

Scratch course ---9.Black line control RGB

!Note:

1. In order to avoid the interference of sunlight on infrared sensor, we need to carry out this experiment indoors.
2. In this experiment, you may need to modify the parameters in the program, please read the third part carefully.

1. Learning goal

In this lesson, we will learn how to use tracking module.

2. Preparation

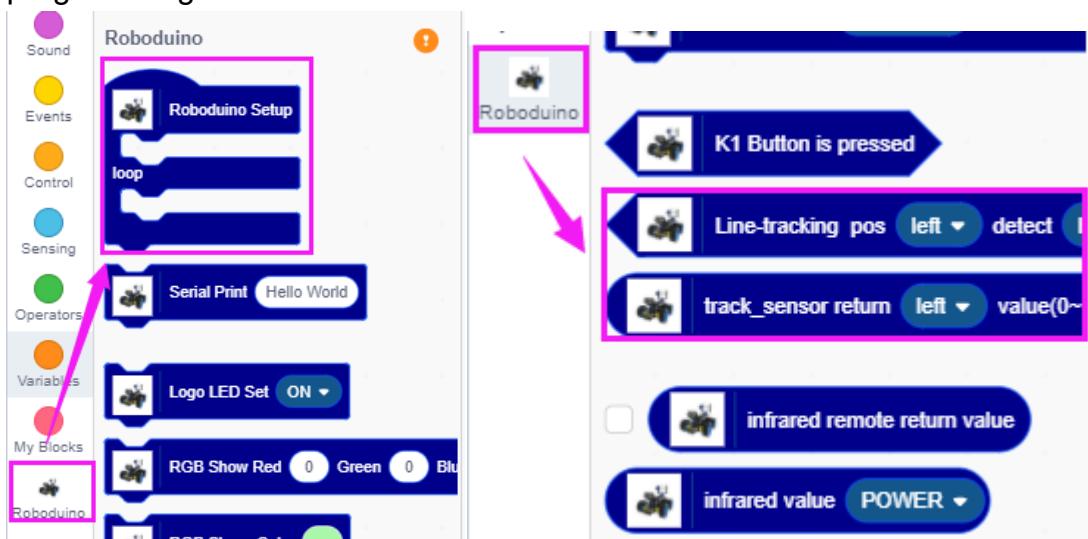
2.1 The position of the tracking sensor port on the expansion board. As shown below.



2.2 Learn how to use line tracking graphically program building blocks.

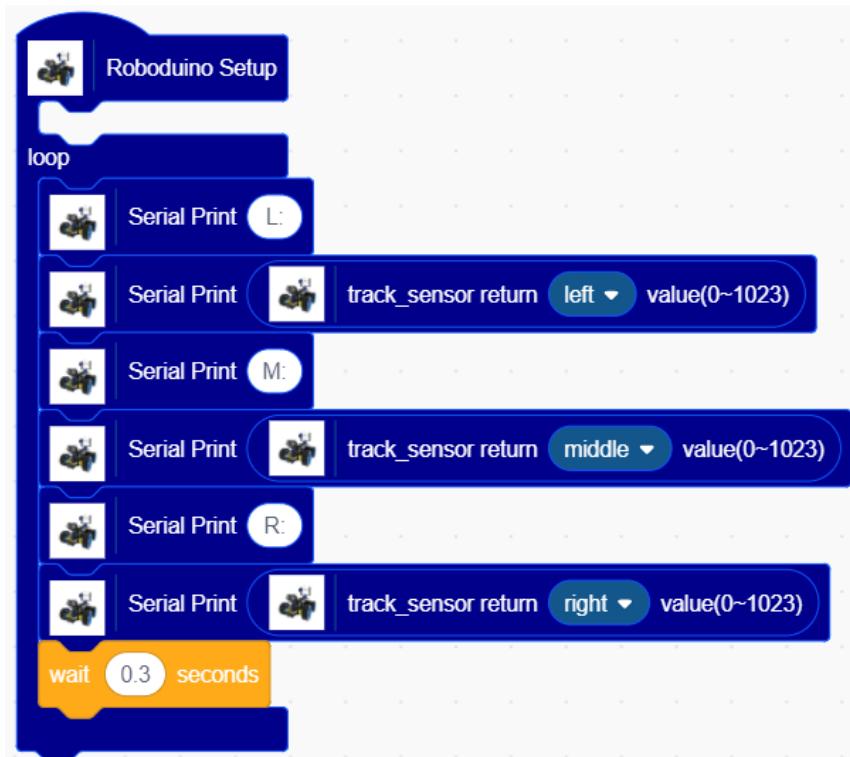
3. Search for blocks

The following is the location of the building blocks required for this programming.

