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Lampiran 1 Hasil Kalibrasi Sensor DHT22 untuk Suhu

***Thermometer* (°C)**	**Sensor DHT22 (°C)**	**Selisih**	***Error* (%)**
10,20	10,00	0,20	1,96
11,00	11,00	0,00	0,00
12,00	12,00	0,00	0,00
13,10	13,00	0,10	0,76
14,10	14,00	0,10	0,71
15,00	15,00	0,00	0,00
16,00	16,00	0,00	0,00
17,00	17,00	0,00	0,00
18,00	18,00	0,00	0,00
19,00	19,00	0,00	0,00
20,00	20,00	0,00	0,00
21,20	21,20	0,00	0,00
22,00	22,00	0,00	0,00
23,00	23,00	0,00	0,00
24,00	24,00	0,00	0,00
25,00	25,00	0,00	0,00
26,00	26,00	0,00	0,00
27,00	27,00	0,00	0,00
28,00	28,00	0,00	0,00
29,20	29,20	0,00	0,00
30,00	30,10	0,10	0,33
31,10	31,10	0,00	0,00
32,00	32,00	0,00	0,00
33,00	33,00	0,00	0,00
34,10	34,00	0,10	0,29
35,00	35,00	0,00	0,00
36,00	36,10	0,10	0,28
37,20	37,20	0,00	0,00
38,00	38,00	0,00	0,00
39,00	39,00	0,00	0,00
40,10	40,00	0,10	0,25
41,00	41,00	0,00	0,00
42,30	42,30	0,00	0,00
43,00	43,00	0,00	0,00
44,00	44,10	0,10	0,23
45,00	45,20	0,20	0,44
46,00	46,10	0,10	0,22

***Thermometer* (°C)**	**Sensor DHT22 (°C)**	**Selisih**	***Error* (%)**
47,00	47,00	0,00	0,00
48,00	48,20	0,20	0,42
49,00	49,20	0,20	0,41
50,00	50,10	0,10	0,20
Rata-rata *Error* (%)			0,16
Akurasi (%)			99,84

Lampiran 2. Hasil Kalibrasi Sensor DHT22 untuk Kelembapan

***Hygrometer* (%)**	**DHT22 (%)**	**Selisih**	***Error* (%)**
20,00	20,10	0,10	0,50
21,00	21,20	0,20	0,95
22,00	22,10	0,10	0,45
23,00	23,10	0,10	0,43
24,00	24,00	0,00	0,00
25,00	25,00	0,00	0,00
26,00	26,00	0,00	0,00
27,00	27,00	0,00	0,00
28,00	28,30	0,30	1,07
29,00	29,00	0,00	0,00
30,00	30,20	0,20	0,67
31,00	31,20	0,20	0,65
32,00	32,00	0,00	0,00
33,00	33,00	0,00	0,00
34,00	34,10	0,10	0,29
35,00	35,00	0,00	0,00
36,00	36,00	0,00	0,00
37,00	37,20	0,20	0,54
38,00	38,10	0,10	0,26
39,00	39,10	0,10	0,26
40,00	40,10	0,10	0,25
41,00	41,00	0,00	0,00
42,00	42,10	0,10	0,24
43,00	43,00	0,00	0,00
44,00	44,00	0,00	0,00
45,00	45,00	0,00	0,00
46,00	46,00	0,00	0,00
47,00	47,00	0,00	0,00
48,00	48,20	0,20	0,42
49,00	49,10	0,10	0,20
50,00	50,10	0,10	0,20
51,00	51,10	0,10	0,20
52,00	52,00	0,00	0,00
53,00	53,00	0,00	0,00
54,00	54,00	0,00	0,00
55,00	55,00	0,00	0,00
56,00	56,20	0,20	0,36

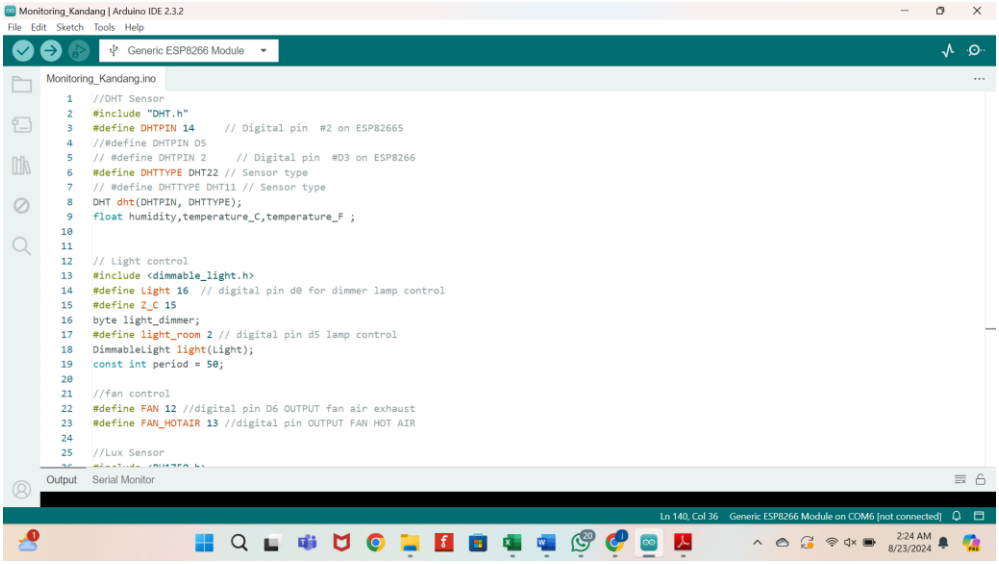
***Hygrometer* (%)**	**DHT22 (%)**	**Selisih**	***Error* (%)**
57,00	57,00	0,00	0,00
58,00	58,00	0,00	0,00
59,00	59,20	0,20	0,34
60,00	60,00	0,00	0,00
61,00	61,10	0,10	0,16
62,00	62,00	0,00	0,00
63,00	63,10	0,10	0,16
64,00	64,10	0,10	0,16
65,00	65,20	0,20	0,31
66,00	66,00	0,00	0,00
67,00	67,00	0,00	0,00
68,00	68,20	0,20	0,29
69,00	69,00	0,00	0,00
70,00	70,00	0,00	0,00
71,00	71,00	0,00	0,00
72,00	72,10	0,10	0,14
73,00	73,00	0,00	0,00
Rata-rata *Error* (%)			0,18
Akurasi (%)			99,82

Lampiran 3. Hasil Kalibrasi Sensor Intensitas Cahaya BH1750

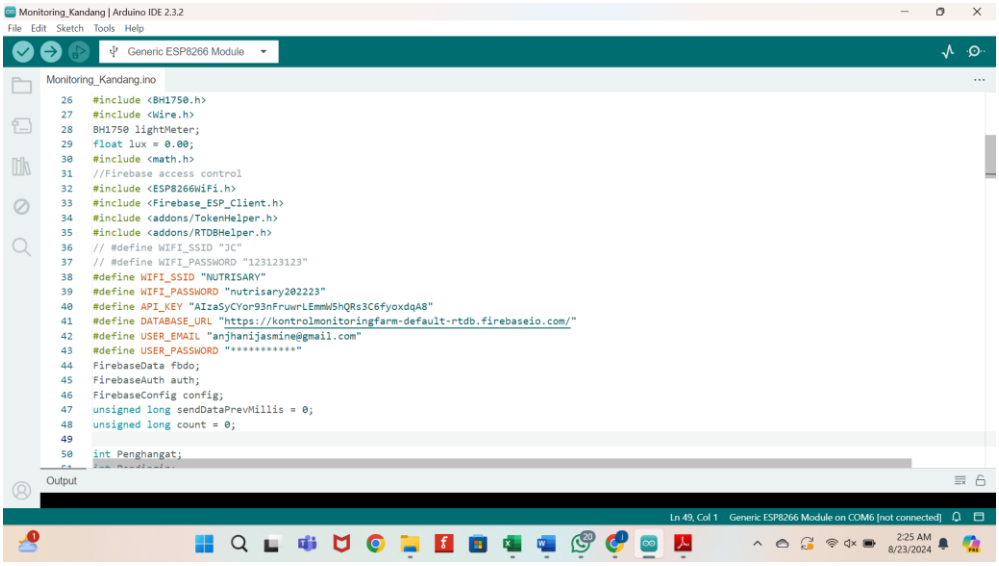
Luxmeter (lux)	BH1750 (lux)	Selisih	*Error* (%)
10,00	10,00	0,00	0,00
11,00	11,00	0,00	0,00
12,00	11,83	0,17	1,42
13,00	13,33	0,33	2,54
14,00	14,17	0,17	1,21
15,00	15,00	0,00	0,00
16,00	15,83	0,17	1,06
17,00	16,83	0,17	1,00
18,00	17,83	0,17	0,94
19,00	19,17	0,17	0,89
20,00	20,00	0,00	0,00
21,00	20,83	0,17	0,81
22,00	22,00	0,00	0,00
23,00	23,17	0,17	0,74
24,00	24,17	0,17	0,71
25,00	25,00	0,00	0,00
26,00	25,83	0,17	0,65
27,00	26,83	0,17	0,63
28,00	28,17	0,17	0,61
29,00	29,00	0,00	0,00
30,00	30,00	0,00	0,00
31,00	30,83	0,17	0,55
32,00	32,00	0,00	0,00
33,00	33,17	0,17	0,52
34,00	34,17	0,17	0,50
35,00	35,00	0,00	0,00
36,00	35,83	0,17	0,47
37,00	36,67	0,33	0,89
38,00	38,00	0,00	0,00
39,00	39,17	0,17	0,44
40,00	40,00	0,00	0,00
41,00	40,83	0,17	0,41
42,00	42,00	0,00	0,00
43,00	43,33	0,33	0,77
44,00	44,17	0,17	0,39
45,00	45,00	0,00	0,00

Luxmeter (lux)	**BH1750 (lux)**	**Selisih**	***Error* (%)**
46,00	45,83	0,17	0,37
47,00	47,00	0,00	0,00
48,00	48,00	0,00	0,00
49,00	49,17	0,17	0,35
50,00	50,00	0,00	0,00
Rata-rata *Error* (%)			0,46
Akurasi (%)			99,54

