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Q-scout Series Course

Section 15:
《Crazy Cross-country》

Curriculum objectives

Knowledge and skills (Technical)

1.Review the usage of variable and line tracking sensor.

2.Complete task programming of crazy cross-country.

Knowledge and Skills (Cognitive)

1. By using various tasks, students will be able to improve their problem solving and analytical skills.

2.Cultivate logical thinking ability of students using the programming exercises.

Knowledge and skills (Emotional attitude and values)

1. Making students able to patiently face the real life challenges and how to solve them, by making of fun-filled projects.

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Curriculum introduction

During an outing, we received a letter asking Q-scout to take part in a special cross-country race nearby. The cross-country race was tough to win and the route was curved, at the same time, obstacles were set up to add some difficulties to race. Meanwhile, we all were given a letter detailing the rules and maps of the crazy cross-country race.

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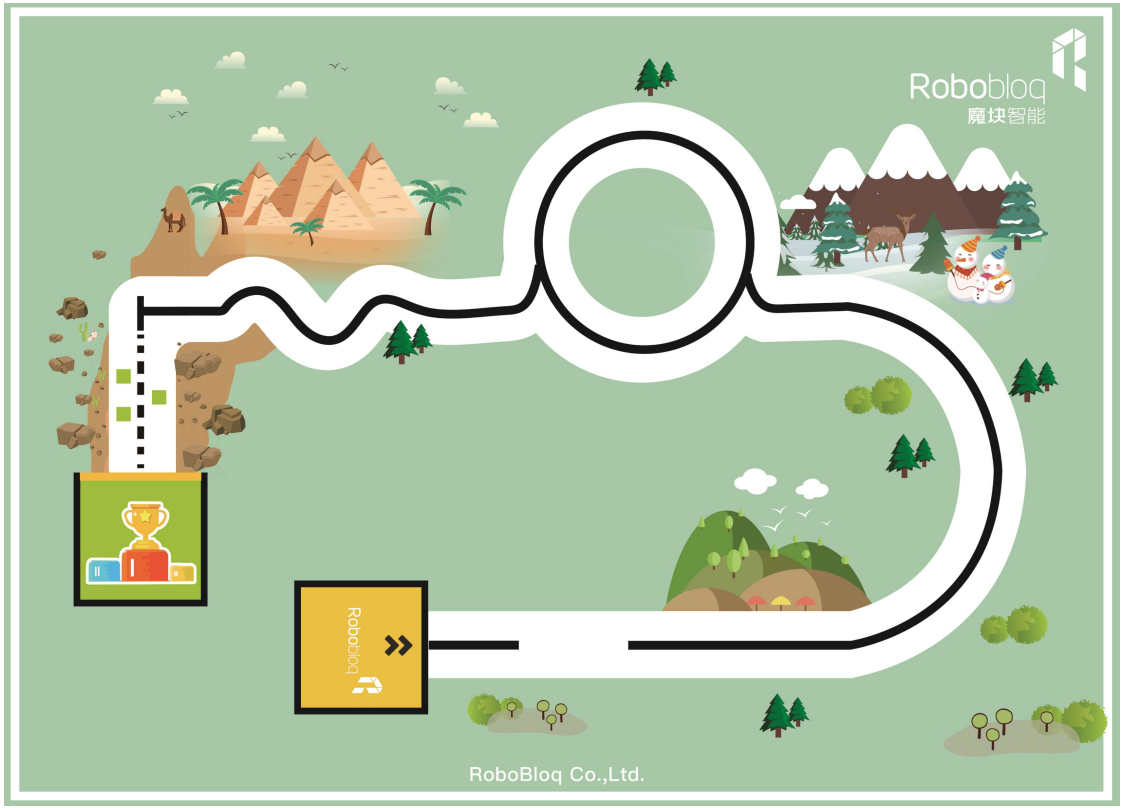
Curriculum introduction



It is mentioned in the rules that after departure, players will have to pass through the blank area, annular terrain area, multi-bend area, gravel area, etc. And finally reach the destination.

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Curriculum introduction

This cross-country race is full of challenges for Q-scout. In order to reach the end line smoothly, we need to help Q-scout to pass through all kinds of difficulties on the track.

