UNIVERSITÀ
DI PARMA

Dipartimento di Ingegneria e Architettura

Corso di Laurea Magistrale Ingegneria Informatica - Internet of Things

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Smart Wellness Village Project

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The final project for the Internet of Things course involves creating a system to manage and monitor a smart wellness village using the CoAP protocol and the Californium framework. The project focuses on simulating the generation, transmission, and management of IoT data for the wellness village.

Expected Goal

The primary goal is to develop a CoAP-based system that models various elements of the smart wellness village, including:

- Three swimming pools with sensors for temperature and chlorine concentration.
  - Olympic Pool
  - Relaxing Lagoon Pool
  - Children's Pool
- Actuators like heating pumps and chlorine mixers.
- Smart entrance and exit turnstiles to monitor visitor traffic.
- A manager system to oversee the wellness village's operation and ensure optimal conditions.

The project aims to implement these components as CoAP servers and clients to simulate their interaction and data exchange, ensuring the effective management of the smart wellness village.

1 Setup Environment

- To manage project you need JavaIDE (use eclipse with an update version of javaSE)
- The project includes:
  - JSON.jar to manage JSON message
  - Californium-core Framework
  - Project Packages
  - JRE System Library
  - Documentation JAVADOC
- Servers and resources use different ports to communicate, if they are busy update the ports

2 Run Application

For a good visualization of the system, the following arrangement of the consoles is advisable:

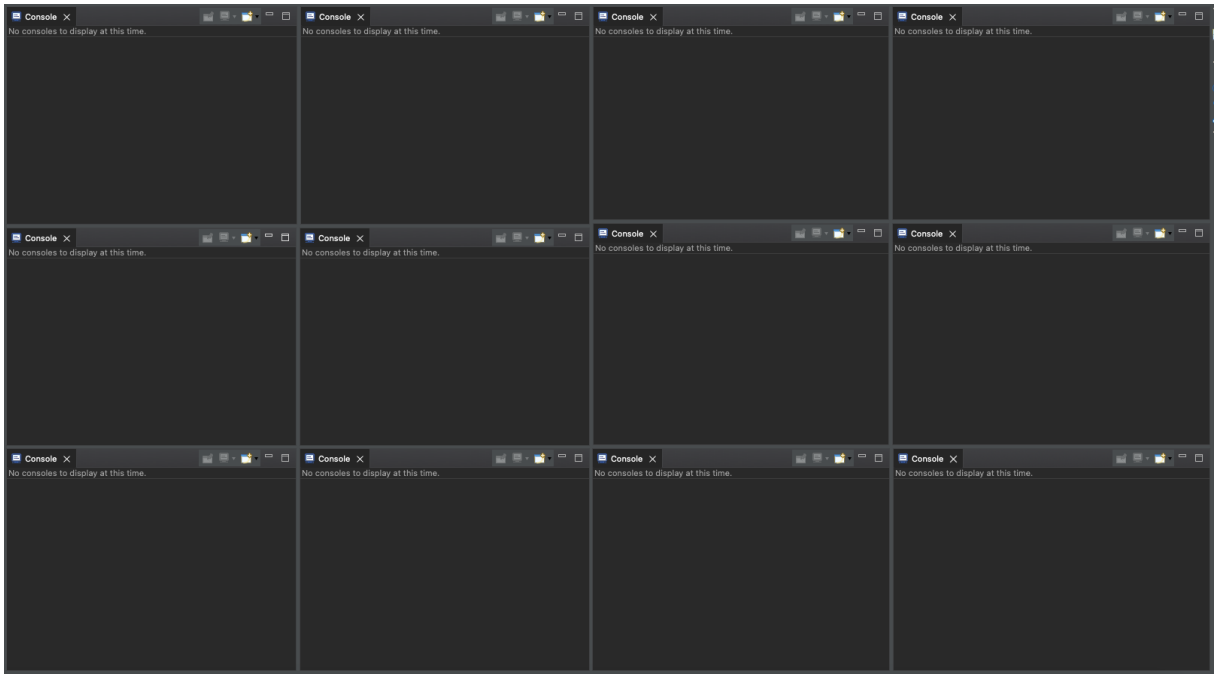

Figura 1: Console Layout

With this layout it is possible to divide the views of the swimming pools with the related sensors and actuators and the other views linked to the turnstiles, managers and holidaymakers

