

Assignment-03: Smart-Garden

Embedded Systems & Internet-Of-Things

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1 Introduction

The project consist of an embedded system simulating a Smart Garden. The system is composed of 5 submodules:

- **garden-service:** The main application, implemented in Java, functioning as the main control unit, governing the management of the garden.
- **garden-dashboard:** A PC app based, implemented in Java, that interacts with the garden-service get the data and print it.
- **garden-sensorboard:** An embedded system, implemented using an ESP32, that monitors the luminosity and the temperature of the garden.
- **garden-controller:** An embedded system, implemented using Arduino UNO, that controls the lighting and the irrigation of the garden.
- **garden-app:** A mobile app, implemented in Java, running on an emulated Android smartphone, that makes it possible to manually control the irrigation system and lighting of the garden.

2 Schemas

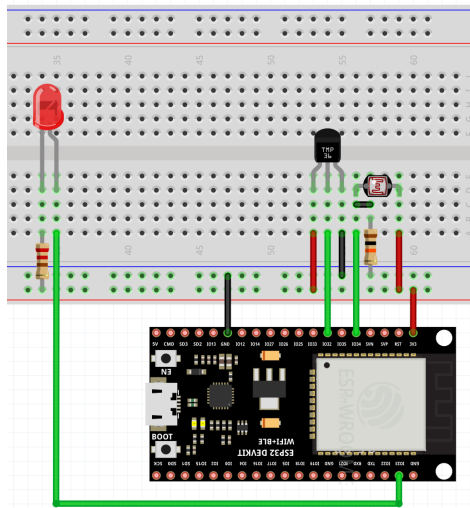


Figure 1: garden-sensorboard schema

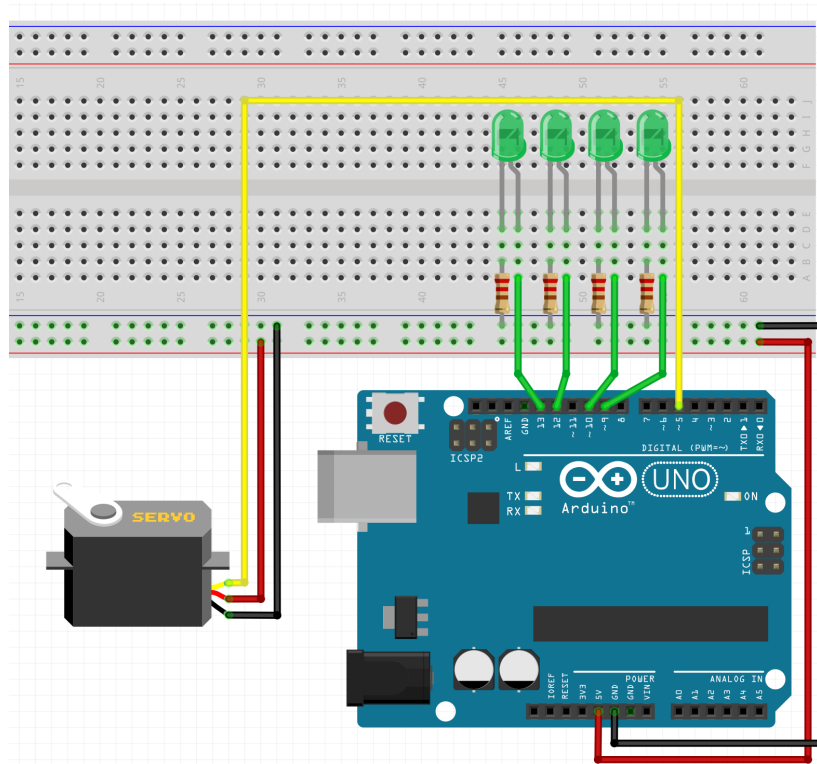


Figure 2: garden-controller schema

3 Final State Machine Diagram

The general diagram of the entire system is shown below.

