

# Smart Aquarium Controller

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# Abstract

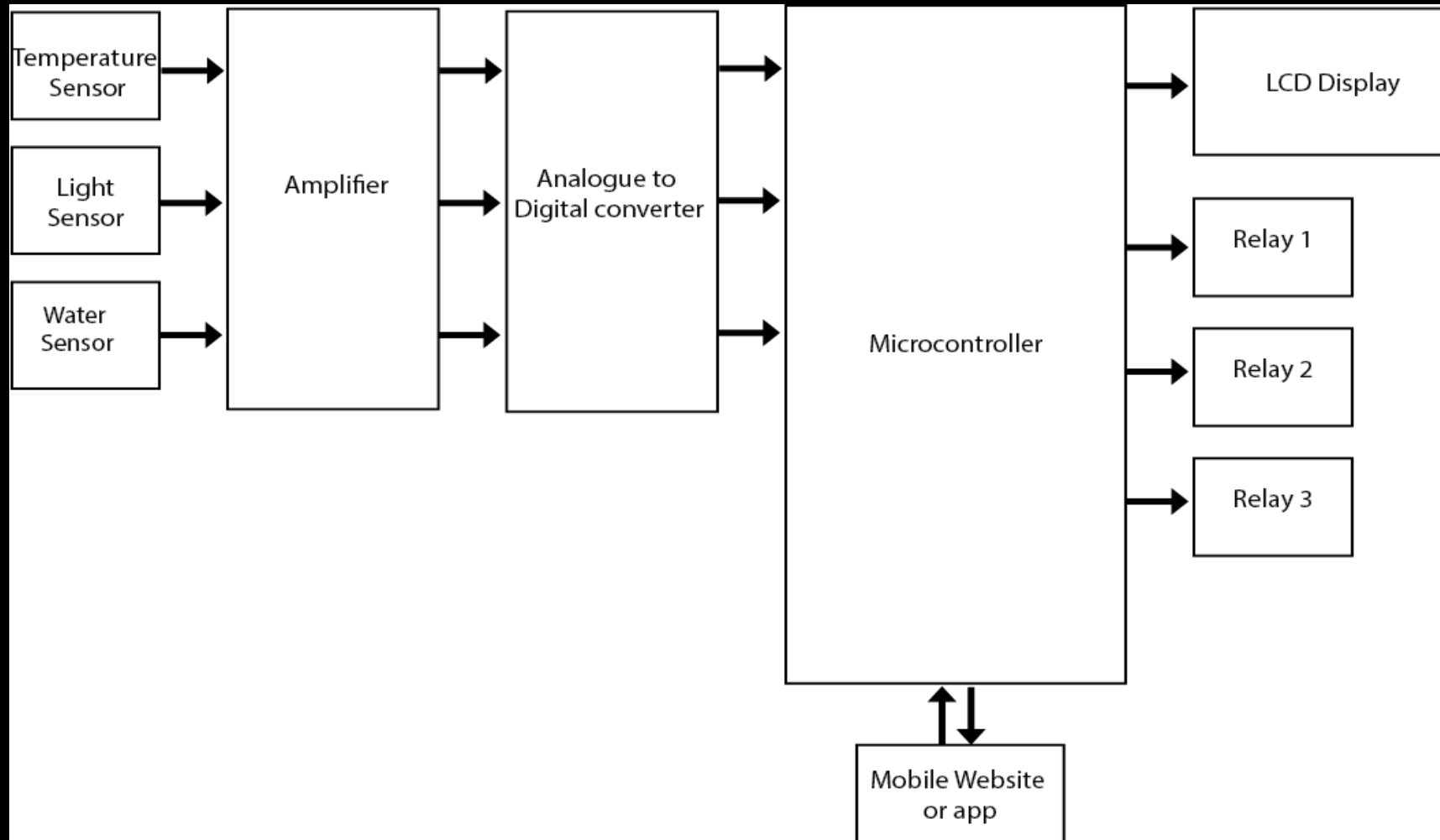
The goal of this project is to make aquarium monitoring and maintenance easier. Using the Arduino UNO, tasks like light , temperature and water level monitoring can be automated. This project has 3 main functionalities: temperature monitoring, water level monitoring, and light control. There is a remote-control aspect over Wi-Fi, where the Wi-Fi module acts as a server and it communicates with the Arduino over serial and computer device over a local Wi-Fi network. You can control and monitor the Arduino via the customized webpage. The interface will allow you to control light and monitor real-time water temperature and level. The temperature reading and water level percentage is displayed on the LCD screen.

# Existing work(literature survey)

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The existing work of an IOT based system which monitors and controls the whole aquarium automatically and provides real time status on the user's Smartphone application. It contains water quality management in which it will monitor the physical changes in the water and will maintain it to the ideal conditions, with required changes. The aquarium will perform all the steps automatically like temperature control, turbidity level control, light monitor, feeding, water renewal etc. The sensor node, we will use the Arduino Nano board and SX1278 LoRa-02 Transceiver module. Then we will interface multiple sensors like capacitive soil moisture sensor v1.2 to measure the quantity of water present in the soil. DS18B20 waterproof temperature sensor to measure the temperature of the soil.

# Block Diagram



# Hardware components Required

- Arduino UNO 3
- Wi-Fi module ESP 8266-01
- DS18B20 digital temperature sensor
- 16x2 LCD
- Relay – 5V 2-Channel Relay
- Aquarium Lights
- Wires, Resistors, etc.
- Water Level Sensor
- 3.3V Voltage Regulator
- IC
- Light Sensor



# Hardware components Required

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**Arduino UNO:** This is the central microcontroller that coordinates all the operations of the system.