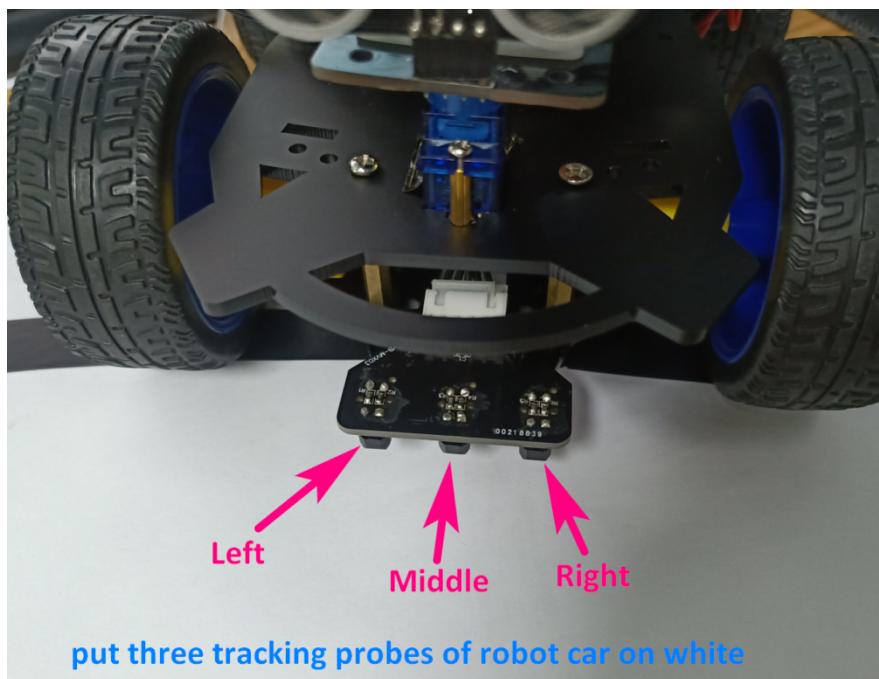


Before writing the program, we need to view the output analog value of the tracking sensor in current environment through serial port.

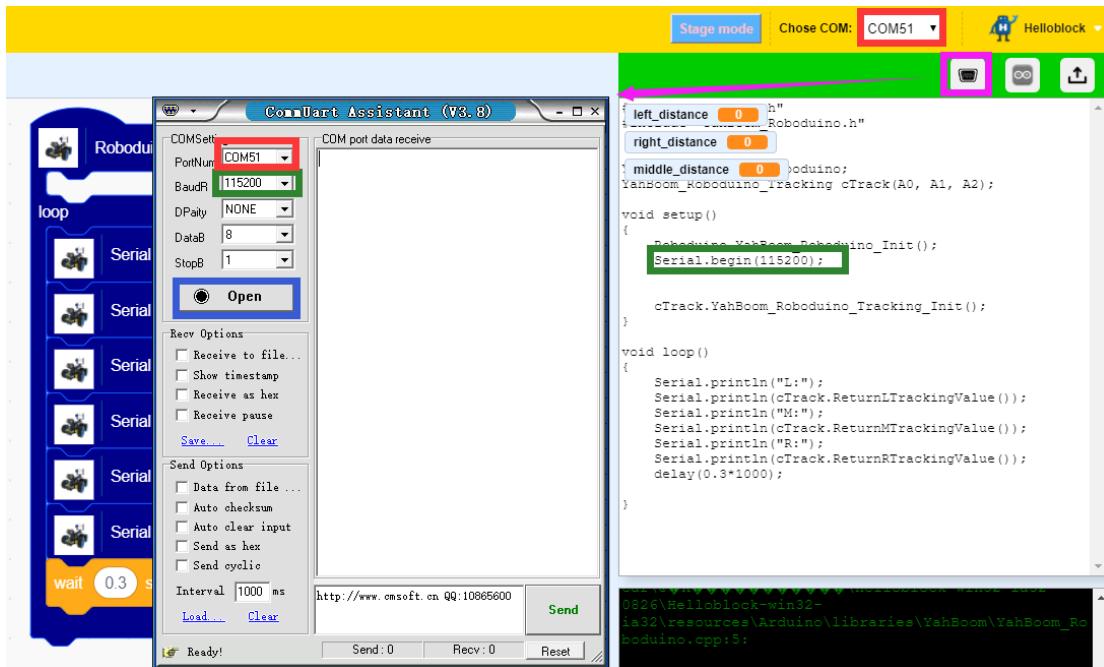
- 1) We need to write the program shown below.(**Tracking_test.sb3**)



- 2) We need to connect robot car and computer by cable and put three tracking probes of robot car on white (**must be the track where you will be conducting a tracking test**). As shown below.



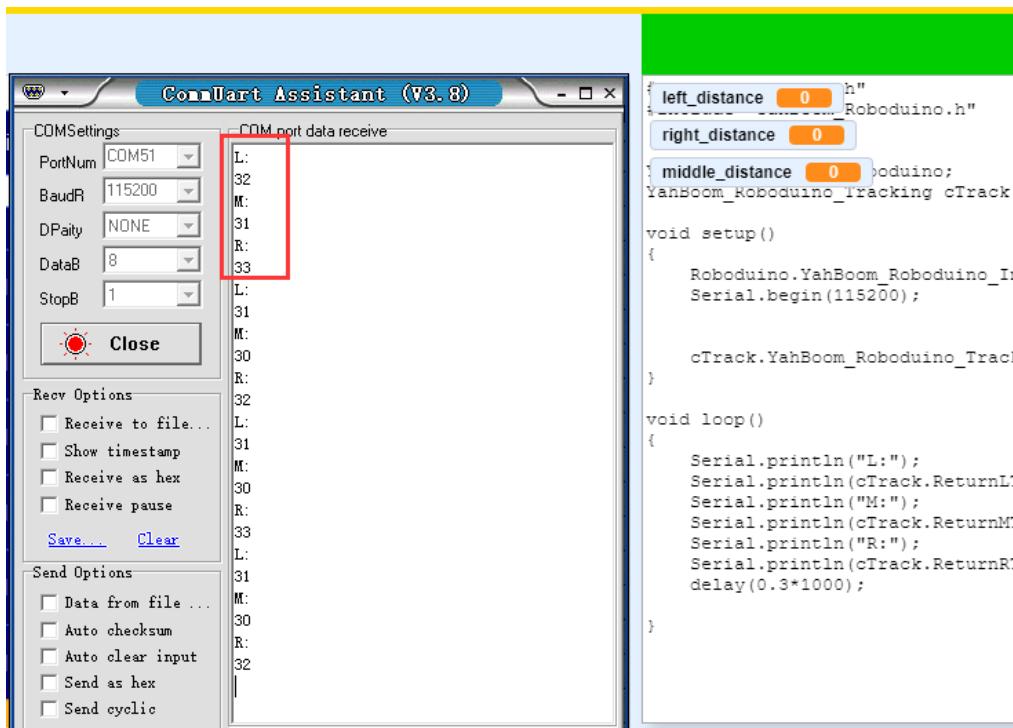
- 3) Open the **Serial Monitor** in the upper right corner of the Helloblock. And we need to select the same baud rate as set in the program. As shown below.



Next, we will see that the analog value of the tracking sensor in current environment are printed on the serial monitor.

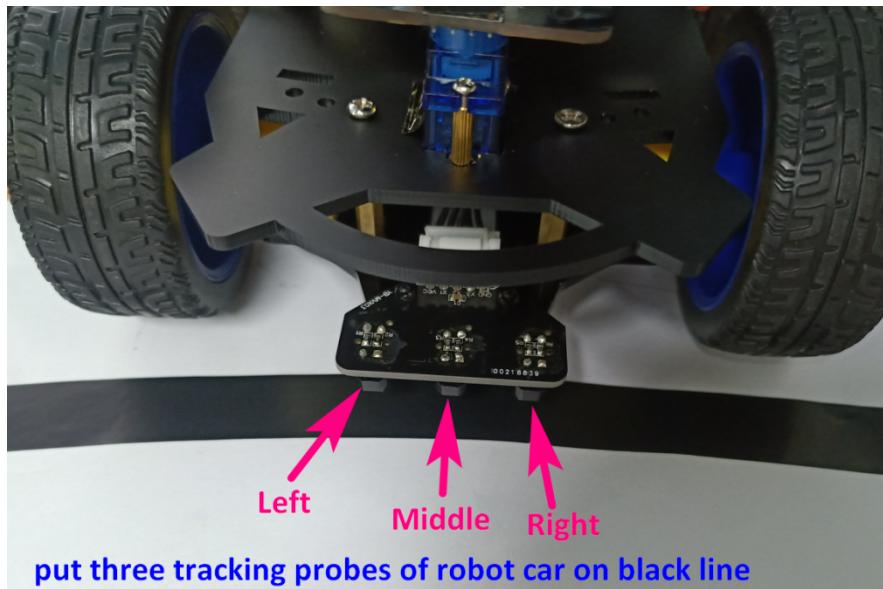
(!!!Note: This data just for my experimental environment , you must record the value you printed, wait until the data is stable)

We can name the three records recorded as: L_white = 32, M_white = 31, R_white = 33.



If the data shows a little fluctuation, that is normal, you can take the average of the five data.

- 4) We need to put three tracking probes of robot car on black line (**must be the track where you will be conducting a tracking test**). As shown below.



Next, we will see that the analog value of the tracking sensor in current environment are printed on the serial monitor.

(!!!Note: This data just for my experimental environment , you must record the value you printed, wait until the data is stable)

We can name the three records recorded as: L_black = 819, M_black = 799, R_black = 751.

```

Stage mode Chose COM:
CommUart Assistant (V3.8)
COMSettings
PortNum: COM51
BaudR: 115200
DPaity: NONE
DataB: 8
StopB: 1
Close
Recv Options
 Receive to file...
 Show timestamp
 Receive as hex
 Receive pause
Save... Clear
Send Options
 Data from file ...
 Auto checksum
 Auto clear input
 Send as hex
 Send cyclic
Interval: 1000 ms
Load... Clear
Ready!
Send: 0 Recv: 1917 Reset
http://www.cmsoft.cn QQ:1086656000
Send
left_distance 0 h" Roboduino.h"
right_distance 0
middle_distance 0 Roboduino;
anBoom_Roboduino_Tracking cTr
pid setup()
Roboduino.YahBoom_Roboduino
Serial.begin(115200);

cTrack.YahBoom_Roboduino_T

pid loop()

Serial.println("L:");
Serial.println(cTrack.Return);
Serial.println("M:");
Serial.println(cTrack.Return);
Serial.println("R:");
Serial.println(cTrack.Return);
delay(0.3*1000);

```

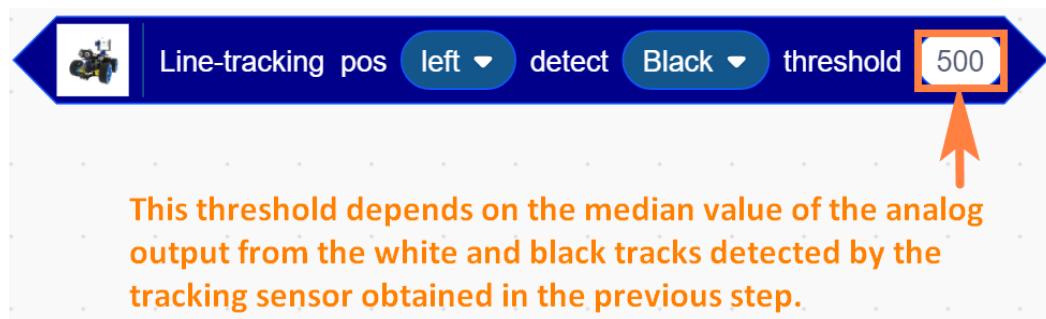
If the data shows a little fluctuation, that is normal, you can take the average of the five data.

4. Combine blocks



!!!Note:

You need to modify threshold according to the actual environment.
Threshold depends on the median value of the analog output from the white and black tracks detected by the tracking sensor obtained in the previous step.



5. Experimental phenomena

After the program is downloaded, open the power switch of robot car.

When right tracking sensor detect white and left tracking sensor detect black, left(No.1) ultrasonic light up red, right(No.2) ultrasonic light up green.

When right tracking sensor detect black and left tracking sensor detect white, left(No.1) ultrasonic light up green, right(No.2) ultrasonic light up red.

When right tracking sensor detect black and left tracking sensor detect black, all ultrasonic light up yellow.

When right tracking sensor detect white and left tracking sensor detect white,

all ultrasonic light up cyan.

As shown below.

