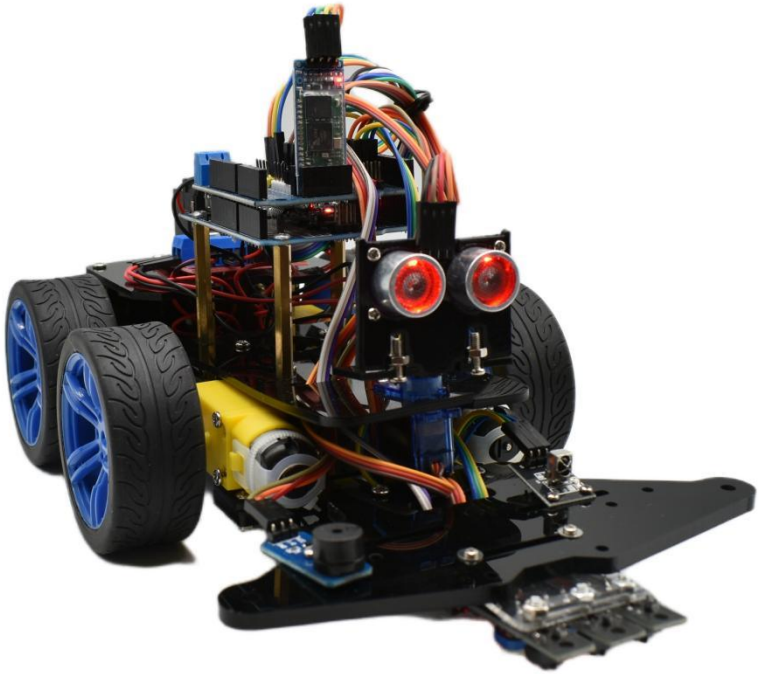
Smart Robot Car Kit



Content

Preface

Company Profile

Founded in 2014, Shenzhen Lonten Technology Co., Ltd. focuses on the design, research production of Electronics Module for robotics related products. Consisting of professional researchers and skilled engineers, our R&D team constantly strives for creative function and excellent user experience. The company's R&D investments on arduino kits raspberry pi kits, as well as 3D printer and robots that back up STEAM education.

Customer Service

Our self-owned factory is certificated with BSCI and SO, covering an area of 5,000 square meters, and achieving an annual production capacity of over 10,000 units. Our products are all certified to CE, FCC, and ROHS standards, have exported to more than 100 countries including, but not limited to France, the United States of America, Australia, Russia, the United Kingdom, Germany, Singapore, Egypt, and India, bringing technological innovation to all walks of life.

By the way, We also look forward to hearing from you and any of your critical comment or suggestions. Pls email us

by lonten3@qq.com or info@lontentech.com， if you have any questions or suggestions. As a continuous and fast growing company. We keep striving our best to offer you excellent products and quality service.

Our Store

store: https://www.lontentech.com/

Brand: LONTEN

Product Catalog

https://www.lontentech.com/collections/steam-robot

Tutorial

This tutorial include codes,libraries and lessons. It is designed for beginners. It will teach every users how to assembly the robot kit and use UNO controller board, sensors,servo.

How to Install Arduino IDE

Introduction

The Arduino Integrated Development Environment (IDE) is the software side of the Arduino platform.

In this Project, you will learn how to setup your computer to use Arduino and how to set about the Projects that follow.

The Arduino software that you will use to program your Arduino is available for Windows, Mac and Linux. The installation process is different for all three platforms and unfortunately there is a certain amount of manual work to install the software.

STEP 1: Go to https://www.arduino.cc/en/software.

The version available at this website is usually the latest version, and the actual version may be newer than the version in the picture.

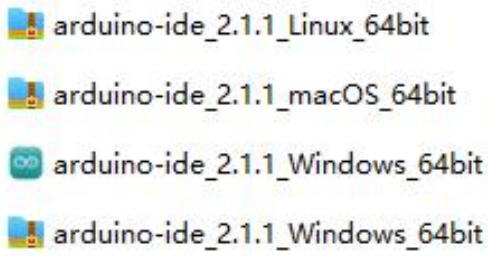
STEP2：Download the development software that is compatible with the operating.

system of your computer. Take Windows as an example here.

Click Windows Win 10 and newer,64 bits.

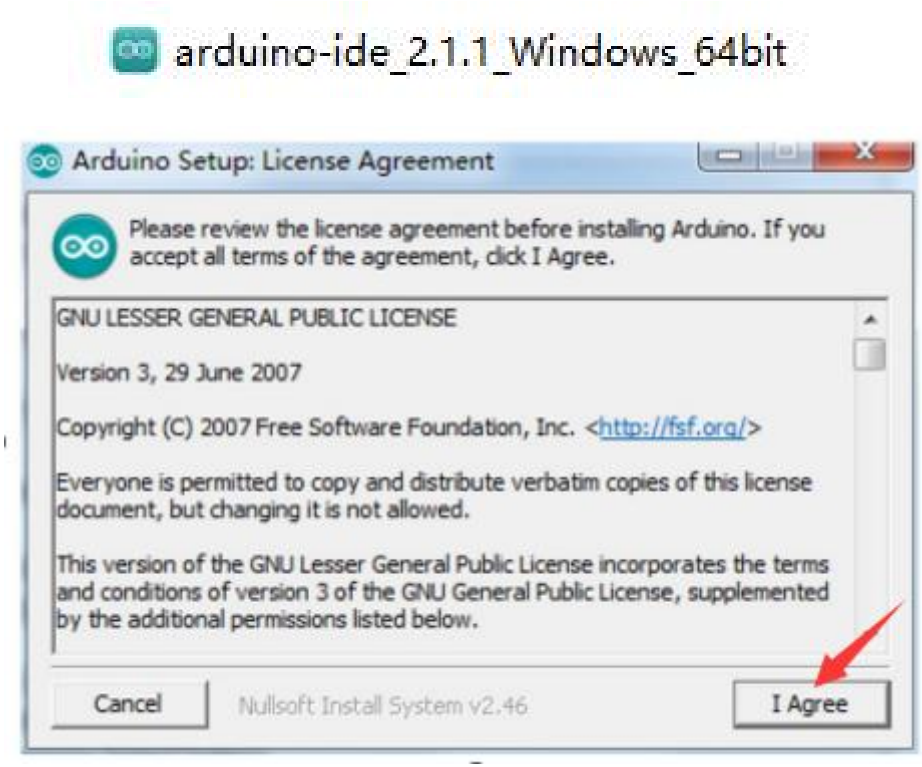
Click JUST DOWNLOAD.

Also version 2.1.1 is available in the material we provided, and the versions of our materials are the latest versions when this course was made.

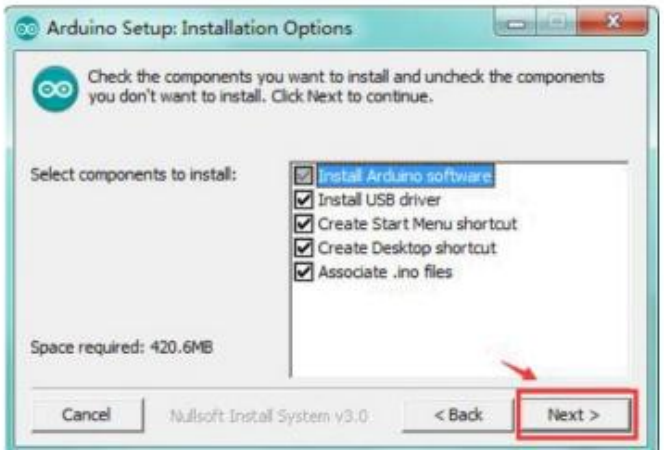


Installing Arduino (Windows)

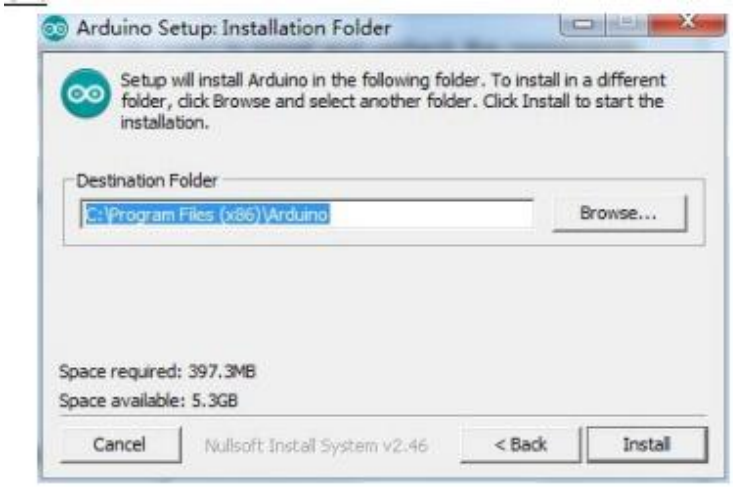
Install Arduino with the exe. Installation package.



Click I Agree to see the following interface.

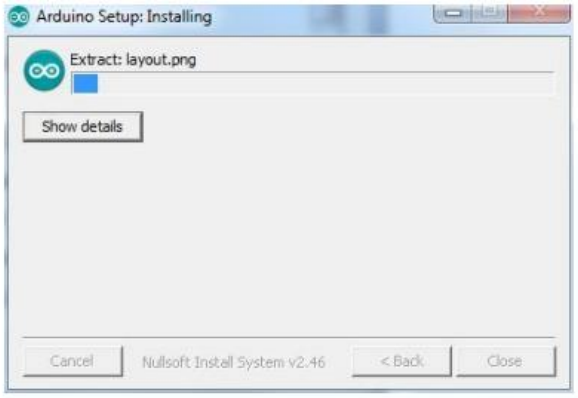

Arduino Setup: Installation Options
Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.
Select components to install:
Install Arduino software
Install USB driver
Create Start Menu shortcut
Create Desktop shortcut
Associate .ino files
Space required: 420.6MB
Cancel
Nullsoft Install System v3.0
< Back
Next >

Click Next

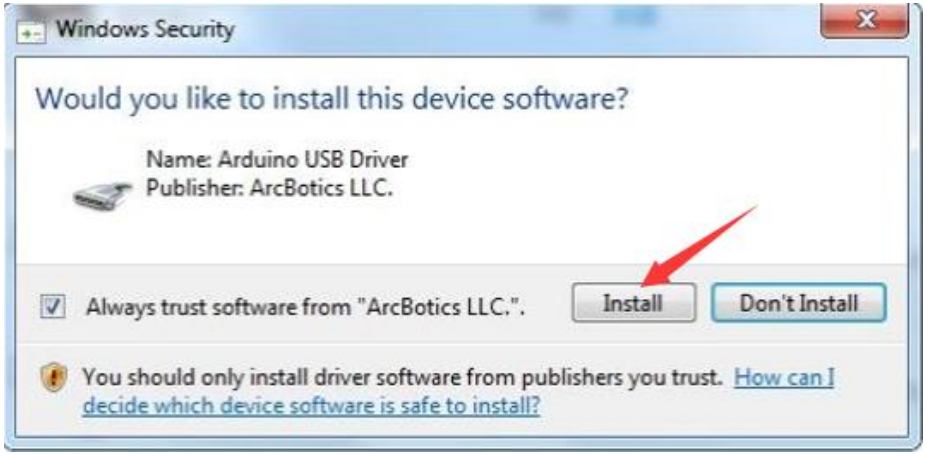

Arduino Setup: Installation Folder
Setup will install Arduino in the following folder. To install in a different folder, click Browse and select another folder. Click Install to start the installation.
Destination Folder
C:\Program Files (x86)\Arduino
Browse...
Space required: 397.3MB
Space available: 5.3GB
Cancel
Nullsoft Install System v2.46
< Back
Install

You can press Browse… to choose an installation path or directly type in the directory you want.

Click Install to initiate installation

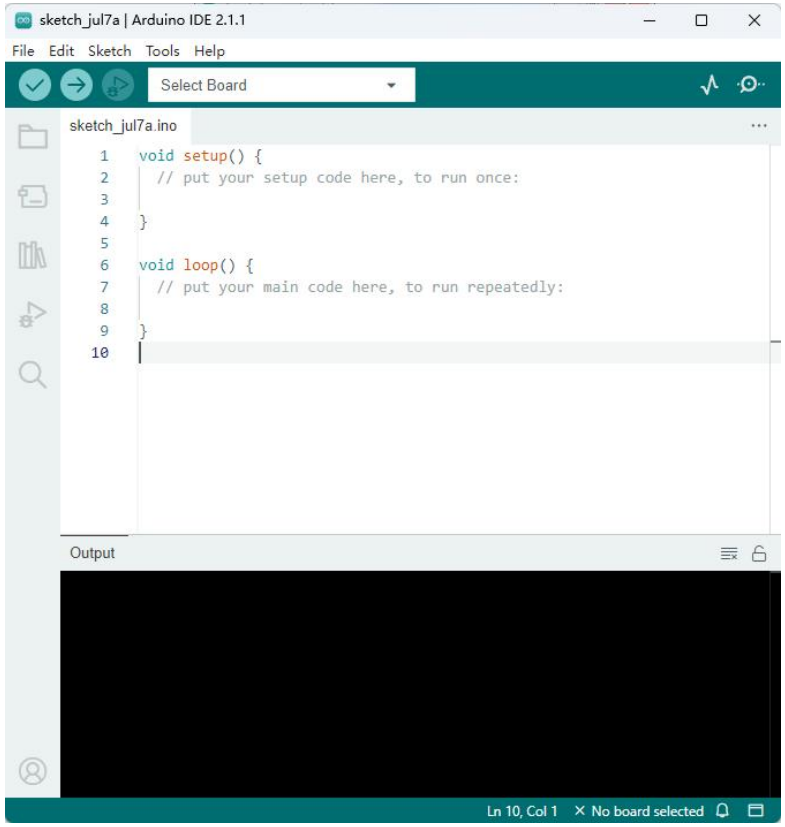


Finally, the following interface appears, click Install to finish the installation.



Next, the following icon appears on the desktop

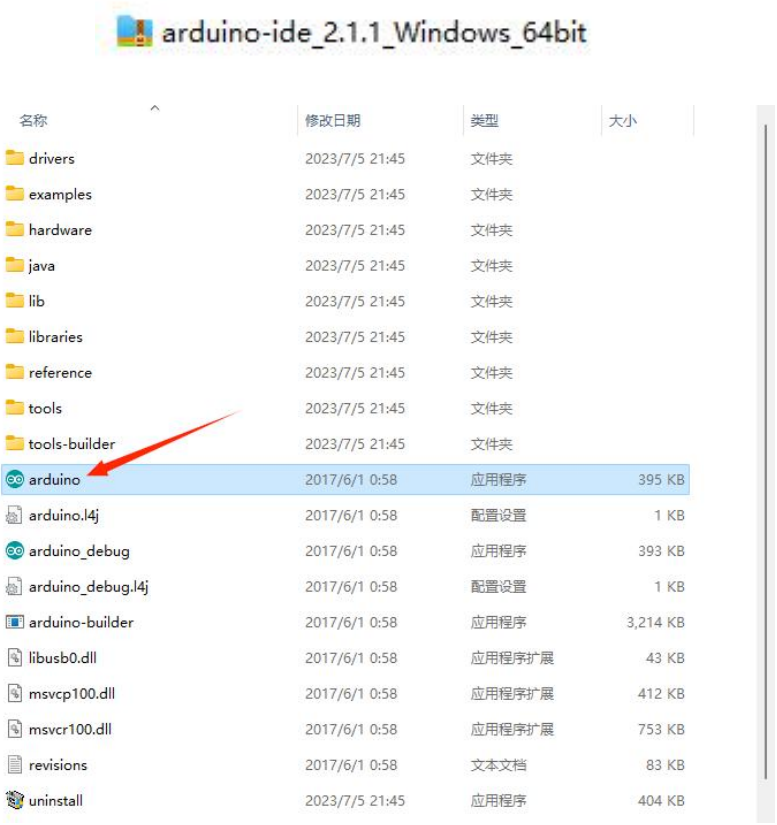
Double-click to enter the desired development environment

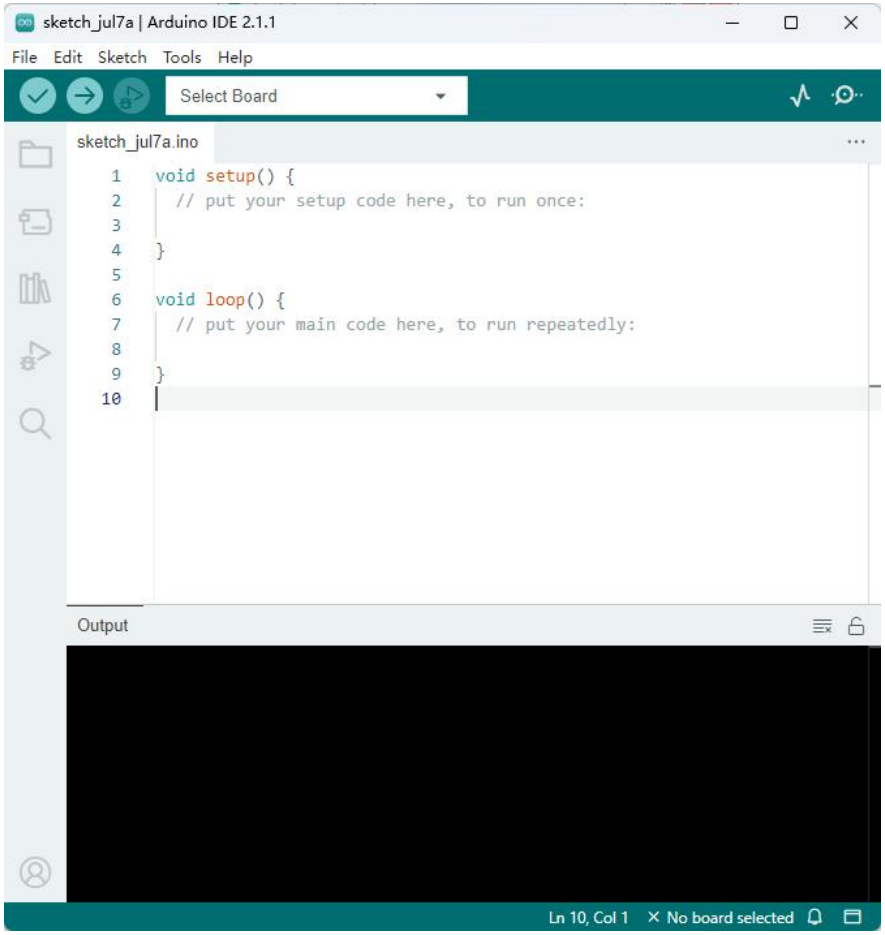


You may directly choose the installation package for installation and skip the contents below and jump to the next section.

But if you want to learn some methods other than the installation package, please continue to read the section.

