

E. 3-wheel Robot

Material

1. Three-wheel Robot
2. Computer



Project #1: Line-following Robot Arduino

Project #1: Line-following Robot

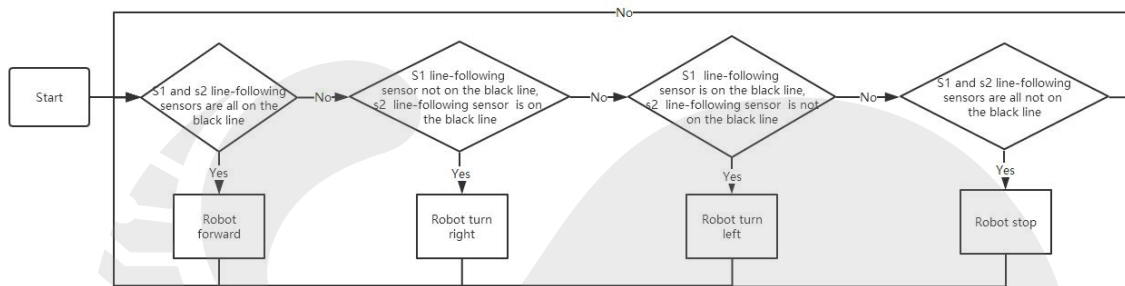
Task: Make a line-following robot.

There are two ways of robot line-following: ① the black line clip line-following sensor (the line is wider than the sensor spacing); ② the line-following sensor clip the black line (the sensor spacing is wider than the line).

- ① The black line clips the line inspection sensor (the line width is larger than the sensor spacing).



Program Idea



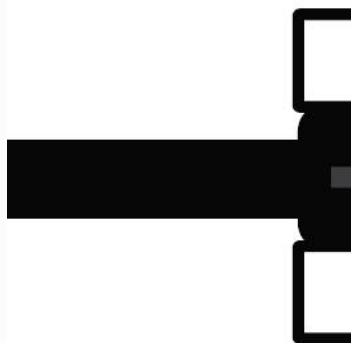
Reference Code

	The block reports the reflection value of S1 and S2 (0-1023), the value will be a significant difference between black color and white color.
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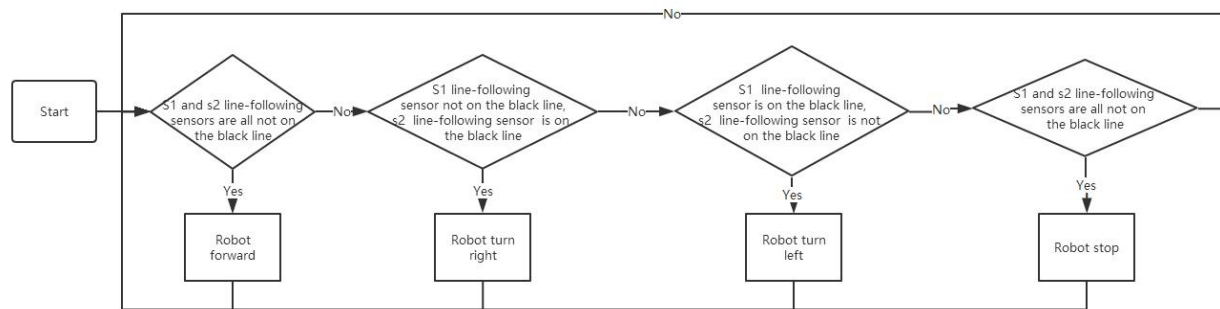


Note: The line-following inspection judgment value needs to be adjusted according to the actual line-following inspection environment.

- ② The line-following sensor clips the black line (the sensor spacing is wider than the line).



