

物聯網實務 HW3

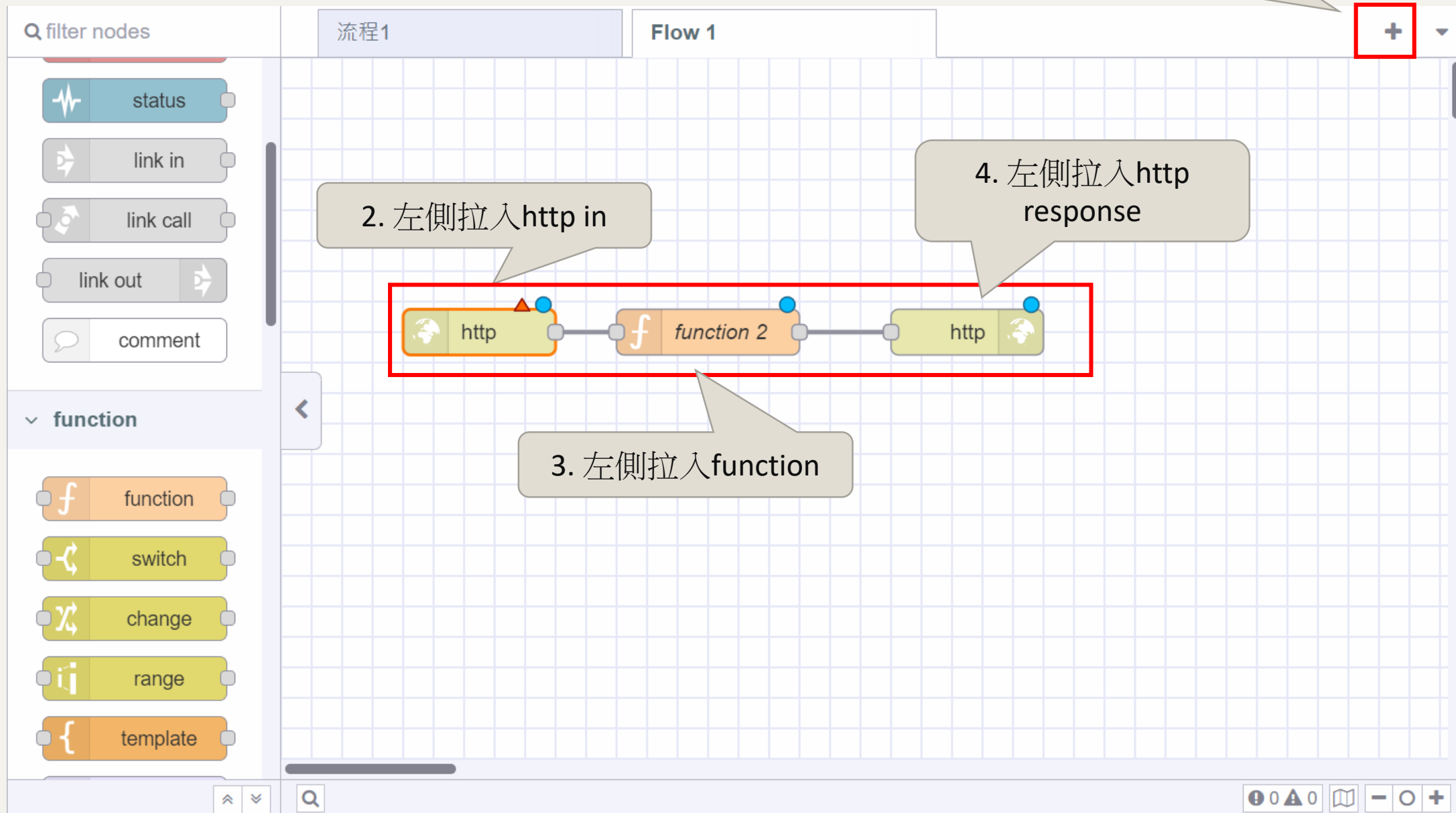
電機碩一 11278008 林佳慧

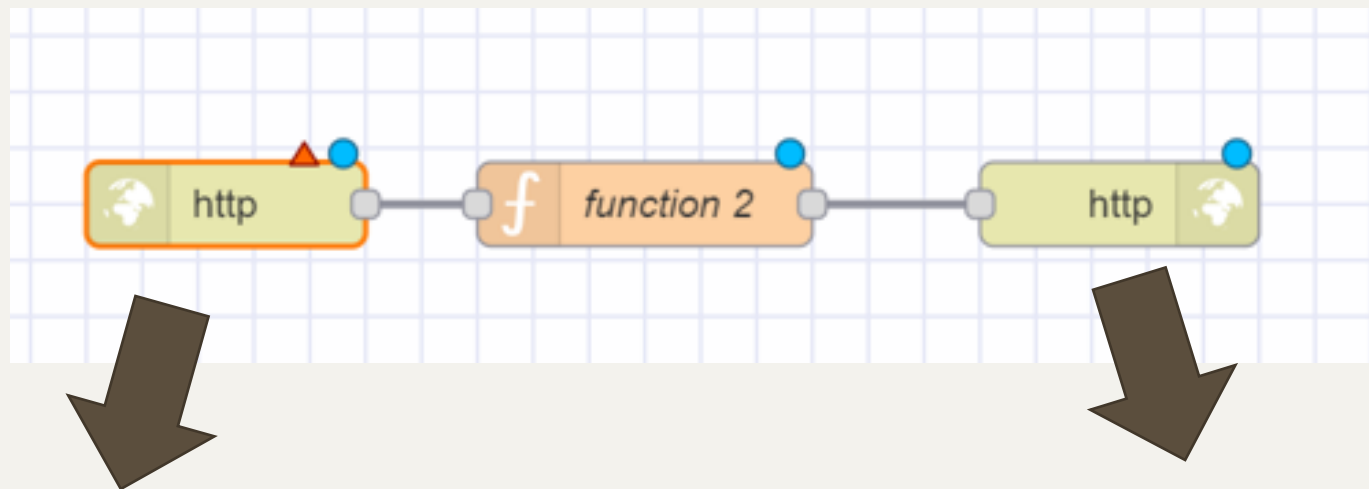
日期:2023/09/27

Exercise 3-1

Communication between a browser and an
API provided by FlowFuse

1. 在雲端FlowFuse建立新的Flow





Edit http in node

Delete Cancel Done

⚙ Properties

Method GET

🌐 URL /apitest

🔖 Name Name

5. 更改為/apitest

Edit function node

Delete Cancel Done

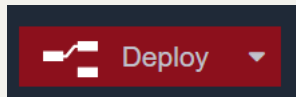
⚙ Properties

🔖 Name function 2

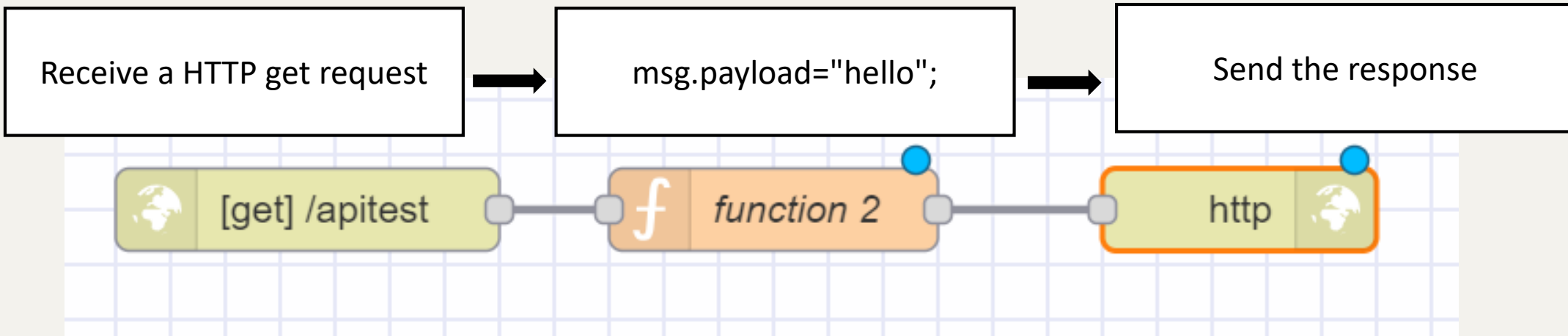
⚙ Setup On Start On Message On Stop

```
1 msg.payload="hello";  
2 return msg;
```

5. 更改為
/msg.payload="hello"



6. 點擊Deploy



<https://team-jia-hui-lin-linda-396f0f0d.flowforge.cloud/apitest>

7. 複製當前網址並
將上/apitest



team-jia-hui-lin-linda-396f0f0d.flowforge.cloud/apitest

hello

This is the response from the server
built in FlowFuse

Exercise 3-2

- Send the http request with local Node-RED environment

1. Run Node-RED輸入指令(node-red)

```
C:\Users\user>node-red
20 Sep 14:36:30 - [info]

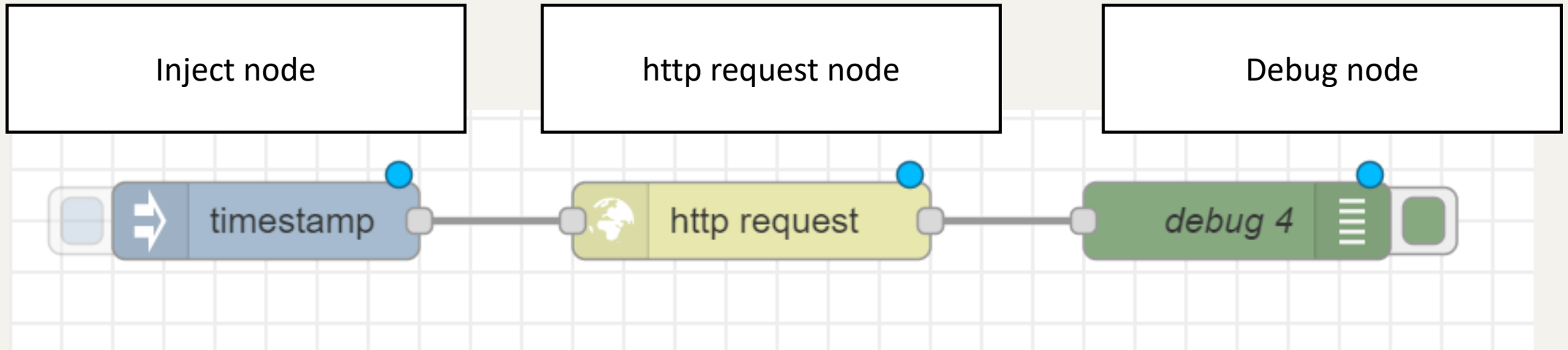
Welcome to Node-RED
=====

20 Sep 14:36:30 - [info] Node-RED version: v3.1.0
20 Sep 14:36:30 - [info] Node.js version: v18.17.0
20 Sep 14:36:30 - [info] Windows_NT 10.0.22621 x64 LE
20 Sep 14:36:33 - [info] Loading palette nodes
20 Sep 14:36:34 - [info] Settings file : C:\Users\user\.node-red\settings.js
20 Sep 14:36:34 - [info] Context store : 'default' [module=memory]
20 Sep 14:36:34 - [info] User directory : C:\Users\user\.node-red
20 Sep 14:36:34 - [warn] Projects disabled : editorTheme.projects.enabled=false
20 Sep 14:36:34 - [info] Flows file : C:\Users\user\.node-red\flows.json
20 Sep 14:36:34 - [info] Creating new flow file
20 Sep 14:36:34 - [warn]

-----Your flow credentials file is encrypted using a system-generated
key.
If the system-generated key is lost for any reason, your credentials
file will not be recoverable, you will have to delete it and re-enter your credentials.

You should set your own key using the 'credentialSecret' option in
your settings file. Node-RED will then re-encrypt your credentials
file using your chosen key the next time you deploy a change.
-----
20 Sep 14:36:34 - [info] Server now running at http://127.0.0.1:1880/
20 Sep 14:36:34 - [info] Starting flows
20 Sep 14:36:34 - [info] Started flows
20 Sep 14:36:34 - [warn] Encrypted credentials not found
```

2. Add nodes



3. Double click “http request” node

Edit http request node

Delete Cancel Done

Properties

Method GET

URL m-jia-hui-lin-linda-396f0f0d.flowforge.cloud/apites

Payload Ignore

☐ Enable secure (SSL/TLS) connection

☐ Use authentication

☐ Enable connection keep-alive

☐ Use proxy

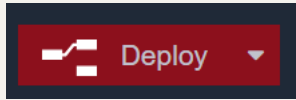
☐ Only send non-2xx responses to Catch node

☐ Disable strict HTTP parsing

Return JSON

Enabled

4. 複製雲端做的網址貼上



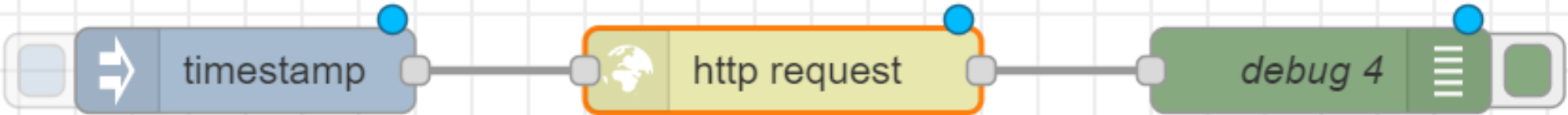
Deploy

5. Deploy

Trigger

Send HTTP GET request

Show the response from the server



Node-RED

Deploy

filter nodes

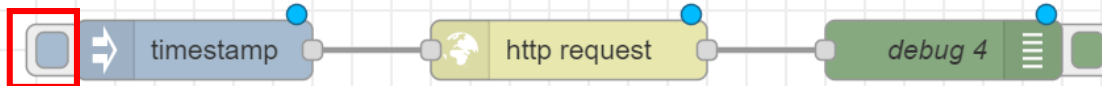
Flow 1

Flow 2

Flow 3

common

Trigger



debug

all nodes

2023/9/27 下午3:31:25 node: debug 4

msg.payload : string[5]

"hello"

Response

Exercise 3-3

Send the http request with the local Node-RED environment

The image shows a workflow editor interface. On the left, a sidebar contains a list of nodes: function, switch, change, range, and template. The 'template' node is highlighted with a red box and labeled '1'. In the main workspace, a workflow is shown with three nodes: '[get] /apitest', 'template', and 'http'. The 'template' node is also labeled '1'. An arrow points from the 'template' node in the sidebar to the 'template' node in the workflow. Another arrow points from the 'template' node in the workflow to the 'Edit template node' dialog. The dialog is labeled '2' and contains the following fields:

- Delete** button
- Cancel** button
- Done** button
- Properties** section with a 'Name' field.
- Property** dropdown set to 'msg. payload'.
- Template** field with the text '1 This is the payload: {{payload}}'.
- Syntax Highlight** dropdown set to 'mustache'.
- Format** dropdown set to 'Mustache template'.
- Output as** dropdown set to 'Plain text'.
- Enabled** checkbox.

The 'Syntax Highlight' dropdown is open, showing a list of options: mustache, HTML, JSON, JavaScript, CSS, Markdown, Python, SQL, YAML, and none. The 'mustache' option is selected and highlighted with a red box.

HTML CSS JAVASCRIPT SQL PYTHON JAVA PHP HOW TO W3.CSS C C++ C#


Canvas Lines
Canvas Shapes
Canvas Rectangles
Canvas Circles
Canvas Curves
Canvas Gradients
Canvas Text
Canvas Images

Canvas Clock

Clock Intro
Clock Face
Clock Numbers
Clock Hands
Clock Start

HTML Game

Game Intro
Game Canvas



JavaScript:

```
const canvas = document.getElementById("canvas");  
const ctx = canvas.getContext("2d");  
let radius = canvas.height / 2;  
ctx.translate(radius, radius);  
radius = radius * 0.90  
//drawClock();  
setInterval(drawClock, 1000);
```

Try it Yourself »

https://www.w3schools.com/graphics/canvas_clock_start.asp



Run >

Result Size: 625 x 440

Get your own website

```
<!DOCTYPE html>
<html>
<body>

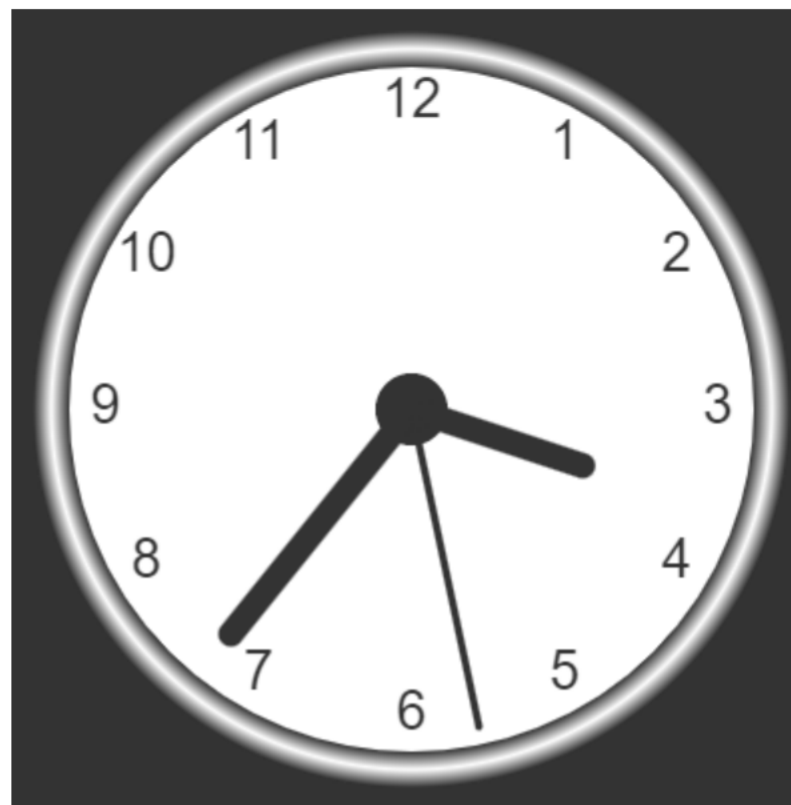
<canvas id="canvas" width="400" height="400"
style="background-color:#333">
</canvas>

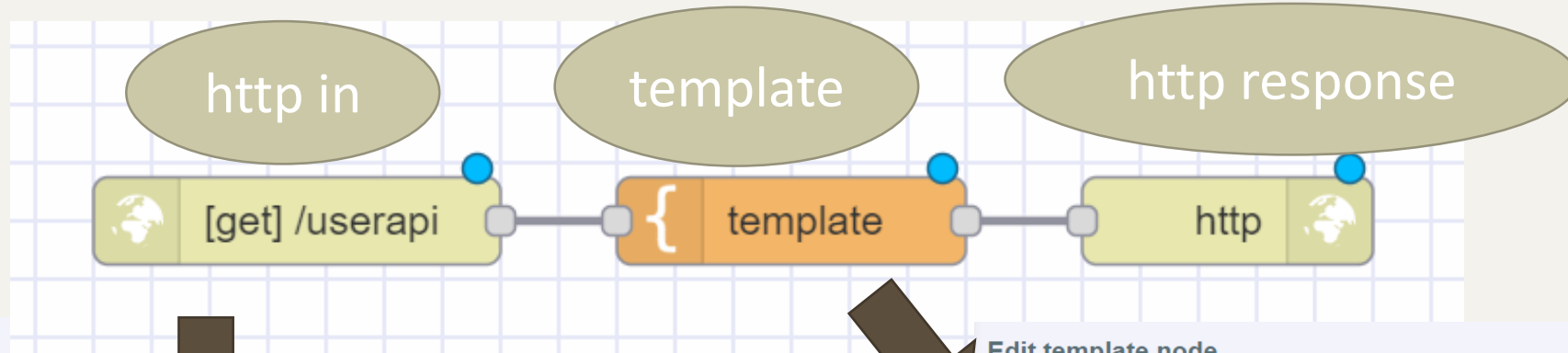
<script>
const canvas = document.getElementById("canvas");
const ctx = canvas.getContext("2d");
let radius = canvas.height / 2;
ctx.translate(radius, radius);
radius = radius * 0.90
setInterval(drawClock, 1000);

function drawClock() {
  drawFace(ctx, radius);
  drawNumbers(ctx, radius);
  drawTime(ctx, radius);
}

function drawFace(ctx, radius) {
  const grad = ctx.createRadialGradient(0,0,radius*0.95,
```

1. COPY





Edit http in node

Delete Cancel Done

Properties

Method: GET

URL: /userapi

Name: Name

2. 輸入/userapi

Enabled

Edit template node

Delete Cancel Done

Properties

Name: Name

Property: msg. payload

Template

```
80 ctx.moveTo(0,0);
81 ctx.rotate(pos);
82 ctx.lineTo(0, -length);
83 ctx.stroke();
84 ctx.rotate(-pos);
85 }
86 </script>
87
```

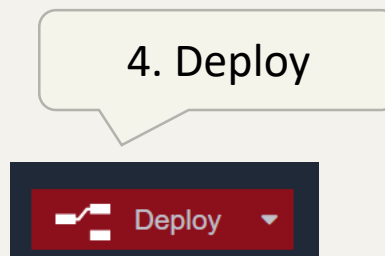
Syntax Highlight: mustache

Format: Mustache template

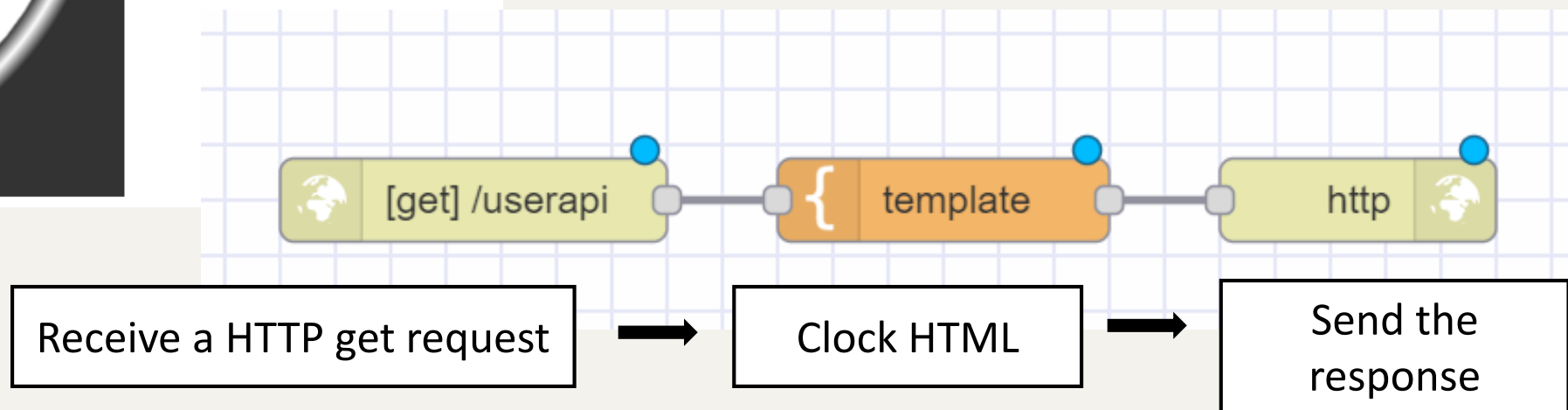
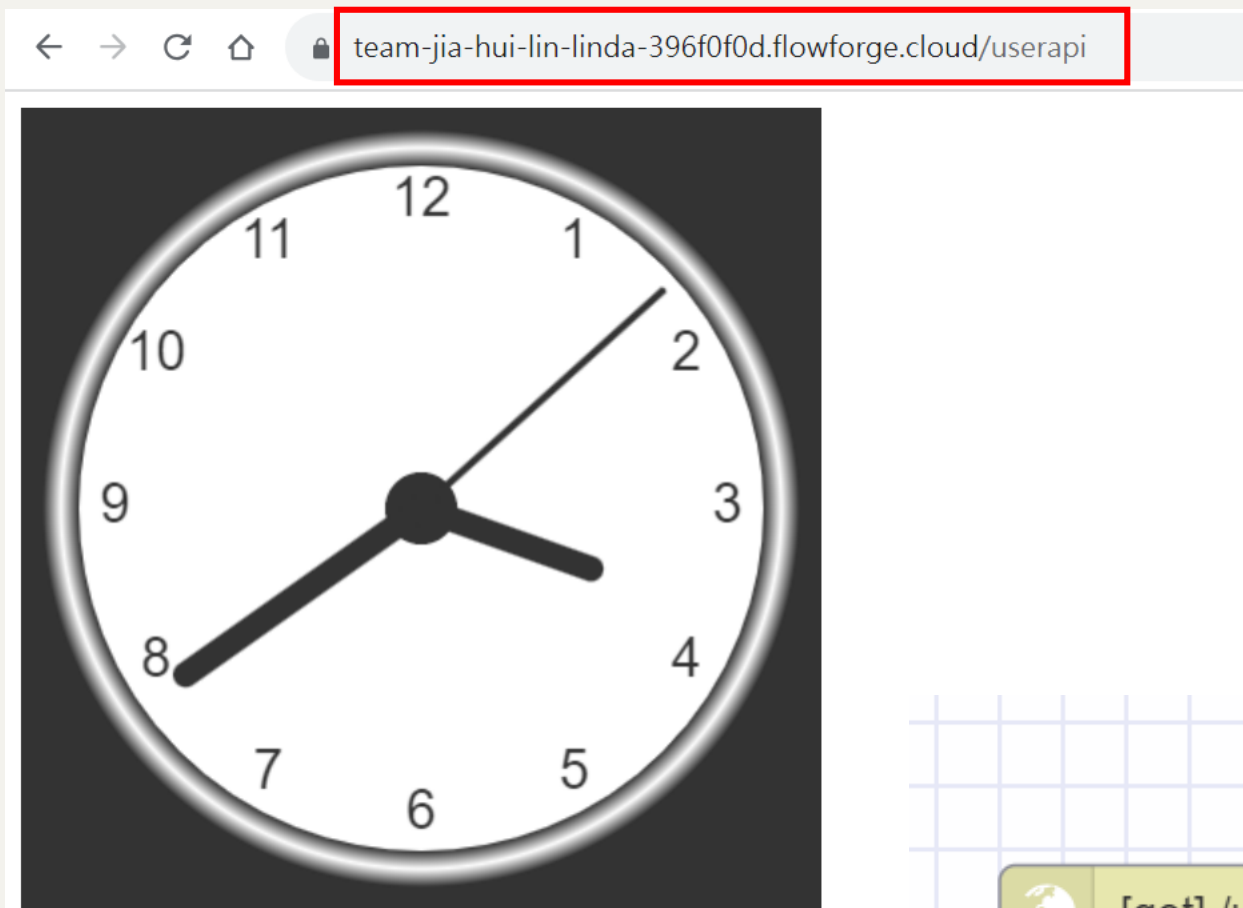
Output as: Plain text

Enabled

3. Paste Clock HTML code



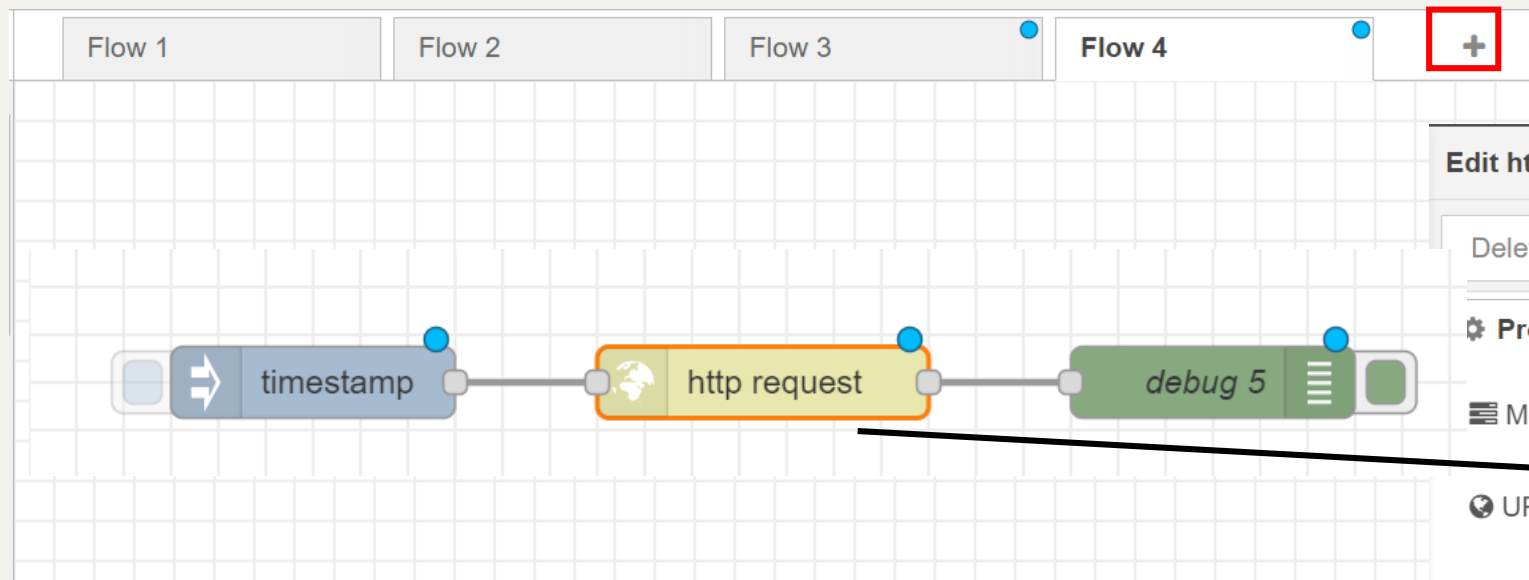
開啟連結可看到時鐘



Homework 3-1

Test with your local Node-RED

1. Add new flow



Edit http request node

Delete

Cancel

Done

Properties

Method

GET

URL

n-jia-hui-lin-linda-396f0f0d.flowforge.cloud/userapi

Payload

Ignore

☐ Enable secure (SSL/TLS) connection

☐ Use authentication

☐ Enable connection keep-alive

☐ Use proxy

☐ Only send non-2xx responses to Catch node

☐ Disable strict HTTP parsing

Return

HTTP 200 OK

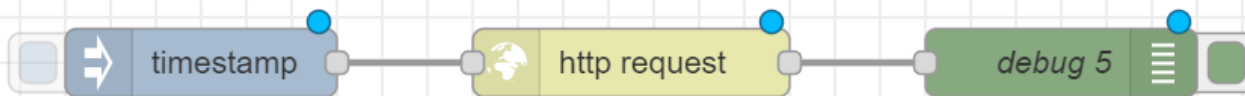


Enabled

2. 貼上ex3-3網址

3. deploy

Deploy



顯示時鐘的程式碼

2023/9/27 下午3:43:56 node: debug 5

1695800632721 : msg.payload : string[2131]

```
> "<!DOCTYPE html><html><body><canvas id="canvas"
width="400" height="400" style="background-
color:#333"></canvas><script>const canvas =
document.getElementById("canvas");const ctx =
canvas.getContext("2d");let radius = canvas.height /
2;ctx.translate(radius, radius);radius = radius *
0.90setInterval(drawClock, 1000);function drawClock()
{ drawFace(ctx, radius); drawNumbers(ctx, radius);
drawTime(ctx, radius);}function drawFace(ctx, radius)
{ const grad =
ctx.createRadialGradient(0,0,radius*0.95,
0,0,radius*1.05);grad.addColorStop(0, '#333');
grad.addColorStop(0.5, 'white');grad.addColorStop(1,
'#333');ctx.beginPath();ctx.arc(0, 0, radius, 0,
2*Math.PI);ctx.fillStyle = 'white';ctx.fill();
ctx.strokeStyle = grad;ctx.lineWidth = radius*0.1;
ctx.stroke();ctx.beginPath();ctx.arc(0, 0,
radius*0.1, 0, 2*Math.PI);ctx.fillStyle = '#333';
ctx.fill();}function drawNumbers(ctx, radius) {
ctx.font = radius*0.15 + "px arial";ctx.t..."
```

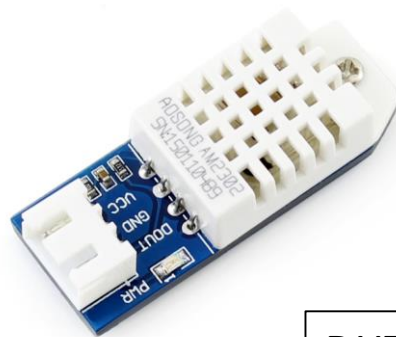
Homework 3-2

Design of Humidity Control with Automatic Drip Irrigation System Based on Fuzzy Logic Using Node-RED and MQTT on Cactus Plants

感測器

溫溼度感測器

測量土壤濕度以及空氣溫度



DHT22

Node-red: 監控溫度濕度，圖表顯示數據。

Exercise 3-4

- `const txt = '{"name":"John", "age":30, "city":"New York", "employees":["Mary","Tom","Jack"],"book":{"Electronics":"Neamen","Electromagnetics":"D.K. cheng"}}'`
- `const obj = JSON.parse(txt);`
- Write the results:
 - (a) `JSON.stringify(obj.employees)`
 - (b) `JSON.stringify(obj.book)`
 - (c) `JSON.stringify(obj.book.Electronics)`



Run >

Result Size: 625 x 440

Get your own website

```
<!DOCTYPE html>
<html>
<body>

<h2>Access a JavaScript Object</h2>
<p id="demo"></p>

<script>
const txt = '{"name":"John", "age":30, "city":"NewYork","employees":
["Mary","Tom","Jack"],"book":
{"Electronics":"Neamen","Electromagnetics":"D.K. cheng"}}'

const obj = JSON.parse(txt);
document.getElementById("demo").innerHTML = "employees :
"+JSON.stringify(obj.employees) + "<br>" + "book
: "+JSON.stringify(obj.book)+ "<br>"+"book.Electronics:
"+obj.book.Electronics;
</script>

</body>
</html>
```

Access a JavaScript Object

employees : ["Mary","Tom","Jack"]
book : {"Electronics":"Neamen","Electromagnetics":"D.K. cheng"}
book.Electronics: Neamen

JSON.stringify(obj.employees)

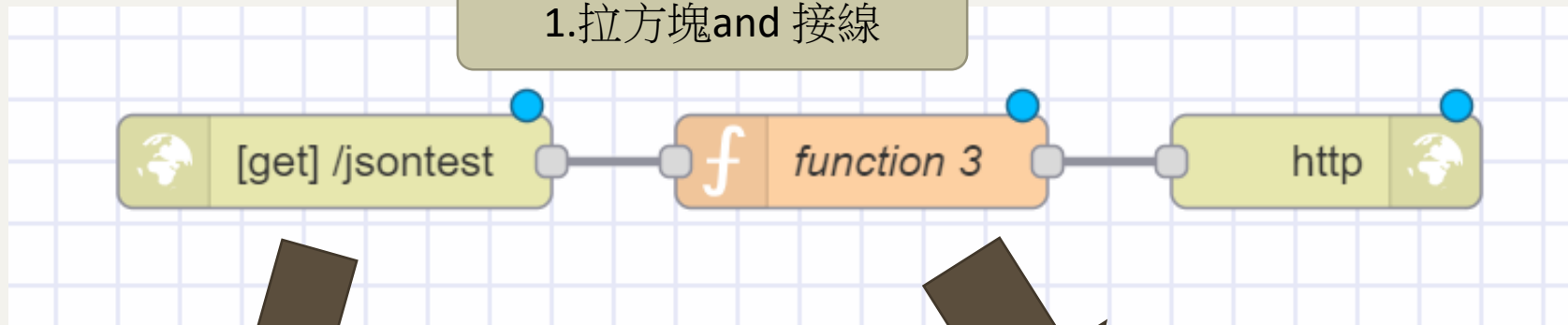
JSON.stringify(obj.book)

JSON.stringify(obj.book.Electronics)

Exercise 3-5

GET JSON format data in the server.

1. 拉方塊and 接線



Edit http in node

Delete

Cancel

Done

Properties

Method

GET

URL

/jsontest

Name

Name

2. /jsontest

Edit function node

Delete

Cancel

Done

Properties

Name

function 3

Setup

On Start

On Message

On Stop

```
1 msg.payload = { "name": "John", "age": 30, "car": null };  
2 return msg;
```

3. 修改程式碼

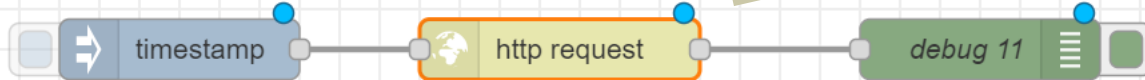
4.copy

Deploy

team-jia-hui-lin-linda-396f0f0d.flowforge.cloud/jsontest

```
{"name":"John","age":30,"car":null}
```

5



Edit http request node

Delete

Cancel

Done

Properties

Method

GET

URL

team-jia-hui-lin-linda-396f0f0d.flowforge.cloud/jsontest

Payload

Ignore

☐ Enable secure (SSL/TLS) connection

☐ Use authentication

☐ Enable connection keep-alive

☐ Use proxy

☐ Only send non-2xx responses to Catch node

☐ Disable strict HTTP parsing

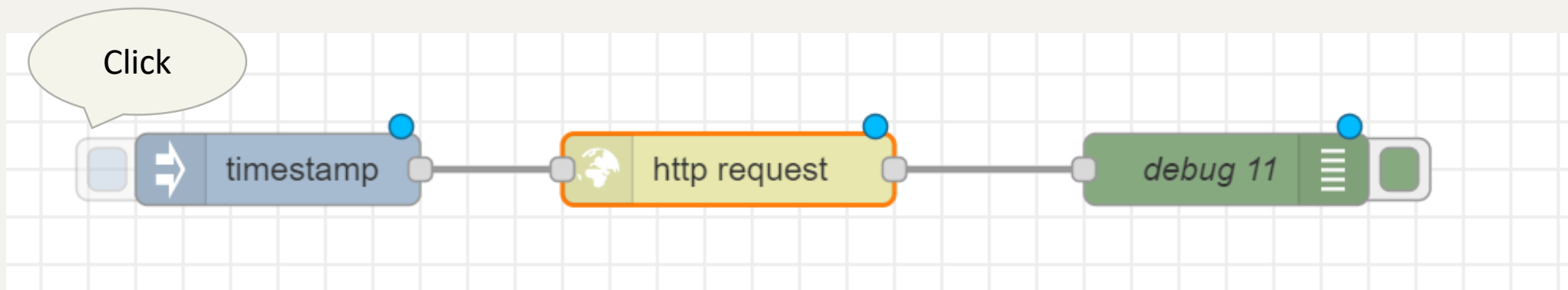
Return

JSON string



Enabled

6. Paste



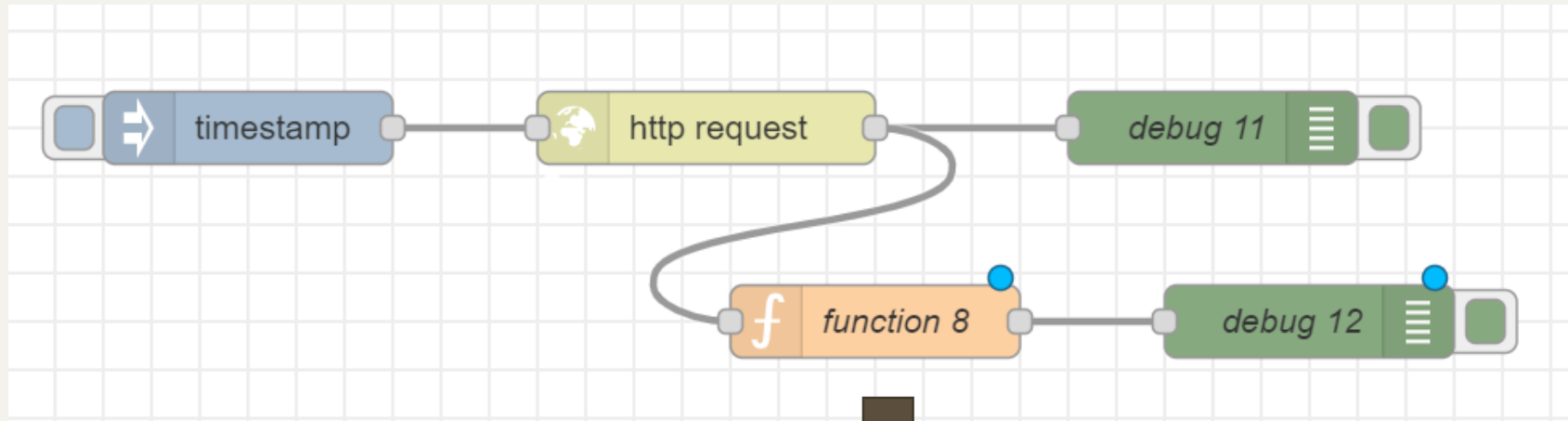
2023/10/4 下午7:16:03 node: debug 11

msg.payload : string[35]

"{"name": "John", "age": 30, "car": null}"

String

Add “function” & “debug” nodes



↓

Edit function node

Delete Cancel Done

⚙ Properties

🏷 Name

⚙ Setup On Start On Message On Stop

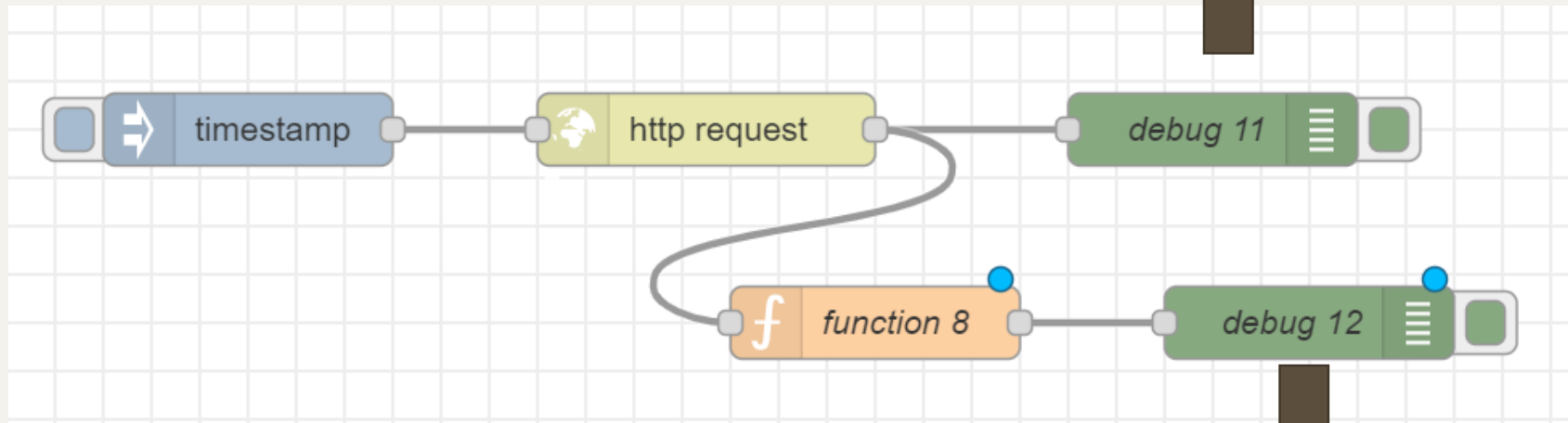
```
1 msg.payload=JSON.parse(msg.payload);
2 return msg;
```

