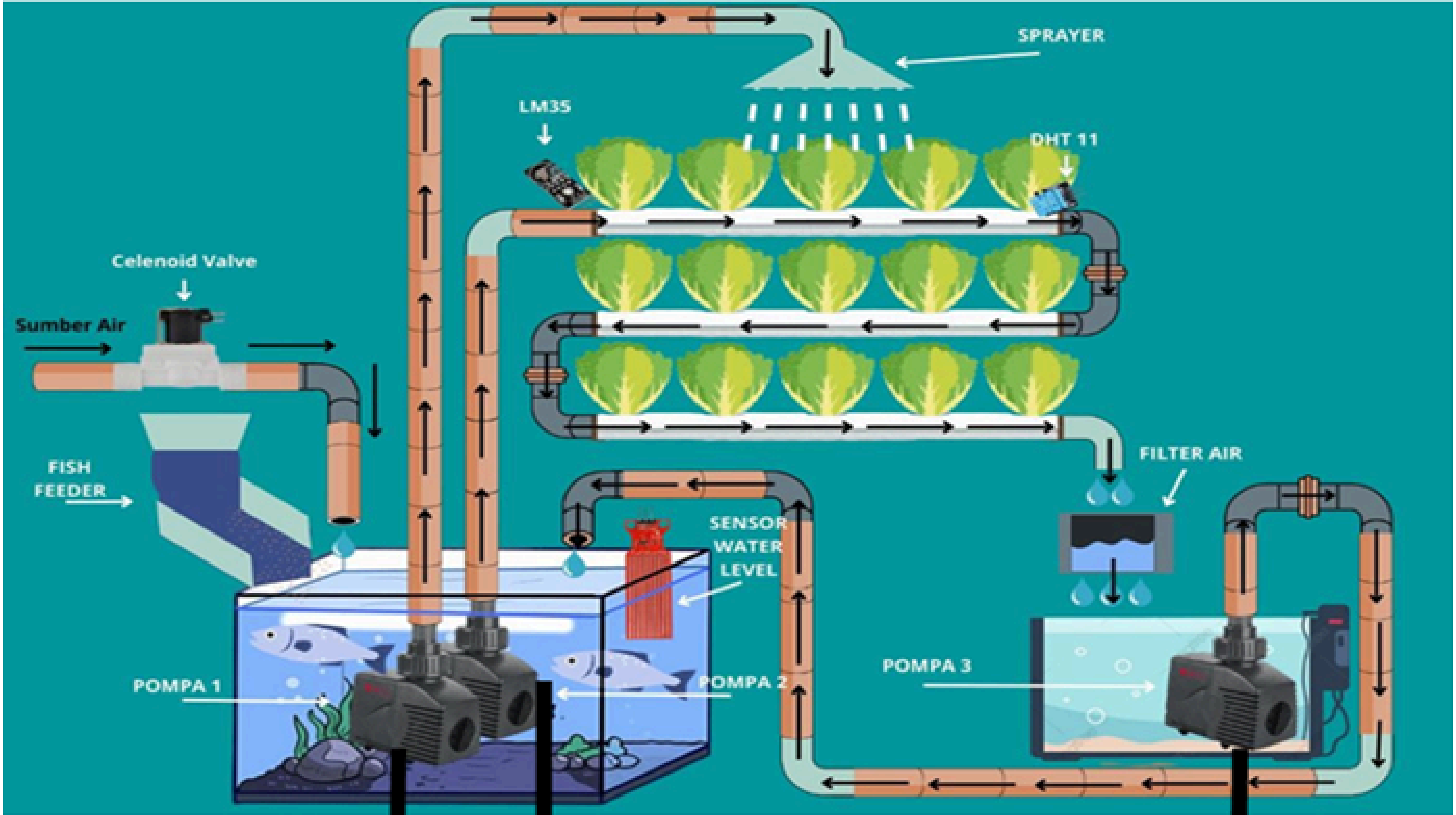
SmartFarming - Penerapan Media Akuaponik dan Hidroponik Berbasis IoT

