

## **SPRINT 1**

|                     |  |
|---------------------|--|
| <b>Date</b>         | <b>10 November 2022</b>                                |
| <b>TEAM ID</b>      | <b>PNT2022TMID24163</b>                                |
| <b>Project name</b> | <b>IOT Based Smart Crop Protection for Agriculture</b> |
| <b>Mark</b>         | <b>20 marks</b>  |

### **PYTHON CODE**

```
import time
import sys
import ibmiotf.application
import ibmiotf.device

organization = "7oyue9" deviceType =
"ESP32_Controller" deviceId = "BME280_Sensor"
authMethod = "usetoken-auth" authToken =
"12345678"
def myCommandCallback(cmd):
print("Command received: %s" % cmd.data)    if
cmd.data['command'] == 'motoron':
print("Motor On IS RECEIVED")    elif
cmd.data['command'] == 'motoroff':
print("Motor Off IS RECEIVED")    if cmd.command == "setInterval":
if 'interval' not in cmd.data: print("Error - command is missing required
information: 'interval'")    else:
interval = cmd.data['interval']    elif
cmd.command == "print":    if 'message' not in
cmd.data:
print("Error - command is missing required information: 'message'")    else:
output = cmd.data['message']    print(output)    try:    deviceOptions = {"org":
organization, "type": deviceType,    "id": deviceId,
"auth-method": authMethod, "authtoken": authToken}    deviceCli
=    ibmiotf.device.Client(deviceOptions)    except
Exception as e: print("Caught exception connecting device: %s" %
str(e)) sys.exit()
deviceCli.connect()
while True:
deviceCli.commandCallback = myCommandCallback

deviceCli.disconnect()
```

Node Red Flow.json

```
[{
  "id": "6a097760.653918",
  "type": "tab",
  "label": "IBMIOT(smart Agriculture)",
  "disabled": false,
  "info": ""
}, {
  "id": "4fdd8d20.76a9b4",
  "type": "ibmiot in",
  "z": "6a097760.653918",
  "authentication": "apiKey",
  "apiKey": "233183d6.16ba7c",
  "inputType": "evt",
  "logicalInterface": "",
  "ruleId": "",
  "deviceId": "BME280_Sensor",
  "applicationId": "",
  "deviceType": "ESP32_Controller",
  "eventType": "+",
  "commandType": "", "format":
"json",
  "name": "IBM IoT",
  "service": "registered",
  "allDevices": "",
  "allApplications": "",
  "allDeviceTypes": "",
  "allLogicalInterfaces": "",
  "allEvents": true,
  "allCommands": "",
  "allFormats": "",
  "qos": 0,
  "x": 130,
  "y": 440,
  "wires": [
    ["8d0c40d3.848cd", "6aa78b4a.da3eb4", "5642999c.ed7868",
"c396573b.e8d738"]
  ]
}, {
  "id": "c396573b.e8d738",
  "type": "debug",
  "z": "6a097760.653918",
  "name": "",
```

```

        "active": false,
        "tosidebar": true,
        "console": false,
        "tostatus": false,
        "complete": "payload",
        "targetType": "msg",
        "x": 770,
        "y": 360,
        "wires": []
    }, {
        "id": "8a49f2d5.e9d07",    "type":
"ui_gauge",
        "z": "6a097760.653918",
        "name": "",
        "group": "28e6141.0c047ec",
        "order": 0,
        "width": "6",
        "height": "4",
        "gtype": "gage",
        "title": "Humidity",
        "label": "%Percentage",
        "format": "{{ value }}",
        "min": 0,
        "max": "100",
        "colors": ["#00b500", "#e6e600", "#ca3838"],
        "seg1": "",
        "seg2": "",
        "x": 800,
        "y": 540,
        "wires": []
    }, {
        "id": "9e820fb2.1ded5",    "type":
"ui_gauge",
        "z": "6a097760.653918",
        "name": "",
        "group": "28e6141.0c047ec",
        "order": 0,
        "width": "6",
        "height": "4",
        "gtype": "gage",
        "title": "Temperature",
        "label": "°C Celcius",
        "format": "{{ value }}",
        "min": 0,
        "max": "100",
        "colors": ["#00b500", "#e6e600", "#ca3838"],

