LISTING PROGRAM

```
#include <Wire.h>
#include <Adafruit_PWMServoDriver.h>
Adafruit_PWMServoDriver pwm = Adafruit_PWMServoDriver();
#include <LiquidCrystal_I2C.h>
#include <EEPROM.h>          // EEPROM memory internal

#define SERVO_FREQ 50 // Analog servos run at ~50 Hz updates
#include "ServoGo.h"

#define pwm1 7
#define inA1 6
#define inB1 5
#define inA2 3
#define inB2 4
#define pwm2 2

#define inA3 23
#define inB3 25

//                                      -    +   50 48 42 44 46
// ---------- TCS Atas ------------ // (GND VCC OUT S2 S3 S1 S0)
| baru
#define S0U 46
#define S1U 44
#define S2U 48
#define S3U 42
#define OutputSensorU 50

//   -   +  47 49 51 53 52
// ---------- TCS Bawah ----------- // (GND VCC S0 S1 S2 S3 OUT)
#define S0B 47
#define S1B 49
#define S2B 51
#define S3B 53
#define OutputSensorB 52

const int pinProxiKapasitif = 40;
const int pinProxiInduktif = 36;
const int pinGarisKiri = A0;
const int pinGarisTengah = A2;
const int pinGarisKanan = A4;
int redB, greenB, blueB;
int redU, greenU, blueU;
String warnaB, warnaU = "Null";
String kondisi, ukuran;
int garisKiri, garisKanan, garisTengah, besi, plastik;
int upL, downL, ok, back;
int mode_no_home, mode_no_sensor, mode_no_motor, mode_no_setpoint,
mode_no_servo, mode_no_reza, mode_no_savewarnaB,
mode_no_savewarnaU;

const int btn_pin[] = {33, 35, 37, 39}; // upL - downL - ok - back
bool anu;
```

```cpp
// =========================== VARIABLE EEPPROM WARNA BAWAH
=======================
int MerahLowerRedB, MerahUpperRedB, MerahLowerGreenB,
MerahUpperGreenB, MerahLowerBlueB, MerahUpperBlueB;
int HijauLowerRedB, HijauUpperRedB, HijauLowerGreenB,
HijauUpperGreenB, HijauLowerBlueB, HijauUpperBlueB;
int BiruLowerRedB, BiruUpperRedB, BiruLowerGreenB,
BiruUpperGreenB, BiruLowerBlueB, BiruUpperBlueB;
int KuningLowerRedB, KuningUpperRedB, KuningLowerGreenB,
KuningUpperGreenB, KuningLowerBlueB, KuningUpperBlueB;
int A_MerahLowerRedB = 10; int A_MerahUpperRedB = 11; int
A_MerahLowerGreenB = 12; int A_MerahUpperGreenB = 13; int
A_MerahLowerBlueB = 14; int A_MerahUpperBlueB = 15;
int A_HijauLowerRedB = 20; int A_HijauUpperRedB = 31; int
A_HijauLowerGreenB = 22; int A_HijauUpperGreenB = 23; int
A_HijauLowerBlueB = 24; int A_HijauUpperBlueB = 25;
int A_BiruLowerRedB = 30; int A_BiruUpperRedB = 41; int
A_BiruLowerGreenB = 32; int A_BiruUpperGreenB = 33; int
A_BiruLowerBlueB = 34; int A_BiruUpperBlueB = 35;
int A_KuningLowerRedB = 40; int A_KuningUpperRedB = 51; int
A_KuningLowerGreenB = 42; int A_KuningUpperGreenB = 43; int
A_KuningLowerBlueB = 44; int A_KuningUpperBlueB = 45;

// =========================== VARIABLE EEPPROM WARNA ATAS
=======================
int MerahLowerRedU, MerahUpperRedU, MerahLowerGreenU,
MerahUpperGreenU, MerahLowerBlueU, MerahUpperBlueU;
int HijauLowerRedU, HijauUpperRedU, HijauLowerGreenU,
HijauUpperGreenU, HijauLowerBlueU, HijauUpperBlueU;
int BiruLowerRedU, BiruUpperRedU, BiruLowerGreenU,
BiruUpperGreenU, BiruLowerBlueU, BiruUpperBlueU;
int KuningLowerRedU, KuningUpperRedU, KuningLowerGreenU,
KuningUpperGreenU, KuningLowerBlueU, KuningUpperBlueU;
int A_MerahLowerRedU = 50; int A_MerahUpperRedU = 51; int
A_MerahLowerGreenU = 52; int A_MerahUpperGreenU = 53; int
A_MerahLowerBlueU = 54; int A_MerahUpperBlueU = 55;
int A_HijauLowerRedU = 60; int A_HijauUpperRedU = 61; int
A_HijauLowerGreenU = 62; int A_HijauUpperGreenU = 63; int