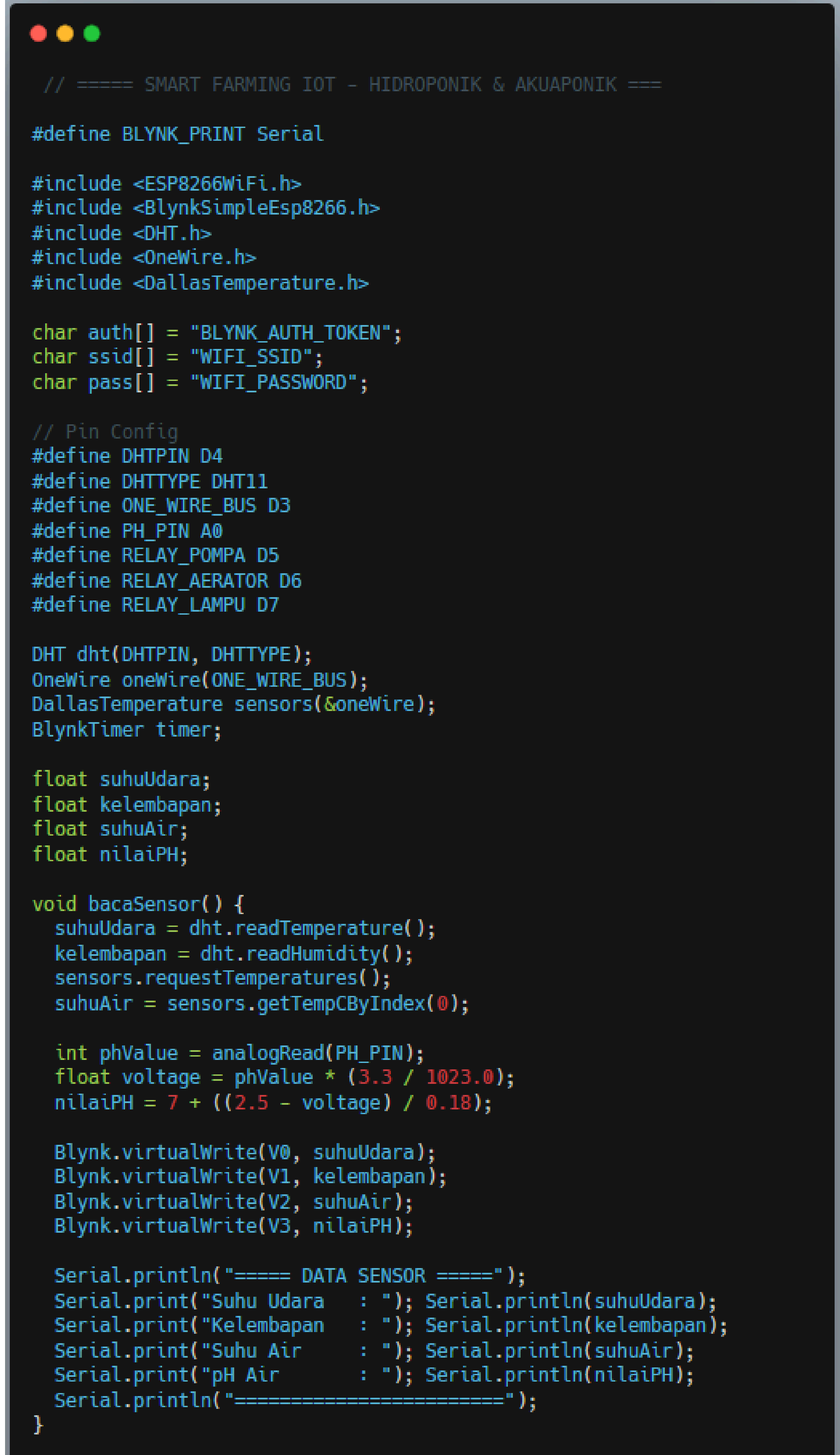


Komponen Hardware & Software

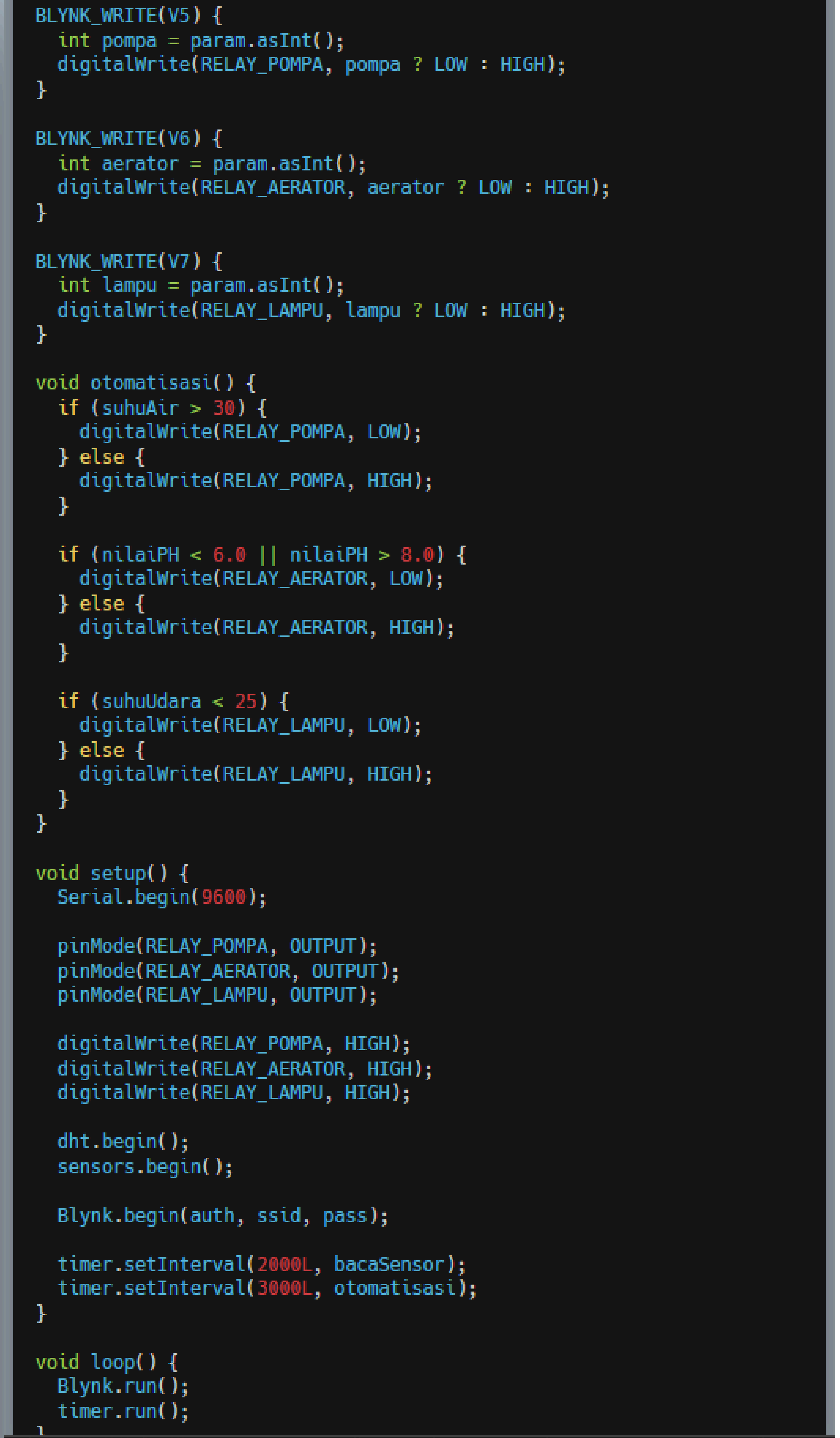
1. ESP8266 (NodeMCU) - Mikrokontroler
2. Sensor DHT11/DHT22 - Sensor Suhu
3. Sensor DS18B20 - suhu air
4. Sensor Ph
5. Relay
6. Pompa air hidroponik
7. Aerator akuaponik
8. Lampu grow light
9. Monitoring via Blynk IoT Cloud
10. Kontrol manual dari HP
11. Otomatisasi berbasis sensor

Proyek Smart Farming berbasis IoT ini merupakan sistem pertanian cerdas yang mengintegrasikan teknologi Internet of Things (IoT) dengan metode hidroponik dan akuaponik untuk menciptakan sistem pertanian modern yang efisien, otomatis, dan terkontrol secara digital.