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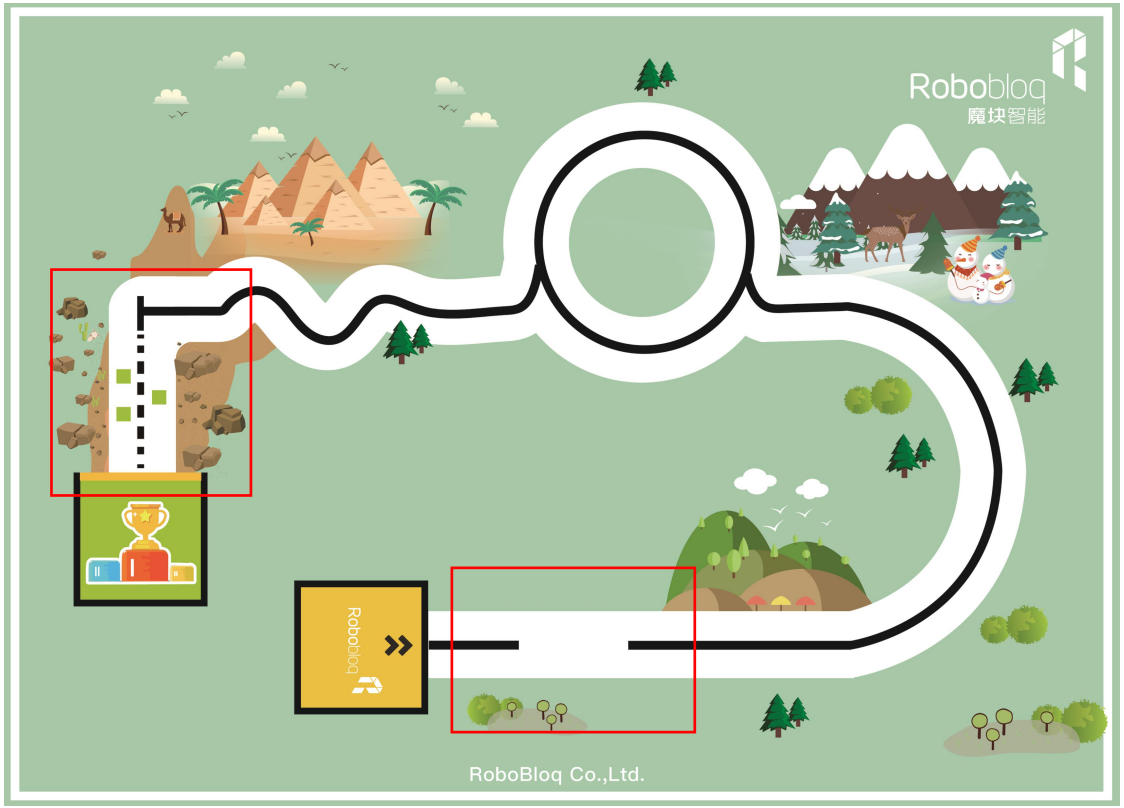
Curriculum introduction



It is mentioned in the rules that after departure, there should be no interference. Q-scout need to go to the destination independently and must enter the black marked garage automatically. The car body must enter the garage completely without pressing the yellow line.