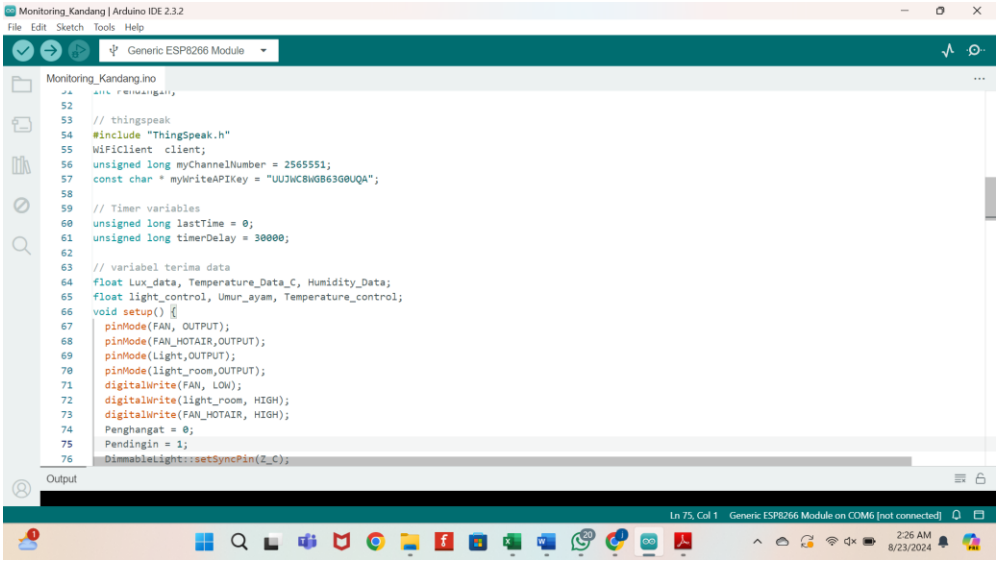
Lampiran 4. Program Mikrokontroler



```
//DHT Sensor
#include "DHT.h"
#define DHTPIN 14     // Digital pin  #2 on ESP82665
//#define DHTPIN D5
// #define DHTPIN 2     // Digital pin  #D3 on ESP8266
#define DHTTYPE DHT22 // Sensor type
// #define DHTTYPE DHT11 // Sensor type
DHT dht(DHTPIN, DHTTYPE);
float humidity,temperature_C,temperature_F ;


// Light control
#include <dimmable_light.h>
#define Light 16  // digital pin d0 for dimmer lamp control
#define Z_C 15
byte light_dimmer;
#define light_room 2 // digital pin d5 lamp control
DimmableLight light(Light);
const int period = 50;

//fan control
#define FAN 12 //digital pin D6 OUTPUT fan air exhaust
#define FAN_HOTAIR 13 //digital pin OUTPUT FAN HOT AIR

//Lux Sensor
```



```
#include <BH1750.h>
#include <Wire.h>
BH1750 lightMeter;
float lux = 0.00;
#include <math.h>
//Firebase access control
#include <ESP8266WiFi.h>
#include <Firebase_ESP_Client.h>
#include <addons/TokenHelper.h>
#include <addons/RTDBHelper.h>
// #define WIFI_SSID "JC"
// #define WIFI_PASSWORD "123123123"
#define WIFI_SSID "NUTRISARY"
#define WIFI_PASSWORD "nutrisary202223"
#define API_KEY "AIzaSyCYor93nFruwrLEmmW5hQRs3C6fyoxdqA8"
#define DATABASE_URL "https://kontrolmonitoringfarm-default-rtdb.firebaseio.com/"
#define USER_EMAIL "anjhanijasmine@gmail.com"
#define USER_PASSWORD "**********"
FirebaseData fbdo;
FirebaseAuth auth;
FirebaseConfig config;
unsigned long sendDataPrevMillis = 0;
unsigned long count = 0;

int Penghangat;
```



Monitoring_Kandang | Arduino IDE 2.3.2

File Edit Sketch Tools Help

Generic ESP8266 Module

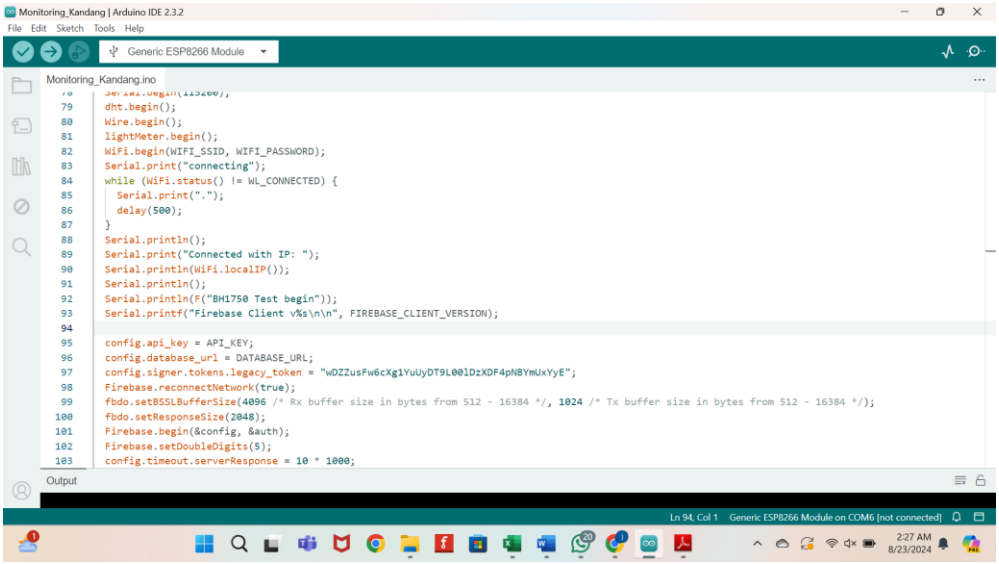
Monitoring_Kandang.ino

```
52
53  // thingspeak
54  #include "ThingSpeak.h"
55  WiFiClient  client;
56  unsigned long myChannelNumber = 2565551;
57  const char * myWriteAPIKey = "UUJWC8WGB63G0UQA";
58
59  // Timer variables
60  unsigned long lastTime = 0;
61  unsigned long timerDelay = 30000;
62
63  // variabel terima data
64  float Lux_data, Temperature_Data_C, Humidity_Data;
65  float light_control, Umur_ayam, Temperature_control;
66  void setup() {
67    pinMode(FAN, OUTPUT);
68    pinMode(FAN_HOTAIR,OUTPUT);
69    pinMode(Light,OUTPUT);
70    pinMode(light_room,OUTPUT);
71    digitalWrite(FAN, LOW);
72    digitalWrite(light_room, HIGH);
73    digitalWrite(FAN_HOTAIR, HIGH);
74    Penghangat = 0;
75    Pendingin = 1;
76    DimmableLight::setSyncPin(Z_C);
```

