Daftar Pustaka

Botta, A., Donato, W., Persico, V., & Pescapè, A. (2014). On the integration of cloud computing and internet of things. *Proceedings - 2014 International Conference on Future Internet of Things and Cloud, FiCloud 2014*, 23–30. https://doi.org/10.1109/FiCloud.2014.14

Guoqiang, S., Yanming, C., Chao, Z., & Yanxu, Z. (2013). Design and Implementation of a Smart IoT Gateway. *2013 IEEE International Conference on Green Computing and Communications and IEEE Internet of Things and IEEE Cyber, Physical and Social Computing*, 720–723. https://doi.org/10.1109/GreenCom-iThings-CPSCom.2013.130

Lutfi, M. E., & Rouf, A. (2014). Purwarupa kWh Meter Prabayar Berbasis Sensor Network. *IJEIS (Indonesian Journal of Electronics and Instrumentation Systems)*, *4*(2), Article 2. https://doi.org/10.22146/ijeis.7114

Novriandry, Y., Triyanto, D., & Suhardi. (2020). PROTOTYPE SISTEM MONITORING DAN PENGISIAN TOKEN LISTRIK PRABAYAR MENGGUNAKAN ARDUINO UNO BERBASIS WEBSITE. *Coding Jurnal Komputer Dan Aplikasi*, *8*(3), Article 3. https://doi.org/10.26418/coding.v8i3.43320

Stoer, M. (2018). *NodeMCU Documentation*. https://nodemcu.readthedocs.io/en/release/

Sudimanto. (2017). *PENGISIAN PULSA (TOKEN) LISTRIK MENGGUNAKAN SMS (SHORT MESSAGES SERVICES)—PDF Download Gratis*. https://docplayer.info/53340125-Pengisian-pulsa-token-listrik-menggunakan-sms-short-messages-services.html

Syafar, A. M. (2017). SISTEM PENGISIAN VOUCHER LISTRIK JARAK JAUH VIA SMS BERBASIS MIKROKONTROLLER. *Jurnal INSTEK (Informatika Sains dan Teknologi)*, *2*(2), Article 2. https://doi.org/10.24252/instek.v2i2.4016

