LAMPIRAN

Lampiran – 1 Listing program arduino

```
#include <OneWire.h>
#include <DallasTemperature.h>
#include <WiFi.h>
#include <FirebaseESP32.h>

#define WIFI_SSID "HK"
#define WIFI_PASSWORD
"helpmeguys"
#define FIREBASE_HOST
"https://iotmultisensor-default-
rtdb.firebaseio.com/"
#define FIREBASE_AUTH
"dxQVsvUnM4Il9N9xl7J2dmyVEM
z5zWAN8npZQ4GK"
FirebaseData fbdo;

//TURBIDITY Pin vcc = 5 volt biru
= analog, merah = vcc, hitam = GND
int pinTurb = 34;
float V;
float kekeruhan;

//PH. Pin vcc = 3.3 volt
const int ph_Pin  = 33;
float Po = 0;
float PH_step;
int nilai_analog_PH;
double TeganganPh;
//untuk kalibrasi pH
float PH4 = 3.30;
float PH7 = 2.64;

//suhu.  Pin vcc = 3.3 volt merah=
vcc  kuning= data  hitam= GND
#define ONE_WIRE_BUS 21 // 21 =
pin data sensor suhu
OneWire
oneWire(ONE_WIRE_BUS);
DallasTemperature
sensorSuhu(&oneWire);
float suhu;

// sensor warna pin vcc = 3.3 volt
#define S0 15
#define S1 2
#define S2 5
#define S3 4
#define sensorOut 18
//Menyimpan frekuensi yang dibaca
oleh fotodioda
int redFrequency = 0;
int greenFrequency = 0;
```

```
int blueFrequency = 0;
// Menyimpan merah, hijau dan biru
int redColor = 0;
int greenColor = 0;
int blueColor = 0;
float Merah;
float Hijau;
float Biru;

void setup () {

   Serial.begin(115200);

  WiFi.begin(WIFI_SSID,
WIFI_PASSWORD);
  Serial.print("Connecting to Wi-Fi");
  while (WiFi.status() !=
WL_CONNECTED)
  {
   Serial.print(".");
   delay(300);
  }
  Serial.println();
  Serial.print("Connected with IP: ");
  Serial.println(WiFi.localIP());
  Serial.println();

  Firebase.begin(FIREBASE_HOST,
FIREBASE_AUTH);
  Firebase.reconnectWiFi(true);
  sensorSuhu.begin();
  //mengatur output
  pinMode(S0, OUTPUT);
  pinMode(S1, OUTPUT);
  pinMode(S2, OUTPUT);
  pinMode(S3, OUTPUT);
  //mengatur sensorOut sebagai input
  pinMode(sensorOut, INPUT);
  //menyetel penskalaan frekuensi ke
20%
  digitalWrite(S0,HIGH);
  digitalWrite(S1,HIGH);
}

void loop () {

   //pembacaan sensor kekeruhan
   int val = analogRead(pinTurb);
   V = val*(5.0/1024);
   kekeruhan= 100.00-
(V/20.00)*100.00;
   Serial.print("Kekeruhan :");
   Serial.print(kekeruhan);
   Serial.println(" NTU");

   //pembacaan sensor pH
   nilai_analog_PH =
analogRead(ph_Pin);
   TeganganPh = 3.3 / 4095.0 *
nilai_analog_PH;
   PH_step = (PH4 - PH7) / 3;
```

```
   Po = 7.00 + ((PH7 - TeganganPh)
/ PH_step);     //Po = 7.00 +
((teganganPh7 - TeganganPh) /
PhStep);
   Serial.print("Nilai PH = ");
   Serial.println(Po, 2);

   //pembacaan sensor suhu

sensorSuhu.requestTemperatures();
   suhu =
sensorSuhu.getTempCByIndex(0);
   Serial.print("Suhu: ");
   Serial.print(suhu);
   Serial.println("ºC");

   //pembacaan sensor warna
      //warna merah. mengatur
fotodioda yang difilter RED (R)
untuk dibaca
   digitalWrite(S2,LOW);
   digitalWrite(S3,LOW);
   //membaca frekuensi keluaran
   redFrequency =
pulseIn(sensorOut, LOW);
   //memetakan ulang nilai frekuensi
RED (R) dari 0 hingga 255
   //anda harus mengganti dengan
nilai-nilai Anda sendiri. Berikut ini
contohnya:
   //redColor = map(redFrequency,
70, 120, 255,0);
   redColor = map(redFrequency,
24,111, 255,0);
   Serial.print("M = ");
   Serial.print(redColor);
//    delay(100);

   //warna hijau. mengatur fotodioda
yang difilter GREEN (G) untuk
dibaca
   digitalWrite(S2,HIGH);
   digitalWrite(S3,HIGH);
   //membaca frekuensi keluaran
   greenFrequency =
pulseIn(sensorOut, LOW);
   //memetakan ulang nilai frekuensi
GREEN (G) dari 0 hingga 255
   //anda harus mengganti dengan
nilai-nilai Anda sendiri. Berikut ini
contohnya:
   // greenColor =
map(greenFrequency, 100, 199, 255,
0);
   greenColor =
map(greenFrequency, 41, 191, 255,
0);
   Serial.print(" H = ");
   Serial.print(greenColor);
//    delay(100);
```

```
   //warna biru. mengatur fotodioda
yang difilter BLUE (B) untuk dibaca
   digitalWrite(S2,LOW);
   digitalWrite(S3,HIGH);
   //membaca frekuensi keluaran