A_HijauLowerBlueU = 64; int A_HijauUpperBlueU = 65;
int A_BiruLowerRedU = 70; int A_BiruUpperRedU = 71; int
A_BiruLowerGreenU = 72; int A_BiruUpperGreenU = 73; int
A_BiruLowerBlueU = 74; int A_BiruUpperBlueU = 75;
int A_KuningLowerRedU = 80; int A_KuningUpperRedU = 81; int
A_KuningLowerGreenU = 82; int A_KuningUpperGreenU = 83; int
A_KuningLowerBlueU = 84; int A_KuningUpperBlueU = 85;

LiquidCrystal_I2C lcd(0x27, 16, 2);

ServoGo dof1 = ServoGo(0, 10, 5); // channel, interval, step
ServoGo dof2 = ServoGo(1, 10, 5);
ServoGo dof3 = ServoGo(2, 10, 5);
ServoGo dof4 = ServoGo(3, 10, 5);
ServoGo dof5 = ServoGo(4, 10, 5);
ServoGo dof6 = ServoGo(5, 10, 5);
ServoGo capitLeft = ServoGo(6, 10, 5);
ServoGo capitRight = ServoGo(7, 10, 5);
```

```
void setup() {
  Serial.begin(115200);
  pwm.begin();
  pwm.setOscillatorFrequency(27000000);
  pwm.setPWMFreq(SERVO_FREQ);  // Analog servos run at ~50 Hz
updates
  loadWarna();
  deklarasi();
  lcd.init();
  lcd.backlight();
  lcd.setCursor(0, 0); lcd.print("    Arm Robot    ");
  lcd.setCursor(0, 1); lcd.print("Teknik Komputer ");
  // ---- setup start -----
  dof1.setupStart(80);  // dof1 : semakin tinggi semakin ke kiri
| 80 posisi untuk jalan
  dof2.setupStart(120);  // dof2 : semakin tinggi semakin mundur
| 120 posisi untuk jalan
  dof3.setupStart(90); // dof3 : semakin tinggi semakin ke bawah
| 50 posisi untuk jalan
  dof4.setupStart(70); // dof4 : semakin tinggi semakin kanan | 80
posisi center
  dof5.setupStart(105);  // dof5 : semakin tinggi semakin ke kanan
| center nya 100 gakperlu diubah
  dof6.setupStart(60);  // dof6 : semakin tinggi semakin ke bawah
| center nya 60
  tutupCapit("Sampah");
  //  capitLeft.setupStart(30);  // capitLeft : semakin tinggi
semakin ke membuka | kondisi capit buka = 90 / tutup = 30
  //  capitRight.setupStart(120);  // capitRight : semakin tinggi
semakin ke menutup | kondisi capit buka = 60 / tutup = 120
  delay(1000);
  lcd.clear();
}

void loop() {
  homescreen();
}
```

PROGRAM PENDETEKSI SAMPAH LOGAM DAN NON LOGAM

```
// MODE PROXI KAPASITIF DAN INDUKTIF
void modeAngga() {
  lcd.clear();
  delay(500);
  int step_step = 0;
  int i = 0;
  String mode;
  while (1) {
    bacaBtn();
    //  dof1.setupStart(80);  // dof1 : semakin tinggi semakin ke
kiri  | 80 posisi untuk jalan
    //  dof2.setupStart(100);  // dof2 : semakin tinggi semakin
mundur  | 100 posisi untuk jalan
```

```
    //  dof3.setupStart(90); // dof3 : semakin tinggi semakin ke
bawah  | 50 posisi untuk jalan
    //  dof4.setupStart(70); // dof4 : semakin tinggi semakin
kanan | 80 posisi center
    //  dof5.setupStart(100);  // dof5 : semakin tinggi semakin ke
kanan | center nya 100 gakperlu diubah
    //  dof6.setupStart(60);  // dof6 : semakin tinggi semakin ke
bawah | center nya 60
    //  capitLeft.setupStart(30);  // capitLeft : semakin tinggi
semakin ke membuka | kondisi capit buka = 90 / tutup = 30
    //  capitRight.setupStart(60);  // capitRight : semakin tinggi
semakin ke menutup | kondisi capit buka = 0 / tutup = 60
    switch (step_step) {
      case 0:
        // gerakan standby
        motor(0, 0);
        for (i; i < step_step + 1; i++) {
          dof2.setLogic(true);
          dof3.setLogic(true);
        }
        bukaCapit();
        dof3.goTo(90, 50);
        dof2.goTo(120, 90);
        if (dof2.getLangkah() == true && dof3.getLangkah() ==
true) step_step += 1;
        break;
