blonwiner@outlook.com

BLONWINER Arduino ARM Board

About BLONWINER

BLONWINER is a technical service team of open source software and hardware. Dedicated to applying the Internet and the latest industrial technology in open source area, we strive to provide best hardware support and software service for general makers and electronic enthusiasts around the world. We aim to create infinite possibilities with sharing. No matter what field you are in, we can lead you into the electronic world and bring your ideas into reality.

Technical Support: blonwiner@outlook.com

Contents

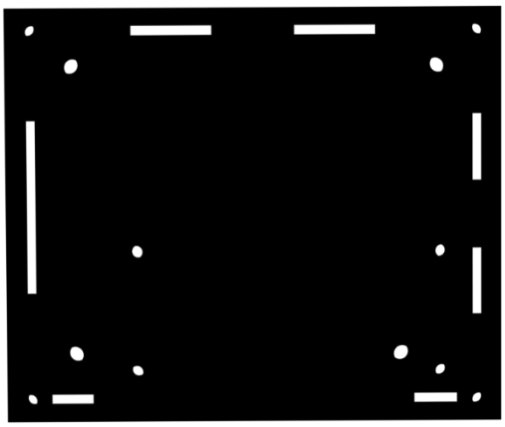
Components List 1
1.1. Acrylic Plates 1
1.2. Machinery Parts 4
1.3. Electronic Parts 5
1.4 Tool 7
1.5 We do not provide 18650 batteries, you need to purchase them yourself. 7
Introduction of Robotic Arm 8
Introduction of BLONWINER Arduino ARM Board 9
Introduction of power module 11
The power module's switch button can be controlled using the handle of Cross-head Screwdriver 13
Building the Arduino Development Environment 14
1. Arduino development language 14
2.Arduino program structure 14
3. The construction of the Arduino development environment 14
4. Introduction of Arduino software interface 18
5.Connecting the BLONWINER Arduino Arm Board and the computer 23
6.The solution for situation that Arduino IDE cannot be opened 27
7、Download Processing 29
8. Configuring the "libraries" folder of the Arduino IDE 35
Lesson 0 The servo initialization code of robotic arm assembly 40
Lesson 1 How to Read the Data of the Potentiometer 41
1.1 Components used in this course 41
1.2 Introduction of Potentiometer 41
1.3 Wiring diagram (Circuit diagram) 42
1.4 Reading the value of the potentiometer and converting it into an angle 43
Lesson 2 Controlling the Servo 50
2.1 Components used in this course 50
2.2 The introduction of the Servo 50
2.3Wiring diagram (Circuit diagram) 53
2.4 How to control Servo 53
Lesson 3 Displaying Text on the OLED Screen 58
3.1 Components used in this course 58
3.2 Introduction of OLED Screen 58
3.3 Wiring diagram (Circuit diagram) 59
3.4 How to display text on the OLED screen 60
Lesson 4 Saving Data with EEPROM 64
4.1 Components used in this course 64
4.2 About EEPROM 64
4.3 Wiring diagram (Circuit diagram) 64
4.4 How to use EEPROM to save data 65

How to Assemble the Robotic Arm 74
Functions of the robotic arm 110
Lesson 5 Potentiometer controls Robotic arm 110
5.1 Components used in this course 110
Lesson 6 Processing controls servo 118
6.1 Components used in this course 119
Lesson 7 IR Remote Controller 129
7.1 Components used in this course 129
Lesson 8 Control Robot by IR Remote 137
8.1 Components used in this course 137

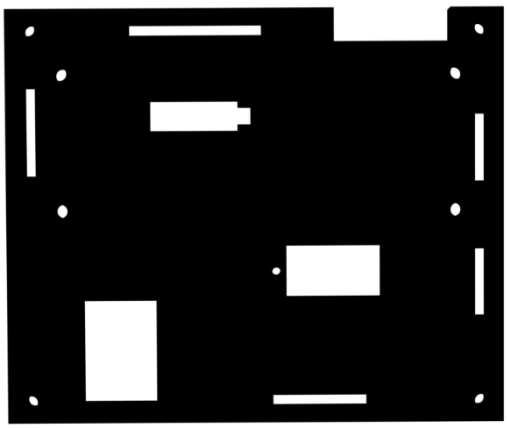
blonwiner@outlook.com

Components List

1.1. Acrylic Plates



A.01/1PCS



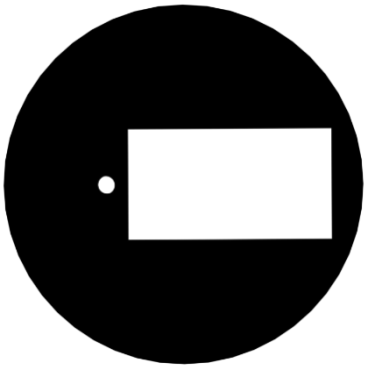
A.02/1PCS

A.03/1PCS

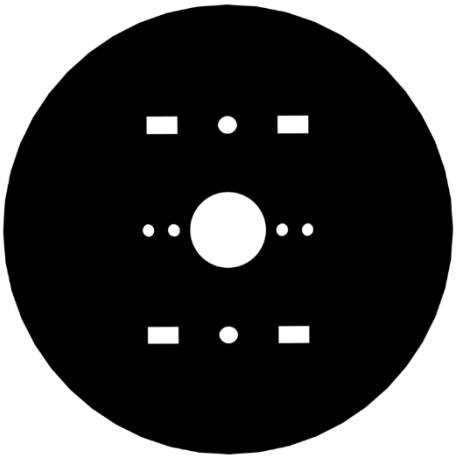
A.04/1PCS

A.05/1PCS

A.06/1PCS

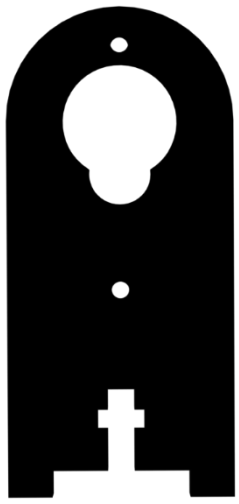


B..01/1PCS

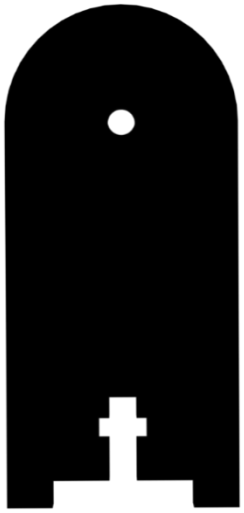


B.02/1PCS

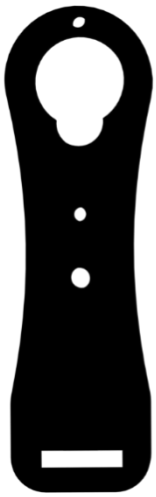
blonwiner@outlook.com



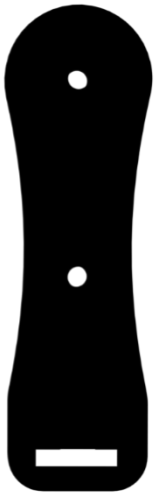
C.01/1PCS



C.02/1PCS



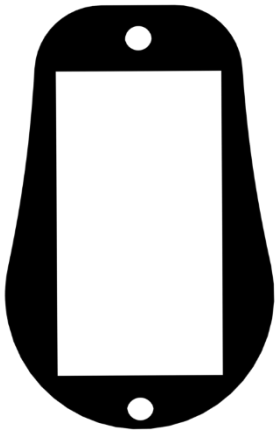
C.03/1PCS



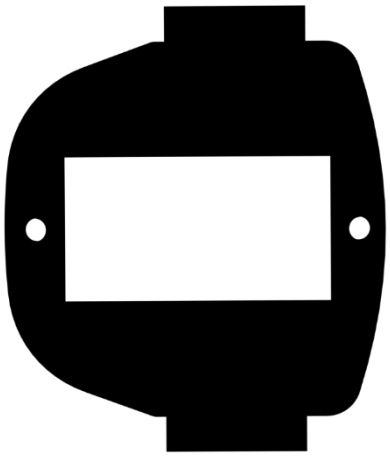
C.04/1PCS

C.05/1PCS

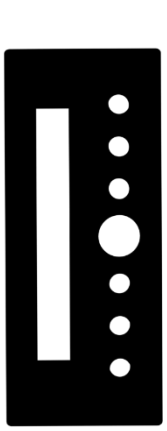
C.06/1PCS



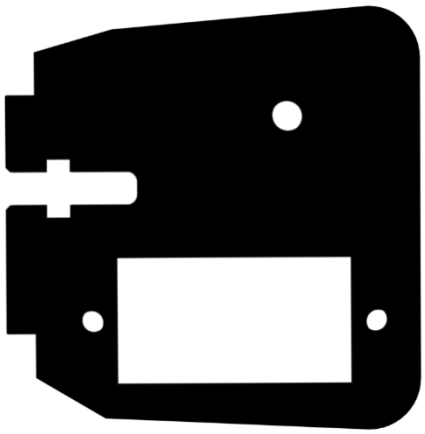
C.07/6PCS



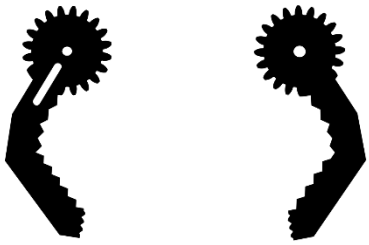
C.08/1PCS



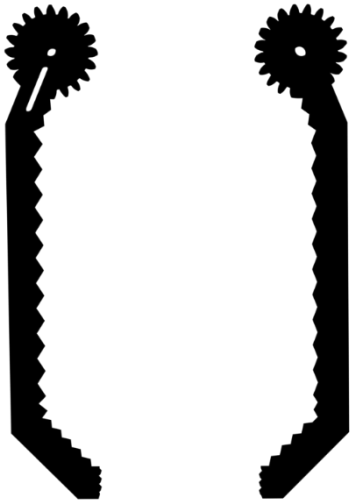
C.09/1PCS



C.10/1PCS



D.01/1PCS D.02/1PCS



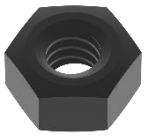
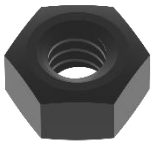
D.03/1PCS D.04/1PCS

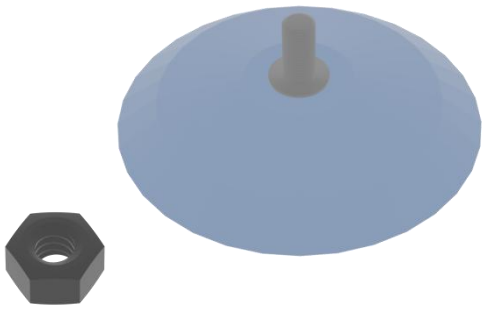
The acrylic plates are fragile, so please be careful when assembling them in case of breaking.

The acrylic plate is covered with a layer of protective film. You need to remove it first.

Some holes in the acrylic may have residues, so you need to clean them before the use.

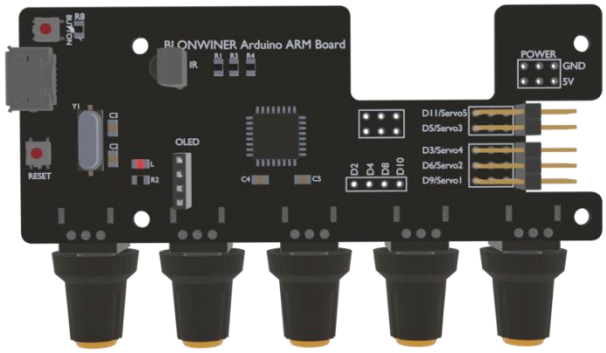
1.2. Machinery Parts

M2.5 Nylon Nut 4PCS 	M2.5*4+6 Copper Standoff 4PCS 	M2.5*8 Screw 7PCS 	M2 Nut 9PCS 	M2*16 Screw 9PCS 
M3 Lock Nut 3PCS 	M3 Nut 3PCS 	M3*8 Nylon Standoff 1PCS 	M3*8 Screw 18PCS 	M3*12 Screw 5PCS 
M3*14 Nylon Standoff 4PCS  .	M3*18 Screw 1PCS . 	M3*30 Nylon Standoff 5PCS 		

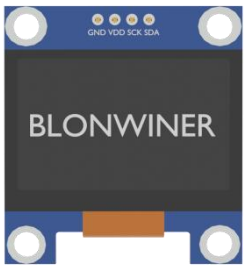
Round Suction Cup M4 Nut(Round Suction Cup Nut) 4PCS Round Suction Cup Screws 4PCS 	51108 Bearing 

1.3. Electronic Parts

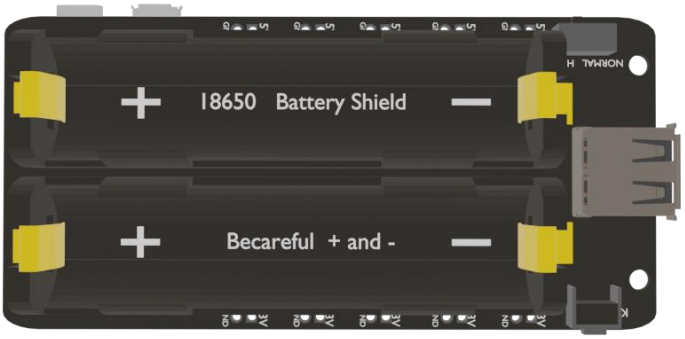
BLONWINER Arduino ARM Board 1PCS



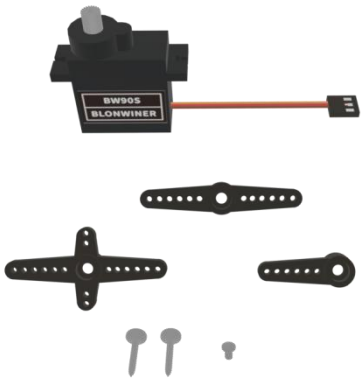
OLED module 1PCS



Power Module 1PCS



Servo 5PCS

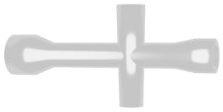


Servo Extension Cable 1PCS

Remote Controller 1pcs

USB Cable 1PCS

1.4 Tool

Cross Socket Wrench 1PCS 
Cross-head Screwdriver 1PCS 
Winding Pipe 1PCS 

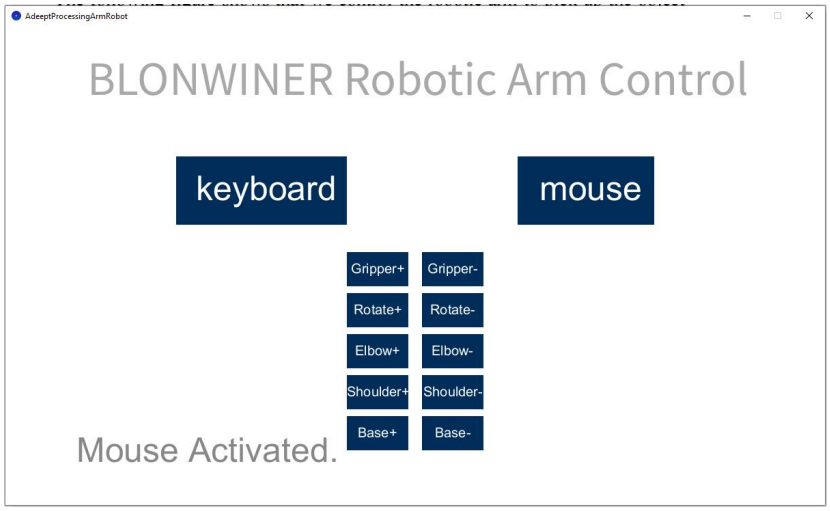
1.5 We do not provide 18650 batteries, you need to purchase them yourself.

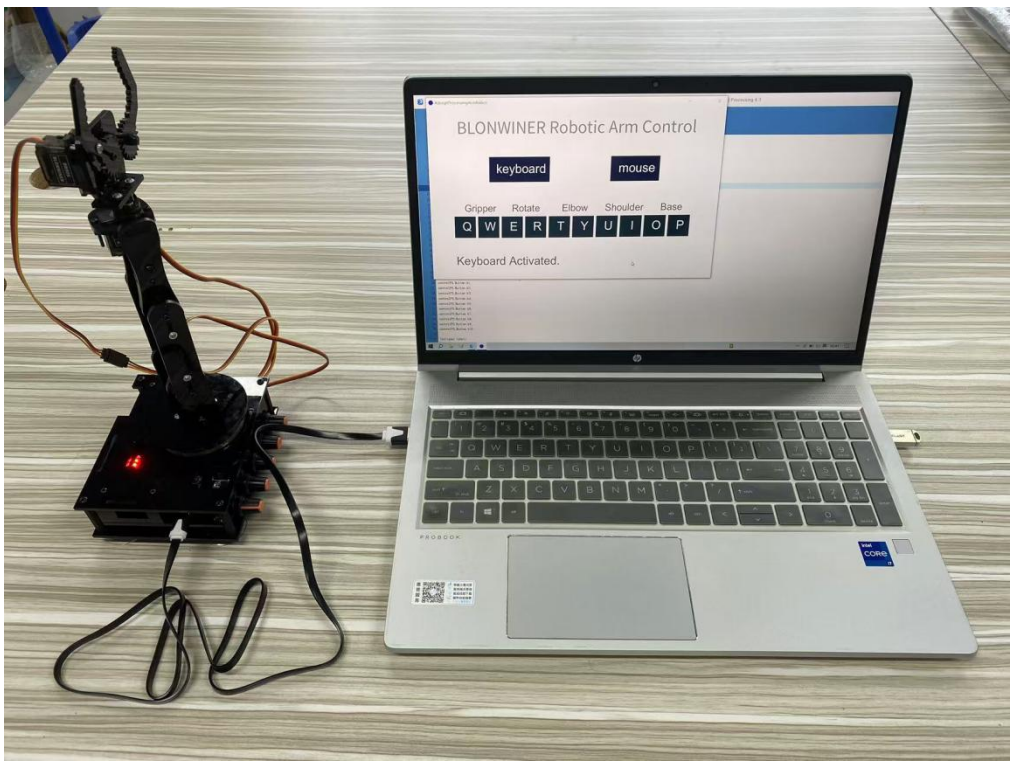
18650 Battery 2PCS  

Introduction of Robotic Arm

Nowadays,under the progress of science and technology,the biggest difference between a robotic arm and a human arm lies inflexibility and strength. That is, the Biggest advantage of the robotic arm is that normally it can repeat the same motion without feeling tired. Today BLONWINER recommends a robotic learning kit to learn how to assemble a robotic arm and learn how to write the code to control the robotic arm to perform the specific motions. We provide a completed using method for learning Arduino and Processing write PC software and send motion commands to the robotic arm with Processing; write the motion of the servo of the robotic arm with Arduino.

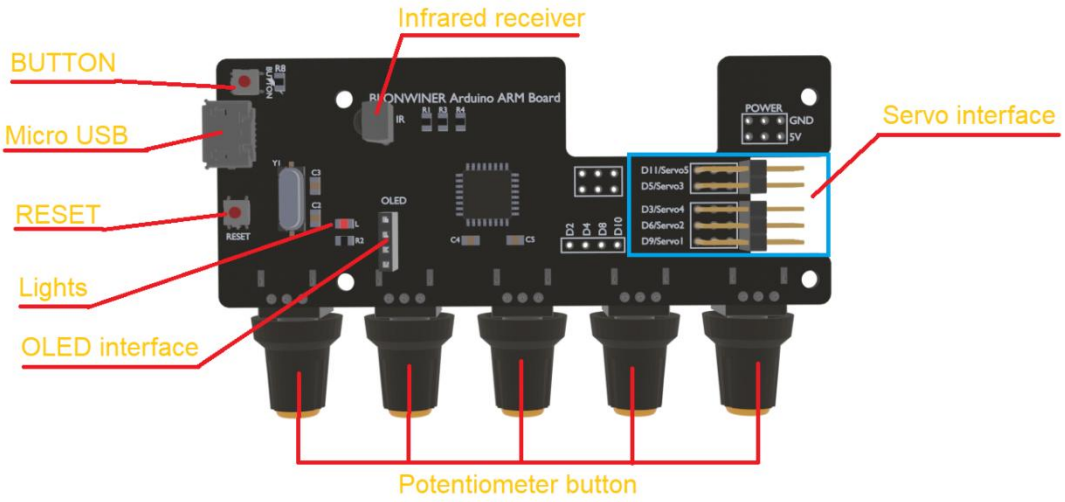
The following figure shows that we control the robotic arm to pick up the object through the keyboard with serial communication.

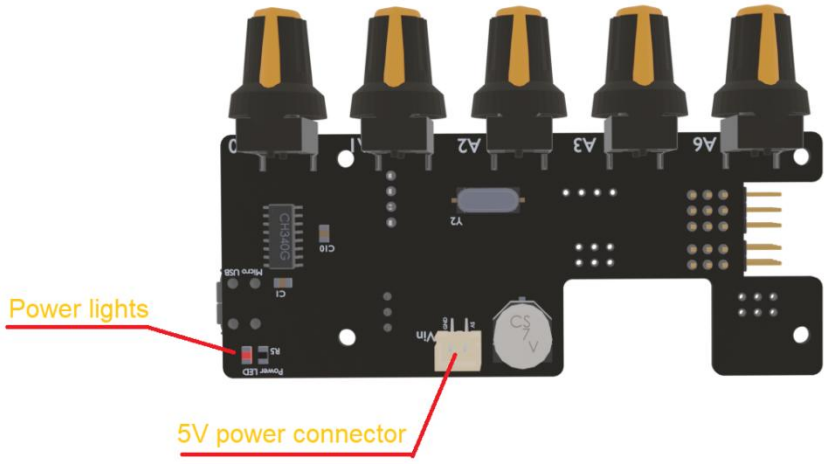




Introduction of BLONWINER Arduino ARM Board

The BLONWINER Arm Drive Board development board is the main component of the robotic arm. Similar to the Arduino UNO development board, it is also an easy-to-use open source electronic prototyping platform, including the hardware part and the software part(Arduino IDE). The BLONWINER Arduino ARM Board is mainly composed of a micro-controller(MCU), a universal input/output interface, etc. You can understand it as a micro-computer motherboard. We will introduce the BLONWINER Arm Board development board in detail.





Power LED：

Power LED is used to indicate the power status of the system. The LED is on, indicating that the system is powered on and ready to run; the LED is off, indicating that the system is not powered on.

Servo interface：

It is the pin interface of Servo.

5V power connector：

It is the pin interface for external power supply. Use 5V DC external power supply to power the BLONWINER Arduino ARM board.

RESET：

Restarting the BLONWINER Arduino ARM board.

Micro USB：

It is used to connect the Micro USB interface of the computer to realize the serial communication, uploading program and serial monitoring between the BLONWINER Arduino ARM board and the computer.

Potentiometer button：

Potentiometer button has five buttons: A0, A1, A2, A3, and A6. By rotating these buttons, you can control the movement of the robotic arm.
In the following courses, we will combine the application of various components to further learn the practical application of the BLONWINER Arduino ARM board.

BUTTON:

BUTTON connects to the D4 data port of Arduino UNO.

Light:

The signal light is connected to the Arduino UNO D13 data port

OLED interface:

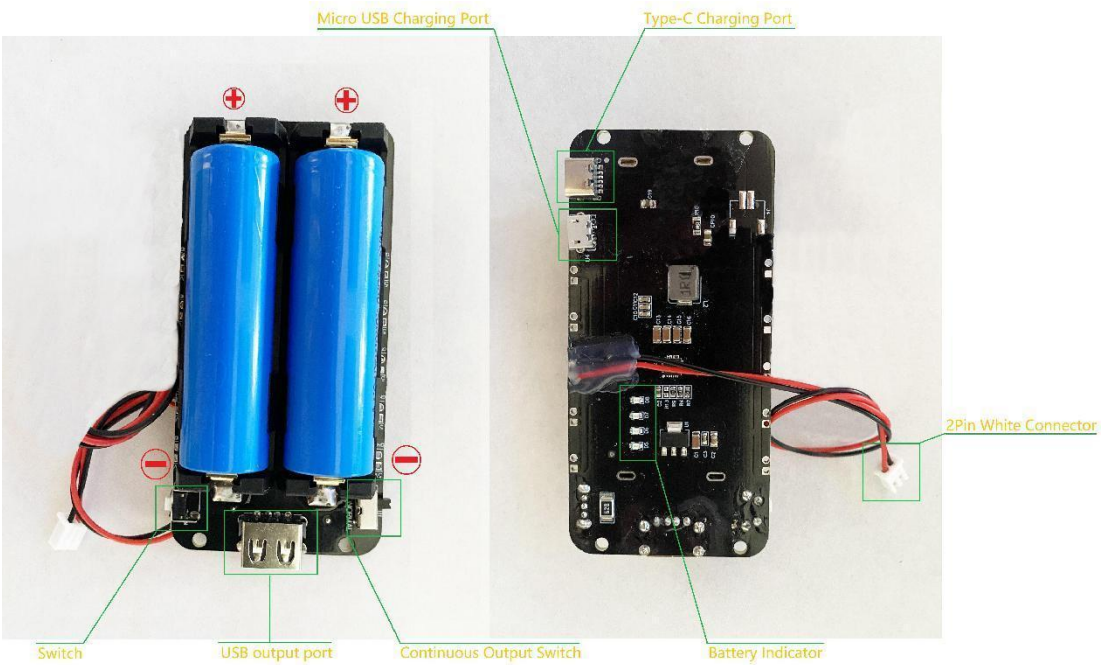
This interface is connected to the interface of the OLED module.

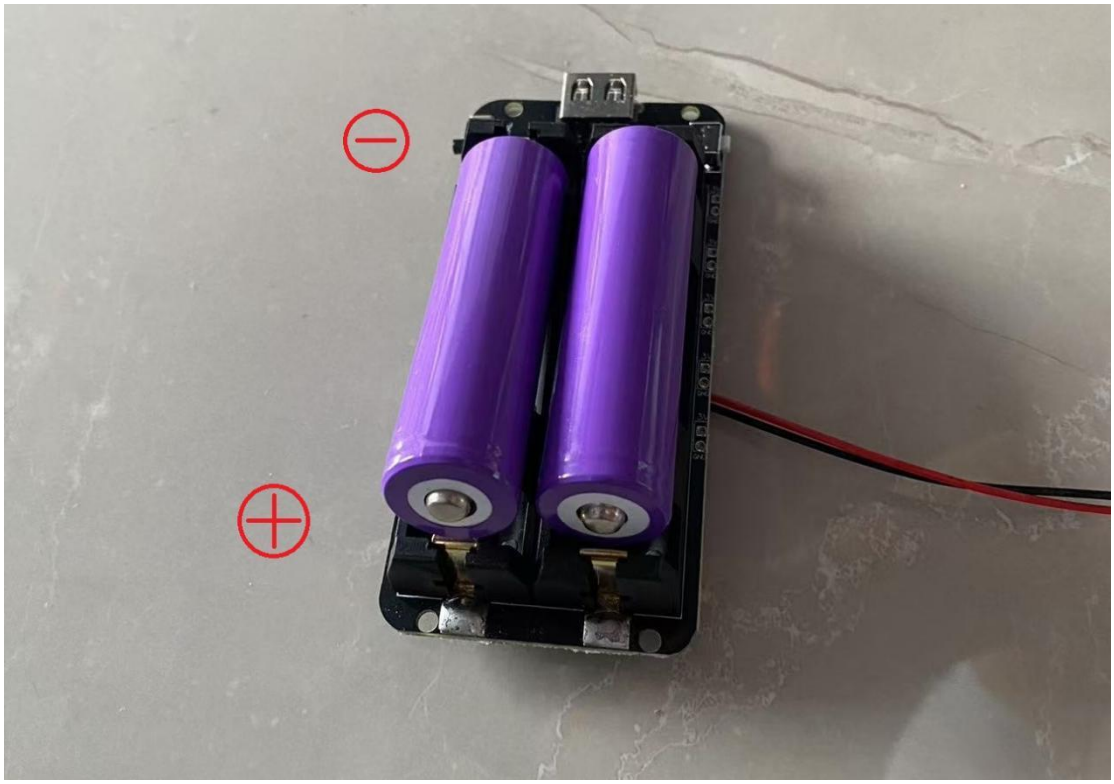
Infrared receiver:

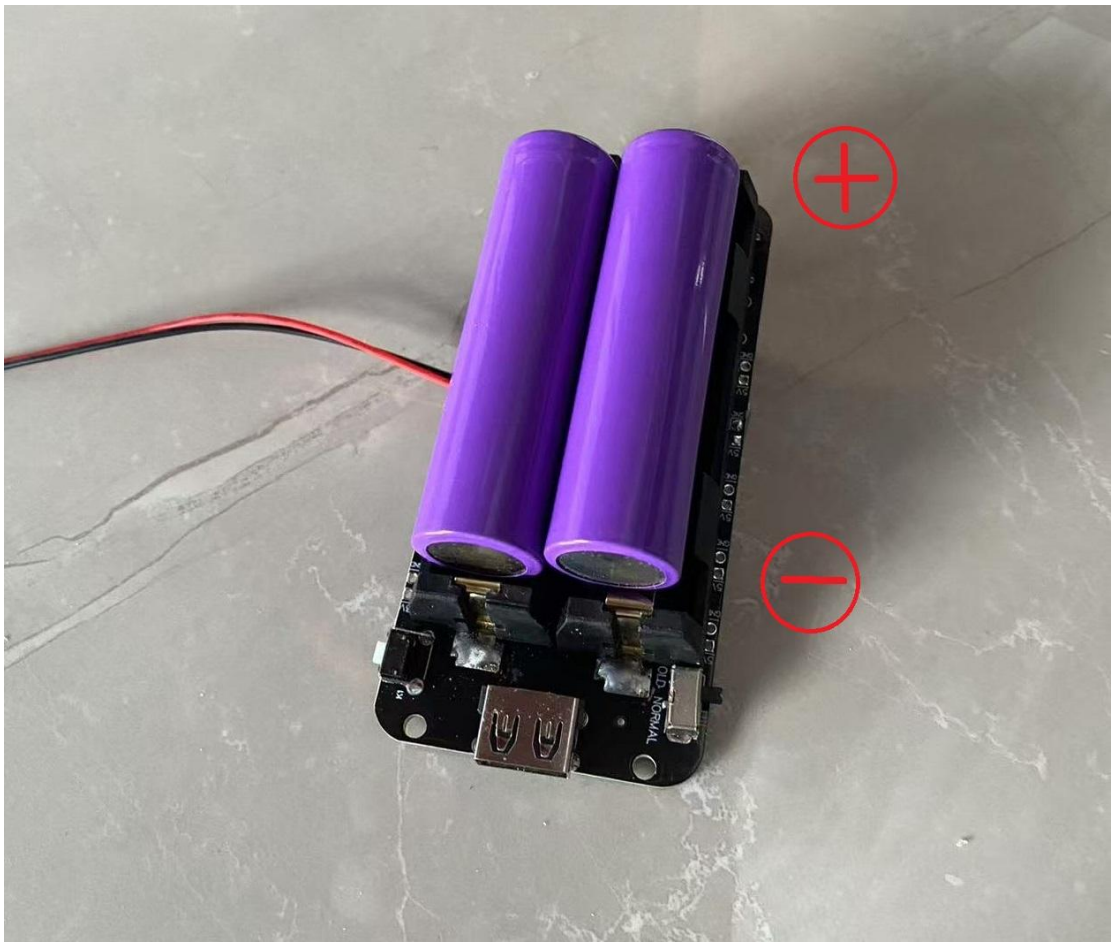
This sensor is used to receive signals from the remote control.

Introduction of power module

When you get the robot product, you will see a board with its name: Power Module(18650 Battery Shield), which is an important part of the robot. There are many interfaces on the Power Module. Note that the positive and negative poles of the battery cannot be installed incorrectly, otherwise the power module will be burned out.(Please refer to the assembly video)







Switch: Power module switch:

Short press once: Turn on the power module

Short press twice/(Press and hold for two seconds): Turn off the power module

USB Output Port:

USB output port: max 2A current

Continuous Output Switch:

- The switch is turned to the HOLD position to control the 2Pin white connector and USB interface to continuously output power, and the power module will not automatically turn off the power supply.
- The switch is turned to the NORMAL position, and the 2Pin white connector and USB interface are controlled to automatically output power, and the power module will automatically turn off the power.

Micro USB Charging Port:

You can charge two 18650 batteries through this port.

Type-C Charging Port:

You can charge two 18650 batteries through this port.

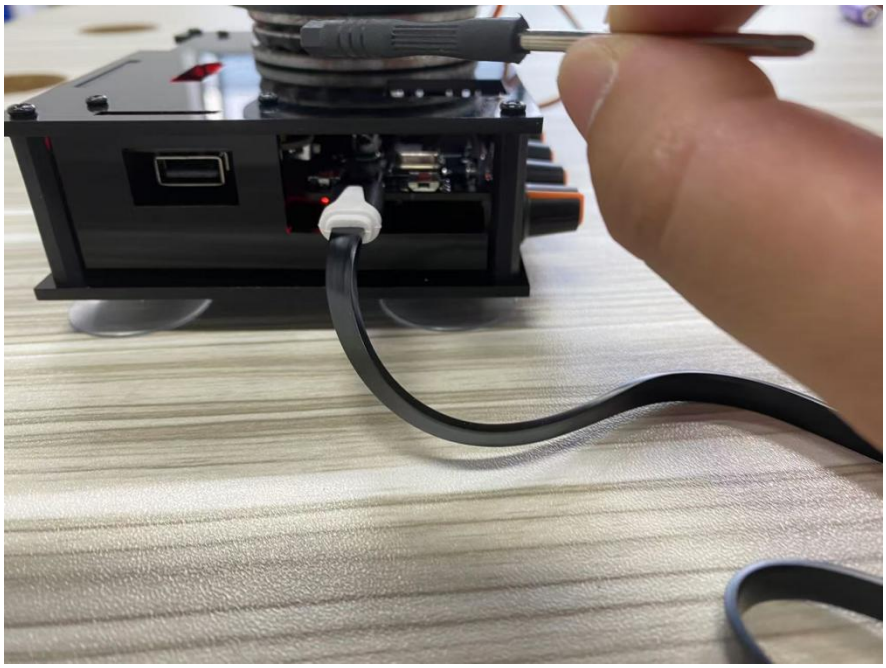
2Pin White Connector:

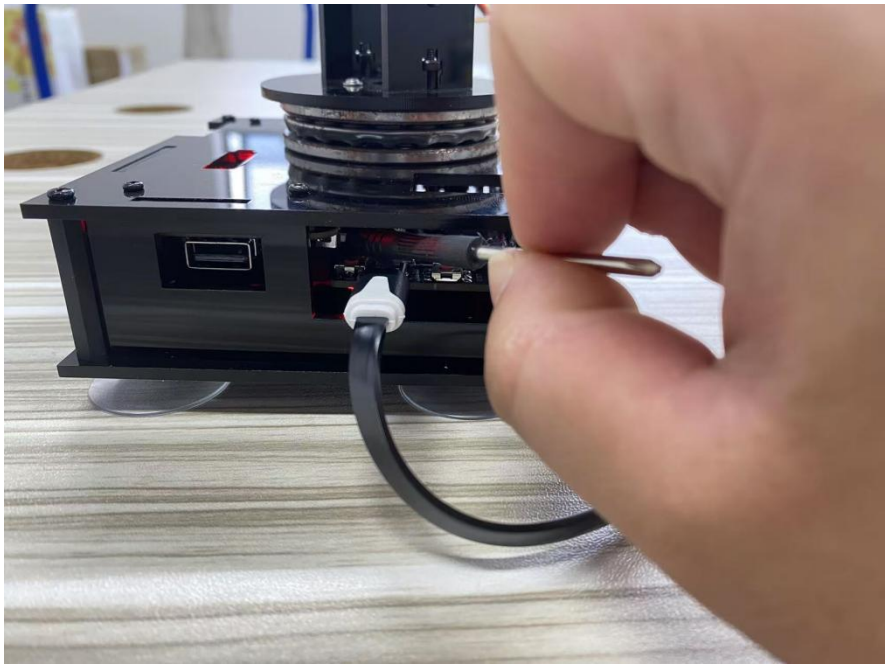
The output voltage is 5V, and the maximum current is 2A. Connect the black connector of 5Vin(2in1 RPI Board)

Battery Indicator:

Displays the battery level and shows that the battery is charging.

The power module's switch button can be controlled using the handle of Cross-head Screwdriver .





Building the Arduino Development Environment

1. Arduino development language

Arduino uses C/C++ to write programs, so before learning Arduino, you need to master the C/C++ language. Although C++ is compatible with the C language, these are two different languages. C is a process-oriented programming language, and C++ is an object-oriented programming language. The early Arduino core library was written in C language. Later, object-oriented ideas were introduced. At present, the latest Arduino core library is written in C and C++.

Generally speaking, the Arduino language refers to a collection of various Application Programming Interfaces (APIs) provided by the Arduino core library files. These APIs are formed by secondary packaging of the lower-level microcontroller support library. For example, the core library of Arduino using AVR microcontroller is the secondary packaging of AVR-Libc (GCC-based AVR support library).

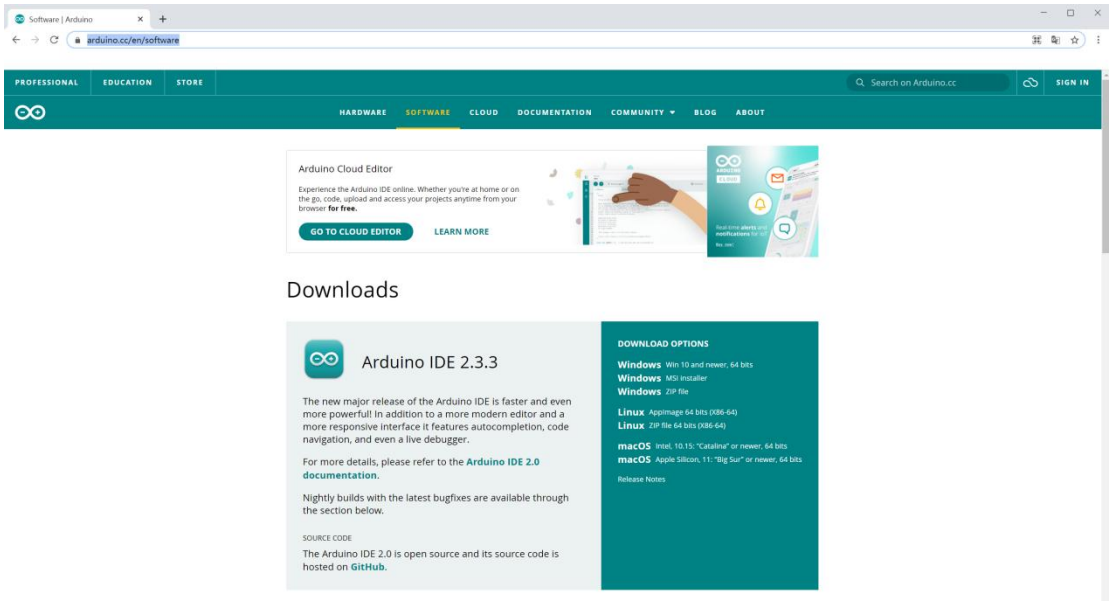
In the traditional development method, multiple registers need to be configured to achieve the corresponding functions. In Arduino, the complicated registers are encapsulated into simple APIs, which can be intuitively controlled, enhancing the readability of the program and improving the development efficiency.

2.Arduino program structure

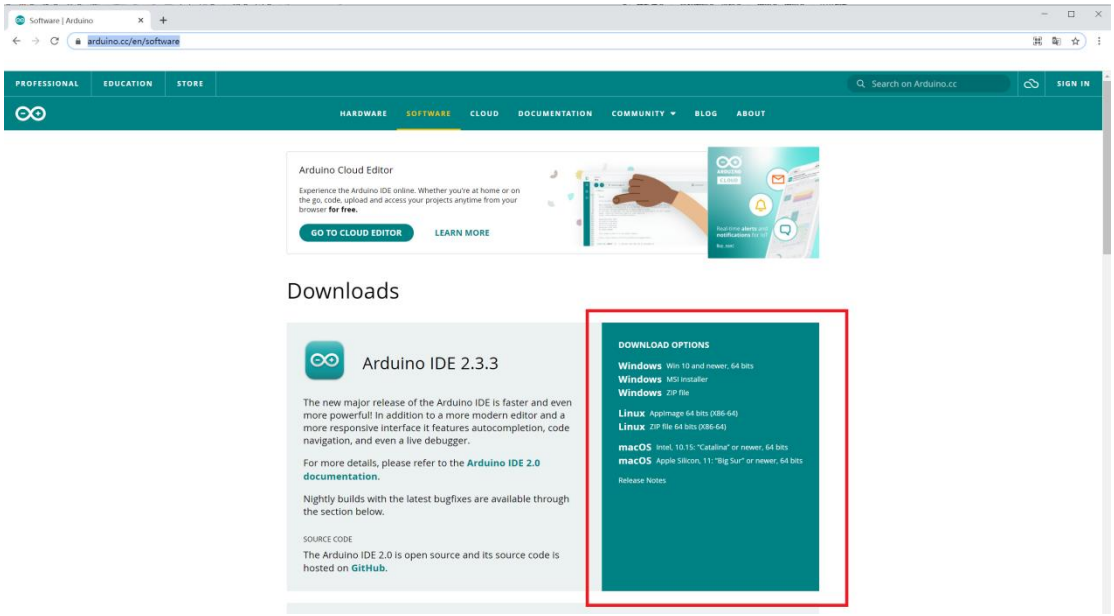
The Arduino program structure is different from the traditional C/C++ program structure-there is no main() function in the Arduino program. In fact, it is not that there is no main() function in the Arduino program, but that the definition of the main() function is hidden in the core library file of the Arduino. In the development of Arduino, the main function is not directly operated, but the two functions of setup() and loop() are used instead.

3. The construction of the Arduino development environment

The IDE of the Arduino development environment can be downloaded from the official website. The download address of the Arduino IDE is:
https://www.arduino.cc/en/software
After successfully opening the interface as shown below.



2. After jumping to the following interface, slide the mouse to the middle to find the part marked in the red circle.You can find that the official website provides us with installation files for Windows, Mac OS X, and Linux systems.



3. We click the installation package of Windows ZIP file for non admin install.After the interface jumps, we select JUST DOWNLOAD.And then start the download. The download status will be displayed in the lower left of Google Chrome.Then we wait for the download to complete.

Downloads

Arduino IDE 2.3.3

The new major release of the Arduino IDE is faster and even more powerful! In addition to a more modern editor and a more responsive interface it features autocompletion, code navigation, and even a live debugger.

For more details, please refer to the **Arduino IDE 2.0 documentation**.

Nightly builds with the latest bugfixes are available through the section below.

SOURCE CODE

The Arduino IDE 2.0 is open source and its source code is hosted on **GitHub**.

DOWNLOAD OPTIONS

Windows Win 10 and newer, 64 bits
Windows MSI installer
Windows ZIP file

Linux AppImage 64 bits (X86-64)
Linux ZIP file 64 bits (X86-64)

macOS Intel, 10.15: "Catalina" or newer, 64 bits
macOS Apple Silicon, 11: "Big Sur" or newer, 64 bits

Release Notes

Download Arduino IDE & support its progress

Since the 1.x release in March 2015, the Arduino IDE has been downloaded **87,381,265** times — impressive! Help its development with a donation.

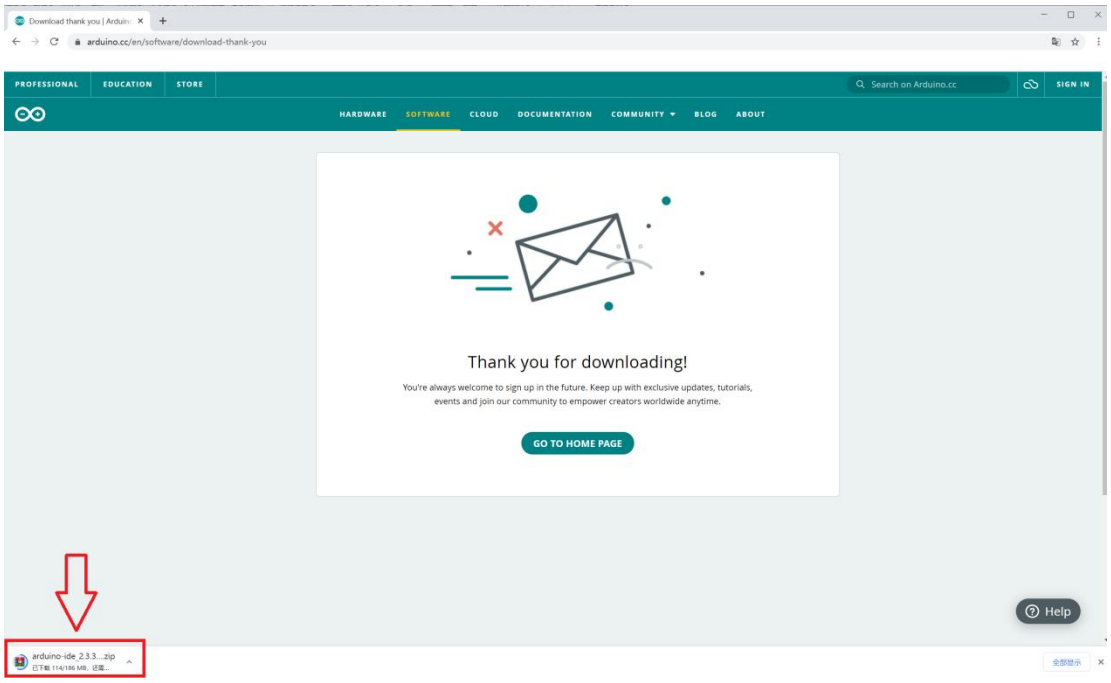
$3 | $5 | $10 | $25 | $50 | Other

CONTRIBUTE AND DOWNLOAD

or

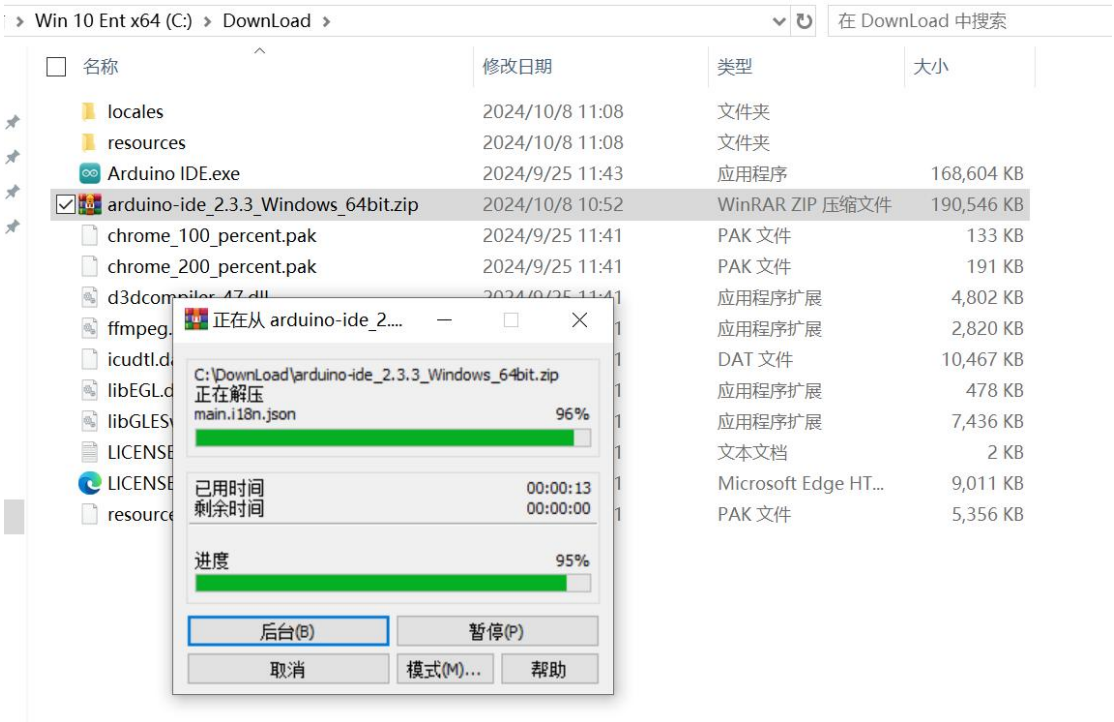
JUST DOWNLOAD

Learn more about **donating to Arduino**.

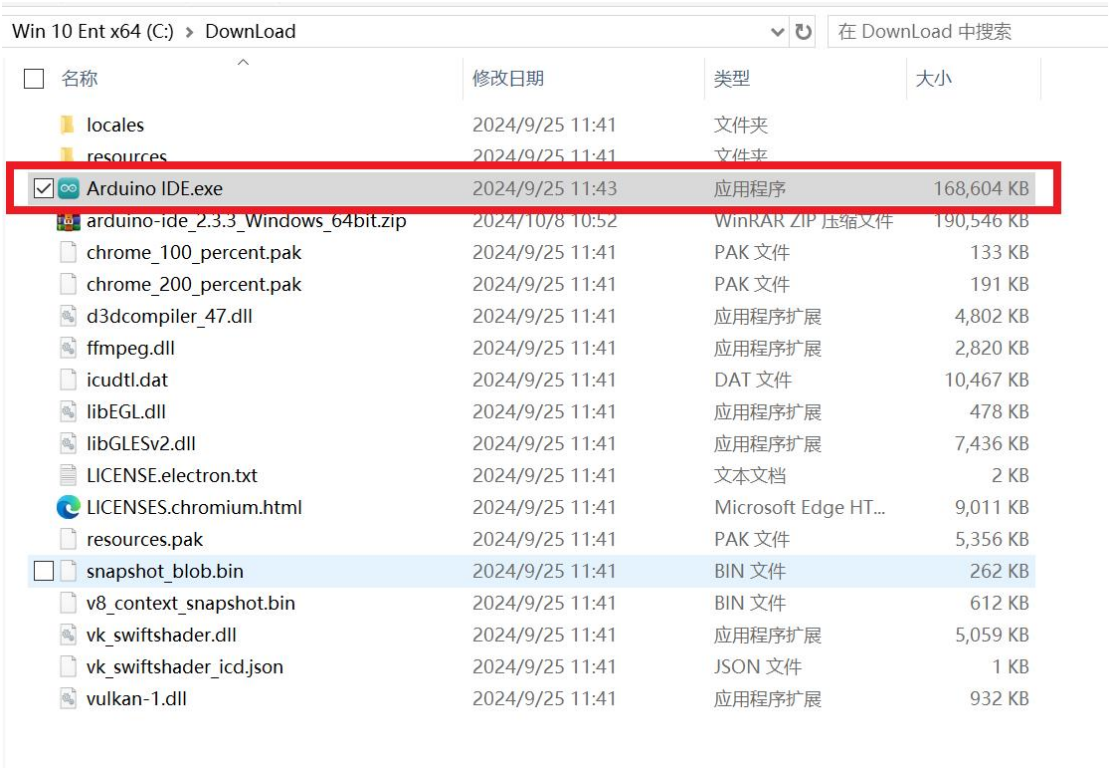


4.After the download is complete, open the folder.There are downloaded compressed installation files:
arduino-ide_2.3.3_Windows_64bit.zip

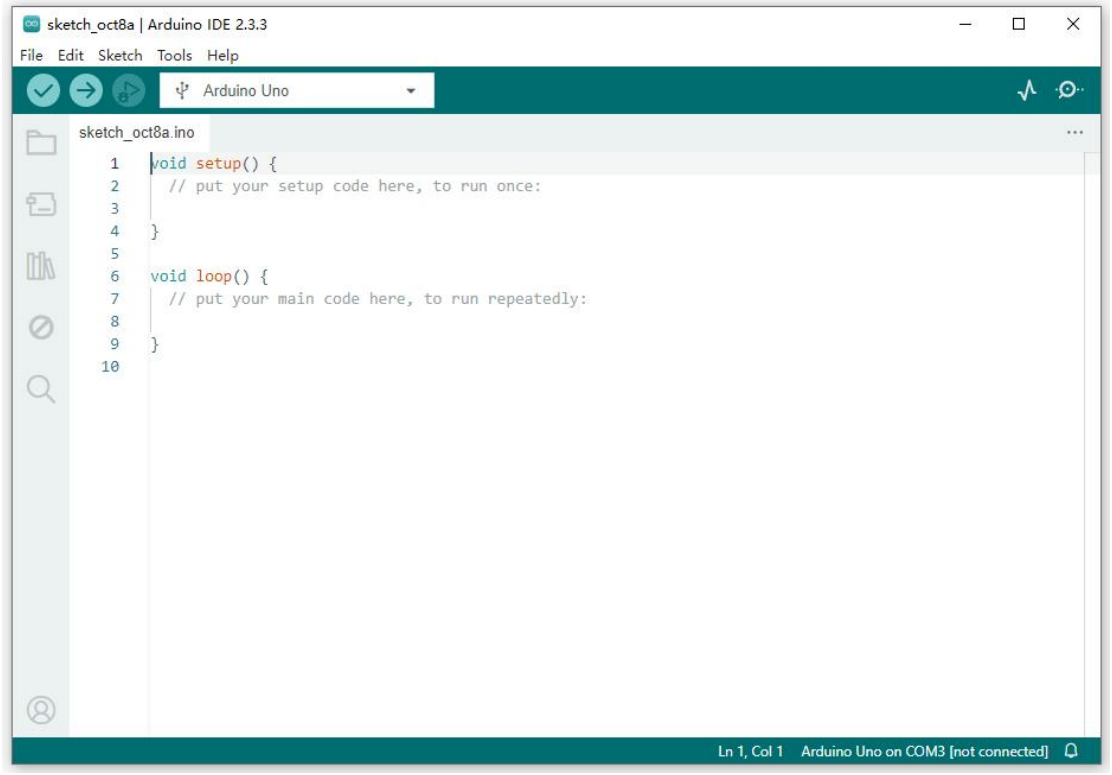
5. Double-click to open the file and unzip it.



