Quadruped Bionic Spider Robot Tutorial

Perface

Our Company

ACEBOTT STEM Education Tech Co.,Ltd

Founded in China's Silicon Valley in 2013, ACEBOTT is a STEM education solution leader We have a team of 150 individuals, including members from research and development, sales, and logistics. Our goal is to provide high-quality STEM education products and services to our customers. We are working together with STEM education experts and our business partners to produce successful STE products together Our self-own factory also provides CEM services for our clients including Logo customization on product packaging and PCB.

Our Tutorial

This course and quadruped robot learning kit is designed for 8+ children and teenagers to learn more about ESP8266 controller board and quadruped robot knowledge, and electronic hardware. If you like to learn quadruped robot knowledge, this kit could provide you the knowledge and steps to build your own quadruped robot.

Through this kit, you can:

1. Learn how to effectively use the ESP8266 controller board, including downloading code, understanding its features, and coding in the ACECode.
2. Build a solid foundation in programming with blockly program, as the ESP8266 utilizes the graphical programming language to control circuits and sensors.
3. Explore the working principle of the servo module and understand the collaborative work of multiple servos in the quadruped robot project.
4. Enhance your maker skills by building your own quadruped robot using the ACEBOTT kit, following step-by-step tutorials.
5. In the quadruped robot project, realized the basic functions such as front and back, left and right movement control, left and right rotation control, combined action control, App control , etc.

6. Develop a comprehensive understanding of quadruped robot concept to prepare for more advanced learning in the future.

In summary, the ACEBOTT quadruped robot is an ESP8266-based learning kit specifically designed for beginners. With this kit, users can gain a comprehensive understanding of how controller boards and servos function within the context of a quadruped robot. By following the provided tutorials, individuals of all ages can acquire valuable knowledge about quadruped robot and successfully build their own quadruped robot projects.

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Our experienced engineers are dedicated to promptly addressing any problems or questions you may have about our products. We guarantee a response within 24 hours during business days.

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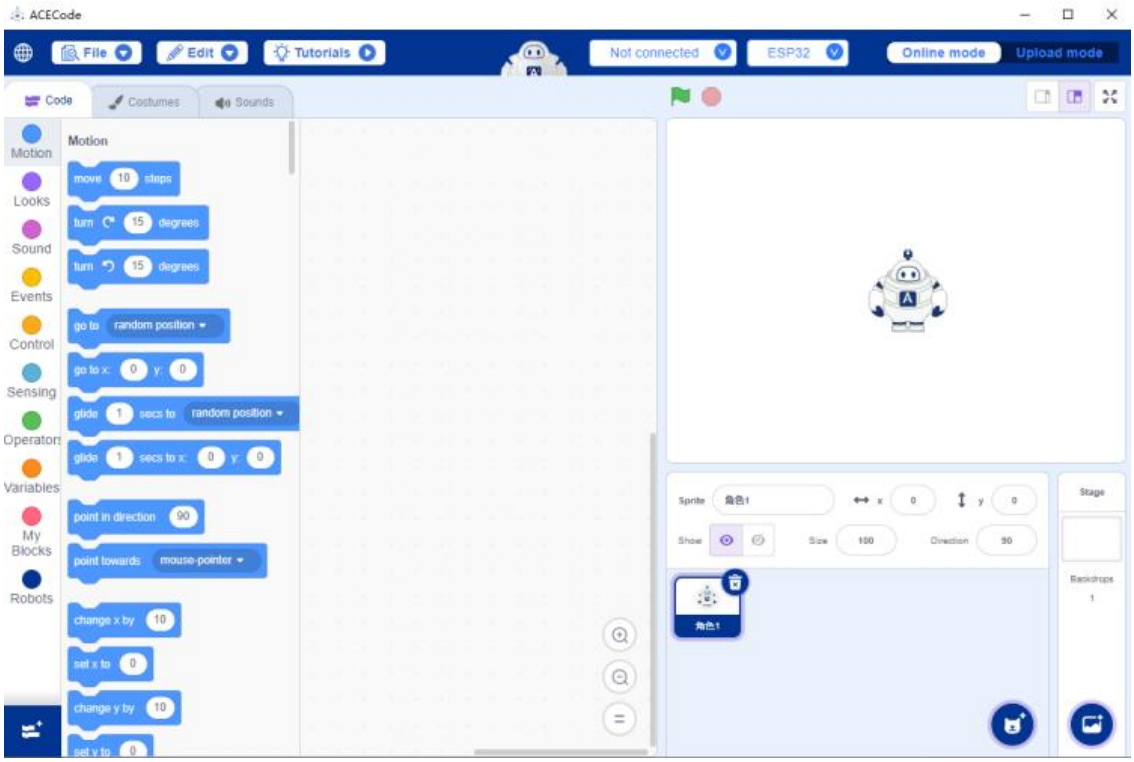
Lesson 1 Software Installation and Hardware Understanding

Ⅰ.Software Installation

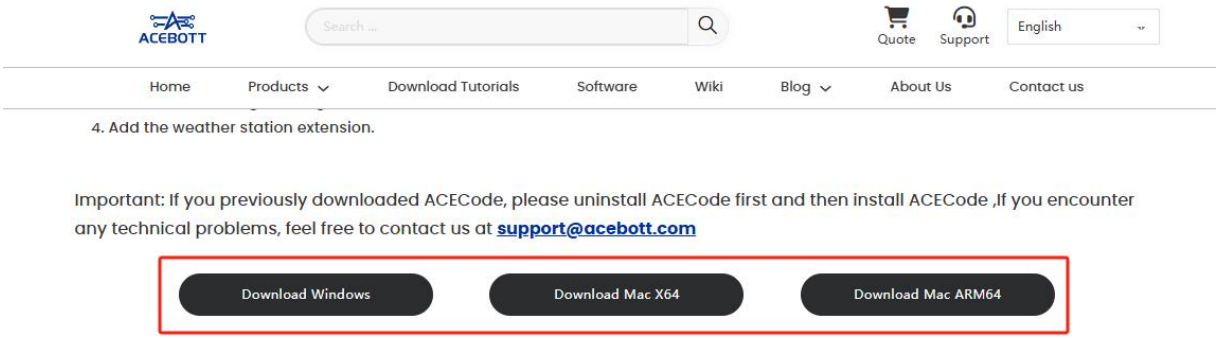
In the quadruped bionic spider project, we mainly use ACECode as the programming software. ACECode is a graphical programming software that allows users to program by simply dragging and dropping blocks, without needing to master complex programming languages. It encompasses all the features of Scratch and additionally includes a robot control module, enabling users to design their own robotic creations through graphical programming, thereby reducing the difficulty of robot programming development.

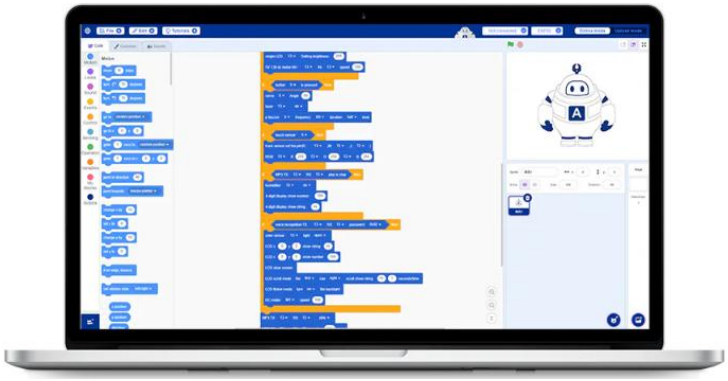
Using ACECode, you only need to write the program code and then upload it to the controller board. The program will instruct the controller board on what actions to perform.



1. Install ACECode

Download the ACECode installer from the official website. Visit the ACECode official website at https://www.acebott.com/pages/software, enter the software download page. Choose the ACECode software version for your corresponding system to start the download.





Attention:

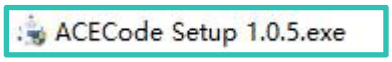
1.This tutorial is applicable to ACECode version 2.0 and above. You can check the software version number in the upper left corner of the ACECode software. Please make sure that the software version you are using meets the requirements.

2. If you need to update the ACECode software version, you can go to the ACEBOTT official website: https://www.acebott.com/pages/software to download the latest ACECode software version.

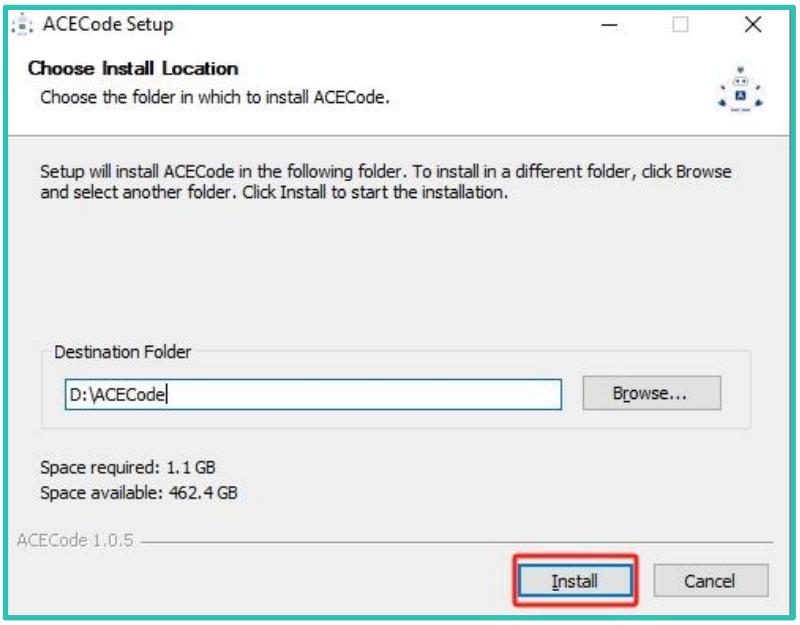
3.If you download a compressed package, please decompress it and then proceed to the subsequent installation steps.

