

Lampiran I *Coding Arduino*

```
#include <Wire.h> // library i2c
#include <LiquidCrystal_I2C.h> // library LCD
LiquidCrystal_I2C lcd (0x27, 16, 2);
#include <Adafruit_INA219.h> // library sensor daya
#include <TimerOne.h>
Adafruit_INA219 sensor219;

int button1 = 5;
int button2 = 6;
int button3 = 7;

int relay1 = 8;
int relay2 = 9;
int relay3 = 10;

int nilaibutton1 = 0;
int nilaibutton2 = 0;
int nilaibutton3 = 0;

int count1;
int count2;
int count3;

int LED1 = 11;
int LED2 = 12;
int LED3 = 13;
```

```

void setup () {
  lcd.begin (); //lcd start
  Serial.begin (9600); //inisiasi serial monitor
  sensor219.begin (); //sensor power start

  pinMode (button1, INPUT);
  pinMode (button2, INPUT);
  pinMode (button3, INPUT);

  pinMode (relay1, OUTPUT);
  pinMode (relay2, OUTPUT);
  pinMode (relay3, OUTPUT);

  pinMode (LED1, OUTPUT);
  pinMode (LED2, OUTPUT);
  pinMode(LED3, OUTPUT);

  digitalWrite (relay1, HIGH);
  digitalWrite (relay2, HIGH);
  digitalWrite (relay3, HIGH);
}
void loop () {
  float busVoltage = 0;
  float current = 0; // Mengukur dalam mA
  float power = 0;

  busVoltage = sensor219.getBusVoltage_V();
  current = sensor219.getCurrent_mA();
  power = busVoltage * (current/1000); // menghitung daya

```

```

lcd.setCursor (0,0);
lcd.print (current/1000,2);
lcd.setCursor (6,0);
lcd.print ("Arus ;      A");// perintah menampilkan nilai Arus

lcd.setCursor (0,1);
lcd.print (busVoltage);
lcd.setCursor (6,1);
lcd.print("Tegangan ;      V");// perintah menampilkan nilai Tegangan
delay (2000); // delay pemrosesan penampil LCD

nilaibutton1 = digitalRead (button1);
nilaibutton2 = digitalRead (button2);
nilaibutton3 = digitalRead (button3);

if (nilaibutton1 ==1) {
  count1++;
  delay (300);
  if (count1 ==1){
    digitalWrite(relay1, LOW);
    digitalWrite(relay2,HIGH);
    digitalWrite(relay3,HIGH);

    digitalWrite(LED1, HIGH);
    digitalWrite(LED2, LOW);
    digitalWrite(LED3, LOW);
  }
  count1 = 0; //RELAY1
} else if (nilaibutton2 ==1) {

```

```

count2++;
delay(300);
if (count2==1) {
    digitalWrite (relay1, HIGH);
    digitalWrite (relay2, LOW);
    digitalWrite (relay3, HIGH);

    digitalWrite (LED2, HIGH);
    digitalWrite (LED3, LOW);
    digitalWrite (LED1, LOW);
}
count2 = 0; //RELAY2

} else if (nilaibutton3 ==1){
count3++;
delay (300);
if (count3==1){
    digitalWrite (relay1, HIGH);
    digitalWrite (relay2, HIGH);
    digitalWrite (relay3, LOW);

    digitalWrite (LED1, LOW);
    digitalWrite (LED2, LOW);
    digitalWrite (LED3, HIGH);
}
count3 = 0; //RELAY3

}
}

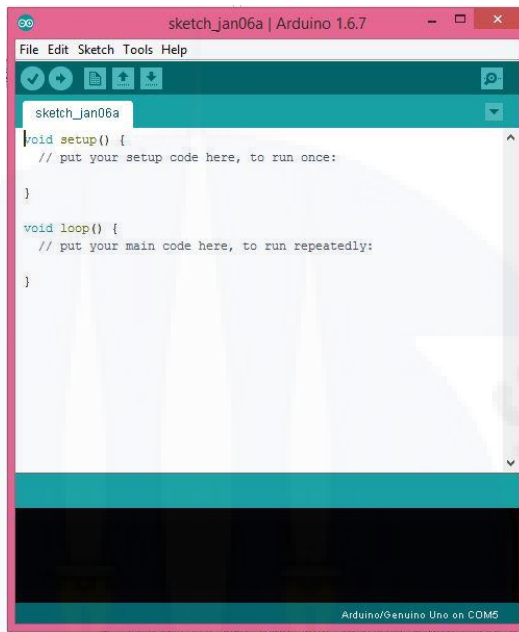
```

Lampiran II

Berikut langkah-langkah yang dilakukan dalam proses pemrograman

Arduino :

1. Buka aplikasi Arduino.IDE seperti gambar di bawah ini:



2. Lakukan pemrograman dengan melakukan pengisian *Coding* pada kolom kerja, seperti di bawah ini:

```
standby_dj_alat
int button1 = 6;
int button2 = 7;
int button3 = 8;

int relay1 = 2;
int relay2 = 3;
int relay3 = 4;

int nilaibutton1 = 0;
int nilaibutton2 = 0;
int nilaibutton3 = 0;

int count1;
int count2;
int count3;
```

3. Setelah selesai melakukan pengisian program, maka langkah selanjutnya adalah mengecek apakah program yang telah di buat dapat dijalankan oleh arduino atau tidak dengan mengklik tombol centang (*Verify*) pada aplikasi arduino.IDE, seperti pada gambar berikut :

```
standby_di_alat
count3++;
delay(300);
if(count3==1){
  digitalWrite(relay1, HIGH);
  digitalWrite(relay2, HIGH);
  digitalWrite(relay3, LOW);

  digitalWrite(LED1, LOW);
  digitalWrite(LED2, LOW);
  digitalWrite(LED3, HIGH);
}
count3 = 0; //RELAY3
}
}
```

Compiling sketch...

