SPRINT 1

Date	10 November 2022
TEAM ID	PNT2022TMID24112
Project name	IOT Based Smart Crop Protection for Agriculture
Mark	20 marks

PYTHON CODE

```python
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

```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",

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        "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": [{
```

```json
      "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,
```

```json
      "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: