escuela técnica superior de ingeniería y diseño industrial
UNIVERSIDAD POLITÉCNICA DE MADRID
ESCUELA TÉCNICA SUPERIOR DE INGENIERÍA Y DISEÑO INDSUTRIAL

Departamento Electrónica, Automática e Informática Industrial

**SURNAME:**

**NAME :**

Grade

**COURSE: Practical IoT with Raspberry Pi**

**CURSO: Int_Semester** **December 2021**

**Total time: 1:30h**
**Max points: 10**
**Personal notes and Internet are allowed**

## Exercise 1: JSON (1 points)

Write a program in Python that displays a JSON in the screen every second with this format:
{"**time**": "current time", "**city**": "your home town", "**temperature**": temperature value from sensehat}

**Now choose three of the following four exercises:**

## Exercise 2: Sensors (3 points)

Use the SenseHAT to display the dew point on the screen.
If the air temperature reaches the dew point, condensation appears. In this case, the displayed text should flash.
* Use the approximation: Dew point [°C] = Air temperature [°C] - (100 - RH [%])/5

## Exercise 3: MQTT (3 points)

Write a program in Python that publishes, using MQTT, the JSON from exercise 1 when the temperature drops below 12ºC. Use a topic like "ETSIDI/ID" (with an ID of your choice) and the broker that you want.

In other terminal, another Python program will subscribe to the messages sent by the other terminal through MQTT and display the temperature data on the screen.

## Exercise 4: Thingspeak (3 points)

Write a program that every 5s uploads the JSON from exercise 1 to your Thingspeak account.
Write a program that reads the last message sent to your Thingspeak account.

## Exercise 5: API REST with Flask (3 points)

Write a POST method using Flask to change the orientation of the LED matrix display on the Sense HAT. The parameter must be 0, 90, 180, or 270 degrees. After changing the orientation, the method must print a test message on the screen.