

JES – Automated plant watering and monitoring system

ICT Infrastructure project
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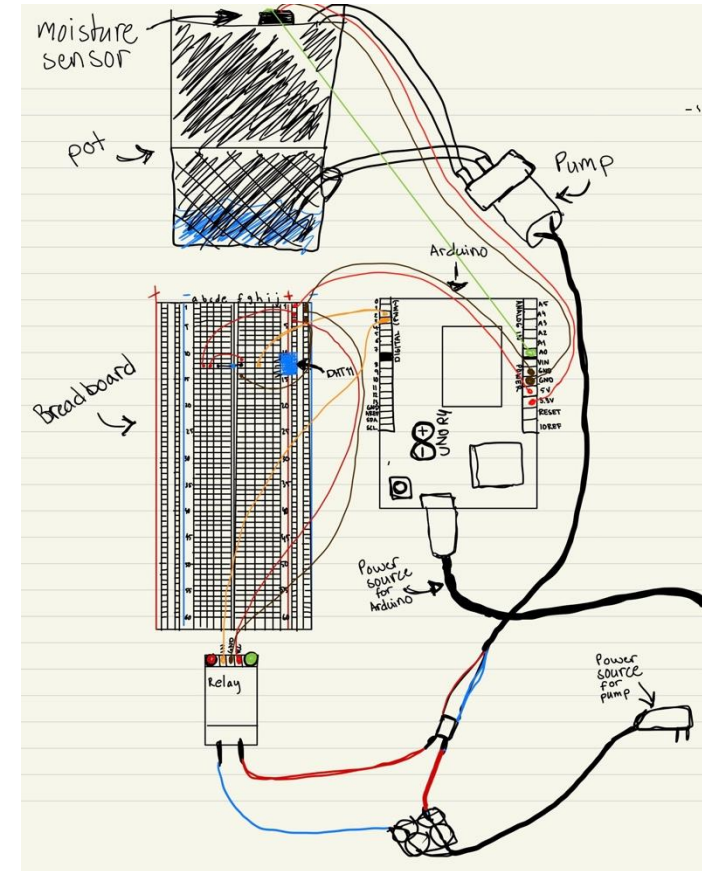
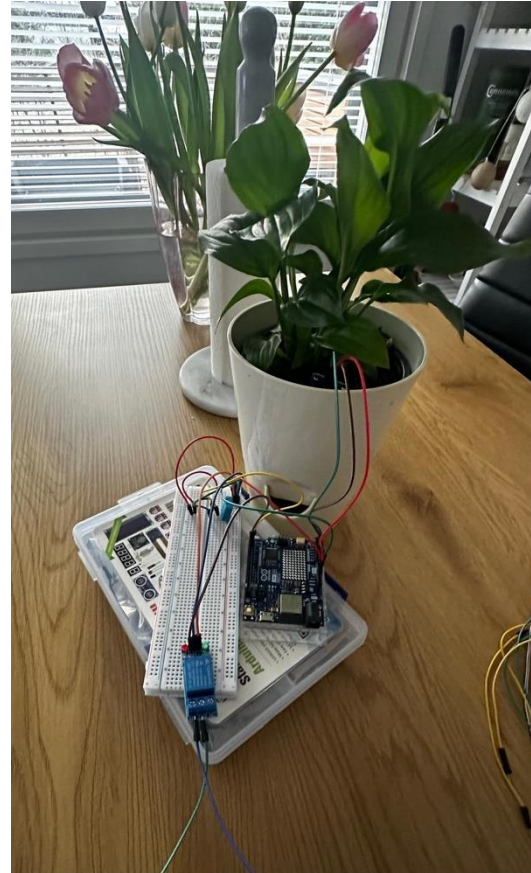