6. Double-click arduino.exe to open the software.

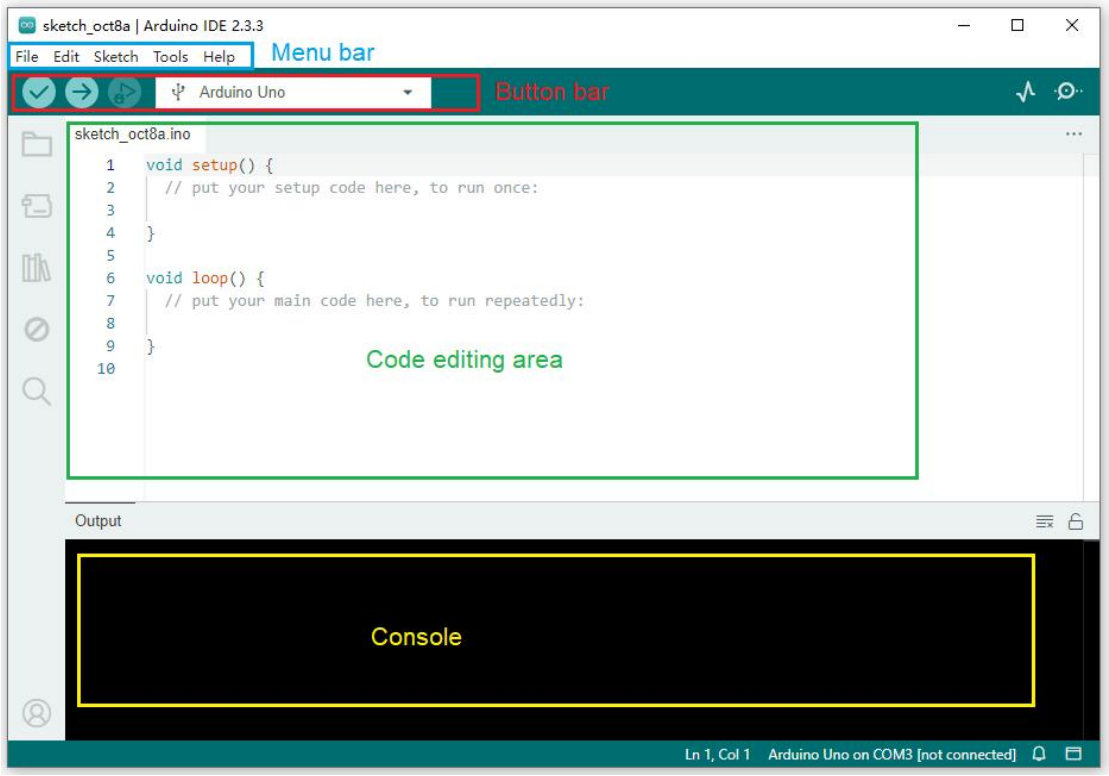


7. The interface will show as follows after the Arduino software is opened, indicating that our software has been downloaded and installed successfully.



4. Introduction of Arduino software interface

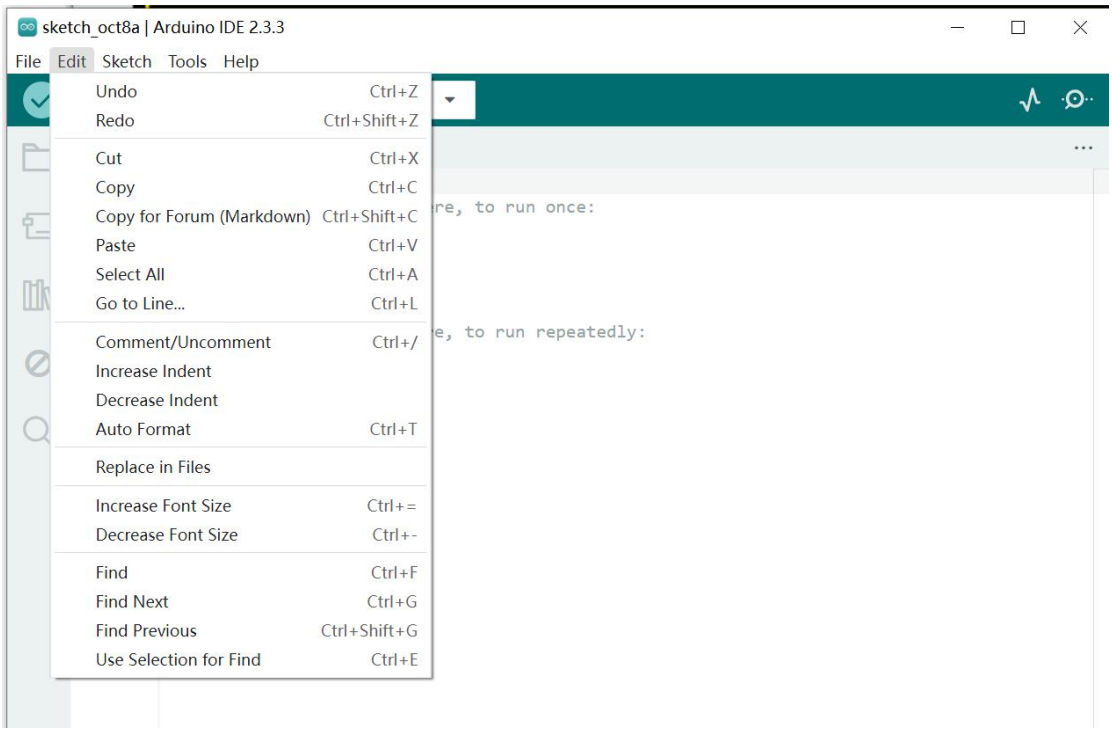
The following figure is the interface introduction of Arduino software



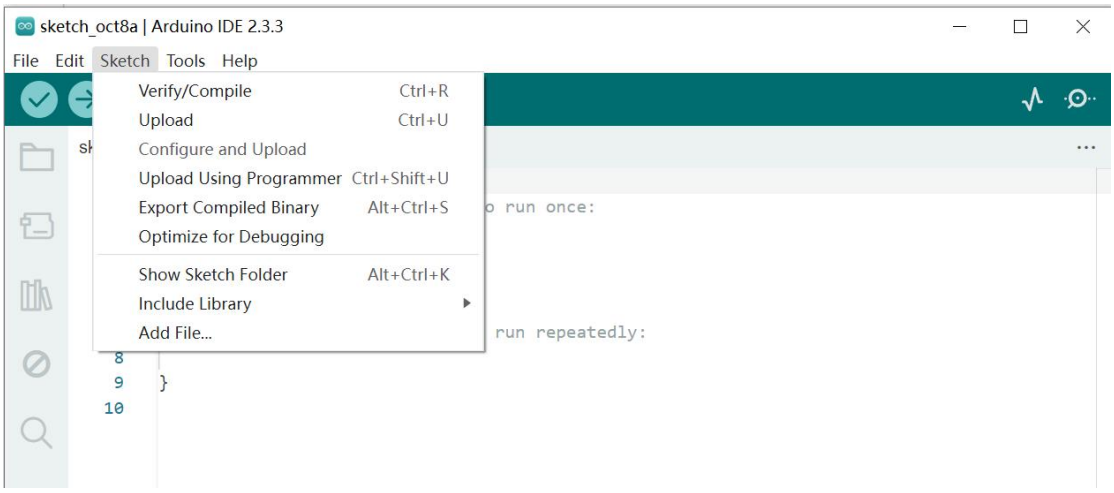
(1)Menu bar

Menu bar contains File, Edit, Sketch, Tools and Help.
(1) "File" can operate new file, open file, save file, close file, save, etc. For the Examples, you can check the official sample program.

(2) "Edit" has the functions for the program code of editing, copying and pasting, commenting, indenting,searching, etc.

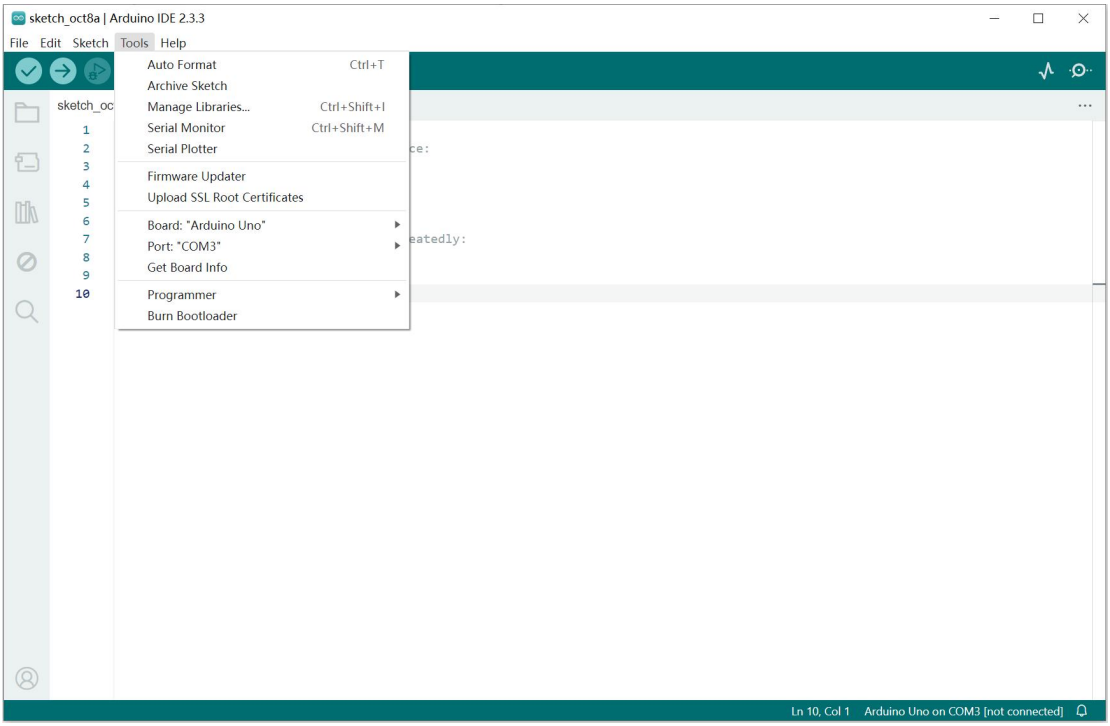


(3) Sketch can perform Verify/Compile, Upload and other operations on the written project.

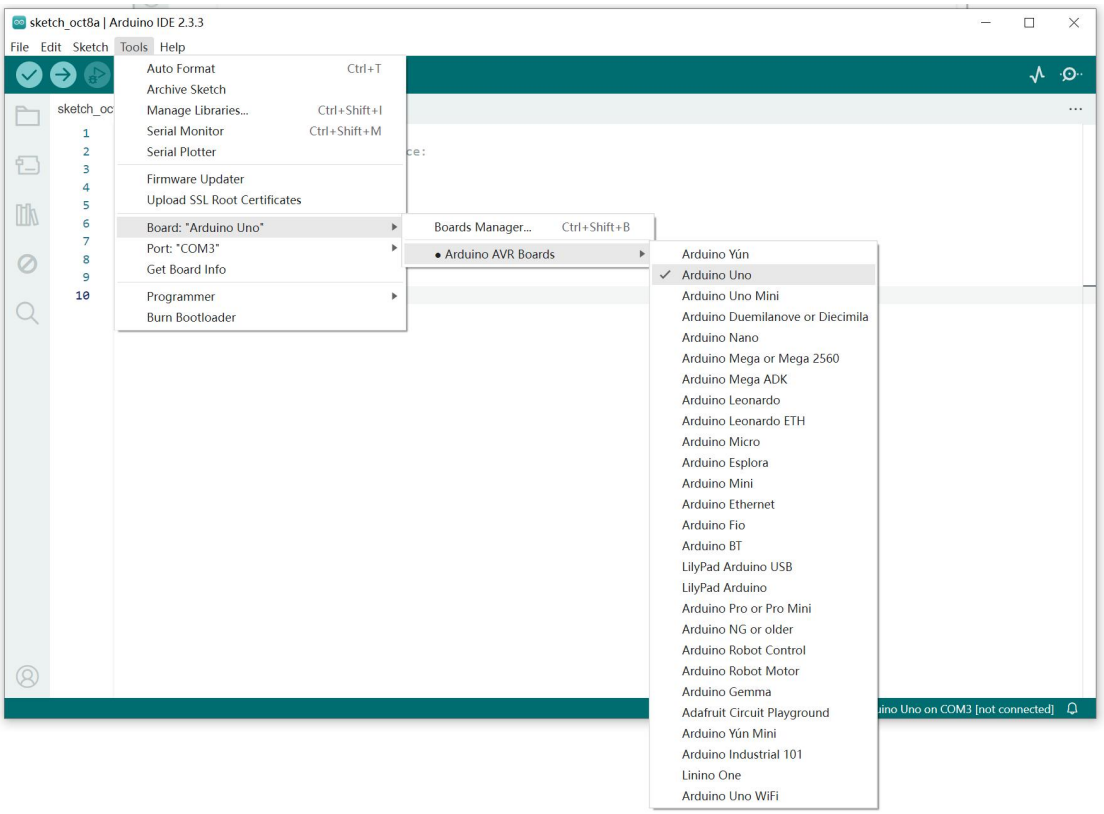


The Include Library can load the library. After selecting the library file in the list, the relevant header files are automatically added in the code editing area.

(4) Board and Port are often used in "Tools".

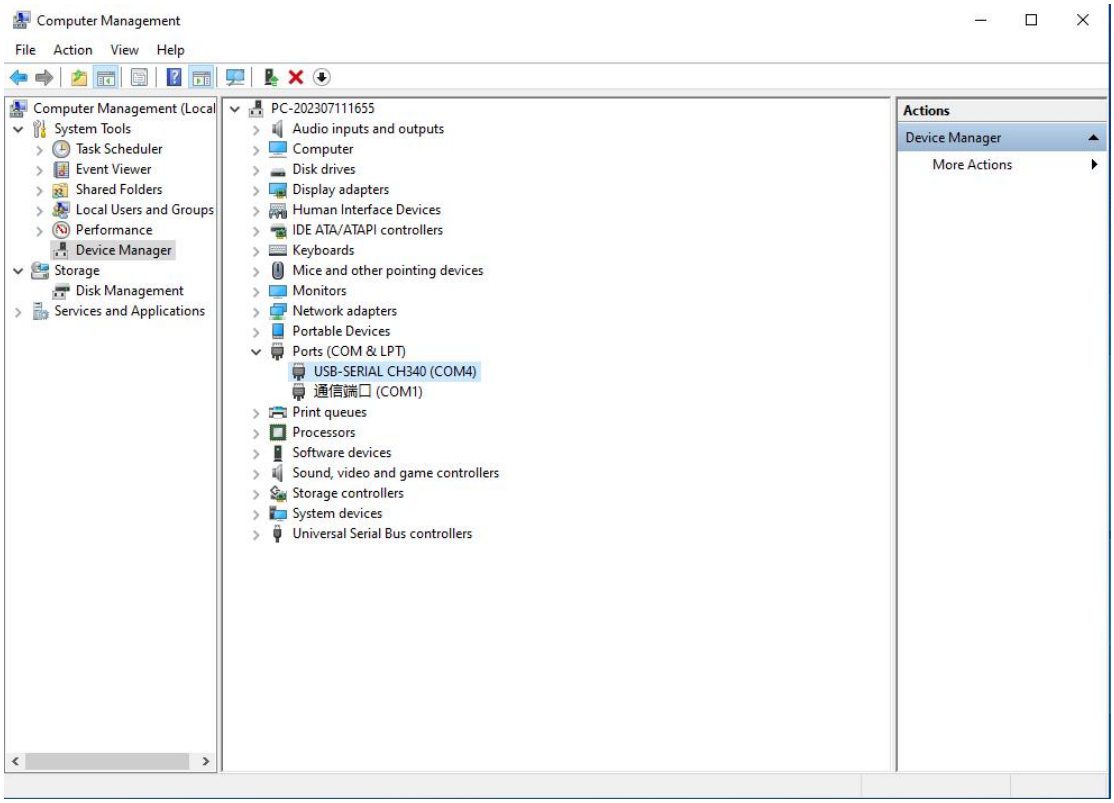


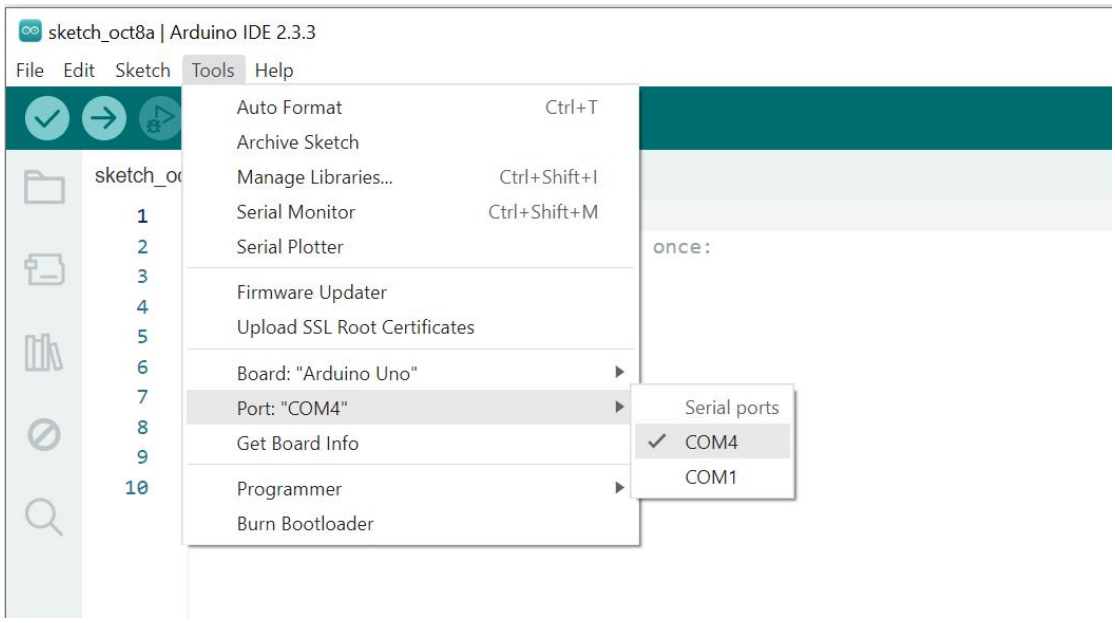
Board can choose different development boards. Our course uses Arduino Uno development board, so we need to choose Arduino Uno. The list contains many Arduino development board models.We choose the corresponding ones according to the model.



Port can set the port used by Arduino IDE to download the program, that is, the port number of the development board connected to the computer. The port display of each

computer is different. When we use the Arduino Uno to connect to the computer, it displays the COM3 port number.(It is determined that the COM3 port is connected to UNO through the task manager.)





(2)Button bar

Button bar includes functions of Verifying,Uploading,Building New,Opening and Saving.

（1）Verify  **：**

Checking and compilation. This button is used to check the correctness of your "syntax" or code. If your code has any syntax errors or undefined variables, an error message will appear at the bottom of the IDE screen. At the same time, the line of error code will be marked with a red background color for easy modification. But if it is correct, you will see the message that the compilation is complete.

（2）Upload  **:**

Download the program code to the Arduino development board. It is better to click Verify first, and then click Upload.

(3)Code editing area

The code editing area is where to write program code and code comments.

(4)Console

The debug window will output information showing various compilation and debugging results. For example, if your code is written incorrectly, you will be prompted about what went wrong.

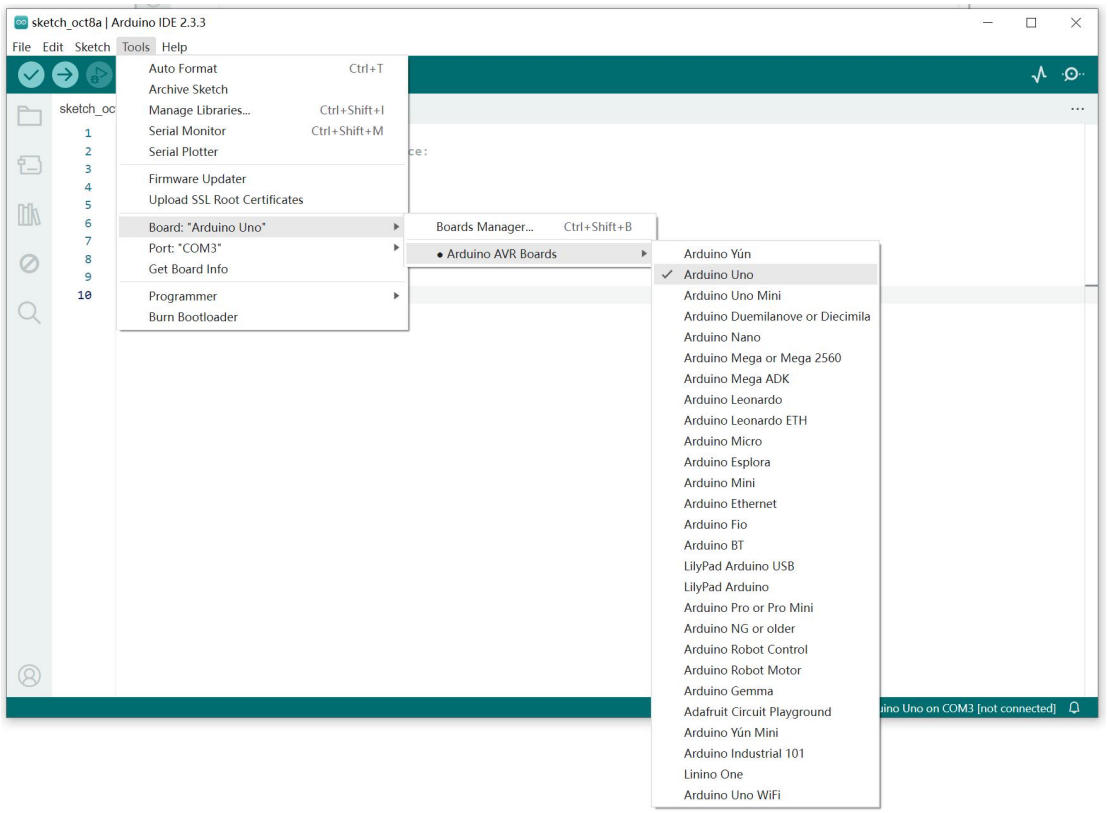
5.Connecting the BLONWINER Arduino Arm Board and the computer

(1)Connecting the BLONWINER Arduino Arm Board and the computer

You need to use USB Cable to connect the BLONWINER Arduino Arm Board to the computer.As shown below:

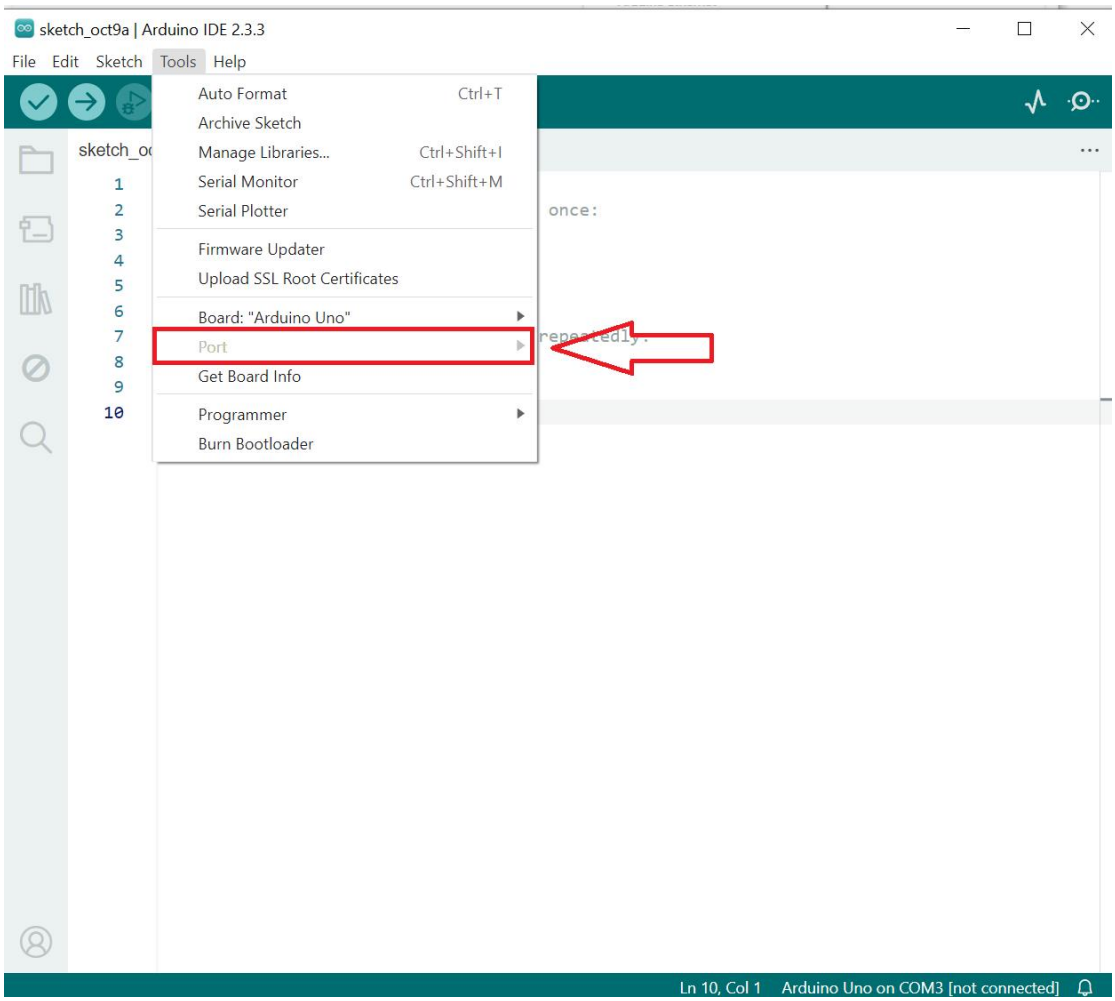
(2) Select the Arduino Uno development board in Tools

Open Arduino IDE under Tools—>Board.Select Arduino UNO in the list.

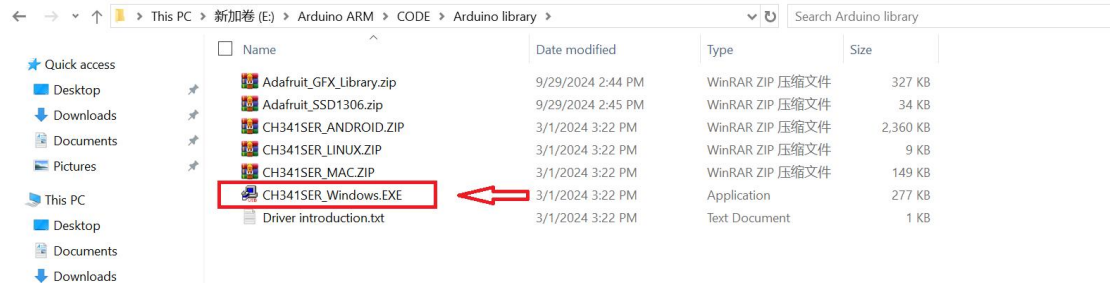


(3)Install CH341SER driver

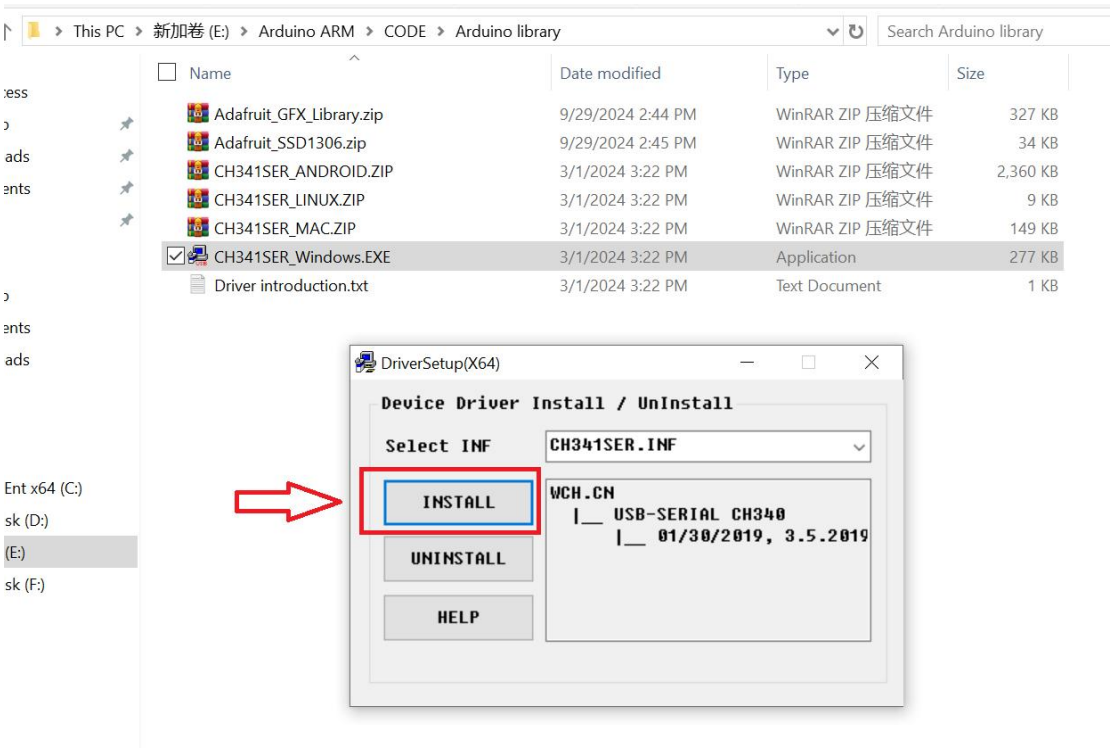
1. Open the Arduino IDE, in the Port on the Tools toolbar, you will see that the serial port cannot be accessed, which means that you have not installed the serial port driver.

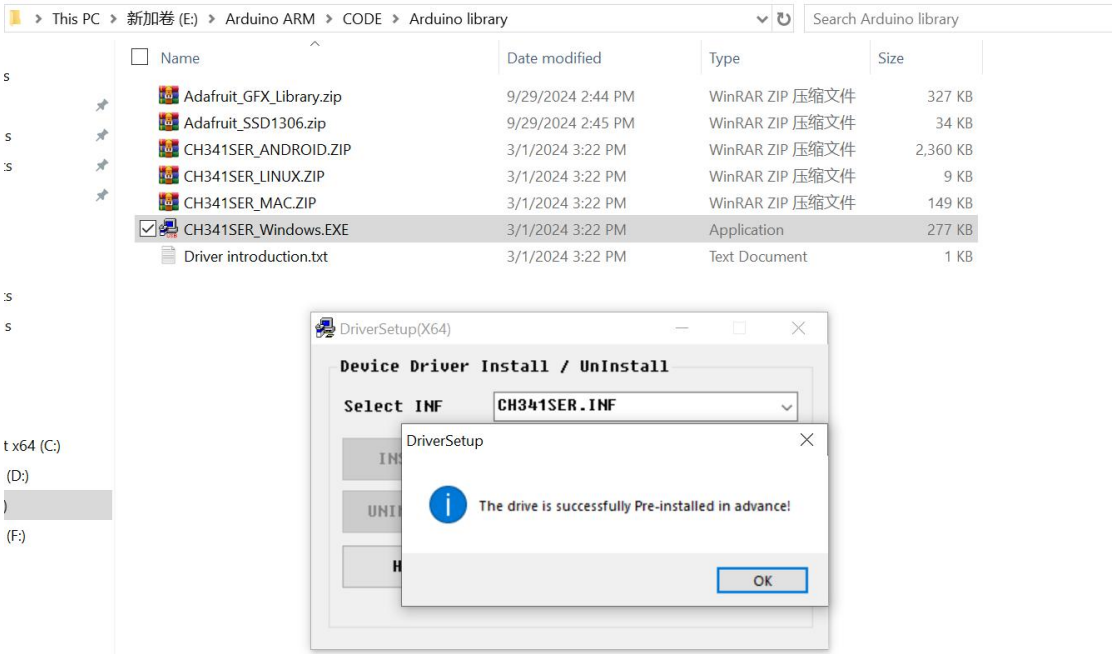


2. You need to find the user folder provided by BLONWINER: BLONWINERRoboticArmforArduino, find the Arduino library folder, and open the BLONWINER driver folder. If you are using a Windows system, you can directly double-click to open CH341SER_Windows.EXE, install corresponding driver according to the computer operating system.

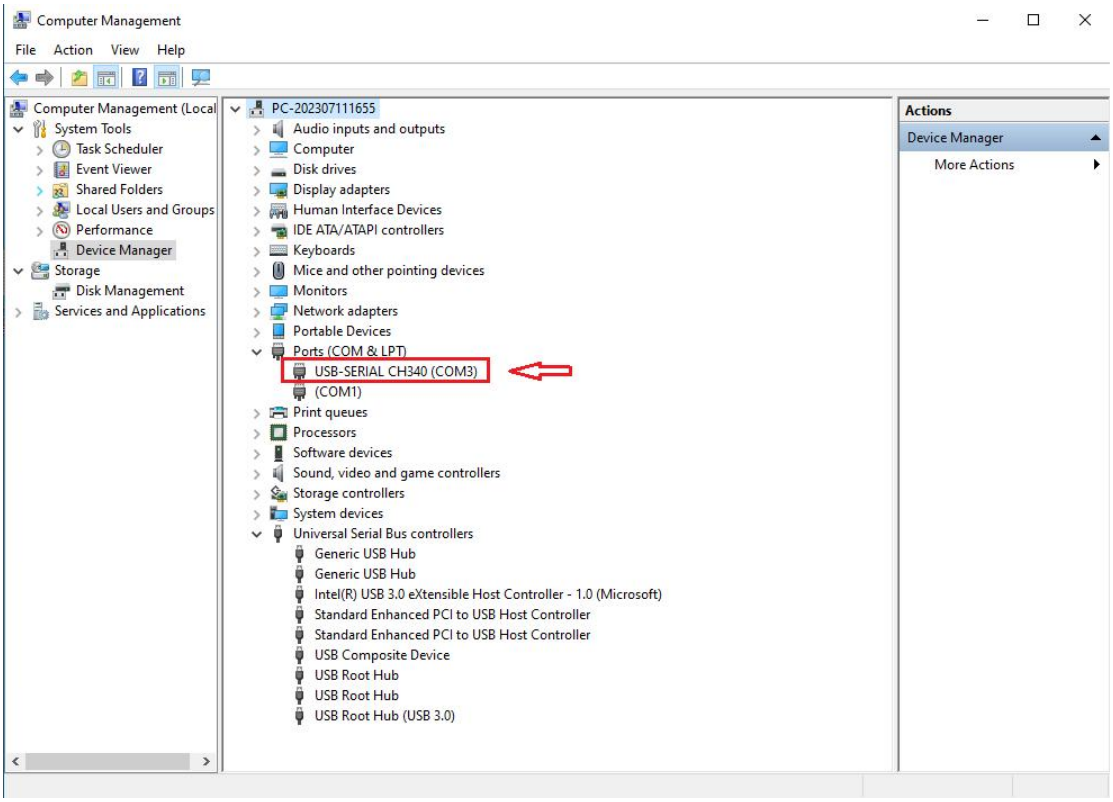


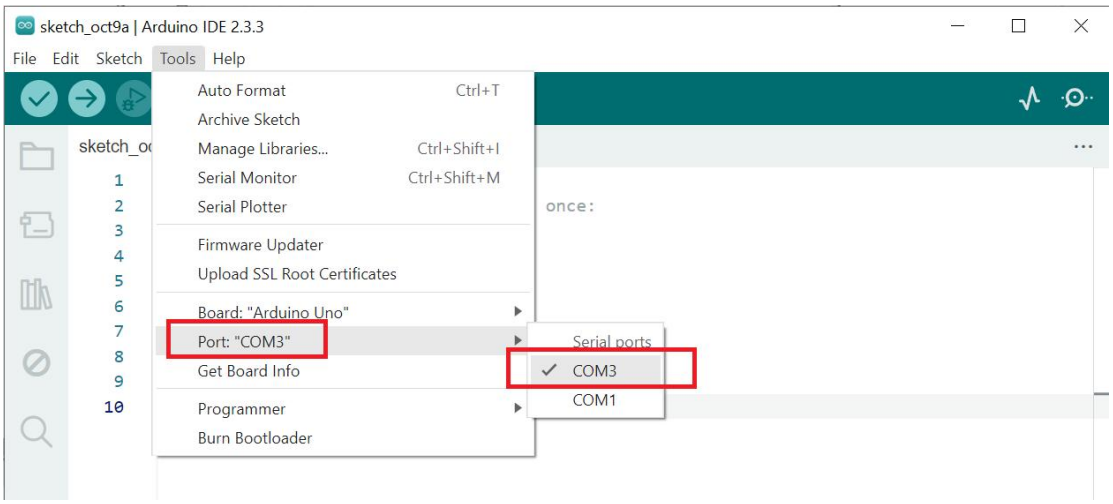
3. Click INSTALL.Wait for the installation to succeed.And click OK





4.Now you will find the Arduino serial port is accessible (different computer configuration has different serial port).It means that the Arduino UNO development board has been successfully connected to the computer. You will need to pay attention to this connection step in the following course.



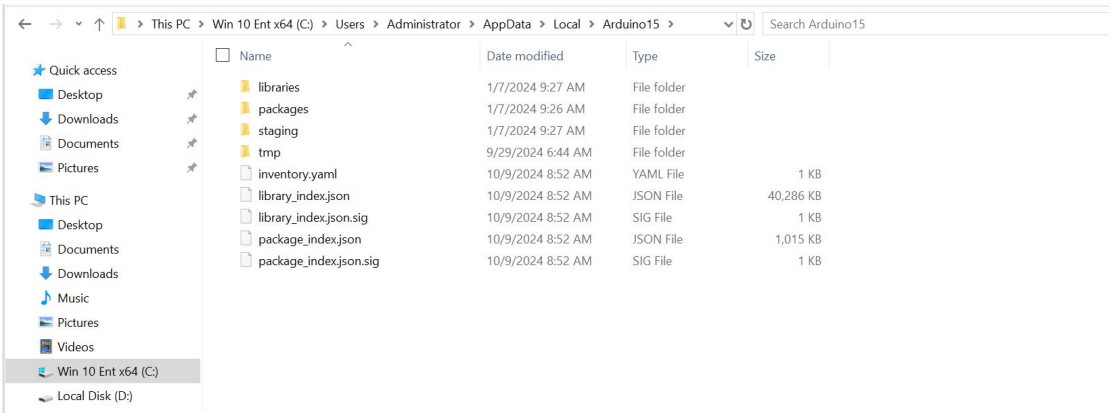


6.The solution for situation that Arduino IDE cannot be opened

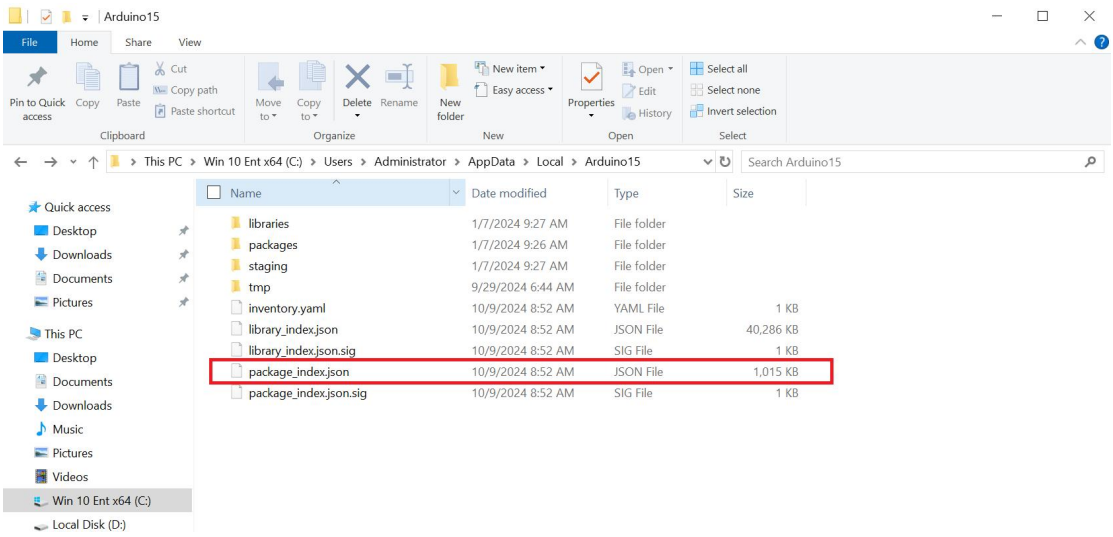
When opening the Arduino IDE, you will suddenly encounter a situation that it cannot be opened.

【Solution】

You need to find the Arduino15 folder in the C:\Users\Administrator\AppData\Local\Arduino15 directory of the C drive.As shown below:



You need to delete the package_index.json file, and then reopen the Arduino IDE.



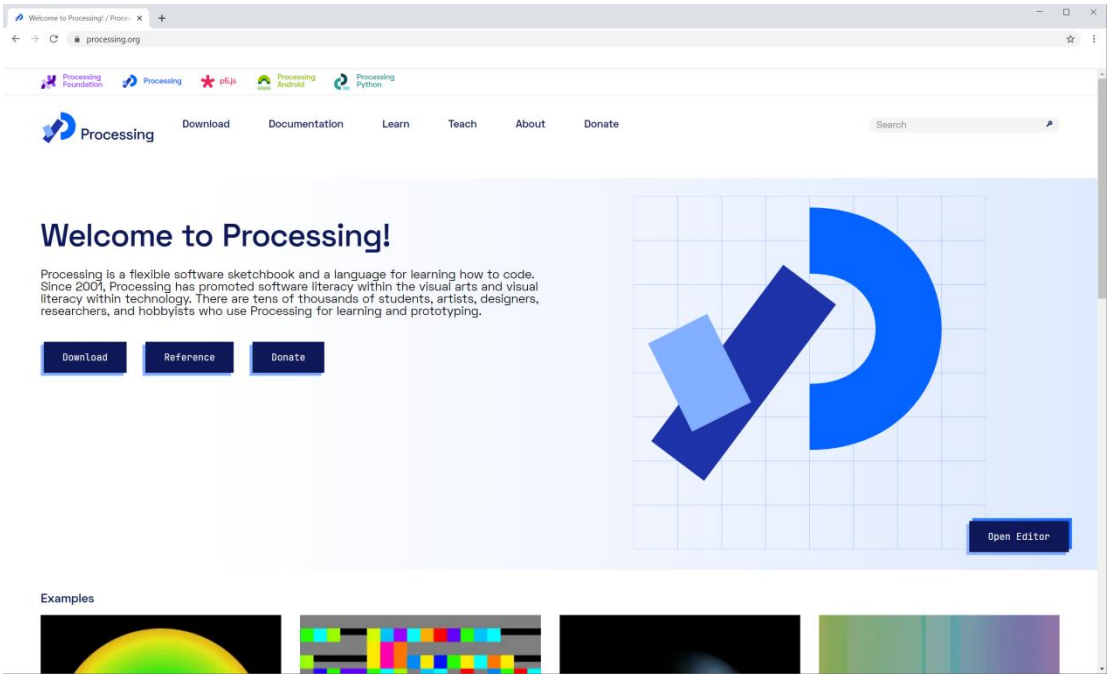
7、Download Processing

Processing is a revolutionary and forward-looking new computer language. Its concept is to introduce programming languages in the environment of electronic art and introduce the concept of electronic art to programmers. It is an extension of the Java language and supports many existing Java language architectures.It is not only much simpler in syntax, but has many intimate and user-friendly designs. Processing can be used on Windows, MAC OS X, MAC OS 9, Linux and other operating systems.

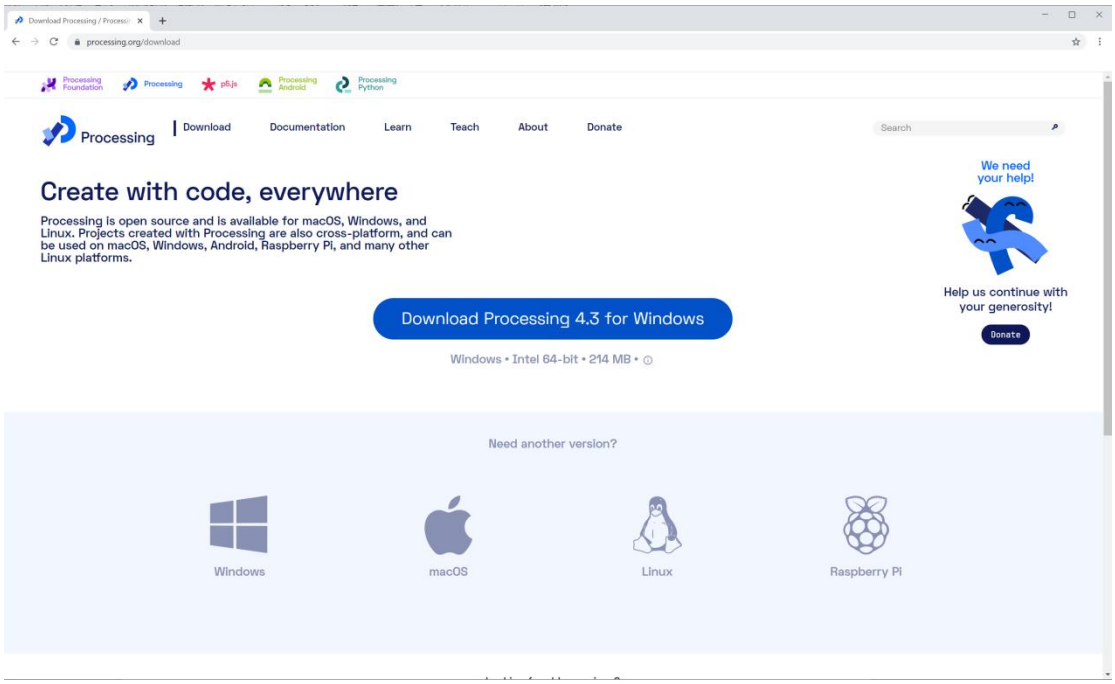
The latest version is Processing 3. The work done in Processing can be used on the personal computer side or exported to the Internet in the form of Java Applets.

How to download Processing?

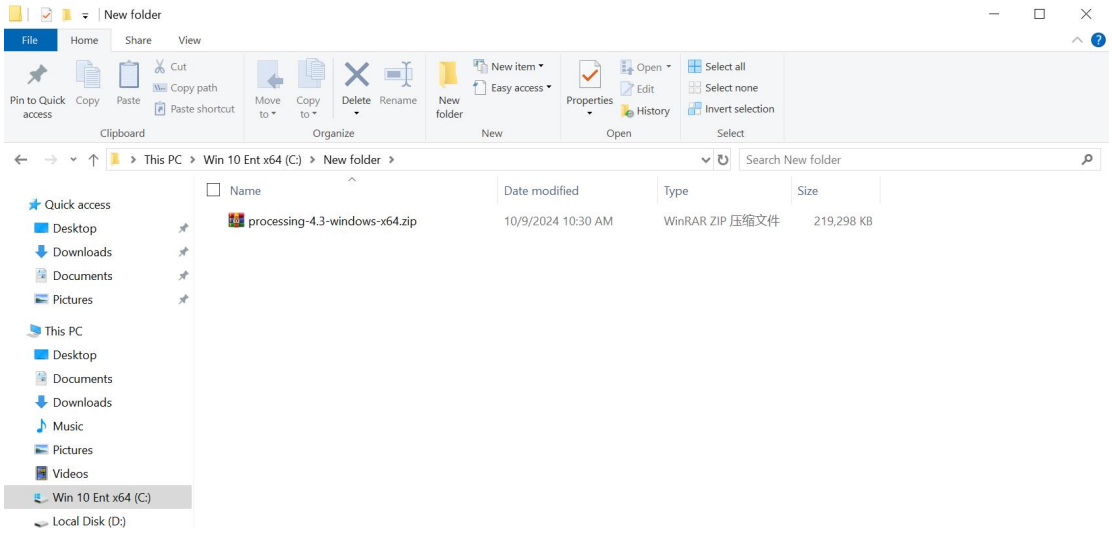
1. Enter this URL with Google Chrome:https://processing.org/



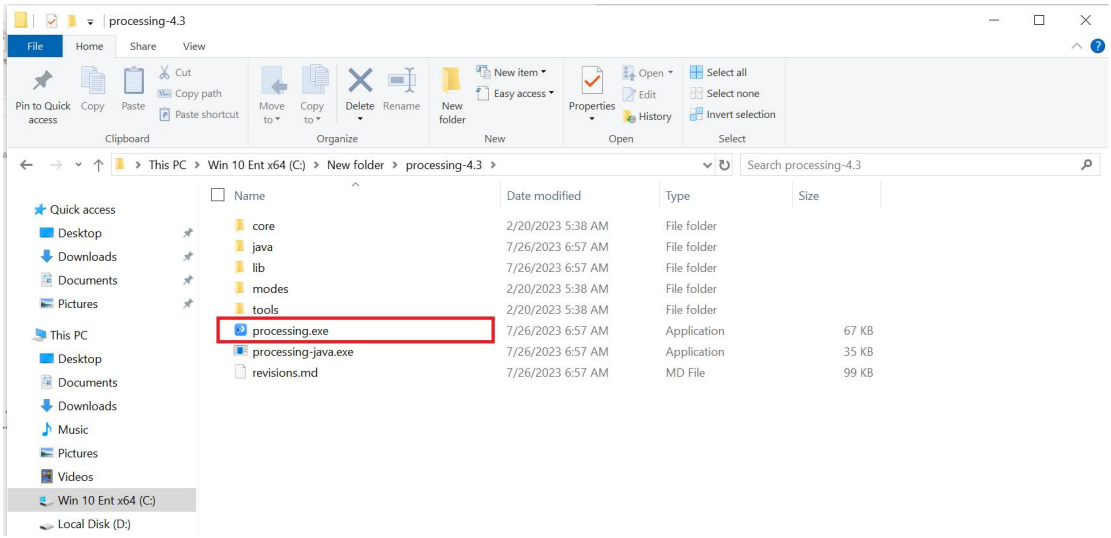
2. Click Download Processing, as shown below:



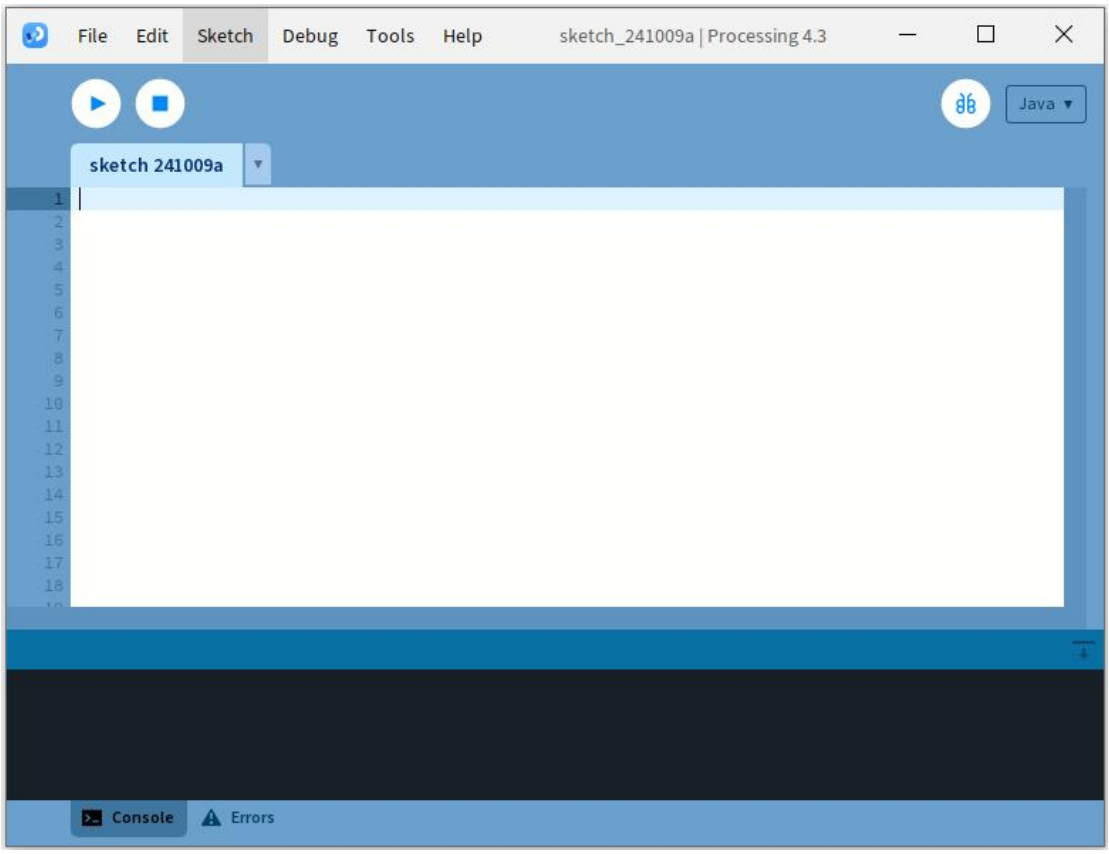
3.When finish downloading, you will get a compressed file "processing-4.3-windows-x64.zip".



