

LAMPIRAN

1. List Program Arduino Uno

```
#include <SoftwareSerial.h> //library serial
#include <Wire.h>           //library wire
#include <LiquidCrystal_I2C.h> //library LCD + I2C
#include "EmonLib.h"       // Emon Library ukur arus AC

LiquidCrystal_I2C lcd(0x27,20,4); //mendefinisikan alamat LCD
SoftwareSerial mySerial(2,3); //koneksi Serial ESP dengan Arduino (pin2
& Pin3)

#include "RTCLib.h" //library Real Time Clock (RTC)
RTC_DS1307 rtc; //definisi RTC
char namaHari[7][12] = {"Minggu", "Senin", "Selasa", "Rabu", "Kamis", "Jumat",
"Sabtu"};

//UKUR ARUS AC
EnergyMonitor emon1;

// UKUR SUHU
#include "DHT.h"
#define DHTPIN 12
#define DHTTYPE DHT22
DHT dht(DHTPIN, DHTTYPE);

String Data;
char c;
```

```

//RELAY

#define relay1 7
#define relay2 6

//BUAT TOMBOL

int tombol= 11;
int nilaitombol;
int count;

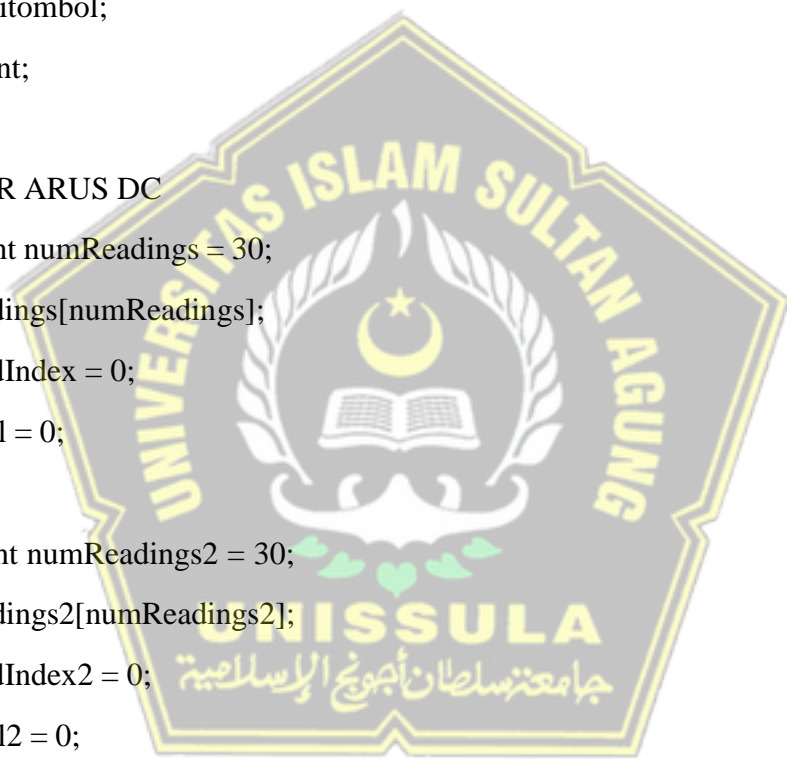
//UKUR ARUS DC
const int numReadings = 30;
int readings[numReadings];
int readIndex = 0;
int total = 0;

const int numReadings2 = 30;
int readings2[numReadings2];
int readIndex2 = 0;
int total2 = 0;

const int numReadings3 = 30;
int readings3[numReadings3];
int readIndex3 = 0;
int total3 = 0;

double batasarus = 2485;
double naikarus = 100;