```

```

    "seg1": "",
    "seg2": "",
    "x": 770,
    "y": 660,
    "wires": []
  }, {
    "id": "6aa78b4a.da3eb4",
    "type": "function",
    "z": "6a097760.653918",
    "name": "Temperature",
    "func": "msg.payload=msg.payload.d.temperature;\nreturn msg;", "outputs": 1,
    "noerr": 0,
    "x": 410,
    "y": 560,
    "wires": [
      ["c396573b.e8d738", "9e820fb2.1ded5", "687d6f13.98f7c"]
    ]
  }, {
    "id": "8d0c40d3.848cd",    "type":
"function",
    "z": "6a097760.653918",
    "name": "Humidity",
    "func": "msg.payload=msg.payload.d.humidity;\nreturn msg;",
    "outputs": 1,
    "noerr": 0,
    "x": 420,
    "y": 500,
    "wires": [
      ["c396573b.e8d738", "8a49f2d5.e9d07", "a4f00796.520788"]
    ]
  }, {
    "id": "5642999c.ed7868",
    "type": "function",
    "z": "6a097760.653918",
    "name": "SoilMoisture",
    "func": "msg.payload=msg.payload.d.objectTemp;\nreturn msg;",
    "outputs": 1,
    "noerr": 0,
    "x": 430,
    "y": 440,
    "wires": [
      ["c396573b.e8d738", "dad1ab68.86f798", "9888ac53.4a285"]
    ]
  }, {
    "id": "dad1ab68.86f798",
    "type": "ui_gauge",

```

```
"z": "6a097760.653918",
"name": "",
"group": "28e6141.0c047ec", "order":
2,
"width": "6",
"height": "4",
"gtype": "gage",
"title": "Soil Moisture",
"label": "% Percentage",
"format": "{{ value }}",
"min": 0,
"max": "100",
"colors": ["#00b500", "#e6e600", "#ca3838"],
"seg1": "",
"seg2": "",
"x": 810,
"y": 420,
"wires": []
}, {
  "id": "9de2a117.06e1d",
  "type": "http request",
  "z": "6a097760.653918",
  "name": "",
  "method": "GET", "ret":
  "obj", "paytoqs": false,
  "url":
"http://api.openweathermap.org/data/2.5/weather?q=Ponda,IN&appid=c17ea9
9bbf41216723c2071ce90c3633",
  "tls": "",
  "persist": false,
  "proxy": "",
  "authType": "",
  "x": 510,
  "y": 240,
  "wires": [
    ["c396573b.e8d738", "91b4e81a.972888", "4bcf3c9.21fd4c4",
"2c496973.5626d6", "3552343c.1a23ac"]
  ]
}, {
  "id": "cbdf50d7.8bd57", "type": "inject",
  "z": "6a097760.653918",
  "name": "",
  "topic": "",
  "payload": "",
  "payloadType": "date",
  "repeat": "5",
```

```

    "crontab": "",
    "once": true,
    "onceDelay": "5",
    "x": 150,
    "y": 300,
    "wires": [
        ["9de2a117.06e1d"]
    ]
}, {
    "id": "f8fb8426.88b758",
    "type": "ibmiot out",
    "z": "6a097760.653918",
    "authentication": "apiKey",
    "apiKey": "233183d6.16ba7c",
    "outputType": "cmd",
    "deviceId": "BME280_Sensor",
    "deviceType": "ESP32_Controller",
    "eventCommandType": "command",
    "format": "json",
    "data": "Data",
    "qos": 0,
    "name": "IBM IoT",
    "service": "registered",
    "x": 560,
    "y": 100,
    "wires": []
}, {
    "id": "2deb666d.10728a",
    "type": "ui_button",
    "z": "6a097760.653918",
    "name": "",
    "group": "d251626d.10cec",
    "order": 2,
    "width": 0,
    "height": 0,
    "passthru": false,
    "label": "Motor on",
    "tooltip": "", "color": "",
    "bgcolor": "",
    "icon": "",
    "payload": "{\"command\":\"motoron\"}",
    "payloadType": "json",
    "topic": "",
    "x": 160,
    "y": 60,
    "wires": [
        ["f8fb8426.88b758", "c396573b.e8d738"]
    ]
}