(1) Installation method under Windows system

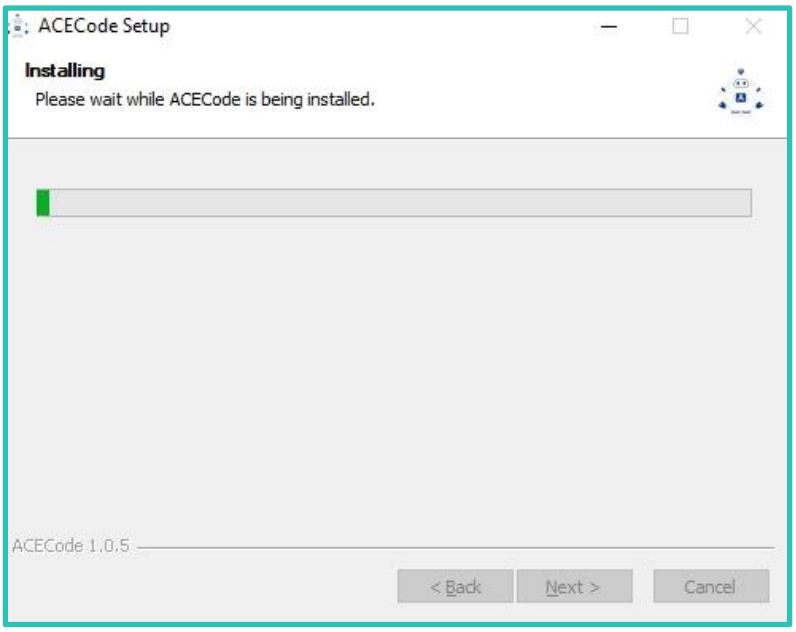
①Double-click the downloaded installation program and follow the instructions below to install ACECode.



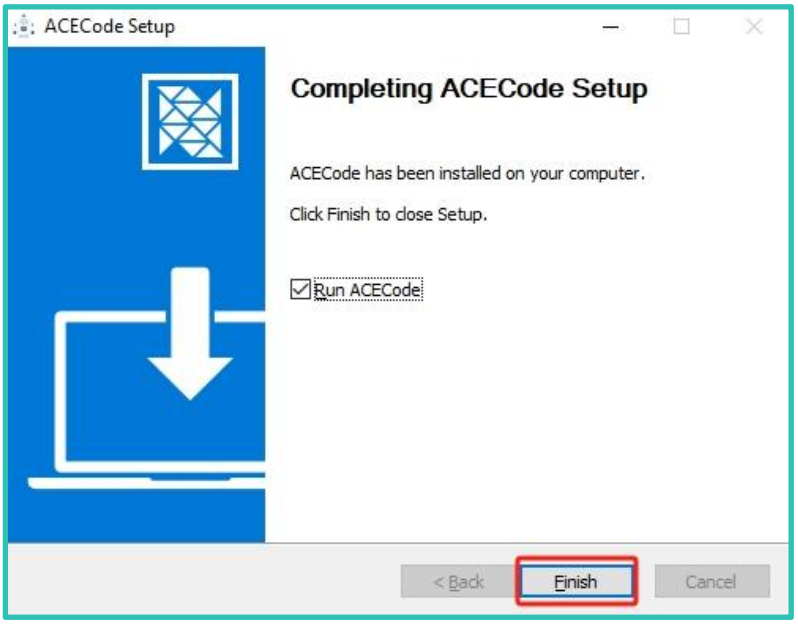
②After clicking on the software, the following screen appears and click "Install".You can choose the default installation path or choose your own software installation route.



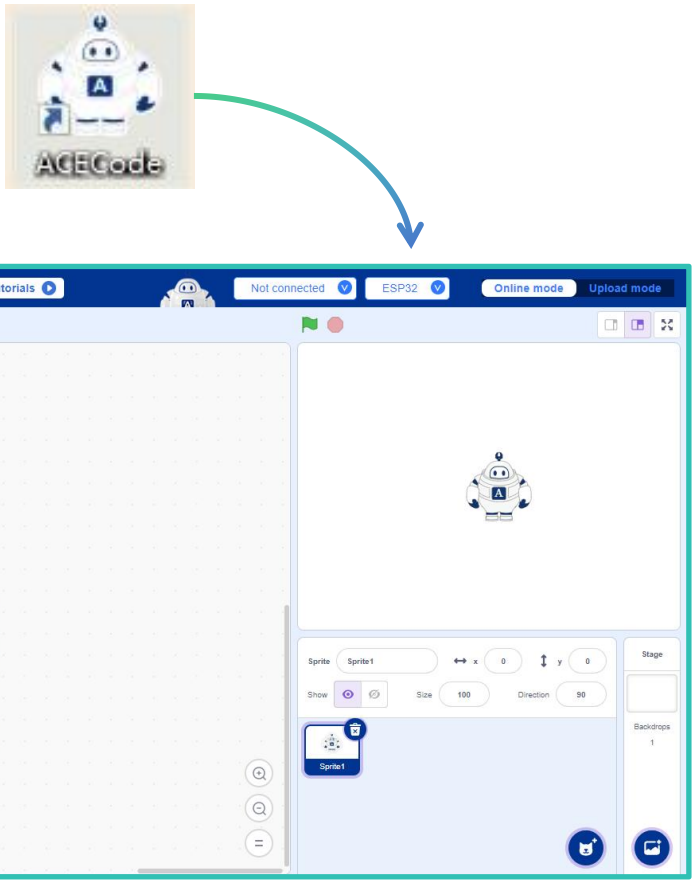
③ACECode is installing.



④Installation is completed.



⑤ Find the shortcut for ACECode on your desktop and double-click to open the ACECode.

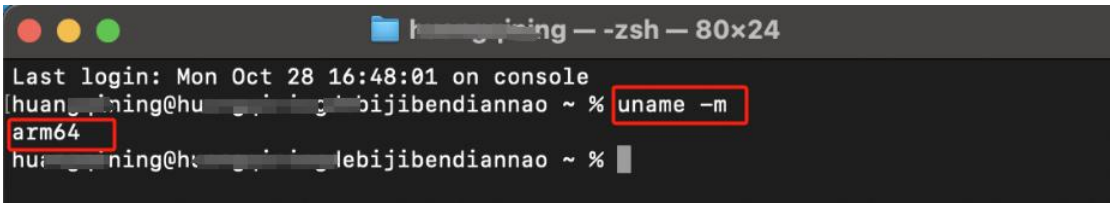


(2) Installation method under Mac system

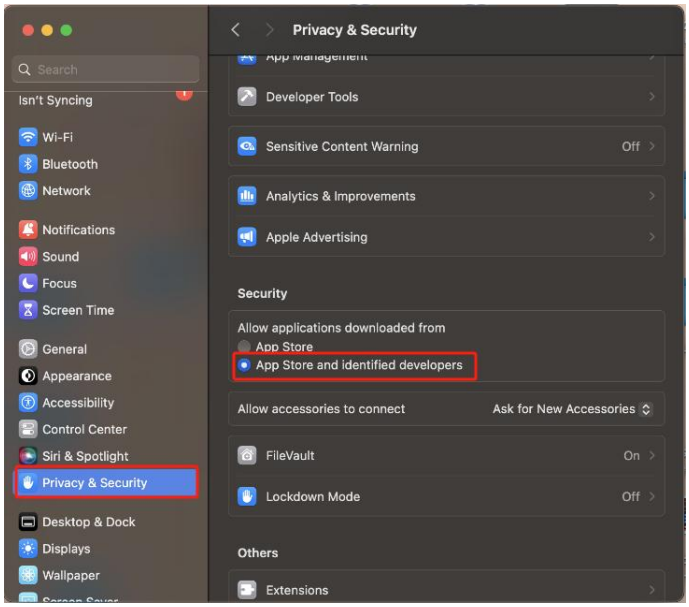
①After the download is complete, the installation package file will appear as shown in the figure. Click to install the software.

Note:

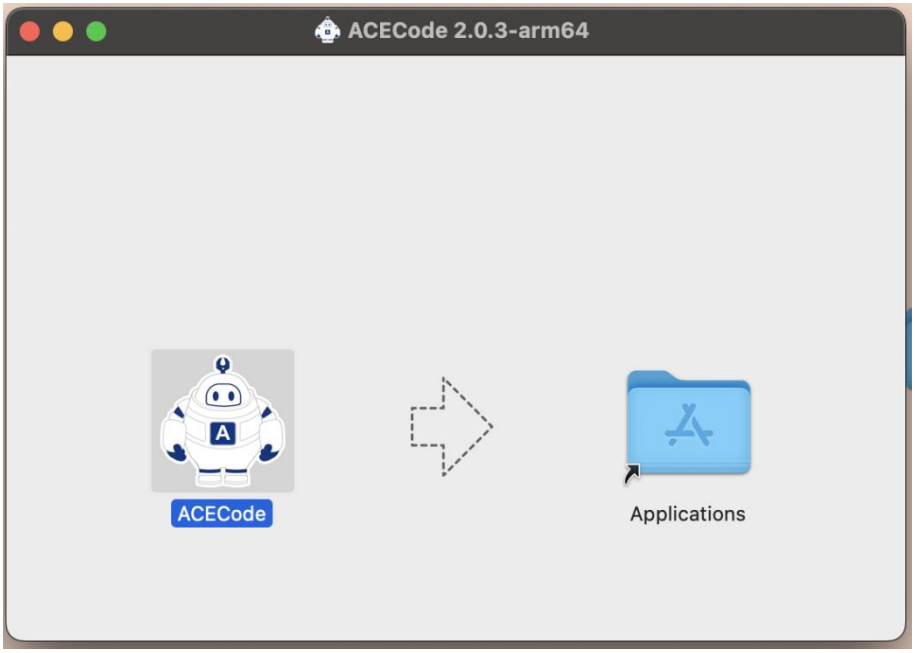
1.Please select the appropriate software version for download based on the type of processor your Apple computer is equipped with (ARM or Intel).You can send the "uname -m" command through the terminal to query the processor type.



2. Before installation, you need to set installation permissions. Click on the "Apple Menu", open "System Settings" -> "Privacy & Security" -> "Security", and set it to "App Store and identified developers".

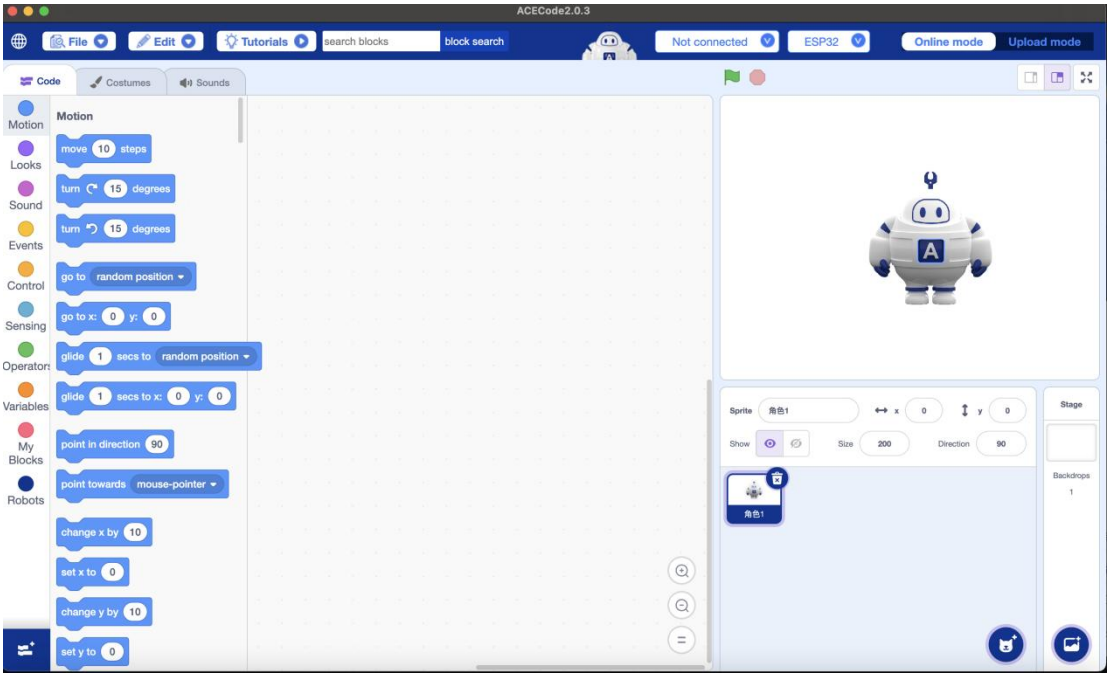


②When you click on the installation package, the installation interface will appear. Simply select the ACECode icon and move it to the Applications folder to install the program.



③After the ACECode software is installed, locate ACECode in the workspace and open it.

④After launching the program, you will see the following interface.



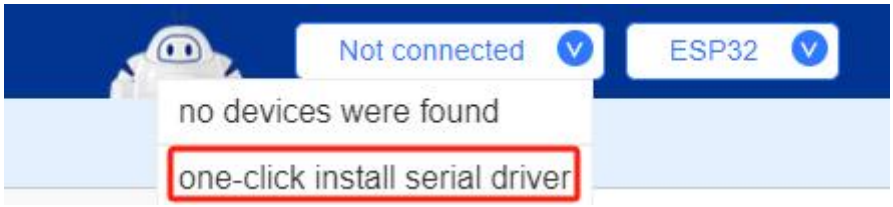
2. Install the serial driver (skip it if installed)

A serial port is a type of computer communication interface commonly used to transfer data between a computer and other devices (such as modems, sensors, printers, microcontrollers, etc.). USB serial ports are the most commonly used communication interfaces.

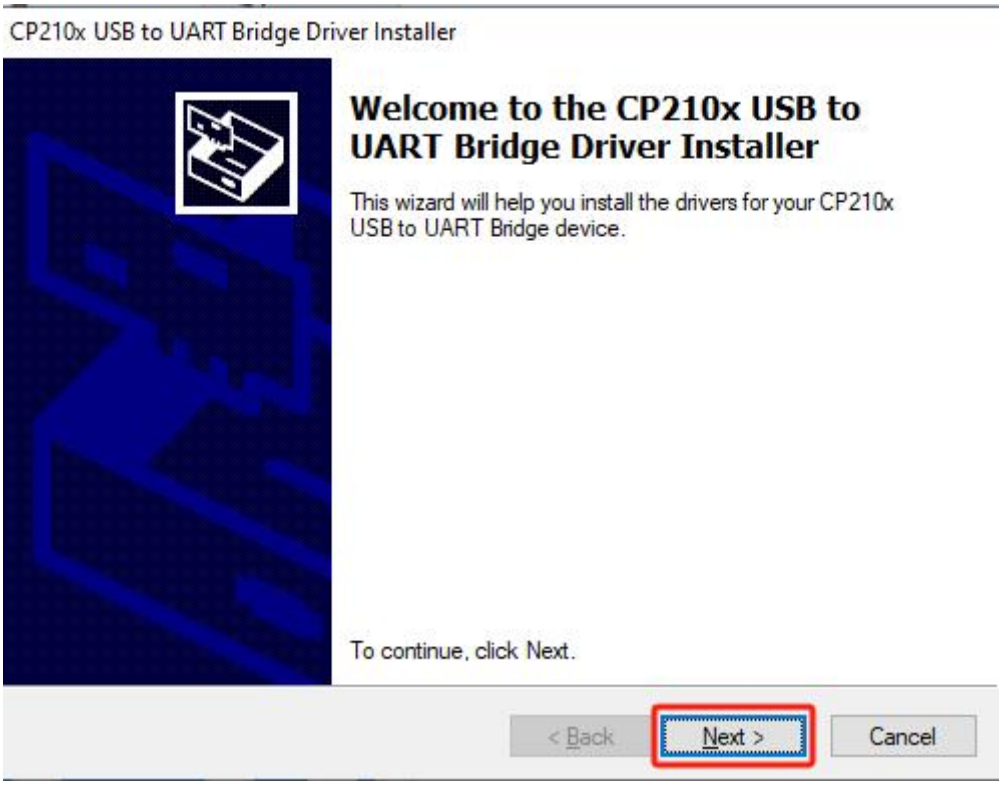
The USB-to-serial chip on the ESP8266 control board is the CP210x, so you also need to install the driver for this chip. Follow the steps below to complete the installation of the serial port.

(1)Driver installation method for Windows systems

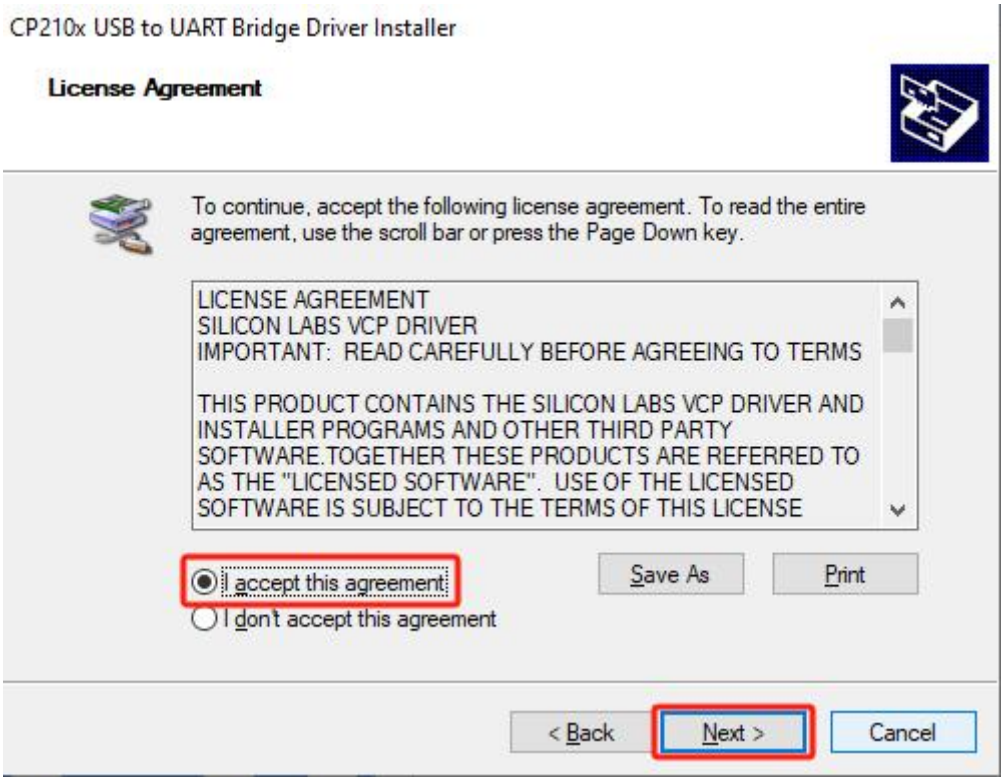
① Open ACECode, click on the serial port connection button, and in the pop-up options, select "One-click to install serial driver." After clicking, it will sequentially install the serial port drivers required for the two controller boards supported by ACECode, ESP8266 and ESP32.



