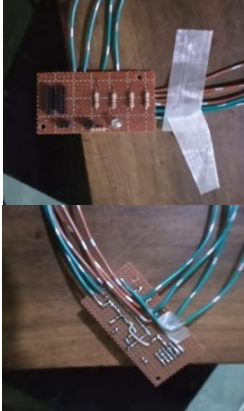








LAMPIRAN A

Proses Pembuatan Elektrikal

Gambar	Keterangan
	<p>Proses men-solder jalur PCB lubang untuk sumber 5v, Ground, 12v, RX TX komunikasi bluetooth, dan <i>pushbutton</i>.</p>
	<p>Proses <i>wiring</i> kabel (-) motor DC.</p>
	<p>Proses <i>wiring</i> kabel (+) motor DC menuju kontak <i>Normally Open</i> relay 8 channel. COM pada relay dirangkai seri dihubungkan menuju <i>output powersupply</i>.</p>

	<p><i>Wiring input relay 8 channel menuju pin digital output arduino mega 2560.</i></p>
	<p><i>Wiring pushbutton menuju PCB lubang, dan saklar on/off .</i></p>
	<p><i>Tampilan atas panel box.</i></p>
	<p><i>Proses pengukuran arus menggunakan multimeter yang dirangkai seri terhadap beban.</i></p>

LAMPIRAN B

1. Listing Program Arduino

Mode Manual

```
int DO=2;
int RE=3;
int MI=4;
int FA=5;
int SOL=6;
int LA=7;
int SI=8;
int DOT=9;
int pb1=10; //Lagu Yamko Rambe Yamko
int pb2=11; //Lagu Suwe Ora Jamu
int pb3=12; //Lagu Gundul Gundul Pacul
int bluetooth=14;

void setup(){
  pinMode(DO,OUTPUT);
  pinMode(RE,OUTPUT);
  pinMode(MI,OUTPUT);
  pinMode(FA,OUTPUT);
  pinMode(SOL,OUTPUT);
  pinMode(LA,OUTPUT);
  pinMode(SI,OUTPUT);
  pinMode(DOT,OUTPUT);
  pinMode(pb1, INPUT);
  pinMode(pb2, INPUT);
  pinMode(pb3, INPUT);
  pinMode(blueetooth, INPUT);
  digitalWrite(DO,HIGH);
  digitalWrite(RE,HIGH);
  digitalWrite(MI,HIGH);
  digitalWrite(FA,HIGH);
  digitalWrite(SOL,HIGH);
  digitalWrite(LA,HIGH);
  digitalWrite(SI,HIGH);
  digitalWrite(DOT,HIGH);
```

```

Serial.begin(9600);
}
char cha;
void loop(){
  if(Serial.available()>0)
  {
    cha = Serial.read();
    delay(2);

    if(cha == 'D'){
      digitalWrite(DO,LOW);
    }
    if(cha == 'R'){
      digitalWrite(RE,LOW);
    }
    if(cha == 'M'){
      digitalWrite(MI,LOW);
    }
    if(cha == 'F'){
      digitalWrite(FA,LOW);
    }
    if(cha == 'S'){
      digitalWrite(SOL,LOW);
    }
    if(cha == 'L'){
      digitalWrite(LA,LOW);
    }
    if(cha == 's'){
      digitalWrite(SI,LOW);
    }
    if(cha == 'd'){
      digitalWrite(DOT,LOW);
    }
    if(cha == '0'){
      digitalWrite(DO,HIGH);
      digitalWrite(RE,HIGH);
      digitalWrite(MI,HIGH);
      digitalWrite(FA,HIGH);
    }
  }
}

```

```

    digitalWrite(SOL,HIGH);
    digitalWrite(LA,HIGH);
    digitalWrite(SI,HIGH);
    digitalWrite(DOT,HIGH);
}
}

```

Mode Otomatis

```

int manual = digitalRead(blueetooth);
  if(digitalRead(pb1)==HIGH && manual==LOW){// hey
ramko rambe yamko
digitalWrite(DOT, LOW); delay(700);
digitalWrite(DOT,HIGH);
delay(100);
digitalWrite(SOL, LOW); delay(250);
digitalWrite(SOL, HIGH);
delay(80);
digitalWrite(SOL, LOW); delay(300);
digitalWrite(SOL, HIGH);
delay(80);
digitalWrite(LA, LOW); delay(300);
digitalWrite(LA, HIGH);
delay(100);
digitalWrite(MI, LOW); delay(250);
digitalWrite(MI, HIGH);
delay(100);
digitalWrite(SOL, LOW); delay(300);
digitalWrite(SOL, HIGH);
delay(100);
digitalWrite(LA, LOW); delay(900);
digitalWrite(LA, HIGH);
delay(200);
    digitalWrite(SOL, LOW); delay(250);// Aronawa
kombe
    digitalWrite(SOL, HIGH);
    delay(80);
    digitalWrite(SOL, LOW); delay(300);
    digitalWrite(SOL, HIGH);

```

```

    delay(80);
    digitalWrite(LA, LOW); delay(300);
    digitalWrite(LA, HIGH);
    delay(100);
    digitalWrite(RE, LOW); delay(1000);
    digitalWrite(RE, HIGH);
    delay(150);
    digitalWrite(MI, LOW); delay(550);
    digitalWrite(MI, HIGH);
    delay(100);
    digitalWrite(DO, LOW); delay(900);
    digitalWrite(DO, HIGH);
    delay(400);
digitalWrite(DOT, LOW); delay(700);// hey ramko rambe
yamko
digitalWrite(DOT,HIGH);
delay(100);
digitalWrite(SOL, LOW); delay(250);
digitalWrite(SOL, HIGH);
delay(80);
digitalWrite(SOL, LOW); delay(300);
digitalWrite(SOL, HIGH);
delay(80);
digitalWrite(LA, LOW); delay(300);
digitalWrite(LA, HIGH);
delay(100);
digitalWrite(MI, LOW); delay(250);
digitalWrite(MI, HIGH);
delay(100);
digitalWrite(SOL, LOW); delay(300);
digitalWrite(SOL, HIGH);
delay(100);
digitalWrite(LA, LOW); delay(900);
digitalWrite(LA, HIGH);
delay(200);
    digitalWrite(SOL, LOW); delay(250);//aronawa
kombe
    digitalWrite(SOL, HIGH);

```

```

    delay(80);
    digitalWrite(SOL, LOW); delay(300);
    digitalWrite(SOL, HIGH);
    delay(80);
    digitalWrite(LA, LOW); delay(300);
    digitalWrite(LA, HIGH);
    delay(100);
    digitalWrite(RE, LOW); delay(1000);
    digitalWrite(RE, HIGH);
    delay(150);
    digitalWrite(MI, LOW); delay(550);
    digitalWrite(MI, HIGH);
    delay(100);
    digitalWrite(DO, LOW); delay(900);
    digitalWrite(DO, HIGH);
    delay(400);
    digitalWrite(DOT, LOW); delay(600); // teminokibe
    yubeno kobombeko yumono yumo awe ade
    digitalWrite(DOT, HIGH);
    digitalWrite(SOL, LOW); delay(100);
    digitalWrite(SOL, HIGH);
    delay(90);
    digitalWrite(SOL, LOW); delay(200);
    digitalWrite(SOL, HIGH);
    delay(90);
    digitalWrite(SOL, LOW); delay(400);
    digitalWrite(SOL, HIGH);
    delay(80);
    digitalWrite(LA, LOW); delay(700);
    digitalWrite(LA, HIGH);
    delay(100);
    digitalWrite(SOL, LOW); delay(200);
    digitalWrite(SOL, HIGH);
    delay(150);
    digitalWrite(LA, LOW); delay(200);
    digitalWrite(LA, HIGH);
    delay(150);
    digitalWrite(SOL, LOW); delay(200);

```

```
digitalWrite(SOL, HIGH);
delay(150);
digitalWrite(LA, LOW); delay(300);
digitalWrite(LA, HIGH);
delay(150);
digitalWrite(DO, LOW); delay(300);
digitalWrite(DO, HIGH);
delay(80);
digitalWrite(RE, LOW); delay(300);
digitalWrite(RE, HIGH);
delay(80);
digitalWrite(MI, LOW); delay(600);
digitalWrite(MI, HIGH);
delay(100);
digitalWrite(RE, LOW); delay(200);
digitalWrite(RE, HIGH);
delay(150);
digitalWrite(MI, LOW); delay(200);
digitalWrite(MI, HIGH);
delay(150);
digitalWrite(RE, LOW); delay(200);
digitalWrite(RE, HIGH);
delay(150);
digitalWrite(MI, LOW); delay(300);
digitalWrite(MI, HIGH);
delay(150);
digitalWrite(DO, LOW); delay(300);
digitalWrite(DO, HIGH);
delay(80);
digitalWrite(RE, LOW); delay(300);
digitalWrite(RE, HIGH);
delay(80);
digitalWrite(MI, LOW); delay(600);
digitalWrite(MI, HIGH);
delay(100);
digitalWrite(RE, LOW); delay(600);
digitalWrite(RE, HIGH);
delay(90);
```



```

digitalWrite(DO, LOW); delay(700);
digitalWrite(DO, HIGH);
delay(400);
    digitalWrite(DOT, LOW); delay(600);//
teminokibe yubeno kobombeko yumono yumo awe ade
    digitalWrite(DOT, HIGH);
    digitalWrite(SOL, LOW); delay(100);
    digitalWrite(SOL, HIGH);
    delay(90);
    digitalWrite(SOL, LOW); delay(200);
    digitalWrite(SOL, HIGH);
    delay(90);
    digitalWrite(SOL, LOW); delay(400);
    digitalWrite(SOL, HIGH);
    delay(80);
    digitalWrite(LA, LOW); delay(700);
    digitalWrite(LA, HIGH);
    delay(100);
    digitalWrite(SOL, LOW); delay(200);
    digitalWrite(SOL, HIGH);
    delay(150);
    digitalWrite(LA, LOW); delay(200);
    digitalWrite(LA, HIGH);
    delay(150);
    digitalWrite(SOL, LOW); delay(200);
    digitalWrite(SOL, HIGH);
    delay(150);
    digitalWrite(LA, LOW); delay(300);
    digitalWrite(LA, HIGH);
    delay(150);
    digitalWrite(DO, LOW); delay(300);
    digitalWrite(DO, HIGH);
    delay(80);
    digitalWrite(RE, LOW); delay(300);
    digitalWrite(RE, HIGH);
    delay(80);
    digitalWrite(MI, LOW); delay(600);
    digitalWrite(MI, HIGH);

```

```

    delay(100);
    digitalWrite(RE, LOW); delay(200);
    digitalWrite(RE, HIGH);
    delay(150);
    digitalWrite(MI, LOW); delay(200);
    digitalWrite(MI, HIGH);
    delay(150);
    digitalWrite(RE, LOW); delay(200);
    digitalWrite(RE, HIGH);
    delay(150);
    digitalWrite(MI, LOW); delay(300);
    digitalWrite(MI, HIGH);
    delay(150);
    digitalWrite(DO, LOW); delay(300);
    digitalWrite(DO, HIGH);
    delay(80);
    digitalWrite(RE, LOW); delay(300);
    digitalWrite(RE, HIGH);
    delay(80);
    digitalWrite(MI, LOW); delay(600);
    digitalWrite(MI, HIGH);
    delay(100);
    digitalWrite(RE, LOW); delay(600);
    digitalWrite(RE, HIGH);
    delay(90);
    digitalWrite(DO, LOW); delay(700);
    digitalWrite(DO, HIGH);
    delay(400);
digitalWrite(SOL, LOW); delay(150);// hongke hongke
hongke rio
digitalWrite(SOL, HIGH);
delay(100);
digitalWrite(SOL, LOW); delay(150);
digitalWrite(SOL, HIGH);
delay(100);
digitalWrite(SOL, LOW); delay(250);
digitalWrite(SOL, HIGH);
delay(100);

```

```

digitalWrite(LA, LOW); delay(800);
digitalWrite(LA, HIGH);
delay(200);
digitalWrite(SOL, LOW); delay(150);
digitalWrite(SOL, HIGH);
delay(100);
digitalWrite(SOL, LOW); delay(250);
digitalWrite(SOL, HIGH);
delay(100);
digitalWrite(LA, LOW); delay(250);
digitalWrite(LA, HIGH);
delay(100);
digitalWrite(RE, LOW); delay(700);
digitalWrite(RE, HIGH);
delay(300);
    digitalWrite(DO, LOW); delay(150); //hongke
jambe jambe rio
    digitalWrite(DO, HIGH);
    delay(100);
    digitalWrite(DO, LOW); delay(150);
    digitalWrite(DO, HIGH);
    delay(100);
    digitalWrite(RE, LOW); delay(250);
    digitalWrite(RE, HIGH);
    delay(100);
    digitalWrite(MI, LOW); delay(800);
    digitalWrite(MI, HIGH);
    delay(200);
    digitalWrite(RE, LOW); delay(150);
    digitalWrite(RE, HIGH);
    delay(100);
    digitalWrite(RE, LOW); delay(250);
    digitalWrite(RE, HIGH);
    delay(100);
    digitalWrite(MI, LOW); delay(250);
    digitalWrite(MI, HIGH);
    delay(100);
    digitalWrite(DO, LOW); delay(700);