```

```

    ]
  }, {
    "id": "154a1e0e.e80672",
    "type": "ui_button",
    "z": "6a097760.653918", "name":
    "",
    "group": "d251626d.10cec",
    "order": 3,
    "width": 0,
    "height": 0,
    "passthru": false,
    "label": "Motoroff",
    "tooltip": "",
    "color": "",
    "bgcolor": "",
    "icon": "",
    "payload": "{\"command\":\"motoroff\"}",
    "payloadType": "json",
    "topic": "",
    "x": 160,
    "y": 160,
    "wires": [
      ["f8fb8426.88b758", "c396573b.e8d738"]
    ]
  }, {
    "id": "6329ceb0.9a74",
    "type": "ui_text",
    "z": "6a097760.653918",
    "group": "a9434212.30379",
    "order": 0,
    "width": 0,
    "height": 0,
    "name": "",
    "label": "Temperature",
    "format": "{{msg.payload}}",
    "layout": "row-spread",
    "x": 970,
    "y": 140,
    "wires": []
  }, {
    "id": "5d4cb33b.861edc",
    "type": "ui_text",
    "z": "6a097760.653918",
    "group": "a9434212.30379",
    "order": 1,
    "width": 0,

```

```

    "height": 0,
    "name": "",
    "label": "Humidity",
    "format": "{{msg.payload}}",
    "layout": "row-spread",
    "x": 980,
    "y": 200,
    "wires": []
  }, {
    "id": "d85fe3cc.9ca31",    "type":
"ui_text",
    "z": "6a097760.653918",
    "group": "a9434212.30379",
    "order": 0,
    "width": 0,
    "height": 0,
    "name": "",
    "label": "Region",
    "format": "{{msg.payload}}",
    "layout": "row-spread",
    "x": 980,
    "y": 260,
    "wires": []
  }, {
    "id": "e00de3f6.29978",
    "type": "ui_text",
    "z": "6a097760.653918",
    "group": "a9434212.30379",
    "order": 3,
    "width": 0,
    "height": 0,
    "name": "",
    "label": "Weather Description",
    "format": "{{msg.payload}}",
    "layout": "row-spread",
    "x": 1020,
    "y": 320,
    "wires": []
  }, {
    "id": "9888ac53.4a285",    "type":
"ui_chart",
    "z": "6a097760.653918",
    "name": "",
    "group": "309c8230.4f9bde",
    "order": 3,
    "width": 0,

```



```

    "height": 0,
    "label": "Soil moisture",
    "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"],
    "useOldStyle": false,
    "outputs": 1,
    "x": 820,
    "y": 460,
    "wires": [
        []
    ]
}, {
    "id": "a4f00796.520788",
    "type": "ui_chart",
    "z": "6a097760.653918",
    "name": "",
    "group": "309c8230.4f9bde",
    "order": 4,
    "width": 0,
    "height": 0,
    "label": "Humidity",
    "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"],
    "useOldStyle": false,
    "outputs": 1,
    "x": 800,
    "y": 580,
    "wires": [
        []
    ]
}, {
    "id": "687d6f13.98f7c",    "type":
"ui_chart",
    "z": "6a097760.653918",
    "name": "",
    "group": "309c8230.4f9bde",
    "order": 5,
    "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"],
    "useOldStyle": false,
    "outputs": 1,
    "x": 810,
    "y": 700,
    "wires": [
        []
    ]
}, {