Output

Ln 75, Col 1 Generic ESP8266 Module on COM6 [not connected]

2:26 AM 8/23/2024



Monitoring_Kandang | Arduino IDE 2.3.2

File Edit Sketch Tools Help

Generic ESP8266 Module

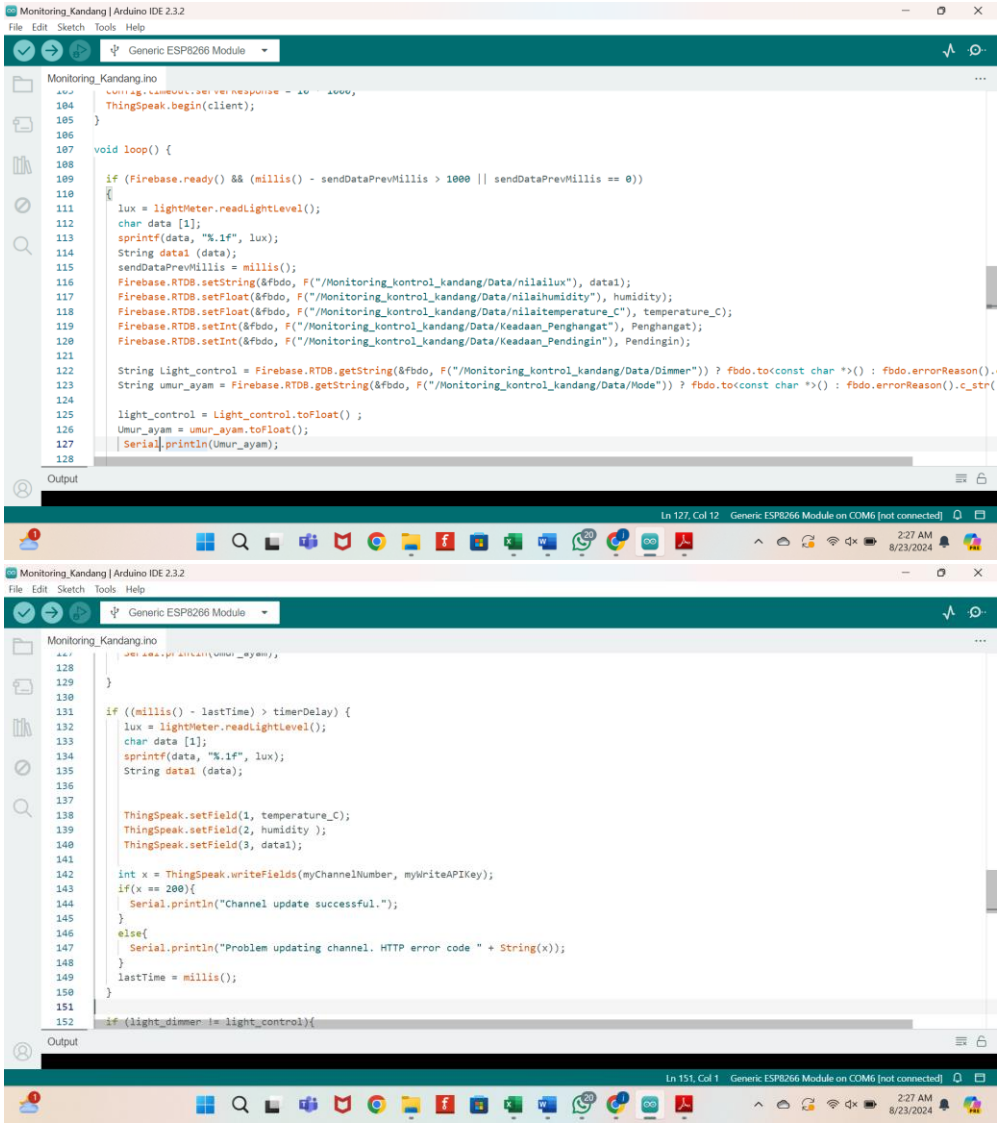
Monitoring_Kandang.ino

```
79    dht.begin();
80    Wire.begin();
81    lightMeter.begin();
82    WiFi.begin(WIFI_SSID, WIFI_PASSWORD);
83    Serial.print("connecting");
84    while (WiFi.status() != WL_CONNECTED) {
85      Serial.print(".");
86      delay(500);
87    }
88    Serial.println();
89    Serial.print("Connected with IP: ");
90    Serial.println(WiFi.localIP());
91    Serial.println();
92    Serial.println(F("BH1750 Test begin"));
93    Serial.printf("Firebase Client v%s\n\n", FIREBASE_CLIENT_VERSION);
94
95    config.api_key = API_KEY;
96    config.database_url = DATABASE_URL;
97    config.signer.tokens.legacy_token = "wDZZusFw6cXg1YuUyDT9L00lDzXDF4pNBYmUxYyE";
98    Firebase.reconnectNetwork(true);
99    fbdo.setBSSLBufferSize(4096 /* Rx buffer size in bytes from 512 - 16384 */, 1024 /* Tx buffer size in bytes from 512 - 16384 */);
100   fbdo.setResponseSize(2048);
101   Firebase.begin(&config, &auth);
102   Firebase.setDoubleDigits(5);
103   config.timeout.serverResponse = 10 * 1000;
```