Proyek ini berfungsi sebagai solusi penyediaan pangan bergizi berkelanjutan dalam rangka peningkatan status gizi masyarakat dan pencegahan stunting, khususnya pada ibu hamil, bayi, dan anak usia dini.



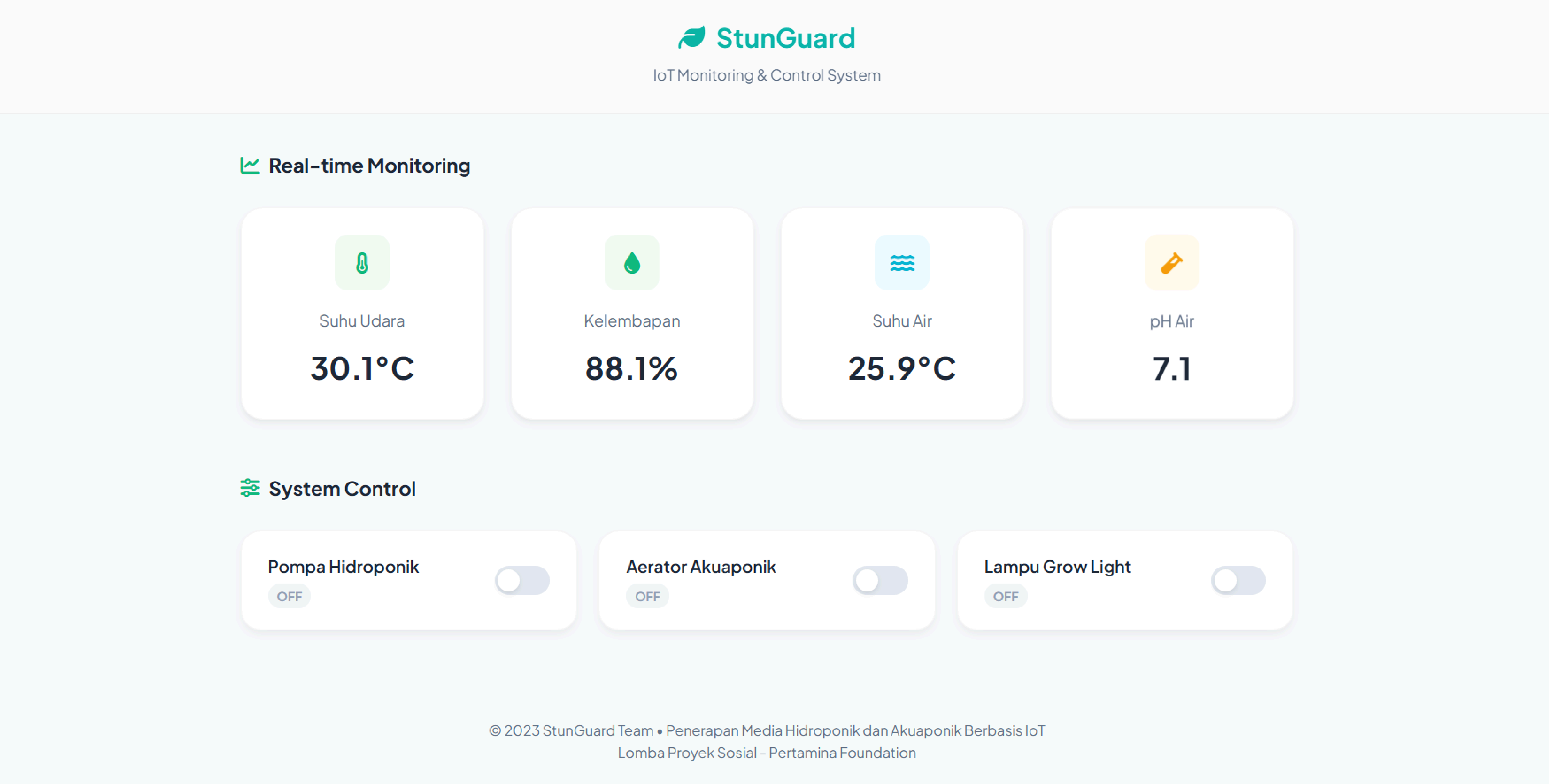
```
 // ===== SMART FARMING IOT - HIDROPONIK & AKUAPONIK ===

#define BLYNK_PRINT Serial

#include <ESP8266WiFi.h>
#include <BlynkSimpleEsp8266.h>
#include <DHT.h>
#include <OneWire.h>
#include <DallasTemperature.h>

char auth[] = "BLYNK_AUTH_TOKEN";
char ssid[] = "WIFI_SSID";
char pass[] = "WIFI_PASSWORD";

// Pin Config
#define DHTPIN D4
#define DHTTYPE DHT11
#define ONE_WIRE_BUS D3
#define PH_PIN A0
#define RELAY_POMPA D5
#define RELAY_AERATOR D6
#define RELAY_LAMPU D7

DHT dht(DHTPIN, DHTTYPE);
OneWire oneWire(ONE_WIRE_BUS);
DallasTemperature sensors(&oneWire);
BlynkTimer timer;

float suhuUdara;
float kelembapan;
float suhuAir;
float nilaiPH;

void bacaSensor() {
  suhuUdara = dht.readTemperature();
  kelembapan = dht.readHumidity();
  sensors.requestTemperatures();
  suhuAir = sensors.getTempCByIndex(0);

  int phValue = analogRead(PH_PIN);
  float voltage = phValue * (3.3 / 1023.0);
  nilaiPH = 7 + ((2.5 - voltage) / 0.18);

  Blynk.virtualWrite(V0, suhuUdara);
  Blynk.virtualWrite(V1, kelembapan);
  Blynk.virtualWrite(V2, suhuAir);
  Blynk.virtualWrite(V3, nilaiPH);

  Serial.println("===== DATA SENSOR =====");
  Serial.print("Suhu Udara   : "); Serial.println(suhuUdara);
  Serial.print("Kelembapan   : "); Serial.println(kelembapan);
  Serial.print("Suhu Air     : "); Serial.println(suhuAir);
  Serial.print("pH Air       : "); Serial.println(nilaiPH);
