

## LAMPIRAN

### A. Hasil Perhitungan Modul Tugas Akhir Pada Kursi Roda

#### 1. Perhitungan Rata-Rata Jarak Tempuh 10meter

$$\begin{aligned} \text{Rata - Rata} &= \frac{\text{Jumlah nilai data}}{\text{Banyak data}} \\ &= \frac{15,28+15,57+15,44+15,34+15,44+15,50+16,34+15,59+16,24}{9} = 15,63 \text{ detik} \end{aligned}$$

#### 2. Perhitungan Kelajuan Kursi Roda Elektrik

$$\text{Kelajuan} = \frac{10 \text{ meter}}{15,63 \text{ detik}} = 0,64 \text{ meter/ detik}$$

#### 3. Perhitungan Akurasi dan *Error* Perintah Eksekusi *joystick*.

$$\text{Persentase Akurasi (\%): } \left( \frac{\text{jumlah percobaan} - \text{hasil kegagalan}}{\text{jumlah percobaan}} \right) \times 100\%$$

- a. Perintah Maju =  $\frac{25-3}{25} \times 100\% = 88\%$
- b. Perintah Kanan =  $\frac{25-0}{25} \times 100\% = 100\%$
- c. Perintah Kiri =  $\frac{25-0}{25} \times 100\% = 100\%$
- d. Perintah Mundur =  $\frac{25-0}{25} \times 100\% = 100\%$

$$\text{Persentase Error (\%): } \left( \frac{\text{jumlah percobaan} - \text{hasil keberhasilan}}{\text{jumlah percobaan}} \right) \times 100\%$$

- a. Perintah Maju =  $\frac{25-22}{25} \times 100\% = 12\%$
- b. Perintah Kanan =  $\frac{25-25}{25} \times 100\% = 0\%$
- c. Perintah Kiri =  $\frac{25-25}{25} \times 100\% = 0\%$
- d. Perintah Mundur =  $\frac{25-25}{25} \times 100\% = 0\%$

## B. Program Arduino

```
const int joy = 12;
const int acc = 13;
#define joyX A0
#define joyY A1
#define xpin A3
#define ypin A2
#define b_safety A4
const int
trigPin1=2,echoPin1=3,ledP
in1=7,bypass=6;
const int DWN=11, UP=10,
LEFT=9, RT =8;
int durasil, jarak1;
int xValue,yValue;
long x, y;
int aktifacc=0,
aktifjoy=0,aktifbp,aktifsf
;
boolean safety=true;
void setup() {
Serial.begin(9600);
pinMode(joy,INPUT_PULLUP);
pinMode(acc,INPUT_PULLUP);
pinMode (bypass,
INPUT_PULLUP);
pinMode (b_safety,
INPUT_PULLUP);

pinMode(trigPin1,OUTPUT);
pinMode(echoPin1,INPUT);
pinMode(ledPin1, OUTPUT);

pinMode(DWN, OUTPUT);
pinMode(UP, OUTPUT);
pinMode(LEFT, OUTPUT);
pinMode(RT, OUTPUT);}

void loop() {
aktifacc=digitalRead(acc);
aktifjoy=digitalRead(joy);
aktifbp=digitalRead(bypass)
;
aktifsf=digitalRead(b_safet
y);

if (safety == true){
if (aktifjoy == LOW){
perintahjoy();
ultrasoundsatu();}
else if (aktifacc == LOW){
perintahacc();
ultrasoundsatu();}
if (aktifbp==LOW){
digitalWrite (ledPin1,LOW);
digitalWrite
(echoPin1,LOW);}
else if (jarak1 <=100){
digitalWrite (ledPin1,
HIGH);
stop_();
delay(2000);}
else {digitalWrite
(ledPin1, LOW);}
delay(50);}
if (aktifsf==LOW){
safety=false;}}

void perintahacc()
{
x = analogRead(xpin);
y = analogRead(ypin);

if (x<=320){
backward();}
else if (x>=370){
maju();}
```

```

else if (y<=310){
left();}
else if (y>350){
right();}
else
{stop_();}
delay(100);}

void perintahjoy() {
xValue = analogRead(joyX);
yValue = analogRead(joyY);

if (xValue>=400 &&
xValue<=600 && yValue<=10){
left();}
else if (xValue<=10 &&
yValue>=400 &&
yValue<=600){
backward();}
else if (xValue>=400 &&
xValue<=600 &&
yValue>=700){
right();}
else if (xValue>=700 &&
yValue>=400 &&
yValue<=600){
maju();}
else{stop_();}
delay(50);}

void stop_(){
Serial.println("");
Serial.println("STOP");
digitalWrite(UP, LOW);
digitalWrite(DWN, LOW);
digitalWrite(LEFT, LOW);
digitalWrite(RT, LOW);
delay(100);}

void maju(){
Serial.println("");
Serial.println("MAJU");
digitalWrite(UP, LOW);
digitalWrite(DWN, LOW);
digitalWrite(LEFT, HIGH);
digitalWrite(RT, HIGH);}

void backward(){
Serial.println("");
Serial.println("MUNDUR");
digitalWrite(UP, HIGH);
digitalWrite(DWN, HIGH);
digitalWrite(LEFT, LOW);
digitalWrite(RT, LOW);}

void left(){
Serial.println("");
Serial.println("KIRI");
digitalWrite(UP, LOW);
digitalWrite(DWN, LOW);
digitalWrite(LEFT, HIGH);
digitalWrite(RT, LOW);}

void right(){
Serial.println("");
Serial.println("KANAN");
digitalWrite(UP, LOW);
digitalWrite(DWN, LOW);
digitalWrite(LEFT, LOW);
digitalWrite(RT, HIGH);}

void ultrasoundsatu() {
digitalWrite (trigPin1,
HIGH);
delayMicroseconds (10);
digitalWrite (trigPin1,
LOW);

```

```
durasil = pulseIn  
(echoPin1, HIGH);
```

```
jarak1 = (durasil / 2) /  
29.1;}
```