//line following robot

//MotorA

int PWMA = 10; //Speed control

int AIN1 = 5; //Direction

int AIN2 = 4; //Direction

//MotorB

int PWMB = 11; //Speed control

int BIN1 = 6; //Direction

int BIN2 = 7; //Direction

//photocellReading

int leftphotocellPin = 0; //the left photocell is plugged into a0

int leftphotocellReading;

int rightphotocellPin = 1; //the right photocell is plugged into a1

int rightphotocellReading;

int leftThreshold = -1;

int rightThreshold = -1;

//photocell test code was based off of https://learn.adafruit.com/photocells/using-a-photocell

void setup(){

pinMode(PWMA, OUTPUT);

pinMode(AIN1, OUTPUT);

pinMode(AIN2, OUTPUT);

pinMode(PWMB, OUTPUT);

pinMode(BIN1, OUTPUT);

pinMode(BIN2, OUTPUT);

pinMode(leftphotocellPin, INPUT);

pinMode(rightphotocellPin, INPUT);

pinMode(8, OUTPUT); //for the red LED to turn on

Serial.begin(9600); //for the photocell readings

delay(500);// put both photocells on white and read white value

//threshold is 0.8 of white value

leftThreshold = analogRead(leftphotocellPin)\*0.75; //xander li told me that threshold (black value) is approx. 0.8 of the white value

rightThreshold = analogRead(rightphotocellPin)\*0.75;

delay(500);

}

void loop(){

int leftphotocellReading = analogRead(leftphotocellPin);

int rightphotocellReading = analogRead(rightphotocellPin);

Serial.print(leftphotocellReading);

Serial.print("||");

Serial.println(rightphotocellReading);

if(leftphotocellReading < leftThreshold && rightphotocellReading < rightThreshold) {

moveForward();

delay(300);

moveStop();

Serial.println("stop");

moveForward(); //if both photocells detect black, the robot follows moveStop then moves forward to obtain new photocell readings

}

else if(rightphotocellReading < rightThreshold) {

moveRight(); //if right photocell detects black, turn right

}

else if(leftphotocellReading< leftThreshold) {

moveLeft(); //if left photocell detects black, turn left

}

else{

moveForward(); //robot moves forward if both photocells detect white

}

}

void move(int motor, int speed, int direction){ //code taken from http://bildr.org/2012/04/tb6612fng-arduino/

//Move specific motor at speed and direction

//motor: 0 for B 1 for A

//speed: 0 is off, and 255 is full speed

//direction: 0 clockwise (forward), 1 counter-clockwise (backward)

boolean inPin1 = LOW;

boolean inPin2 = HIGH;

if(direction == 1){

inPin1 = HIGH;

inPin2 = LOW;

}

if(motor == 1){

digitalWrite(AIN1, inPin1);

digitalWrite(AIN2, inPin2);

analogWrite(PWMA, speed);

}else{

digitalWrite(BIN1, inPin1);

digitalWrite(BIN2, inPin2);

analogWrite(PWMB, speed);

}

}

void moveRight(){

move(1, 0, 0);

move(2, 60, 0); //right motor stops whilst left motor turns clockwise

}

void moveLeft(){

move(1, 60, 0);

move(2, 0, 0); //right motor turns clockwise whilst left motor stops

}

void moveForward() {

move(1, 60, 0);

move(2, 60, 0); //both left and right motors turn clockwise

}

void moveStop() {

move(1, 0, 0);

move(2, 0, 0);

digitalWrite(8, HIGH); //both left and right motors will stop, turn on the red LED, pause for 3 seconds

delay(3000);

digitalWrite(8, LOW);

}