Program Idea



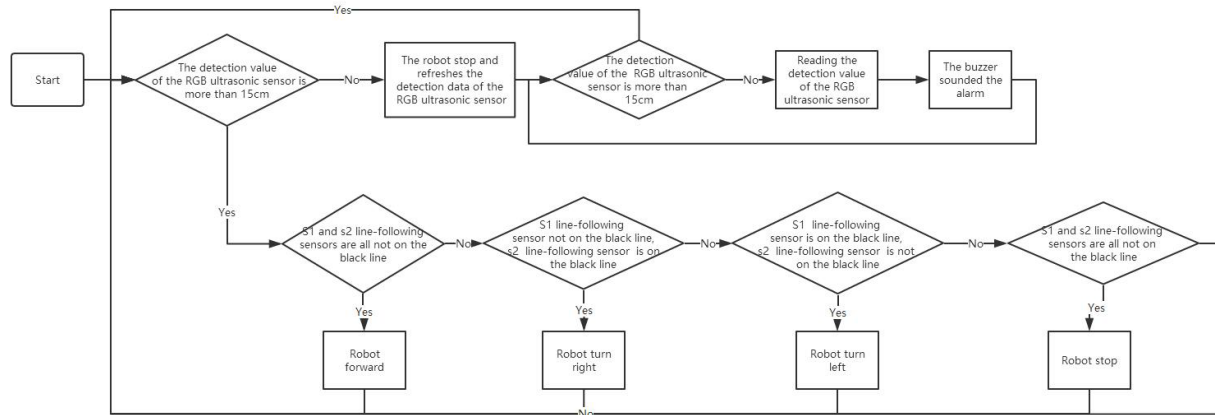
Reference Code



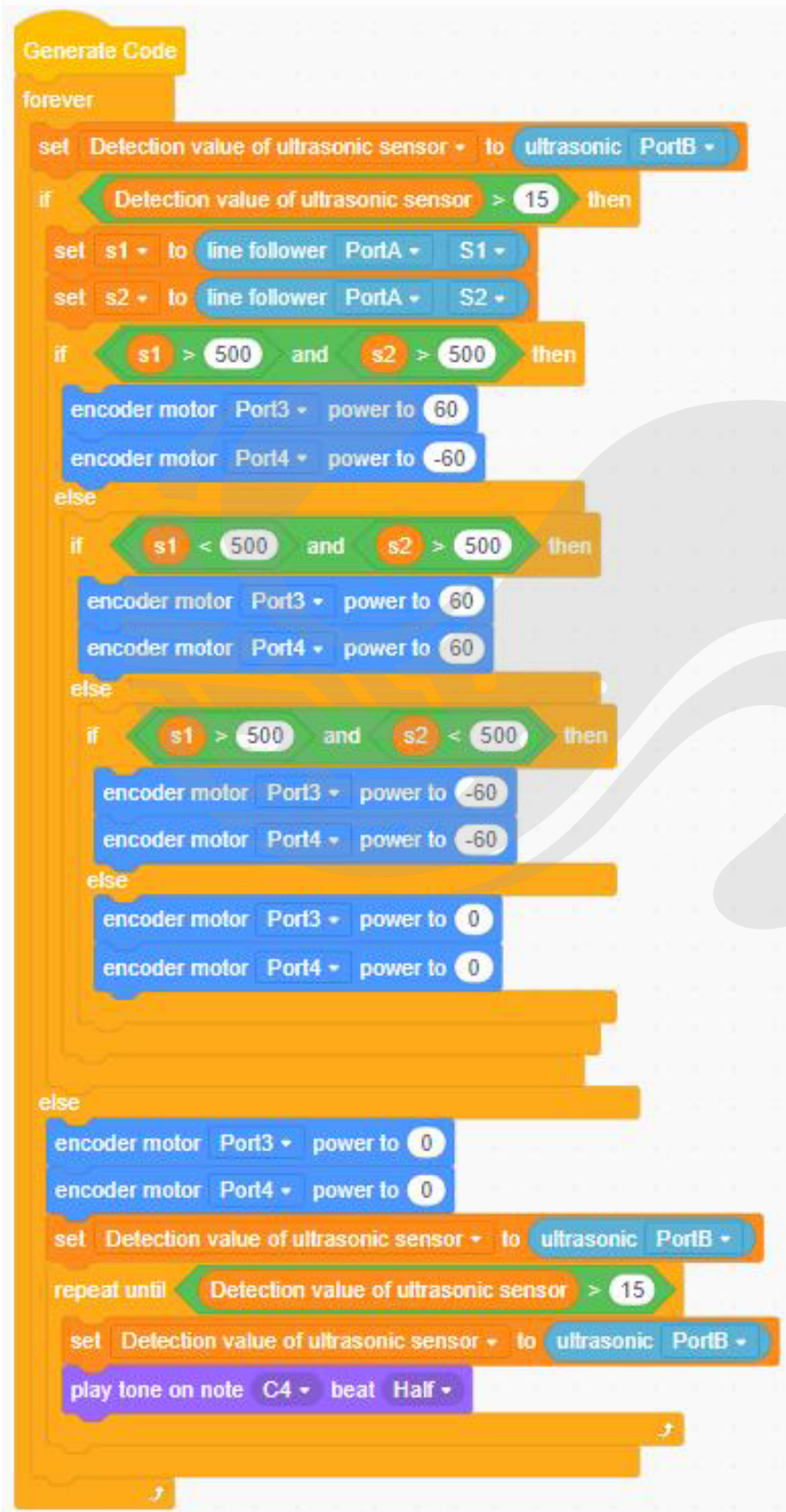
Project #2: Combine Line-following with Obstacle Avoidance

