Required Project 24.1 (Part 1): Streaming Live Data to ThingsBoard

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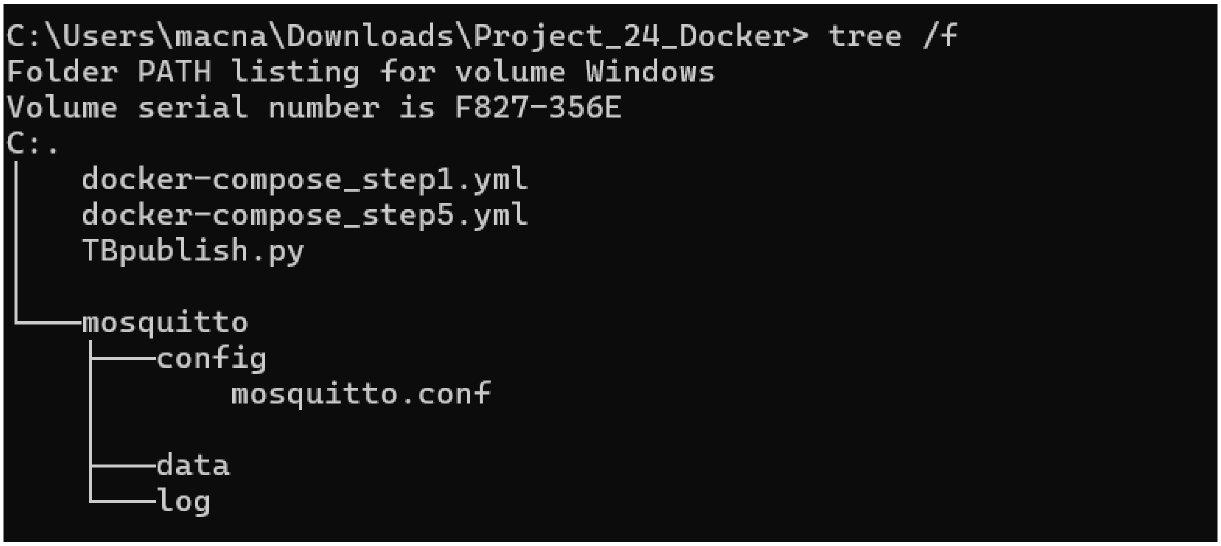
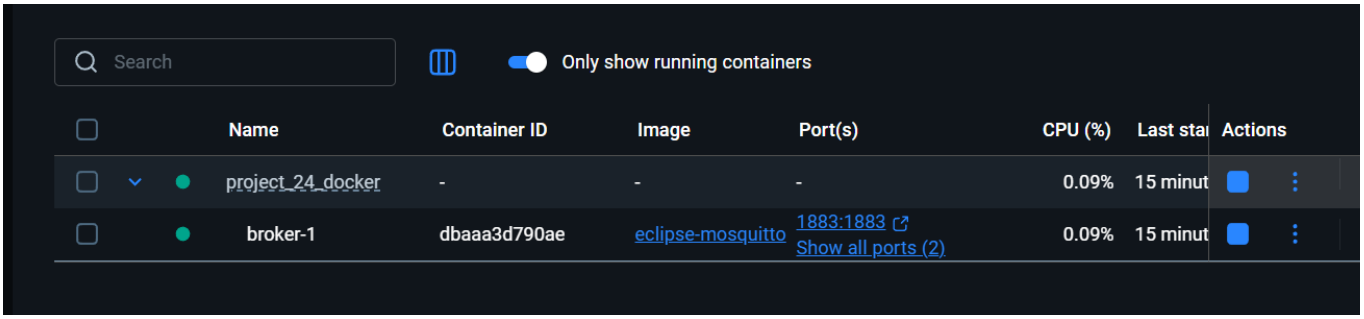
1. Provide a screenshot showing that you correctly created all the required folders and placed the docker-compose.yml and mosquitto.conf files in the Project_24_Docker and config folders, respectively.



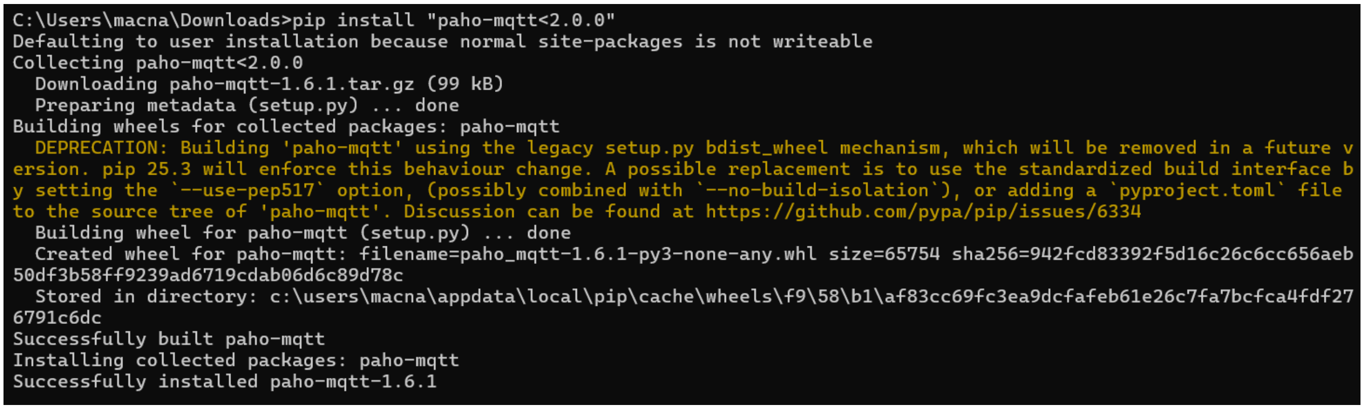
```
C:\Users\macna\Downloads\Project_24_Docker> tree /f
Folder PATH listing for volume Windows
Volume serial number is F827-356E
C:.
│   docker-compose_step1.yml
│   docker-compose_step5.yml
│   TBpublish.py
│
└───mosquitto
    ├───config
    │       mosquitto.conf
    │
    ├───data
    └───log
```