  Serial.println("========================");
}
```



```
BLYNK_WRITE(V5) {
  int pompa = param.asInt();
  digitalWrite(RELAY_POMPA, pompa ? LOW : HIGH);
}

BLYNK_WRITE(V6) {
  int aerator = param.asInt();
  digitalWrite(RELAY_AERATOR, aerator ? LOW : HIGH);
}

BLYNK_WRITE(V7) {
  int lampu = param.asInt();
  digitalWrite(RELAY_LAMPU, lampu ? LOW : HIGH);
}

void otomatisasi() {
  if (suhuAir > 30) {
    digitalWrite(RELAY_POMPA, LOW);
  } else {
    digitalWrite(RELAY_POMPA, HIGH);
  }

  if (nilaiPH < 6.0 || nilaiPH > 8.0) {
    digitalWrite(RELAY_AERATOR, LOW);
  } else {
    digitalWrite(RELAY_AERATOR, HIGH);
  }

  if (suhuUdara < 25) {
    digitalWrite(RELAY_LAMPU, LOW);
  } else {
    digitalWrite(RELAY_LAMPU, HIGH);
  }
}

void setup() {
  Serial.begin(9600);

  pinMode(RELAY_POMPA, OUTPUT);
  pinMode(RELAY_AERATOR, OUTPUT);
  pinMode(RELAY_LAMPU, OUTPUT);

  digitalWrite(RELAY_POMPA, HIGH);
  digitalWrite(RELAY_AERATOR, HIGH);
  digitalWrite(RELAY_LAMPU, HIGH);

  dht.begin();
  sensors.begin();

  Blynk.begin(auth, ssid, pass);

  timer.setInterval(2000L, bacaSensor);
  timer.setInterval(3000L, otomatisasi);
}

void loop() {
  Blynk.run();
  timer.run();
}
```

Web Smart-Farming

https://ai-tj.github.io/smartfarming-stunguard/



StunGuard

IoT Monitoring & Control System

Real-time Monitoring

Suhu Udara

30.1°C

Kelembapan

88.1%

Suhu Air

25.9°C

pH Air

7.1

System Control

Pompa Hidroponik

OFF

Aerator Akuaponik

OFF

Lampu Grow Light

OFF

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Lomba Proyek Sosial - Pertamina Foundation