

LAMPIRAN

Lampiran 1. Spesifikasi dan Gambar Prototipe Robot Mobil Pengangkut

Barang

1. Spesifikasi

Dimensi : P 20cm x L 13cm x T20cm

Tipe Mikrokontroler : Arduino Uno 328

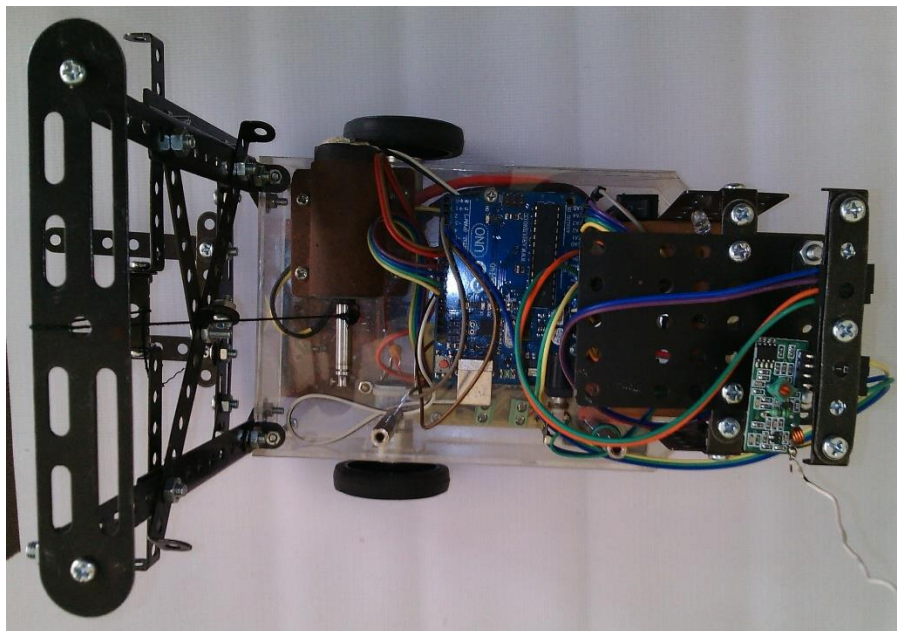
Tegangan : 12 Volt DC

Input : Sensor Cahaya, Modul Bluetooth, Modul Rx
RF433Mhz

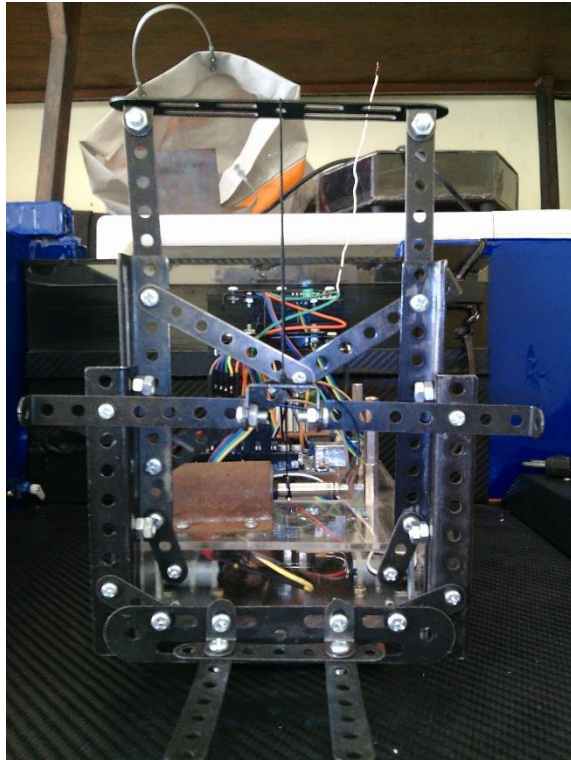
Output : Motor DC dan Motor DC gearbox

Interface (Antarmuka) : Aplikasi Sistem Kontrol Robot Mobil

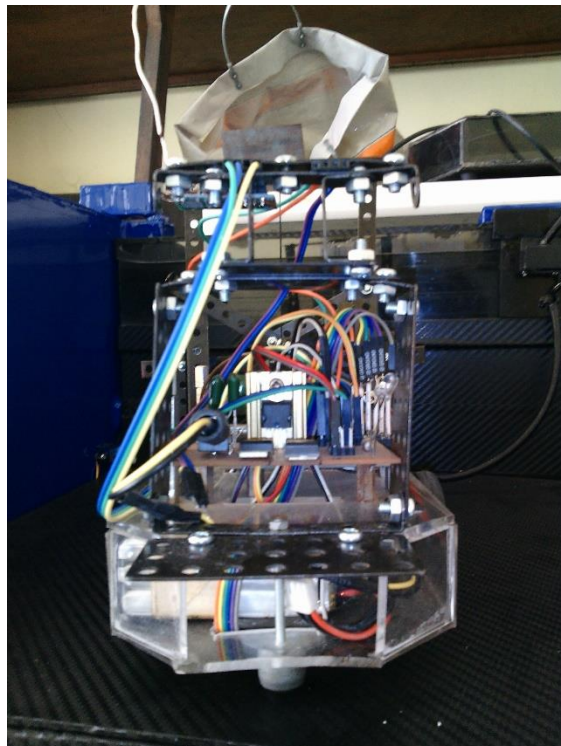
2. Gambar



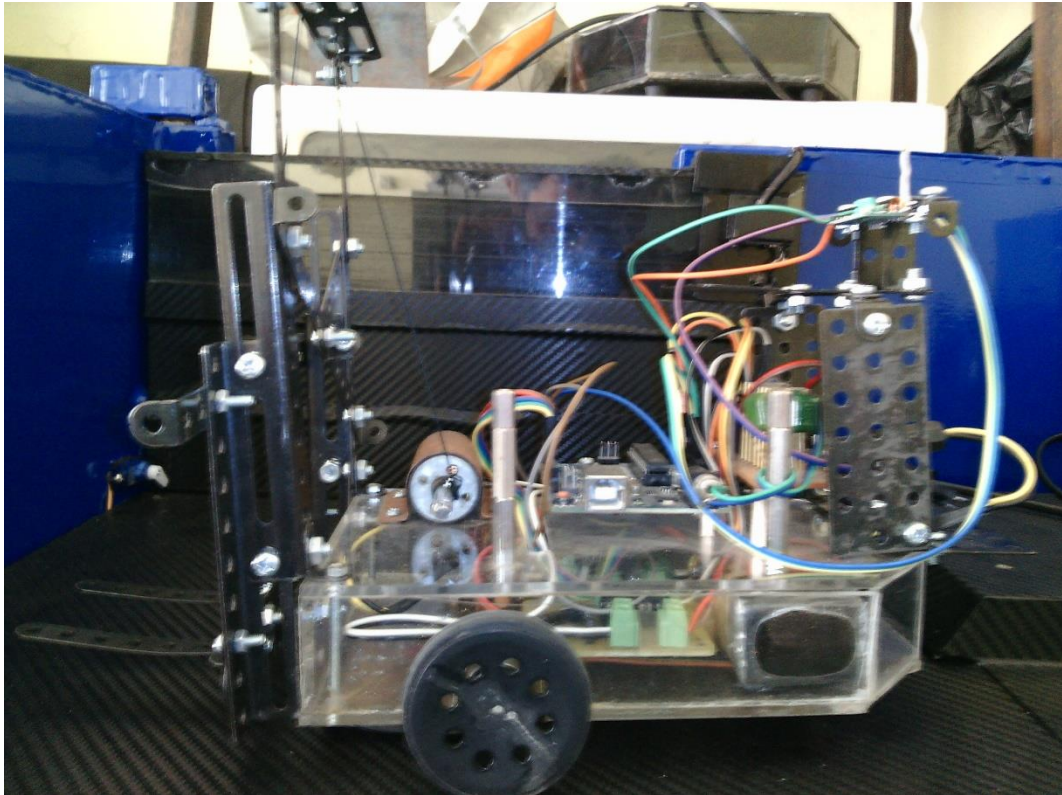
Gambar Robot Mobil Tampak Atas



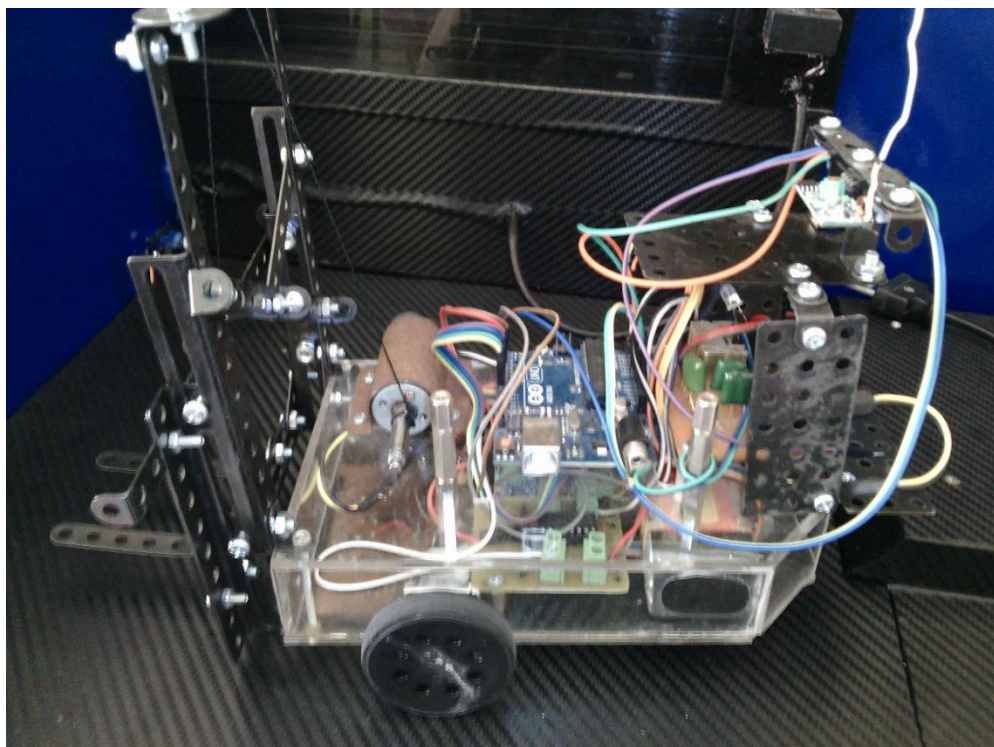
Gambar Robot Mobil Tampak Depan