```



```
int adctegangan, adctegangan2, tegangan, tegangan2, adcarus, aktif, t, h,  
automanual;
```

```
double arusdc, varus, vaki, vsolar;
```

```
//BUAT SIMBOL
```

```
byte aki[] = {
```

```
0b00100,
```

```
0b01000,
```

```
0b11100,
```

```
0b01001,
```

```
0b10010,
```

```
0b00111,
```

```
0b00010,
```

```
0b00100
```

```
};
```

```
byte solar[] = {
```

```
0b01110,
```

```
0b11011,
```

```
0b10001,
```

```
0b11011,
```

```
0b11111,
```

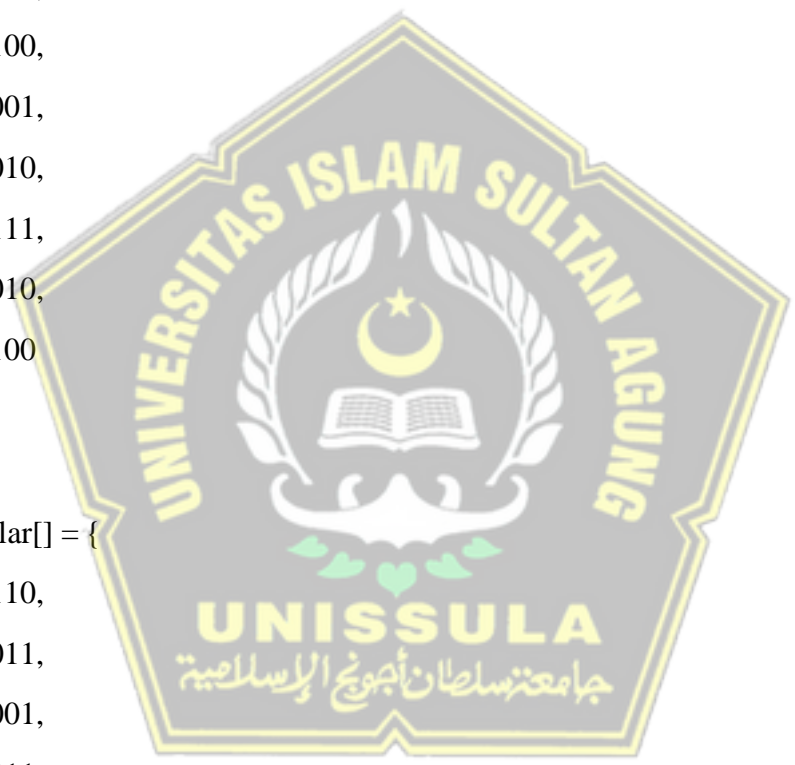
```
0b11111,
```

```
0b10001,
```

```
0b11111
```

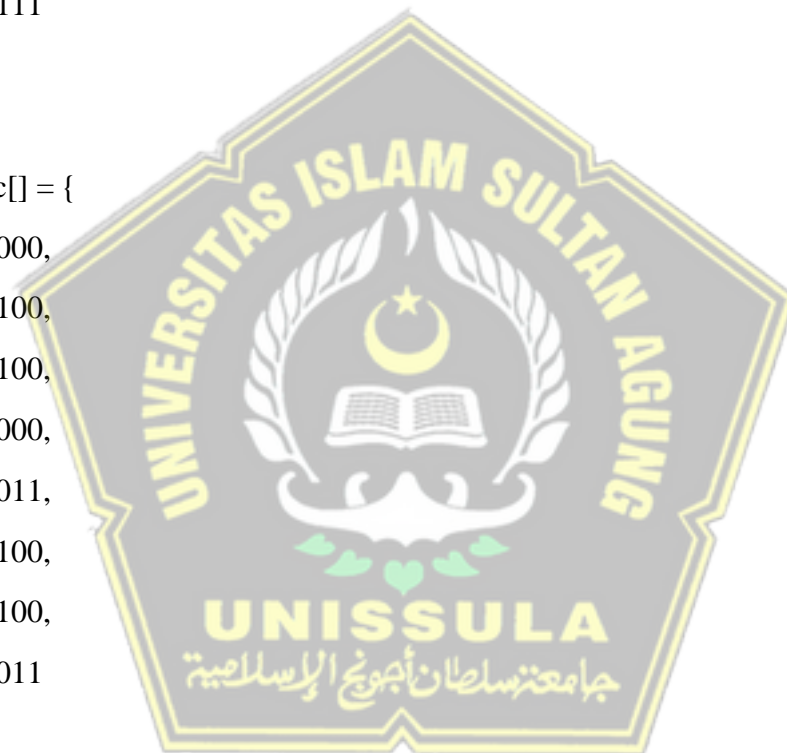
```
};
```

```
byte ac[] = {
```



```
0b01000,  
0b10100,  
0b11100,  
0b10100,  
0b00111,  
0b00100,  
0b00100,  
0b00111  
};
```

```
byte dc[] = {  
0b11000,  
0b10100,  
0b10100,  
0b11000,  
0b00011,  
0b00100,  
0b00100,  
0b00011  
};
```



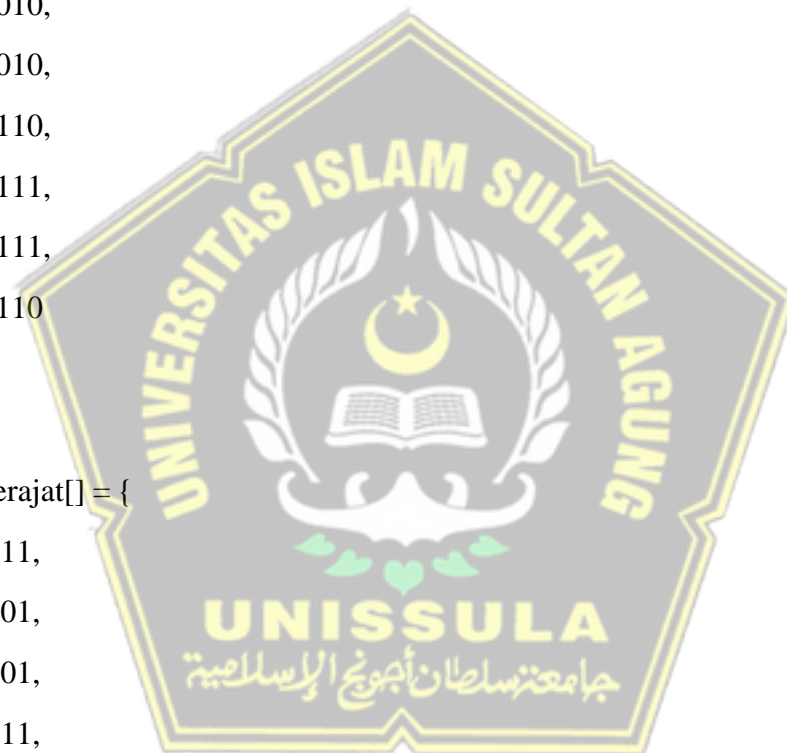
```
byte koil[] = {  
0b00100,  
0b11111,  
0b10001,  
0b10001,  
0b10001,  
0b10001,
```

```
0b11111,  
0b00100  
};
```

```
byte termo[] = {  
0b00100,  
0b01010,  
0b01010,  
0b01010,  
0b01110,  
0b11111,  
0b11111,  
0b01110  
};
```

```
byte derajat[] = {  
B01111,  
B01001,  
B01001,  
B01111,  
B00000,  
B00000,  
B00000,  
B00000  
};
```

```
byte daya[] = {  
B00001,
```



```
B00110,  
B01100,  
B11111,  
B11111,  
B00111,  
B01100,  
B10000  
};
```

```
void setup(){  
  Serial.begin (9600);  
  mySerial.begin (9600);  
  dht.begin();  
  Wire.begin();  
  emon1.current(3, 150); //KALIBRASI SENSOR ARUS AC  
  pinMode(tombol, INPUT);  
  pinMode (relay1, OUTPUT);  
  pinMode (relay2, OUTPUT);  
  digitalWrite(relay1, HIGH);  
  digitalWrite(relay2, HIGH);
```

```
  lcd.init();  
  lcd.backlight();  
  lcd.setBacklight(HIGH);  
  lcd.createChar(0, solar);  
  lcd.createChar(1, aki);  
  lcd.createChar(2, dc);
```

```
lcd.createChar(3, ac);  
lcd.createChar(4, koil);  
lcd.createChar(5, termo);  
lcd.createChar(6, derajat);  
lcd.createChar(7, daya);  
aktif = 0;  
automanual = 0;
```