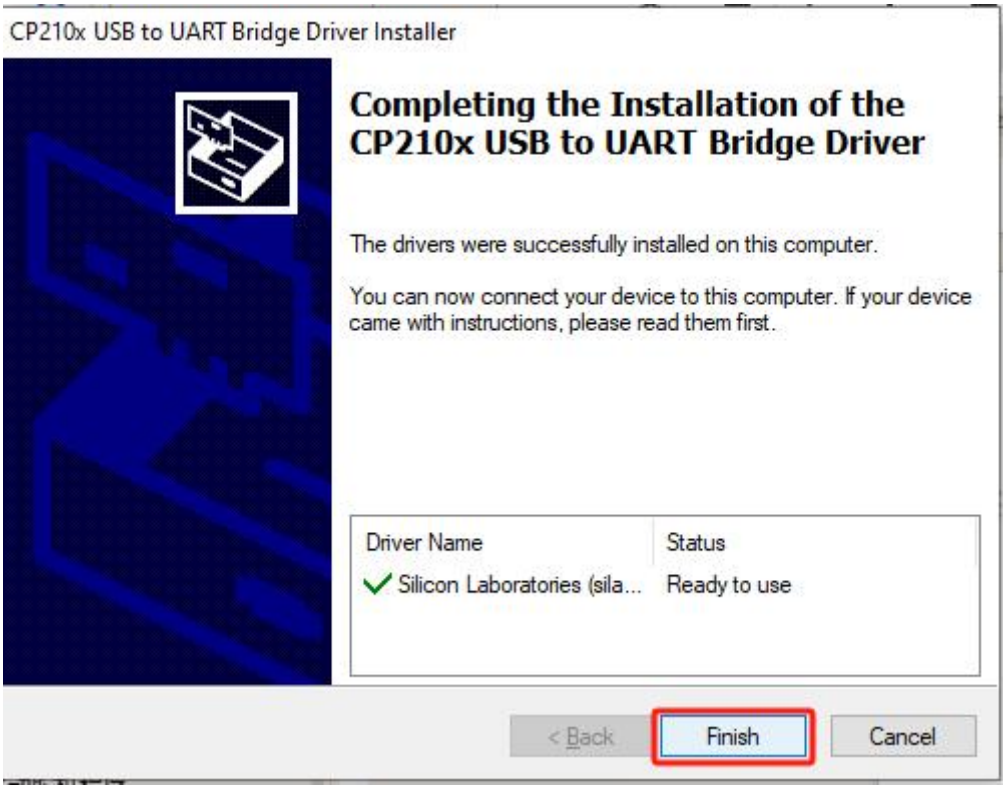
②Click "Next" based on the prompt.



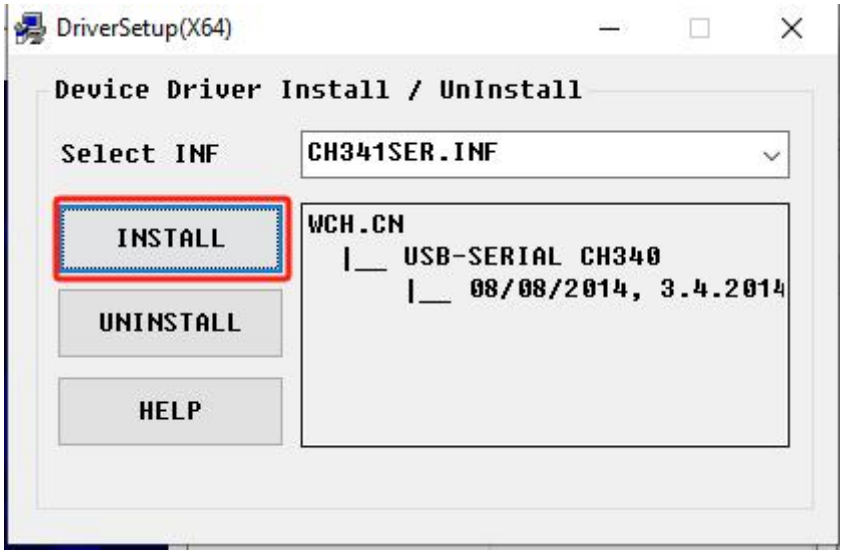
③After clicking "I Accept," click "Next" again.



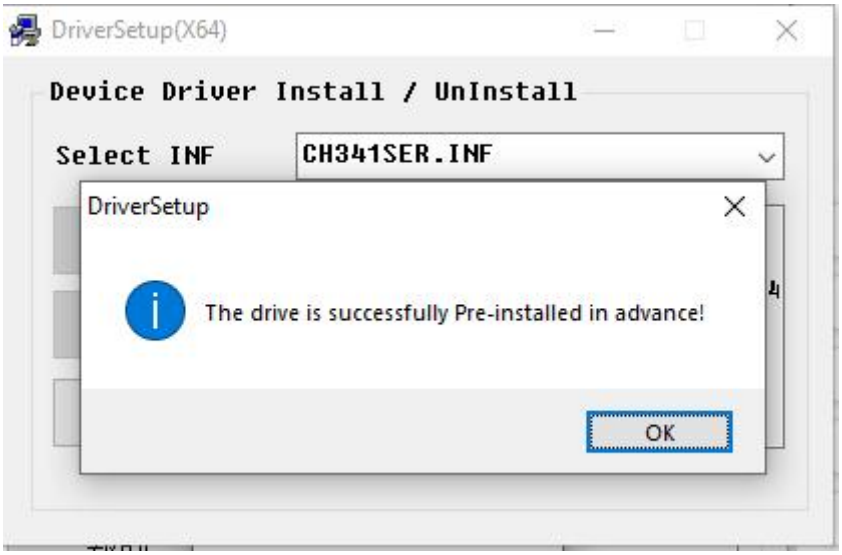
④Click "Finish", the first driver installation is complete.



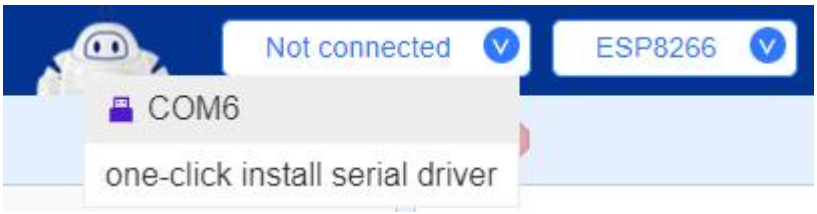
⑤Next, a pop-up window for the installation of the second driver will appear; click "Install."



⑥After the installation is completed, a message indicating that the installation was successful will be displayed.

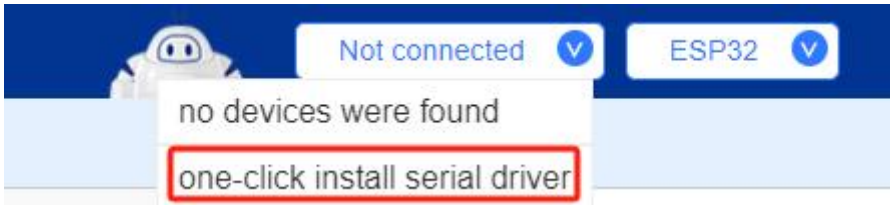


⑦To confirm whether the installation was successful, plug one end of the USB cable into the ESP8266 controller board and the other end into a USB port on the computer. In ACECode, select ESP8266, and then check the serial port connection button. At this point, a new serial port will be added, representing the connected controller board. If this happens, it indicates that the serial port driver has been successfully installed.

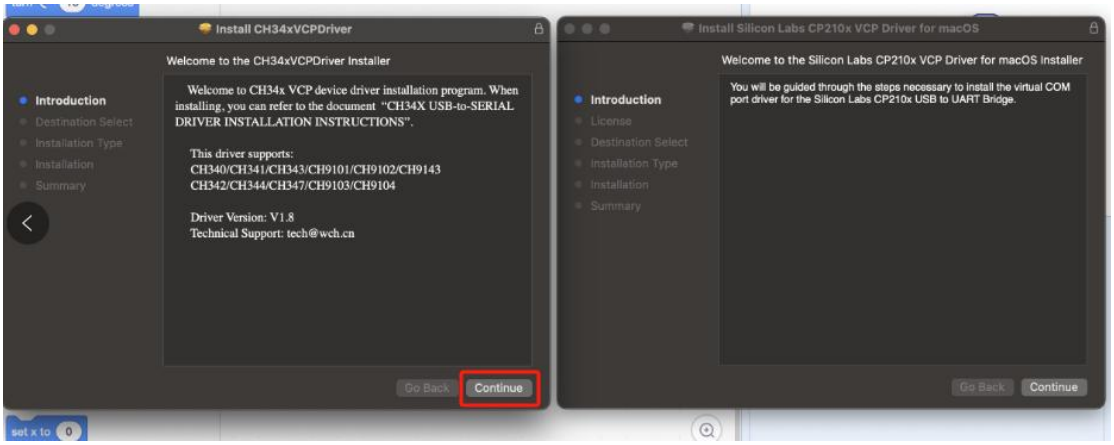


(2)Driver installation method for Mac systems

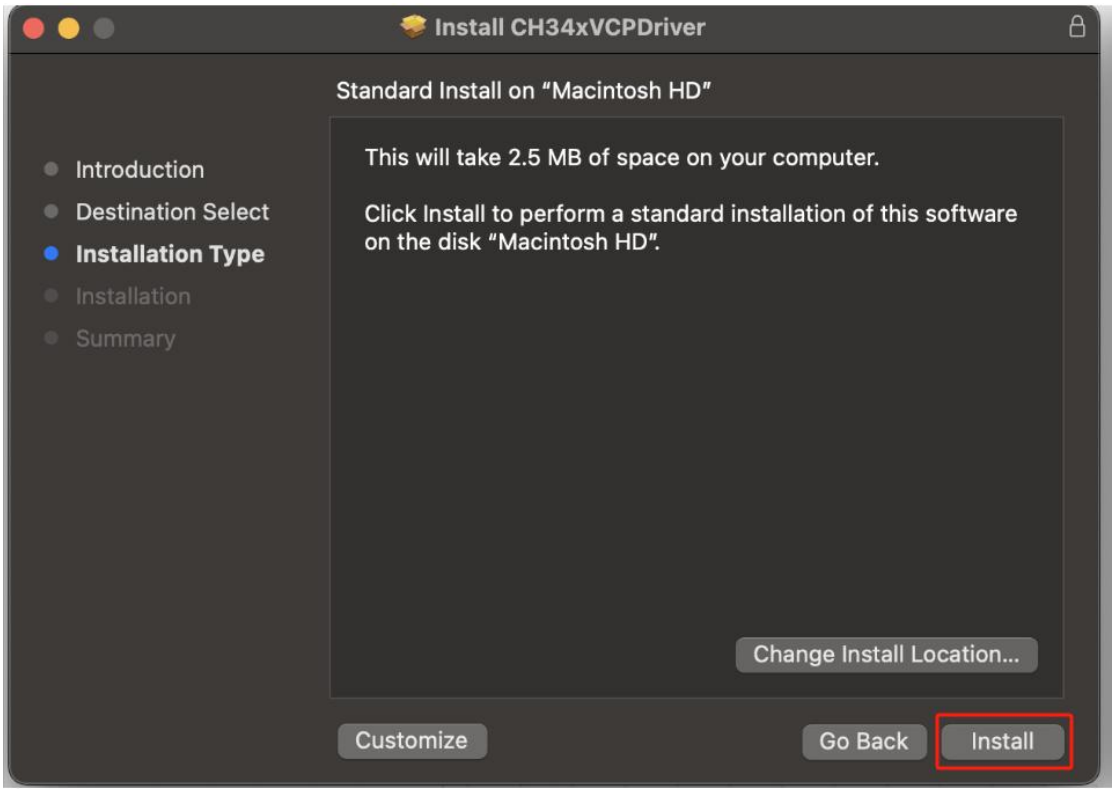
①Open ACECode and click on the serial port connection button. In the pop-up options, select "One-click install serial driver". After clicking, it will display the serial port drivers required for the two controller board supported by ACECode, ESP8266 and ESP32.

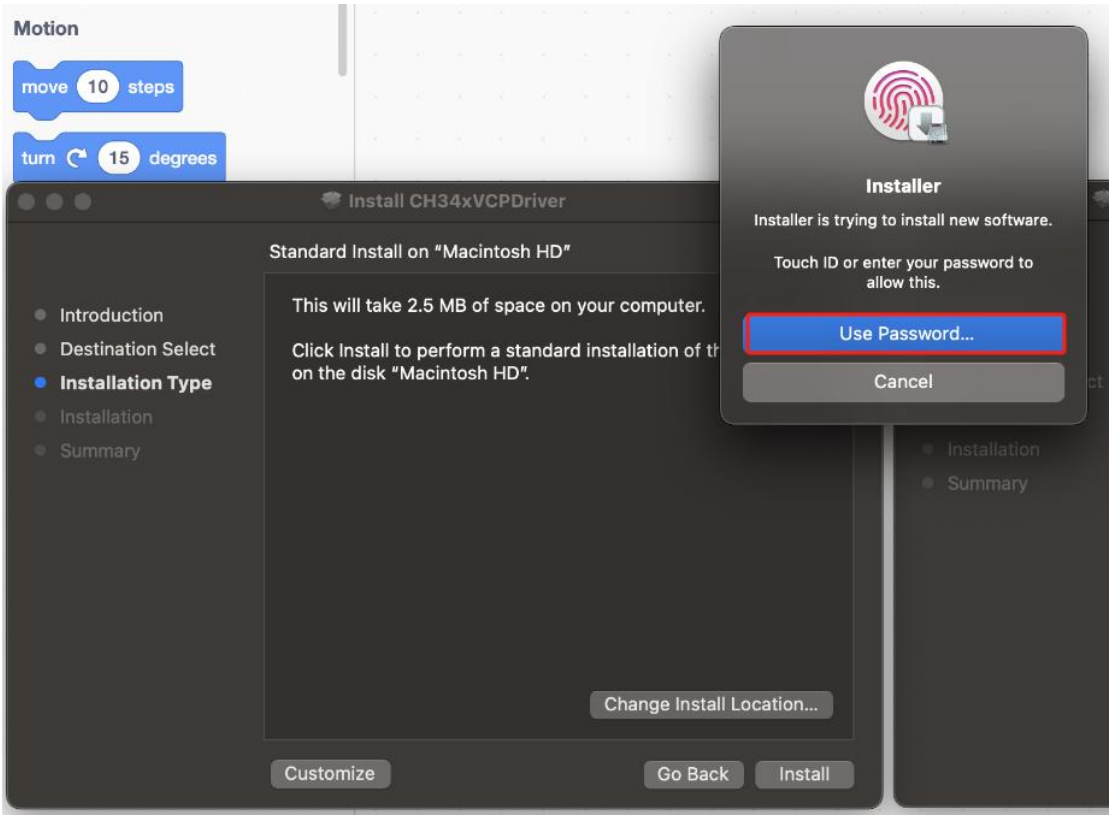


②Follow the prompts to install the two serial port drivers in sequence. Start by installing the CH340 driver and click "Continue".

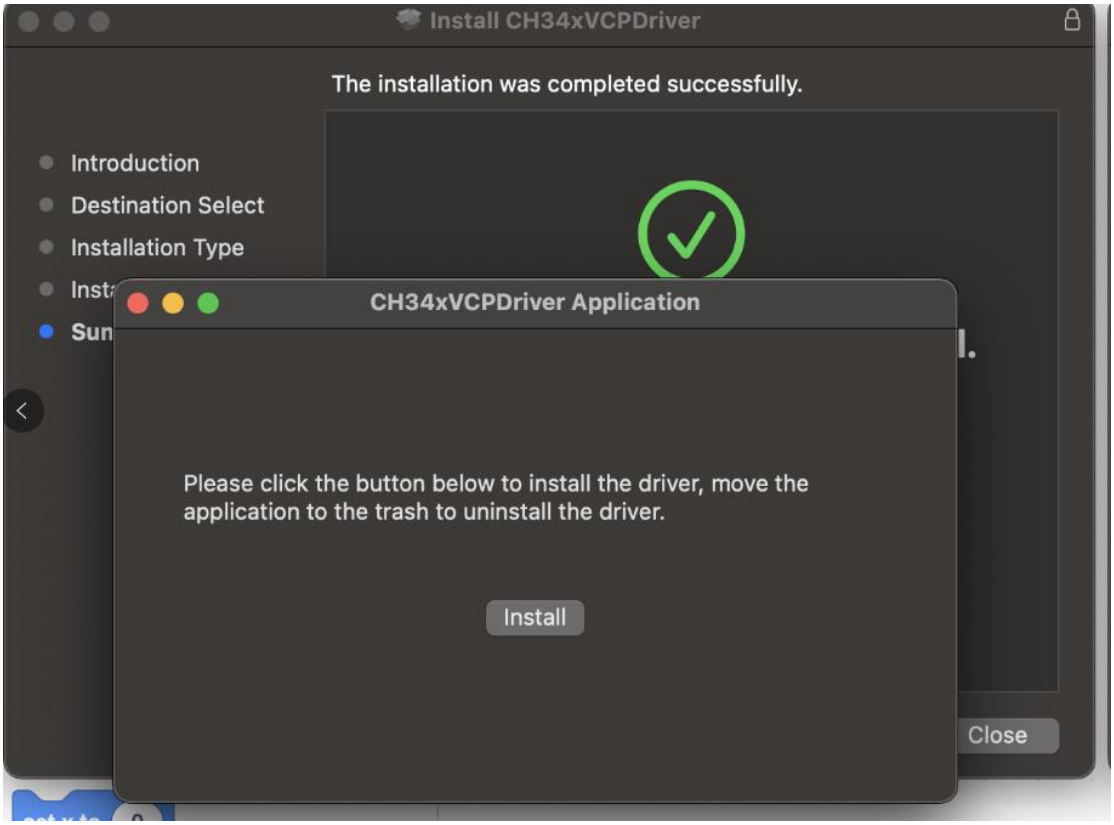


③Click "Install" and, as prompted, enter your fingerprint or password.