Gambar Robot Mobil tampak Belakang



Gambar Robot Mobil Tampak Samping



Gambar Robot Mobil Tampak Samping Atas

Lampiran 2. Program Arduino Prototipe Robot Mobil Pengangkut Barang

```

/*
String Input = "";

Skripsi

Prototipe Robot Mobil Pengangkut Barang
Otomatis dengan Smartphone Android
Sebagai Pengendali

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*/

#include <SoftwareSerial.h>
#include <VirtualWire.h>
SoftwareSerial bluetooth(0,1);
int Sensor[6] = { A0, A1, A2, A3, A4, A5 };
int Data[6] = { 0, 0, 0, 0, 0, 0 };

char state;
int flag = 1;

int naik=6;
int turun=7;
int m1mundur=8;
int m1maju=9;
int m2mundur=11;
int m2maju=12;
int enb1=3;
int enb2=5;
int otomatis=2;

int j=0;
int k=0;

void setup()
{
  Serial.begin(9600); // the GPRS baud rate
  for(int i = 0; i < 6; i++)
  {
    pinMode(Sensor[i], INPUT);
  }
  pinMode(naik, OUTPUT); //motor 2 naik
  pinMode(turun, OUTPUT); //motor 2
  turun
  pinMode(m1maju, OUTPUT); //
  pinMode(m1mundur, OUTPUT);
  pinMode(m2maju, OUTPUT);
  pinMode(m2mundur, OUTPUT);
  pinMode(enb1,OUTPUT);
  pinMode(enb2,OUTPUT);
  pinMode(otomatis, OUTPUT);

  vw_set_ptt_inverted(true); // Required for
DR3100
  vw_set_rx_pin(4);
  vw_setup(4000); // Bits per sec
  pinMode(13, OUTPUT);

  vw_rx_start(); // Start the receiver
  PLL running
}

void loop()
{