2. Provide a screenshot of your Docker GUI to show that you have successfully initialized the Mosquitto *container*.



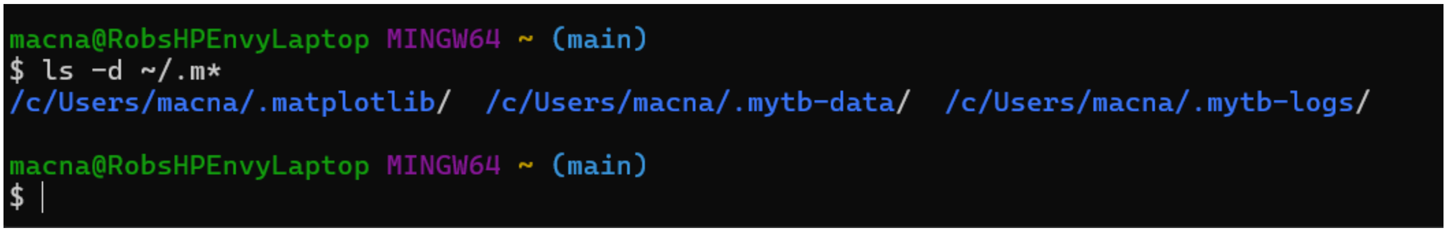
□			Name	Container ID	Image	Port(s)	CPU (%)	Last star	Actions
□	⌄	●	project_24_docker	-	-	-	0.09%	15 minut	■ ⋮
□		●	broker-1	dbaaa3d790ae	eclipse-mosquitto	1883:1883 Show all ports (2)	0.09%	15 minut	■ ⋮

3. Provide a screenshot showing that you have successfully installed the Paho MQTT Python *client library*.



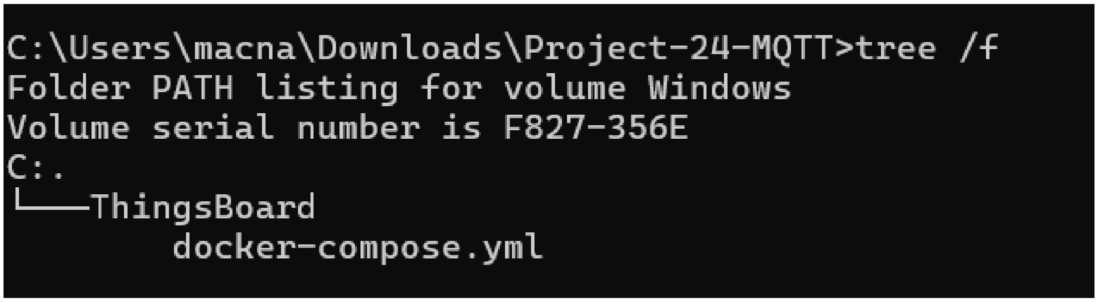
```
C:\Users\macna\Downloads>pip install "paho-mqtt<2.0.0"
Defaulting to user installation because normal site-packages is not writeable
Collecting paho-mqtt<2.0.0
  Downloading paho-mqtt-1.6.1.tar.gz (99 kB)
  Preparing metadata (setup.py) ... done
Building wheels for collected packages: paho-mqtt
  DEPRECATION: Building 'paho-mqtt' using the legacy setup.py bdist_wheel mechanism, which will be removed in a future v
ersion. pip 25.3 will enforce this behaviour change. A possible replacement is to use the standardized build interface b
y setting the `--use-pep517` option, (possibly combined with `--no-build-isolation`), or adding a `pyproject.toml` file
to the source tree of 'paho-mqtt'. Discussion can be found at https://github.com/pypa/pip/issues/6334
  Building wheel for paho-mqtt (setup.py) ... done
  Created wheel for paho-mqtt: filename=paho_mqtt-1.6.1-py3-none-any.whl size=65754 sha256=942fcd83392f5d16c26c6cc656aeb
50df3b58ff9239ad6719cdab06d6c89d78c
  Stored in directory: c:\users\macna\appdata\local\pip\cache\wheels\f9\58\b1\af83cc69fc3ea9dcfafeb61e26c7fa7bcfca4fdf27
6791c6dc
Successfully built paho-mqtt
Installing collected packages: paho-mqtt
Successfully installed paho-mqtt-1.6.1
```

