Robobloq

Q-scout Series Course

Section 6:
《The Tracking Guards》

Curriculum objectives

Knowledge and skills (Technical)

1 Learn the knowledge of line tracking sensor, master its working principle and programming methods.

2. Know well the usage of "operation" module in programming and programming of multi-conditional judgment.

3. Learn computer programming, connection and program download.

Knowledge and skills (Cognitive)

1. Improve logical thinking ability by analyzing the recognition of black ling by line tracking sersor

2. Driven by patrol tasks. Stimulate students' ability of 'study in practice' and ability to make reflection of technical knowledge into real life.

Knowledge and skills (Emotional attitude and values)

1.Cultivate students' positive life attitude, and make them feel optimistic about life.

Curriculum introduction

All schools players are to participate in the upcoming sports meet and they will perform in front of their parents, watching game. In order to maintain safety, and to keep watch on the tracking line (in the ground) security officers are on the alert and patrolling around the ground. Our Q-scout also wants to become the part of tracking team by joining those security officers.

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Curriculum introduction

As a tracking guards, Q-scout needs to complete the task of tracking around the school on a designated route to ensure the safety during the event.

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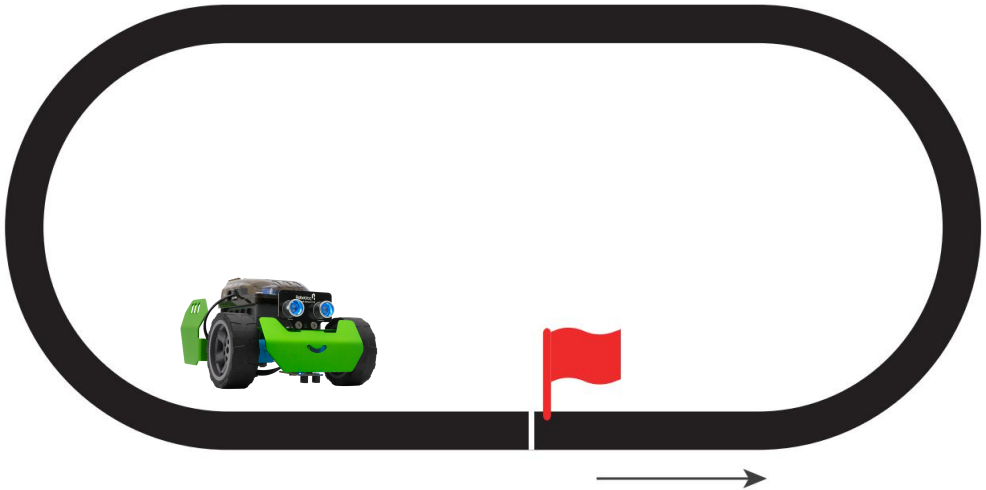
Task analysis

The Q-scout should be able to patrol along a certain route without any deviation.

We need to think about: 1. How to make our Q-scout know that it is following a line?

2. How does the Q-scout to take turn on the ellipsoidal line, without moving from the line?



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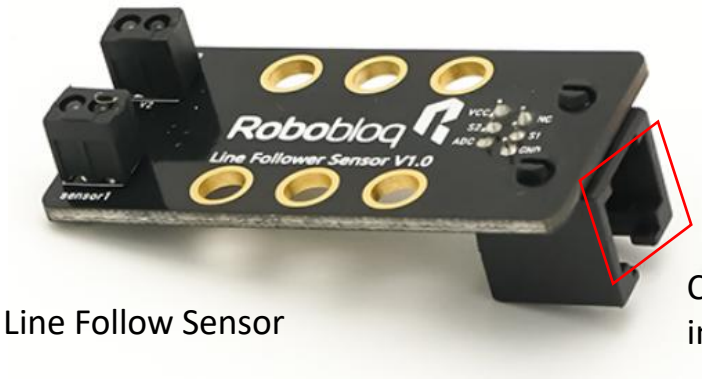
Knowledge explanation

Line Follow Sensor:

The line follow sensor, which is installed at the bottom of the Q-scout to determine whether it is following the route or not, can detect black lines on a white background, helps the robot to track a white or black line.