```

```

Bluetooth();
//rf433();
//sensor();
//Line_1();
//Line_2();
//Line_3();
}

void Bluetooth()
{
  if (bluetooth.available())
  {
    state = bluetooth.read(); // read incoming
state (Rx)

    bluetooth.println(state); // re-send respon
(Tx)

    flag = 0;
  }

  if (Serial.available())
  {
    state = Serial.read(); // read from internal
serial port

    bluetooth.println(state); // send respon to
Tx

    flag = 0;
  }

  if (flag == 0)
  {
    if (state == 'a'){Naik(); flag=1;}
    if (state == 'b'){Turun(); flag=1;}
    if (state == 'c'){Belok_Kanan(); flag=1;}
    if (state == 'd'){Belok_Kiri(); flag=1;}
    if (state == 'e'){Maju(); flag=1;}
    if (state == 'f'){Mundur(); flag=1;}
    if (state == 's'){Stop(); flag=1;}

    if (state == 'o')
    {
      Otomatis_On();
      int z=0;
      while (z < 10000)
      {
        rf433();
        delay(1);
        z++;
      }

      flag=1;
    }

    if (state == 'm'){Otomatis_Off();loop();
flag=1;}
  }
}

void rf433()
{
  uint8_t buf[VW_MAX_MESSAGE_LEN];
  uint8_t buflen =
VW_MAX_MESSAGE_LEN;

  if (vw_get_message(buf, &buflen))
  {
    if(buf[0]=='1')
    {
      digitalWrite(13,1);
      Serial.println("1");
      Maju(); delay(500);
      k=0;
      j=0;
      int z=0;

```

```

while (z < 10000)
{
  Line_1();
  delay(1);
  z++;
}
}

if(buf[0]=='2')
{
  digitalWrite(13, 1);
  Serial.print("2");
  Maju(); delay(500);
  k=0;
  j=0;
  int z=0;
  while (z < 10000)
  {
    Line_2();
    delay(1);
    z++;
  }
}

if(buf[0]=='3')
{
  digitalWrite(13, 1);
  Serial.println("3");
  Maju(); delay(500);
  k=0;
  j=0;
  int z=0;
  while (z < 10000)
    {
      Line_3();
      delay(1);
      z++;
    }
  }if(buf[0]=='0')
  {
    digitalWrite(13,0);
  }
}

if (bluetooth.available())
{
  state = bluetooth.read(); // read incoming
state (Rx)

  bluetooth.println(state); // re-send respon
(Tx)

  flag = 0;
}

if (Serial.available())
{
  state = Serial.read(); // read from internal
serial port

  bluetooth.println(state); // send respon to
Tx

  flag = 0;
}

if (flag == 0)
{
  if (state == 'm'){Otomatis_Off();loop();
flag=1;}
}
}