Unzip the zip file downloaded, Double-click to open the program and enter the desired development environment.


arduino-ide_2.1.1_Windows_64bit
名称
修改日期
类型
大小
drivers 2023/7/5 21:45 文件夹
examples 2023/7/5 21:45 文件夹
hardware 2023/7/5 21:45 文件夹
java 2023/7/5 21:45 文件夹
lib 2023/7/5 21:45 文件夹
libraries 2023/7/5 21:45 文件夹
reference 2023/7/5 21:45 文件夹
tools 2023/7/5 21:45 文件夹
tools-builder 2023/7/5 21:45 文件夹
arduino 2017/6/1 0:58 应用程序 395 KB
arduino.l4j 2017/6/1 0:58 配置设置 1 KB
arduino_debug 2017/6/1 0:58 应用程序 393 KB
arduino_debug.l4j 2017/6/1 0:58 配置设置 1 KB
arduino-builder 2017/6/1 0:58 应用程序 3,214 KB
libusb0.dll 2017/6/1 0:58 应用程序扩展 43 KB
msvcp100.dll 2017/6/1 0:58 应用程序扩展 412 KB
msvcr100.dll 2017/6/1 0:58 应用程序扩展 753 KB
revisions 2017/6/1 0:58 文本文档 83 KB
uninstall 2023/7/5 21:45 应用程序 404 KB


sketch_jul7a | Arduino IDE 2.1.1
File Edit Sketch Tools Help
Select Board
sketch_jul7a.ino
1 void setup() {
2 // put your setup code here, to run once:
3
4 }
5
6 void loop() {
7 // put your main code here, to run repeatedly:
8
9 }
10
Output
Ln 10, Col 1
No board selected

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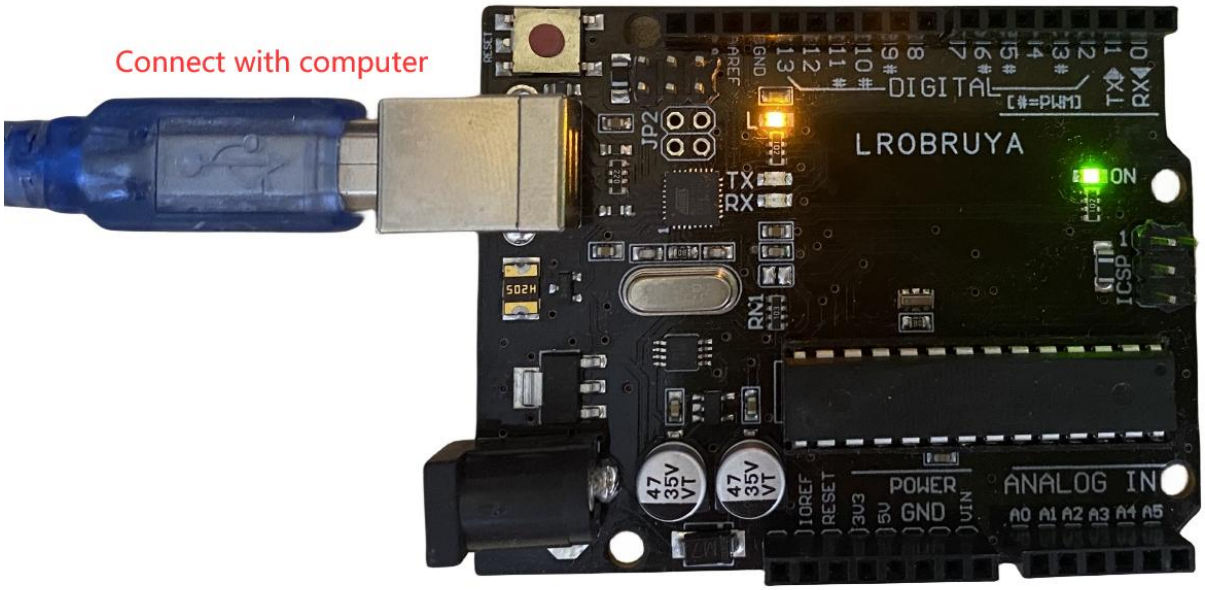
How to Install Arduino Driver

For Windows

Arduino UNO R3 board



Serial communication interface: D0 is RX, D1 is TX

PWM interface (pulse width modulation): D3 D5 D6 D9 D10 D11

External interrupt interface: D2 (interrupt 0) and D3 (interrupt 1)

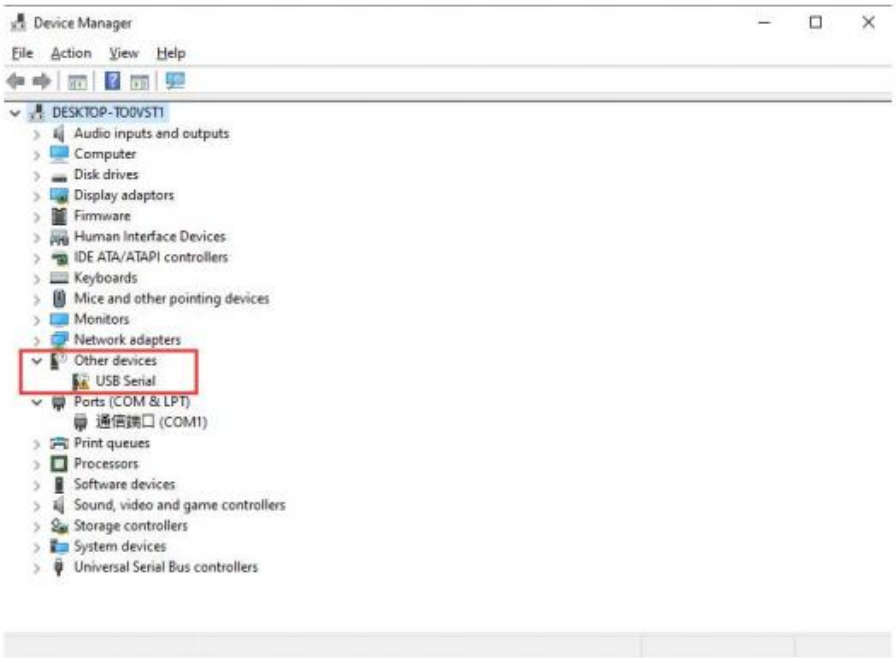
SPI communication interface: D10 is SS, D11 is MOSI, D12 is MISO, D13 is SCK

IIC communication port: A4 is SDA, A5 is SCL

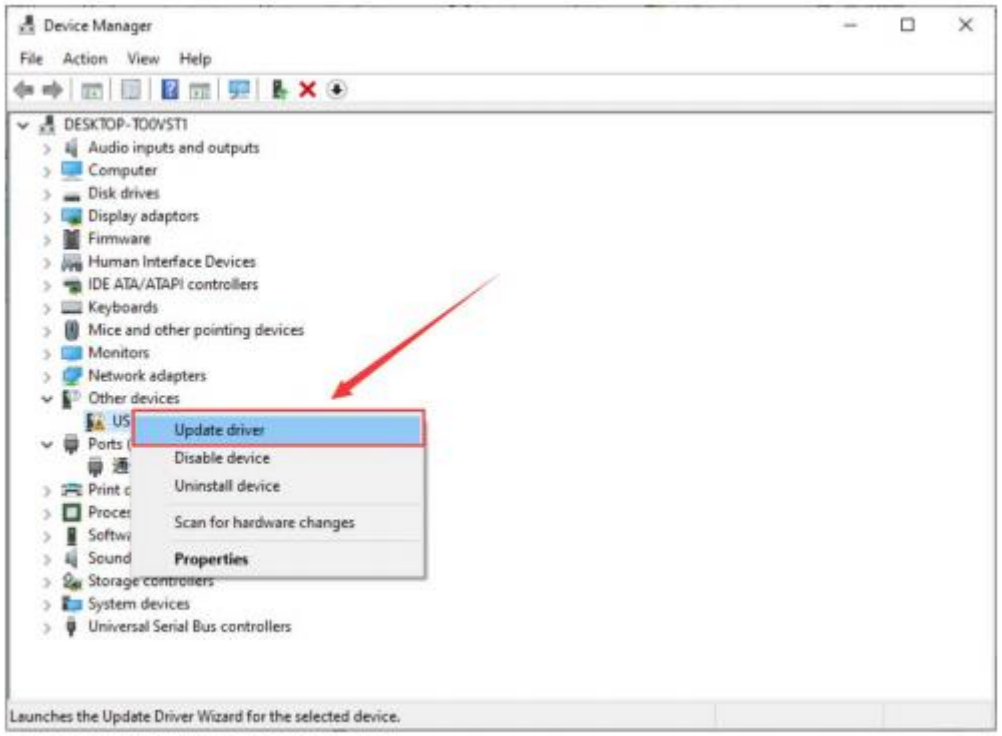
In different systems, the driver installation is similar. Here we start to install the driver on the Win10 system. You can find the “USB_Drive_CH341_3_1” folder in the information we provide, this is the driver file we want to install.

Plug one end of your USB cable into the Arduino UNO R3 Board and the other into a USB socket on your computer.

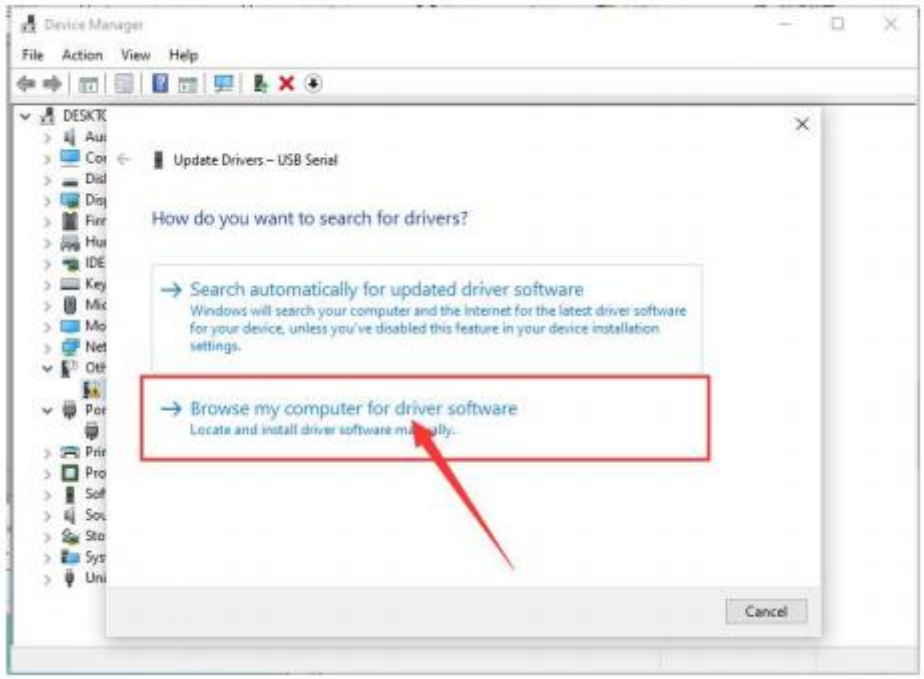
When you connect the Arduino UNOR3 Board to your computer at the first time, right click your “My Computer”—>for “Properties”—>click the “Device manager”, under Other devices, you should see the “USB-Serial” or “Unknown device ”.Or you can search for "devi" in your computer, or you can open the device manager of your computer.



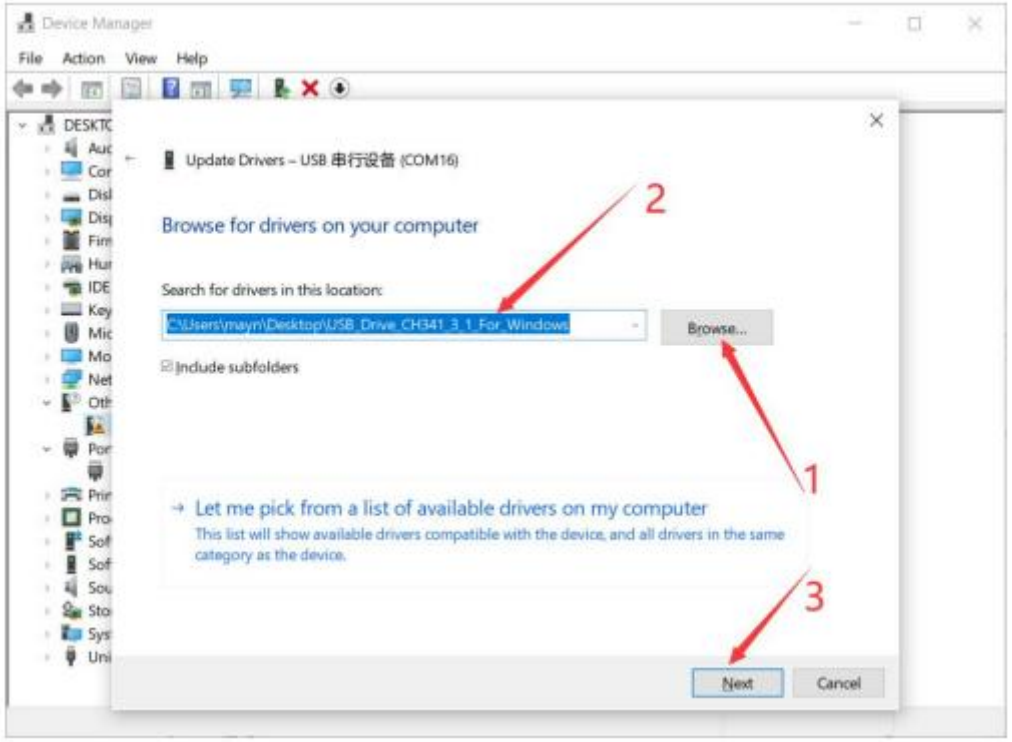
Then right-click on the device and select the top menu option (Update Driver Software...) shown as the figure below.



Then it will be prompted to either “Search Automatically for updated driver software” or “Browse my computer for driver software”. Shown as below. In this page, select “Browse my computer for driver software”.

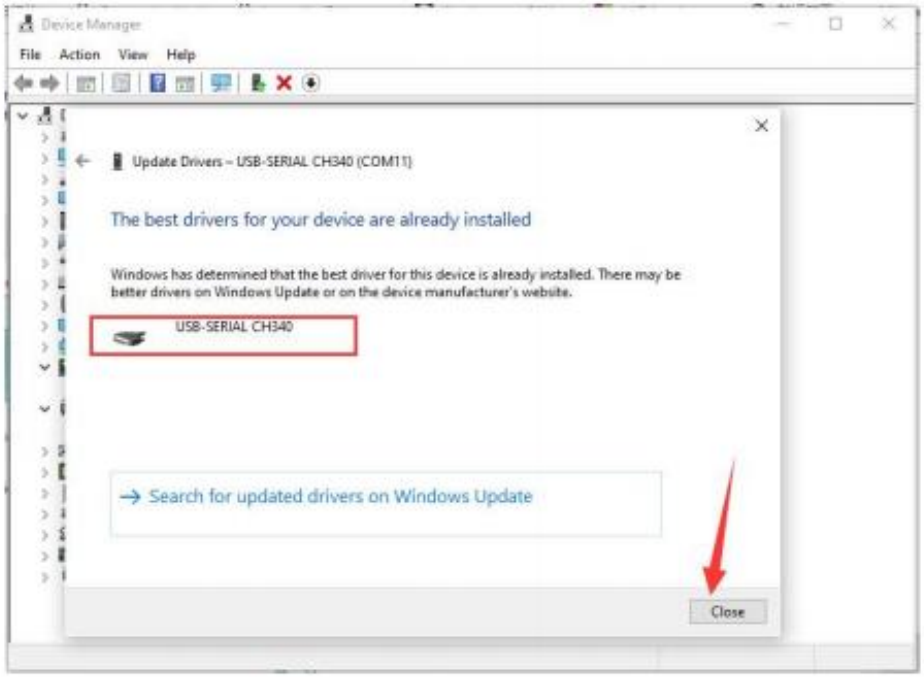


After that, select the browse option and navigate to the drive folder "USB_Drive_CH341_3_1", which can be found in the information we provide.(Note that the file path selects the location of the. For example, I store this driver file on the computer desktop, so the file path I choose is C:\Users\mayn\Desktop\USB_Drive_CH341_3_1_For_Windows)

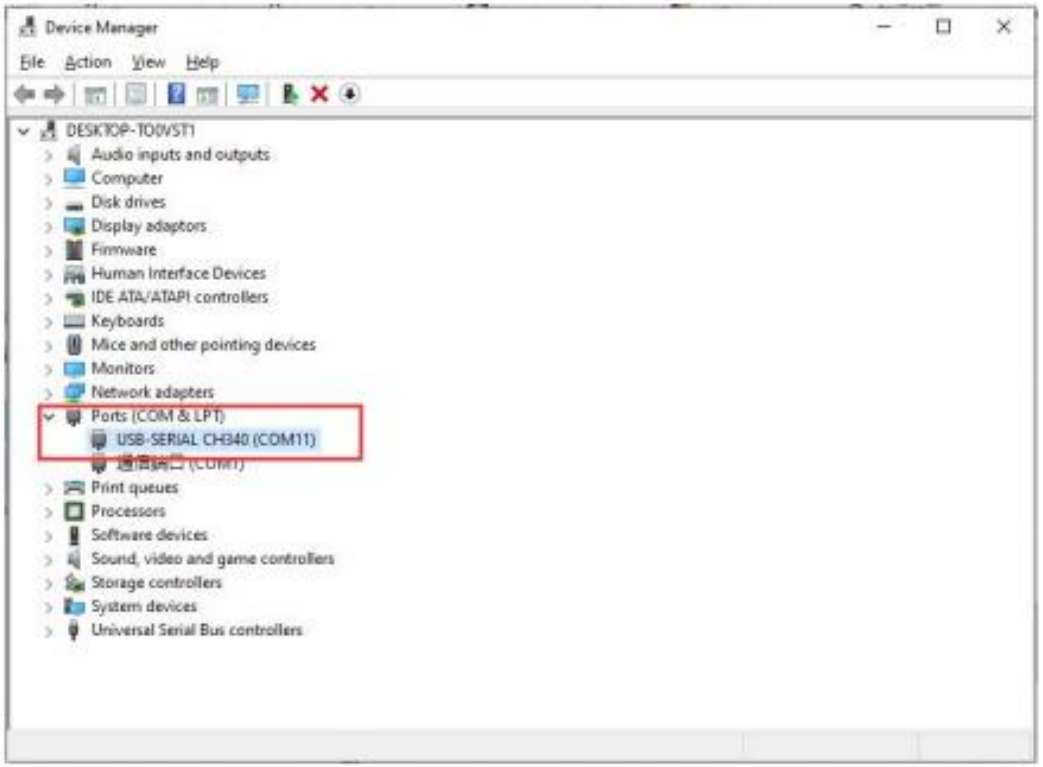


Once the software has been installed, you will get a confirmation message.

Installation completed, click “Close”.



Up to now, the driver is installed well. Then you can right click “My Computer”—>for “Properties”—>click the “Device manager”, you should see the device as the figure shown below. Or you can search for "devi" in your computer, or you can open the device manager of your computer.


Device Manager
File Action View Help
DESKTOP-TO0VST1
Audio inputs and outputs
Computer
Disk drives
Display adaptors
Firmware
Human Interface Devices
IDE ATA/ATAPI controllers
Keyboards
Mice and other pointing devices
Monitors
Network adapters
Ports (COM & LPT)
USB-SERIAL CH340 (COM11)
Print queues
Processors
Software devices
Sound, video and game controllers
Storage controllers
System devices
Universal Serial Bus controllers

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How to Add Arduino Libraries

Installing Additional Arduino Libraries

Once you are comfortable with the Arduino software and using the built-in functions, you may want to extend the ability of your Arduino with additional libraries.

What are Libraries?

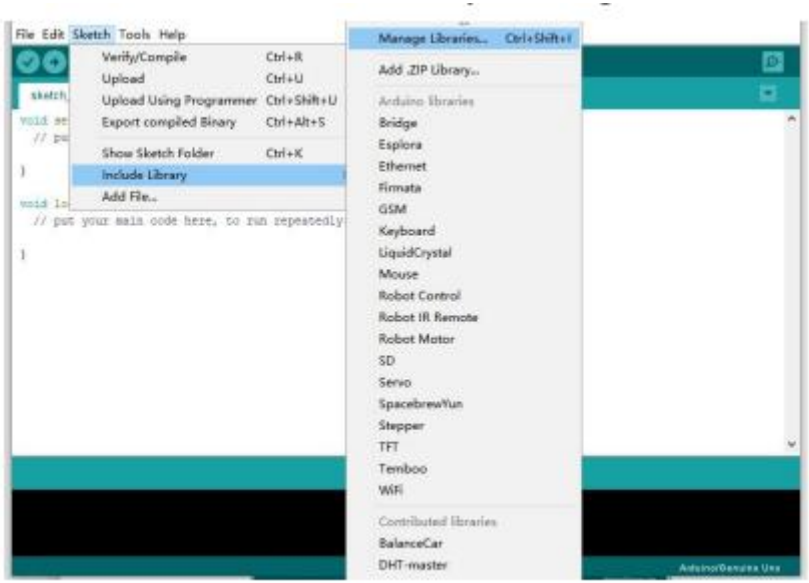
Libraries are a collection of code that makes it easy for you to connect to a sensor, display, module, etc. For example, the built-in Liquid Crystal library makes it easy to talk to character LCD displays. There are hundreds of additional libraries available on the Internet for download.

The built-in libraries and some of these additional libraries are listed in the reference. To use the additional libraries, you will need to install them.

How to Install a Library

Using the Library Manager

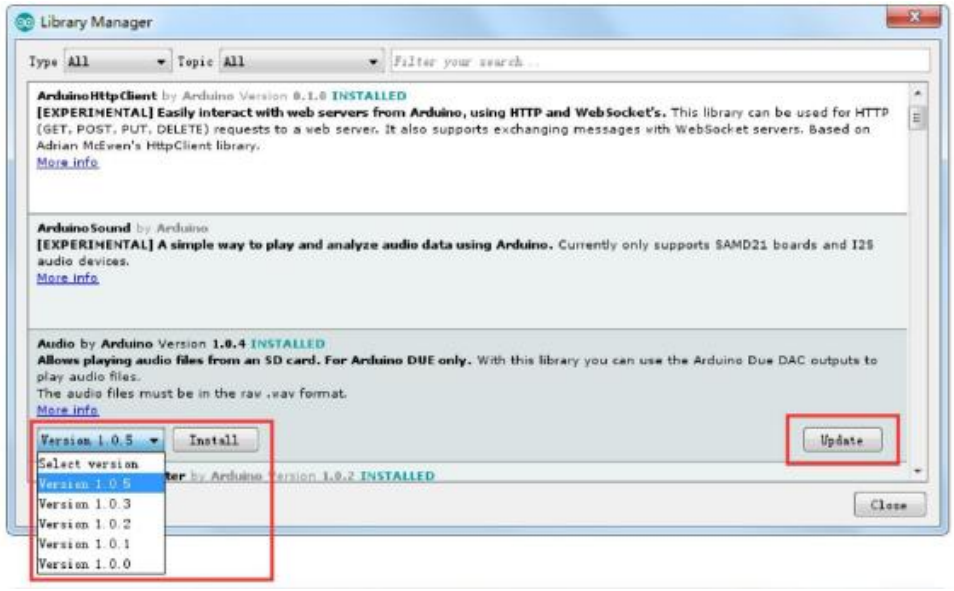
To install a new library into your Arduino IDE you can use the Library Manager (available from IDE version 1.8.0). Open the IDE and click to the "Sketch" menu and then Include Library > Manage Libraries.

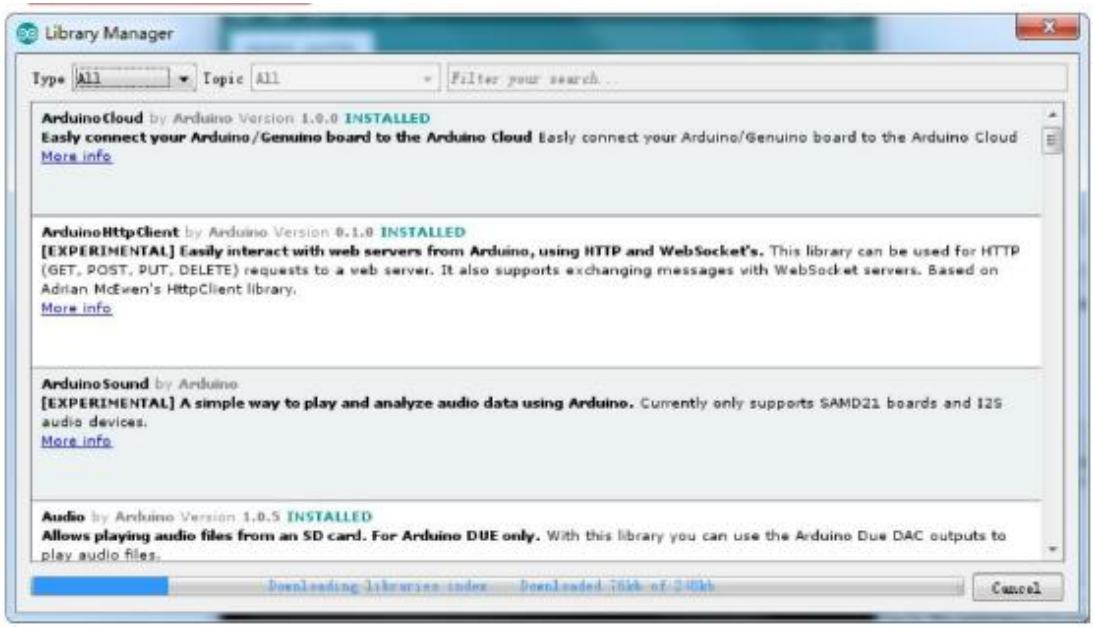


Then the library manager will open and you will find a list of libraries that are already installed or ready for installation. In this example we will install the Bridge library. Scroll the list to find it, then select the version of the library you want to install. Sometimes only one version of the library is available. If the version selection menu does not appear, don't

worry: it is normal.

There are times you have to be patient with it, just as shown in the figure. Please refresh it and wait.

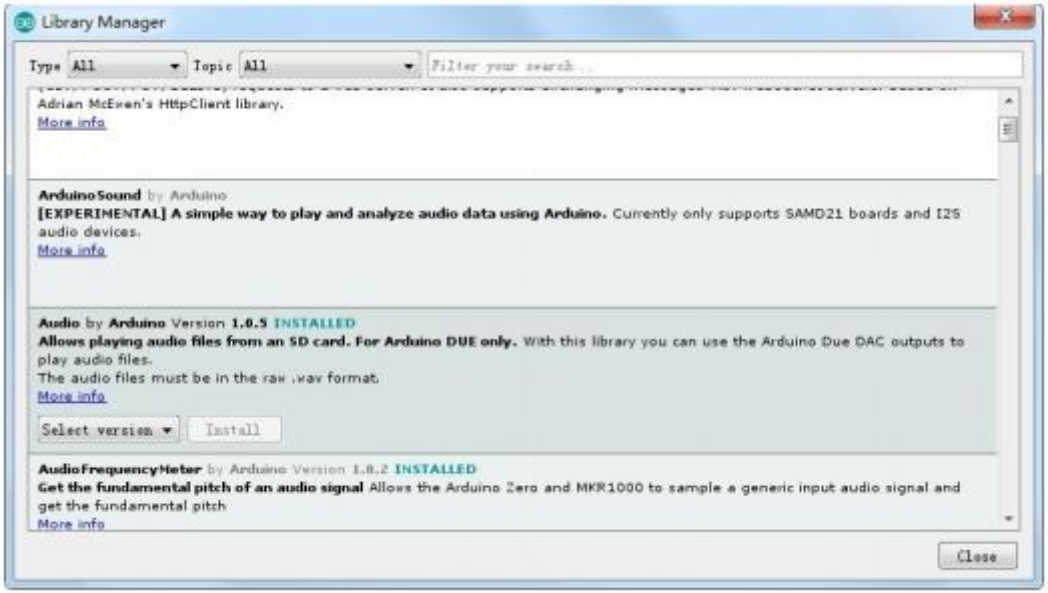




Finally click on install and wait for the IDE to install the new library.

Downloading may take time depending on your connection speed. Once it has finished, an Installed tag should appear next to the Bridge library.

You can close the library manager.

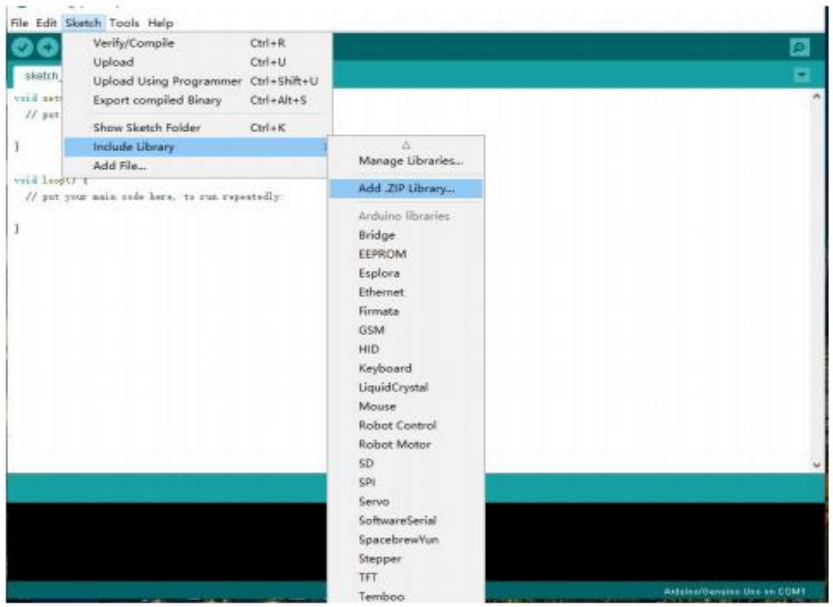


You can now find the new library available in the Include Library menu. If you want to add your own library open a new issue on Github.

Importing a .zip Library

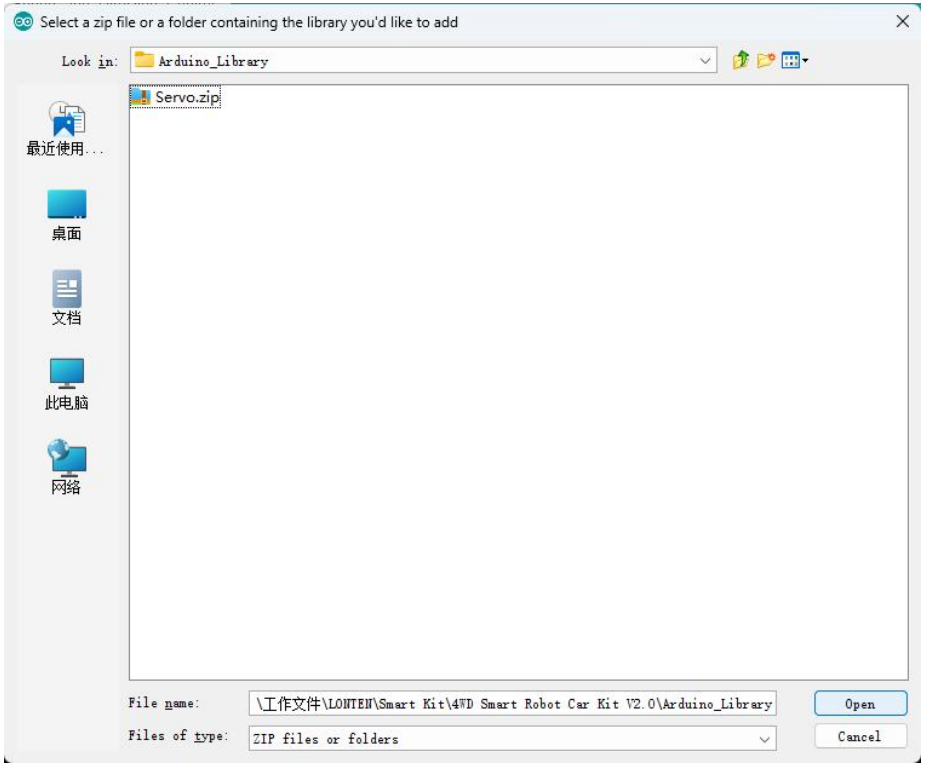
Libraries are often distributed as a ZIP file or folder. The name of the folder is the name of the library. Inside the folder will be a .cpp file, a .h file and often a keywords.txt file, examples folder, and other files required by the library. Starting with

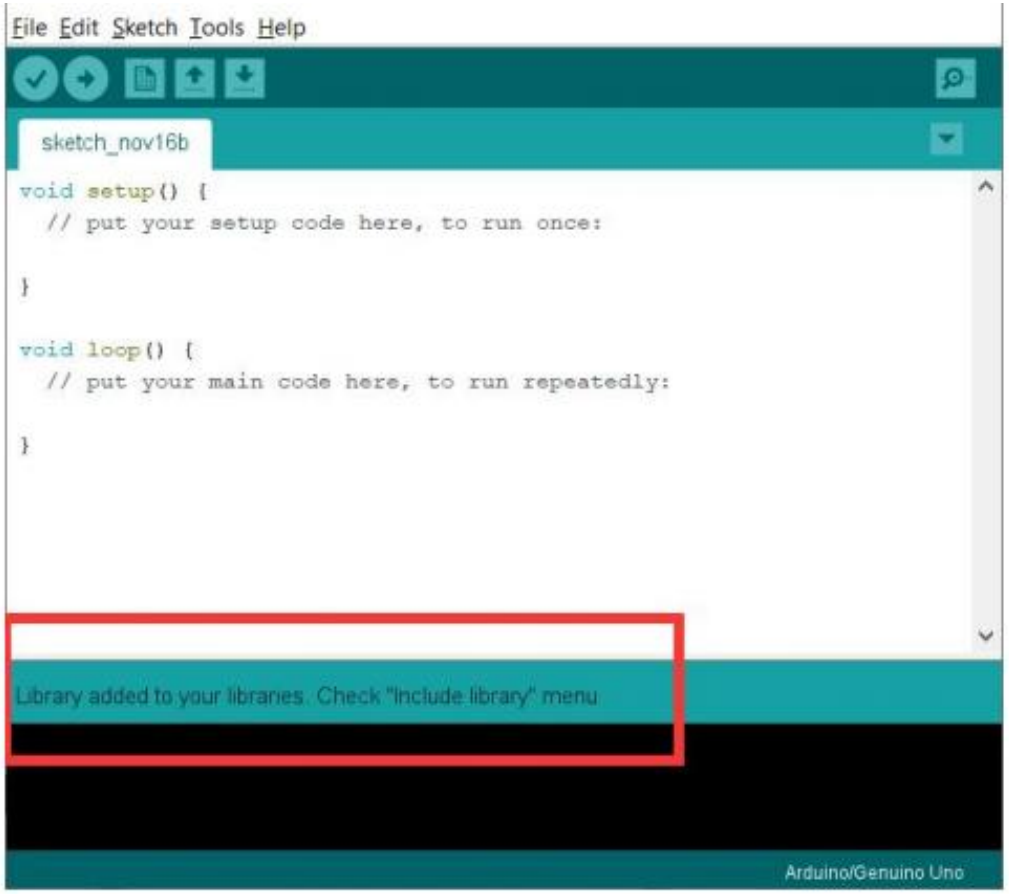
version 1.0.5, you can install 3rd party libraries in the IDE. Do not unzip the downloaded library, leave it as is. In the Arduino IDE, navigate to Sketch > Include Library. At the top of the drop down list, select the option to "Add .ZIP Library".



You will be prompted to select the library you would like to add.

Navigate to the .zip file's location and open it.


Select a zip file or a folder containing the library you'd like to add
Look in:
Arduino_Library
Servo.zip
最近使用...
桌面
文档
此电脑
网络
File name:
\工作文件\LOWTEN\Smart Kit\4WD Smart Robot Car Kit V2.0\Arduino_Library
Files of type:
ZIP files or folders
Open
Cancel


File Edit Sketch Tools Help
sketch_nov16b
void setup() {
// put your setup code here, to run once:
}
void loop() {
// put your main code here, to run repeatedly:
}
Library added to your libraries. Check "Include library" menu
Arduino/Genuino Uno

Return to the Sketch > Import Library menu. You should now see the library at the bottom of the drop-down menu. It is ready to be used in your sketch. The zip file will have been expanded in the libraries folder in your Arduino sketches directory. NB: the Library will be available to use in sketches, but examples for the library will not be exposed in the File > Examples until after the IDE has restarted.

Blink Test

Overview

In this Project, you will learn how to program your UNO R3 controller board to blink the Arduino's built-in LED, and how to download programs by basic steps.

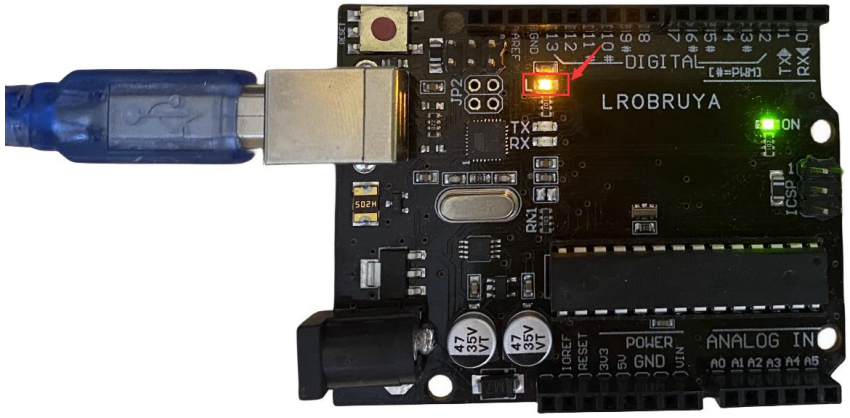
Component Required:

LROBRUYA Uno R3 Board* 1

Principle

The UNO R3 board has rows of connectors along both sides that are used to connect to several electronic devices and plug-in 'shields' that extends its capability.

It also has a single LED that you can control from your sketches. This LED is built onto the UNO R3 board and is often referred to as the 'L' LED as this is how it is labeled on the board.

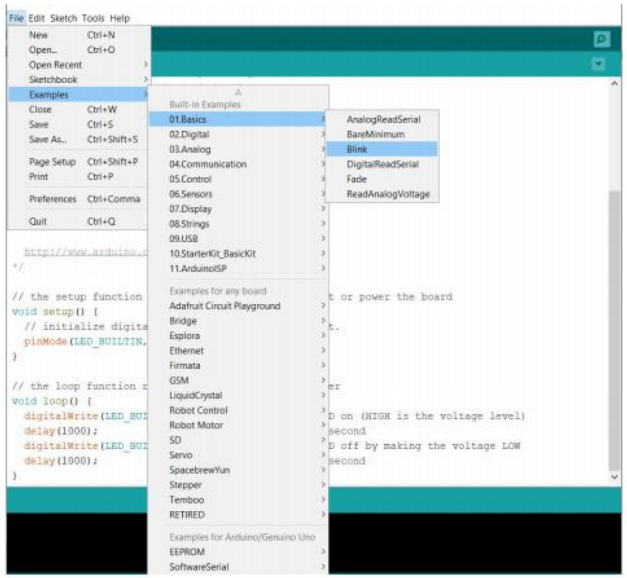


In this Project, we will reprogram the UNO board with our own Blink sketch and then change the rate at which it blinks.

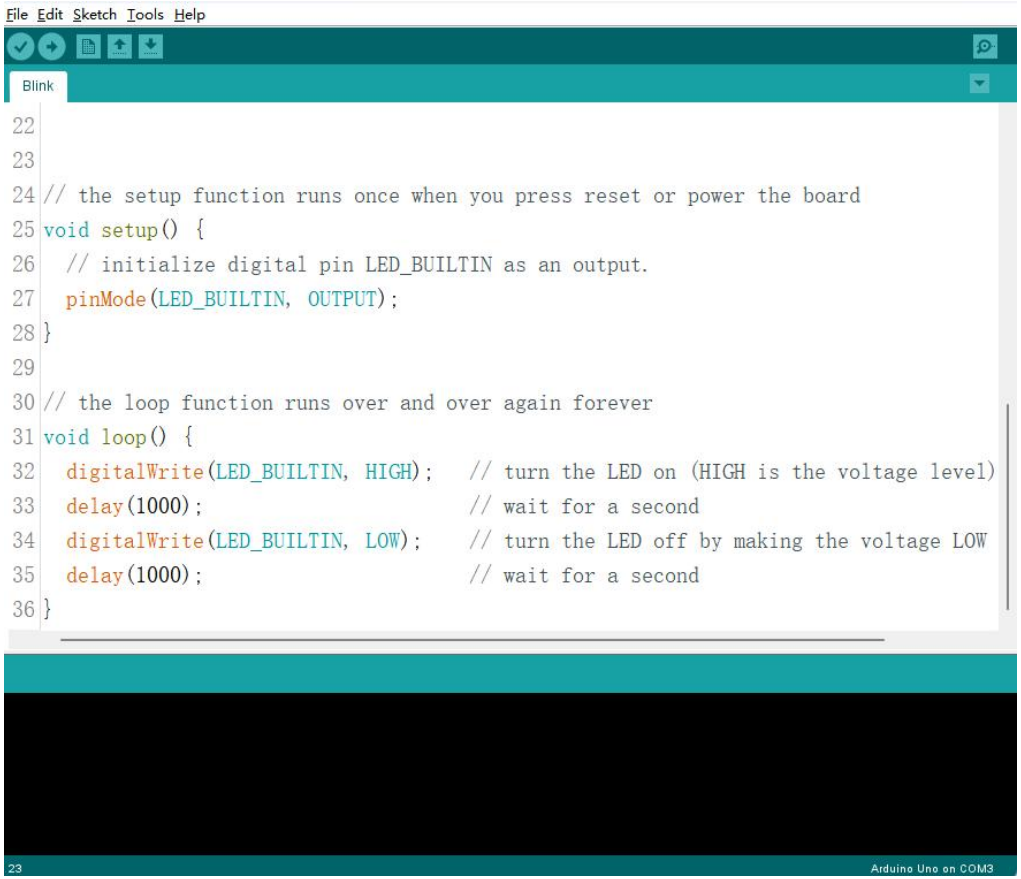
In the previous chapter-How to install Arduino IDE, you set up your Arduino IDE and made sure that you could find the right serial port for it to connect to your UNO board. The time has now come to put that connection to the test and program your UNO board.

The Arduino IDE includes a large collection of example sketches that you can load up and use. This includes an example sketch for making the 'L' LED blink.

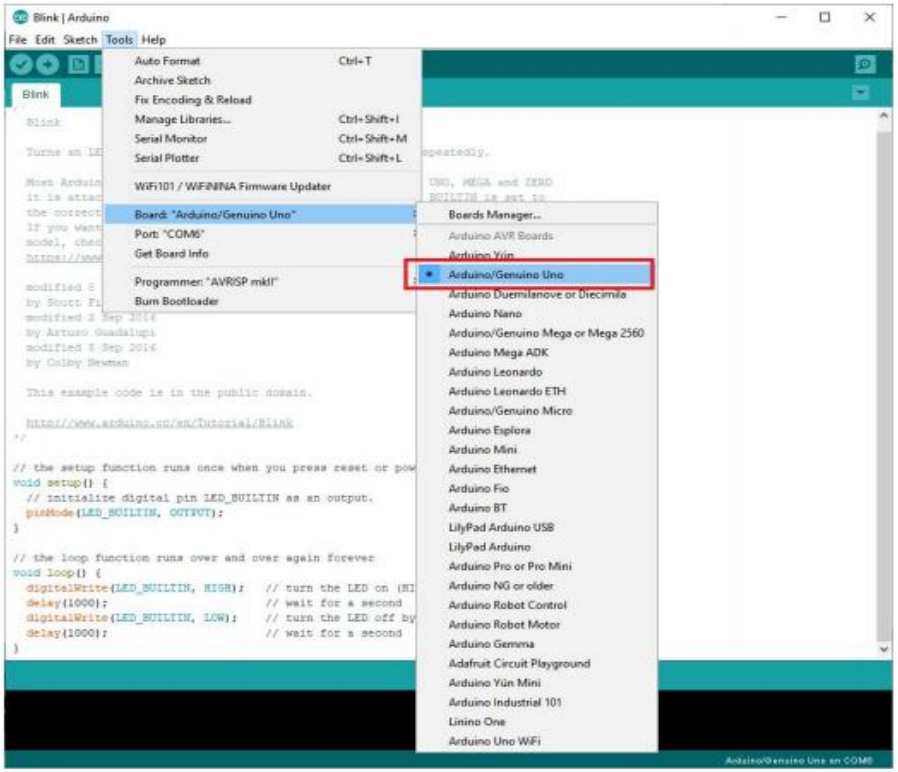
Load the 'Blink' sketch that you will find in the IDE's menu system under File > Examples > 01.Basics>Blink

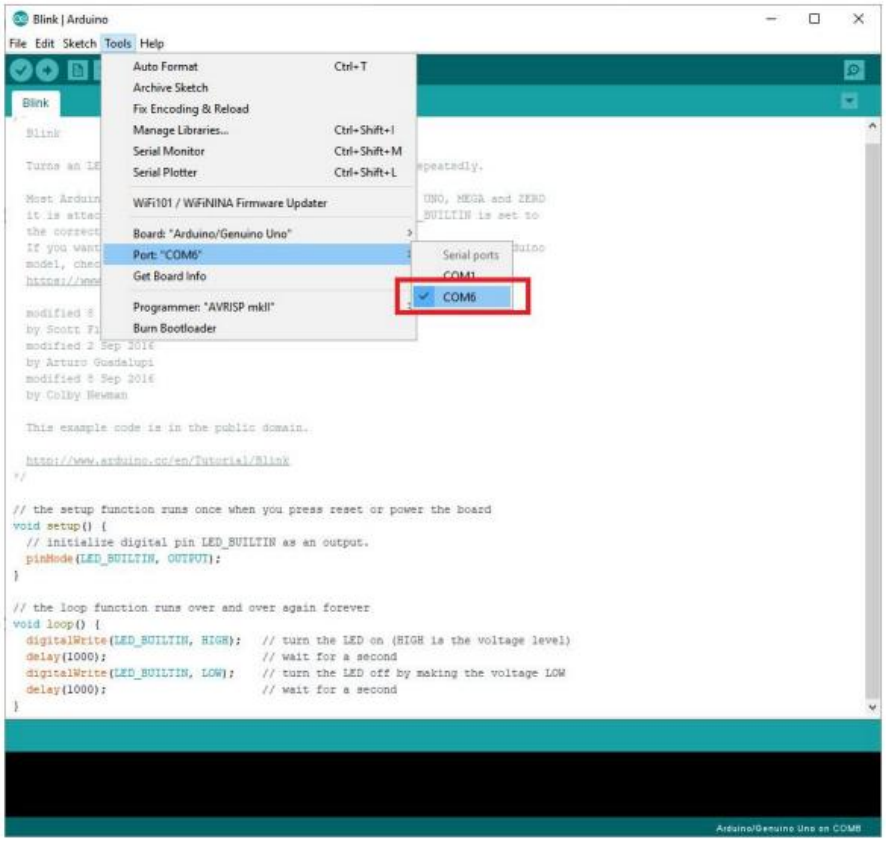


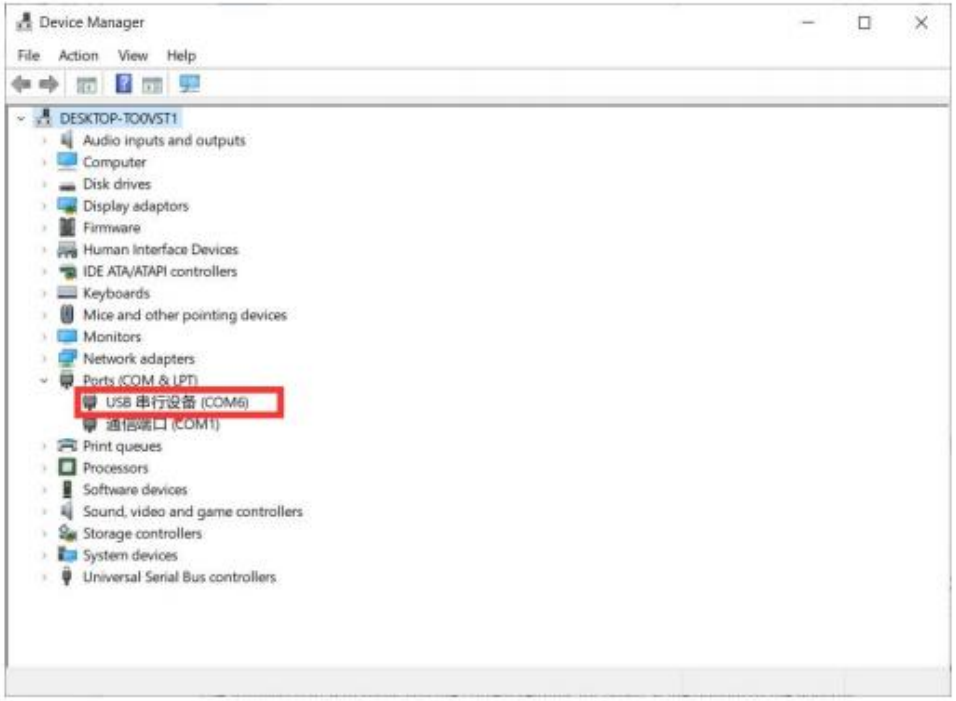
When the sketch window opens, enlarge it so that you can see the entire sketch in the window.



Attach your Arduino board to your computer with the USB cable and check that the 'Board Type' and 'Serial Port' are set correctly.



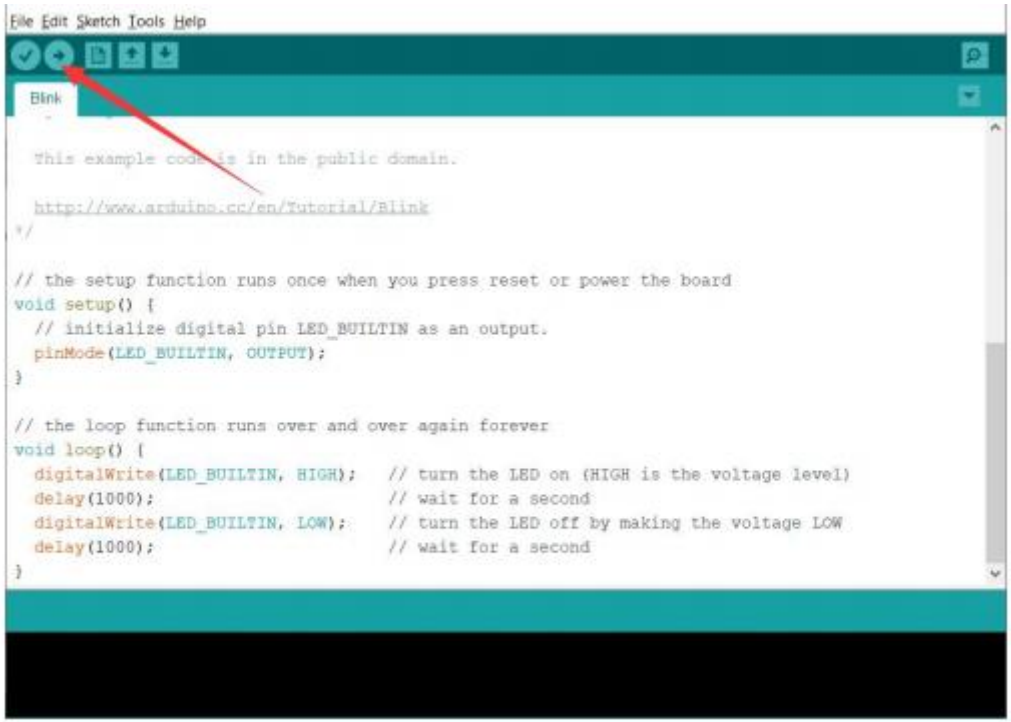

Blink | Arduino
File Edit Sketch Tools Help
Auto Format Ctrl+T
Archive Sketch
Fix Encoding & Reload
Manage Libraries... Ctrl+Shift+I
Serial Monitor Ctrl+Shift+M
Serial Plotter Ctrl+Shift+L
WiFi101 / WiFiNINA Firmware Updater
Board: "Arduino/Genuino Uno"
Port: "COM6"
Get Board Info
Programmer: "AVRISP mkII"
Burn Bootloader
Serial ports
COM1
COM6
Blink
Blink
Turns an LED
Most Arduin
it is attac
the correct
If you want
model, chec
https://www
modified 8
by Scott Fi
modified 2 Sep 2016
by Arturo Guadalupi
modified 8 Sep 2016
by Colby Newman
This example code is in the public domain.
http://www.arduino.cc/en/Tutorial/Blink
*/
// the setup function runs once when you press reset or power the board
void setup() {
// initialize digital pin LED_BUILTIN as an output.
pinMode(LED_BUILTIN, OUTPUT);
}
// the loop function runs over and over again forever
void loop() {
digitalWrite(LED_BUILTIN, HIGH); // turn the LED on (HIGH is the voltage level)
delay(1000); // wait for a second
digitalWrite(LED_BUILTIN, LOW); // turn the LED off by making the voltage LOW
delay(1000); // wait for a second
}
repeatedly.
UNO, MEGA and ZERO
_BUILTIN is set to
uino
Arduino/Genuino Uno on COM6



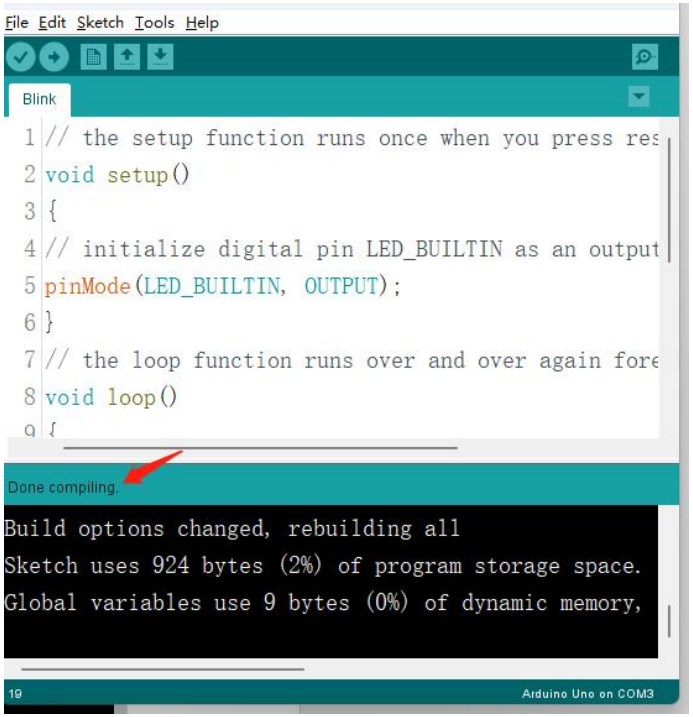
Note: The Board Type and Serial Port here are not necessarily the same as shown in picture. If you are using UNO, then you will have to choose Arduino UNO as the Board Type, other choices can be made in the same manner. And the Serial Port displayed for everyone is different, despite COM 6 chosen here, it could be COM3 or COM4 on your computer. A right COM port is supposed to be COMX (arduino XXX), which is by the certification criteria.

The Arduino IDE will show you the current settings for board at the bottom of the window.

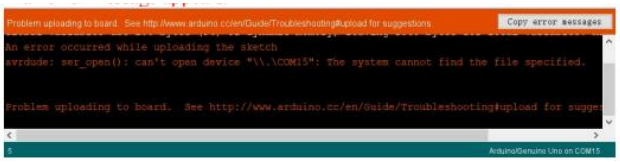
Click on the 'Upload' button. The second button from the left on the toolbar.



When the status bar prompts "Done uploading", it means the code upload is successful



If an error message appears.

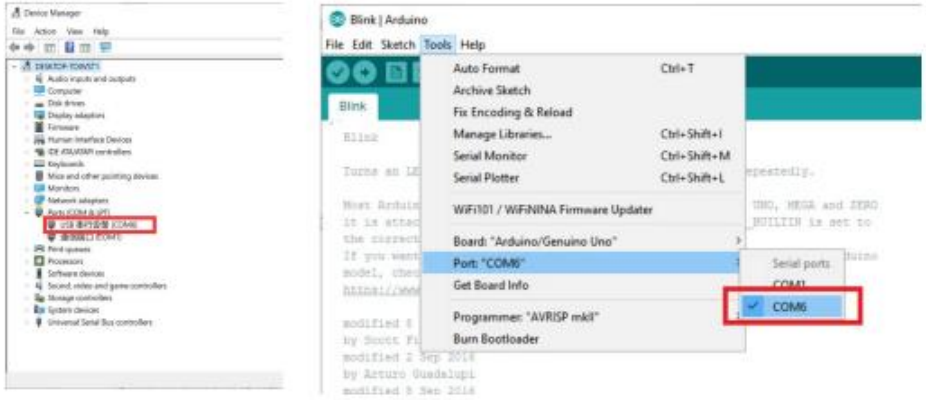


There can be several reasons:

1. The arduino uno driver software is not installed successfully, please refer to the course for the installation steps: How to Install Arduino Driver.

2. The communication serial port selection of arduino uno is wrong;

you can check the communication port COMx of your arduino uno in the computer in the device manager.

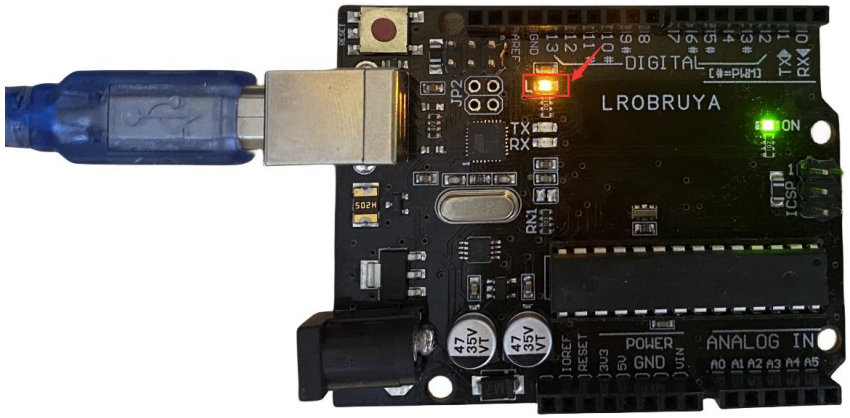


3. If your Arduino uno is connected to a Bluetooth module, it will occupy the communication serial port. You need to remove the Bluetooth module connection before uploading the code.

4. The USB data cable is not firmly connected. Check if there are any of the above problems. After correcting, follow the previous steps to re-operate.

Test Code

```
void setup() // the setup function runs once when you press reset or power the board
{
    pinMode(LED_BUILTIN, OUTPUT); // initialize digital pin LED_BUILTIN as an output.
}
void loop() // the loop function runs over and over again forever
{
    digitalWrite(LED_BUILTIN, HIGH); // turn the LED on (HIGH is the voltage level)
    delay(1000); // wait for a second
    digitalWrite(LED_BUILTIN, LOW); // turn the LED off by making the voltage LOW
    delay(1000); // wait for a second }
```



After the code is successfully uploaded, the "L" character LED will flash once per second. So far, you have completed the testing process of your first program.

LROBRUYA

Lesson 1 The Use of Buzzer

About this lesson:

In this lesson, we will learn how to control the buzzer on the expansion board and how to make the buzzer play a song.

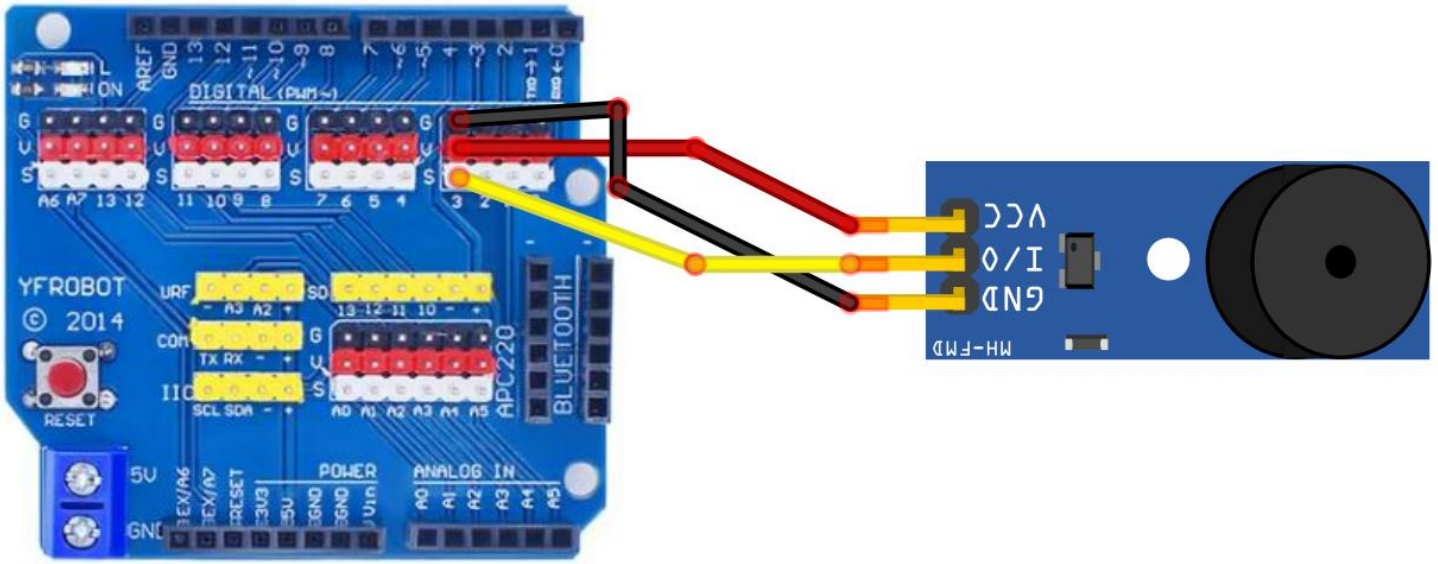
Component Introduction

Buzzers are divided into two types: "active buzzers" and "passive buzzers".Active means that they possess a multi-vibrator inside. It only needs to provide the working voltage externally, it can emit a fixed frequency sound.

Passive means that there is no internal oscillation source, and an external drive circuit is required to provide a certain frequency of the drive signal.

In this experiment, we will use passive buzzer.we use buzzer are directly driven by P3 of UNO.

Wiring diagram



Let's program

Test 1--Car_whistle

The experiment was mainly used to imitate the effect of car honking.

Result

If you want to refer to the program we provide.Open the reference code for this lesson "**Test_1_Car_whistle.ino**" in the reference materials we provided.

After the program is downloaded, the buzzer will start whistle and keep looping in this state.

Test 2--Singing

In Experimental Test 2, We will learn to play a tune on the buzzer.

Result

If you want to refer to the program we provide.open Arduino IDE software and open the reference code for this lesson "**Test_2_Singing.ino**" in the reference materials we provided.

After the program is downloaded, the buzzer will play song《Merry Christmas》and keep looping in this state.

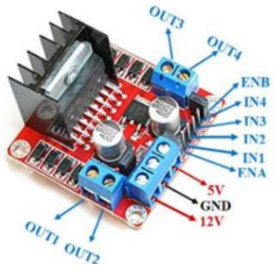
Lesson 2 Motor Speed and Direction Control

About this lesson:

In this lesson, you will learn how to use a Motor Driver module control the direction and speed control of the robot car.

Component Introduction

This L298N Motor Driver Module is a high power motor driver module for driving DC and Stepper Motors. This module consists of an L298 motor driver IC and a 78M05 5V regulator. L298N Module can control up to 4 DC motors, or 2 DC motors with directional and speed control.



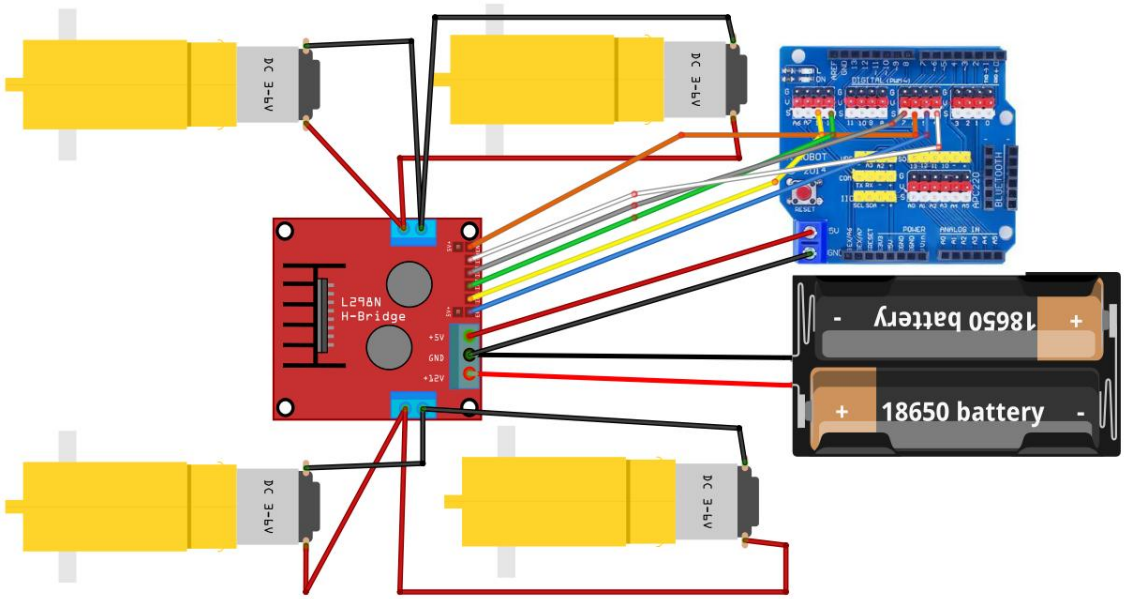
Using L298N made by ST Company as the control chip, the module has characteristics of strong driving ability, low

calorific value and strong anti-interference ability.

This module can use built-in 78M05 for electric work via a driving power supply part. But to avoid the damage of the voltage stabilizing chip, please use an external 5V logic supply when using more than 12V driving voltage.

Using large capacity filter capacitor, this module can follow current to protect diodes, and improve reliability.

Wiring diagram



Attention

When connecting, the jumper caps of ENA and ENB must be removed.

If the car is moving in the opposite direction, please carefully check whether the motor line is connected incorrectly.

Result

After connection and power-on, two motors rotate clockwise for 2 second at a speed of 200 (PWM value is 200) and then stop for 2 second; two motors rotate anticlockwise for 2 second at a speed of 200 (PWM value is 200) and then stop for 2second; circulating like this.

Lesson 3 IR Receiver

About this lesson:

In this lesson, We will learn the infrared emission and receiver module and use it to control the car.

What is IR receiver sensor

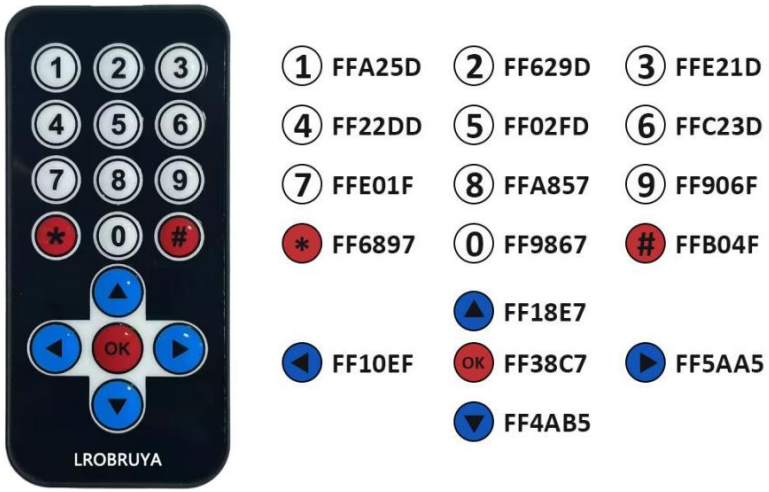
IR is widely used in remote control. With this IR receiver, Arduino project is able to receive command from any IR remoter controller if you have the right decoder. Well, it will be also easy to make your own IR controller using IR transmitter.

There are 3 connections to the IR Receiver.

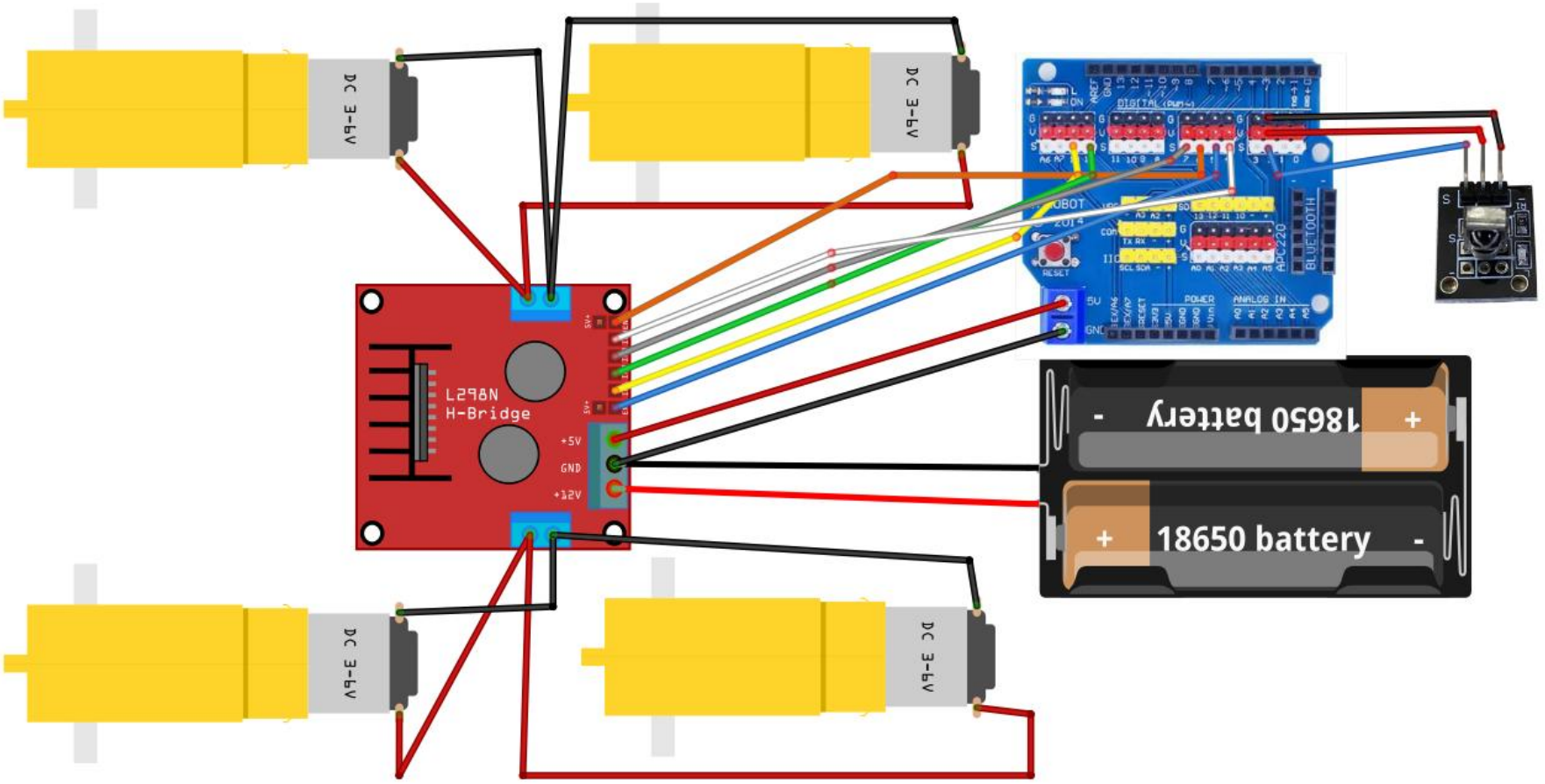
The connections are: Signal, Voltage and Ground.

The “-” is the Ground, “S” is signal, and middle pin is Voltage 5V.

Remote control code:



Wiring diagram



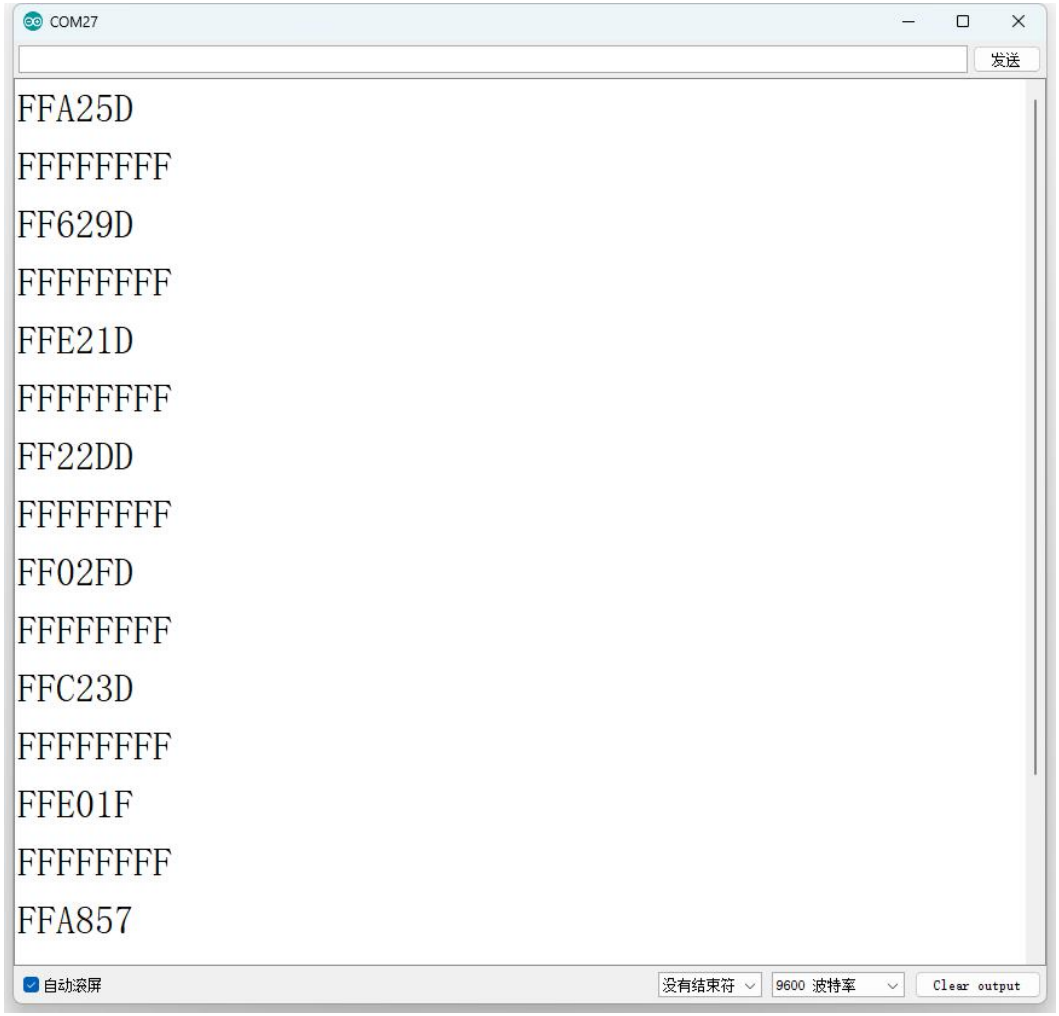
Let's program

Test 1--IR Remote

In this lesson, we need to use a IR remote control which has 17 functional key and its launching distance is 8 meters at most, proper to control various devices indoors.

Result

This project is actually to decode remote control signal. After connection and uploading codes, aim at IR receiving module and press the key, finally you can see corresponding codes. If you press the key too long, it will show messy codes easily as shown in bellow figure.


COM27
发送
FFA25D
FFFFFFFF
FF629D
FFFFFFFF
FFE21D
FFFFFFFF
FF22DD
FFFFFFFF
FF02FD
FFFFFFFF
FFC23D
FFFFFFFF
FFE01F
FFFFFFFF
FFA857
自动滚屏
没有结束符
9600 波特率
Clear output

Test 2--IR Remote Car

This lesson ,regarding Arduino microcontroller as main control, uses IR module to receive IR remote signal and send the signal to Arduino. Arduino will analyses the signal and then control the driver motor and the motion of the car with IR remote control.

How to control the Robot Car

Key on IR remote control					
Robot status	Go forward	Go backward	Turn left	Turn right	Stop

Result

Press the corresponding button and the car will run according to the corresponding function.

Lesson 4 Line Tracking

About this lesson:

In this lesson, we will complete the test of two experimental codes. In experimental test 1, we learned how to use the infrared line-following sensor, and observed the results returned by the sensor to distinguish black and white objects. In the experimental test 2, we learned to combine the infrared line-following sensor with the motor to control the robot car to complete the line-following function.

Component Introduction

The tracking sensor is actually an infrared sensor. The component used here is the TCRT5000 infrared tube. Its working principle is to use the different reflectivity of infrared light to the color, then convert the strength of the reflected signal into

a current signal. During the process of detection, black is active at HIGH level, but white is active at LOW level. The detection height is 0-3 cm. By rotating the adjustable potentiometer on the sensor, it can adjust the detection sensitivity of the sensor.

Specification:

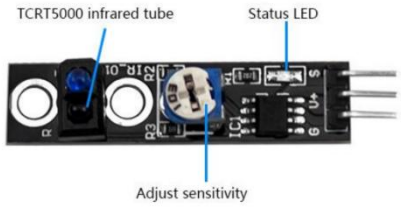
Operating Voltage: 3.3-5V (DC)

Interface: G(GND) V+(VCC) S(Signal)

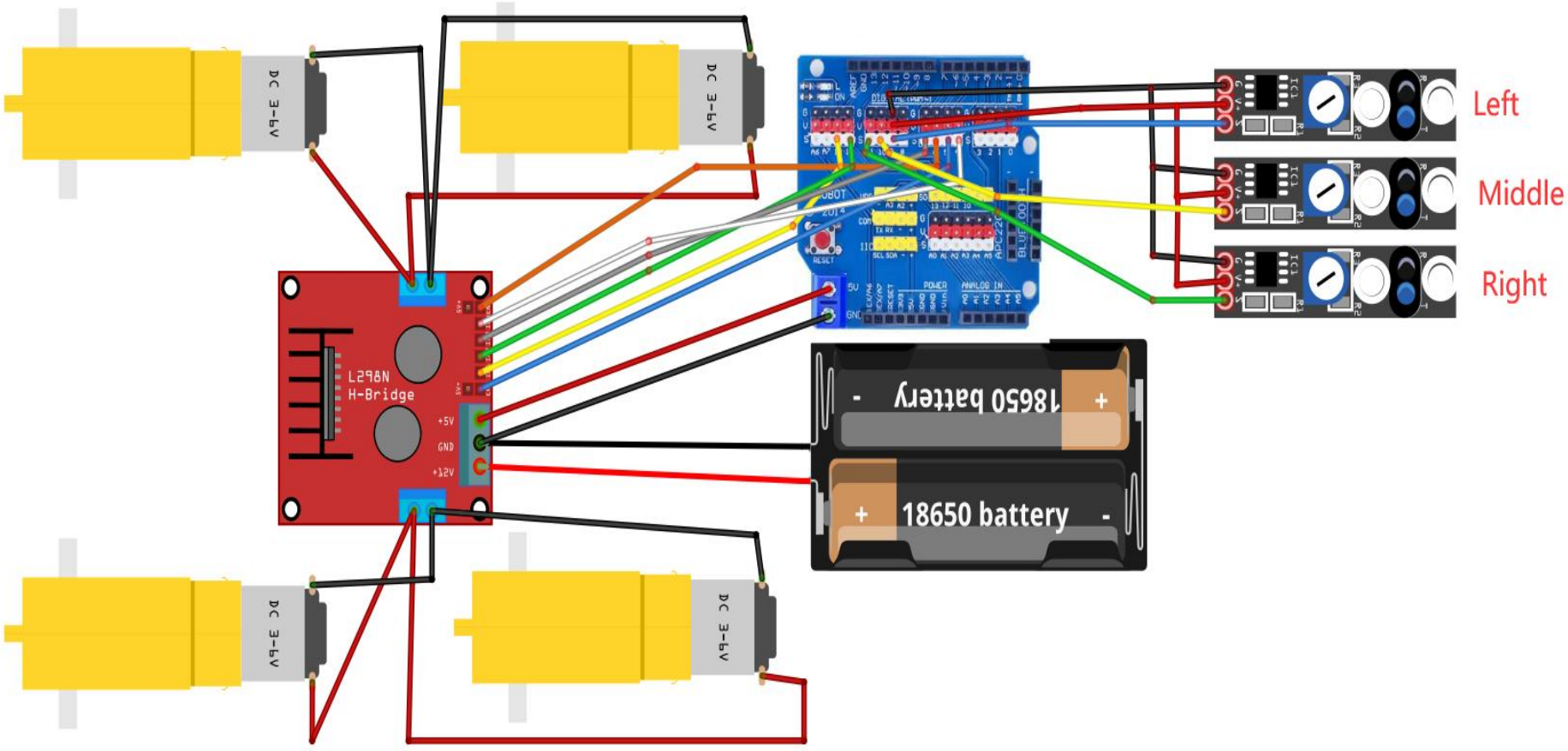
Output Signal: Digital signal

Detection Height: 0-3 cm

Special note: before testing, turn the potentiometer on the sensor to adjust the detection sensitivity. When adjust the LED at the threshold between ON and OFF, the sensitivity is the best.



Wiring diagram



Let's program

Test 1--Line Tracking Sensor

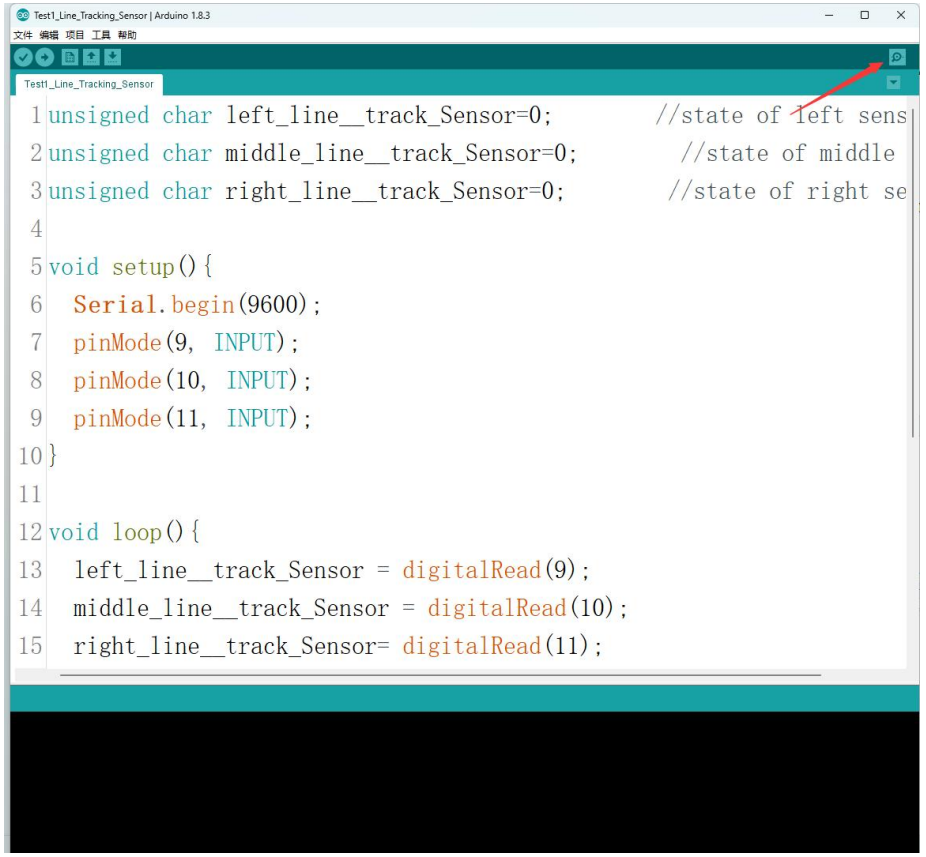
The main purpose of the test experiment is to read the return signal of the line tracking sensor and print it to the serial port monitor.When detects white paper, sensor’s signal pin outputs LOW (display 0),and status LED is on;When detects black, sensor’s signal pin outputs HIGH (display 1),and status LED is off.

Result

if you want to refer to the program we provide.open the reference code for this lesson

"Test1_Line_Tracking_Sensor.ino" in the reference materials we provided.

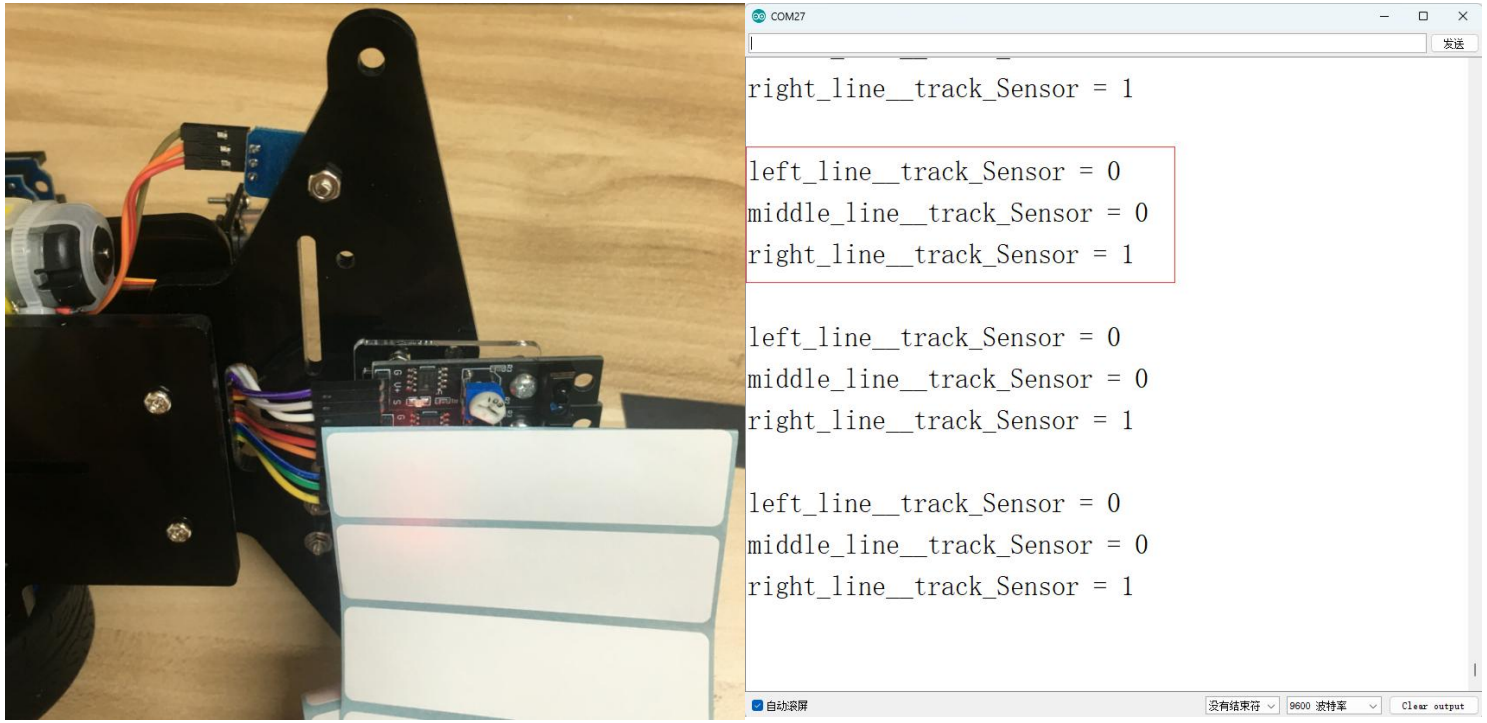
After uploading the code, click the button in the upper right corner to open the serial monitor to view the measured distance.



Then you can see the data as blow:

When detects white paper, sensor’s signal pin outputs LOW (display 0),and status LED is on;When detects black, sensor’s

signal pin outputs HIGH (display 1),and status LED is off.



Important note: Before you upload the program, you need to close the serial monitor, otherwise the serial monitor will occupy the communication interface of the uploaded program.

Test 2--Line Tracking Car

In the experimental test 2, we learned to combine the infrared line-following sensor with the motor to control the robot car to complete the line-following function.

Step 1: Prepare a black track on white ground. (the width of the black track is more than 15mm and less than 20mm).

Please note, the bend angle of the track can't be larger than 90 degree. If the angle is too large, the car will move out of the track.

Step 2: Adjust the sensitivity of tracking sensor modules.

Turn on and hold the car to adjust the potentiometer on the tracking sensor with Phillips screwdriver until you get the best sensitivity status: the signal indicate LED light will turn on when sensor is above white ground, and the signal LED will turn off when the sensor is above black track.

Signal Indicate LED ON: White Ground

Signal Indicate LED OFF: Black Track

Step 3: Turn on the car and put the car over the black track, then the car will move along the black track.

If the car can't move, please check the following:

If adjusted well the sensibility of the tracking sensor.

Car tracking flow chart

The car entered the tracking mode, namely began constantly scanning and detector connected to the I/O port of the SCM, once detected a signal of a I/O port, enter judgment processing procedures, to determine which one of 3 detectors detect the black line.

Result

Turn the POWER switch ON.The robot car will move forward along the black track.

Lesson 5 Ultrasonic Obstacle Avoidance Robot

About this lesson:

In this lesson, we will complete the test of 3 experimental codes. In experimental test 1, we will learn to use the ultrasonic module to measure distance. In the experimental test 2, we will learn how to control the servo motor to rotate to any angle.

In the experimental test 3, the ultrasonic module and the servo motor were assembled on the robot car at the same time, and to assist the robot car to complete the obstacle avoidance function more accurately.

What is an ultrasonic sensor

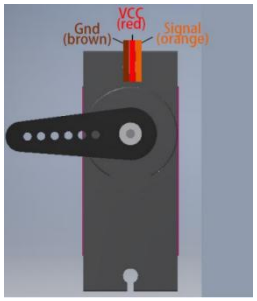
RCWL-1633 is a built-in 6 colorful LEDs, single bus ultrasonic ranging module.Each probe is integrated with 3 pieces of 0807 (WS2812) inside Color LED, programmable RGB three color LED, probe input produce various colors to make the product more dazzling. Specially applied to toy ultrasonic ranging, robot and other applications.2CM ultra small blind spot, 4M typical farthest range. Adopt self developed ultrasonic distance measurement and demodulation chip RCWL-9625, single total line, with a more concise periphery, and a high-precision oscillator built into the chip,No additional crystal

oscillator required. Drive adopts sweep frequency technology to reduce exploration the impact of head consistency on module sensitivity.

Interface Definition

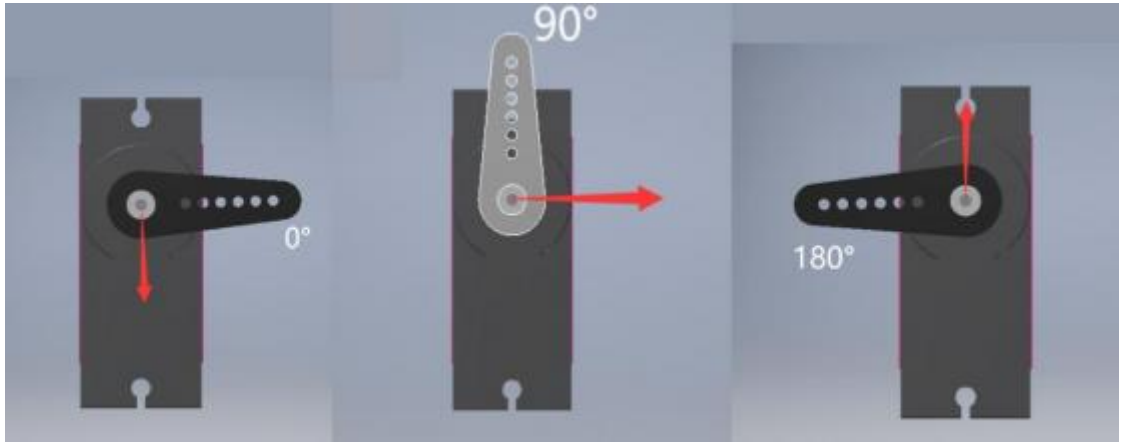
Number	Interface	Remarks
1	VCC	Power supply, 3-5 V power supply.
2	I/O	Ultrasonic single bus control.
3	RGB	WS2812 color light data input port.
4	GND	Grounding.

What is a servo motor



Servo motors are great devices that can turn to a specified position.

Usually, they have a servo arm that can turn 180 degrees. Using the Arduino, we can tell a servo to go to a specified position and it will go there. As simple as that!



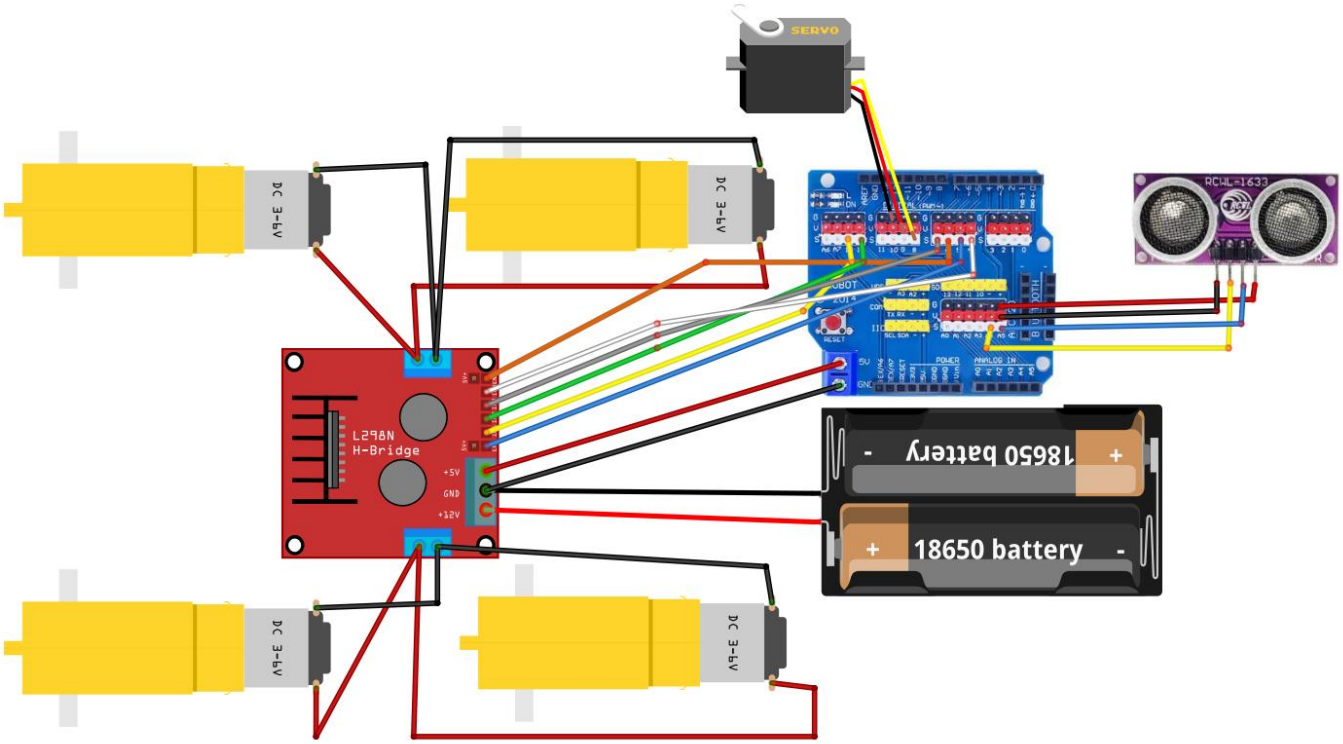
Servo motors were first used in the Remote Control (RC) world, usually to control the steering of RC cars or the flaps on a RC plane. With time, they found their uses in robotics, automation, and of course, the Arduino world.

There are two ways to control a servomotor with Arduino. One is to use a common digital sensor port of Arduino to produce square wave with different duty cycle to simulate PWM signal and use that signal to control the positioning of the

motor. Another way is to directly use the Servo function of the Arduino to control the motor.

The Arduino drive capacity is limited. So if you need to control more than one motor, you will need external power.

Wiring diagram



Let's program

Test 1--Ultrasonic Sensor Module

In Experimental Test 1, we will learn how to control the ultrasonic sensor, and display the distance measured by the ultrasonic sensor on the serial monitor.And the color light changes on the ultrasound can be observed. When it is less than 10cm, a red light is emitted, when it is greater than 10cm but less than 20cm, a green light is emitted, and when it is greater than 20cm, a blue light is emitted.

Result

If you want to refer to the program we provide.open Arduino IDE software and open the reference code for this lesson "**Test1_Ultrasonic_Sensor_Module.ino**" in the reference materials we provided.

After uploading the code, click the button in the upper right corner to open the serial monitor to view the measured distance.

Test 2--Servo Control

In this experimental test , we learn how to control the servo motor and control the servo motor to rotate to the specified angle.

Result

If you want to refer to the program we provide.open Arduino IDE software and open the reference code for this lesson "**Test2_Servo.ino**" in the reference materials we provided.

Before you can run this, make sure that you have installed the < Servo> library or re-install it, if necessary. Otherwise, your code won't work.For details about loading the library file, see Lesson about how to add libraries .

Code Explanation

Arduino comes with #include <Servo.h> (servo function and statement）

The following are some common statements of the servo function:

1. attach（interface）——Set servo interface, port 8 is available

2. write（angle）——The statement to set rotation angle of servo, the angle range is from 0° to 180°

3. read（）——used to read angle of servo, read the command value of “write()”

4. attached（）——Judge if the parameter of servo is sent to its interface

Note: The above written format is“servo variable name, specific statement （）”, for instance: myservo.attach(8)

Test 3--Ultrasonic_Infrared_Obstacle_Avoidance_Robot_Car

In the experimental test 3, the ultrasonic module and the servo motor were assembled on the robot car at the same time, and assist the robot car to complete the obstacle avoidance function more accurately.

Result

If you want to refer to the program we provide.open the reference code for this lesson

"**Test3_Ultrasound_Obstacle_Avoidance_Car.ino**" in the reference materials we provided.

What will you see

Upload the code to UNO R3 control board, and turn the POWER switch ON.

Note: It is recommended that the height of the obstacle is greater than 10cm.which means that the height of the obstacle is greater than the height of the ultrasonic sensor.

Arduino will analyses the feedback signal and then control the driver motor to adjust the car diversion. Finally the car is able to avoid obstacle automatically and keep going.

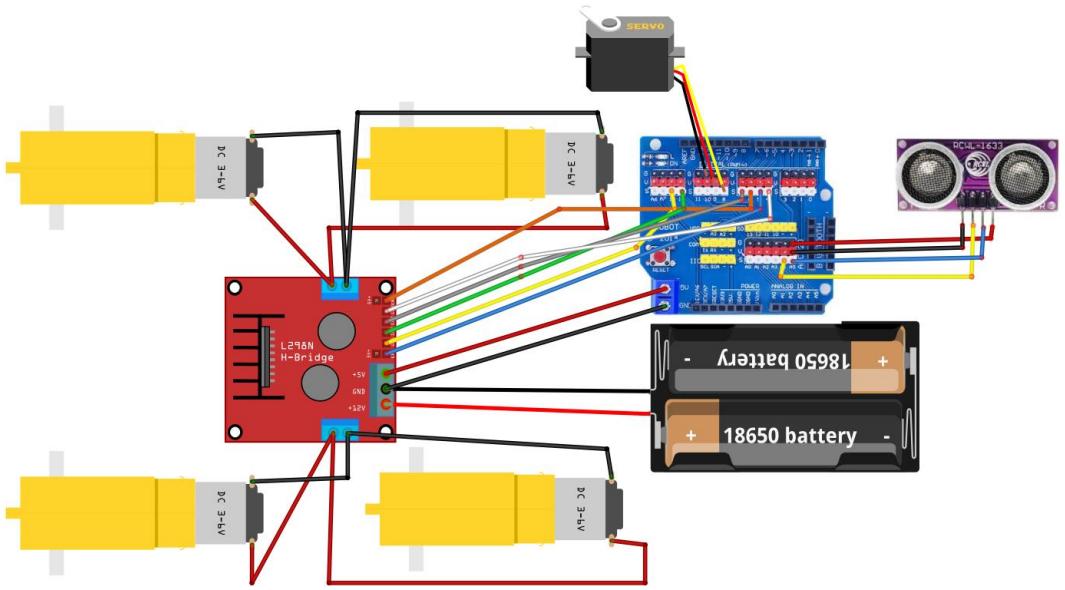
LROBRUYA

Lesson 6 Follow Car

About this lesson:

In this lesson, we learn the use of ultrasonic sensors and then use ultrasonic sensors to detect distances to achieve robots to follow his master.

Wiring diagram



Let's program

Test 1--Follow_Car

After downloading the program and observing the distance information printed by the serial port window, unplug the USB data cable and turn on the power switch of the robot.you can move your hand close to the front of the ultrasonic sensor. When the robot is less than 15 cm away from your hand, he will stop.Move your hand straight forward.When the robot is more than 15cm away from your hand, the robot will approach your hand.

Result

If you want to refer to the program we provide.open the reference code for this lesson

"**Test_1_Ultrasonic_Follow_Robot_Car.ino**" in the reference materials we provided.

Note: It is recommended to use a rectangular object box to guide the robot car. Length>10cm.Width>15cm.

Lesson 7 Bluetooth Multifunctional Robot Car

About this lesson:

In this lesson, we mainly study two experimental tests.In the first test experiment, We learn how to use the Bluetooth Module; In the second test experiment, We will integrate all of its functions via a Bluetooth.

Introduction:

The HC-06 is a Serial port Bluetooth module which having fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Blue core 04-External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature).

We use the serial port communication function of the Bluetooth module, use the app to control the Bluetooth connection of the mobile phone and the HC-06 Bluetooth module, and then the mobile phone app sends data, and the HC-06 Bluetooth module transmits the received data to the arduino uno through the serial port. The default communication baud rate of the HC-06 Bluetooth module is 9600.

The HC-06 Bluetooth module to UNO R3:

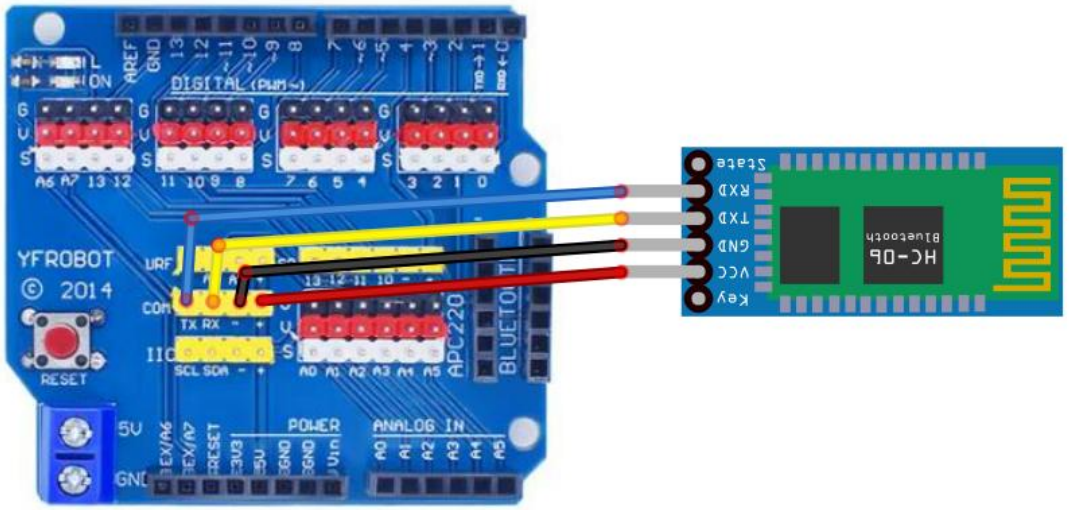
VCC>>>> +

GND>>>> -

TXD>>>>RX

RXD>>>>TX

Wiring diagram



Attention

The bluetooth module should be pulled out before you upload the program every time,or it will be failed to upload the program.When uploading the code, CANNOT connect the Bluetooth module first; otherwise uploading fails! You are supposed to upload the code to control board, then connect the Bluetooth module.

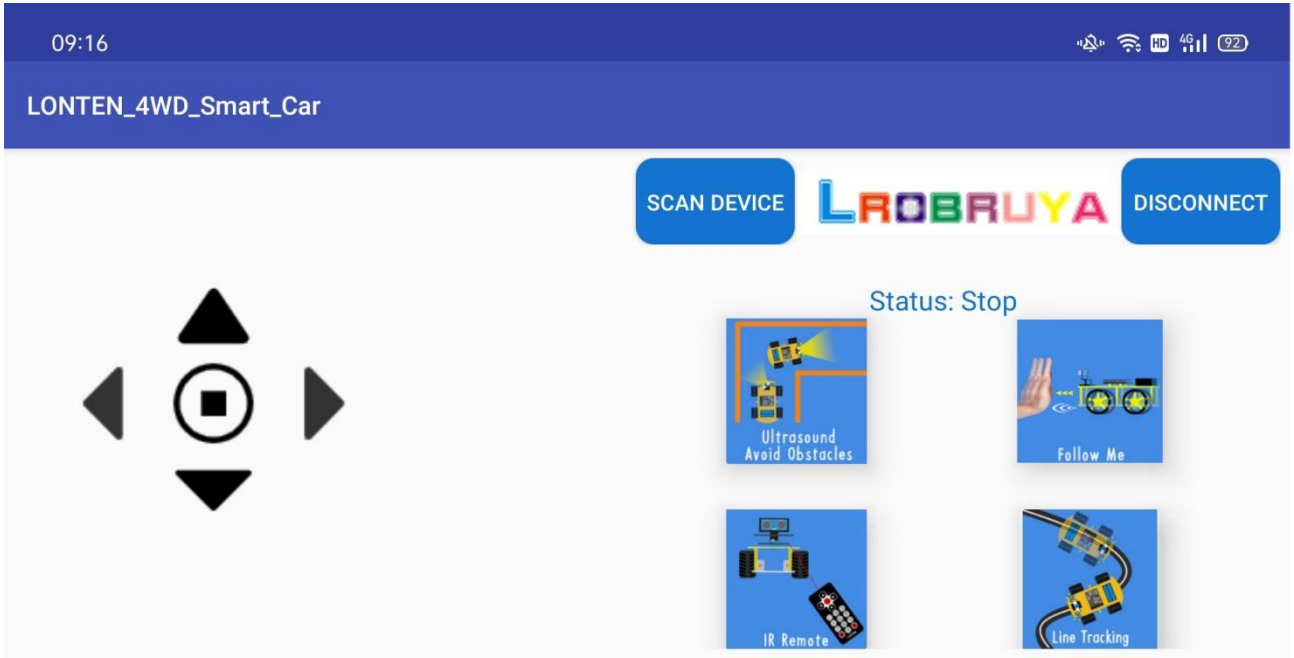
Instructions for the use of app

Firstly, download the "**LONTEN_4WD_Smart_Car.apk**" file from the folder to your Android mobile phone and install it into an application software.

Then make sure the Bluetooth module is connected. Pair your phone with HC-06. for doing this go to Settings->Bluetooth->Scan device->select HC-06 and pair it. Pass code to pair is '1234'.

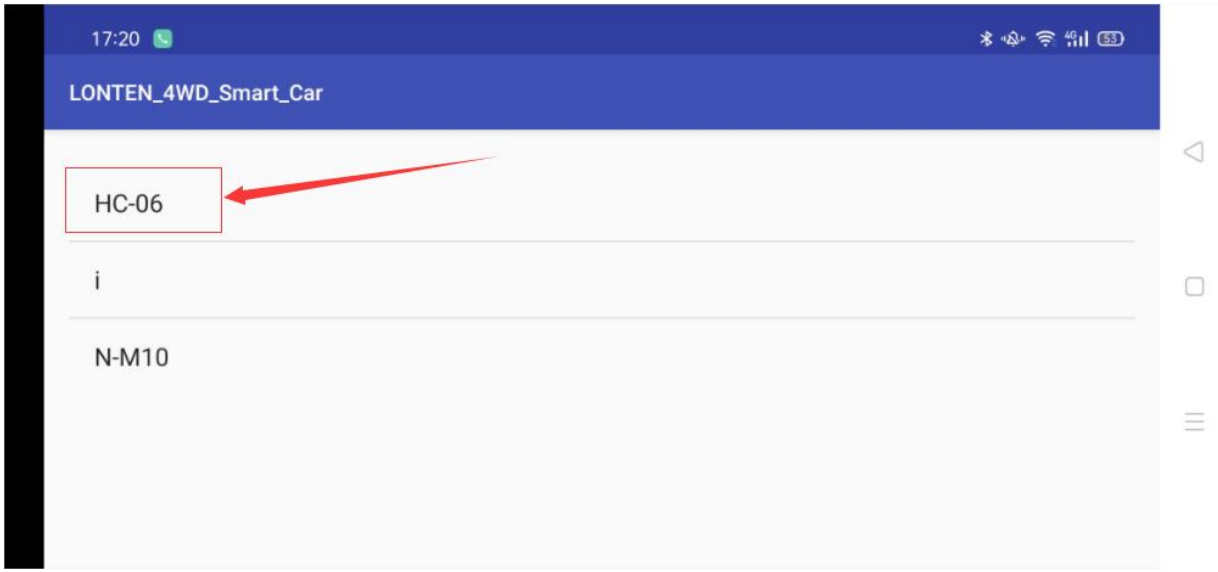
Open Bluetooth Terminal software, go to options and select 'connect a device - secure' option. It it ask for pass code enter 1234.If your phone is connected to the Bluetooth module, you will see a usable device called HC-06 on the PAIRED DEVICES(As shown below).If the HC-06 does not appear on the PAIRED DEVICES, repeat the above steps.

After the above steps are complete, we open the **LONTEN_4WD_Smart_Car app**.

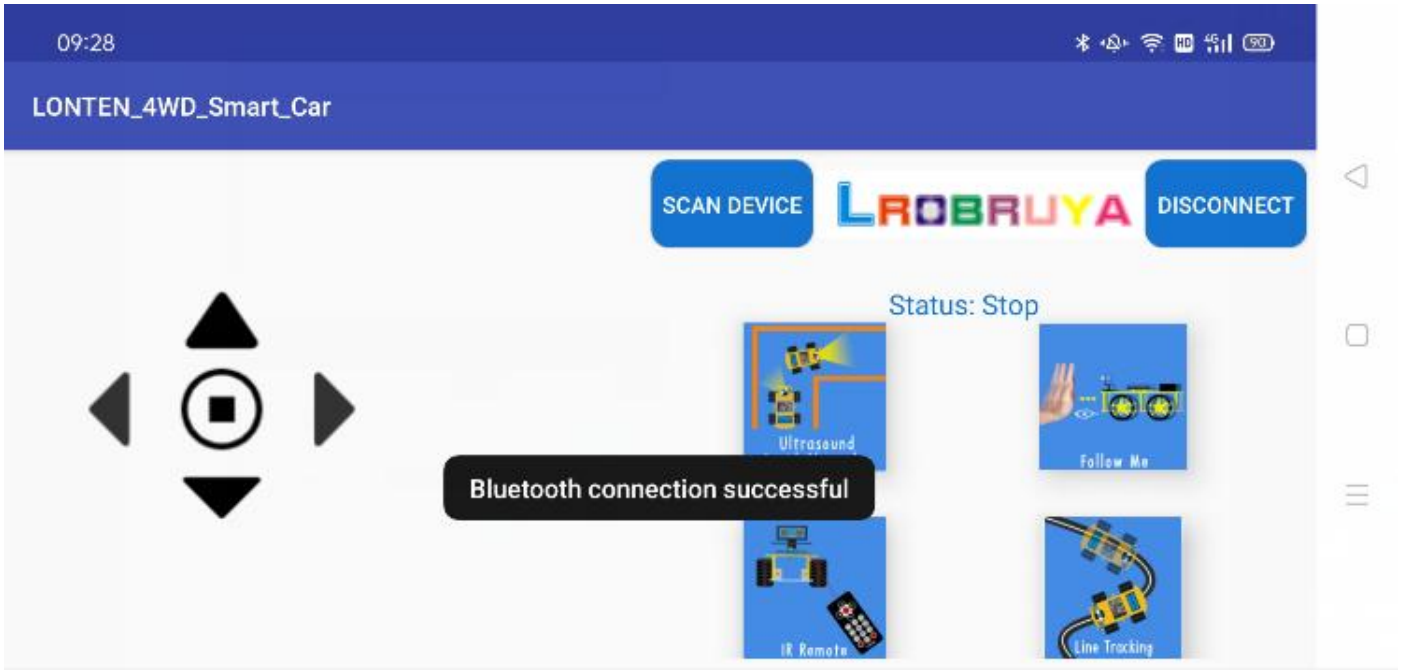


Click the Connect Bluetooth icon button”SCAN DEVICE” . the HC-06 will appear in our scan results.Select HC-06.

After selecting the HC-06 device, click button will to connect .



After click on the button .wait 2 seconds,If the connection is successful, "Bluetooth connection successful" will be displayed.



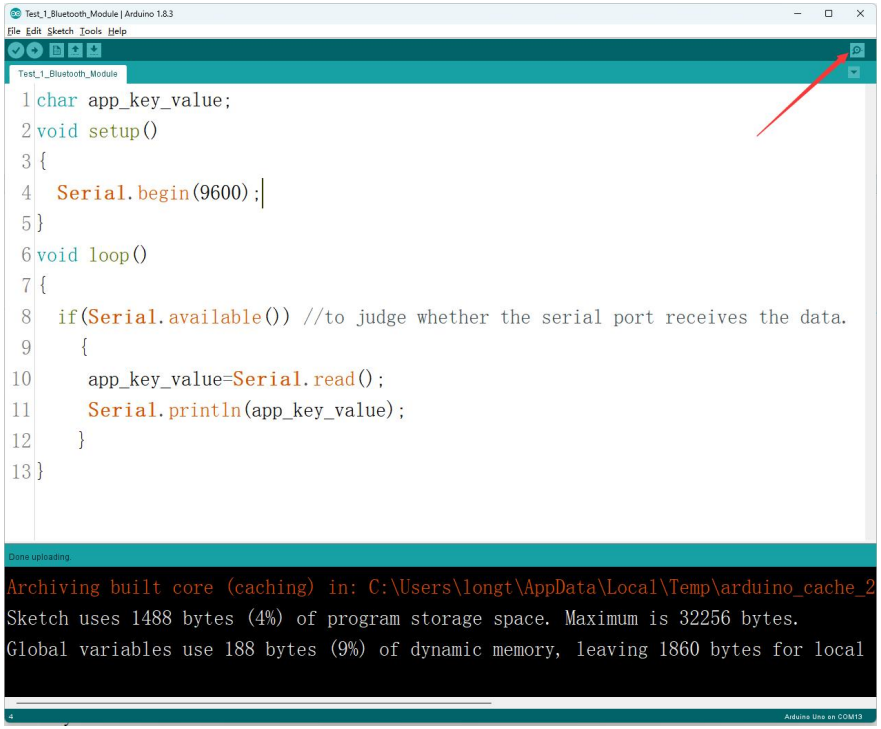
(Note: When the Bluetooth module is not successfully connected, the red LED light will continue to flash. When the connection is successful, the red LED light will be remain on.)