Line Follow Sensor

Connection line interface

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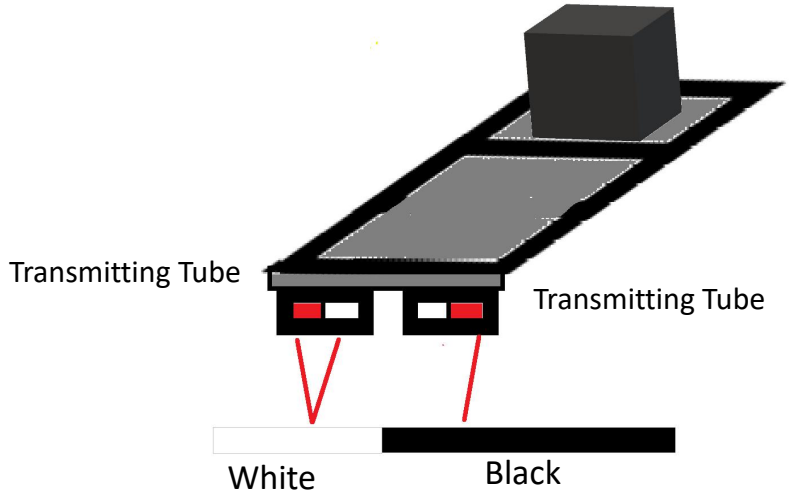
Knowledge explanation

Learn to use line follow sensor:

The principle of the line follow sensor is to emit light through the infrared transmitter tube. If the light gets reflected back, the light will be received by the receiver tube. The intensity of the reflected light varies on the basis of white or black background, from where the light is getting reflected. And on the basis of high or low intensity of the reflected light, the sensor can identify white or black line.



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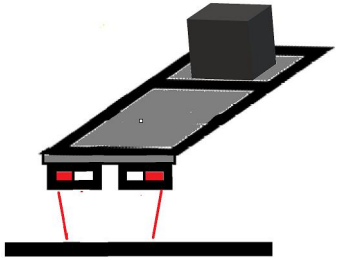
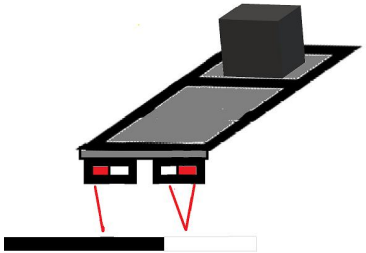
Knowledge explanation

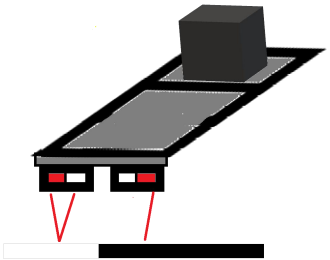
Based on the intensity or data signal returned by the line follow sensor on the left and right side of the receiving tube, four return numbers of 0, 1, 2, and 3 are used to represent the communication number of the receiving tube which are transmitted to the main control board.



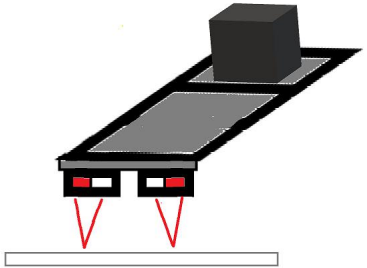
number=0 condition



number=1 condition



number=2 condition



number=3 condition

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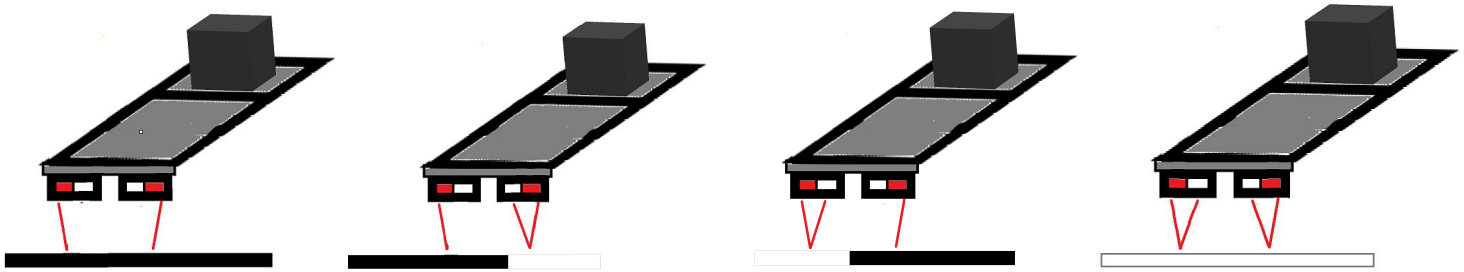
Knowledge explanation

