

Bài 1. Giao tiếp sử dụng HTTP API

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Yêu cầu. Viết chương trình (bằng ngôn ngữ tùy ý: C#, Java, python) thực hiện

a) Gửi dữ liệu gồm 2 trường field1, field2 lên Thinkspeak qua API theo 2 cách:

Cách 1. Các trường field1, field2 được đóng gói trong url (urlencoded)

The screenshot shows the Postman application interface. On the left, there's a sidebar with 'My Workspace' containing 'Collections', 'Environments', 'Flows', and 'History'. A 'Create a collection for your requests' section is visible. In the main area, a 'GET https://api.thingspeak.com/update?api_key=T7H40F0X82VGW7L5&field1=20&field2=33' request is selected. The 'Headers' tab shows 'Content-Type: application/x-www-form-urlencoded'. The 'Body' tab is set to 'Raw' and contains the JSON payload: {"field1": 20, "field2": 33}. The 'Test Results' tab shows a successful response with status 200 OK, duration 421 ms, and size 550 B. The response body is empty.

Cách 2. Các trường field1, field2 được đóng gói trong body request bằng json.

GET https://api.thingspeak.com/update?api_key=T7H40F0X82VGW7L5

Ví dụ: body request.

```
{
  "field1": 20,
  "field2": 33}
```

{}

Home Workspaces API Network

My Workspace

GET https://api.thingspeak.com/update?api_key=T7H40F0X82VGW7L5

Params Authorization Headers (9) Body Scripts Settings

none form-data x-www-form-urlencoded raw binary GraphQL JSON

```
1 {
2   "field1": 20,
3   "field2": 33
4 }
```

Send Cookies Beautify

Body Cookies Headers (14) Test Results

200 OK 337 ms 550 B

Raw Preview Visualize

Create a collection for your requests

A collection lets you group related requests and easily set common authorization, tests, scripts, and variables for all requests in it.

Create Collection

Online Console

Runner Capture requests Cloud Agent Cookies Vault Trash

b) Lấy dữ liệu về từ Thingspeak API

```
GET https://api.thingspeak.com/channels/1529099/feeds.json?results=2
```

Parsing dữ liệu gửi về để lấy ra 2 trường field1 (temperature) và field2 (humidity) và hiển thị ra màn hình.

The screenshot shows the Postman application interface. On the left, there's a sidebar with 'My Workspace' containing 'Collections', 'Environments', 'Flows', and 'History'. A 'Create a collection for your requests' section is present. The main area shows a request card for a GET request to <https://api.thingspeak.com/channels/1529099/feeds.json?results=2>. The 'Body' tab displays the JSON response:

```

1  {
2     "channel": {
3         "id": 1529099,
4         "name": "IoTLab",
5         "description": "Kênh phục vụ gửi dữ liệu giám sát thông số môi trường",
6         "latitude": "0.0",
7         "longitude": "0.0",
8         "field1": "Temperature",
9         "field2": "Humidity",
10        "field3": "Ied1",
11        "field4": "Ied2",
12        "created_at": "2021-10-07T07:22:04Z",
13        "updated_at": "2024-12-13T03:46:00Z",
14        "last_entry_id": 9778
15    },
16    "feeds": [
17        {
18            "created_at": "2025-10-17T03:15:43Z",
19            "entry_id": 9777,
20            "field1": "20",
21            "field2": "33",
22            "field3": null,
23            "field4": null
24        },
25        {
26            "created_at": "2025-10-17T03:16:02Z",
27            "entry_id": 9778,
28            "field1": "26",
29            "field2": "8",
30            "field3": null
31        }
32    ]
33 }

```

The status bar at the bottom indicates '200 OK' with a response time of 336 ms and a size of 1.07 KB.

Lập trình với API

The screenshot shows the PyCharm IDE interface. On the left, the project structure for 'IT4735-IoT-Kỳ 2025.1' is visible, containing 'main.py' and 'External Libraries'. The main editor window shows the code for 'main.py':

```

35     print("[ERROR] Không gửi được:", response.status_code, response.text)
36
37     # Cách 3: Lấy dữ liệu mới nhất từ Channel
38     def get_data(results=2): 1 usage
39         url = f"{BASE_URL}/channels/{CHANNEL_ID}/feeds.json"
40         params = {"results": results}
41         response = requests.get(url, params=params)
42         if response.status_code == 200:
43             data = response.json()
44             print("\n DỮ LIỆU NHÂN VÉ:")
45             feeds = data.get("feeds", [])

```

The terminal window at the bottom shows the execution results:

```

== GỬI DỮ LIỆU CÁCH 1: URL Encoded ==
[SUCCESS] Gửi thành công (URL encoded). Entry ID: 0

== GỬI DỮ LIỆU CÁCH 2: JSON Body ==
[SUCCESS] Gửi thành công (JSON body). Entry ID: 0

== LẤY DỮ LIỆU MỚI NHẤT ==
|
DỮ LIỆU NHÂN VÉ:
- Thời gian: 2025-10-17T03:23:51Z, field1 = 20, field2 = 33
- Thời gian: 2025-10-17T03:24:13Z, field1 = 20, field2 = 33

Process finished with exit code 0

```

The status bar at the bottom right shows the Python version as 3.13 and the file path as 'IT4735-IoT-Kỳ 2025.1 > main.py'.