LROBRUYA

Smart Robot Tank Kit

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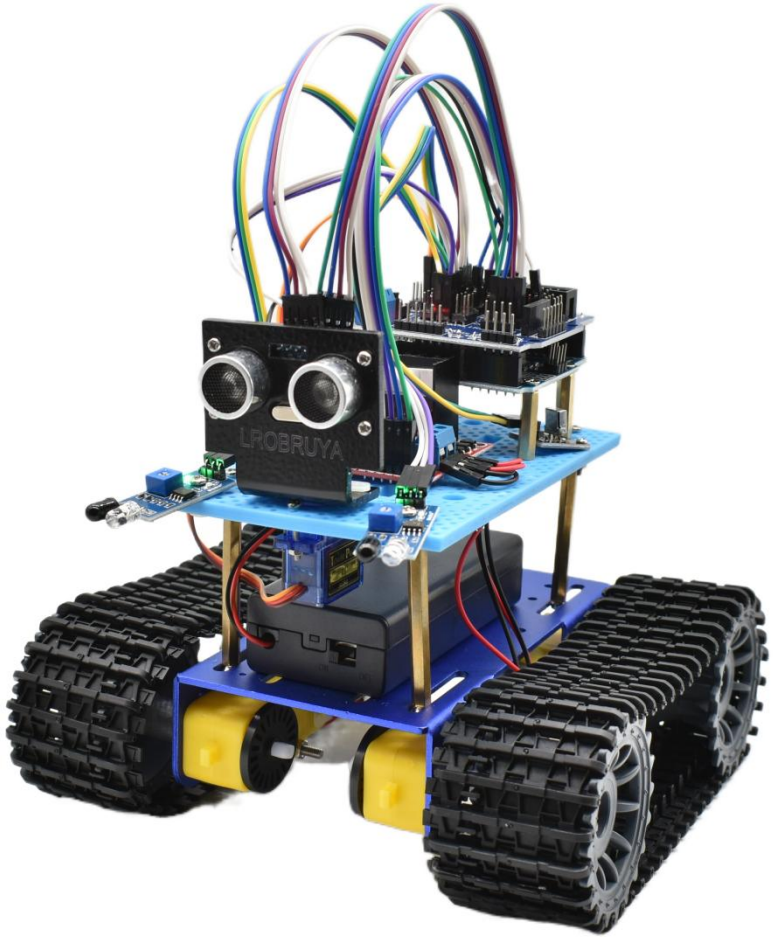

Preface

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. The easy to install DIY tank chassis is adopted for easy installation. The power supply uses two 18650 lithium batteries with long-lasting battery life.The newly created APP control software, the six major functions of the tank kit are comprehensively controlled by the APP, the function mode can be switched freely.

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Packing list

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.

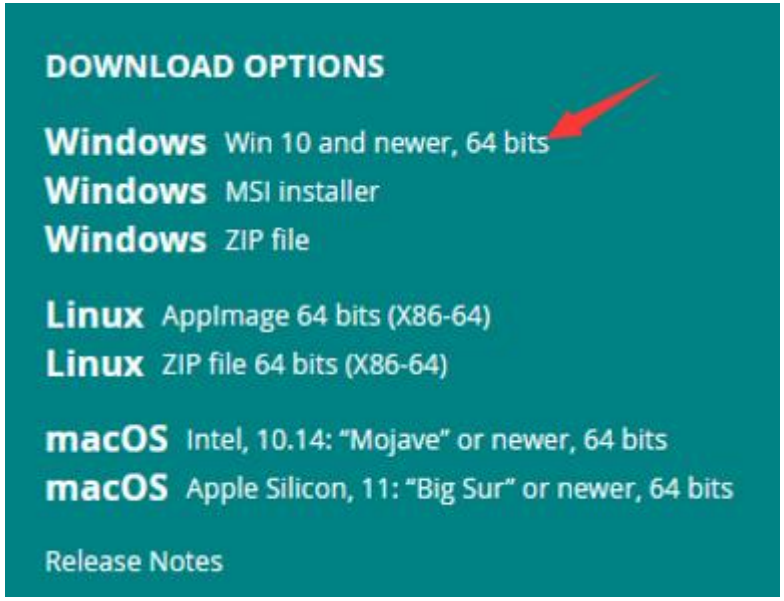
The Arduino software that you will use to program your Arduino is available for Windows, Mac and Linux. The installation process is different for all three platforms and unfortunately there is a certain amount of manual work to install the software.

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.

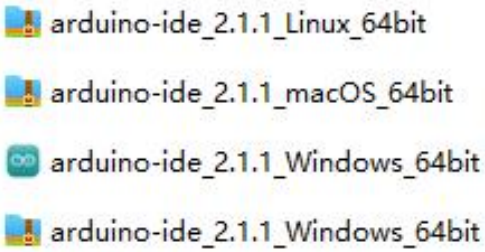
system of your computer. Take Windows as an example here.



Click Windows Win 10 and newer,64 bits.

Click JUST DOWNLOAD.

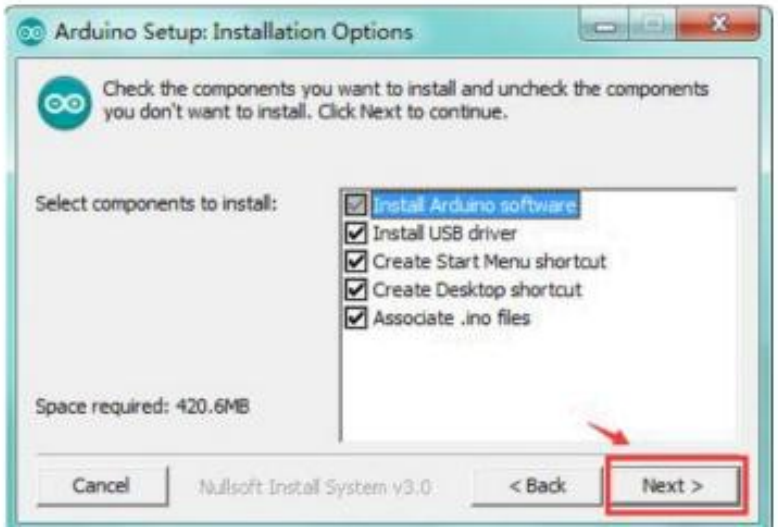
Also version 2.1.1 is available in the material we provided, and the versions of our materials are the latest versions when this course was made.



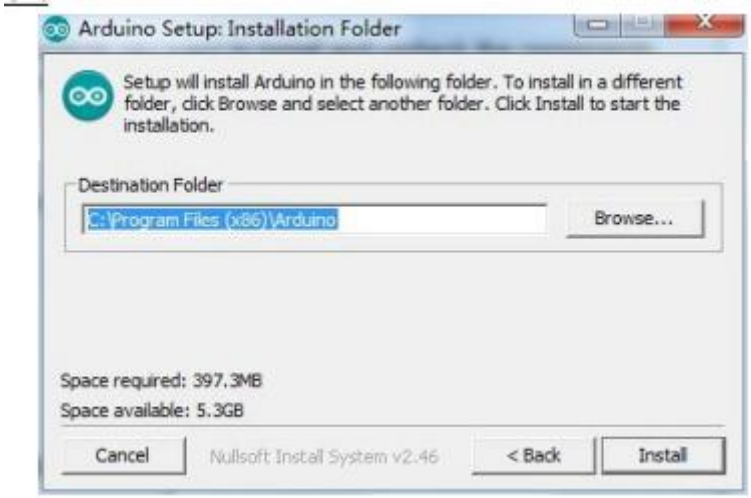
Installing Arduino (Windows)

Install Arduino with the exe. Installation package.

Click I Agree to see the following interface.

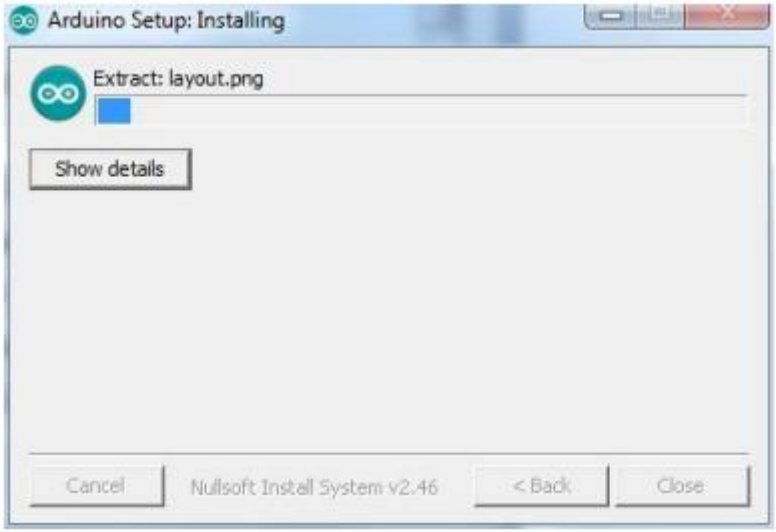

Arduino Setup: Installation Options
Check the components you want to install and uncheck the components you don't want to install. Click Next to continue.
Select components to install:
Install Arduino software
Install USB driver
Create Start Menu shortcut
Create Desktop shortcut
Associate .ino files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

Click Next

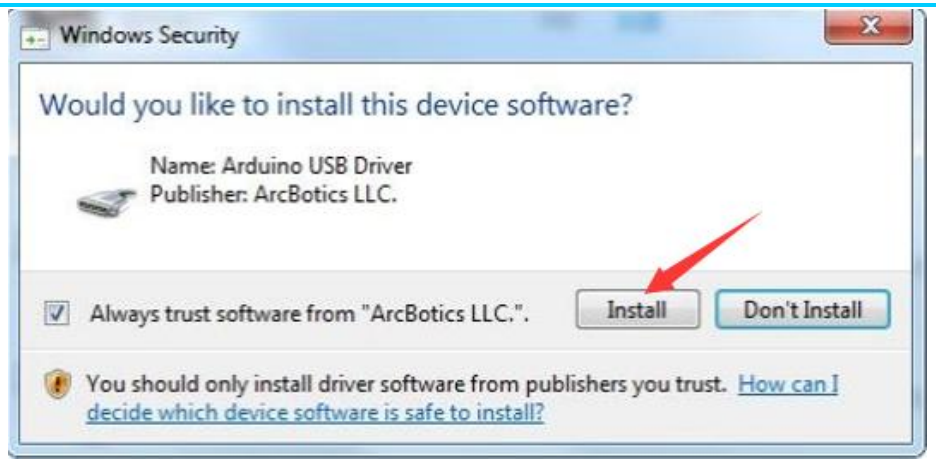


You can press Browse… to choose an installation path or directly type in the directory you want.

Click Install to initiate installation.

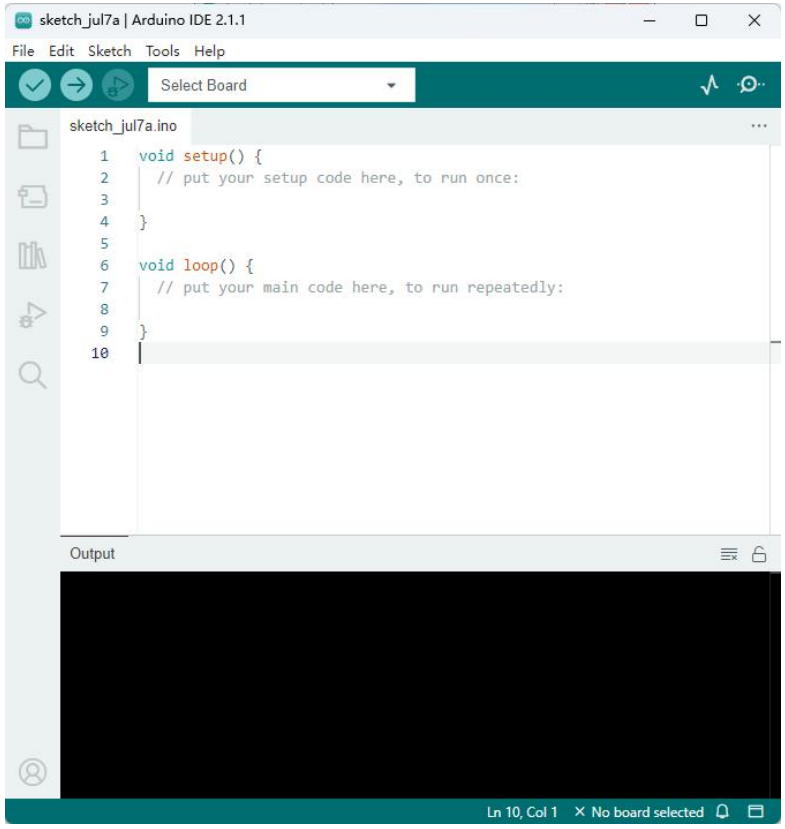


Finally, the following interface appears, click Install to finish the installation.



Next, the following icon appears on the desktop

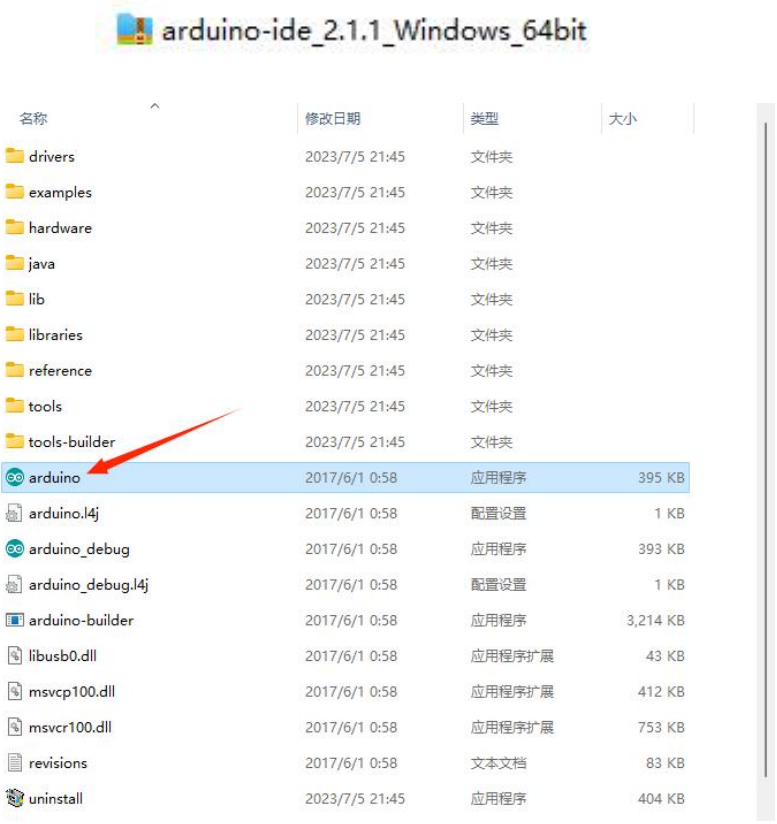
Double-click to enter the desired development environment



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.



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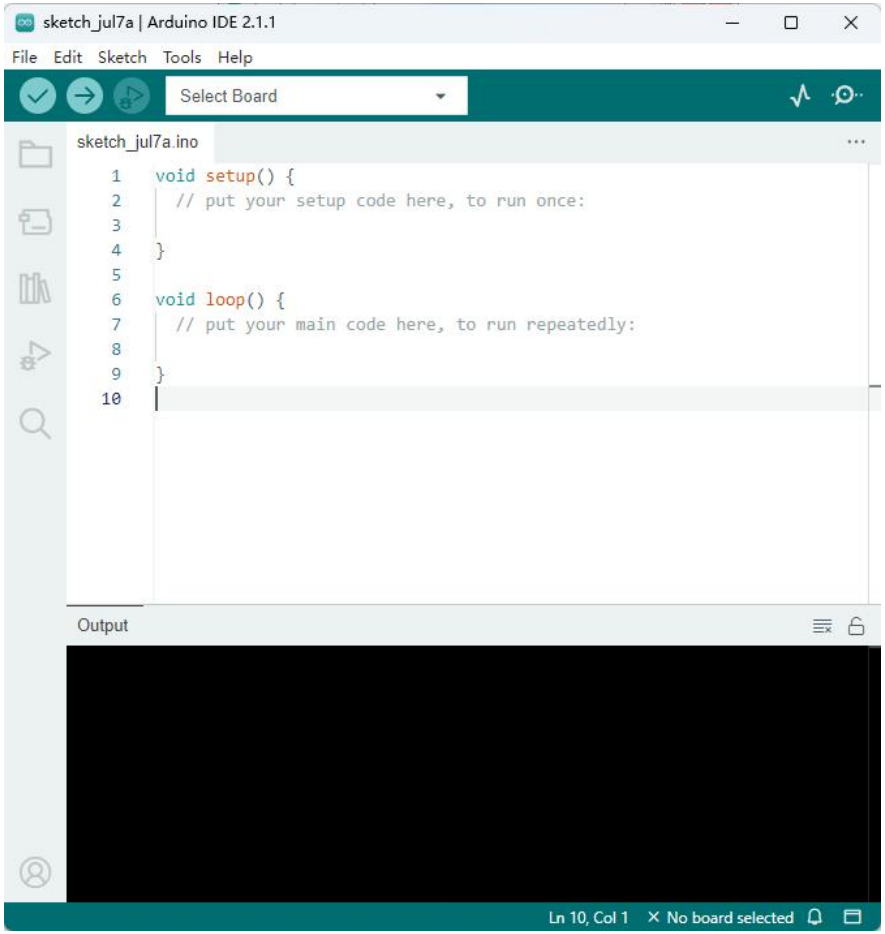
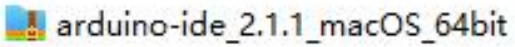

sketch_jul7a | Arduino IDE 2.1.1
File Edit Sketch Tools Help
Select Board
sketch_jul7a.ino
1 void setup() {
2 // put your setup code here, to run once:
3
4 }
5
6 void loop() {
7 // put your main code here, to run repeatedly:
8
9 }
10
Output
Ln 10, Col 1
No board selected

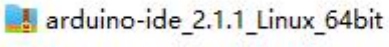
Installing Arduino (Mac OS X)

Download and Unzip the zip file, double click the Arduino.app to enter Arduino IDE; the system will ask you to install Java runtime library if you don't have it in your computer. Once the installation is complete you can run the Arduino IDE.



Installing Arduino (Linux)

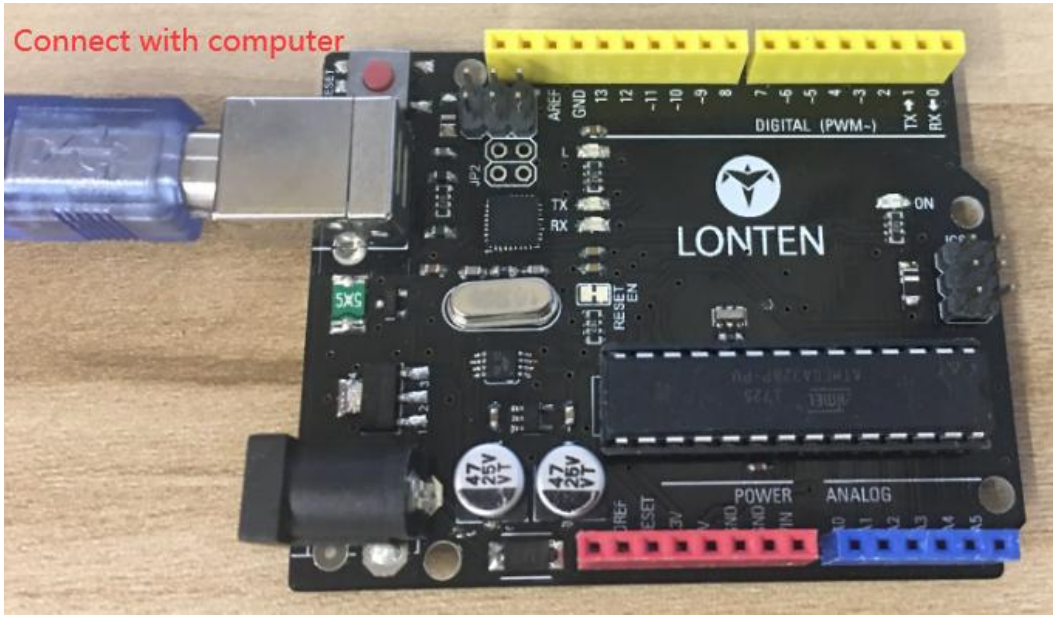
You will have to use the make install command. If you are using the Ubuntu system, it is recommended to install Arduino IDE from the software center of Ubuntu.



