//Coded by Abhijit

float pi = 3.14159;

float r1 = 0;

float phi1 = 0;

float phi2 = 0;

float phi3 = 0;

float a1 = 0;

float a2 = 39;

float a3 = 0;

float a4 = 39;

float T1 = 0;

float T2 = 0;

float X = 0;

float Y = 0;

float fb1 = 0;

float fb2 = 0;

float Kp = 1;

float error1 = 0;

float error2 = 0;

bool flag1 = 1;

bool flag2 = 1;

void setup()

{

Serial.begin(115200);

pinMode(4, OUTPUT);

pinMode(5, OUTPUT);

pinMode(6, OUTPUT);

pinMode(7, OUTPUT);

Serial.flush();

digitalWrite(4, HIGH);

digitalWrite(5, HIGH);

digitalWrite(6, HIGH);

digitalWrite(7, HIGH);

delay(1000);

digitalWrite(4, LOW);

digitalWrite(5, LOW);

digitalWrite(6, LOW);

digitalWrite(7, LOW);

delay(1000);

}

void loop()

{

// T1 = 175;

// T2 = -90;

X = 2 0;

Y = 40;

gotopos();

}

void gotopos()

{

flag1 = 1;

flag2 = 1;

while (flag1 == 1 || flag2 == 1)

{

calculateangle();

onoffcontrol();

}

}

void calculateangle()

{

r1 = sqrt(X \* X + Y \* Y);

phi1 = acos(((a4 \* a4) - (a2 \* a2) - (r1 \* r1)) / (-2.0 \* a2 \* r1));

phi2 = atan(Y / X);

T1 = phi2 + phi1;

phi3 = acos(((r1 \* r1) - (a2 \* a2) - (a4 \* a4)) / (-2.0 \* a2 \* a4));

T2 = pi + phi3;

T1 = T1 \* 180 / pi;

T2 = T2 \* 180 / pi;

T2 = T2 - 360;

}

void onoffcontrol()

{

fb1 = analogRead(A0);

fb2 = analogRead(A1);

fb1 = map(fb1, 753, 139, 75, 170);

fb2 = map(fb2, 110, 858, -160, 15);

Serial.print(" fb1 ");

Serial.print(fb1);

Serial.print(" T1 ");

Serial.print(T1);

Serial.print(" fb2 ");

Serial.print(fb2);

Serial.print(" T2 ");

Serial.print(T2);

error1 = T1 - fb1;

error2 = T2 - fb2;

if (abs(error1) < 1)

{

hardstop(4, 5);

flag1 = 0;

}

if (abs(error2) < 1)

{

hardstop(6, 7);

flag2 = 0;

}

if (fb1 < T1 && fb2 < T2)

{

if (flag1 == 1)

forward(4, 5);

if (flag2 == 1)

forward(6, 7);

Serial.println(" forward");

}

else if (fb1 < T1 && fb2 > T2)

{

if (flag1 == 1)

forward(4, 5);

if (flag2 == 1)

backward(6, 7);

Serial.println(" backward");

}

else if (fb1 > T1 && fb2 < T2)

{

if (flag1 == 1)

backward(4, 5);

if (flag2 == 1)

forward(6, 7);

Serial.println(" forward");

}

else if (fb1 > T1 && fb2 > T2)

{

if (flag1 == 1)

backward(4, 5);

if (flag2 == 1)

backward(6, 7);

Serial.println(" backward");

}

}

void backward(int l1, int l2)

{

digitalWrite(l1, HIGH);

digitalWrite(l2, LOW);

}

void forward(int l1, int l2)

{

digitalWrite(l1, LOW);

digitalWrite(l2, HIGH);

}

void hardstop(int l1, int l2)

{

digitalWrite(l1, LOW);

digitalWrite(l2, LOW);

}