

SmartBridge Externship

Name: Harshitha Munagala

Registration number:19BEC0565

Assignment 3: Develop a code to upload the water tank level and light intensity values to the IBM IoT platform and visualize them in the web application.

Python code:

```
import wiotp.sdk.device

import time

import random

myConfig = {
    "identity": {
        "orgId": "x012hb",
        "typeId": "VITDevice",
        "deviceId": "500062"
    },
    "auth": {
        "token": "12345678"
    }
}

def myCommandCallback(cmd):
    print("Message received from IBM IoT Platform: %s" % cmd.data['command'])
    m=cmd.data['command']

client = wiotp.sdk.device.DeviceClient(config=myConfig, logHandlers=None)
client.connect()

"""
```

Understanding Water Level and Light Intensity Working:

Let Water Level be 500 litres tank capacity (Take Water Level= 'water':w).

Let Light Intensity be measured in percentage (Take Light Intensity= 'light':l).

Corresponding to the water level, the light intensity is determined-

For Example: If the Water Level is full(500L), Light Intensity will be maximum(100%).

"""

while True:

 w=random.randint(0,500)

 l=(w/500)*100

 myData={'water':w, 'light':l}

 client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0, onPublish=None)

 print("Published data Successfully: %s", myData)

 client.commandCallback = myCommandCallback

 time.sleep(2)

client.disconnect()

```
*Assignment 3- Water Level.py - C:\Users\91995\AppData\Local\Programs\Python\Python37-32\Assignment 3- Water Level.py (3.7.4)*
File Edit Format Run Options Window Help

import wiotp.sdk.device
import time
import random

myConfig = {
    "identity": {
        "orgId": "x012hb",
        "typeId": "VITDevice",
        "deviceId": "500062"
    },
    "auth": {
        "token": "12345678"
    }
}

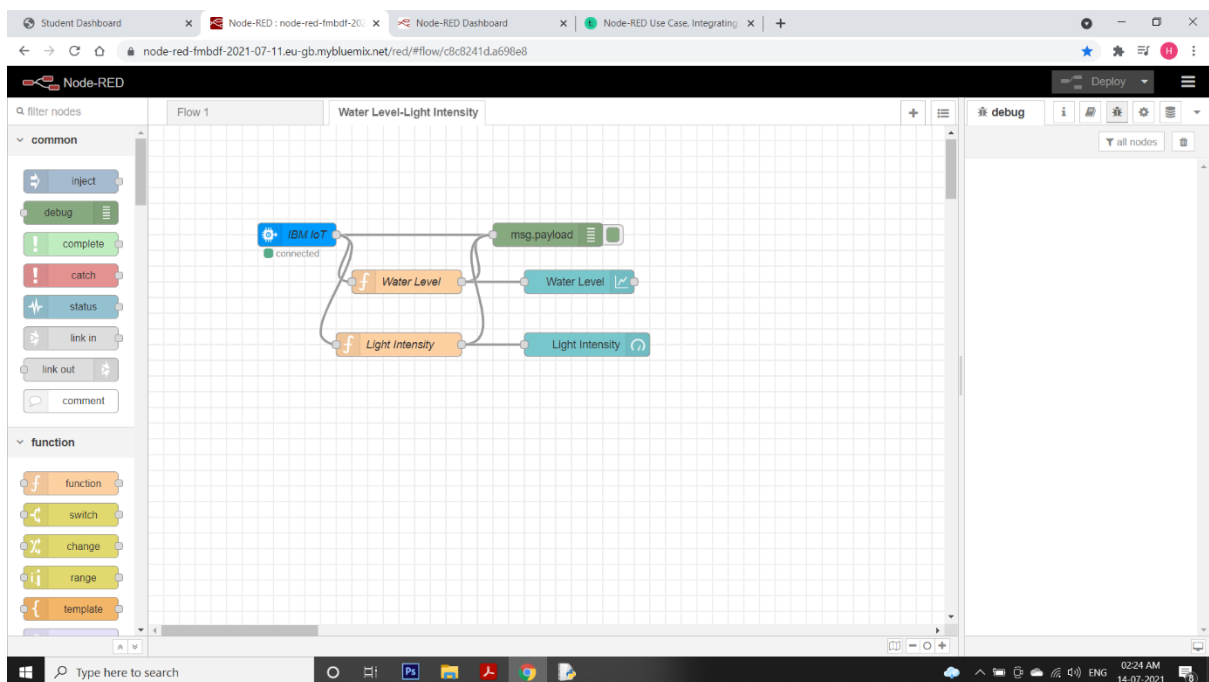
def myCommandCallback(cmd):
    print("Message received from IBM IoT Platform: %s" % cmd.data['command'])
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Understanding Water Level and Light Intensity Working:
Let Water Level be 500 litres tank capacity (Take Water Level= 'water':w).
Let Light Intensity be measured in percentage (Take Light Intensity= 'light':l).
Corresponding to the water level, the light intensity is determined-
For Example: If the Water Level is full(500L), Light Intensity will be maximum(100%).
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while True:
    w=random.randint(0,500)
    l=(w/500)*100
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    client.publishEvent(eventId="status", msgFormat="json", data=myData, qos=0, onPublish=None)
    print("Published data Successfully: %s", myData)
    client.commandCallback = myCommandCallback
    time.sleep(2)
client.disconnect()
```

Python code screenshot



Node setup in Node Red

The image shows a Python 3.7.4 Shell window on the left and a Node-RED interface on the right. The Python window displays a series of log messages from a device client, including connection status and sensor data (water level and light intensity). The Node-RED interface shows a flow with two nodes: 'Water Level' and 'Light Intensity'. The debug console on the right displays the messages being sent by these nodes, showing the payload structure for each message.