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)

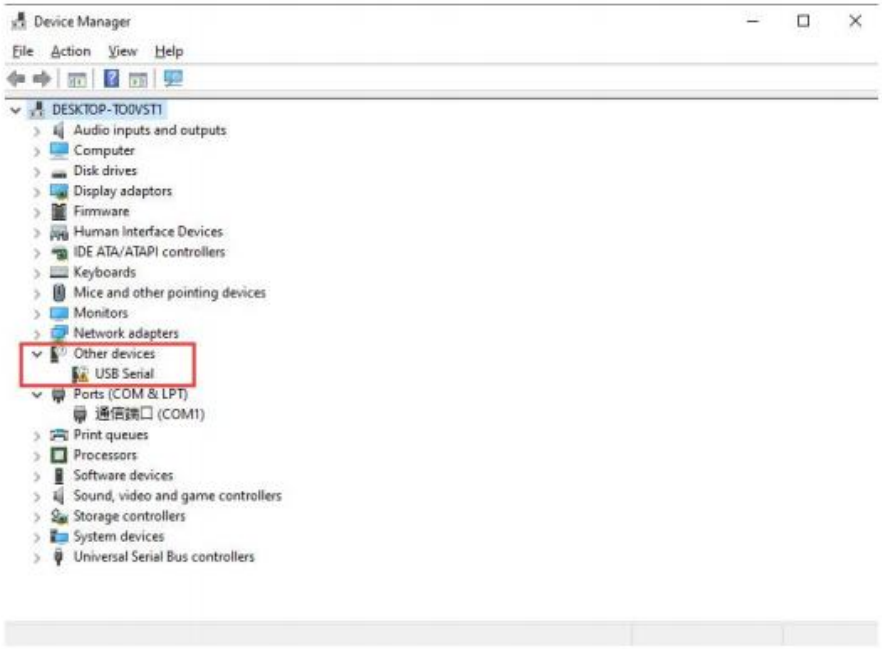
SPI communication interface: D10 is SS, D11 is MOSI, D12 is MISO, D13 is SCK

IIC communication port: A4 is SDA, A5 is SCL

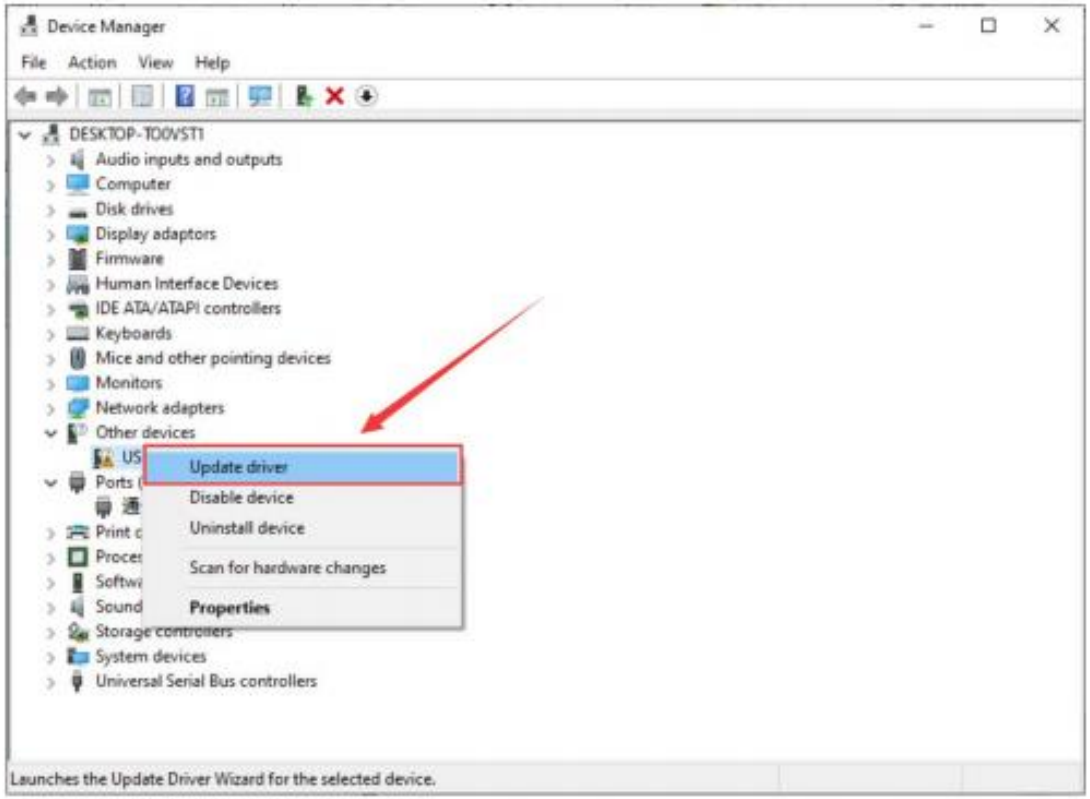
In different systems, the driver installation is similar. Here we start to install the driver on the Win10 system. You can find the “USB_Drive_CH341_3_1” folder in the information we provide, this is the driver file we want to install.

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

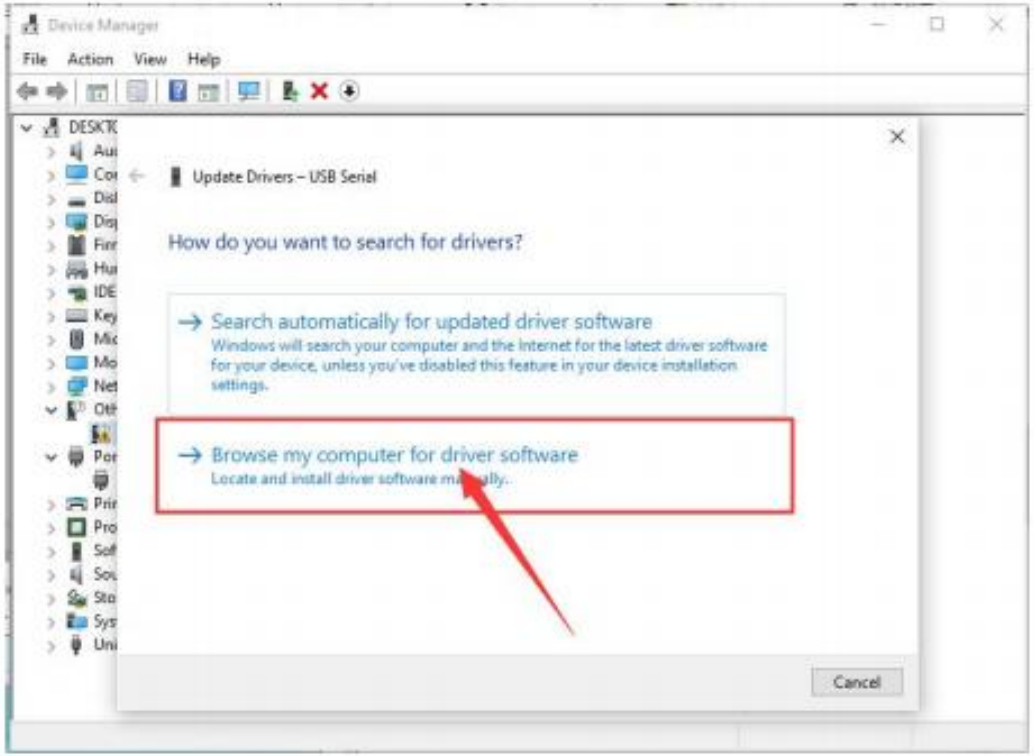
When you connect the Arduino UNOR3 Board to your computer at the first time, right click your “My Computer”—>for “Properties”—>click the “Device manager”, under Other devices, you should see the “USB-Serial” or “Unknown device ”.Or you can search for "devi" in your computer, or you can open the device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



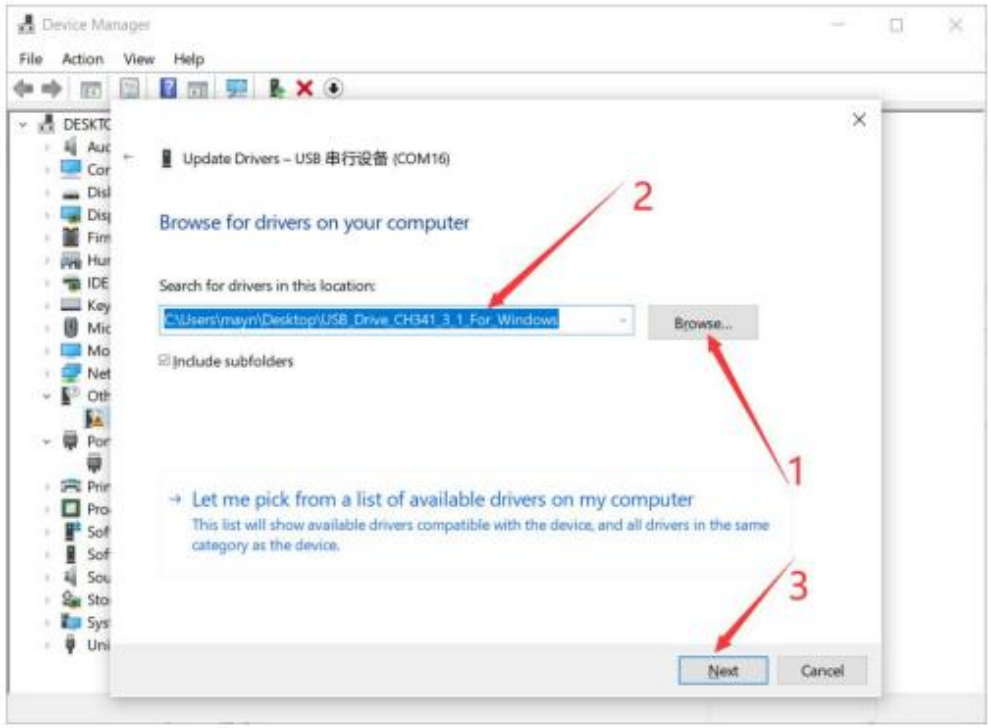
Then right-click on the device and select the top menu option (Update Driver Software...) shown as the figure below.



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”.

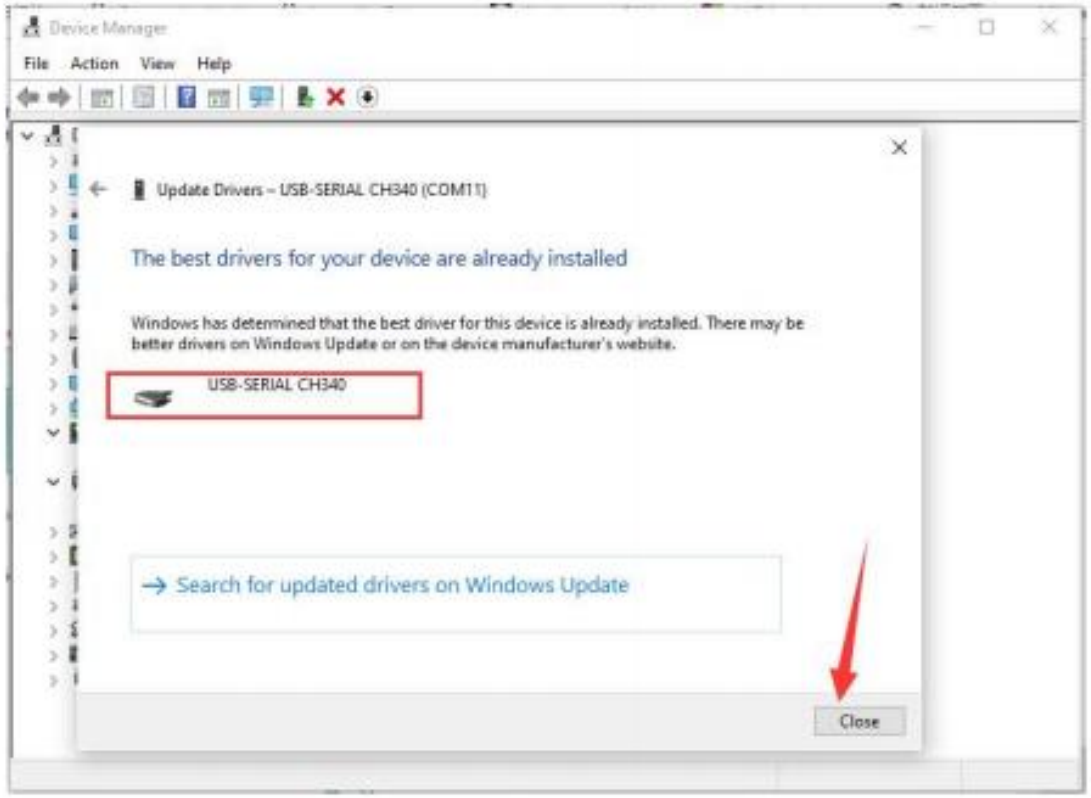


After that, select the browse option and navigate to the drive folder "USB_Drive_CH341_3_1", which can be found in the information we provide.(Note that the file path selects the location of the. For example, I store this driver file on the computer desktop, so the file path I choose is C:\Users\mayn\Desktop\USB_Drive_CH341_3_1_For_Windows)

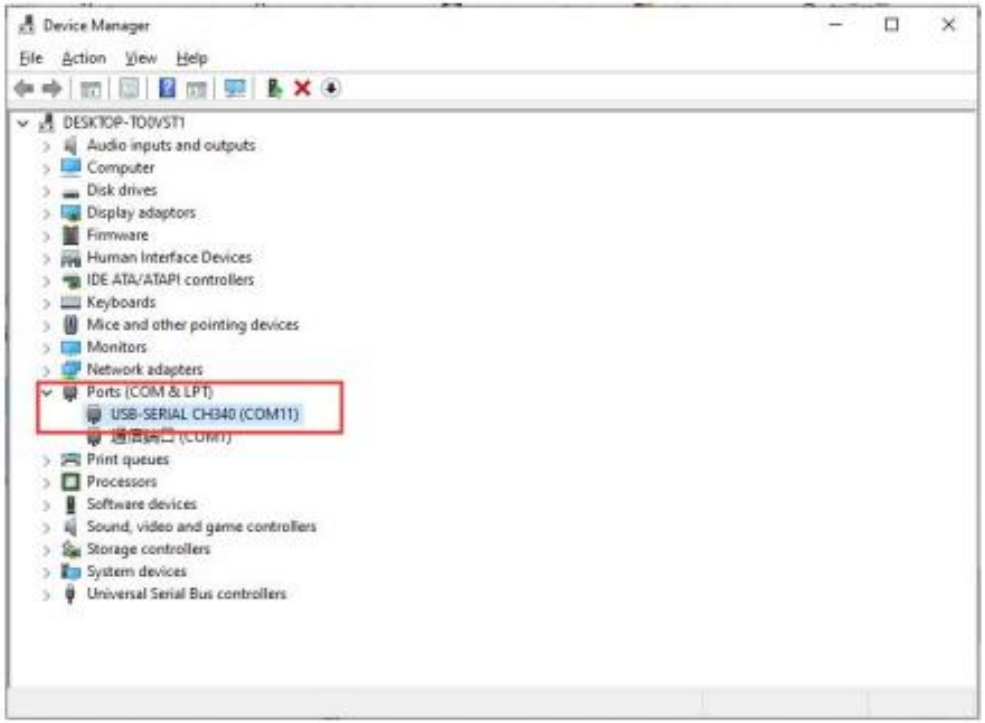


Once the software has been installed, you will get a confirmation message.

Installation completed, click “Close”.



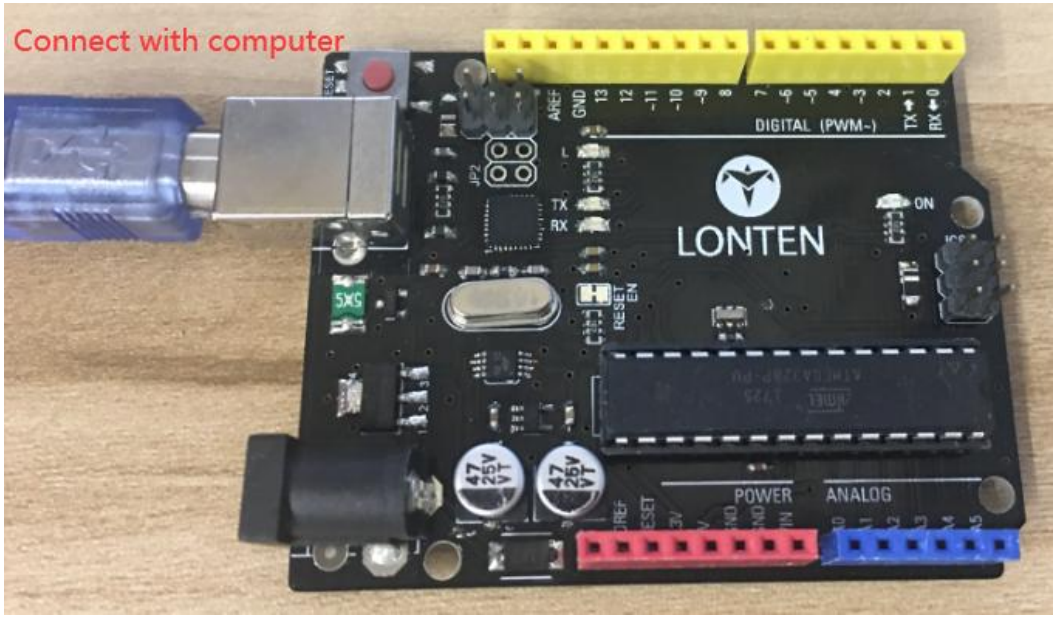
Up to now, the driver is installed well. Then you can right click “My Computer”—>for “Properties”—>click the “Device manager”, you should see the device as the figure shown below. Or you can search for "devi" in your computer, or you can open the device manager of your computer.