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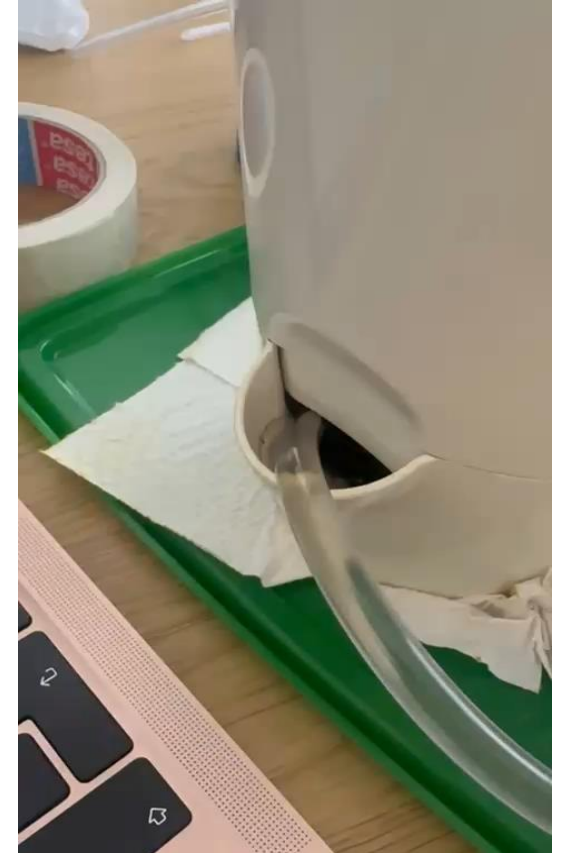
What did we build?

Developed an **Automatic Plant Watering And Monitoring System!**

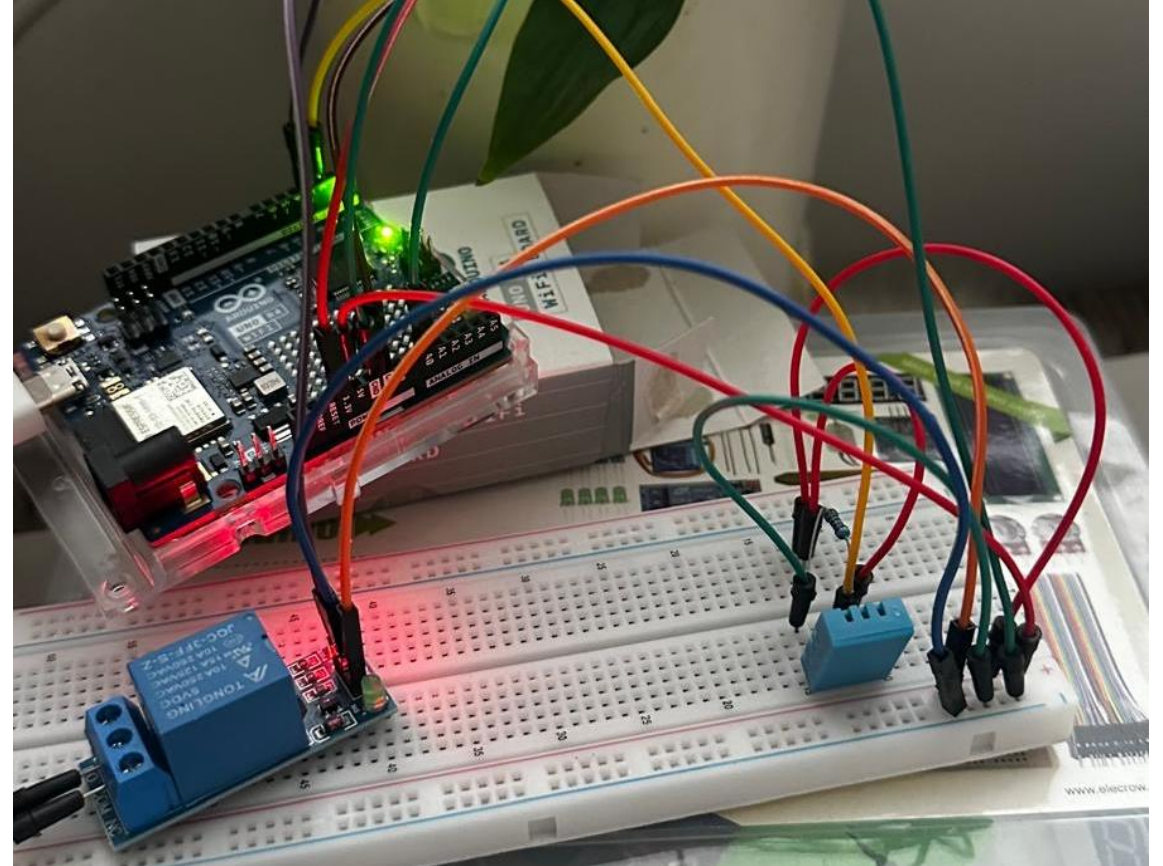
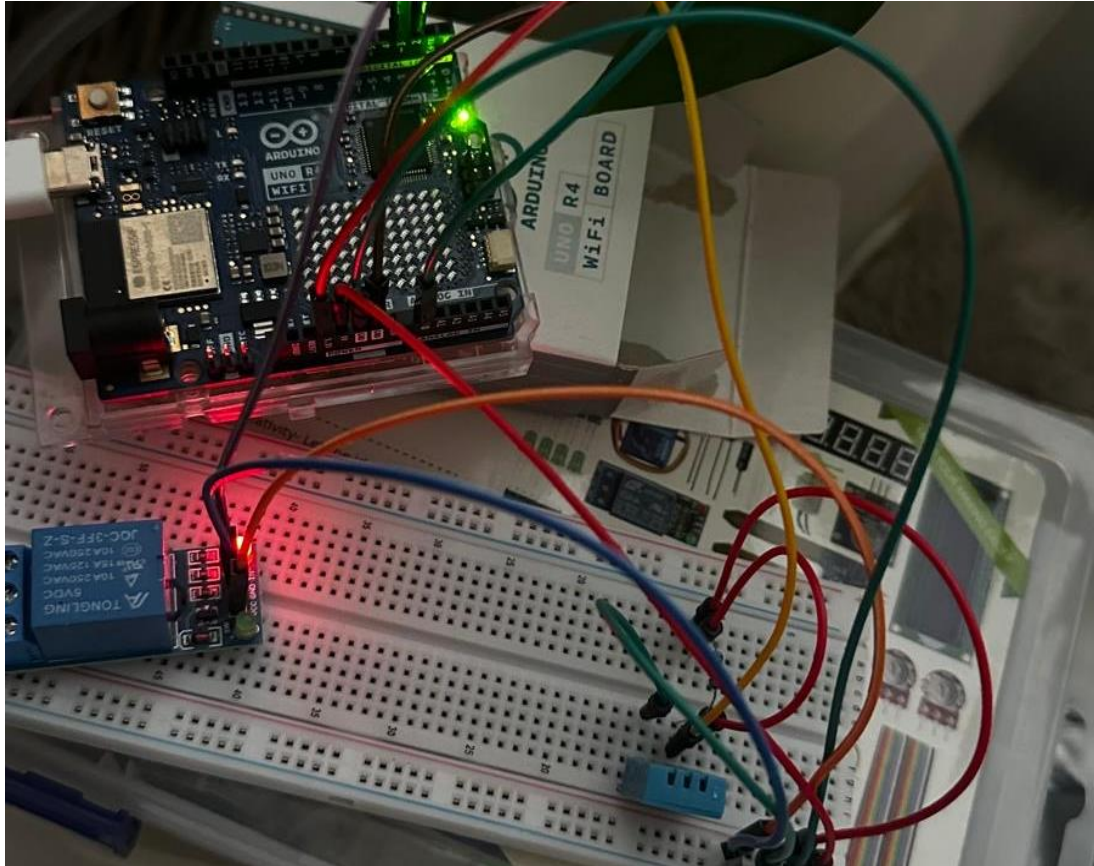
- Measures soil moisture, temperature and humidity.
- System will detect dry soil and triggers the relay that activates the pump to water the plant.
- Visualize moisture and temperature data in real-time using Grafana.