```

```

void sensor()
{
  for(int i = 0; i < 6; i++)
  {
    Data[i] = analogRead(Sensor[i]);
    if (Data[i]<90)
    {
      Data[i]=0;
    }
    else if (Data[i]>130)
    {
      Data[i]=1;
    }
  }
  Input = "";

  for(int i = 0; i < 6; i++)
  {
    Input = Input + Data[i];
  }
}

void Line_1()
{
  sensor();

  //Serial.println(Input);
  if(Input=="000000"){Stop();}
  if(Input=="000001"){Banting_KananA();}
  if(Input=="000010"){Belok_Kanan();}

  if(Input=="000110"){Belok_Kanan();}
  if(Input=="000011"){Banting_Kanan();}
  if(Input=="000111"){Banting_KananA();}
  if(Input=="001111"){Banting_Kanan();}
  if(Input=="001110"){Maju();}
  if(Input=="000100"){Maju();}
  if(Input=="001100"){Maju();}
  if(Input=="001000"){Maju();}
  if(Input=="011100"){Maju();}
  if(Input=="111100"){Banting_Kiri();}
  if(Input=="111000"){Banting_KiriA();}
  if(Input=="110000"){Banting_Kiri();}
  if(Input=="010000"){Belok_Kiri();}
  if(Input=="011000"){Belok_Kiri();}
  if(Input=="100000"){Banting_KiriA();}
  if(Input=="011110")
  {
    k=k+1;
    if (k==1)
    {
      pos_kanan();
      Banting_Kanan();
      delay(200);
    }
    if (k==2)
    {
      Maju();
      delay(30);
      Ngambil();
    }
    if (k==3)
    {
      pos_kiri();
      Banting_Kiri();

```

```

    delay(100);
    Maju();
    delay(50);
  }
}
if(Input=="011110")
{
  j=j+1;
  if (j==1)
  {
    Banting_Kanan();
    delay(100);
    Maju();
    delay(100);
  }
  else if (j==3)
  {
    Maju();
    delay(50);
  }
  else if (j==5)
  {
    Maju();
    delay(200);
  }
  else if (j==6)
  {
    Maju();
    delay(100);
  }
  else if (j==7)
  {
    Naro();
  }
  else if (j==8)
  {
    Stop();
    delay(500);
    int r=0;
    while (r < 10000)
    {
      rf433();
      delay(1);
      r++;
    }
  }
}

void Line_2()
{
  sensor();

  //Serial.println(Input);
  if(Input=="000000"){Stop();}
  if(Input=="000001"){Banting_KananA();}
  if(Input=="000010"){Belok_Kanan();}
  if(Input=="000110"){Belok_Kanan();}
  if(Input=="000011"){Banting_Kanan();}
  if(Input=="000111"){Banting_KananA();}
  if(Input=="001111"){Banting_Kanan();}
  if(Input=="001110"){Maju();}
  if(Input=="000100"){Maju();}
  if(Input=="001100"){Maju();}
  if(Input=="001000"){Maju();}
  if(Input=="011100"){Maju();}
  if(Input=="111100"){Banting_Kiri();}
  if(Input=="111000"){Banting_KiriA();}
}

```



```

if(Input=="110000"){Banting_Kiri();}           delay(20);
if(Input=="010000"){Belok_Kiri();}           }
if(Input=="011000"){Belok_Kiri();}           else if (j==5)
if(Input=="100000"){Banting_KiriA();}         {
if(Input=="011110")                           Maju();
{                                               delay(200);
  k=k+1;                                       }
  if (k==1)                                   else if (j==6)
  {                                           {
    Maju();                                   Maju();
  }                                           delay(50);
  if (k==2)                                   }
  {                                           else if (j==7)
    Maju();                                   {
    delay(30);                                Naro();
    Ngambil();                               }
  }                                           else if (j==8)
  if (k==3)                                   {
  {                                           Stop();
    Maju();                                   delay(500);
    delay(50);                                int r=0;
  }                                           while (r < 10000)
  }                                           {
if(Input=="011110")                           rf433();
{                                               delay(1);
  j=j+1;                                       r++;
  if (j==1)                                   }
  {                                           }
    Maju();                                   }
    delay(300);                               }
  }
else if (j==3)                                void Line_3()
{                                               {
  Maju();                                       sensor();
}

