



Q-scout Series Course

Section 10:

《Park in Designated space》

Curriculum Objectives

Knowledge and skills (Technical)

1. Know well the use of ultrasonic sensor and on-board light.
2. Understand relative knowledge about automatic parking.
3. Developing the working procedure of a safe parking for our Q-scout.

Knowledge and Skills (Cognitive)

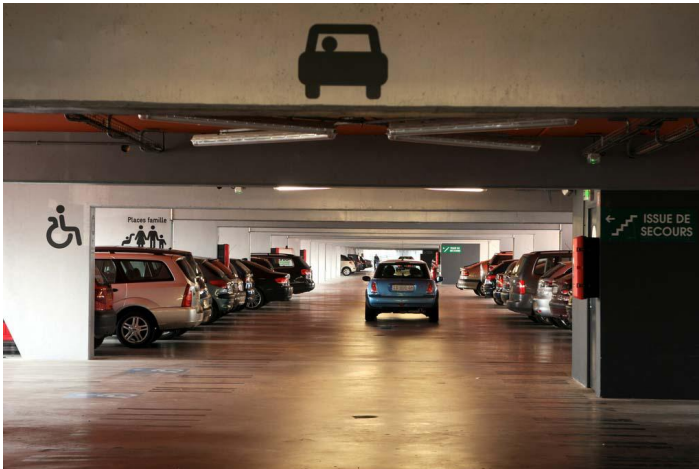
1. Through understanding of automatic parking and enhancing students' critical thinking and observational skills.
2. Cultivate students' ability of learning for practice and drawing rationales and conclusions from real life scene.

Knowledge and skills (Emotional attitude and values)

1. Let students experience different real life challenges and the way of solving them using various technologies.

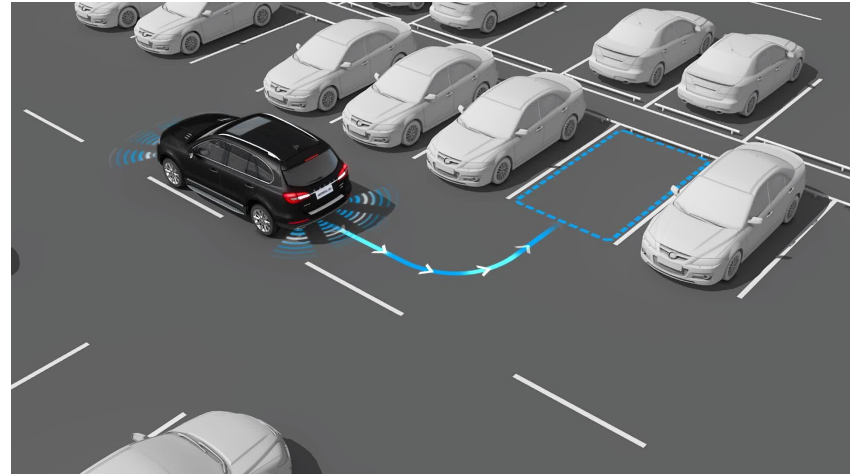
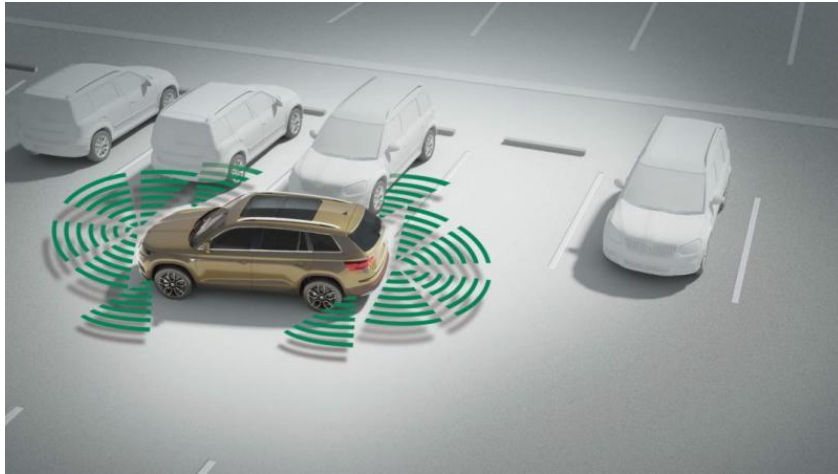
Curriculum introduction

In our daily life, cars have very important role to play and for many of us, it is a good driving skill. When we talk about good driving skills, your ability to drive a car carefully even in the narrow streets and appropriately parking the car at right place are also discussed. Most of the time, we see people having problem while parking the car (without good driving skills) and as we know, inappropriate parking often leads to traffic jam or a probable accident/collision zone and so on.