Python Shell Output:

```
Python 3.7.4 (tags/v3.7.4:09359112e, Jul 8 2019, 19:29:22) [MSC v.1916 32 bit (Intel)] on win32
Type "help", "copyright", "credits" or "license()" for more information.
>>>
RESTART: C:\Users\91995\AppData\Local\Programs\Python\Python37-32\Assignment 3- Water Level .py
2021-07-14 02:25:31,871 wiotp.sdk.device.client.DeviceClient INFO Connected successful
ly: dx012hb:VITDevice:500062
Published data Successfully: ks {'water': 430, 'light': 86.0}
Published data Successfully: ks {'water': 190, 'light': 38.0}
Published data Successfully: ks {'water': 489, 'light': 97.8}
Published data Successfully: ks {'water': 341, 'light': 68.2}
Published data Successfully: ks {'water': 399, 'light': 79.800000000000001}
Published data Successfully: ks {'water': 163, 'light': 32.6}
Published data Successfully: ks {'water': 259, 'light': 51.800000000000004}
Published data Successfully: ks {'water': 56, 'light': 11.200000000000001}
Published data Successfully: ks {'water': 226, 'light': 45.2}
Published data Successfully: ks {'water': 326, 'light': 65.2}
Published data Successfully: ks {'water': 215, 'light': 43.0}
Published data Successfully: ks {'water': 179, 'light': 35.8}
Published data Successfully: ks {'water': 297, 'light': 59.4}
Published data Successfully: ks {'water': 215, 'light': 43.0}
Published data Successfully: ks {'water': 255, 'light': 51.0}
Published data Successfully: ks {'water': 430, 'light': 86.0}
Published data Successfully: ks {'water': 116, 'light': 23.200000000000003}
Published data Successfully: ks {'water': 88, 'light': 17.599999999999998}
Published data Successfully: ks {'water': 102, 'light': 20.4}
Published data Successfully: ks {'water': 442, 'light': 88.4}
Published data Successfully: ks {'water': 12, 'light': 2.4}
Published data Successfully: ks {'water': 81, 'light': 16.2}
Published data Successfully: ks {'water': 182, 'light': 36.4}
Published data Successfully: ks {'water': 177, 'light': 35.4}
Published data Successfully: ks {'water': 10, 'light': 2.0}
Published data Successfully: ks {'water': 5, 'light': 1.0}
Published data Successfully: ks {'water': 29, 'light': 5.800000000000001}
Published data Successfully: ks {'water': 39, 'light': 7.8}
```

Node-RED Debug Console:

```
msg.payload: {
  water: 29,
  light: 5.800000000000001
}
14/07/2021, 02:26:25 node: c71a756f5bfeb8
iot-2-type/VITDeviceId/500062/ev/status/frm/json :
msg.payload: number
29
14/07/2021, 02:26:25 node: c71a756f5bfeb8
iot-2-type/VITDeviceId/500062/ev/status/frm/json :
msg.payload: number
5.800000000000001
14/07/2021, 02:26:27 node: c71a756f5bfeb8
iot-2-type/VITDeviceId/500062/ev/status/frm/json :
msg.payload: Object
{
  water: 39,
  light: 7.8
}
14/07/2021, 02:26:27 node: c71a756f5bfeb8
iot-2-type/VITDeviceId/500062/ev/status/frm/json :
msg.payload: number
39
14/07/2021, 02:26:27 node: c71a756f5bfeb8
iot-2-type/VITDeviceId/500062/ev/status/frm/json :
msg.payload: number
7.8
```

Debug messages-1

The image shows a Python 3.7.4 Shell window on the left and a Node-RED interface on the right. The Python window displays the same log messages as the first screenshot. The Node-RED interface shows a flow with two nodes: 'Water Level' and 'Light Intensity'. The debug console on the right displays the messages being sent by these nodes, showing the payload structure for each message.

