unsigned long previousMillis = 0;

const long interval = 604800016.56;

//Variabel perhitungan konversi rotasi ke translasi kendali motor stepper

float step = 200; //jumlah step dalam satu putaran motor steper

float dpulley = 40; // diameter pulley

float degperstep = 360 / step; // sudut per 1 step

float kllpulley = dpulley \* (22 / 7); // panjang lintasan perkeliling pulley

float lpersatstep = (degperstep / 360) \* kllpulley; //panjang perstep pulley

float la = 500;// step asumsi 0.5 meter

float lb = 1000;// step asumsi 1 meter

float lc = 1800; // step asumsi 1,5 meter

int stepla = la / lpersatstep;

int steplb = lb / lpersatstep;

int steplc = lc / lpersatstep;

int steplaa = stepla + 1;

int steplba = steplb + 1;

int steplca = steplc + 1;

int x = 0;

//parameter soilmoisture

int moisture1;

int moisture2;

int moisture3;

int percentage1;

int percentage2;

int percentage3;

int map\_low1 = 300; //Kondisi basah sensor 88/540

int map\_high1 = 592; // Kondisi kering sensor 1

int map\_low2 = 275; //Kondisi basah sensor 2

int map\_high2 = 618; // Kondisi kering sensor 2

int map\_low3 = 270; //Kondisi basah sensor 3

int map\_high3 = 643; // Kondisi kering sensor 3

int val = 0; // variabel pembantu

//I/O device

int sensorSoil1 = A0;

int sensorSoil2 = A1;

int sensorSoil3 = A2;

int relay = 11;

int relay2 = 10;

const int stepPin = 3;

const int dirPin = 4;

void setup() {

pinMode(relay, OUTPUT);

pinMode(relay2, OUTPUT);

pinMode(stepPin, OUTPUT);

pinMode(dirPin, OUTPUT);

digitalWrite(relay, HIGH);

digitalWrite(relay2, LOW);

digitalWrite(stepPin, LOW);

digitalWrite(dirPin, LOW);

Serial.begin(9600);

}

void loop() {

unsigned long currentMillis = millis();

moisture1 = analogRead(sensorSoil1);// aktivasi object sensor soil 1

moisture2 = analogRead(sensorSoil2);// aktivasi object sensor soil 2

moisture3 = analogRead(sensorSoil3);// aktivasi object sensor soil 3

percentage1 = map(moisture1, map\_low1, map\_high1, 0, 100);// Persentase kekeringan sensor 1

percentage2 = map(moisture2, map\_low2, map\_high2, 0, 100);// Persentase kekeringan sensor 2

percentage3 = map(moisture3, map\_low3, map\_high3, 0, 100);// Persentase kekeringan sensor 3

Serial.print(" |Soil1 ");

Serial.print(percentage1);

Serial.print("%; ");

Serial.print(" |Soil2 ");

Serial.print(percentage2);

Serial.print("%; ");

Serial.print(" |Soil3 ");

Serial.print(percentage3);

Serial.println("%");

delay(1000);

if (currentMillis - previousMillis >= interval)

{

digitalWrite(relay2, HIGH);

previousMillis = currentMillis;

val = 4;

}

else

{

val = 0;

}

if (percentage1 > 50) {

Serial.println("Sektor 1 akan disiram");

delay(2000);

val = 1;

}

else if (percentage2 > 75) {

Serial.println("Sektor 2 akan disiram");

delay(2000);

val = 2;

}

else if (percentage3 > 70) {

Serial.println("Sektor 3 akan disiram");

delay(2000);

val = 3;

}

else {

Serial.println("Semua sektor dalam kondisi basah");

delay(2000);

val = 0;

}

switch (val) {

case 0 :

cektanah1 ();

cektanah2 ();

cektanah3 ();

break;

case 1 :

point1();

while ( percentage1 > 35) {

cektanah1();

delay(2000);

digitalWrite(relay, LOW);

Serial.println("Keran penyiram sektor 1 diaktifkan");

delay(1000);

penyiraman1();

digitalWrite(relay, HIGH);

Serial.println("Keran sektor 1 dinonaktifkan");

cektanah1();

delay(1000);

}

homing1();

break;

case 2 :

point2();

while ( percentage2 > 60 ) {

cektanah2();

digitalWrite(relay, LOW);

Serial.println("Keran penyiram sektor 2 diaktifkan");

delay(1000);

penyiraman2();

digitalWrite(relay, HIGH);