For MAC System

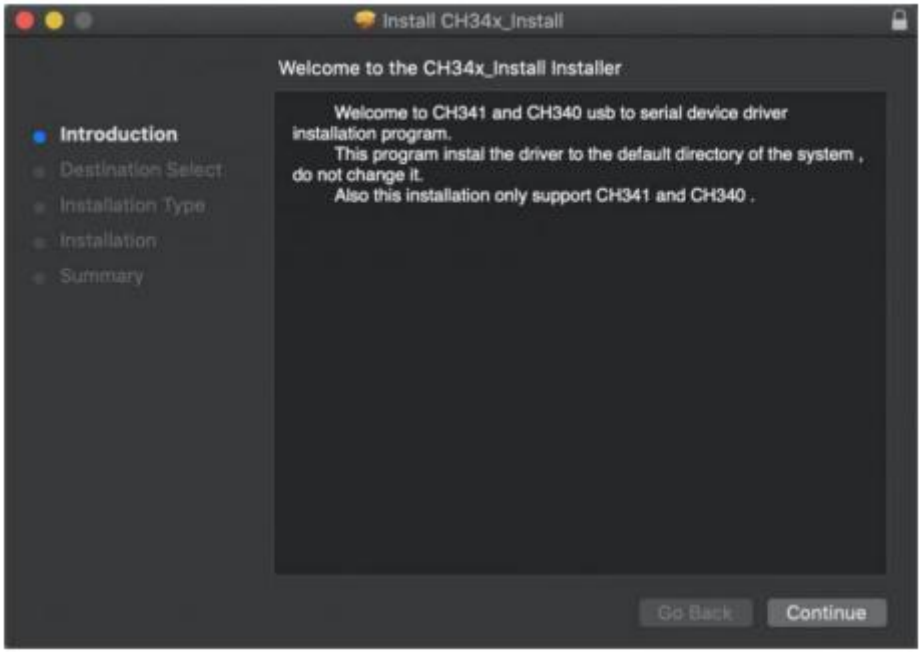
Arduino UNO R3 board

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

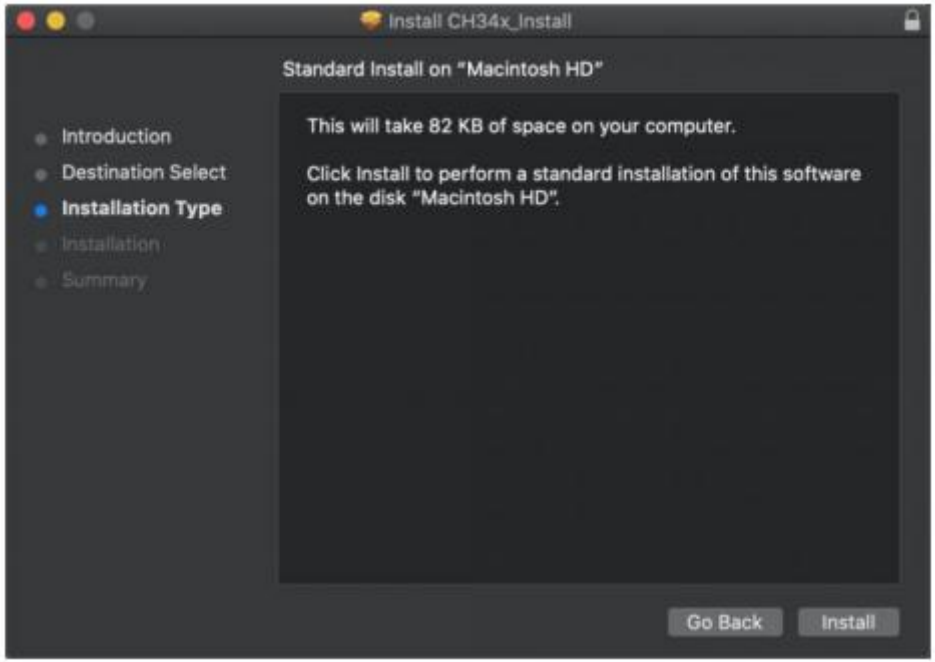


The driver file of the R3 of the MAC system is provided in the tutorial data package.

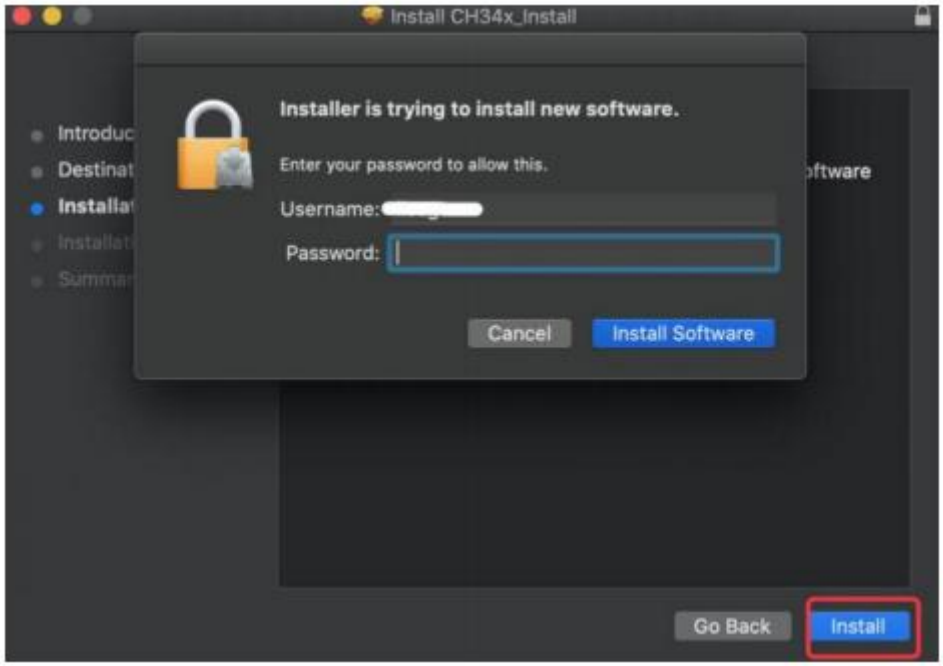
Double-click installation package and tap Continue



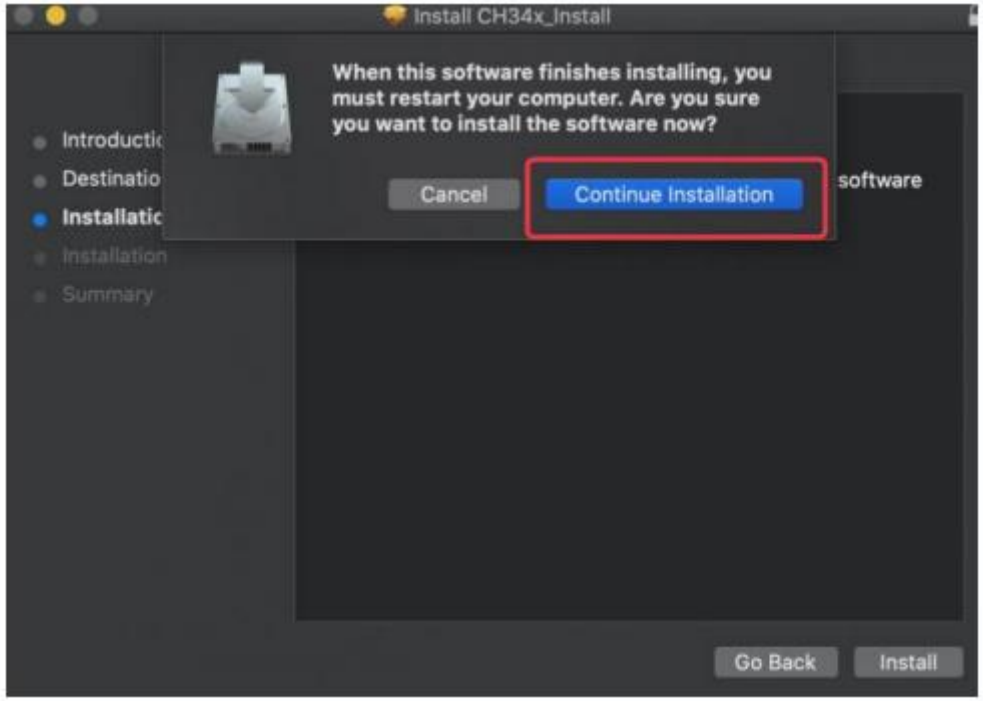
Click Install



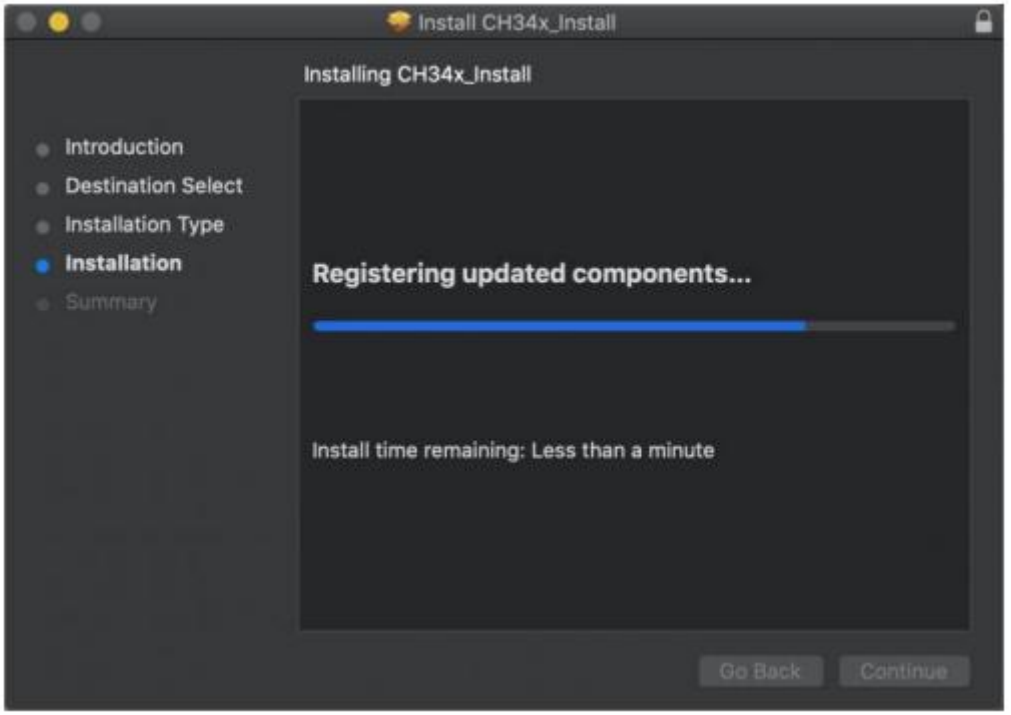
Input your user password and click Install Software



Tap Continue Installation



Wait to install



Click Restart after the installation is finished

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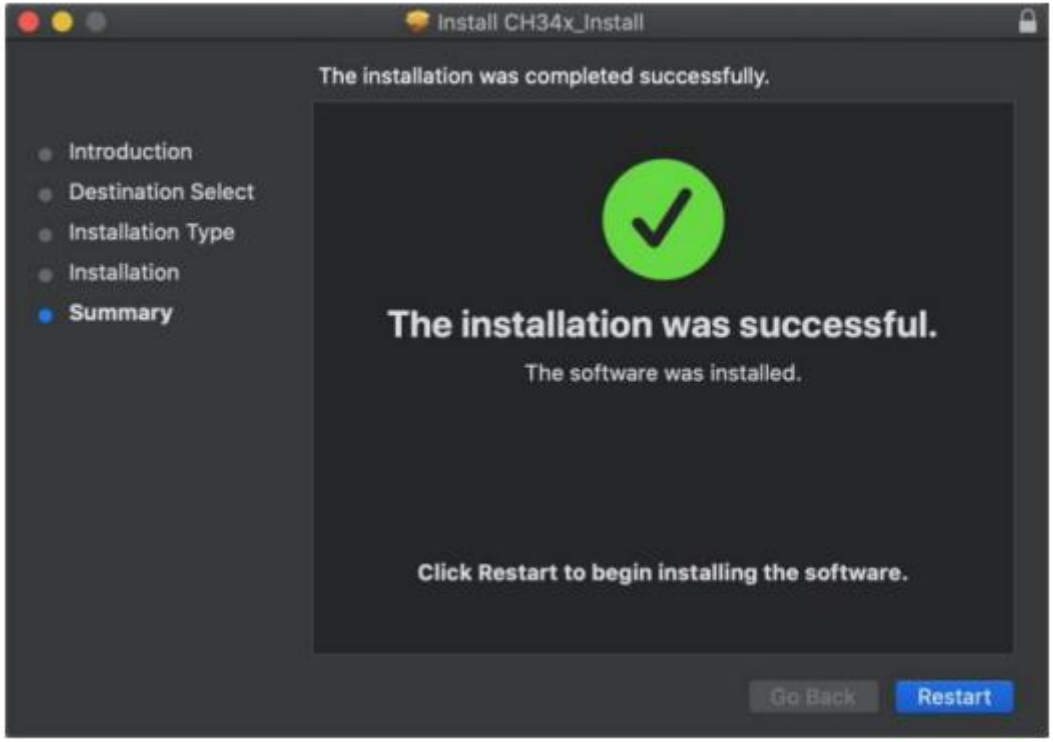
Install CH34x_Install
The installation was completed successfully.
Introduction
Destination Select
Installation Type
Installation
Summary
The installation was successful.
The software was installed.
Click Restart to begin installing the software.
Go Back
Restart

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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?

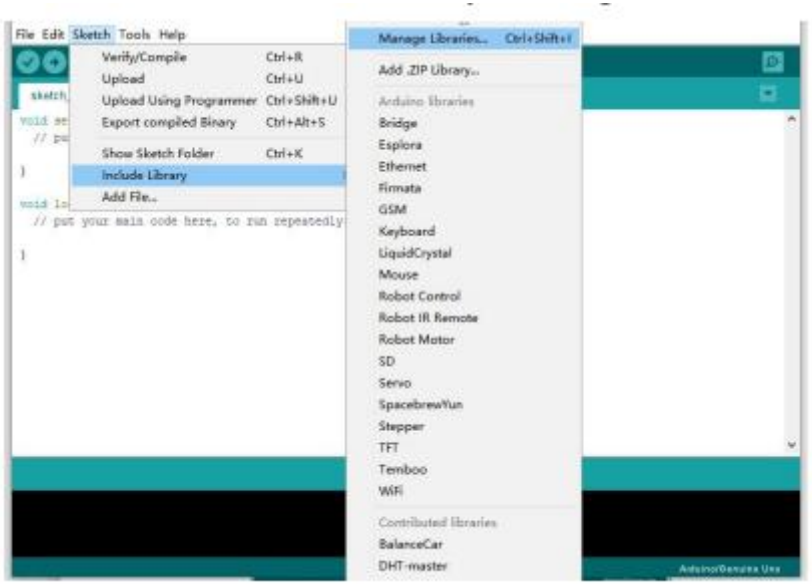
Libraries are a collection of code that makes it easy for you to connect to a sensor, display, module, etc. For example, the built-in Liquid Crystal library makes it easy to talk to character LCD displays. There are hundreds of additional libraries available on the Internet for download.

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

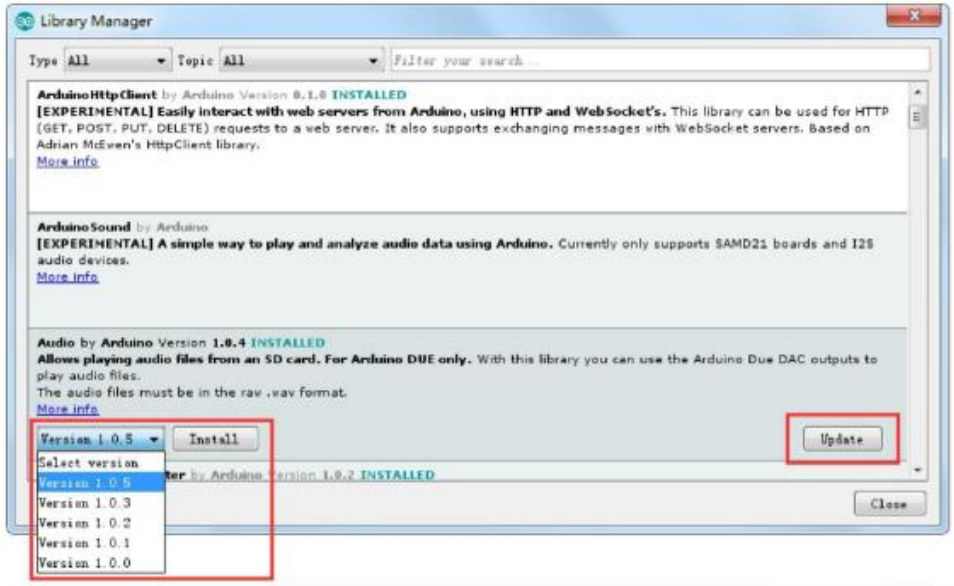
Using the Library Manager

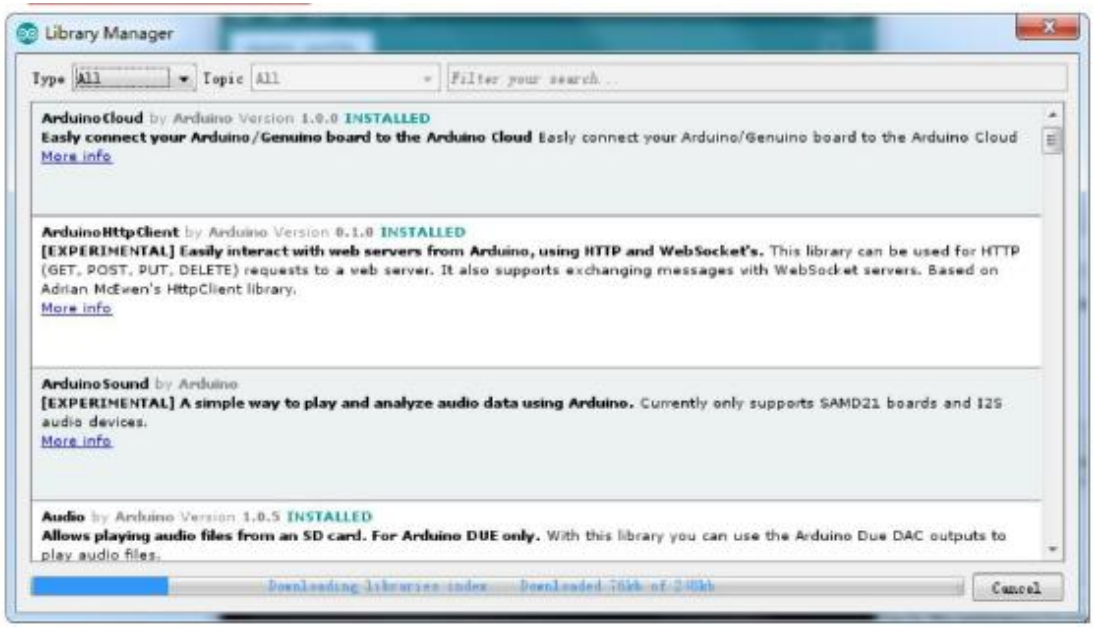
To install a new library into your Arduino IDE you can use the Library Manager (available from IDE version 1.8.0). Open the IDE and click to the "Sketch" menu and then Include Library > Manage Libraries.



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.

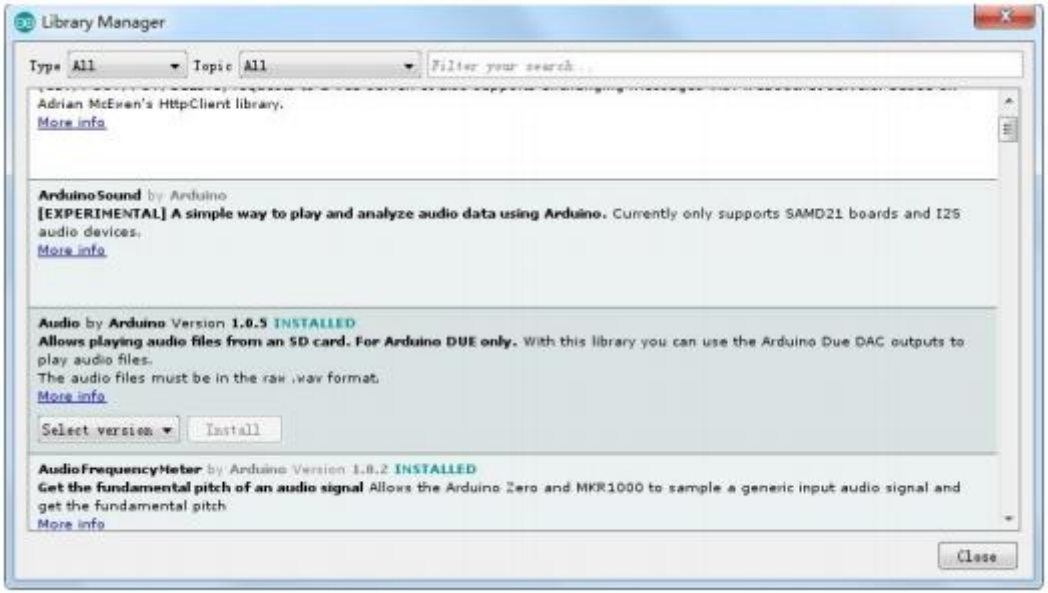




Finally click on install and wait for the IDE to install the new library.