      case 1:
        delay(2000);
        tutupCapit("kaleng");
        delay(2000);
        i++;
        step_step += 1;
        break;
      case 2:
        for (i; i < step_step + 1; i++) {
          dof2.setLogic(true);
          dof3.setLogic(true);
        }
        dof2.goTo(90, 120);
        dof3.goTo(50, 90);
        if (dof2.getLangkah() == true && dof3.getLangkah() ==
true) step_step += 1;
        break;
      case 3:
        bacaProxi();
        lcd.setCursor(0, 0); lcd.print("Scanning : ");
        lcd.setCursor(11, 0); lcd.print(besi); lcd.print(" | ");
lcd.print(plastik);
        if ((besi == 1 && plastik == 1) || (!upL)) {  // kalo
plastik
          step_step = 10;
        }  // default normal besi && !plastik.
        else if ((besi == 0 && plastik == 1) || (!back)) { // kalo
besi
          step_step = 30;
          } else {
```

```
        step_step = step_step;
      }
      break;
    // --------------- plastikk -----------------
    case 10:
      lcd.setCursor(0, 1); lcd.print("Plastik tDeteksi");
      delay(2000);
      lcd.clear();
      i++;
      step_step += 1;
      break;
    case 11:
      // gerakan ngangkatt
      for (i; i < step_step + 1; i++) {
        dof2.setLogic(true);
        dof3.setLogic(true);
      }
      dof2.goTo(120, 130);
      dof3.goTo(120, 90);
      if (dof2.getLangkah() == true && dof3.getLangkah() ==
true) step_step += 1;
      break;
    case 12:
      // putar kanan
      patahKanan(230);
      delay(1200);
      step_step += 1;
      break;
    case 13:
      bacaGaris();
      if (!garisTengah) {
        step_step += 1;
      }
      break;
    case 14:
      bacaWarnaB();
      susurGaris();
      if (warnaB == "Merah")
      {
        //            i++;
        step_step += 1;
      }
      else {
        step_step = step_step;
      }
      break;
    case 15:
      lcd.setCursor(0, 0); lcd.print("Merah terdeteksi");
      lcd.setCursor(0, 1); lcd.print(" Menaruh Sampah ");
      motor(0, 0);
      delay(500);
      maju(200);
      delay(250);
      motor(0, 0);
      // gerakan narok barang;
      for (i; i < step_step + 1; i++) {
```

```
            dof2.setLogic(true);
            dof3.setLogic(true);
            dof1.setLogic(true);
          }
        dof1.goTo(80, 150);
        dof3.goTo(90, 60);
        dof2.goTo(120, 80);
        bukaCapit();
        if (dof2.getLangkah() == true && dof3.getLangkah() == true
&& dof1.getLangkah() == true ) step_step += 1;
        break;
      case 16:
        lcd.setCursor(0, 0); lcd.print("  - Selesai -   ");
        lcd.setCursor(0, 1); lcd.print(" Menaruh Barang ");
        delay(2000);
        i++;
        step_step += 1;
        break;
      case 17:
        for (i; i < step_step + 1; i++) {
          dof2.setLogic(true);
          dof3.setLogic(true);
          dof1.setLogic(true);
        }
        dof3.goTo(60, 90);
        dof2.goTo(80, 120);
        dof1.goTo(150, 80);
        if (dof2.getLangkah() == true && dof3.getLangkah() == true
&& dof1.getLangkah() == true ) step_step += 1;
        break;
      case 18:
        tutupCapit("kaleng");
        mundur(200);
        delay(1500);
        patahKiri(220);
        delay(1200);
        i++;
        step_step++;
        break;
      case 19:
        bacaGaris();
        if (!garisTengah) {
          i++;
          step_step++;
        }
        break;