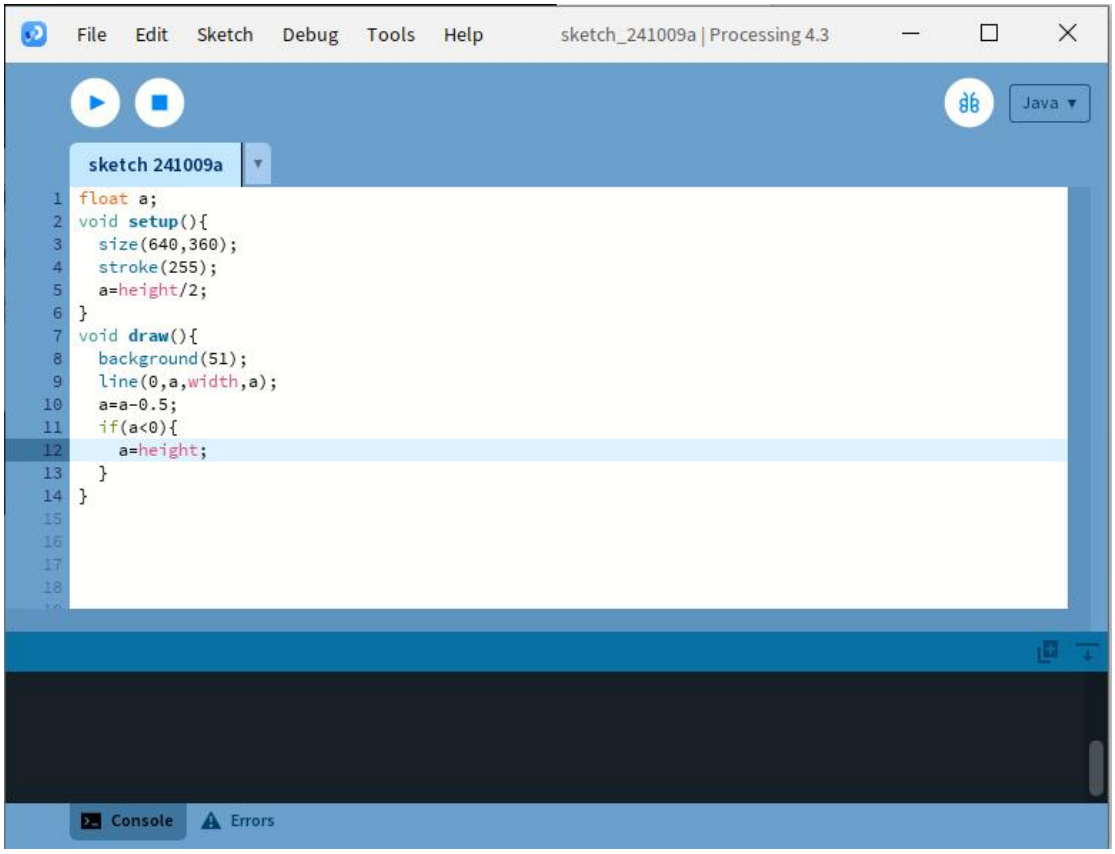
4.After extracting this file, you can get the following file, just click to run processing, it can be run directly without installation.



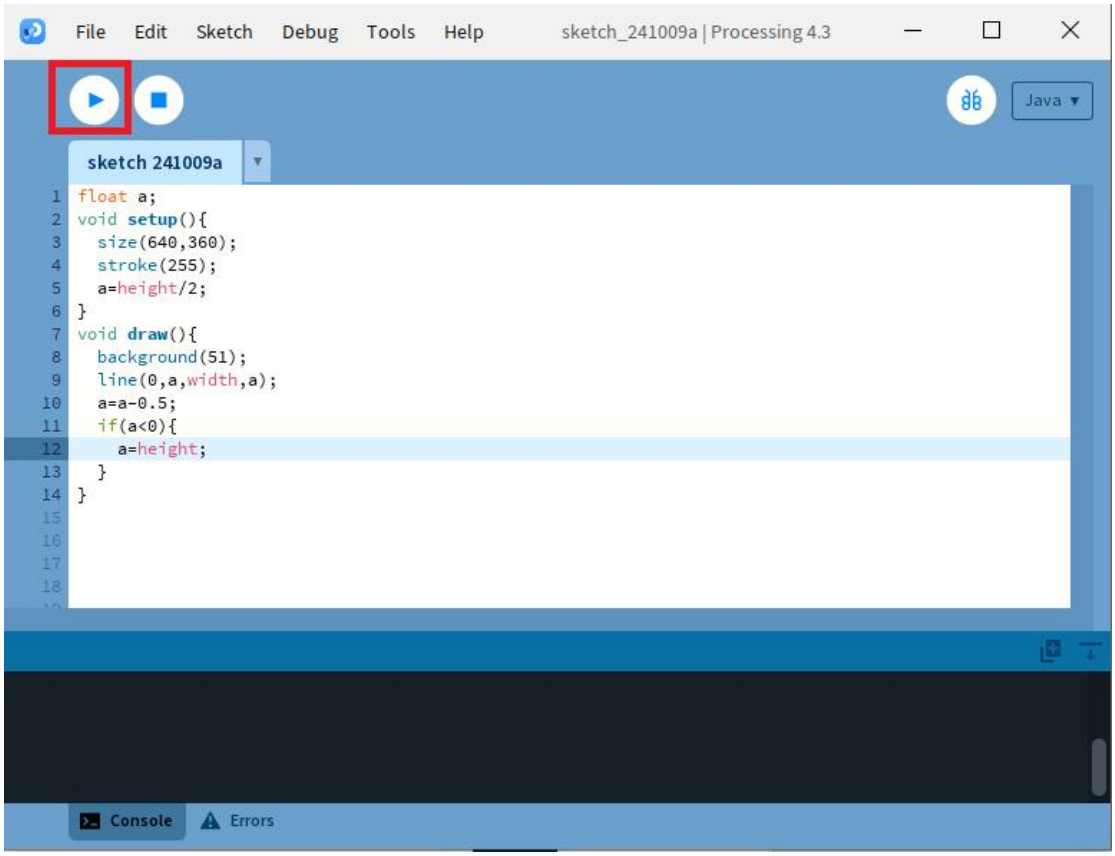
5.The interface is as follows after the Processing runs



6.Let's write a simple code that implements the following functions "Change the variable to create a moving line. When the line moves out of the window edge, the variable becomes 0 and the line goes back to the bottom of the screen

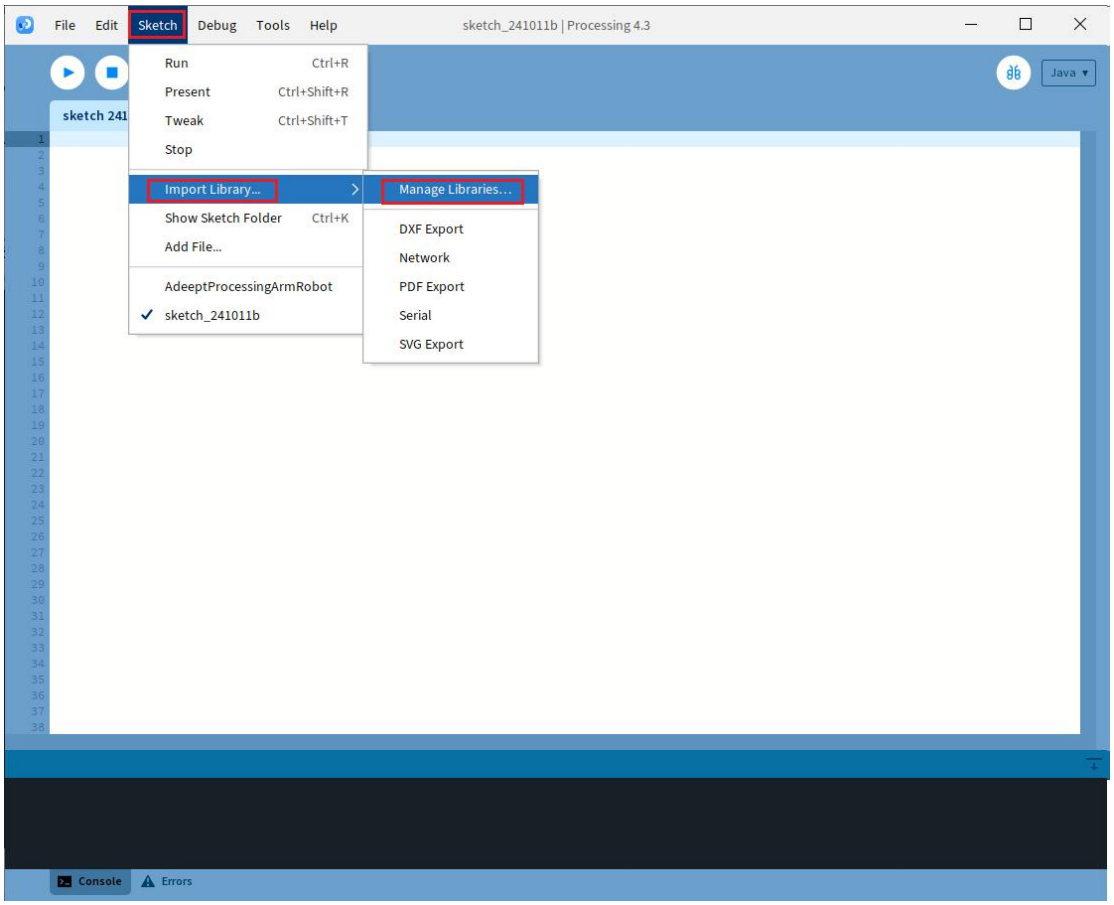


7. Click “Run”.



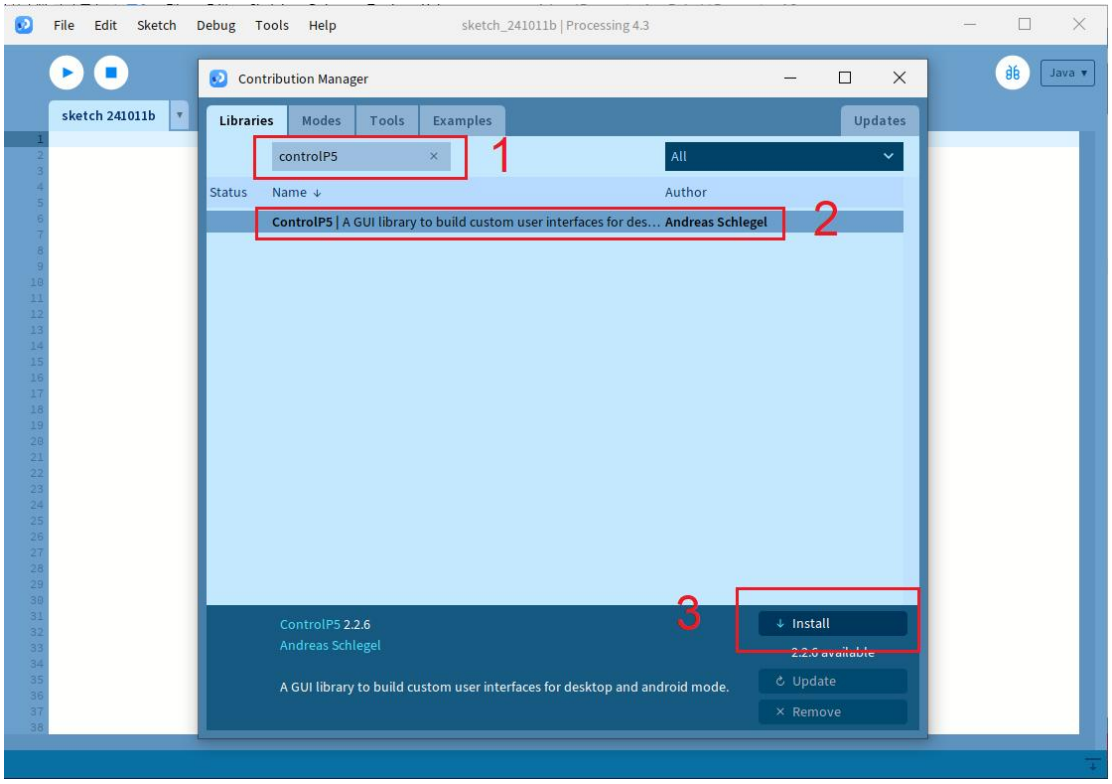
8.Running effect is as follow.

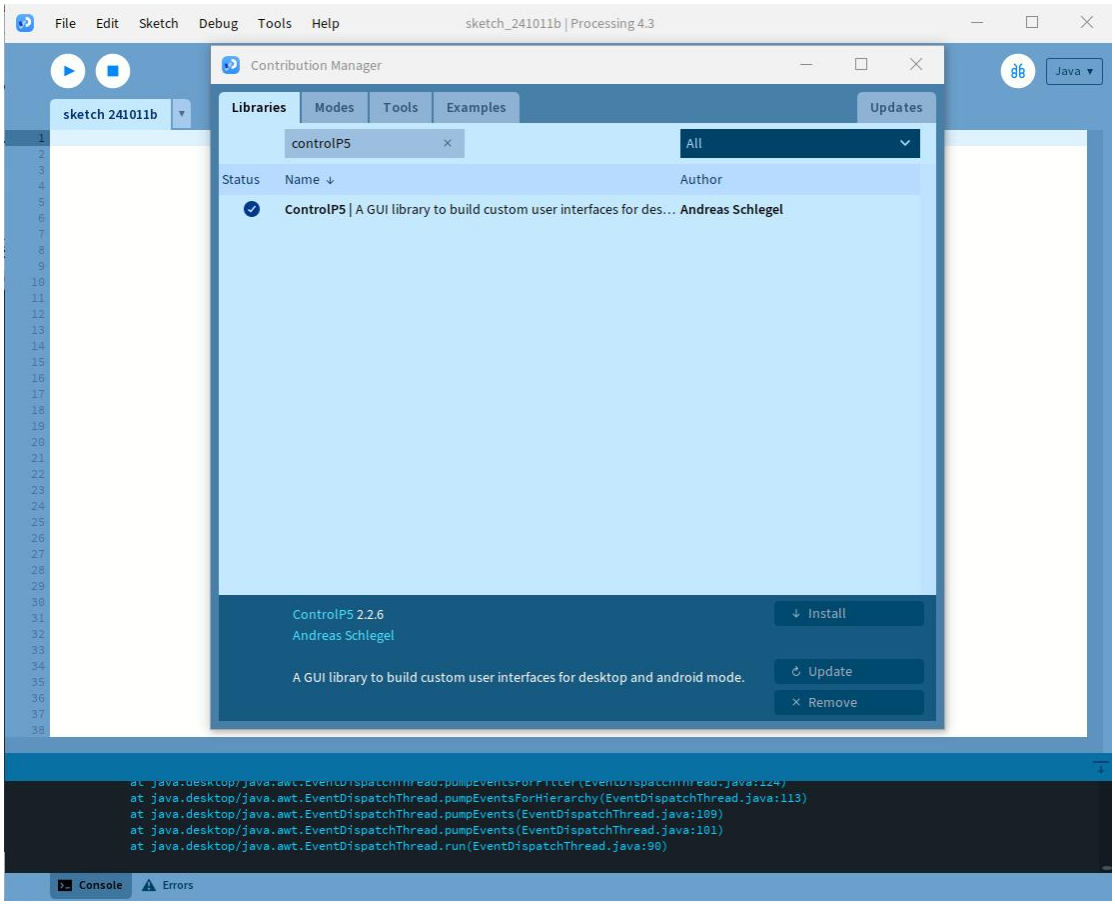
Install the controlP5 library,



Enter ‘controlP5’ here, select ‘controlP5’, and click ‘Install’.

blonwiner@outlook.com

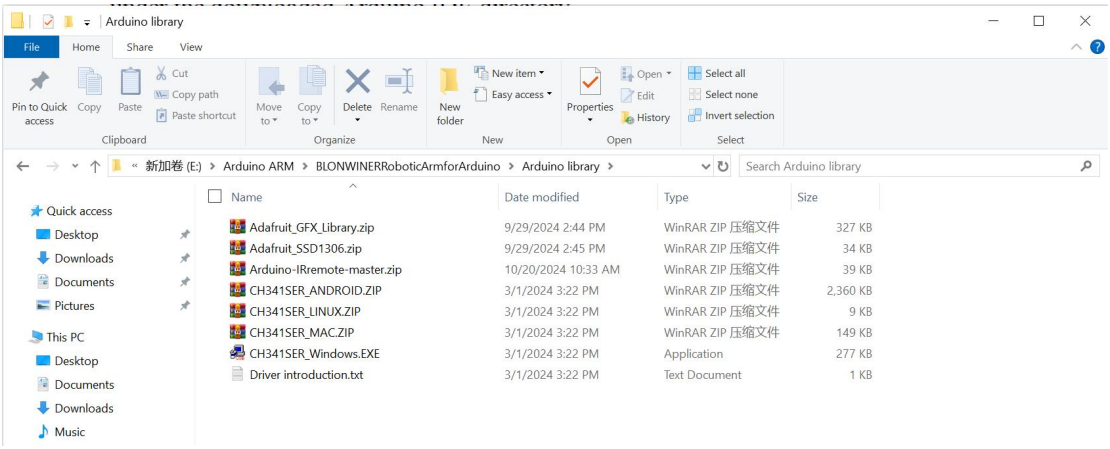




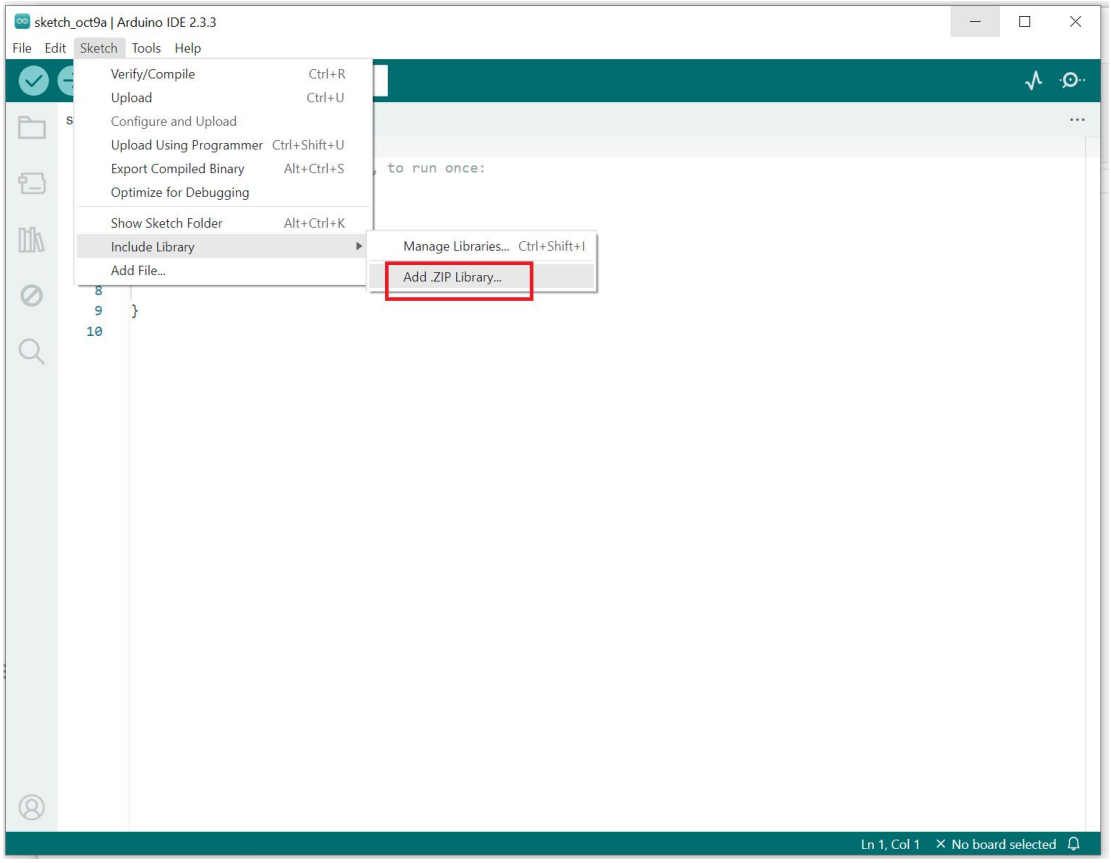
We need to upload a piece of code to the BLONWINER Arduino ARM Board before starting to assemble the robotic arm. Find out"Lesson 0 The servo initialization code of robotic arm assembly"in the documentation we provided and upload the code from the file to BLONWINER Arduino ARM Board.

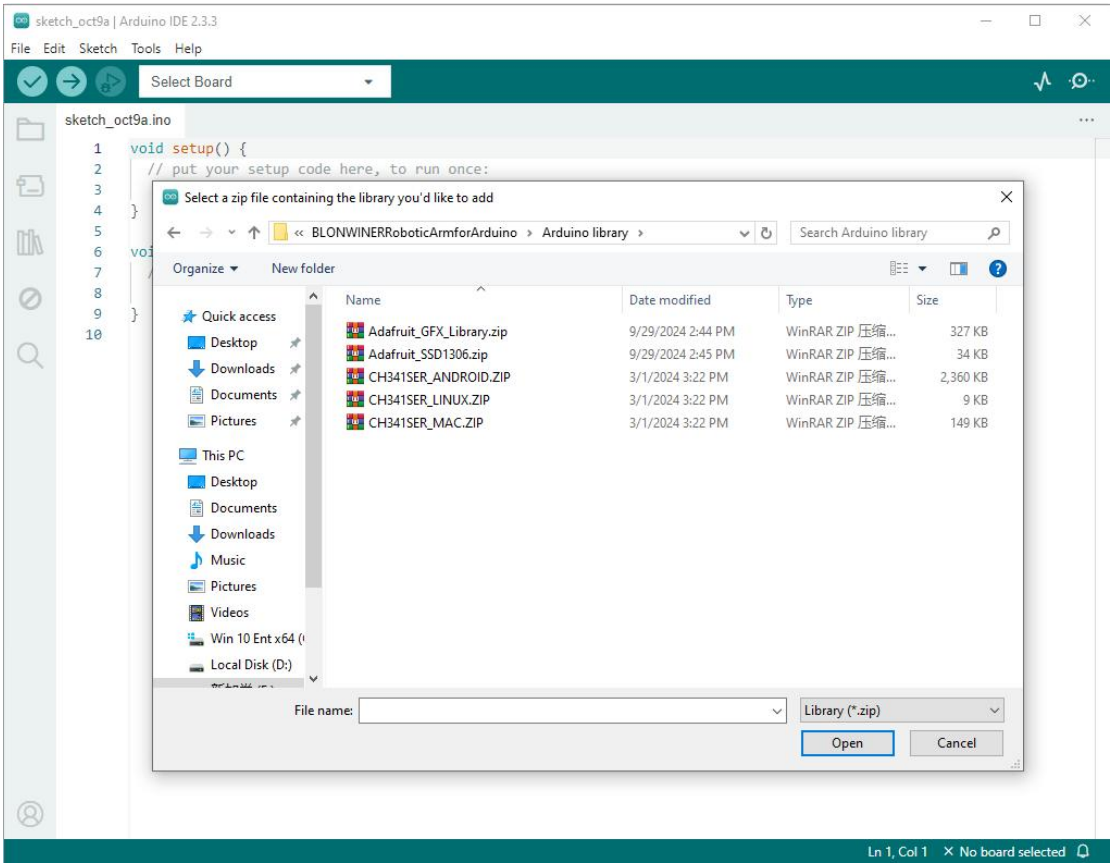
8. Configuring the "libraries" folder of the Arduino IDE

Before using BLONWINER Robotic Arm, you need to configure the "libraries" folder under the downloaded Arduino IDE directory.
First, you need to find the user folder provided by BLONWINER: BLONWINERRoboticArmforArduino, and find the "Arduino library" folder. Open the "Arduino library" folder, as shown below:

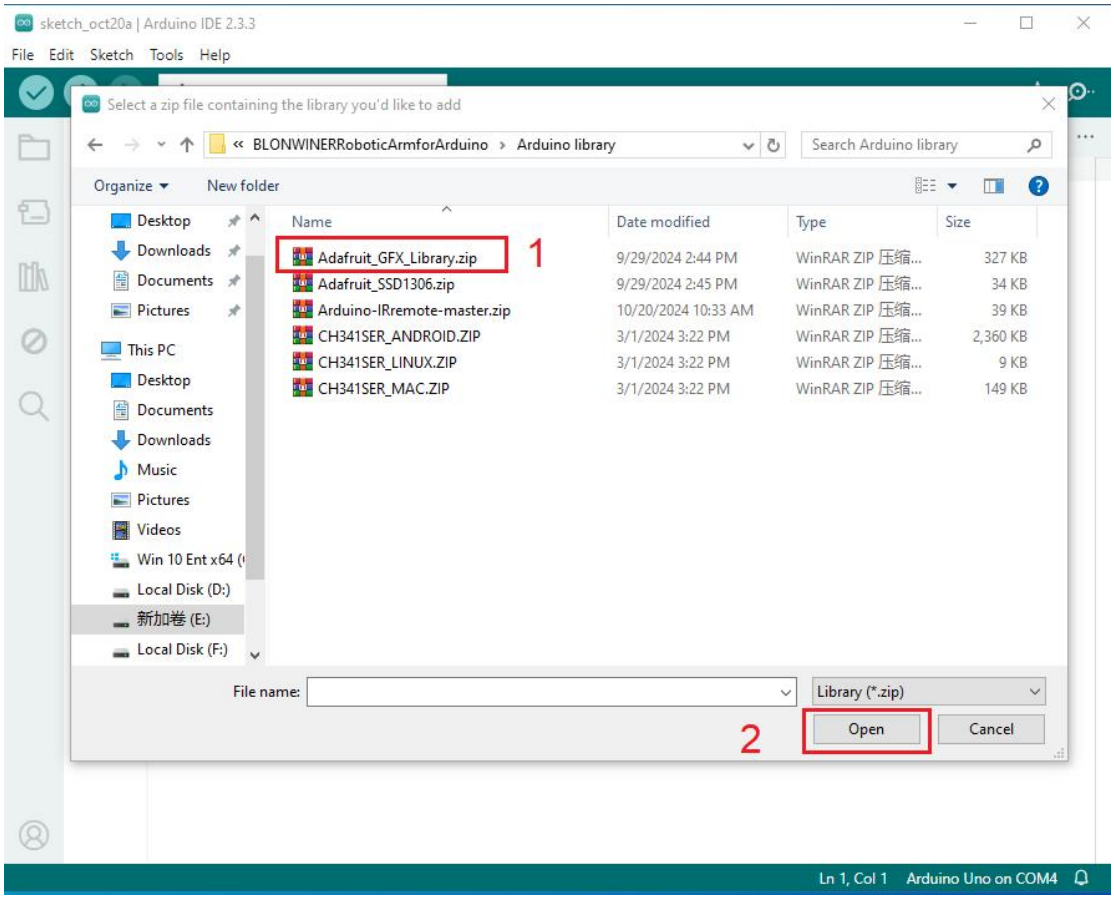


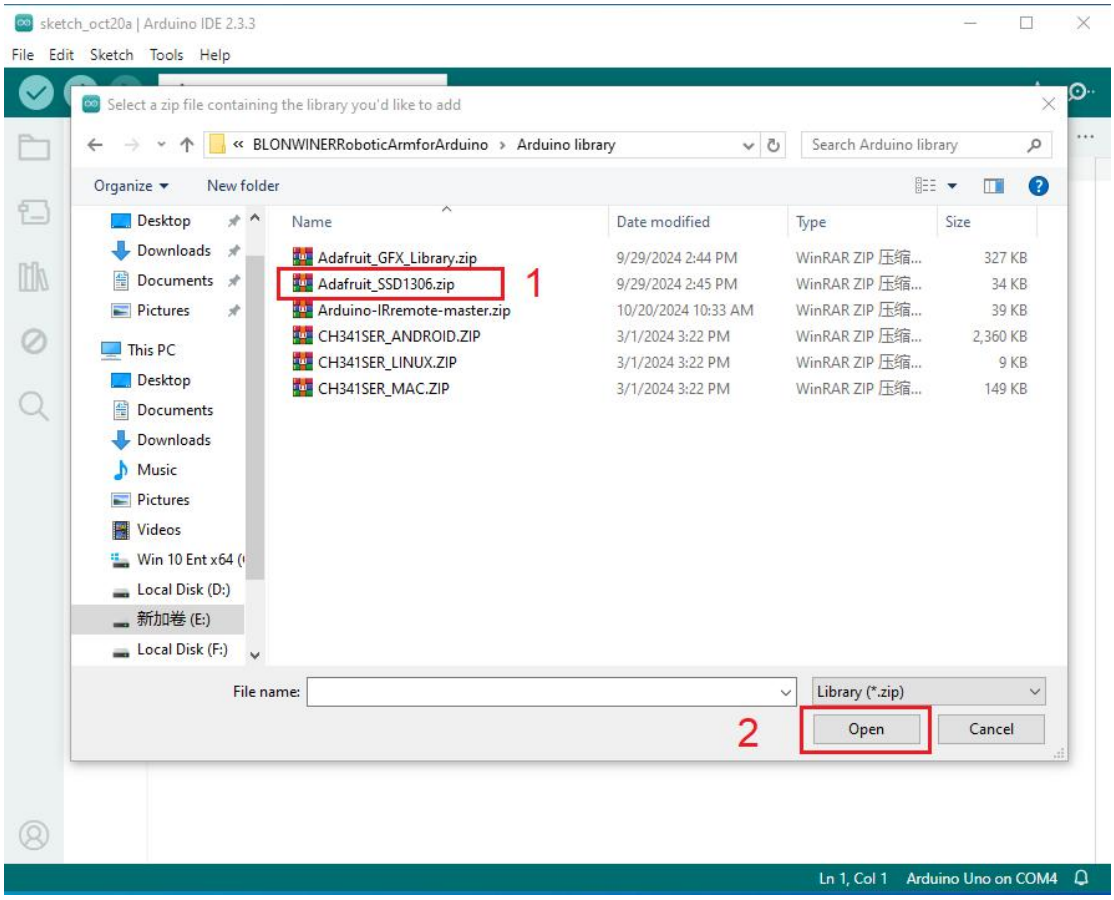
Open the arduino IDE software and select ‘Add .ZIP Library...’, as shown in the figure below

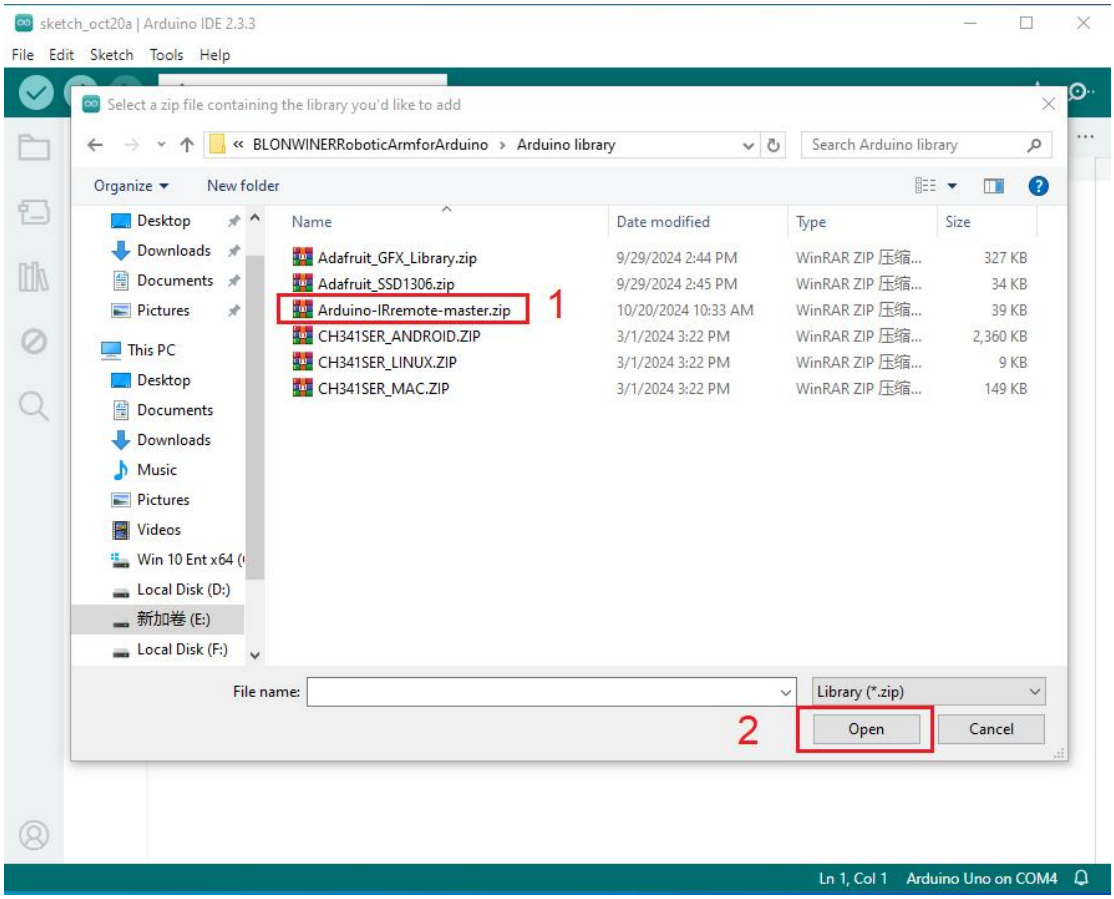




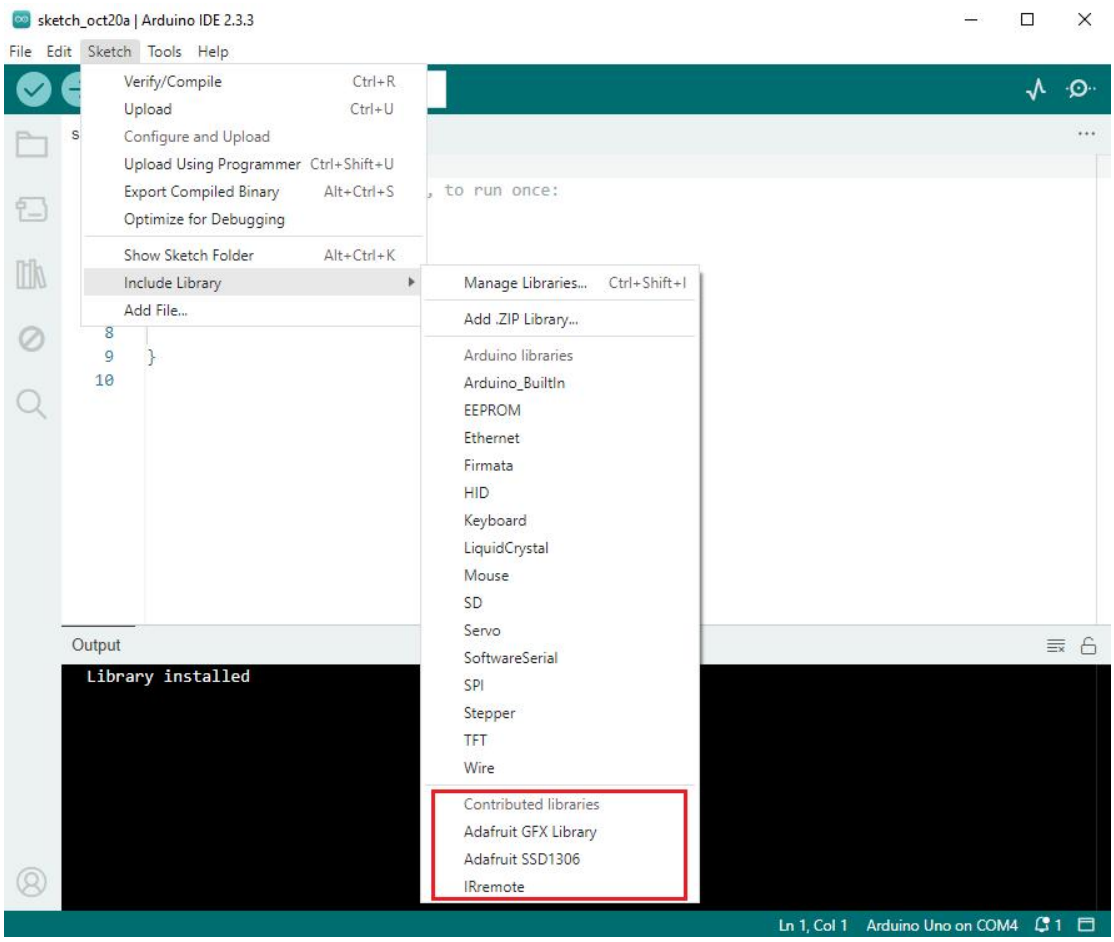
Add the two library files ‘Adafruit_GFX_Library.zip’ and ‘Adafruit_SSD1306.zip’ one by one.


sketch_oct20a | Arduino IDE 2.3.3
File Edit Sketch Tools Help
Select a zip file containing the library you'd like to add
« BLONWINERRoboticArmforArduino › Arduino library
Search Arduino library
Organize
New folder
Desktop
Downloads
Documents
Pictures
This PC
Desktop
Documents
Downloads
Music
Pictures
Videos
Win 10 Ent x64 (
Local Disk (D:)
新加卷 (E:)
Local Disk (F:)
Name
Date modified
Type
Size
Adafruit_GFX_Library.zip
Adafruit_SSD1306.zip
Arduino-IRremote-master.zip
CH341SER_ANDROID.ZIP
CH341SER_LINUX.ZIP
CH341SER_MAC.ZIP
9/29/2024 2:44 PM
9/29/2024 2:45 PM
10/20/2024 10:33 AM
3/1/2024 3:22 PM
3/1/2024 3:22 PM
3/1/2024 3:22 PM
WinRAR ZIP 压缩...
327 KB
34 KB
39 KB
2,360 KB
9 KB
149 KB
1
File name:
Library (*.zip)
2
Open
Cancel
Ln 1, Col 1
Arduino Uno on COM4


sketch_oct20a | Arduino IDE 2.3.3
File Edit Sketch Tools Help
Select a zip file containing the library you'd like to add
« BLONWINERRoboticArmforArduino › Arduino library
Search Arduino library
Organize
New folder
Desktop
Downloads
Documents
Pictures
This PC
Desktop
Documents
Downloads
Music
Pictures
Videos
Win 10 Ent x64 (
Local Disk (D:)
新加卷 (E:)
Local Disk (F:)
Name
Date modified
Type
Size
Adafruit_GFX_Library.zip
Adafruit_SSD1306.zip
Arduino-IRremote-master.zip
CH341SER_ANDROID.ZIP
CH341SER_LINUX.ZIP
CH341SER_MAC.ZIP
9/29/2024 2:44 PM
9/29/2024 2:45 PM
10/20/2024 10:33 AM
3/1/2024 3:22 PM
3/1/2024 3:22 PM
3/1/2024 3:22 PM
WinRAR ZIP 压缩...
327 KB
34 KB
39 KB
2,360 KB
9 KB
149 KB
1
File name:
Library (*.zip)
2
Open
Cancel
Ln 1, Col 1
Arduino Uno on COM4

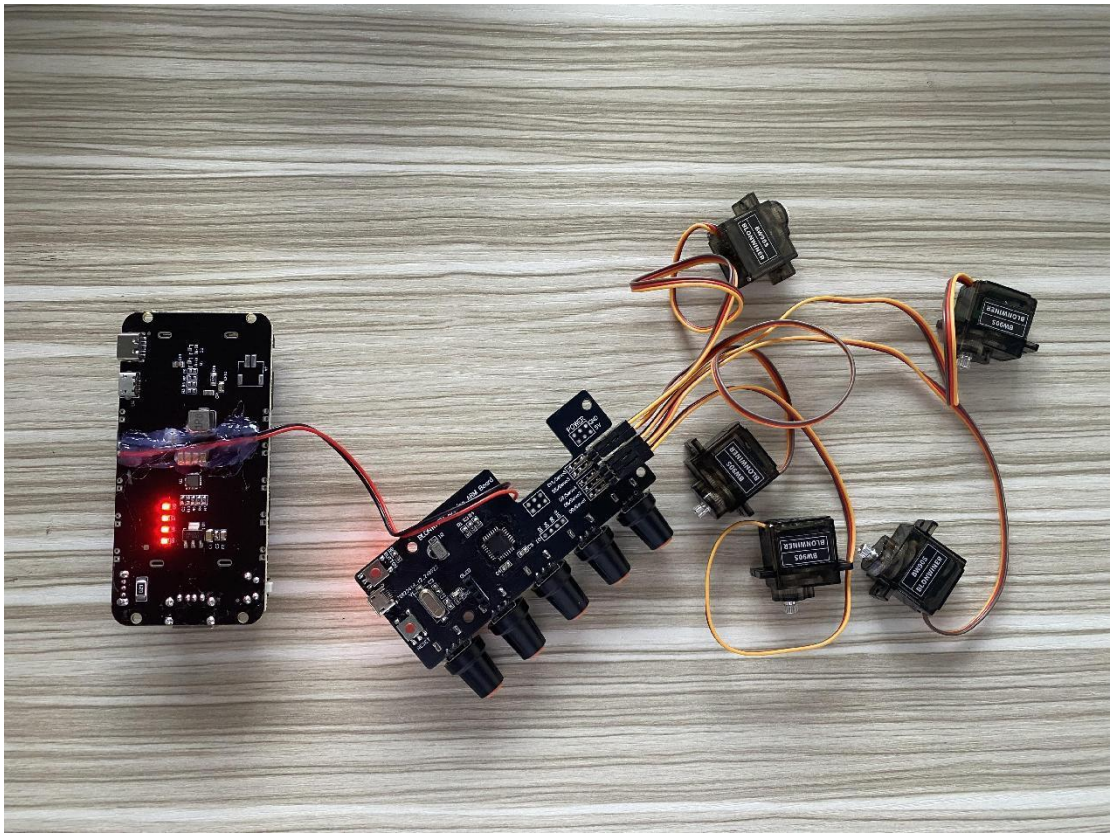


After successful installation, you can see that the Arduino IDE will appear these two library files.


sketch_oct20a | Arduino IDE 2.3.3
File Edit Sketch Tools Help
Verify/Compile Ctrl+R
Upload Ctrl+U
Configure and Upload
Upload Using Programmer Ctrl+Shift+U
Export Compiled Binary Alt+Ctrl+S
Optimize for Debugging
Show Sketch Folder Alt+Ctrl+K
Include Library
Add File...
Manage Libraries... Ctrl+Shift+I
Add .ZIP Library...
Arduino libraries
Arduino_BuiltIn
EEPROM
Ethernet
Firmata
HID
Keyboard
LiquidCrystal
Mouse
SD
Servo
SoftwareSerial
SPI
Stepper
TFT
Wire
Contributed libraries
Adafruit GFX Library
Adafruit SSD1306
IRremote
, to run once:
}
Output
Library installed
Ln 1, Col 1 Arduino Uno on COM4

Lesson 0 The servo initialization code of robotic arm assembly

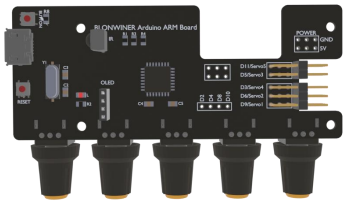
Download the program to the BLONWINER Arduino ARM Board. The procedure is to control the servo to turn to the 90° position. Then refer to the assembly section at the back to start assembling the robotic arm.



Lesson 1 How to Read the Data of the Potentiometer

In this lesson, we will learn how to read the data of the potentiometer and convert the data into an angle.

1.1 Components used in this course

Components	Quantity	Picture
BLONWINER Arduino Arm Board	1	
Micro USB Cable	1	

1.2 Introduction of Potentiometer

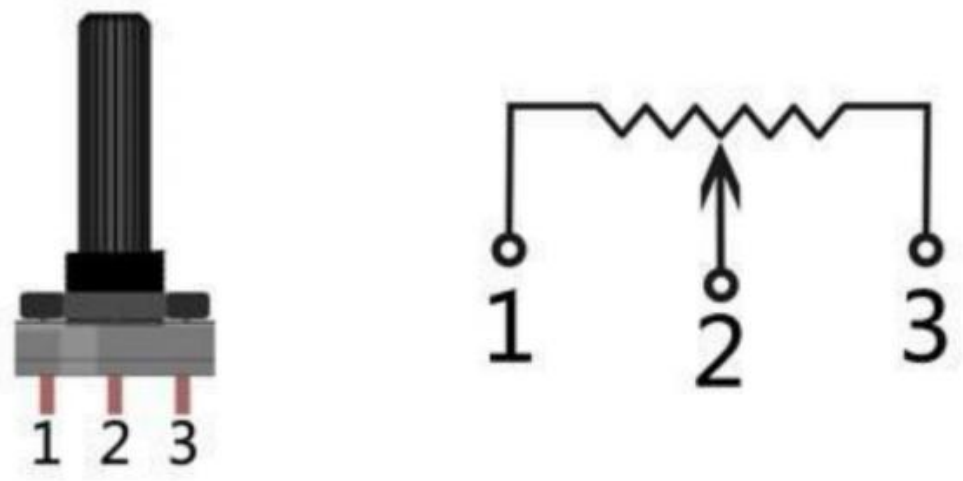
(1) Potentiometer

The potentiometer is a resistance element with three terminals and the resistance value can be adjusted according to a certain change law, which is equivalent to a variable resistor. Because its role in the circuit is to obtain a certain relationship with the input voltage (external voltage) to output Voltage, so called potentiometer. Potentiometers can be divided into rotary potentiometers, push-pull potentiometers, straight slide potentiometers, etc. according to the adjustment method. Our course experiment uses a rotary potentiometer.Its three pins are showed as below:

The rotary potentiometer is an adjustable resistance element. It is composed of a resistor and a rotating system. When a voltage is applied between the two fixed contacts of the resistive body, the position of the contact on the resistive body is changed by the rotating system, and a voltage that has a certain relationship with the position of the moving contact can be achieved between the moving contact and the fixed contact. Potentiometer can be used to adjust the voltage and current.

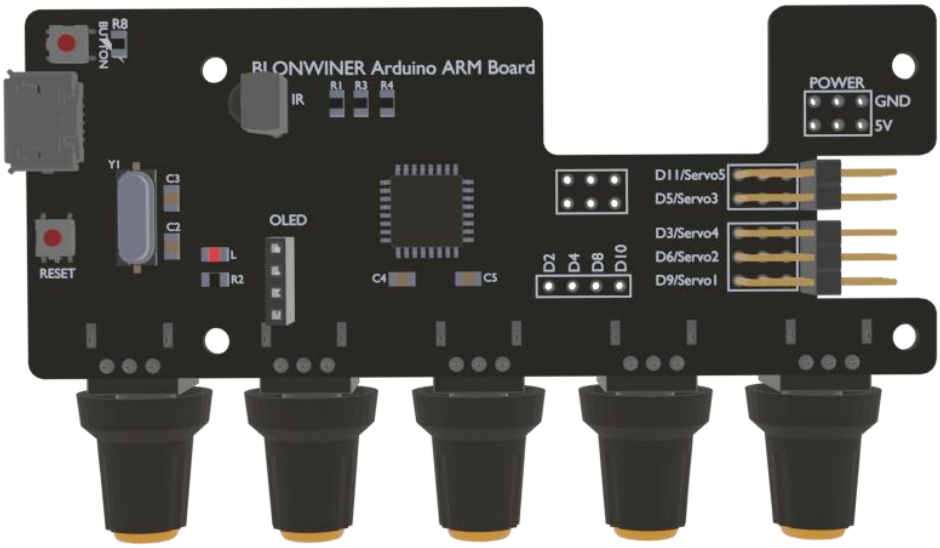
Our course uses a rotary potentiometer. Its structure is as shown in the figure below. By rotating the knob, the position of pin 2 is changed, thereby changing the resistance value from pin 2 to both ends. In the experiment. Connect pin 1 and pin 3 to the GND

and 5V of the development board respectively. And then read the voltage divided by the pin 2 of the potentiometer through the analog input pin A0. The range is between 0V and 5V. The analog input function of Arduino has 10-bit precision, that is, it can convert the voltage signal of 0 to 5V into an integer form of 0 to 1024.

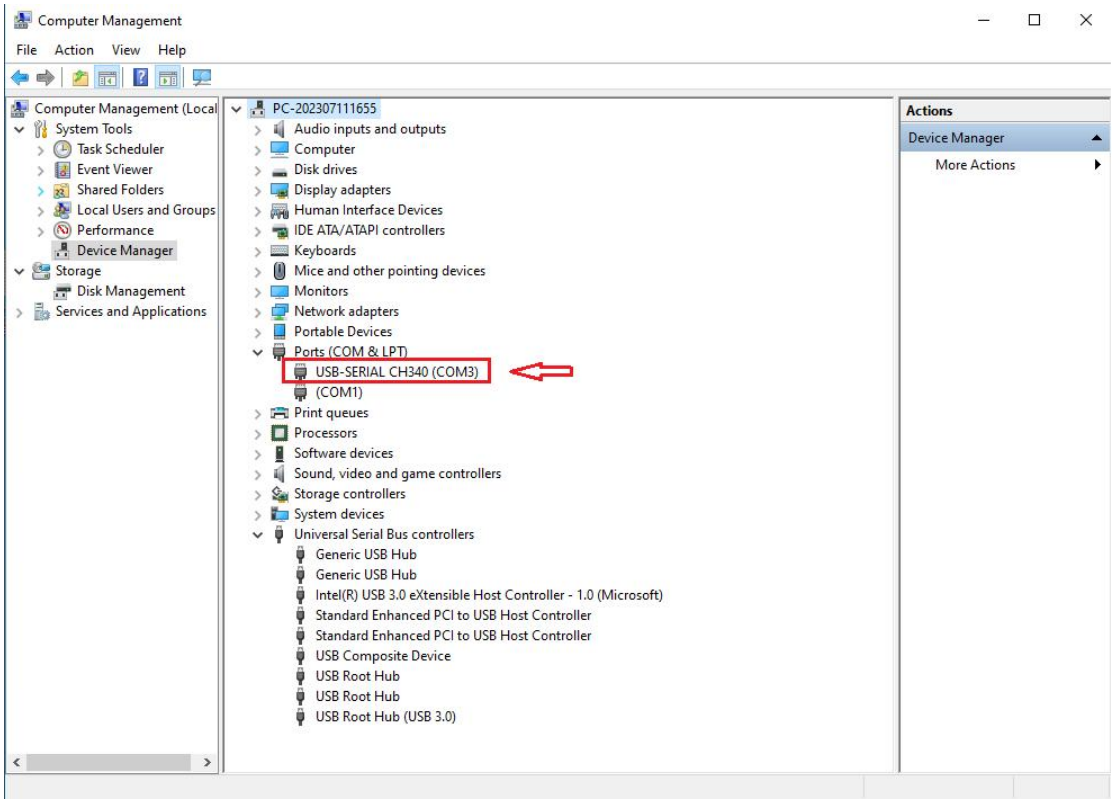


1.3 Wiring diagram (Circuit diagram)

Figure as below：



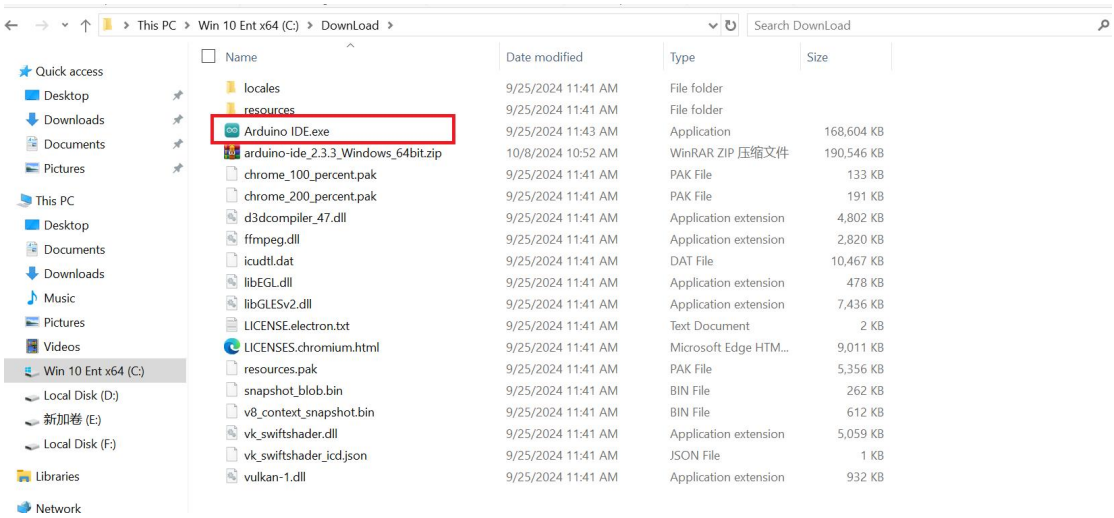
BLONWINER Arduino Arm Board is connected to a computer.Once you have successfully connected to your computer, Computer Management will display this.



