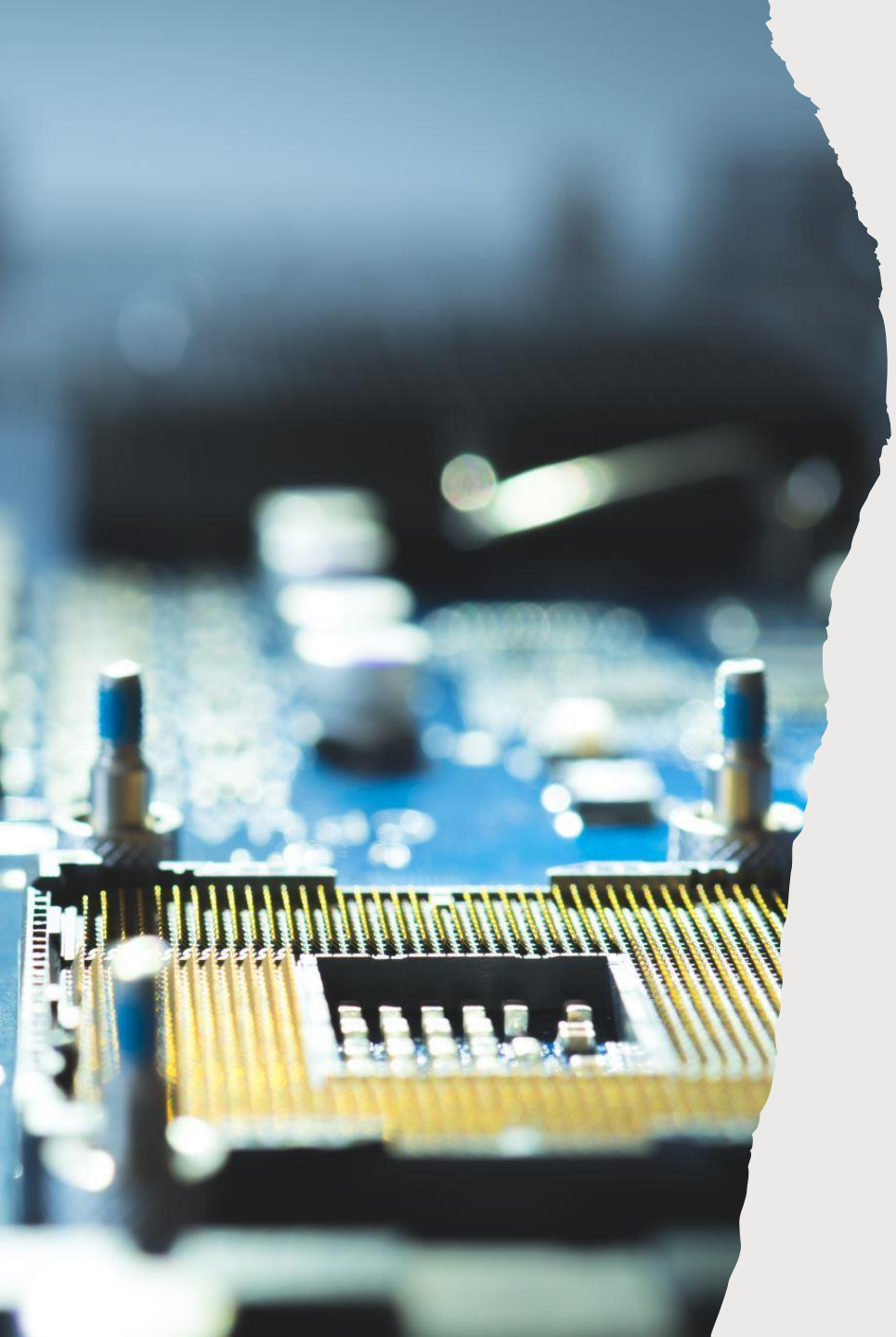