If there is a warning in the interface, it means that Bluetooth is not turned on normally or the selected device is wrong.

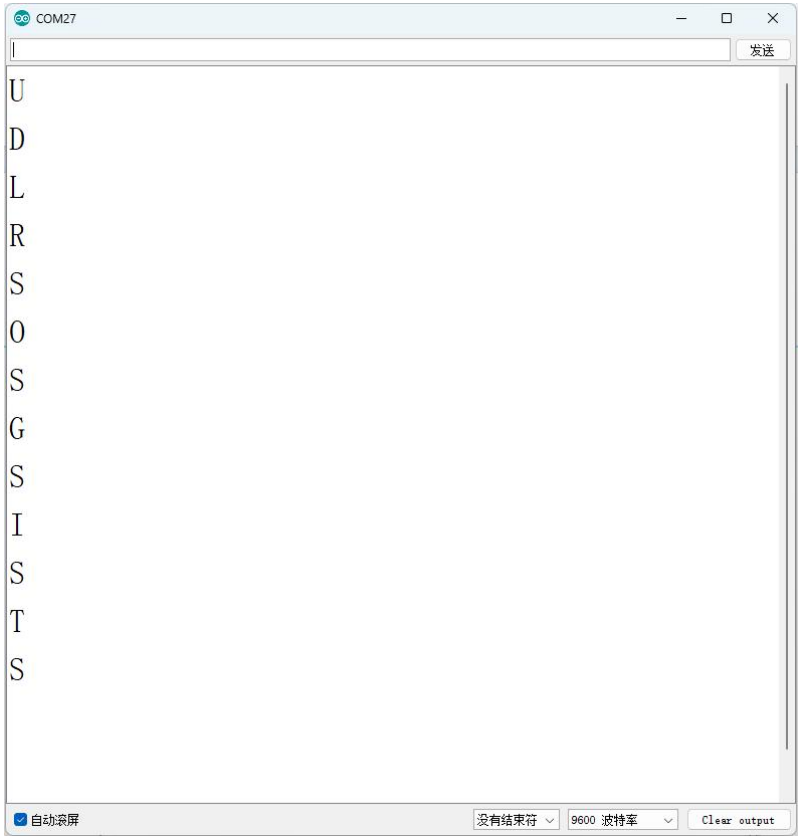
Let's program

Test 1--Bluetooth Module

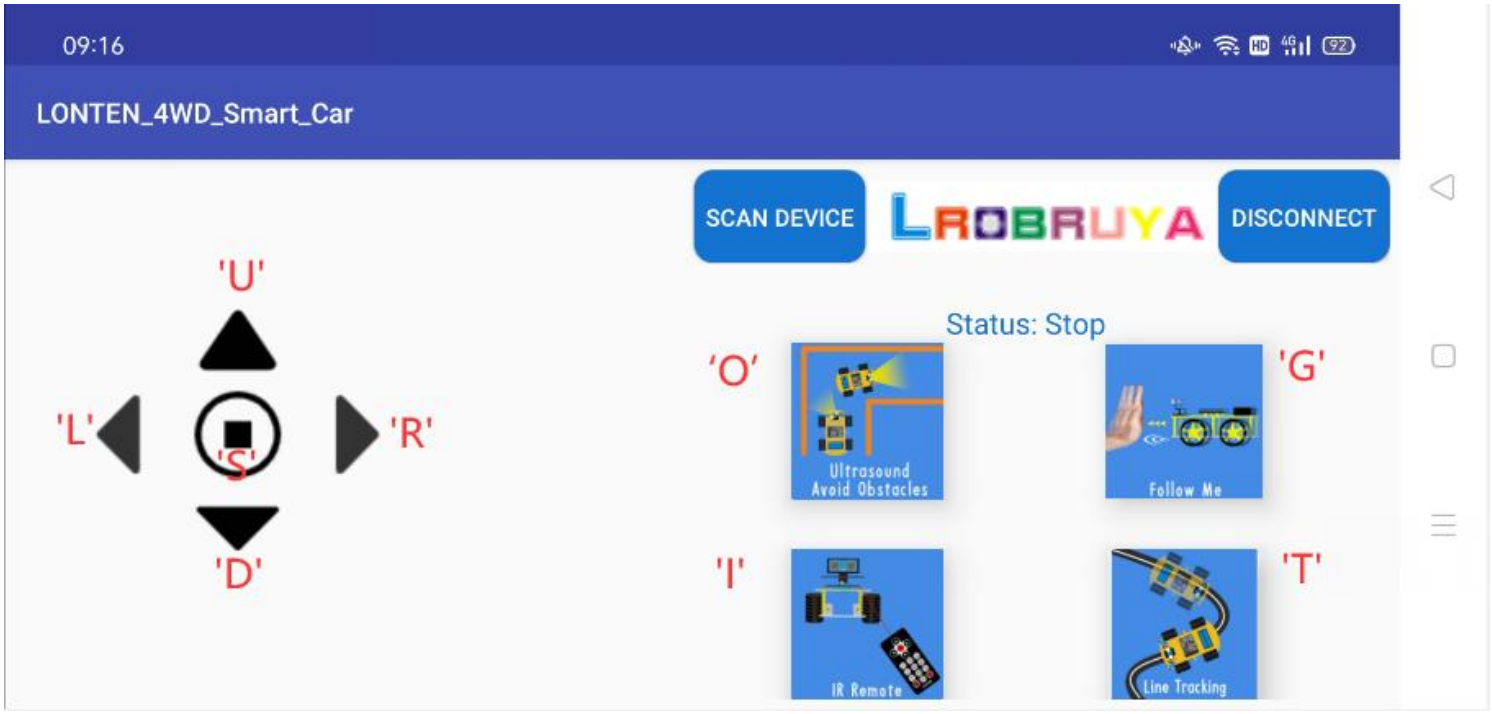
Follow the steps above to reconnect. After uploading the code, click the button in the upper right corner to open the serial monitor to view the measured distance.



Then you can see the data as blow:

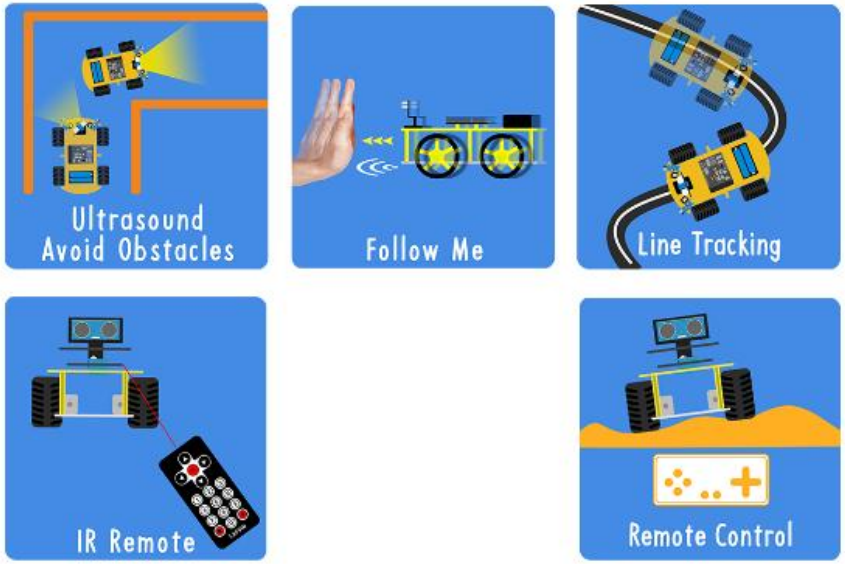


For example,If the Line Tracking mode button is pressed,the mobile phone Bluetooth sends the character "T" to the Robot car Bluetooth module.Set the baud rate of the communication between the Bluetooth module and the mobile phone's Bluetooth to 9600.



Test 2--Bluetooth Multifunctional Robot Car

In previous projects, the car only performs a single function. However, in this lesson, we will integrate all of its functions via a Bluetooth.



Attention

The bluetooth module should be pulled out before you upload the program every time,or it will be failed to

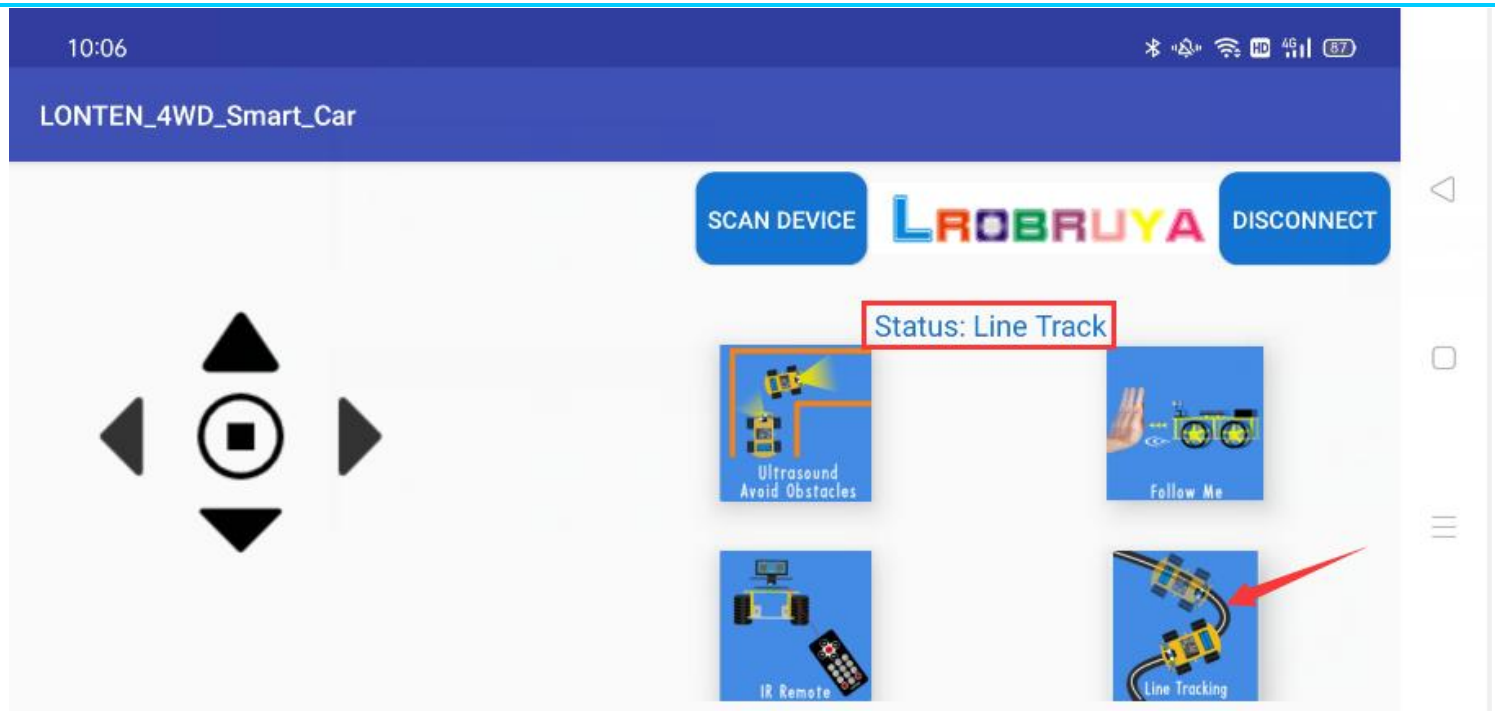
upload the program.When uploading the code, CANNOT connect the Bluetooth module first; otherwise uploading fails! You are supposed to upload the code to control board, then connect the Bluetooth module.

How to use the app to control the robot car

After completing the program upload, plug in the Bluetooth module again, and then open the app software to complete the connection of the Bluetooth device.

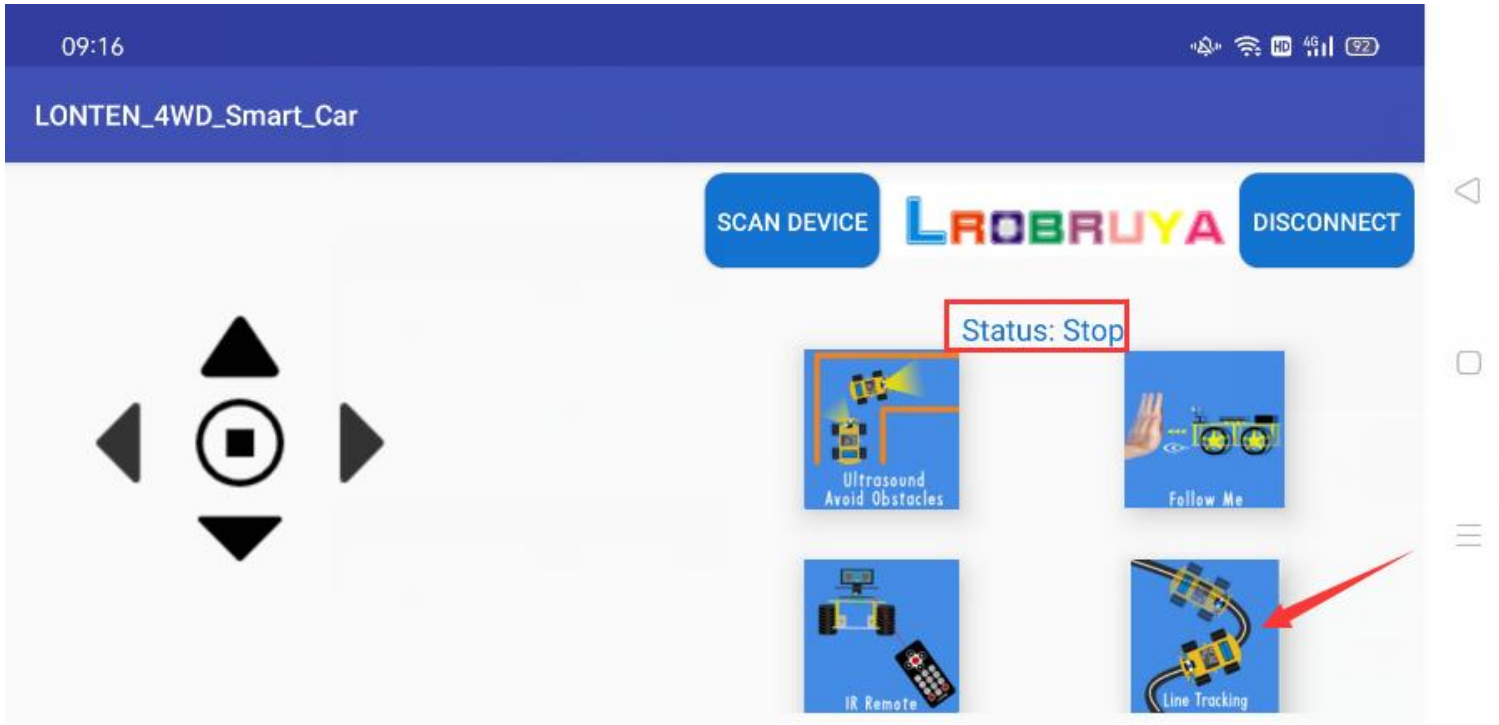
The interface after the app software and Bluetooth module are successfully connected is as follows.

For example, if you want to control the car to enter the Line tracking mode, you click the line patrol function button.After the robot car receives the signal, it will enter the line patrol state. At this time, you need to provide a black track for the robot car.

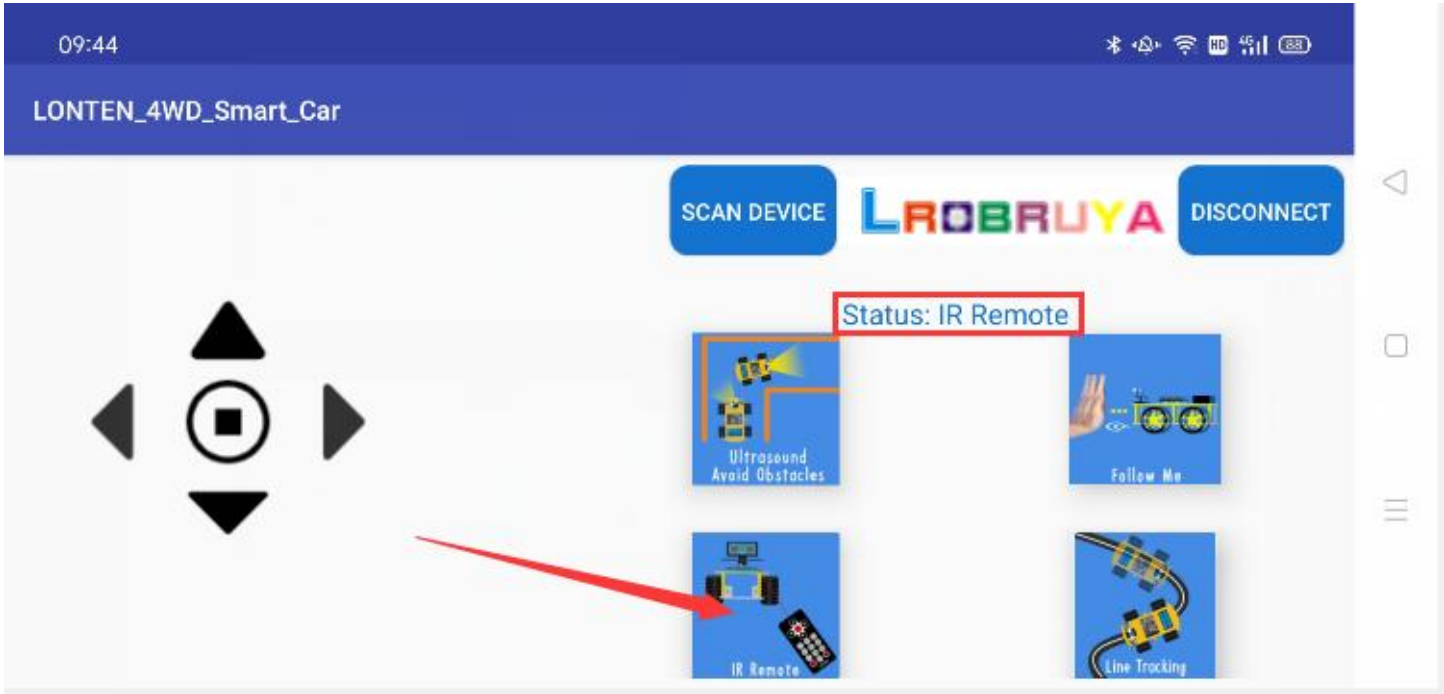


Note: If you want to switch to other modes, you need to click the button again, and then click the function button you want to switch. It means that you need to be in status: stop to switch to other modes.

Step 1:


09:16
LONTEN_4WD_Smart_Car
SCAN DEVICE
LROBRUYA
DISCONNECT
Status: Stop
Ultrasound
Avoid Obstacles
Follow Me
IR Remote
Line Tracking

Step 2：



The app can control the robot car to complete all functions, and can switch freely. The functions you can choose are Ultrasonic Obstacle Avoidance Mode, Follow Control Mode, IR Remote Control Mode, Line Tracking Mode.