



Q-scout Series Course

Section 2:

《Pole-speed curve》

Curriculum objectives

Knowledge and skills (Technical)

1. Getting familiar with the principle of two-wheel drive structure.
2. Getting familiar with the operation principle of two-wheel drive - left and right-turns.
3. Getting familiar with how to write the program of Q-scout left- turn, right-turn procedures.

Knowledge and skills (Cognitive)

1. By understanding the principle of two-wheel drive, students are able to gain the ability of controlling and operating robots.
2. Students are able to think and summarize how to deal with those challenges in form of a task or a project.

Knowledge and skills (Emotional attitude and values)

1. Let students experience various phenomena of science and technology and stimulate a positive attitude towards learning with practical operation.



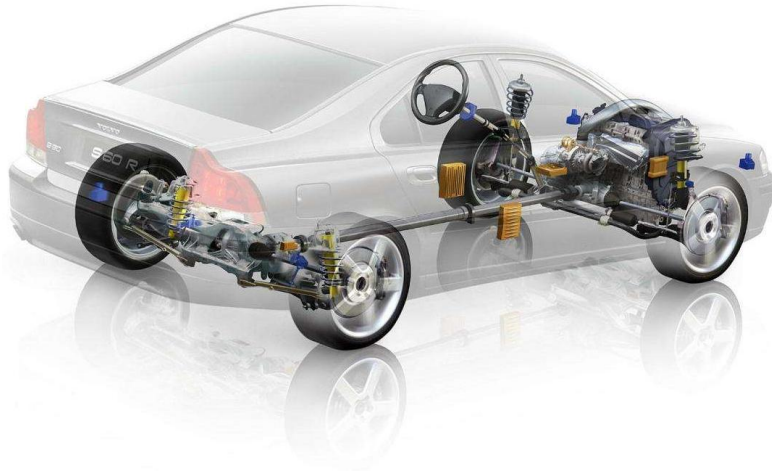
Curriculum introduction

The Q-scout was on standby mode at the moment it was assembled and turned On. Now, the Q-scout has got an urgent assignment, to stop its random driving exercises and start chasing down a suspected vehicle, the task is to stop the suspected vehicle before he leaves the S-bend ahead.



Curriculum introduction

In order to assist the Q-scout to complete the task successfully, we should first understand some of the properties. The driving mode of a car is divided into two-wheel drive and four-wheel drive, that is to say, it is the number of wheels driven by a machine. Though, the Q-scout has two motors which drive forward the Q-scout. In turns, two rotating tires makes the Q-scout the two-wheel front mode type.



Task analysis



1. First of all, in order to drive through the S-bend, we need to know that how to make Q-scout to take a smooth turn.
2. Secondly, how to manage the work of speed variation before taking a turn so that a smooth turning can be achieved.

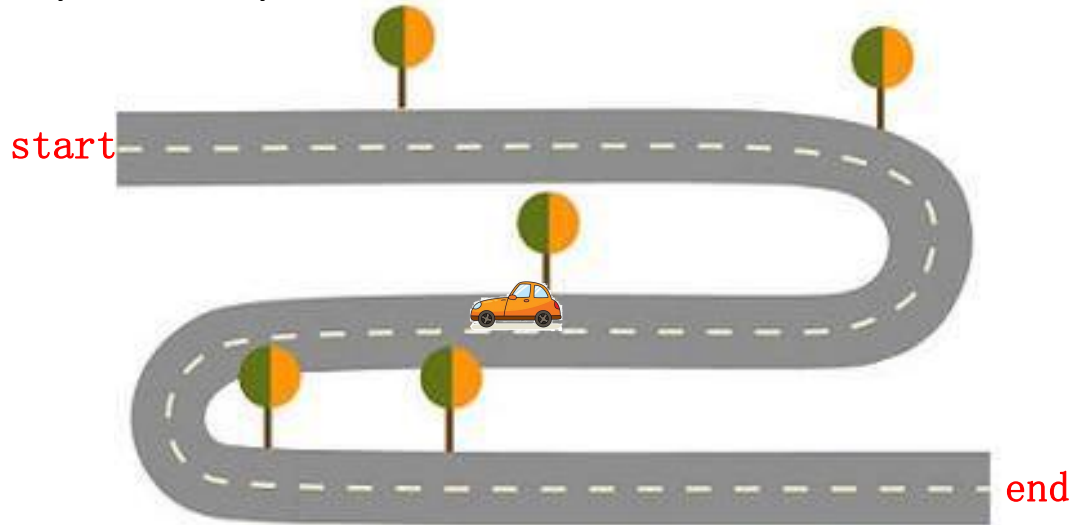
Knowledge explanation

1. When a car is running in the straight direction, the speed of the wheels on both sides is the same as the steering. If we rotate the steering wheel, the steering wheel takes a turn, and when steering occurs, the inner wheels tend to slow down. In such conditions, the speed of the outer wheel automatically increases, which causes the difference in the speed of inner and outer wheels.
2. In practical application, we have three kinds of left turn methods, the example of left turn is as follows:

Left Motor Speed	Direction	Right Motor Speed	Direction
0	clockwise	60	clockwise
45	clockwise	80	clockwise
60	Counterclockwise	60	clockwise

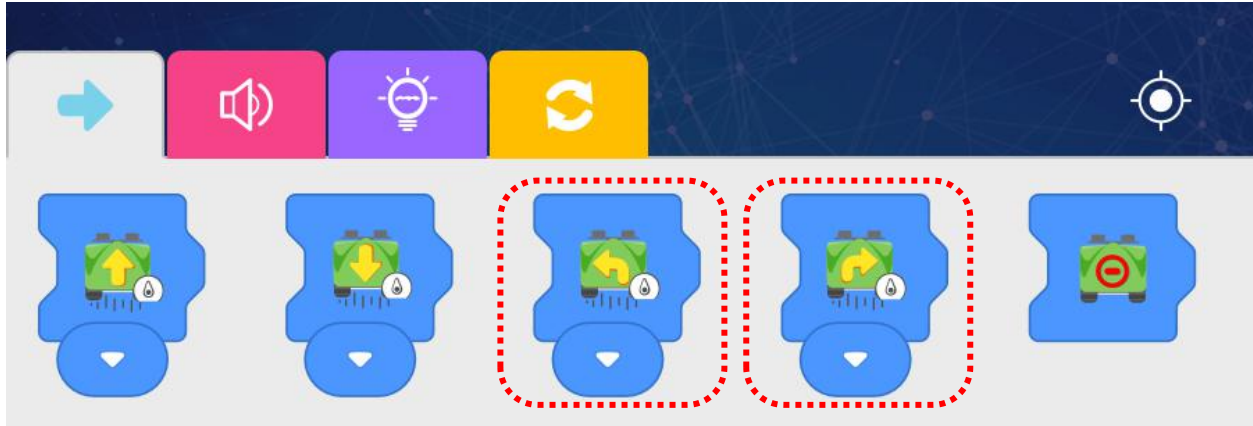
Hands-on practice

Mission Description: Q-scout is all set to mark the beginning of chasing down the suspected vehicle or you can say – the start of an S-bend chase.



Hands-on practice

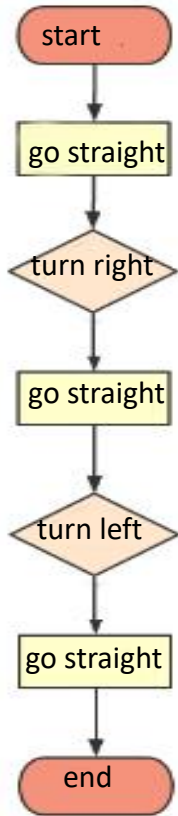
Recognize the right-turn icon and the left-turn icon.



Right turn icon

Left turn icon

Hands-on practice

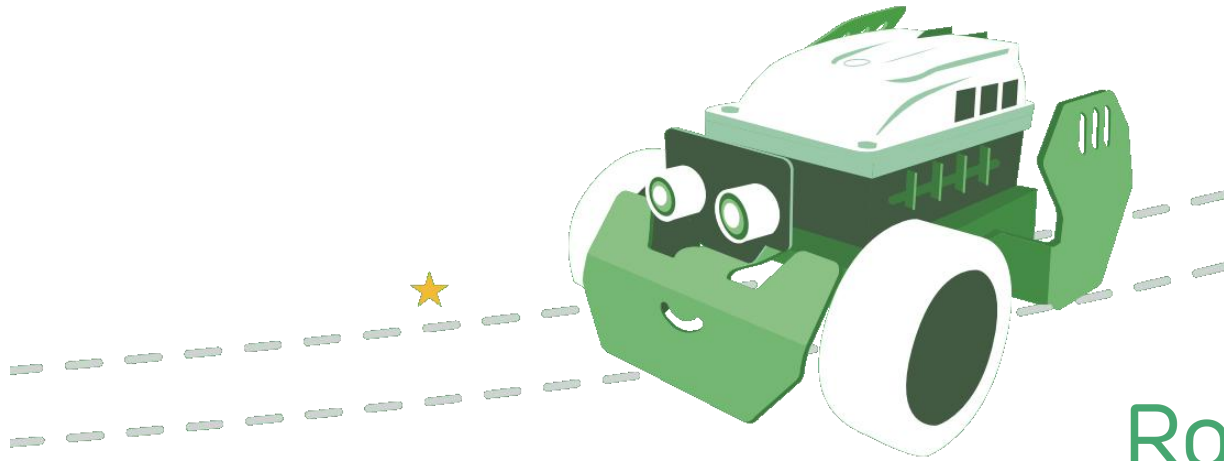


Think about programming according to the mission site.



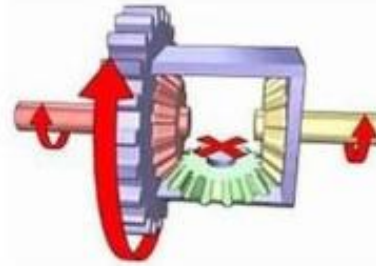
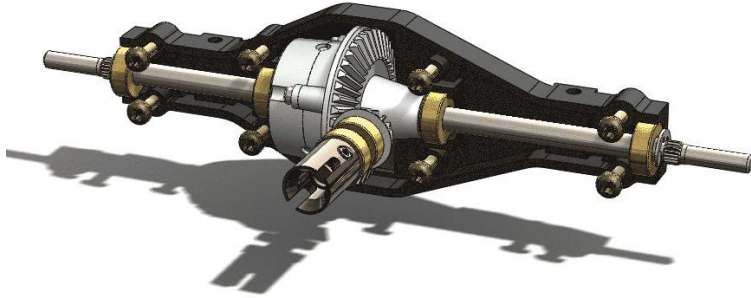
Hands-on practice

1. Start debugging the program according to actual site.
2. After completing the task, design a different type of route to run your bot on, and write a Q-scout procedure according to the site.

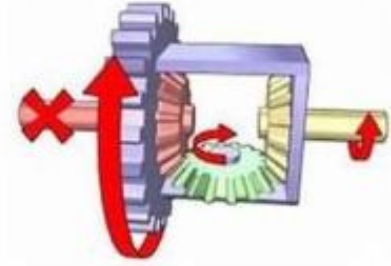


Extends

1. Try figuring out the difference in following different wheel mechanisms and explain how do they help in making a smooth turning.



As go straight, difderential mechanism. do not act

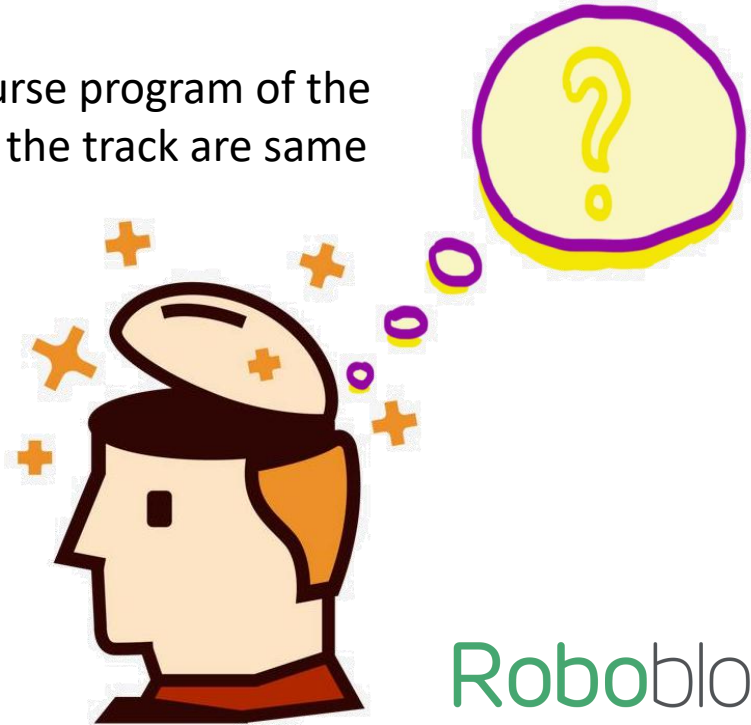


As turn, differential mechanism act

2. What is the turn-by-turn approach used in primary programming? What is its turning trajectory?

Conclusion and reflection

1. Thinking about the motion track and course program of the other two left-turn ways turning radian of the track are same or not? What's the difference?



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