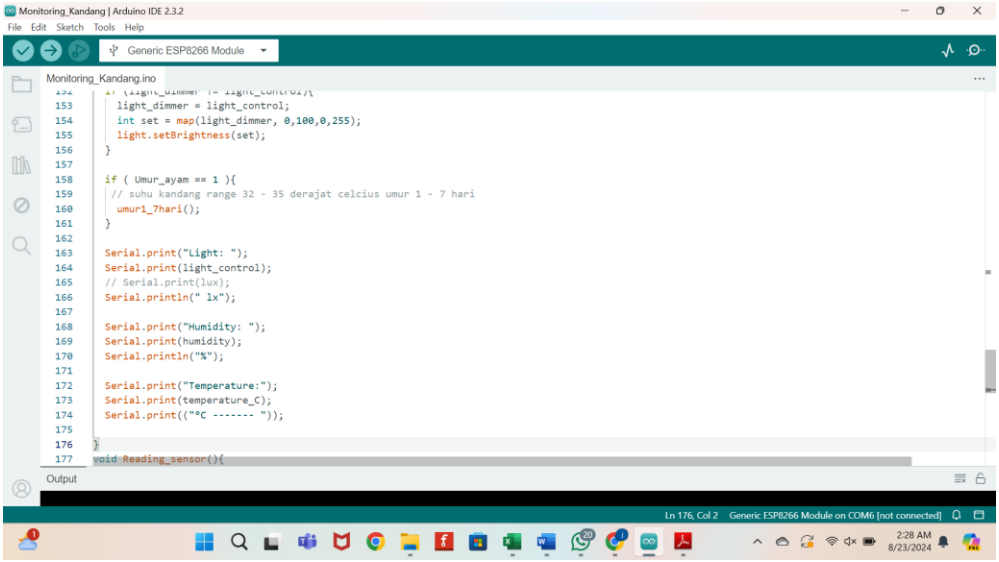
Output

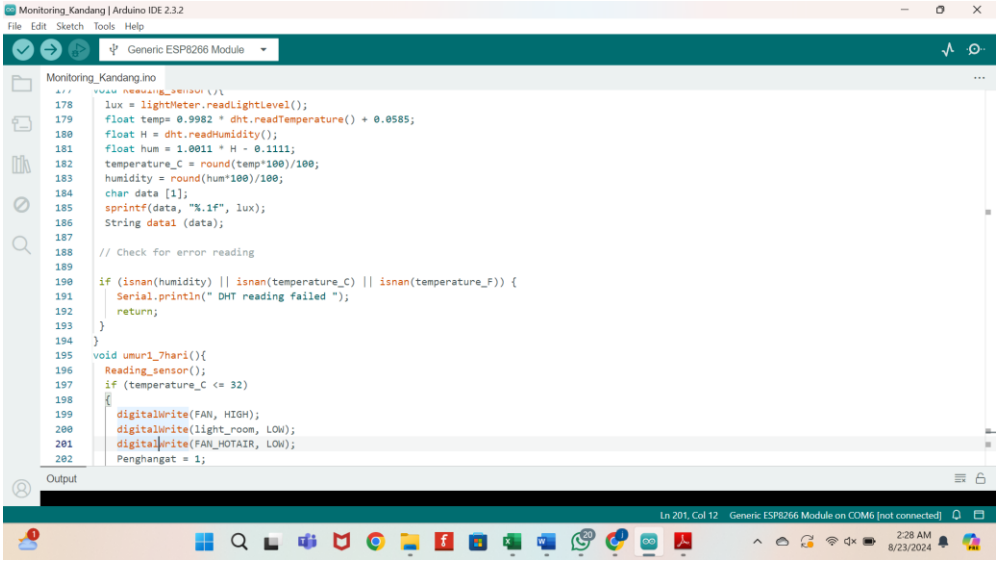
Ln 94, Col 1 Generic ESP8266 Module on COM6 [not connected]