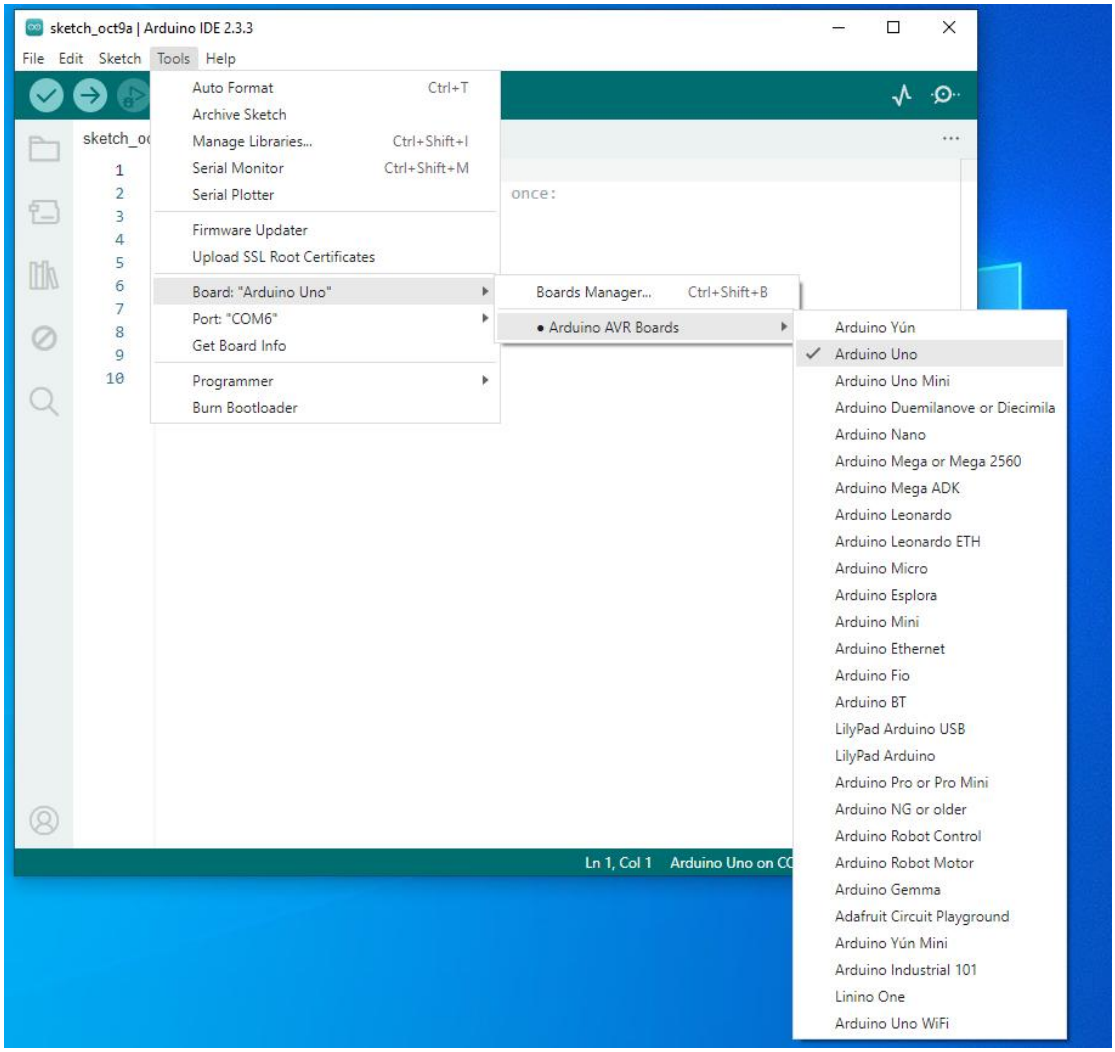
1.4 Reading the value of the potentiometer and converting it into an angle

1.4.1Compile and run the code program of this course

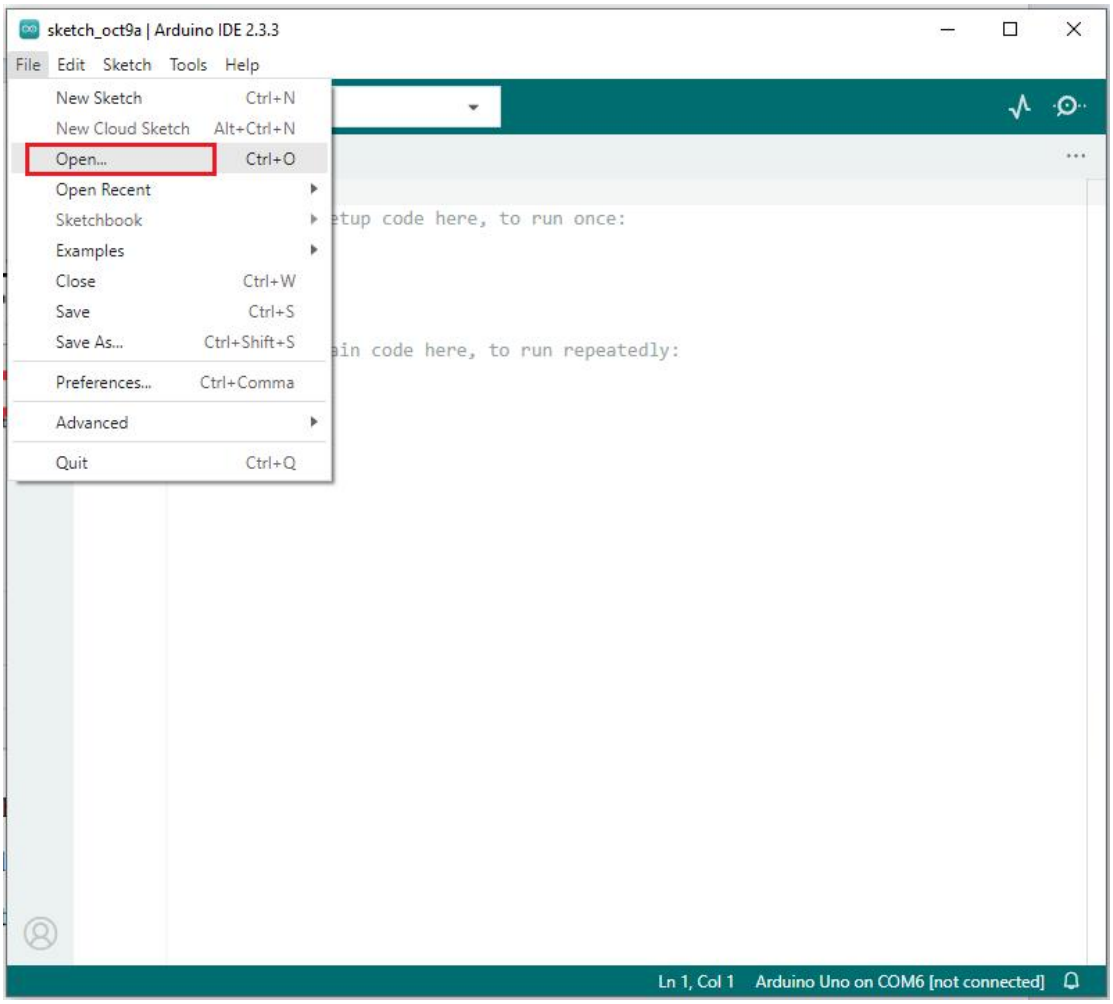
1.Open the Arduino IDE software, as shown below:



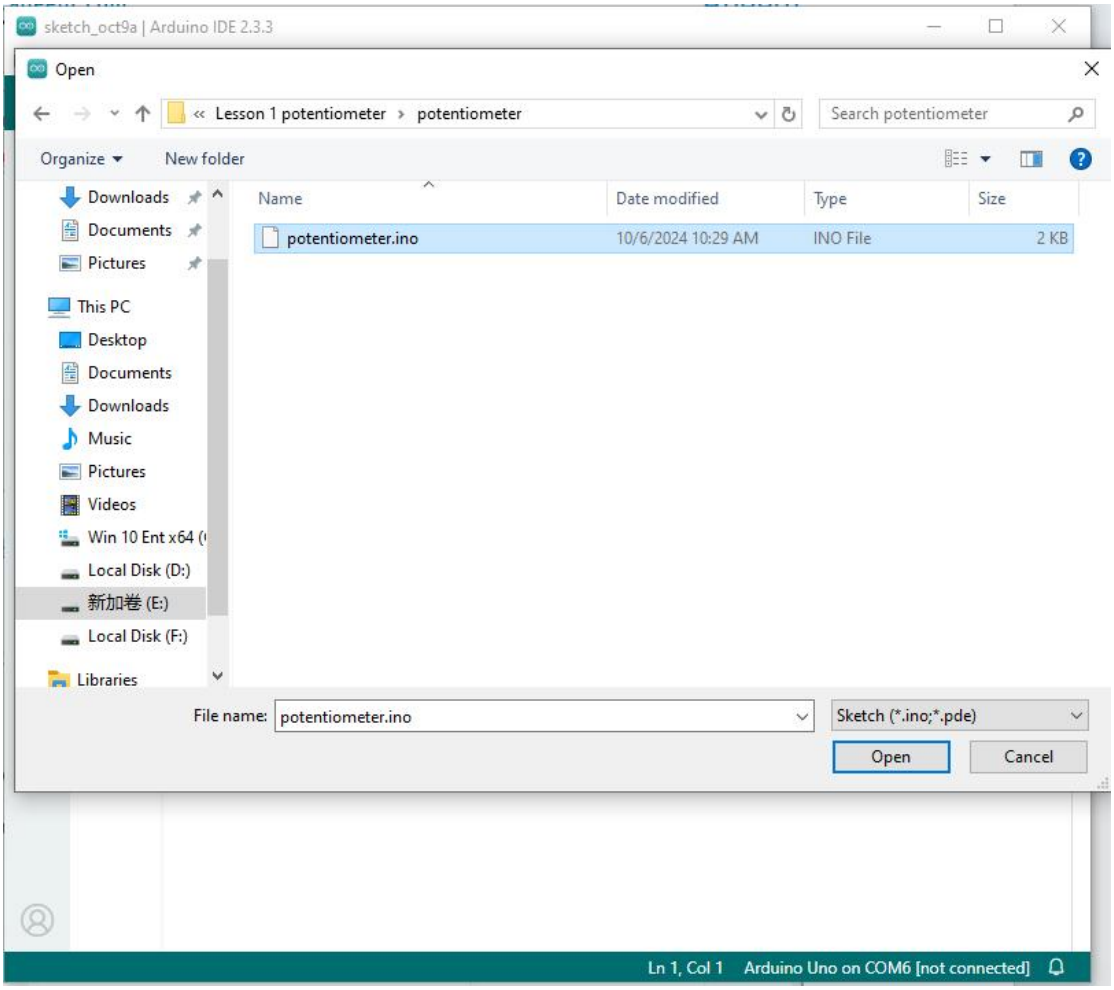
2. In the Tools toolbar, find Board and select Arduino Uno, as shown below:



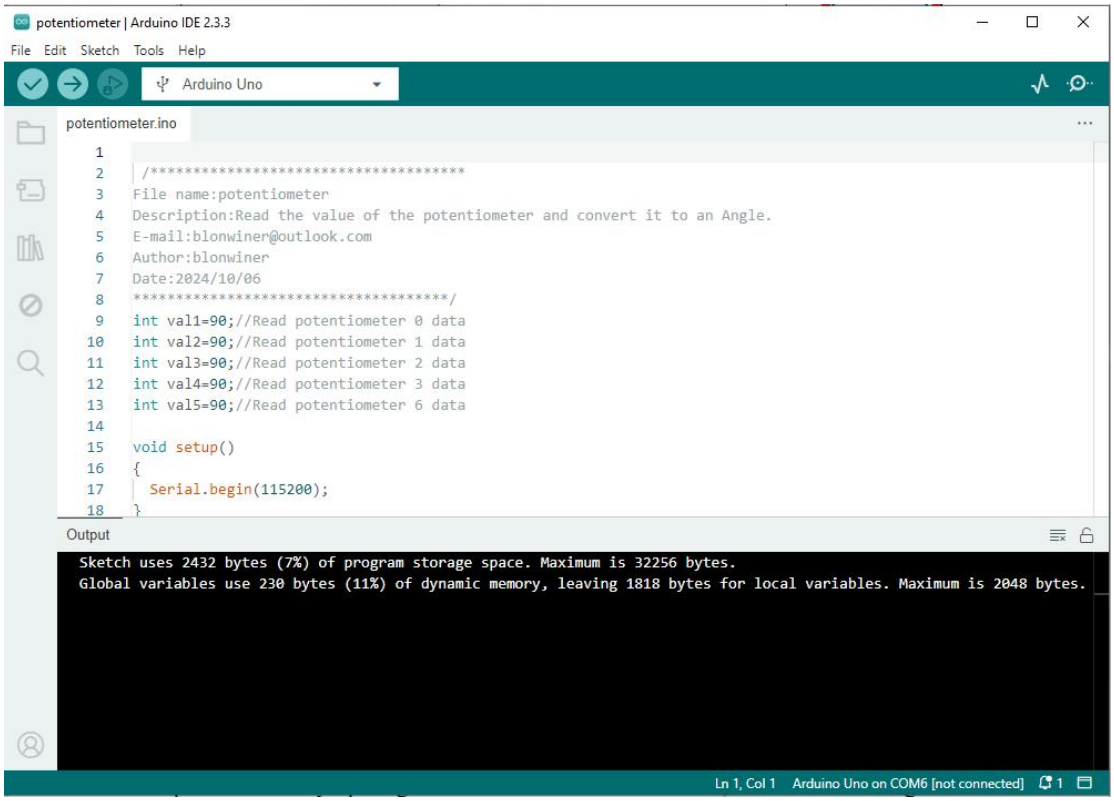
3.Click Open in the File drop-down menu:



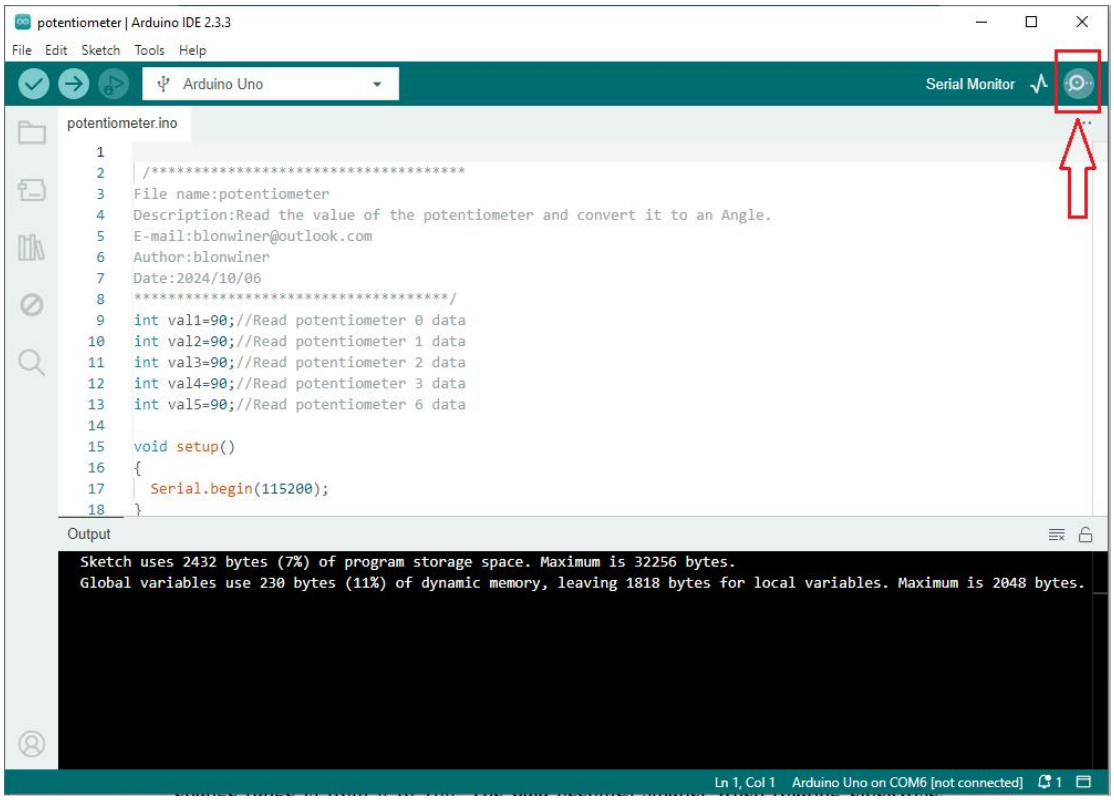
4.Find the folder BLONWINERRoboticArmforArduino that we provide to the user. Enter the Lesson 1 potentiometer directory. Select potentiometer.ino. This file is the code program we need in this course. Then click Open.



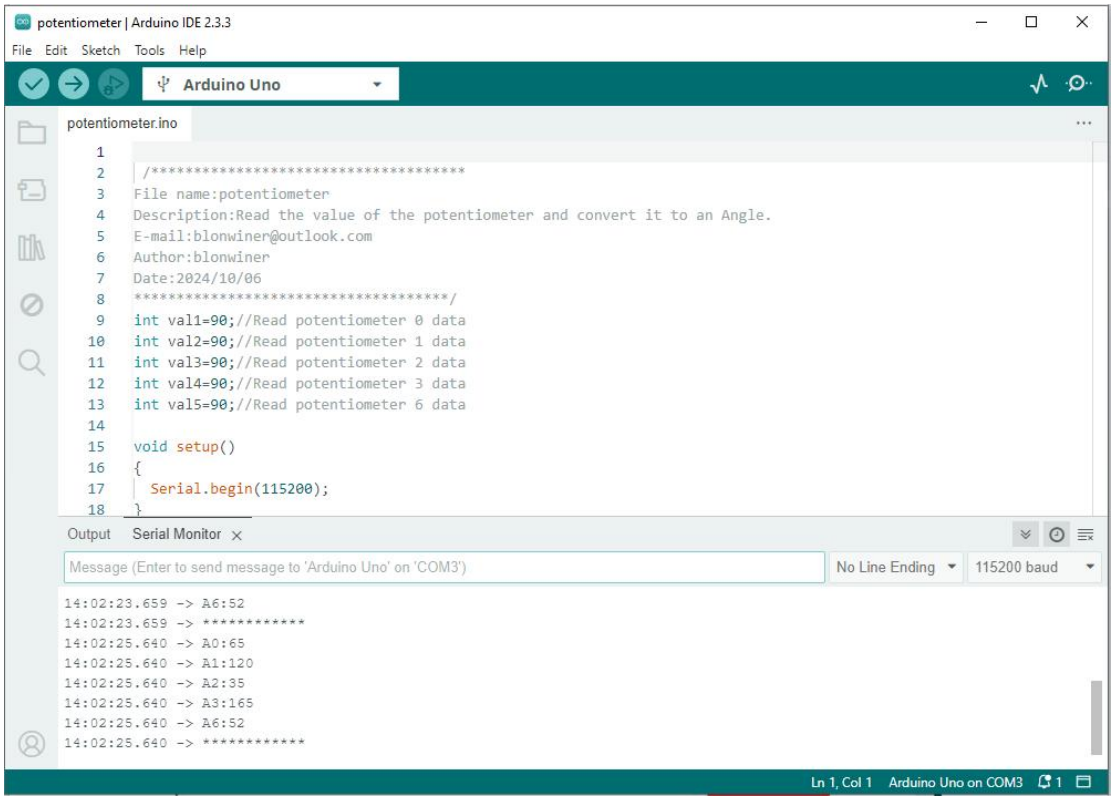
5.After opening, click  to upload the code program to the Arduino UNO. If there is no error warning in the console below, it means that the Upload is successful.



6. After successfully running the program, we need to observe the value of the potentiometer by opening the serial monitor and click  , as shown in the figure below:



Then open the serial monitor, you need to modify the displayed bit rate and the bit rate set in the code to 115200, so that the display will not appear garbled. You can observe the data changes corresponding to each button by rotating the buttons of A0, A1, A2, A3, and A6. When the buttons of A0, A1, A2, and A3 are rotated, the data change range is from 0 to 180. The data becomes smaller when rotating clockwise, and the data becomes larger when rotating counterclockwise. When the A6 button is rotated, the data change range is 35~90. When it is rotated clockwise, the data becomes smaller, and when it is rotated counterclockwise, the data becomes larger.



1.4.2 Learning the code program of this lesson

Initialize potentiometers A0, A1, A2, A3, A6.

```
int val1=90;//Read potentiometer 0 data
int val2=90;//Read potentiometer 1 data
int val3=90;//Read potentiometer 2 data
int val4=90;//Read potentiometer 3 data
int val5=90;//Read potentiometer 6 data

void setup()
{
  Serial.begin(115200);
}
```

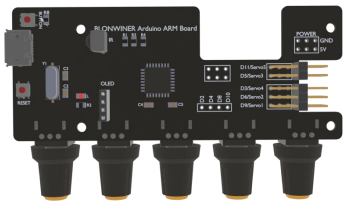
Convert the value of 1023 to 180 proportionally, and then print out the converted data to the serial monitor.

```
19  void loop()
20  {
21      val1 = map(analogRead(0), 0, 1023, 0, 180);
22      val2 = map(analogRead(1), 0, 1023, 0, 180);
23      val3 = map(analogRead(2), 0, 1023, 0, 180);
24      val4 = map(analogRead(3), 0, 1023, 0, 180);
25      val5 = map(analogRead(6), 0, 1023, 35, 90);
26      Serial.print("A0:");Serial.println(val1);
27      Serial.print("A1:");Serial.println(val2);
28      Serial.print("A2:");Serial.println(val3);
29      Serial.print("A3:");Serial.println(val4);
30      Serial.print("A6:");Serial.println(val5);
31      Serial.println("************");
32      delay(2000);
33  }
```

Lesson 2 Controlling the Servo

In this lesson, we will learn how to control the Servo.

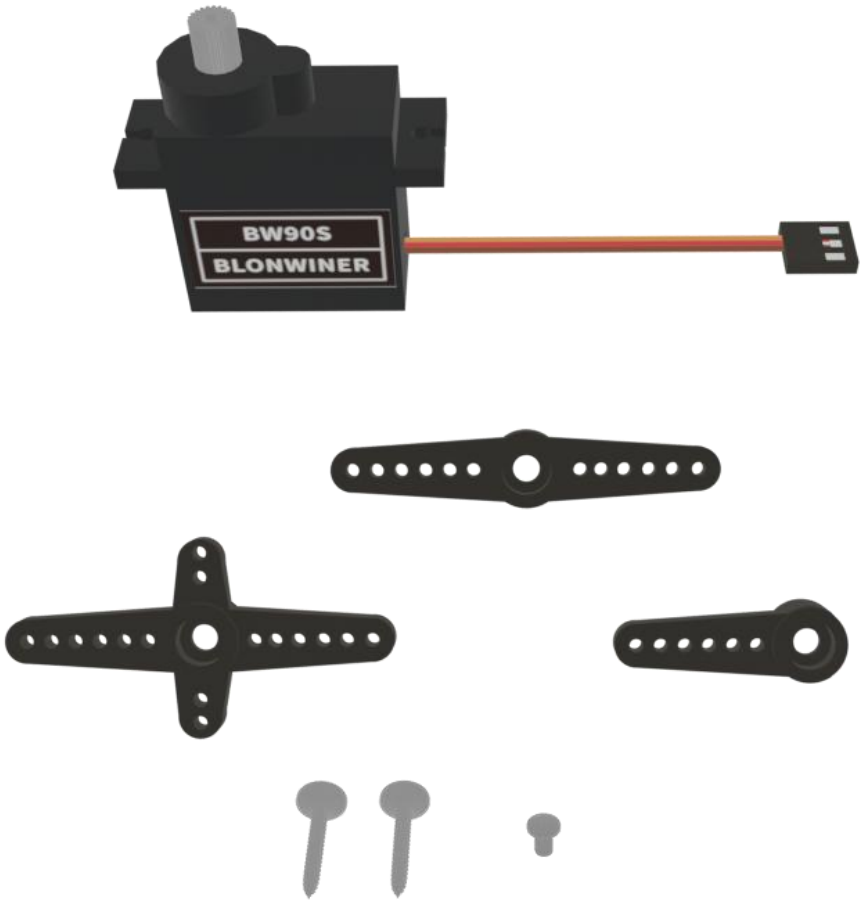
2.1 Components used in this course

Components	Quantity	Picture
BLONWINER Arduino Arm Board	1	
Micro USB Cable	1	
Servo	1	

2.2 The introduction of the Servo

2.2.1 Servo

Servo motor refers to the engine that controls mechanical component operation in the servo system. It is a kind of auxiliary motor indirect transmission device. The servo motor is a gear motor that can rotate only 180 degrees. It is controlled by sending pulses from the microcontroller. These pulses tell the server where to move. The servo motor system includes housing, circuit board, non-core motor, gearing and position detection. Servo motor is shown in the figure:

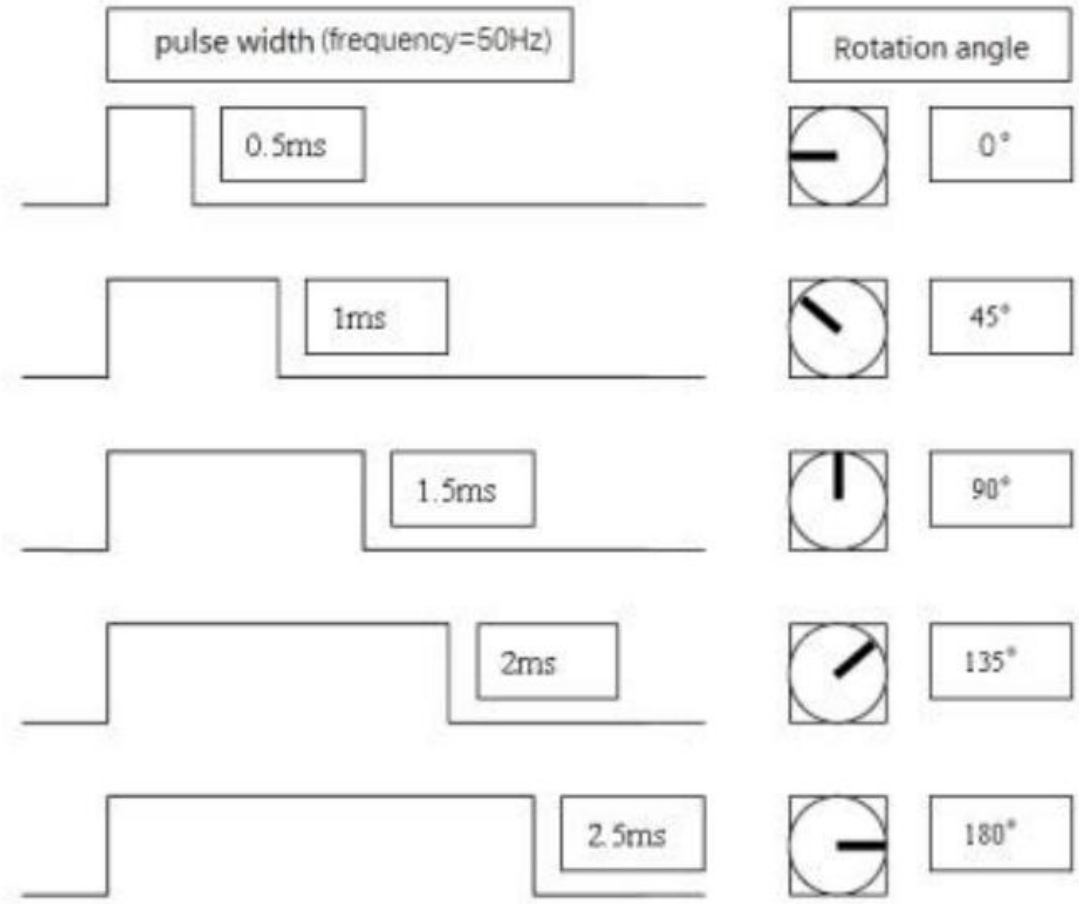


2.2.2 The working principle of the Servo

The servo mechanism is an automatic control system that enables the object's position, orientation, state and other output controlled quantities to follow arbitrary changes in the input target (or given value). The servo mainly depends on Pulsefor location. Basically, it can be understood that the servo motor receives an impulse and rotates the angle corresponding to the impulse to realize displacement. Because the servo motor itself has the function of sending out pulses, the servo motor rotates every time at an angle, and a corresponding number of pulses will be sent out. In this way, the pulses received by the servo motor form a response, or a closed loop. In this way, the system will know how many pulses are sent to the servo motor and how many pulses are received. In this way, it is possible to precisely control the rotation of the motor, thereby achieving precise positioning.

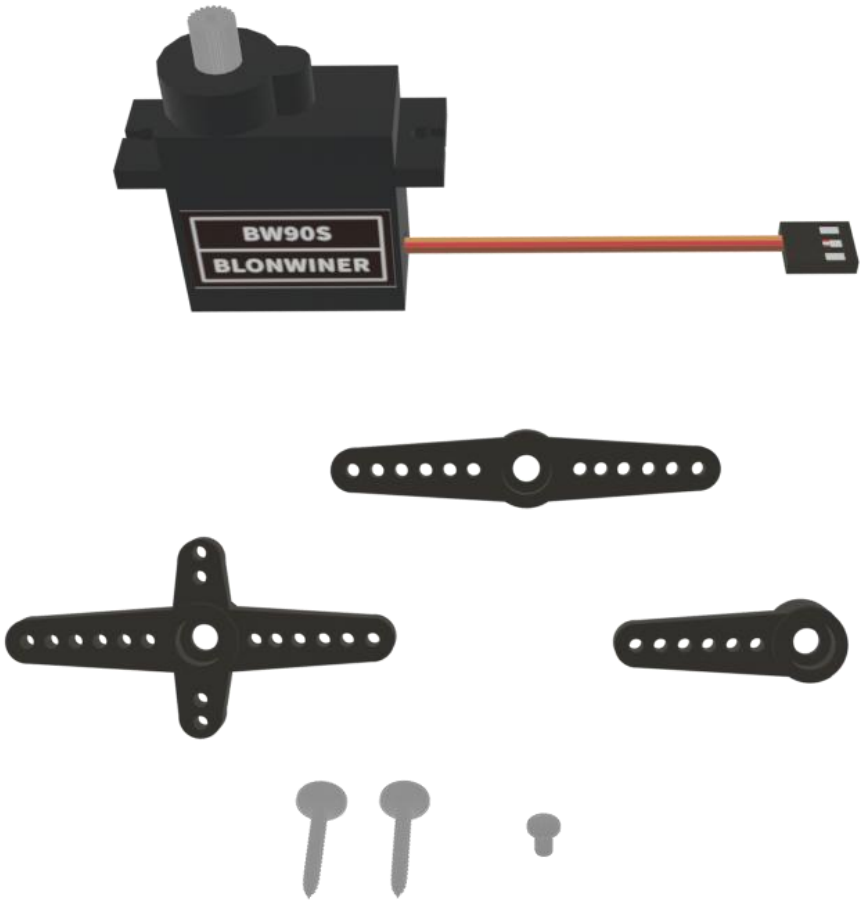
BLONWINER Arduino Arm Board sends a PWM signal to a servomotor, which is then processed by an IC on the circuit board to calculate the rotation direction of the drive motor, which is then transmitted through a reduction gear to the swing arm. At

the same time, the position detector returns a position signal to determine whether the set position has been reached or not.



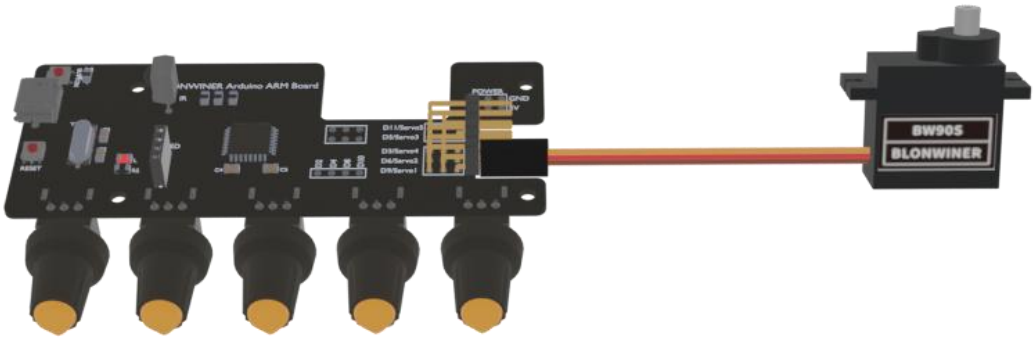
2.2.3 The principle of write () function

In the program, we use the write() function to control the rotation of the servo. For standard servos, the write() function will rotate the servo axis to the corresponding angular position. For the continuous rotation type of servo, the write() function can set the rotation speed of the servo (0 indicates that the servo rotates at full speed in one direction, 180 indicates that the servo rotates at full speed in another direction, and 90 indicates that the servo is stationary). The servo which is used this time is a standard servo.



2.3Wiring diagram (Circuit diagram)

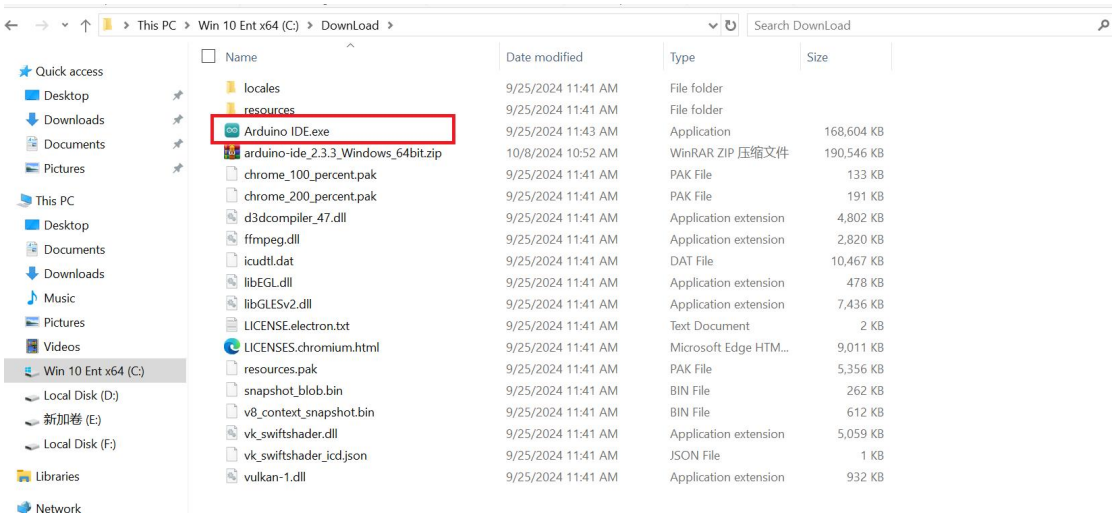
Connect Servo to the servo port on the BLONWINER Arduino Arm Board, as shown below:



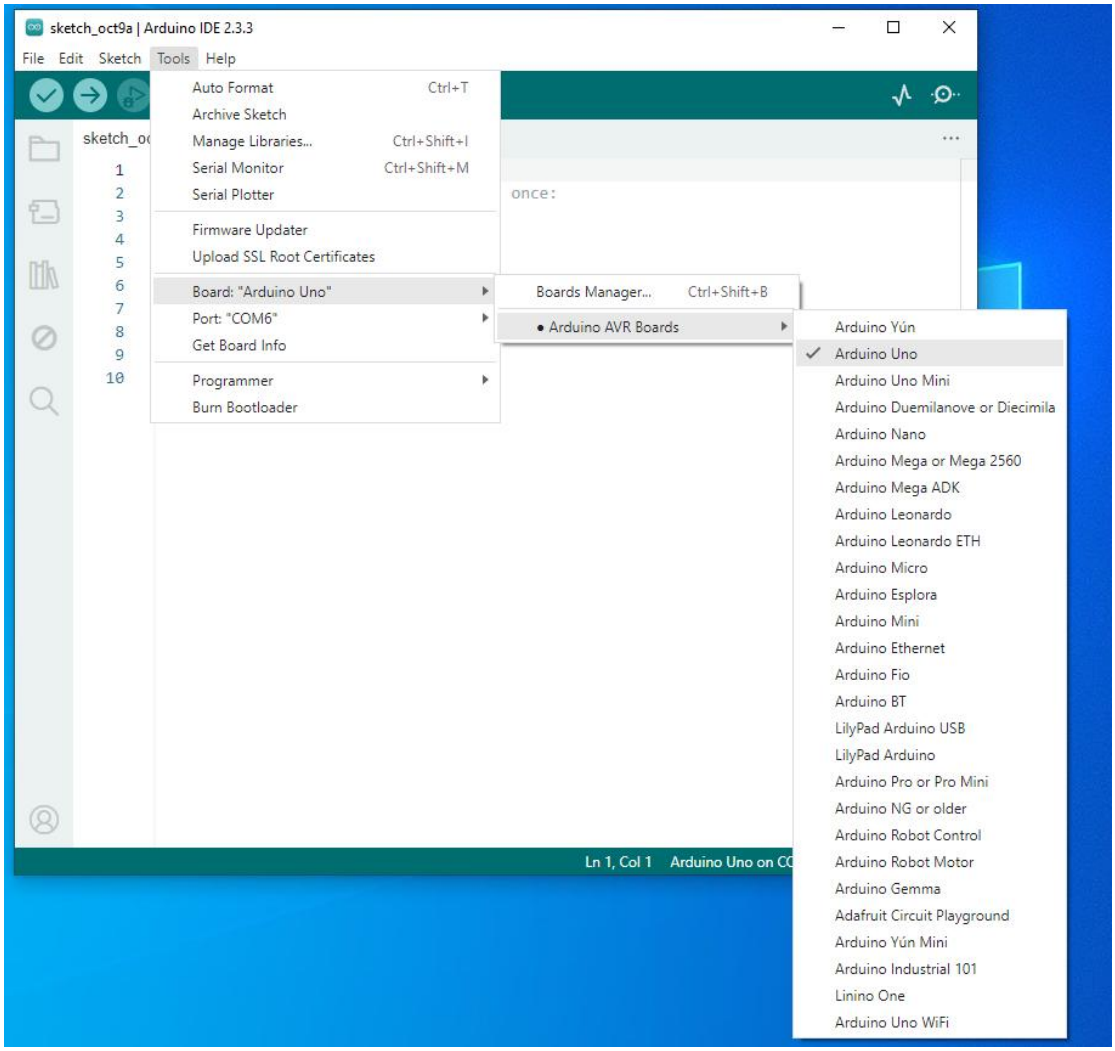
2.4 How to control Servo

2.4.1Compile and run the code program of this course

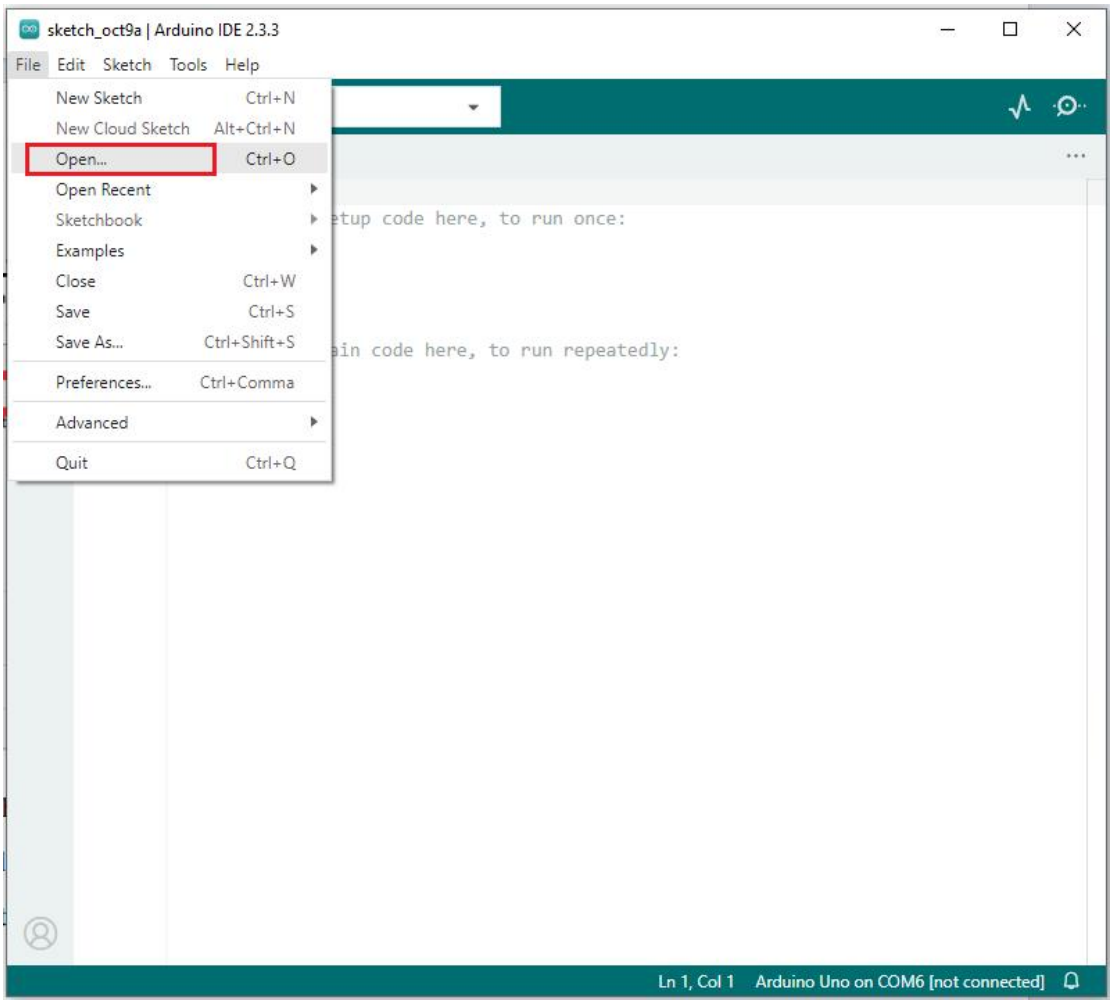
1.Open the Arduino IDE software, as shown below:



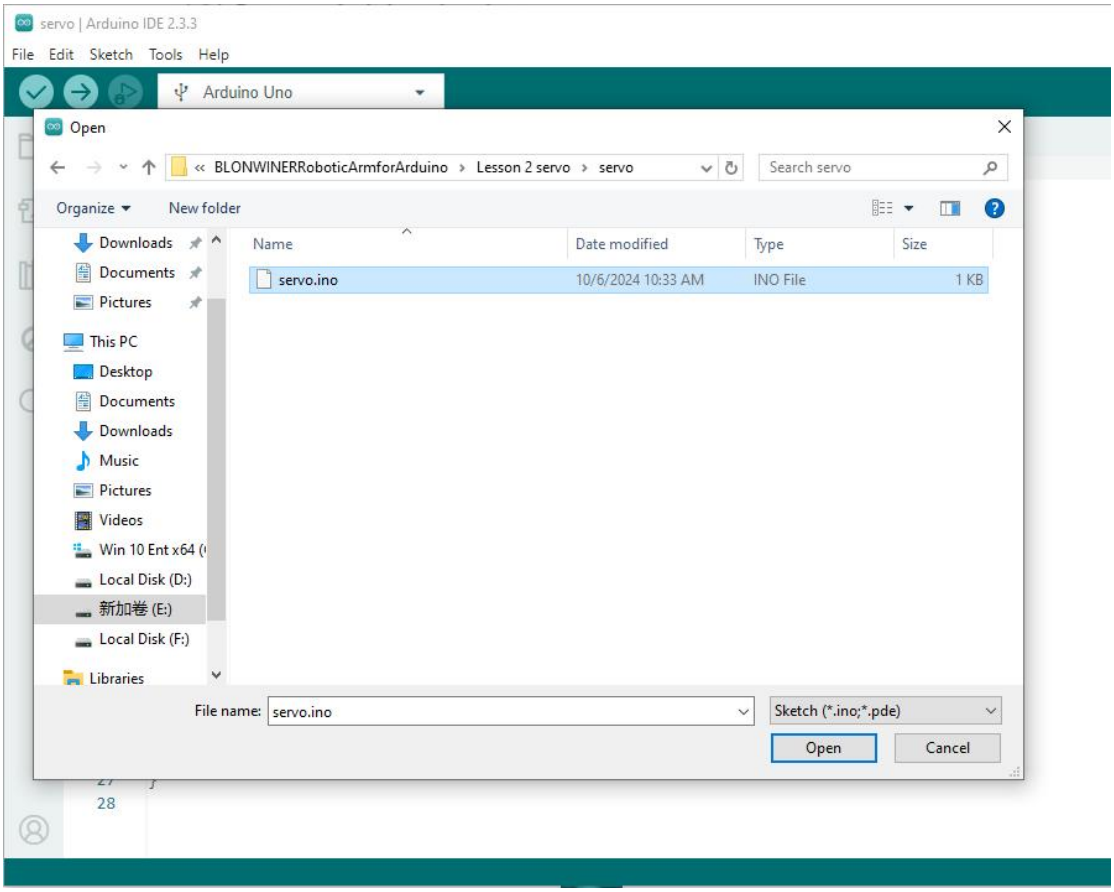
2. In the Tools toolbar, find Board and select Arduino Uno, as shown below:



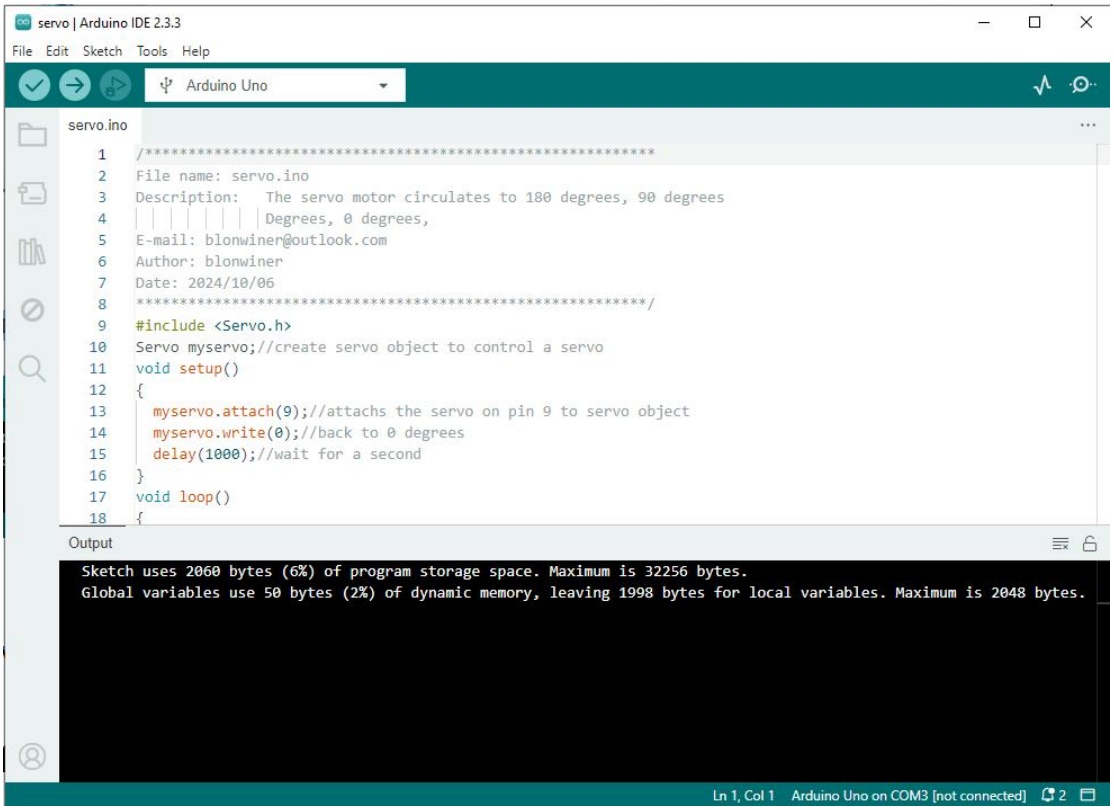
3.Click Open in the File drop-down menu:



4.Find the folder BLONWINERRoboticArmforArduino that we provide to the user. Enter the Lesson 2 servo directory. Select servo.ino. This file is the code program we need in this course. Then click Open.



5.After opening, click  to upload the code program to the Arduino UNO. If there is no error warning in the console below, it means that the Upload is successful.



6. After successfully running the program, you will observe the movement of the servo.

2.4.2 Learning the code program of this lesson

Create servo object to control a servo.

```
10  Servo myservo;//create servo object to control a servo
```

In the setup() function, attach the servo on pin 9 to servo object; back to 0 degrees; wait for a second.

```
11  void setup()
12  {
13    myservo.attach(9);//attachs the servo on pin 9 to servo object
14    myservo.write(0);//back to 0 degrees
15    delay(1000);//wait for a second
16  }
```

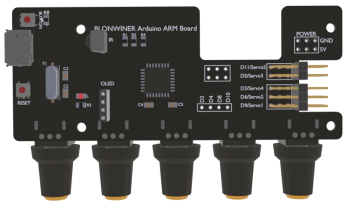
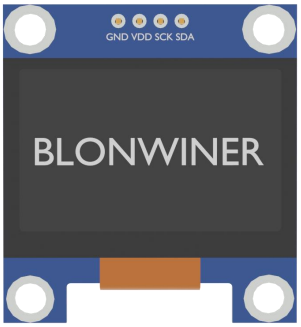
In the loop() function, respectively control Servo to turn to different angles.

```
17  void loop()
18  {
19    myservo.write(180);//goes to 15 degrees
20    delay(2000);//wait for a second
21
22    myservo.write(90);//goes to 30 degrees
23    delay(2000);//wait for a second.33
24
25    myservo.write(0);//goes to 45 degrees
26    delay(2000);//wait for a second.33
27  }
```

Lesson 3 Displaying Text on the OLED Screen

In this lesson, we will learn how to display text on the OLED screen.