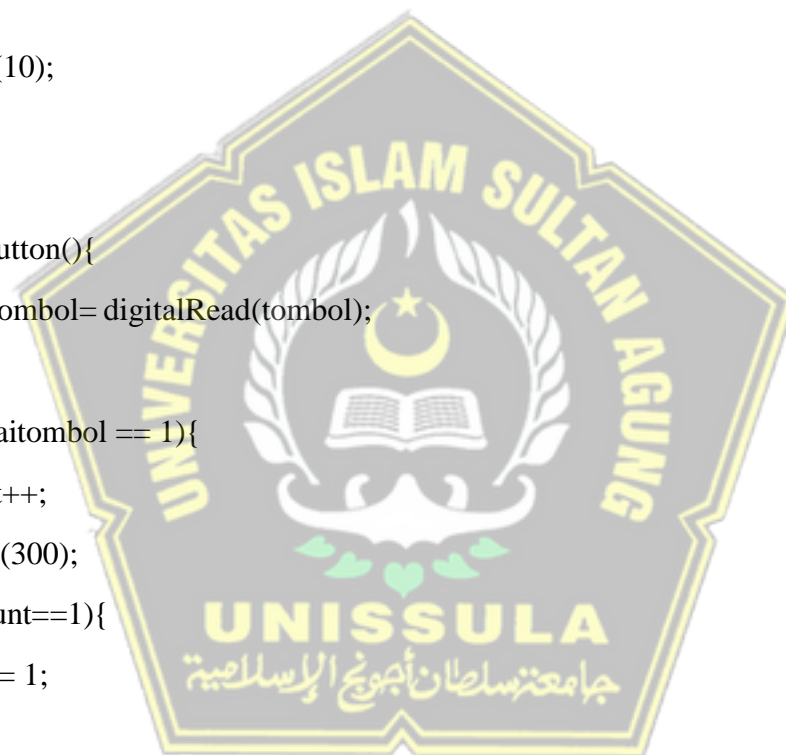
```
delay(10);  
}
```

```
void button(){  
  nilaitombol= digitalRead(tombol);
```

```
  if(nilaitombol == 1){  
    count++;  
    delay(300);  
    if(count==1){  
      aktif = 1;  
    }  
  }
```

```
  if(count==2){  
    aktif = 0;  
    count=0; }  
  }  
}
```

```
void UkurTegangan(){  
  adctegangan = analogRead(A0);
```



```

total2 = total2 - readings2[readIndex2];
readings2[readIndex2] = adctegangan;
total2 = total2 + readings2[readIndex2];
readIndex2 = readIndex2 + 1;
if (readIndex2 >= numReadings2) {
    readIndex2 = 0;
}
adctegangan = total2 / numReadings2;
tegangan = map(adctegangan, 0, 1024, 0, 250);
vsolar = tegangan / 10.0;

adctegangan2 = analogRead(A1);
total3 = total3 - readings3[readIndex3];
readings3[readIndex3] = adctegangan2;
total3 = total3 + readings3[readIndex3];
readIndex3 = readIndex3 + 1;
if (readIndex3 >= numReadings3) {
    readIndex3 = 0;
}
adctegangan2 = total3 / numReadings3;
tegangan2 = map(adctegangan2, 0, 1024, 0, 250);
vaki = tegangan2 / 10.0;
}

void UkurArus()
{
    adcarus = analogRead(A2);
    total = total - readings[readIndex];
}

```



```

readings[readIndex] = adcarus;
total = total + readings[readIndex];
readIndex = readIndex + 1;
if (readIndex >= numReadings) {
    readIndex = 0;
}
adcarus = total / numReadings;
varus = ( adcarus / 1024.0) * 5000;
arusdc = ((varus - batasarus) / naikarus);
if (arusdc <= 0)
{
    arusdc = 0;
}
}

void UkurSuhuLembab(){
    h = dht.readHumidity();
    t = dht.readTemperature();
}

void hasilrelay()
{
    if (aktif == 0)
    {
        digitalWrite(relay1, HIGH);
        digitalWrite(relay2, HIGH);
    }
    else {

```



```

digitalWrite(relay1, LOW);
digitalWrite(relay2, LOW);
}
}

void loop() {

//UKUR ARUS AC
double Irms = emon1.calcIrms(1480); // Calculate Irms only 1480
float Irms2 = Irms/120;
if (Irms2 < 0.3) Irms2 =Irms2/4;

//MENENTUKAN DAYA
int Daya = 215 * Irms2; //Ukur Daya
if (Daya < 4 ) Daya=0;

float Daya2 = 215 * Irms2; //Ukur Daya
if (Daya2 < 4 ) Daya2=0;

UkurTegangan();
UkurArus();
button();
delay(10);

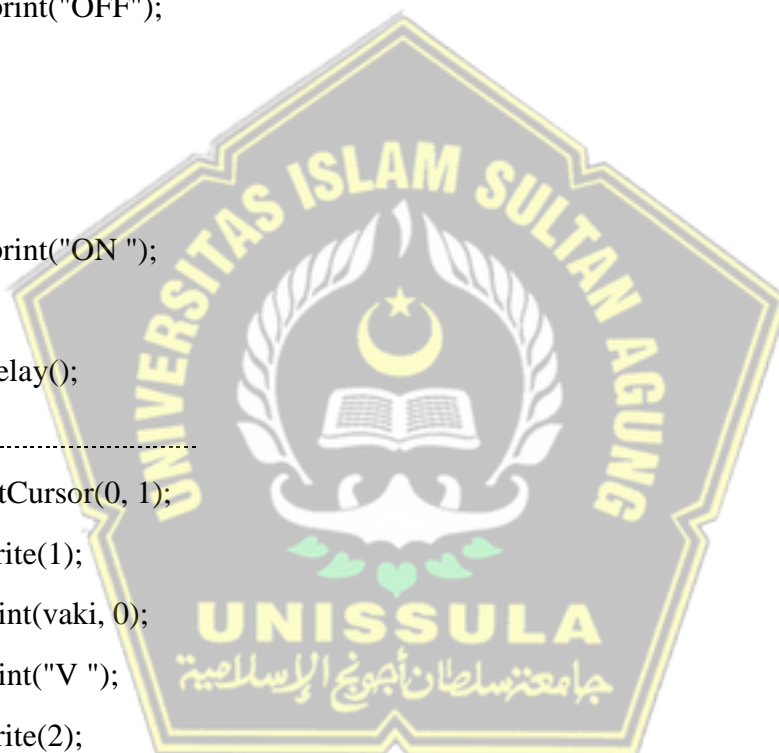
lcd.setCursor(0, 0);
lcd.write(0);
lcd.print(vsolar, 0);
lcd.print("V ");

```

```

lcd.write(7);
lcd.print(Daya);
lcd.print(" W  ");
lcd.setCursor(12, 0);
lcd.write(4);
if (aktif == 0)
{
  lcd.print("OFF");
}
else
{
  lcd.print("ON ");
}
hasilrelay();
//.....
lcd.setCursor(0, 1);
lcd.write(1);
lcd.print(vaki, 0);
lcd.print("V ");
lcd.write(2);
lcd.print(arusdc, 1);
lcd.print("A ");
lcd.write(3);
lcd.print(Irms2, 1);
lcd.print("A");
//.....
if (automanual == 1)
{

```



```

if (vaki <= 11.0)
{
    aktif = 0;
}
else
{
    aktif = 1;
}
}

```

```
//INTERAKSI DENGAN ESP8266
```

```

while(mySerial.available()>0){
    delay(10);
    c = mySerial.read();
    Data +=c;
}

```

```

if (Data.length()>0){
    Serial.println(Data);
    if (Data == "Auto") {
        automanual = 1;
        mySerial.print ("Sistim Mode= Otomatis");
    }
}

```

```

else if (Data == "Manual")
{
    automanual = 0;
}

```



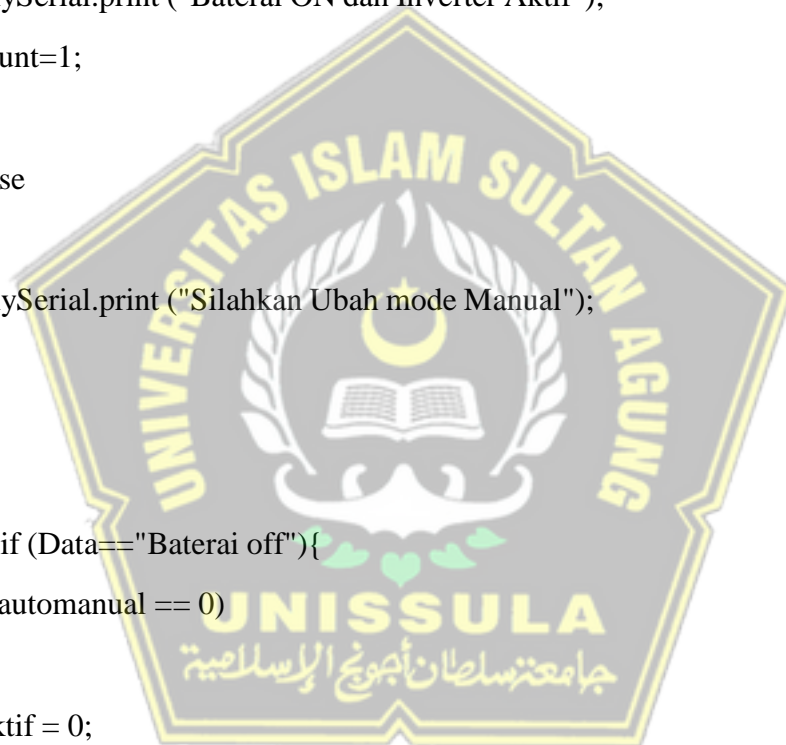
```

    mySerial.print ("Sistim Mode= Manual");
}

else if (Data == "Baterai on") {
    if (automanual == 0)
    {
        aktif = 1;
        mySerial.print ("Baterai ON dan Inverter Aktif");
        count=1;
    }
    else
    {
        mySerial.print ("Silahkan Ubah mode Manual");
    }
}

else if (Data=="Baterai off"){
    if (automanual == 0)
    {
        aktif = 0;
        mySerial.print ("Baterai OFF dan Inverter NonAktif");
        count=0;
    }
    else
    {
        mySerial.print ("Silahkan Ubah mode Manual");
    }
}