```

```

        digitalWrite(DO, HIGH);
        delay(400);
digitalWrite(SOL, LOW); delay(150);// hongke hongke
hongke rio
digitalWrite(SOL, HIGH);
delay(100);
digitalWrite(SOL, LOW); delay(150);
digitalWrite(SOL, HIGH);
delay(100);
digitalWrite(SOL, LOW); delay(250);
digitalWrite(SOL, HIGH);
delay(100);
digitalWrite(LA, LOW); delay(800);
digitalWrite(LA, HIGH);
delay(200);
digitalWrite(SOL, LOW); delay(150);
digitalWrite(SOL, HIGH);
delay(100);
digitalWrite(SOL, LOW); delay(250);
digitalWrite(SOL, HIGH);
delay(100);
digitalWrite(LA, LOW); delay(250);
digitalWrite(LA, HIGH);
delay(100);
digitalWrite(RE, LOW); delay(700);
digitalWrite(RE, HIGH);
delay(300);
        digitalWrite(DO, LOW); delay(150);//hongke
jambe jambe rio
        digitalWrite(DO, HIGH);
        delay(100);
        digitalWrite(DO, LOW); delay(150);
        digitalWrite(DO, HIGH);
        delay(100);
        digitalWrite(RE, LOW); delay(250);
        digitalWrite(RE, HIGH);
        delay(100);
        digitalWrite(MI, LOW); delay(800);

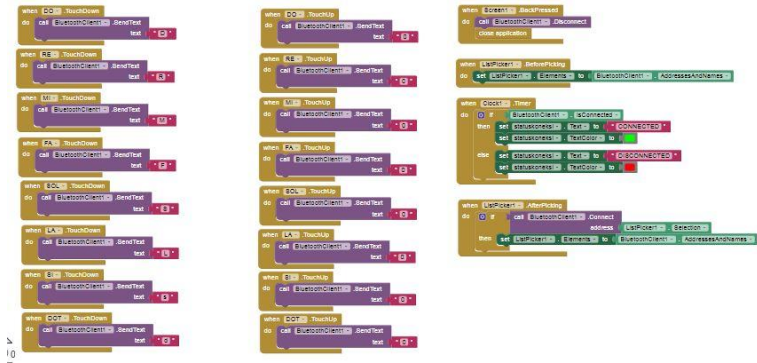
```

```

digitalWrite(MI, HIGH);
delay(200);
digitalWrite(RE, LOW); delay(150);
digitalWrite(RE, HIGH);
delay(100);
digitalWrite(RE, LOW); delay(250);
digitalWrite(RE, HIGH);
delay(100);
digitalWrite(MI, LOW); delay(250);
digitalWrite(MI, HIGH);
delay(100);
digitalWrite(DO, LOW); delay(900);
digitalWrite(DO, HIGH);
}

```

2. Program Bloks MIT APP INVENTOR



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LAMPIRAN C

Proses Pembuatan Aplikasi Kontrol

Prosedur untuk melakukan pembuatan aplikasi dengan *website* MIT *App Inventor* yaitu sebagai berikut:

1. Buka website <https://appinventor.mit.edu/>
Tekan *icon* *Create Apps!*. Maka akan diarahkan untuk membuat atau *login* akun terlebih dahulu. Menu *icon* *create apps* dapat dilihat pada Gambar C.1



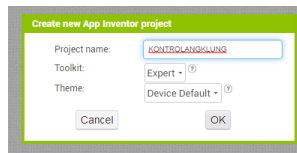
Gambar C. 1 *Icon* *Create Apps* MIT *App Inventor*

2. Klik *New Project*
Setelah berhasil login, untuk membuat aplikasi baru klik *icon* *New Project*. Menu *icon* *New Project* dapat dilihat pada Gambar C.2



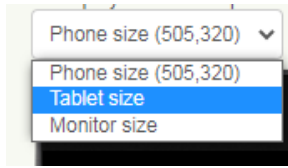
Gambar C. 2 *Icon* *New project*

3. Mengisi nama proyek pada kolom *project name*, gunakan nama tanpa spasi dan tanpa karakter lain, lihat pada Gambar C.3