4. Provide a screenshot showing that you created the .mytb-data and .mytb-logs folders inside the home folder correctly.



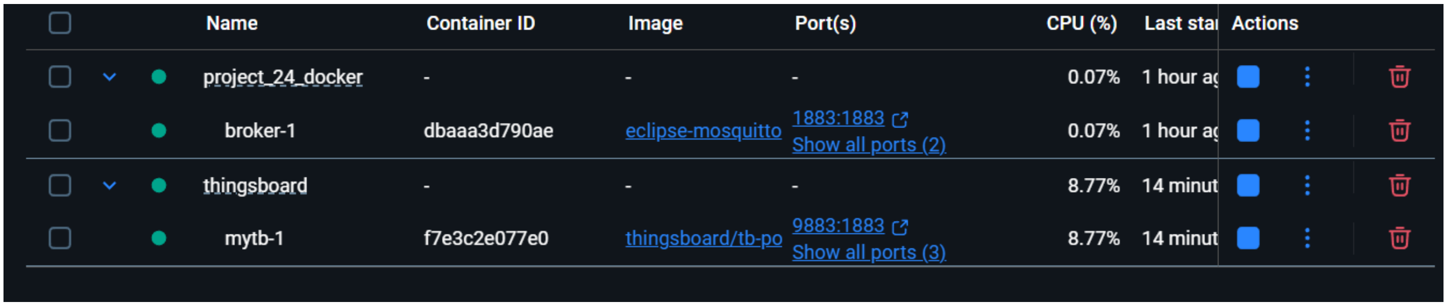
```
macna@RobsHPEnvyLaptop MINGW64 ~ (main)
$ ls -d ~/.m*
/c/Users/macna/.matplotlib/  /c/Users/macna/.mytb-data/  /c/Users/macna/.mytb-logs/

macna@RobsHPEnvyLaptop MINGW64 ~ (main)
$ |
```

5. Provide a screenshot showing that you correctly created all the required folders and placed the docker-compose.yml inside the ThingsBoard folder.



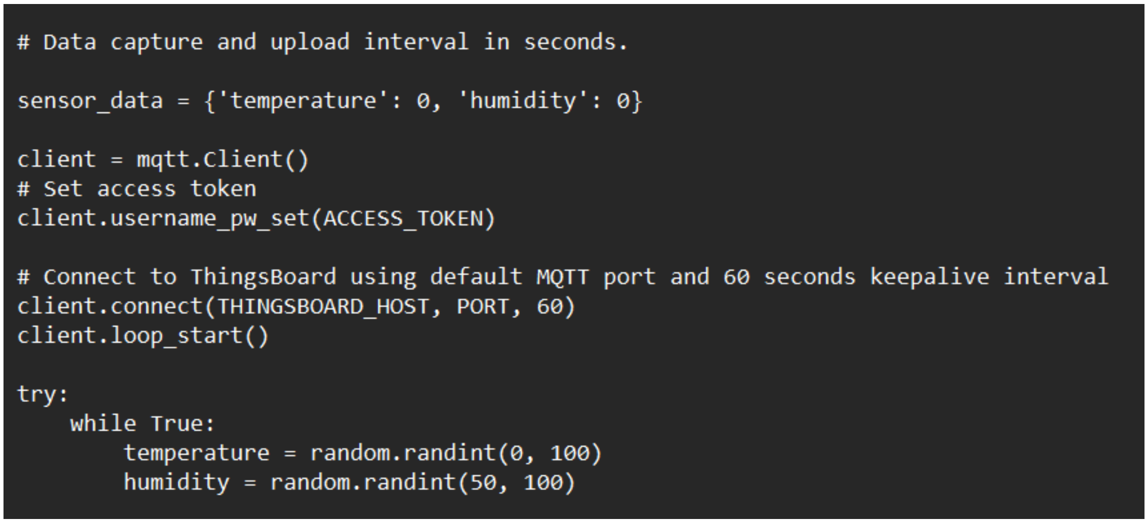
```
C:\Users\macna\Downloads\Project-24-MQTT>tree /f
Folder PATH listing for volume Windows
Volume serial number is F827-356E
C:.
└───ThingsBoard
        docker-compose.yml
```