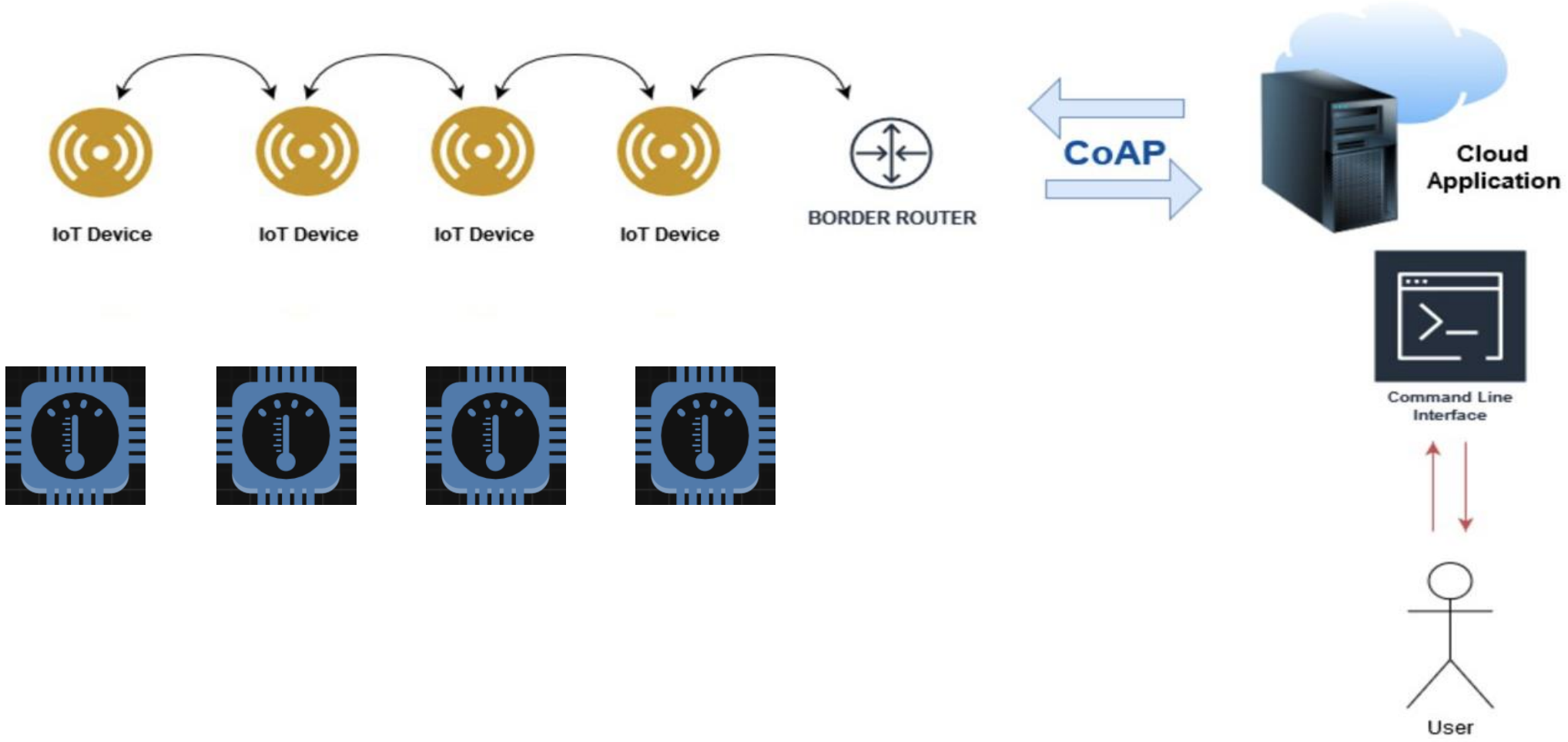
SMART TEMPSYNC SYSTEM