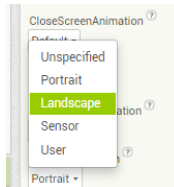


Gambar C. 3 *Project name*

4. Sesuaikan ukuran layar *handphone*, buat orientasi *landscape*. Menu ukuran layar dapat dilihat pada Gambar C.4

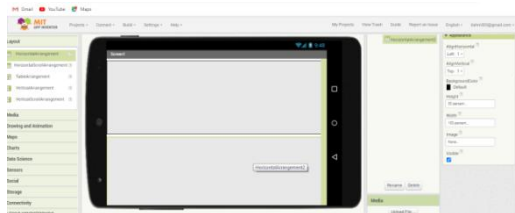


Gambar C. 4 Size Screen



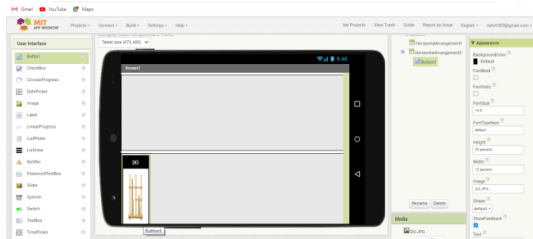
Gambar C. 5 Screen Orientation

5. *Drag and drop HorizontalArrangement* pada menu *Layout* untuk mempermudah penyusunan *button*. Buat ukuran *Height* = 50% dan *Width* = 50%. Buat 2 *HorizontalArrangement* pada sisi atas dan bawah



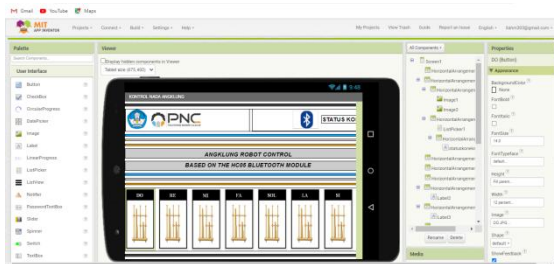
Gambar C. 6 Membuat *HorizontalArrangement*

6. *Drag and drop button* pada menu *user interface* menuju *HorizontalArrangement*, lalu ubah tampilan *button* menggunakan gambar yang sudah disiapkan, deklarasikan *button* tersebut untuk mempermudah dalam pemrograman.



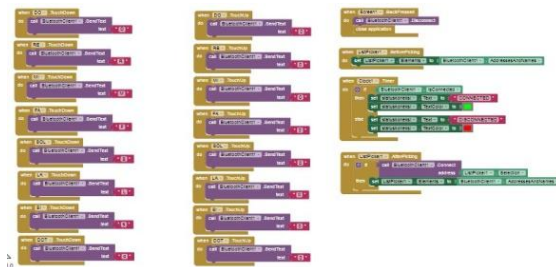
Gambar C. 7 Membuat *Button* Pada *HorizontalArrangement*

7. Lakukan hal yang sama hingga tersusun *button* tangga nada sesuai Gambar C.8



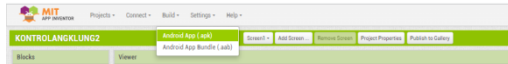
Gambar C. 8 Tampilan *Screen*

8. Buat program dengan klik *icon Blocks* di pojok kanan atas

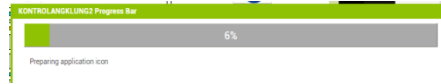


Gambar C. 9 Program *Blocks* Aplikasi

9. Setelah selesai memprogram. Build menjadi file aplikasi dengan menekan icon build klik menu android app .apk, tunggu hingga prosesnya selesai.