   blueFrequency =
pulseIn(sensorOut, LOW);
   //memetakan ulang nilai frekuensi
BLUE (B) dari 0 hingga 255
   //anda harus mengganti dengan
nilai-nilai Anda sendiri. Berikut ini
contohnya:
   // blueColor =
map(blueFrequency, 38, 84, 255, 0);
   blueColor = map(blueFrequency,
34, 156, 255, 0);
   Serial.print(" B = ");
   Serial.print(blueColor);
//    delay(100);

  //Memeriksa warna dan cetakan
yang terdeteksi saat ini
  //pesan di monitor serial
  if(redColor > greenColor &&
redColor > blueColor){
     Serial.println(" - Keruh");
     Firebase.setString(fbdo,
"/warna", "Keruh");
  }
  if(greenColor > redColor &&
greenColor > blueColor){
   Serial.println(" - Keruh");
   Firebase.setString(fbdo, "/warna",
"Keruh");
  }
  if(blueColor > redColor &&
blueColor > greenColor){
   Serial.println(" - Jernih");
   Firebase.setString(fbdo, "/warna",
"Jernih");
  }
      Serial.println("");
      Serial.println("Kirim data ke
Firebase");
      firebaseSend ();
      Serial.println("OK Success");
      delay(500);
      }

void firebaseSend ()  {
    Firebase.setFloat(fbdo, "/suhu",
suhu);
    Firebase.setFloat(fbdo,
"/kekeruhan", kekeruhan);
    Firebase.setFloat(fbdo, "/pH",
Po);
   }
```

Lampiran – 2 Listing program *user interface* situs web

```
<!DOCTYPE html>
<html lang="en">
   <head>
      <meta charset="utf-8" />
      <meta name="viewport"
content="width=device-width,
initial-scale=1, shrink-to-fit=no" />
      <meta name="description"
content="" />
      <meta name="author"
content="" />
      <title>Monitoring Pencemaran
Air</title>
      <!-- Favicon-->
      <link rel="icon" type="image/x-
icon" href="assets/favicon.ico" />
      <!-- Bootstrap icons-->
      <link
href="https://cdn.jsdelivr.net/npm/bo
otstrap-icons@1.4.1/font/bootstrap-
icons.css" rel="stylesheet" />
      <script
src="https://www.gstatic.com/firebas
ejs/8.7.1/firebase-app.js"></script>
      <script
src="https://www.gstatic.com/firebas
ejs/8.7.1/firebase-
database.js"></script>
      <!-- Core theme CSS (includes
Bootstrap)-->
      <link href="css/styles.css"
rel="stylesheet" />
   </head>
   <body>
      <!-- Responsive navbar-->
      <nav class="navbar navbar-
expand-lg navbar-dark bg-primary">
         <div class="container px-lg-
5">
            <a class="navbar-brand"
href="#!">Monitoring Pencemaran
Air</a>
            </div>
         </div>
      </nav>
      <!-- Header-->
      <header class="py-3">
         <div class="container px-lg-
5">
            <div class="p-3 p-lg-1 bg-
light rounded-5 text-center">
               <div class="m-4 m-lg-
5">
                  <h1 class="display-6
fw-bold">Implementasi IoT Sebagai
Alat Pengolah Multi Sensor</h1>
```

```
                <p class="fs-5">Prodi Teknik Informatika, Fakultas Teknik, Universitas Muhammadiyah Parepare</p>
                <button class="btn btn-primary btn-lg" onclick="reloadPage()">Refresh Page</button>
              </div>
            </div>
          </div>
        </header>
        <!-- Page Content-->
        <section class="pt-1">
          <div class="container px-lg-5">
            <!-- Page Features-->
            <div class="row gx-lg-3">
              <div class="col-lg-6 col-xxl-4 mb-3">
                <div class="card bg-light border-0 h-100">
                  <div class="card-body text-center p-4 p-lg-5 pt-0 pt-lg-0">
                    <!-- <div class="feature bg-primary bg-gradient text-white rounded-3 mb-4 mt-n4"><i class="bi bi-collection"></i></div> -->
                    <br> <img src="img/warna.png" /> </br>
                    <h2 class="fs-4 fw-bold">Sensor Warna</h2>
                    <h5 class="title"> <span id="warna">Mohon tunggu...</span></h5>
                  </div>
                </div>
              </div>
              <div class="col-lg-6 col-xxl-4 mb-3">
                <div class="card bg-light border-0 h-100">