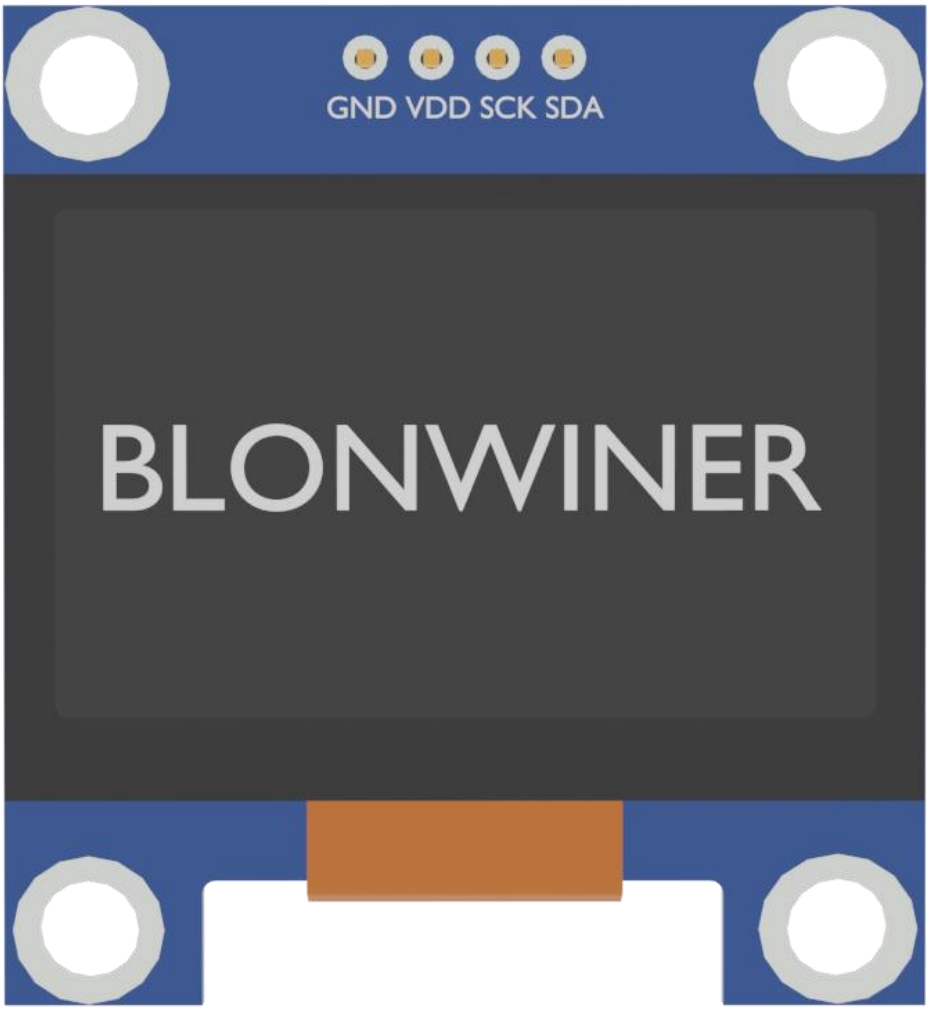
3.1 Components used in this course

Components	Quantity	Picture
BLONWINER Arduino Arm Board	1	
Micro USB Cable	1	
OLED screen	1	

3.2 Introduction of OLED Screen

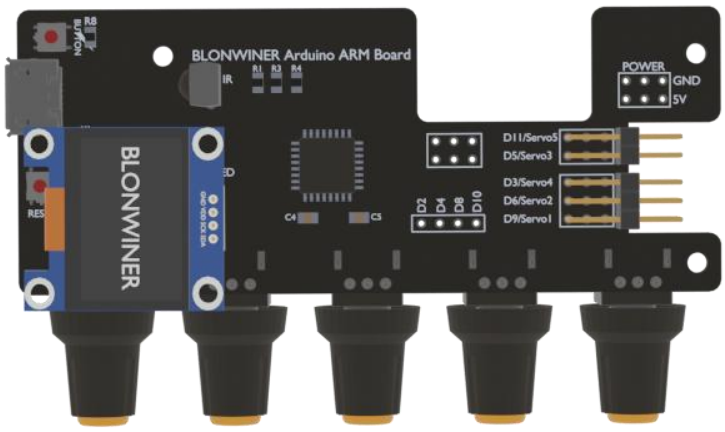
OLED (Organic Light-Emitting Diode), also known as organic electric laser display, organic light emitting semiconductor (Organic Electroluminesence Display, OLED). OLED is a kind of current-type organic light-emitting device, which produces light by the injection and recombination of carriers, and the luminous intensity is proportional to the injected current. The robot uses an OLED screen to display the expressions or some parameters of the robot. OLED Screen is a commonly used module on robot products. Due to the black non-luminous feature of OLED Screen, this type of screen has extremely high contrast. Even if the ambient light is strong, you can see the information on the OLED Screen clearly, and the power consumption is relatively low.

When using the OLED Screen, you need to connect it to the OLED interface on the BLONWINER Arduino Arm Board.



3.3 Wiring diagram (Circuit diagram)

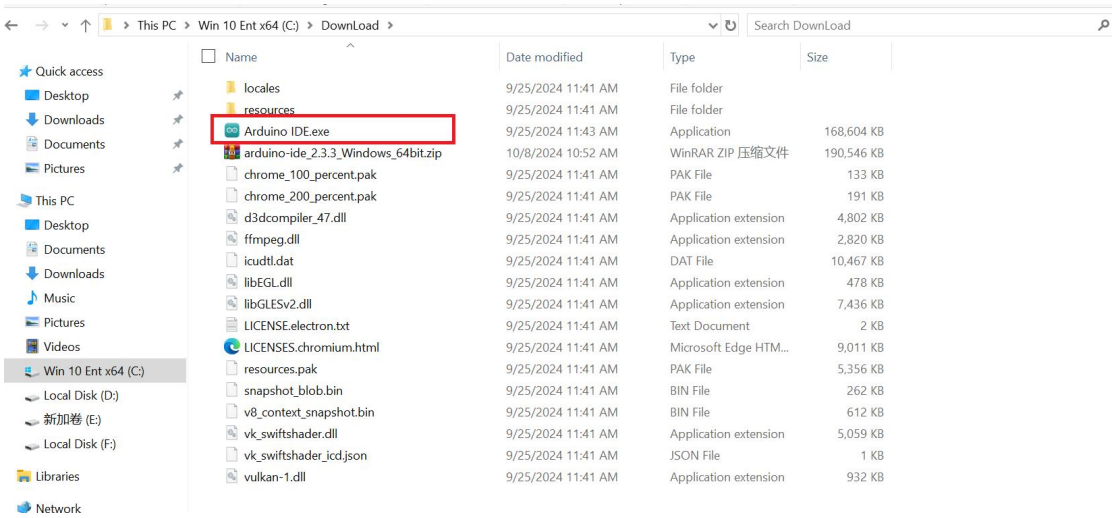
You need to connect it to the OLED interface on the BLONWINER Arduino Arm Board. As shown below:



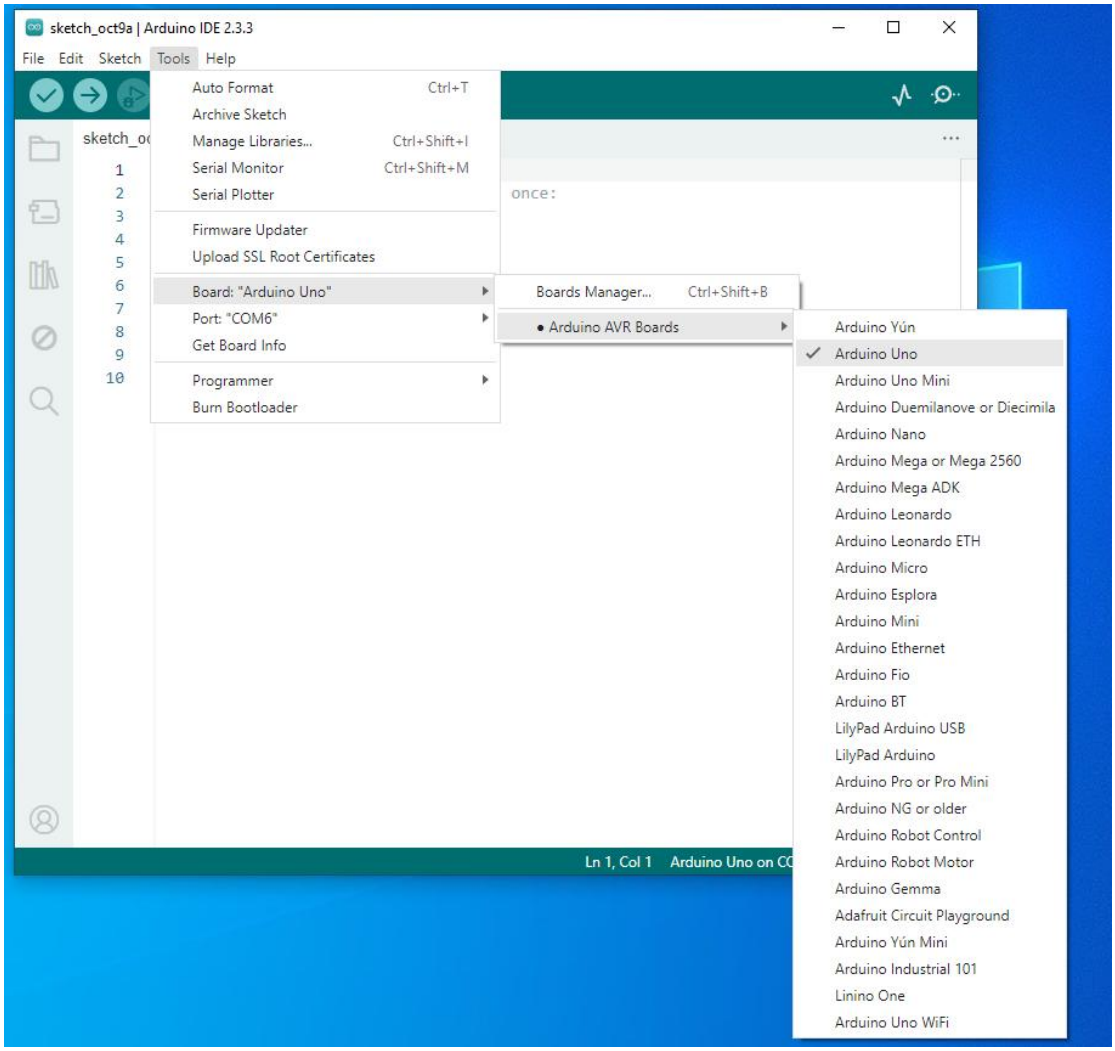
3.4 How to display text on the OLED screen

3.4.1 Compile and run the code program of this course

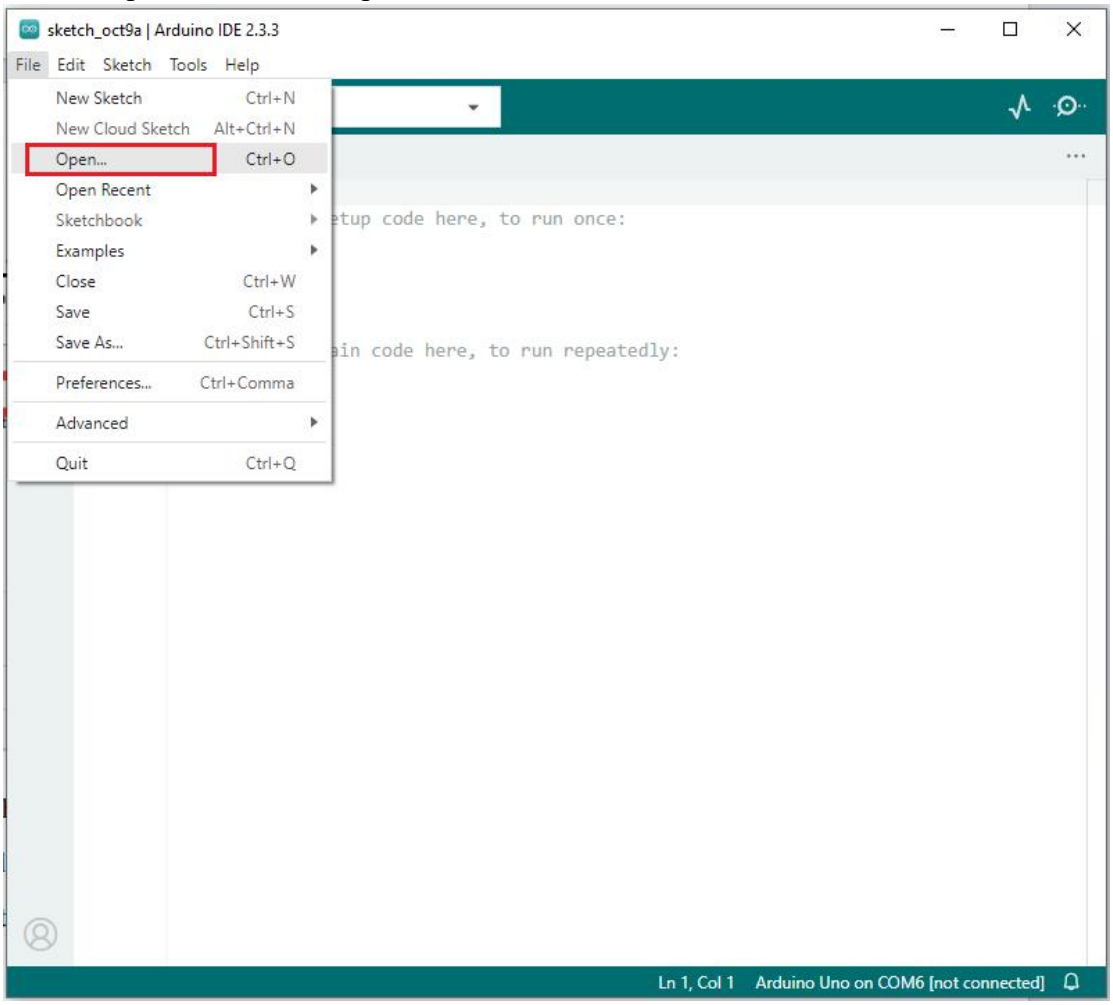
1.Open the Arduino IDE software, as shown below:



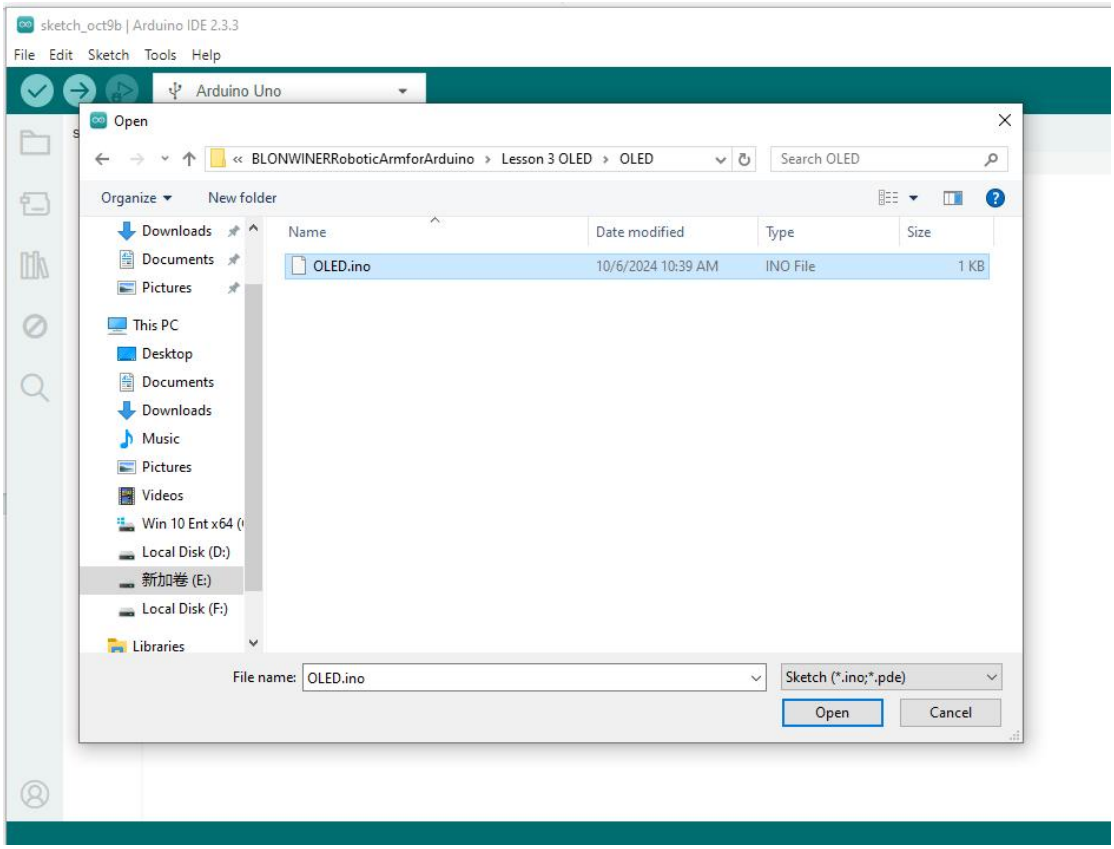
2. In the Tools toolbar, find Board and select Arduino Uno, as shown below:



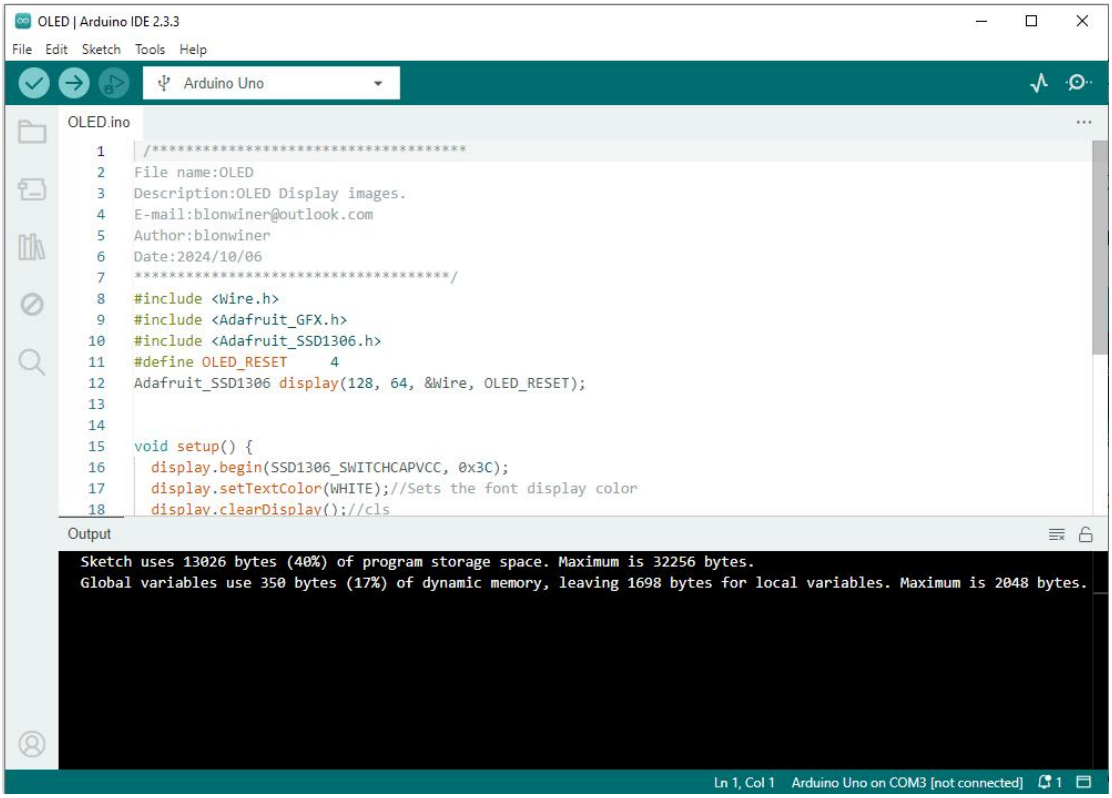
3.Click Open in the File drop-down menu:



4.Find the folder BLONWINERRoboticArmforArduino that we provide to the user. Enter the Lesson 3 OLED directory. Select OLED.ino. This file is the code program we need in this course. Then click Open.



5.After opening, click  to upload the code program to the Arduino UNO. If there is no error warning in the console below, it means that the Upload is successful.



6. After successfully running the program, you will observe that text will be displayed on the OLED screen.

3.4.2 Learning the code program of this lesson

After the above practical operation, you must be very curious to know how we use C language to program on the BLONWINER Arduino Arm Board to display text on the OLED screen. Below we will introduce how the main code program is implemented. First, in the setup() function, set the display color of the font to white.

```
15  void setup() {
16    display.begin(SSD1306_SWITCHCAPVCC, 0x3C);
17    display.setTextColor(WHITE);//Sets the font display color
18    display.clearDisplay();//cls
19  }
```

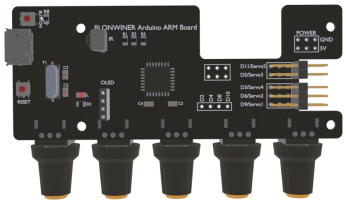
In the loop() function, set the display font size with setTextSize(1); setCursor(30,30) sets the position of the text displayed on the OLED screen, and print("Hello") prints out the text information that needs to be displayed.

```
21  void loop() {
22    //Set the font size
23    display.setTextSize(2);
24    //Set the display location
25    display.setCursor(30,30);
26    //String displayed
27    display.print("Hello");
28    //Began to show
29    display.display();
30  }
```

Lesson 4 Saving Data with EEPROM

In this lesson, we will learn how to save data with EEPROM.

4.1 Components used in this course

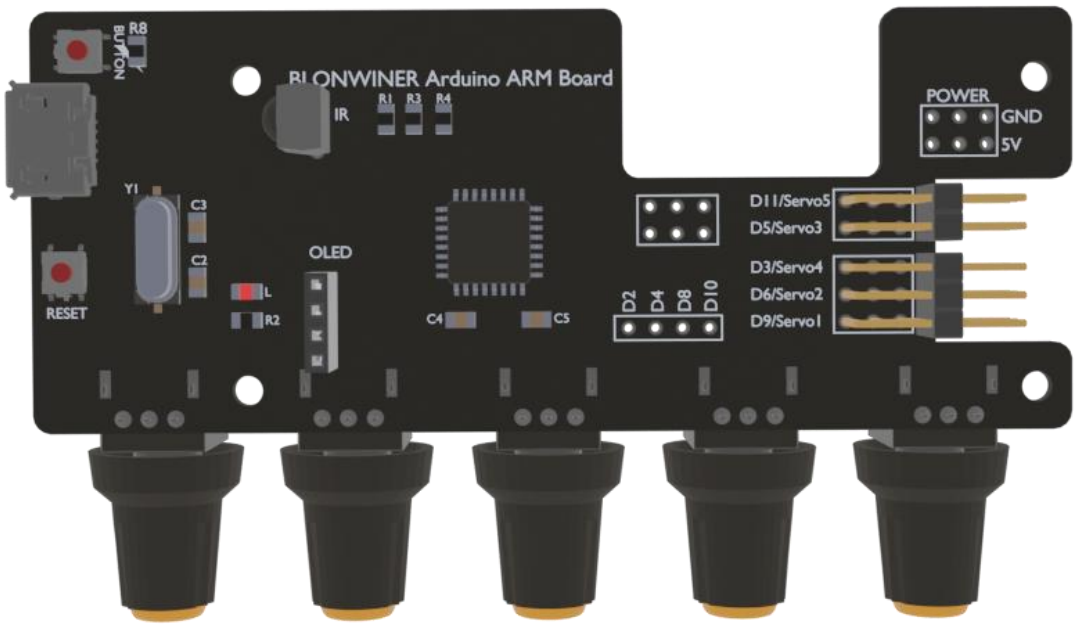
Components	Quantity	Picture
BLONWINER Arduino Arm Board	1	
Micro USB Cable	1	

4.2 About EEPROM

EEPROM (Electrically Erasable Programmable Read Only Memory) refers to electrically erasable programmable read only memory. It is a memory chip that does not lose data after power failure. EEPROM can erase existing information on a computer or special equipment and reprogram it.It is generally used in plug and play.
The BLONWINER Arduino Arm Board has its own EEPROM, and its memory size is 1K.
Arduino IDE comes with EEPROM usage method. The Arduino library has prepared EEPROM library for us.You can directly call EEPROM.h in the code when you are using the EEPROM library.And then use the write() and read() methods to operate the EEPROM.

4.3 Wiring diagram (Circuit diagram)

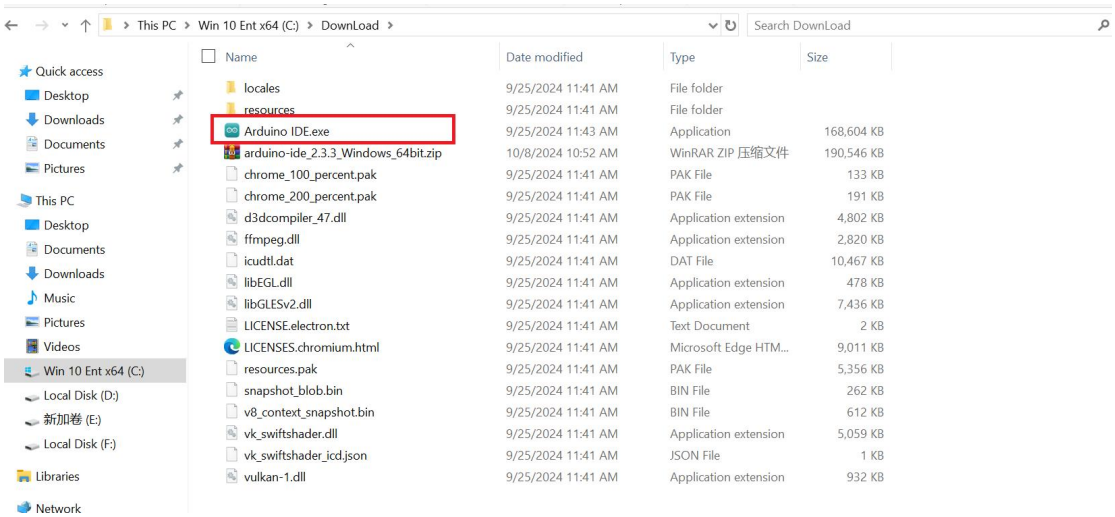
You need to connect it to the OLED interface on the BLONWINER Arduino Arm Board. As shown below:



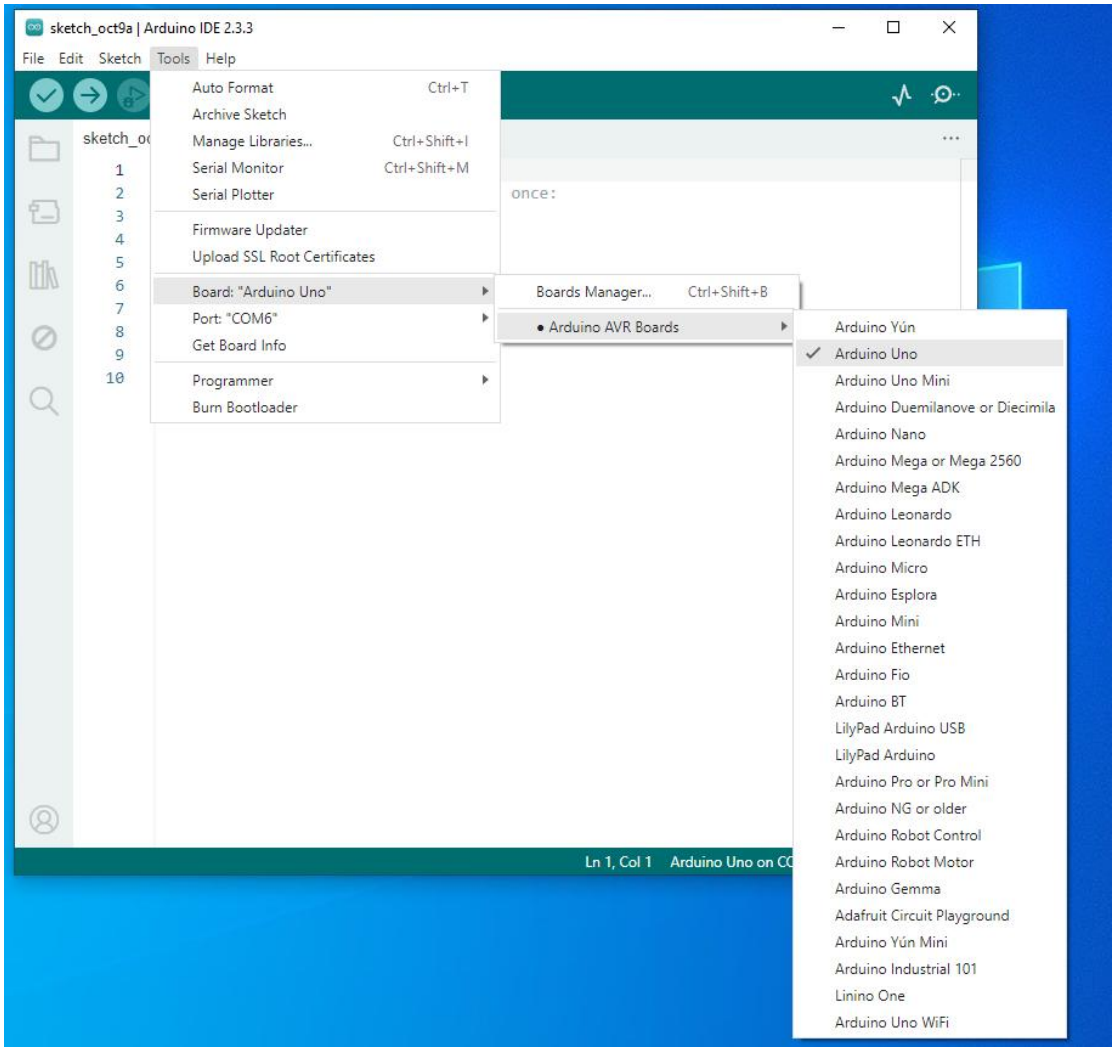
4.4 How to use EEPROM to save data

4.4.1 Compile and run the code program of this course

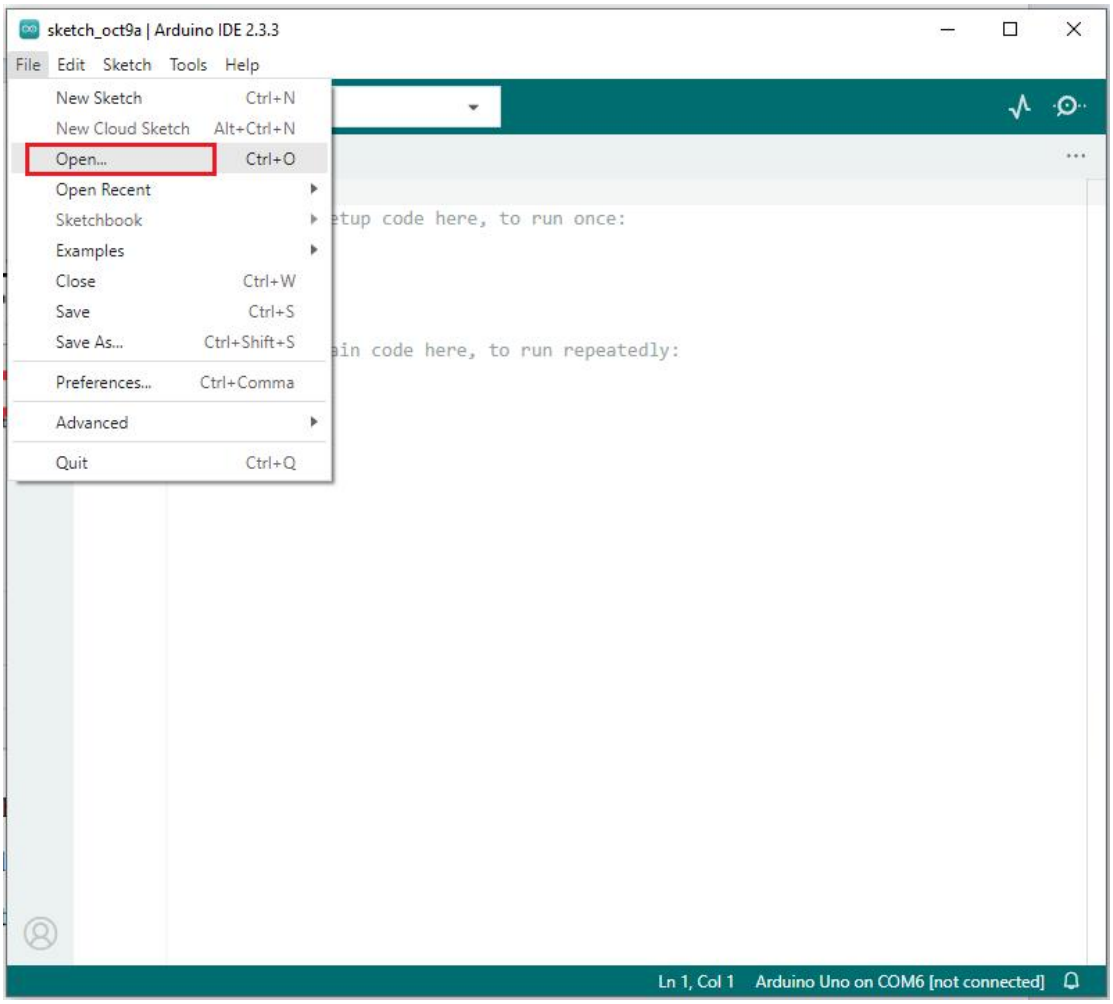
1.Open the Arduino IDE software, as shown below:



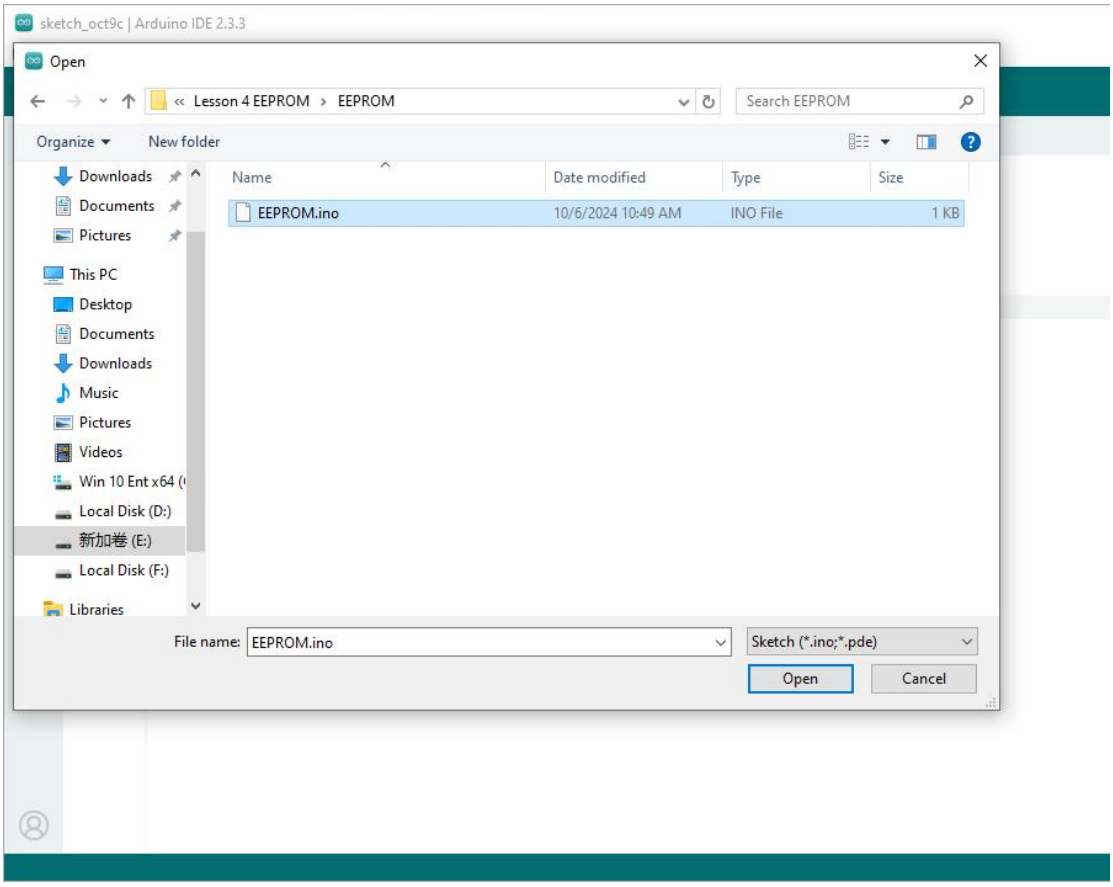
2. In the Tools toolbar, find Board and select Arduino Uno, as shown below:



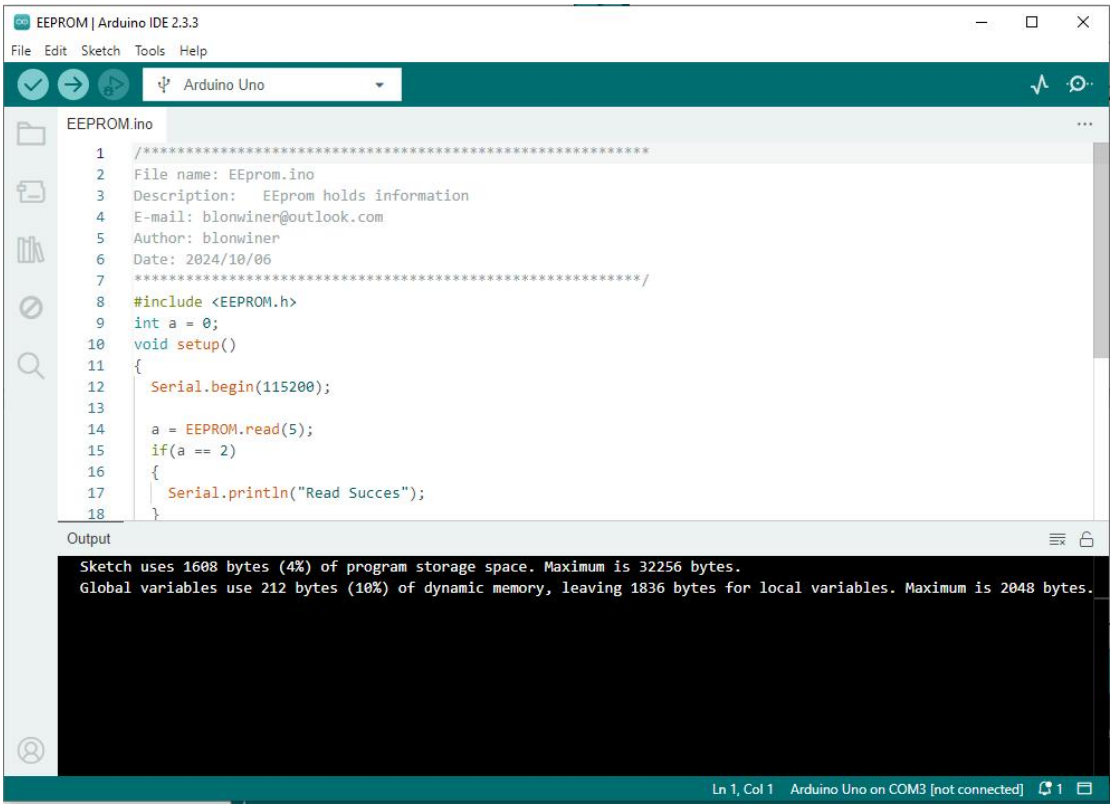
3.Click Open in the File drop-down menu:



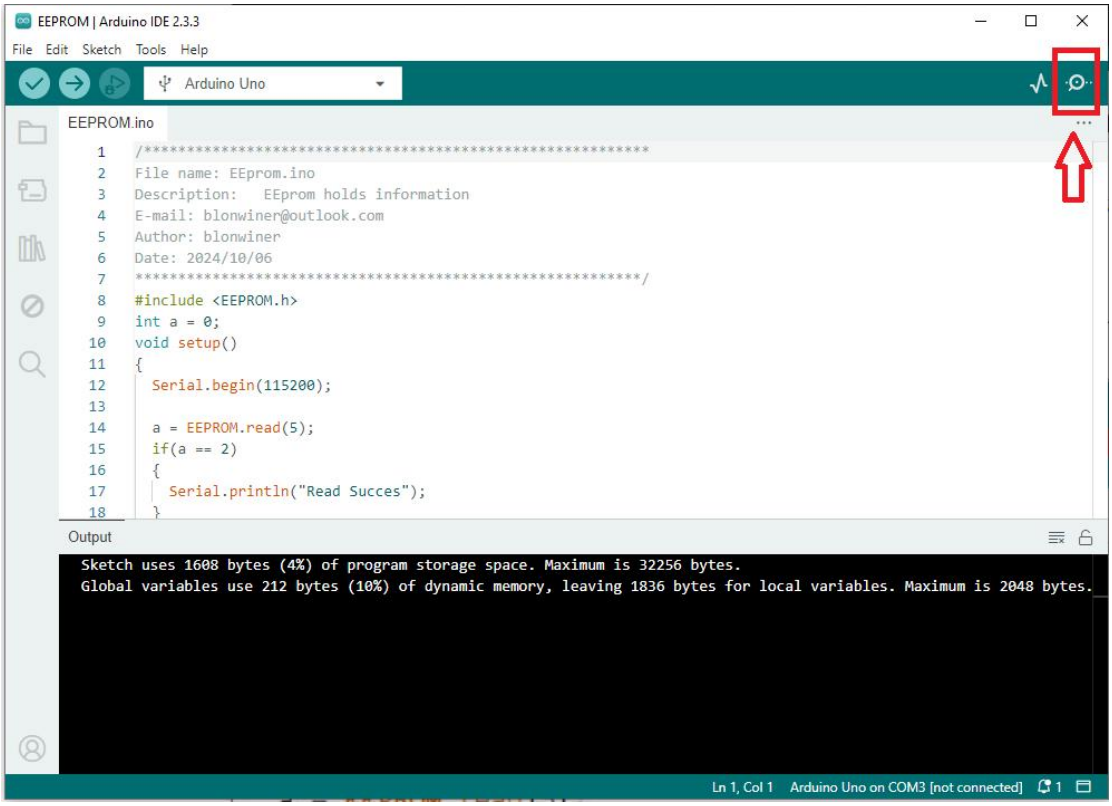
4.Find the folder BLONWINERRoboticArmforArduino that we provide to the user. Enter the Lesson 4 EEPROM directory. Select EEPROM.ino. This file is the code program we need in this course. Then click Open.



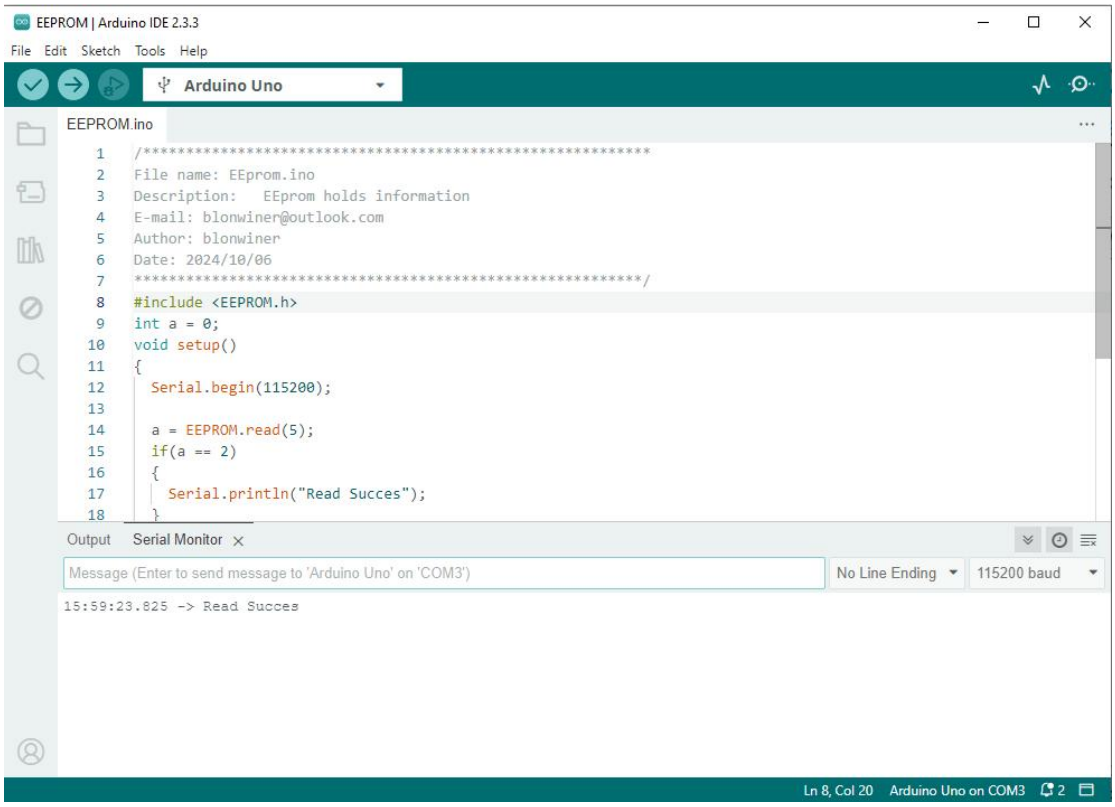
5.After opening, click  to upload the code program to the Arduino UNO. If there is no error warning in the console below, it means that the Upload is successful.



6. After successfully running the program, we need to observe the value of the potentiometer by opening the serial monitor and click  , as shown in the figure below:



You will see the returned information in the serial monitor: Read Succes, indicating that the data has been saved successfully.



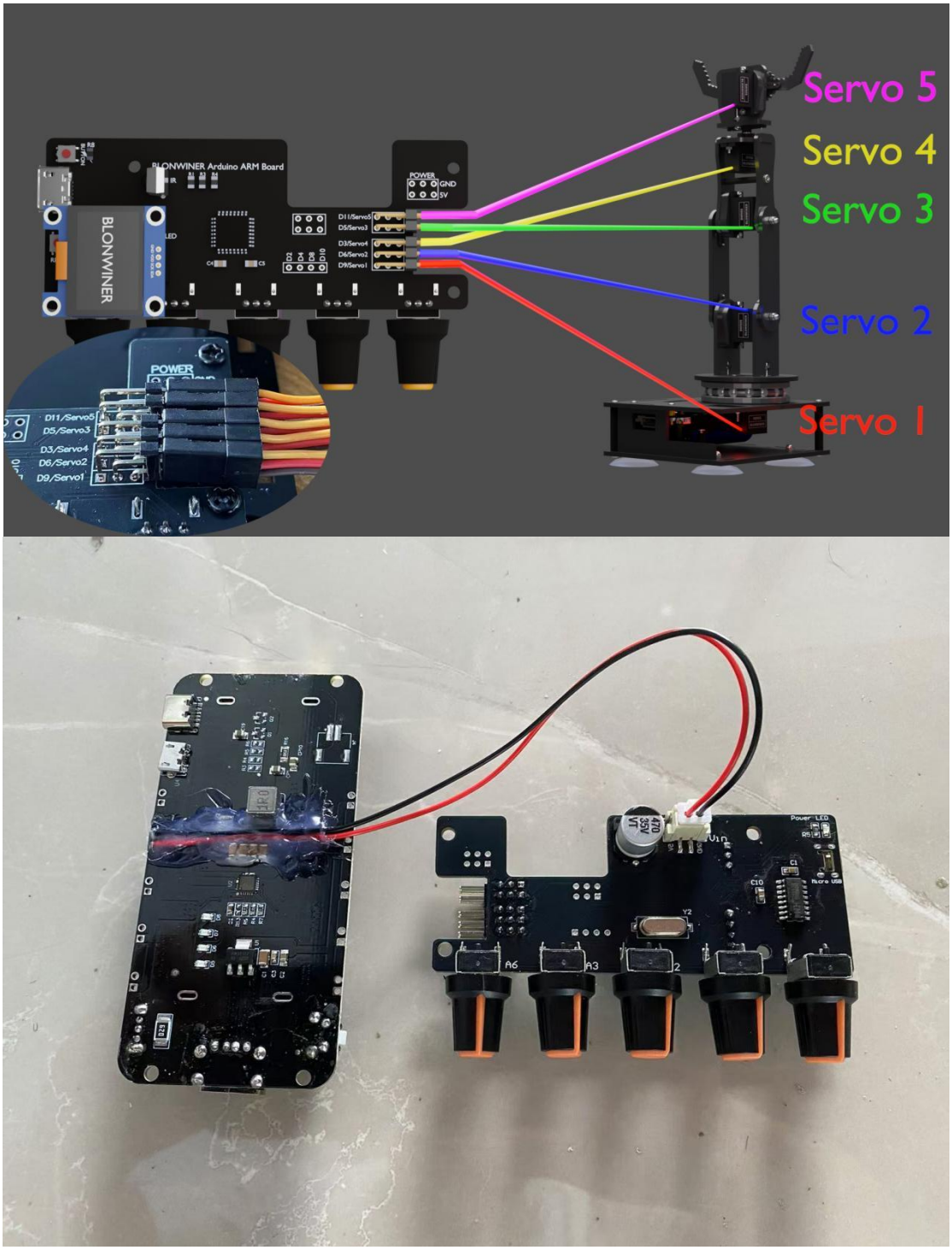
4.4.2 Learning the code program of this lesson

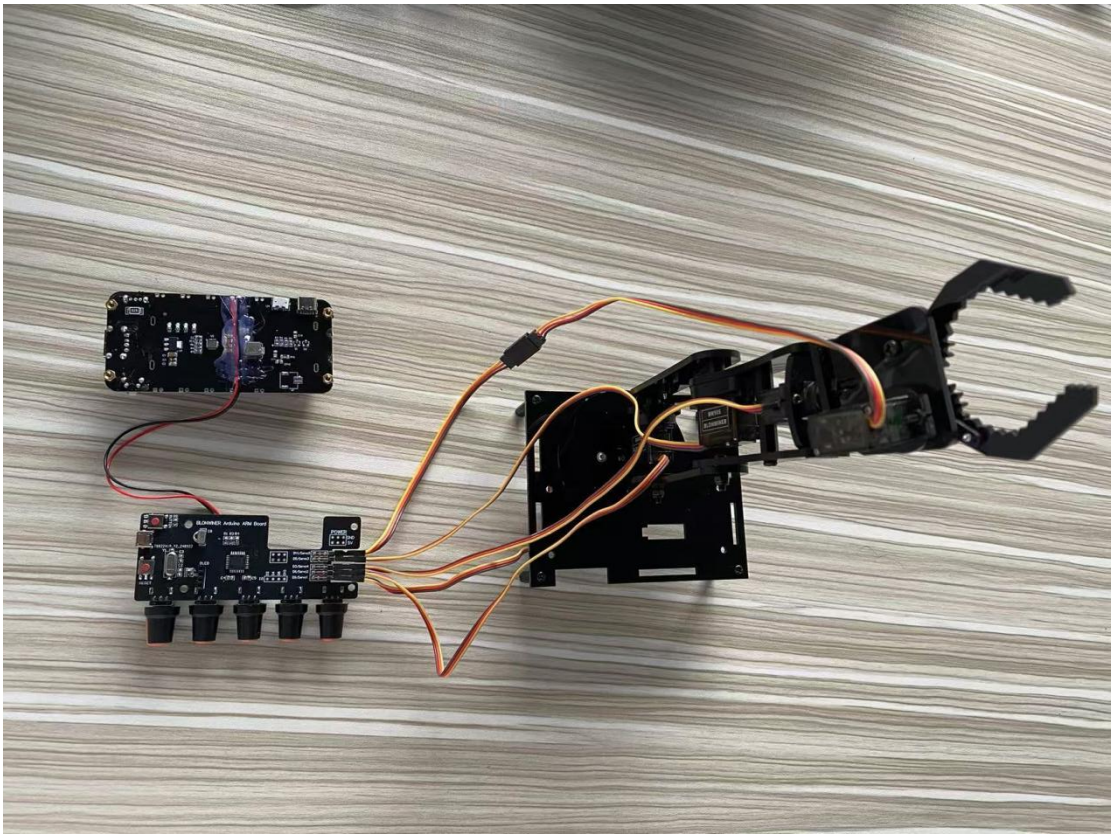
After the above practical operation, you must be very curious to know how we use C language to program on the BLONWINER Arduino Arm Board to save data with EEPROM. Below we will introduce how the main code program is implemented.

In the setup() function, first initialize the serial monitor, EEPROM.read(5) reads the data, and judges by if, if the read data is 2, then it is saved successfully.

