

HYDROPONICS PROJECT

- **Hardware:**

1. Arduino board (Arduino Mega 2650)
2. Sensors (e.g., pH sensor, temperature sensor, humidity sensor)
3. Actuators (e.g., water pumps, solenoid valves, grow lights)
4. Relays or motor drivers to interface with high-power devices.
5. WiFi module (ESP8266)
6. Containers, trays and pipes for hydroponic plant growth.
7. Water reservoir or tank for nutrient solution storage.
8. Power supply and necessary cables.
9. Lcd display to display the pH, temperature and humidity.

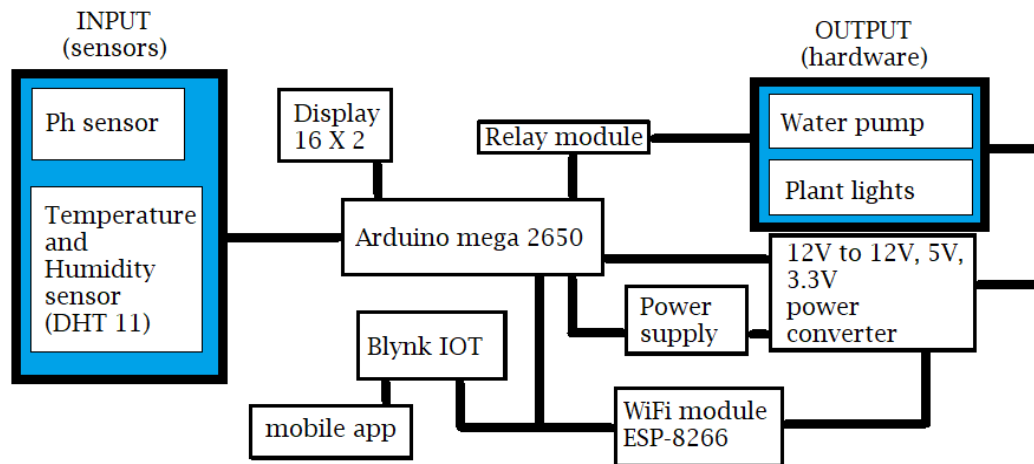
- **Software:**

1. Arduino IDE (Integrated Development Environment) - used to write and upload code to the Arduino board.
2. Arduino libraries (e.g., Adafruit LiquidCrystal, Adafruit unified sensor, DHT sensor library, Blynk) - provide pre-written code for interacting with sensors, actuators, and other peripherals
3. Programming language- Arduino programming language (based on C/C++)
4. Blynk IOT- app to control the hydroponics modular system.

- **Tools:**

1. Computer or laptop with a USB port to connect the Arduino board.
2. USB cable for connecting the Arduino board and ESP8266 to the computer.
3. Breadboard or prototyping board for circuit prototyping.
4. Jumper wires for connecting components and breadboard.
5. Soldering iron and solder (if necessary for permanent connections)
6. Multimeter for testing and debugging circuits.
7. Screwdriver and pliers for assembly and wiring.

Block diagram & Description



The block diagram of an Arduino-controlled smart hydroponic modular system typically consists of several components interconnected to create an automated and controlled environment for plant growth. Here's a description of the major blocks:

Arduino Board: The central control unit that receives data from sensors and controls the actuators based on programmed logic.

- 1. Sensors:** Various sensors such as pH, temperature and humidity are used to monitor environmental conditions and nutrient levels in the hydroponic system.
- 2. Actuators:** Actuators like water pumps and grow lights are controlled by the Arduino to provide appropriate conditions for plant growth.
- 3. Power Supply:** Provides the necessary power to run the entire system, including the Arduino board and actuators.
- 4. Communication:** WiFi module ESP-8266 module enables remote monitoring and control of the system through internet connectivity.
- 5. User Interface:** A mobile app using Blynk-IOT and a display module is added to allow users to interact with and monitor the system.



Images of the hydroponics modular system and HP Plant Buddy, an app created to control the system.