Curriculum introduction

With advancements in technology, the concept of automatic parking technology has become the good assistant of parking the cars safely and properly. Automatic parking refers to cars automatically get parked onto the specified space without driver's operation, that saves our time and effort.



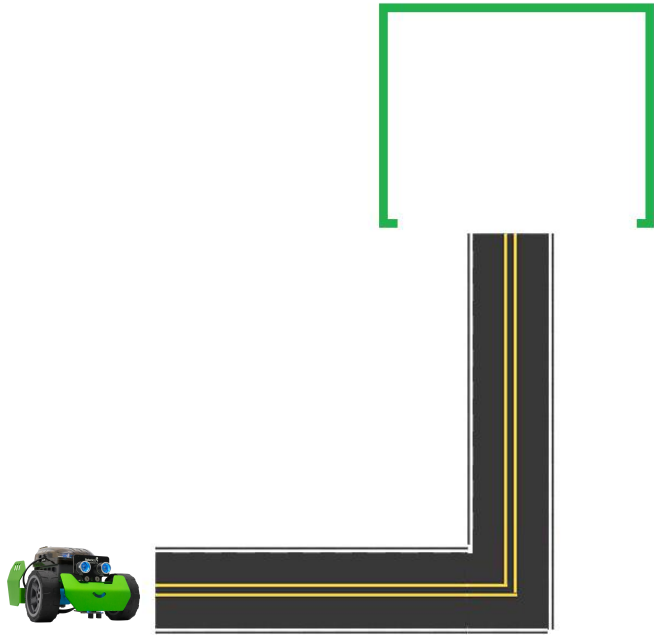
Curriculum introduction



The car with installed sensor in its body, during the process of parking, can monitor obstacles around the car, and can adjust the position of the car depending on the position of the obstacles around the car.

Our Q-scout assembled with ultrasonic sensor, can also detect the distance of obstacle, so can we perform the process of automatic parking by using our Q-Scout?

Task analysis

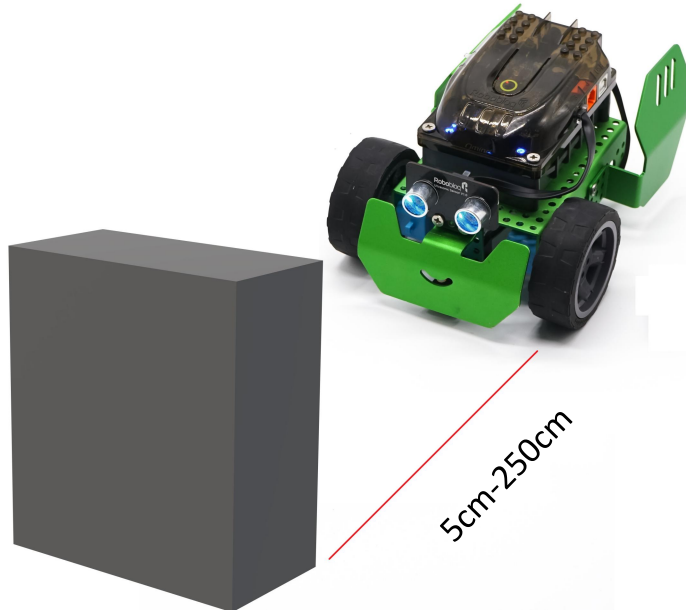


Think the complete working process of automatic parking onto the designated space:

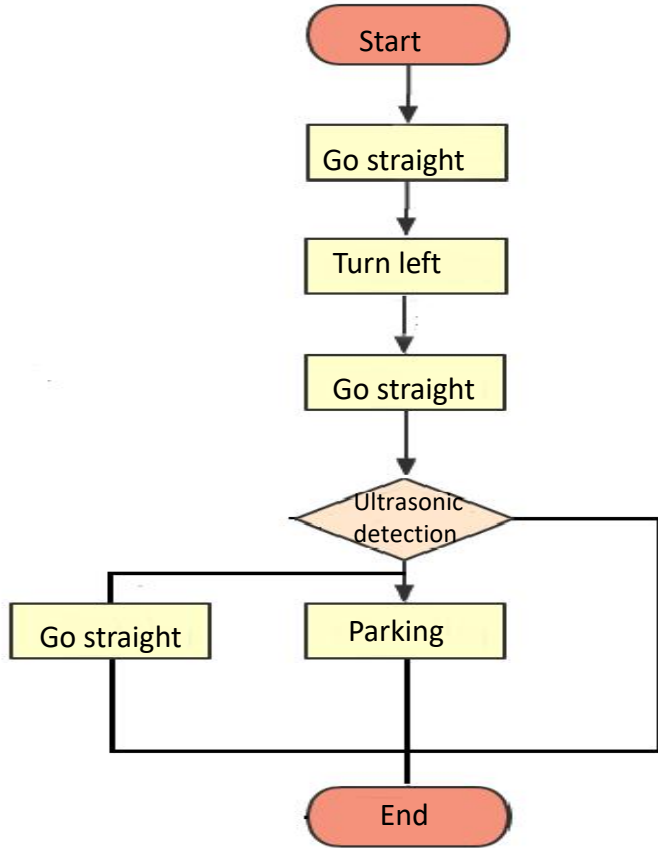
1. Q-scout to go straight, turn left, and then ago to go straight.
2. Once the Q-scout enters into carport, ultrasonic sensor detect distance, makes the parking at an appropriate distance, and completes the process of parking.

Knowledge explanation

Previously, we have already learned that for an ultrasonic sensor, the range of distances to be effectively detected is between 5cm to 250cm, the more ultrasonic sensor close to obstacle, the distance is smaller. In addition, we also know that the connection line interface can connect 1 to 3 interface to the main board.



Knowledge explanation



By keeping the parking route in the mind, design a flow chart of Q-scout parking onto the designated space, analyse and try your skill of programming logics for the challenge.