```

```

//Serial.println(Input);
if(Input=="000000"){Stop();}
if(Input=="000001"){Banting_KananA();}
if(Input=="000010"){Belok_Kanan();}
if(Input=="000110"){Belok_Kanan();}
if(Input=="000011"){Banting_Kanan();}
if(Input=="000111"){Banting_KananA();}
if(Input=="001111"){Banting_Kanan();}
if(Input=="001110"){Maju();}
if(Input=="000100"){Maju();}
if(Input=="001100"){Maju();}
if(Input=="001000"){Maju();}
if(Input=="011100"){Maju();}
if(Input=="111100"){Banting_Kiri();}
if(Input=="111000"){Banting_KiriA();}
if(Input=="110000"){Banting_Kiri();}
if(Input=="010000"){Belok_Kiri();}
if(Input=="011000"){Belok_Kiri();}
if(Input=="100000"){Banting_KiriA();}
if(Input=="011110")
{
  k=k+1;
  if (k==1)
  {
    pos_kiri();
    Banting_Kiri();
    delay(100);
  }
  if (k==2)
  {
    Maju();
    delay(30);
    Ngambil();
  }
  if (k==3)
  {
    pos_kanan();
    Banting_Kanan();
    delay(100);
    Maju();
    delay(50);
  }
  if(Input=="011110")
  {
    j=j+1;
    if (j==1)
    {
      Maju();
      delay(200);
    }
    else if (j==3)
    {
      Belok_Kanan();
      delay(50);
      Maju();
      delay(50);
    }
    else if (j==5)
    {
      Maju();
      delay(200);
    }
    else if (j==6)
    {
      Maju();
      delay(100);
    }
  }
}

```

```

}
else if (j==7)
{
  Naro();
}
else if (j==8)
{
  Stop();
  delay(300);
  int r=0;
  while (r < 10000)
  {
    rf433();
    delay(1);
    r++;
  }
}
}

void Stop()
{
  digitalWrite(naik,LOW);
  digitalWrite(turun,LOW);
  digitalWrite(m1maju,LOW);
  digitalWrite(m1mundur,LOW);
  digitalWrite(m2maju,LOW);
  digitalWrite(m2mundur,LOW);
  analogWrite(enb1,0);
  analogWrite(enb2,0);
}

void Maju()
{
  digitalWrite(naik,LOW);
  digitalWrite(turun,LOW);
  digitalWrite(m1maju,HIGH);
  digitalWrite(m1mundur,LOW);
  digitalWrite(m2maju,HIGH);
  digitalWrite(m2mundur,LOW);
  analogWrite(enb1,160);
  analogWrite(enb2,180);
}

void Mundur()
{
  digitalWrite(naik,LOW);
  digitalWrite(turun,LOW);
  digitalWrite(m1maju,LOW);
  digitalWrite(m1mundur,HIGH);
  digitalWrite(m2maju,LOW);
  digitalWrite(m2mundur,HIGH);
  analogWrite(enb1,160);
  analogWrite(enb2,1800);
}

void Belok_Kanan()
{
  digitalWrite(naik,LOW);
  digitalWrite(turun,LOW);
  digitalWrite(m1maju,HIGH);
  digitalWrite(m1mundur,LOW);
  digitalWrite(m2maju,LOW);
  digitalWrite(m2mundur,LOW);
  analogWrite(enb1,140);
  analogWrite(enb2,140);
}