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

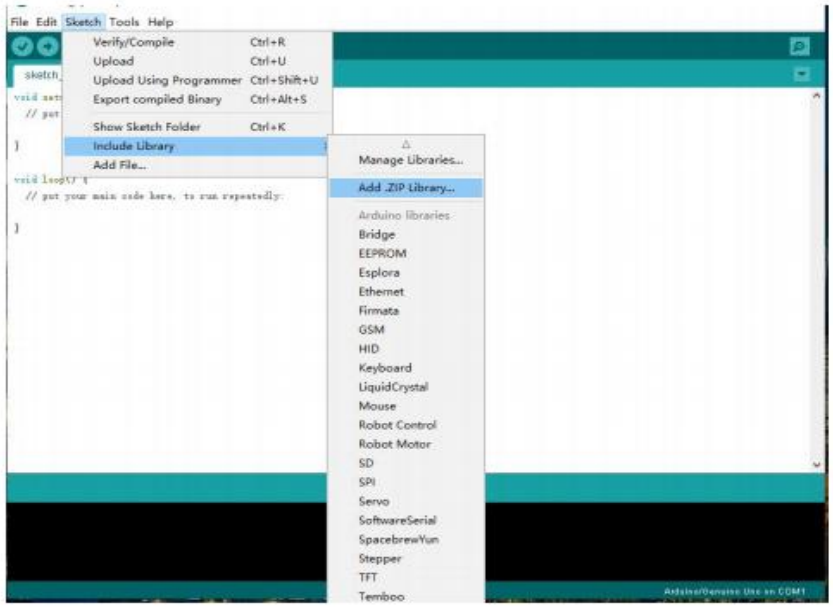
You can close the library manager.



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.

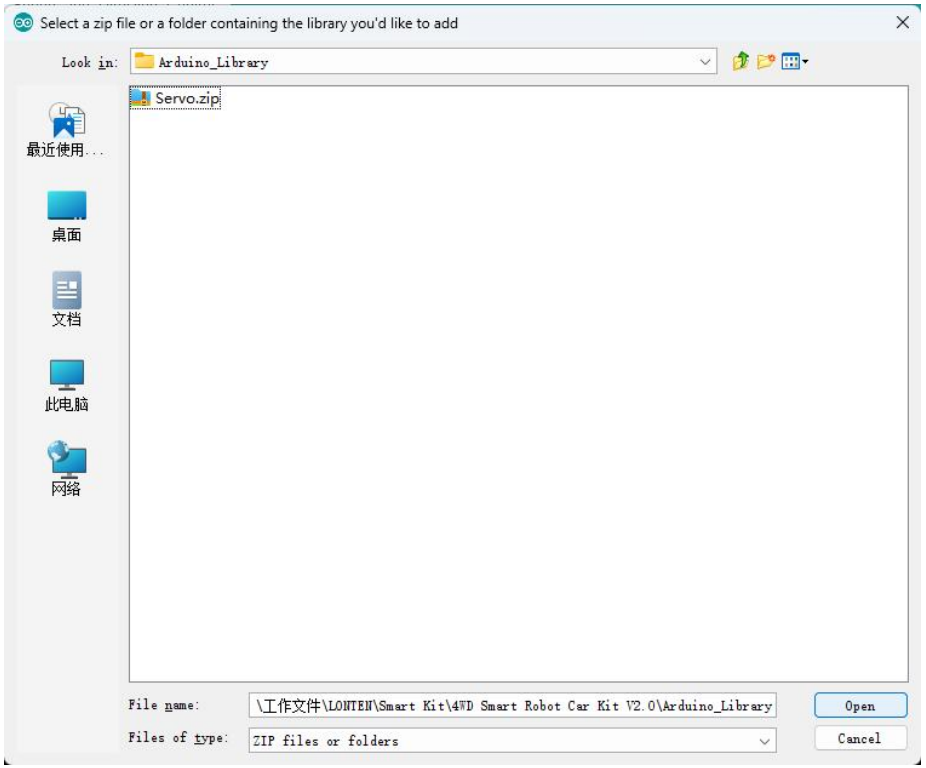
Importing a .zip Library

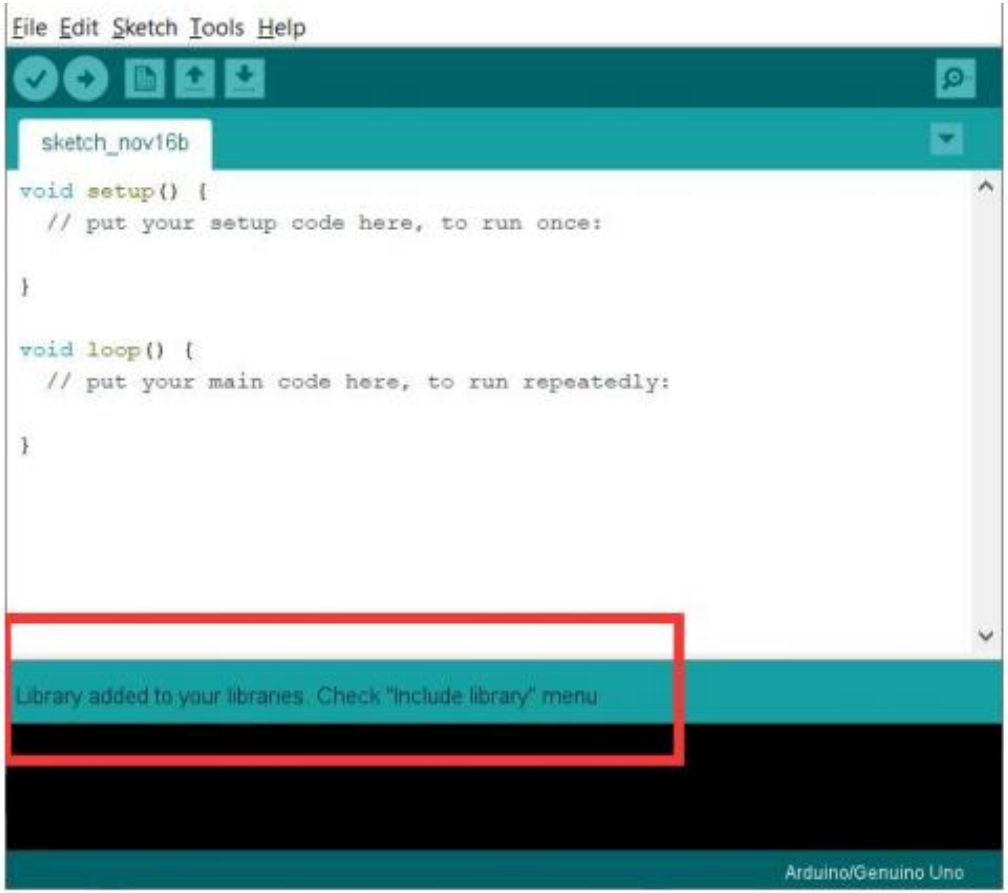
Libraries are often distributed as a ZIP file or folder. The name of the folder is the name of the library. Inside the folder will be a .cpp file, a .h file and often a keywords.txt file, examples folder, and other files required by the library. Starting with version 1.0.5, you can install 3rd party 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.




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.

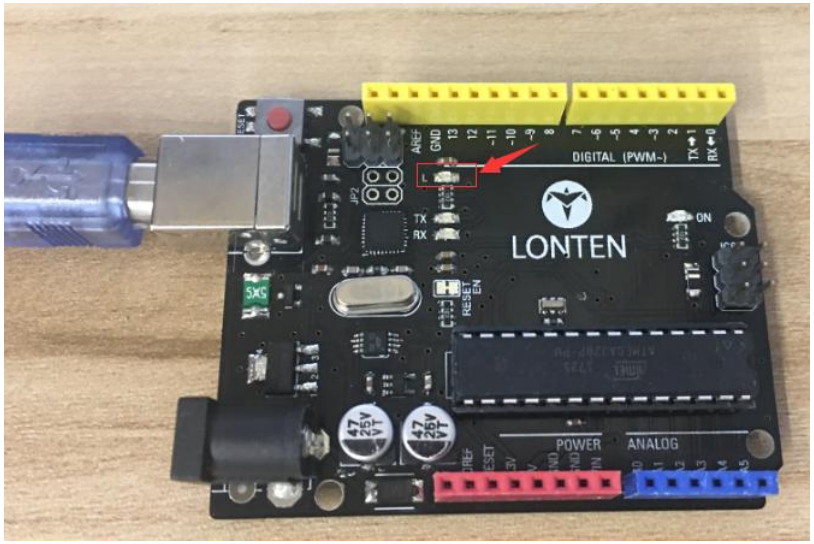
Component Required:

LONTEN 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.

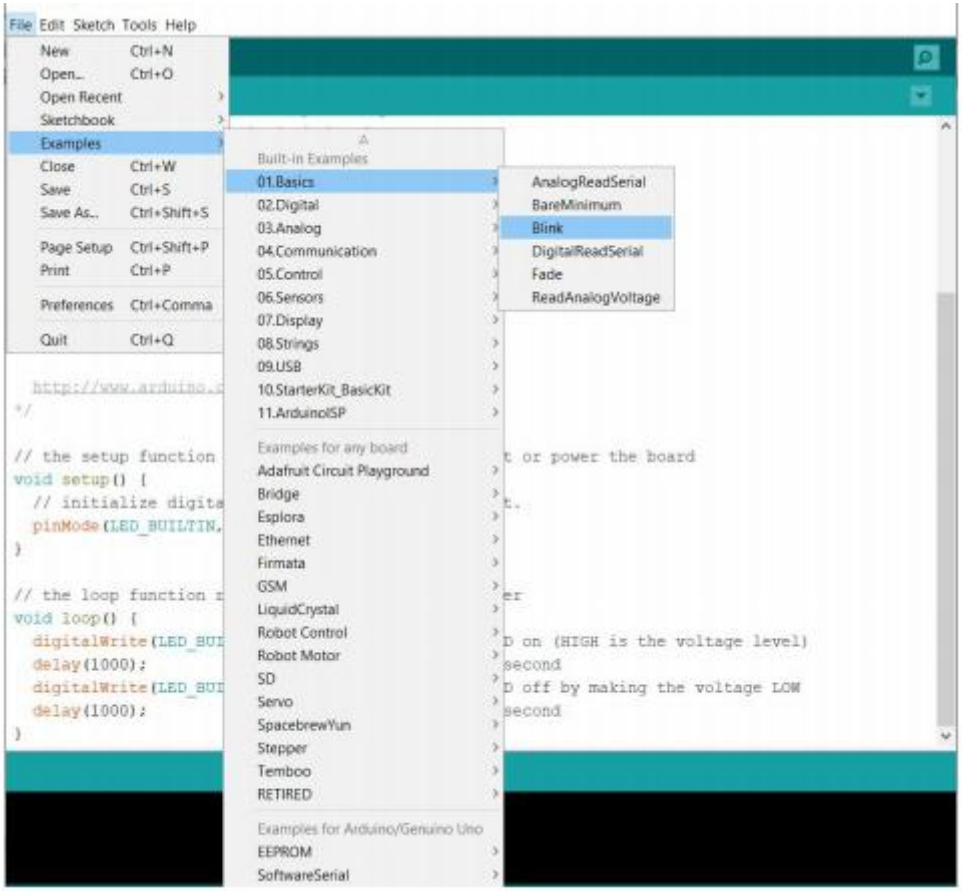


In this Project, we will reprogram the UNO board with our own Blink sketch and then change the rate at which it blinks.

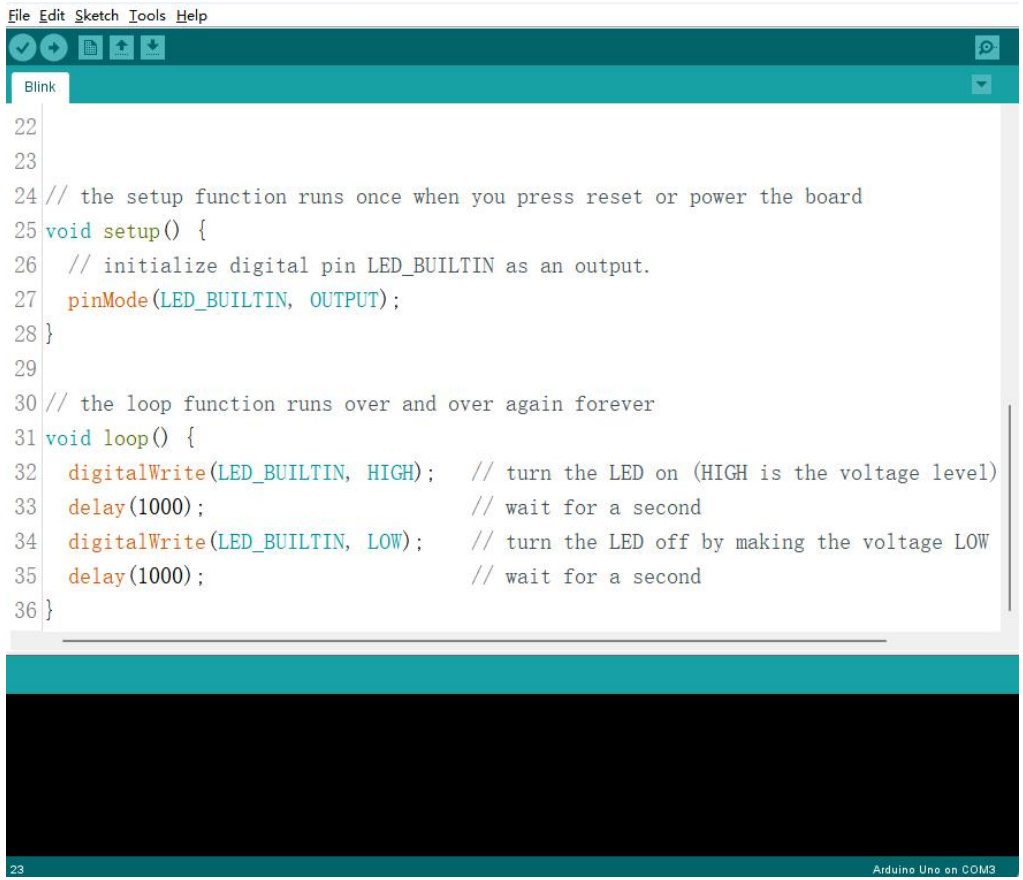
In the previous chapter-How to install Arduino IDE, you set up your Arduino IDE and made sure that you could find the right serial port for it to connect to your UNO board. The time has now come to put that connection to the test and program your UNO board.

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.

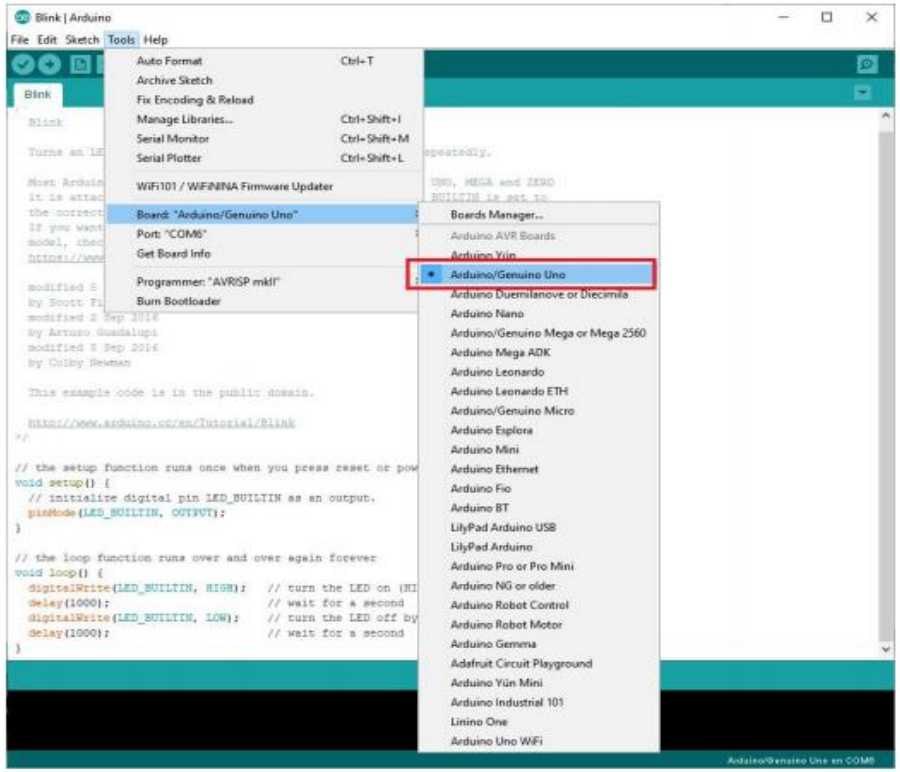
Load the 'Blink' sketch that you will find in the IDE's menu system under File > Examples > 01.Basics>Blink



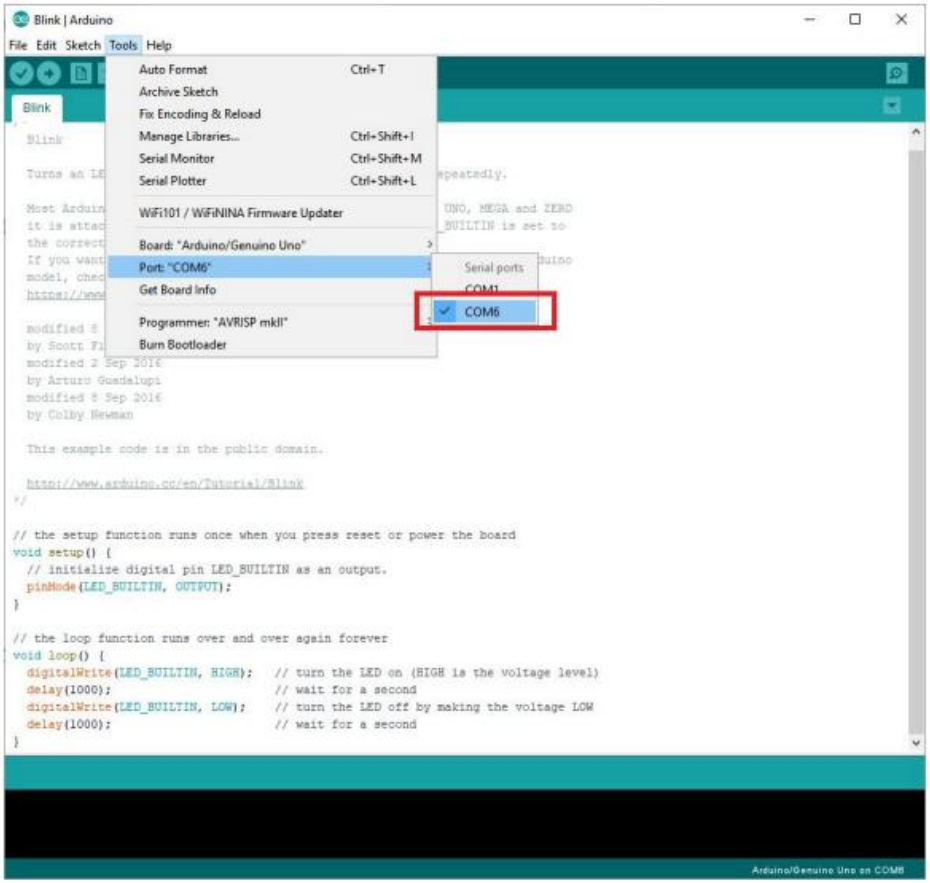
When the sketch window opens, enlarge it so that you can see the entire sketch in the window.