Farzaneh Moghani

IOT-2020



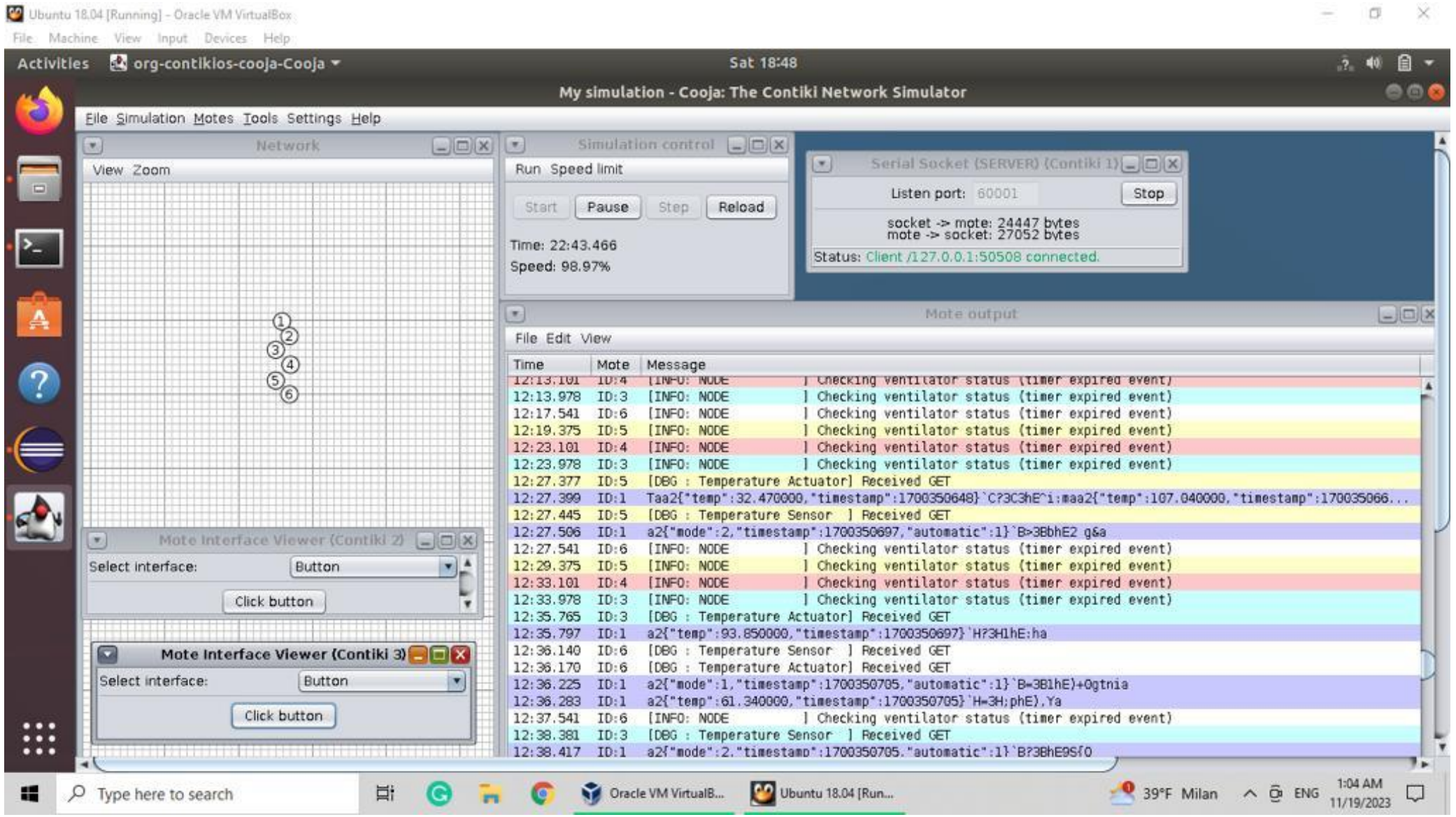
- This project creates a smart temperature control system. We place sensors and devices in the desired environment, and they connect to a cloud app. The app collects data and allows users to adjust the system settings and perform some functionalities.

