấu trúc như sau:

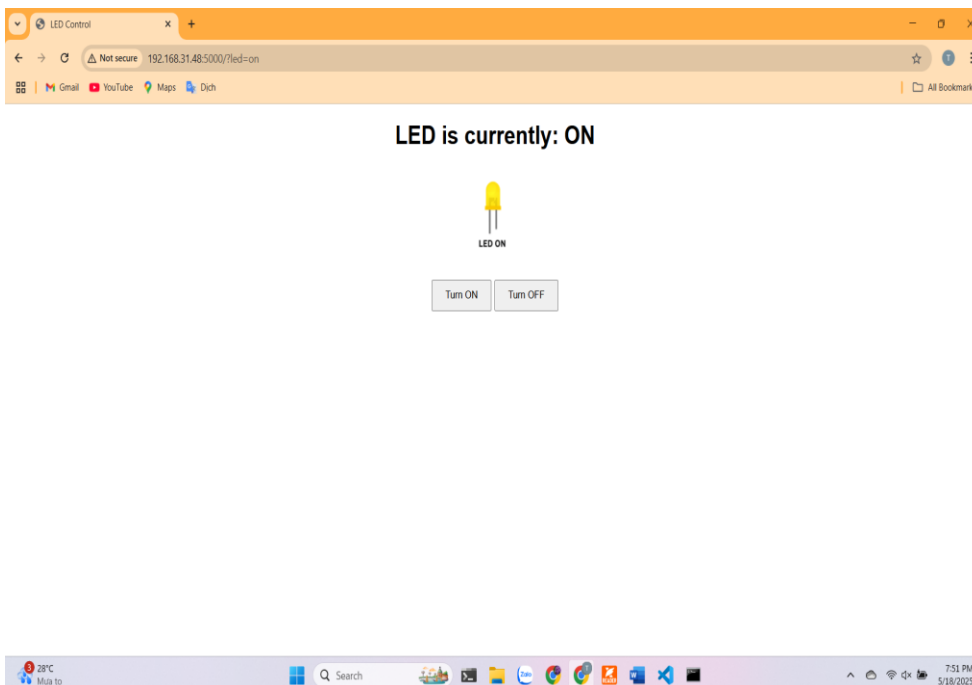
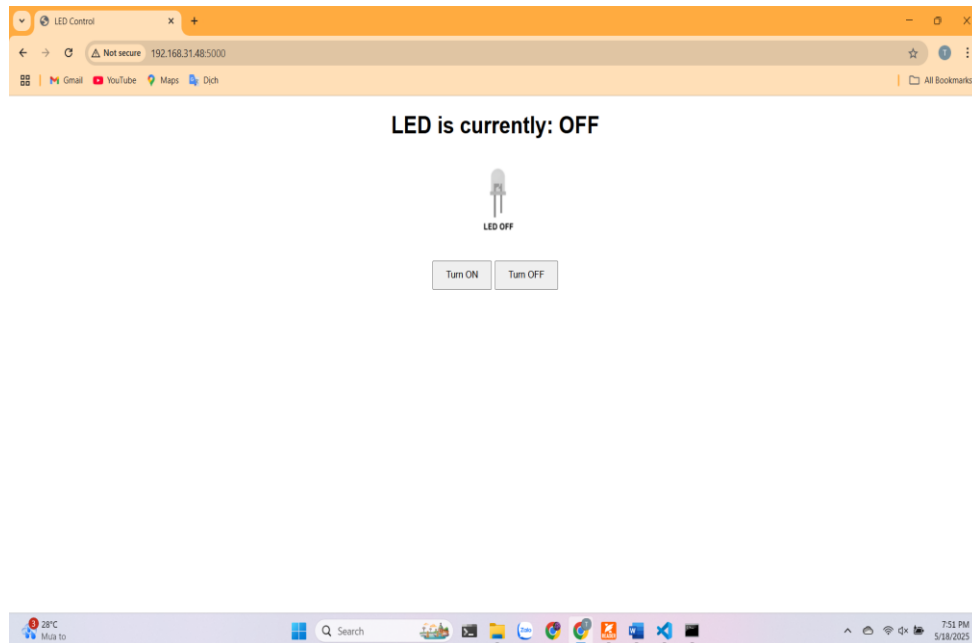
```
project_folder/  
├── iot_led_sim_image.py  
└── static/  
    ├── led_on.png  
    └── led_off.png
```

- Cài Flask: pip install flask và sau đó chạy mã nguồn `iot_led_sim_image.py`



```
Administrator: Command Prompt - python D:\MMT\project_folder\iot_led_sim_image.py  
(c) Microsoft Corporation. All rights reserved.  
  
C:\Windows\System32>python D:\MMT\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://192.168.31.48:5000  
Press CTRL+C to quit
```

- Mở trình duyệt trên PC, truy cập địa chỉ <http://127.0.0.1:5000> hoặc <http://192.168.31.48:5000>