Like the feeding robot, when the robot encounters an obstacle in front of the line, the robot stops line-following and issues an alarm. If there is no obstacle in front, the robot will do line-following normally.

Program Idea



Reference Code



Expansion: Try to design more complex line-following route and use more optimized line-following algorithms or more line-following sensors to enable robots to work.

ARDUINO

Project #1: Line-following Robot Arduino

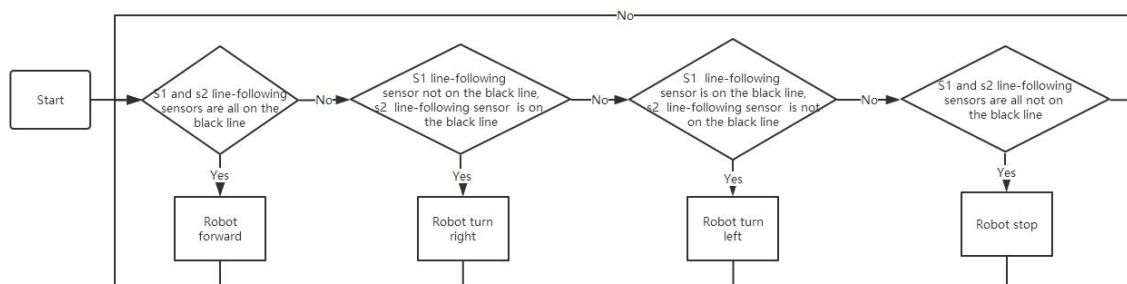
Task: Make a line-following robot.

There are two ways of robot line-following: ① the black line clip line-following sensor (the line is wider than the sensor spacing); ② the line-following sensor clip the black line (the sensor spacing is wider than the line).

- ① The black line clips the line inspection sensor (the line width is larger than the sensor spacing).



Program Idea



Reference Code

```
#include<WeELF328P.h>

WeLineFollower linefollower_A(PORT_A);
WeEncoderMotor encoder_3(PORT_3);
WeEncoderMotor encoder_4(PORT_4);
double v_s1;          //s1;
double v_s2;          //s2;

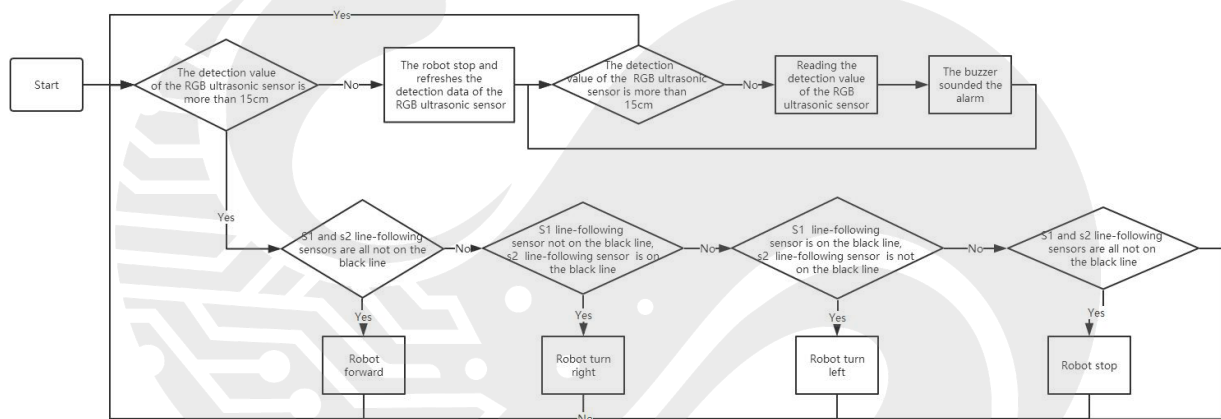
void setup(){
}

void loop(){
    v_s1 = linefollower_A.startRead(1);
    v_s2 = linefollower_A.startRead(2);
    if(v_s1 < 500 && v_s2 < 500){
        encoder_3.run(60);
        encoder_4.run(-60);
    }else if(v_s1 > 500 && v_s2 < 500){
        encoder_3.run(-60);
        encoder_4.run(-60);
    }else if(v_s1 < 500 && v_s2 > 500){
        encoder_3.run(60);
        encoder_4.run(60);
    }else{
        encoder_3.run(0);
        encoder_4.run(0);
    }
}
```