Serial.println("Keran sektor 2 dinonaktifkan");

cektanah2();

delay(1000);

}

homing2();

break;

case 3 :

point3();

while ( percentage3 > 60 ) {

cektanah3();

digitalWrite(relay, LOW);

Serial.println("Keran penyiram sektor 3 diaktifkan");

delay(1000);

delay(1000);

penyiraman3();

digitalWrite(relay, HIGH);

Serial.println("Keran sektor 3 dinonaktifkan");

cektanah3();

delay(1000);

}

homing3();

break;

case 4 :

point3();

while ( val = 4 ) {

digitalWrite(relay2, LOW);

Serial.println("Keran penyiram pupuk diaktifkan");

delay(1000);

delay(1000);

penyiraman4();

digitalWrite(relay2, HIGH);

Serial.println("Keran penyiraman pupuk dinonaktifkan");

delay(1000);

}

homing3();

break;

}

}

void point1 () {

digitalWrite(dirPin, HIGH);

for (int x = 0; x < steplaa ; x++) {

digitalWrite(stepPin, HIGH);

delayMicroseconds(500);

digitalWrite(stepPin, LOW);

delayMicroseconds(500);

Serial.print("MENUJU POSISI 1 ");

Serial.print(x \* lpersatstep);

Serial.println("mm");

}

}

void point2 () {

digitalWrite(dirPin, HIGH);

for (int x = 0; x < steplba ; x++) {

digitalWrite(stepPin, HIGH);

delayMicroseconds(500);

digitalWrite(stepPin, LOW);

delayMicroseconds(500);

Serial.print("MENUJU POSISI 2 ");

Serial.print(x \* lpersatstep);

Serial.println("mm");

}

}

void point3 () {

digitalWrite(dirPin, HIGH);

for (int x = 0; x < steplca ; x++) {

digitalWrite(stepPin, HIGH);

delayMicroseconds(500);

digitalWrite(stepPin, LOW);

delayMicroseconds(500);

Serial.print("MENUJU POSISI 3 ");

Serial.print(x \* lpersatstep);

Serial.println("mm");

}

}

void homing1() {

digitalWrite(dirPin, LOW);

for (int x = steplaa; x > 0 ; x--) {

digitalWrite(stepPin, HIGH);

delayMicroseconds(500);

digitalWrite(stepPin, LOW);

delayMicroseconds(500);

Serial.print("MENUJU HOMING1 JARAK ");

Serial.print(x \* lpersatstep);

Serial.println(" mm");

}

delay(5000);

}

void homing2() {

digitalWrite(dirPin, LOW);

for (int x = steplba; x > 0 ; x--) {

digitalWrite(stepPin, HIGH);

delayMicroseconds(500);

digitalWrite(stepPin, LOW);

delayMicroseconds(500);

Serial.print("MENUJU HOMING2 JARAK ");

Serial.print(x \* lpersatstep);

Serial.println(" mm");

}

delay(5000);

}

void homing3() {

digitalWrite(dirPin, LOW);

for (int x = steplca; x > 0 ; x--) {

digitalWrite(stepPin, HIGH);

delayMicroseconds(500);

digitalWrite(stepPin, LOW);

delayMicroseconds(500);

Serial.print("MENUJU HOMING3 JARAK ");

Serial.print(x \* lpersatstep);

Serial.println(" mm");

}

delay(5000);

}

void cektanah1 () {

//digitalWrite(stepPin, LOW);

baca();

Serial.print(" Tingkat kekeringan tanah 1 : ");

Serial.print(percentage1);

Serial.print("%");

Serial.print("| Raw 1 : ");

Serial.println(moisture1);

delay(3000);

}

void cektanah2 () {

//digitalWrite(stepPin, LOW);

baca();

Serial.print(" Tingkat kekeringan tanah 2 : ");

Serial.print(percentage2);

Serial.print("%");

Serial.print("| Raw 2 : ");

Serial.println(moisture2);

delay(3000);

}

void cektanah3 () {

//digitalWrite(stepPin, LOW);

baca();

Serial.print(" Tingkat kekeringan tanah 3 : ");

Serial.print(percentage3);

Serial.print("%");

Serial.print("| Raw 3 : ");

Serial.println(moisture3);

delay(3000);