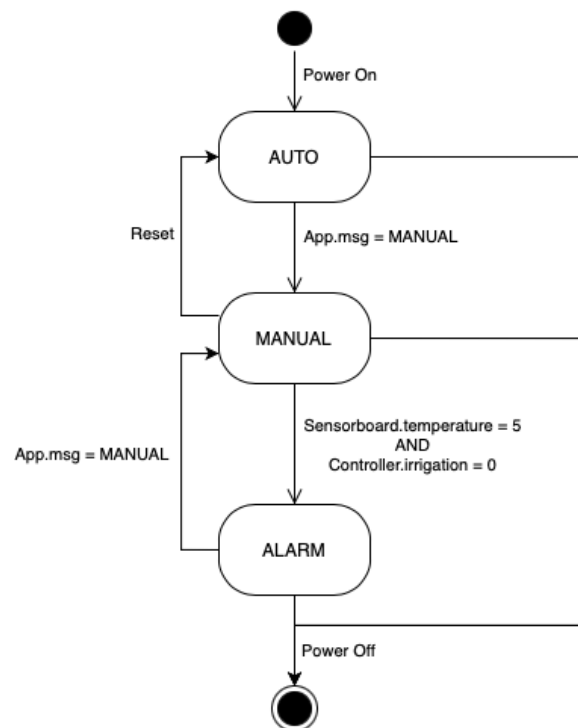


Figure 3: Smart Garden FSM diagram

Below the FSM diagram of the system while in AUTO mode. In order not to overly complicate the scheme, the part where the brightness reading continues to be carried out even during irrigation has been omitted, so the lighting is still updated while the irrigation is running or sleeping.