Lampiran

Program Arduino Uno

```
#include <SoftwareSerial.h>
#define limitUp A1   //limit up sebagai posisioning stepper atas dihubungkan dengan pin a1
#define limitDown A0 // limit down sebagai posisioning stepper bawah dihunungkan dengan pin a0
#define suara A2 // sensor suara dihubungkan dengan pin a2 pada arduino , dia mendeteksi suara pada kwh pada saat vocer habis ,
#define buzzer 9 // buzzer dihubungkan dengan pin 9 pada arduino
#define Solenoid 2  //solenoid dihubungkan dengan pin 2 pada arduino
#define dirStepUp 3   //pin diirection stepper atas dihubungkan dengan pin 3 arduino
#define stepStepUp 4  //pin stepper atas dihunungkan dengan pin 4 arduino
#define dirStepDw1 5   //pin direction stepper bawah dihubungkan dengan pin 5 arduino
#define stepStepDw1 6  //pin stepper bawah dihubungkan dengan pin 6 arduino
#define dirStepDw2 11   //pin direction stepper bawah duhubungkan dengan pi 11 arduino
#define stepStepDw2 10  //pin stepper bawah duhubungkan dengan pi 1o arduino
#define rx 7 // receiver unutk menerima data dari esp ke arduino , dihunungkan ke pi 7 pada arduino
#define tx 8 // transmitter unutk mengirim data ke esp , dihubungkan ke pin 8 aarduino

char nomorToken[25];
String dataSerial="";
boolean statusSuara=1;
boolean statusHitung=1;
byte hitung=0;
unsigned long waktu,waktuRst;
SoftwareSerial serialToESP(rx,tx);

void setup() {
```

```
  Serial.begin(9600);   //mengatur baud rate Serial ke 9600
  serialToESP.begin(9600); // mengatur baud rate Serial 1 arduino ke 9600 agar sesuai dengan baud rate sensor QR code

  pinMode (limitUp,INPUT_PULLUP);   //mengatur limit sebagai masukan, mengatur pin arduino sebagai penerima data dari limit
  pinMode (limitDown,INPUT_PULLUP);   //mengatur limit sebagai masukan
  pinMode (suara,INPUT);
  pinMode (buzzer,OUTPUT);        //mengatur sensor IR sebagai masukan atau input
  pinMode (Solenoid,OUTPUT);    //relay sebagai output
  pinMode (dirStepUp,OUTPUT); //step sebagai output
  pinMode (stepStepUp,OUTPUT);
  pinMode (dirStepDw1,OUTPUT);
  pinMode (stepStepDw1,OUTPUT);
  pinMode (dirStepDw2,OUTPUT);
  pinMode (stepStepDw2,OUTPUT);
  ResetStepperUp(); // mereset posisi stepper
  ResetStepperDw();
}

void loop() {

menuUtama:
while (serialToESP.available()>0) {dataSerial=serialToESP.readString(); // membaca data string yang berasal dari node mcu
                        dataSerial.toCharArray(nomorToken,25); // mengelompokkan data yang diterima menjadi satu per satu
                        Serial.println (dataSerial);
                        for (int x=0; x<25; x++) {Serial.println(nomorToken[x]);}; // hanya unutk memastikan data masuk atau diterima dari esp
                        for (int x=0; x<3; x++){digitalWrite(buzzer,HIGH);delay(100);digitalWrite(buzzer,LOW);delay(100);}
```

```
                goto menu1;
                }

int dataSuara = analogRead(suara);//Serial.print ("adc=
");Serial.print(dataSuara);Serial.println();
if (dataSuara<100 && statusHitung==1) {delay(500);hitung++;//Serial.print ("hitung=
");Serial.print(hitung);Serial.println();
                waktu = millis();
                if ((waktu-waktuRst)>=30000) {hitung=0;waktuRst=waktu; }
                if (hitung>=10 && statusSuara==1) {serialToESP.print("NOTIF");
delay(1000);statusSuara=0;}
                statusHitung=0;
                }
if (dataSuara>500) {statusHitung=1;}

goto menuUtama;

menu1:
if (nomorToken[0]=='0') {Serial.println ("nol"); tekan0();goto menu2;}
if (nomorToken[0]=='1') {Serial.println ("satu"); tekan1();goto menu2;}
if (nomorToken[0]=='2') {Serial.println ("dua"); tekan2();goto menu2;}
if (nomorToken[0]=='3') {Serial.println ("tiga"); tekan3();goto menu2;}
if (nomorToken[0]=='4') {Serial.println ("empat"); tekan4();goto menu2;}
if (nomorToken[0]=='5') {Serial.println ("lima"); tekan5();goto menu2;}
if (nomorToken[0]=='6') {Serial.println ("enam"); tekan6();goto menu2;}
if (nomorToken[0]=='7') {Serial.println ("tujuh"); tekan7();goto menu2;}
if (nomorToken[0]=='8') {Serial.println ("delapan"); tekan8();goto menu2;}
if (nomorToken[0]=='9') {Serial.println ("sembilan"); tekan9();goto menu2;}
goto menu1;

menu2:
if (nomorToken[1]=='0') {Serial.println ("nol"); tekan0();goto menu3;}
```

```
if (nomorToken[1]=='1') {Serial.println ("satu"); tekan1();goto menu3;}
if (nomorToken[1]=='2') {Serial.println ("dua"); tekan2();goto menu3;}
if (nomorToken[1]=='3') {Serial.println ("tiga"); tekan3();goto menu3;}
if (nomorToken[1]=='4') {Serial.println ("empat"); tekan4();goto menu3;}
if (nomorToken[1]=='5') {Serial.println ("lima"); tekan5();goto menu3;}
if (nomorToken[1]=='6') {Serial.println ("enam"); tekan6();goto menu3;}
if (nomorToken[1]=='7') {Serial.println ("tujuh"); tekan7();goto menu3;}
if (nomorToken[1]=='8') {Serial.println ("delapan"); tekan8();goto menu3;}
if (nomorToken[1]=='9') {Serial.println ("sembilan"); tekan9();goto menu3;}
goto menu2;

menu3:
if (nomorToken[2]=='0') {Serial.println ("nol"); tekan0();goto menu4;}
if (nomorToken[2]=='1') {Serial.println ("satu"); tekan1();goto menu4;}
if (nomorToken[2]=='2') {Serial.println ("dua"); tekan2();goto menu4;}
if (nomorToken[2]=='3') {Serial.println ("tiga"); tekan3();goto menu4;}
if (nomorToken[2]=='4') {Serial.println ("empat"); tekan4();goto menu4;}
if (nomorToken[2]=='5') {Serial.println ("lima"); tekan5();goto menu4;}
if (nomorToken[2]=='6') {Serial.println ("enam"); tekan6();goto menu4;}
if (nomorToken[2]=='7') {Serial.println ("tujuh"); tekan7();goto menu4;}
if (nomorToken[2]=='8') {Serial.println ("delapan"); tekan8();goto menu4;}
if (nomorToken[2]=='9') {Serial.println ("sembilan"); tekan9();goto menu4;}
goto menu3;

menu4:
if (nomorToken[3]=='0') {Serial.println ("nol"); tekan0();goto menu5;}
if (nomorToken[3]=='1') {Serial.println ("satu"); tekan1();goto menu5;}
if (nomorToken[3]=='2') {Serial.println ("dua"); tekan2();goto menu5;}
if (nomorToken[3]=='3') {Serial.println ("tiga"); tekan3();goto menu5;}
if (nomorToken[3]=='4') {Serial.println ("empat"); tekan4();goto menu5;}
if (nomorToken[3]=='5') {Serial.println ("lima"); tekan5();goto menu5;}
if (nomorToken[3]=='6') {Serial.println ("enam"); tekan6();goto menu5;}
```

```
if (nomorToken[3]=='7') {Serial.println ("tujuh"); tekan7();goto menu5;}
if (nomorToken[3]=='8') {Serial.println ("delapan"); tekan8();goto menu5;}
if (nomorToken[3]=='9') {Serial.println ("sembilan"); tekan9();goto menu5;}
goto menu4;

menu5:
if (nomorToken[4]=='0') {Serial.println ("nol"); tekan0();goto menu6;}
if (nomorToken[4]=='1') {Serial.println ("satu"); tekan1();goto menu6;}
if (nomorToken[4]=='2') {Serial.println ("dua"); tekan2();goto menu6;}
if (nomorToken[4]=='3') {Serial.println ("tiga"); tekan3();goto menu6;}
if (nomorToken[4]=='4') {Serial.println ("empat"); tekan4();goto menu6;}
if (nomorToken[4]=='5') {Serial.println ("lima"); tekan5();goto menu6;}
if (nomorToken[4]=='6') {Serial.println ("enam"); tekan6();goto menu6;}
if (nomorToken[4]=='7') {Serial.println ("tujuh"); tekan7();goto menu6;}
if (nomorToken[4]=='8') {Serial.println ("delapan"); tekan8();goto menu6;}
if (nomorToken[4]=='9') {Serial.println ("sembilan"); tekan9();goto menu6;}
goto menu5;

menu6:
if (nomorToken[5]=='0') {Serial.println ("nol"); tekan0();goto menu7;}
if (nomorToken[5]=='1') {Serial.println ("satu"); tekan1();goto menu7;}
if (nomorToken[5]=='2') {Serial.println ("dua"); tekan2();goto menu7;}
if (nomorToken[5]=='3') {Serial.println ("tiga"); tekan3();goto menu7;}
if (nomorToken[5]=='4') {Serial.println ("empat"); tekan4();goto menu7;}
if (nomorToken[5]=='5') {Serial.println ("lima"); tekan5();goto menu7;}
if (nomorToken[5]=='6') {Serial.println ("enam"); tekan6();goto menu7;}
if (nomorToken[5]=='7') {Serial.println ("tujuh"); tekan7();goto menu7;}
if (nomorToken[5]=='8') {Serial.println ("delapan"); tekan8();goto menu7;}
if (nomorToken[5]=='9') {Serial.println ("sembilan"); tekan9();goto menu7;}
goto menu6;

menu7:
```

```
if (nomorToken[6]=='0') {Serial.println ("nol"); tekan0();goto menu8;}
if (nomorToken[6]=='1') {Serial.println ("satu"); tekan1();goto menu8;}
if (nomorToken[6]=='2') {Serial.println ("dua"); tekan2();goto menu8;}
if (nomorToken[6]=='3') {Serial.println ("tiga"); tekan3();goto menu8;}
if (nomorToken[6]=='4') {Serial.println ("empat"); tekan4();goto menu8;}
if (nomorToken[6]=='5') {Serial.println ("lima"); tekan5();goto menu8;}
if (nomorToken[6]=='6') {Serial.println ("enam"); tekan6();goto menu8;}
if (nomorToken[6]=='7') {Serial.println ("tujuh"); tekan7();goto menu8;}
if (nomorToken[6]=='8') {Serial.println ("delapan"); tekan8();goto menu8;}
if (nomorToken[6]=='9') {Serial.println ("sembilan"); tekan9();goto menu8;}
goto menu7;

menu8:
if (nomorToken[7]=='0') {Serial.println ("nol"); tekan0();goto menu9;}
if (nomorToken[7]=='1') {Serial.println ("satu"); tekan1();goto menu9;}
if (nomorToken[7]=='2') {Serial.println ("dua"); tekan2();goto menu9;}
if (nomorToken[7]=='3') {Serial.println ("tiga"); tekan3();goto menu9;}
if (nomorToken[7]=='4') {Serial.println ("empat"); tekan4();goto menu9;}
if (nomorToken[7]=='5') {Serial.println ("lima"); tekan5();goto menu9;}
if (nomorToken[7]=='6') {Serial.println ("enam"); tekan6();goto menu9;}
if (nomorToken[7]=='7') {Serial.println ("tujuh"); tekan7();goto menu9;}
if (nomorToken[7]=='8') {Serial.println ("delapan"); tekan8();goto menu9;}
if (nomorToken[7]=='9') {Serial.println ("sembilan"); tekan9();goto menu9;}
goto menu8;

menu9:
if (nomorToken[8]=='0') {Serial.println ("nol"); tekan0();goto menu10;}
if (nomorToken[8]=='1') {Serial.println ("satu"); tekan1();goto menu10;}
if (nomorToken[8]=='2') {Serial.println ("dua"); tekan2();goto menu10;}
if (nomorToken[8]=='3') {Serial.println ("tiga"); tekan3();goto menu10;}
if (nomorToken[8]=='4') {Serial.println ("empat"); tekan4();goto menu10;}
if (nomorToken[8]=='5') {Serial.println ("lima"); tekan5();goto menu10;}
```

```
if (nomorToken[8]=='6') {Serial.println ("enam"); tekan6();goto menu10;}
if (nomorToken[8]=='7') {Serial.println ("tujuh"); tekan7();goto menu10;}
if (nomorToken[8]=='8') {Serial.println ("delapan"); tekan8();goto menu10;}
if (nomorToken[8]=='9') {Serial.println ("sembilan"); tekan9();goto menu10;}
goto menu9;

menu10:
if (nomorToken[9]=='0') {Serial.println ("nol"); tekan0();goto menu11;}
if (nomorToken[9]=='1') {Serial.println ("satu"); tekan1();goto menu11;}
if (nomorToken[9]=='2') {Serial.println ("dua"); tekan2();goto menu11;}
if (nomorToken[9]=='3') {Serial.println ("tiga"); tekan3();goto menu11;}
if (nomorToken[9]=='4') {Serial.println ("empat"); tekan4();goto menu11;}
if (nomorToken[9]=='5') {Serial.println ("lima"); tekan5();goto menu11;}
if (nomorToken[9]=='6') {Serial.println ("enam"); tekan6();goto menu11;}
if (nomorToken[9]=='7') {Serial.println ("tujuh"); tekan7();goto menu11;}
if (nomorToken[9]=='8') {Serial.println ("delapan"); tekan8();goto menu11;}
if (nomorToken[9]=='9') {Serial.println ("sembilan"); tekan9();goto menu11;}
goto menu10;

menu11:
if (nomorToken[10]=='0') {Serial.println ("nol"); tekan0();goto menu12;}
if (nomorToken[10]=='1') {Serial.println ("satu"); tekan1();goto menu12;}
if (nomorToken[10]=='2') {Serial.println ("dua"); tekan2();goto menu12;}
if (nomorToken[10]=='3') {Serial.println ("tiga"); tekan3();goto menu12;}
if (nomorToken[10]=='4') {Serial.println ("empat"); tekan4();goto menu12;}
if (nomorToken[10]=='5') {Serial.println ("lima"); tekan5();goto menu12;}
if (nomorToken[10]=='6') {Serial.println ("enam"); tekan6();goto menu12;}
if (nomorToken[10]=='7') {Serial.println ("tujuh"); tekan7();goto menu12;}
if (nomorToken[10]=='8') {Serial.println ("delapan"); tekan8();goto menu12;}
if (nomorToken[10]=='9') {Serial.println ("sembilan"); tekan9();goto menu12;}
goto menu11;
```

```
menu12:
if (nomorToken[11]=='0') {Serial.println ("nol"); tekan0();goto menu13;}
if (nomorToken[11]=='1') {Serial.println ("satu"); tekan1();goto menu13;}
if (nomorToken[11]=='2') {Serial.println ("dua"); tekan2();goto menu13;}
if (nomorToken[11]=='3') {Serial.println ("tiga"); tekan3();goto menu13;}
if (nomorToken[11]=='4') {Serial.println ("empat"); tekan4();goto menu13;}
if (nomorToken[11]=='5') {Serial.println ("lima"); tekan5();goto menu13;}
if (nomorToken[11]=='6') {Serial.println ("enam"); tekan6();goto menu13;}
if (nomorToken[11]=='7') {Serial.println ("tujuh"); tekan7();goto menu13;}
if (nomorToken[11]=='8') {Serial.println ("delapan"); tekan8();goto menu13;}
if (nomorToken[11]=='9') {Serial.println ("sembilan"); tekan9();goto menu13;}
goto menu12;

menu13:
if (nomorToken[12]=='0') {Serial.println ("nol"); tekan0();goto menu14;}
if (nomorToken[12]=='1') {Serial.println ("satu"); tekan1();goto menu14;}
if (nomorToken[12]=='2') {Serial.println ("dua"); tekan2();goto menu14;}
if (nomorToken[12]=='3') {Serial.println ("tiga"); tekan3();goto menu14;}
if (nomorToken[12]=='4') {Serial.println ("empat"); tekan4();goto menu14;}
if (nomorToken[12]=='5') {Serial.println ("lima"); tekan5();goto menu14;}
if (nomorToken[12]=='6') {Serial.println ("enam"); tekan6();goto menu14;}
if (nomorToken[12]=='7') {Serial.println ("tujuh"); tekan7();goto menu14;}
if (nomorToken[12]=='8') {Serial.println ("delapan"); tekan8();goto menu14;}
if (nomorToken[12]=='9') {Serial.println ("sembilan"); tekan9();goto menu14;}
goto menu13;

menu14:
if (nomorToken[13]=='0') {Serial.println ("nol"); tekan0();goto menu15;}
if (nomorToken[13]=='1') {Serial.println ("satu"); tekan1();goto menu15;}
if (nomorToken[13]=='2') {Serial.println ("dua"); tekan2();goto menu15;}
if (nomorToken[13]=='3') {Serial.println ("tiga"); tekan3();goto menu15;}
if (nomorToken[13]=='4') {Serial.println ("empat"); tekan4();goto menu15;}
```

```
if (nomorToken[13]=='5') {Serial.println ("lima"); tekan5();goto menu15;}
if (nomorToken[13]=='6') {Serial.println ("enam"); tekan6();goto menu15;}
if (nomorToken[13]=='7') {Serial.println ("tujuh"); tekan7();goto menu15;}
if (nomorToken[13]=='8') {Serial.println ("delapan"); tekan8();goto menu15;}
if (nomorToken[13]=='9') {Serial.println ("sembilan"); tekan9();goto menu15;}
goto menu14;

menu15:
if (nomorToken[14]=='0') {Serial.println ("nol"); tekan0();goto menu16;}
if (nomorToken[14]=='1') {Serial.println ("satu"); tekan1();goto menu16;}
if (nomorToken[14]=='2') {Serial.println ("dua"); tekan2();goto menu16;}
if (nomorToken[14]=='3') {Serial.println ("tiga"); tekan3();goto menu16;}
if (nomorToken[14]=='4') {Serial.println ("empat"); tekan4();goto menu16;}
if (nomorToken[14]=='5') {Serial.println ("lima"); tekan5();goto menu16;}
if (nomorToken[14]=='6') {Serial.println ("enam"); tekan6();goto menu16;}
if (nomorToken[14]=='7') {Serial.println ("tujuh"); tekan7();goto menu16;}
if (nomorToken[14]=='8') {Serial.println ("delapan"); tekan8();goto menu16;}
if (nomorToken[14]=='9') {Serial.println ("sembilan"); tekan9();goto menu16;}
goto menu15;

menu16:
if (nomorToken[15]=='0') {Serial.println ("nol"); tekan0();goto menu17;}
if (nomorToken[15]=='1') {Serial.println ("satu"); tekan1();goto menu17;}
if (nomorToken[15]=='2') {Serial.println ("dua"); tekan2();goto menu17;}
if (nomorToken[15]=='3') {Serial.println ("tiga"); tekan3();goto menu17;}
if (nomorToken[15]=='4') {Serial.println ("empat"); tekan4();goto menu17;}
if (nomorToken[15]=='5') {Serial.println ("lima"); tekan5();goto menu17;}
if (nomorToken[15]=='6') {Serial.println ("enam"); tekan6();goto menu17;}
if (nomorToken[15]=='7') {Serial.println ("tujuh"); tekan7();goto menu17;}
if (nomorToken[15]=='8') {Serial.println ("delapan"); tekan8();goto menu17;}
if (nomorToken[15]=='9') {Serial.println ("sembilan"); tekan9();goto menu17;}
goto menu16;
```

```
menu17:
if (nomorToken[16]=='0') {Serial.println ("nol"); tekan0();goto menu18;}
if (nomorToken[16]=='1') {Serial.println ("satu"); tekan1();goto menu18;}
if (nomorToken[16]=='2') {Serial.println ("dua"); tekan2();goto menu18;}
if (nomorToken[16]=='3') {Serial.println ("tiga"); tekan3();goto menu18;}
if (nomorToken[16]=='4') {Serial.println ("empat"); tekan4();goto menu18;}
if (nomorToken[16]=='5') {Serial.println ("lima"); tekan5();goto menu18;}
if (nomorToken[16]=='6') {Serial.println ("enam"); tekan6();goto menu18;}
if (nomorToken[16]=='7') {Serial.println ("tujuh"); tekan7();goto menu18;}
if (nomorToken[16]=='8') {Serial.println ("delapan"); tekan8();goto menu18;}
if (nomorToken[16]=='9') {Serial.println ("sembilan"); tekan9();goto menu18;}
goto menu17;

menu18:
if (nomorToken[17]=='0') {Serial.println ("nol"); tekan0();goto menu19;}
if (nomorToken[17]=='1') {Serial.println ("satu"); tekan1();goto menu19;}
if (nomorToken[17]=='2') {Serial.println ("dua"); tekan2();goto menu19;}
if (nomorToken[17]=='3') {Serial.println ("tiga"); tekan3();goto menu19;}
if (nomorToken[17]=='4') {Serial.println ("empat"); tekan4();goto menu19;}
if (nomorToken[17]=='5') {Serial.println ("lima"); tekan5();goto menu19;}
if (nomorToken[17]=='6') {Serial.println ("enam"); tekan6();goto menu19;}
if (nomorToken[17]=='7') {Serial.println ("tujuh"); tekan7();goto menu19;}
if (nomorToken[17]=='8') {Serial.println ("delapan"); tekan8();goto menu19;}
if (nomorToken[17]=='9') {Serial.println ("sembilan"); tekan9();goto menu19;}
goto menu18;

menu19:
if (nomorToken[18]=='0') {Serial.println ("nol"); tekan0();goto menu20;}
if (nomorToken[18]=='1') {Serial.println ("satu"); tekan1();goto menu20;}
if (nomorToken[18]=='2') {Serial.println ("dua"); tekan2();goto menu20;}
if (nomorToken[18]=='3') {Serial.println ("tiga"); tekan3();goto menu20;}
```

```
if (nomorToken[18]=='4') {Serial.println ("empat"); tekan4();goto menu20;}
if (nomorToken[18]=='5') {Serial.println ("lima"); tekan5();goto menu20;}
if (nomorToken[18]=='6') {Serial.println ("enam"); tekan6();goto menu20;}
if (nomorToken[18]=='7') {Serial.println ("tujuh"); tekan7();goto menu20;}
if (nomorToken[18]=='8') {Serial.println ("delapan"); tekan8();goto menu20;}
if (nomorToken[18]=='9') {Serial.println ("sembilan"); tekan9();goto menu20;}
goto menu19;

menu20:
if (nomorToken[19]=='0') {Serial.println ("nol"); tekan0();goto menu21;}
if (nomorToken[19]=='1') {Serial.println ("satu"); tekan1();goto menu21;}
if (nomorToken[19]=='2') {Serial.println ("dua"); tekan2();goto menu21;}
if (nomorToken[19]=='3') {Serial.println ("tiga"); tekan3();goto menu21;}
if (nomorToken[19]=='4') {Serial.println ("empat"); tekan4();goto menu21;}
if (nomorToken[19]=='5') {Serial.println ("lima"); tekan5();goto menu21;}
if (nomorToken[19]=='6') {Serial.println ("enam"); tekan6();goto menu21;}
if (nomorToken[19]=='7') {Serial.println ("tujuh"); tekan7();goto menu21;}
if (nomorToken[19]=='8') {Serial.println ("delapan"); tekan8();goto menu21;}
if (nomorToken[19]=='9') {Serial.println ("sembilan"); tekan9();goto menu21;}
goto menu20;

menu21:
Serial.println ("SELESAI");tekanEnter();
for (int x=0; x<3;
x++){digitalWrite(buzzer,HIGH);delay(100);digitalWrite(buzzer,LOW);delay(100);}
dataSerial="";
for (int x=0; x<25; x++) {nomorToken[x]=' ';};
statusSuara=1; serialToESP.print ("BERHASIL");
goto menuUtama;
goto menu21;

}
```

```
void tekan1(){
  ResetStepperUp();
  ResetStepperDw();
  digitalWrite(Solenoid,HIGH);delay(500);digitalWrite(Solenoid,LOW);delay(500);
  ResetStepperUp();
  ResetStepperDw();
  }

void tekan2(){
  ResetStepperUp();
  ResetStepperDw(); delay(100);
  digitalWrite(dirStepUp,LOW);     //arah putaran stepper besar untuk turun ke bawah
  for(int x=0;x<6000;x++) {     //jumlah putaran
    digitalWrite(stepStepUp,HIGH);
    delayMicroseconds(50);     //kecepatan putaran
    digitalWrite(stepStepUp,LOW);
    delayMicroseconds(50);}
  digitalWrite(Solenoid,HIGH);delay(500);digitalWrite(Solenoid,LOW);delay(500);
  ResetStepperUp();
  ResetStepperDw();
  }

void tekan3(){
  ResetStepperUp();
  ResetStepperDw();delay(100);
  digitalWrite(dirStepUp,LOW);     //arah putaran stepper besar untuk turun ke bawah
  for(int x=0;x<12000;x++) {     //jumlah putaran
    digitalWrite(stepStepUp,HIGH);
    delayMicroseconds(50);     //kecepatan putaran
    digitalWrite(stepStepUp,LOW);
```

```
    delayMicroseconds(50);}
  digitalWrite(Solenoid,HIGH);delay(500);digitalWrite(Solenoid,LOW);delay(500);
  ResetStepperUp();
  ResetStepperDw();
  }

void tekan4(){
  ResetStepperUp();
  ResetStepperDw();delay(100);
  digitalWrite(dirStepDw1,HIGH);     //arah putaran stepper besar untuk turun ke bawah
  digitalWrite(dirStepDw2,HIGH);
  for(int x=0;x<3500;x++) {     //jumlah putaran
    digitalWrite(stepStepDw1,HIGH);
    digitalWrite(stepStepDw2,HIGH);
    delayMicroseconds(50);     //kecepatan putaran
    digitalWrite(stepStepDw1,LOW);
    digitalWrite(stepStepDw2,LOW);
    delayMicroseconds(50);}
  digitalWrite(Solenoid,HIGH);delay(500);digitalWrite(Solenoid,LOW);delay(500);
  ResetStepperUp();
  ResetStepperDw();
  }

void tekan5(){
  ResetStepperUp();
  ResetStepperDw();delay(100);
  digitalWrite(dirStepDw1,HIGH);     //arah putaran stepper besar untuk turun ke bawah
  digitalWrite(dirStepDw2,HIGH);
  for(int x=0;x<3500;x++) {     //jumlah putaran
    digitalWrite(stepStepDw1,HIGH);
    digitalWrite(stepStepDw2,HIGH);
    delayMicroseconds(50);     //kecepatan putaran
```

```
  digitalWrite(stepStepDw1,LOW);
  digitalWrite(stepStepDw2,LOW);
  delayMicroseconds(50);}

 digitalWrite(dirStepUp,LOW);     //arah putaran stepper besar untuk turun ke bawah
 for(int x=0;x<6000;x++) {     //jumlah putaran
  digitalWrite(stepStepUp,HIGH);
  delayMicroseconds(50);     //kecepatan putaran
  digitalWrite(stepStepUp,LOW);
  delayMicroseconds(50);}
 digitalWrite(Solenoid,HIGH);delay(500);digitalWrite(Solenoid,LOW);delay(500);
 ResetStepperUp();
 ResetStepperDw();
 }

void tekan6(){
 ResetStepperUp();
 ResetStepperDw();delay(100);
 digitalWrite(dirStepDw1,HIGH);     //arah putaran stepper besar untuk turun ke bawah
 digitalWrite(dirStepDw2,HIGH);
 for(int x=0;x<3500;x++) {     //jumlah putaran
  digitalWrite(stepStepDw1,HIGH);
  digitalWrite(stepStepDw2,HIGH);
  delayMicroseconds(50);     //kecepatan putaran
  digitalWrite(stepStepDw1,LOW);
  digitalWrite(stepStepDw2,LOW);
  delayMicroseconds(50);}

 digitalWrite(dirStepUp,LOW);     //arah putaran stepper besar untuk turun ke bawah
 for(int x=0;x<12000;x++) {     //jumlah putaran
  digitalWrite(stepStepUp,HIGH);
  delayMicroseconds(50);     //kecepatan putaran
```

```
    digitalWrite(stepStepUp,LOW);
    delayMicroseconds(50);}
  digitalWrite(Solenoid,HIGH);delay(500);digitalWrite(Solenoid,LOW);delay(500);
  ResetStepperUp();
  ResetStepperDw();
  }

void tekan7(){
  ResetStepperUp();
  ResetStepperDw();delay(100);
  digitalWrite(dirStepDw1,HIGH);     //arah putaran stepper besar untuk turun ke bawah
  digitalWrite(dirStepDw2,HIGH);
  for(int x=0;x<7200;x++) {     //jumlah putaran
    digitalWrite(stepStepDw1,HIGH);
    digitalWrite(stepStepDw2,HIGH);
    delayMicroseconds(50);     //kecepatan putaran
    digitalWrite(stepStepDw1,LOW);
    digitalWrite(stepStepDw2,LOW);
    delayMicroseconds(50);}
  digitalWrite(Solenoid,HIGH);delay(500);digitalWrite(Solenoid,LOW);delay(500);
  ResetStepperUp();
  ResetStepperDw();
  }

void tekan8(){
  ResetStepperUp();
  ResetStepperDw();delay(100);
  digitalWrite(dirStepDw1,HIGH);     //arah putaran stepper besar untuk turun ke bawah
  digitalWrite(dirStepDw2,HIGH);
  for(int x=0;x<7200;x++) {     //jumlah putaran
    digitalWrite(stepStepDw1,HIGH);
    digitalWrite(stepStepDw2,HIGH);
```

```
  delayMicroseconds(50);     //kecepatan putaran
  digitalWrite(stepStepDw1,LOW);
  digitalWrite(stepStepDw2,LOW);
  delayMicroseconds(50);}

  digitalWrite(dirStepUp,LOW);     //arah putaran stepper besar untuk turun ke bawah
 for(int x=0;x<6000;x++) {     //jumlah putaran
  digitalWrite(stepStepUp,HIGH);
  delayMicroseconds(50);     //kecepatan putaran
  digitalWrite(stepStepUp,LOW);
  delayMicroseconds(50);}
 digitalWrite(Solenoid,HIGH);delay(500);digitalWrite(Solenoid,LOW);delay(500);
 ResetStepperUp();
 ResetStepperDw();
 }

void tekan9(){
 ResetStepperUp();
 ResetStepperDw();delay(100);
 digitalWrite(dirStepDw1,HIGH);     //arah putaran stepper besar untuk turun ke bawah
 digitalWrite(dirStepDw2,HIGH);
 for(int x=0;x<7200;x++) {     //jumlah putaran
  digitalWrite(stepStepDw1,HIGH);
  digitalWrite(stepStepDw2,HIGH);
  delayMicroseconds(50);     //kecepatan putaran
  digitalWrite(stepStepDw1,LOW);
  digitalWrite(stepStepDw2,LOW);
  delayMicroseconds(50);}

  digitalWrite(dirStepUp,LOW);     //arah putaran stepper besar untuk turun ke bawah
 for(int x=0;x<12000;x++) {     //jumlah putaran
  digitalWrite(stepStepUp,HIGH);
```

```
  delayMicroseconds(50);     //kecepatan putaran
  digitalWrite(stepStepUp,LOW);
  delayMicroseconds(50);}
 digitalWrite(Solenoid,HIGH);delay(500);digitalWrite(Solenoid,LOW);delay(500);
 ResetStepperUp();
 ResetStepperDw();
 }

void tekan0(){
 ResetStepperUp();
 ResetStepperDw();delay(100);
 digitalWrite(dirStepDw1,HIGH);     //arah putaran stepper besar untuk turun ke bawah
 digitalWrite(dirStepDw2,HIGH);
 for(int x=0;x<11000;x++) {     //jumlah putaran
  digitalWrite(stepStepDw1,HIGH);
  digitalWrite(stepStepDw2,HIGH);
  delayMicroseconds(50);     //kecepatan putaran
  digitalWrite(stepStepDw1,LOW);
  digitalWrite(stepStepDw2,LOW);
  delayMicroseconds(50);}

  digitalWrite(dirStepUp,LOW);     //arah putaran stepper besar untuk turun ke bawah
 for(int x=0;x<6000;x++) {     //jumlah putaran
  digitalWrite(stepStepUp,HIGH);
  delayMicroseconds(50);     //kecepatan putaran
  digitalWrite(stepStepUp,LOW);
  delayMicroseconds(50);}
 digitalWrite(Solenoid,HIGH);delay(500);digitalWrite(Solenoid,LOW);delay(500);
 ResetStepperUp();
 ResetStepperDw();
 }
```

```
void tekanEnter(){
  ResetStepperUp();
  ResetStepperDw();delay(100);
  digitalWrite(dirStepDw1,HIGH);     //arah putaran stepper besar untuk turun ke bawah
  digitalWrite(dirStepDw2,HIGH);
  for(int x=0;x<11000;x++) {     //jumlah putaran
    digitalWrite(stepStepDw1,HIGH);
    digitalWrite(stepStepDw2,HIGH);
    delayMicroseconds(50);     //kecepatan putaran
    digitalWrite(stepStepDw1,LOW);
    digitalWrite(stepStepDw2,LOW);
    delayMicroseconds(50);}

    digitalWrite(dirStepUp,LOW);     //arah putaran stepper besar untuk turun ke bawah
  for(int x=0;x<12000;x++) {     //jumlah putaran
    digitalWrite(stepStepUp,HIGH);
    delayMicroseconds(50);     //kecepatan putaran
    digitalWrite(stepStepUp,LOW);
    delayMicroseconds(50);}
  digitalWrite(Solenoid,HIGH);delay(500);digitalWrite(Solenoid,LOW);delay(500);
  ResetStepperUp();
  ResetStepperDw();
  }

void ResetStepperUp(){
  while(digitalRead(limitUp)!=0){
  digitalWrite(dirStepUp,HIGH);     //arah putaran stepper besar untuk turun ke bawah
  for(int x=0;x<300;x++) {     //jumlah putaran
    digitalWrite(stepStepUp,HIGH);
    delayMicroseconds(50);     //kecepatan putaran
    digitalWrite(stepStepUp,LOW);
    delayMicroseconds(50);}
```

```
 }}

void ResetStepperDw(){
 while(digitalRead(limitDown)!=0){
 digitalWrite(dirStepDw1,LOW);     //arah putaran stepper besar untuk turun ke bawah
 digitalWrite(dirStepDw2,LOW);
 for(int x=0;x<300;x++) {     //jumlah putaran
  digitalWrite(stepStepDw1,HIGH);
  digitalWrite(stepStepDw2,HIGH);
  delayMicroseconds(50);     //kecepatan putaran
  digitalWrite(stepStepDw1,LOW);
  digitalWrite(stepStepDw2,LOW);
  delayMicroseconds(50);}
 }}
```

Program Esp

```
#include <ESP8266WiFi.h> // aktifkan wifi
#include <ESP8266HTTPClient.h> // menghubungkan ke web
#include <ArduinoJson.h> // menghubungkan ke web
#include <SoftwareSerial.h> // unutk menghubungkan ke arduino

const char* ssid = "yonam";
const char* password = "1111111188";

#define rx D5
#define tx D6
//Your Domain name with URL path or IP address with path
String serverName = "http://mcbmeter.monlab.site/";
String Status,pesan,perbarui,id,no_meter,kirim;
int Restart;
```

```
SoftwareSerial serialToNano(rx,tx);

void setup() {
  Serial.begin(115200);
  serialToNano.begin(9600);
  WiFi.begin(ssid, password);
  Serial.println("Connecting");
  while(WiFi.status() != WL_CONNECTED) {delay(500);Serial.print(".");}
  Serial.println("");
  Serial.print("Connected to WiFi network with IP Address: ");
  Serial.println(WiFi.localIP());

}

void loop() {
    //Check WiFi connection status
    if(WiFi.status()== WL_CONNECTED){

      while (serialToNano.available()>0){String inString=serialToNano.readString();
Serial.println(inString);
            if(inString=="NOTIF"){
               Restart=0;
               while (updateStatus()==false){updateStatus();Restart++;
               if(Restart>10){ESP.restart();}}
               Status = "1";                // 0 untuk voucher normal, 1 untuk warning atau
kurang, 2 untuk habis (kondisi voucher)
               pesan = no_meter+"%20Voucher%20listrik%20habis%20!!!";  //ganti
keterangan normal sesuai kondisi status jika ingin mebuat notif lain
               sendNotif();delay(1000); inString="";}

            if(inString=="BERHASIL"){
               Restart=0;
```

```
            while (updateStatus()==false){updateStatus();Restart++;
            if(Restart>10){ESP.restart();}}
            Status = "0";                // 0 untuk voucher normal, 1 untuk warning atau
kurang, 2 untuk habis (kondisi voucher)
            pesan = no_meter+"%20Pengisian%20voucher%20sukses%20:)";  //ganti
keterangan normal sesuai kondisi status jika ingin mebuat notif lain
            sendNotif();delay(1000); inString="";}
            }

    while(getStatus()==false){getStatus();Restart++;
     if(Restart>10){ESP.restart();}}

    if (kirim == "0"){                //tombol kirim pada aplikasi ditekan
     Restart=0;
     perbarui="1";           // 0 untuk pending, 1 on proses, 2 berhasil (terima token dari
apk)
     while (updateStatus()==false){updateStatus();Restart++;
      if(Restart>10){ESP.restart();}}
     serialToNano.print(no_meter);}

    if (kirim == "1"){              //tombol kirim aplikasi selesai ditekan
     Restart=0;
     perbarui="2";
     while (updateStatus()==false){updateStatus();Restart++;
      if(Restart>10){ESP.restart();}}
     Status = "0";                // 0 untuk voucher normal, 1 untuk warning atau kurang, 2
untuk habis (kondisi voucher)
     pesan = no_meter+"%20Normal";  //ganti keterangan normal sesuai kondisi status
jika ingin mebuat notif lain
     sendNotif();}
   }
```

```
    else {Serial.println("WiFi Disconnected");}
    delay(2000);
}

bool updateStatus(){
  HTTPClient http;
  Serial.println("Update Status");
  String serverPath = serverName +
"index.php/post/update_meter?id="+id+"&kirim="+perbarui;
  http.begin(serverPath.c_str());
  int httpResponseCode = http.POST("");    // Send HTTP POST request

  if (httpResponseCode>0) {
    Serial.print("HTTP Response code: ");
    Serial.println(httpResponseCode);
    String payload = http.getString();
    Serial.println(payload);
    return true;}

  else {
    Serial.print("Error code: ");
    Serial.println(httpResponseCode);
    Serial.print("Fail to update status");
    return false;}

  delay(3000);
  http.end();
}

bool sendNotif(){
  HTTPClient http;
  Serial.println("Send Notif..");
```

```
  String serverPath = serverName +
"index.php/post/update_notif?status="+Status+"&pesan="+pesan;
  http.begin(serverPath.c_str());      // Your Domain name with URL path or IP address
with path
  int httpResponseCode = http.POST("");     // Send HTTP POST request

  if (httpResponseCode>0) {
    Serial.print("HTTP Response code: ");
    Serial.println(httpResponseCode);
    String payload = http.getString();
    Serial.println(payload);
    return true;}

  else {
    Serial.print("Error code: ");
    Serial.println(httpResponseCode);
    Serial.print("Fail to send notif");
    return false;}

  delay(3000);
  http.end();
}

bool getStatus() {
  HTTPClient http;
  Serial.println("Get Meter Number");
  String serverPath = serverName + "index.php/post/get_meter";
  http.begin(serverPath.c_str());     // Your Domain name with URL path or IP address
with path
  int httpResponseCode = http.POST("");      // Send HTTP POST request

   if (httpResponseCode>0) {
```

```
    Serial.print("HTTP Response code: ");
    Serial.println(httpResponseCode);
    String payload = http.getString();
    Serial.println(payload);
    const size_t capacity = JSON_OBJECT_SIZE(2) + 30;          // Allocate JsonBuffer
// Use arduinojson.org/assistant to compute the capacity.
    DynamicJsonBuffer jsonBuffer(capacity);

    JsonObject& root = jsonBuffer.parseObject(payload);   // Parse JSON object
    if (!root.success()) {
      Serial.println(F("Parsing failed!"));return false;}

    id = root["id"].as<String>();          // Decode JSON/Extract values, di ekstrak
menjadi data angka
    no_meter = root["no_meter"].as<String>(); // "0987609"
    kirim = root["kirim"].as<String>(); // "0"
    return true;
  }

  else {
    Serial.print("Error code: ");
    Serial.println(httpResponseCode);
    Serial.print("Fail to get meter");
    return false;}

  delay(3000);
  http.end();
}
```

DAFTAR PERBAIKAN

Adrian Yonam Lovari Minggu – D121181505
Rancang Bangun Sistem Kontrol Pengisian Otomatis Token Listrik Prabayar
Menggunakan Website berbasis Arduino Uno

Perbaikan sampul sesuai dengan format baru	Sampul
Perbaikan pada penulisan catatan kaki (harus disama ratakan dalam penulisannya)	BAB II Tinjauan Pustaka
Perbaikan pada penulisan tabel gambar	BAB III dan BAB IV
Menambakan proses sistem membaca data suara pada **flowchart sistem keseluruhan**	BAB III Halaman 27
Menambahkan berapa besar jumlah biner yang dikirimkan pada motor stepper	BAB IV Halaman 37
Menambahkan berupa saran untuk membuat prototype dalam penginputan token listrik	BAB V Halaman 50

LEMBAR PERBAIKAN SKRIPSI

"RANCANG BANGUN SISTEM KONTROL PENGISIAN OTOMATIS TOKEN LISTRIK PRABAYAR MENGGUNAKAN WEBSITE BERBASIS ARDUINO UNO"

OLEH:

ADRIAN YONAM LOVARI MINGGU
D121181505

Skripsi ini telah dipertahankan pada Ujian Akhir Sarjana tanggal 3 maret 2023.

Telah dilakukan perbaikan penulisan dan isi skripsi berdasarkan usulan dari penguji dan pembimbing skripsi.

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