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LAMPIRAN 1 CODING TAMPIL PADA SERIAL MONITOR

1. Coding DHT11, DS1302 di simpan pada *Micro SD* dan tampil pada Serial Monitor pada software Arduino

```
#include <SD.h>

#include <Wire.h>

#include <virtuabotixRTC.h>

#include <DHT.h>

#define DHTPIN 3

#define DHTTYPE DHT11

DHT dht(DHTPIN, DHTTYPE);

virtuabotixRTC myRTC(6, 7, 8);

File dataFile;

void setup() {

  Serial.begin(9600);

  if (!SD.begin(4)) {

    Serial.println("Gagal menginisialisasi SD card");

    return;

  }

  dataFile = SD.open("dht11.txt", FILE_WRITE);

  if (!dataFile) {

    Serial.println("Gagal membuka file");
```

```
    return;
}

dht.begin();

myRTC.setDS1302Time(30, 20, 14, 06, 7, 07, 2023);
}

void loop() {

    int temperature = dht.readTemperature();

    int humidity = dht.readHumidity();

    myRTC.updateTime();

    dataFile.print(myRTC.hours);

    dataFile.print(":");

    dataFile.print(myRTC.minutes);

    dataFile.print(":");

    dataFile.print(myRTC.seconds);

    dataFile.print(",");

    dataFile.print(myRTC.dayofmonth);

    dataFile.print("/");

    dataFile.print(myRTC.month);

    dataFile.print("/");

    dataFile.print(myRTC.year);

    dataFile.print(",");

    dataFile.print(temperature);

    dataFile.print(",");
```

```
dataFile.println(humidity);

Serial.print(myRTC.hours);

Serial.print(":");

Serial.print(myRTC.minutes);

Serial.print(":");

Serial.print(myRTC.seconds);

Serial.print(" ");

Serial.print(myRTC.dayofmonth);

Serial.print("/");

Serial.print(myRTC.month);

Serial.print("/");

Serial.print(myRTC.year);

Serial.print(" ");

Serial.print(temperature);

Serial.print("°C, ");

Serial.print(humidity);

Serial.println(" %");

delay(600000);

dataFile.flush();

}

void cleanup() {

    dataFile.close();

}
```

2. Coding BMP180, DS1302 di simpan pada *Micro SD* dan tampil pada Serial Monitor pada software Arduino

```
#include <Wire.h>

#include <SD.h>

#include <Adafruit_Sensor.h>
#include <Adafruit_BMP085_U.h>
#include <virtuabotixRTC.h>

Adafruit_BMP085_Unified bmp;
virtuabotixRTC myRTC(6,7,8);//CLK, DAT, RST

File dataFile;

void setup() {
  Serial.begin(9600);
  if (!bmp.begin()) {
    Serial.println("Tidak dapat menemukan sensor BMP180 yang valid, periksa koneksi!");
    while (1);
  }
  if (!SD.begin(4)) {
    Serial.println("Gagal menginisialisasi SD card");
    return;
  }
  dataFile = SD.open("BMP180.txt", FILE_WRITE);
```

```
if (!dataFile) {  
    Serial.println("Gagal membuka file");  
    return;  
}  
myRTC.setDS1302Time(24, 10, 14, 06, 07, 07, 2023);  
}  
void loop() {  
    myRTC.updateTime();  
    sensors_event_t event;  
    bmp.getEvent(&event);  
    float pressure = event.pressure;  
    float altitude = bmp.pressureToAltitude(1013.25, pressure);  
  
    dataFile.print(myRTC.hours);  
    dataFile.print(":");  
    dataFile.print(myRTC.minutes);  
    dataFile.print(":");  
    dataFile.print(myRTC.seconds);  
    dataFile.print(",");  
    dataFile.print(myRTC.dayofmonth);  
    dataFile.print("/");  
    dataFile.print(myRTC.month);  
    dataFile.print("/");
```

```
dataFile.print(myRTC.year);  
dataFile.print(",");  
dataFile.print("Tekanan: ");  
dataFile.print(pressure);  
dataFile.print(" mb");  
dataFile.print(",");  
dataFile.print("Ketinggian: ");  
dataFile.print(altitude);  
dataFile.println(" m");  
  
Serial.print(myRTC.hours);  
Serial.print(":");  
Serial.print(myRTC.minutes);  
Serial.print(":");  
Serial.print(myRTC.seconds);  
Serial.print(", ");  
Serial.print(myRTC.dayofmonth);  
Serial.print("/");  
Serial.print(myRTC.month);  
Serial.print("/");  
Serial.print(myRTC.year);  
Serial.print(", ");  
Serial.print("Tekanan: ");
```

```
Serial.print(pressure);  
  
Serial.print(" mb");  
  
Serial.print(", ");  
  
Serial.print("Ketinggian: ");  
  
Serial.print(altitude);  
  
Serial.println(" m");  
  
  
delay(600000);  
  
dataFile.flush();  
  
}  
  
void cleanup() {  
  
    dataFile.close();  
  
}
```


2. Coding *Raindrops Module*, DS1302 di simpan pada *Micro SD* dan tampil pada Serial Monitor pada software Arduino

```
#include <SD.h>

#include <Wire.h>

#include <virtuabotixRTC.h>

virtuabotixRTC myRTC(6, 7, 8);

int Tanggal, Bulan, Tahun, Jam, Menit, Detik;

const int rainPin = A0;

const int ledPin = 13;

File dataFile;

void setup() {

  Serial.begin(9600);

  if (!SD.begin(4)) {

    Serial.println("Gagal menginisialisasi SD card");

    return;

  }

  dataFile = SD.open("HUJAN.txt", FILE_WRITE);

  if (!dataFile) {

    Serial.println("Gagal membuka file");

    return;

  }

}
```

```
pinMode(ledPin, OUTPUT); // Mengatur pin ledPin sebagai output
myRTC.setDS1302Time(30, 20, 14, 06, 07, 07, 2023);
}

void loop() {
    int rainValue = analogRead(rainPin);
    myRTC.updateTime();

    dataFile.print(myRTC.hours);
    dataFile.print(":");
    dataFile.print(myRTC.minutes);
    dataFile.print(":");
    dataFile.print(myRTC.seconds);
    dataFile.print(",");
    dataFile.print(myRTC.dayofmonth);
    dataFile.print("/");
    dataFile.print(myRTC.month);
    dataFile.print("/");
    dataFile.print(myRTC.year);
    dataFile.print(",");
    dataFile.print(rainValue);
    dataFile.print(",");
    if (rainValue < 500) {
        dataFile.println("Hujan");
    }
}
```

```
} else {  
dataFile.println("Tidak Hujan");  
Serial.print(myRTC.hours);  
Serial.print(":");  
Serial.print(myRTC.minutes);  
Serial.print(":");  
Serial.print(myRTC.seconds);  
Serial.print(", ");  
Serial.print(myRTC.dayofmonth);  
Serial.print("/");  
Serial.print(myRTC.month);  
Serial.print("/");  
Serial.print(myRTC.year);  
Serial.print(", ");  
Serial.print("Nilai Analog: ");  
Serial.print(rainValue);  
Serial.print(", ");  
if (rainValue < 500) {  
digitalWrite(ledPin, HIGH);  
Serial.print("Hujan");  
} else {  
digitalWrite(ledPin, LOW);  
Serial.println("Tidak Hujan");
```

```
    }  
    delay(600000);  
  }  
  dataFile.flush();  
}  
void cleanup() {  
  dataFile.close();  
}
```

LAMPIRAN 2 CODING TAMPIL PADA LCD

1. Data input Sensor DHT11 di proses oleh mikrokontroller di tampil pada LCD dan selanjutnya di simpan pada *Micro SD / SD card*

```
#include <SD.h>

#include <Wire.h>

#include <virtuabotixRTC.h>

#include <DHT.h>

#include <LiquidCrystal_I2C.h>

#define DHTPIN 3

#define DHTTYPE DHT11

LiquidCrystal_I2C lcd(0x27, 16, 2)

DHT dht(DHTPIN, DHTTYPE);

virtuabotixRTC myRTC(6, 7, 8);

File dataFile;

void setup() {

    Serial.begin(9600);

    lcd.begin();

    lcd.print("DHT11 Modul");

    delay(2000);

    lcd.clear();
```

```
    lcd.print("Mengukur...");  
if (!SD.begin(4)) {  
    lcd.clear();  
    lcd.print("Gagal menginisialisasi SD card");  
    while (1);  
}  
    dataFile = SD.open("dht11.txt", FILE_WRITE);  
if (!dataFile) {  
    lcd.clear();  
    lcd.print("Gagal membuka file");  
    while (1);  
}  
    dht.begin();  
    myRTC.setDS1302Time(30, 20, 14, 06, 7, 07, 2023);  
    delay(2000);  
    lcd.clear();  
}  
void loop() {  
    int temperature = dht.readTemperature();  
    int humidity = dht.readHumidity();  
    myRTC.updateTime();  
  
    dataFile.print(myRTC.hours);
```

```
dataFile.print(":");  
dataFile.print(myRTC.minutes);  
dataFile.print(":");  
dataFile.print(myRTC.seconds);  
dataFile.print(",");  
dataFile.print(myRTC.dayofmonth);  
dataFile.print("/");  
dataFile.print(myRTC.month);  
dataFile.print("/");  
dataFile.print(myRTC.year);  
dataFile.print(",");  
dataFile.print(temperature);  
dataFile.print(",");  
dataFile.println(humidity);  
  
lcd.clear();  
lcd.setCursor(0, 0);  
lcd.print("Suhu   :");  
lcd.print(temperature);  
lcd.print(" C");  
lcd.setCursor(0, 1);  
lcd.print("Kelembaban: ");  
lcd.print(humidity);
```

```
lcd.print(" %");  
  
delay(600000);  
  
lcd.clear();  
  
lcd.setCursor(0, 1);  
  
lcd.print("Waktu :");  
  
lcd.print(myRTC.hours);  
  
lcd.print(":");  
  
lcd.print(myRTC.minutes);  
  
lcd.print(":");  
  
lcd.print(myRTC.seconds);  
  
lcd.print(", ");  
  
lcd.print("Tanggal: ");  
  
lcd.print(myRTC.dayofmonth);  
  
lcd.print("/");  
  
lcd.print(myRTC.month);  
  
lcd.print("/");  
  
lcd.print(myRTC.year);  
  
delay(5000);  
  
dataFile.flush();  
  
}  
  
void cleanup() {  
    dataFile.close();  
  
}
```


2. Data input Sensor BMP180 di proses oleh mikrokontroler di tampil pada LCD dan selanjutnya di simpan pada *Micro SD / SD card*

```
#include <Wire.h>

#include <SD.h>

#include <Adafruit_Sensor.h>
#include <Adafruit_BMP085_U.h>
#include <virtuabotixRTC.h>
#include <LiquidCrystal_I2C.h>

Adafruit_BMP085_Unified bmp;
LiquidCrystal_I2C lcd(0x27, 16, 2);

virtuabotixRTC myRTC(6,7,8);
File dataFile;

void setup() {
  Serial.begin(9600);
  lcd.begin();
  lcd.print("BMP180 Modul");
  delay(2000);
  lcd.clear();
  lcd.print("Mengukur...");

  if (!bmp.begin()) {
    Serial.println("Tidak dapat menemukan sensor BMP180 yang valid, periksa koneksi!");
  }
}
```

```
    while (1);
}

if (!SD.begin(4)) {
    lcd.clear();
    lcd.print("Gagal menginisialisasi SD card");
    while (1);
}

dataFile = SD.open("s2.txt", FILE_WRITE);

if (!dataFile) {
    lcd.clear();
    lcd.print("Gagal membuka file");
    while (1);
}

myRTC.setDS1302Time(24, 10, 14, 06, 07, 07, 2023);

delay(2000);

lcd.clear();
}

void loop() {
    myRTC.updateTime();
    sensors_event_t event;
    bmp.getEvent(&event);
```

```
float pressure = event.pressure;

float altitude = bmp.pressureToAltitude(1013.25, pressure);

dataFile.print(myRTC.hours);
dataFile.print(":");
dataFile.print(myRTC.minutes);
dataFile.print(":");
dataFile.print(myRTC.seconds);
dataFile.print(",");
dataFile.print(myRTC.dayofmonth);
dataFile.print("/");
dataFile.print(myRTC.month);
dataFile.print("/");
dataFile.print(myRTC.year);
dataFile.print(",");
dataFile.print(pressure);
dataFile.print(" mb");
dataFile.print(",");
dataFile.print(altitude);
dataFile.println(" m");

lcd.clear();
lcd.setCursor(0, 0);
lcd.print("Tekanan: ");
```

```
lcd.print(pressure);  
lcd.print(" mb");  
lcd.print(" ");  
lcd.print("Ketinggian: ");  
lcd.print(altitude);  
lcd.print(" m");  
delay(600000);  
  
lcd.clear();  
lcd.setCursor(0, 1);  
lcd.print("Waktu :");  
lcd.print(myRTC.hours);  
lcd.print(":");  
lcd.print(myRTC.minutes);  
lcd.print(":");  
lcd.print(myRTC.seconds);  
lcd.setCursor(0, 0);  
lcd.print("Tanggal: ");  
lcd.print(myRTC.dayofmonth);  
lcd.print("/");  
lcd.print(myRTC.month);  
lcd.print("/");  
lcd.print(myRTC.year);
```

```

    delay(5000);

    dataFile.flush();
}

void cleanup() {
    dataFile.close();
}

```

3. Data input Sensor *Raindrops Module* di proses oleh mikrokontroler di tampil pada LCD dan selanjutnya di simpan pada *Micro SD / SD card*

```

#include <SD.h>

#include <Wire.h>

#include <virtuabotixRTC.h>

#include <LiquidCrystal_I2C.h>

LiquidCrystal_I2C lcd(0x27, 16, 2);

virtuabotixRTC myRTC(6, 7, 8);

int Tanggal, Bulan, Tahun, Jam, Menit, Detik;

const int rainPin = A0;

const int ledPin = 13;

File dataFile;

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

    pinMode(ledPin, OUTPUT);
}

```

```
lcd.begin();  
lcd.print("Raindrops Modul");  
delay(2000);  
  
lcd.clear();  
lcd.print("Mengukur...");  
  
if (!SD.begin(4)) {  
    lcd.clear();  
    lcd.print("Gagal menginisialisasi SD card");  
    while (1);  
}  
dataFile = SD.open("s3.txt", FILE_WRITE);  
if (!dataFile) {  
    lcd.clear();  
    lcd.print("Gagal membuka file");  
    while (1);  
}  
pinMode(ledPin, OUTPUT);  
myRTC.setDS1302Time(30, 20, 14, 06, 07, 07, 2023);  
delay(2000);  
lcd.clear();  
}
```

```
void loop() {  
    int rainValue = analogRead(rainPin);  
    myRTC.updateTime();  
  
    dataFile.print(myRTC.hours);  
    dataFile.print(":");  
    dataFile.print(myRTC.minutes);  
    dataFile.print(":");  
    dataFile.print(myRTC.seconds);  
    dataFile.print(",");  
    dataFile.print(myRTC.dayofmonth);  
    dataFile.print("/");  
    dataFile.print(myRTC.month);  
    dataFile.print("/");  
    dataFile.print(myRTC.year);  
    dataFile.print(",");  
    dataFile.print(rainValue);  
    dataFile.print(",");  
    if (rainValue < 500) {  
        dataFile.println("Hujan");  
    } else {  
        dataFile.println("Tidak Hujan");  
    }  
}
```

```
lcd.clear();

lcd.setCursor(0, 0);

lcd.print("Nilai Analog: ");

lcd.print(rainValue);

lcd.print(", ");

if (rainValue < 500) {

digitalWrite(ledPin, HIGH);

lcd.print("Hujan");

} else {

digitalWrite(ledPin, LOW);

lcd.print("Tidak Hujan");

}

delay(600000);

lcd.clear();

lcd.setCursor(0, 1);

lcd.print("Waktu : ");

lcd.print(myRTC.hours);

lcd.print(":");

lcd.print(myRTC.minutes);

lcd.print(":");

lcd.print(myRTC.seconds);

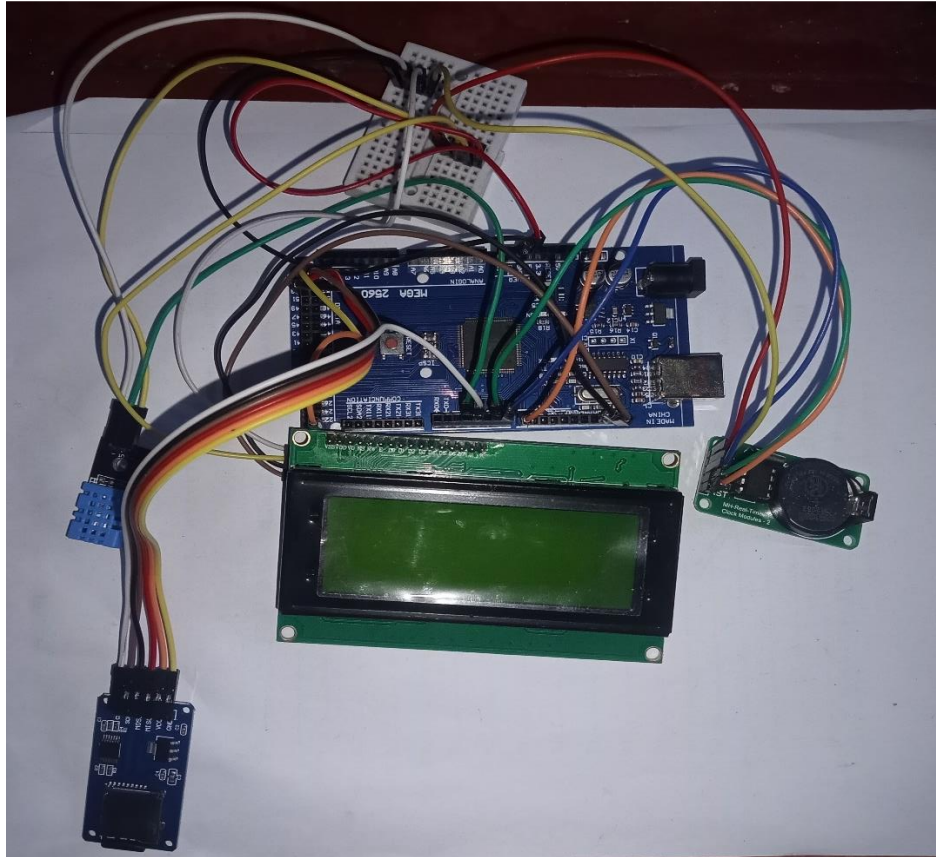
lcd.setCursor(0, 0);
```



```
lcd.print("Tanggal: ");  
lcd.print(myRTC.dayofmonth);  
lcd.print("/");  
lcd.print(myRTC.month);  
lcd.print("/");  
lcd.print(myRTC.year);  
  
delay(5000);  
  
dataFile.flush();  
}  
void cleanup() {  
    dataFile.close();  
}
```

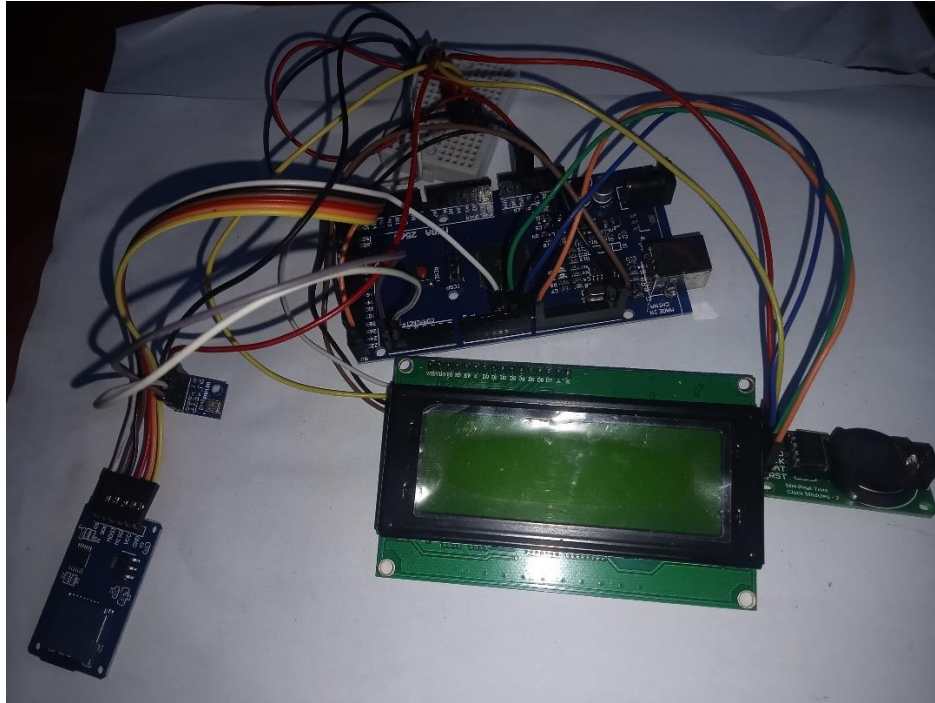
LAMPIRAN 3 RANGKAIAN ALAT

1. DHT11 (Suhu Dan Kelembaban)



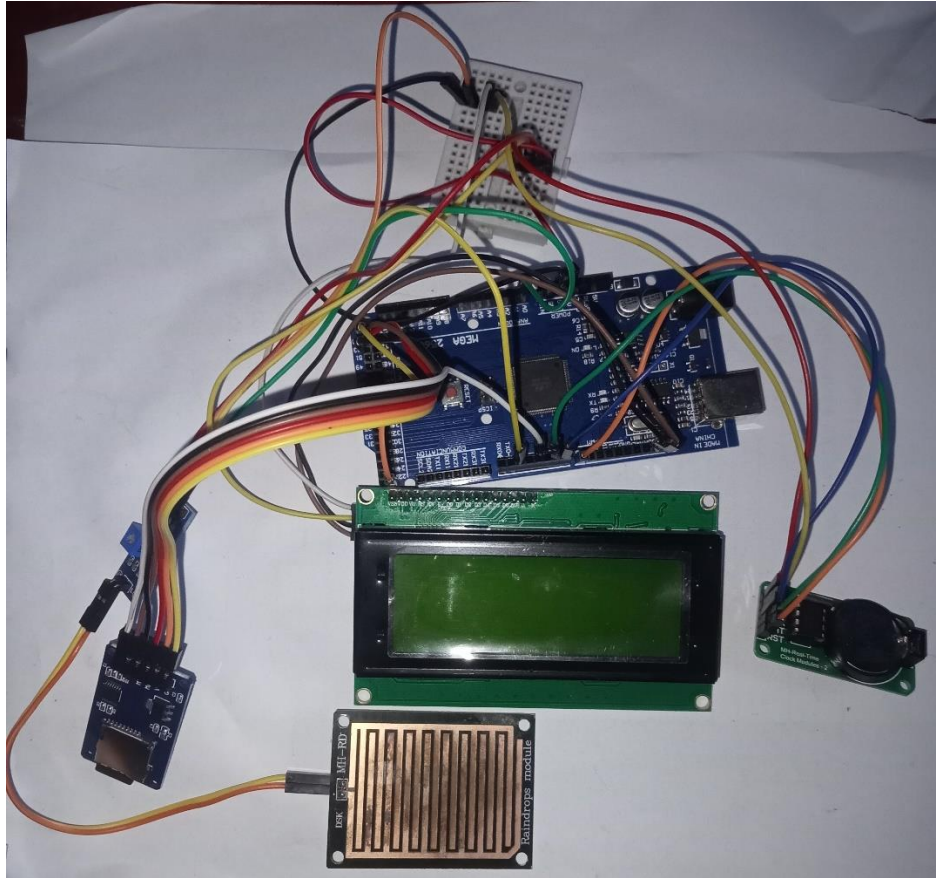
Pemasangan Arduino ATmega 2560 dengan Sensor DHT11, LCD 20 x 4, RTC
(*Real Time Clock*) dan Modul SD Card .

2. BMP180 (Tekanan Udara dan ketinggian)



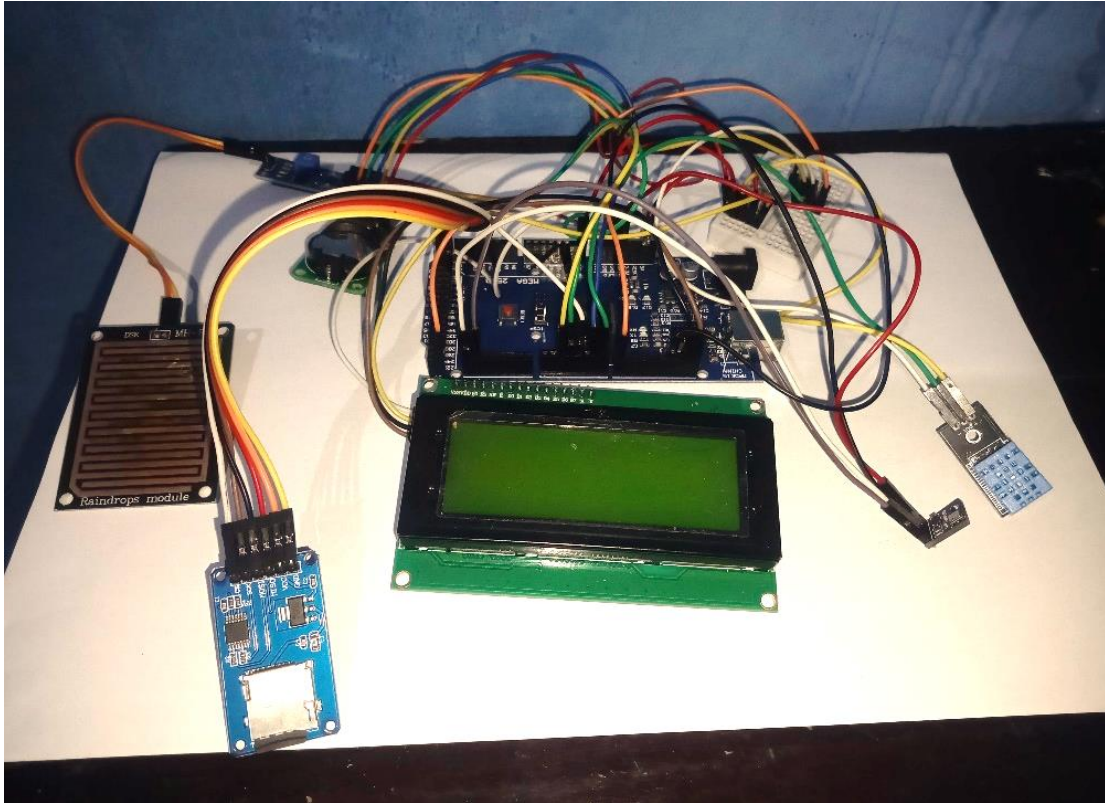
Pemasangan Arduino ATmega 2560 dengan Sensor BMP180, LCD 20 x 4, RTC (*Real Time Clock*) dan Modul SD Card.

3. Sensor Hujan (Raindrop Module)



Pemasangan Arduino ATmega 2560 dengan Sensor *Raindrops Mudule*, LCD 20 x 4, RTC (*Real Time Clock*) dan Modul SD Card.

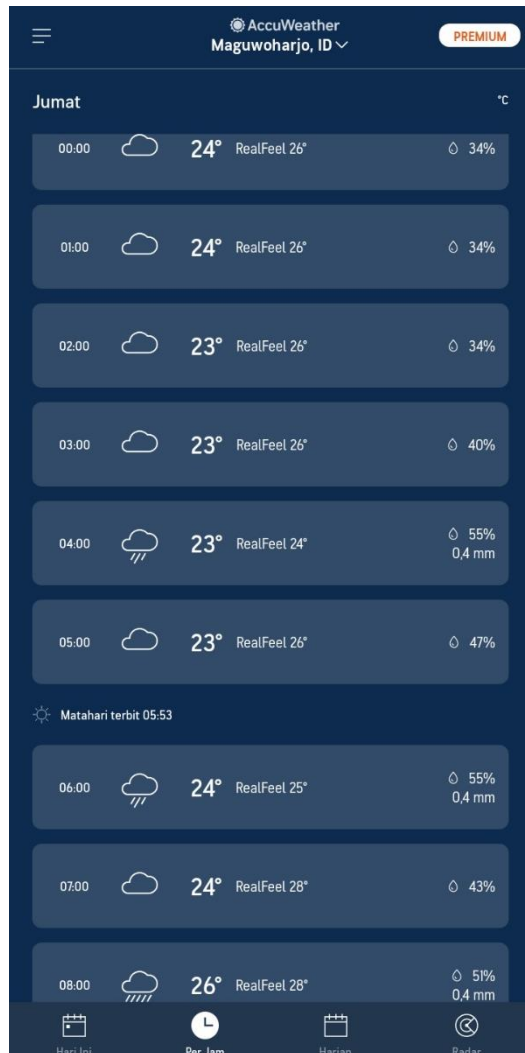
LAMPIRAN 4 HASIL RANGKAIAN KESELURUHAN



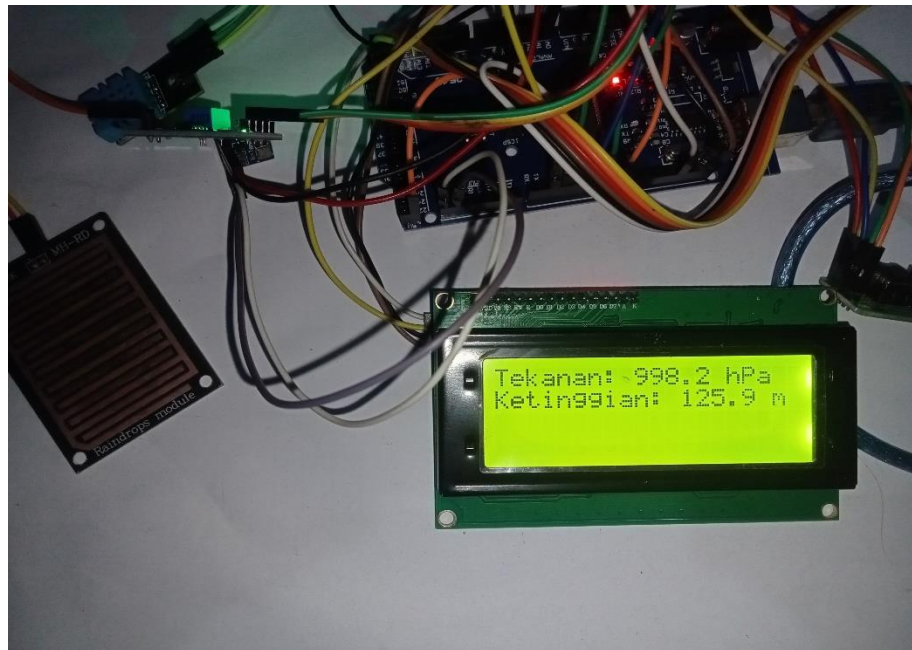
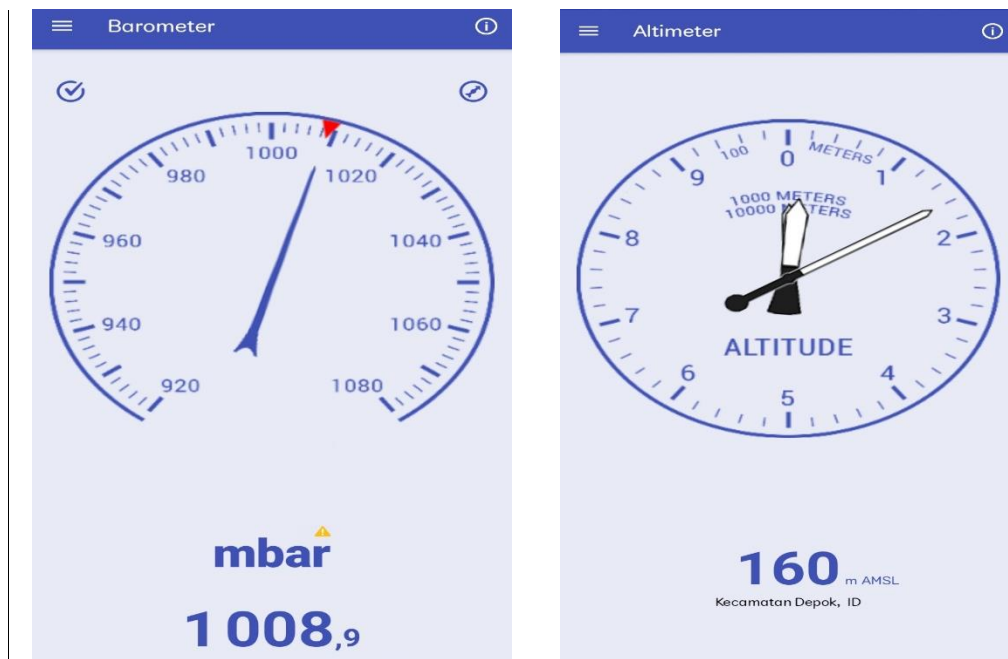
Pemasangan Arduino ATmega 2560 dengan Sensor *Raindrops Mudule*, DHT11, BMP180, LCD 20 x 4, RTC (*Real Time Clock*) dan Modul SD Card.

LAMPIRAN 5 CARA PENGAMBILAN DATA

1. DHT11 dengan sensor AccuWeather yang terdapat pada smartphone. Pada data tersebut mengambil suhu dan kelembaban udara.



2. BMP180 dengan sensor Barometer yang terdapat pada smartphone. Pada data tersebut mengambil nilai tekanan udara dan ketinggian.



3. Sensor hujan cara mengambil data dengan meneteskan air pada beberapa titik air ke bagian panel dari sensor hujan sedikit demi sedikit