Videos



Photos



What Components did we use?

- **Soil Moisture sensor**

Measures soil moisture levels

- **DHT11 sensor**

Measures air humidity and temperature

- **Arduino Uno R4 WiFi**

Logs the and sends analogs sensor data to MQTT

- **Water Pump and plastic PVC hose**

Activated when soil is dry

- **Relay module, breadboard and jumper wires**



What Software and Cloud tools did we use?

- **Grafana**

Data visualization

- **Mosquitto**

MQTT Broker

- **InfluxDB**

Time-series database

- **Ubuntu VM on CSC cPouta**

- **Telegraf**

Data collector

- **Nginx**

Secure access to (HTTPS)

- **Docker**

Containerized environment



How the system works ?

Software Architecture

- **Arduino Uno** reads sensor data
- **Sends data via MQTT** to the cloud using **Mosquitto**
- **Telegraf** collects the data from MQTT and brings it to InfluxDB
- **InfluxDB** stores it as a time-series data
- **Grafana** shows real-time graphs
- **Nginx** secures access to Grafana with HTTPS

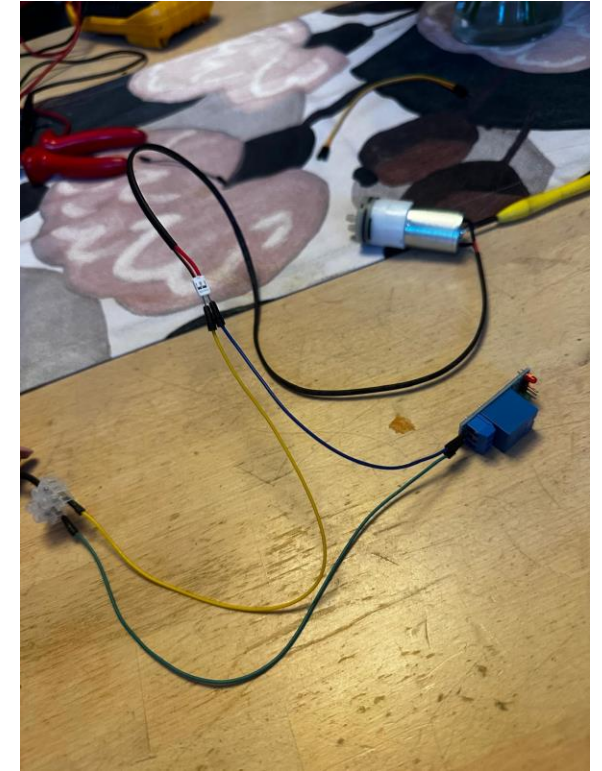
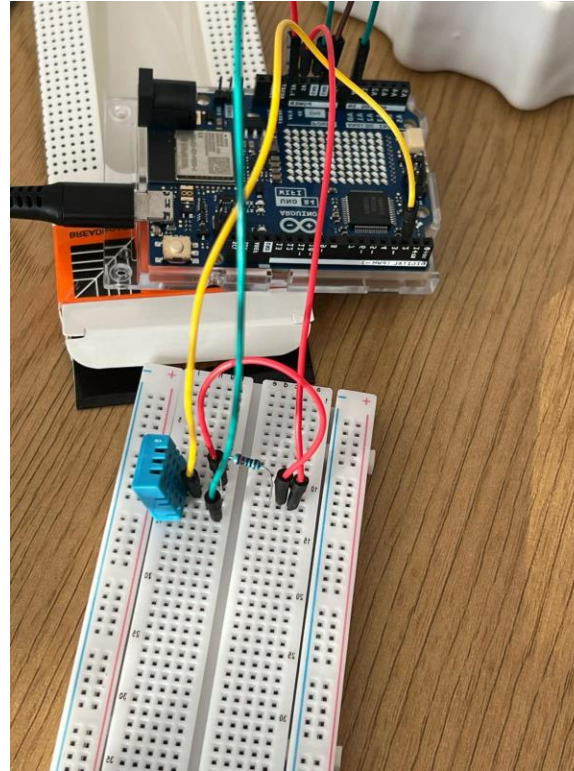
Cloud setup

- All these services run in a virtual machine on CSC's cPouta cloud
- **Flavor:** standars.large
- **OS Image:** Ubuntu 24.04 LTS
- **VCPUs:** 4
- **RAM:** 7.8 GB
- **Disk size:** 80GB
- The services are run in Docker containers (**InfluxDB**, **Telegraf**, **Mosquitto** and **Grafana**)

