Qbot Robot Car Kit

User Manual

Warming tips

1. Please charge the battery in time if you find Qbot running slow and the indicator is dimming.

2. Infrared obstacle avoidance sensor, line tracking sensor are sensitive to infrared interference, they might not work in strong light.

3. The ultrasonic sensor must be installed according to the instructions. Incorrect installation can cause damage to the ultrasonic sensor.

4. When using infrared remote control, there should be no object between the remote controller and the receiver.

5. Don’t let metal objects touch the circuit board and the electronic component on circuit board, otherwise the product may be damaged.

6. The product contains small parts, do not let children eat by mistake.

7. Please use the included charger to charge the battery, otherwise it may cause a fire and explosion.

8. Do not short-circuit, dismantle, destroy the battery or throw the battery into the fire, otherwise it may cause dangerous.

9. Pay attention when connecting the computer: the switch is turned off, the USB is not recognized and cannot be connected, and then the switch is still not connected. You can only open the switch first, then plug in the USB to connect.

Catalog

1 Introduction

1.1 Product introduction

LewanSoul-Qbot is an educational robot based on graphical programming and Arduino platform. This robot is perfect for learning STEAM and robotic knowledge. Perfect choice for robot lovers and beginners to learn robotics, electronics and programming. Beside, Qbot is a Smart Robot Car Kit with Ultrasonic Sensor, Light Sensor, Line Tracking Sensor, OLED Display Screen, Bluetooth Module, Infrared Remote Control (Receiver), Free Mobile APP for Arduino. The whole assembly process of Qbot only takes 2 minutes, so that you are no longer bothered by the tedious assembly. The holes in the robot can be compatible with the LEGO bricks and you can extend its function yourself, this means that Qbot will have infinite possibilities. (which means that Qbot will have infinite possibilities for you to discover.)

Hope that Qbot can be a good partner in your study and life!

1.2 Features

A Various electronic modules: Integrated infrared, line tracking, dot matrix, ultrasonic, RGB light (Indicator), Bluetooth 4.0 module and more than 10 electronic modules.

B Quick assembly: The whole assembly process of Qbot only takes 2 minutes.

C Compatible with LEGO bricks: It can be used to expand the compatibility(by using LEGO) between the hole position and LEGO bricks.

D Various ways of mobile phone control: We provide customers with a mobile APP, there are three working modes: Gravity mode, (Line-drawing control mode) drawing line mode and stick rocker mode to enhance the interest and experience of Qbot. (help you enjoy much fun from Qbot)

E Support Scratch programming: It allows us to learn to program and control the robot quickly. (Easy programming way, help you quick to learn)

F Plenty of learning material and gameplay: Rich in courses and play ways; We provide users with 16 kinds of Qbot gameplay, each of them has a very detailed video tutorial.

2 Main assembly

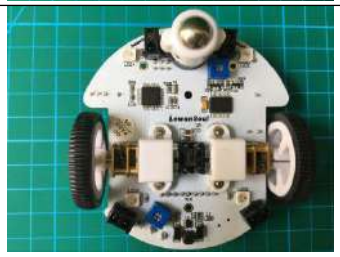
2.1 Product list

Motor driven board	1
Upper plate	1
Ultrasonic sensor	1
Charger	1
Lithium battery	2
Infrared remote control	1
Screwdriver	1
Screw and copper pillar kit	1
USB cable	1

2.2 Product parameters

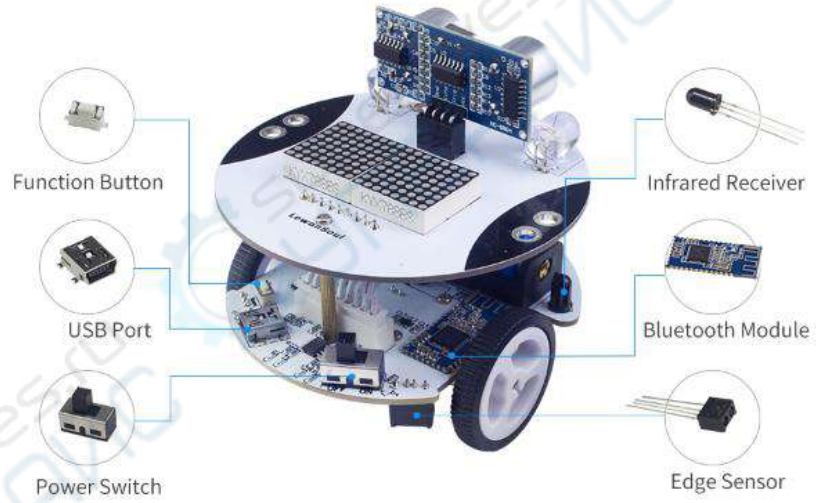
Net Weight	About 0.308 pounds
Material	Fiberglass
Bluetooth module	Support
Package Dimensions	9.8 x 6.2 x 2.4 inches
Programming software	WeMake(based on Scrach2.0) Windows Arduino IDE Support
Input	Edge sensor, Button module, Line tracking sensor, Ultrasonic sensor, Infrared receiving module
Output	Buzzer, RGB lights, two motor ports
Communication interface	USB, Bluetooth
Microprocessor	Arduino UNO
Power supply	One 3.7V 600mAh Lithium battery
Diameter	85mm

2.3 Components

Name of Component	Picture	Quantity
Upper Plate		1
Motor Driven board		1
Ultrasonic sensor		1
Infrared remote controller		1
Copper pillars and screws		Several

Lithium battery		2
Flat Cable		1
Charger		1

2.4 Overall component display



Tips:The Function Button is the button that If you click it, Qbot will run the built-in program on it.

3 Installation and Operation

3.1 Overview

1. Different functions require different code;
2. The default installation is Bluetooth and infrared firmware so that you can use the cell phone and infrared remote control to control the Qbot directly. There are 16 kinds of gameplay code in this product, and bluetooth and infrared firmware are one of them. There is only one firmware on the Qbot at the same time. If you upload other firmware (such as Gesture control code) to Qbot, the mobile APP and infrared remote control cannot be used;
3. If you want to control the Qbot through using Bluetooth module or infrared remote controller, the programs that we need to download first are the same. You can refer to the above link or QR code;
4. Different parts of Qbot have different functions, you can explore more fun from it;
5. When your phone fails to connect to Qbot, please check out whether the Bluetooth firmware has been already downloaded or not.

Here are the icon and link and QR code(Table 1):

Table 1

Icon	Link	QR code
	http://bit.ly/2wCKlz6	

6. Here are the link and QR code concerning YouTube and Dropbox of Qbot. (Table 2)

Table 2

	Learning video	Software, mobile app, code, etc.
Link	http://bit.ly/2xKMgBl	http://bit.ly/2wCKlz6
QR code		

3.2 Mobile phone APP

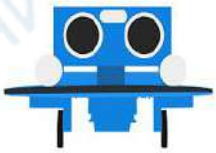
3.2.1 Download Mobile APP

Table 3

Types	Android System	iOS System
Link	http://bit.ly/2EITSEJ	https://apple.co/2CxiAYw
QR code		

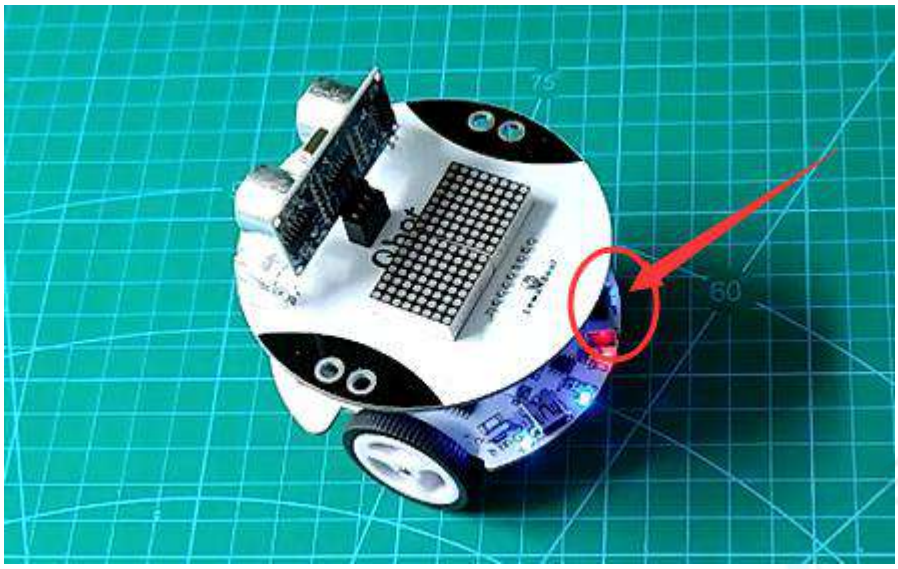
(1) You can open the Installation package and download it on your mobile phone(Refer to Table 2). (And you can also refer to the table above)
(2) If you open the Installation package you can find the Mobile App(Android Only)

Note:
1. If your phone system is Android, this file prepares for it. If it is Apple system, you can search for "Qbot Lobot" in APP Store and download it.(Refer to Table 3)
2. Qbot Android app released version 1.4, the modification information is as follows:
a. Repair Bluetooth connection unconnected after accidental disconnection;
b. Optimize part of the interface.
The following figure is a software diagram of the an Android system and an iOS system respectively.



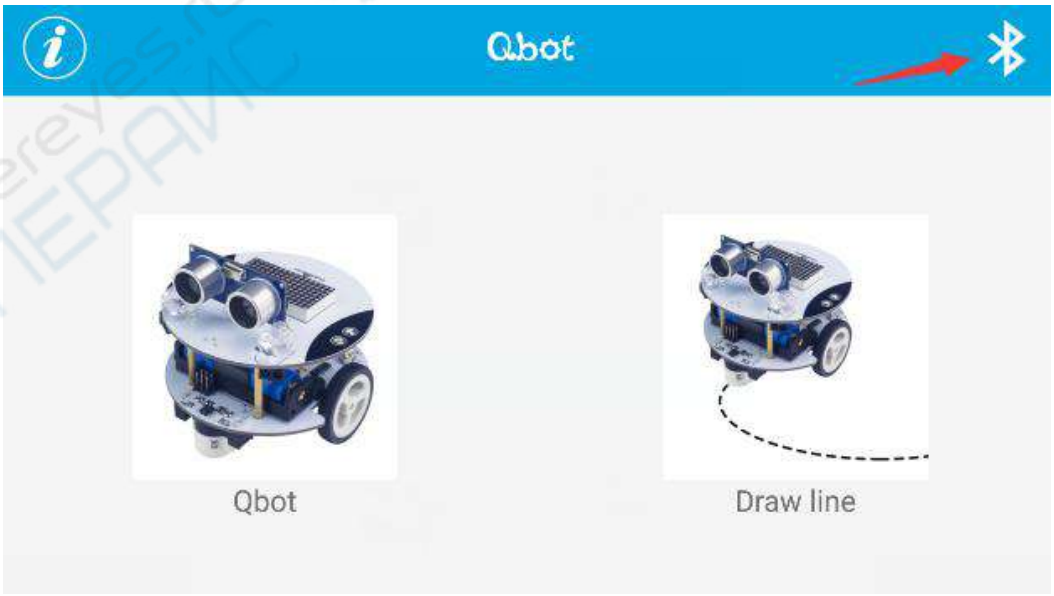
3.2.2 Mobile phone APP to control the Qbot

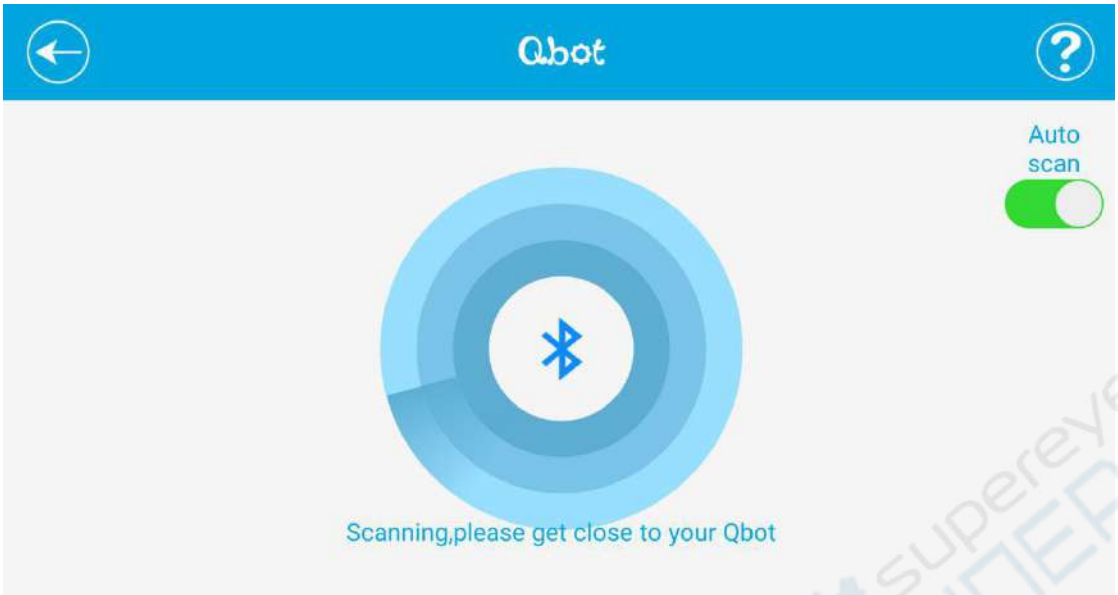
(1)First turn on the switch of the Qbot



(2)Then open the Qbot APP that have been download on your mobile phone.

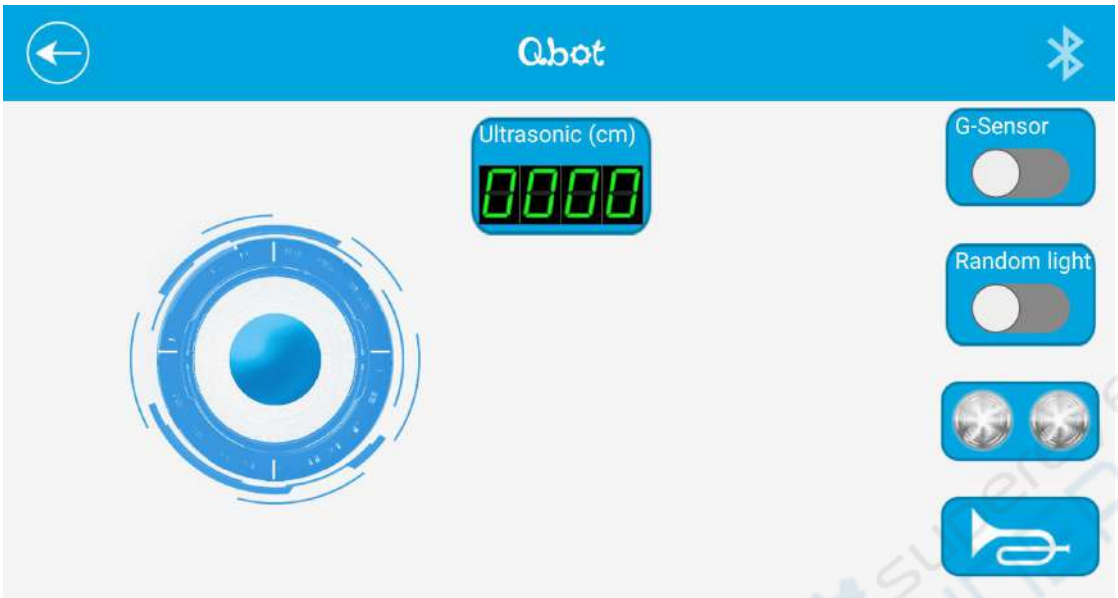
(3)After connecting the Bluetooth,you can start controlling your Qbot.





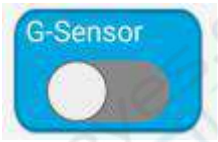
Note:
1. The automatic search function of Bluetooth is closed by default.
2. If you click the Auto scan button, it will automatically scan Bluetooth itself;
3. If you click the icon in the lower right corner,you will see the picture following:

If the connection fails, restart the APP and reconnect several times. (Please remember using the Bluetooth inside the phone app rather than the one on your phone system.)
If you connect to the Qbot successfully, you can do the following.
When you click the Qbot,you will see picture as following:



Here is the introduction of each icon:

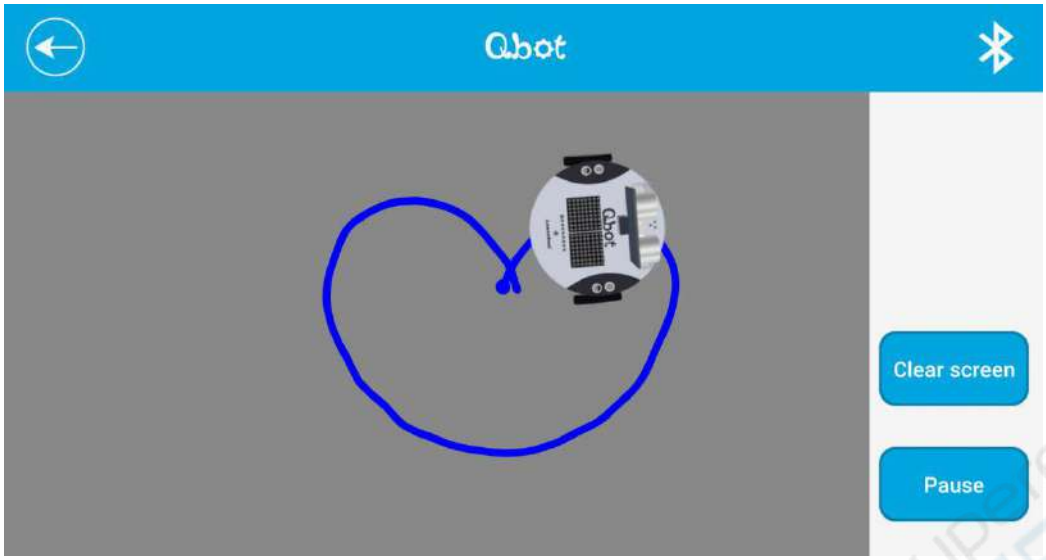
Table 4

Icon	Meaning	Icon	Meaning
	Turn on the Bluetooth switch.		Once you touch the button that picture shows, the light on the upper plate will shine.
	Distance value between the ultrasonic sensor and the obstacle are shown through this icon.		It means that the lights on the Motor Driven board are illuminated randomly.
	Stick mode: this mini bubble uses to control the movement of Qbot		Make the Qbot alarm.
	Change to gravity mode.		

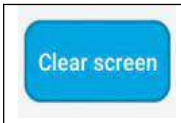
First, you may notice the Numbers on the Ultrasonic section. This number represents the distance between the Qbot and the object in front of it. The distance will change as the way it moves.

Then, you can click the Gravity control icon, you can control the movement of Qbot by moving your mobile phone. In fact, we offer two modes to control the movement of Qbot, and the other is stick mode, which means you can operate the Qbot through the virtual button on your phone.

After that, if you click the Random light, the lights on the Motor Driven board are illuminated randomly. If you click on the third icon, the light on the Upper Plate will light up.
Last, if you click on the fourth icon, the Qbot will alarm.
If you click the Dawn line icon, you will see picture as following:



You can draw any route you want Qbot in the gray part, then click Play this icon, then Qbot will follow the route you draw, and you can clear the previous route (click Clear screen icon). As is shown in the picture, if you draw a heart-shape in the gray part, the Qbot will go around the shapes that you draw.
Here is the function of the icon:

	Clear the route you draw on the screen.
	Let Qbot to follow the route you have drawn.
	When you press this button, you can stop the Qbot at any time.

3.3 Infrared remote controller

Our package contains infrared remote controller, you can use in combination with Qbot.

Hardware principle of infrared remote controller: Infrared light is a light that our human eye can not see. We regard the infrared remote controller as a flashlight that can emit infrared light, and the infrared receiver module as an eye that can only see the infrared light.

When we press button 2 on the remote controller. Qbot will move forward and if we press button 8, it will move backward. Pressing button 4 means turning left, button 6 means turning right. (Refer to 3.4.6 Gameplay and Its Corresponding Programs)

3.4 WeMake Software

3.4.1 What's WeMake Software

WeMake is a graphical programming tool based on Scratch 2.0, which is developed by our company. We can use this software to control. Through WeMake programming we can achieve the interaction between software and the physical world to make QBot do corresponding response according to the changes in the environment. WeMake's simple operability makes it possible for everyone to build their own intelligent robots without having to learn esoteric electronic knowledge.

3.4.2 How to install WeMake on your computer

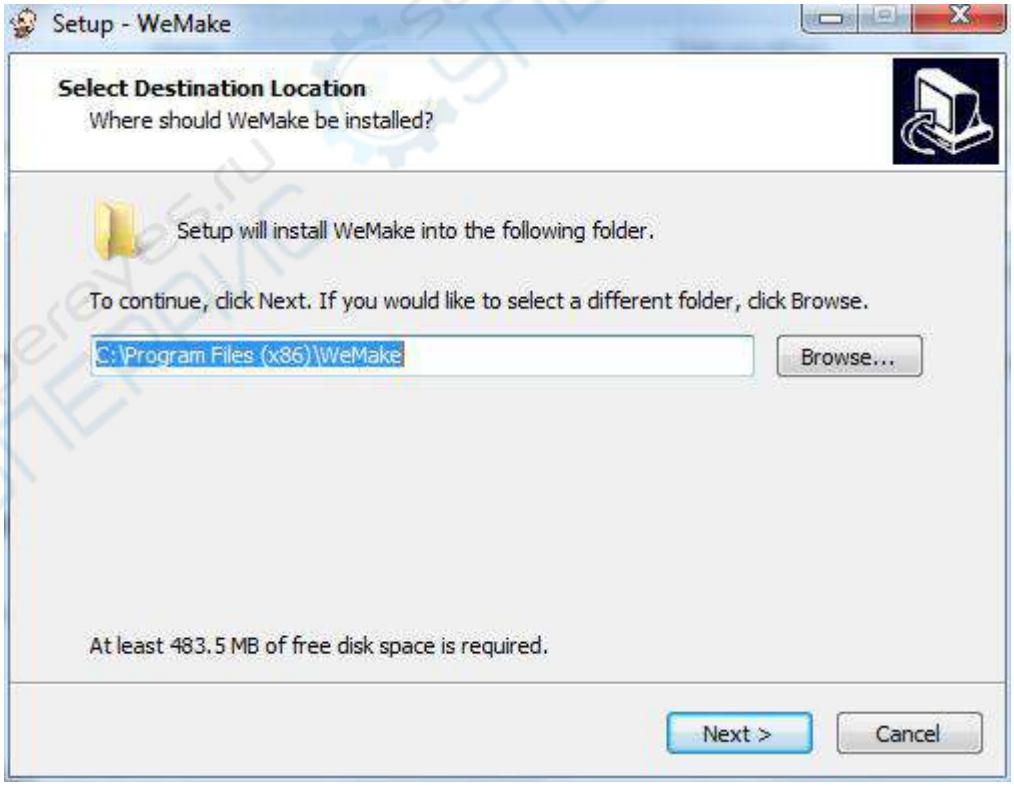
You can download the installation file of WeMake.

Table 5

Icon	link	QR code
	http://bit.ly/2wCKlz6	

Open installation file and select installation path.

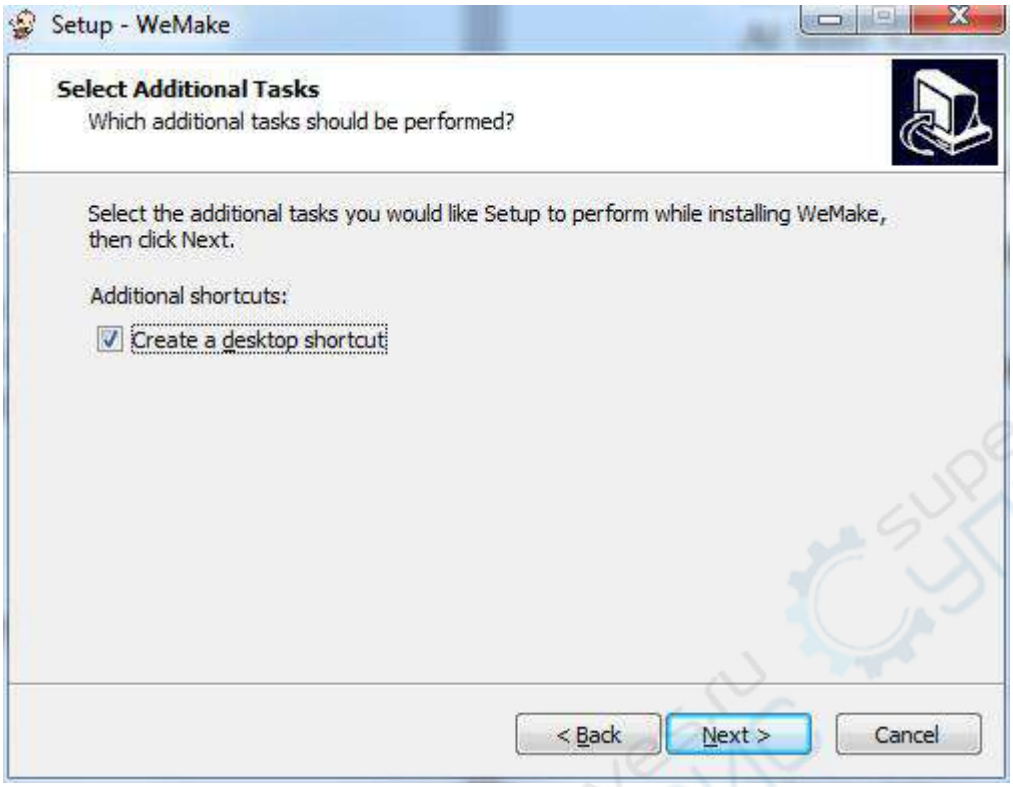
Click "next"

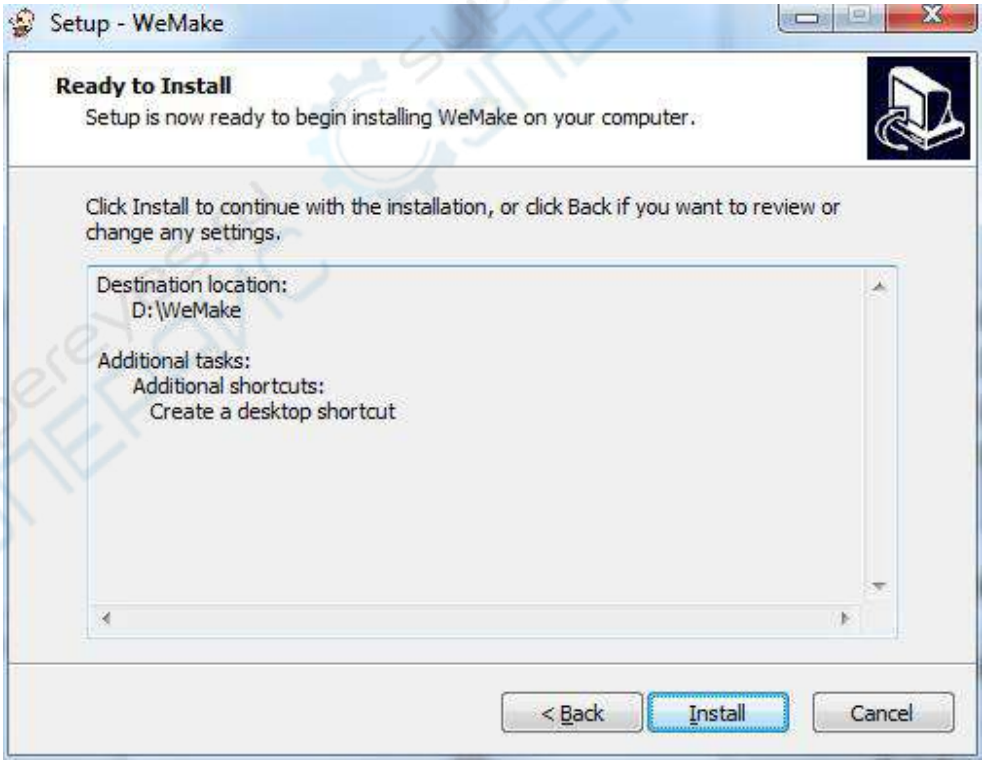


Select destination location.

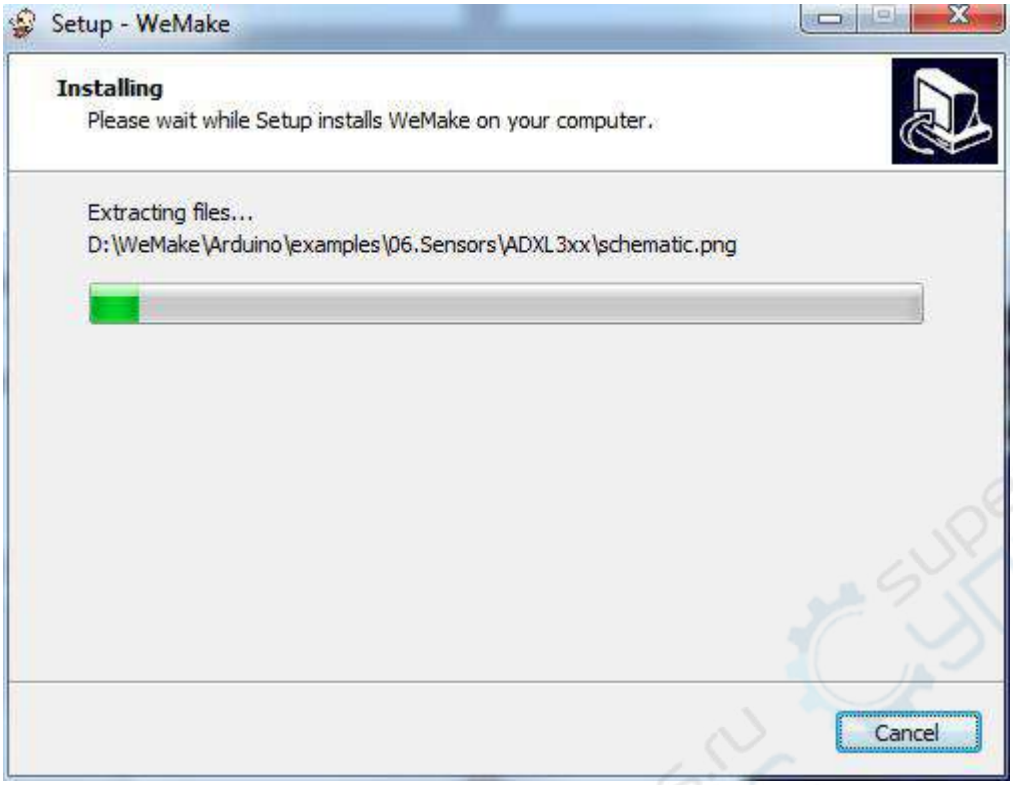
The installer will install WeMake into the following folder.

Click next to continue, if you want to select other folder, click”browse”.

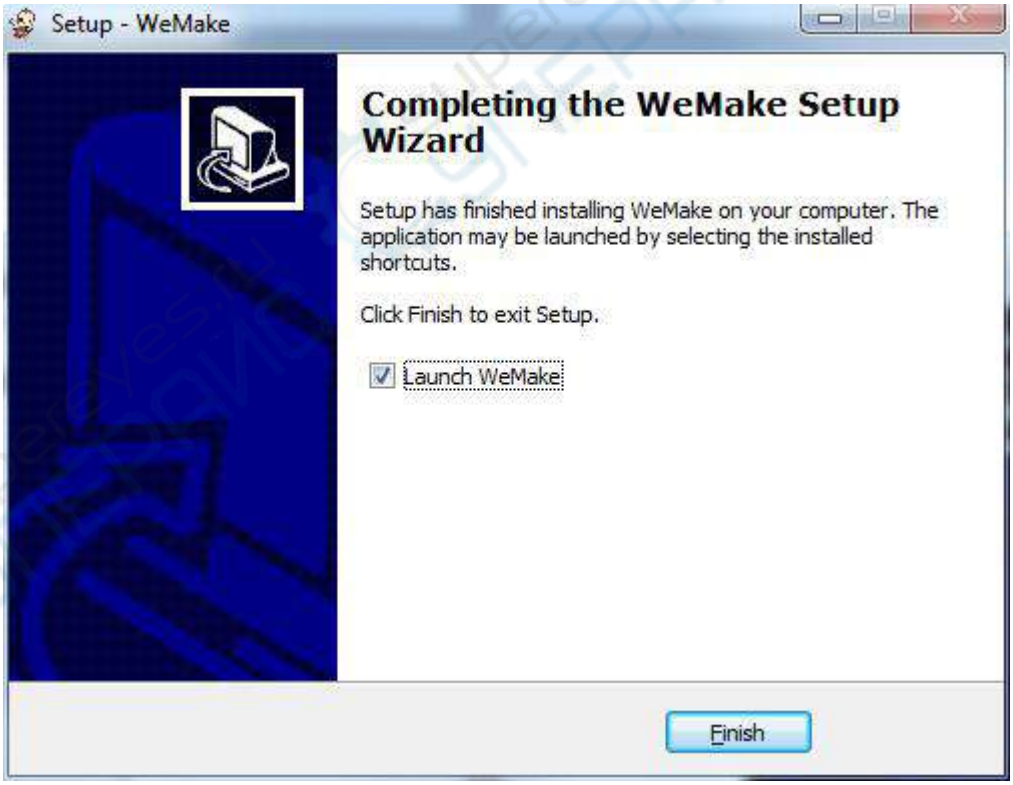




The installer is now ready to install WeMake into your computer.
Click install to continue with this installer, if you want to review or change the settings, please click “back”.



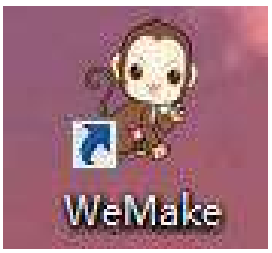
Installing.
The installer is installing WeMake into your computer, please wait.



The WeMake installation wizard finishes.
The installer has installed WeMake into your computer, this application can be run by selecting the installed shortcut.
Click “finish” exit the installer.
Only after QBot is connected to WeMake, we can use WeMake to program QBot.

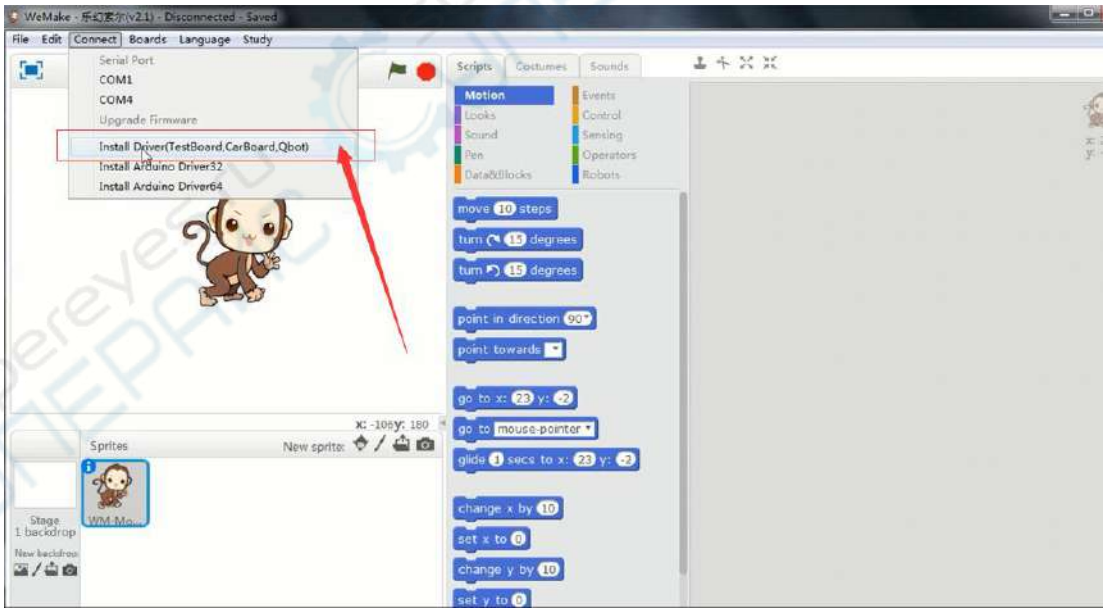
3.4.3 How to connect Qbot to WeMake

First, we need to connect Qbot to computer by using Micro USB cable, and open WeMake software. Then, you can edit some programs by WeMake.

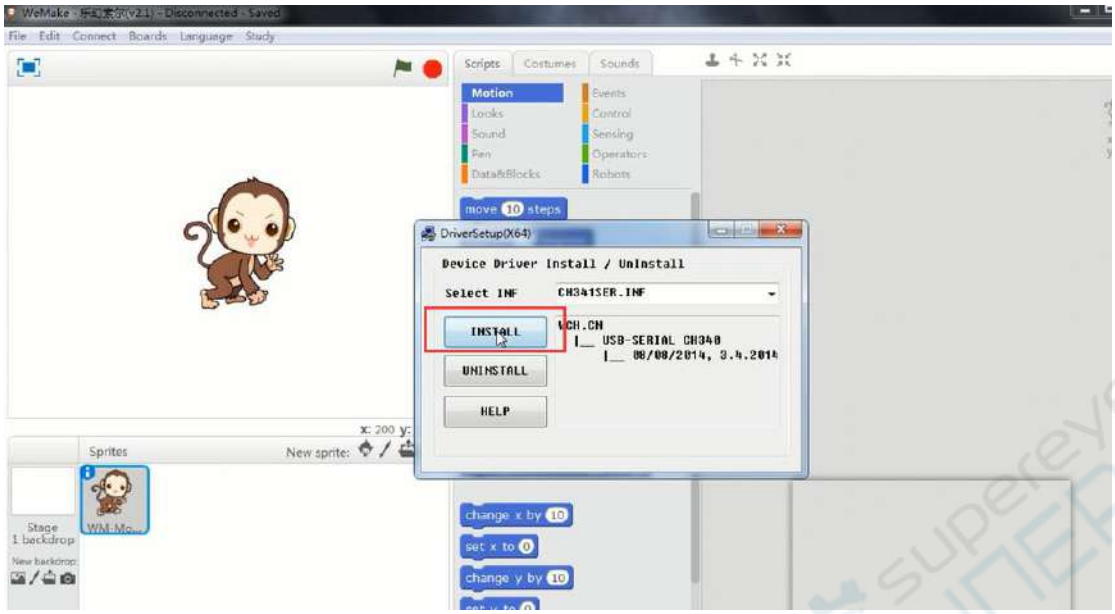


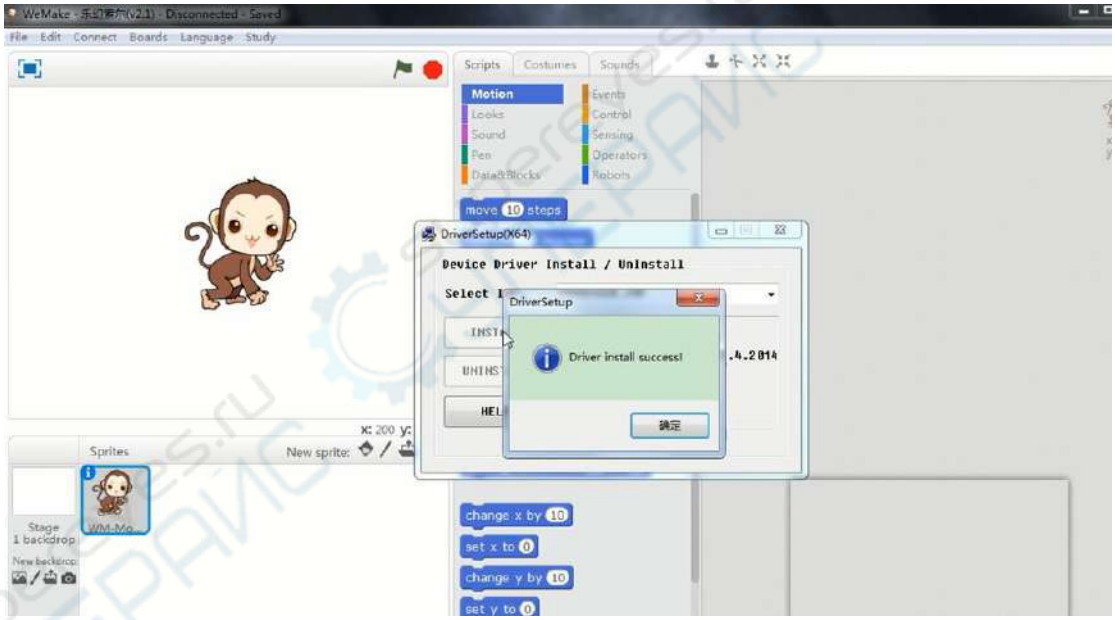
3.4.4 Install the driver

Use the WeMake at the first time, you should install the driver.
Select the corresponding path in Menu> Connect> Install Driver

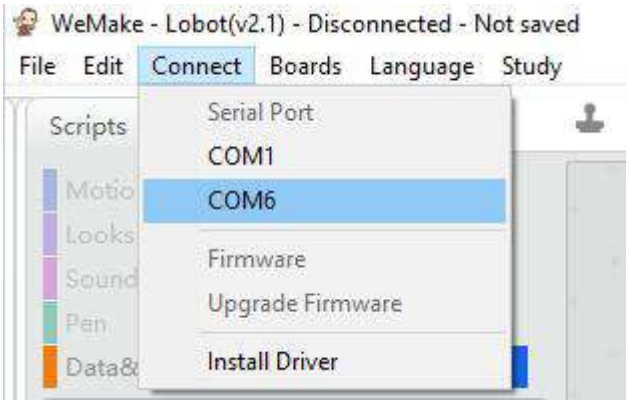


Open the driver installation interface

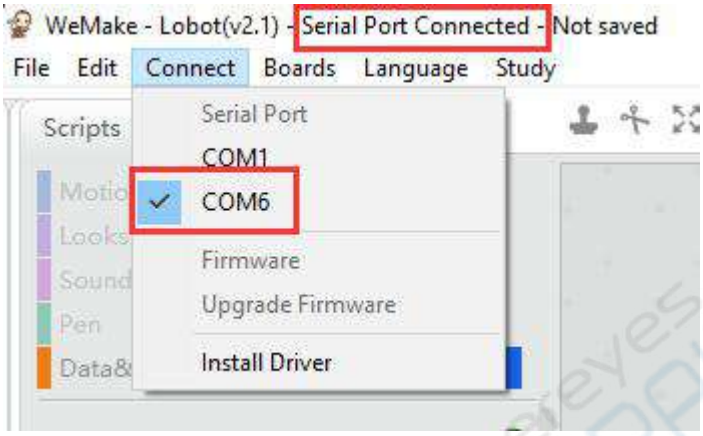




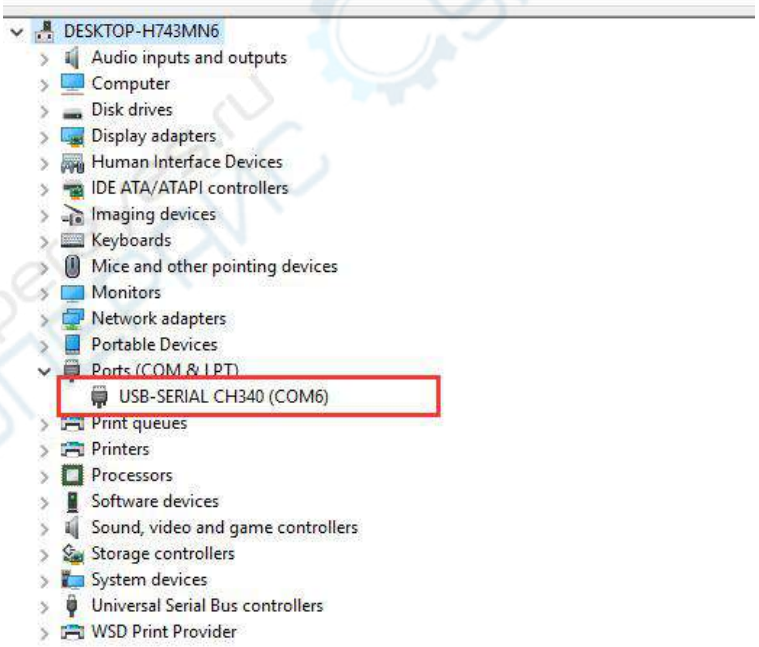
Waiting for installation.
Next select the corresponding COM port in Menu> Boards> Qbot

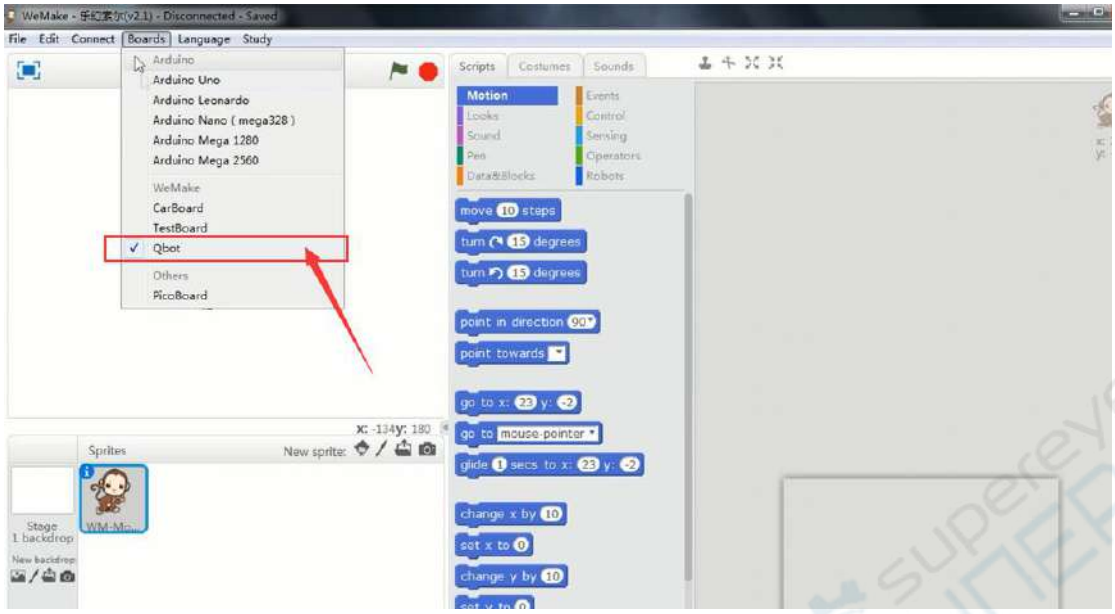


Click COM6 to display Connected



Different computers may have different ports(don't choose COM1), you can open the DeviceManager, expand "Ports (COM & LPT) .





3.4.5 How to use WeMake to install firmware

There are two ways for controlling the Qbot, one is using Infrared remote controller and the other one is through mobile phone App. Different functions require different firmware to control. If you use the first way to control the Qbot you can control it directly by the Infrared remote control, because the default state of Qbot that the firmware we have installed. If you use the second way you should install the firmware by yourself.

After connecting the Qbot, then find the firmware that of mobile phone App control, and open it.

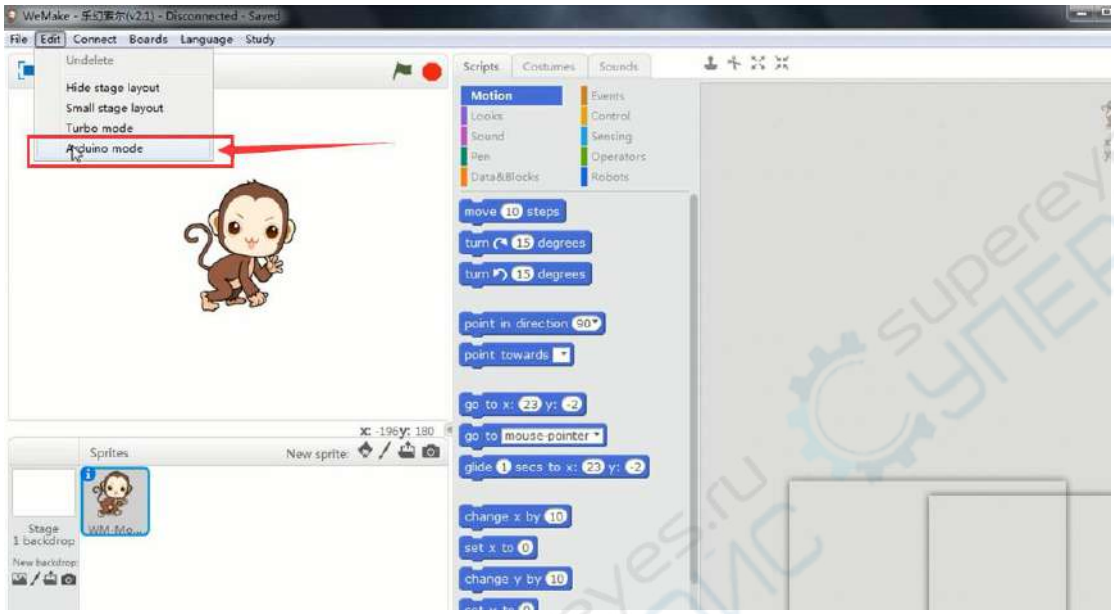
Qbot(Both the IR rem...
ult).sb2

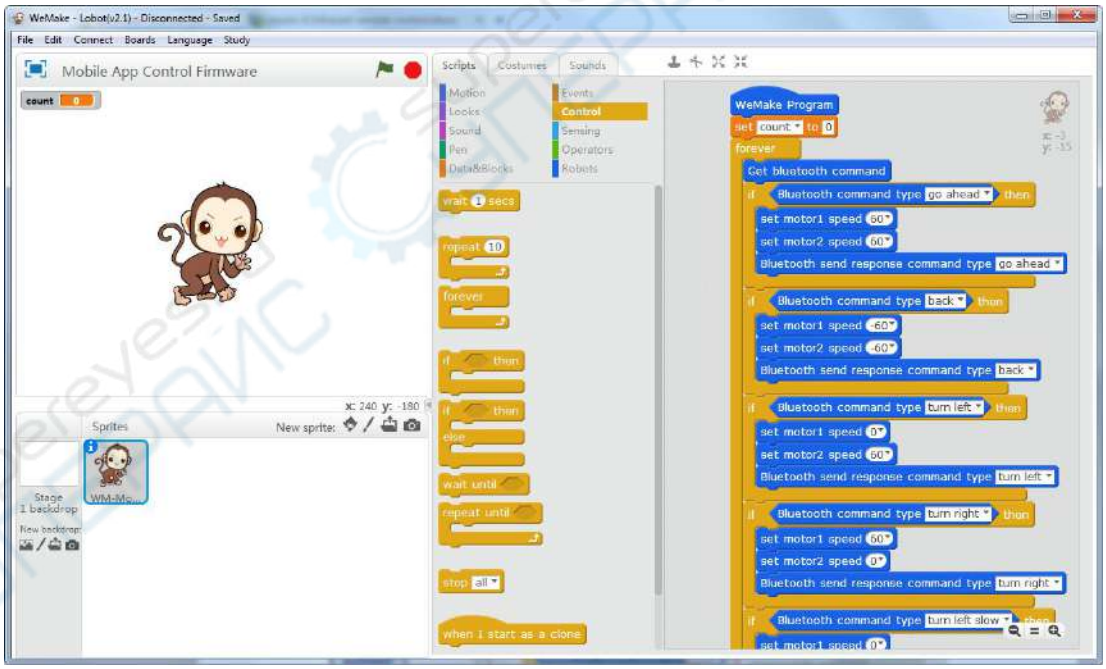
Note:

1. The default state is infrared and Bluetooth firmware.

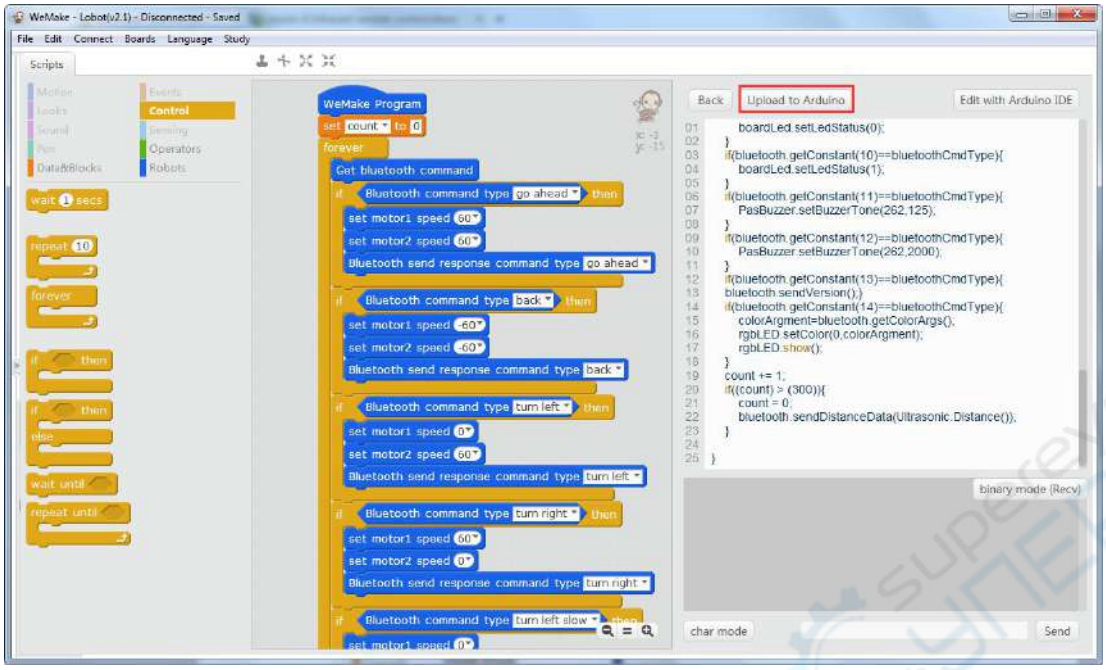
2. The infrared and Bluetooth functions are by default.

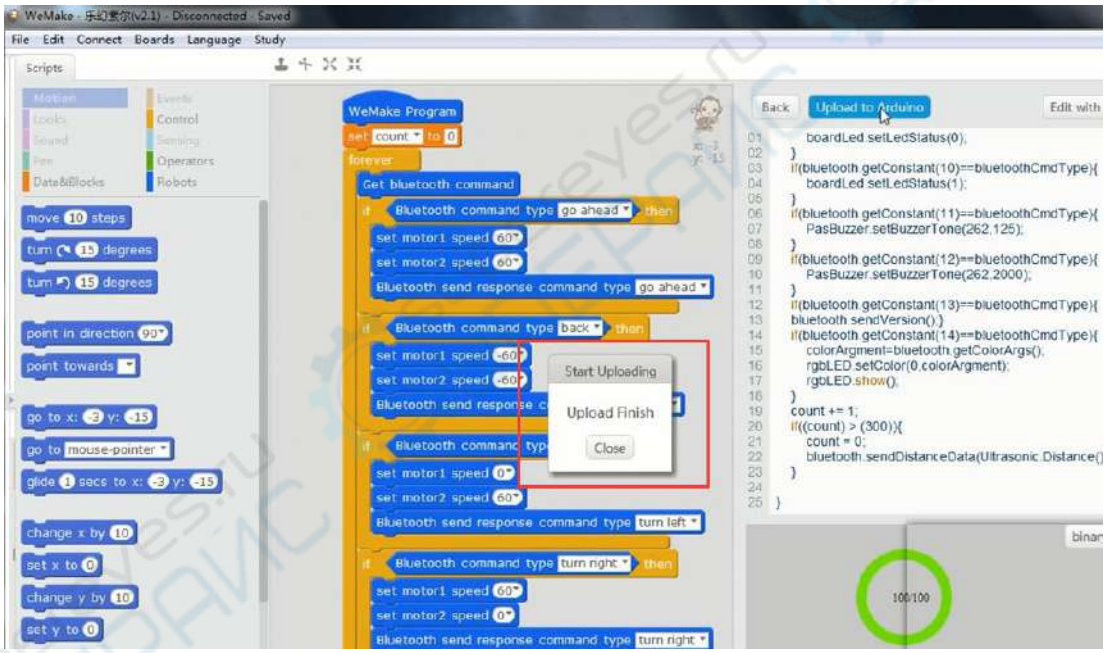
Select the corresponding port in Menu> Edit> Ardunio mode.





Then click the “ Upload to Ardunio”.





When it appears Upload finish, you can start control your Qbot with mobile phone.

3.4.6 Gameplay and Its Corresponding Programs

You can get gameplay and its corresponding programs on the following.Here is the icon, link and QR code:

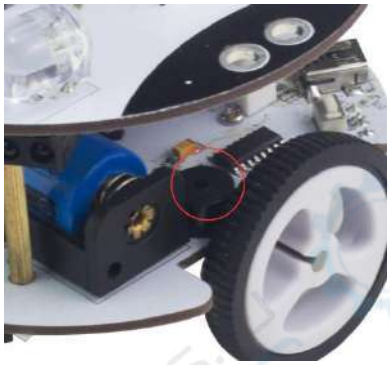
Table 6

Icon	link	QR code
 code	http://bit.ly/2wCKlz6	

Here are gameplay and its corresponding programs:

1. Hardware principle of buzzer

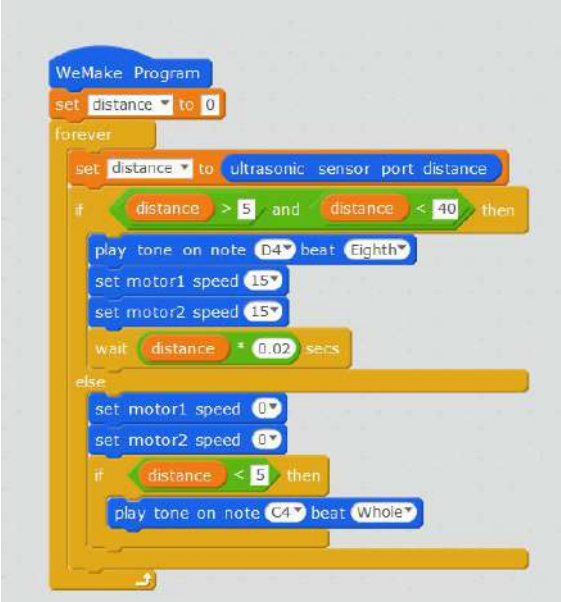
A buzzer can send out various tunes of different beats.



Software Command

Script Type	Command	Comment
Robots		Get the distance measured by ultrasonic module
Robots		The playing tone is 1/8 of the C4 beat

Create a target: Ultrasonic detects the distance automatically,the closer the distance is, the higher the alarm frequency of the buzzer. When only 5cm from the wall is detected, Qbot stops and the buzzer make long sound of beep which indicates that the parking is completed.



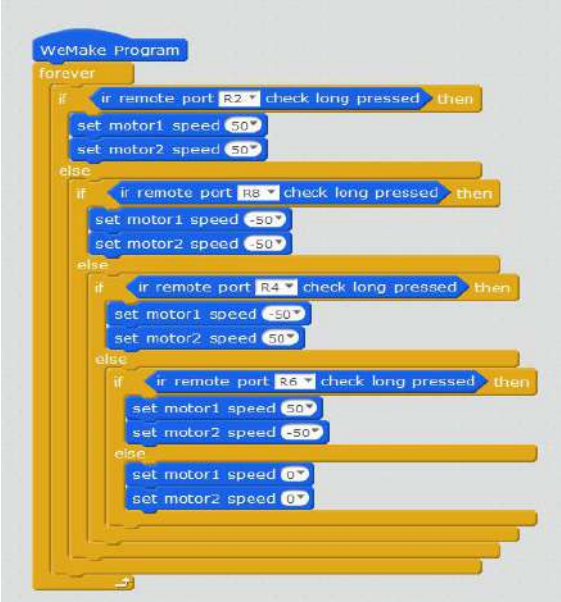
2. Infrared remote control

Script Type	Command	Comment
Robot Module		To determine whether a button on the infrared remote controller has been pressed or not.
Robot Module		To determine whether a button on the infrared remote controller has been long pressed.

Create a Target: Qbot controlled by infrared remote controller

Realization: When we press button 2 on the remote controller. Qbot will move forward and if we press button 8, it will move backward. Pressing button 4 means turning left, button 6 means turning right.

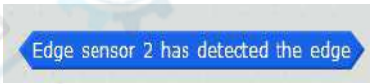
It is noted that the procedures corresponding to both Bluetooth and infrared remote control are the same.



3. Avoid the edge

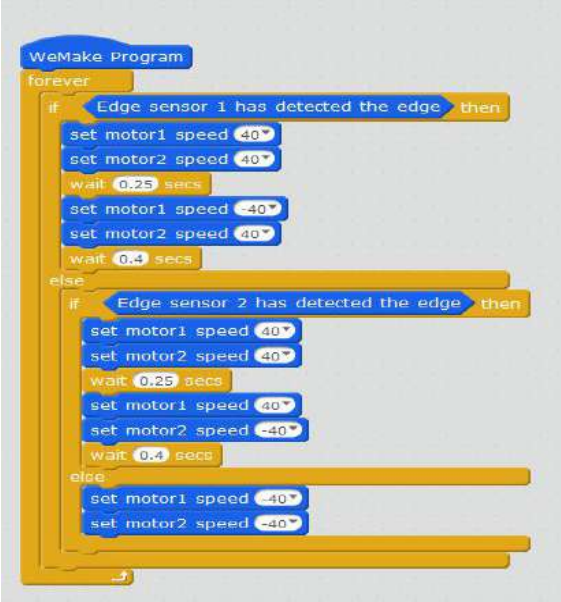
In this episode, we continue to use the line tracking sensor to achieve some other play. This also allows everyone to know more applications of line tracking sensor in the actual scene.

Software Command:

Script Type	Command	Comment
Robots		Get the status of Edge sensor 1
Robots		Get the status of Edge sensor 2

Create a Target: Our map is a large black runway, and Qbot can be placed inside the runway. After turning on the switch, it will run when it touches the black line. That means the Qbot will continue to move within the black runway.

Realization: We can monitor whether Qbot touch the black line or not through line tracking sensor so as to control the movement of Qbot.



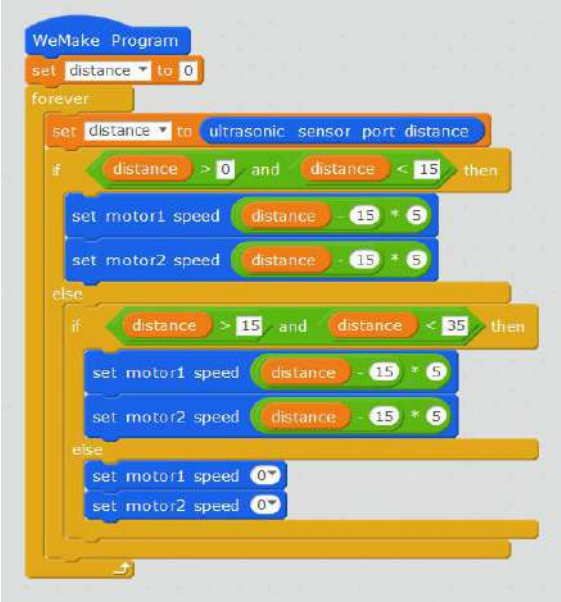
4. Follow the Object

In this episode, we continue to use ultrasonic sensor to perform some other gameplay. This also allows you to know more about applications of ultrasonic sensor.

Software Command:

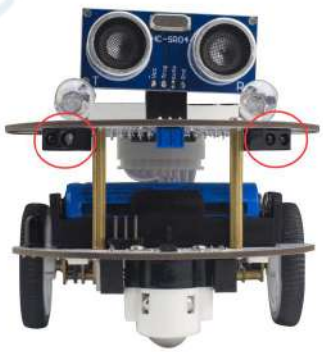
Script Type	Command	Comment
Robots	ultrasonic sensor port distance	Get the distance measured by the ultrasonic wave

Create a Target: The ultrasonic sensor measures the distance between the Qbot and the obstacle. If the distance is less than 15 cm, Qbot will move backward, the smaller the distance, the faster the speed. If the distance is greater than 15 cm, Obot will move forward, the greater the distance, the faster the speed. Therefore, the distance between Qbot and the obstacle is about 15cm.



5. Tracking

Hardware principle of obstacle avoidance sensor: The basic principle of the obstacle avoidance sensor and the working principle of the tracking sensor are basically the same. If there is no obstacle in a certain range, the emitted infrared rays gradually fade away as the distance farther and farther away, and finally disappear. If there is an obstacle, the infrared encounters an obstacle which is reflected to the sensor receiver. The sensor detects this signal and it will know there is an obstacle ahead.



Software Command

Script Type	Command	Comment
Robots	Obstacle avoidance sensor 1 has detected obstacle	Gets the status of the No.1 obstacle avoidance sensor
Robots	Obstacle avoidance sensor 2 has detected obstacle	Gets the status of the No.2 obstacle avoidance sensor

Create a target: Through the obstacle avoidance sensor for the position identification of the object ahead to achieve automatic tracking.

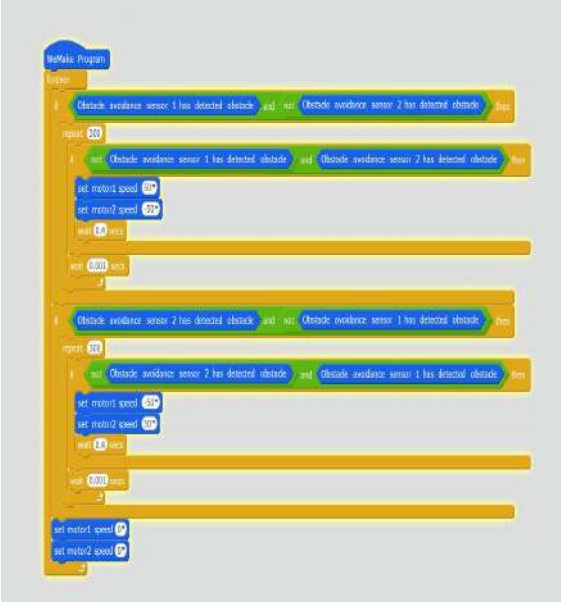
6. Gesture control

In this episode, we will continue to use obstacle avoidance sensors to achieve new gameplay!

Software Command

Script Type	Command	Comment
Robots	Obstacle avoidance sensor 1 has detected obstacle	Gets the status of the No.1 obstacle avoidance sensor
Robots	Obstacle avoidance sensor 2 has detected obstacle	Gets the status of the No.2 obstacle avoidance sensor

Creat a target: Using 2 obstacle avoidance sensors at the top of the Qbot to determine the direction of movement of the object ahead, so as to make a left or right turn.



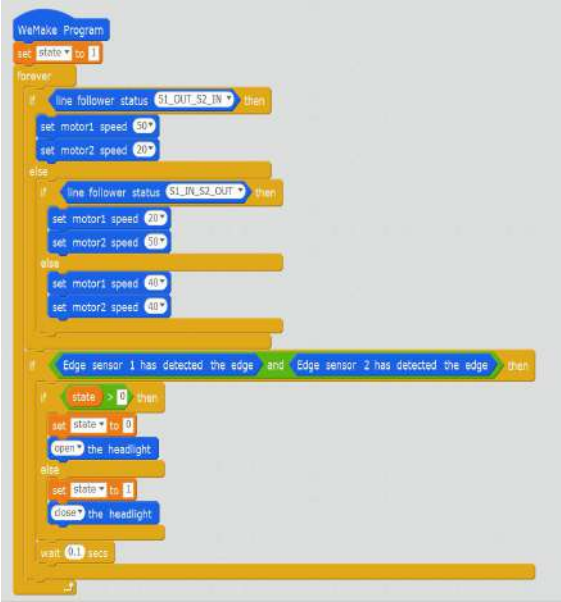
7. Illuminate the night

LED hardware principle: There are two large LED lights with 1cm diameter on the Qbot. We can control the situation of lights(off/ on) by programming.

Software Command:

Script Type	Command	Comment
Robots		Turn on or off the Headlight.

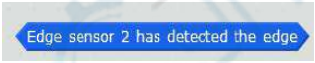
Create a target: Qbot travels along the black track which has been marked. When traveling to the designated section, 2 LED lights of Qbot open and illuminate the road ahead. When Qbot leaves the specified section , LED lights turn off.



8. Parking automatically

In this episode, we use edge sensor to achieve new gameplay!

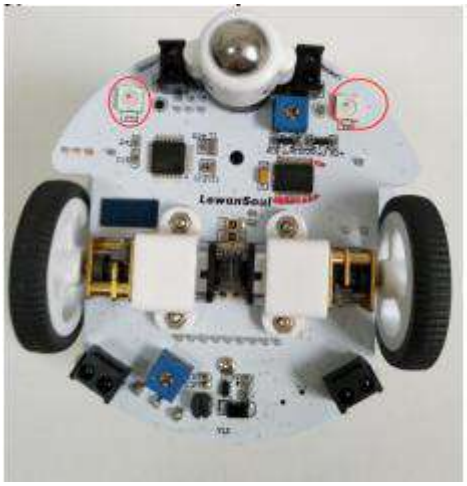
Software Command:

Script Type	Command	Comment
Robots		Get the status of Edge sensor 1
Robots		Get the status of Edge sensor 2

Create a Target: We can make Qbot park automatically

9. RGB lights dancing

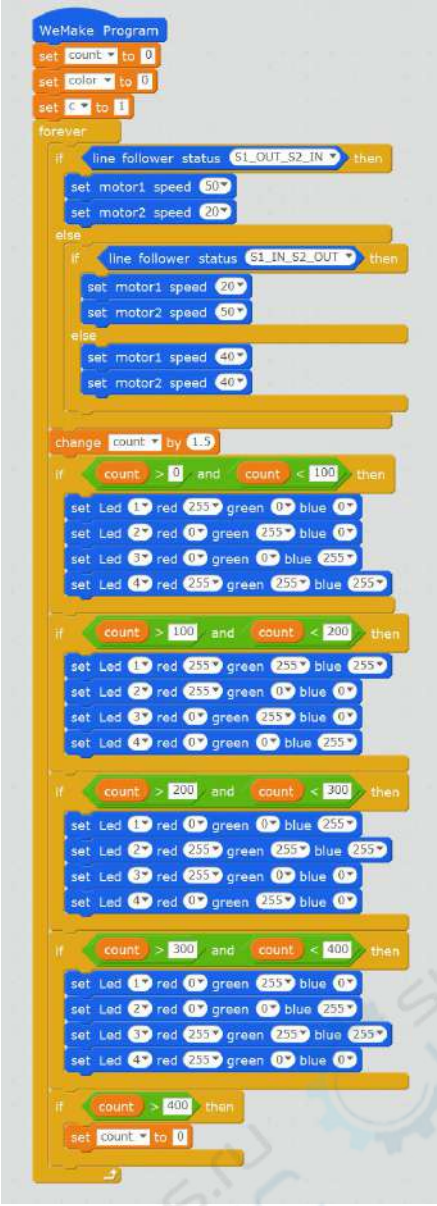
Hardware principle of RGB light: There are 2"LED lights" on the LED module. Each LED light is composed of a red LED lamp bead, a green LED lamp bead and a blue LED lamp bead.



Software Command

Script Type	Command	Comment
Robots		Set the color of the RGB light “all” : select the light which you want to control

Create a target: When Qbot moves, RGB lights randomly issued a variety of colors of light.



10. Football match

Have you ever seen robot play football? In this episode, we will show you how our Qbot play this fantastic game!

Create a Target: The Qbot has expanded holes and is compatible with the structure bracket of the Lego blocks. You can expand the mechanical structure of Qbot by yourself!

Realization: Carry out the robot soccer contest with mobile phone.

11. Trajectories control

Game description: You can draw trajectories on your mobile phone APP to control the movement of Qbot. Then Qbot will move along the track.

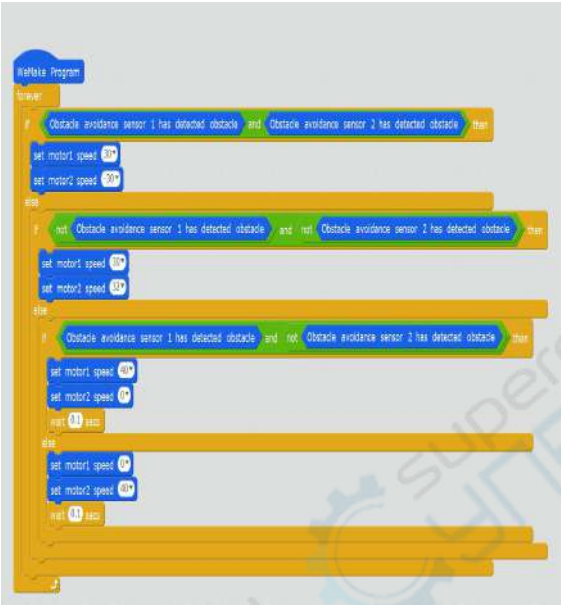
12. Through the maze

How to apply obstacle avoidance sensors to the actual scene? We'll show it in this episode!

Software Command

Script Type	Command	Comment
Robots		Get the status of the No.1 obstacle avoidance sensor
Robots		Get the status of the No.1 obstacle avoidance sensor

Create a target: Using 2 obstacle avoidance sensors at the top of the Qbot combined with an ultrasonic sensor, the Qbot avoids obstacle and goes out of the maze.



13. Ultrasonic Ranging

Hardware principle of Ultrasonic sensor: The ultrasonic sensor is the input device for detecting the distance. It has two “eyes”. One is used to launch ultrasonic waves. The ultrasound will bounce when it encounters an obstacle, which is received by another “eye”. Sound propagation takes a certain amount of time so that we can measure the distance of the obstacle based on the time it takes to send and receive the ultrasonic wave.

For example: you can drag the program “ Alarming and Stopping while facing the obstacle” into the WeMake, then upload it to Qbot, and then Qbot will alarm and then stop while facing the obstacle.

14. Mobile Phone control

In this episode, we will show you how to use mobile phone to control Qbot? Let me show you our Bluetooth module 4.0 first!

Create a Target:

Mobile phone APP control Qbot move forward, backward, turn left, turn right.
You can control the movement of the Qbot through gravity.
Mobile phone APP can control the switch on the front headlight.
The distance measured by the battery voltage and the ultrasonic wave can be displayed on the mobile phone interface.

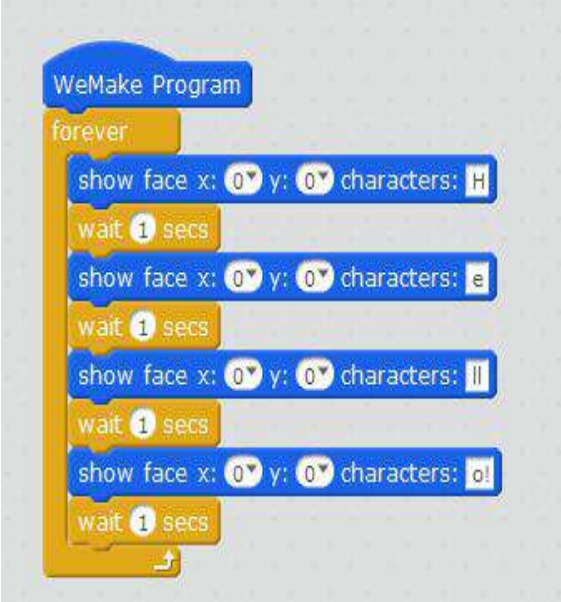
15. LED Dot Matric Display

Hardware principle of LED Dot Matric: The dot matrix is made up of many LED lights, and these LED lights are arranged into a 16*8 matrix, so we can show the numbers, letters, or simple patterns through the matrix of the LED light.

Software Command:

Script Type	Command	Comment
Robots		Display characters at the specified location (The position is determined by the value of X and Y）

Create a Target：Show “Hi, I am Qbot! ” on the dot matrix.



16. Trajectories control

Game description: You can draw trajectories on your mobile phone APP to control the movement of Qbot. Then Qbot will move along the track.

4 Troubleshooting

Q1:I buy Qbot for my children, can children learn to use it?

A:The products of our company are suitable for people of all ages. Children under the third grade are advised to play with the help of parents. In the process of operation, not only can the children exercise ability but also develop the intelligence and develop interest.

Q2:It is unable to maintain a straight line when the car moves forward and backward,how can i deal with it?

A:Because of the difference in hardware, even if the same power supply standard is given, the speed of the two wheels of the car is not necessarily synchronous, which should be modified in the program, and which side is slow to give the higher value, which needs to be adjusted by the customer.

Q3: The switch of Qbot is turned on, but it cannot connect the Bluetooth signal anyway,how can i deal with it?Or why should I input PIN in the process of using the Bluetooth to connect the Qbot?

A:First,it must be on that mobile phone app, not in the setting.Please check the power the battery is sufficient or not, if the Bluetooth is insufficient, the signal will be weak and cause unsuccessful connection.Then,whether the access to the app in the mobile phone is open or not, some permissions limit the normal use of the software;Last,it is difficult to connect to a few cell phone for Bluetooth chip used by some cell phone is not very good.(Refer to 3.1 Overview)

Q4: Why can't mobile APP control Qbot?

A: First, confirm your download on the Qbot (mobile + infrared control) .sb2 file (The user can find the associated path through his own document) , Next, check whether the cell phone has turned on Bluetooth, and then check whether the car has opened the switch.

Case one: The APP prompt reads the firmware version timeout.

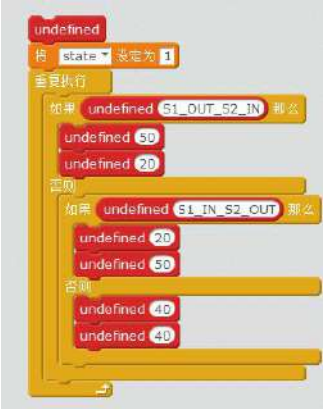
Find Qbot(mobile phone + infrared control).sb2 file and then drag it into the WeMake main interface to load, then download to Qbot to ensure that Qbot APP should be restarted.

Case 2: Shortage of electric quantity

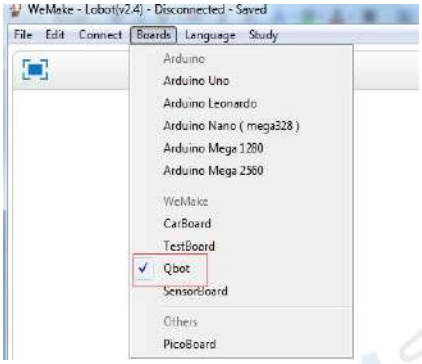
When the Qbot is shortage in power, it will make a sound just like”DiDiDi”. The battery should be taken out and put into a special charger made by tour company for at least two hours of charging.

Q5: Why did the .sb2 file fail to read?

A:When the software display: underwrite or upload failure.



This prompt indicates that you do not select the control panel type. You should select Qbot in the control panel(Just like the picture shown below). Or reconnect the USB port first.



Q6. Why does LED light do not light up?

A: Please check whether the switch of Qbot has turned on first, second check whether electric quantity is sufficient.

Q: Why can't I edit Qbot actions on my phone?

A: Only support PC to edit Qbot movement for now.

5 The Historical version of the user manual

Version	Modification date	Instructions	Modifier
V1.4	2018.7.4	The add information: (1) Solve the problem of drawing line function on mobile phone (2) The problem of solution the Bluetooth interface is that you need to click "re-scan" to display Bluetooth (3) Add the unit "cm" to the ultrasonic display (4) Change MiniUSB port to MicroUSB	cheny