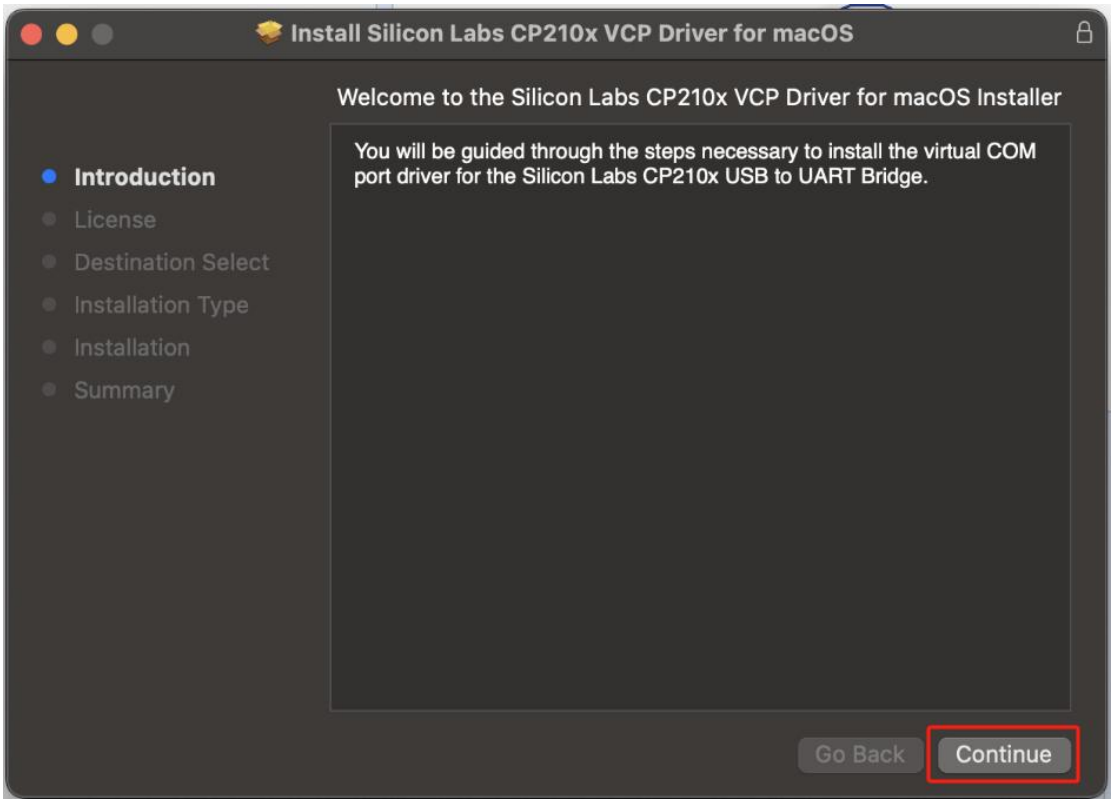


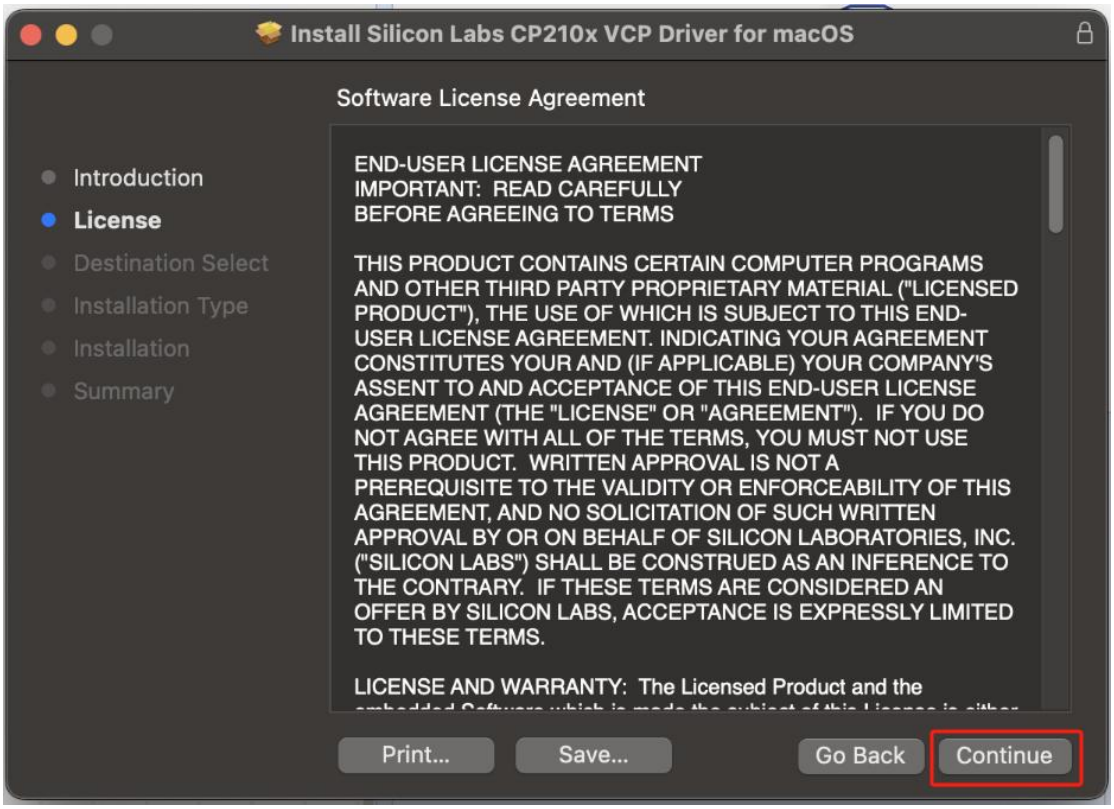


④The CH340 driver has been successfully installed. Close the window.



⑤Next, install the CP210 serial port driver. After clicking "Continue," click the "Agree" button again.