Project #2: Combine Line-following with Obstacle Avoidance Arduino

Like the feeding robot, when the robot encounters an obstacle in front of the line, the robot stops line-following and issues an alarm. If there is no obstacle in front, the robot will do line-following normally.

Program Idea



Reference Code #A

```
#include<WeELF328P.h>

WeLineFollower linefollower_A(PORT_A);
WeEncoderMotor encoder_3(PORT_3);
WeEncoderMotor encoder_4(PORT_4);
double v_s1;          //s1;
double v_s2;          //s2;

void setup(){
}

void loop(){
    v_s1 = linefollower_A.startRead(1);
    v_s2 = linefollower_A.startRead(2);
    if(v_s1 < 500 && v_s2 < 500){
        encoder_3.run(60);
        encoder_4.run(-60);
    }else if(v_s1 > 500 && v_s2 < 500){
        encoder_3.run(-60);
        encoder_4.run(-60);
    }else if(v_s1 < 500 && v_s2 > 500){
        encoder_3.run(60);
        encoder_4.run(60);
    }else{
        encoder_3.run(0);
        encoder_4.run(0);
    }
}
```

Reference Code #B

```
#include<WeELF328P.h>

WeUltrasonicSensor ultrasonic_B(PORT_B);
WeLineFollower linefollower_A(PORT_A);
WeEncoderMotor encoder_3(PORT_3);
WeEncoderMotor encoder_4(PORT_4);
WeBuzzer buzzer(OnBoard_Buzzer);
double v_s1;      //s1;
double v_s2;      //s2;
double v_Detection_value_of_ultrasonic_sensor; //Detection value of ultrasonic sensor;

void setup(){
}

void loop(){
    v_Detection_value_of_ultrasonic_sensor = ultrasonic_B.distanceCm();
    //Detection value of ultrasonic sensor
    if(v_Detection_value_of_ultrasonic_sensor/*Detection value of ultrasonic sensor*/ > 15){
        v_s1 = linefollower_A.startRead(1);
        v_s2 = linefollower_A.startRead(2);
        if(v_s1 < 500 && v_s2 < 500){
            encoder_3.run(60);
            encoder_4.run(-60);
        }else if(v_s1 > 500 && v_s2 < 500){
            encoder_3.run(-60);
            encoder_4.run(-60);
        }else if(v_s1 < 500 && v_s2 > 500){
            encoder_3.run(60);
            encoder_4.run(60);
        }else{
            encoder_3.run(0);
            encoder_4.run(0);
        }
    }else{
        encoder_3.run(0);
        encoder_4.run(0);
        v_Detection_value_of_ultrasonic_sensor = ultrasonic_B.distanceCm();
        //Detection value of ultrasonic sensor
        while(!(v_Detection_value_of_ultrasonic_sensor/*Detection value of ultrasonic sensor*/ > 15)){
            v_Detection_value_of_ultrasonic_sensor = ultrasonic_B.distanceCm();
            //Detection value of ultrasonic sensor
            buzzer.tone(262, 500);
        }
    }
}
```