Deploy & Trigger

2023/10/4 下午7:23:12 node: debug 11

msg.payload : string[36]

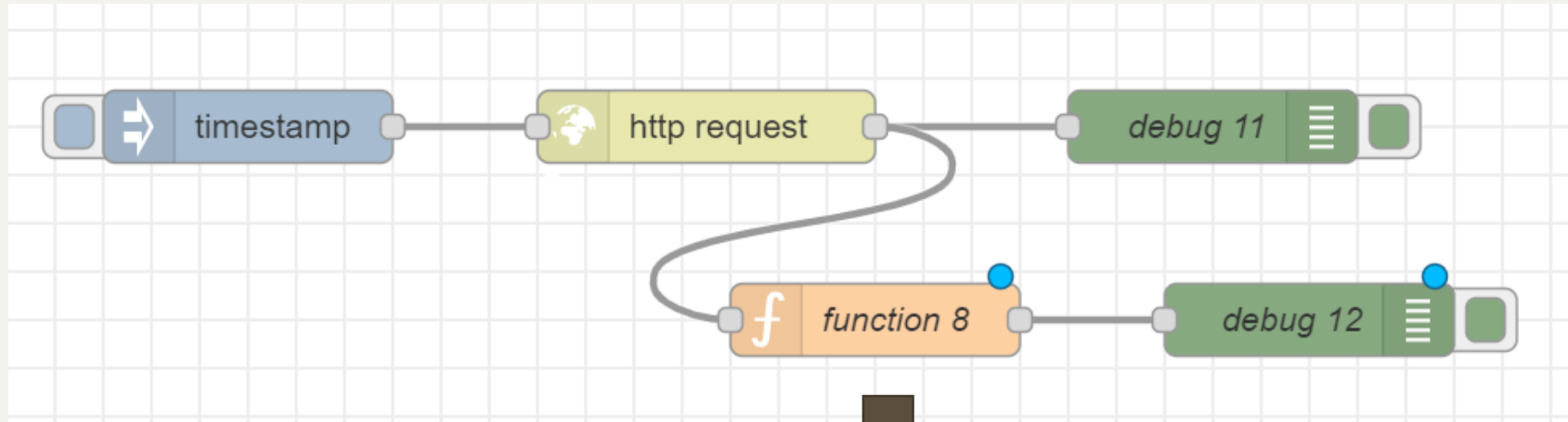
```
"{"name": "John", "age": 30, "car": "BMW"}"
```



2023/10/4 下午7:23:12 node: debug 12

msg.payload : Object

```
▶ { name: "John", age: 30, car: "BMW" }
```



Edit function node

Delete Cancel Done

⚙️ **Properties** ⚙️ 📄 🖨️

🔑 Name 📄 ▼

⚙️ Setup On Start **On Message** On Stop

```
1 msg.payload=JSON.parse(msg.payload).name;  
2 return msg;
```

Exercise 3-6

Install “node-red-dashboard”

1. Open node.js and input node-red

```
C:\Users\user>node-red
```

```
3 Oct 18:56:45 - [info]
```

```
Welcome to Node-RED
```

```
=====
```

```
3 Oct 18:56:45 - [info] Node-RED version: v3.1.0
```

```
3 Oct 18:56:45 - [info] Node.js version: v18.17.0
```

```
3 Oct 18:56:45 - [info] Windows_NT 10.0.22621 x64 LE
```

```
3 Oct 18:56:46 - [info] Loading palette nodes
```

```
3 Oct 18:56:47 - [info] Settings file : C:\Users\user\.node-red\settings.js
```

```
3 Oct 18:56:47 - [info] Context store : 'default' [module=memory]
```

```
3 Oct 18:56:47 - [info] User directory : \Users\user\.node-red
```

```
3 Oct 18:56:47 - [warn] Projects disabled : editorTheme.projects.enabled=false
```

```
3 Oct 18:56:47 - [info] Flows file : \Users\user\.node-red\flows.json
```

```
3 Oct 18:56:47 - [warn]
```

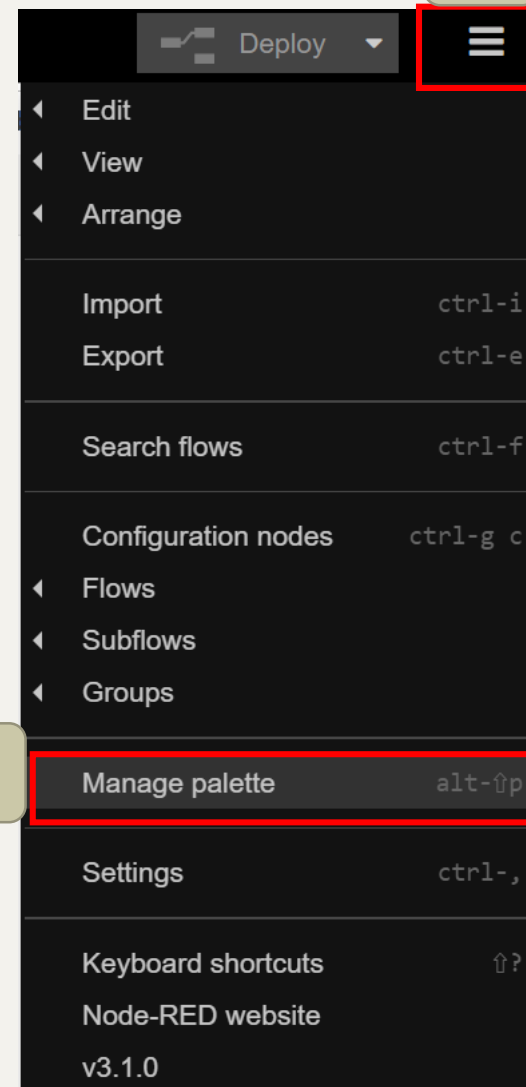
```
-----  
Your flow credentials file is encrypted using a system-generated key.
```

```
If the system-generated key is lost for any reason, your credentials  
file will not be recoverable, you will have to delete it and re-enter  
your credentials.
```



```
4 Oct 19:05:31 - [info] Node-RED version: v3.1.0
4 Oct 19:05:31 - [info] Node.js version: v18.17.0
4 Oct 19:05:31 - [info] Windows_NT 10.0.22621 x64 LE
4 Oct 19:05:34 - [info] Loading palette nodes
4 Oct 19:05:35 - [info] Dashboard version 3.6.0 started at /ui
4 Oct 19:05:35 - [info] Settings file : C:\Users\user\.node-red\settings.js
4 Oct 19:05:35 - [info] Context store : 'default' [module=memory]
4 Oct 19:05:35 - [info] User directory : \Users\user\.node-red
4 Oct 19:05:35 - [warn] Projects disabled : editorTheme.projects.enabled=false
4 Oct 19:05:35 - [info] Flows file : \Users\user\.node-red\flows.json
4 Oct 19:05:35 - [info] Server now running at http://127.0.0.1:1880/
4 Oct 19:05:35 - [warn]
```

2. Ctrl + 滑鼠左鍵開啟網站



User Settings

10

5. install

Close

View

Nodes

Install

6. Search "dashboard"

sort: [Icons]

Palette

86 / 4657

Q dashboard

dashboard-evi

A set of dashboard nodes for Node-RED

1.0.2 2 years, 2 months ago

install

cn-dashboard-nodes

Install

0.0.2 5 years, 5 months ago

install

7. node-red-dashboard

node-red-dashboard

A set of dashboard nodes for Node-RED

3.6.0 1 month ago

8. install

install

feezeal

Web Components based Dashboard UI with WYSIWYG Editor

0.8.1 2 years, 11 months ago

install

Installing 'node-red-dashboard'

Before installing, please read the node's documentation. Some nodes have dependencies that cannot be automatically resolved and can require a restart of Node-RED.