6. Provide a screenshot of your Docker GUI showing that you have successfully initialized the ThingsBoard *container*.



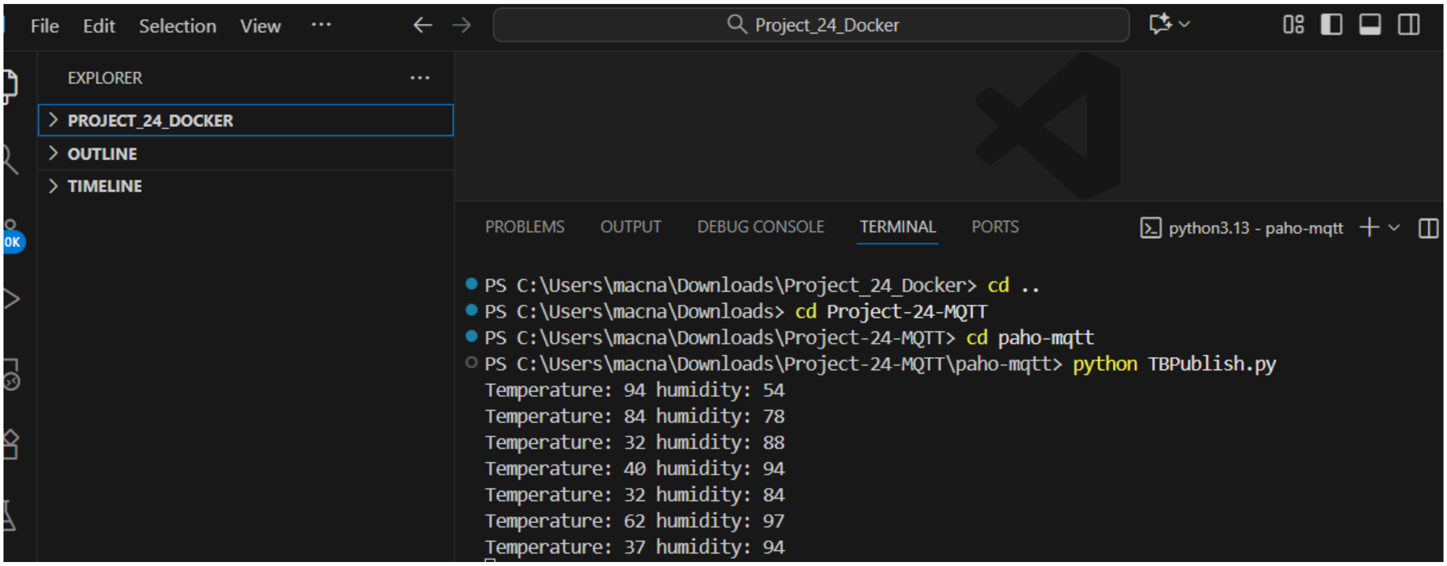
□			Name	Container ID	Image	Port(s)	CPU (%)	Last star	Actions		
□	⌄	●	project_24_docker	-	-	-	0.07%	1 hour ag	■	⋮	🗑
□		●	broker-1	dbaaa3d790ae	eclipse-mosquitto	1883:1883 ↗ Show all ports (2)	0.07%	1 hour ag	■	⋮	🗑
□	⌄	●	thingsboard	-	-	-	8.77%	14 minut	■	⋮	🗑
□		●	mytb-1	f7e3c2e077e0	thingsboard/tb-po	9883:1883 ↗ Show all ports (3)	8.77%	14 minut	■	⋮	🗑

7. Provide a screenshot showing that you created the paho-mqtt folder and modified the code inside the TBPublish.py file to add the humidity *key* with the correct values assigned to the humidity variable.