- Quan sát giao diện web hiển thị trạng thái LED và các nút điều khiển.

```
Administrator: Command Prompt - python D:\MMT\project_folder\led_sim_image.py
(c) Microsoft Corporation. All rights reserved.

C:\Windows\System32>python D:\MMT\project_folder\led_sim_image.py
* Serving Flask app '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://192.168.31.48:5000
Press CTRL+C to quit
192.168.31.48 - - [18/May/2025 19:51:06] "GET / HTTP/1.1" 200 -
192.168.31.48 - - [18/May/2025 19:51:06] "GET /static/led_off.png HTTP/1.1" 200 -
192.168.31.48 - - [18/May/2025 19:51:06] "GET /favicon.ico HTTP/1.1" 404 -
192.168.31.48 - - [18/May/2025 19:51:41] "GET /?led=on HTTP/1.1" 200 -
192.168.31.48 - - [18/May/2025 19:51:41] "GET /static/led_on.png HTTP/1.1" 200 -
192.168.31.48 - - [18/May/2025 19:51:58] "GET /?led=off HTTP/1.1" 200 -
192.168.31.48 - - [18/May/2025 19:51:58] "GET /static/led_off.png HTTP/1.1" 304 -
192.168.31.48 - - [18/May/2025 19:52:01] "GET /?led=on HTTP/1.1" 200 -
192.168.31.48 - - [18/May/2025 19:52:01] "GET /static/led_on.png HTTP/1.1" 304 -
192.168.31.48 - - [18/May/2025 19:52:04] "GET /?led=off HTTP/1.1" 200 -
192.168.31.48 - - [18/May/2025 19:52:04] "GET /static/led_off.png HTTP/1.1" 304 -
```

- **MỞ RỘNG: Truy cập từ smartphone trong cùng mạng WiFi**

- Trên máy tính đang chạy, mở CMD và nhập lệnh ipconfig:

```
Administrator: Command Prompt
Microsoft Windows [Version 10.0.26100.4061]
(c) Microsoft Corporation. All rights reserved.

C:\Windows\System32>ipconfig

Windows IP Configuration

Wireless LAN adapter Local Area Connection* 1:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Local Area Connection* 2:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

Wireless LAN adapter Wi-Fi:

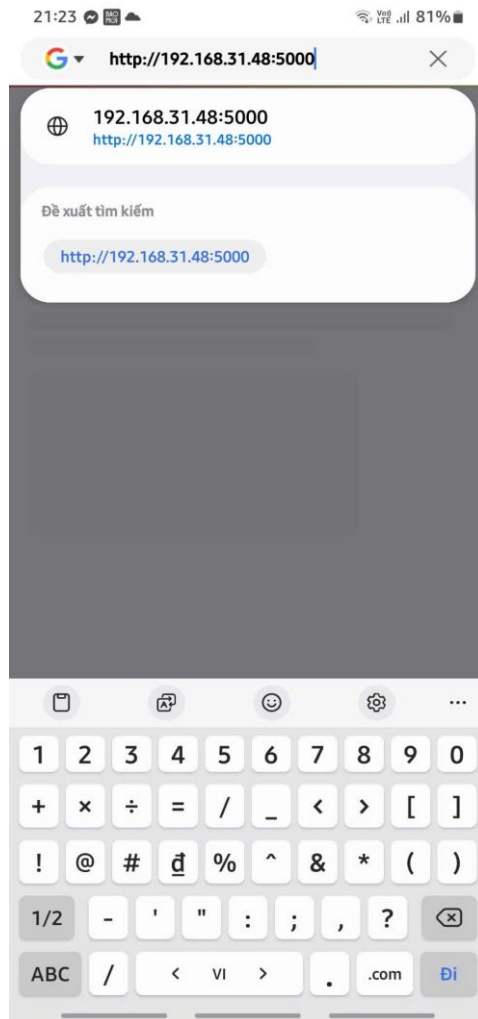
    Connection-specific DNS Suffix  . :
    Link-local IPv6 Address . . . . . : fe80::b889:7e76:6c68:d990%18
    IPv4 Address. . . . . : 192.168.31.48
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.31.1

Ethernet adapter Bluetooth Network Connection:

    Media State . . . . . : Media disconnected
    Connection-specific DNS Suffix  . :

C:\Windows\System32>
```

- Địa chỉ IPv4: 192.168.31.48
- Mở trình duyệt trên điện thoại và truy cập địa chỉ: <http://192.168.31.48:5000>



```
192.168.31.126 - - [18/May/2025 21:23:06] "GET / HTTP/1.1" 200 -
192.168.31.126 - - [18/May/2025 21:23:06] "GET /static/led_off.png HTTP/1.1" 200 -
192.168.31.126 - - [18/May/2025 21:23:07] "GET /favicon.ico HTTP/1.1" 404 -
192.168.31.126 - - [18/May/2025 21:23:16] "GET /?led=on HTTP/1.1" 200 -
192.168.31.126 - - [18/May/2025 21:23:16] "GET /static/led_on.png HTTP/1.1" 200 -
192.168.31.126 - - [18/May/2025 21:23:16] "GET / HTTP/1.1" 200 -
```

- Thao tác bật tắt trên điện thoại:

