การสร้าง MQTT Server บน Raspberry Pi เพื่อใช้งาน Chatbot LINE ในฟาร์มอัจฉริยะ

Chatbot LINE from Raspberry Pi MQTT Server for Smart Farming
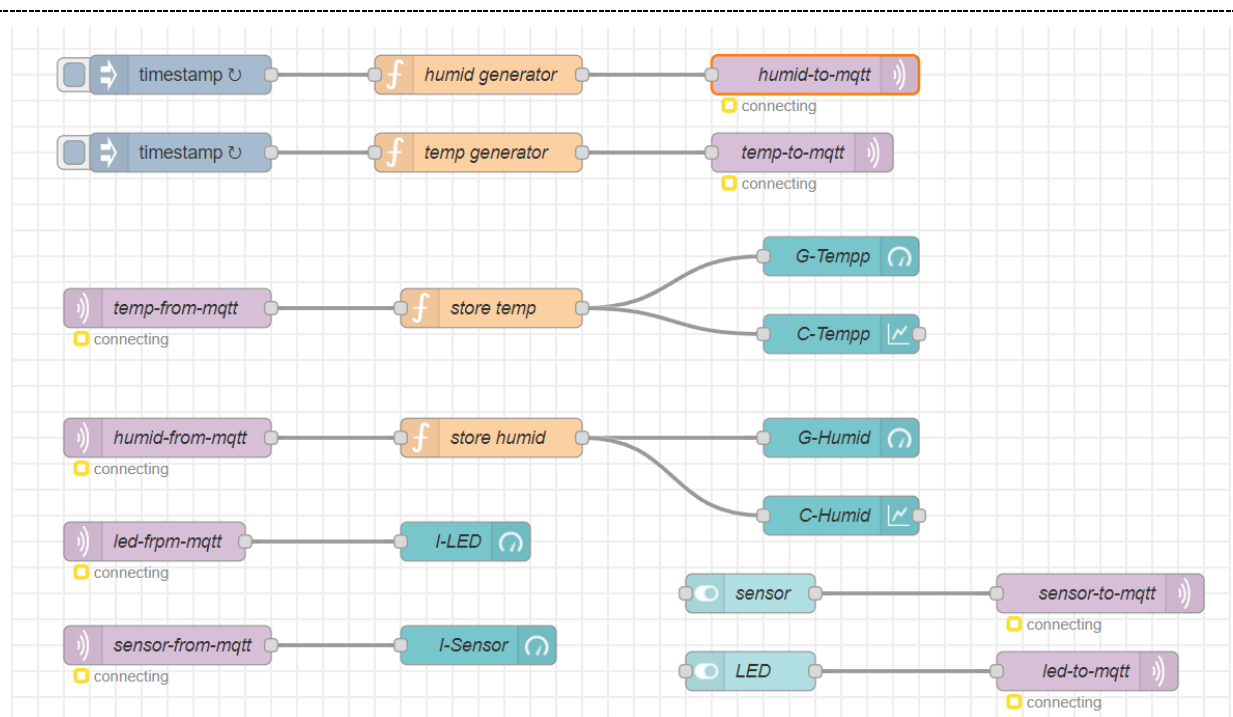
ชื่อ-สกุล : นางสาวขวัญจิรา พันธุเกตุ　　　　　　**รหัสนักศึกษา : B6321451**

6/6 - คำถามท้ายบทเพื่อทดสอบความเข้าใจ

Quiz_401 – RPi Smart Farm

- แสดงรูป โปรแกรม ของผลการทำงานตามหัวข้อ การสร้าง UI ด้วย Node-RED สำหรับฟาร์มอัจฉริยะ
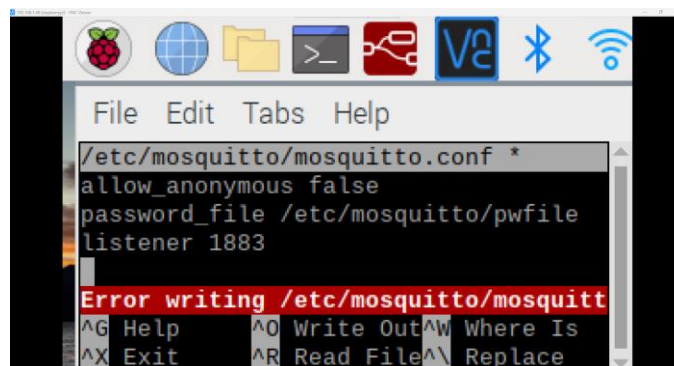
Capture Node-RED Flow

ติดปัญหาคือ การติดตั้ง MQTT broker บน Raspberry Pi ขั้นตอน แก้ไขไฟล์คอนฟิกเกอเรชั่น

allow_anonymous false
password_file /etc/mosquitto/pwfile
listener 1883

ผู้เรียนจึงใช้   test.mosquitto.org เช่นเดิม

Node-RED Code

```
[
    {
        "id": "76e22d7a1273650f",
        "type": "mqtt out",
        "z": "fc6a20cd2ab30867",
        "name": "humid-to-mqtt",
```

```
        "topic": "humid",

        "qos": "",

        "retain": "",

        "respTopic": "",

        "contentType": "",

        "userProps": "",

        "correl": "",

        "expiry": "",

        "broker": "0d0b1fae8579f986",

        "x": 700,

        "y": 40,

        "wires": []
    },
    {

        "id": "0d0b1fae8579f986",

        "type": "mqtt-broker",

        "name": "m3d4",

        "broker": "test.mosquitto.org",

        "port": "1883",

        "clientid": "",

        "autoConnect": true,

        "usetls": false,

        "protocolVersion": "4",

        "keepalive": "60",

        "cleansession": true,

        "birthTopic": "",

        "birthQos": "0",
```

```
        "birthPayload": "",

        "birthMsg": {},

        "closeTopic": "",

        "closeQos": "0",

        "closePayload": "",

        "closeMsg": {},

        "willTopic": "",

        "willQos": "0",

        "willPayload": "",

        "willMsg": {},

        "userProps": "",

        "sessionExpiry": "",

        "credentials": {}

    }

]
```

ในวันที่ผู้เรียนทำแบบฝึกหัด MQTT Lens เกิดปัญหา มาสามารถใช้งานได้

ผู้เรียนจึงได้เลือกใช้ MQTT x

รูปการทดสอบ 1: UI Result

รูปวงจร

Quiz_402 – LINE Notify

- **แสดงรูป โปรแกรม ของผลการทำงานตามหัวข้อ การส่งข้อความด้วย Node-RED สำหรับฟาร์มอัจฉริยะ**

Capture Node-RED Flow จากข้อด้านบนนำมาทำต่อ
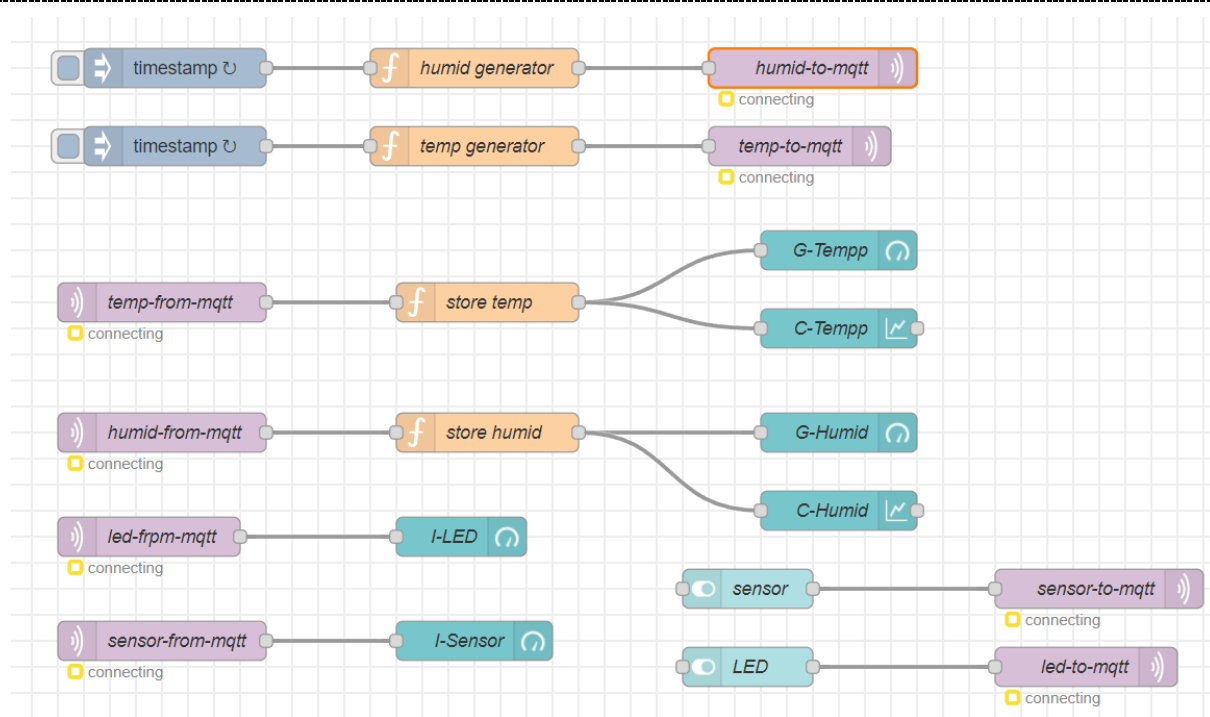
โปรแกรมที่ใช้ทดสอบ – รับ token ของ LINE Notify ไปที่ https://notify-bot.line.me/en/
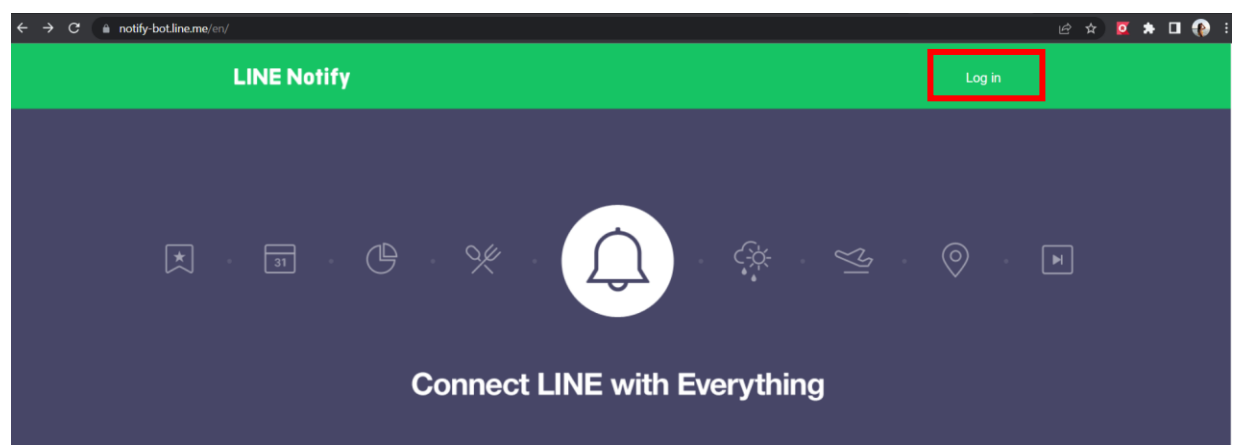
Login ด้วยบัญชี LINE ที่ใช้งานอยู่

กดที่ชื่อบัญชี LINE แล้วกด หน้าของฉัน (My page)

LINE Notify

Gg ⌄

หน้าของฉัน
การจัดการบริการที่ลงทะเบียน
ออกจากระบบ

Connect LINE with Everything
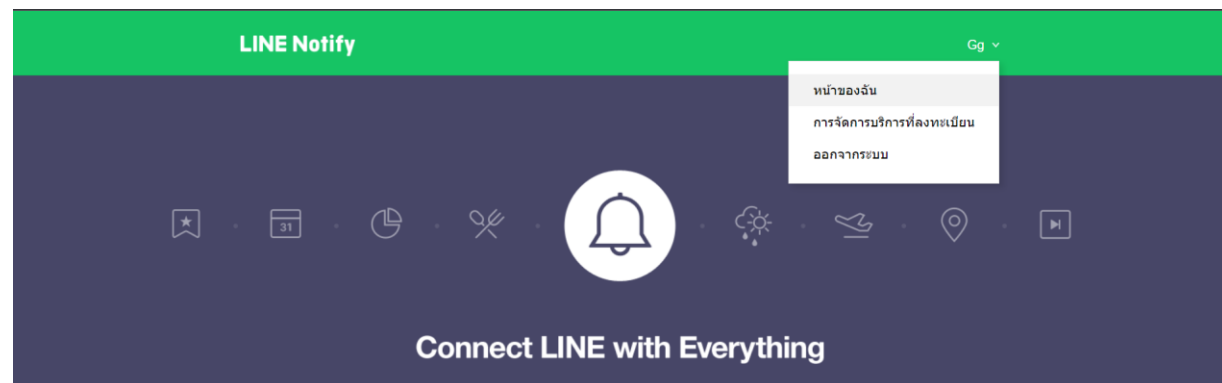
เลื่อนหน้า Web ลงมาด้านล่างสุด แล้วกด ออก Token (Generate token)

ออก Access Token (สำหรับผู้พัฒนา)

เมื่อใช้ Access Token แบบบุคคล จะสามารถตั้งค่าการแจ้งเตือนได้โดยไม่ต้องลงทะเบียนกับเว็บเซอร์วิส

ออก Token

LINE Notify API Document

ตั้งชื่อเป็น Node-Red แล้วเลือก 1-on1 chat with LINE Notify จากนั้นกด Generate token

ออก Token   ✕

โปรดใส่ชื่อ Token (จะแสดงเมื่อมีการแจ้งเตือน)

M3D4

โปรดเลือกห้องแชทที่ต้องการส่งข้อความแจ้งเตือน

🔍 Search by group name

👩 **รับการแจ้งเตือนแบบตัวต่อตัวจาก LINE Notify**

🟢 3/4/65 รุ่นงานยายบุญทัน

🔵4B 523201-641-4B

🔵 CPE 28#

🟤 ENG

* เมื่อเปิดเผย Personal Access Token จะทำให้บุคคลที่สามสามารถรับข้อมูลชื่อห้อง
แชทที่เชื่อมต่อและชื่อโปรไฟล์ได้

ออก Token

Copy Token	

Token ที่ออก

LxXkd4jX1I3fiVuISZ9UpL5W0qnE6WH4wuO0h7"

ถ้าออกจากหน้านี้ ระบบจะไม่แสดง Token ที่ออกใหม่อีกต่อไป โปรดคัด
ลอก Token ก่อนออกจากหน้านี้

คัดลอก   **ปิด**

LxXkd4jX1I3fiVuISZ9UpL5W0qnE6WH4wuO0h7VACBL
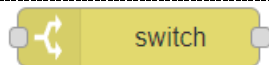
Node-RED Flow – เลือก   switch   แล้วตั้งค่าตามนี้จากนั้นกด Done

Edit switch node

Delete   Cancel   Done

⚙ Properties

🏷 Name   Name

••• Property   ▼ msg. payload

≡ == ∨ ▼ ᵃz 1   → 1 ✖

≡ == ∨ ▼ ᵃz 0   → 2 ✖

➕ add

checking all rules

☐ recreate message sequences

○ Enabled

Node-RED Flow – เลือก [line - notify] แล้วตั้งค่าตามนี้จากนั้นกด Done

Edit line-notify node

Delete   Cancel   **Done**

⚙ **Properties**   ⚙ ▤ ▣

🏷 Name   notify-active

🔑 Token   M3D4   ✎

☰
ContentType   Only Message   ∨

💬 Message

```
1    Sensor Deactive
```

Node-RED Flow – เลือก [line - notify] แล้วตั้งค่าตามนี้จากนั้นกด Done

Edit line-notify node

Delete   Cancel   **Done**

⚙ **Properties**   ⚙ ▤ ▣

🏷 Name   notify-deactive

🔑 Token   M3D4   ✎

☰
ContentType   Only Message   ∨

💬 Message

```
1    Sensor Deactive
```
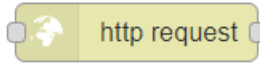
Node-RED Flow – เลือก ⬡ http request ⬡ แล้วตั้งค่าตามนี้จากนั้นกด Done

Edit http request node

| Delete | | Cancel | **Done** |

⚙ **Properties**

☰ Method   POST ⌄

🌐 URL   https://notify-api.line.me/api/notify

☐ 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   a UTF-8 string ⌄

☰ Headers

Node-RED Code

```
[
    {
        "id": "fc6a20cd2ab30867",

        "type": "tab",

        "label": "Flow 1",

        "disabled": false,

        "info": "",

        "env": []
    },
```

```json
{
    "id": "c74ba8f634ac3c4a",
    "type": "inject",
    "z": "fc6a20cd2ab30867",
    "name": "",
    "props": [
        {
            "p": "payload"
        },
        {
            "p": "topic",
            "vt": "str"
        }
    ],
    "repeat": "1",
    "crontab": "",
    "once": false,
    "onceDelay": 0.1,
    "topic": "",
    "payload": "",
    "payloadType": "date",
    "x": 210,
    "y": 100,
    "wires": [
        [
            "14018ba7bb89e110"
        ]
```

```json
            ]
        },
        {
            "id": "ea4304285bcbef17",
            "type": "mqtt out",
            "z": "fc6a20cd2ab30867",
            "name": "temp-to-mqtt",
            "topic": "temp",
            "qos": "",
            "retain": "",
            "respTopic": "",
            "contentType": "",
            "userProps": "",
            "correl": "",
            "expiry": "",
            "broker": "0d0b1fae8579f986",
            "x": 690,
            "y": 100,
            "wires": []
        },
        {
            "id": "76e22d7a1273650f",
            "type": "mqtt out",
            "z": "fc6a20cd2ab30867",
            "name": "humid-to-mqtt",
            "topic": "humid",
            "qos": "",
```

```
        "retain": "",

        "respTopic": "",

        "contentType": "",

        "userProps": "",

        "correl": "",

        "expiry": "",

        "broker": "0d0b1fae8579f986",

        "x": 700,

        "y": 40,

        "wires": []
    },
    {

        "id": "8e9f2e5c6ec418f5",

        "type": "mqtt in",

        "z": "fc6a20cd2ab30867",

        "name": "temp-from-mqtt",

        "topic": "temp",

        "qos": "2",

        "datatype": "auto",

        "broker": "0d0b1fae8579f986",

        "nl": false,

        "rap": false,

        "rh": 0,

        "inputs": 0,

        "x": 200,

        "y": 200,

        "wires": [
```

```json
        [
            "80861fd6dea2605f"
        ]
    ]
},
{
    "id": "ac2416eb1bd04886",
    "type": "mqtt in",
    "z": "fc6a20cd2ab30867",
    "name": "humid-from-mqtt",
    "topic": "humid",
    "qos": "2",
    "datatype": "auto",
    "broker": "0d0b1fae8579f986",
    "nl": false,
    "rap": false,
    "rh": 0,
    "inputs": 0,
    "x": 200,
    "y": 300,
    "wires": [
        [
            "31f035a08467cc4f"
        ]
    ]
},
{
```

```
        "id": "40ab94c75b296e51",

        "type": "mqtt in",

        "z": "fc6a20cd2ab30867",

        "name": "led-frpm-mqtt",

        "topic": "led",

        "qos": "2",

        "datatype": "auto",

        "broker": "0d0b1fae8579f986",

        "nl": false,

        "rap": false,

        "rh": 0,

        "inputs": 0,

        "x": 190,

        "y": 380,

        "wires": [

            [

                "36f94099e717afa3"

            ]

        ]

    },

    {

        "id": "201f756fc17e0ec0",

        "type": "mqtt in",

        "z": "fc6a20cd2ab30867",

        "name": "sensor-from-mqtt",

        "topic": "sensor",

        "qos": "2",
```

```
        "datatype": "auto",

        "broker": "0d0b1fae8579f986",

        "nl": false,

        "rap": false,

        "rh": 0,

        "inputs": 0,

        "x": 200,

        "y": 520,

        "wires": [

            [

                "09b0d43f7847c072",

                "3ab0c3d7039dea36"

            ]

        ]

    },

    {

        "id": "b6741f9581830227",

        "type": "mqtt out",

        "z": "fc6a20cd2ab30867",

        "name": "sensor-to-mqtt",

        "topic": "sensor",

        "qos": "",

        "retain": "",

        "respTopic": "",

        "contentType": "",

        "userProps": "",

        "correl": "",
```

```
    "expiry": "",

    "broker": "0d0b1fae8579f986",

    "x": 920,

    "y": 440,

    "wires": []

},

{

    "id": "32d58d7410255383",

    "type": "mqtt out",

    "z": "fc6a20cd2ab30867",

    "name": "led-to-mqtt",

    "topic": "led",

    "qos": "",

    "retain": "",

    "respTopic": "",

    "contentType": "",

    "userProps": "",

    "correl": "",

    "expiry": "",

    "broker": "0d0b1fae8579f986",

    "x": 910,

    "y": 500,

    "wires": []

},

{

    "id": "14018ba7bb89e110",

    "type": "function",
```

```
    "z": "fc6a20cd2ab30867",

    "name": "temp generator",

    "func": "msg.payload = parseFloat((Math.random() * 20) + 20).toFixed(2);\nreturn msg; return msg;\n",

    "outputs": 1,

    "noerr": 0,

    "initialize": "",

    "finalize": "",

    "libs": [],

    "x": 440,

    "y": 100,

    "wires": [

        [

            "ea4304285bcbef17"

        ]

    ]

},

{

    "id": "5bd772e172b0080b",

    "type": "function",

    "z": "fc6a20cd2ab30867",

    "name": "humid generator",

    "func": "msg.payload = parseFloat((Math.random() * 20) + 40).toFixed(2);\nreturn msg;",

    "outputs": 1,

    "noerr": 0,

    "initialize": "",

    "finalize": "",

    "libs": [],
```

```
        "x": 440,

        "y": 40,

        "wires": [

            [

                "76e22d7a1273650f"

            ]

        ]

    },

    {

        "id": "80861fd6dea2605f",

        "type": "function",

        "z": "fc6a20cd2ab30867",

        "name": "store temp",

        "func": "flow.set(\"tempp\", msg.payload);\nreturn msg;",

        "outputs": 1,

        "noerr": 0,

        "initialize": "",

        "finalize": "",

        "libs": [],

        "x": 450,

        "y": 200,

        "wires": [

            [

                "7137b1415f23324f",

                "484b3ea877754b19"

            ]

        ]
```

```
        },
        {
            "id": "31f035a08467cc4f",
            "type": "function",
            "z": "fc6a20cd2ab30867",
            "name": "store humid",
            "func": "flow.set(\"humid\", msg.payload);\nreturn msg;",
            "outputs": 1,
            "noerr": 0,
            "initialize": "",
            "finalize": "",
            "libs": [],
            "x": 450,
            "y": 300,
            "wires": [
                [
                    "811cc793b08d161c",
                    "03eedbaf2584be45"
                ]
            ]
        },
        {
            "id": "7137b1415f23324f",
            "type": "ui_gauge",
            "z": "fc6a20cd2ab30867",
            "name": "G-Tempp",
            "group": "4653299a298ad477",
```

```
        "order": 0,

        "width": 0,

        "height": 0,

        "gtype": "gage",

        "title": "Temperature",

        "label": "C",

        "format": "{{value}}",

        "min": 0,

        "max": "100",

        "colors": [

            "#00b500",

            "#e6e600",

            "#ca3838"

        ],

        "seg1": "",

        "seg2": "",

        "diff": false,

        "className": "",

        "x": 720,

        "y": 160,

        "wires": []

    },

    {

        "id": "484b3ea877754b19",

        "type": "ui_chart",

        "z": "fc6a20cd2ab30867",

        "name": "C-Tempp",
```

```
"group": "fbda4bffd1e3fb22",

"order": 0,

"width": 0,

"height": 0,

"label": "Temperature",

"chartType": "line",

"legend": "false",

"xformat": "HH:mm:ss",

"interpolate": "linear",

"nodata": "",

"dot": false,

"ymin": "",

"ymax": "",

"removeOlder": 1,

"removeOlderPoints": "",

"removeOlderUnit": "3600",

"cutout": 0,

"useOneColor": false,

"useUTC": false,

"colors": [

    "#1f77b4",

    "#aec7e8",

    "#ff7f0e",

    "#2ca02c",

    "#98df8a",

    "#d62728",

    "#ff9896",
```

```
        "#9467bd",

        "#c5b0d5"

    ],

    "outputs": 1,

    "useDifferentColor": false,

    "className": "",

    "x": 720,

    "y": 220,

    "wires": [

        []

    ]

},

{

    "id": "811cc793b08d161c",

    "type": "ui_gauge",

    "z": "fc6a20cd2ab30867",

    "name": "G-Humid",

    "group": "4653299a298ad477",

    "order": 1,

    "width": 0,

    "height": 0,

    "gtype": "gage",

    "title": "Humid",

    "label": "%",

    "format": "{{value}}",

    "min": 0,

    "max": "100",
```

```
    "colors": [

        "#00b500",

        "#e6e600",

        "#ca3838"

    ],

    "seg1": "",

    "seg2": "",

    "diff": false,

    "className": "",

    "x": 720,

    "y": 300,

    "wires": []

},

{

    "id": "03eedbaf2584be45",

    "type": "ui_chart",

    "z": "fc6a20cd2ab30867",

    "name": "C-Humid",

    "group": "fbda4bffd1e3fb22",

    "order": 1,

    "width": 0,

    "height": 0,

    "label": "Humid",

    "chartType": "line",

    "legend": "false",

    "xformat": "HH:mm:ss",

    "interpolate": "linear",
```

```
    "nodata": "",

    "dot": false,

    "ymin": "",

    "ymax": "",

    "removeOlder": 1,

    "removeOlderPoints": "",

    "removeOlderUnit": "3600",

    "cutout": 0,

    "useOneColor": false,

    "useUTC": false,

    "colors": [

        "#1f77b4",

        "#aec7e8",

        "#ff7f0e",

        "#2ca02c",

        "#98df8a",

        "#d62728",

        "#ff9896",

        "#9467bd",

        "#c5b0d5"

    ],

    "outputs": 1,

    "useDifferentColor": false,

    "className": "",

    "x": 720,

    "y": 360,

    "wires": [
```

```
            []
        ]
    },
    {
        "id": "09b0d43f7847c072",
        "type": "ui_gauge",
        "z": "fc6a20cd2ab30867",
        "name": "I-Sensor",
        "group": "d4030c680888d72c",
        "order": 0,
        "width": 0,
        "height": 0,
        "gtype": "wave",
        "title": "sensor status",
        "label": "",
        "format": "{{value}}",
        "min": 0,
        "max": "1",
        "colors": [
            "#00b500",
            "#e6e600",
            "#ca3838"
        ],
        "seg1": "",
        "seg2": "",
        "diff": false,
        "className": "",
```

```
        "x": 440,

        "y": 520,

        "wires": []

    },

    {

        "id": "36f94099e717afa3",

        "type": "ui_gauge",

        "z": "fc6a20cd2ab30867",

        "name": "l-LED",

        "group": "7e9bb1574690a9db",

        "order": 0,

        "width": 0,

        "height": 0,

        "gtype": "wave",

        "title": "LED status",

        "label": "",

        "format": "{{value}}",

        "min": 0,

        "max": "1",

        "colors": [

            "#00b500",

            "#e6e600",

            "#ca3838"

        ],

        "seg1": "",

        "seg2": "",

        "diff": false,
```

```
        "className": "",

        "x": 430,

        "y": 380,

        "wires": []

    },

    {

        "id": "af9a350596225913",

        "type": "ui_switch",

        "z": "fc6a20cd2ab30867",

        "name": "sensor",

        "label": "sensor",

        "tooltip": "",

        "group": "d4030c680888d72c",

        "order": 1,

        "width": 0,

        "height": 0,

        "passthru": true,

        "decouple": "false",

        "topic": "topic",

        "topicType": "msg",

        "style": "",

        "onvalue": "true",

        "onvalueType": "bool",

        "onicon": "",

        "oncolor": "",

        "offvalue": "false",

        "offvalueType": "bool",
```

```
        "officon": "",

        "offcolor": "",

        "animate": false,

        "className": "",

        "x": 650,

        "y": 440,

        "wires": [

            [

                "b6741f9581830227"

            ]

        ]

    },

    {

        "id": "d9bbe799a72ab7e8",

        "type": "ui_switch",

        "z": "fc6a20cd2ab30867",

        "name": "LED",

        "label": "LED",

        "tooltip": "",

        "group": "7e9bb1574690a9db",

        "order": 1,

        "width": 0,

        "height": 0,

        "passthru": true,

        "decouple": "false",

        "topic": "topic",

        "topicType": "msg",
```

```json
        "style": "",

        "onvalue": "true",

        "onvalueType": "bool",

        "onicon": "",

        "oncolor": "",

        "offvalue": "false",

        "offvalueType": "bool",

        "officon": "",

        "offcolor": "",

        "animate": false,

        "className": "",

        "x": 650,

        "y": 500,

        "wires": [

            [

                "32d58d7410255383"

            ]

        ]

    },

    {

        "id": "c364cc28d4125f3f",

        "type": "inject",

        "z": "fc6a20cd2ab30867",

        "name": "",

        "props": [

            {

                "p": "payload"
```

```
            },

            {

                "p": "topic",

                "vt": "str"

            }

        ],

        "repeat": "1",

        "crontab": "",

        "once": false,

        "onceDelay": 0.1,

        "topic": "",

        "payload": "",

        "payloadType": "date",

        "x": 210,

        "y": 40,

        "wires": [

            [

                "5bd772e172b0080b"

            ]

        ]

    },

    {

        "id": "3ab0c3d7039dea36",

        "type": "switch",

        "z": "fc6a20cd2ab30867",

        "name": "",

        "property": "payload",
```

```
    "propertyType": "msg",

    "rules": [

        {

            "t": "eq",

            "v": "1",

            "vt": "str"

        },

        {

            "t": "eq",

            "v": "0",

            "vt": "str"

        }

    ],

    "checkall": "true",

    "repair": false,

    "outputs": 2,

    "x": 270,

    "y": 600,

    "wires": [

        [

            "0274f38bb5f360d2"

        ],

        [

            "edbe05a591d5ae34"

        ]

    ]

},
```

```
{
    "id": "0274f38bb5f360d2",
    "type": "line-notify",
    "z": "fc6a20cd2ab30867",
    "name": "notify-active",
    "message": "Sensor Deactive",
    "contentType": "message",
    "imageThumbnail": "",
    "imageUrl": "",
    "sticker": "default",
    "stickerPackageId": "1",
    "stickerId": "1",
    "silent": false,
    "creds": "04b17b6b8edbf861",
    "x": 510,
    "y": 580,
    "wires": [
        [
            "9418bfe60e36f926"
        ]
    ]
},
{
    "id": "edbe05a591d5ae34",
    "type": "line-notify",
    "z": "fc6a20cd2ab30867",
    "name": "notify-deactive",
```

```
        "message": "Sensor Deactive",

        "contentType": "message",

        "imageThumbnail": "",

        "imageUrl": "",

        "sticker": "default",

        "stickerPackageId": "1",

        "stickerId": "1",

        "silent": false,

        "creds": "04b17b6b8edbf861",

        "x": 520,

        "y": 640,

        "wires": [

            [

                "9418bfe60e36f926"

            ]

        ]

    },

    {

        "id": "9418bfe60e36f926",

        "type": "http request",

        "z": "fc6a20cd2ab30867",

        "name": "",

        "method": "POST",

        "ret": "txt",

        "paytoqs": "ignore",

        "url": "https://notify-api.line.me/api/notify",

        "tls": "",
```

```
        "persist": false,

        "proxy": "",

        "insecureHTTPParser": false,

        "authType": "",

        "senderr": false,

        "headers": [],

        "x": 790,

        "y": 600,

        "wires": [

            []

        ]

    },

    {

        "id": "0d0b1fae8579f986",

        "type": "mqtt-broker",

        "name": "m3d4",

        "broker": "test.mosquitto.org",

        "port": "1883",

        "clientid": "",

        "autoConnect": true,

        "usetls": false,

        "protocolVersion": "4",

        "keepalive": "60",

        "cleansession": true,

        "birthTopic": "",

        "birthQos": "0",

        "birthPayload": "",
```

```
        "birthMsg": {},

        "closeTopic": "",

        "closeQos": "0",

        "closePayload": "",

        "closeMsg": {},

        "willTopic": "",

        "willQos": "0",

        "willPayload": "",

        "willMsg": {},

        "userProps": "",

        "sessionExpiry": ""
    },
    {
        "id": "4653299a298ad477",

        "type": "ui_group",

        "name": "1",

        "tab": "3d7e4e84185eb0d7",

        "order": 1,

        "disp": false,

        "width": "6",

        "collapse": false,

        "className": ""
    },
    {
        "id": "fbda4bffd1e3fb22",

        "type": "ui_group",

        "name": "2",
```

```
        "tab": "3d7e4e84185eb0d7",

        "order": 2,

        "disp": true,

        "width": "6",

        "collapse": false,

        "className": ""

    },

    {

        "id": "d4030c680888d72c",

        "type": "ui_group",

        "name": "3",

        "tab": "3d7e4e84185eb0d7",

        "order": 3,

        "disp": false,

        "width": "6",

        "collapse": false,

        "className": ""

    },

    {

        "id": "7e9bb1574690a9db",

        "type": "ui_group",

        "name": "4",

        "tab": "3d7e4e84185eb0d7",

        "order": 4,

        "disp": false,

        "width": "6",

        "collapse": false,
```

```
        "className": ""

    },

    {

        "id": "04b17b6b8edbf861",

        "type": "linetoken",

        "name": "M3D4"

    },

    {

        "id": "3d7e4e84185eb0d7",

        "type": "ui_tab",

        "name": "smart farm",

        "icon": "dashboard",

        "disabled": false,

        "hidden": false

    }

]
```
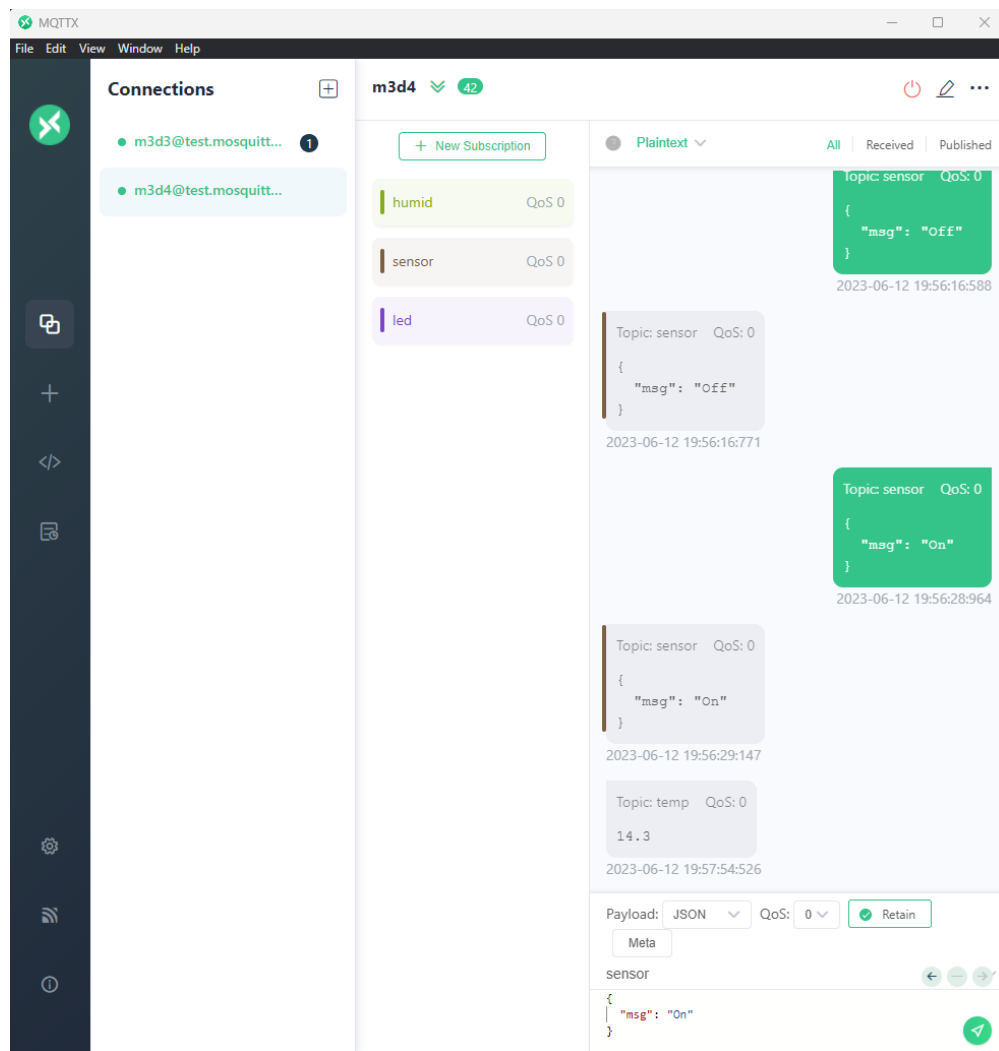
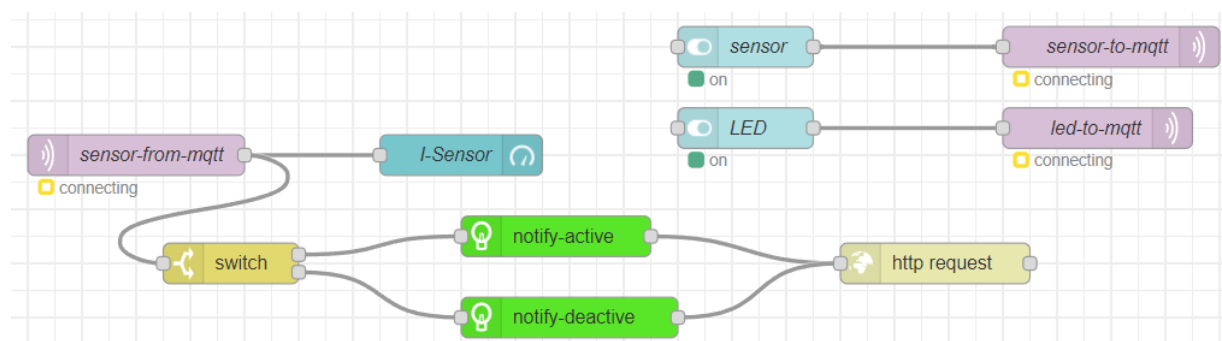Node-RED Code -- นำ Flow เก่าบ้างส่วนมาต่อกับ Flow ใหม่
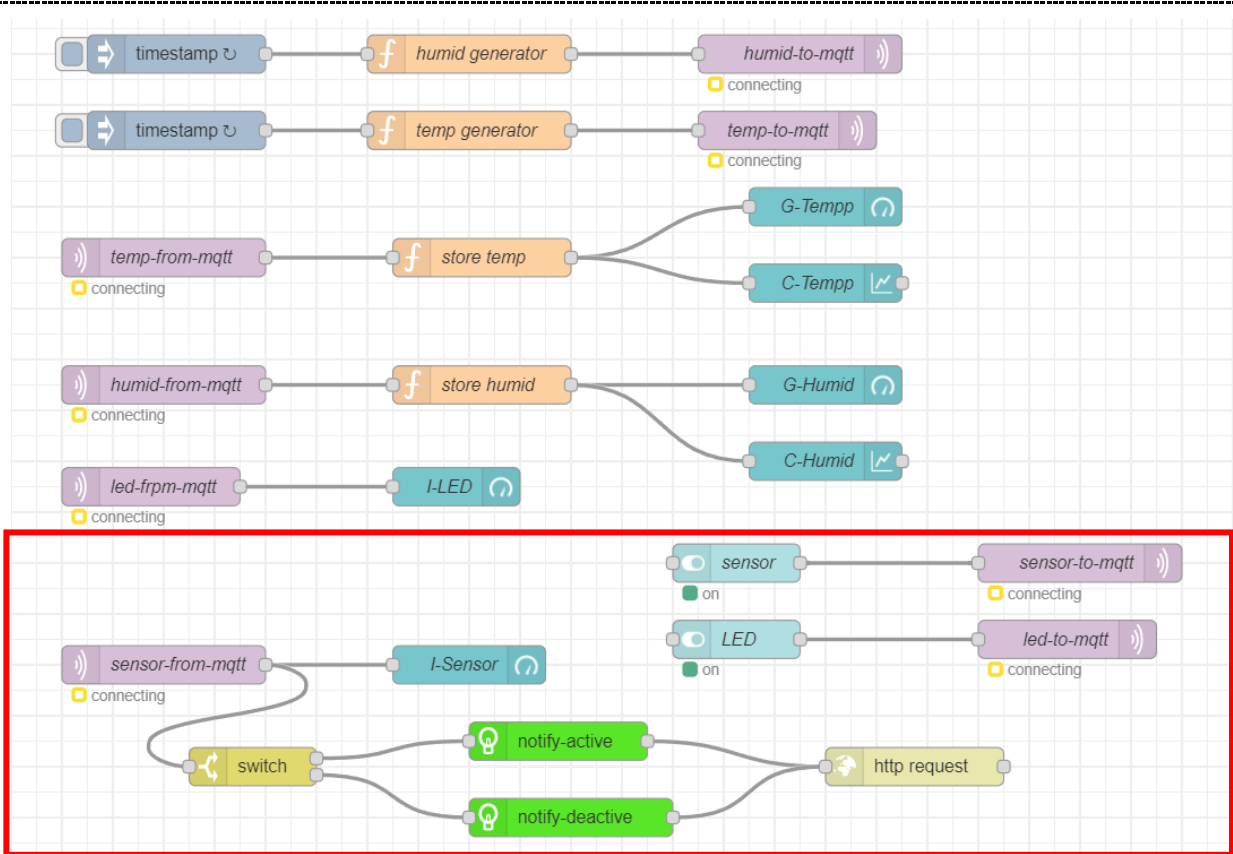