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Published data Successfully: ks {'water': 163, 'light': 32.6}
Published data Successfully: ks {'water': 259, 'light': 51.800000000000004}
Published data Successfully: ks {'water': 56, 'light': 11.200000000000001}
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```

Node-RED Debug Console:

```
msg.payload: {
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iot-2-type/VITDeviceId/500062/ev/status/frm/json :
msg.payload: number
29
14/07/2021, 02:26:25 node: c71a756f5bfeb8
iot-2-type/VITDeviceId/500062/ev/status/frm/json :
msg.payload: number
5.800000000000001
14/07/2021, 02:26:27 node: c71a756f5bfeb8
iot-2-type/VITDeviceId/500062/ev/status/frm/json :
msg.payload: Object
{
  water: 39,
  light: 7.8
}
14/07/2021, 02:26:27 node: c71a756f5bfeb8
iot-2-type/VITDeviceId/500062/ev/status/frm/json :
msg.payload: number
39
14/07/2021, 02:26:27 node: c71a756f5bfeb8
iot-2-type/VITDeviceId/500062/ev/status/frm/json :
msg.payload: number
7.8
```

Data Visualization-1

Python 3.7.4 Shell
Python 3.7.4 (tags/v3.7.4:ef9359112e, Jul 8 2019, 19:29:22) [MSC v.1916 32 bit (Intel)] on win32
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>>>
RESTART: C:\Users\91995\AppData\Local\Programs\Python\Python37-32\Assignment 3- Water Level
.PY
2021-07-14 02:25:31,071 wiotp.sdk.device.client.DeviceClient INFO Connected successfully: dx012hb:VITDevice:500062
Published data Successfully: {'water': 430, 'light': 86.0}
Published data Successfully: {'water': 190, 'light': 38.0}
Published data Successfully: {'water': 489, 'light': 97.8}
Published data Successfully: {'water': 341, 'light': 68.2}
Published data Successfully: {'water': 399, 'light': 79.80000000000001}
Published data Successfully: {'water': 163, 'light': 32.6}
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Published data Successfully: {'water': 255, 'light': 51.0}
Published data Successfully: {'water': 430, 'light': 86.0}
Published data Successfully: {'water': 116, 'light': 23.200000000000003}
Published data Successfully: {'water': 88, 'light': 17.599999999999998}
Published data Successfully: {'water': 102, 'light': 20.4}
Published data Successfully: {'water': 442, 'light': 80.4}
Published data Successfully: {'water': 12, 'light': 2.4}
Published data Successfully: {'water': 81, 'light': 16.2}
Published data Successfully: {'water': 182, 'light': 36.4}
Published data Successfully: {'water': 177, 'light': 35.4}
Published data Successfully: {'water': 10, 'light': 2.0}
Published data Successfully: {'water': 5, 'light': 1.0}
Published data Successfully: {'water': 29, 'light': 5.800000000000001}
Published data Successfully: {'water': 39, 'light': 7.8}
Published data Successfully: {'water': 500, 'light': 100.0}
Published data Successfully: {'water': 497, 'light': 99.4}
Published data Successfully: {'water': 477, 'light': 95.39999999999999}
Published data Successfully: {'water': 236, 'light': 47.199999999999996}
Published data Successfully: {'water': 125, 'light': 25.0}
Published data Successfully: {'water': 248, 'light': 49.6}
Ln: 5 Col: 0

Node-RED
Flow 1 Water Level-Light In
debug
msg.payload - number
47.199999999999996
14/07/2021, 02:26:37 node: c71a756f5f6eb8
iot-2/type/VITDeviceId/500062/ev/status/html/json :
msg.payload - Object
{ water: 125, light: 25 }
14/07/2021, 02:26:37 node: c71a756f5f6eb8
iot-2/type/VITDeviceId/500062/ev/status/html/json :
msg.payload - number
125
14/07/2021, 02:26:37 node: c71a756f5f6eb8
iot-2/type/VITDeviceId/500062/ev/status/html/json :
msg.payload - number
25
14/07/2021, 02:26:39 node: c71a756f5f6eb8
iot-2/type/VITDeviceId/500062/ev/status/html/json :
msg.payload - Object
{ water: 248, light: 49.6 }
14/07/2021, 02:26:39 node: c71a756f5f6eb8
iot-2/type/VITDeviceId/500062/ev/status/html/json :
msg.payload - number
248
14/07/2021, 02:26:39 node: c71a756f5f6eb8
iot-2/type/VITDeviceId/500062/ev/status/html/json :
msg.payload - number
49.6

Debug messages- 2

Python 3.7.4 Shell
Python 3.7.4 (tags/v3.7.4:ef9359112e, Jul 8 2019, 19:29:22) [MSC v.1916 32 bit (Intel)] on win32
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RESTART: C:\Users\91995\AppData\Local\Programs\Python\Python37-32\Assignment 3- Water Level
.PY
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Published data Successfully: {'water': 102, 'light': 20.4}
Published data Successfully: {'water': 442, 'light': 80.4}
Ln: 5 Col: 0

Wate level - Light Intensity
Values
Water Level
500
450
400
350
300
250
200
150
100
50
02:25:31 02:25:36 02:25:41 02:25:46 02:25:51 02:25:56 02:26:01 02:26:06 02:26:11
Light Intensity
88.4
0 % 100

Data visualization- 2

Working:

We configure the python shell to node-red by providing the required credentials under “myConfig” in the python code. Now, using “chart” dashboard for Water level and “gauge” dashboard for light intensity, we can visualise the water level (in litres) and the corresponding light intensity (in percentage).

The python program is written in such a way that light intensity directly depends on water level.

For example: Assuming 500 litres to be full capacity for the water tank, and if 500 litres water is present then light intensity will be 100%. And if there's no water present, light intensity will be 0%.