Cancel

Open node information

9

Install



Node-RED



Deploy



filter nodes

Flow 2

Flow 3

Flow 4

Flow 5

debug



all nodes

all



watch

dashboard



form



button



dropdown



switch



slider



numeric



text input



date picker



colour picker



text

abc

dashboard

Homework 3-3

Q filter nodes

Flow 2

Flow 3

Flow 4

Flow 5

common

inject

debug

complete

catch

status

link in

link call

link out

comment

function

function

1.從左側拉node，並接線

timestamp

function 2

debug 6

chart



timestamp

function 2

debug 6

chart

Edit inject node

Delete

Properties

Name

Name

msg. payload = timestamp

msg. topic = a_z

+ add

inject now

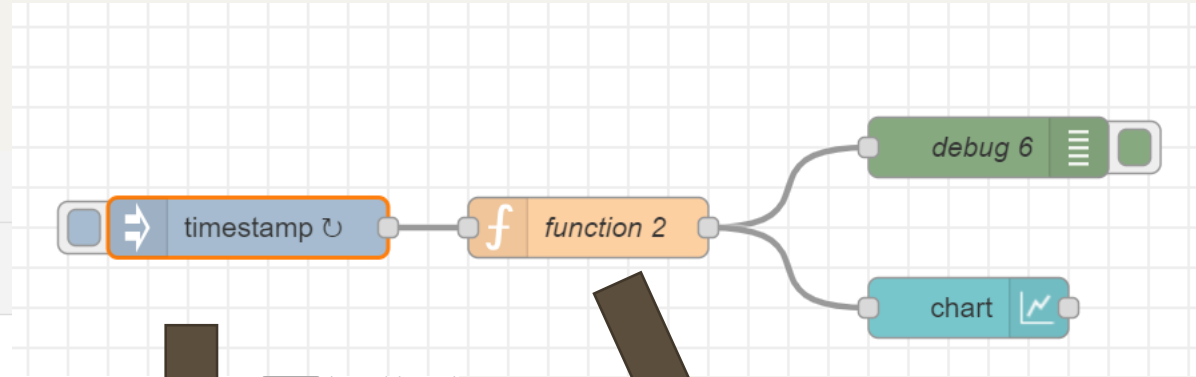
☐ Inject once after 0.1 seconds, then

Repeat interval

every 5 seconds



Enabled



Edit function node

Delete

Cancel

Done

Properties

Name

function 2

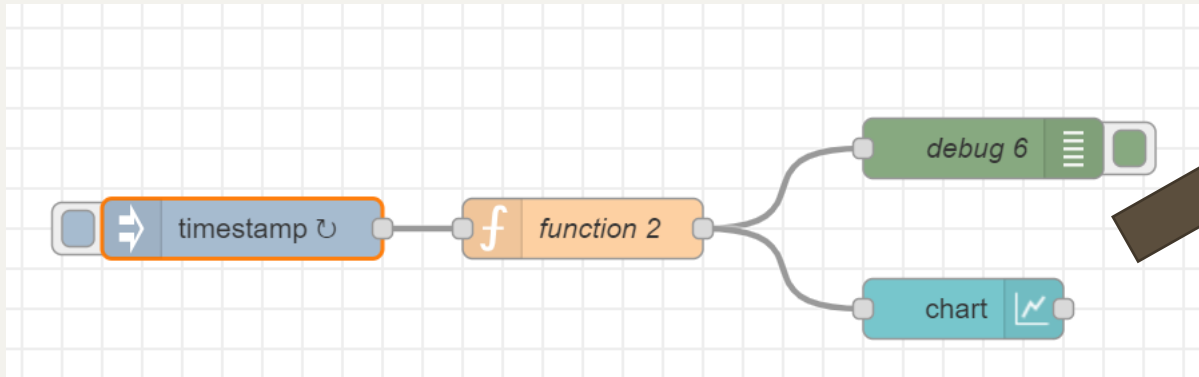
Setup

On Start

On Message

On Stop


```
1 msg.payload = Math.round(Math.random()*100);  
2 return msg;
```



Edit chart node


Delete Cancel Done

Properties


Group [Home] Default 

Size auto

Label chart


Type  Line chart ☐ enlarge points

X-axis last 5 minutes OR 1000 points

X-axis Label  HH:mm:ss ☐ as UTC

Y-axis min max

Legend None Interpolate linear

 ☐ Enabled

Edit chart node > **Edit dashboard group node**

Delete Cancel **Update**

Properties

Name Default

Tab Add new dashboard tab...

Class Optional CSS class name(s) for widget

Width 6

☒ Display group name

☐ Allow group to be collapsed

Enabled **i** 1 node uses this config

Edit chart node > Edit dashboard group node > **Add new dashboard tab config node**

Cancel **Add**

Properties

Name Home

Icon dashboard

State ☒ Enabled

Nav. Menu ☒ Visible

The **Icon** field can be either a Material Design icon (e.g. 'check', 'close') or a Font Awesome icon (e.g. 'fa-fire'), or a Weather icon (e.g. 'wi-wu-sunny').

You can use the full set of google material icons if you add 'mi-' to the icon name. e.g. 'mi-videogame_asset'.

Enabled **i** 0 nodes use this config On all flows

Edit chart node > **Edit dashboard group node**

Delete Cancel **Update**

Properties

Name Default

Tab Home

Class Optional CSS class name(s) for widget

Width 6

☒ Display group name

☐ Allow group to be collapsed

Enabled 1 node uses this config

Deploy

dashboard

Layout Site Theme

Tabs & Links

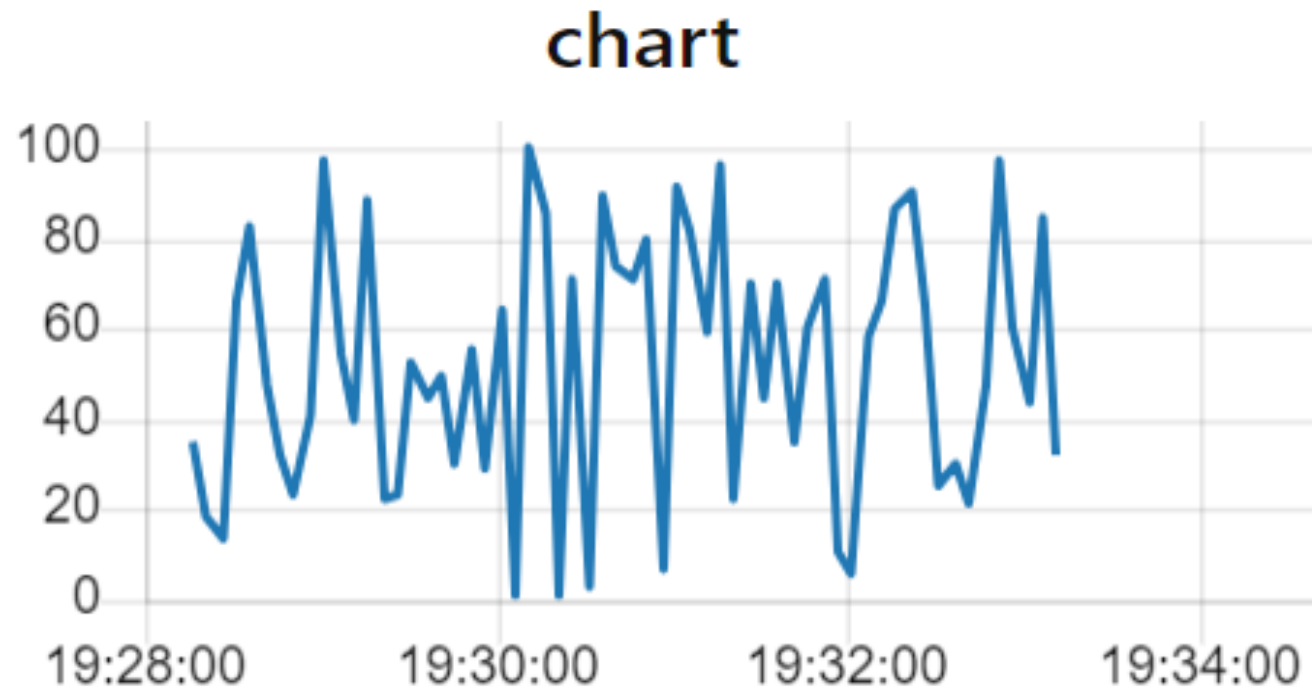
Home

Default

chart

查看圖表

Default



每5秒鐘會發送0~100隨機一個數字

Adding a second line to our chart

Edit function node

Delete

Cancel

Done

Properties

Name

function 2

Setup

On Start

On Message

On Stop

```
1 var msg = {};  
2 var msg1 = {};  
3 msg.payload = Math.round(Math.random()*100);  
4 msg.topic = 'Line1';  
5 msg1.payload = Math.round(Math.random()*100);  
6 msg1.topic = 'Line2';  
7 return [msg, msg1];
```