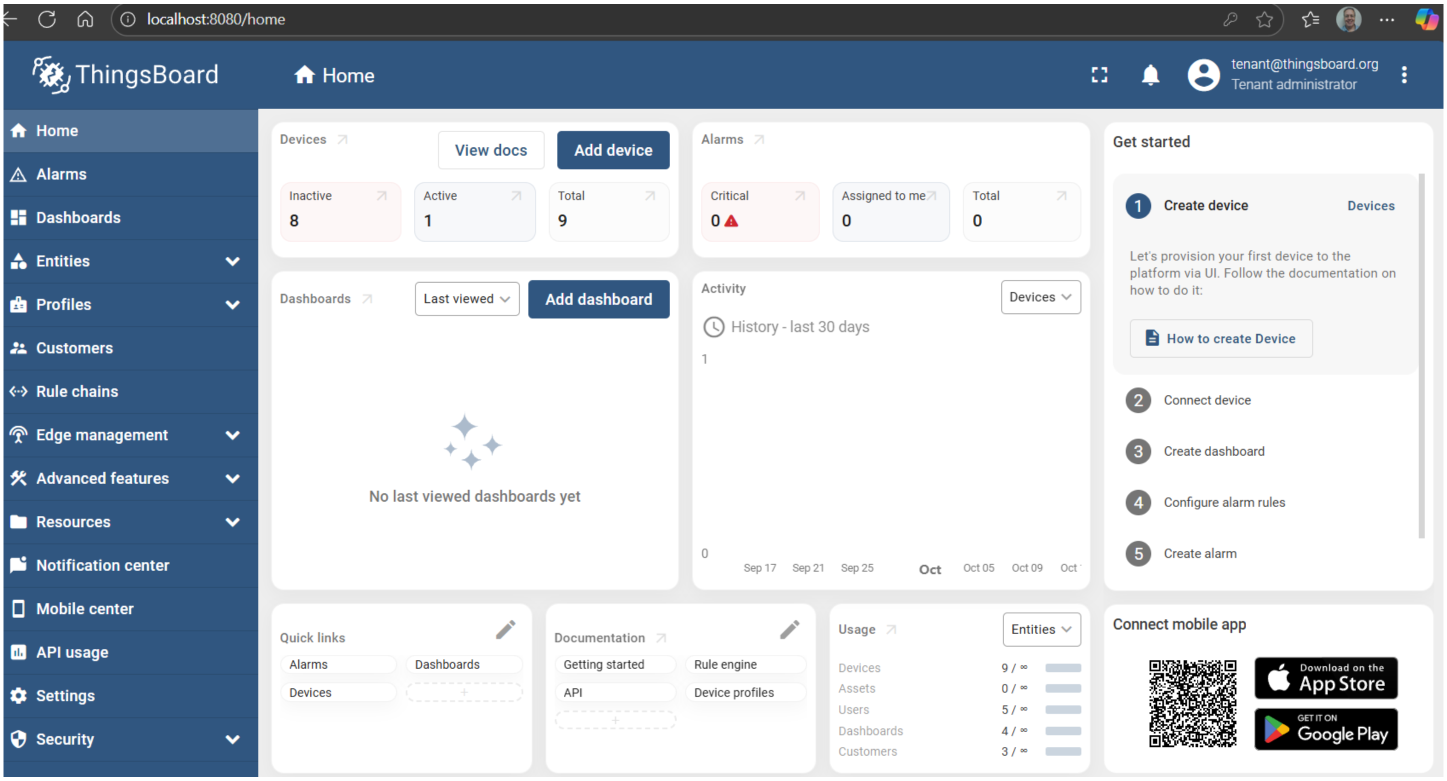
```
# Data capture and upload interval in seconds.

sensor_data = {'temperature': 0, 'humidity': 0}

client = mqtt.Client()
# Set access token
client.username_pw_set(ACCESS_TOKEN)

# Connect to ThingsBoard using default MQTT port and 60 seconds keepalive interval
client.connect(THINGSBOARD_HOST, PORT, 60)
client.loop_start()

try:
    while True:
        temperature = random.randint(0, 100)
        humidity = random.randint(50, 100)
```

8. Provide a screenshot showing that your code is correctly producing data for the temperature and the humidity.



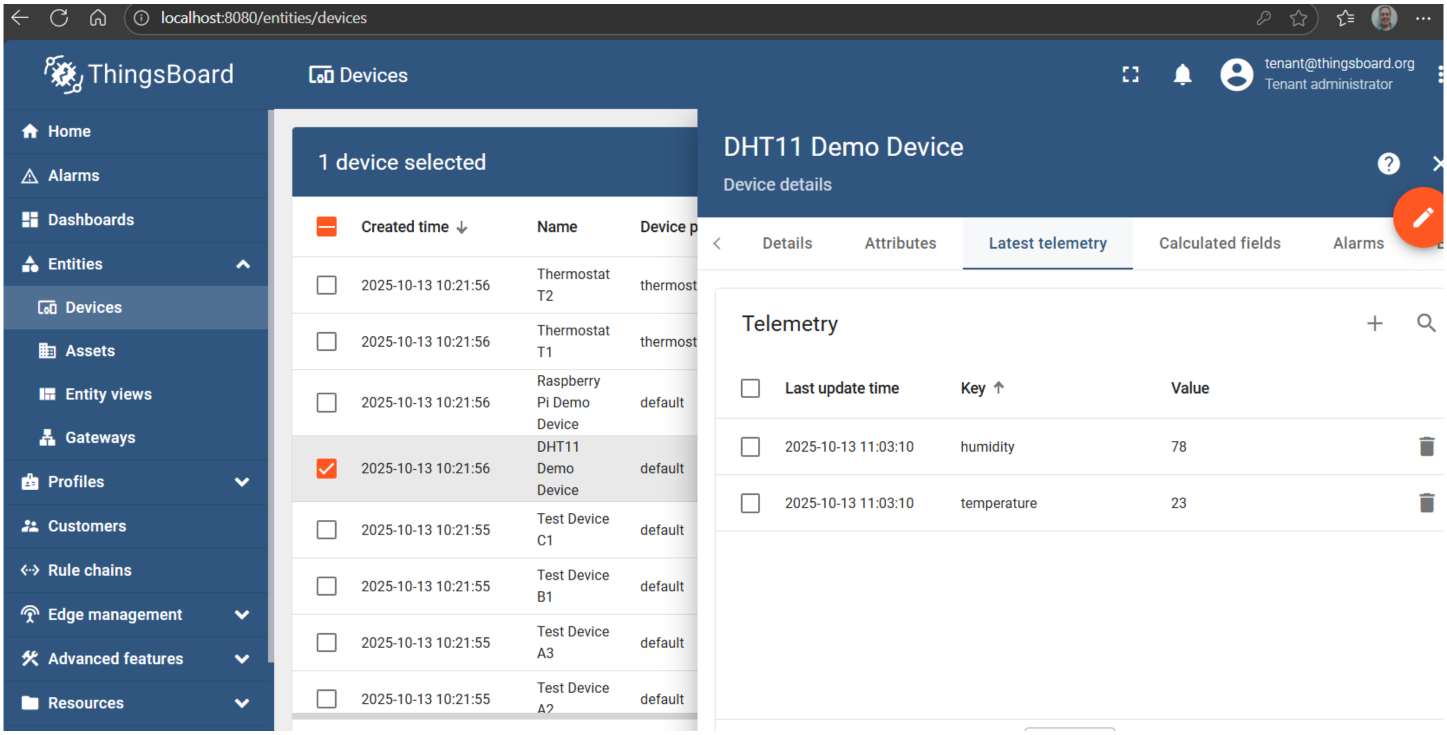
```
PS C:\Users\macna\Downloads\Project_24_Docker> cd ..
PS C:\Users\macna\Downloads> cd Project-24-MQTT
PS C:\Users\macna\Downloads\Project-24-MQTT> cd paho-mqtt
PS C:\Users\macna\Downloads\Project-24-MQTT\paho-mqtt> python TBPublish.py
Temperature: 94 humidity: 54
Temperature: 84 humidity: 78
Temperature: 32 humidity: 88
Temperature: 40 humidity: 94
Temperature: 32 humidity: 84
Temperature: 62 humidity: 97
Temperature: 37 humidity: 94
```