รูปการทดสอบ 1
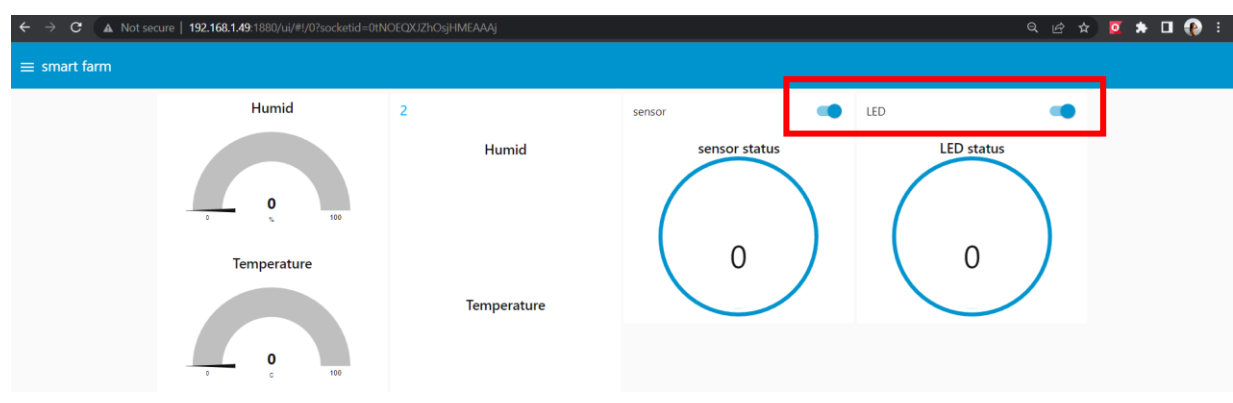
MQTT x



ปัญหาที่พบ  Node-RED ที่ MQTT status ขึ้นแจ้งเตือนว่า connecting ตลอดเวลา ทำให้ไม่สามารถใช้งาน MQTTได้



ที่ LINE Notify จึงไม่มีข้อความส่งมา

**Quiz_403 – LINE Chatbot**

- แสดงรูป โปรแกรม ของผลการทำงานตามหัวข้อ การโต้ตอบด้วยข้อความสำหรับฟาร์มอัจฉริยะ

| |
|---|
| Capture Node-RED Flow |
| Node-RED Code |
| รูปการทดสอบ 1 |
| รูปการทดสอบ 2: |
| รูปการทดสอบ 3 |
| รูปการทดสอบ 4 |
| รูปการทดสอบ 5 |
| รูปการทดสอบ 6 |