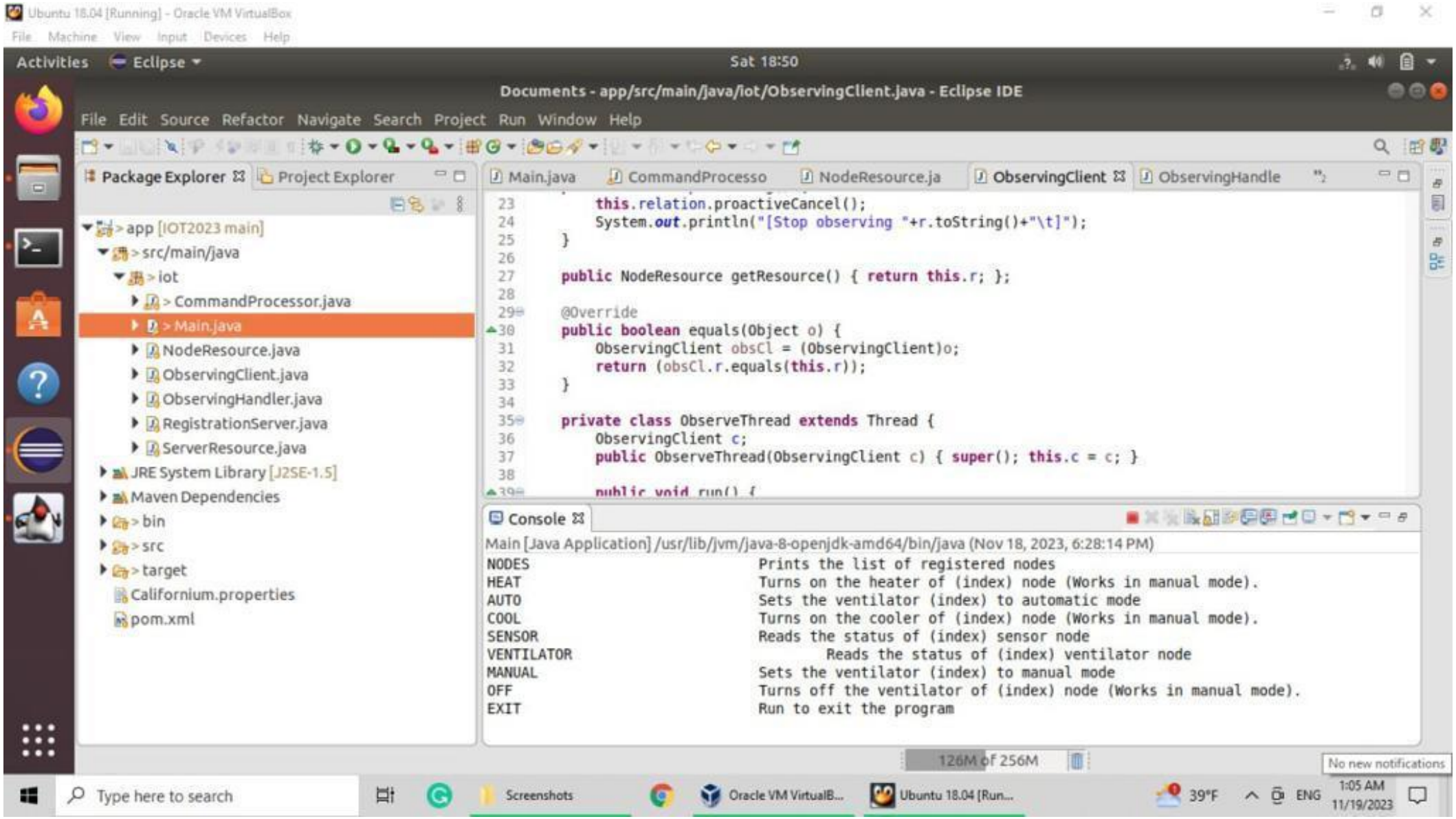

IoT Device
IoT Device
IoT Device
IoT Device
BORDER ROUTER
CoAP
Cloud Application
Command Line Interface
User

In my project, the temperature control system is equipped with two main modules: a heating module and a ventilator module. The temperature controller continuously measures the heat in its surroundings, and the goal is to keep the temperature within the range of 40 to 60 degrees Celsius. The heating and cooling systems are activated or deactivated based on these temperature measurements. Similar to the other project, the application allows manual control by the user or automatic control by the device itself.

Users have the flexibility to manually adjust the temperature settings through the application interface, or they can opt for an automatic mode where the system itself manages the heating and cooling processes. Each temperature control node is equipped with these functionalities, and all nodes are coordinated and managed through a central hub or border router, ensuring seamless control and maintenance of the desired temperature range.

- In automatic mode, each temperature control node autonomously activates or deactivates the heating or ventilator system based on the temperature measurements gathered by the sensor.
- Conversely, when the actuators are set to manual mode, the heating or cooling systems are initiated only upon a request from the cloud application.
- Each node is equipped with a mode-switching button, allowing users to toggle between automatic and manual modes.
- Additionally, users have the option to change modes through an interface command, providing flexibility in controlling the temperature management system.


