POLITECNICO
MILANO 1863

IoT Challenge #2

Node-Red

Home Challenge #2

- Download the **challenge2023_2.csv** file here
  or from WeBeep

- Process the CSV file in Node-Red

```
"No.","Time","Source","Destination","Protocol","Length","Source Port","Destination Port","Info","Message"
"44","1.631805505","10.0.2.15","3.65.137.17","MQTT","79","34039","1883","Connect Command",""
"48","1.633054189","10.0.2.15","3.65.137.17","MQTT","85","47723","1883","Connect Command",""
"53","1.656703356","3.65.137.17","10.0.2.15","MQTT","62","1883","34039","Connect Ack",""
"57","1.666550621","10.0.2.15","91.121.93.94","MQTT","80","43133","1883","Connect Command",""
"59","1.673414543","3.65.137.17","10.0.2.15","MQTT","67","1883","47723","Connect Ack",""
"61","1.717782327","91.121.93.94","10.0.2.15","MQTT","62","1883","43133","Connect Ack",""
"64","2.634685221","10.0.2.15","3.65.137.17","MQTT","91","34039","1883","Subscribe Request (id=1) [metaverse/building3/section2]",
"66","2.635737036","10.0.2.15","3.65.137.17","MQTT","82","47723","1883","Subscribe Request (id=1) [university/+/area0]",""
"68","2.656128517","3.65.137.17","10.0.2.15","MQTT","62","1883","34039","Subscribe Ack (id=1)",""
"70","2.664970959","3.65.137.17","10.0.2.15","MQTT","62","1883","47723","Subscribe Ack (id=1)",""
```

Packet Number!

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What to do? (1)

- Connect to the public HiveMQ Broker ('**broker.hivemq.com**' with port **1883**)
- Subscribe to the topic ***polimi/challenge_2/2023/id_code_generator***
  - A client will automatically send an ID evry 5 seconds with the following structure: {"timestamp":"yyyy..","id":"6292"}

- Extract the ID, **add** the last **4 digits** of your person code (team leader), and take the Remainder (%) of division by 7711 **n**=(ID+xyzw) modulo 7711

- Based on the result take the message with frame number equal to the obtained number **n**

e.g. Person Code = 10692911 , id=6282
n = (2911+6292) modulo 7711 **= 1492**

What to do? (2)

- If the message found contains an **MQTT Publish** then, send a publish message to the same broker to the topic **/polimi/iot2023/challenge2/PERSON_CODE** with payload as the following string:
  {"timestamp":"CURRENT_TIMESTAMP","id":"PREVIOUS_ID","payload":"MQTT_PUBLISH_PAYLOAD"}
  Where:
  - CURRENT_TIMESTAMP **Current time** at the moment of the sending
  - PREVIOUS_ID Message **id** received from the Subscription i.e. 6292
  - MQTT_PUBLISH_PAYLOAD Payload from the CSV of the Publish message with frame number **n**

- Program your flow to stop working after **receiving exactly 100 id** messages (i.e. do not process more than 100 messages)

Warning! If packet contains multiple Publish, send them as separate publish messages

If some of the payload do not appear, send empty payload

What to do? (3)

- Program your Node-Red flow in order to **also SUBSCRIBE** to the same topic that you publish on /polimi/iot2023/challenge2/PERSON_CODE, on the same broker. The subscription should be done as **first thing**, to receive the message you publish

- Messages received from subscriptions:
  - Filter only messages having payload with temperature in Celsius
  - Produce a chart in Node-Red plotting the temperature value **(taking the maximum value in the "range" attribute as a number)** of these filtered messages

*{"long": 80, "range": [0, **59**], "lat": 86, "type": "temperature", "unit": "C", "description": "Room Temperature"}*

  - Save the payload **string** of such filtered messages in a CSV containin one msg Payload for each row. **Include this CSV in your delivery**

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What to do?(4)
Attention:

- Check how publish messages are formatted in the CSV
  i.e. with a text editor

- **Before starting your final execution flow, send a publish to that topic with mosquitto_pub with payload «START», Do the same at the end with «END» payload.**

- Consider always the person code of the "leader" (either for the topic and for the computation of **n**)

Challenge deliverables

What to deliver:

- A **PDF** report containing the explanation of the Node-Red nodes. Include Node-Red image, and explain the meaning of each node.
- Node-Red flow export as JSON
- CSV file produced from Node-Red filtered messages
- **YOUR NAME and PERSON CODE**

The files should be included in a ZIP and should be named as follows:

2-teams: <personcode1>_<personcode2>.zip

Single: <person_code>.zip

E.g. 10692911.zip or 10692911_10692912.zip

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Challenge delivery: HOW?

How to deliver?

- Upload the files in a zip archive as .zip file on the **folder #2** on WeBeep “Assignments” folder

- Fill this **form** with the csv values produced from Node-Red filtered messages

For two-people teams:

- Choose your team leader and name the file as:
  <leader_personcode>_<other_personcode>.zip

- **Only the teamleader** should upload the challenge in WeBeep
  Do note upload the same challenge twice

- *Can I take the challenges with the other class students (Prof. Redondi)*?
  YES, **but** only the team leader should upload the challenge in WeBeep

Delivery Deadline

- **STRICT** Deadline:

  April 25, 2023 h 23.59

- Max 2 people
- Up to **1.5** points

Good Luck!

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