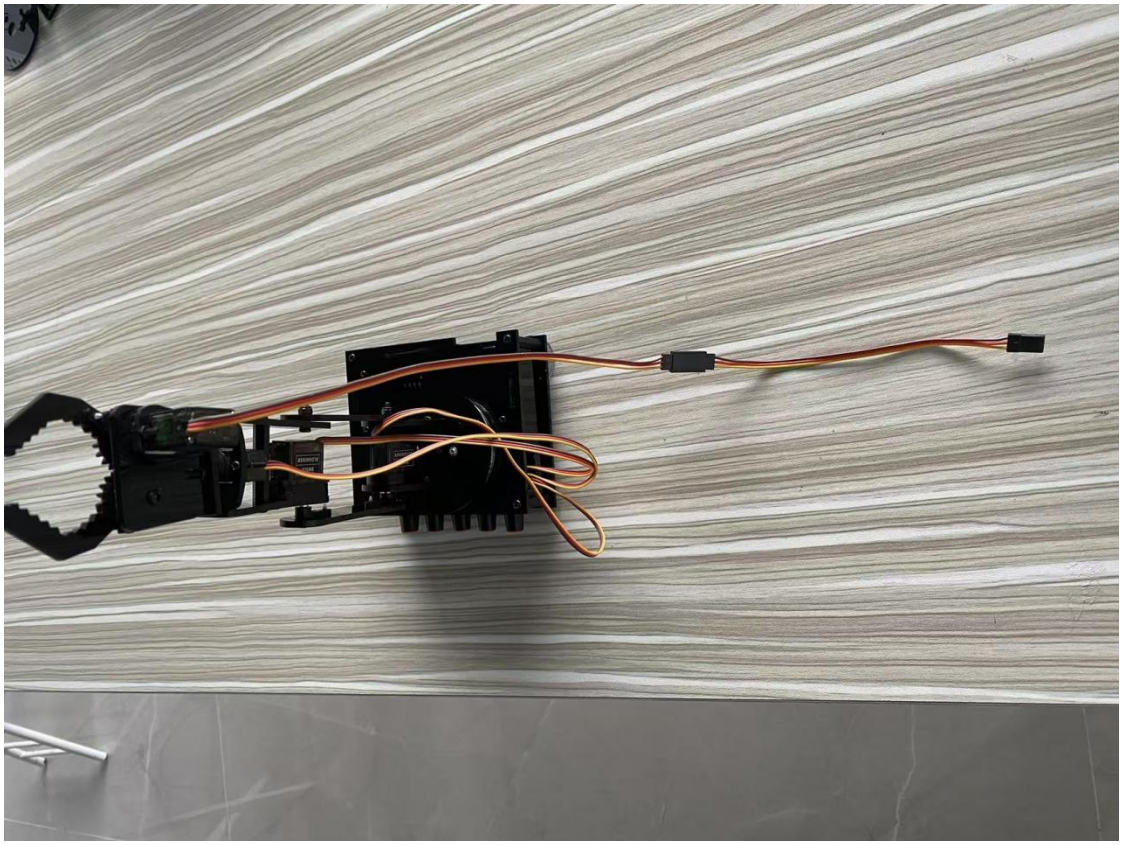
```
10  void setup()
11  {
12    Serial.begin(115200);
13
14    a = EEPROM.read(5);
15    if(a == 2)
16    {
17      Serial.println("Read Succes");
18    }
19    else
20    {
21      Serial.println("Read Failed");
22      EEPROM.write(5,2);
23
24    }
25
26  }
```

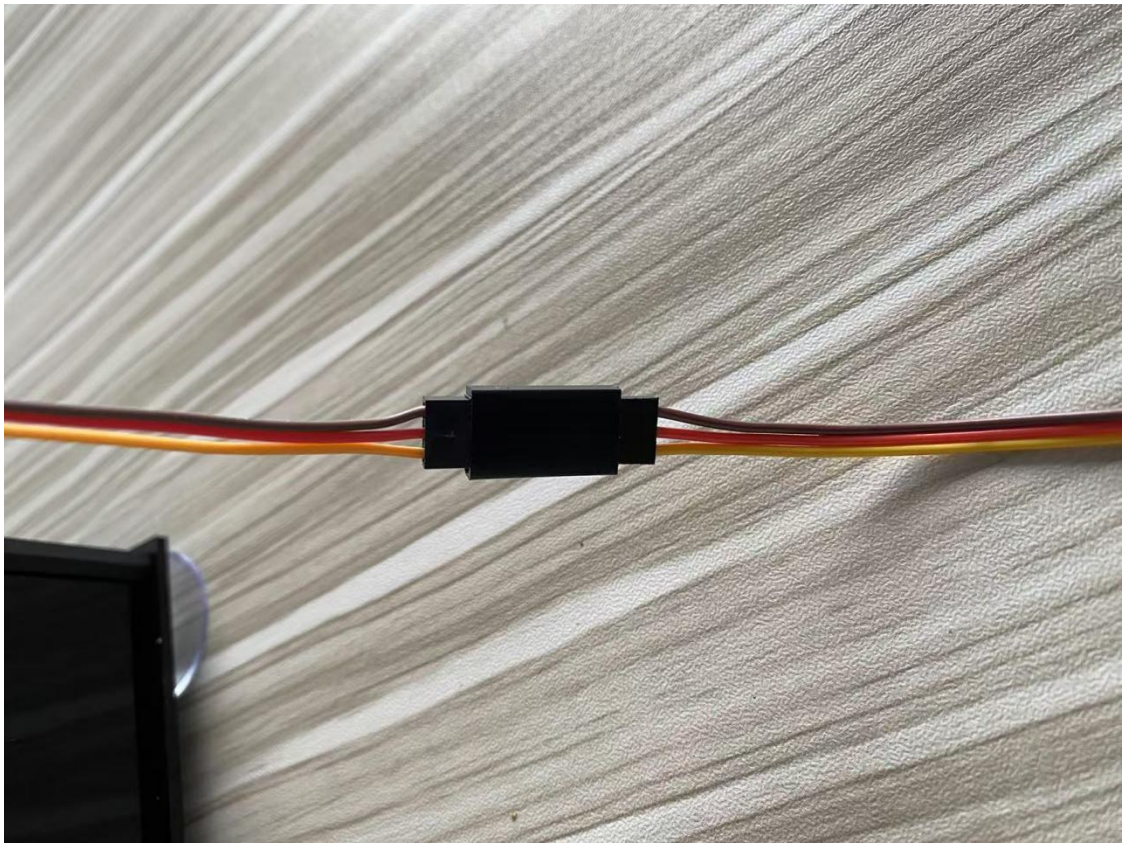
Diagram of the robot circuit connection





The servo extension cable is used on the servo 5.



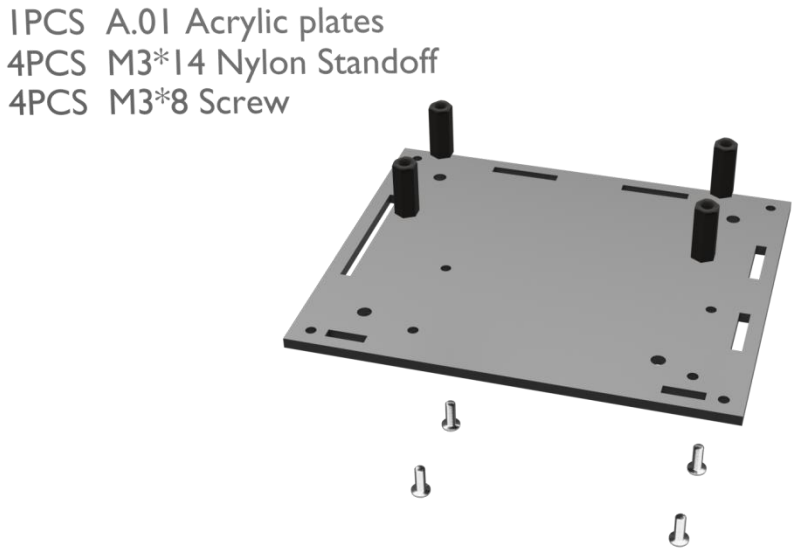


How to Assemble the Robotic Arm

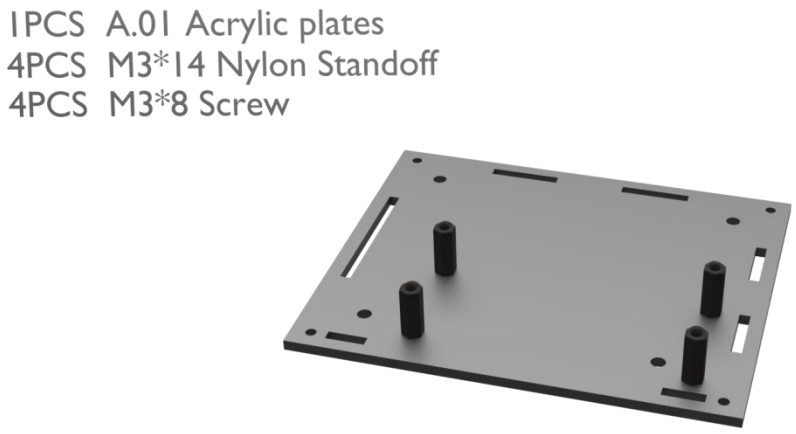
Pedestal Assembly

1.Fix the four M3*14 nylon standoffs posts and four M3*8 screws on the A01.

Assemble the following components



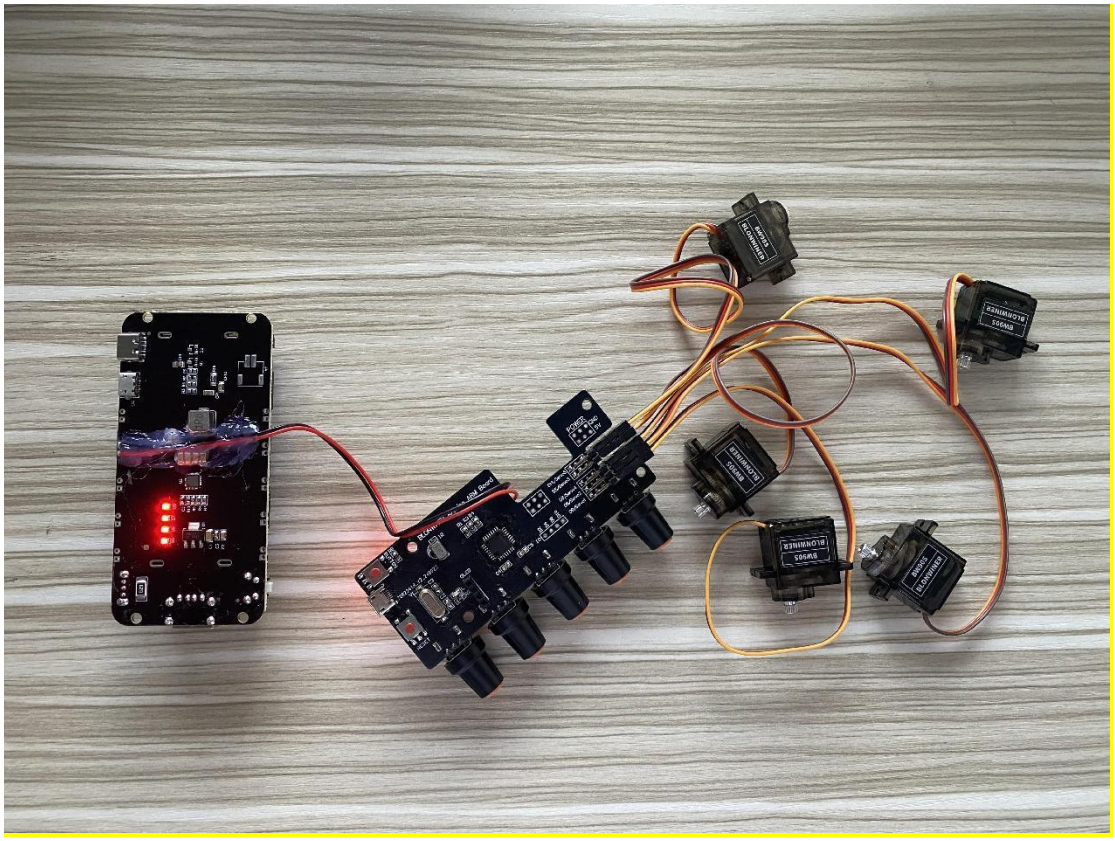
Effect diagram after assembling



Note:

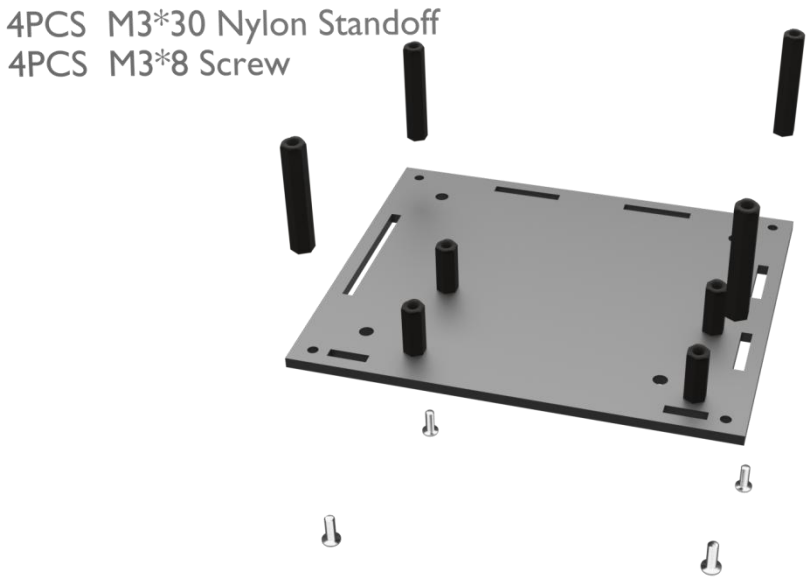
To assemble the robot, you need to download the code in Lesson 0 The servo initialization code of robotic arm assembly and let the servos run to 90° .

blonwiner@outlook.com



2.Fix the four M3*30 nylon standoffs posts and four M3*8 screws on the A01.

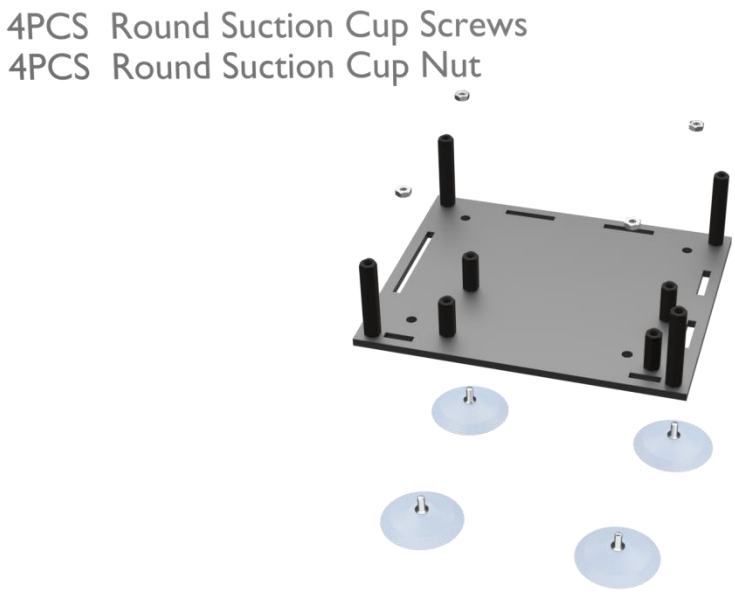
Assemble the following components



Effect diagram after assembling

3.Fix four round suction cup on the four corners of A01.

Assemble the following components

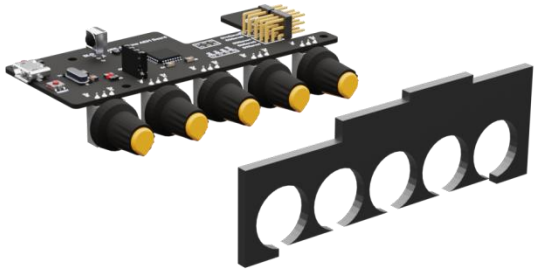


Effect diagram after assembling

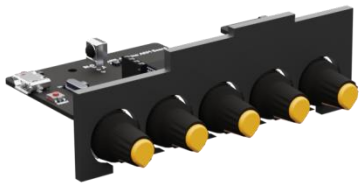
4.Fix BLONWINER Arduino ARM Board on A.06.

Assemble the following components

1PCS BLONWINER Arduino ARM Board
1PCS A.06 Acrylic plates

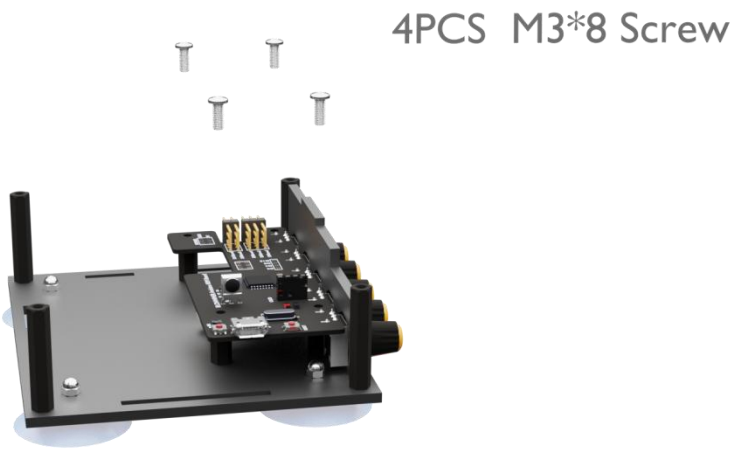


Effect diagram after assembling

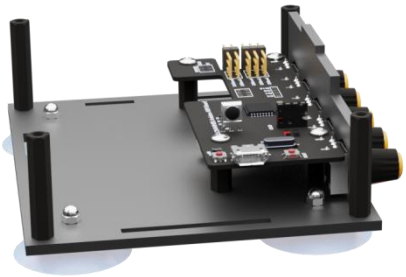


5.Fix BLONWINER Arduino ARM Board and A.06 on A.01.

Assemble the following components



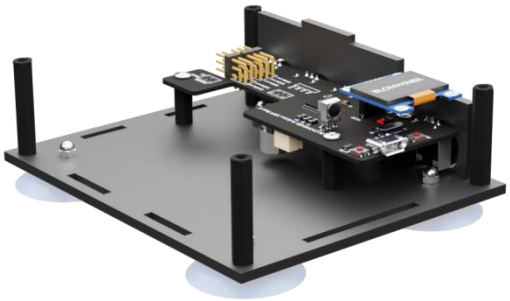
Effect diagram after assembling



6.Fix OLED module on BLONWINER Arduino ARM Board.

Assemble the following components

Effect diagram after assembling



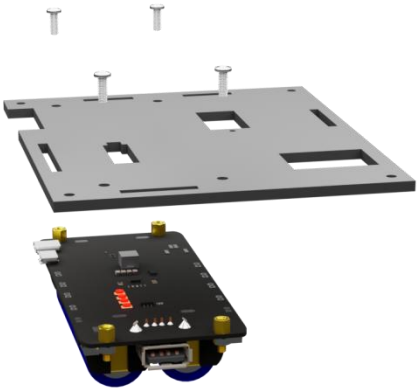
7.Fix four M2.5*4+6 copper standoff and four M2.5 nylon on power module.

Assemble the following components

Effect diagram after assembling

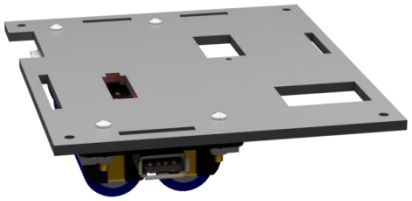
8.Fix four M2.5*8 screw and A.02 on power module.

Assemble the following components



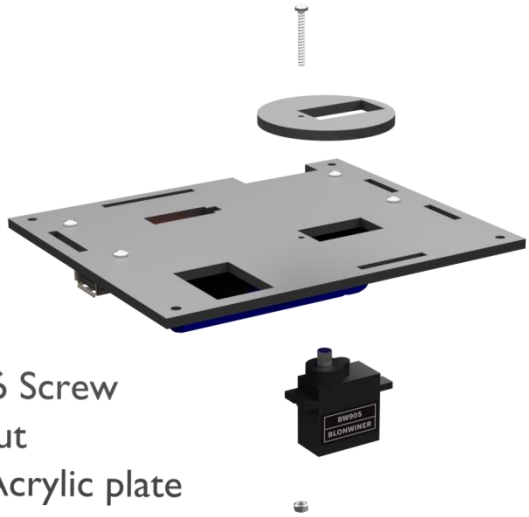
4PCS M2.5*8 Screw
1PCS Acrylic plate

Effect diagram after assembling

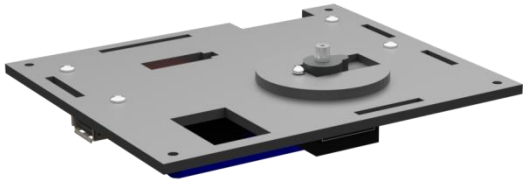


9.Fix M2*16 screw, M2 nut, B.01 and BLONWINER servo on A.02.

Assemble the following components

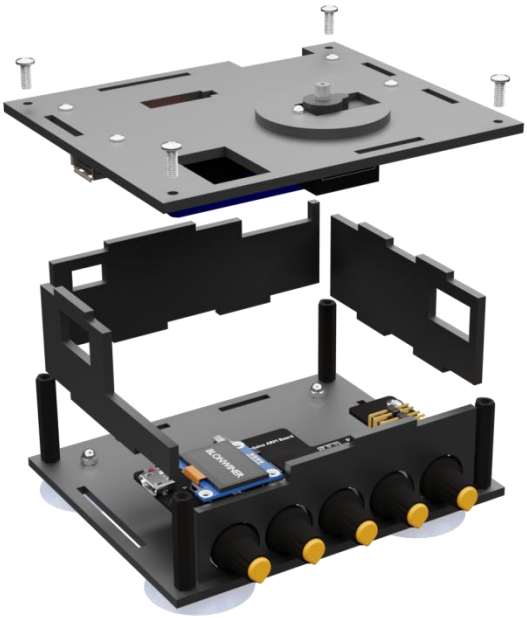


Effect diagram after assembling



10.Fix four M3*8 screw, A.03, A.04 and A.05 servo on A.02.

Assemble the following components



1PCS A.03 Acrylic plate
1PCS A.04 Acrylic plate
1PCS A.05 Acrylic plate
4PCS M3*8 Screw

Effect diagram after assembling

1PCS A.03 Acrylic plate
1PCS A.04 Acrylic plate
1PCS A.05 Acrylic plate
4PCS M3*8 Screw

11.Fix 51108 bearing on A.02.

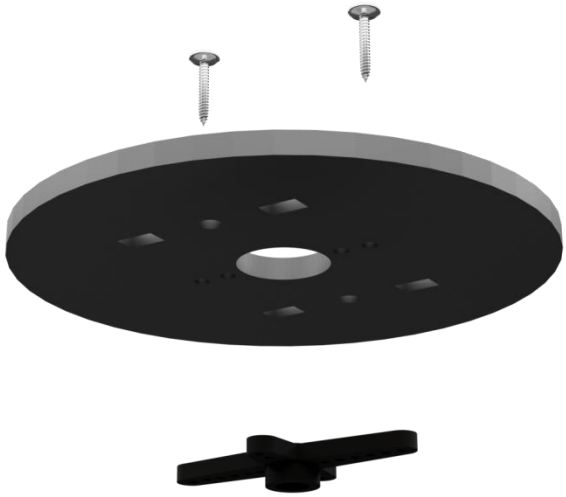
Assemble the following components

Effect diagram after assembling

12.Fix two screw(fixing screw packaged with servo) and servo arm on B.02.

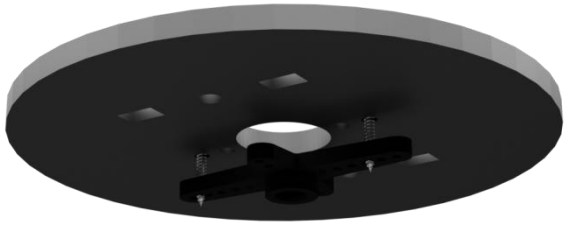
Assemble the following components

2PCS Fixing screw packaged with servo
1PCS B.02 Acrylic plates
1PCS Servo Arm



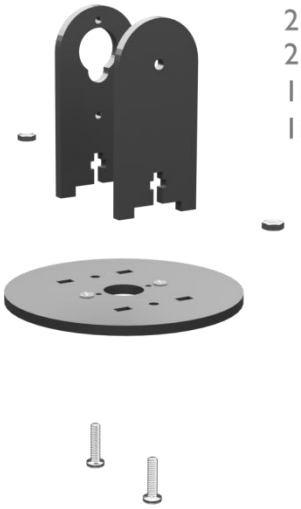
Effect diagram after assembling

Note: Do not tighten the screws(Self-tapping screw packaged with servo) here, leaving a large space between the servo rocker arm and B.02 acrylic plate.



13.Fix two M3*12 screw, two M3 nut, C.01 and C.02 on B.02.

Assemble the following components



2PCS M3 Nut
2PCS M3*12 Screw
1PCS C.01 Acrylic plates
1PCS C.02 Acrylic plates

Effect diagram after assembling

14.Fix the screw(fixing screw packaged with servo) on B.02.

Assemble the following components

1PCS Fixing screw packaged with servo

Effect diagram after assembling

Note: Please tighten this screw on the servo below.

Note: If the bearing(51108 Bearing) is very loose at this time,
adjust these two screws to hold the bearing(51108 Bearing) in place.

15.Fix two M3*12 screw, two M3 lock nut, C.04 and C.06 on C.02.

Assemble the following components

1PCS C.06 Acrylic plates
1PCS C.04 Acrylic plates
2PCS M3 Lock Nut
2PCS M3*12 Screw

Effect diagram after assembling

Note:
The M3 Lock Nut cannot be tightened, otherwise it will cause the robot arm to fail to rotate and even burn the servo.

Note:
The M3 self-locking screw cannot be tightened, otherwise it will cause the mechanical arm to fail to rotate and even burn the servo.

Note:
When the M3 Lock Nut is installed correctly, the C.04 acrylic sheet and C.06 acrylic sheet can be moved easily.

Note:
When the M3 Lock Nut is installed correctly, the C.04 acrylic sheet and C.06 acrylic sheet can be moved easily.

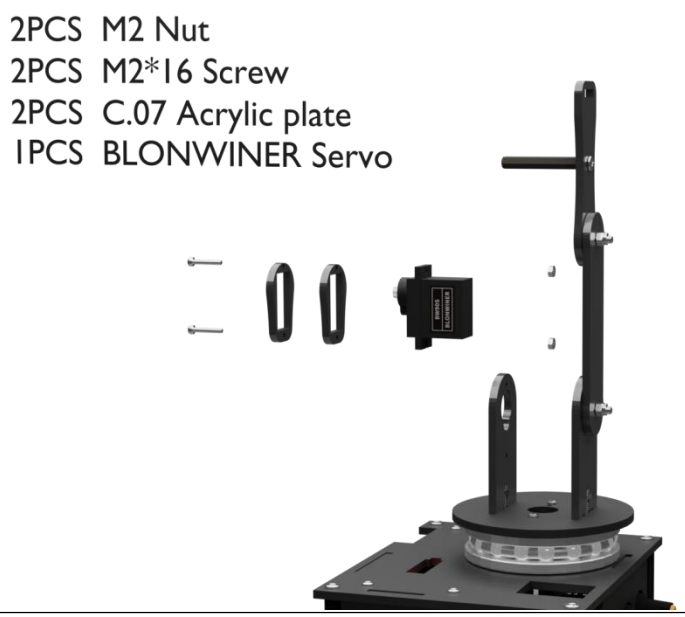
16.Fix M3*8 screw and M3*30 nylon standoff on C.04.

Assemble the following components

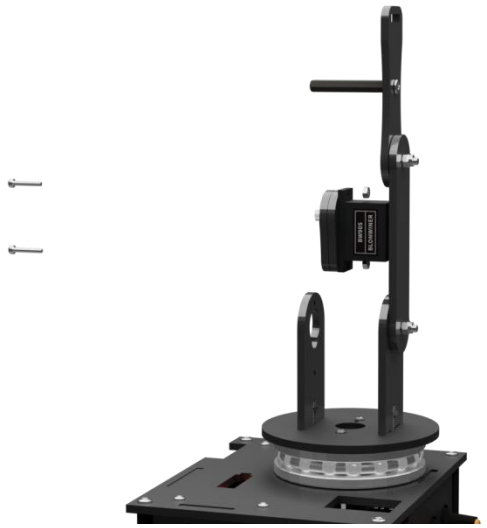
Effect diagram after assembling

17.Fix two M2*16 screw, two M2 nut, two C.07 and BLONWINER servo on C.01.

Assemble the following components



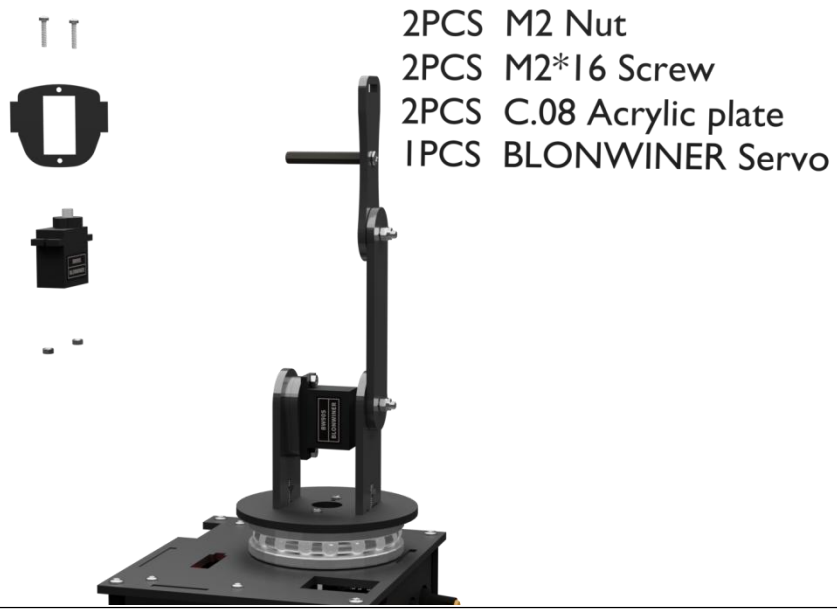
Effect diagram after assembling



blonwiner@outlook.com

18.Fix two M2*16 screw, two M2 nut, two C.07 and BLONWINER servo on C.04.

Assemble the following components

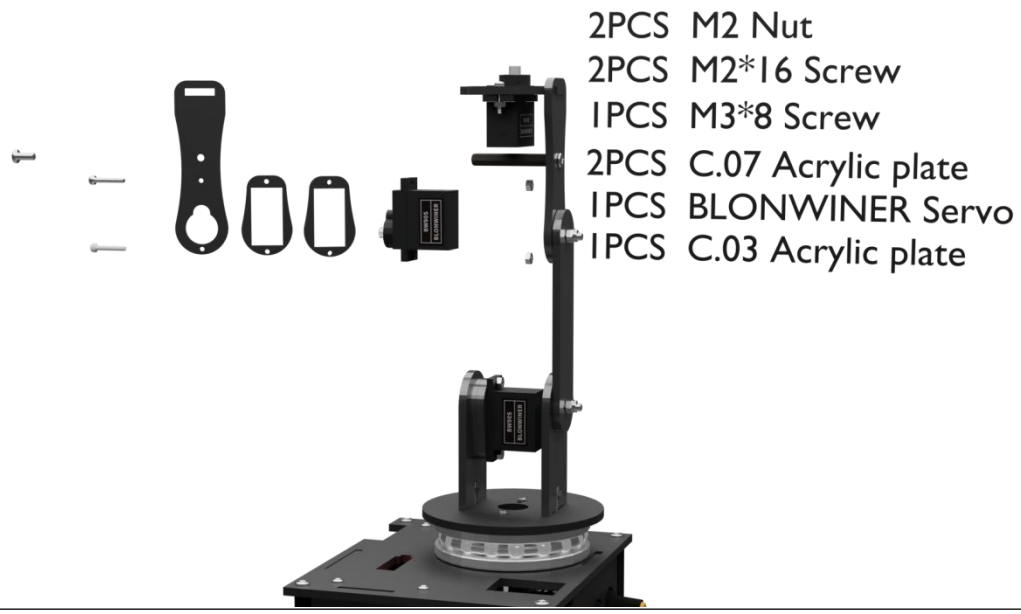


Effect diagram after assembling

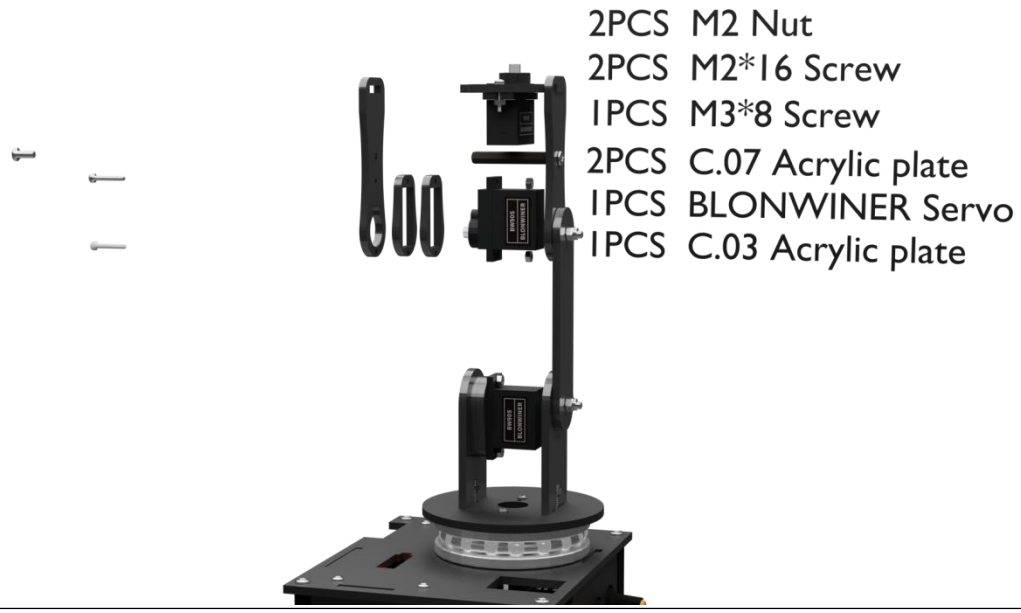
blonwiner@outlook.com

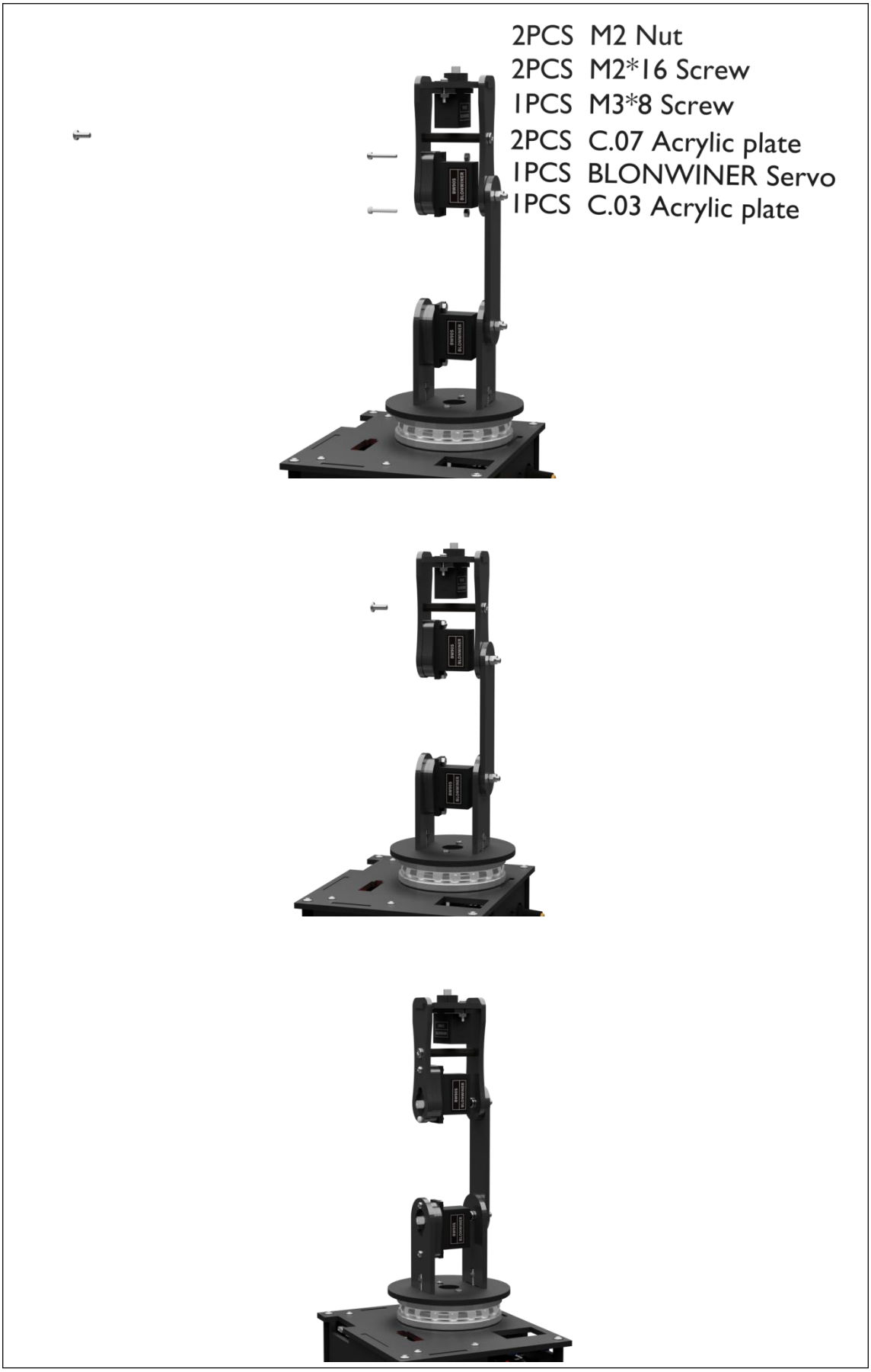
19.Fix M3*8 screw, two M2*16 screw, two M2 nut, two C.07 and BLONWINER servo on C.03.

Assemble the following components



Effect diagram after assembling

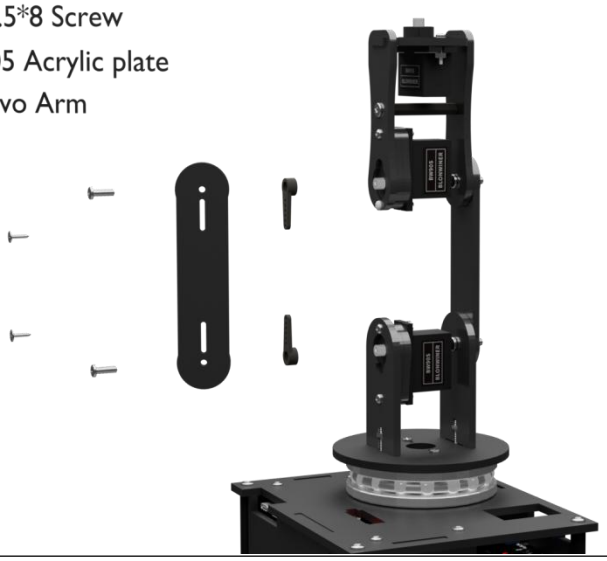



2PCS M2 Nut
2PCS M2*16 Screw
1PCS M3*8 Screw
2PCS C.07 Acrylic plate
1PCS BLONWINER Servo
1PCS C.03 Acrylic plate

20.Fix the screw(fixing screw packaged with servo), two M2.5*8 screw, C.05 and two servo arms on two BLONWINER servos.

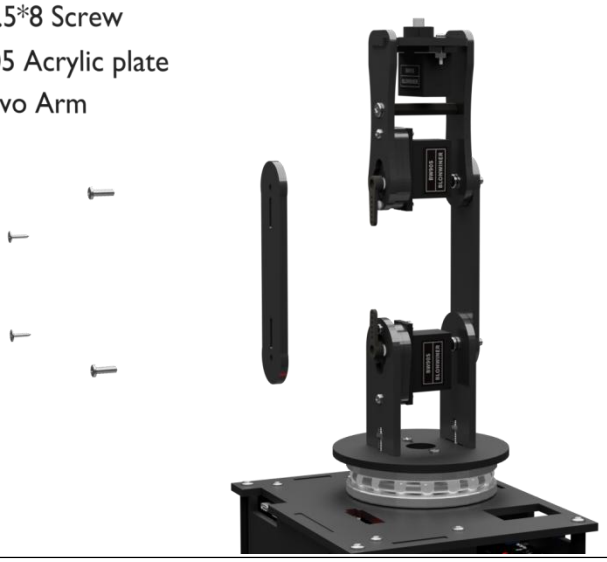
Assemble the following components

2PCS Self-tapping screw packaged with servo
2PCS M2.5*8 Screw
1PCS C.05 Acrylic plate
2PCS Servo Arm



Effect diagram after assembling

2PCS Self-tapping screw packaged with servo
2PCS M2.5*8 Screw
1PCS C.05 Acrylic plate
2PCS Servo Arm



2PCS Self-tapping screw packaged with servo
2PCS M2.5*8 Screw
1PCS C.05 Acrylic plate
2PCS Servo Arm

2PCS Self-tapping screw packaged with servo
2PCS M2.5*8 Screw
1PCS C.05 Acrylic plate
2PCS Servo Arm

21.Fix two M2 nut, two M2*16 screw, BLONWINER servos and two C.07 on C.10.

Assemble the following components

2PCS M2 Nut
2PCS M2*16 Screw
1PCS C.10 Acrylic plates
2PCS C.07 Acrylic plates
1PCS BLONWINER Servo

Effect diagram after assembling

2PCS M2 Nut
2PCS M2*16 Screw
1PCS C.10 Acrylic plates
2PCS C.07 Acrylic plates
1PCS BLONWINER Servo

2PCS M2 Nut
2PCS M2*16 Screw
1PCS C.10 Acrylic plates
2PCS C.07 Acrylic plates
1PCS BLONWINER Servo

22.Fix M3 lock nut, M3*18 screw, M3*8 nylon standoff and D.02 on C.10.

Assemble the following components

1PCS M3*18 Screw
1PCS M3*8 Nylon Standoff
1PCS D.02 Acrylic plates
1PCS M3 Lock Nut

Effect diagram after assembling

1PCS M3*18 Screw
1PCS M3*8 Nylon Standoff
1PCS D.02 Acrylic plates
1PCS M3 Lock Nut

1PCS M3*18 Screw
1PCS M3*8 Nylon Standoff
1PCS D.02 Acrylic plates
1PCS M3 Lock Nut

Note:
The M3 Lock Nut cannot be tightened, otherwise it will cause the robot arm to fail to rotate and even burn the servo.
When the M3 Lock Nut is installed correctly, the D.02 acrylic plate can be moved easily.

Note:
The M3 Lock Nut cannot be tightened, otherwise it will cause the robot arm to fail to rotate and even burn the servo.
When the M3 Lock Nut is installed correctly, the D.02 acrylic plate can be moved easily.

Note:
The M3 Lock Nut cannot be tightened, otherwise it will cause the robot arm to fail to rotate and even burn the servo.
When the M3 Lock Nut is installed correctly, the D.02 acrylic plate can be moved easily.

Note:
The M3 Lock Nut cannot be tightened, otherwise it will cause the robot arm to fail to rotate and even burn the servo.
When the M3 Lock Nut is installed correctly, the D.02 acrylic plate can be moved easily.

23.Fix the screw(fixing screw packaged with servo), M2.5*8 screw, servo arm and D.01 on BLONWINER servo.

Assemble the following components

1PCS Servo Arms
1PCS D.01 Acrylic plates
1PCS M2.5*8 Screw
1PCS Self-tapping screw packaged with servo

Effect diagram after assembling

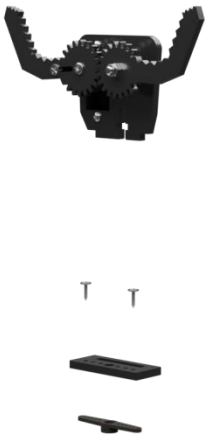
1PCS Servo Arms
1PCS D.01 Acrylic plates
1PCS M2.5*8 Screw
1PCS Self-tapping screw packaged with servo

blonwiner@outlook.com

24.Fix the screw(fixing screw packaged with servo), and servo arm on C.09.

Assemble the following components

2PCS Self-tapping screw packaged with servo
1PCS C.09 Acrylic plates
1PCS Servo Arm



Effect diagram after assembling

25.Fix M3*12 screw, M3 nut and C.09 on C.10.

Assemble the following components

1PCS M3*12 Screw
1PCS M3 Nut

Effect diagram after assembling

1PCS M3*12 Screw
1PCS M3 Nut

26.Fix the screw(fixing screw packaged with servo) and servo arm on BLONWINER servo.

Assemble the following components

1PCS Fixing screw packaged with servo

Effect diagram after assembling

1PCS Fixing screw packaged with servo

Rendering of the robot after it is assembled

Functions of the robotic arm

We provide the example to complete the function of carrying objects. You can give full play to your creativity to develop new functions. And learn with us.

Lesson 5 Potentiometer controls Robotic arm

Rotate the potentiometer on the driver board to control the robotic arm to clamp objects. Code PotentiometerControlArm.ino

Specific function descriptions.

- The potentiometer A0 on the driver board controls the movement of servo 1, range from 0 to 180 degrees.
- The potentiometer A1 on the driver board controls the movement of servo 2, range from 0 to 180 degrees.
- The potentiometer A2 on the driver board controls the movement of servo 3, range from 0 to 180 degrees.
- The potentiometer A3 on the driver board controls the movement of servo 4, range from 0 to 180 degrees.
- The potentiometer A6 on the driver board controls the movement of servo 5, range from 90 to 145 degrees.

The movement angle of servo 5 can be adjusted by modifying the value of dataServo5 in the program.

```
19    int dataServo5 = 90; // Servo 5 rotation range(dataServo5=0~180)
```

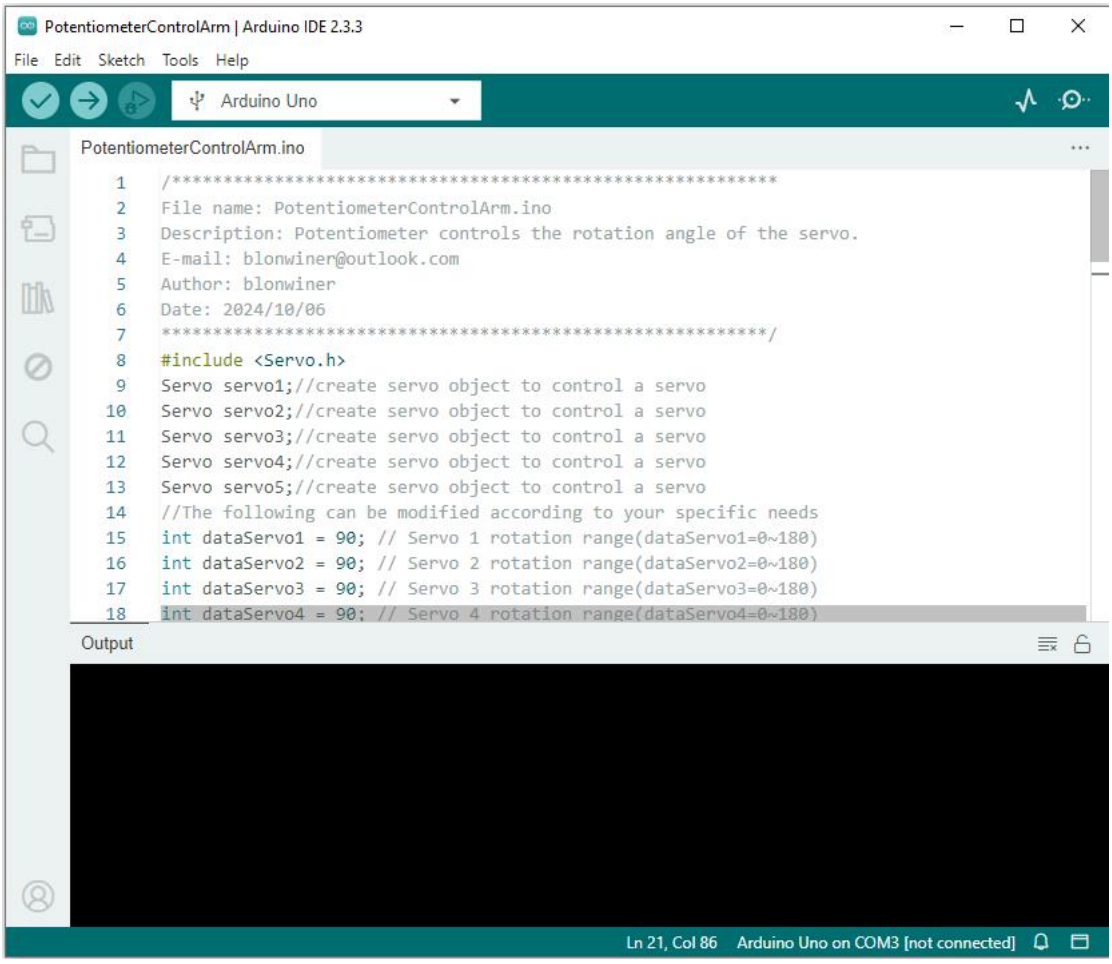
5.1 Components used in this course

Components	Quantity	Picture
BLONWINER Robot	1	

Micro USB Cable	1	

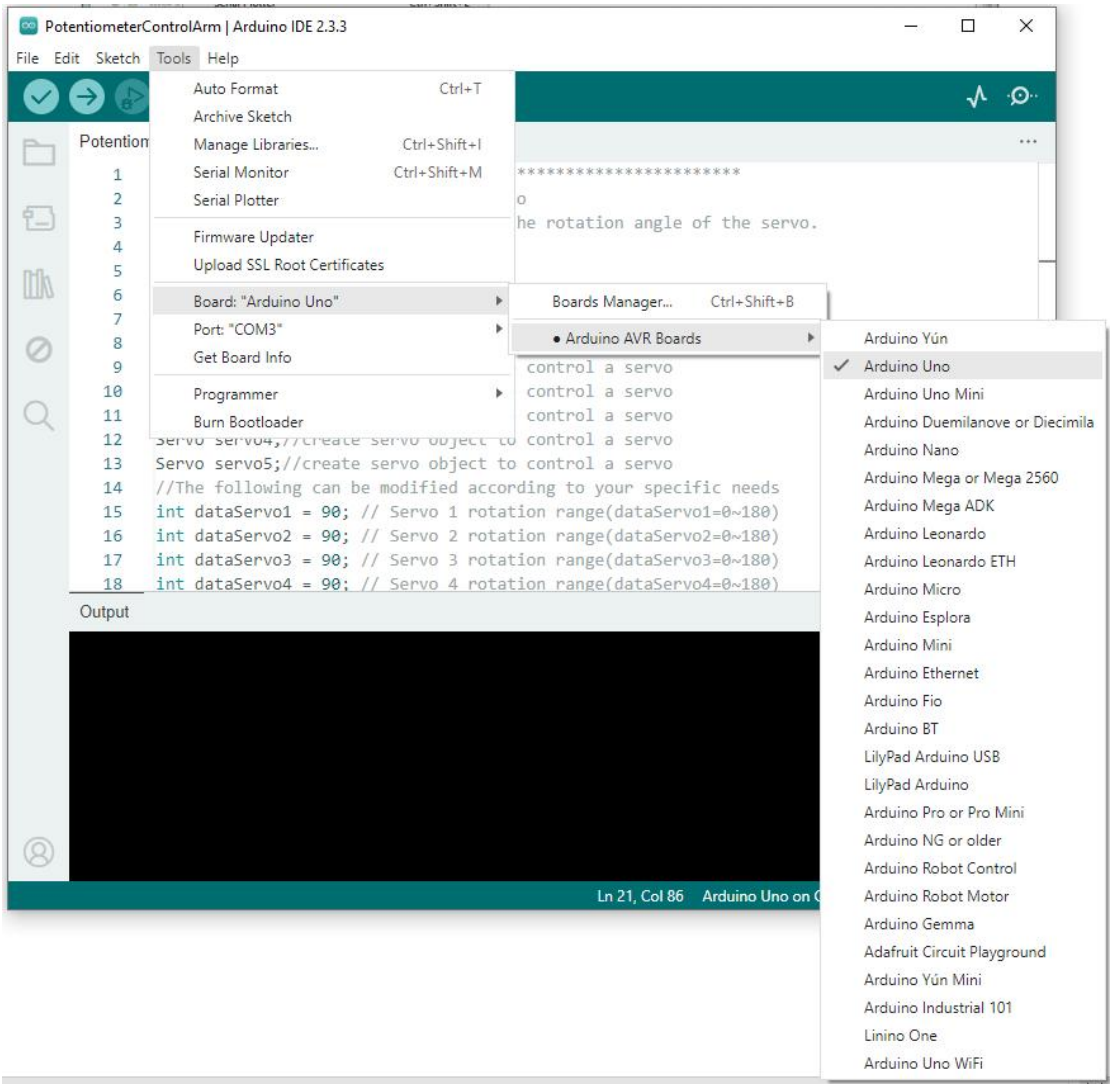
Operating steps

Firstly open the code PotentiometerControlArm.ino we provide.