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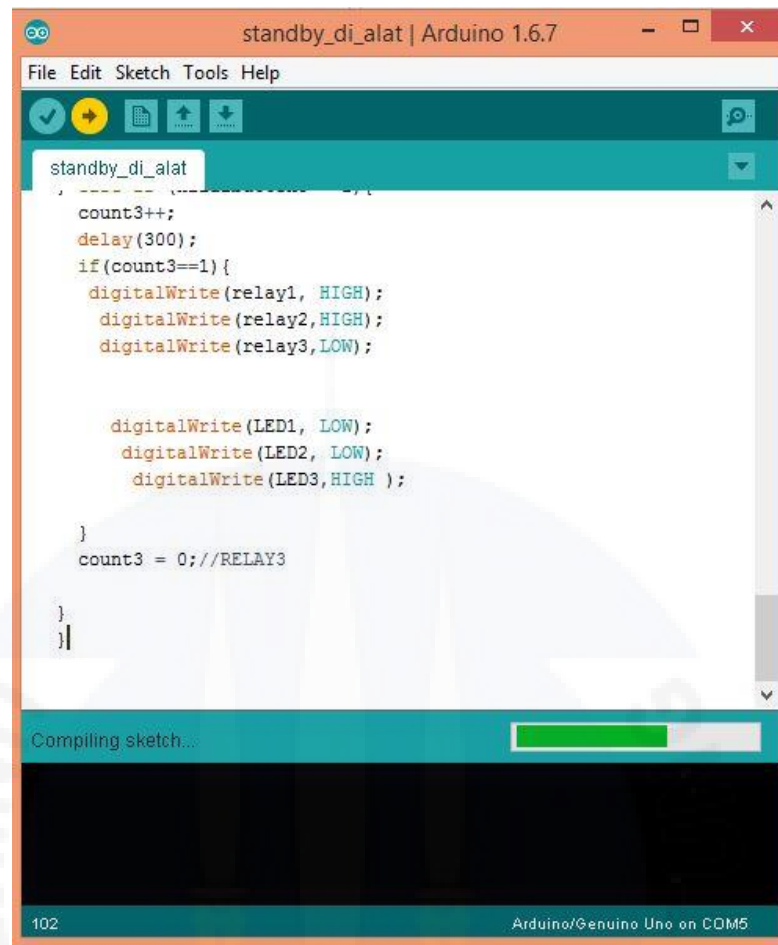
4. Setelah itu lalu akan terjadi proses *compiling sketch* pada aplikasi, tunggu hingga proses selesai.
5. Setelah selesai *compiling* apabila program berhasil maka pada bar *report* di aplikasi arduino.IDE akan menampilkan *Done Compiling*, seperti gambar berikut :

```
standby_di_alat | Arduino 1.6.7
File Edit Sketch Tools Help
standby_di_alat
count3++;
delay(300);
if(count3==1){
  digitalWrite(relay1, HIGH);
  digitalWrite(relay2, HIGH);
  digitalWrite(relay3, LOW);

  digitalWrite(LED1, LOW);
  digitalWrite(LED2, LOW);
  digitalWrite(LED3, HIGH );
}
count3 = 0;//RELAY3
}
}

Done compiling.
Sketch uses 1,686 bytes (5%) of program storage space. Maximum is ...
Global variables use 39 bytes (1%) of dynamic memory, leaving 2,00 ...
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```

6. Setelah program selesai, maka langkah selanjutnya adalah memasukkan program tersebut ke dalam *Board* arduino yang digunakan.
7. Sebelum melakukan proses *Upload* program ke *board* arduino, pilih terlebih dahulu jenis *Board* dan *Port* yang digunakan, dengan mengklik menu *Tools* pada aplikasi Arduino.IDE.
8. Setelah memilih *Board* dan *port* yang digunakan, lalu *Upload* program yang telah selesai dibuat dengan mengklik tombol *Upload* pada aplikasi arduino.IDE, yang terletak di sebelah tombol *Verify*.



```
standby_di_alat
count3++;
delay(300);
if(count3==1){
  digitalWrite(relay1, HIGH);
  digitalWrite(relay2, HIGH);
  digitalWrite(relay3, LOW);

  digitalWrite(LED1, LOW);
  digitalWrite(LED2, LOW);
  digitalWrite(LED3, HIGH );
}
count3 = 0;//RELAY3
}
}
```

Compiling sketch...

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9. Setelah selesai proses *Upload*, maka pada kolom *Report* akan tertulis *Done Uploading*.

```
standby_di_alat
// ...
count3++;
delay(300);
if(count3==1){
  digitalWrite(relay1, HIGH);
  digitalWrite(relay2, HIGH);
  digitalWrite(relay3, LOW);

  digitalWrite(LED1, LOW);
  digitalWrite(LED2, LOW);
  digitalWrite(LED3, HIGH );
}
count3 = 0; //RELAY3
}
}
```

Done uploading.

Sketch uses 1,686 bytes (5%) of program storage space. Maximum is 32,
Global variables use 39 bytes (1%) of dynamic memory, leaving 2,009 b

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