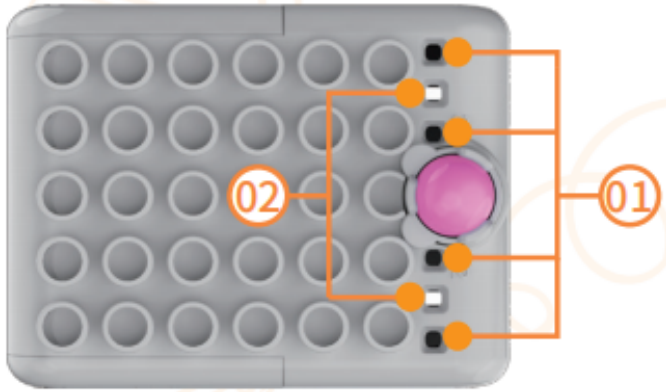
Course Review

1.Line sensor

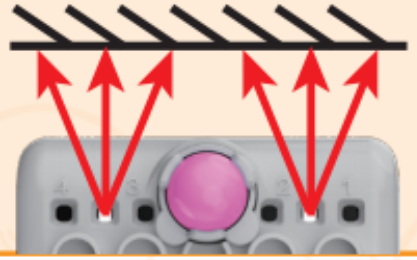
The Superbot Robot is equipped with a four-way line-following sensor that can detect black lines.



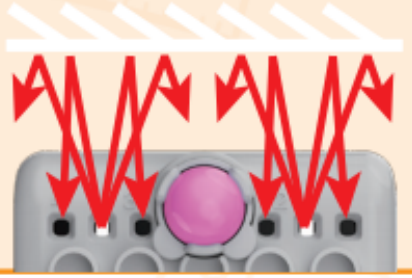
01. sensor receiving tube

02. sensor transmitting tube

When the ground is black, black absorbs all the light, causing the light to not reflect.
Therefore, the sensor receiving tube cannot receive the signal light from the sensor transmitting tube.

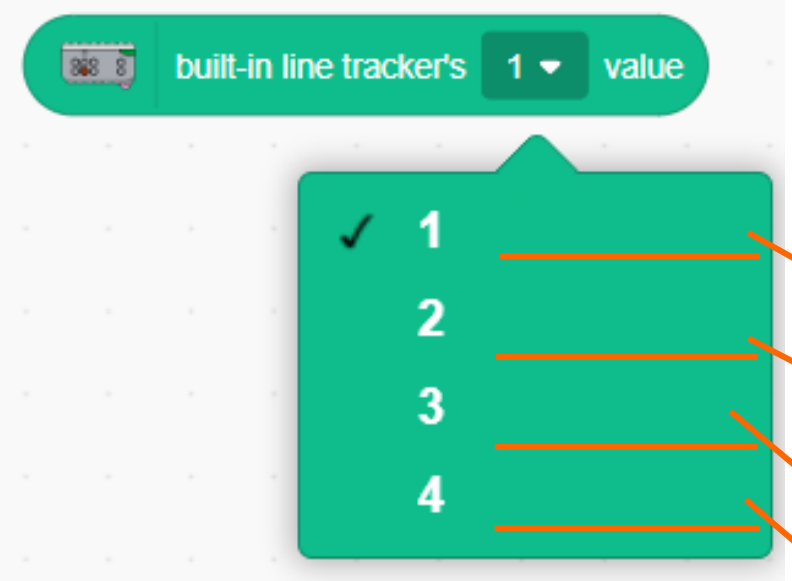


When the ground is white, white reflects all the light.
So the sensor receiving tube can receive the signal light from the sensor transmitting tube.

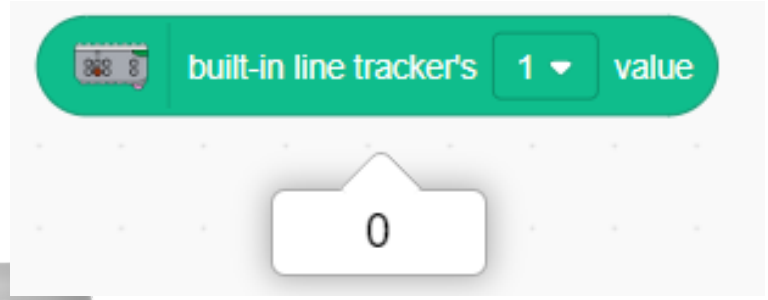


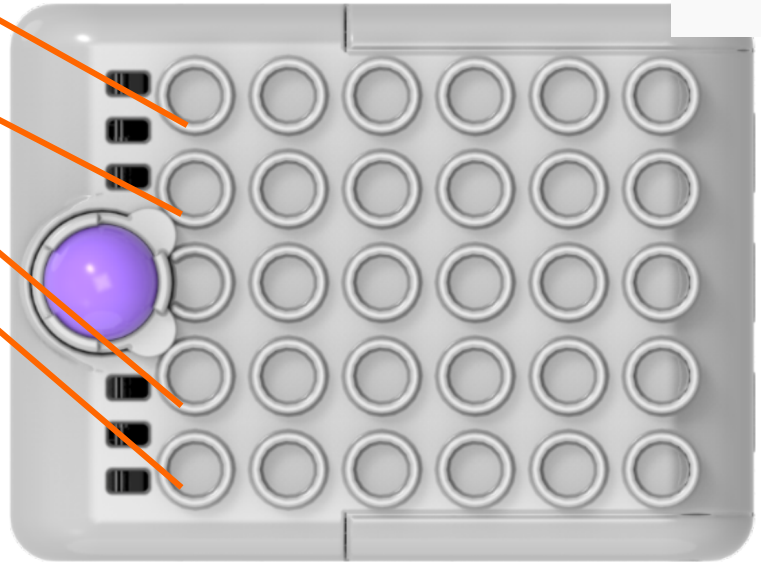
Course Review

2. Program module



You can read the value of the specified sensor.





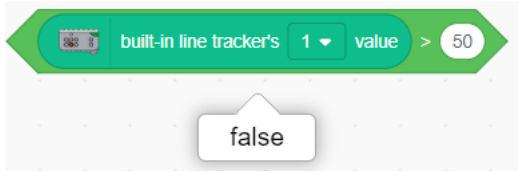
Course Review

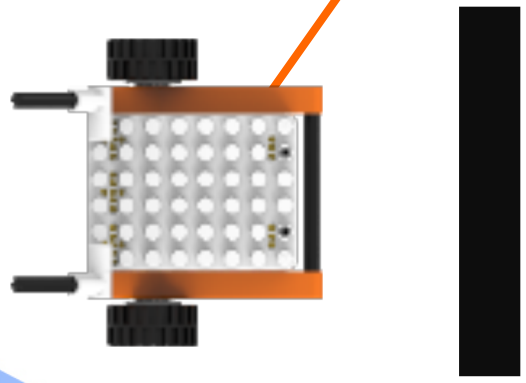
You can check if the monitored value is greater than a specified threshold. If it is, output true (yes); if not, output false (no).

For ex

0 is not greater than 50, so the output is false.

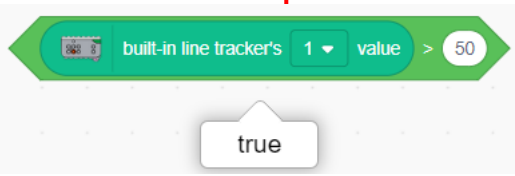
power: 36*25%
six axis gyroscope: -0.23*-0.72*-81.57
superbot mini track: 0*0*0*0
light: 65
superbot mini motor: 0*0*0*0*0*0*0*0*0*0*0*0
mic: 0
simulating sensor: 0*0

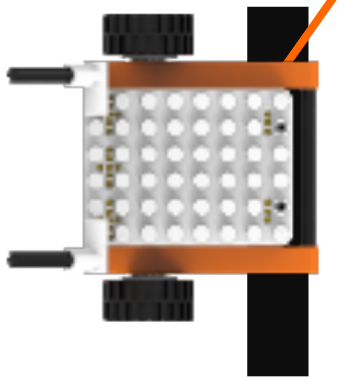




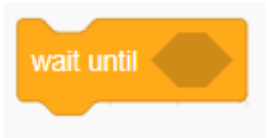
51 is greater than 50, so the output is true.

power: 36*25%
six axis gyroscope: -1.22*-0.20*-105.71
superbot mini track: 51*56*52*28
light: 63
superbot mini motor: 0*0*0*0*0*0*0*0*0*0*0*0
mic: 0
simulating sensor: 0*0

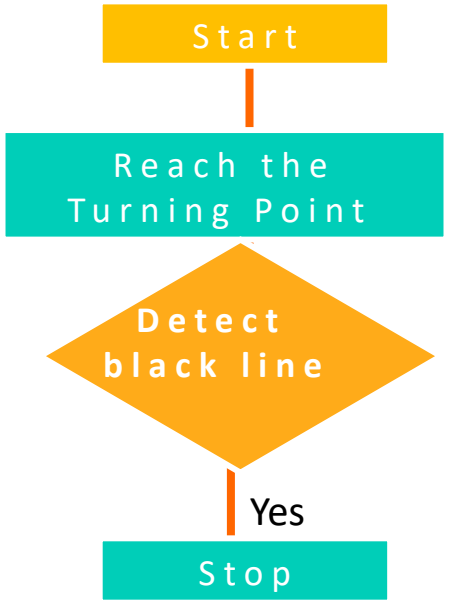


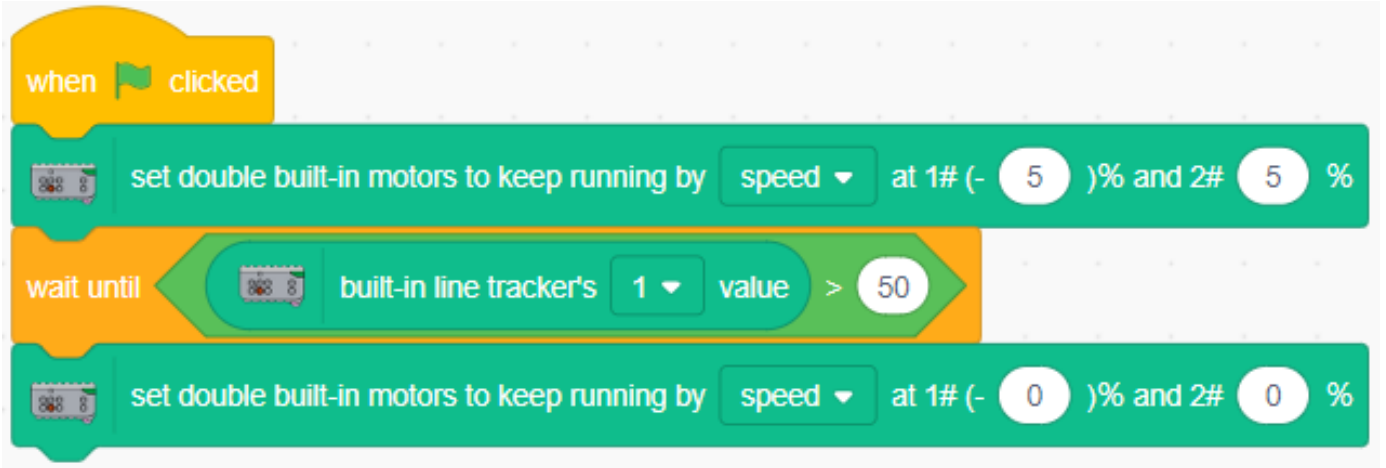


Course Review



Make the program wait until the specified condition is met before executing the next module.

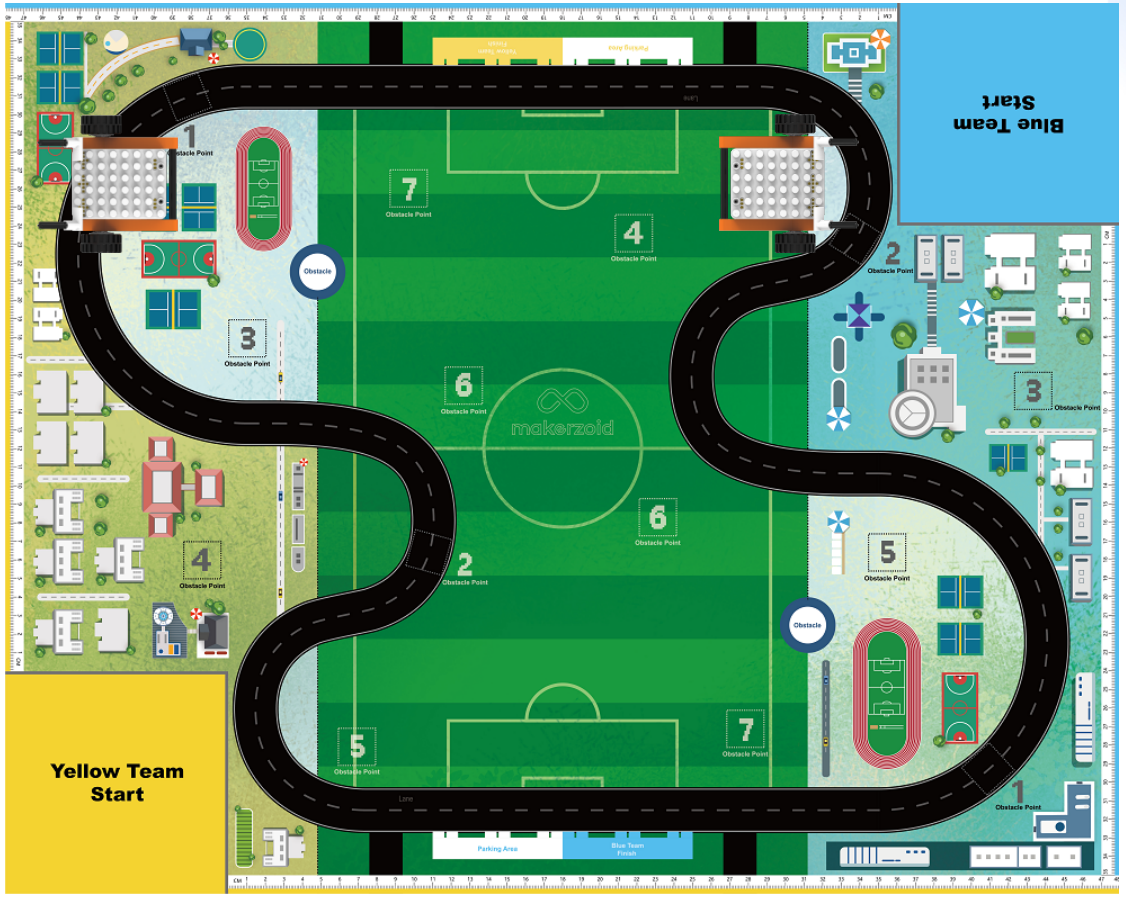




Course Review

3. Finish the competition

You need to set the waiting time according to the actual conditions.



Please use your own kit.

Do not put any parts in your mouth.

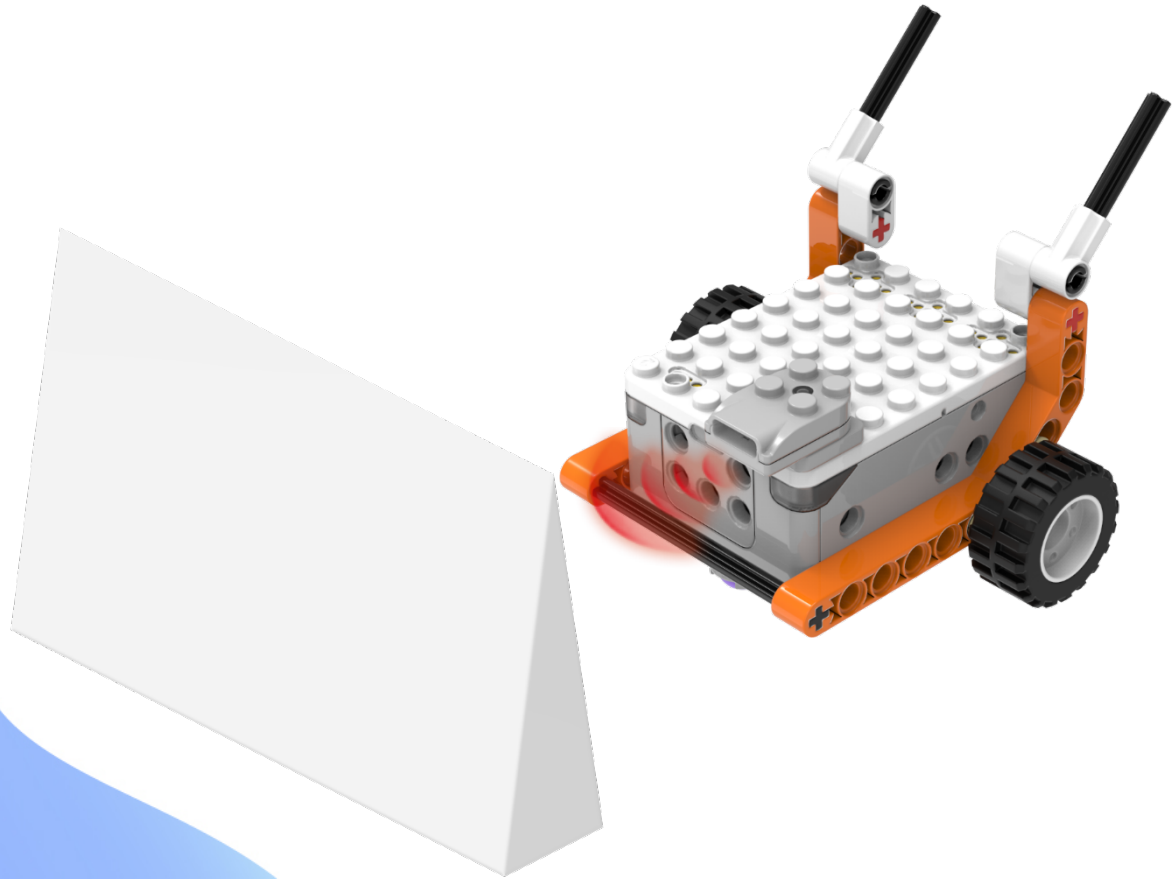
Please clean up after use.

Please raise your hand if you have any questions.

INTRODUCTION

Scenarios

In the previous lesson, we used line-following sensors to detect the black line and stop the robot. So how should the robot detect obstacles when they are in front of it?



Dear kids:

What sensor can we use to make the robot detect obstacles?

How can we program the car to stop when it encounters an obstacle?

Let's embark on our exploration journey through "obstacle detection"!

暗物智能
DARKMATTER AI

Obstacle Detection

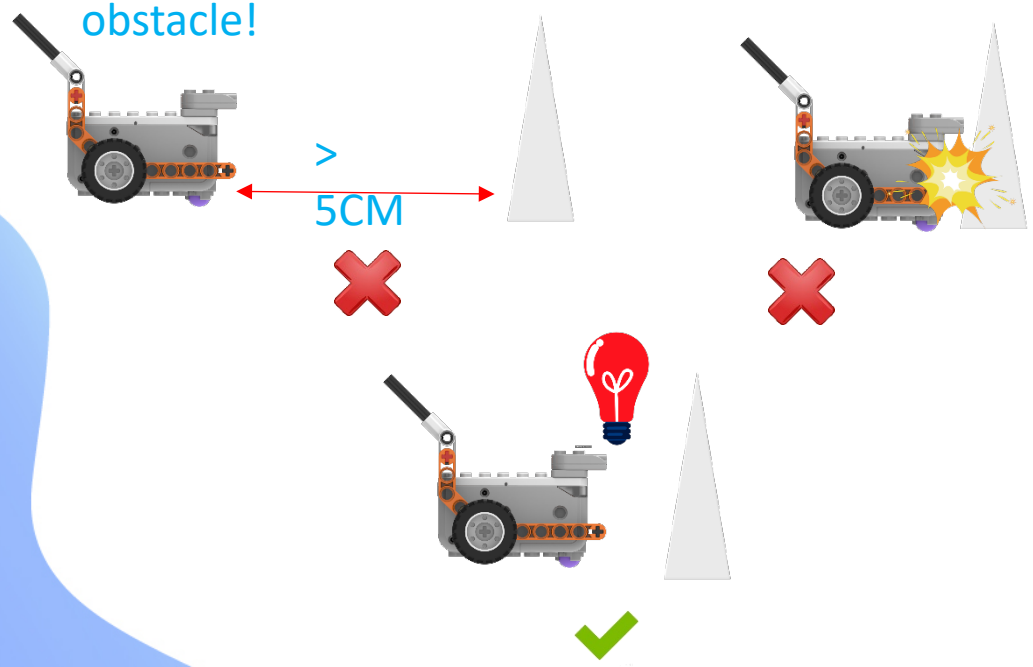
AI Courses

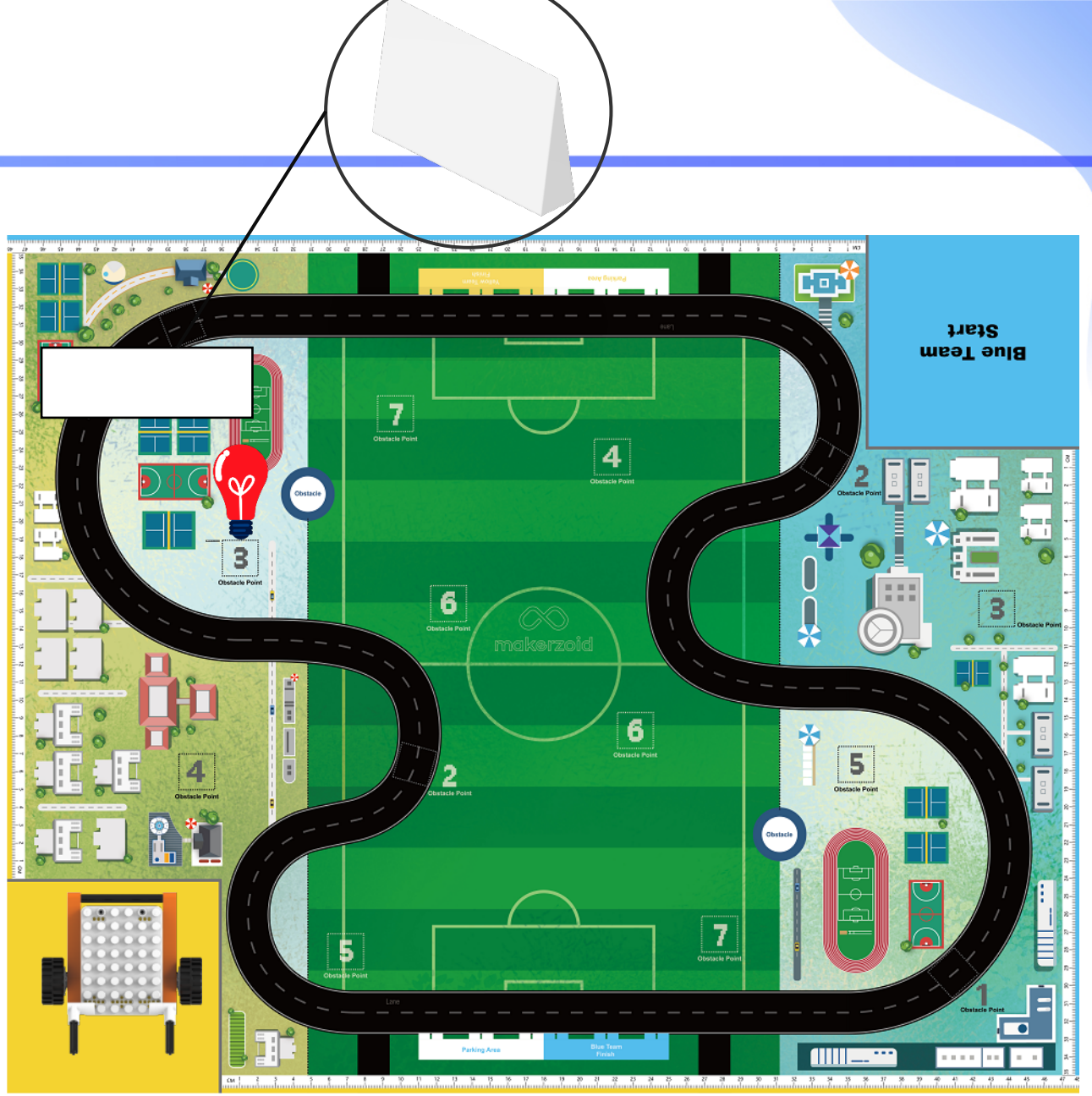
Scenarios

Competition rules:

1. The contestant's car will start from the starting point, stop within 5 centimeters of the obstacle, and turn on the red light.

2. Let's see who can accurately detect the obstacle!





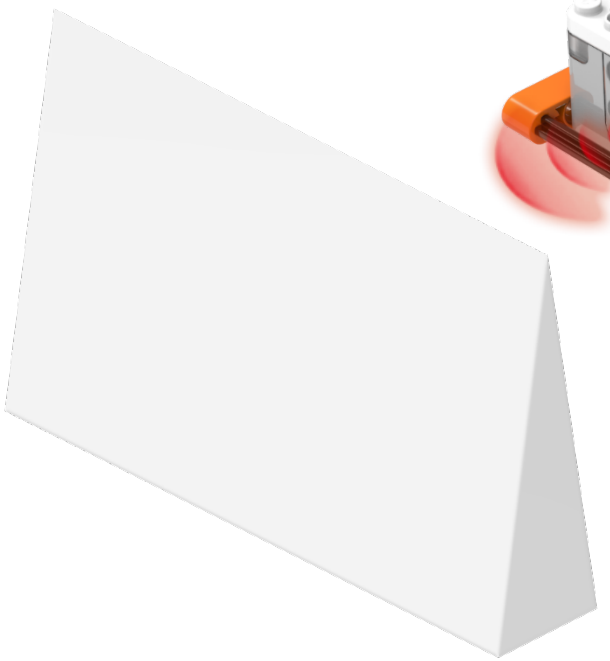
Scenarios

Question ：

Dear kids, do you know:

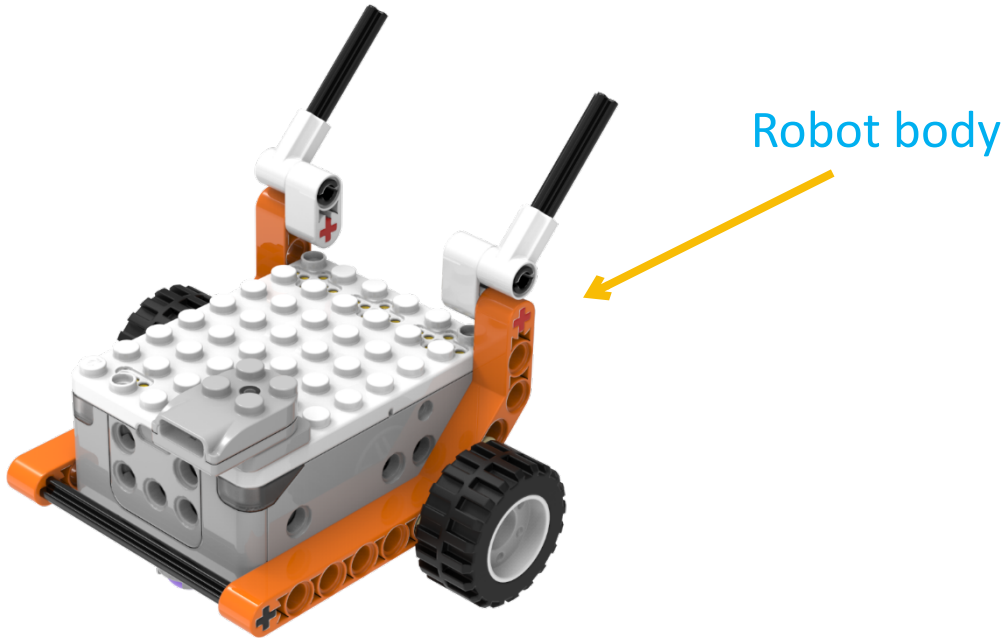
What sensor can we use to make the robot detect obstacles?

How can we program the car to stop when it encounters an obstacle?



Scenarios

Today, everyone is a junior engineer. Let's work together to complete the obstacle detection course!

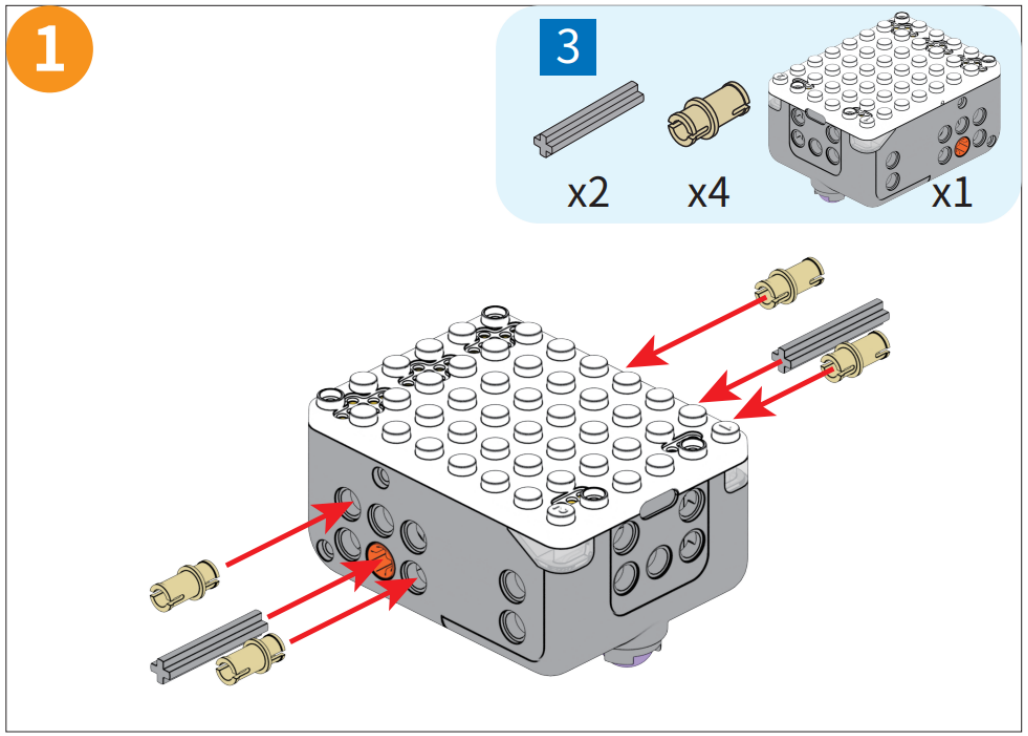


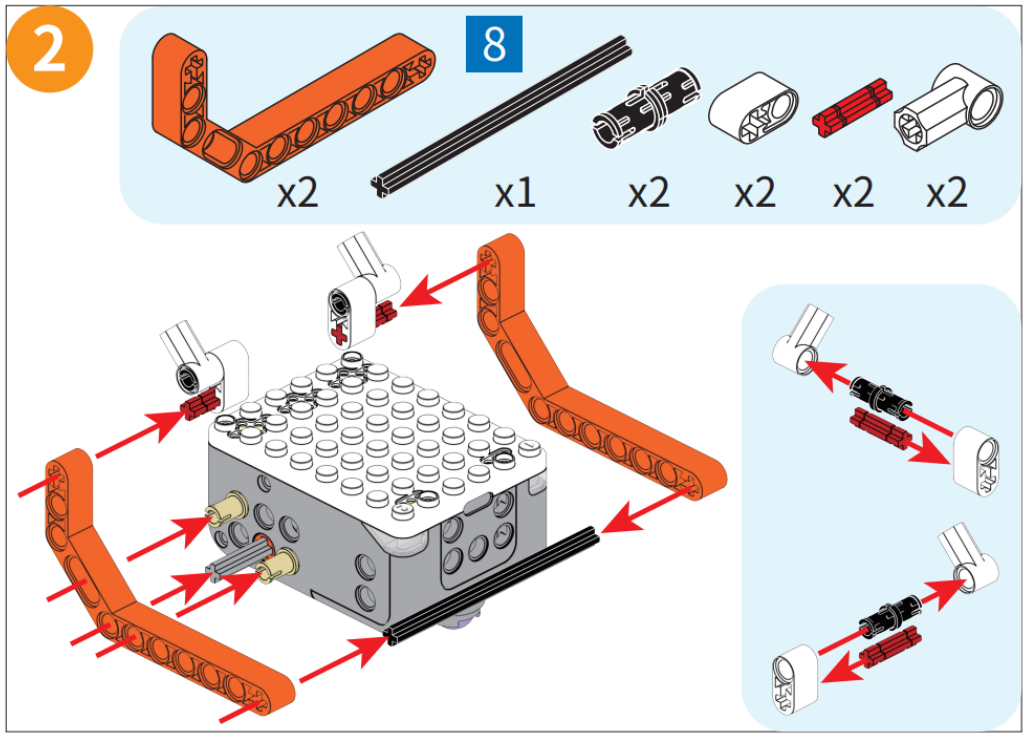
ASSEMBLY

The Final Model

Building the components and assembling them with the robot's main body

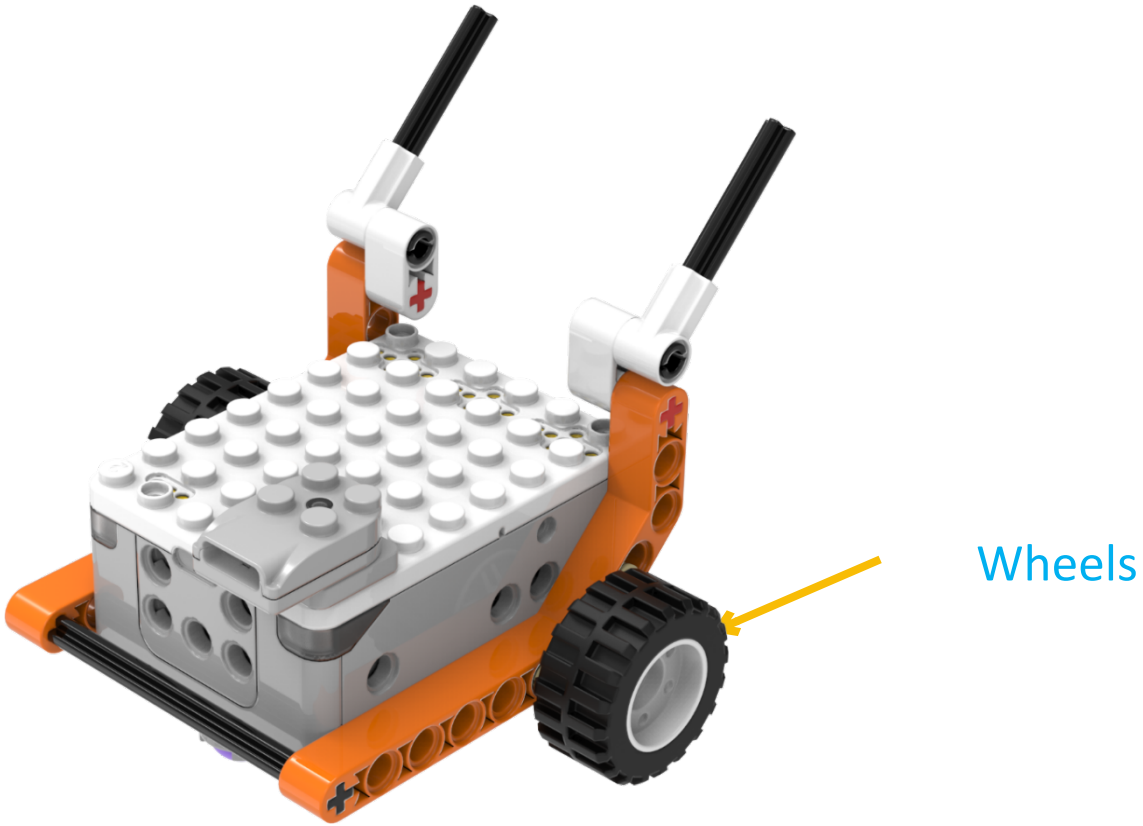
Assembly



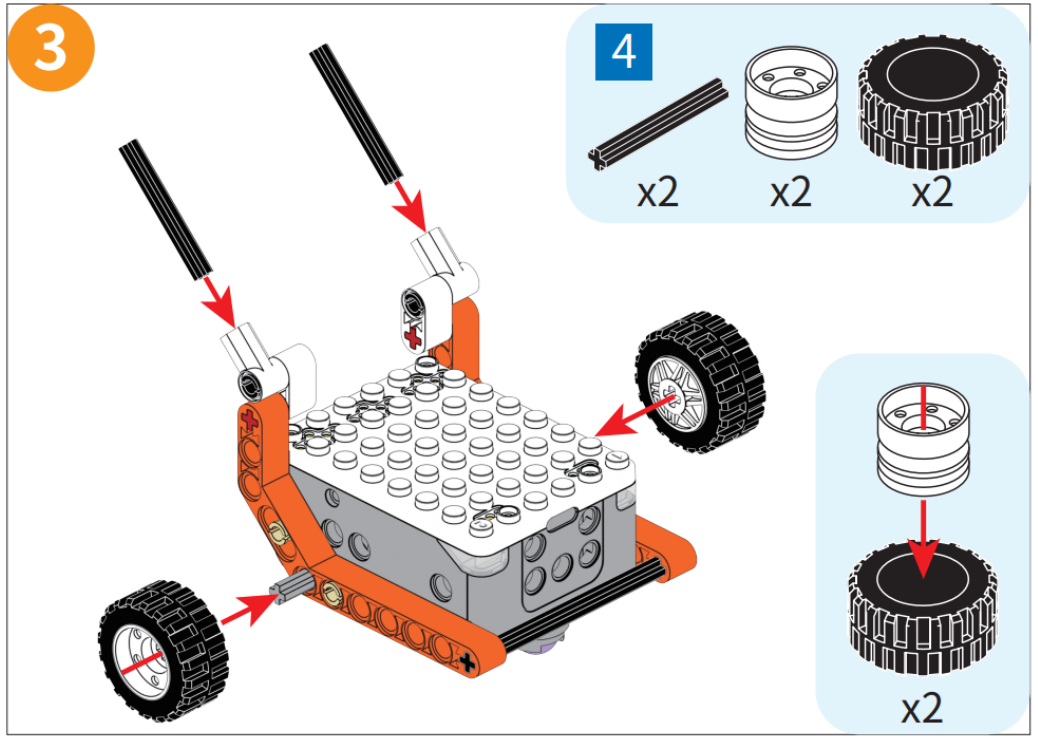


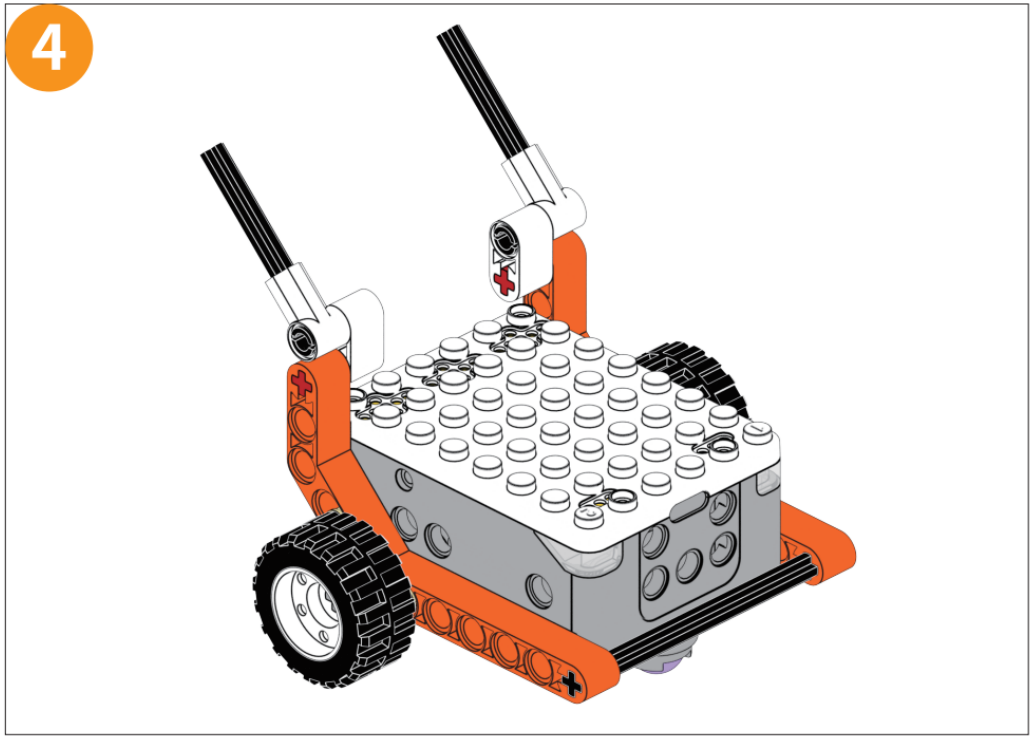
Assembly

Assemble the wheels



Assembly

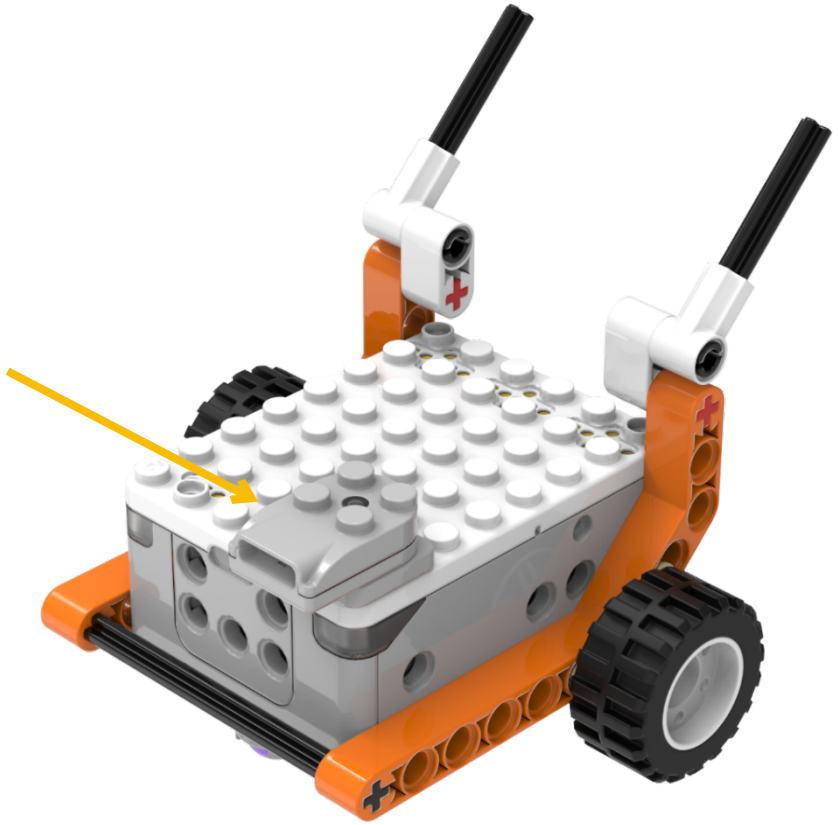




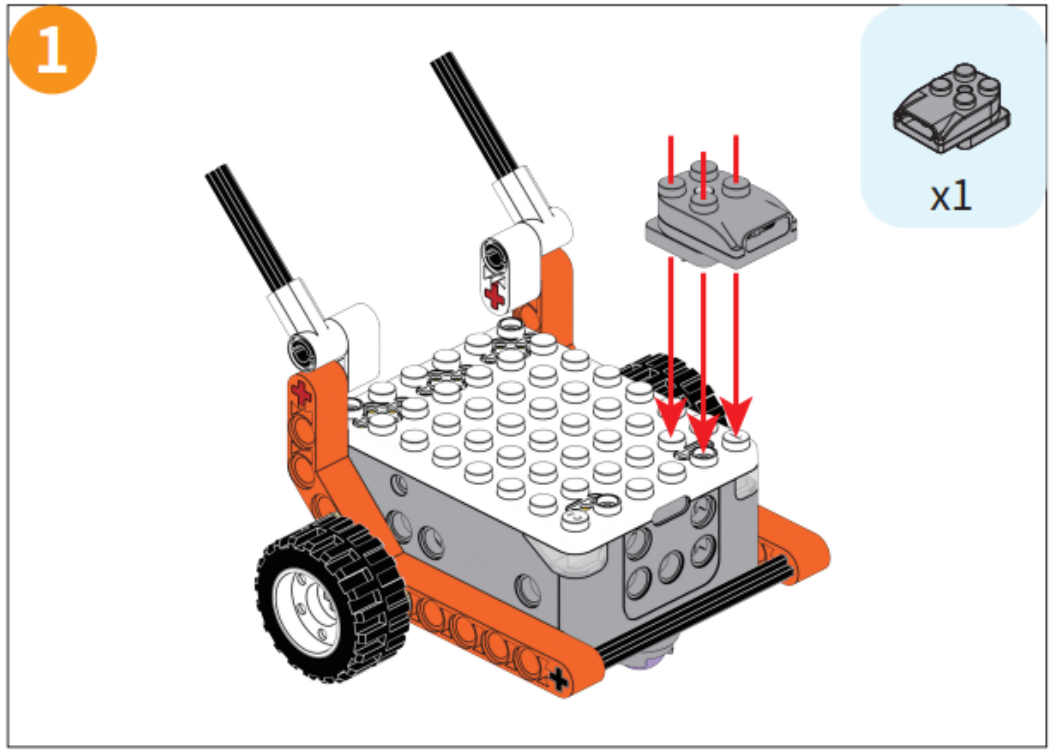
Assembly

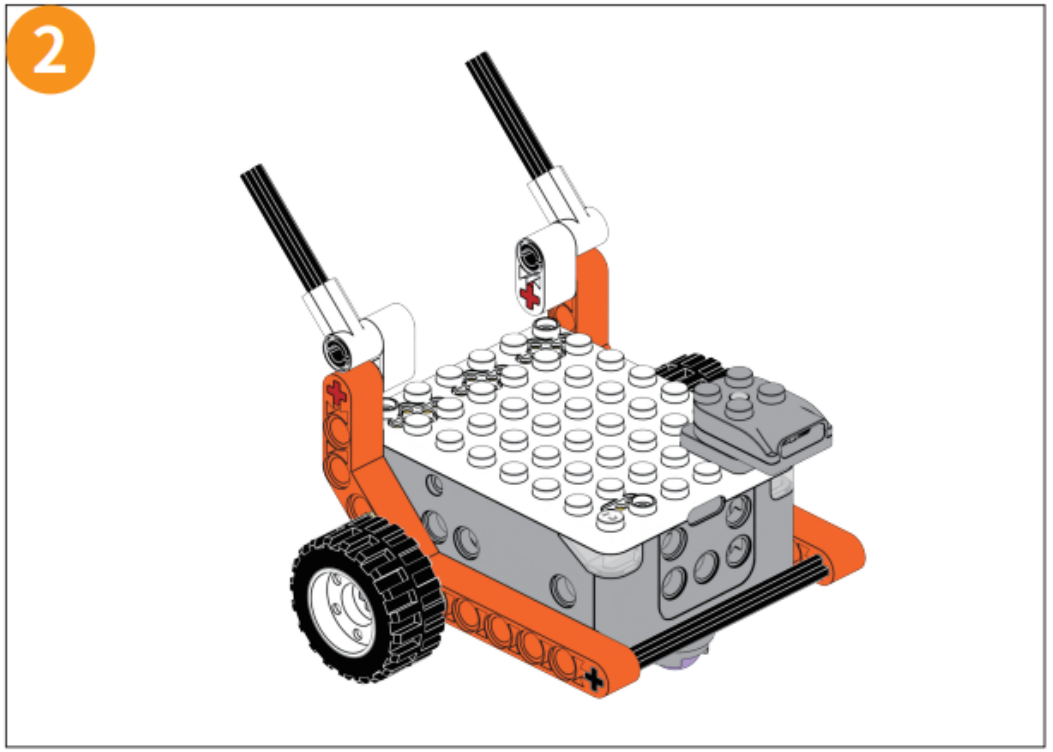
Assemble the rotary IR sensor

Rotary IR sensor



Assembly



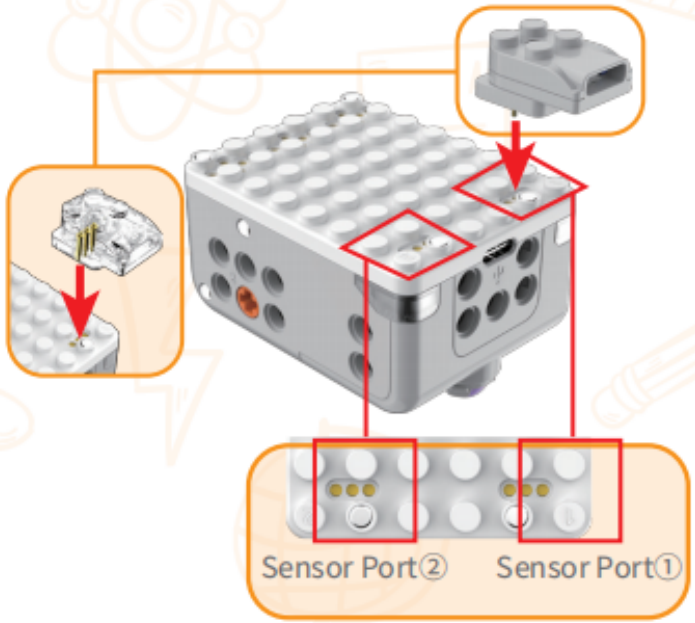


PROGRAMMING

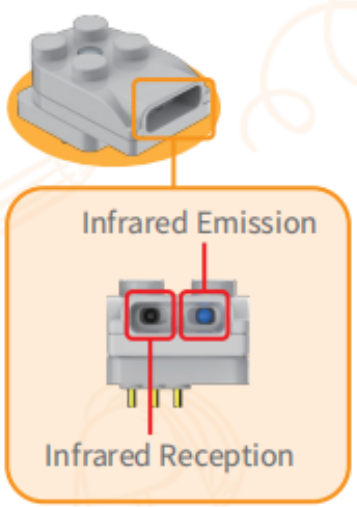
Introductions

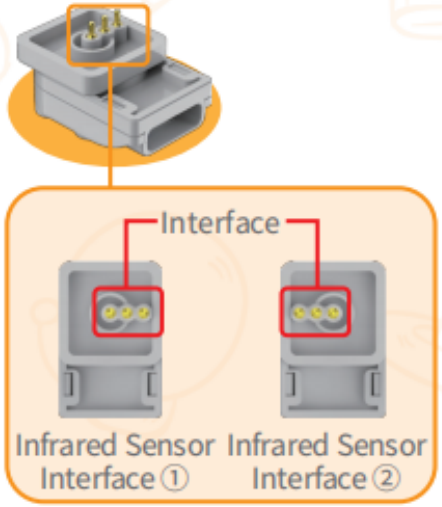
The infrared distance sensor

The infrared distance sensor uses the principle of infrared light to determine the distance to an obstacle. The sensor has two small "eyes" or parts: one for emitting the infrared light and the other for receiving it.

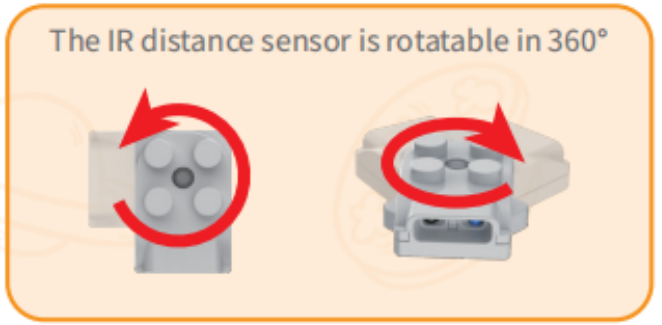


The infrared distance sensor uses the principle of infrared light to determine distance and obstacles.
There are two eyes inside the sensor, which are responsible for transmitting and receiving.



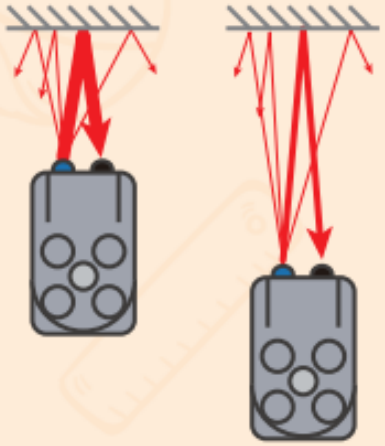


Notice:
When removing the sensor connector, please use a removal tool (Splitter) and avoid forcing it.



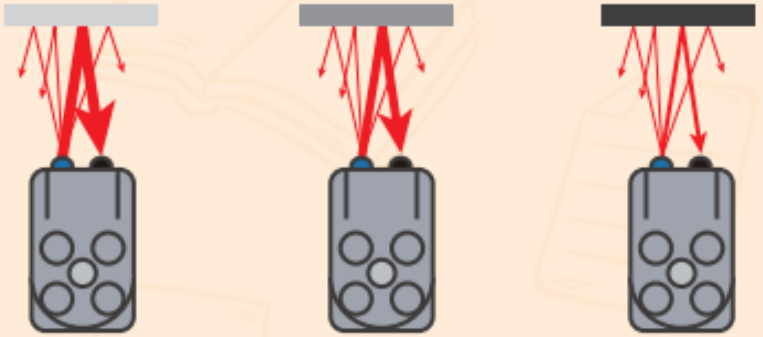
Introductions

Distance Measurement



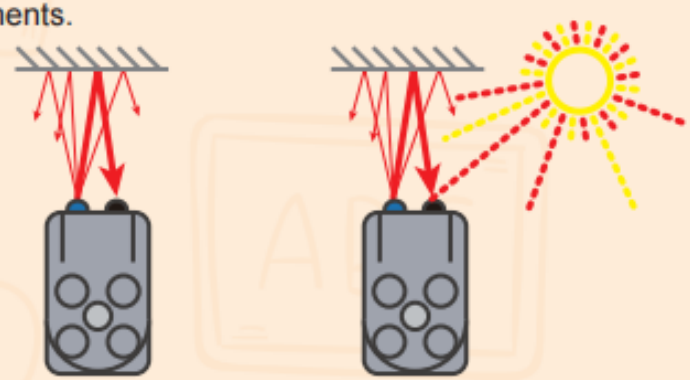
Color Reflection

The color of reflective surfaces affects the intensity of reflected light. The darker the color, the weaker the reflection, while lighter colors result in stronger reflection.



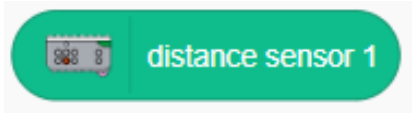
Influence of the sunlight

Sunlight contains intense infrared light, which can affect the sensor's reception of infrared light and lead to sensor misjudgments.

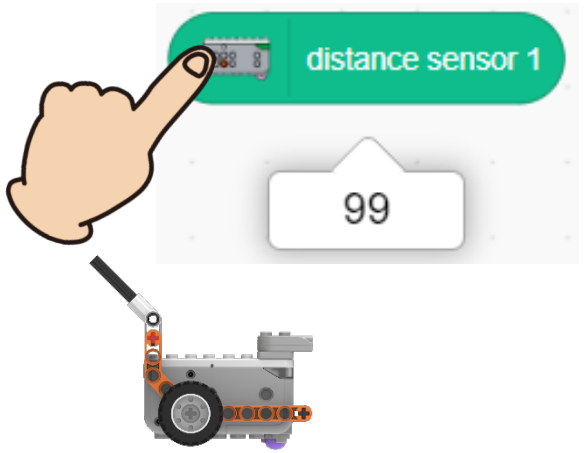


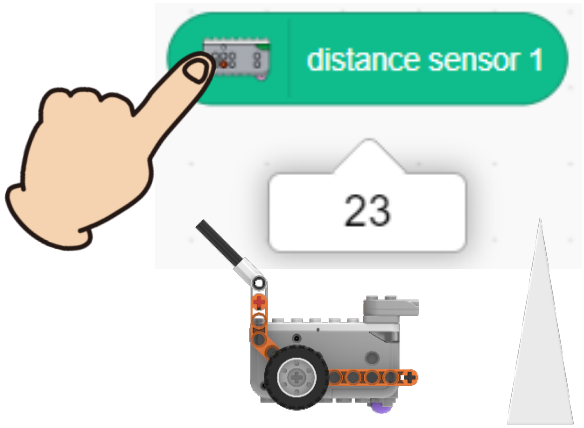
Introductions

Module Explanation

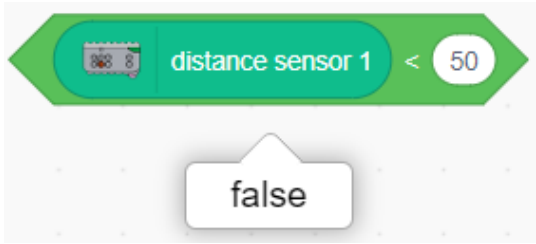


The values from the infrared sensor can be read.

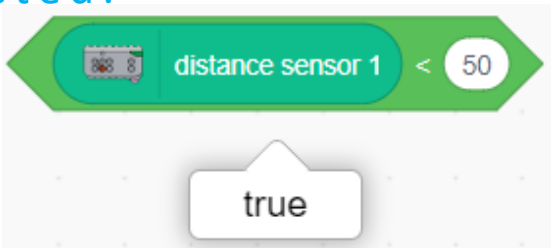




When no obstacles are detected



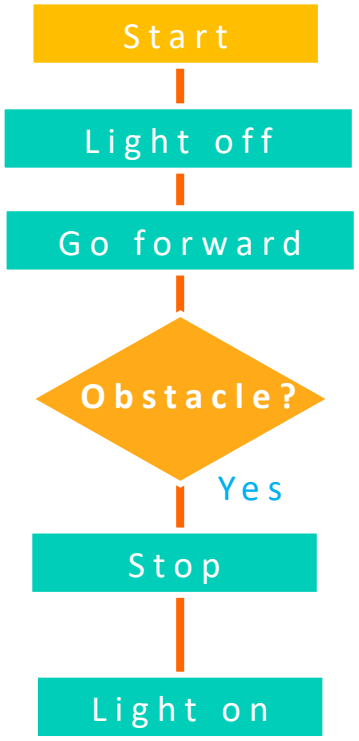
The values decrease when an obstacle is detected.

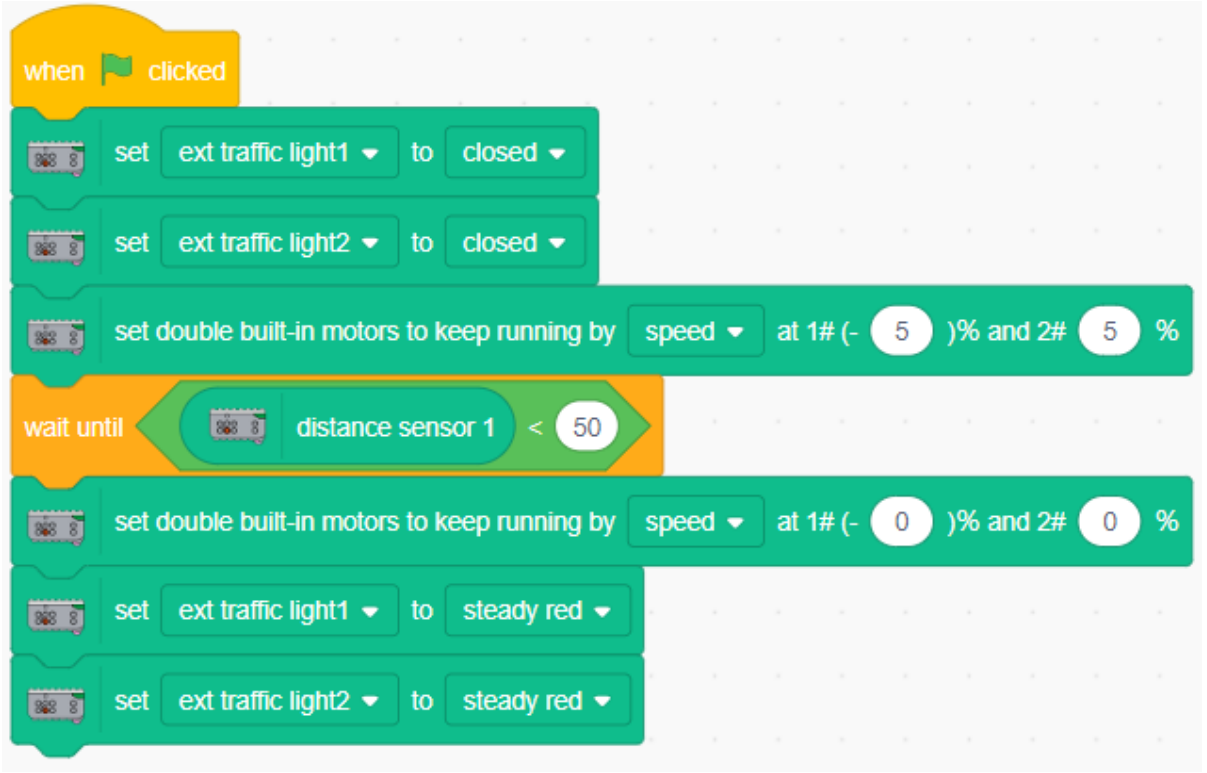


Introductions

Program Explanation

They enable the robot to determine whether there is an obstacle ahead.

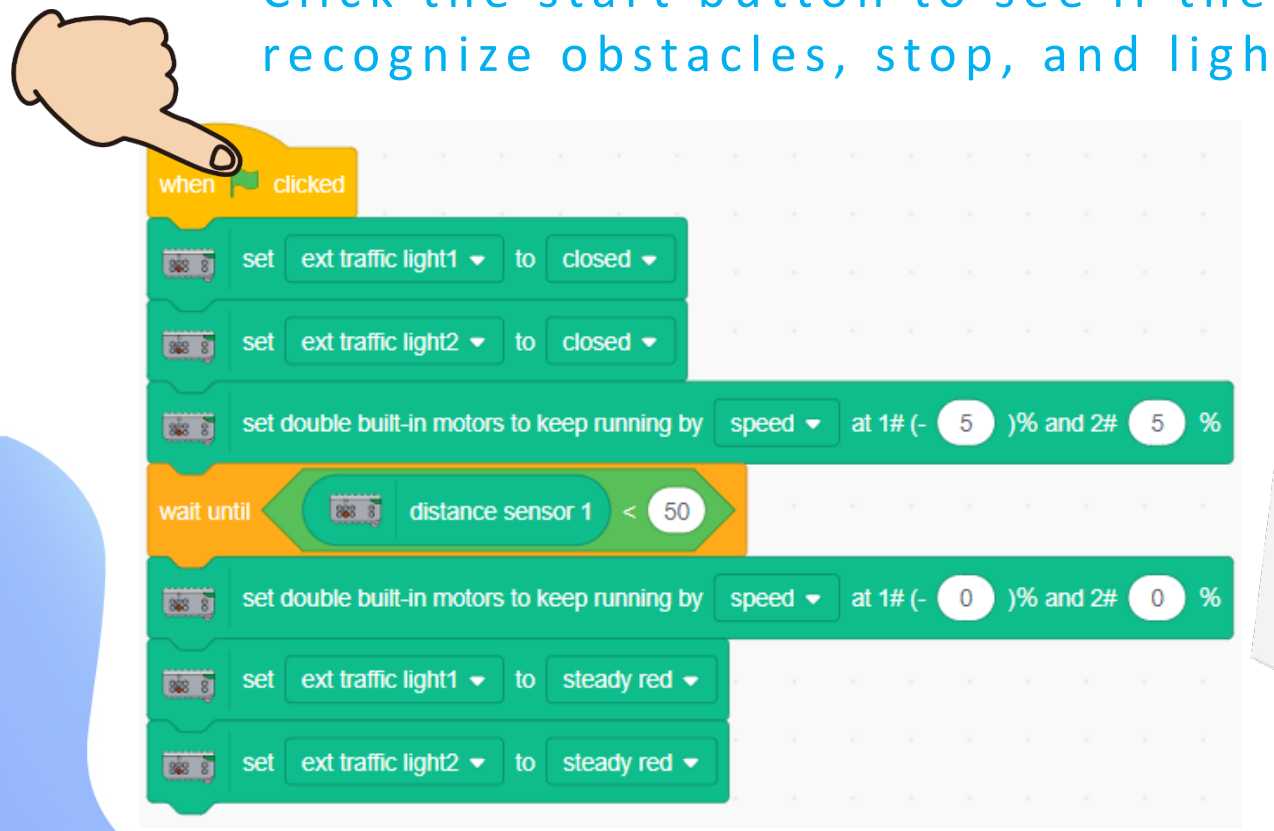


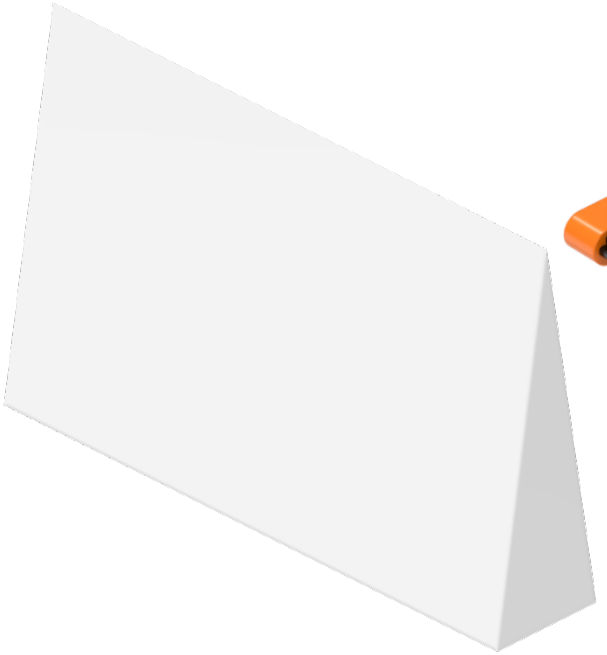


Play and Try

Try It Out:

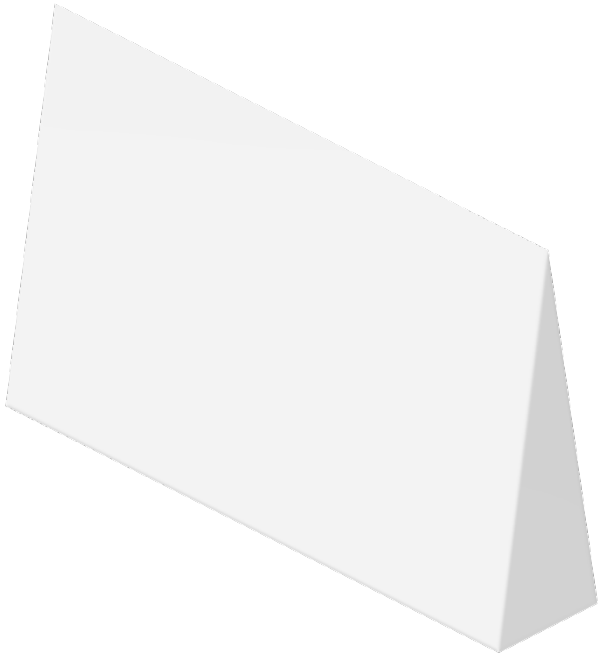
Click the start button to see if the robot can recognize obstacles, stop, and light up





Play and Try

The contestants are ready. Let's see who can identify the obstacles and stop!

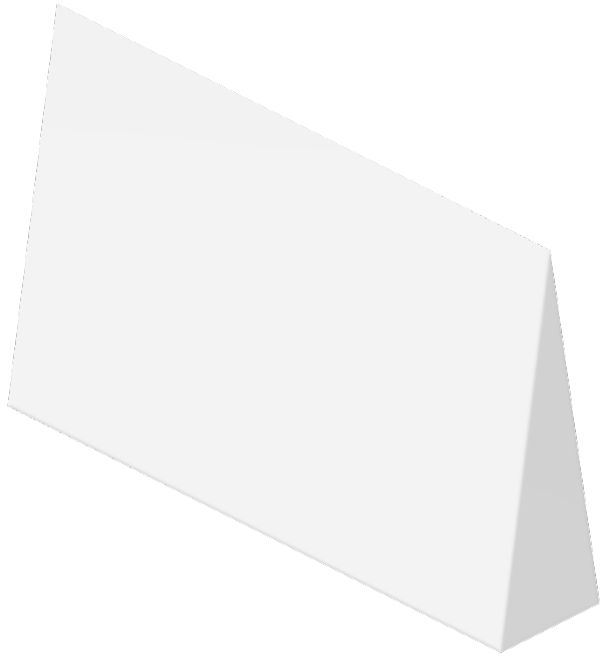


Kids, is there a way to make the robot even stronger?

CREATION

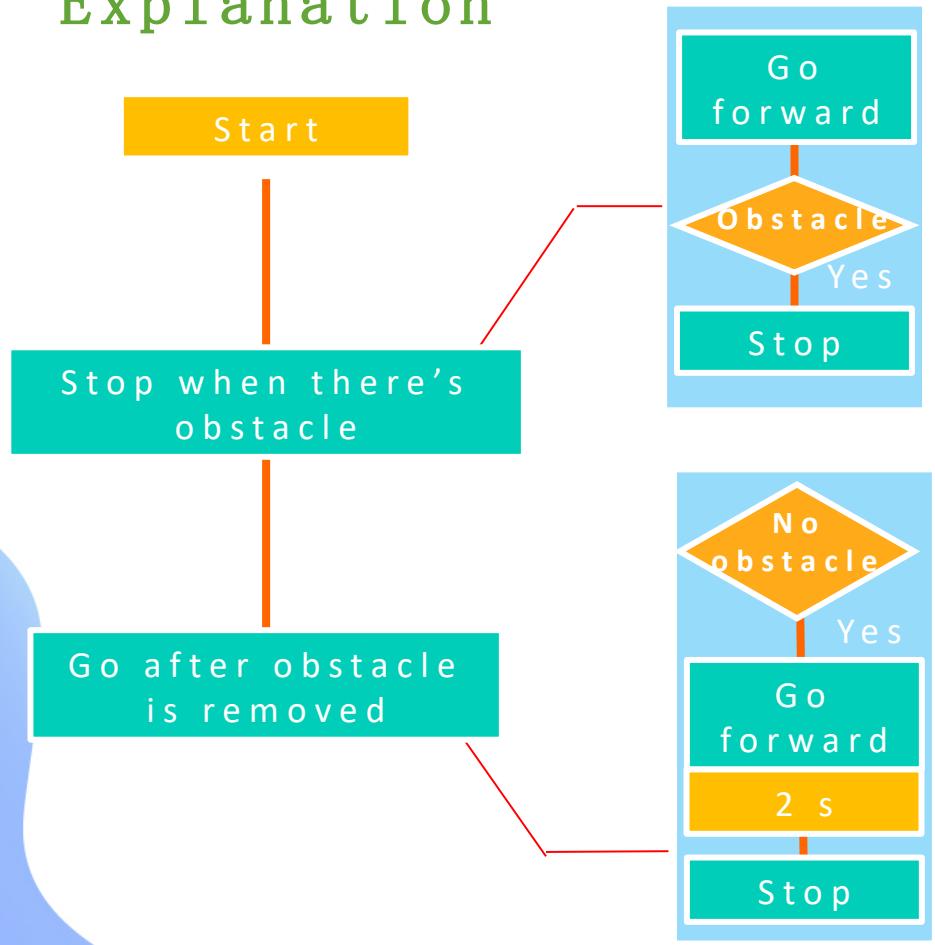
Create

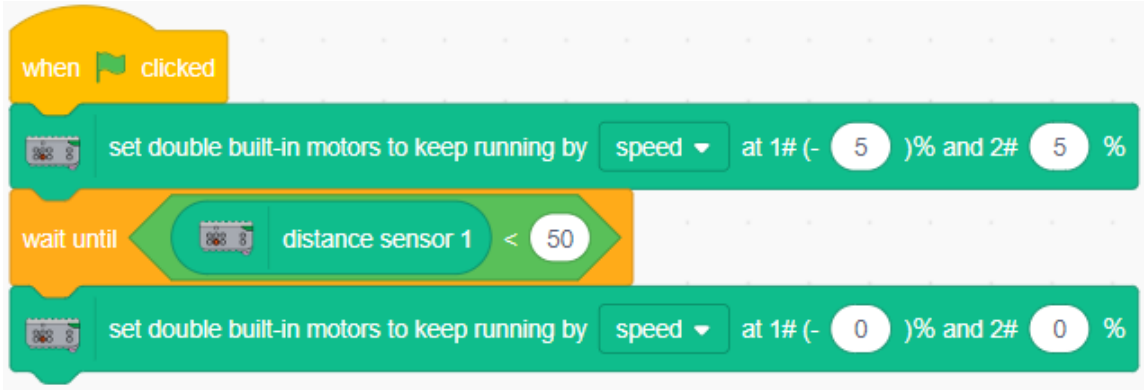
1.Have the robot stop when there are obstacles and move forward when there are none

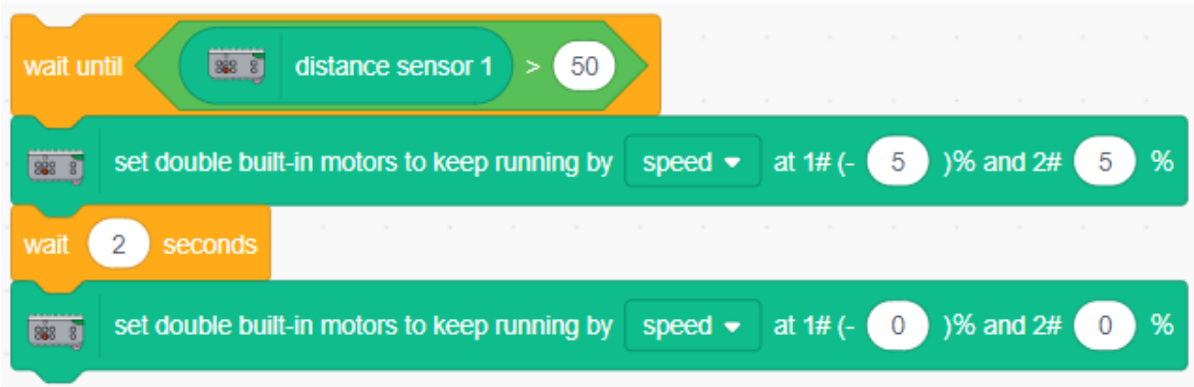


Introductions

Program Explanation

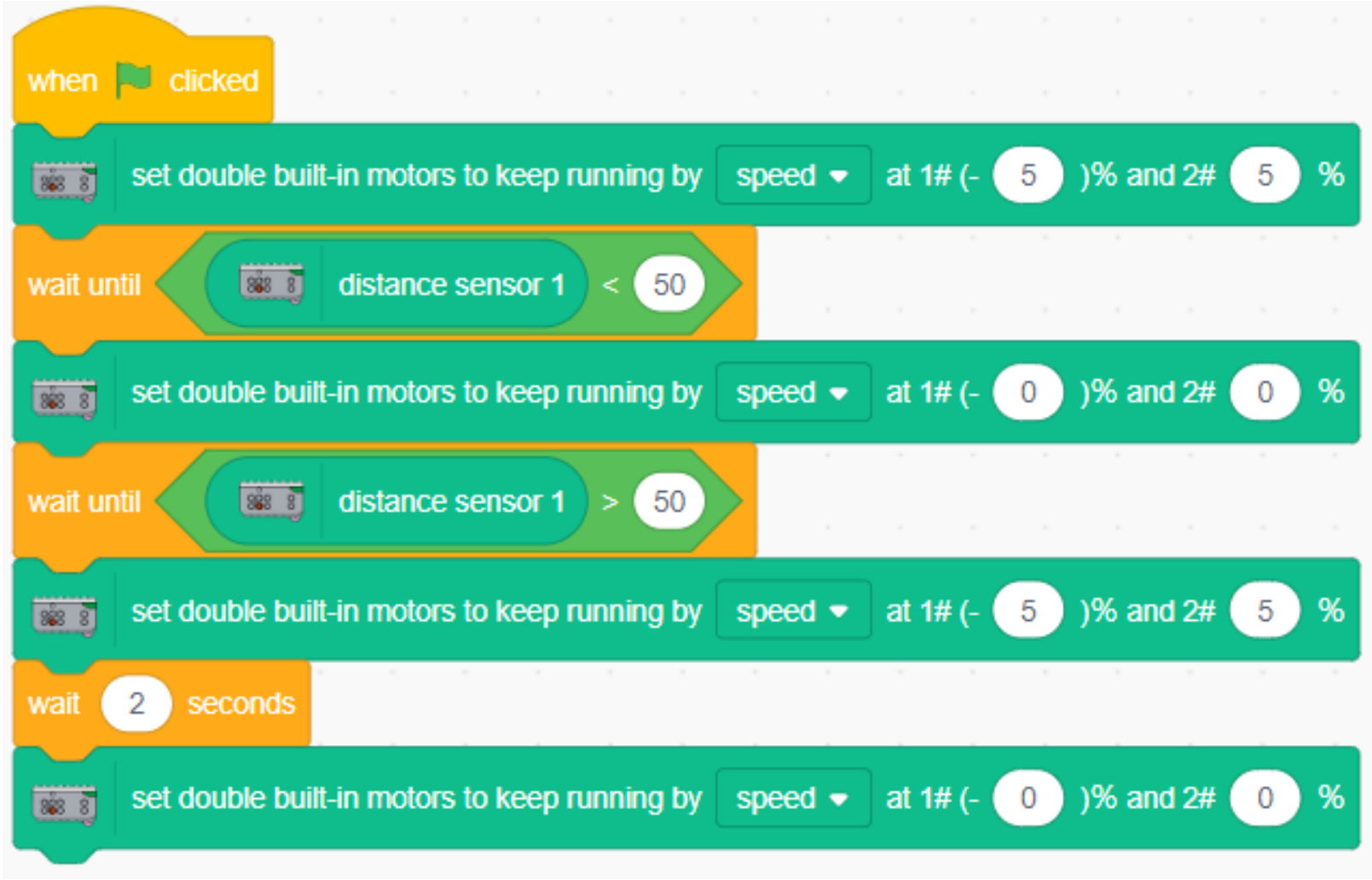






Introductions

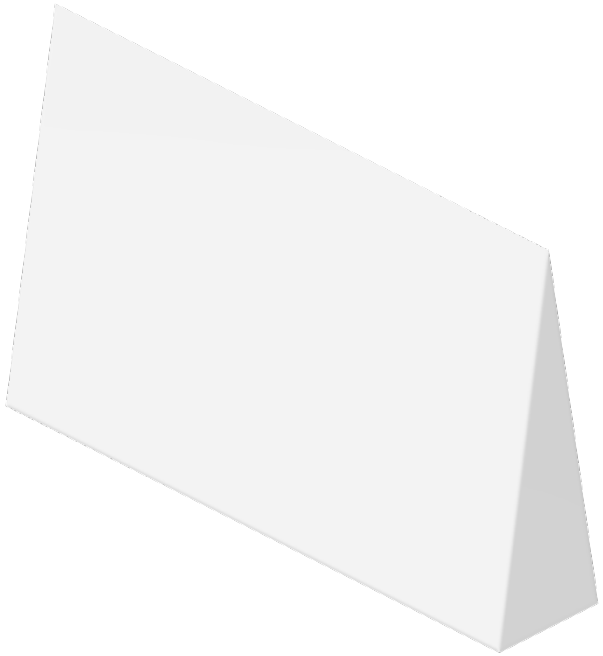
Program Explanation



Create

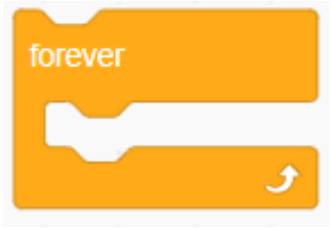
2.Make the vehicle repeat this function

Stop when there are obstacles, and move forward when the obstacles are gone

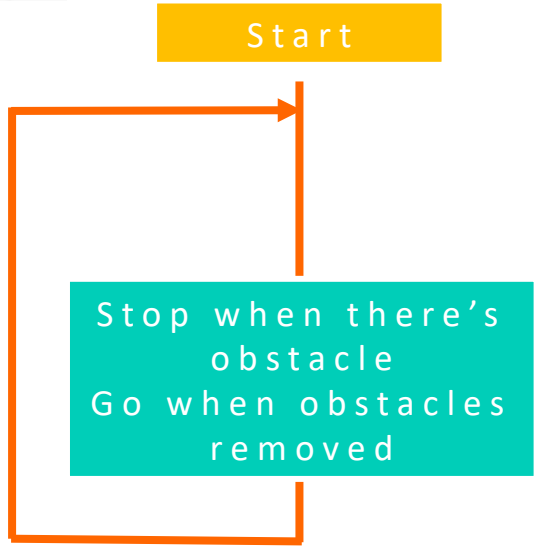


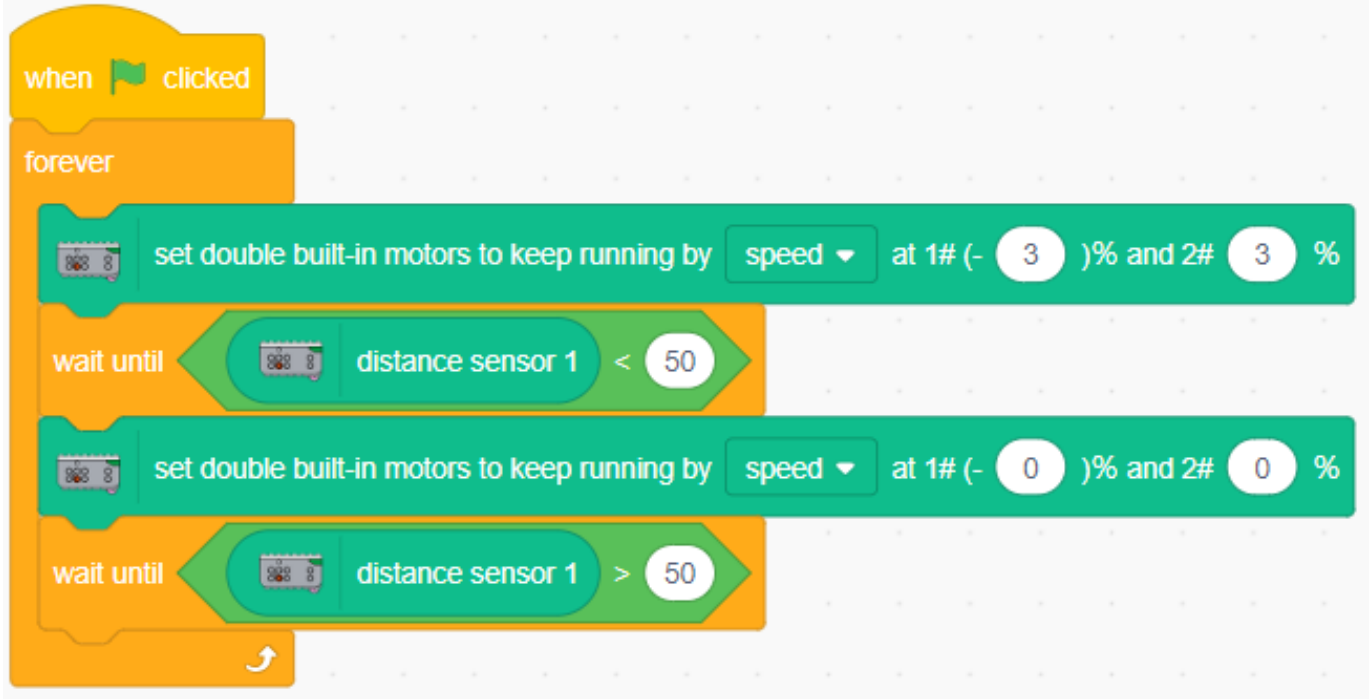
Introductions

Program Explanation



Can make the robot work repeatedly.

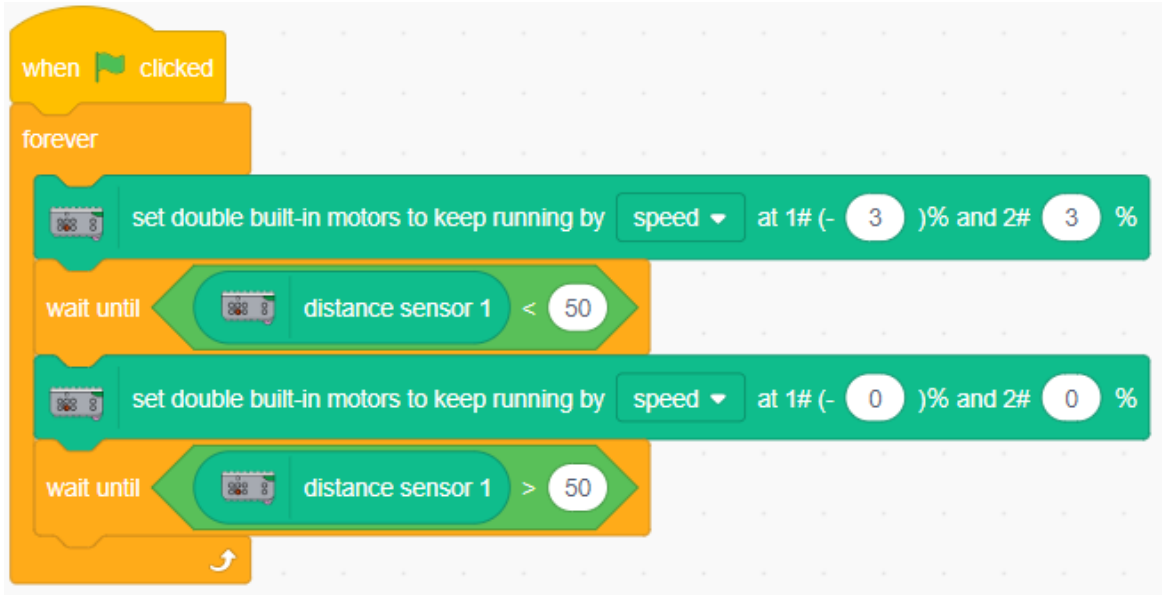


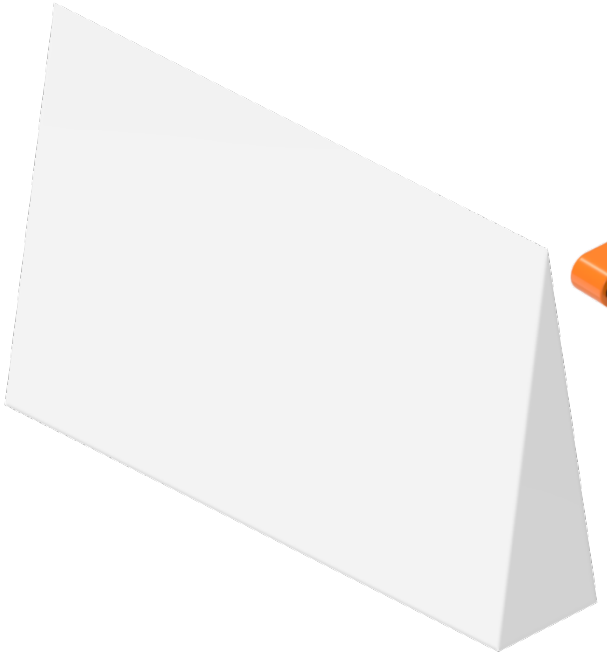


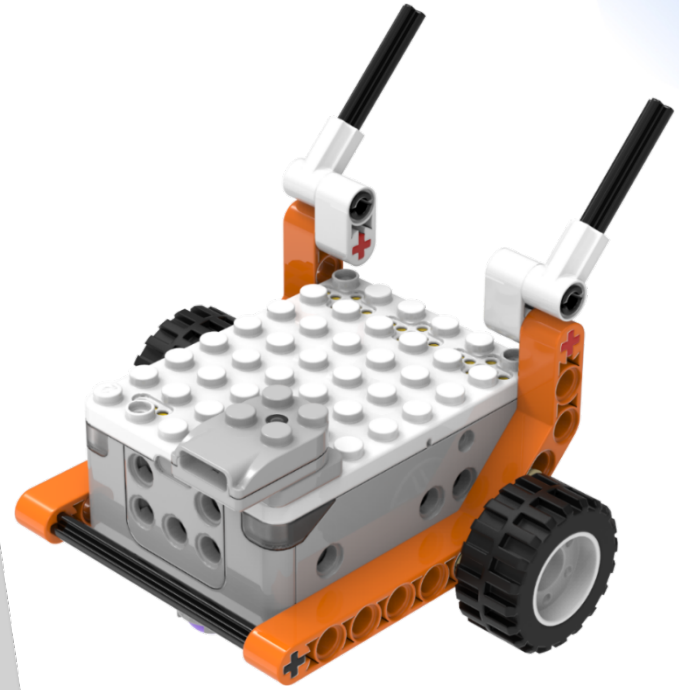
Create

2.Make the vehicle repeat this function

Stop when there are obstacles, and move forward when the obstacles are gone





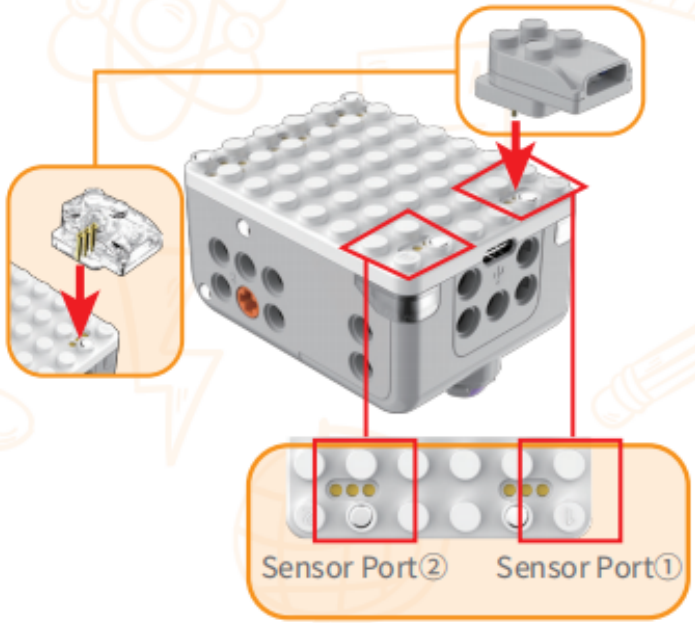


SUMMARY

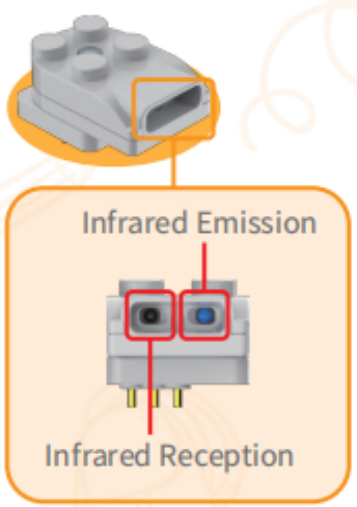
Summary

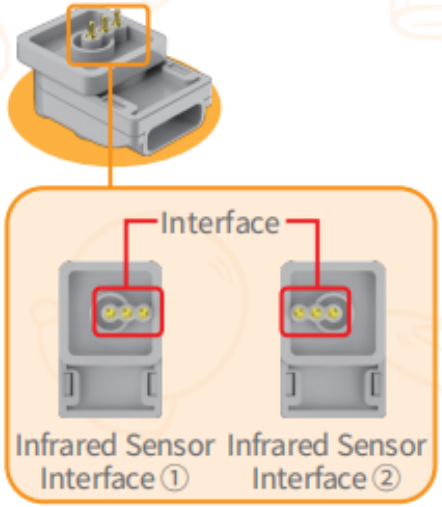
1. The infrared distance sensor

The infrared distance sensor uses the principle of infrared light to determine the distance to an obstacle. The sensor has two small "eyes" or parts: one for emitting the infrared light and the other for receiving it.

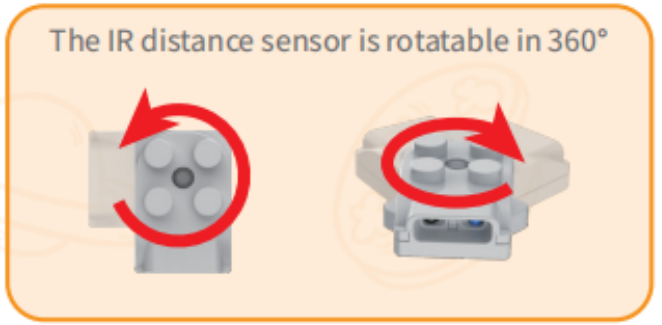


The infrared distance sensor uses the principle of infrared light to determine distance and obstacles.
There are two eyes inside the sensor, which are responsible for transmitting and receiving.



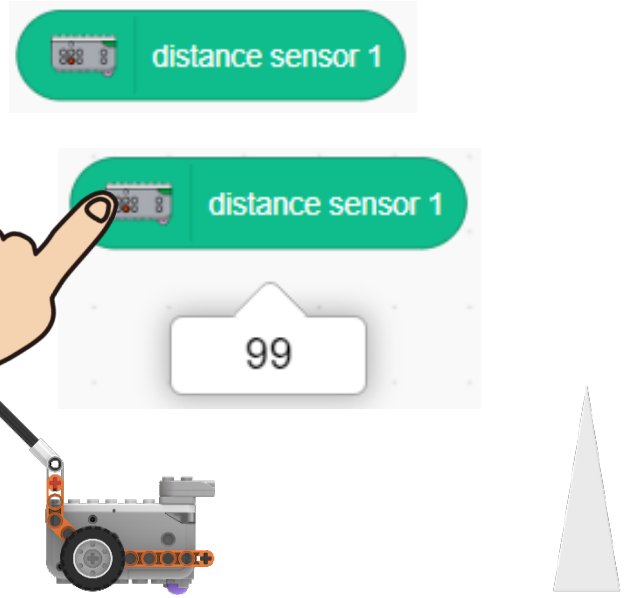


Notice:
When removing the sensor connector, please use a removal tool (Splitter) and avoid forcing it.

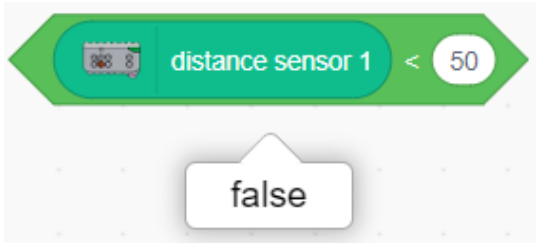


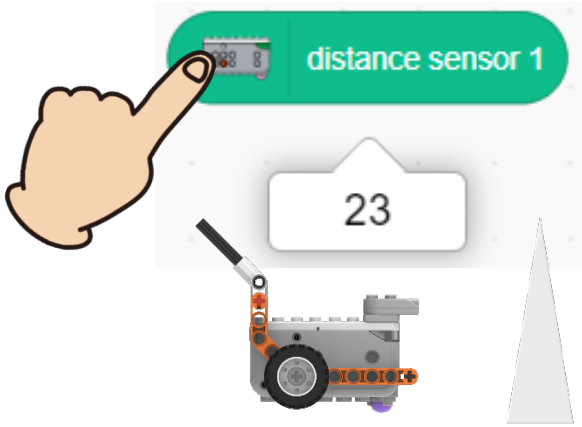
Summary

2. Module Explanation

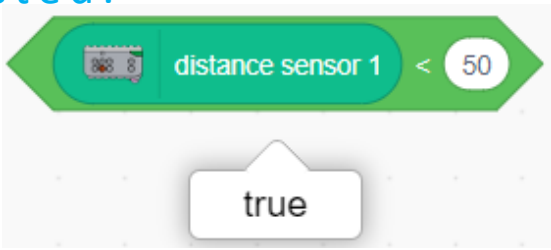


When no obstacles are detected



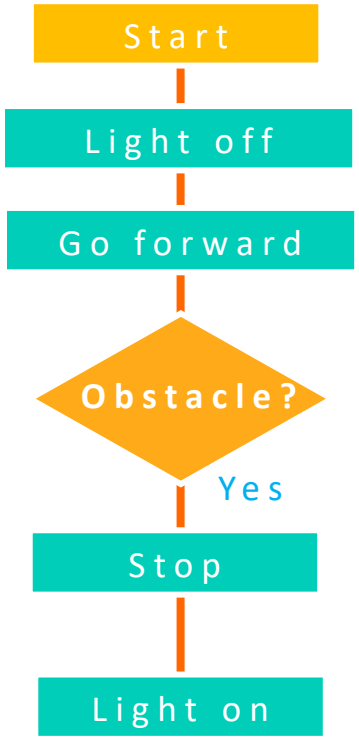


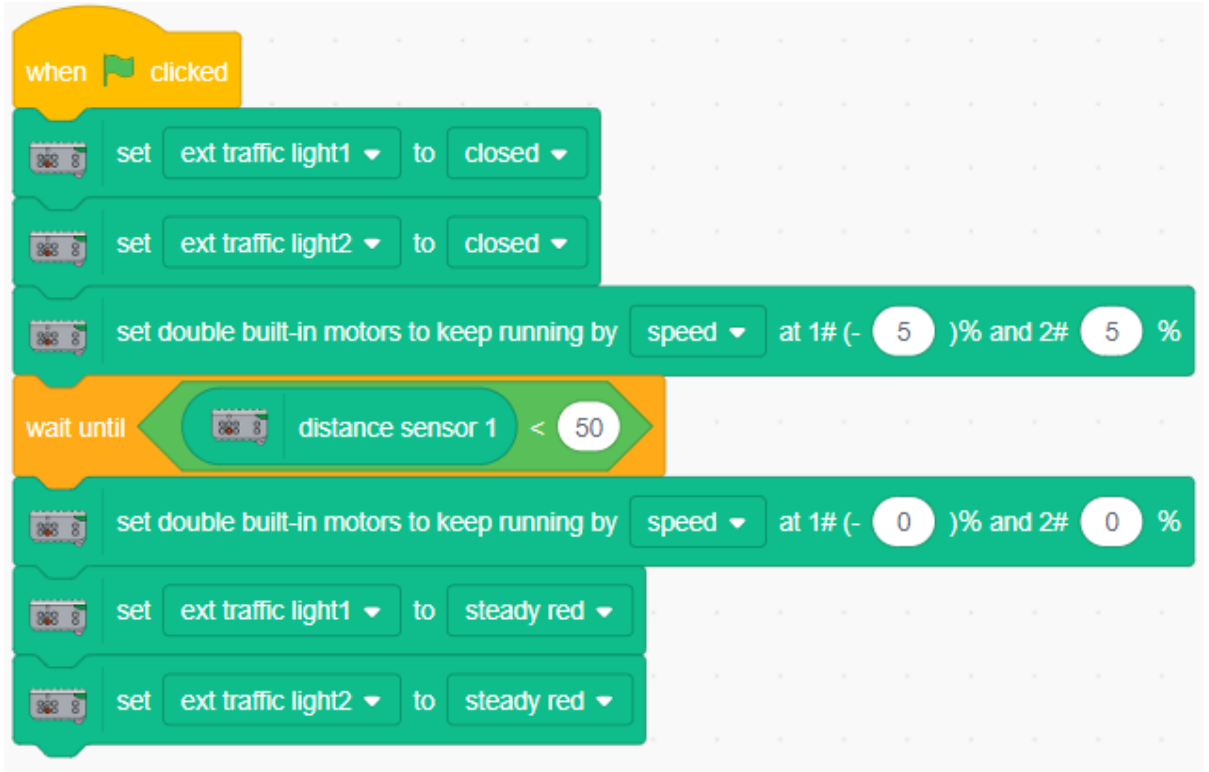
The values decrease when an obstacle is detected.



Summary

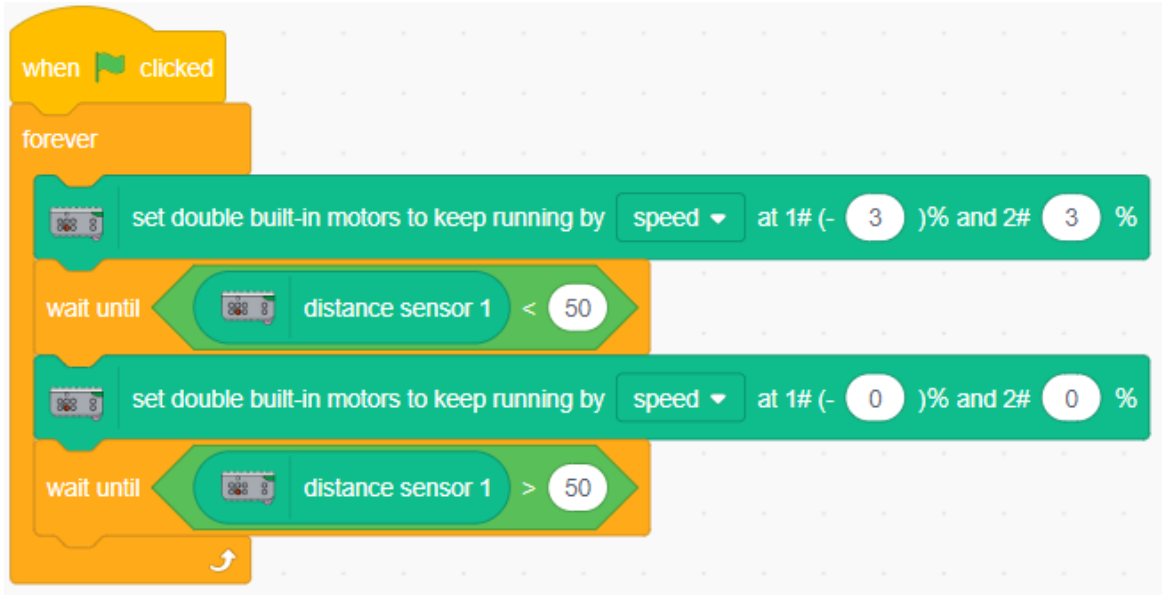
3. Program Explanation

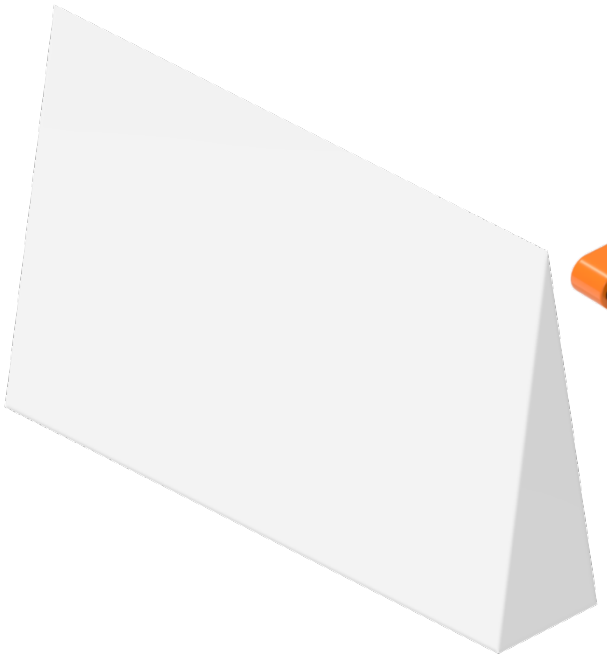


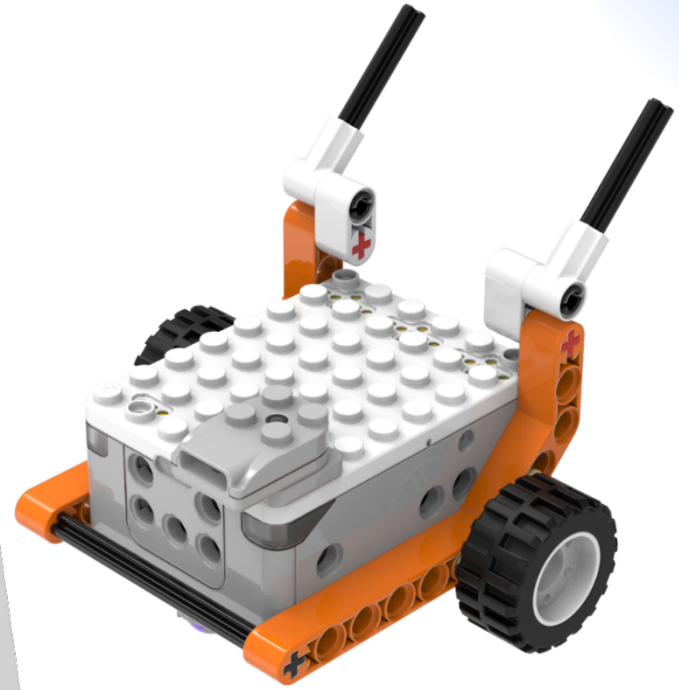


Summary

4. Finish the task







SHARE WITH YOUR PARENTS

Share the knowledge about the Obstacle Detection with your mom and dad when you get home!