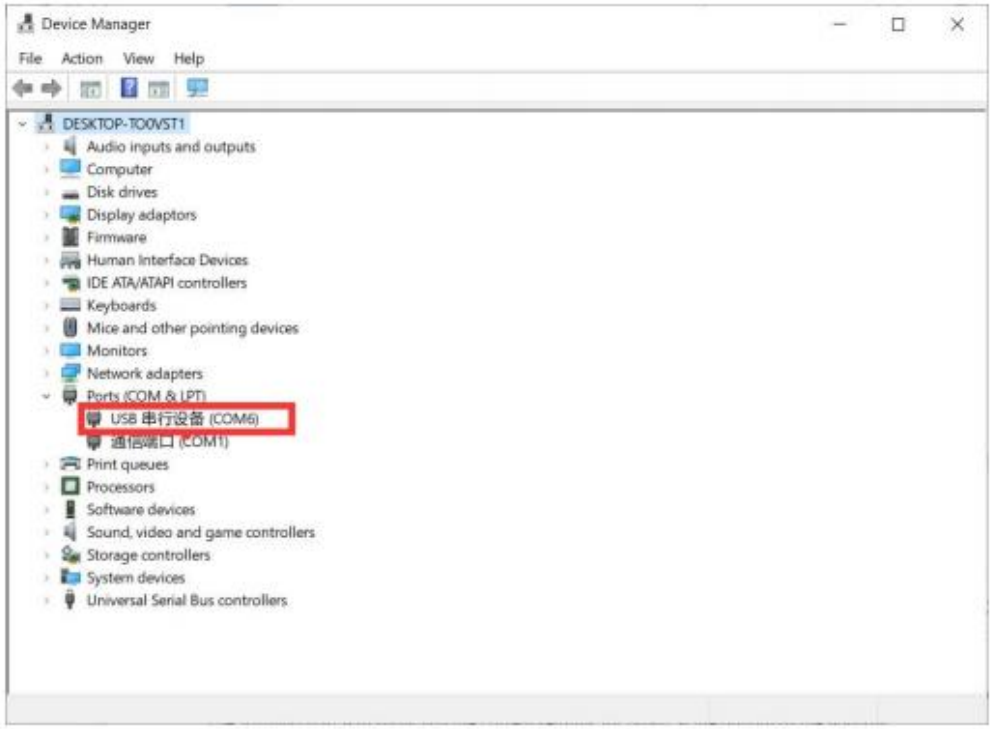

File Edit Sketch Tools Help
Blink
// the setup function runs once when you press reset or power the board
void setup() {
// initialize digital pin LED_BUILTIN as an output.
pinMode(LED_BUILTIN, OUTPUT);
}
// the loop function runs over and over again forever
void loop() {
digitalWrite(LED_BUILTIN, HIGH); // 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
}
23
Arduino Uno on COM3

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



LROBRUYA


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
// 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
}
Arduino/Genuino Uno on COM6

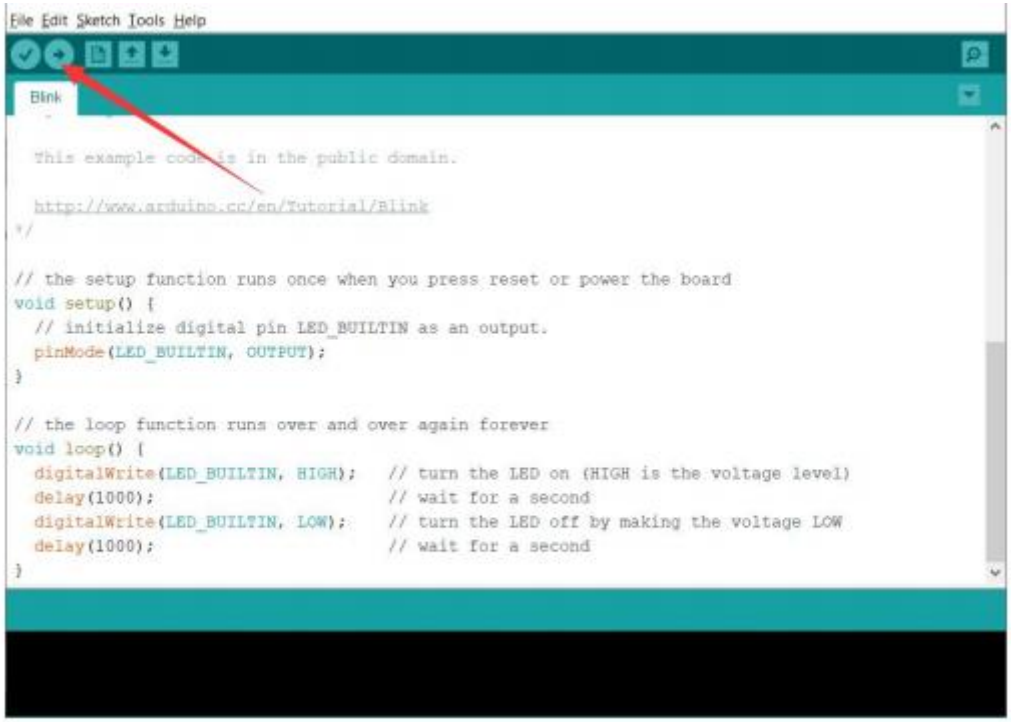


Note: The Board Type and Serial Port here are not necessarily the same as shown in picture. If you are using UNO, then you will have to choose Arduino UNO as the Board Type, other choices can be made in the same manner. And

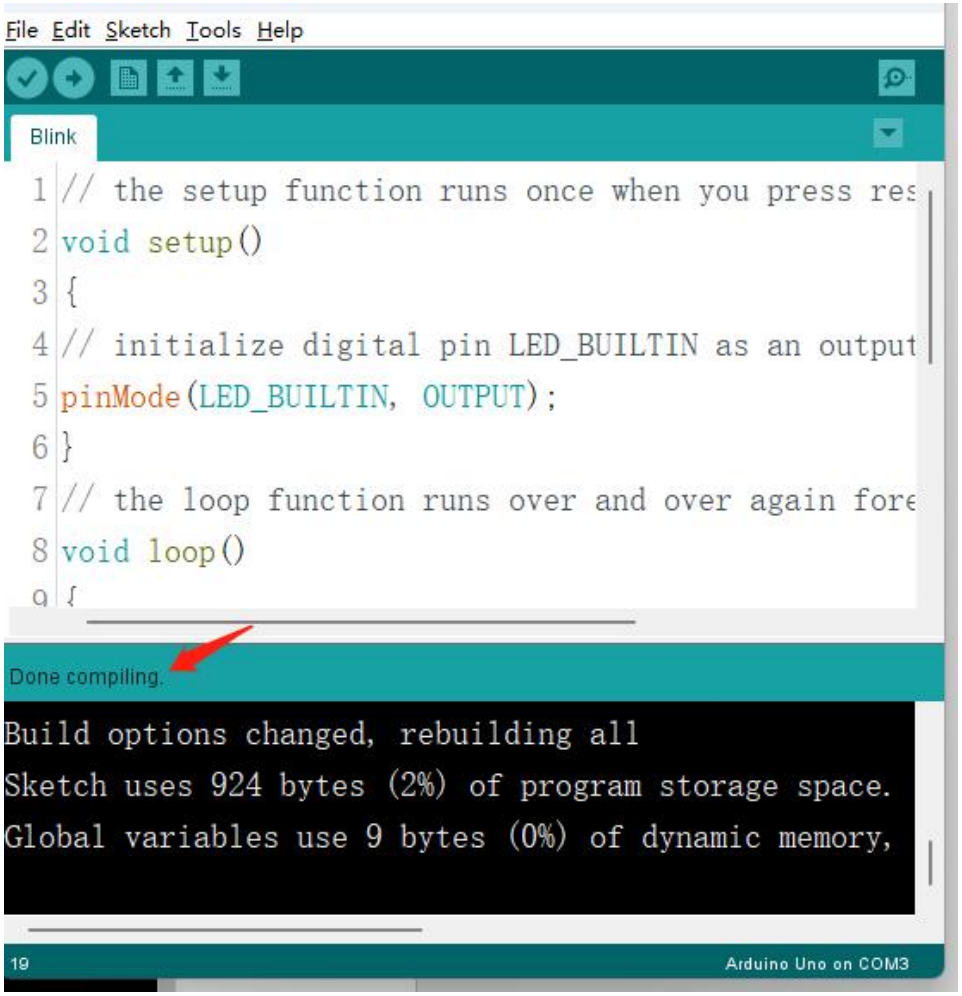
the Serial Port displayed for everyone is different, despite COM 6 chosen here, it could be COM3 or COM4 on your computer. A right COM port is supposed to be COMX (arduino XXX), which is by the certification criteria.

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

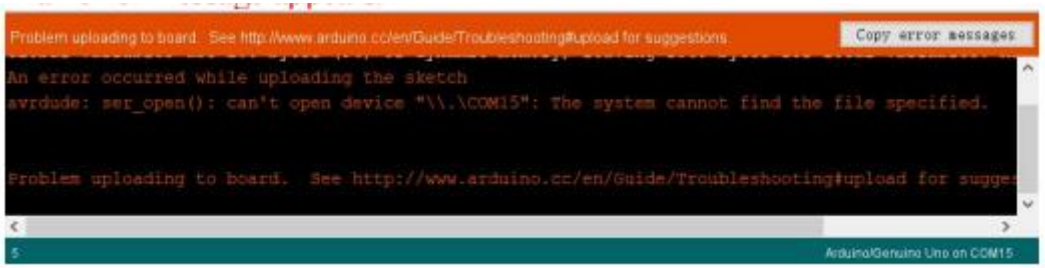
Click on the 'Upload' button. The second button from the left on the toolbar.



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


File Edit Sketch Tools Help
Blink
1 // the setup function runs once when you press res
2 void setup()
3 {
4 // initialize digital pin LED_BUILTIN as an output
5 pinMode(LED_BUILTIN, OUTPUT);
6 }
7 // the loop function runs over and over again fore
8 void loop()
Done compiling.
Build options changed, rebuilding all
Sketch uses 924 bytes (2%) of program storage space.
Global variables use 9 bytes (0%) of dynamic memory,
19
Arduino Uno on COM3

If an error message appears.

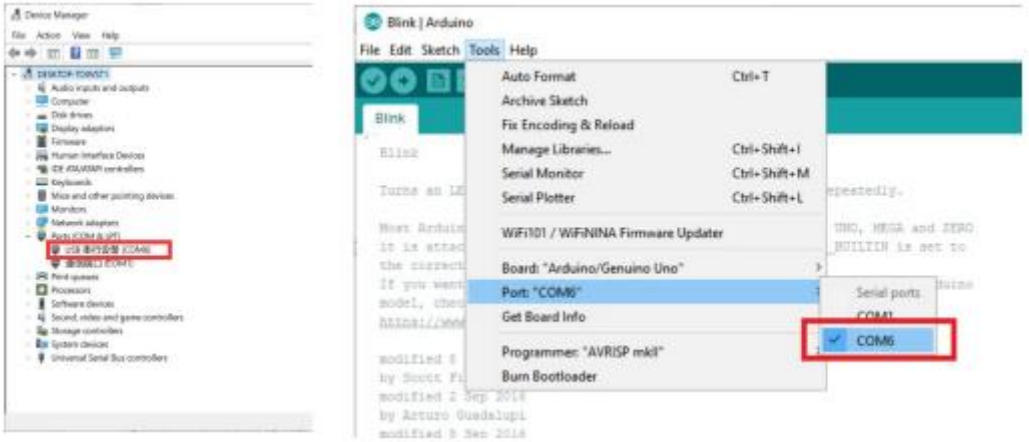


There can be several reasons:

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.

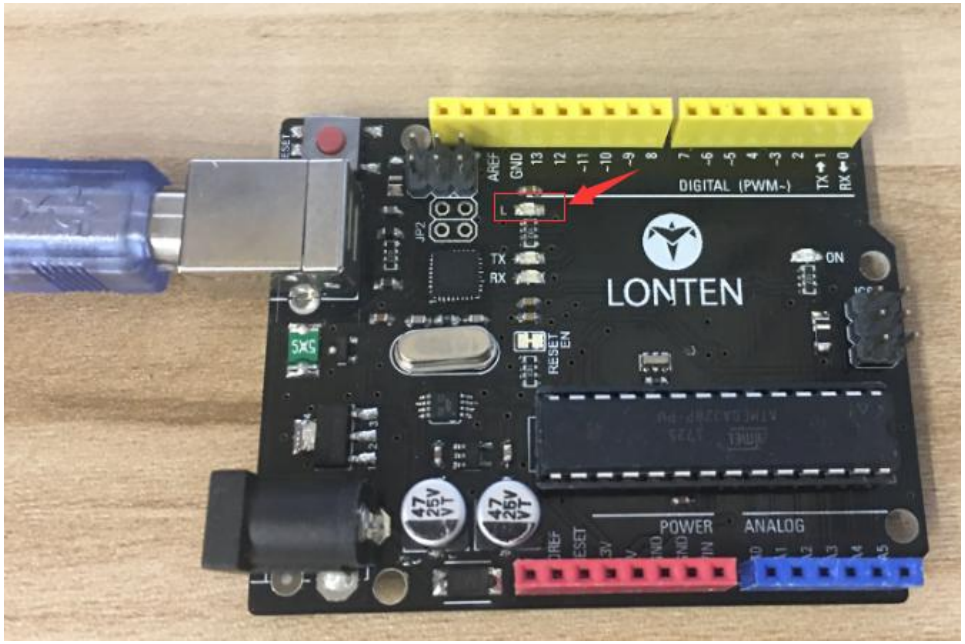


3. If your Arduino uno is connected to a Bluetooth module, it will occupy the communication serial port. You need to remove the Bluetooth module connection before uploading the code.

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 Motor Speed and Direction Control

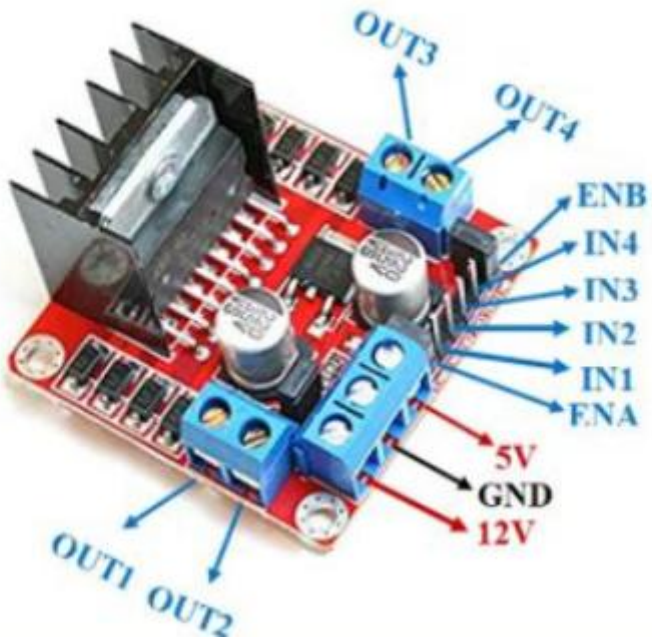
About this lesson:

In this lesson, you will learn how to use a L298N Motor Driver module control the direction and speed control of the tank.

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.

LROBRUYA



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.

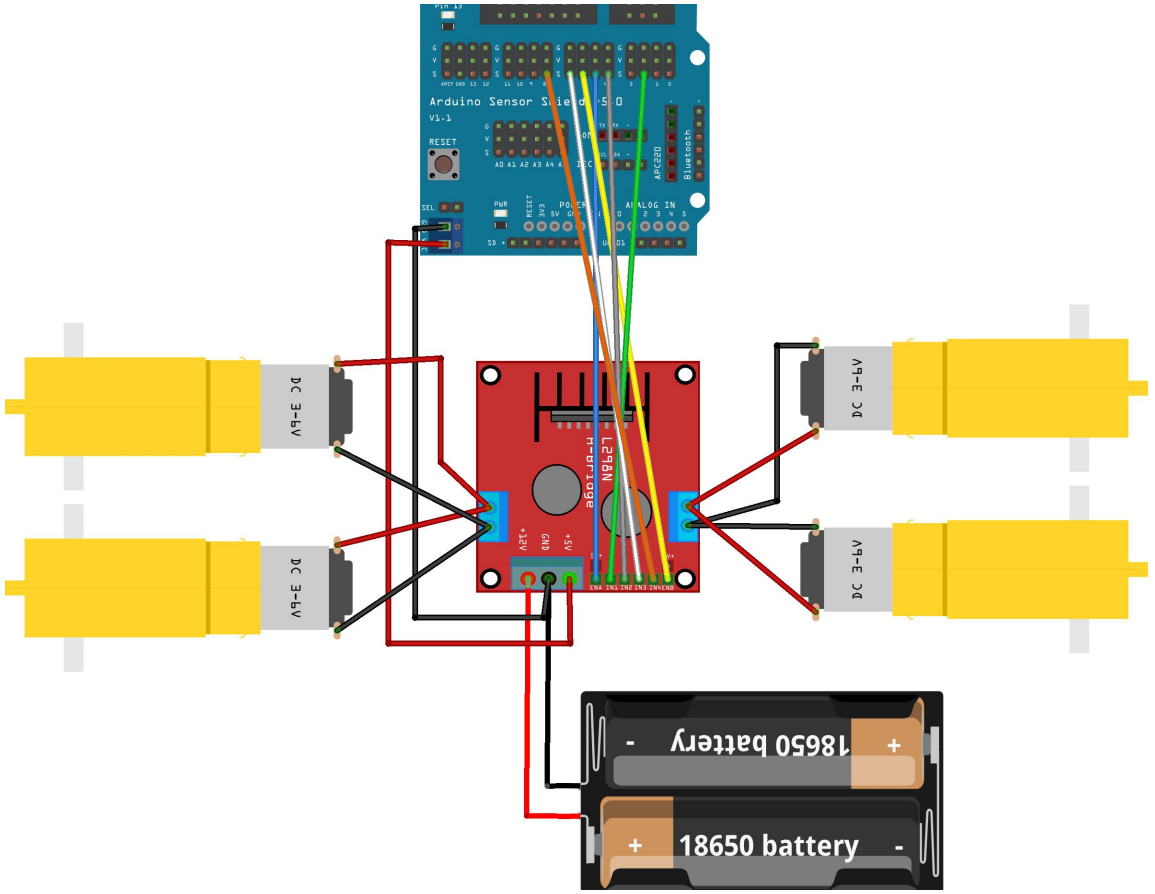
This module can use built-in 78M05 for electric work via a driving power supply part. But to avoid the damage of the

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.

Tank	D7	D8	D2	D4
Forward	HIGH	LOW	HIGH	LOW
Backward	LOW	HIGH	LOW	HIGH
Turn right	LOW	LOW	HIGH	LOW
Turn left	HIGH	LOW	LOW	LOW
Rotate to left	HIGH	LOW	LOW	HIGH
Rotate to right	LOW	HIGH	HIGH	LOW
Stop	LOW	LOW	LOW	LOW

Wiring diagram



Attention

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

After wiring, please open the program in the code Test_1_Motor_Speed_and_Direction_Control and click UPLOAD to upload the program.

Result

Upload the test code to UNO R3 control board, turn the POWER switch ON.You will see that the tank takes 1 second to move forward, then 1 second to retreat, 1 second to the right, 1 second to the left, and 1 second to stop. And then loop through these processes.