9. Provide a screenshot showing that you successfully logged in to ThingsBoard using the credentials provided.



Let's provision your first device to the platform via UI. Follow the documentation on how to do it:

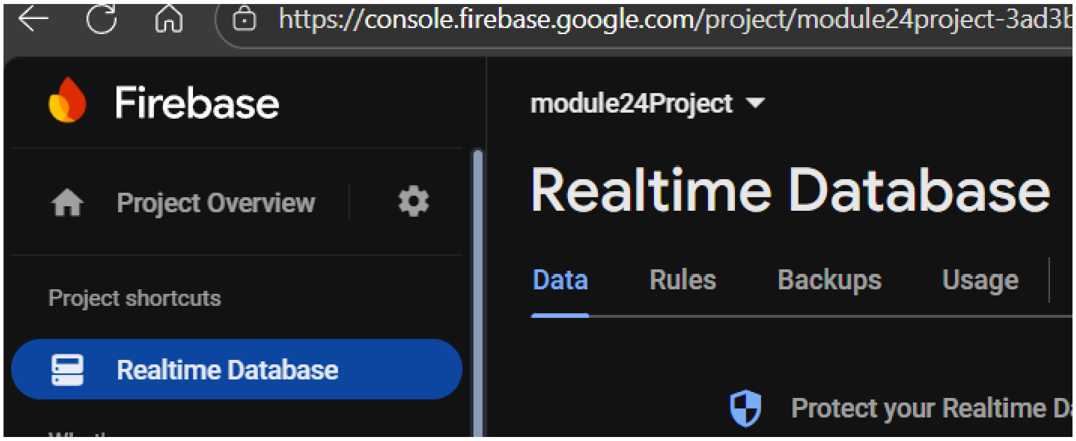
10. Provide a screenshot of the data in the latest telemetry tab showing that the DHT11 Demo *Device* is *publishing* the data produced by the TBPublish.py file to ThingsBoard.



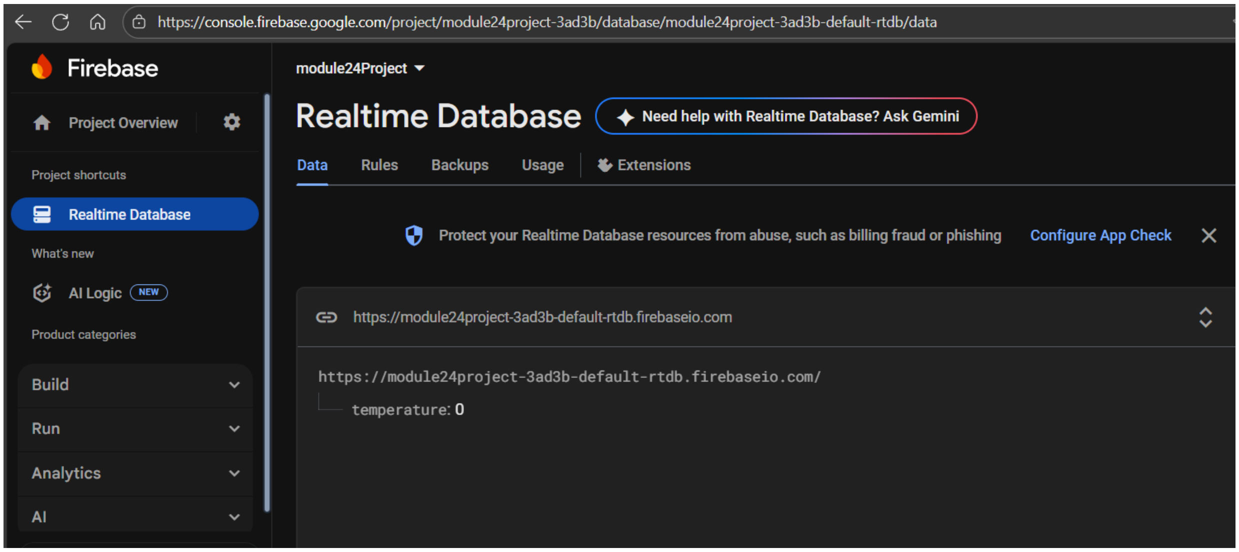
	Created time ↓	Name	Device p
□	2025-10-13 10:21:56	Thermostat T2	thermost
□	2025-10-13 10:21:56	Thermostat T1	thermost
□	2025-10-13 10:21:56	Raspberry Pi Demo Device	default
☑	2025-10-13 10:21:56	DHT11 Demo Device	default
□	2025-10-13 10:21:55	Test Device C1	default
□	2025-10-13 10:21:55	Test Device B1	default
□	2025-10-13 10:21:55	Test Device A3	default
□	2025-10-13 10:21:55	Test Device A2	default