```

```

void Belok_Kiri()
{
    digitalWrite(naik,LOW);
    digitalWrite(turun,LOW);
    digitalWrite(m1maju,LOW);
    digitalWrite(m1mundur,LOW);
    digitalWrite(m2maju,HIGH);
    digitalWrite(m2mundur,LOW);
    analogWrite(enb1,140);
    analogWrite(enb2,160);
}

void Banting_Kanan()
{
    digitalWrite(naik,LOW);
    digitalWrite(turun,LOW);
    digitalWrite(m1maju,HIGH);
    digitalWrite(m1mundur,LOW);
    digitalWrite(m2maju,LOW);
    digitalWrite(m2mundur,HIGH);
    analogWrite(enb1,140);
    analogWrite(enb2,140);
}

void Banting_Kiri()
{
    digitalWrite(naik,LOW);
    digitalWrite(turun,LOW);
    digitalWrite(m1maju,LOW);
    digitalWrite(m1mundur,HIGH);
    digitalWrite(m2maju,HIGH);
    digitalWrite(m2mundur,LOW);
    analogWrite(enb1,150);
    analogWrite(enb2,150);
}

void Naik()
{
    digitalWrite(naik,HIGH);
    digitalWrite(turun,LOW);
    digitalWrite(m1maju,LOW);
    digitalWrite(m1mundur,LOW);
    digitalWrite(m2maju,LOW);
    digitalWrite(m2mundur,LOW);
}

void Turun()
{
    digitalWrite(naik,LOW);
    digitalWrite(turun,HIGH);
    digitalWrite(m1maju,LOW);
    digitalWrite(m1mundur,LOW);
    digitalWrite(m2maju,LOW);
    digitalWrite(m2mundur,LOW);
}

void Banting_KananA()
{
    digitalWrite(naik,LOW);
    digitalWrite(turun,LOW);
    digitalWrite(m1maju,HIGH);
    digitalWrite(m1mundur,LOW);
    digitalWrite(m2maju,LOW);
    digitalWrite(m2mundur,HIGH);
    analogWrite(enb1,130);
    analogWrite(enb2,130);
}

```

```

                                analogWrite(enb2,230 );
void Banting_KiriA()
{
    digitalWrite(naik,LOW);
    digitalWrite(turun,LOW);
    digitalWrite(m1 maju,LOW);
    digitalWrite(m1 mundur,HIGH);
    digitalWrite(m2 maju,HIGH);
    digitalWrite(m2 mundur,LOW);
    analogWrite(enb1,130);
    analogWrite(enb2,130);
}

void Banting_KananAA()
{
    digitalWrite(naik,LOW);
    digitalWrite(turun,LOW);
    digitalWrite(m1 maju,HIGH);
    digitalWrite(m1 mundur,LOW);
    digitalWrite(m2 maju,LOW);
    digitalWrite(m2 mundur,HIGH);
    analogWrite(enb1,200);
    analogWrite(enb2,200);
}

void Banting_KiriAA()
{
    digitalWrite(naik,LOW);
    digitalWrite(turun,LOW);
    digitalWrite(m1 maju,LOW);
    digitalWrite(m1 mundur,HIGH);
    digitalWrite(m2 maju,HIGH);
    digitalWrite(m2 mundur,LOW);
    analogWrite(enb1,200);
                                analogWrite(enb2,230 );
}

void Ngambil()
{
    Stop();
    delay (500);
    Naik();
    delay (6000);
    Stop();
    delay (500);
    Mundur();
    delay (500);
    Banting_KananAA();
    delay (1000);
}

void Naro()
{
    Stop();
    delay (500);
    Turun();
    delay (6000);
    Stop();
    delay (500);
    Mundur();
    delay(500);
    Banting_KananAA();
    delay (950);
}

void pos_kanan()
{
    Mundur();
}

```

```
delay (100);
Banting_Kanan();
delay (650);
Maju() ;
delay (200);
}

void pos_kiri()
{
Mundur();
delay (100);
Banting_Kiri();
delay (700);

Maju();
delay (300);
}

void Otomatis_Off()
{
digitalWrite(otomatis,LOW);
}

void Otomatis_On()
{
digitalWrite(otomatis,HIGH);
}
```

