// C++ code

//......edited

#define l 13

#define r 2

#define cl 10

#define cr 6

#define er 5

#define el 11

#define pl 12

#define pr 8

#define nl 7

#define nr 4

int L=0;

int R=0;

int CL=0;

int CR=0;

char turn[1000];

void left(){

analogWrite(el,155);

analogWrite(er,200);

digitalWrite(nr, LOW);

digitalWrite(nl, LOW);

delay(100);

return;}

void right(){

analogWrite(el,200);

analogWrite(er,155);

digitalWrite(nr, LOW);

digitalWrite(nl, LOW);

delay(100);

return;}

void straight(){

analogWrite(el,155);

analogWrite(er,155);

digitalWrite(pr, HIGH);

digitalWrite(pl, HIGH);

digitalWrite(nr, LOW);

digitalWrite(nl, LOW);

return;}

void stop(){

digitalWrite(pr, LOW);

digitalWrite(pl, LOW);

digitalWrite(nr, LOW);

digitalWrite(nl, LOW);

return;}

void u(){

digitalWrite(pr, LOW);

digitalWrite(pl, HIGH);

digitalWrite(nr, HIGH);

digitalWrite(nl, LOW);

delay(100);

return;}

void arrange(char turn[],int n,int i){

turn[i]=turn[i+1];

i++;

while(i<n-2){

turn[i]=turn[i+2];

if(turn[i]=='D') break;

i++;

}

turn[i++]='D';

turn[i]='D';

}

void short\_path(char turn[],int n){

for(int i = 0; i < n-1; i++){

if(turn[i]=='U'){

if(turn[i-1]=='L' && turn[i+1]=='R'){

turn[i-1]=0;

turn[i+1]=0;

arrange(turn,n,i-1);

}

else if(turn[i-1]=='L' && turn[i+1]=='S'){

turn[i]='R';

turn[i-1]=0;

turn[i+1]=0;

arrange(turn,n,i-1);

}

else if(turn[i-1]=='R' && turn[i+1]=='L'){

turn[i-1]=0;

turn[i+1]=0;

arrange(turn,n,i-1);

}

else if(turn[i-1]=='S' && turn[i+1]=='L'){

turn[i]='R';

turn[i-1]=0;

turn[i+1]=0;

arrange(turn,n,i-1);

}

else if(turn[i-1]=='S' && turn[i+1]=='S'){

turn[i-1]=0;

turn[i+1]=0;

arrange(turn,n,i-1);

}

else if(turn[i-1]=='L' && turn[i+1]=='L'){

turn[i]='S';

turn[i-1]=0;

turn[i+1]=0;

arrange(turn,n,i-1);

}

i=-1;

}

}

}

void back(char turn[],int n){

int i=0;

short\_path(turn,n);

delay(2000);

u();

straight();

while(turn[i]!='D'){

L=digitalRead(l);

R=digitalRead(r);

CL=digitalRead(cl);

CR=digitalRead(cr);

if(L==1 && CL==0 && CR==0 && R==1){

straight();

}

else{

if(turn[i]=='L'){

right();

straight();

i++;

}

else if(turn[i]=='R'){

left();

straight();

i++;

}

else if(turn[i]=='S'){

straight();

i++;

}

}

}

stop();

return;

}

void setup()

{

pinMode(l, INPUT);

pinMode(r, INPUT);

pinMode(pl, OUTPUT);

pinMode(pr, OUTPUT);

pinMode(nl, OUTPUT);

pinMode(nr, OUTPUT);

pinMode(el, OUTPUT);

pinMode(er, OUTPUT);

Serial.begin(9600);

delay(3000);

}

int i=0;

void loop()

{

analogWrite(el,155);

analogWrite(er,155);

L=digitalRead(l);

R=digitalRead(r);

CL=digitalRead(cl);

CR=digitalRead(cr);

Serial.println(R);

if(CL==0 && CR==1){

analogWrite(el,100);

analogWrite(er,155);

digitalWrite(nr, LOW);

digitalWrite(nl, LOW);

delay(50);

}

if(CL==1 && CR==0){

analogWrite(el,155);

analogWrite(er,100);

digitalWrite(nr, LOW);

digitalWrite(nl, LOW);

delay(50);

}

if(L==1 && CL==0 && CR==0 && R==1){

straight();

}

else if(L==0 && CL==0 && CR==0 && R==1){

left();

straight();

turn[i++]='L'; }

else if(L==1 && R==1 && CL==1 && CR==1){

u();

straight();

turn[i++]='U'; }

else if(L==1 && CL==0 && CR==0 && R==0){

delay(10);

L=digitalRead(l);

R=digitalRead(r);

CL=digitalRead(cl);

CR=digitalRead(cr);

if(L==1 && R==1 && CL==1 && CR==1){

right();

straight();

turn[i++]='R';

}

else{

straight();

turn[i++]='S';} }

else if(L==0 && CL==0 && CR==0 && R==0){

delay(10);

if(L==0 && CL==0 && CR==0 && R==0){

stop();

back(turn,i);

return;

} else {

left();

straight();

turn[i++]='L';

}

}

}