□	Last update time	Key ↑	Value
□	2025-10-13 11:03:10	humidity	78
□	2025-10-13 11:03:10	temperature	23

11. Provide a screenshot showing that you created the module24Project project in Firebase.

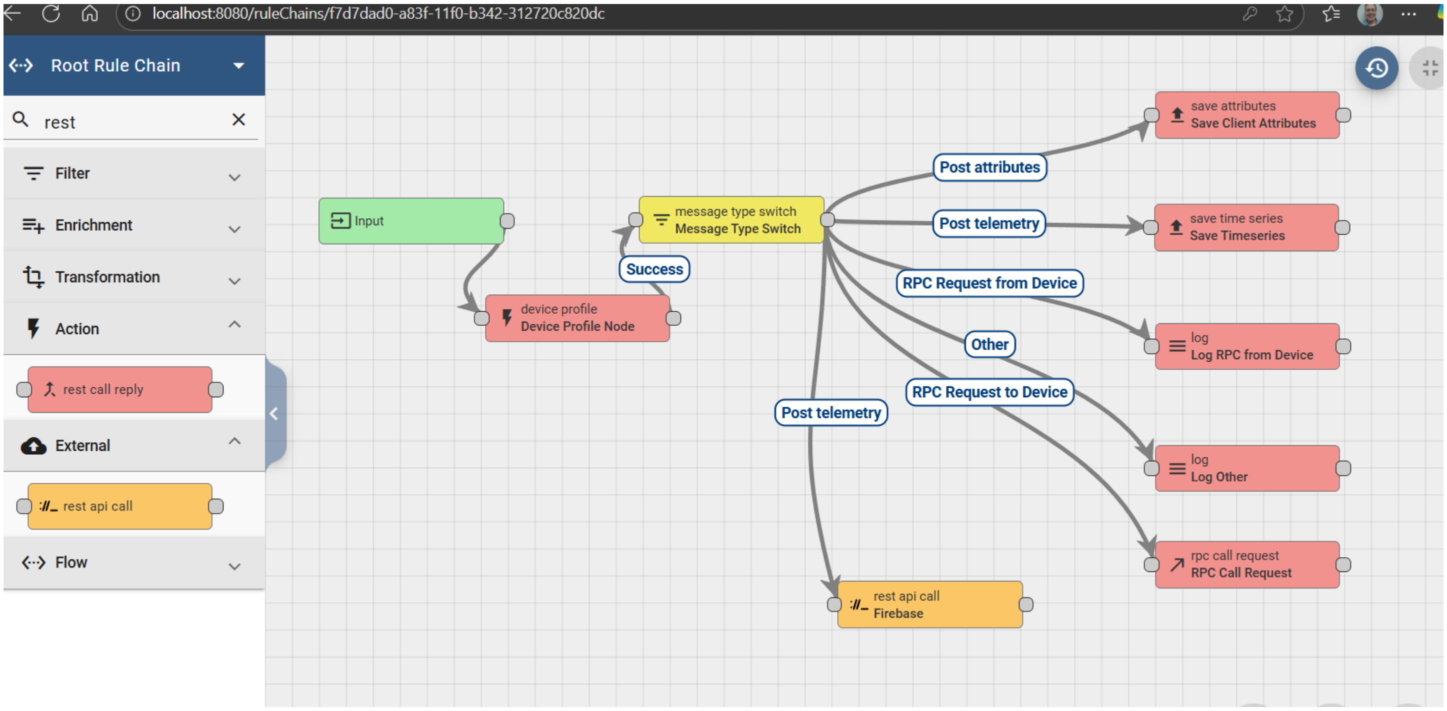


12. Provide a screenshot showing that you created the temperature field inside your Realtime database.

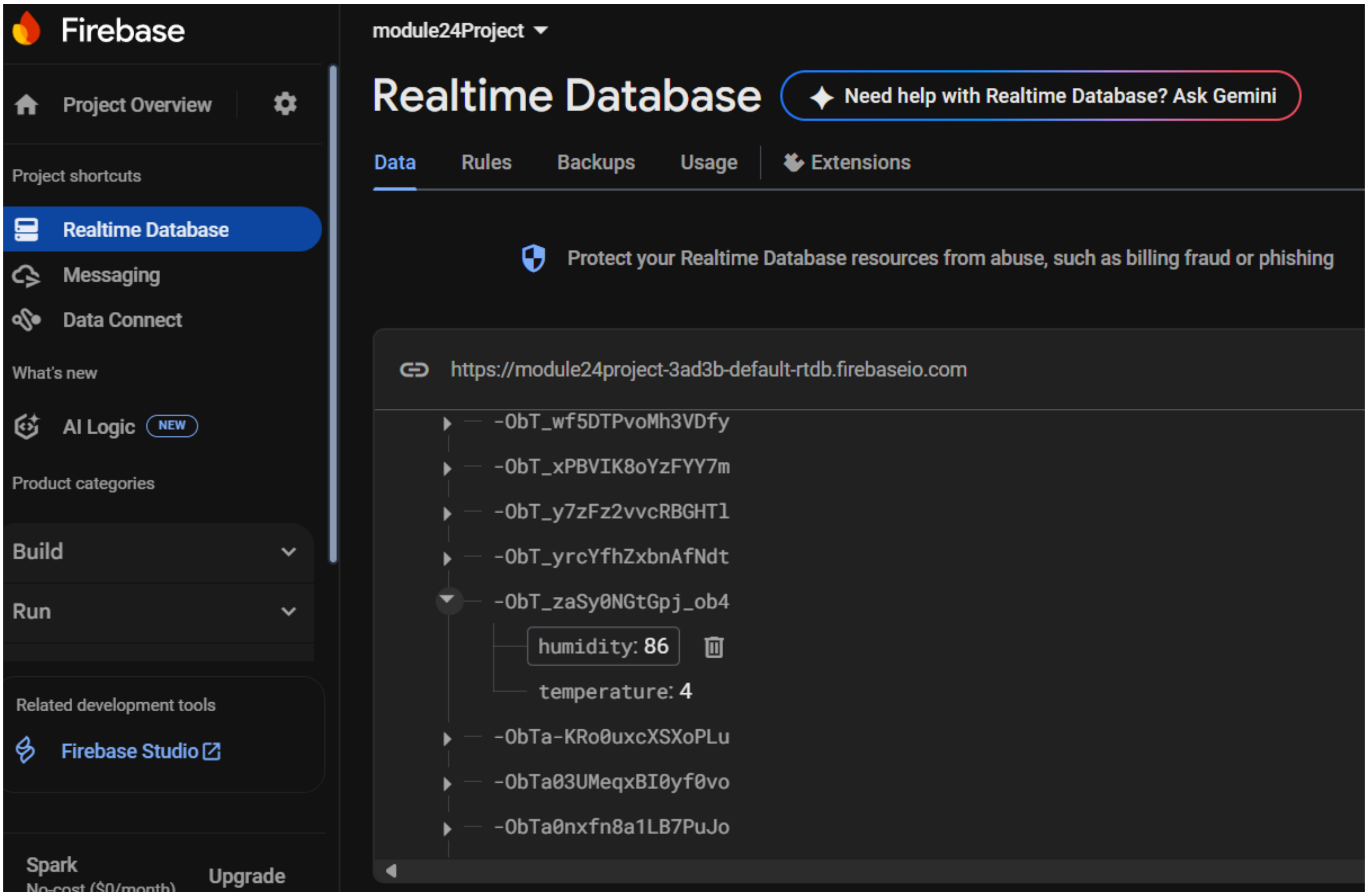

https://console.firebase.google.com/project/module24project-3ad3b/database/module24project-3ad3b-default-rtdb/data
Firebase
module24Project
Project Overview
Realtime Database
Need help with Realtime Database? Ask Gemini
Data
Rules
Backups
Usage
Extensions
Project shortcuts
Realtime Database
What's new
AI Logic
NEW
Product categories
Build
Run
Analytics
AI
Protect your Realtime Database resources from abuse, such as billing fraud or phishing
Configure App Check
https://module24project-3ad3b-default-rtdb.firebaseio.com

```
https://module24project-3ad3b-default-rtdb.firebaseio.com/
  └ temperature: 0
```

13. Provide a screenshot showing that you have created the Firebase *node* correctly, connected it to the "Message Type *Switch*" *node*, and added "Post telemetry" as the link label.



14. Provide a screenshot showing that your Realtime database is updating correctly and displaying your temperature and humidity data.



```
https://module24project-3ad3b-default-rtdb.firebaseio.com
  -ObT_wf5DTPvoMh3VDfy
  -ObT_xPBVIK8oYzFYY7m
  -ObT_y7zFz2vvcRBGHTl
  -ObT_yrcYfhZxbnAfNdt
  -ObT_zaSy0NGtGpj_ob4
      humidity: 86
      temperature: 4
  -ObTa-KRo0uxcXSXoPLu
  -ObTa03UMeqxBI0yf0vo
  -ObTa0nxfn8a1LB7PuJo
```