Lesson 2 Infrared Obstacle Avoidance Robot Tank

About this lesson:

In this lesson, we will complete the test of two experimental codes. In Experimental Test 1, we separately learn how to use infrared obstacle avoidance sensors to detect obstacles, and observe the results returned by the sensors to determine whether obstacles are detected. In Experimental Test 2, we learned to combine the infrared obstacle avoidance sensor with the motor to control the tank to complete the obstacle avoidance function.

What is infrared obstacle avoidance sensor

The infrared obstacle detector sensor has a pair of infrared transmitting and receiving tubes.The transmitter emits an infrared rays of a certain frequency. When the detection direction encounters an obstacle (reflecting surface), the infrared rays are reflected back, and receiving tube will receive it.At this time, the indicator (green LED) lights up. After processed by the circuit, the signal output terminal will output Digital signal.You can rotate the potentiometer on the shield to adjust

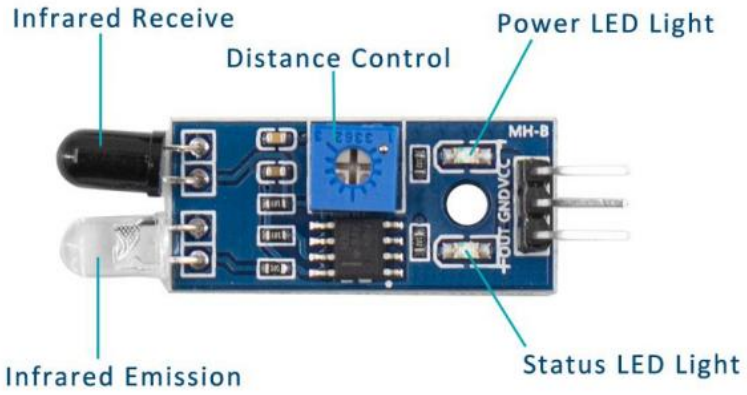
the detection distance. It is better to adjust the potentiometer to make the green LED in a state between on and off. The detection distance is the best,almost 10cm.

How to use the infrared obstacle avoidance sensor

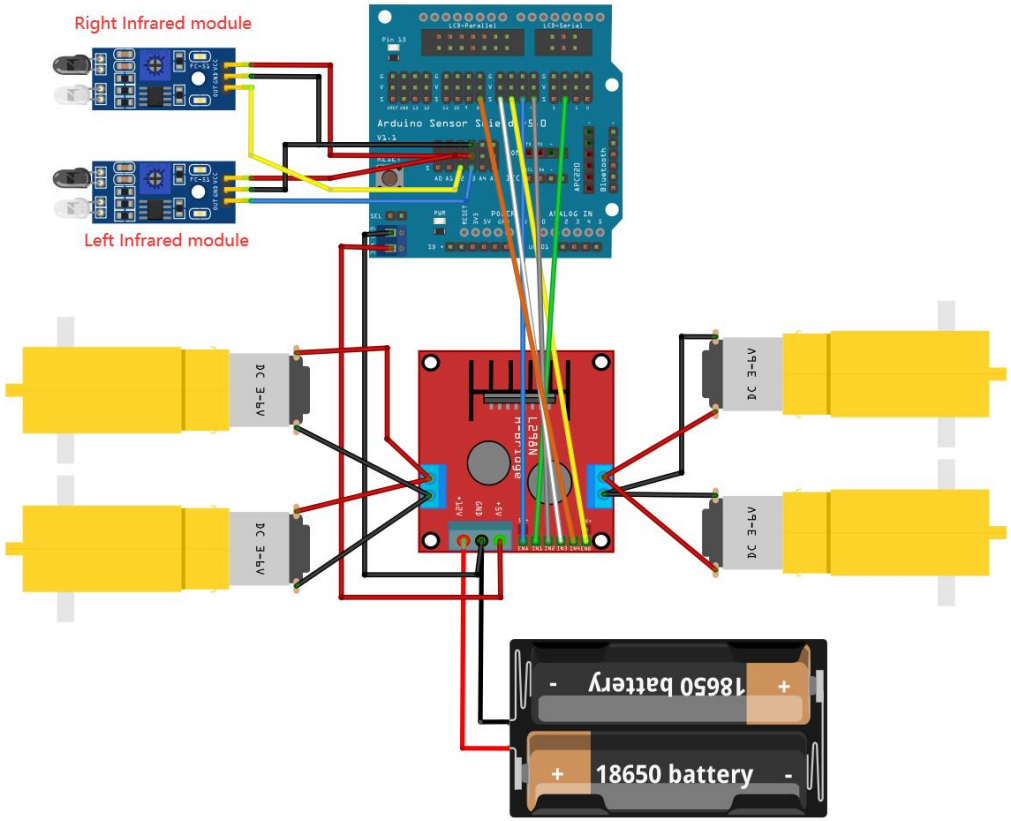
we read the signal level of obstacle detector sensor to judge whether detect obstacles or not.

When detects an obstacle, sensor’ s signal pin outputs LOW (display 0); otherwise, output HIGH (display 1).

Show the result on the serial monitor, and control the external LED module turn ON/OFF.



Wiring diagram



Let's program

Test 1--infrared obstacle avoidance sensor

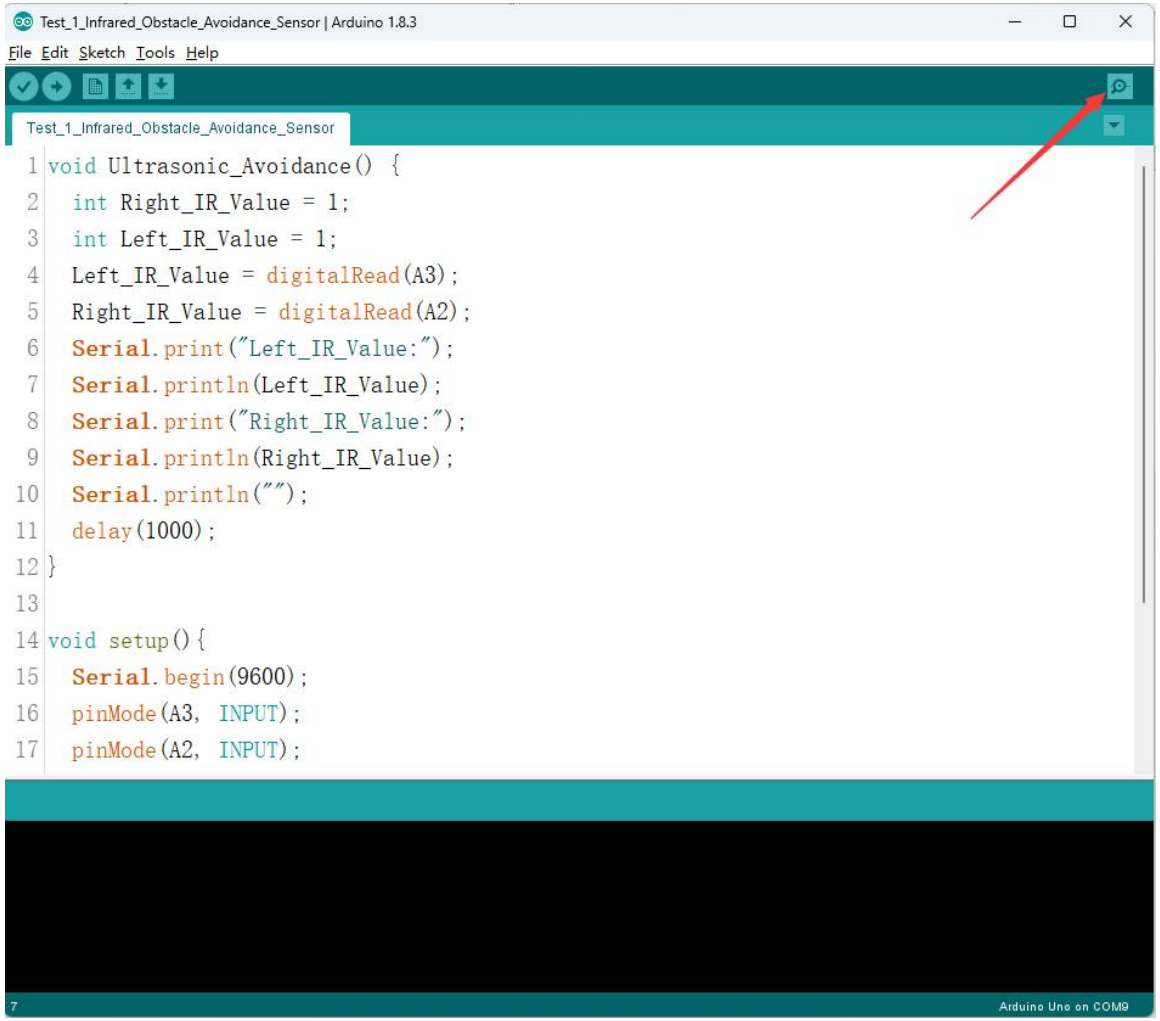
The main purpose of the test experiment is to read the return signal of the infrared obstacle avoidance sensor and print it to the serial port monitor.When detects an obstacle, sensor’s signal pin outputs LOW (display 0); otherwise, output HIGH (display 1).

Result

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

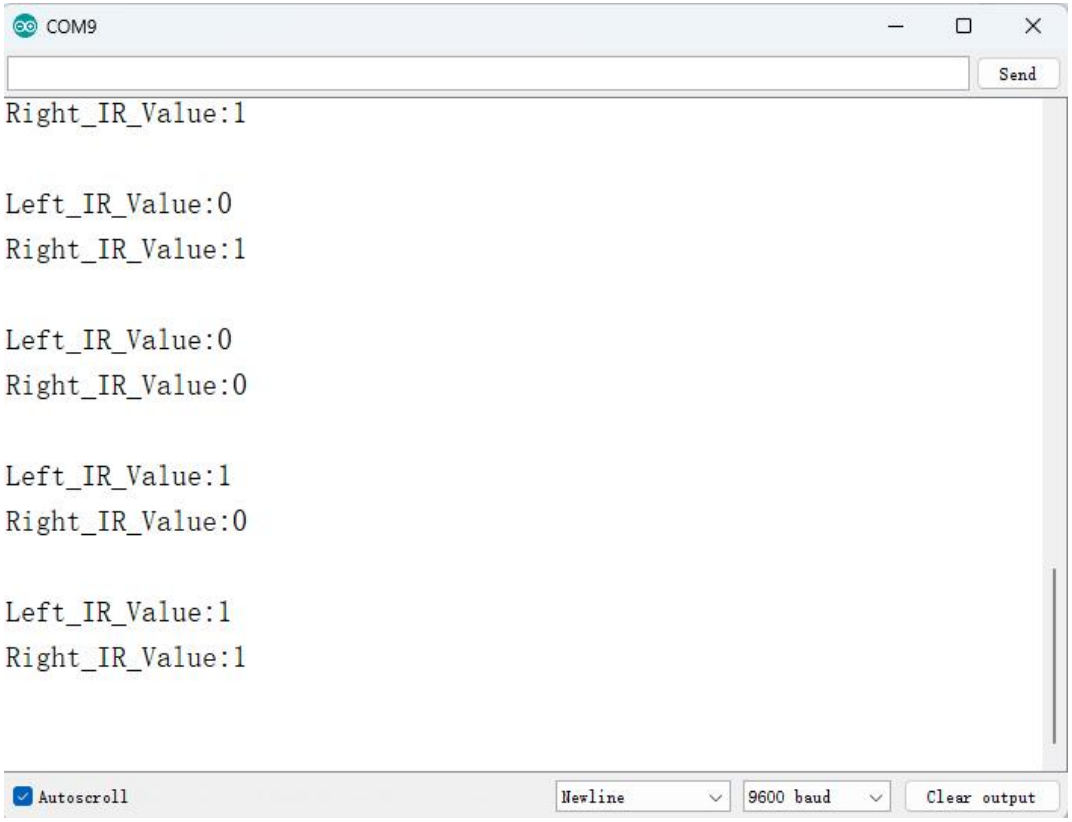
"**Test_1_Infrared_Obstacle_Avoidance_Sensor.ino**" in the reference materials we provided.

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


Test_1_Infrared_Obstacle_Avoidance_Sensor | Arduino 1.8.3
File Edit Sketch Tools Help
Test_1_Infrared_Obstacle_Avoidance_Sensor
void Ultrasonic_Avoidance() {
int Right_IR_Value = 1;
int Left_IR_Value = 1;
Left_IR_Value = digitalRead(A3);
Right_IR_Value = digitalRead(A2);
Serial.print("Left_IR_Value:");
Serial.println(Left_IR_Value);
Serial.print("Right_IR_Value:");
Serial.println(Right_IR_Value);
Serial.println("");
delay(1000);
}
void setup(){
Serial.begin(9600);
pinMode(A3, INPUT);
pinMode(A2, INPUT);
7
Arduino Uno on COM9

Then you can see the data as blow:

When there is an obstacle in the front, IR_value=0, and the indicator light on the sensor lights up.



Test 2--Infrared Obstacle Avoidance Robot Tank

In this experimental test , we learn how to control the tank to avoiding obstacles.

Result

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

"**Test_2_Infrared_Obstacle_Avoidance_Robot_Tank.ino**" in the reference materials we provided.

What will you see

Upload the test code to UNO R3 control board, turn the POWER switch ON. If there is an obstacle in front of the left of the tank, the tank will retreat and turn right, If there is an obstacle in the front right of the tank, the tank will retreat and turn left, If there are obstacles in the front left and front right, the tank moves backwards and then randomly chooses to turn right or left.If there are no obstacles ahead, the tank goes straight.

Note: According to the physical laws: Black objects have a strong ability to absorb light. The infrared obstacle avoidance function relies on transmitting and receiving infrared rays to detect obstacles in front. When all obstacles in front of the tank are black objects, the sensitivity of the sensor detection will decrease.

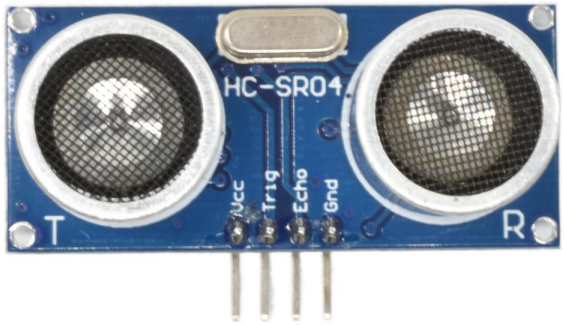
Lesson 3 Ultrasonic Obstacle Avoidance Robot Tank

About this lesson:

In this lesson we will learn about ultrasonic sensors and servos and combine them. The servo motor drives the ultrasonic wave to help the tank detect the front left and front right obstacles as well as the front obstacles, thus avoiding obstacles.Use ultrasound to measure the distance of objects in front of the tank to help the tank to follow the object in front of it.

LROBRUYA

What is an ultrasonic sensor



Ultrasonic sensor module HC-SR04 provides 2cm-400cm non-contact measurement function, the ranging accuracy can reach to 3mm. The modules includes ultrasonic transmitters, receiver and control circuit.

The basic principle of work:

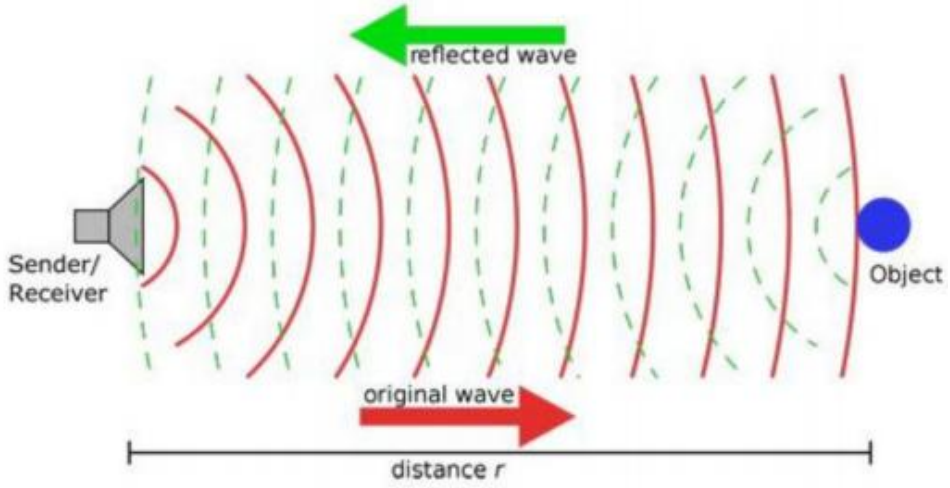
(1) Using IO trigger for at least 10us high level signal

(2) The Module automatically sends eight 40 kHz and detect whether there is a pulse signal back.

(3) IF the signal back, through high level , time of high output IO duration is the time from sending ultrasonic tore turning.

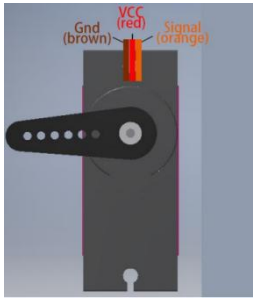
Test distance = (high level time × velocity of sound (340m/s) /2

The Timing diagram is shown below. You only need to supply a short 10us pulse to the trigger input to start the ranging, and then the module will send out an 8 cycle burst of ultrasound at 40 kHz and raise its echo. The Echo is a distance object that is pulse width and the range in proportion .You can calculate the range through the time interval between sending trigger signal and receiving echo signal. Formula: us / 58 = centimeters or us / 148 =inch; or: the range = high level time * velocity (340M/S) / 2; we suggest to use over 60ms measurement cycle, in order to prevent trigger signal to the echo signal.



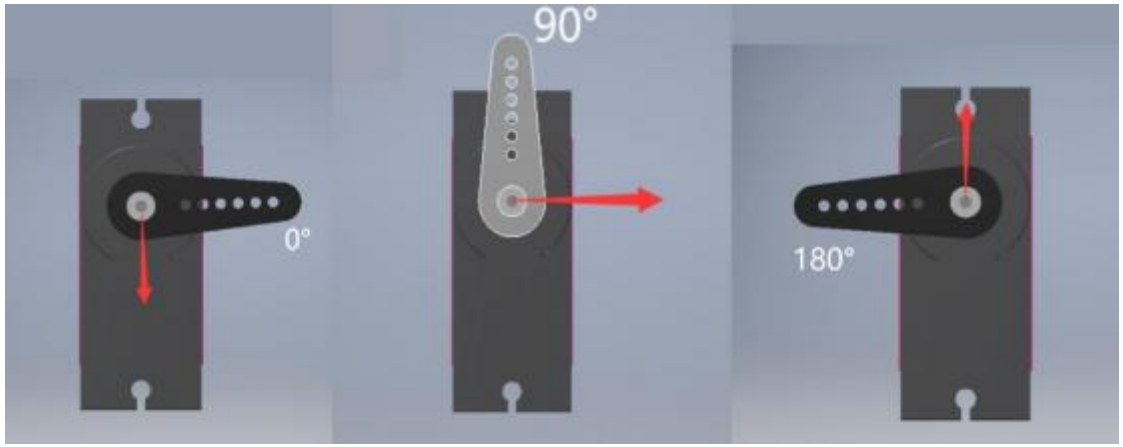
LROBRUYA

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!