Using the line follow sensor to receive the data signals returned by the tubes on the left and right, when Q-scout deviate from the line, they adjust the route by turning bot to left or right.



number=0—go straight

number=2—turn right

number=1—turn left

number=3—stop

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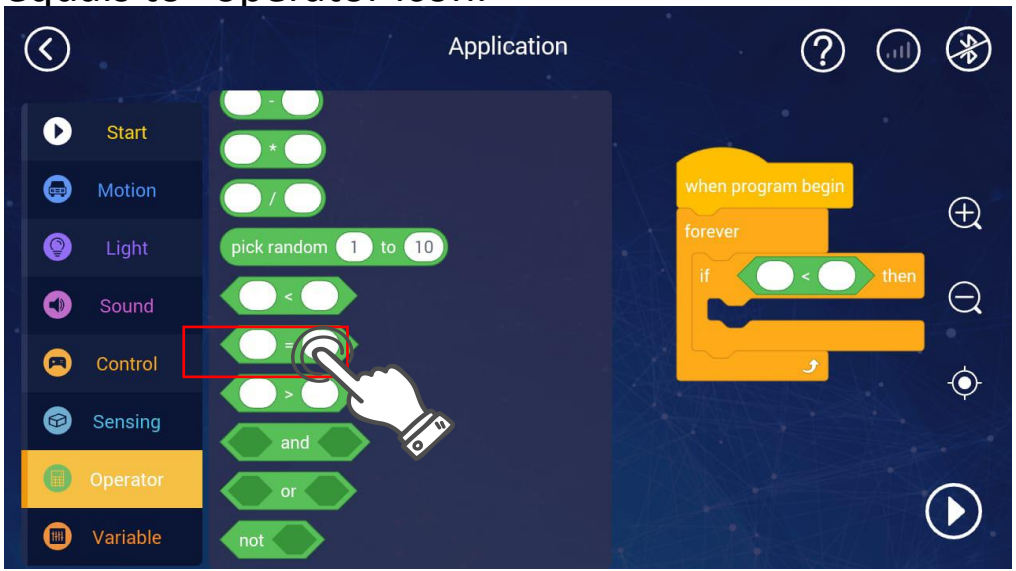
Knowledge explanation

Learning operators module:

Depending on the requirement of the operators such as “addition, subtraction, multiplication and division operations, random numbers, greater than, equal to, less than" and others, the return value by the sensor can be written on the left or the right side of "equals to" operator icon.



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Hands-on practice

1. Drag the icon of line tracking sensor to the programming area from the control module area. Then pick the right port (port 1, 2, 3, or 4) on which the line tracking sensor is connected.

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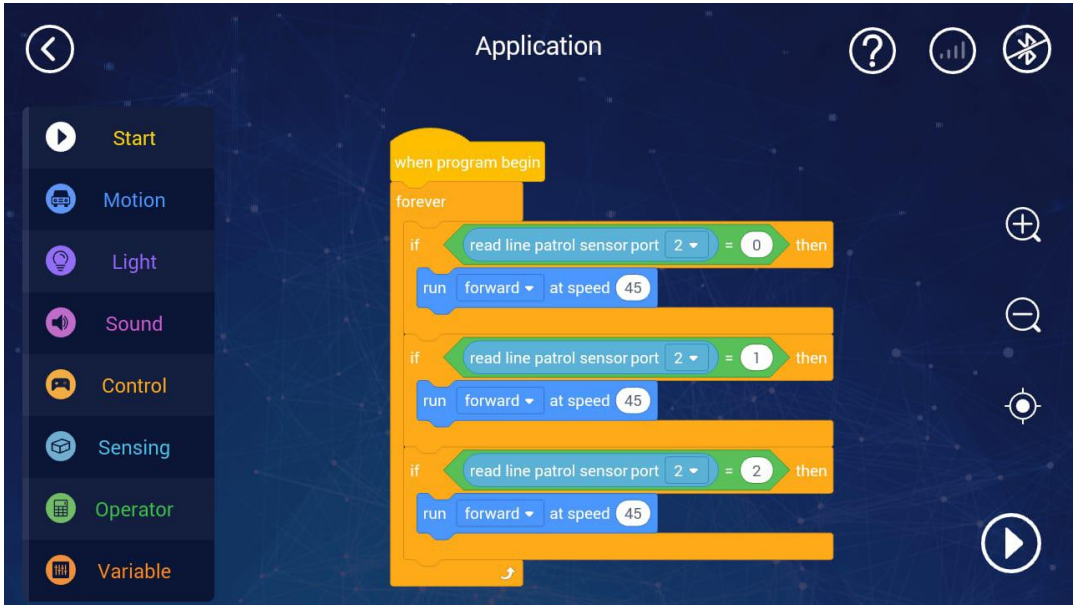
Hands-on practice