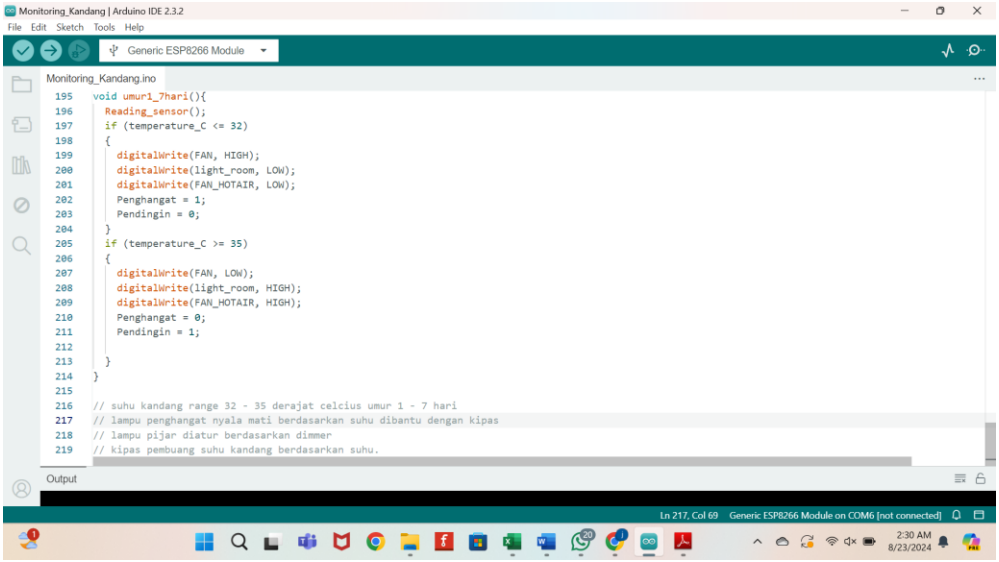
2:27 AM 8/23/2024


Monitoring_Kandang | Arduino IDE 2.3.2
File Edit Sketch Tools Help
Generic ESP8266 Module
Monitoring_Kandang.ino
ThingSpeak.begin(client);
}
void loop() {
if (Firebase.ready() && (millis() - sendDataPrevMillis > 1000 || sendDataPrevMillis == 0))
{
lux = lightMeter.readLightLevel();
char data [1];
sprintf(data, "%.1f", lux);
String data1 (data);
sendDataPrevMillis = millis();
Firebase.RTDB.setString(&fbdo, F("/Monitoring_kontrol_kandang/Data/nilailux"), data1);
Firebase.RTDB.setFloat(&fbdo, F("/Monitoring_kontrol_kandang/Data/nilaihumidity"), humidity);
Firebase.RTDB.setFloat(&fbdo, F("/Monitoring_kontrol_kandang/Data/nilaitemperature_C"), temperature_C);
Firebase.RTDB.setInt(&fbdo, F("/Monitoring_kontrol_kandang/Data/Keadaan_Penghangat"), Penghangat);
Firebase.RTDB.setInt(&fbdo, F("/Monitoring_kontrol_kandang/Data/Keadaan_Pendingin"), Pendingin);
String Light_control = Firebase.RTDB.getString(&fbdo, F("/Monitoring_kontrol_kandang/Data/Dimmer")) ? fbdo.to<const char *>() : fbdo.errorReason().
String umur_ayam = Firebase.RTDB.getString(&fbdo, F("/Monitoring_kontrol_kandang/Data/Mode")) ? fbdo.to<const char *>() : fbdo.errorReason().c_str(
light_control = Light_control.toFloat() ;
Umur_ayam = umur_ayam.toFloat();
Serial.println(Umur_ayam);
Output
Ln 127, Col 12 Generic ESP8266 Module on COM6 [not connected]
2:27 AM
8/23/2024

Monitoring_Kandang | Arduino IDE 2.3.2
File Edit Sketch Tools Help
Generic ESP8266 Module
Monitoring_Kandang.ino
}
if ((millis() - lastTime) > timerDelay) {
lux = lightMeter.readLightLevel();
char data [1];
sprintf(data, "%.1f", lux);
String data1 (data);
ThingSpeak.setField(1, temperature_C);
ThingSpeak.setField(2, humidity);
ThingSpeak.setField(3, data1);
int x = ThingSpeak.writeFields(myChannelNumber, myWriteAPIKey);
if(x == 200){
Serial.println("Channel update successful.");
}
else{
Serial.println("Problem updating channel. HTTP error code " + String(x));
}
lastTime = millis();
}
if (light_dimmer != light_control){
Output
Ln 151, Col 1 Generic ESP8266 Module on COM6 [not connected]
2:27 AM
8/23/2024


Monitoring_Kandang | Arduino IDE 2.3.2
File Edit Sketch Tools Help
Generic ESP8266 Module
Monitoring_Kandang.ino
light_dimmer = light_control;
int set = map(light_dimmer, 0,100,0,255);
light.setBrightness(set);
}
if (Umur_ayam == 1){
// suhu kandang range 32 - 35 derajat celcius umur 1 - 7 hari
umur1_7hari();
}
Serial.print("Light: ");
Serial.print(light_control);
// Serial.print(lux);
Serial.println(" lx");
Serial.print("Humidity: ");
Serial.print(humidity);
Serial.println("%");
Serial.print("Temperature:");
Serial.print(temperature_C);
Serial.print(("°C ------- "));
}
void Reading_sensor(){
Output
Ln 176, Col 2 Generic ESP8266 Module on COM6 [not connected]
2:28 AM
8/23/2024


Monitoring_Kandang | Arduino IDE 2.3.2
File Edit Sketch Tools Help
Generic ESP8266 Module
Monitoring_Kandang.ino
lux = lightMeter.readLightLevel();
float temp= 0.9982 * dht.readTemperature() + 0.0585;
float H = dht.readHumidity();
float hum = 1.0011 * H - 0.1111;
temperature_C = round(temp*100)/100;
humidity = round(hum*100)/100;
char data [1];
sprintf(data, "%.1f", lux);
String data1 (data);
// Check for error reading
if (isnan(humidity) || isnan(temperature_C) || isnan(temperature_F)) {
Serial.println(" DHT reading failed ");
return;
}
}
void umur1_7hari(){
Reading_sensor();
if (temperature_C <= 32)
{
digitalWrite(FAN, HIGH);
digitalWrite(light_room, LOW);
digitalWrite(FAN_HOTAIR, LOW);
Penghangat = 1;
Output
Ln 201, Col 12 Generic ESP8266 Module on COM6 [not connected]
2:28 AM
8/23/2024