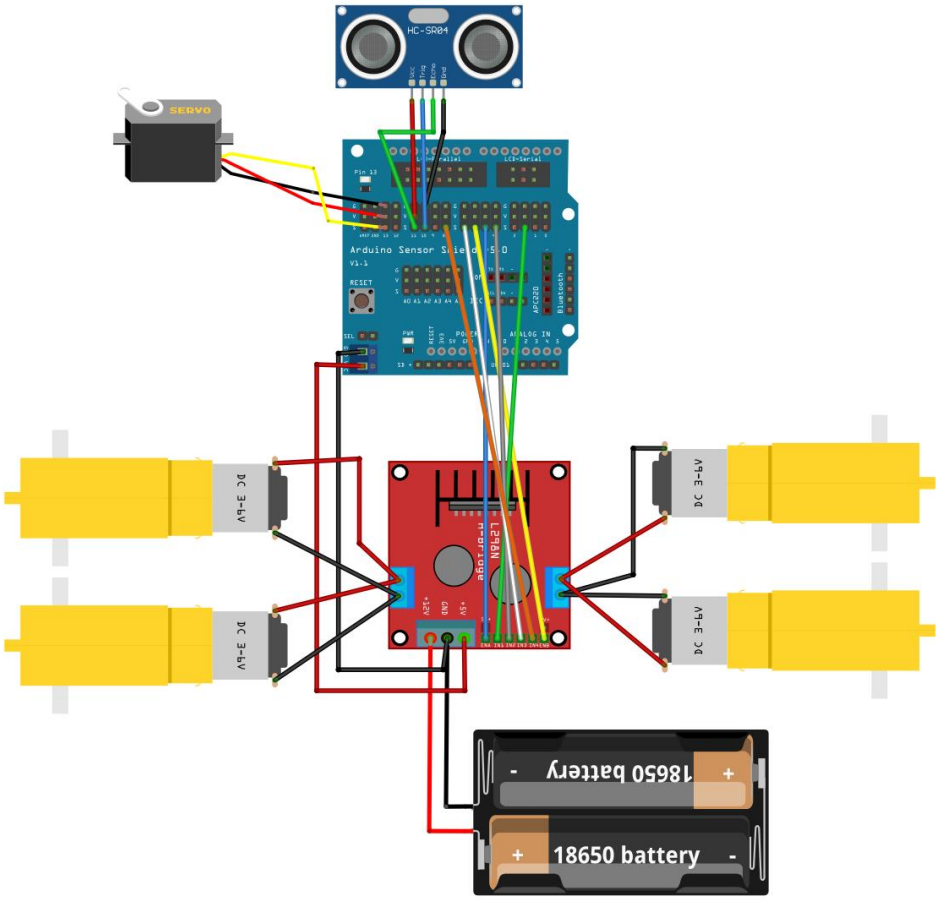


Servo motors were first used in the Remote Control (RC) world, usually to control the steering of RC cars or the flaps on a RC plane. With time, they found their uses in robotics, automation, and of course, the Arduino world.

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 Servo Control

In experimental test 1, we learned 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 **"Test_1_Servo_Control.ino"** in the reference materials we provided.

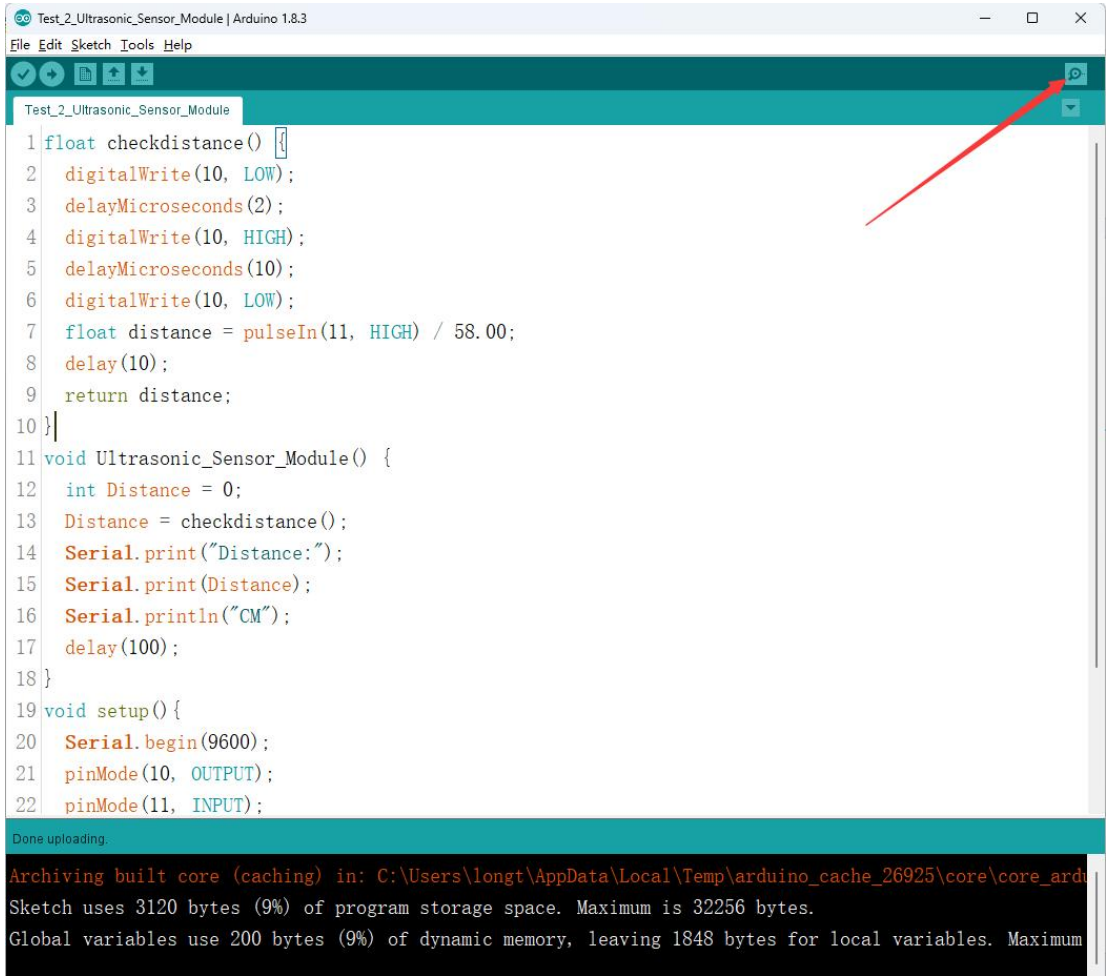
Before you can run this, make sure that you have installed the < Servo> library or re-install it, if necessary. Otherwise, your code won't work.For details about loading the library file, see Lesson about how to add libraries.

Test 2--Ultrasonic Sensor Module

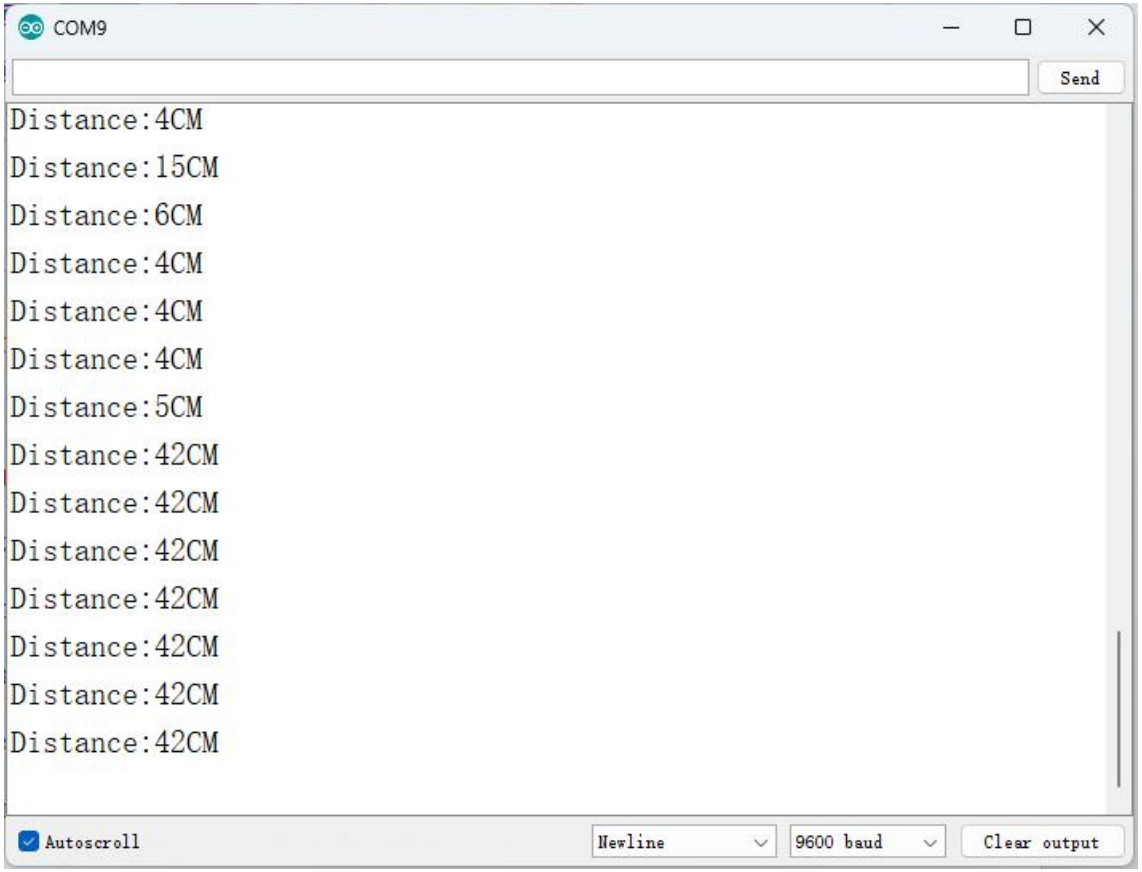
In Experimental Test 2, we will learn how to control the ultrasonic sensor, and display the distance measured by the ultrasonic sensor on the serial monitor.

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_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_Ultrasonic_Sensor_Module | Arduino 1.8.3
File Edit Sketch Tools Help
Test_2_Ultrasonic_Sensor_Module
float checkdistance() {
digitalWrite(10, LOW);
delayMicroseconds(2);
digitalWrite(10, HIGH);
delayMicroseconds(10);
digitalWrite(10, LOW);
float distance = pulseIn(11, HIGH) / 58.00;
delay(10);
return distance;
}
void Ultrasonic_Sensor_Module() {
int Distance = 0;
Distance = checkdistance();
Serial.print("Distance:");
Serial.print(Distance);
Serial.println("CM");
delay(100);
}
void setup(){
Serial.begin(9600);
pinMode(10, OUTPUT);
pinMode(11, INPUT);
Done uploading.
Archiving built core (caching) in: C:\Users\longt\AppData\Local\Temp\arduino_cache_26925\core\core_ardu
Sketch uses 3120 bytes (9%) of program storage space. Maximum is 32256 bytes.
Global variables use 200 bytes (9%) of dynamic memory, leaving 1848 bytes for local variables. Maximum

Then you can see the data as blow:



Test 3--Ultrasonic_Obstacle_Avoidance_Robot_Tank

In the experimental test 3, the servo motor, ultrasonic sensor and motor are simultaneously controlled to help the tank achieve ultrasonic waves to avoid obstacles.

Result

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

"**Test_3_Ultrasonic_Obstacle_Avoidance_Robot_Tank.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.

When there is no obstacle in front of the tank, the tank keeps walking straight. When the distance of the obstacle in front of the tank is less than 20cm, the tank stops, then detects whether there is an obstacle in the left front and right front, and then turns in the opposite direction.

Test 4--Ultrasonic_Follow_Robot_Tank

In this experimental test,Use ultrasound to measure the distance of objects in front of the tank to help the tank to follow the object in front of it.

Result

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

"Test_4_Ultrasonic_Follow_Robot_Tank.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.

The tank detects the distance of the object in front through the ultrasonic sensor. When the front object moves, the tank will follow the movement, keeping the distance between the tank and the object in front between 10cm~20cm.

Lesson 4 Infrared Remote Control Robot Tank

About this lesson:

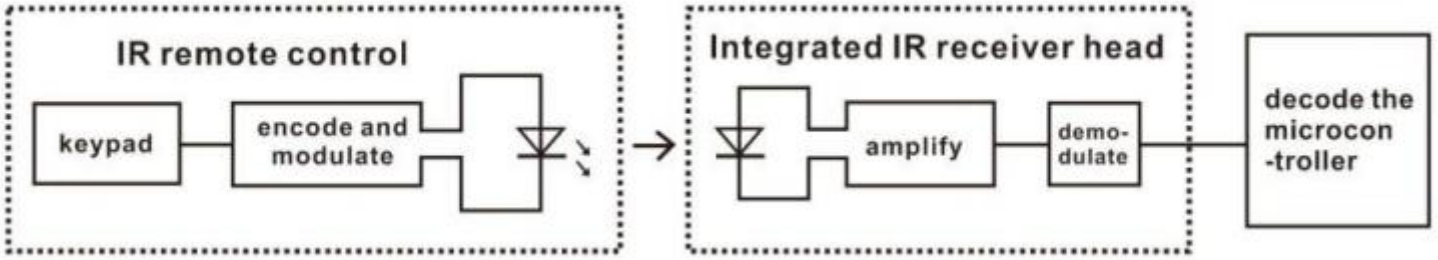
In this lesson, we will learn the infrared remote control, and use the infrared remote control to control the tank go forward, backward, turn left, turn right.

What is an infrared remote control

There is no doubt that infrared remote control is commonly seen in our daily life. It's hard to imagine our world without it.An infrared remote control can be used to control a wide range of home appliances such as television, audio, video recorders and satellite signal receivers.Well, in the following let’s get a better understanding of the infrared remote control.Infrared remote control is composed of infrared transmitting and infrared receiving systems.That is, consist of an infrared remote control, an infrared receiver module and a microcontroller that can decode.You can refer to the figure below.

LROBRUYA

Remote control key value



The 38K infrared carrier signal transmitted by an infrared remote controller is encoded by an encoding chip inside the remote controller. It is composed of a pilot code, user code, data code, and data inversion code.The time interval between pulses is used to distinguish whether it is a signal 0 or 1. (when the ratio of high level to low level is about 1:1, considered as signal 0.)

And the encoding is just well composed of signal 0 and 1.The user code of the same button on remote controller is unchanged. Using difference data distinguish the key pressed on the remote control. When press down a button on the remote control, it will send out an infrared carrier signal. And when infrared receiver receives that signal, its program will decode the carrier signal, and through different data codes, thus can judge which key is pressed.The microcontroller is

decoded by an received signal 0 or 1 to determine which key is pressed by the remote control.

What is an infrared receiver

The infrared receiver module. It is mainly composed of an infrared receiving head. This device integrates with reception, amplification and demodulation.Its inter IC has been demodulated, outputting Digital signal. Suitable for IR remote control and infrared data transmission.

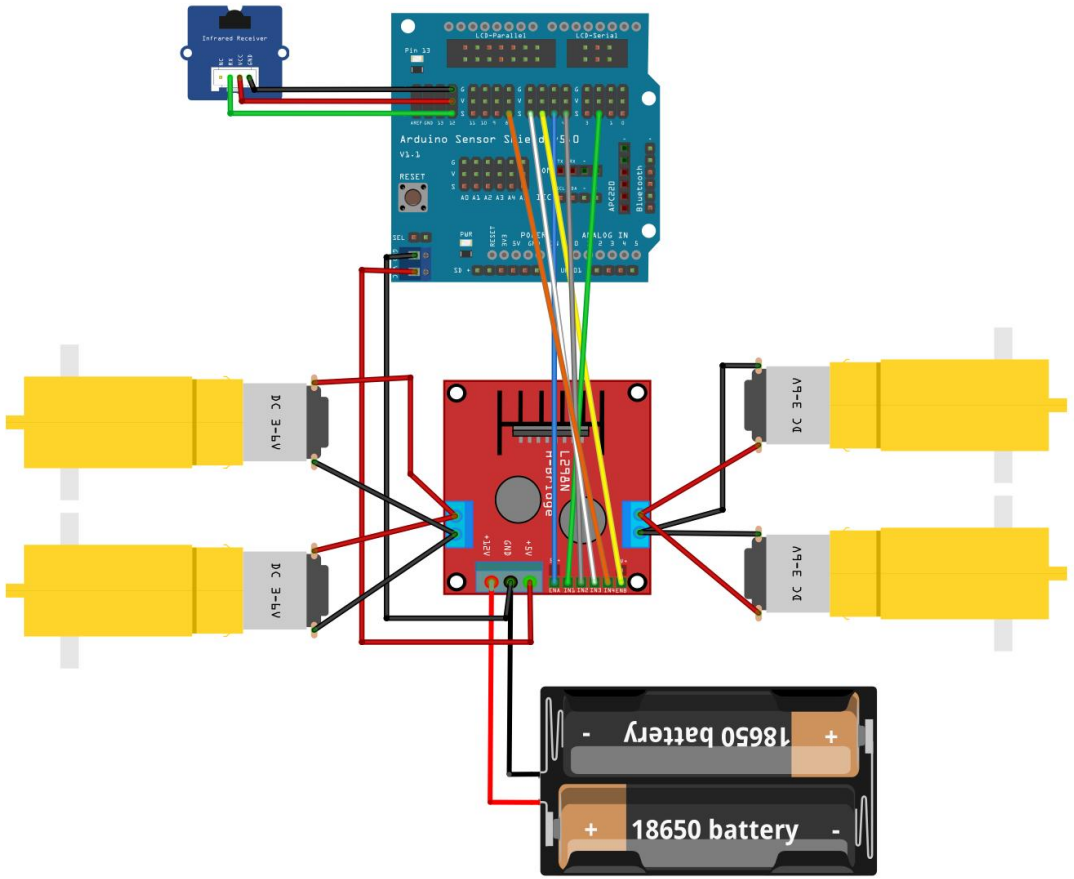
LROBRUYA

Remote control code:

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

1 FFA25D
2 FF629D
3 FFE21D
4 FF22DD
5 FF02FD
6 FFC23D
7 FFE01F
8 FFA857
9 FF906F
* FF6897
0 FF9867
FFB04F
FF18E7
FF10EF
OK FF38C7
FF5AA5
FF4AB5

Wiring diagram



Let's program

Test 1--Infrared Remote Control Robot Tank

In experimental test 1, learn to receive infrared remote control signals, and distinguish the corresponding remote control key value, and finally realize infrared remote control tank.

Result

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

"**Test_1_Infrared_Remote_Control_Robot_Tank.ino**" in the reference materials we provided.

Before you can run this, make sure that you have installed the < IRremote > 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.

After completing the code upload, use the infrared remote control to control the tank's direction of advance.

Lesson 5 APP Control Robot Tank

About this lesson:

In this lesson, we mainly study two experimental tests. In Test 1, we learn the communication between the Bluetooth module and the mobile phone. In Test 2, we can freely switch the various functional modes through the mobile phone app, such as ultrasonic obstacle avoidance, infrared obstacle avoidance, infrared remote control, gravity sensor remote control.

What is a Bluetooth module

Principle and Application of Bluetooth Remote Control Bluetooth, as the name implies, blue teeth, and is not used to bite people, but a wireless data transmission method.Bluetooth technology is a wireless standard technology that enables short-range data exchange among fixed devices, mobile devices, and personal area networks of buildings (UHF radio waves

in the ISM band of 2.4 to 2.485GHz).There are two kinds of commonly used Bluetooth module on the market,HC-05 and HC-06 models. The difference between them is that the HC-05 is a master-slave one. It can not only make small reports to its own “master”, but also can receive the command given to it.

The HC-06 can only work in slave mode, which can only accept the superior command. For instance, in many cases you may want to be an overbearing man, letting the subordinates obey the order without any nonsense. So in such situation, it is enough to use the HC-06 module shown as below.