Install Silicon Labs CP210x VCP Driver for macOS
Welcome to the Silicon Labs CP210x VCP Driver for macOS Installer
Introduction
License
Destination Select
Installation Type
Installation
Summary
You will be guided through the steps necessary to install the virtual COM port driver for the Silicon Labs CP210x USB to UART Bridge.
Go Back
Continue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License
Destination Select
Installation Type
Installation
Summary
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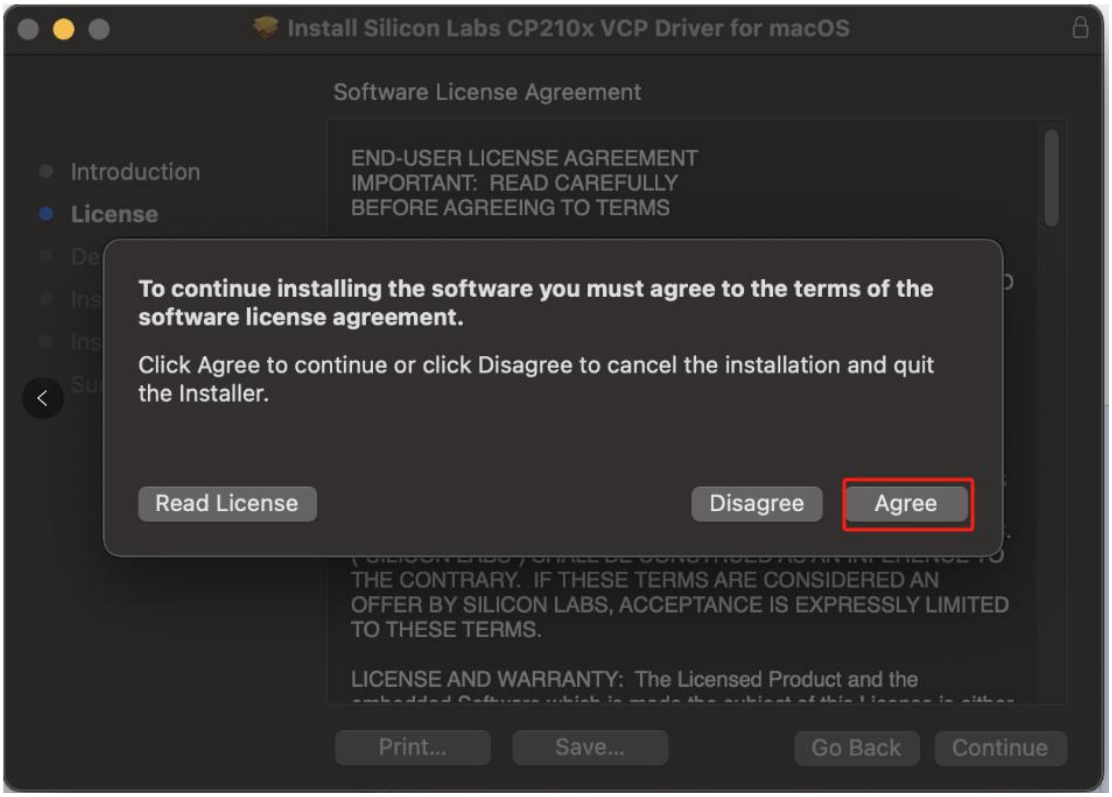
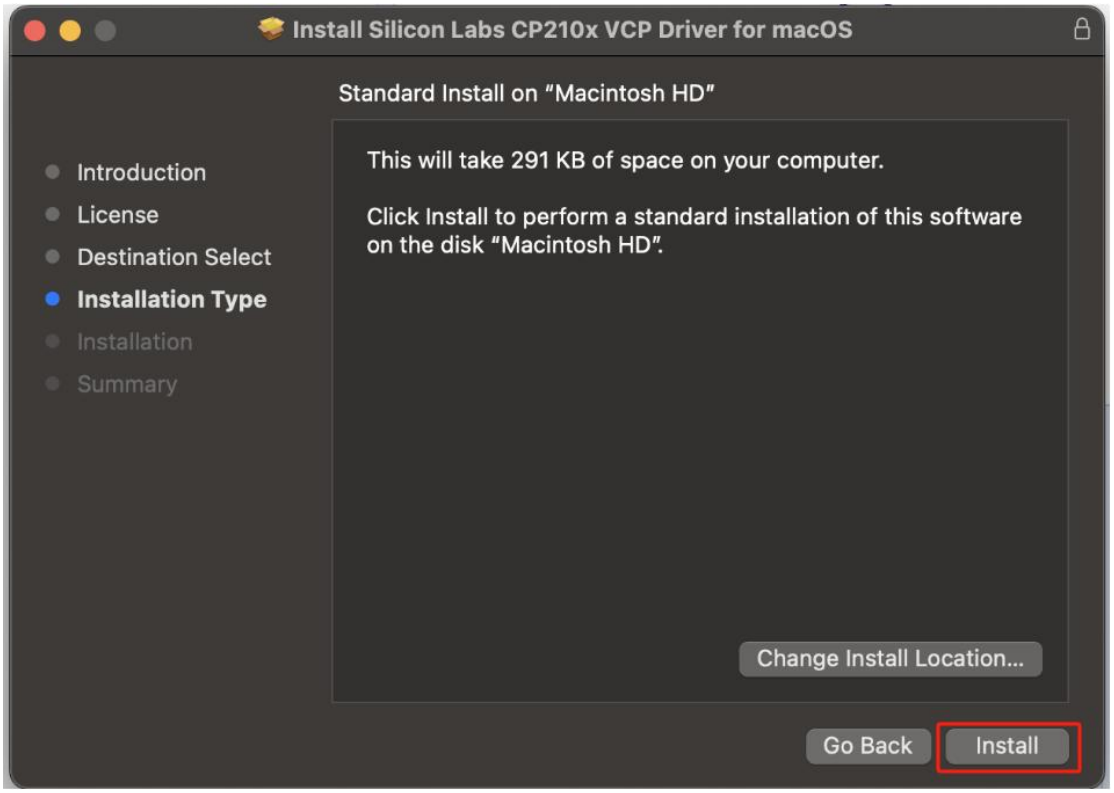
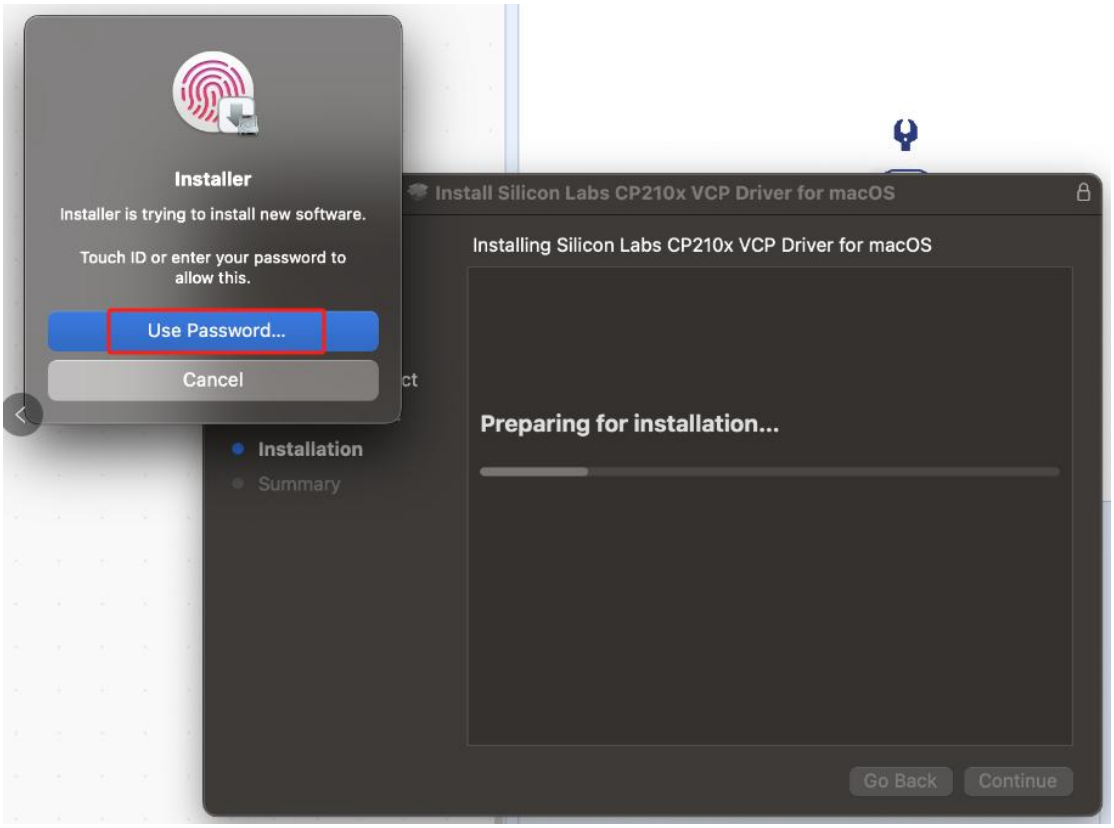
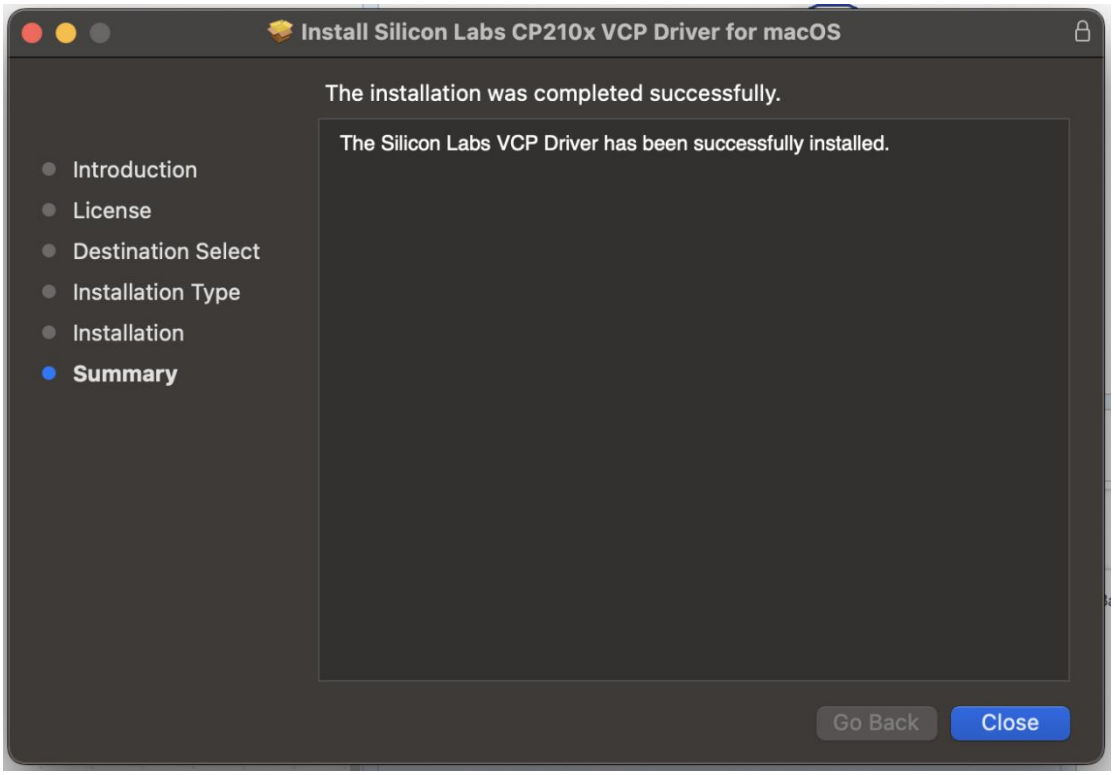


⑥ Click the "Install" button and, following the prompts, enter your fingerprint or password.



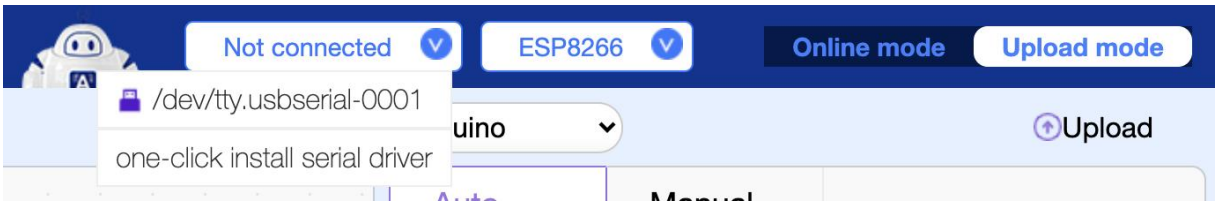


⑦ After the installation is complete, you will be prompted that the installation was successful. Close the page.



⑧To confirm whether the installation was successful, plug one end of the USB cable into the ESP8266 controller board and the other end into a USB port on your computer.

Then, check the serial port connection button in ACECode. If a new serial port appears, representing the connected control board, this indicates that the serial port drivers have been successfully installed.

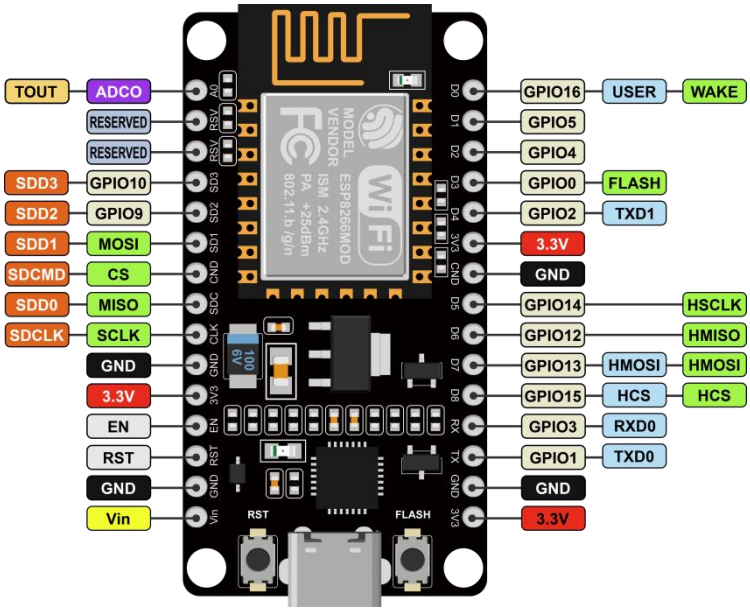


Ⅱ.Hardware Knowledge

1.Recognize ESP8266

ESP8266 is a low-power, high-performance WiFi module. It integrates WiFi function and TCP/IP protocol stack, and can communicate with the main controller through the serial port. It is a module suitable for mobile devices, wearable electronics, and iot applications.

ESP8266 controller board includes: ESP-01, ESP-12E, NodeMCU and so on.