1. Enter the appropriate number as per the return value of the line tracking sensor to the right side of the "equal" operation icon.

2. Set the movement condition of Q-scout according to the return value.



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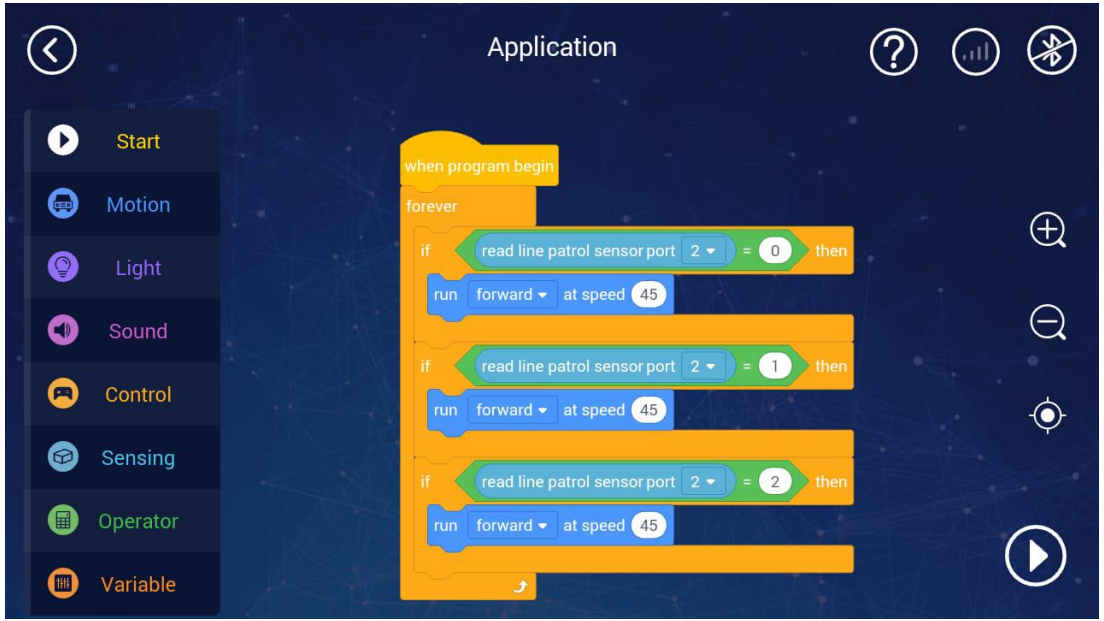
Hands-on practice

Add the conditional statement, set the motion condition of other return numbers of line tracking sensor, and complete the tracking program of Q-scout.