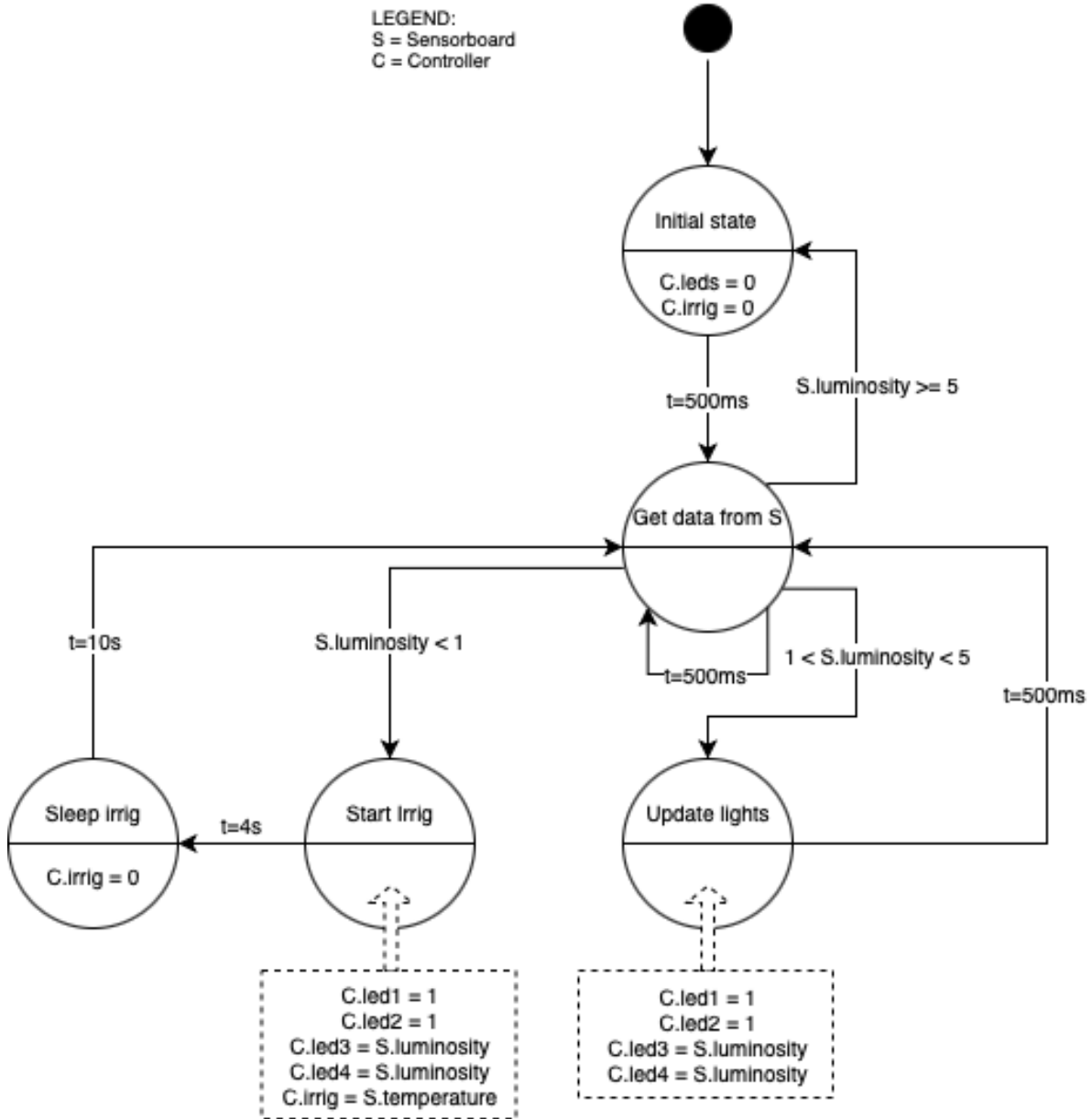


Figure 4: Smart Garden FSM diagram in AUTO mode

The system goes in MANUAL mode when a human operator through the Android app requires the MANUAL mode. Then he can manually turn on/off the leds and the irrigation.

If the temperature detected by the sensorboard reach the value of 5, the system goes in ALARM mode. Then the human operator has to fix it through the Android app. After that the system goes back to MANUAL mode.

To pass from MANUAL to AUTO mode simply restart the system.

4 GUI

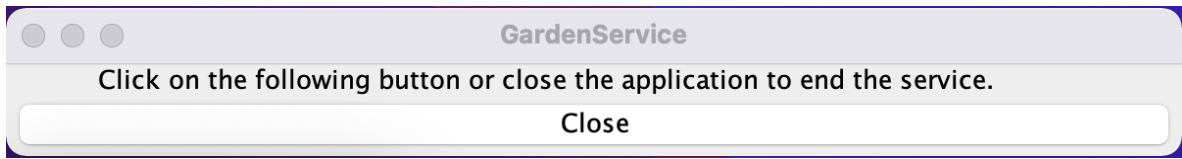


Figure 5: garden-service GUI



Figure 6: garden-dashboard GUI

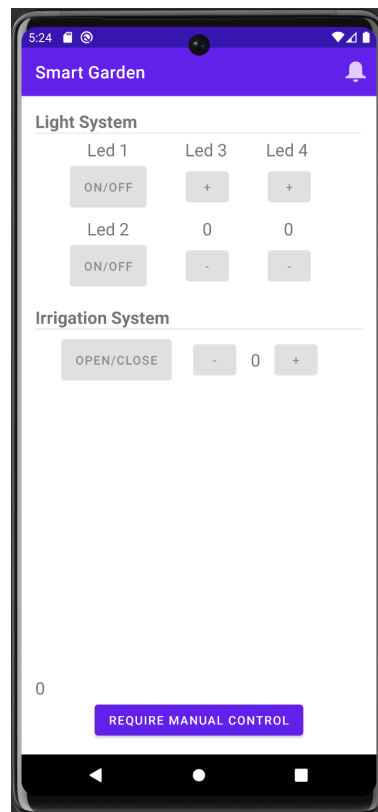


Figure 7: garden-app GUI

After the MANUAL mode is required, all the control buttons in the app are enabled.