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**Wi-Fi Module (ESP8266-01):** The Wi-Fi module connects the aquarium system to a local Wi-Fi network, allowing remote control and monitoring of the system via an Android app or a Website.

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**DS18B20 Digital Temperature Sensor:** This sensor measures the water temperature of the aquarium.

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**16x2 LCD Display:** The LCD display provides visual feedback and information about the aquarium's status.

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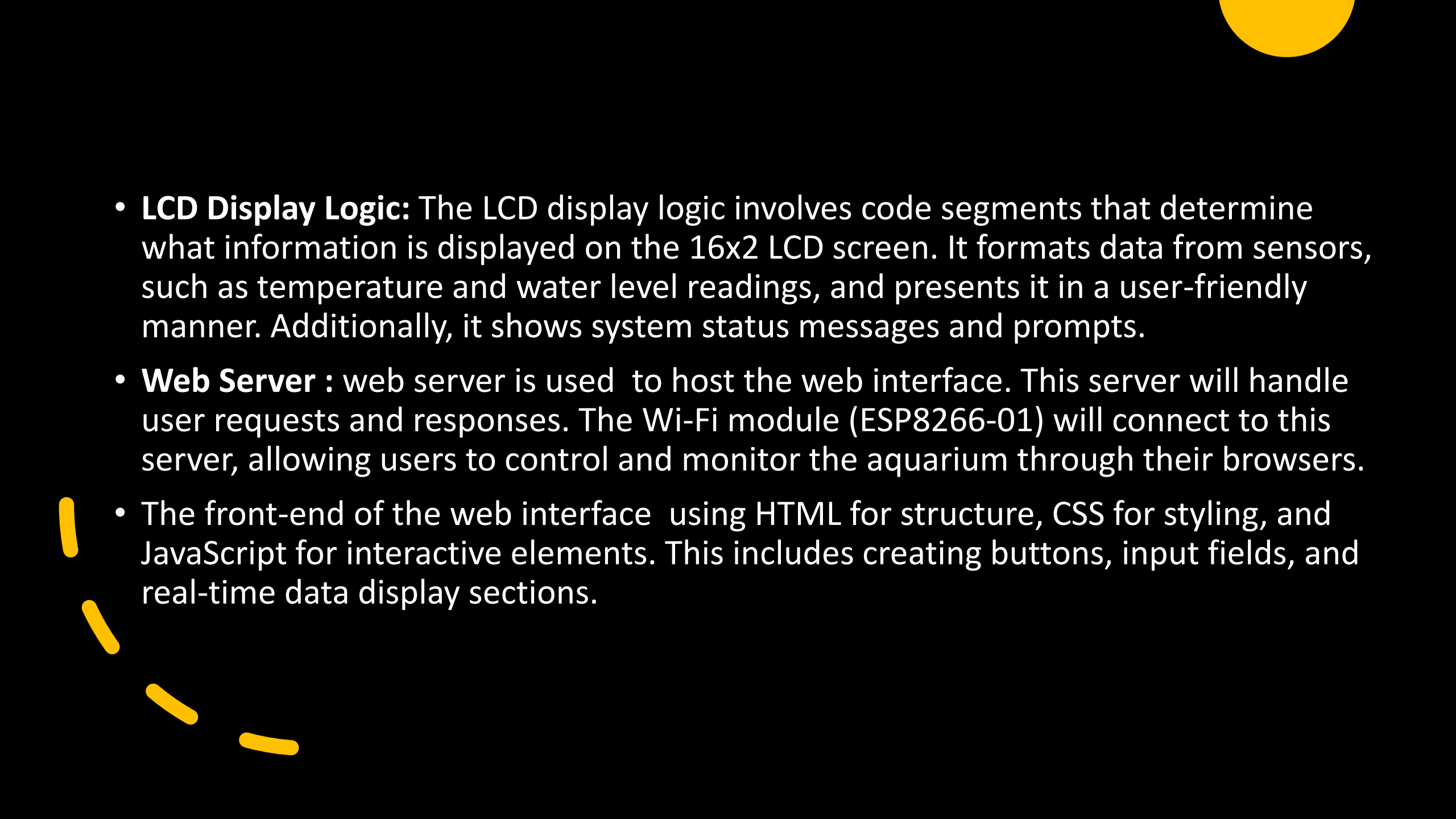
**Relay Module:** This module controls the aquarium lights and other electrical devices.

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**Water Level Sensor:** The water level sensor monitors the water level in the aquarium

# SOFTWARE TOOLS REQUIRED

- **Arduino Code:** The Arduino code is the backbone of the project, responsible for controlling and coordinating the various hardware components. It handles tasks such as reading data from sensors (temperature sensor, water level sensor), controlling actuators (relay for lighting), and interfacing with the Wi-Fi module. The code also manages the user interface on the LCD display, displaying real-time information and status updates

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- **LCD Display Logic:** The LCD display logic involves code segments that determine what information is displayed on the 16x2 LCD screen. It formats data from sensors, such as temperature and water level readings, and presents it in a user-friendly manner. Additionally, it shows system status messages and prompts.
  - **Web Server :** web server is used to host the web interface. This server will handle user requests and responses. The Wi-Fi module (ESP8266-01) will connect to this server, allowing users to control and monitor the aquarium through their browsers.
  - The front-end of the web interface using HTML for structure, CSS for styling, and JavaScript for interactive elements. This includes creating buttons, input fields, and real-time data display sections.