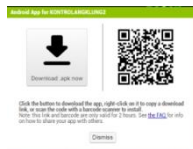


Gambar C. 10 *Build Aplikasi*

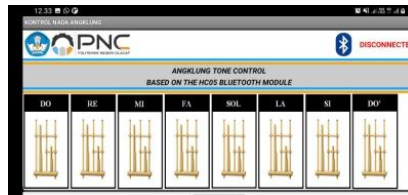


Gambar C. 11 Proses *build Aplikasi*

10. *Downlaod file aplikasi dan install pada perangkat android.*



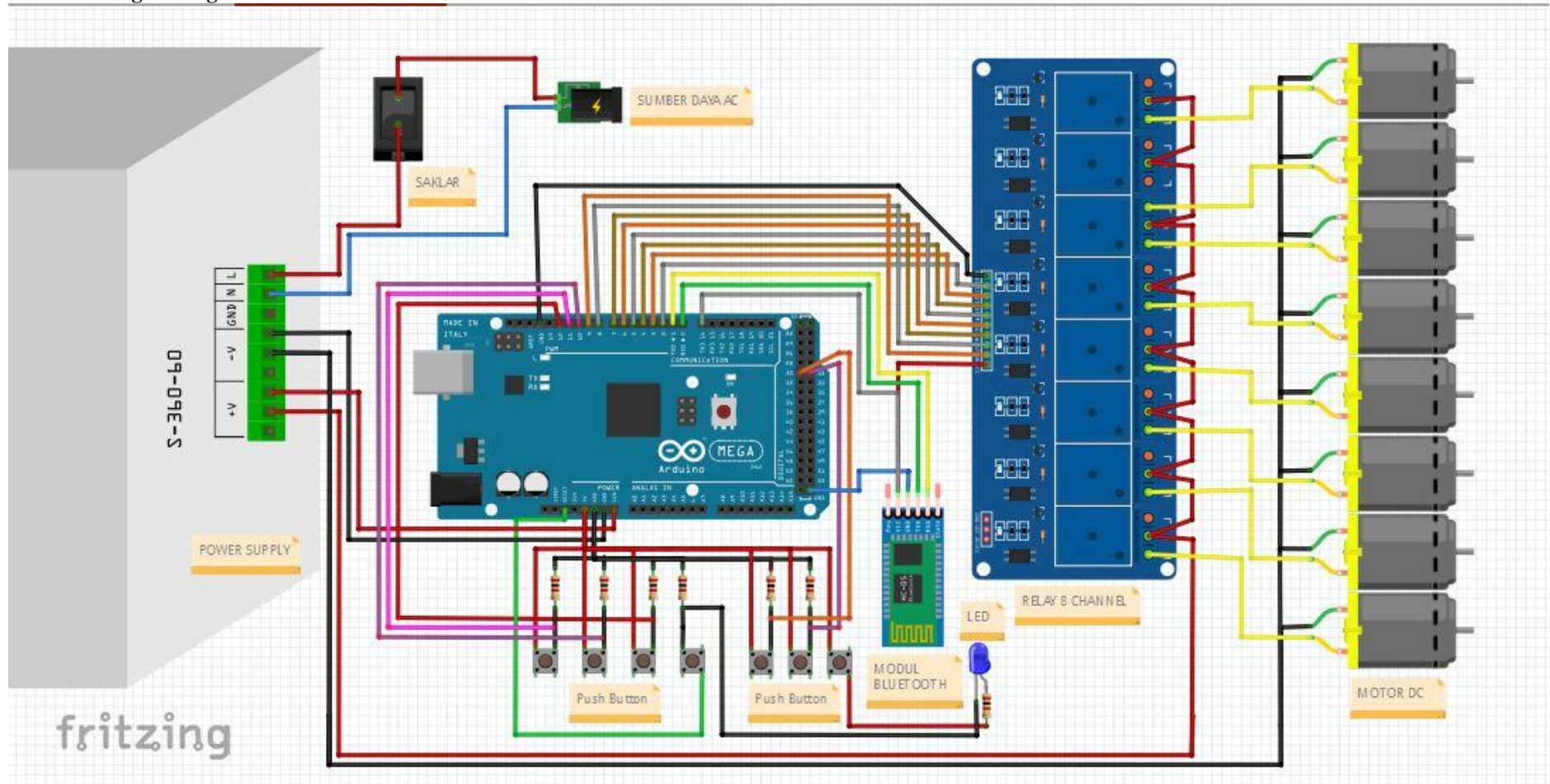
Gambar C. 12 Proses *Build Aplikasi Selesai*



Gambar C. 13 Tampilan Aplikasi Pada *Handphone*

LAMPIRAN D

Hasil Rancangan Pengkabelan



LAMPIRAN E

Hasil Rancangan Angklung



Gambar E. 1 Angklung Tampak Depan



Gambar E. 2 Angklung Tampak Belakang



Gambar E. 3 Angklung Tampak Kanan



Gambar E. 4 Angklung Tampak Kiri



Gambar E. 5 Angklung Tampak Atas

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LAMPIRAN F

Dokumentasi Pengujian



Gambar F. 6 Pengujian Kesesuaian Nada



Gambar F. 7 Hasil Pengujian Kesesuaian Nada



Gambar F. 8 Pengujian Intensitas Suara



Gambar F. 9 Pengujian Komunikasi Bluetooth



Gambar F. 10 Pengukuran Arus Listrik

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