```

```
"id": "91b4e81a.972888",
"type": "change",
"z": "6a097760.653918",
"name": "Temperature",
"rules": [{
  "t": "set",
  "p": "payload",
  "pt": "msg",
  "to": "payload.main.temp",
  "tot": "msg"
}],
"action": "",
"property": "",
"from": "",
"to": "",
"reg": false,
"x": 750,
"y": 120,
"wires": [
  ["6329ceb0.9a74"]
]
}, {
  "id": "4bcf3c9.21fd4c4",
  "type": "change",
  "z": "6a097760.653918",
  "name": "Humidity",
  "rules": [{
    "t": "set",
    "p": "payload",
    "pt": "msg",
    "to": "payload.main.humidity",
    "tot": "msg"
  }],
  "action": "",
  "property": "",
  "from": "",
  "to": "",
  "reg": false,
  "x": 740,
  "y": 180,
  "wires": [
    ["5d4cb33b.861edc"]
  ]
}, {
  "id": "2c496973.5626d6",
  "type": "change",
```

```
"z": "6a097760.653918",
"name": "Region",
"rules": [{
  "t": "set",
  "p": "payload",
  "pt": "msg",
  "to": "payload.name",
  "tot": "msg"
}],
"action": "",
"property": "",
"from": "",
"to": "",
"reg": false,
"x": 740,
"y": 240,
"wires": [
  ["d85fe3cc.9ca31"]
]
}, {
  "id": "3552343c.1a23ac",
  "type": "change",
  "z": "6a097760.653918",
  "name": "Weather Description",
  "rules": [{
    "t": "set",
    "p": "payload",
    "pt": "msg",
    "to": "payload.weather.0.description",
    "tot": "msg"
  }],
  "action": "",
  "property": "",
  "from": "",
  "to": "",
  "reg": false,
  "x": 780,
  "y": 300,
  "wires": [
    ["e00de3f6.29978"]
  ]
}, {
  "id": "233183d6.16ba7c",
  "type": "ibmiot",
  "z": "",
  "name": "",
```

```
    "keepalive": "60",
    "serverName": "",
    "cleansession": true,
    "appId": "",
    "shared": false
  }, {
    "id": "28e6141.0c047ec",
    "type": "ui_group",
    "z": "",
    "name": "Smart Agriculture",
    "tab": "d669ffca.1402d",
    "order": 6,
    "disp": true,
    "width": "6",
    "collapse": false
  }, {
    "id": "d251626d.10cec",
    "type": "ui_group",
    "z": "",
    "name": "Motor Commands",
    "tab": "d669ffca.1402d",
    "order": 1,
    "disp": true,
    "width": "6",
    "collapse": false
  }, {
    "id": "a9434212.30379",
    "type": "ui_group",
    "z": "",
    "name": "Weather Forecast",
    "tab": "d669ffca.1402d",
    "order": 3,
    "disp": true,
    "width": "6",
    "collapse": false
  }, {
    "id": "309c8230.4f9bde",
    "type": "ui_group",
    "z": "",
    "name": "Graphical Representation",
    "tab": "d669ffca.1402d",
    "order": 5,
    "disp": true,
    "width": "6",
    "collapse": false
  }, {
```

```

    "id": "d669ffca.1402d",
    "type": "ui_tab",
    "z": "",
    "name": "Smart Agriculture",
    "icon": "dashboard",
    "disabled": false,
    "hidden": false
  }
}

```

## OUTPUT:

The screenshot shows a web interface for managing devices. At the top, there are tabs for 'Browse', 'Action', 'Device Types', and 'Interfaces'. A blue 'Add Device' button is in the top right. Below the tabs, a message states: 'criteria. To get started, you can add devices by using the Add Device button, or by using API.'

A search bar labeled 'Search by Device ID' is on the left. On the right, there is a 'Device Simulator' toggle switch and icons for a list and a filter.

The main content area displays a table of devices. The first device, 'BME280\_Sensor', is selected, and its details are expanded. The details include a tabbed interface with 'Identity', 'Device Information', 'Recent Events', 'State', and 'Logs'. The 'Recent Events' tab is active, showing a table of events.

| Event   | Value  | Format | Last Received     |
|---------|--|--------|-------------------|
| status1 | {"d":{"Name":"BME280_Sensor","temperature":... | json   | a few seconds ago |
| status1 | {"d":{"Name":"BME280_Sensor","temperature":... | json   | a few seconds ago |
| status1 | {"d":{"Name":"BME280_Sensor","temperature":... | json   | a few seconds ago |
| status1 | {"d":{"Name":"BME280_Sensor","temperature":... | json   | a few seconds ago |