Ubuntu 18.04 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
org-contikios-cooja-Cooja
Sat 18:48
My simulation - Cooja: The Contiki Network Simulator
File Simulation Motes Tools Settings Help
Network
View Zoom
Simulation control
Run Speed limit
Start Pause Step Reload
Time: 22:43.466
Speed: 98.97%
Serial Socket (SERVER) (Contiki 1)
Listen port: 60001
Stop
socket -> mote: 24447 bytes
mote -> socket: 27052 bytes
Status: Client /127.0.0.1:50508 connected.
Mote output
File Edit View
Time Mote Message
12:13.978 ID:3 [INFO: NODE] Checking ventilator status (timer expired event)
12:17.541 ID:6 [INFO: NODE] Checking ventilator status (timer expired event)
12:19.375 ID:5 [INFO: NODE] Checking ventilator status (timer expired event)
12:23.101 ID:4 [INFO: NODE] Checking ventilator status (timer expired event)
12:23.978 ID:3 [INFO: NODE] Checking ventilator status (timer expired event)
12:27.377 ID:5 [DBG : Temperature Actuator] Received GET
12:27.399 ID:1 Taa2{"temp":32.470000,"timestamp":1700350648}`C?3C3hE^i:maa2{"temp":107.040000,"timestamp":170035066...
12:27.445 ID:5 [DBG : Temperature Sensor] Received GET
12:27.506 ID:1 a2{"mode":2,"timestamp":1700350697,"automatic":1}`B>3BbhE2 g&a
12:27.541 ID:6 [INFO: NODE] Checking ventilator status (timer expired event)
12:29.375 ID:5 [INFO: NODE] Checking ventilator status (timer expired event)
12:33.101 ID:4 [INFO: NODE] Checking ventilator status (timer expired event)
12:33.978 ID:3 [INFO: NODE] Checking ventilator status (timer expired event)
12:35.765 ID:3 [DBG : Temperature Actuator] Received GET
12:35.797 ID:1 a2{"temp":93.850000,"timestamp":1700350697}`H?3H1hE:ha
12:36.140 ID:6 [DBG : Temperature Sensor] Received GET
12:36.170 ID:6 [DBG : Temperature Actuator] Received GET
12:36.225 ID:1 a2{"mode":1,"timestamp":1700350705,"automatic":1}`B=3B1hE}+Ogtnia
12:36.283 ID:1 a2{"temp":61.340000,"timestamp":1700350705}`H=3H;phE},Ya
12:37.541 ID:6 [INFO: NODE] Checking ventilator status (timer expired event)
12:38.381 ID:3 [DBG : Temperature Sensor] Received GET
12:38.417 ID:1 a2{"mode":2,"timestamp":1700350705,"automatic":1}`B?3BhE9Sf0
Mote Interface Viewer (Contiki 2)
Select interface: Button
Click button
Mote Interface Viewer (Contiki 3)
Select interface: Button
Click button
Type here to search
Oracle VM VirtualB...
Ubuntu 18.04 [Run...
39°F Milan
ENG
1:04 AM
11/19/2023


Ubuntu 18.04 [Running] - Oracle VM VirtualBox
File Machine View Input Devices Help
Activities
Eclipse
Sat 18:50
Documents - app/src/main/java/iot/ObservingClient.java - Eclipse IDE
File Edit Source Refactor Navigate Search Project Run Window Help
Package Explorer
Project Explorer
app [IOT2023 main]
src/main/java
iot
CommandProcessor.java
Main.java
NodeResource.java
ObservingClient.java
ObservingHandler.java
RegistrationServer.java
ServerResource.java
JRE System Library [J2SE-1.5]
Maven Dependencies
bin
src
target
Californium.properties
pom.xml
Main.java
CommandProcesso
NodeResource.ja
ObservingClient
ObservingHandle
this.relation.proactiveCancel();
System.out.println("[Stop observing "+r.toString()+"\t]");
}
public NodeResource getResource() { return this.r; };
@Override
public boolean equals(Object o) {
ObservingClient obsCl = (ObservingClient)o;
return (obsCl.r.equals(this.r));
}
private class ObserveThread extends Thread {
ObservingClient c;
public ObserveThread(ObservingClient c) { super(); this.c = c; }
public void run() {
Console
Main [Java Application] /usr/lib/jvm/java-8-openjdk-amd64/bin/java (Nov 18, 2023, 6:28:14 PM)
NODES Prints the list of registered nodes
HEAT Turns on the heater of (index) node (Works in manual mode).
AUTO Sets the ventilator (index) to automatic mode
COOL Turns on the cooler of (index) node (Works in manual mode).
SENSOR Reads the status of (index) sensor node
VENTILATOR Reads the status of (index) ventilator node
MANUAL Sets the ventilator (index) to manual mode
OFF Turns off the ventilator of (index) node (Works in manual mode).
EXIT Run to exit the program
126M of 256M
No new notifications
Type here to search
Screenshots
Oracle VM VirtualB...
Ubuntu 18.04 [Run...
39°F
ENG
1:05 AM
11/19/2023

- Mode 0 , when the temperature is within the favourite range.
- Mode 1 , when the temperature is below the threshold and Heater is on.
- Mode 2, when the temperature is above the threshold and Cooler is on.

NODE number	Ventilator #	Sensor #
5	1	2
3	3	4
6	5	6
2	7	8
4	9	10