Monitoring_Kandang | Arduino IDE 2.3.2
File Edit Sketch Tools Help
Generic ESP8266 Module
Monitoring_Kandang.ino
195 void umur1_7hari(){
196 Reading_sensor();
197 if (temperature_C <= 32)
198 {
199 digitalWrite(FAN, HIGH);
200 digitalWrite(light_room, LOW);
201 digitalWrite(FAN_HOTAIR, LOW);
202 Penghangat = 1;
203 Pendingin = 0;
204 }
205 if (temperature_C >= 35)
206 {
207 digitalWrite(FAN, LOW);
208 digitalWrite(light_room, HIGH);
209 digitalWrite(FAN_HOTAIR, HIGH);
210 Penghangat = 0;
211 Pendingin = 1;
212
213 }
214 }
215
216 // suhu kandang range 32 - 35 derajat celcius umur 1 - 7 hari
217 // lampu penghangat nyala mati berdasarkan suhu dibantu dengan kipas
218 // lampu pijar diatur berdasarkan dimmer
219 // kipas pembuang suhu kandang berdasarkan suhu.
Output
Ln 217, Col 69 Generic ESP8266 Module on COM6 [not connected]
2:30 AM
8/23/2024

Lampiran 5. Tabel Hasil Pemantauan Sistem *Monitoring* Kandang Ayam

Hari Pertama

Jam	Suhu (°C)	Kelembapan (%)	Intensitas Cahaya (lux)
01.00	33,43	60,94	27,30
02.00	33,74	59,37	28,56
03.00	33,59	58,74	28,87
04.00	33,47	58,45	29,31
05.00	33,64	57,85	29,04
06.00	33,75	57,68	27,95
07.00	34,09	57,27	25,54
08.00	33,70	57,40	26,91
09.00	33,12	58,67	28,72
10.00	33,21	57,71	30,14
11.00	34,67	54,20	28,96
12.00	34,05	54,24	23,60
13.00	34,05	57,52	25,22
14.00	33,64	53,16	28,80
15.00	34,48	54,06	30,39
16.00	34,84	54,40	29,63
17.00	34,42	55,72	27,18
18.00	33,50	58,77	29,13
19.00	33,00	59,69	29,58
20.00	32,25	62,67	26,12
21.00	32,94	59,16	25,56
22.00	33,21	59,59	24,34
23.00	33,66	57,19	24,17
00.00	33,31	53,88	23,75

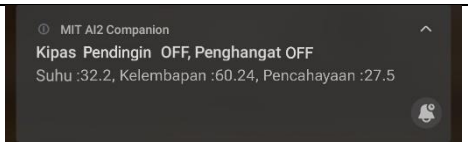
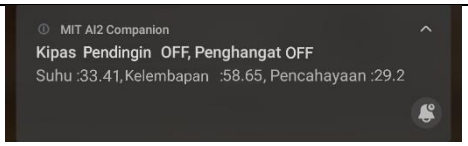
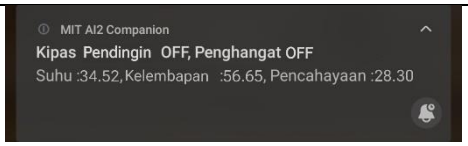
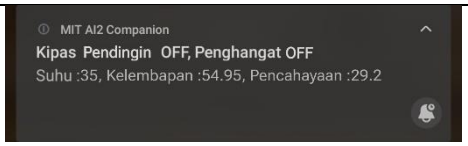
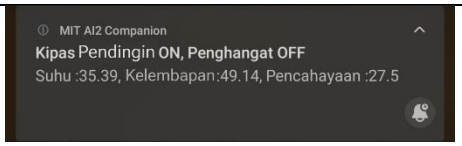
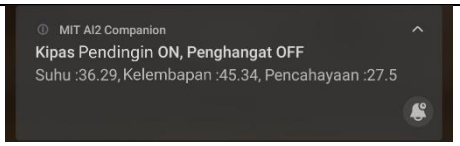
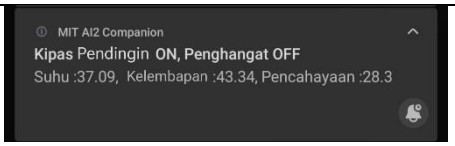
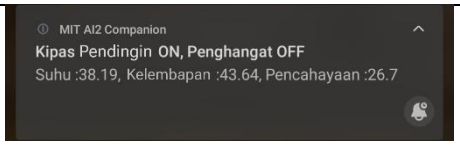
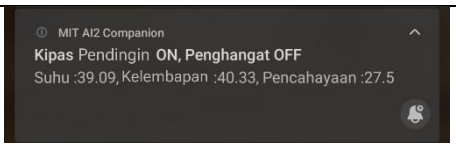
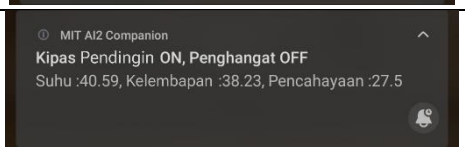
Hari Kedua

Jam	Suhu (°C)	Kelembapan (%)	Intensitas Cahaya (lux)
01.00	33,70	58,82	23,76
02.00	33,87	58,50	23,79
03.00	33,72	57,22	23,51
04.00	33,79	55,75	23,05
05.00	33,65	54,85	27,05
06.00	33,42	57,73	24,59
07.00	33,36	55,75	28,88
08.00	33,57	51,44	29,78
09.00	33,49	53,67	29,40
10.00	33,02	53,73	28,32
11.00	33,88	58,35	25,34
12.00	34,18	57,61	23,75
13.00	34,68	57,99	26,58
14.00	34,94	56,17	29,71
15.00	34,60	56,48	31,65
16.00	33,74	56,40	34,16
17.00	33,93	57,68	32,30
18.00	33,43	57,64	31,41
19.00	32,67	60,84	30,56
20.00	32,65	61,00	30,81
21.00	32,93	60,44	30,21
22.00	33,41	60,61	30,75
23.00	33,47	60,63	30,80
00.00	33,40	60,18	30,28