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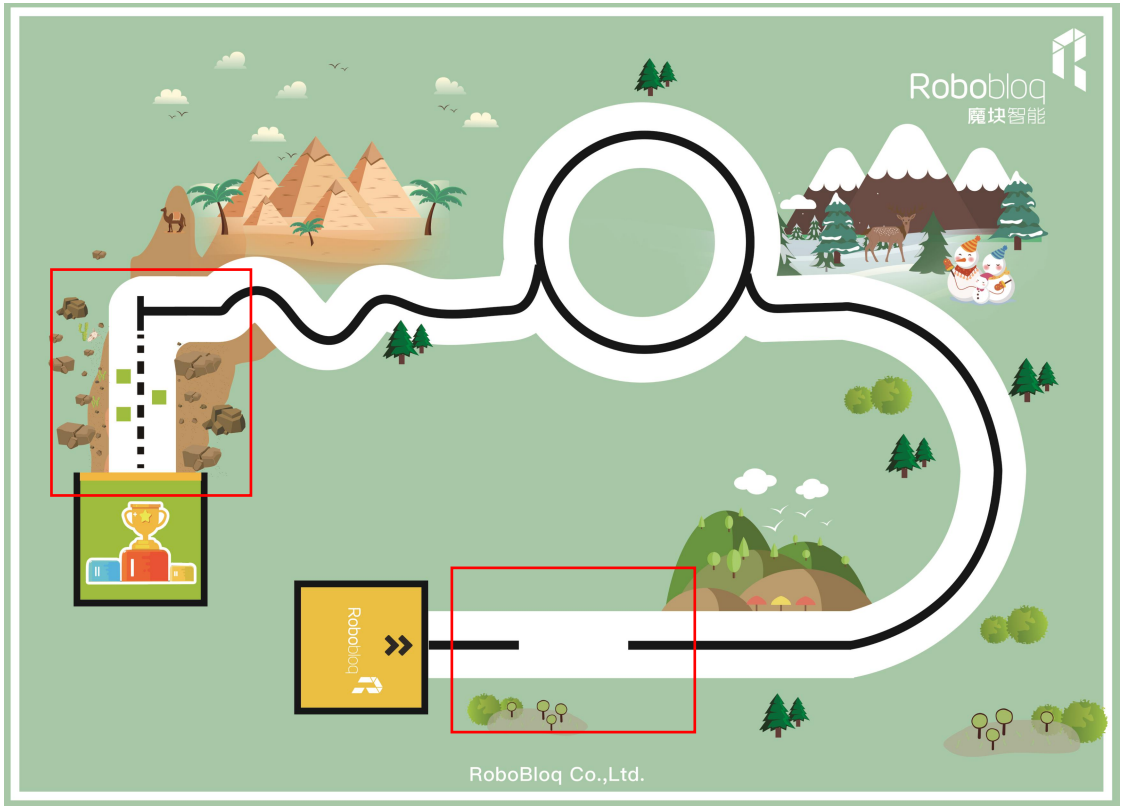
Task analysis



We need to solve two problems if we want to reach the end point:

1.How to cross the route blank area?

2.How to reach the end point garage?

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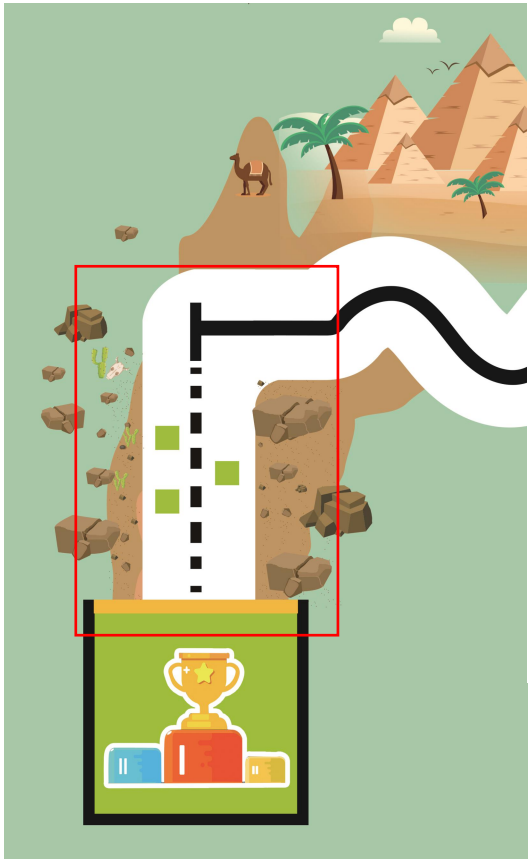
Knowledge explanation



Similarly, Our Q-scout cannot enter the gravel road, at the end of the track, see the route. After the Q-scout runs to the T-shaped route in front of the gravel road, the left and right receiving pipes of the line tracking sensor detect white. At this time, the program written for the left turn and forward movement are executed, and the car stops after reaching the garage.

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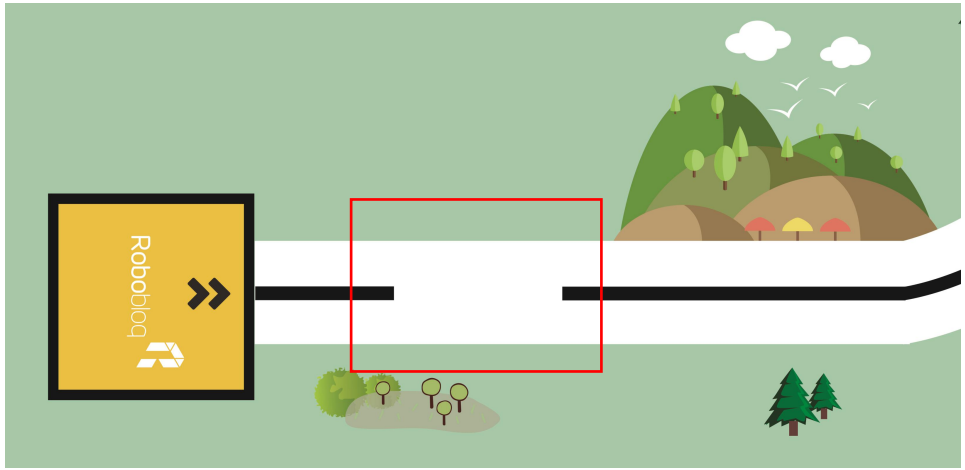
Knowledge explanation

The whole track is guided by black lines, and most of the tracks can be completed by using the line tracking sensors of Q-scout. Although there is no black line, to guide through, on blank area of route, as it is a straight track, you can keep your Q-scout move forward directly and use the line tracking procedure and program once that Q-scout has cross the blank area



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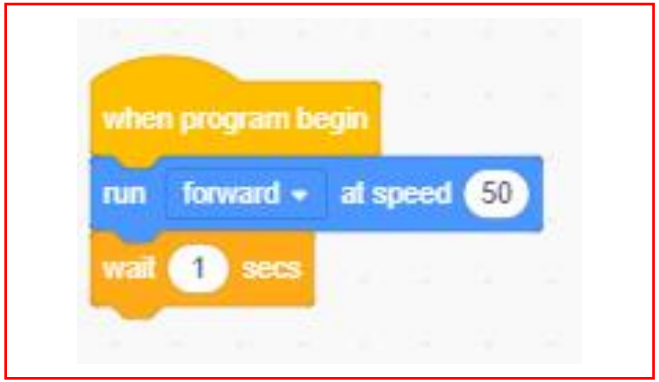
Hands-on practice

Pass through the blank area of the route:

Write a program to let the Q-scout move forward for a certain period of time. The waiting time can be adjusted according to the actual site conditions.



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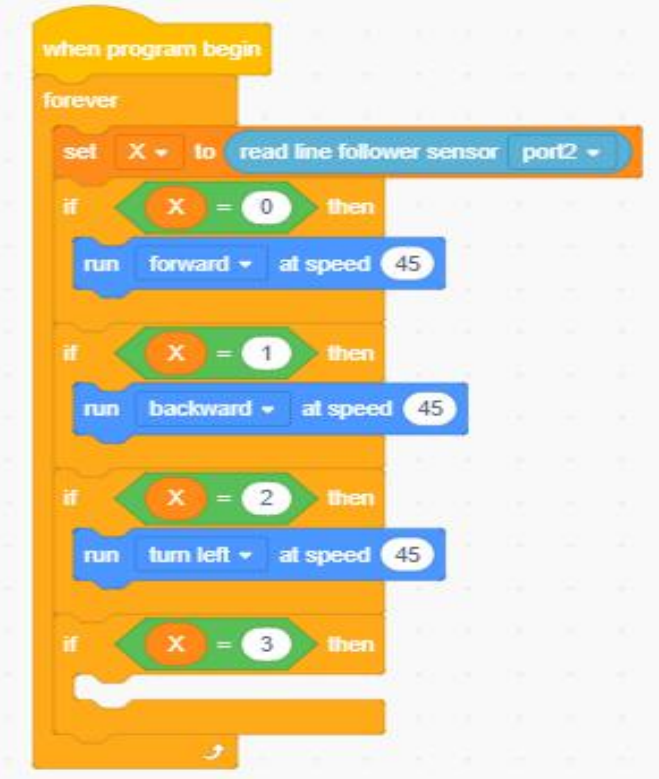
Hands-on practice



Write line tracking program:

Create a variable "x", set the variable x to the line tracking sensor number connected on the port 2.

Write Q-scout line tracking procedure, by setting movement condition for the return values of the line tracking sensor 0, 1, or 2 .

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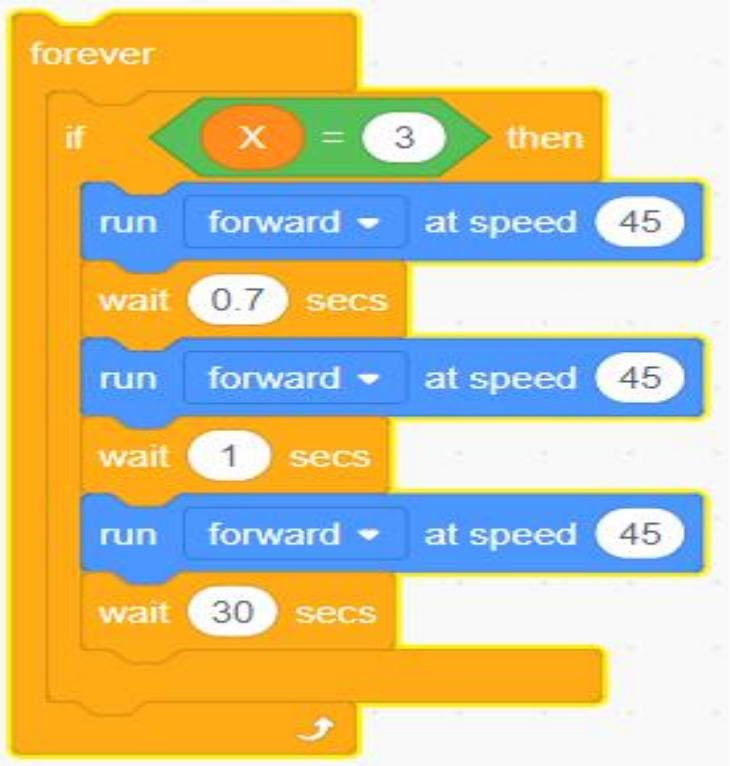
Hands-on practice



Through the rubble area, go to the garage:

When the Q-scout arrives at the T-shaped route in front of gravel area, the line tracking sensor returns the number 3, now, write a program that turn straight into the garage.

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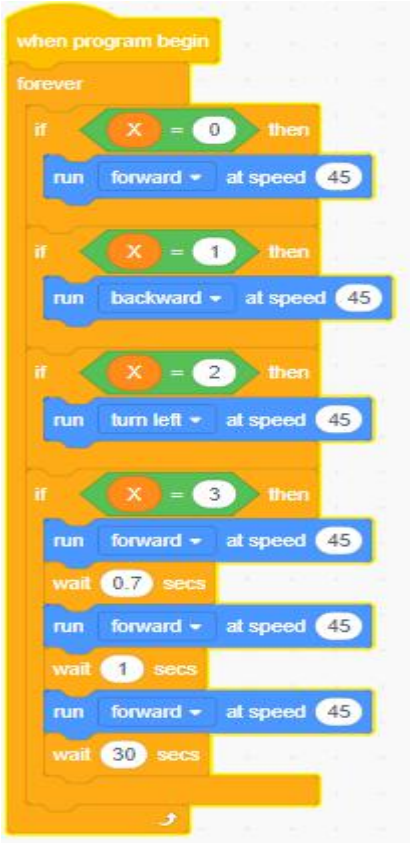
Hands-on practice



Integrate both of the programs you have written for blank area of the route, the line tracking program with the program for the gravel area into the garage, and debug the program to see if the cross-country race can be successfully reached.

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Extends

Do you have any other programming methods to complete the task of crazy cross-country race by Q-scout?

Try to add light and sound effects in the program when Q -scout reaches to areas such as route blank areas and gravel areas.

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Conclusion and reflection

1. How to adjust the movement of the Q-scout when it is not able to access the values returned by the line tracking due to the deviation during the straight direction movement after departure?

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