```



```

else if (Data=="Monitor"){
    DateTime now = rtc.now();
    mySerial.print(namaHari[now.dayOfTheWeek()]);
    mySerial.print(',');
    mySerial.print(now.day(), DEC);
    mySerial.print('/');
    mySerial.print(now.month(), DEC);
    mySerial.print('/');
    mySerial.print(now.year(), DEC);
    mySerial.print(" ");
    mySerial.print(now.hour(), DEC);
    mySerial.print(':');
    mySerial.print(now.minute(), DEC);
    mySerial.print(':');
    mySerial.print(now.second(), DEC);

    mySerial.print (" ||MONITOR SISTEM KONTROL|| Teg. Baterai = ");
    mySerial.print (vsolar);
    Serial.print(vsolar);
    mySerial.print (" V");
    mySerial.print (" , Teg. Panel = ");
    mySerial.print (vaki);
    mySerial.print (" V");
    mySerial.print (" , Arus DC = ");
    mySerial.print (arusdc);
    mySerial.print (" A");
    mySerial.print (" , Arus AC = ");
    mySerial.print (Irms2);

```

```

mySerial.print (" A");
mySerial.print (" , Daya Terpakai = ");
mySerial.print (Daya2);
mySerial.print (" Watt");
mySerial.print (" %");
mySerial.print (" , Baterai ");
    if (aktif == 0)
    {
        mySerial.print ("OFF");
    }
    else
    {
        mySerial.print ("ON");
    }
mySerial.print (" , Mode = ");
    if (automanual == 1)
    {
        mySerial.print ("Otomatis.");
    }
    if (automanual == 0)
    {
        mySerial.print ("Manual.");
    }
}
Data = "";
}
}

```



2. List Program Telegram

```
#include "CTBot.h"

CTBot myBot;

String ssid = "FREZA FINA";
String pass = "ezafina0212";
String token= "767638841:AAFh-ICbnXXMJMudTAg7XVwU2OresEVkwwE";

String Data;
char c;

void setup(){
  Serial.begin (115200);
  Serial.println("Starting TelegramBot...");

  myBot.wifiConnect(ssid, pass);
  myBot.setTelegramToken(token);

  if (myBot.testConnection())
    Serial.println ("\ntestConnection OK");
  else
    Serial.println ("\ntestConnection NOK");
}

void loop() {
  TBMessage msg;
```



```

if (myBot.getNewMessage(msg)){

    if (msg.text.equalsIgnoreCase("Baterai on")){
        myBot.sendMessage(msg.sender.id, "Mengulang Perintah..... " + Data);
        Serial.print ("Baterai on");
    }
    else if (msg.text.equalsIgnoreCase("Baterai off")){
        myBot.sendMessage(msg.sender.id, "Mengulang Perintah..... " + Data);
        Serial.print ("Baterai off");
    }
    else if (msg.text.equalsIgnoreCase("Monitor")){
        Serial.print ("Monitor");
    }
    else if (msg.text.equalsIgnoreCase("Auto")){
        Serial.print ("Auto");
        myBot.sendMessage(msg.sender.id, "Beralih ke Mode Otomatis");
    }
    else if (msg.text.equalsIgnoreCase("Manual")){
        Serial.print ("Manual");
        myBot.sendMessage(msg.sender.id, "Beralih ke Mode Manual, silakan berikan perintah");
    }
    else {
        String reply;

        reply = (String) "Selamat datang " + msg.sender.username + (String)". Ini adalah layanan sistem kontrol. Silakan masukkan perintah berikut : Manual (untuk beralih ke mode manual), Auto (untuk beralih ke mode otomatis), Baterai On (untuk menyalakan baterai), Baterai Off (untuk mematikan baterai), dan Monitor (untuk menampilkan kondisi sitem). ";

        myBot.sendMessage(msg.sender.id, reply);
    }
}

```

```
    }  
  }  
  while (Serial.available()>0){  
    delay(10);  
    c =Serial.read();  
    Data += c;  
  }  
  if (Data.length()>0){  
    myBot.sendMessage(msg.sender.id, Data + ". Terimakasih");  
    delay(10);  
    Data ="";  
  }  
  
  delay(500);  
}
```