So you need to run the following .java files and view them in the relevant consoles:

- Servers
  - Pool1Server
  - Pool2Server
  - Pool3Server
  - TurnstileServer
- Clients
  - ChlorineMixer1
  - ChlorineMixer2
  - ChlorineMixer3
  - HeatingPump1
  - HeatingPump2
  - HeatingPump3
  - ManagerB
  - SmartVillageMember

I recommend the following division starting from the top left:

- First row: Pool1Server, Pool2Server, Pool3Server, TurnstileServer
- Second row: ChlorineMixer1, ChlorineMixer2, ChlorineMixer3, ManagerB
- Third row: HeatingPump1, HeatingPump2, HeatingPump3, SmartVillageMember

The end result will be:

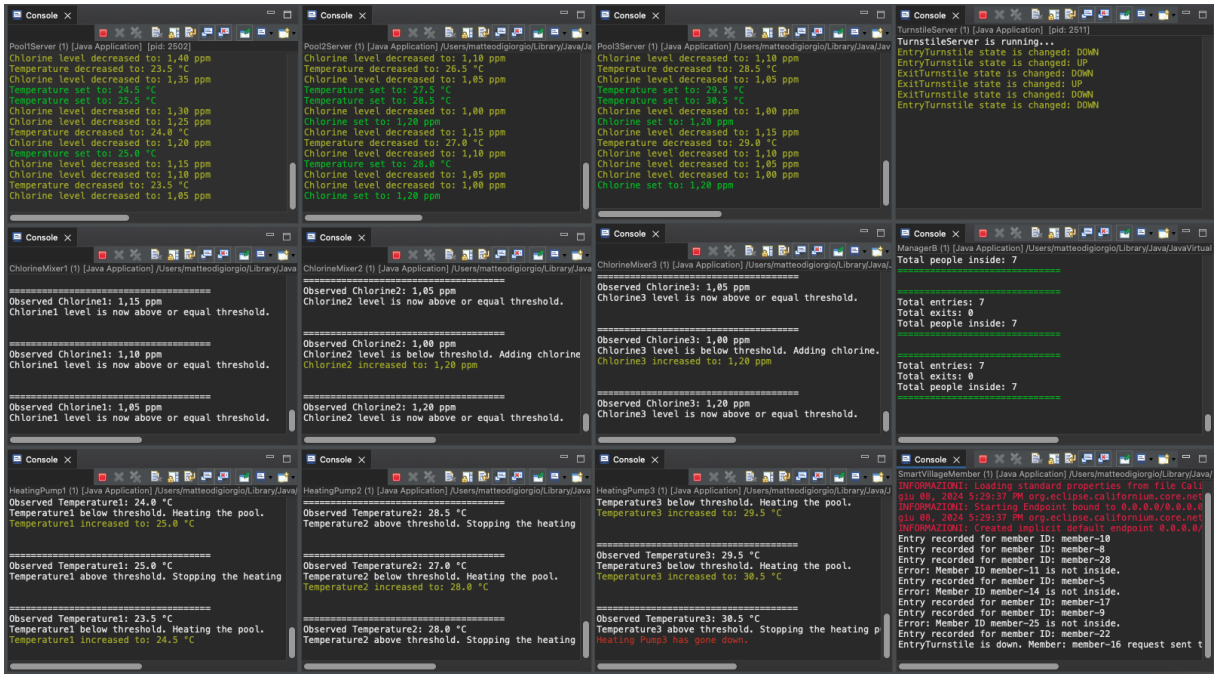

Figura 2: Console Layout Runs

I considered the following ranges for temperature and chlorine of the relevant swimming pools:

Pool Type	Ideal Temperature	Ideal Chlorine Level
Olympic Pool (Pool1)	25°C - 28°C	1.0 - 2.0 ppm
Relaxing Lagoon (Pool2)	28°C - 32°C	1.0 - 1.5 ppm
Children's Pool (Pool3)	30°C - 34°C	1.0 - 1.5 ppm

Figura 3: Pools Ranges

3 Documentation

- Javadoc documentation can be found in the folder: DiGiorgioMatteo353719/doc.
- To view the project documentation on the open browser: DiGiorgioMatteo353719/doc/index.html