

CODINGAN ROBOT

1. Program Utama

```
intarm_Dwi() {  
  
    digitalWrite(relay_Mp, 0);  
  
    if (raspi == 1) {  
  
        while (1) {  
  
            bacaUltra();  
  
            lcd.setCursor(1, 0); lcd.print("Arm Robot Mode");  
  
            lcd.setCursor(0, 1); lcd.print("Besi& Non Besi");  
  
            if (jarak<= 10) {  
  
                lcd.clear();  
  
                lcd.setCursor(1, 0); lcd.print("Arm Robot Move");  
  
                lcd.setCursor(5, 1); lcd.print("Besi");  
  
                delay(1900);  
  
                move_D();  
  
                }  
  
            if (raspi == 0)  lcd.clear(); break;  
  
                }  
  
        }  
  
    else {  
  
        lcd.setCursor(1, 0); lcd.print("Arm Robot Mode");  
  
        lcd.setCursor(0, 1); lcd.print("Besi& Non Besi");
```

```

delay(50);

standby();

    }

}

intmove_D() {

    //turun

    digitalWrite(relay_Mp, 1);
    digitalWrite(relay_Me, 0);

    gerak_servo(my servo3, 125, 140);
    gerak_servo(my servo2, 180, 160);
    gerak_servo(my servo5, 90, 97);

    posisi_awal_my servo3 = 140;
    posisi_awal_my servo2 = 160;
    posisi_awal_my servo5 = 97;

    delay(2000);

    gerak_servo(my servo5, 97, 90);
    gerak_servo(my servo2, 160, 180);
    gerak_servo(my servo3, 140, 125);

    posisi_awal_my servo5 = 90;
    posisi_awal_my servo2 = 180;
    posisi_awal_my servo3 = 125;

    delay(300);

    gerak_servo(my servo8, 90, 152);

```

```

    posisi_awal_my servo8 = 152;

delay(300);

    //geser

gerak_servo(my servo1, 85, 0);

    posisi_awal_my servo1 = 0;

delay(300);

gerak_servo(my servo2, 180, 160);

gerak_servo(my servo3, 125, 145);

    posisi_awal_my servo2 = 160;

    posisi_awal_my servo3 = 145;

delay(300);

digitalWrite(relay_Me, 1);

delay(300);

gerak_servo(my servo2, 160, 180);

gerak_servo(my servo3, 145, 125);

    posisi_awal_my servo2 = 180;

    posisi_awal_my servo3 = 125;

delay(300);

gerak_servo(my servo1, 0, 85);

    posisi_awal_my servo1 = 85;

delay(300);

}

```

2. Image Processing

```

import cv2

import numpy as np

import time

import RPi.GPIO as GPIO

def nothing(x):

    pass

GPIO.setmode(GPIO.BOARD)

GPIO.setup(40, GPIO.OUT)

time.sleep(1)

cap = cv2.VideoCapture(0)

cv2.namedWindow ('HSV Value',)

cv2.createTrackbar('H_objek','HSV Value',0,180,nothing)

cv2.createTrackbar('S_objek','HSV Value',161,255,nothing)

cv2.createTrackbar('V_objek','HSV Value',78,255,nothing)

while True:

    __,frame = cap.read()

    kernel = np.ones((5, 5), np.uint8)

    hsv = cv2.cvtColor(frame, cv2.COLOR_BGR2HSV)

    H_objek = cv2.getTrackbarPos('H_objek','HSV Value')

    S_objek = cv2.getTrackbarPos('S_objek','HSV Value')

    V_objek = cv2.getTrackbarPos('V_objek','HSV Value')

    lower0 = np.array([H_objek,S_objek,V_objek])

    upper0 = np.array([180,255,255])

    objek = cv2.inRange(hsv,lower0,upper0)