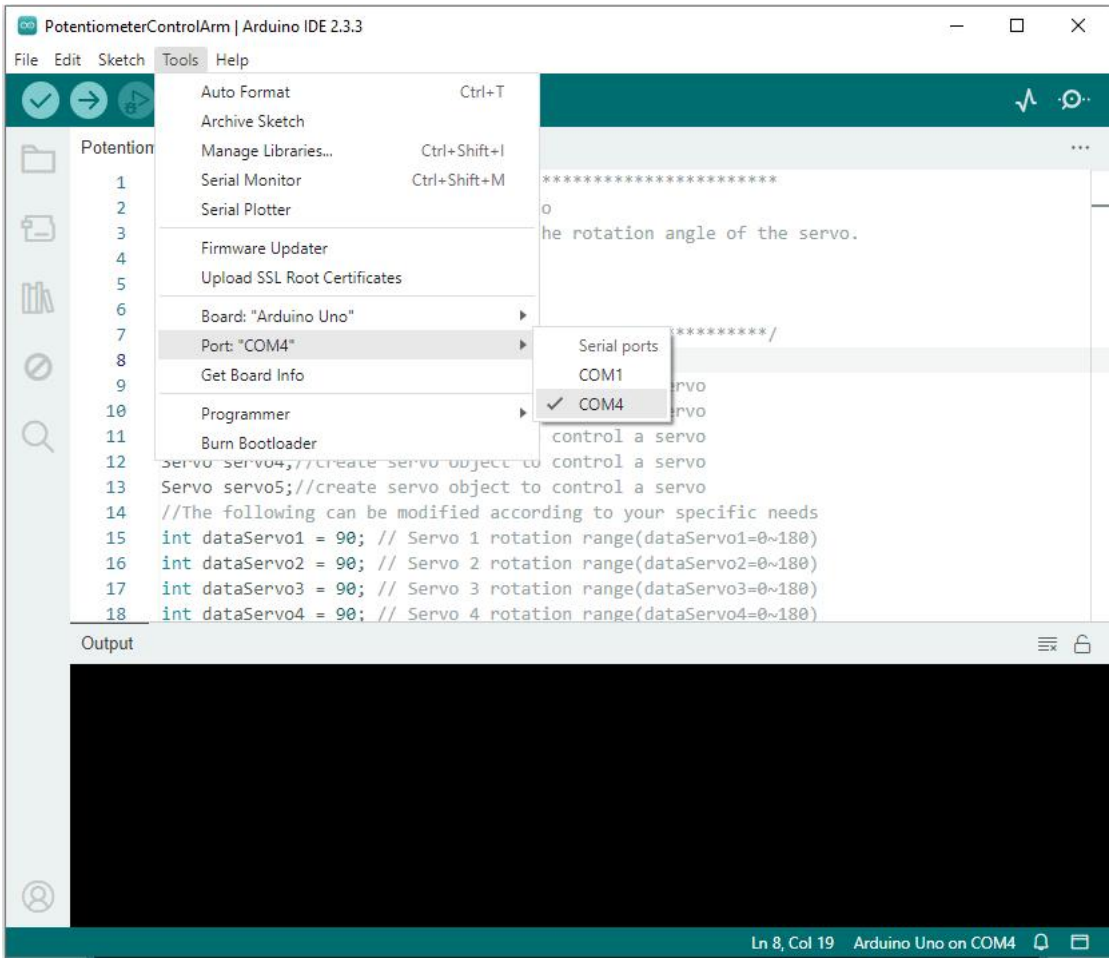


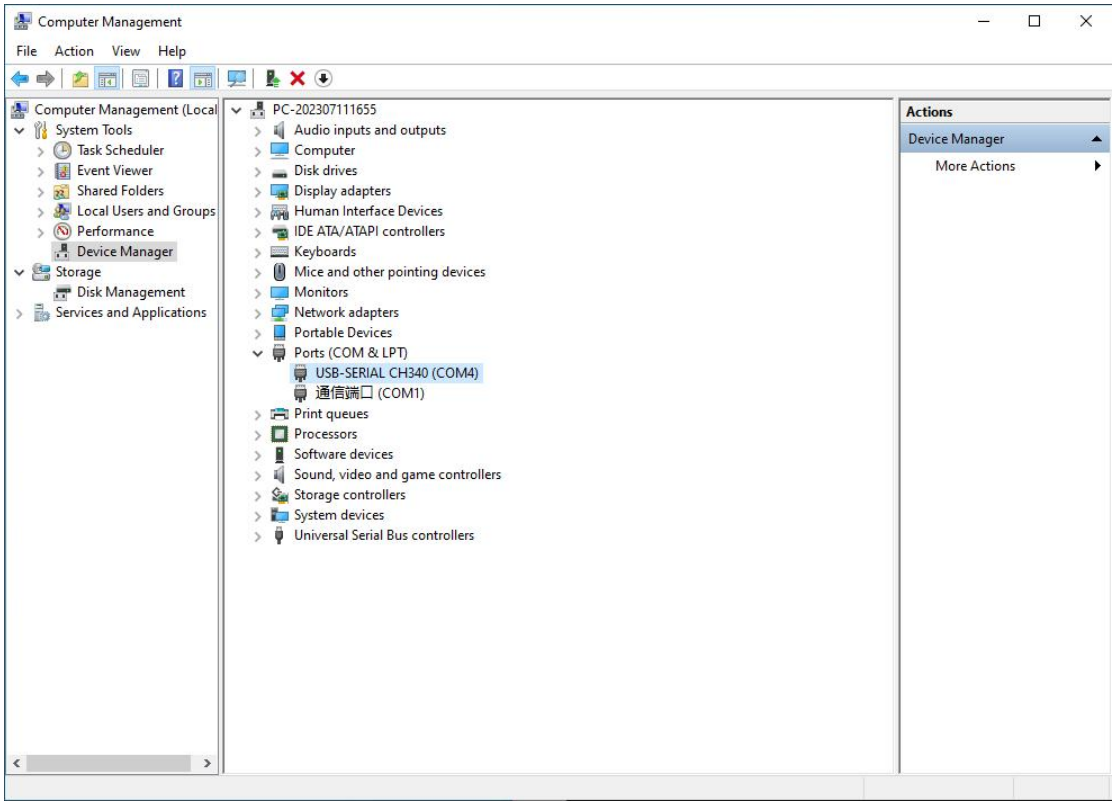
Then connect the robotic arm to the computer with the USB cable. (Note: Do not turn on the power supply to prevent damages of swinging arm. Also pay attention to this in the subsequent operation).

Motor software "Tools"->"Board"->"Arduino/Genuino Uno"

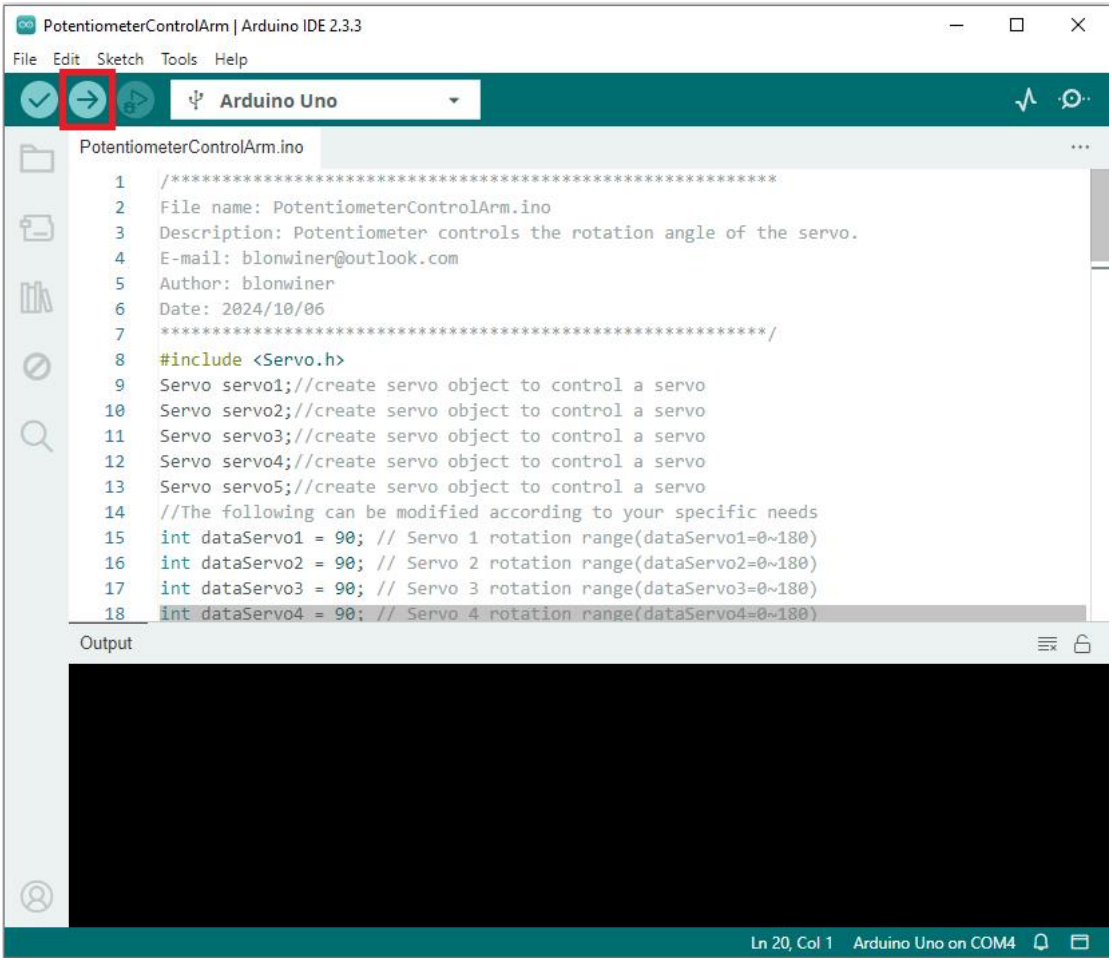


Next, click on "Tools" -> "Port:" -> "COM4" (note that the COM4 here may be recognized differently on different computers, it can be COM1, COM2 or COM3 and so on.)

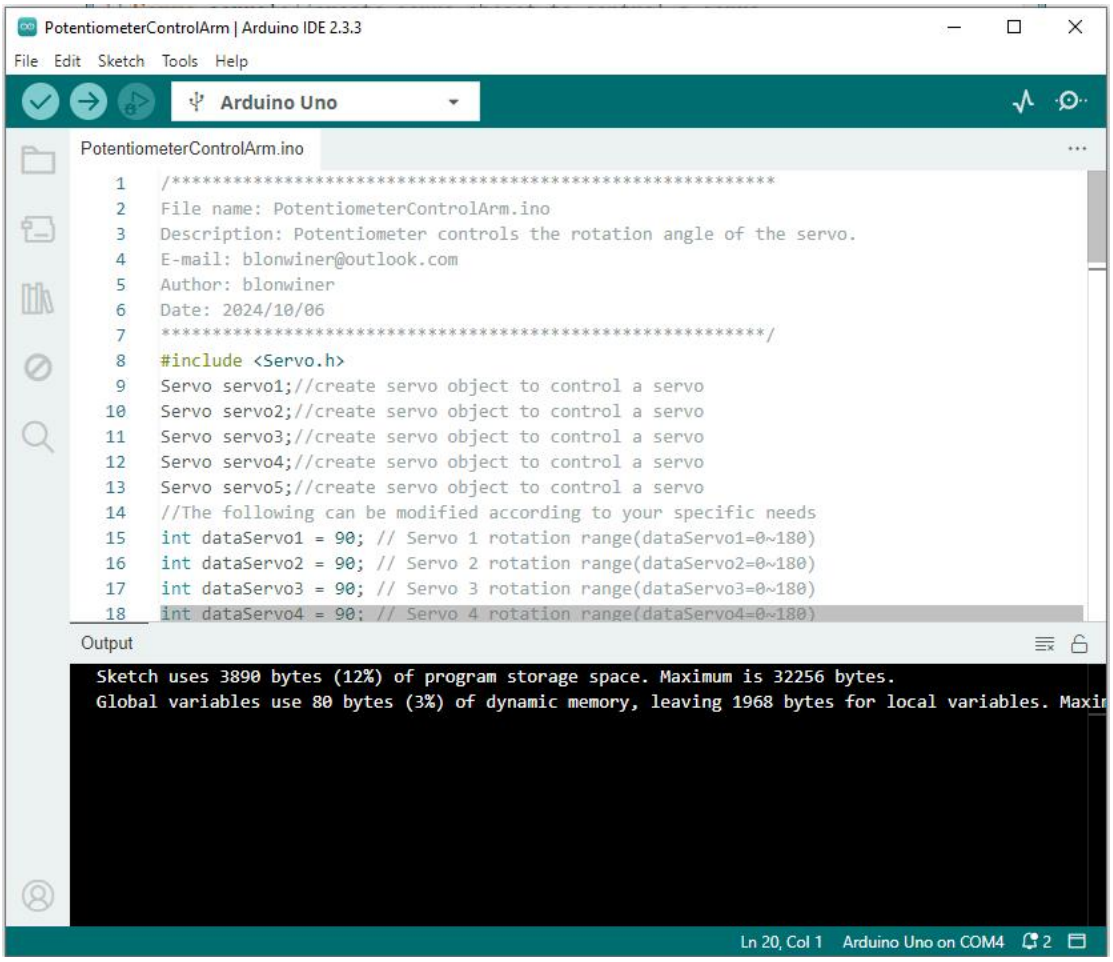




Then click "Upload" to upload the program to the UNO board.



When the software prompts the following information, the code upload is complete.



Next, unplug the USB cable connected to the robotic arm. Note: Do not turn on the power of the arm after downloading the program. Adjust the four potentiometers on the driver board to the center first, as shown below:

Gently support the robotic arm with your hand to prevent swinging arm. Turn on the power, and then rotate the four potentiometers on the driver board to control the arm to clamp and carry objects. The rotation angle of Servo5 is set in the code.

Lesson 6 Processing controls servo

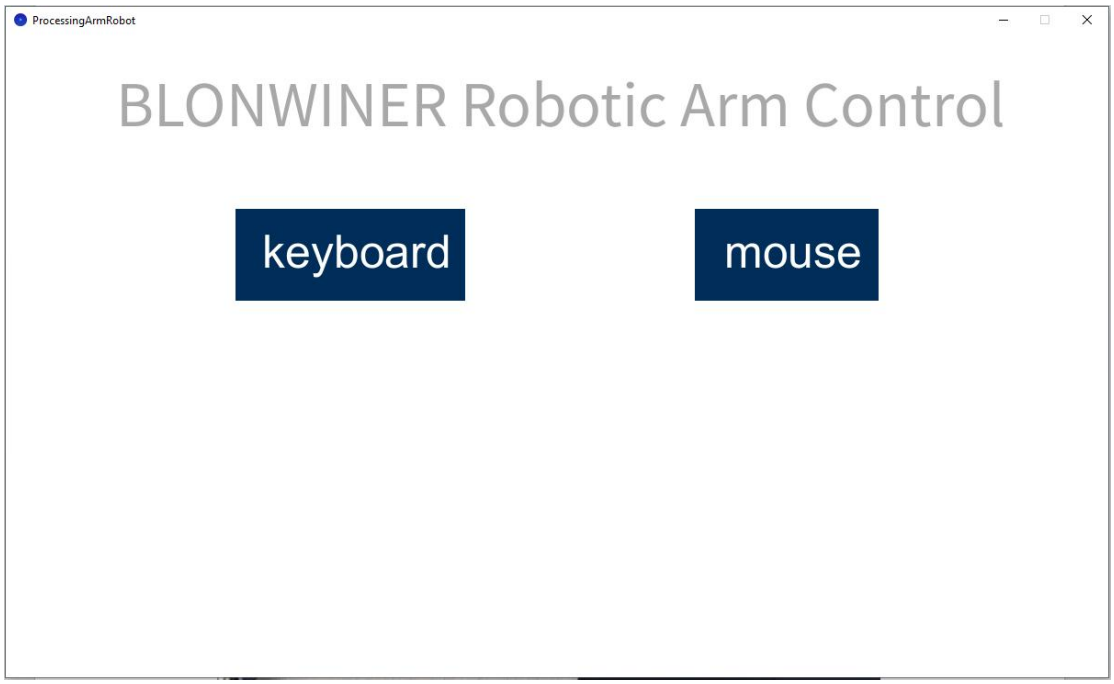
If the code hasn’t been used in processing before, the library file controlP5 needs to be added.

You can refer to the previous manual for the installation process of Processing.

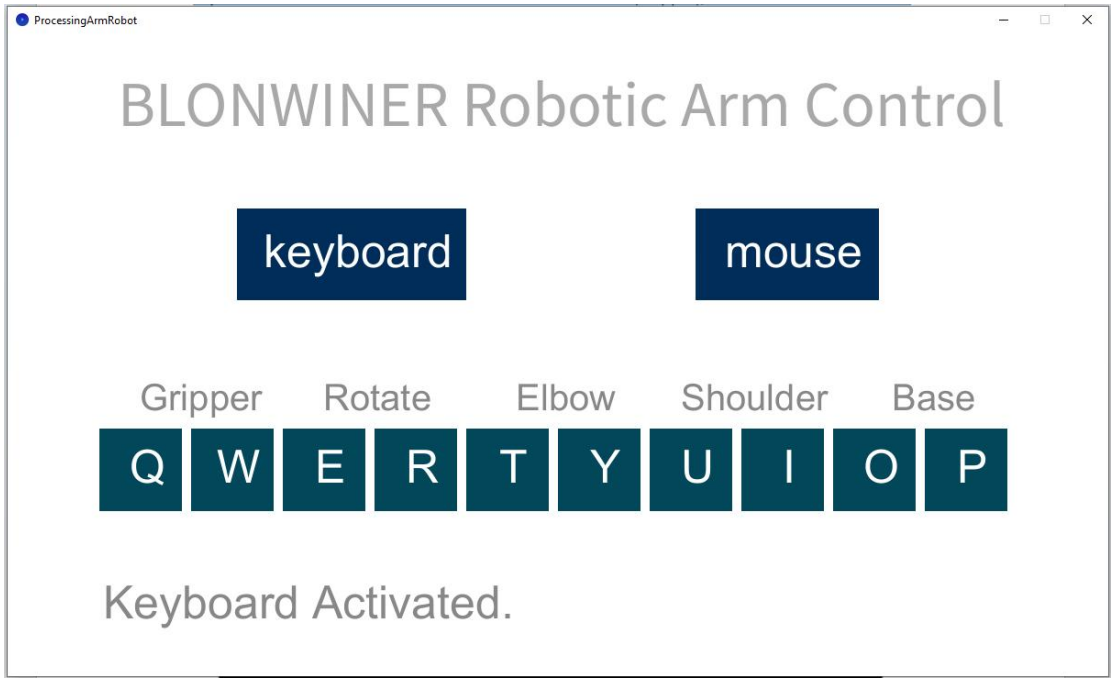
Specific function introduction:

Control the robotic arm to carry objects through Processing with serial communication.

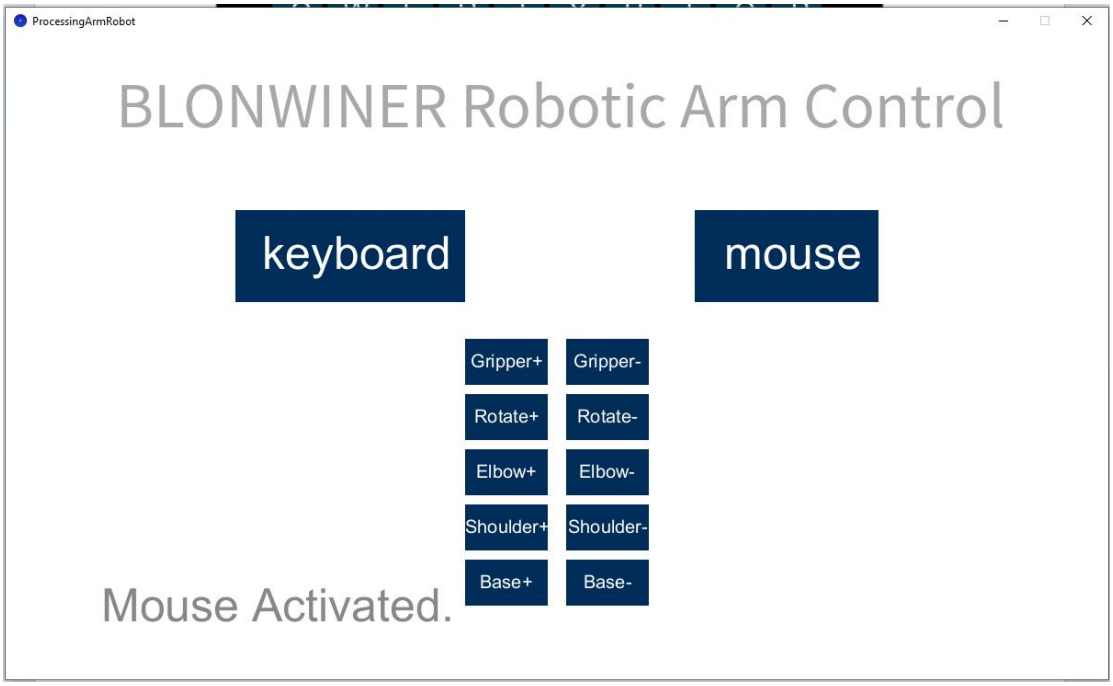
Processing interfaces are as follows.



Click "keyboard" the following interface will appear. Next, press the corresponding button on the keyboard to control the arm. "Q" and "W" control servo4 (Gripper), "E" and "R" control servo5 (Rotate), "T" and "Y" control servo3 (Elbow), "U" and "I" control servo2 (Shoulder), "O" and "P" control servo1 (Base).



Click "mouse" and the following interface will appear.



At this point, click the corresponding button, the robotic arm will make the corresponding movement. "Gripper+" and "Gripper-" control the servo4, "Rotate+" and "Rotate-" control the servo5, "Elbow+" and "Elbow-" control the servo3, "Shoulder+" and "Shoulder-" control the servo2, " Base+" and "Base-" control the servo1.

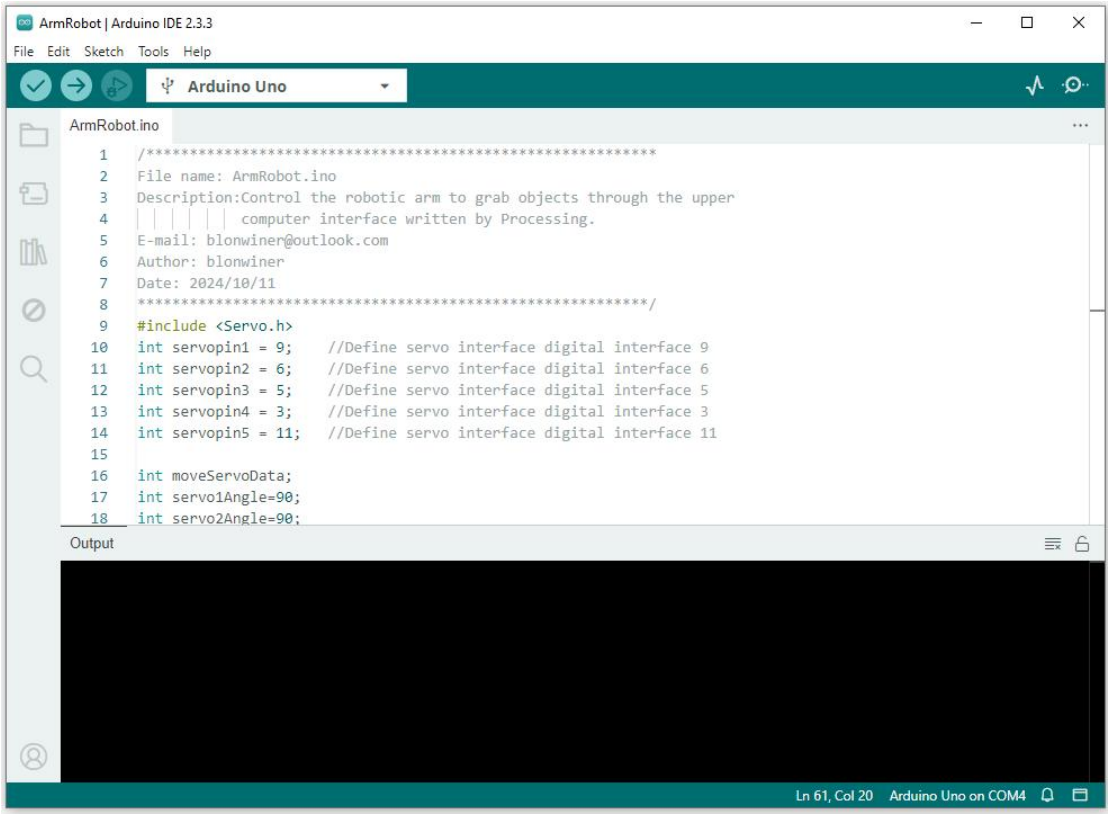
6.1 Components used in this course

Components	Quantity	Picture
BLONWINER Robot	1	

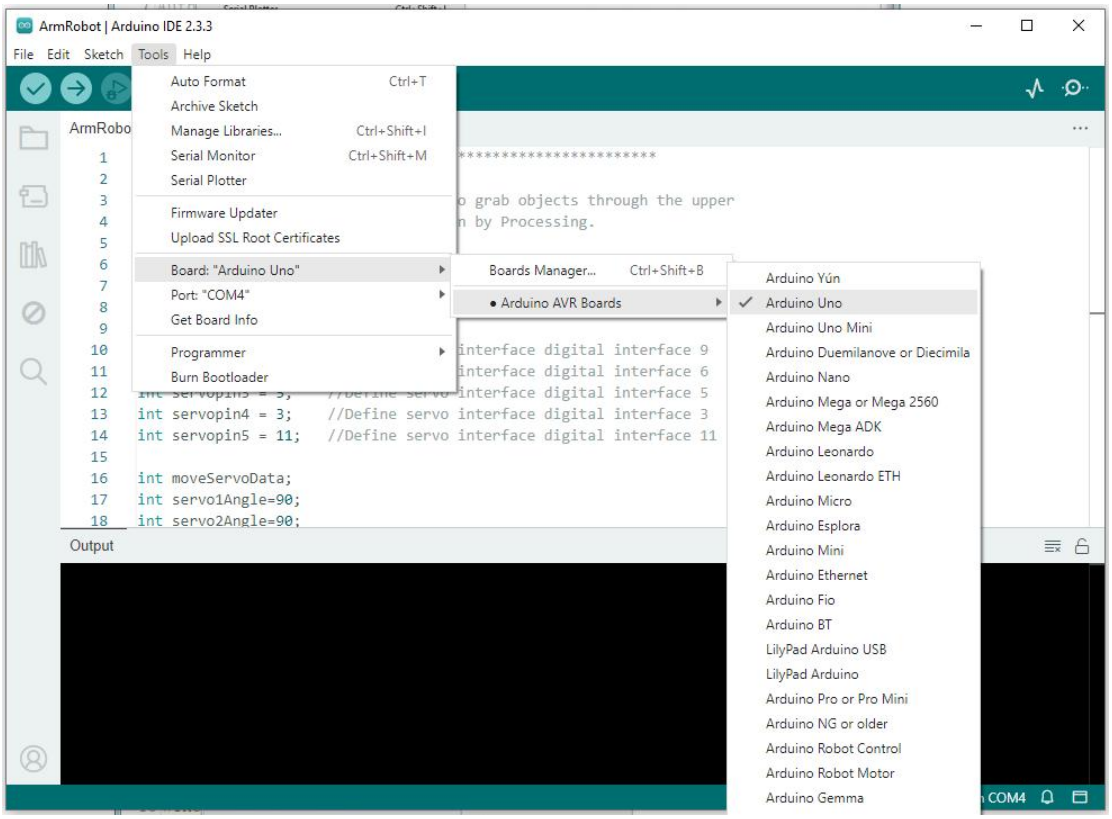
Micro USB Cable	1	

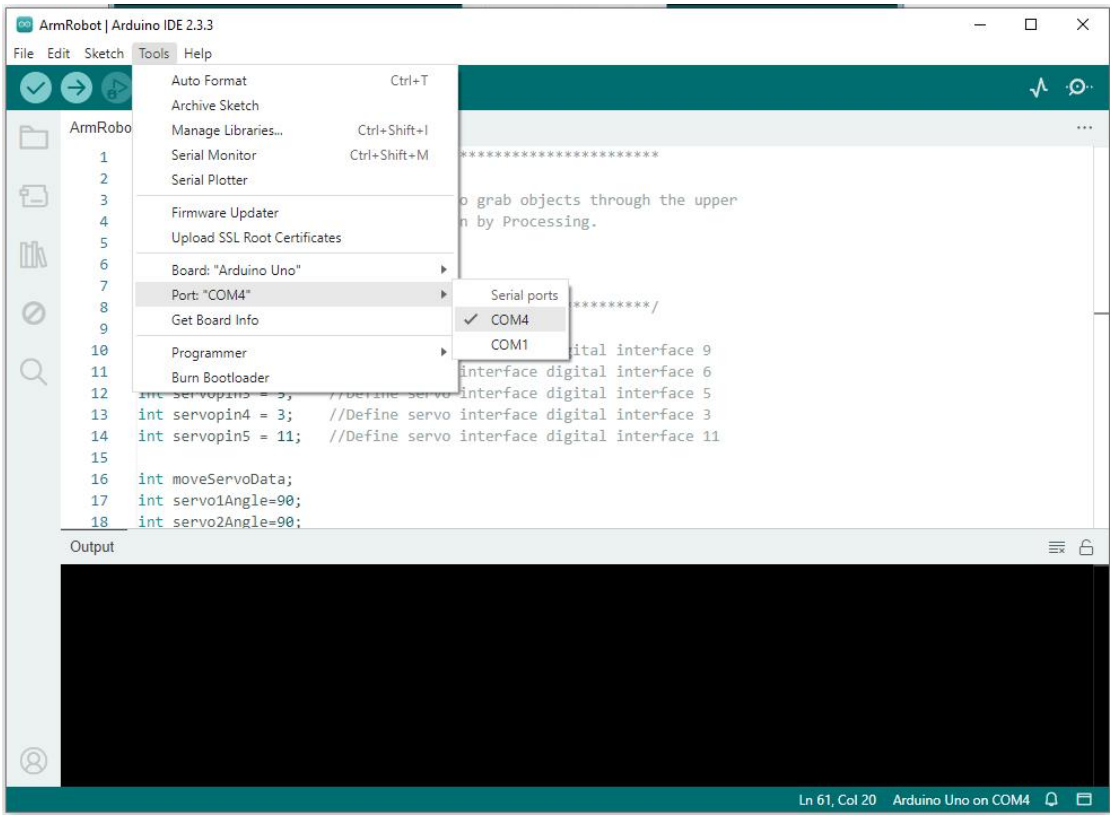
Operating steps:

Open the file ArmRobot.ino, as shown below:

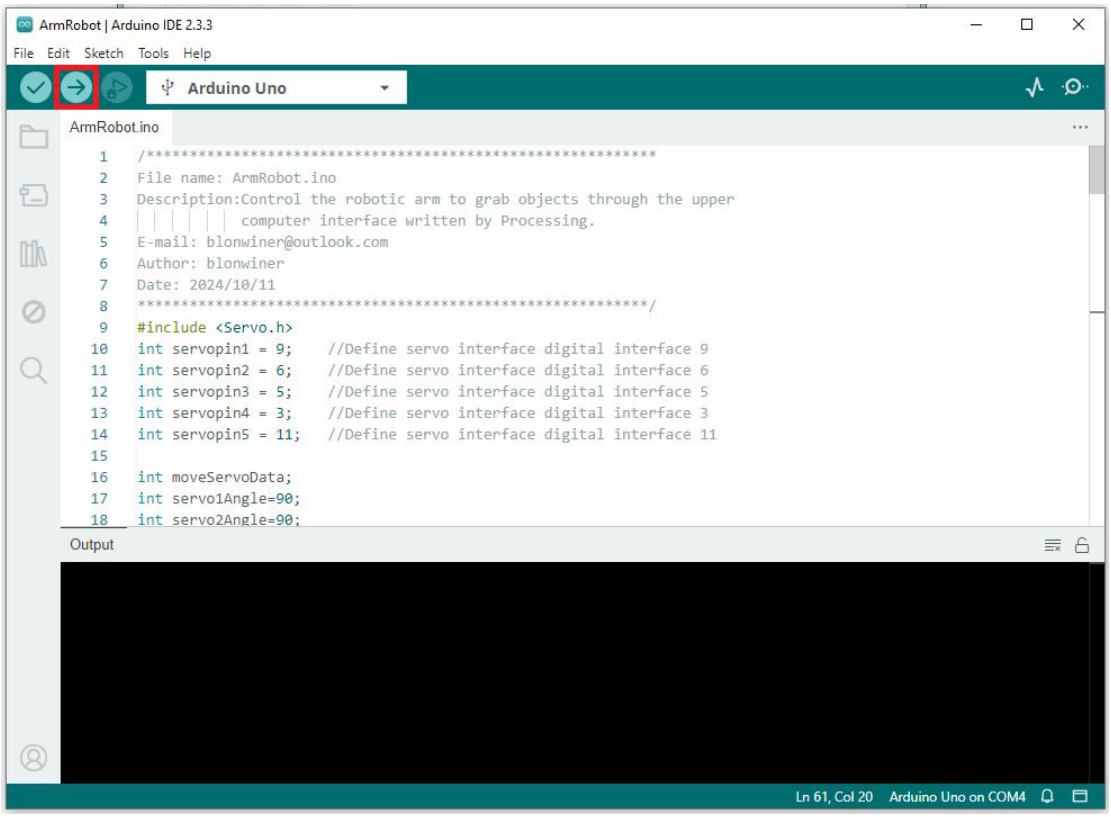


Next, connect the robotic arm to the computer with the USB cable. Select the development board model and port, as shown below:





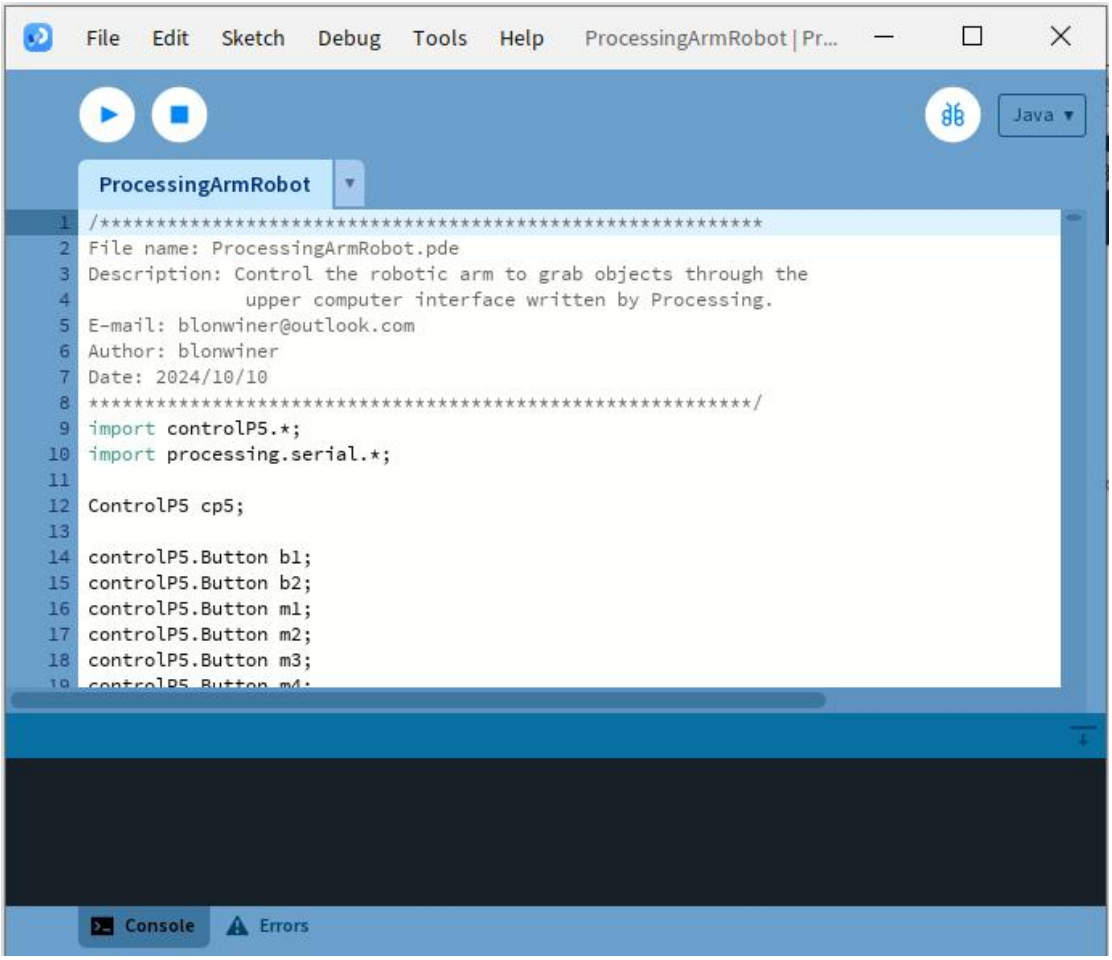
Click "Upload" to upload the code to UNO, as shown below:



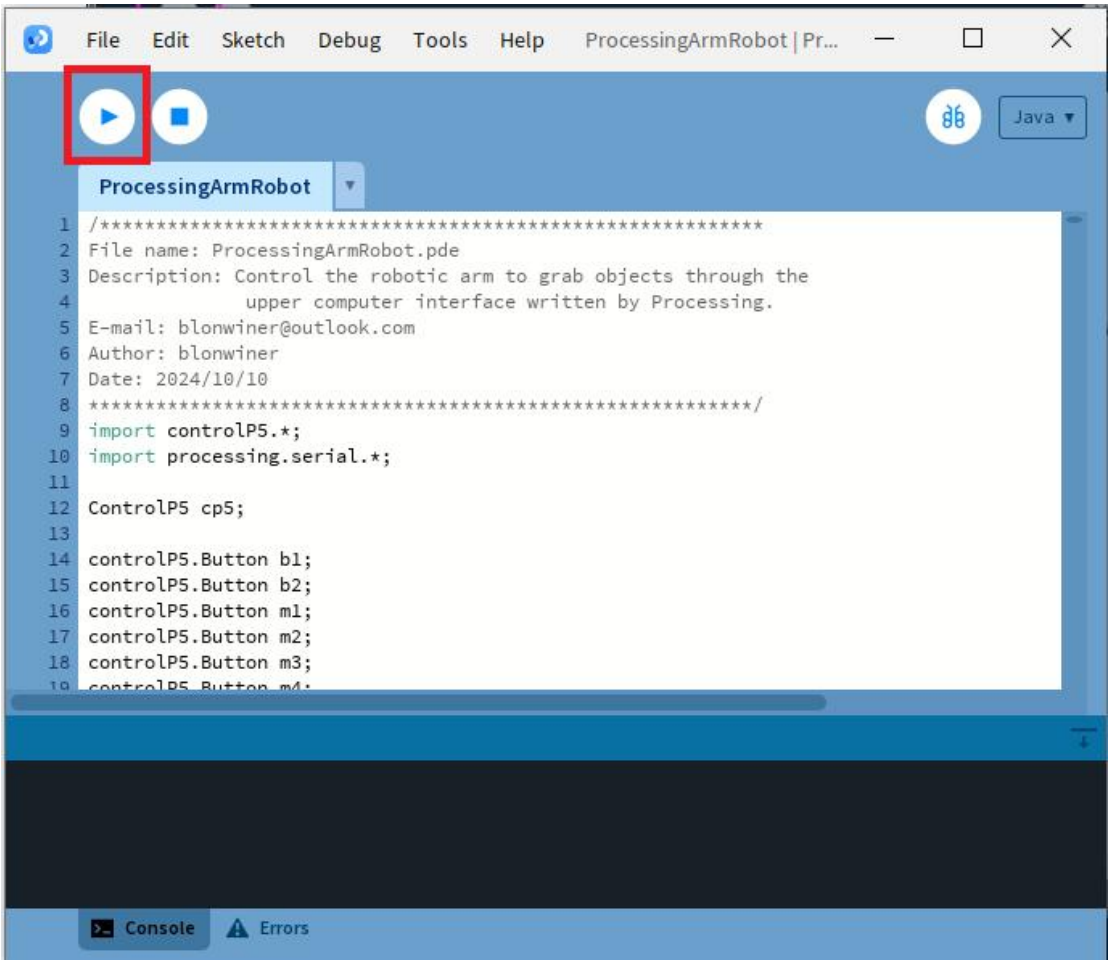
After downloading, close ArmRobot.ino.

Note: that the arm is still connected to the computer with the USB cable. Rotate the arm to the position as shown in the figure below (the initialization value is set in the program. If the arm is not in the position as shown below before powered on, it will swing and may cause damages when is energized), and then turn on the power.

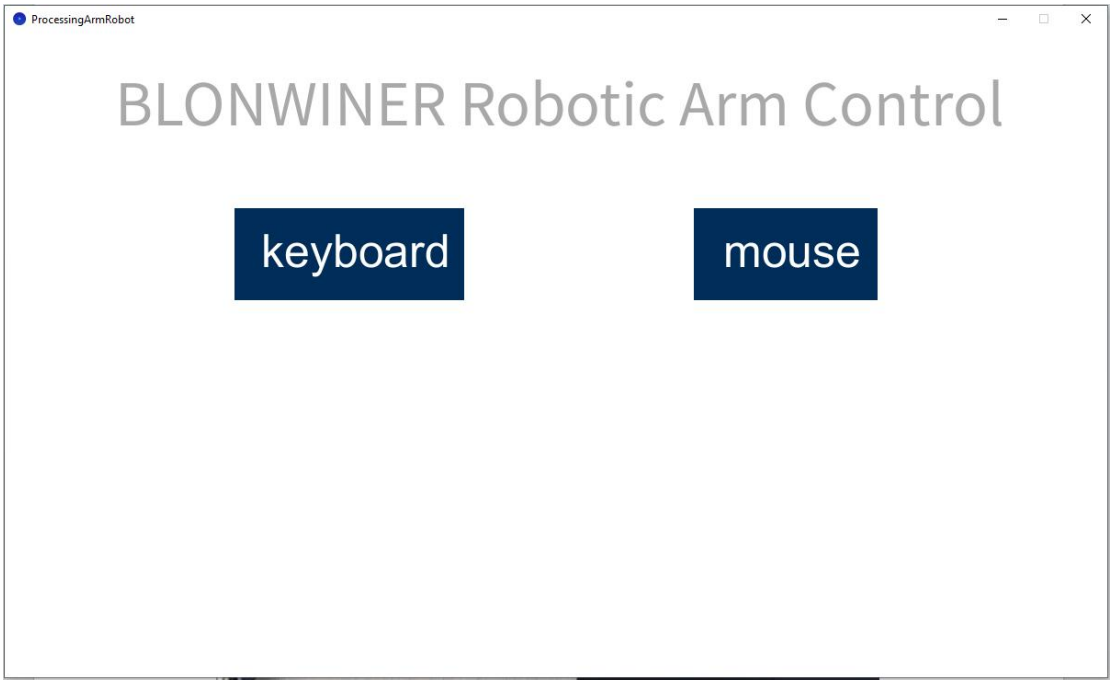
Next open ProcessingArmRobot.pde



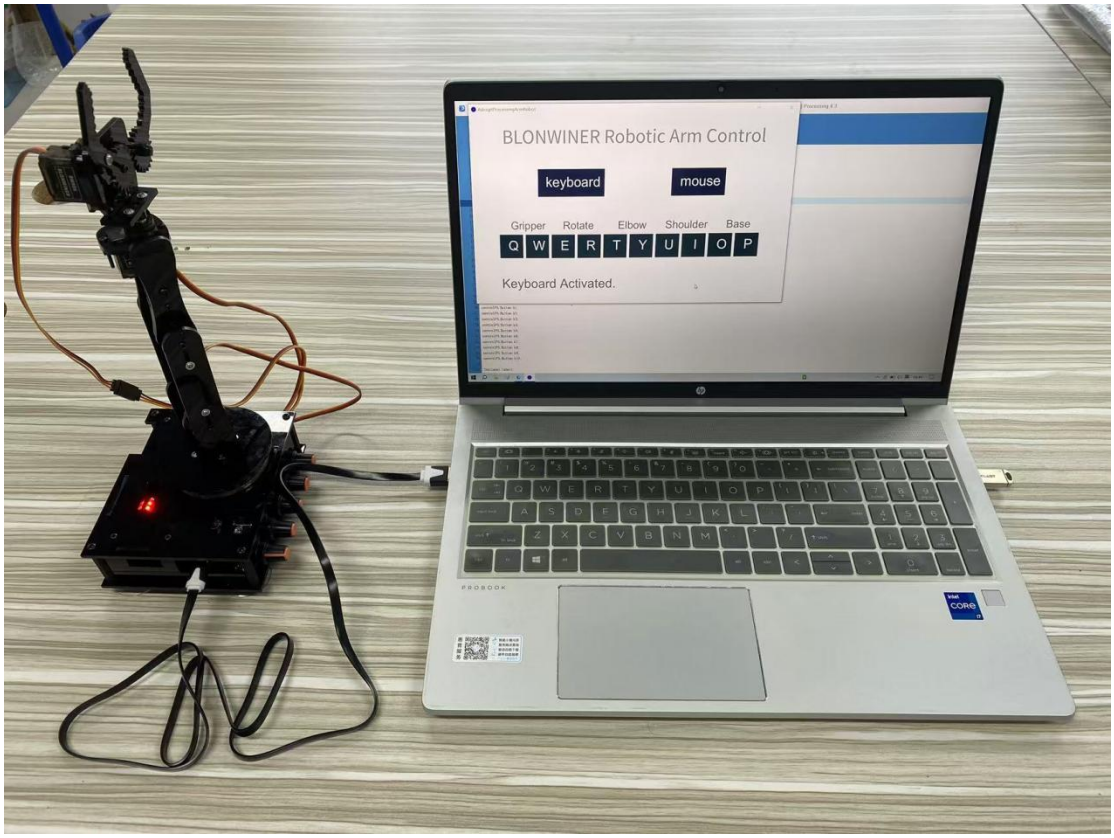
Click "Run" to run the code, as shown below:



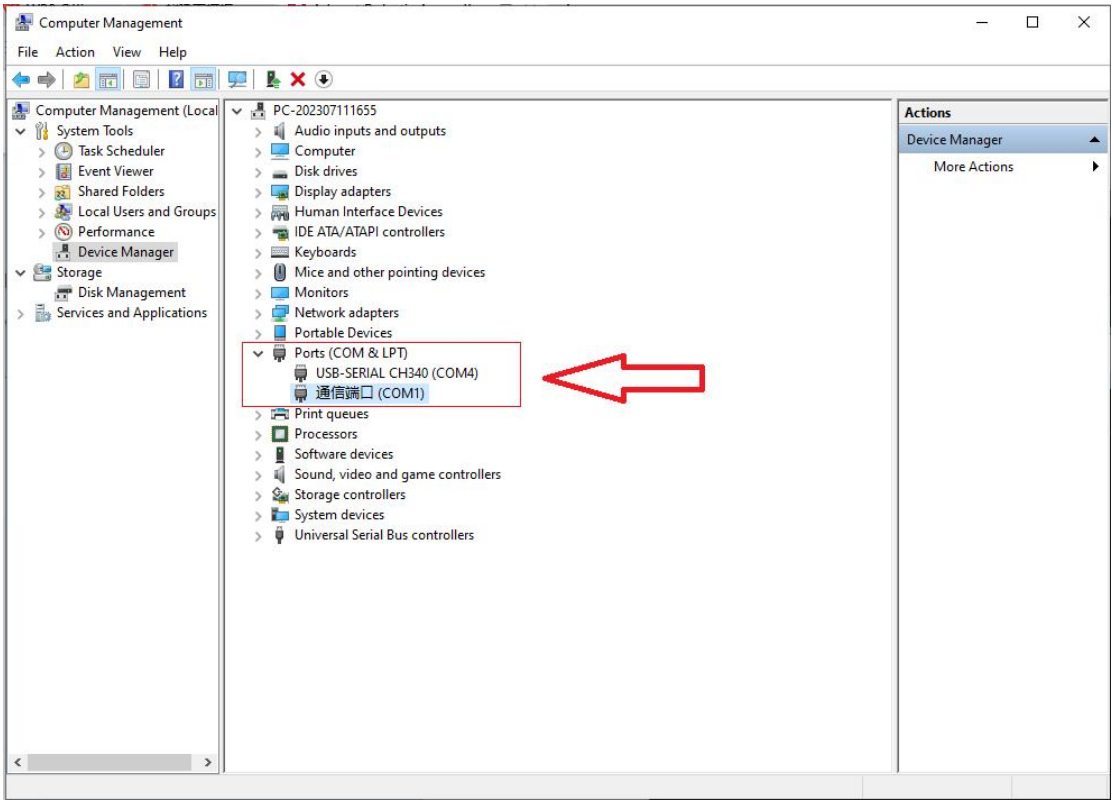
The interface of successful running is as below:



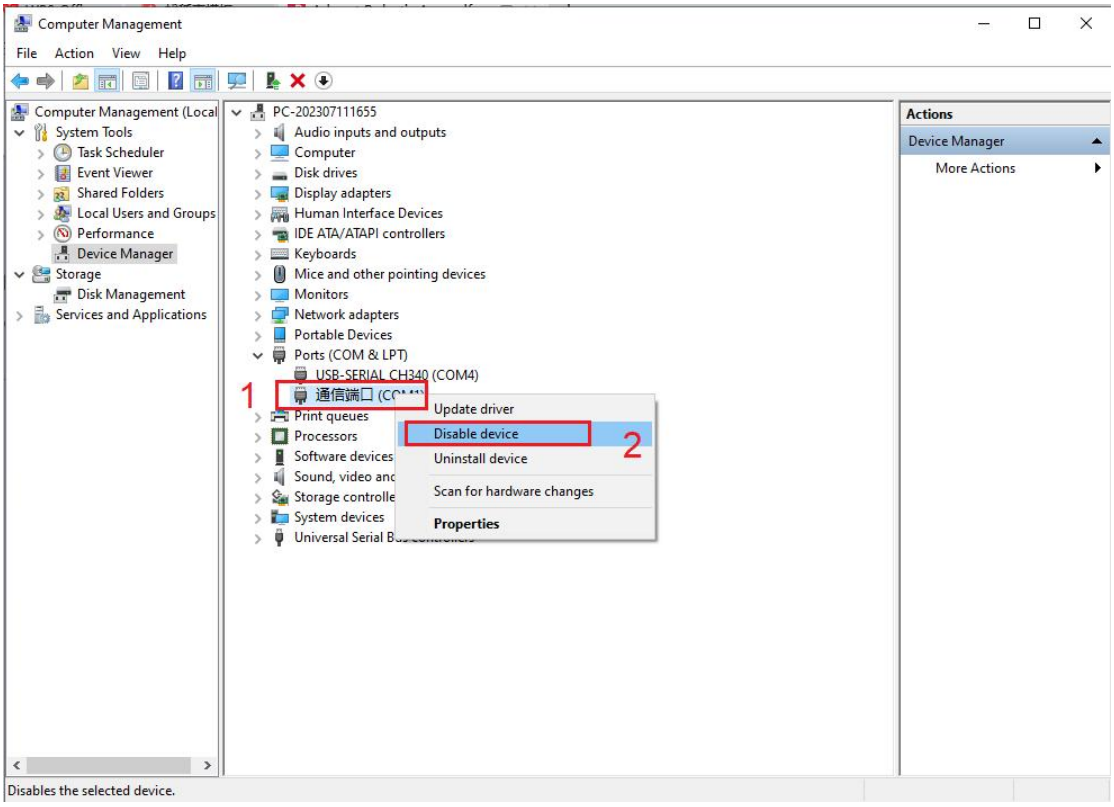
The control interface can then be used to control the robotic arm.