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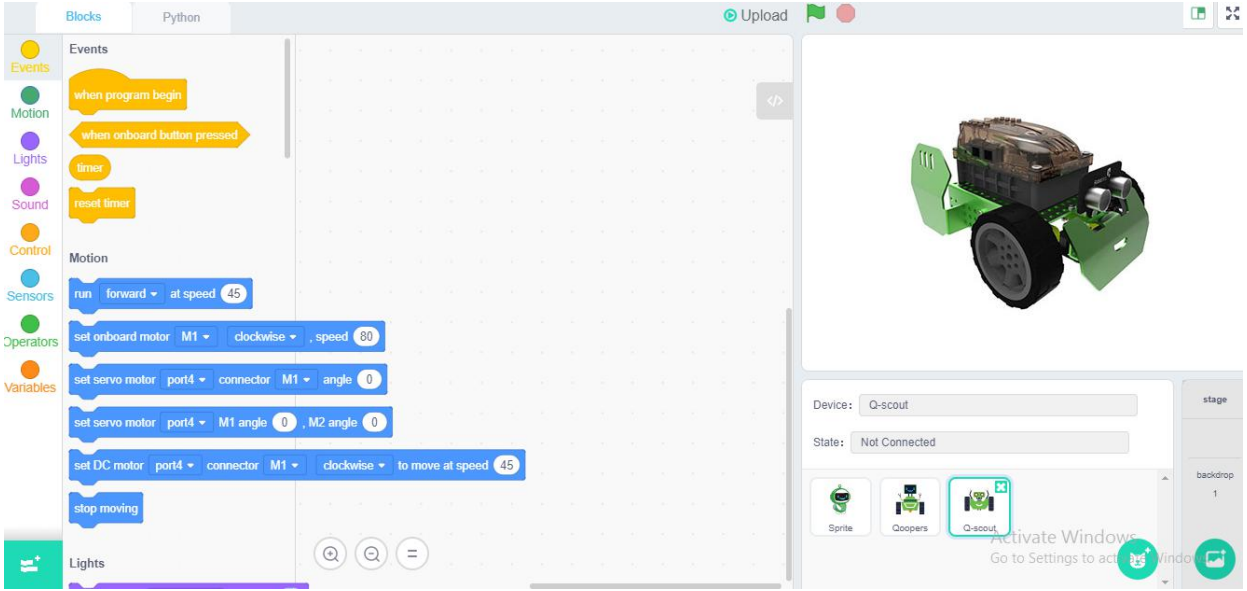
Hands-on practice

In addition to being able to write programs to control Q-scout by mobile phone application, you can also write programs on the computer terminal to make Q-scout run, Open the Robobloq programming software and enter into the programming interface.



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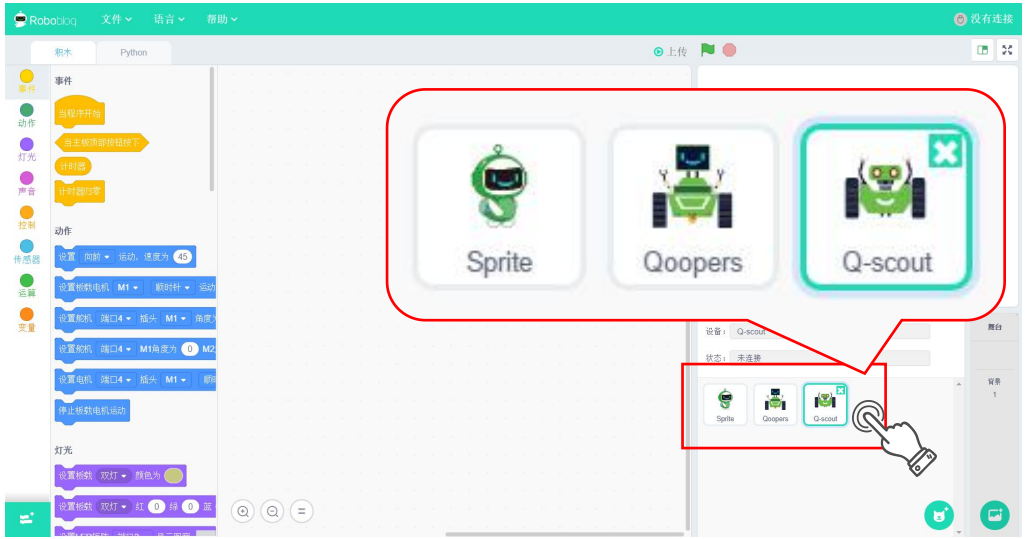
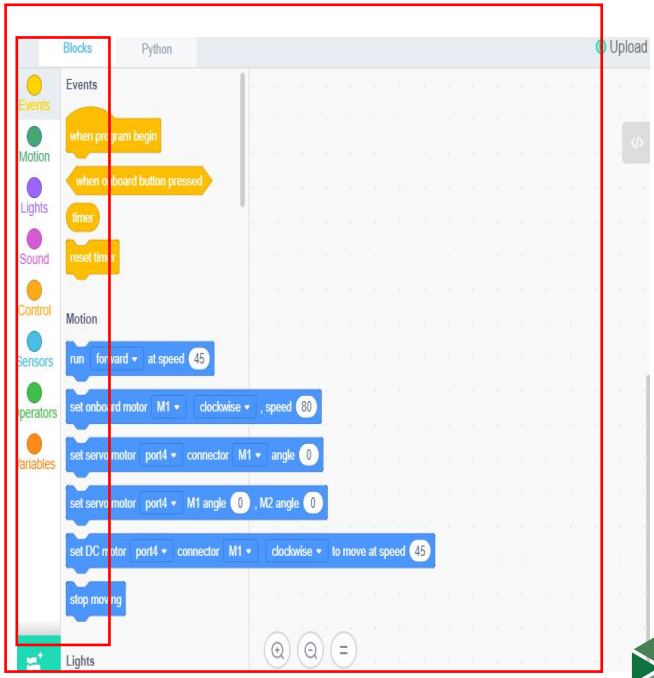
Hands-on practice