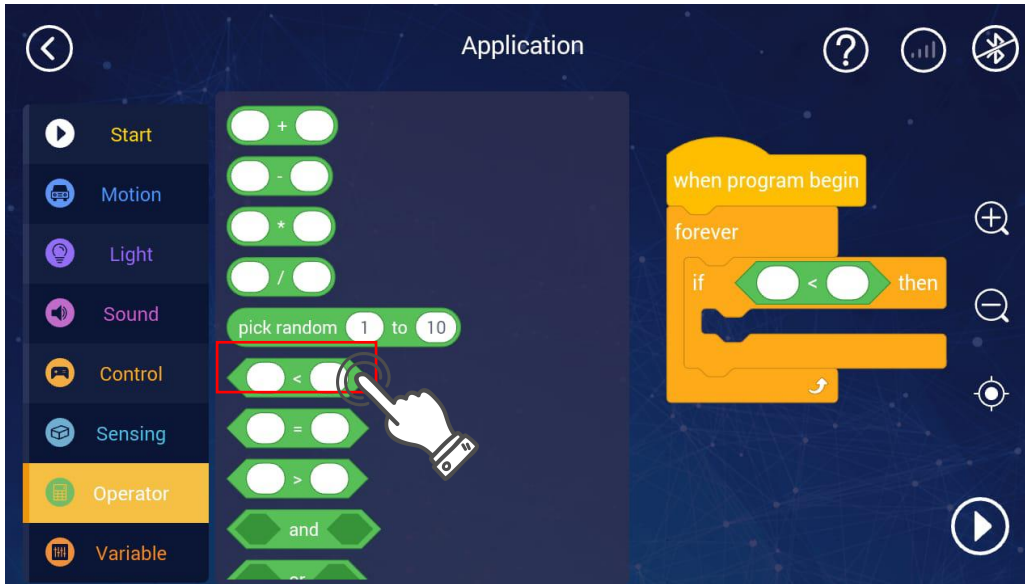
Knowledge explanation

In the programming application area,

1. From the list of arithmetic module, drag

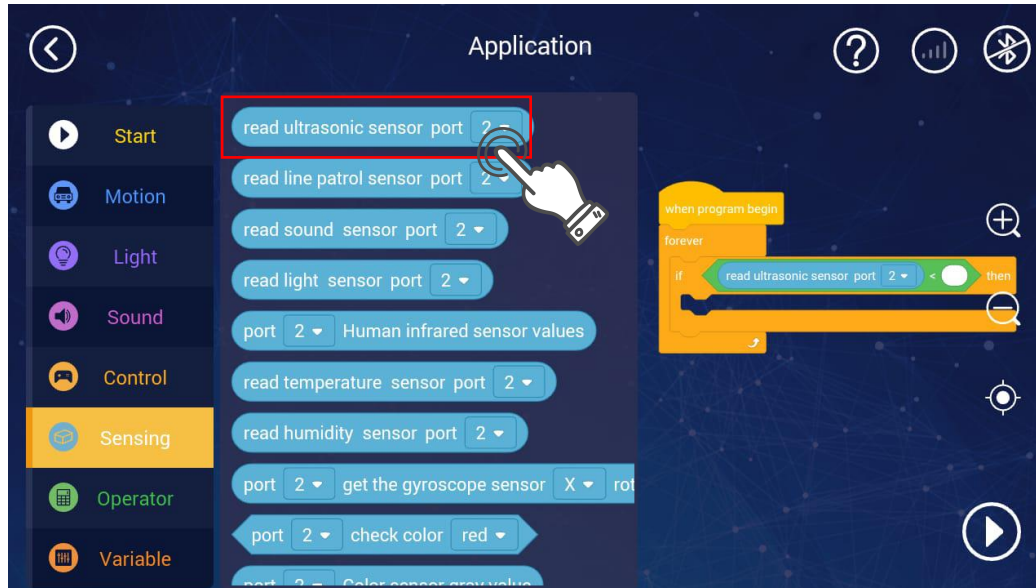


and place it to the condition judgment statement icon, as shown:

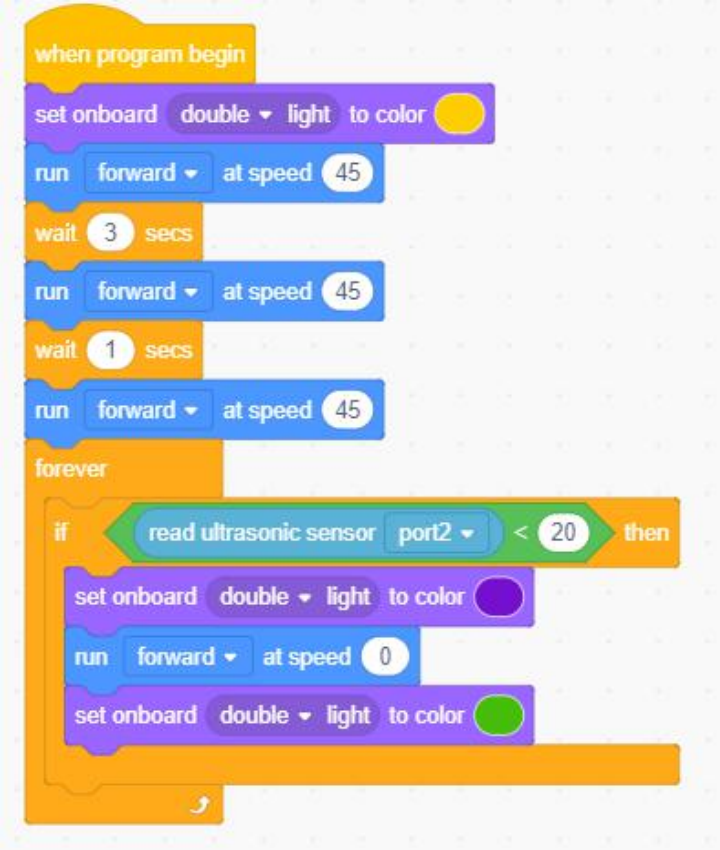


Knowledge explanation

2. In the sensor module, drag the ultrasonic sensor block to arithmetic icon.



Hands-on practice



```
when program begin
  set onboard double light to color yellow
  run forward at speed 45
  wait 3 secs
  run forward at speed 45
  wait 1 secs
  run forward at speed 45
  forever
    if read ultrasonic sensor port2 < 20 then
      set onboard double light to color purple
      run forward at speed 0
      set onboard double light to color green
```

The image shows a Scratch-style block diagram for a Q-scout parking program. The program starts with a 'when program begin' block. It then sets the onboard light to yellow, runs forward at speed 45, waits 3 seconds, runs forward at speed 45, waits 1 second, and runs forward at speed 45. Finally, it enters a 'forever' loop. Inside the loop, it checks if the ultrasonic sensor at port2 is less than 20. If true, it sets the light to purple, stops forward motion (speed 0), and then sets the light to green.

Write a Q-scout program for parking of a car onto designated space. Set an appropriate safety distance, and add onboard light and ultrasonic sensor, light color, to make the Q-scout parking process smoother.

Extends

- 1.If the Q-scout is at not a safe distance, during parking and there is a need to generate the sound, how should the program be written?
2. Try to use the remote control mode of Q-scout to operate in more complicated routes so that Q-scout can park safely and accurately.

Conclusion and reflection

1. What do the reversing radar system and automatic parking technology have in common?
2. What other technologies can help drivers to improve safety and ease traffic jams while driving?



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