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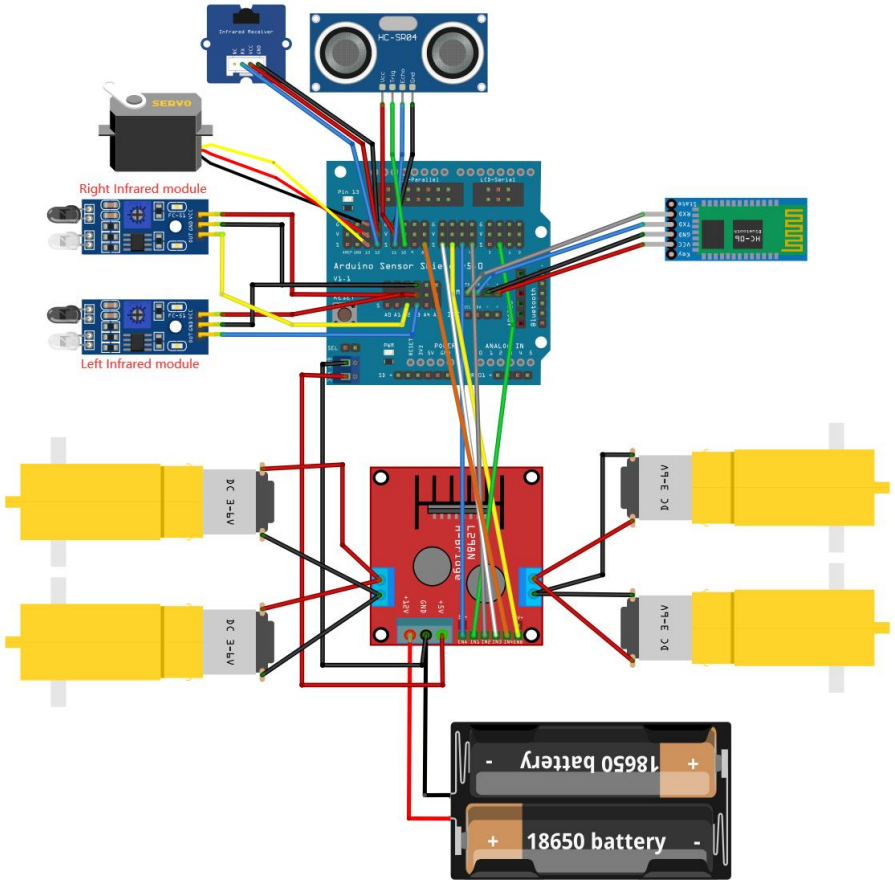
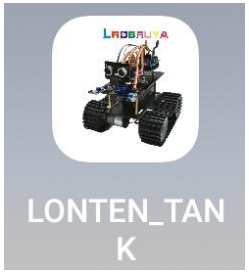
Wiring diagram



Instructions for the use of app

Firstly, download the “ LONTEN_TANK.apk ”file from the folder to your 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.

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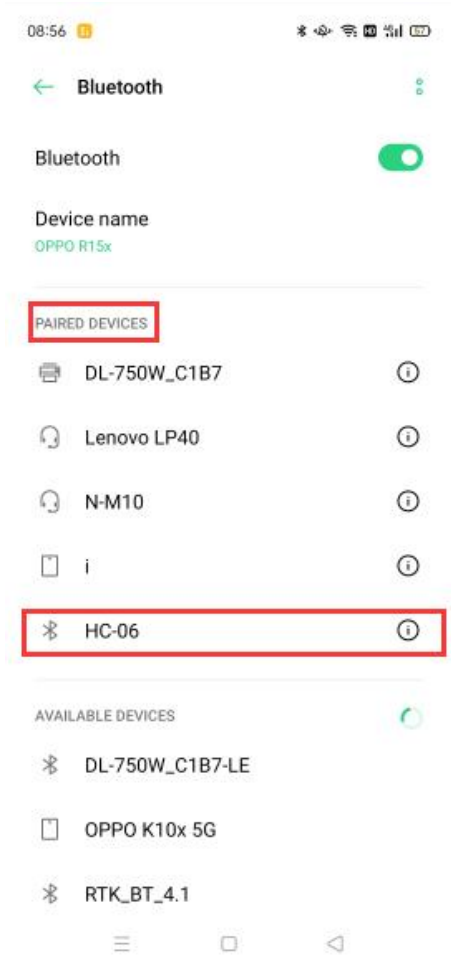
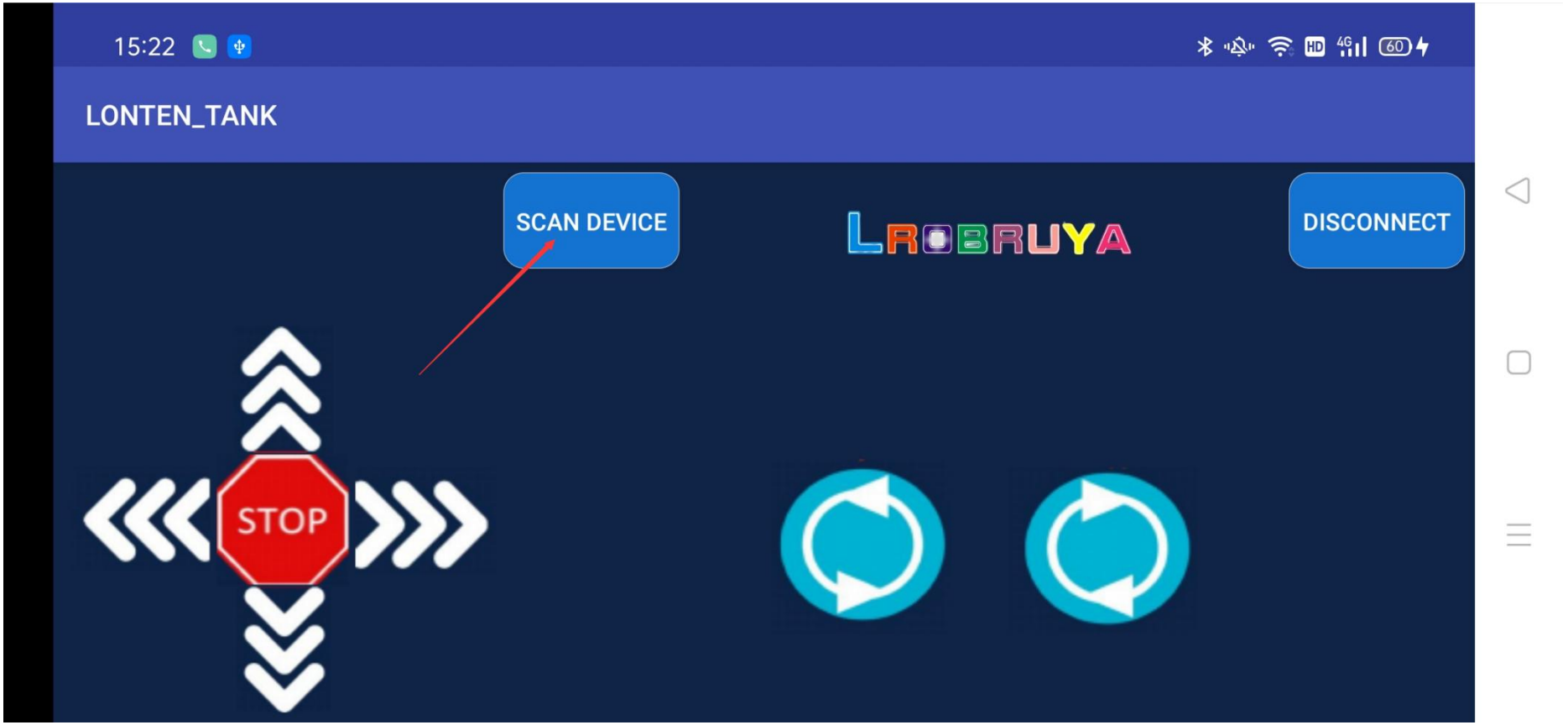

08:56
Bluetooth
Bluetooth
Device name
OPPO R15x
PAIRED DEVICES
DL-750W_C1B7
Lenovo LP40
N-M10
i
HC-06
AVAILABLE DEVICES
DL-750W_C1B7-LE
OPPO K10x 5G
RTK_BT_4.1

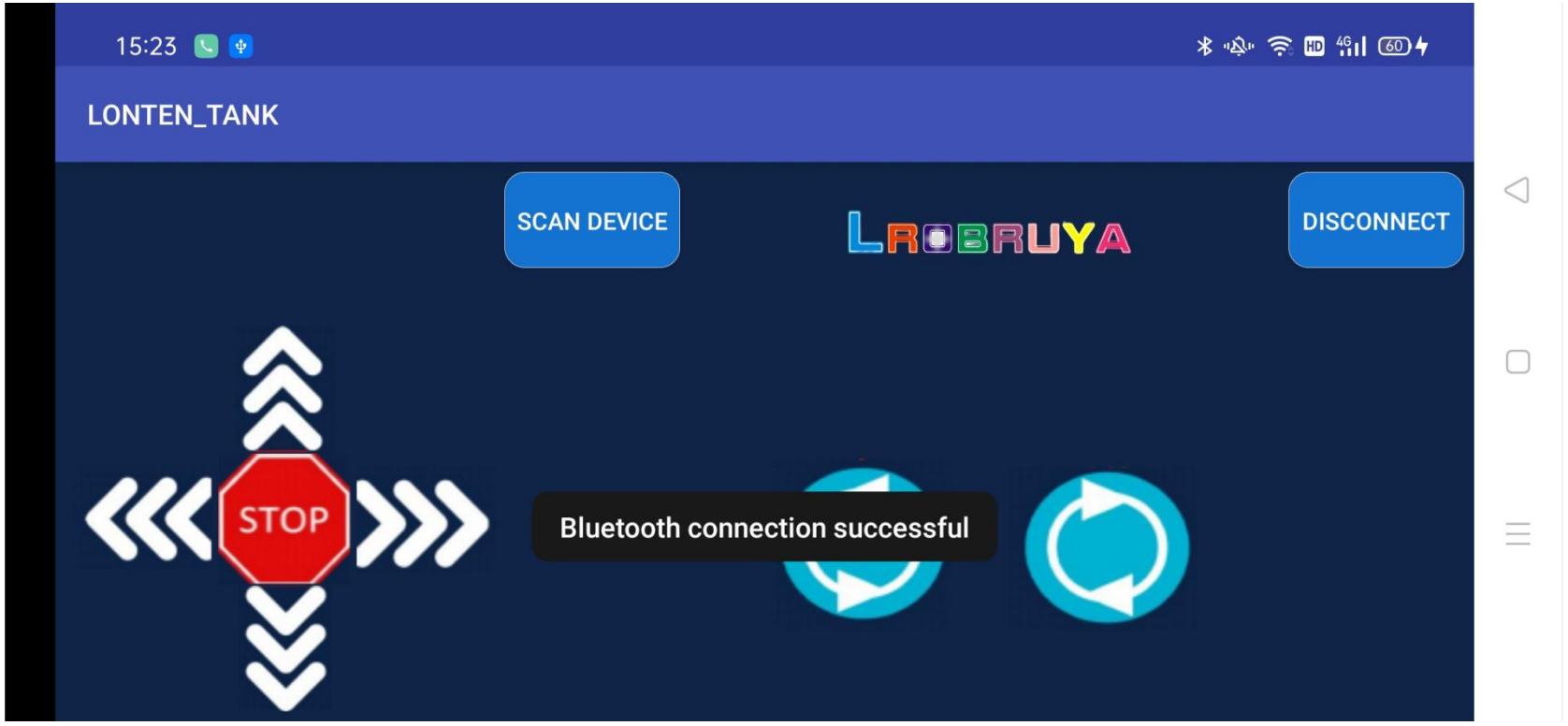
After the above steps are complete, we open the **LONTEN_Tank** app.



Click the **SCAN DEVICE** button in the upper right corner to enter the Bluetooth connection interface.

Then click on the , and 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 Receives Information

In Experimental Test 1, we learned how to receive the information sent by the mobile phone app to the Bluetooth module HC-06.

Result

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

"**Test_1_Bluetooth_Module_Receives_Information.ino**" in the reference materials we provided.

After completing the program upload, open the serial monitor to view the information received by the Bluetooth module.

Then you can see the data as blow:

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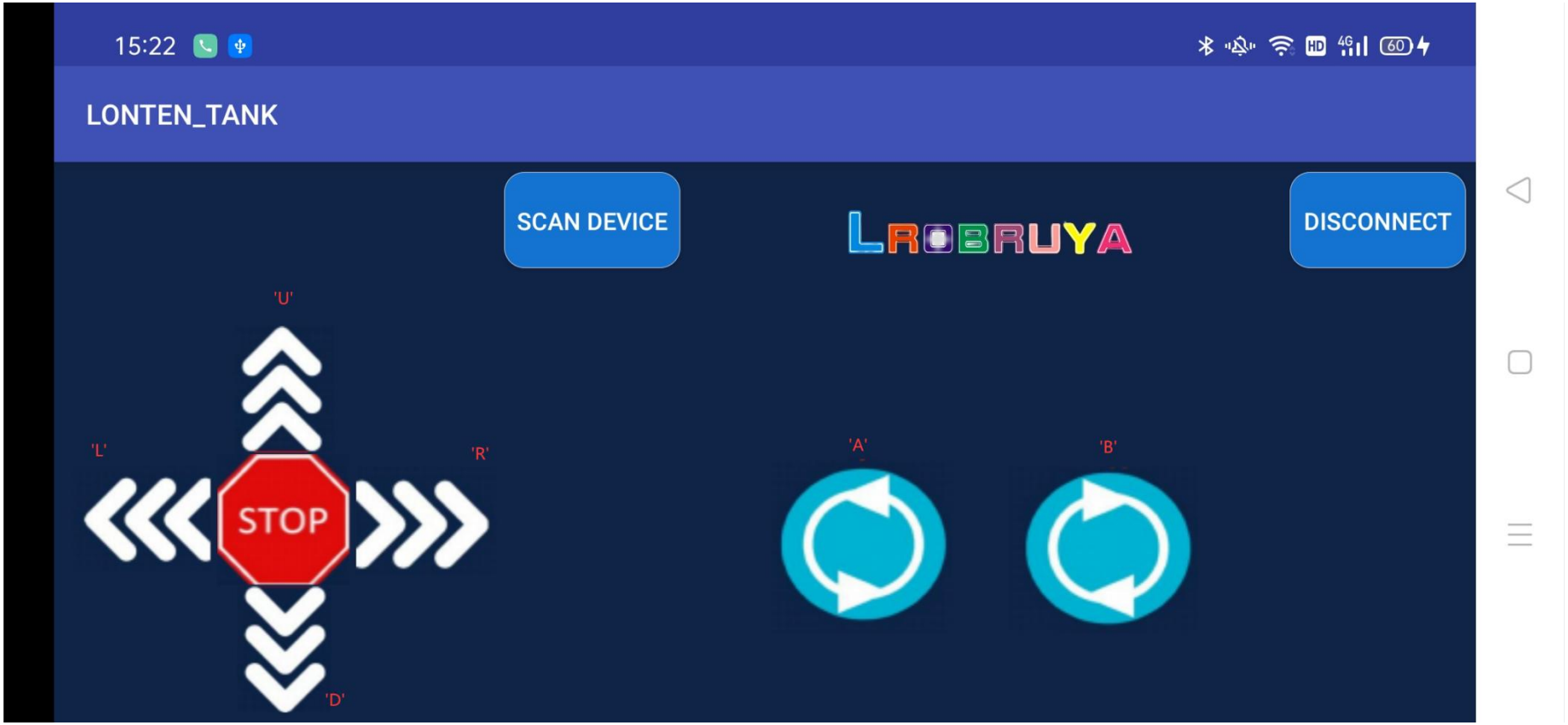
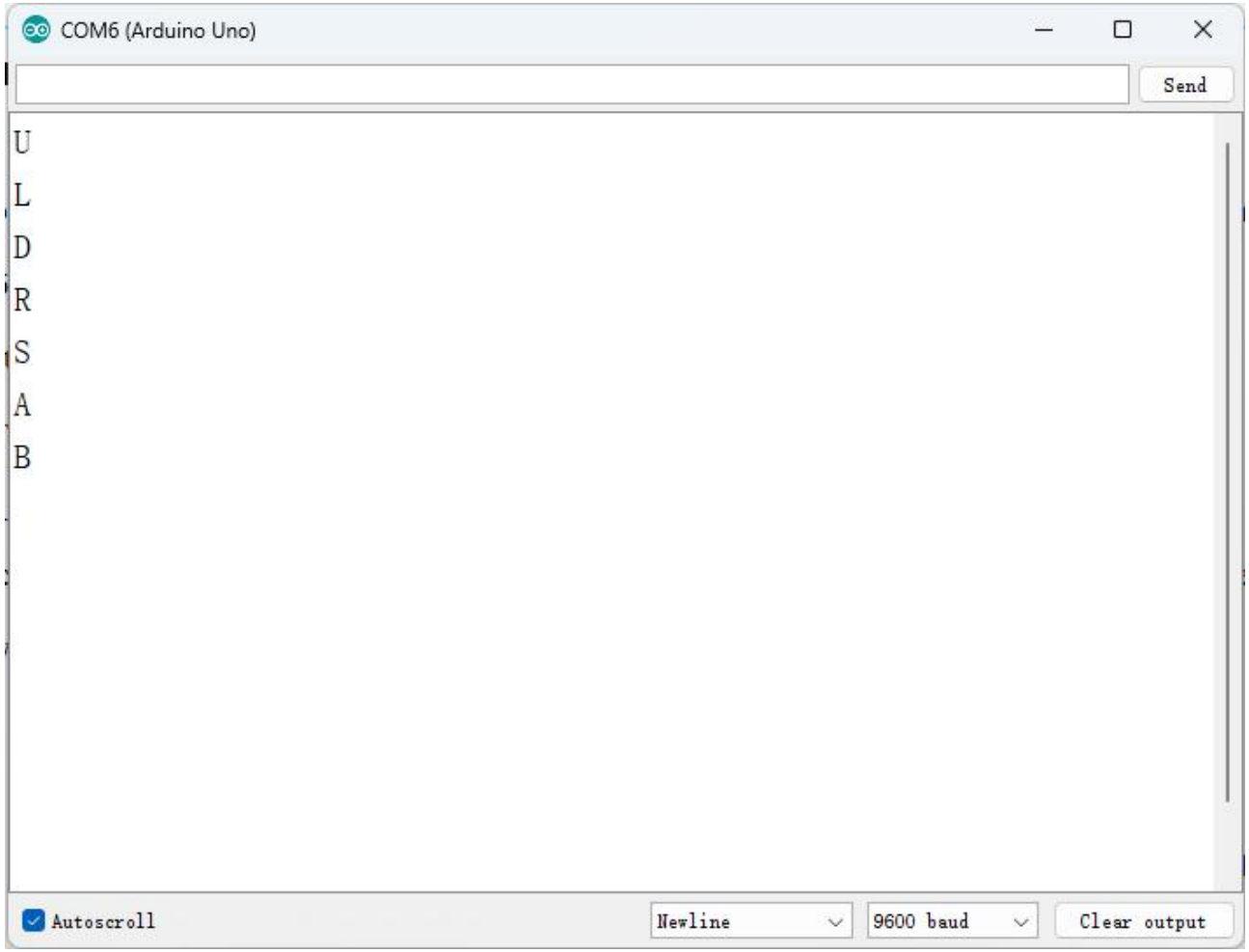

15:22
LONTEN_TANK
SCAN DEVICE
LROBRUYA
DISCONNECT
'U'
'L'
'R'
STOP
'D'
'A'
'B'

LROBRUYA


COM6 (Arduino Uno)
Send
U
L
D
R
S
A
B
Autoscroll
Newline
9600 baud
Clear output

Test 2--APP Control Robot Tank

In this experimental test, We can control the operation of tank through the app.

Result

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

"**Test_2_APP_Control_Robot_Tank.ino**" in the reference materials we provided.

How to use the app to control the robot car

After completing the program upload, and then open the app software to complete the connection of the Bluetooth device

(App and HC-06 Bluetooth module connection reference **Test 1 Bluetooth Module Receives Information**).

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

If you want to tank go advance, click the corresponding function icon, the app will send the character 'U' to the tank's Bluetooth module HC-06, the tank will go advance.