```

```

objek = cv2.erode(objek, kernel)

objek = cv2.morphologyEx(objek, cv2.MORPH_OPEN, kernel)
#Membuat Opening (yaitumengurangi noise di luarkontourwarna)

objek = cv2.morphologyEx(objek, cv2.MORPH_CLOSE, kernel)
#Membuat Closing (yaitumenutupilobanglobang di dalamkontourwarna)

#=====
=====

contours = cv2.findContours(objek, cv2.RETR_TREE,
cv2.CHAIN_APPROX_SIMPLE)[-2]

if len(contours) > 0:

    area = max(contours, key = cv2.contourArea)

    approx = cv2.approxPolyDP(area, 0.02*cv2.arcLength(area, True), True)

        x = approx.ravel()[0]

        y = approx.ravel()[1]

        M = cv2.moments(area)

        m00 = M['m00']

    if m00 !=0:

        center =(int(M['m10'] / m00), int(M['m01'] / m00))

        if area is not None:

            cv2.drawContours(frame, [approx], 0, (0, 0, 255), 2)

            if len(approx) >= 3:

                cv2.putText(frame, "SampahBesi", (x, y), cv2.FONT_HERSHEY_SIMPLEX, 1,
                (0, 0, 255),1)

                print('SampahBesiTerdeteksi')

            cv2.putText(frame,"("+str(center[0])+","+str(center[1])+")",
            (x+5,center[1]+18), cv2.FONT_HERSHEY_SIMPLEX, 0.4, (0, 0, 255),1)

```

```

GPIO.output(40,GPIO.HIGH)

elif len(approx) < 2:

cv2.putText(frame, "Sampah Non Besi", (x, y), cv2.FONT_HERSHEY_SIMPLEX,
1, (0, 0, 255),1)

print('SampahBesiTidakTerdeteksi')

cv2.putText(frame,"("+str(center[0])+","+str(center[1])+")",
(x+5,center[1]+18), cv2.FONT_HERSHEY_SIMPLEX, 0.4, (0, 0, 255),1)

GPIO.output(40,GPIO.LOW)

else:

print('SampahBesiTidakTerdeteksi')

GPIO.output(40, GPIO.LOW)

cv2.imshow("Original", frame)

cv2.imshow("tresholding", objek)

key = cv2.waitKey(1)

if key == 27:

break

cap.release()

cv2.destroyAllWindows()

```

3. Sistem Gerak Robot

1. Arm_Robot

```

#include "hardware.h"

void setup() {

Serial.begin(9600);

hardwareSet();

lcdReady();

```

```

}

void loop() {

if (!btB) {

while (1) arm_Bella();

    }

if (!btD) {

lcd.clear();

while (1) arm_Dwi();

    }

if (!btM) {

while (1) arm_Merry();

    }

}

```

2. HardwareSet

```

inthardwareSet() {

    /*----- Raspberry pi -----*/

pinMode(A10, INPUT_PULLUP);

pinMode(A11, INPUT_PULLUP);

pinMode(A12, INPUT_PULLUP);

    /*----- Lcd i2c 16X2 -----*/

lcd.begin();

    /*----- Motor servo -----*/

myservo1.attach(23);      //servo base bawah

myservo2.attach(25);

myservo3.attach(27);

```

```

myservo4.attach(29);

myservo5.attach(31);

myservo6.attach(33);

myservo7.attach(35);

myservo8.attach(6);

/*----- Robot keadaan standby -----*/

standby();

/*----- Relay -----*/

pinMode(relay_Mp, OUTPUT);    // Motor Power Window

pinMode(relay_Me, OUTPUT);    // Motor Elektromagnet

digitalWrite(relay_Mp, 1);

digitalWrite(relay_Me, 1);

/*----- Push Button -----*/

pinMode(button1, INPUT_PULLUP); pinMode(button2, INPUT_PULLUP);

pinMode(button3, INPUT_PULLUP); pinMode(button4, INPUT_PULLUP);

pinMode(button5, INPUT_PULLUP); pinMode(button6, INPUT_PULLUP);

pinMode(button7, INPUT_PULLUP);

/*----- Sensor Ultrasonik -----*/

pinMode(trig, OUTPUT);    // set pin trig menjadi OUTPUT

pinMode(echo, INPUT);    // set pin echo menjadi

/*----- Driver Motor -----*/

pinMode(in1, OUTPUT);

pinMode(in2, OUTPUT);

pinMode(in3, OUTPUT);