      case 20:
        bacaWarnaB();
        susurGaris();
        if (warnaB == "Hijau") step_step += 1;
        break;
      case 21:
        motor(0, 0);
        delay(2000);
        maju(200);
        delay(500);
```

```
      patahKanan(220);
      delay(2000);
      motor(0, 0);
      i = 0;
      step_step = 0;
      homescreen();
      break;
    // --------------- BESI ----------------
    case 30:
      lcd.setCursor(0, 1); lcd.print("Besi terdeteksi");
      delay(3000);
      lcd.clear();
      i++;
      step_step += 1;
      break;
    case 31:
      // gerakan ngangkatt
      for (i; i < step_step + 1; i++) {
        dof2.setLogic(true);
        dof3.setLogic(true);
      }
      dof2.goTo(120, 130);
      dof3.goTo(120, 90);
      if (dof2.getLangkah() == true && dof3.getLangkah() ==
true) step_step += 1;
      break;
    case 32:
      // putar kanan
      patahKiri(230);
      delay(1200);
      step_step += 1;
      break;
    case 33:
      bacaGaris();
      if (!garisTengah) {
        step_step += 1;
      }
      break;
    case 34:
      bacaWarnaB();
      susurGaris();
      if (warnaB == "Merah")
      {
        step_step += 1;
      }
      else {
        step_step = step_step;
      }
      break;
    case 35:
      lcd.setCursor(0, 0); lcd.print("Merah terdeteksi");
      lcd.setCursor(0, 1); lcd.print(" Menaruh Sampah ");
      motor(0, 0);
      delay(500);
      maju(200);
      delay(250);
```

```
            motor(0, 0);
            // gerakan narok barang;
            for (i; i < step_step + 1; i++) {
              dof2.setLogic(true);
              dof3.setLogic(true);
              dof1.setLogic(true);
            }
            dof1.goTo(80, 0);
            dof3.goTo(90, 60);
            dof2.goTo(120, 80);
            bukaCapit();
            if (dof2.getLangkah() == true && dof3.getLangkah() == true
  && dof1.getLangkah() == true ) step_step += 1;
            break;
          case 36:
            lcd.setCursor(0, 0); lcd.print("  - Selesai -    ");
            lcd.setCursor(0, 1); lcd.print("Kembali ke Home ");
            delay(2000);
            i++;
            step_step += 1;
            break;
          case 37:
            tutupCapit("kaleng");
            for (i; i < step_step + 1; i++) {
              dof2.setLogic(true);
              dof3.setLogic(true);
              dof1.setLogic(true);
            }
            dof3.goTo(60, 90);
            dof2.goTo(80, 120);
            dof1.goTo(0, 80);
            if (dof2.getLangkah() == true && dof3.getLangkah() == true
  && dof1.getLangkah() == true ) step_step += 1;
            break;
          case 38:
            mundur(200);
            delay(1300);
            patahKanan(220);
            delay(1500);
            i++;
            step_step++;
            break;
          case 39:
            bacaGaris();
            if (!garisTengah) {
              i++;
              step_step++;
            }
            break;
          case 40:
            bacaWarnaB();
            susurGaris();
            if (warnaB == "Hijau") step_step += 1;
            break;
          case 41:
            motor(0, 0);
```

```
        delay(1000);
        maju(200);
        delay(500);
        patahKiri(220);
        delay(1500);
        motor(0, 0);
        i = 0;
        step_step = 0;
        homescreen();
        break;
      }
    }
}
```