Click on the Q-scout icon in the lower right corner of the screen, go to the programming module area, and compare the listed programming modules on the PC to the programming modules of mobile and see differences.





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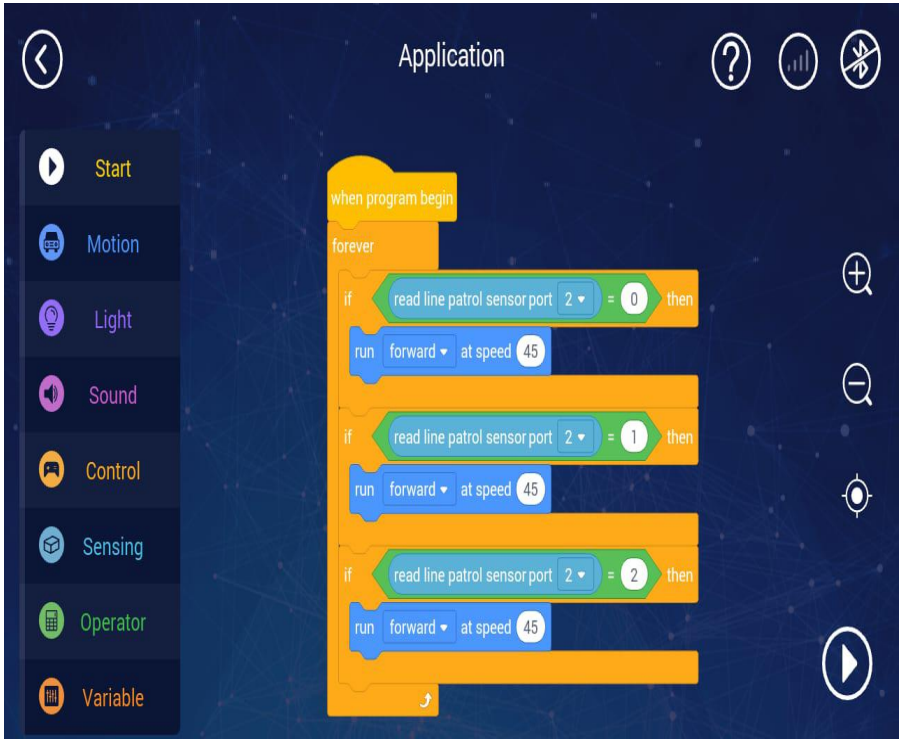
Hands-on practice



Referring to the program written using the mobile phone programming software, write Q scout patrol program using Robobloq PC software.