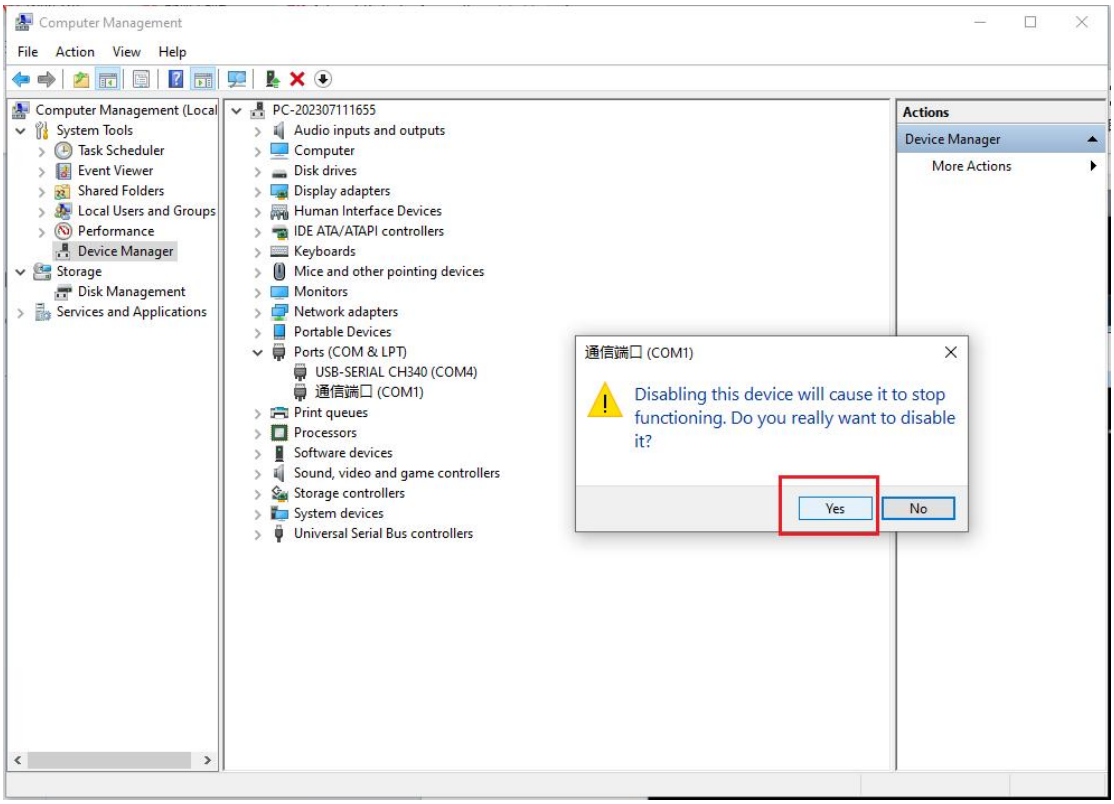
Note: When your computer's COM port has multiple displays(COM1 and COM4), as shown in the following figure:



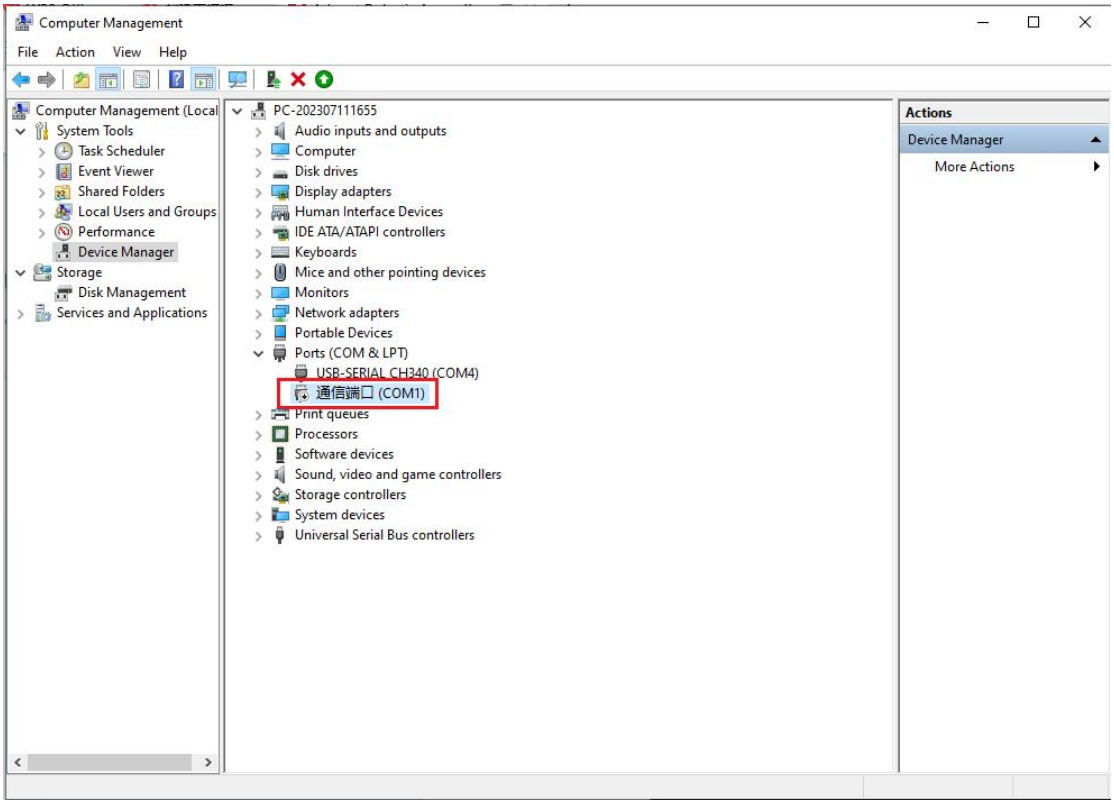
Running Processing fails. In this case, we need to select the COM port(COM1) that is not CH340 and right-click. Click on "Disable device"



Click on "Yes"



At this point, the port COM1 stops working.

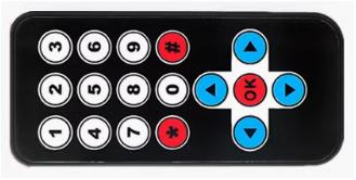


At this time, only the USB-SERIAL CH340 (COM4) port is working, and the BLONWINER Arduino ARM Board can be successfully connected when the processing program is running.

Lesson 7 IR Remote Controller

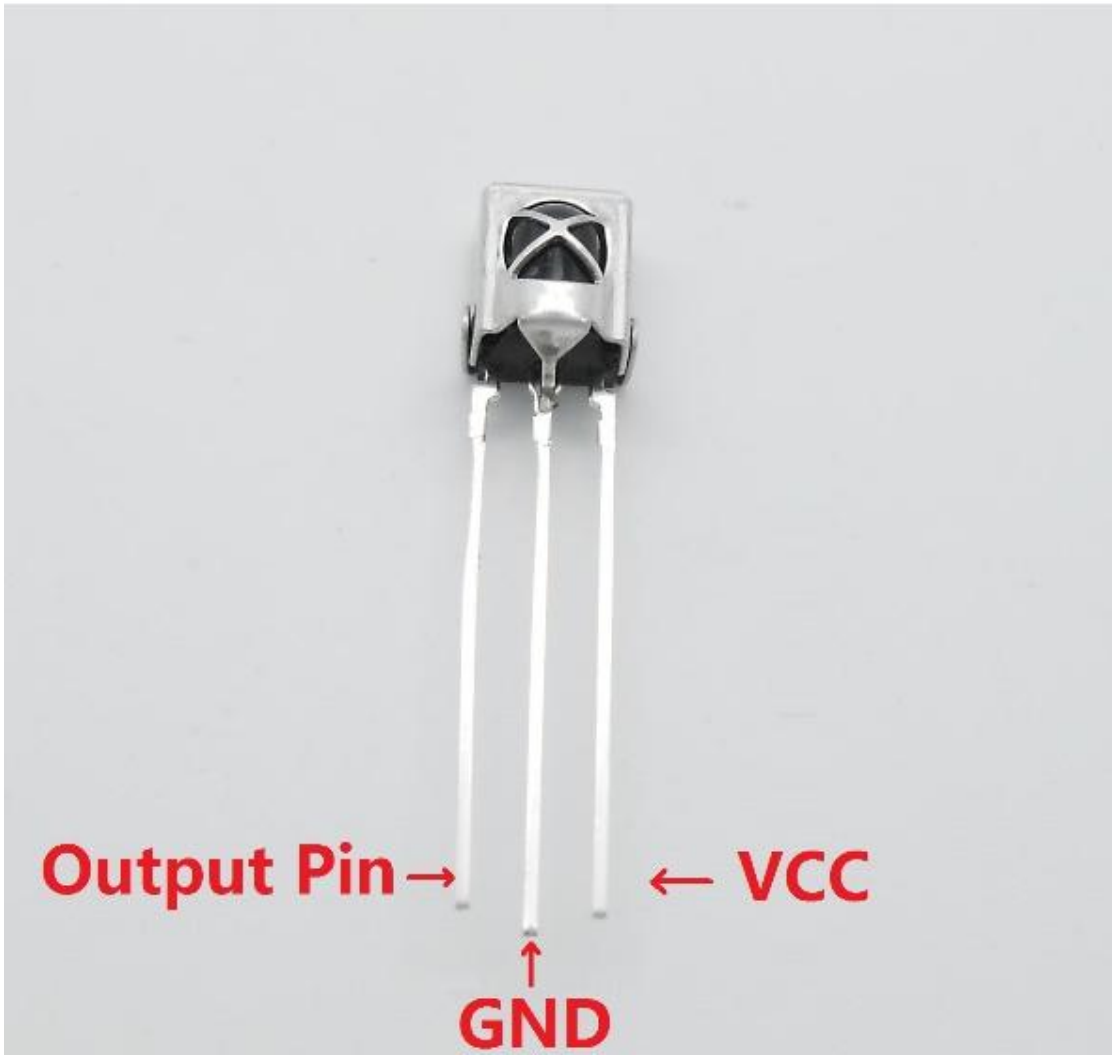
In this lesson, we will learn how to use an IR receiver to receive signals from a remote controller.

7.1 Components used in this course

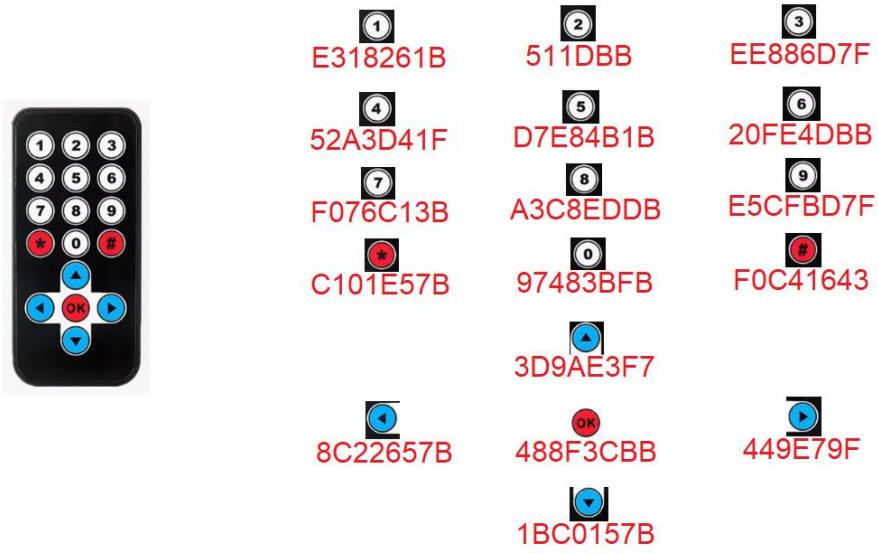
Components	Quantity	Picture
BLONWINER Robot	1	
Micro USB Cable	1	
Remote Controller	1	

Principle

The IR receiver HX1838 can receive signals from an infrared (IR) remote controller. It has only three pins: signal, VCC and GND. So it is simple to connect with an Arduino board.



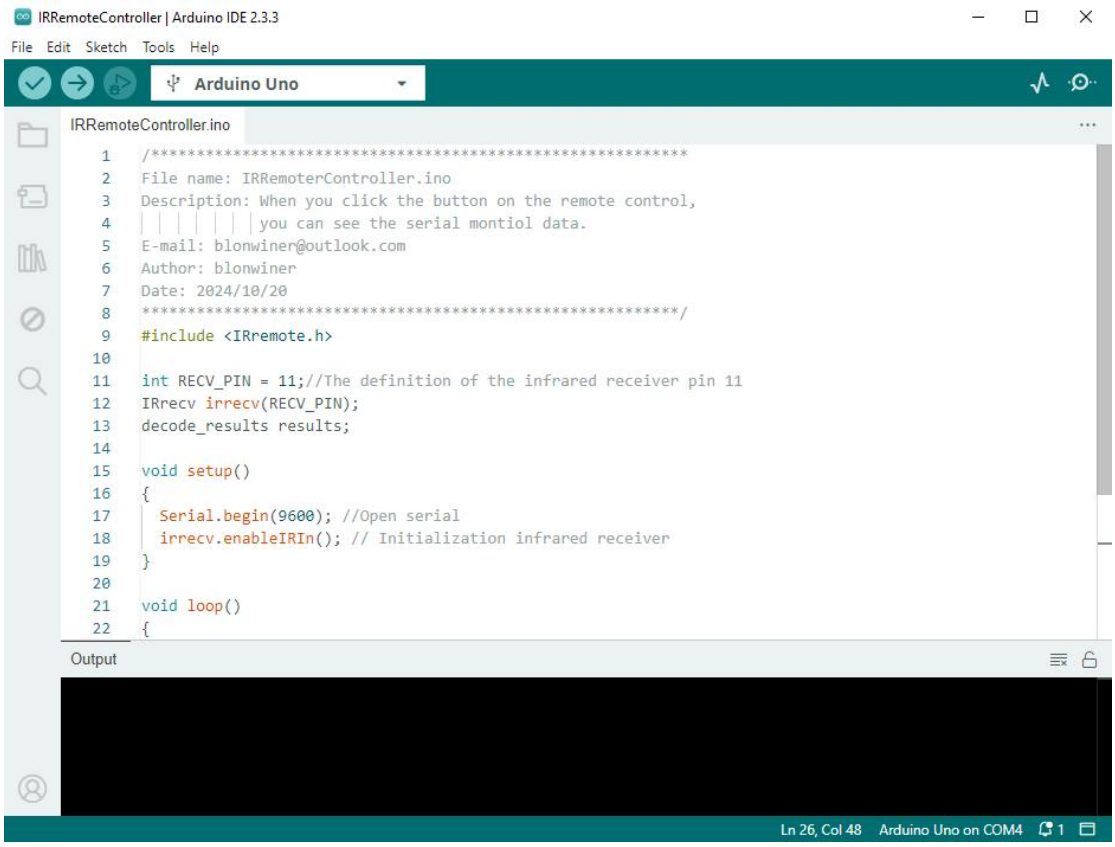
The following figure shows an IR remote controller:



In this experiment, we program the Arduino board to receive the infrared signals, and then send the received data to Serial Monitor. In the program, we use the Arduino-IRremote-master library (provided).

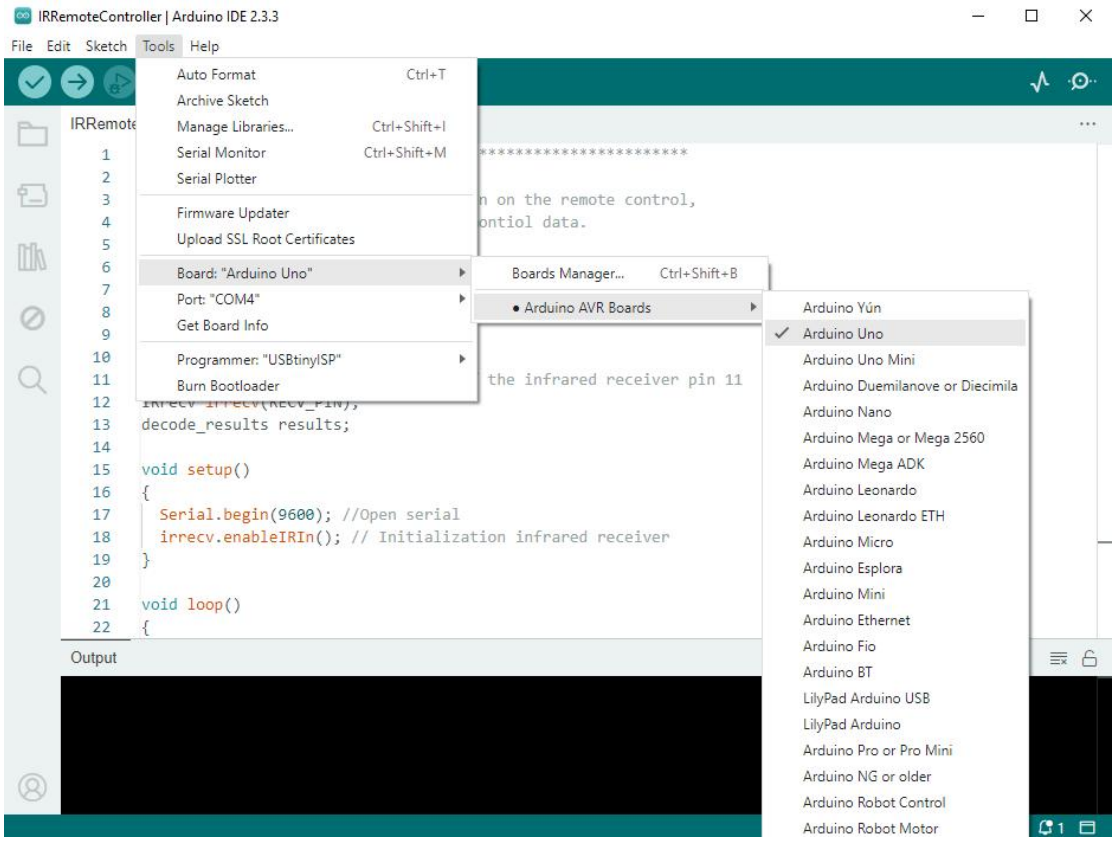
Operating steps

Firstly open the code IRRemoteController.ino we provide.

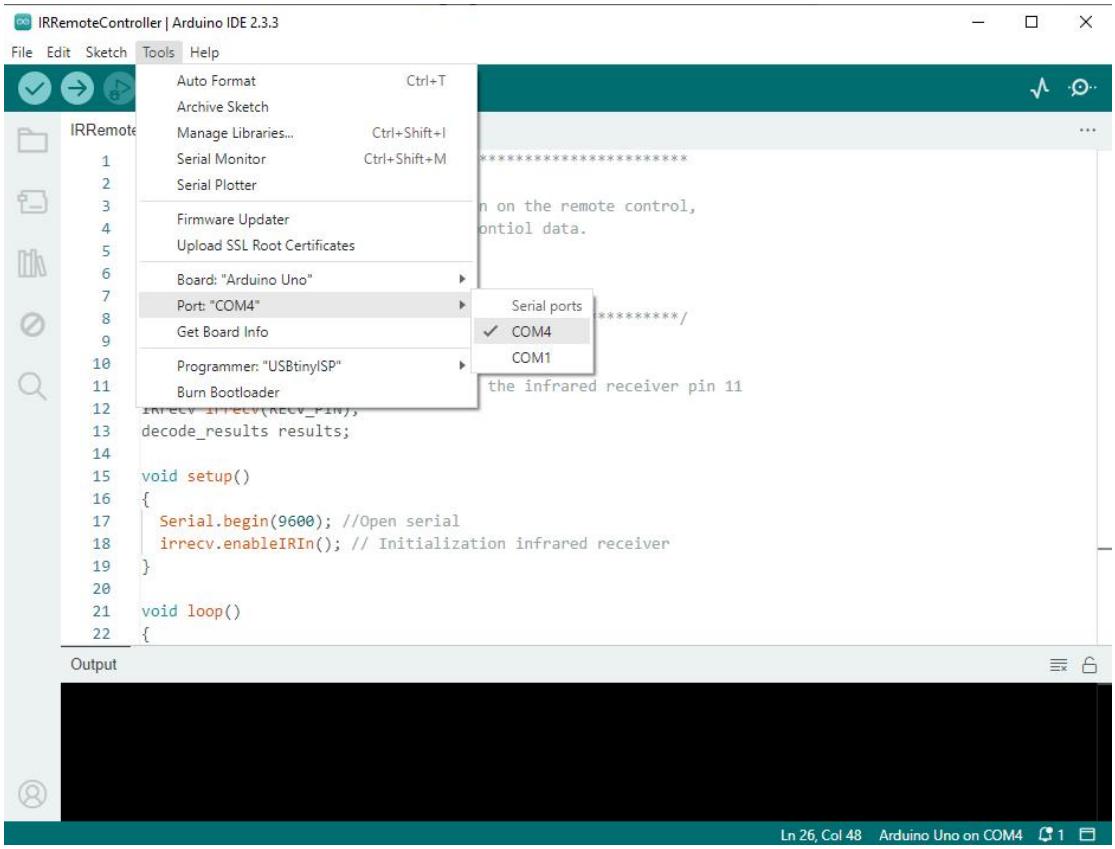


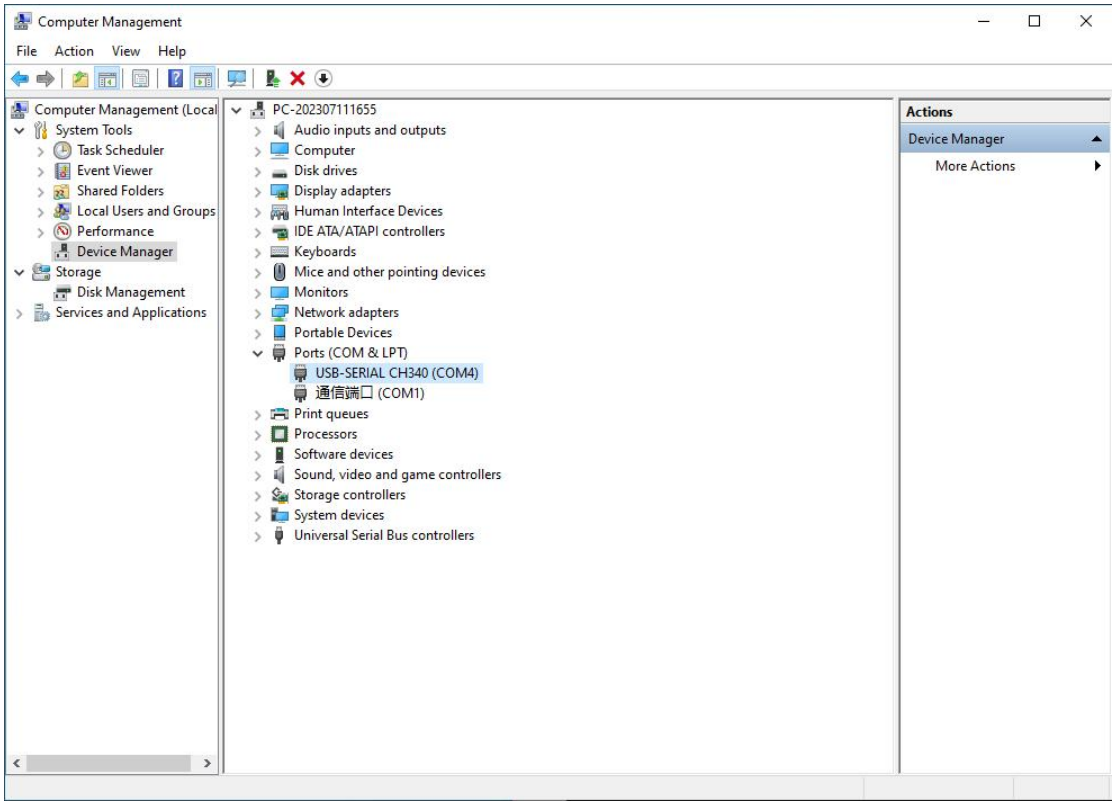
Then connect the robotic arm to the computer with the USB cable. (Note: Do not turn on the power supply to prevent damages of swinging arm. Also pay attention to this in the subsequent operation).

Motor software "Tools"->"Board"->"Arduino/Genuino Uno"

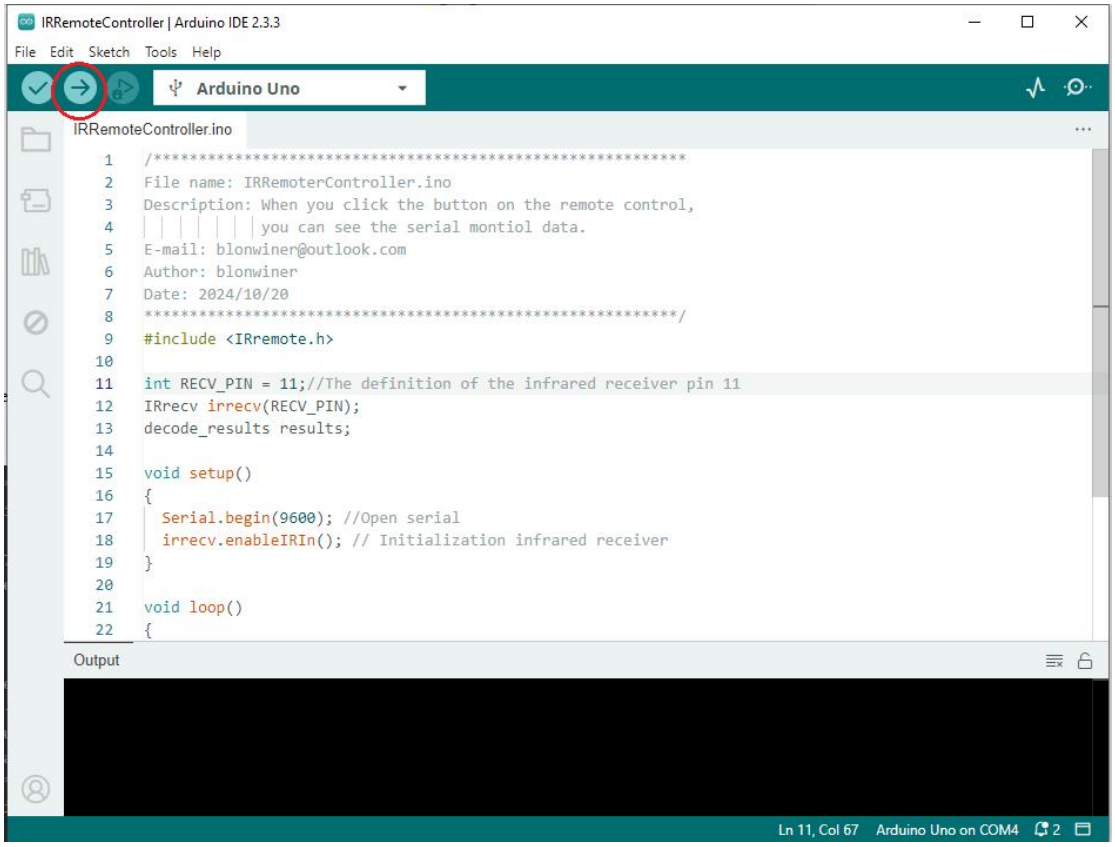


Next, click on "Tools" -> "Port:" -> "COM4" (note that the COM4 here may be recognized differently on different computers, it can be COM1, COM2 or COM3 and so on.)

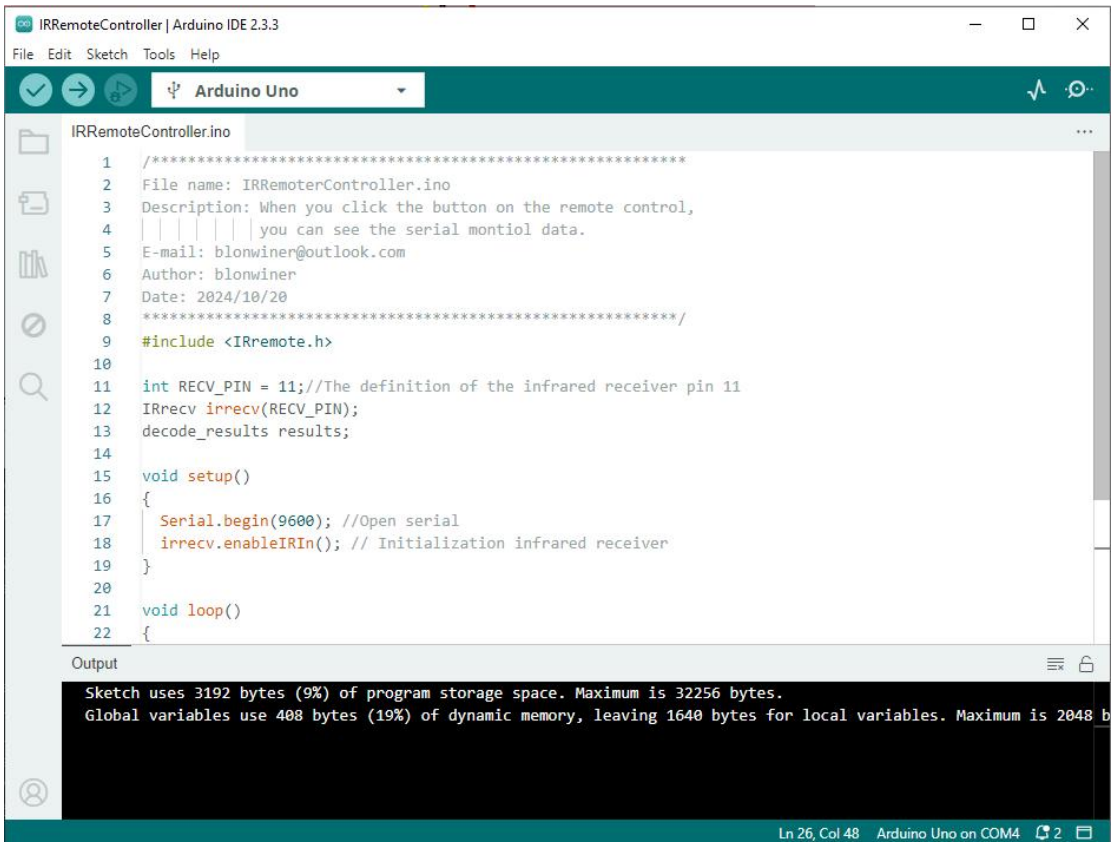




Click "Upload" to upload the code to UNO, as shown below:

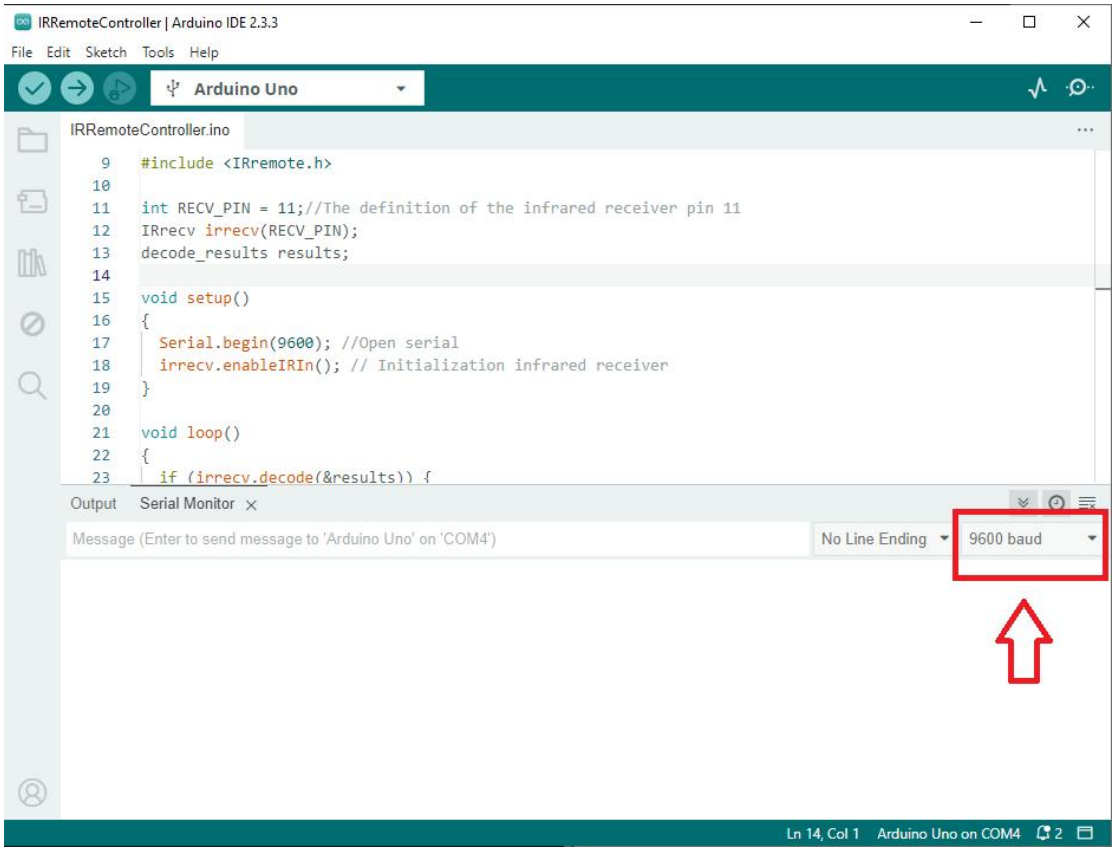


When the software prompts the following information, the code upload is complete.

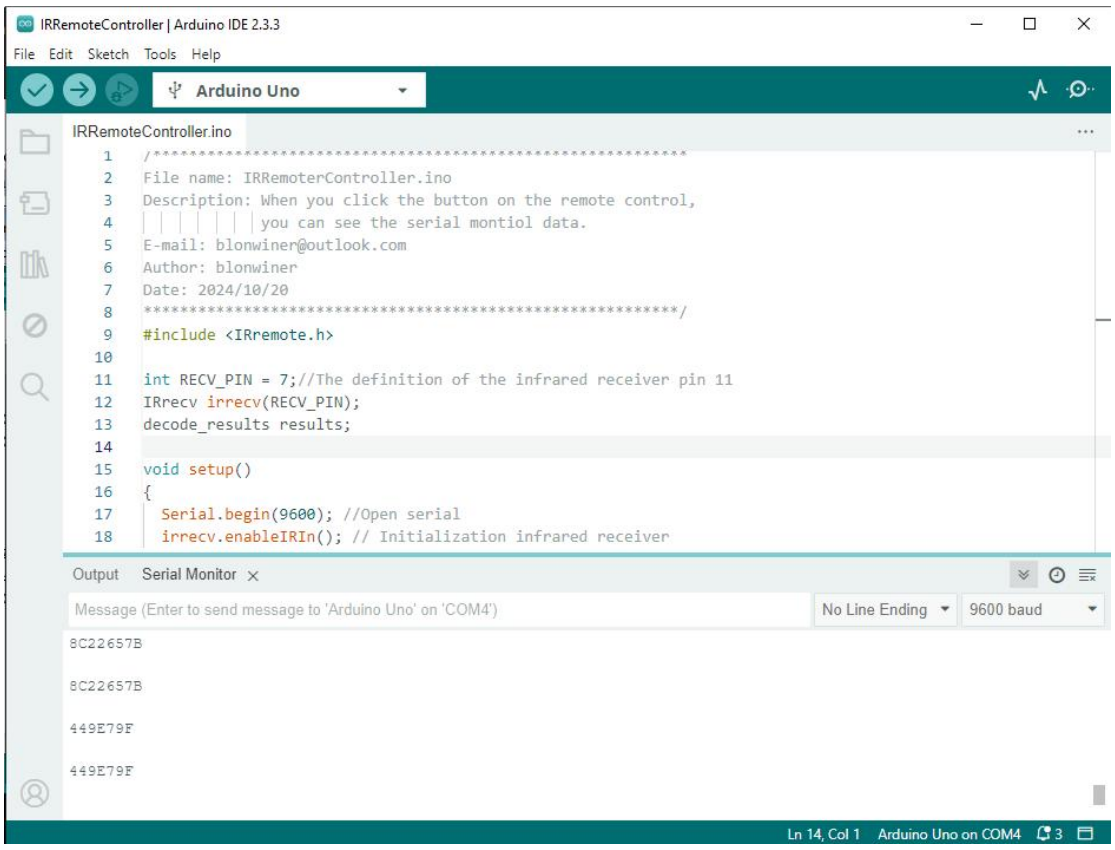


Compile the program and upload to Arduino UNO board

Now, press a button on the remote controller, and you will see the button number displayed on Serial Monitor.



Now, press a button on the remote controller, and you will see the button number displayed on Serial Monitor.

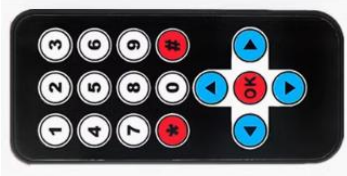


Note: The remote control needs to be facing the signal receiving port of the robotic arm. Other angles of the robot arm will not receive the remote control signal.

Lesson 8 Control Robot by IR Remote

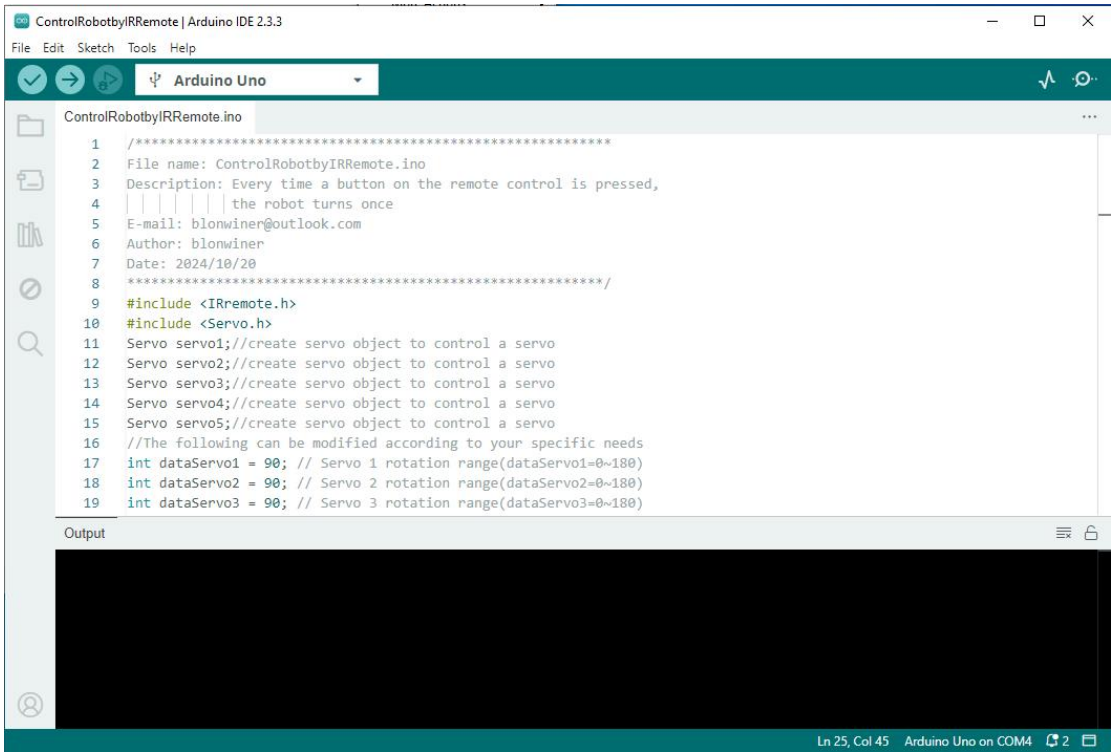
In this lesson, the remote control controls the movement of the robotic arm.

8.1 Components used in this course

Components	Quantity	Picture
BLONWINER Robot	1	
Micro USB Cable	1	
Remote Controller	1	

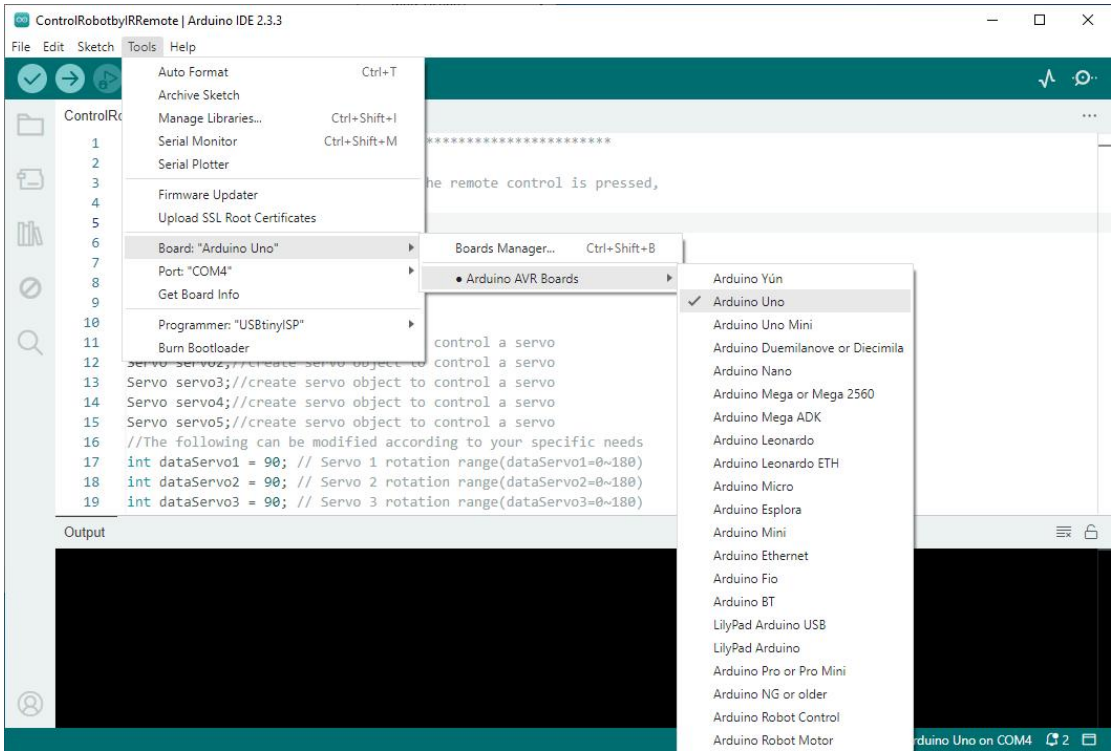
Operating steps

Firstly open the code ControlRobotbyIRRemote.ino we provide.

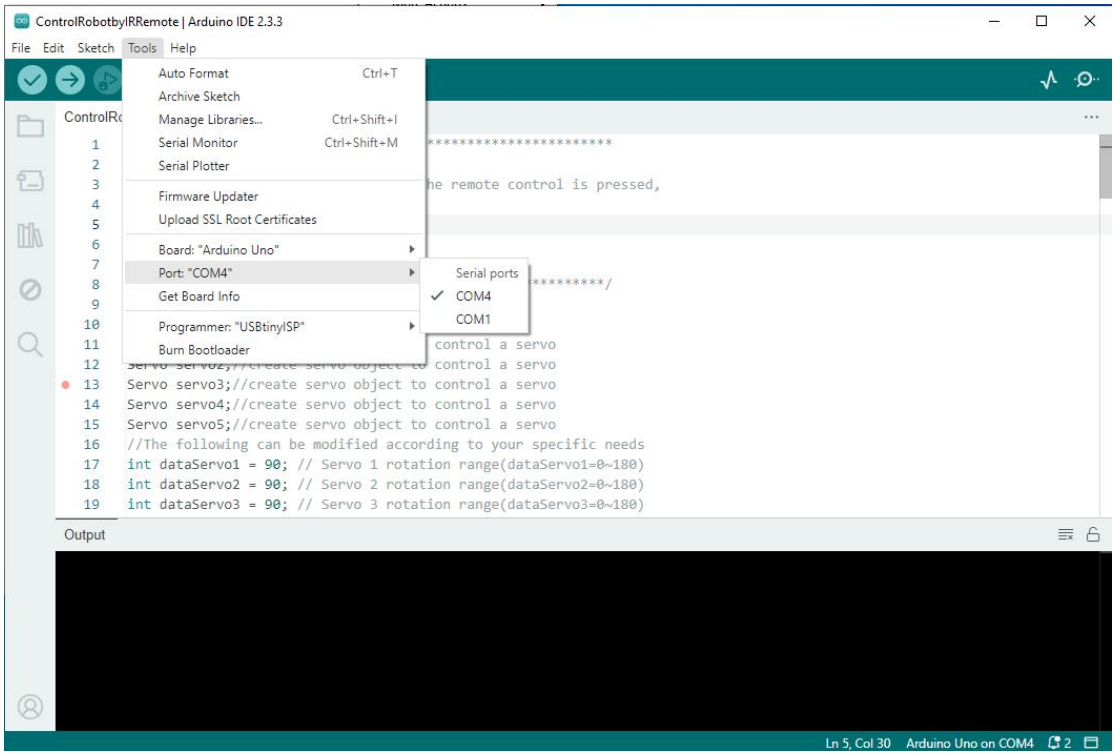


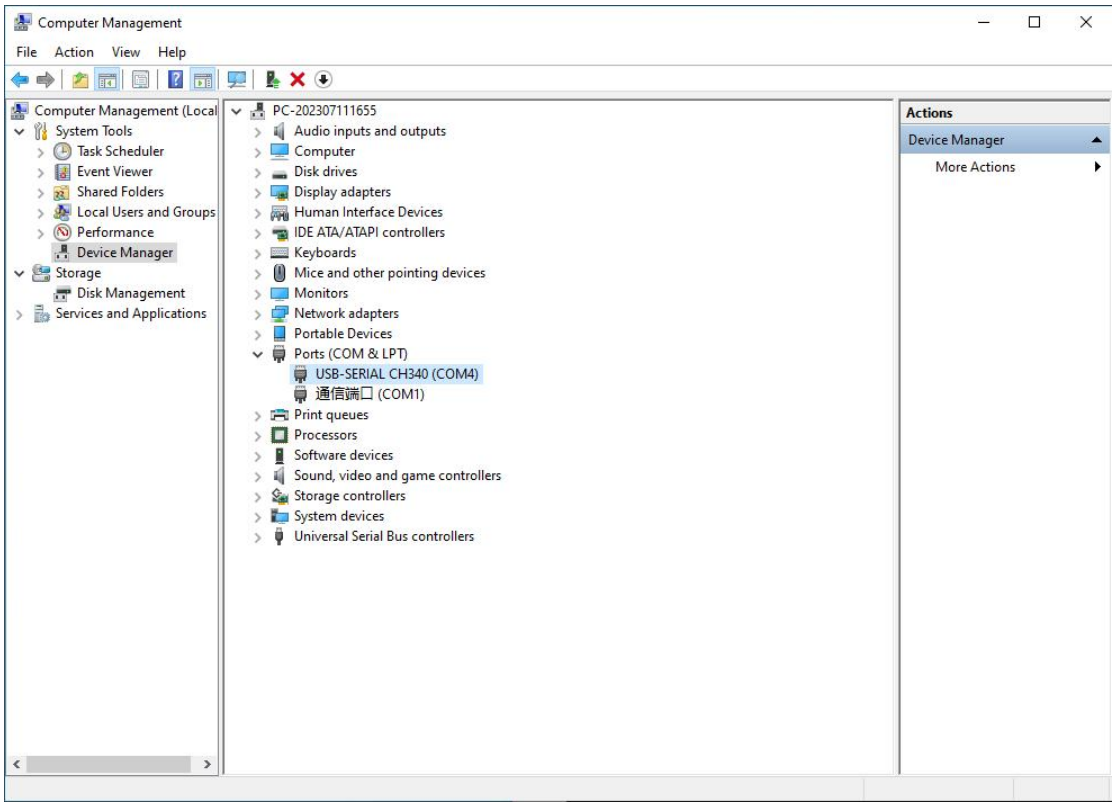
Then connect the robotic arm to the computer with the USB cable. (Note: Do not turn on the power supply to prevent damages of swinging arm. Also pay attention to this in the subsequent operation).

Motor software "Tools"->"Board"->"Arduino/Genuino Uno"

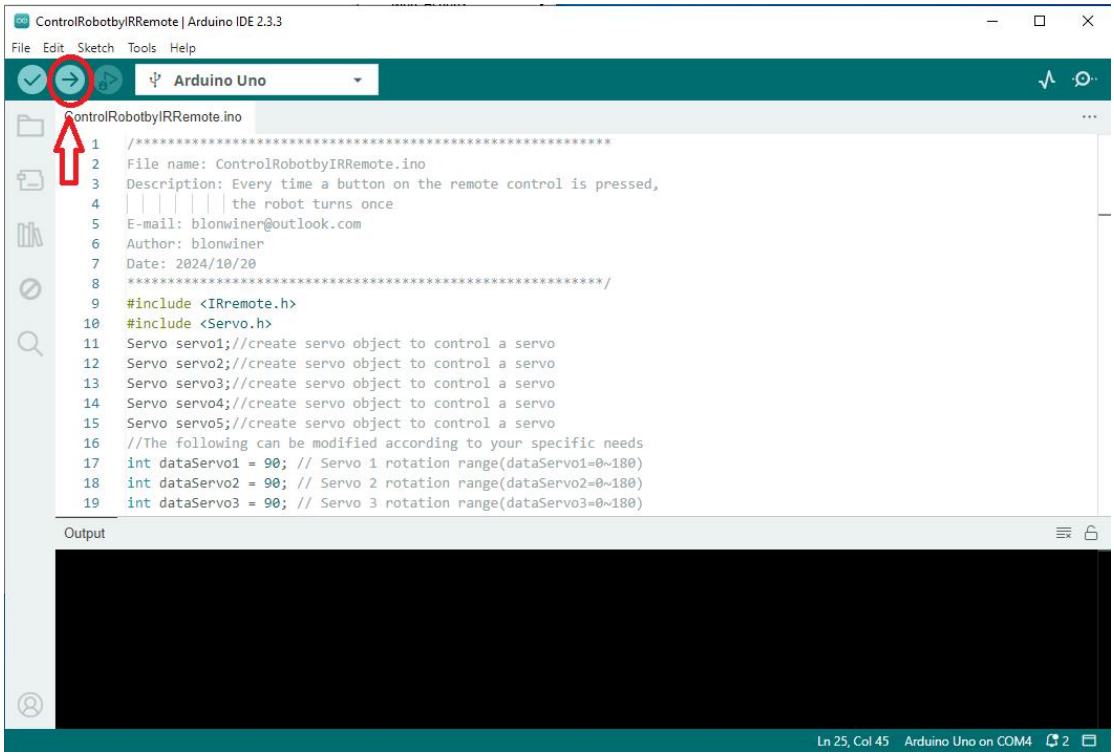


Next, click on "Tools" -> "Port:" -> "COM4" (note that the COM4 here may be recognized differently on different computers, it can be COM1, COM2 or COM3 and so on.)

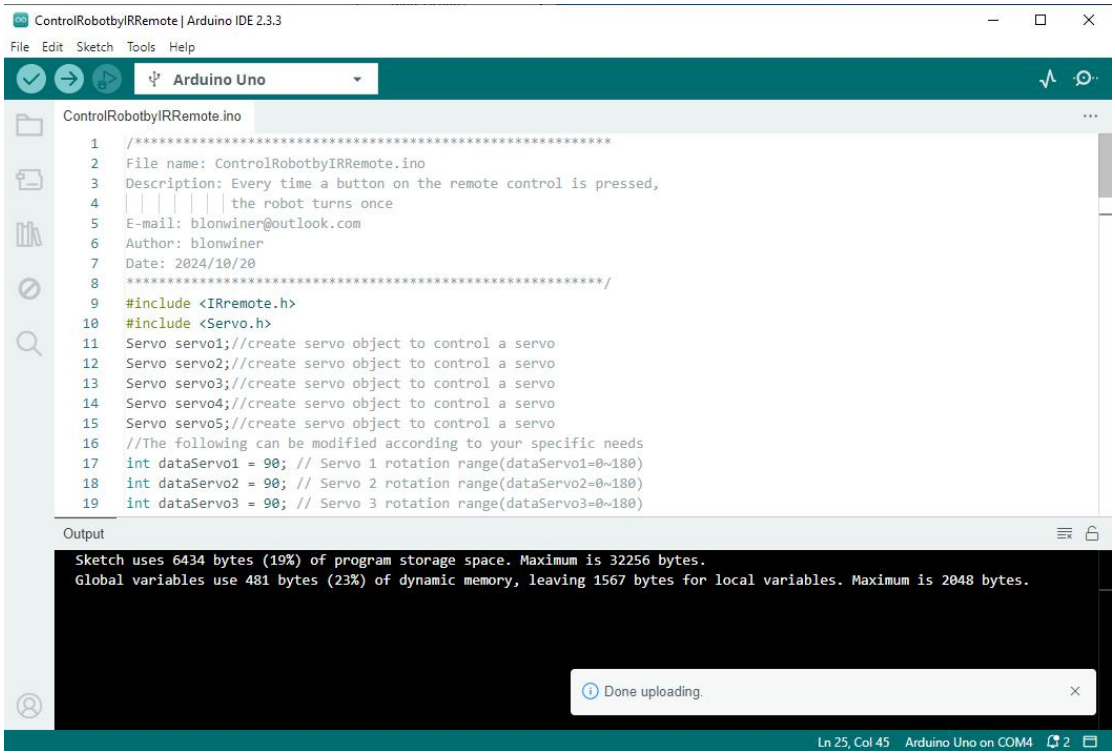




Click "Upload" to upload the code to UNO, as shown below:



When the software prompts the following information, the code upload is complete.



Compile the program and upload to Arduino UNO board

Now, press a button on the remote controller, and the robot turns once.

Note: Each time you press the button, the robot will turn once. If you keep pressing the button, the robot will only turn once

Note: The remote control needs to be facing the signal receiving port of the robotic arm. Other angles of the robot arm will not receive the remote control signal.

If you encounter any problems in the process of learning the robot, please contact us by email.

blonwiner@outlook.com

We would be very happy if you could give me a 5 star review with us.