```



```

pinMode(in4, OUTPUT);

/*----- Sensor Garis -----*/

pinMode(irl1, INPUT);

pinMode(ir2, INPUT);

pinMode(ir3, INPUT);

pinMode(ir4, INPUT);

pinMode(ir5, INPUT);

}

```

3. Hardware.h

```

/***** Deklarasi servo *****/

#include<Servo.h>

Servo myservo1; Servo myservo2;

Servo myservo3; Servo myservo4;

Servo myservo5; Servo myservo6;

Servo myservo7; Servo myservo8;


/*----- setting sudutawal servo standby -----*/

int posisi_awal_myservo1 = 85; int posisi_awal_myservo2 = 180;

int posisi_awal_myservo3 = 125; int posisi_awal_myservo4 = 80;

int posisi_awal_myservo5 = 90; int posisi_awal_myservo6 = 60;

int posisi_awal_myservo7 = 90; int posisi_awal_myservo8 = 90;


int nilai_servo1; int nilai_servo2;

```

```
int nilai_servo3; int nilai_servo4;

int nilai_servo5; int nilai_servo6;

int nilai_servo7; int nilai_servo8;


/***** Deklarasilcd i2c *****/

#include <Wire.h>

#include <LiquidCrystal_I2C.h>

LiquidCrystal_I2C lcd(0x27 , 16, 2);

/***** Deklarasi relay pin *****/

#define relay_Me 26

#define relay_Mp 28

/***** Deklarasi button pin *****/

#define button1 9

#define button2 10

#define button3 11

#define button4 12

#define button5 13

#define button6 A0

#define button7 A1

#define btBdigitalRead(9)

#define btDdigitalRead(10)

#define btMdigitalRead(11)

#define bt1 digitalRead(12)

#define bt2 digitalRead(13)
```

```

#define bt3 digitalRead(A0)

#define bt4 digitalRead(A1)

/***** Deklarasi Sensor Ultrasonik *****/

int trig = 30;

int echo = 32;

longdurasi, jarak;      // membuatvariabeldurasidanjarak

/***** Receiver Raspi *****/

#define raspidigitalRead (A10)

#define hijaudigitalRead (A11)

#define merahdigitalRead (A12)

```

4. Fungsi Motor

```

intgerak_servo(Servo servo, intmulai, intselesai) {

    if (mulai<selesai) {

        for (int i = mulai; i <selesai; i++) {

            servo.write(i);

            delay(20);

        }

    }

    else {

        for (int i = mulai; i >selesai; i--) {

            servo.write(i);

            delay(20);

        }
    }
}

```

```

    }

}

int standby() {

myservo1.write(posisi_awal_myservo1);

myservo2.write(posisi_awal_myservo2);

myservo3.write(posisi_awal_myservo3);

myservo4.write(posisi_awal_myservo4);

myservo5.write(posisi_awal_myservo5);

myservo6.write(posisi_awal_myservo6);

myservo7.write(posisi_awal_myservo7);

myservo8.write(posisi_awal_myservo8);

}

```

5. Tampilan LCD

```

int lcdReady() {

lcd.setCursor(2, 0); lcd.print("Arm Robot");

lcd.setCursor(1, 1); lcd.print("Manipulator");

delay(2500); lcd.clear();

lcd.setCursor(1, 0); lcd.print("Arm Robot Mode");

lcd.setCursor(4, 1); lcd.print("Standby");

delay(100);

}

```

6. Sensor Ultrasonik

```
int bacaUltra() {  
  
    digitalWrite(trig, LOW);  
  
    delayMicroseconds(8);  
  
    digitalWrite(trig, HIGH);  
  
    delayMicroseconds(8);  
  
    digitalWrite(trig, LOW);  
  
    delayMicroseconds(8);  
  
    durasi = pulseIn(echo, HIGH);    // menerima suara ultrasonik  
  
    jarak = (durasi / 2) / 29.1;    // mengubah durasi menjadi jarak (cm)  
  
    if (jarak > 50) {  
  
        jarak = 50;  
  
        }  
  
    delay(10);  
  
}
```