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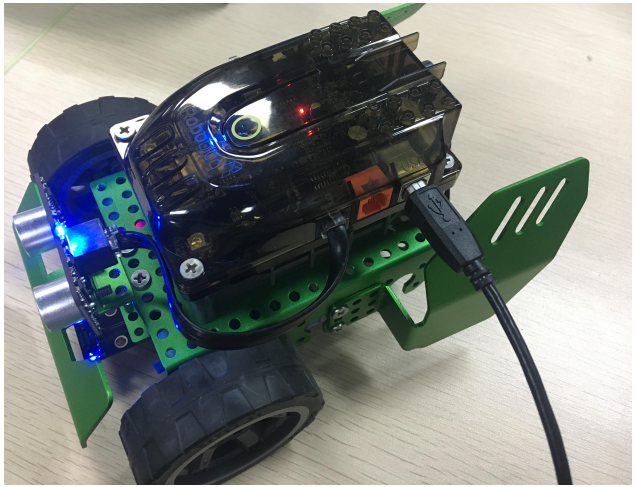
Hands-on practice

How to Q-scout to PC and download the software

1. One side of the USB port will be connected to the Q-scout and other side to the PC, once connected, the on-board Lights of the Q-scout will be automatically turned ON.



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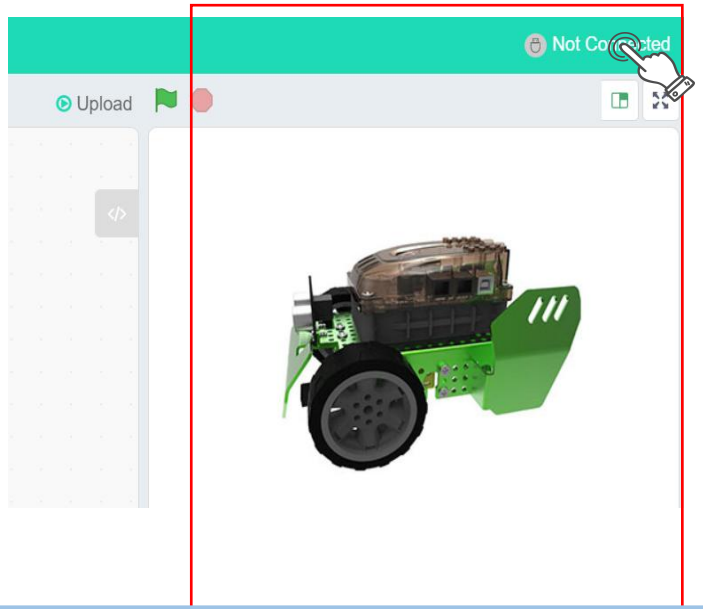
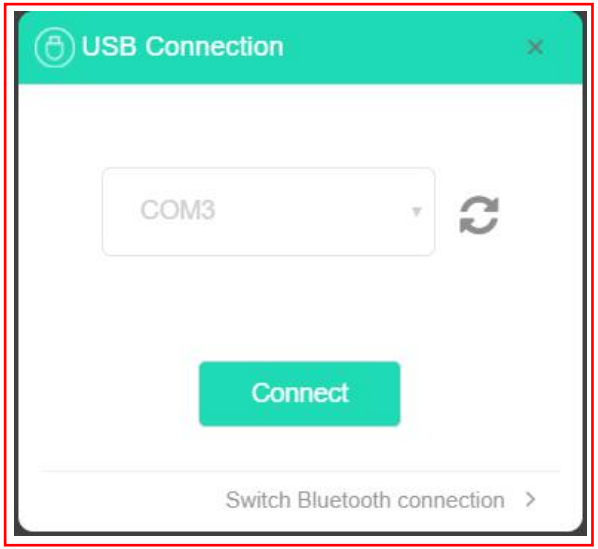
Hands-on practice

How to Q-scout to PC and download the software

2. The software interface displays the connection status with Q-scout. Click “no connection” and select right COM3 port number.