                  <div class="card-body text-center p-4 p-lg-5 pt-0 pt-lg-0">
                    <!-- <div class="feature bg-primary bg-gradient text-white rounded-3 mb-4 mt-n4"><i class="bi bi-cloud-download"></i></div> -->
                    <br> <img src="img/PH.png" /> </br>
                    <h2 class="fs-4 fw-bold">Sensor PH</h2>
                    <h5 class="title"> <span id="pH">Mohon tunggu...</span></h5>
```

```
                </div>
            </div>
        </div>
        <div class="col-lg-6 col-xxl-4 mb-3">
            <div class="card bg-light border-0 h-100">
                <div class="card-body text-center p-4 p-lg-5 pt-0 pt-lg-0">
                    <!-- <div class="feature bg-primary bg-gradient text-white rounded-3 mb-4 mt-n4"><i class="bi bi-card-heading"></i></div> -->
                    <br> <img src="img/suhu.png" /> </br>
                    <h2 class="fs-4 fw-bold">Sensor Suhu</h2>
                    <h5 class="title"> <span id="suhu">Mohon tunggu...</span></h5>
                </div>
            </div>
        </div>
        <div class="col-lg-6 col-xxl-4 mb-3">
            <div class="card bg-light border-0 h-100">
                <div class="card-body text-center p-4 p-lg-5 pt-0 pt-lg-0">
                    <br> <img src="img/kekeruhan.png" /> </br>
                    <h2 class="fs-4 fw-bold">Sensor Turbidity</h2>
                    <h5 class="title"><span id="kekeruhan">Mohon tunggu...</span></h5>
                </div>
            </div>
        </div>
            </div>
        </div>
    </section>
    <!-- Footer-->
    <footer class="py-3 bg-primary">
        <div class="container"><p class="m-0 text-center text-white">Copyright &copy; Your Website 2021</p></div>
    </footer>
    <!-- Bootstrap core JS-->
    <script src="https://cdn.jsdelivr.net/npm/boo
```

```
tstrap@5.1.0/dist/js/bootstrap.bundle.
min.js"></script>
        <!-- Core theme JS-->
        <script
src="js/scripts.js"></script>

         <script>
           // Your web app's Firebase
configuration
           var firebaseConfig = {
            apiKey:
"AIzaSyD3n52vLAuuL2B8cxdkTxT
j807MaVfRKh0",
            authDomain:
"iotmultisensor.firebaseapp.com",
            databaseURL:
"https://iotmultisensor-default-
rtdb.firebaseio.com",
            projectId: "iotmultisensor",
            storageBucket:
"iotmultisensor.appspot.com",
            messagingSenderId:
"113969898369",
            appId:
"1:113969898369:web:0eb97e49389
c29664fbe80"
           };
           // Initialize Firebase

firebase.initializeApp(firebaseConfig
);
           const db = firebase.database();

           var kekeruhan =
document.getElementById("kekeruh
an");
           var dbRef =
firebase.database().ref().child("keker
uhan");
           dbRef.on("value", snap =>
kekeruhan.innerHTML =
snap.val()+" NTU");
           dbRef.on("value", snap =>
console.log("Kekeruhan",
snap.val()+" NTU - ", new Date));

           var suhu =
document.getElementById("suhu");
           var dbRef =
firebase.database().ref().child("suhu"
);
           dbRef.on("value", snap =>
suhu.innerHTML = snap.val()+"
ºC");
           dbRef.on("value", snap =>
console.log("Suhu", snap.val()+"ºC -
", new Date));

           var PH =
document.getElementById("pH");
           var dbRef =
firebase.database().ref().child("pH");
```

```
        dbRef.on("value", snap =>
pH.innerHTML = snap.val());
        dbRef.on("value", snap =>
console.log("pH", snap.val()+" - ",
new Date));

        var warna =
document.getElementById("warna");
        var dbRef =
firebase.database().ref().child("warna
");
        dbRef.on("value", snap =>
warna.innerHTML = snap.val());
        dbRef.on("value", snap =>
console.log("Warna", snap.val()+" -
",    new Date));

        function reloadPage(){
            window.location.reload();
          }
    </script>

  </body>
</html>
```