int Debug\_LED\_13 = 13; // pin 13, debug LED

int LeftMotor\_Enable\_18 = 18; // pin D18/A6, motor left, enable

int LeftMotor\_Forward\_22 = 22; // pin 22, motor left forward, digital out

int LeftMotor\_Reverse\_23 = 23; // pin 23, motor left reverse, digital out

int LeftEncoder\_A\_3 = 3; // pin 3, PWM

int LeftEncoder\_B\_4 = 4; // pin 4, PWM

volatile int LeftCounter = 0;

int RightMotor\_Enable\_19 = 19; // pin D19/A7, motor right, enable

int RightMotor\_Forward\_21 = 21; // pin 21, motor right forward, digital out

int RightMotor\_Reverse\_20 = 20; // pin 20, motor right reverse, digital out

int RightEncoder\_A\_5 = 5; // pin 5, PWM

int RightEncoder\_B\_6 = 6; // pin 6, PWM

volatile int RightCounter = 0;

int IR1\_14 = 14;

int IR2\_15 = 15;

int IR3\_16 = 16;

int IR4\_17 = 17;

int IR\_Read1\_14 = 0;

int IR\_Read2\_15 = 0;

int IR\_Read3\_16 = 0;

int IR\_Read4\_17 = 0;

bool start = false;

bool emptyStart = false;

bool ready = false;

void blinkLED() {

digitalWrite(Debug\_LED\_13, HIGH);

delay(500);

digitalWrite(Debug\_LED\_13, LOW);

delay(500);

}

void halt(){

digitalWrite(LeftMotor\_Enable\_18, LOW);

digitalWrite(RightMotor\_Enable\_19, LOW);

analogWrite(LeftMotor\_Forward\_22, LOW);

analogWrite(LeftMotor\_Reverse\_23, LOW);

analogWrite(RightMotor\_Forward\_21, LOW);

analogWrite(RightMotor\_Reverse\_20, LOW);

}

void forwardLeft(int i) {

digitalWrite(LeftMotor\_Enable\_18, HIGH);

analogWrite(LeftMotor\_Forward\_22, i);

analogWrite(LeftMotor\_Reverse\_23, 0);

}

void forwardRight(int i) {

digitalWrite(RightMotor\_Enable\_19, HIGH);

analogWrite(RightMotor\_Forward\_21, i); // Why was there 128 instead of i?

analogWrite(RightMotor\_Reverse\_20, 0);

}

void reverseLeft(int i) {

digitalWrite(LeftMotor\_Enable\_18, HIGH);

analogWrite(LeftMotor\_Forward\_22, 0);

analogWrite(LeftMotor\_Reverse\_23, i);

}

void reverseRight(int i) {

digitalWrite(RightMotor\_Enable\_19, HIGH);

analogWrite(RightMotor\_Forward\_21, 0);

analogWrite(RightMotor\_Reverse\_20, i);

}

void turnLeft(int i) {

digitalWrite(LeftMotor\_Enable\_18, HIGH);

digitalWrite(RightMotor\_Enable\_19, HIGH);

analogWrite(LeftMotor\_Reverse\_23, i);

analogWrite(RightMotor\_Forward\_21, i);

}

void turnRight(int i) {

digitalWrite(LeftMotor\_Enable\_18, HIGH);

digitalWrite(RightMotor\_Enable\_19, HIGH);

analogWrite(LeftMotor\_Forward\_22, i);

analogWrite(RightMotor\_Reverse\_20, i);

}

void incrementLeft() {

LeftCounter++;

}

void incrementRight() {

RightCounter++;

}

void interrupt(){

attachInterrupt(digitalPinToInterrupt(LeftEncoder\_A\_3), incrementLeft, CHANGE);

attachInterrupt(digitalPinToInterrupt(LeftEncoder\_B\_4), incrementLeft, CHANGE);

attachInterrupt(digitalPinToInterrupt(RightEncoder\_A\_5), incrementRight, CHANGE);

attachInterrupt(digitalPinToInterrupt(RightEncoder\_B\_6), incrementRight, CHANGE);

}

void readIR() {

IR\_Read1\_14 = analogRead(IR1\_14);

IR\_Read2\_15 = analogRead(IR2\_15);

IR\_Read3\_16 = analogRead(IR3\_16);

IR\_Read4\_17 = analogRead(IR4\_17);

}

void printIR() {

Serial.print("IR1: ");

Serial.println(IR\_Read1\_14);

Serial.print("IR2: ");

Serial.println(IR\_Read2\_15);

Serial.print("IR3: ");

Serial.println(IR\_Read3\_16);

Serial.print("IR4: ");

Serial.println(IR\_Read4\_17);

}

void emptyWall(){

if(IR\_Read1\_14 < 200 && RightCounter > 0){ //Empty Wall AND moving!

emptyStart = true;

}

else{

emptyStart = false;

}

}

void standby() {

if(IR\_Read1\_14 > 127) { //IR\_Read2\_15 > 127 && IR\_Read3\_16 > 127) {

ready = true;

}

if(ready == true && IR\_Read1\_14 < 290) { //IR\_Read2\_15 < 127 && IR\_Read3\_16 < 127) {

start = true;

}

}

void setup() {

// put your setup code here, to run once:

// setup LED

pinMode(Debug\_LED\_13, OUTPUT);

// setup Left motor

pinMode(LeftMotor\_Enable\_18, OUTPUT);

digitalWrite(LeftMotor\_Enable\_18, LOW);

pinMode(LeftMotor\_Forward\_22, OUTPUT);

analogWrite(LeftMotor\_Forward\_22, 0);

pinMode(LeftMotor\_Reverse\_23, OUTPUT);

analogWrite(LeftMotor\_Reverse\_23, 0);

// setup Right motor

pinMode(RightMotor\_Enable\_19, OUTPUT);

digitalWrite(RightMotor\_Enable\_19, LOW);

pinMode(RightMotor\_Forward\_21, OUTPUT);

analogWrite(RightMotor\_Forward\_21, 0);

pinMode(RightMotor\_Reverse\_20, OUTPUT);

analogWrite(RightMotor\_Reverse\_20, 0);

pinMode(IR1\_14, INPUT);

pinMode(IR2\_15, INPUT);

pinMode(IR3\_16, INPUT);

pinMode(IR4\_17, INPUT);

Serial.begin(9600);

IR\_Read1\_14 = 0;

IR\_Read2\_15 = 0;

IR\_Read3\_16 = 0;

IR\_Read4\_17 = 0;

}

void loop() {

// put your main code here, to run repeatedly:

blinkLED();

readIR();

printIR();

Serial.print("LeftCounter: ");

Serial.println(LeftCounter);

Serial.print("RightCOunter: ");

Serial.println(RightCounter);

///\*

if(start == true) {

forwardLeft(127);

forwardRight(127);

emptyWall();

if(emptyStart == true){ //Indicates an open gap on the right

halt();

turnRight(127);

delay(500);

}

else{

}

//reverseLeft(127);

//reverseRight(127);

//turnLeft(127);

//turnRight(127);

interrupt();

}

else {

standby();

}

//\*/

}