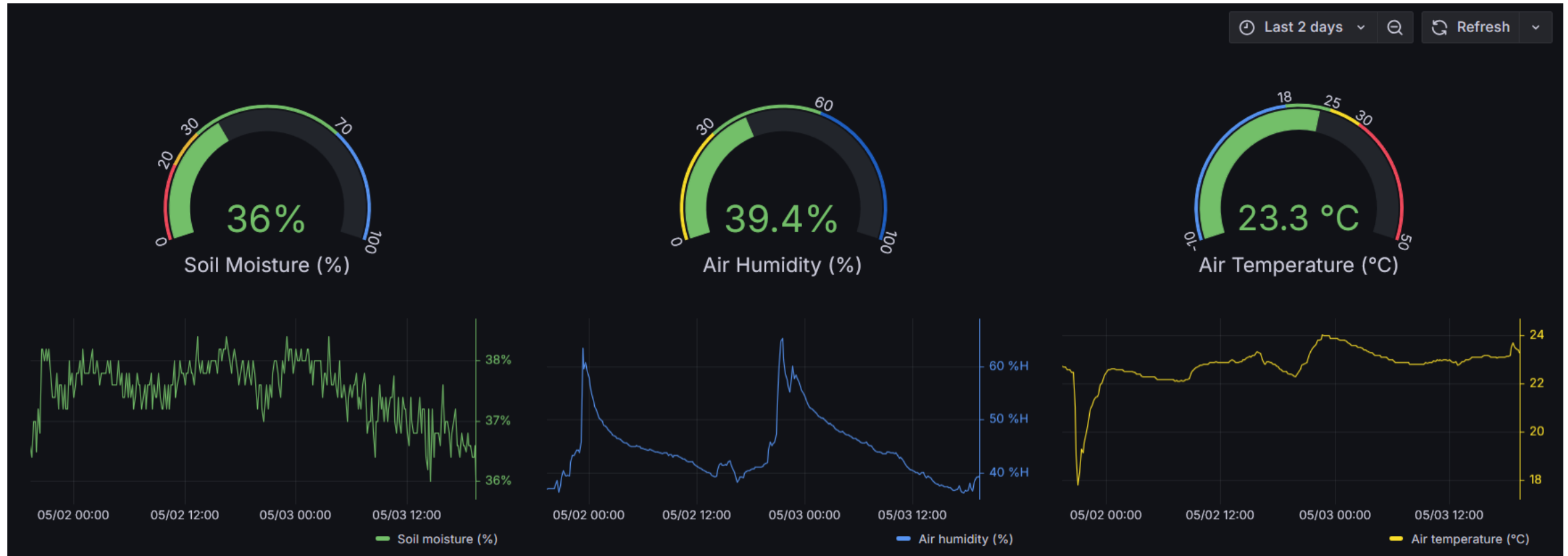
Project phases

We divided our work into different phases:

1. Ordering the components
2. Building the physical IoT part
3. VM configuration
4. Graphical Interface
5. Finalizing the project



Real-time monitoring with Grafana



Statistics

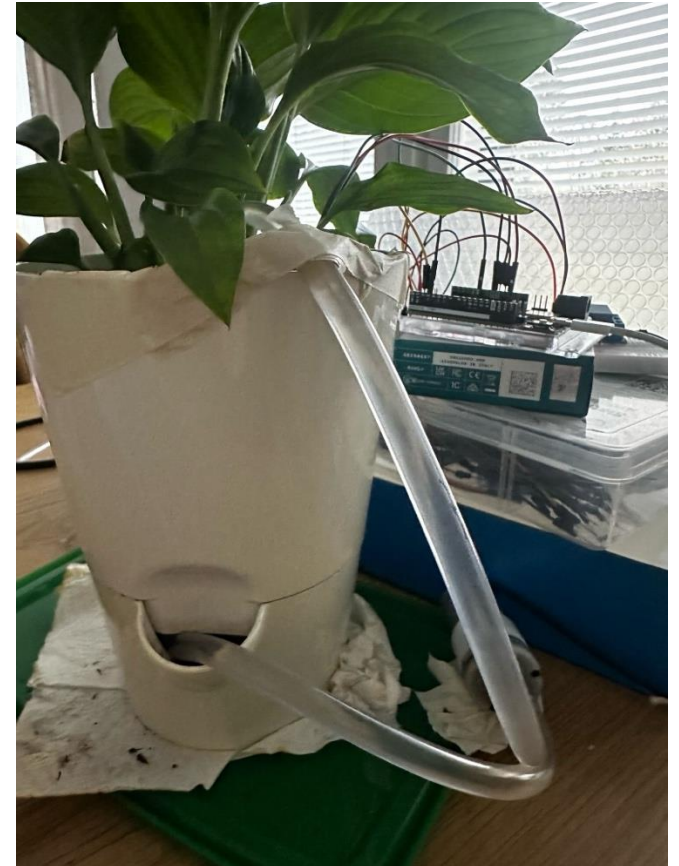


Pump activation

Timestamp
2025-04-24 08:01:54
2025-04-24 06:21:16
2025-04-24 04:40:39
2025-04-24 03:00:01
2025-04-24 01:19:23
2025-04-23 23:38:46

GitHub Repository

- <https://github.com/redbulls77/plantproject>
- [JES - Monitoring – Grafana -snapshot](#)



The END!

- Thank you!
- Any questions? 😊

Image sources:

[Grafana](#)

[Arduino](#)

[Question mark](#)