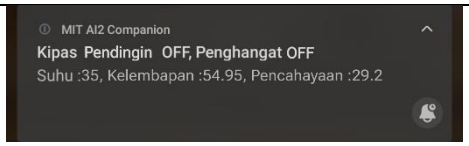
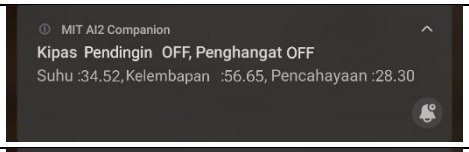
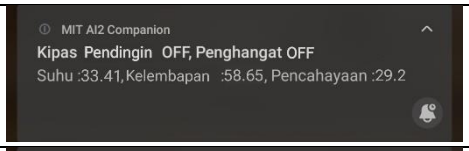
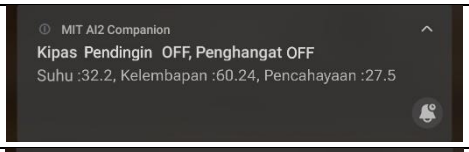
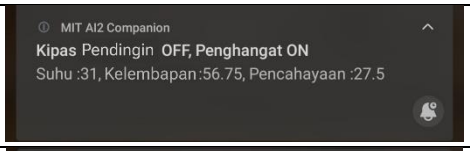
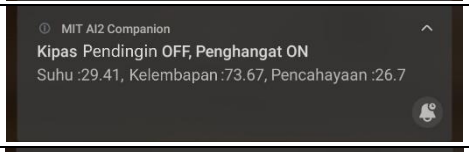
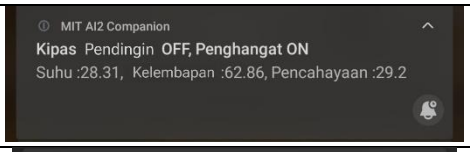
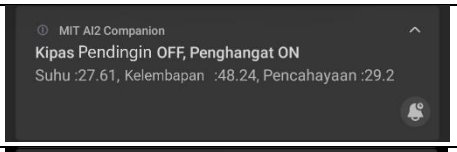
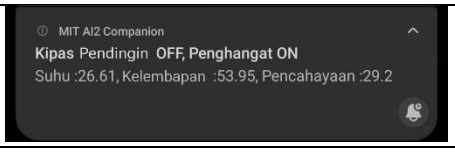
Hari Ketiga

Jam	Suhu (°C)	Kelembapan (%)	Intensitas Cahaya (lux)
01.00	33,52	58,72	30,29
02.00	33,54	57,58	30,42
03.00	33,69	56,60	31,83
04.00	33,69	56,38	31,88
05.00	33,78	56,13	29,94
06.00	33,49	56,67	27,39
07.00	32,80	57,76	25,63
08.00	33,02	56,68	29,61
09.00	33,21	54,60	29,88
10.00	32,48	59,35	29,44
11.00	32,75	59,10	29,83
12.00	33,88	55,29	31,66
13.00	35,08	51,45	26,97
14.00	35,00	50,00	26,42
15.00	35,00	50,90	26,98
16.00	34,36	50,98	27,41
17.00	34,25	51,20	28,18
18.00	33,52	54,32	27,42
19.00	33,15	56,37	27,51
20.00	32,60	58,59	28,06
21.00	32,93	54,09	28,62
22.00	33,22	52,71	28,01
23.00	33,47	53,50	28,78
00.00	33,30	54,31	28,45

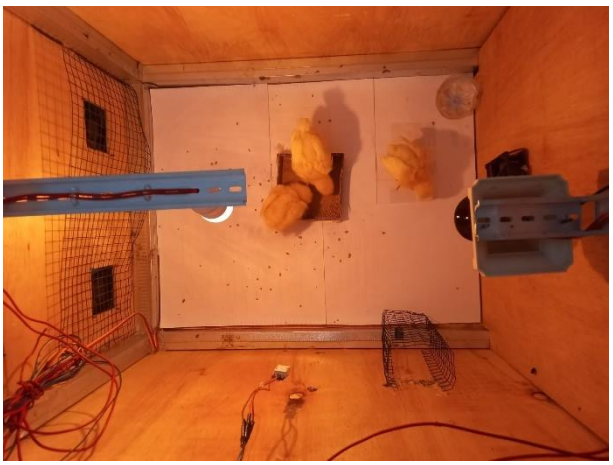
Lampiran 6. Tabel Data Uji Pendingin

No.	Suhu	Status Pendingin	Gambar
1	32,20	Mati	
2	33,41	Mati	
3	34,52	Mati	
4	35,00	Mati	
5	35,39	Aktif	
6	36,29	Aktif	
7	37,09	Aktif	
8	38,19	Aktif	
9	39,09	Aktif	
10	40,59	Aktif	

Lampiran 7. Tabel Data Uji Penghangat

No.	Suhu	Status Penghangat	Gambar
1	35,00	Mati	
2	34,52	Mati	
3	33,41	Mati	
4	32,20	Mati	
5	31,00	Aktif	
6	30,10	Aktif	
7	29,41	Aktif	
8	28,31	Aktif	
9	27,61	Aktif	
10	26,61	Aktif	

Lampiran 8. Dokumentasi Pengambilan Data

Hari	Dokumentasi
Hari Pertama	
Hari Kedua	
Hari Ketiga