Q-scout Series Course

Section 9:
《Straight Dash》

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Curriculum Objectives

Knowledge and skills (Technical)

1.Understanding the working principle and programming of line tracking sensor.

2. Ability to write the program to be used in the competition of Q-scout straight dash.

Knowledge and skills (Cognitive)

1. Enhancing students' innovational ability.

2. Enhancing the ability of doing things and level of critical thinking through the exploration of different competitive projects.

Knowledge and skills (Emotional attitude and values)

1. Ability to experience the capability of solving real life challenges by applying the learned knowledge and skills, by doing different competitive projects.

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Tomorrow, our Q-scout will participate in a special racing challenge against other racing drivers.

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Curriculum Introduction

But the biggest challenge of this racing event is the rule that asks the drivers to stop their car immediately, before the end line, even at the maximum possible speed, without touching the end line. What makes this racing challenge distinguished from other racing events is the examination of critical and quick decision making abilities of the racing-drivers, a very tough challenge for the Q-scout too.

As the friend of Q-scout, let us think of some ideas to help Q-scout out there. As we have to cogitate and solve the biggest question:

How a rapidly rushing Q-scout will be able to know that whether it has reached to end line or not, if we want to win the race.
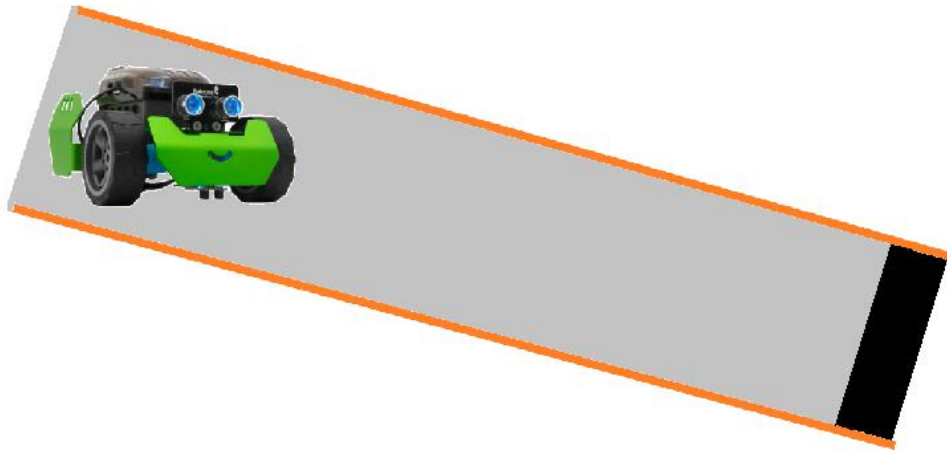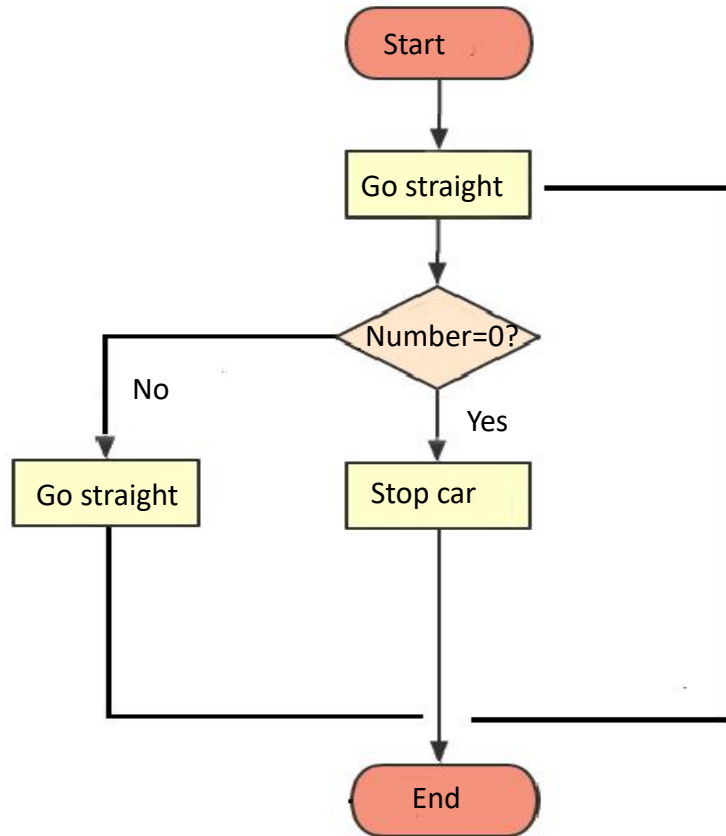
Knowledge Explanation

Okay.., now let's recall the lesson of Line Tracking Sensor that we have already learned about, as mentioned in the curriculum. The sensor can track the black or white line, so, can this idea help our Q-scout to quickly detect the End Line and eventually help winning the race? Yes! Definitely!

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        ┌──────────┐
        │  Start   │
        └────┬─────┘
             │
        ┌────▼──────┐
        │ Go straight │──────────────┐
        └────┬──────┘                │
             │                       │
          ◇────────◇                 │
   No   ╱ Number=0? ╲  Yes           │
  ┌────◇            ◇────┐           │
  │     ╲          ╱     │           │
  │      ◇────────◇      │           │
  │                      │           │
┌─▼─────────┐      ┌─────▼─────┐     │
│ Go straight │      │ Stop car  │     │
└─┬─────────┘      └─────┬─────┘     │
  │                      │           │
  │                      │           │
  └──────────┐  ┌────────┴───────────┘
             │  │
          ┌──▼──▼──┐
          │  End   │
          └────────┘
```

The numerical value that both the line tracking sensors (fitted on left and right sides) will return is 0 after the detection of the end line, so when the receiver tubes of sensors return 0, the bot should immediately be stopped. Though, in sprint phase the Q scout returns 3.

Hands-on practice

   In this task, when the Q-scout meets the end line upon the detection of the black line by the line tracking sensor, the STOP command should be immediately executed by the Q-scout.

   But since the object has inertia, it is the nature or attribute that maintains the original state of motion unchanged, so when the Q-scout encounters the end line, it still advances to a certain distance before it gets to stop.

Hands-on practice
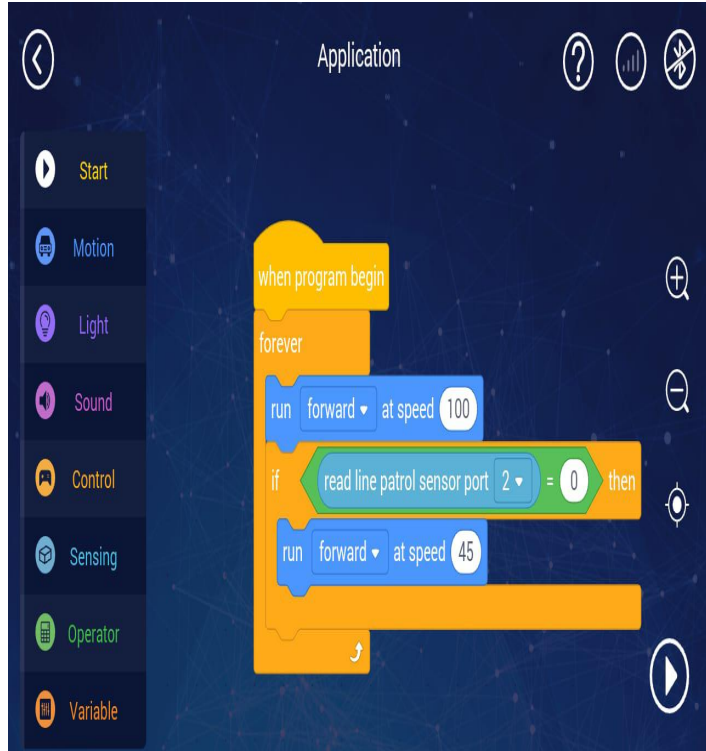
So, now, as per the design of the flowchart, write a program for the Q-scout to go straight for all the sprint phase and stop the Bot immediately when it reaches to the end line and help the Bot to win the race.

Extends

At the end of the programming, when the Q-scout has stopped after reaching to the end line, try adding some sound and lighting effects to mark the celebration.

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1. In addition to the line tracking sensor, is there other methods available to stop the Q-scout immediately before the End Line?

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