}

void penyiraman1 () {

digitalWrite(dirPin, HIGH);// arah putaran stepper berlawanan jarum jam

for (int x = steplaa; x > steplaa - 200 ; x--) {

digitalWrite(stepPin, HIGH);

delayMicroseconds(500);

digitalWrite(stepPin, LOW);

delayMicroseconds(500);

Serial.print("LANGKAH PENYIRAMAN KANAN ");

Serial.print(x \* lpersatstep);

Serial.println("mm");

}

delay(1000);

digitalWrite(dirPin, LOW);// arah putaran stepper berlawanan jarum jam

for (int x = steplaa - 200; x < steplaa; x++) {

digitalWrite(stepPin, HIGH);

delayMicroseconds(500);

digitalWrite(stepPin, LOW);

delayMicroseconds(500);

Serial.print("LANGKAH PENYIRAMAN KIRI ");

Serial.print(x \* lpersatstep);

Serial.println("mm");

}

delay(1000);

}

void penyiraman2 () {

digitalWrite(dirPin, HIGH);// arah putaran stepper berlawanan jarum jam

for (int x = steplba; x > steplba - 200 ; x--) {

digitalWrite(stepPin, HIGH);

delayMicroseconds(500);

digitalWrite(stepPin, LOW);

delayMicroseconds(500);

Serial.print("LANGKAH PENYIRAMAN KANAN");

Serial.print(x \* lpersatstep);

Serial.println("mm");

}

delay(1000);

digitalWrite(dirPin, LOW);// arah putaran stepper berlawanan jarum jam

for (int x = steplba - 200; x < steplba; x++) {

digitalWrite(stepPin, HIGH);

delayMicroseconds(500);

digitalWrite(stepPin, LOW);

delayMicroseconds(500);

Serial.print("LANGKAH PENYIRAMAN KIRI");

Serial.print(x \* lpersatstep);

Serial.println("mm");

}

delay(1000);

}

void penyiraman3 () {

digitalWrite(dirPin, HIGH);// arah putaran stepper berlawanan jarum jam

for (int x = steplca; x > steplca - 200 ; x--) {

digitalWrite(stepPin, HIGH);

delayMicroseconds(500);

digitalWrite(stepPin, LOW);

delayMicroseconds(500);

Serial.print("LANGKAH PENYIRAMAN KANAN");

Serial.print(x \* lpersatstep);

Serial.println("mm");

}

delay(1000);

digitalWrite(dirPin, LOW);// arah putaran stepper berlawanan jarum jam

for (int x = steplca - 200; x < steplca; x++) {

digitalWrite(stepPin, HIGH);

delayMicroseconds(500);

digitalWrite(stepPin, LOW);

delayMicroseconds(500);

Serial.print("LANGKAH PENYIRAMAN KIRI");

Serial.print(x \* lpersatstep);

Serial.println("mm");

}

delay(1000);

}

void penyiraman4 () {

digitalWrite(dirPin, HIGH);// arah putaran stepper berlawanan jarum jam

for (int x = 0; x < steplca ; x++) { //int x = 0; x < steplca ; x++

digitalWrite(stepPin, HIGH);

delayMicroseconds(500);

digitalWrite(stepPin, LOW);

delayMicroseconds(500);

Serial.print("MENYIRAM PUPUK KE KANAN");

Serial.print(x \* lpersatstep);

Serial.println("mm");

}

delay(1000);

digitalWrite(dirPin, LOW);// arah putaran stepper berlawanan jarum jam

for (int x = steplca; x > 0 ; x--) {

digitalWrite(stepPin, HIGH);

delayMicroseconds(500);

digitalWrite(stepPin, LOW);

delayMicroseconds(500);

Serial.print("MENYIRAM PUPUK KE KIRI");

Serial.print(x \* lpersatstep);

Serial.println("mm");

}

delay(1000);

}

void baca() {

moisture1 = analogRead(sensorSoil1);// aktivasi object sensor soil 1

moisture2 = analogRead(sensorSoil2);// aktivasi object sensor soil 2

moisture3 = analogRead(sensorSoil3);// aktivasi object sensor soil 3

percentage1 = map(moisture1, map\_low1, map\_high1, 0, 100);// Persentase kekeringan sensor 1

percentage2 = map(moisture2, map\_low2, map\_high2, 0, 100);// Persentase kekeringan sensor 2

percentage3 = map(moisture3, map\_low3, map\_high3, 0, 100);// Persentase kekeringan sensor 3

}

void motoroff() {

digitalWrite(dirPin, LOW);

digitalWrite(stepPin, LOW);

}