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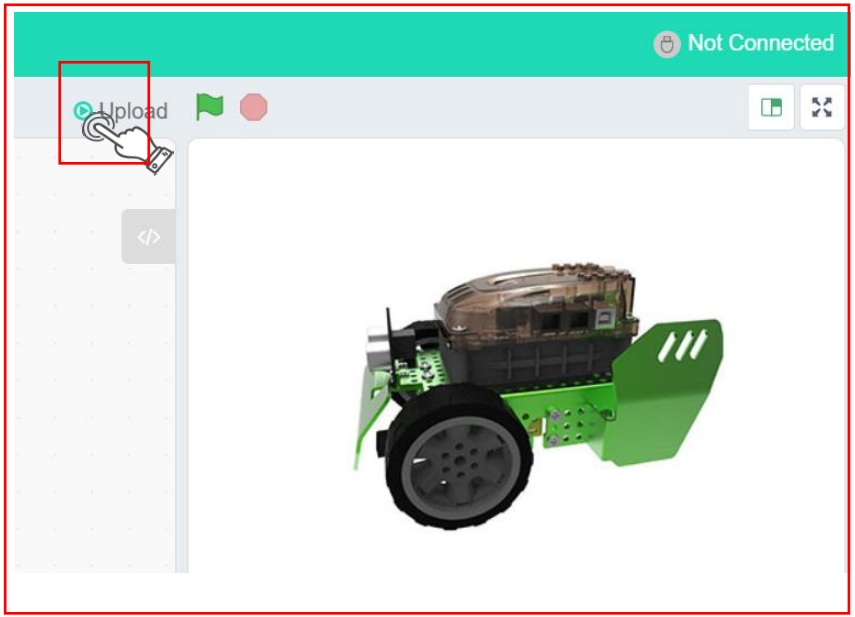
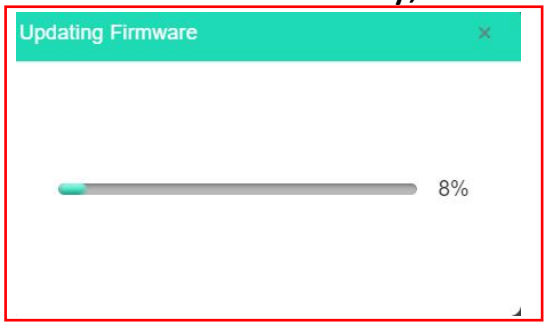
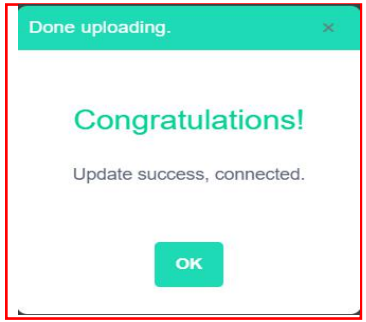
Hands-on practice

How to Q-scout to PC and download the software

3. Click the upload icon in the programming area and wait for the upload completion window to show the success message, it shows downloaded successfully, then turn On the Q scout switch.







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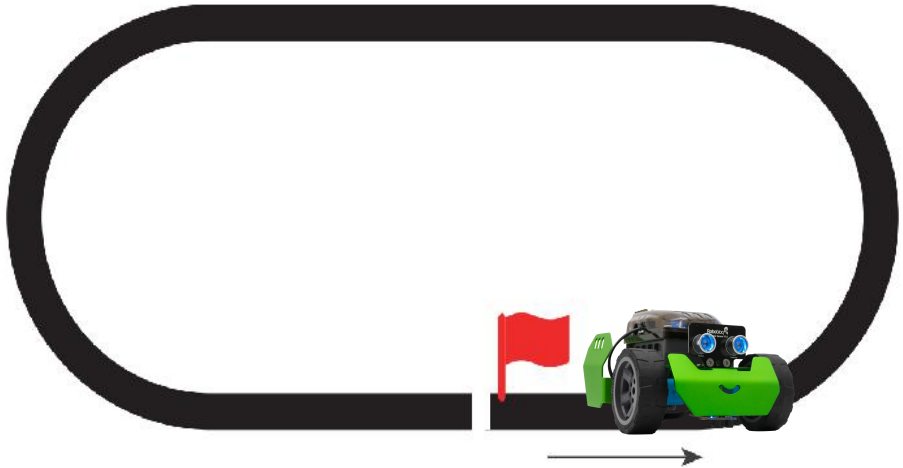
Extends

A patrolling Q-scout walks along the circle which need to be stopped before the red flag. Mark a white line immediately before the red flag so that upon the detection of that white line our Q-scout can stop. Write a program for this scenario.



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Conclusion and reflection

1. When a Q-scout is on patrol mode, it rarely deviates from the track or even runs off the track while it is following black tracking line. If there is any deviation, it automatically debug the program and fix the error.

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