Lampiran 3. Program Tampilan Aplikasi Antarmuka Sistem Kontrol Robot Mobil pada Smartphone Android

```
initialize global tes to "0"  
initialize global barang_a to "0"  
initialize global barang_b to "0"  
initialize global barang_c to "0"  
  
when Clock1 .Timer  
do  
  if BluetoothClient1 .IsConnected  
  then  
    set global tes to call BluetoothClient1 .ReceiveText  
    numberOfBytes call BluetoothClient1 .BytesAvailableToReceive  
    if get global tes = "1"  
    then  
      set a .BackgroundColor to red  
      set global barang_a to get global barang_a + "1"  
      set barang_a .Text to get global barang_a  
    else if get global tes = "2"  
    then  
      set b .BackgroundColor to red  
      set global barang_b to get global barang_b + "1"  
      set barang_b .Text to get global barang_b  
    else if get global tes = "3"  
    then  
      set c .BackgroundColor to red  
      set global barang_c to get global barang_c + "1"  
      set barang_c .Text to get global barang_c  
    else  
      set a .BackgroundColor to gray  
      set b .BackgroundColor to gray  
      set c .BackgroundColor to gray
```

```

when connect .BeforePicking
do set connect .Elements to BluetoothClient1 .AddressesAndNames

```

```

when disconnect .Click
do if BluetoothClient1 .IsConnected
then call BluetoothClient1 .Disconnect
set connect .Visible to true
call Notifier1 .ShowAlert
notice "Koneksi Bluetooth Terputus !!!"
else call Notifier1 .ShowAlert
notice "Bluetooth Masih Tersambung !!!"
set connect .Visible to false

```

```

when connect .AfterPicking
do if call BluetoothClient1 .Connect
address connect .Selection
then set connect .Visible to false
else call Notifier1 .ShowAlert
notice "Gagal Koneksi Bluetooth !!!"

```

```

when otomatis .Click
do if BluetoothClient1 .IsConnected
then set naik .Enabled to false
set turun .Enabled to false
set kiri .Enabled to false
set kanan .Enabled to false
set maju .Enabled to false
set mundur .Enabled to false
call BluetoothClient1 .SendText
text "o"

```

```

when manual .Click
do if BluetoothClient1 .IsConnected
then set naik .Enabled to true
set turun .Enabled to true
set kiri .Enabled to true
set kanan .Enabled to true
set maju .Enabled to true
set mundur .Enabled to true
call BluetoothClient1 .SendText
text "m"

```



```

when naik . TouchDown
do
  if BluetoothClient1 . IsConnected
  then
    call BluetoothClient1 . SendText
    text " a "
  
```

```

when naik . TouchUp
do
  if BluetoothClient1 . IsConnected
  then
    call BluetoothClient1 . SendText
    text " s "
  
```

```

when turun . TouchDown
do
  if BluetoothClient1 . IsConnected
  then
    call BluetoothClient1 . SendText
    text " b "
  
```

```

when turun . TouchUp
do
  if BluetoothClient1 . IsConnected
  then
    call BluetoothClient1 . SendText
    text " s "
  
```

```

when kanan . TouchDown
do
  if BluetoothClient1 . IsConnected
  then
    call BluetoothClient1 . SendText
    text " c "
  
```

```

when kanan . TouchUp
do
  if BluetoothClient1 . IsConnected
  then
    call BluetoothClient1 . SendText
    text " s "
  
```

```

when kiri . TouchDown
do
  if BluetoothClient1 . IsConnected
  then
    call BluetoothClient1 . SendText
    text " d "
  
```

```

when kiri . TouchUp
do
  if BluetoothClient1 . IsConnected
  then
    call BluetoothClient1 . SendText
    text " s "
  
```

```

when maju . TouchDown
do
  if BluetoothClient1 . IsConnected
  then
    call BluetoothClient1 . SendText
    text " e "
  
```

```

when maju . TouchUp
do
  if BluetoothClient1 . IsConnected
  then
    call BluetoothClient1 . SendText
    text " s "
  
```

```

when mundur . TouchDown
do
  if BluetoothClient1 . IsConnected
  then
    call BluetoothClient1 . SendText
    text " f "
  
```

```

when mundur . TouchUp
do
  if BluetoothClient1 . IsConnected
  then
    call BluetoothClient1 . SendText
    text " s "
  
```

```

when reset . Click
do
  set barang_a . Text to " 0 "
  set barang_b . Text to " 0 "
  set barang_c . Text to " 0 "

```

```

when petunjuk . Click
do
  open another screen screenName " Screen3 "

```