timestamp

function 2

debug 6

chart

Edit function node

Delete

Cancel

Done

Properties

Name

function 2

Setup

On Start

On Message

On Stop

Outputs

2

Timeout

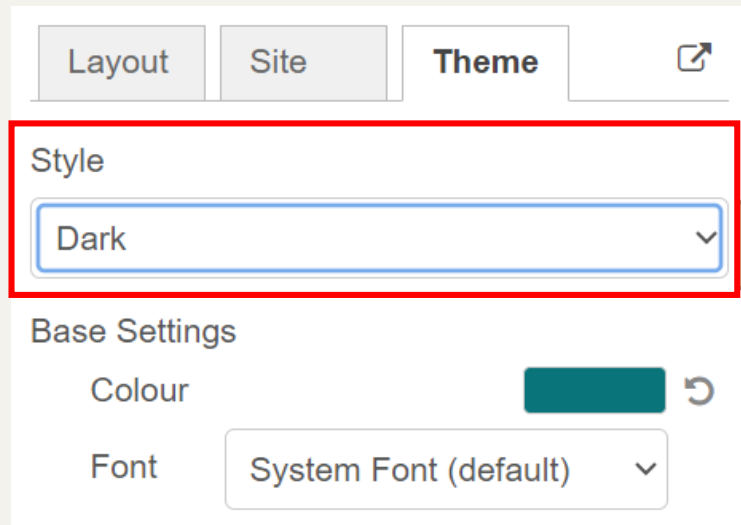
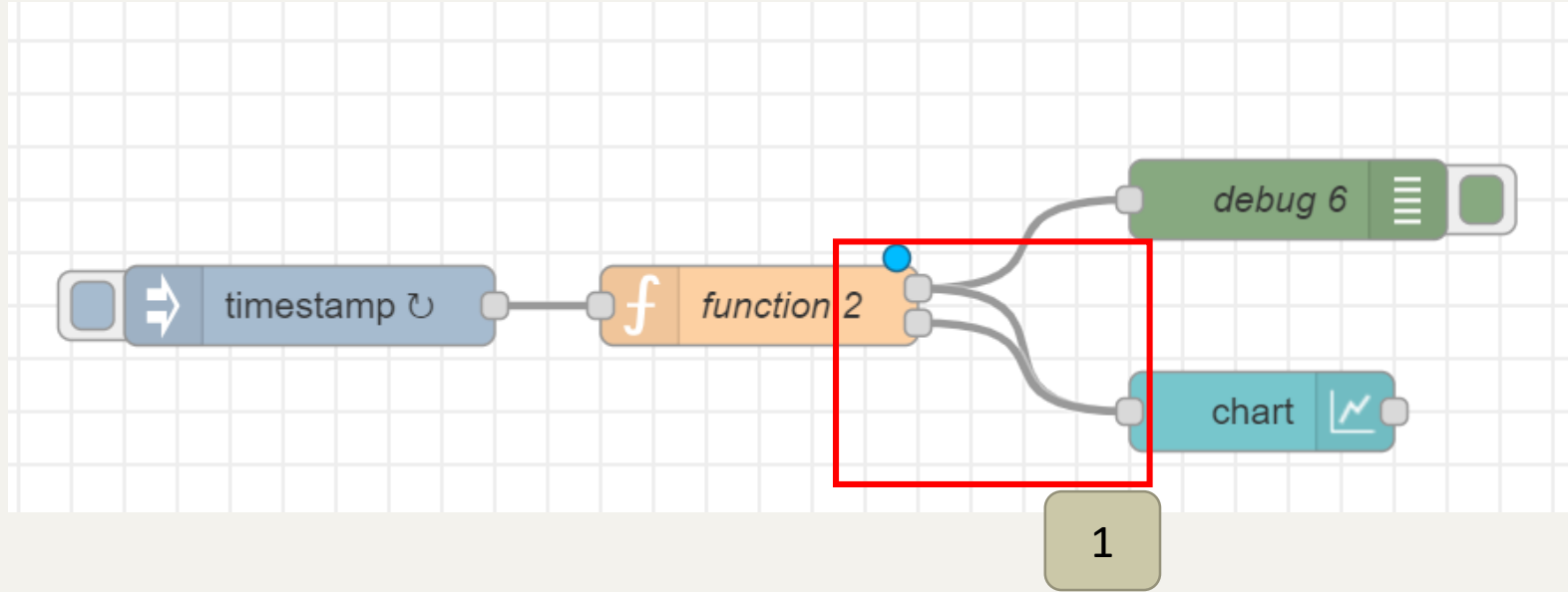
0

Modules

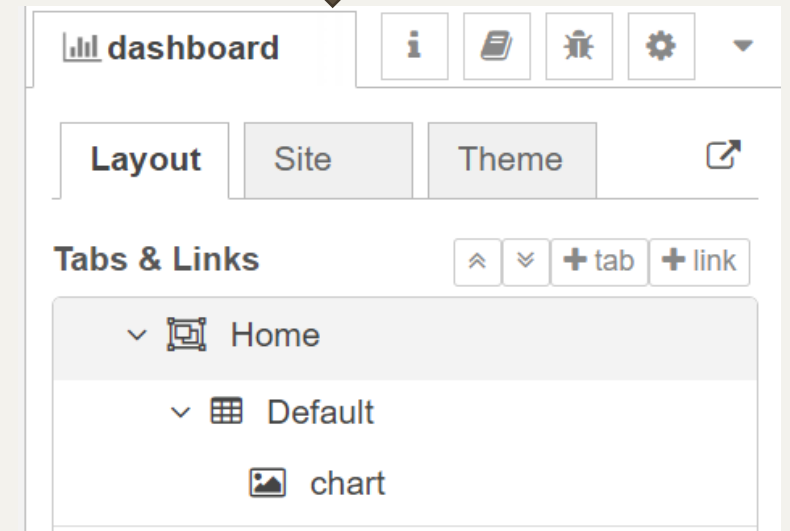
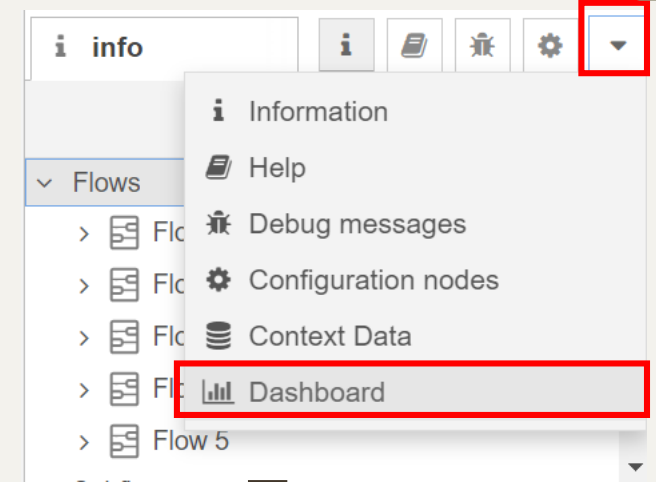
Module name	Import as
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+ add

Enabled

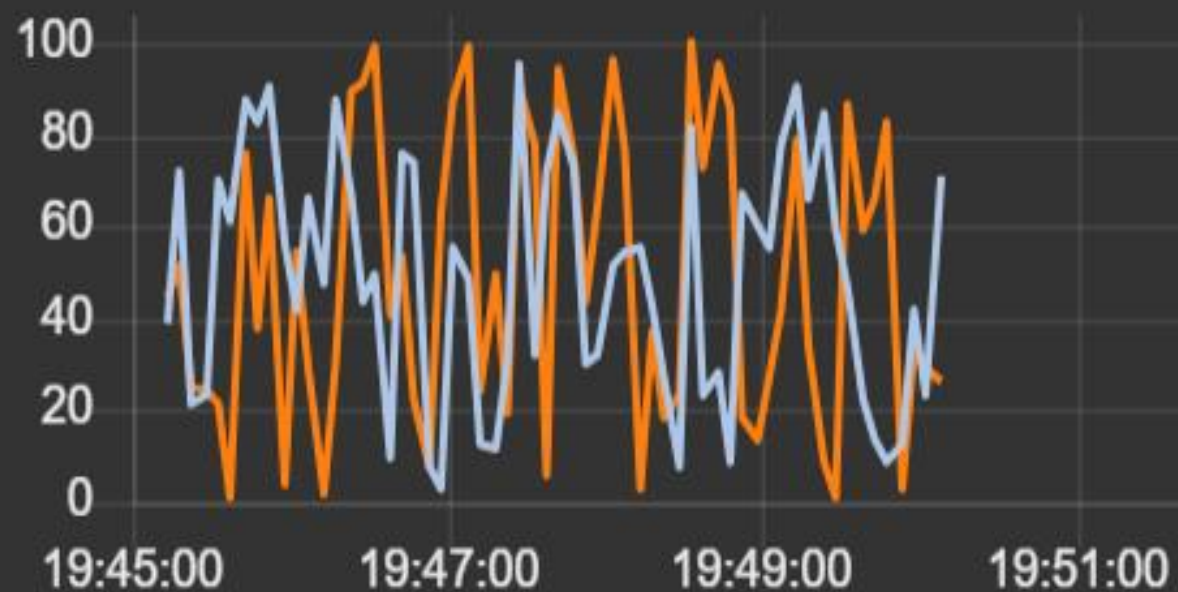


3. Turn to black



Default

chart



兩條線每5秒鐘都會發送0~100隨機一個數字