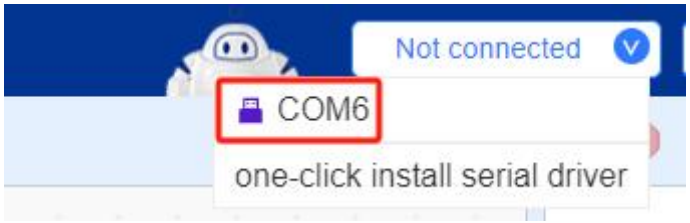


2.Test the development environment

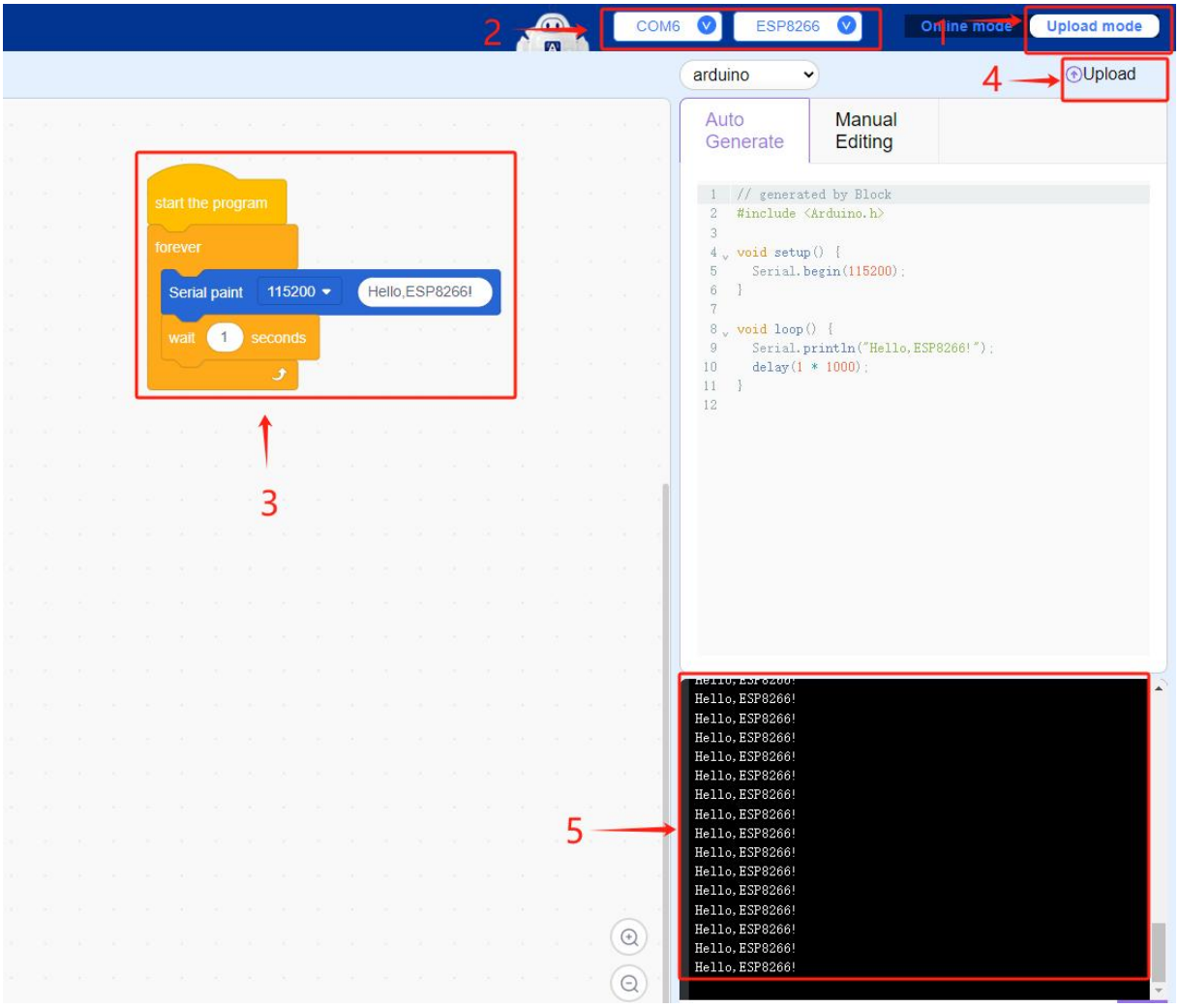
After installing ACECode, you can use a simple program to test whether the development environment is successfully built. Please follow the steps below:

① Connect the motherboard to the computer > Open ACECode > Select upload mode > Select ESP8266.

②Click the connection button, and in the pop-up serial port list, select the serial port where the ESP8266 is located. (Since each controller board has a different COM number, please choose according to the actual displayed COM number).



③Open "1.1hello_esp8266.sb3" in ″ English\ACECode\2.ACECode Program\Lesson 1″, connect ESP8266 controller board and computer with USB cable.Switch to Upload Mode. Select the correct controller board and port, Upload the code to the ESP8266 controller board. You can see the serial port monitor constantly output "Hello, ESP8266!" .



Ⅲ.Servo Drive

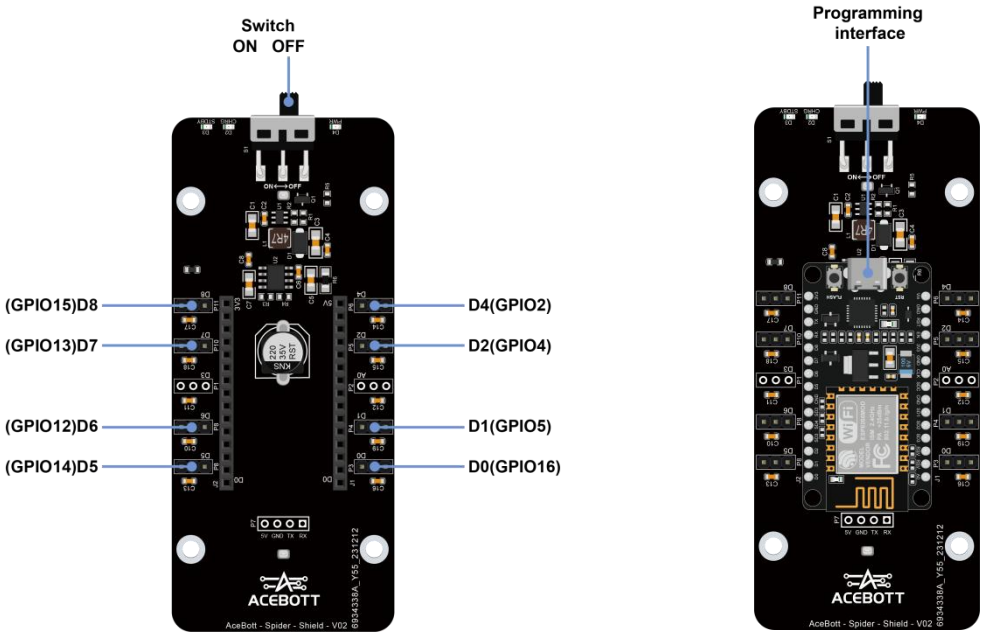
1.Know the servo extension board

Servo expansion board is mainly used to connect eight servos, and under the control of ESP8266 controller board, drive the servo to complete different actions. The following points should be noted when using the servo expansion board:

●Connect the controller board: insert the pin of the ESP8266 controller board into the bus interface of the servo expansion board. Pay attention to the USB port of the controller board and the switch of the expansion board on the same side.

●Charging mode: After connecting the battery and turning the switch to the OFF block, connect the USB charging cable and expansion board.

●Use mode: put the switch to the ON block.



2.Drive servo program

(1) Pin description of servo extension board

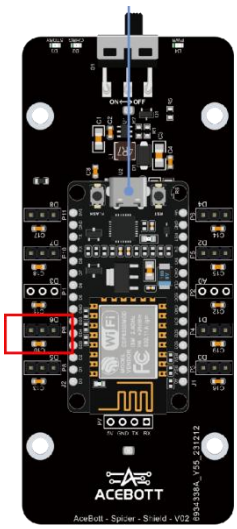
NO.	Expand plate pin number	GPIO pin number for ESP8266
1	D0	GPIO16
2	D1	GPIO5
3	D2	GPIO4
4	D4	GPIO2
5	D5	GPIO14
6	D6	GPIO12
7	D7	GPIO13
8	D8	GPIO15

(2) Servo pin definition

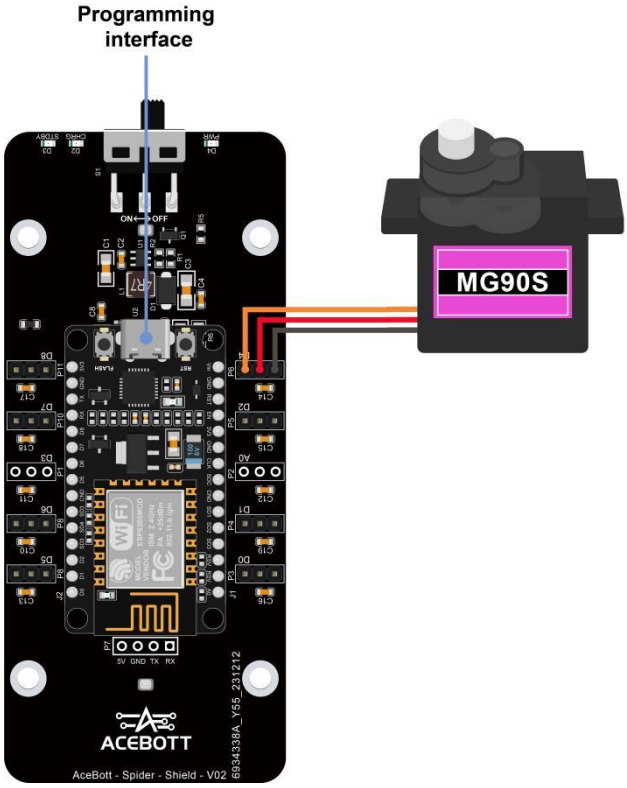
①Usually the servo has three control lines: power line, ground line and signal line.

②Servo pin definition: brown line -- GND, red line -- 5V, orange line -- signal.

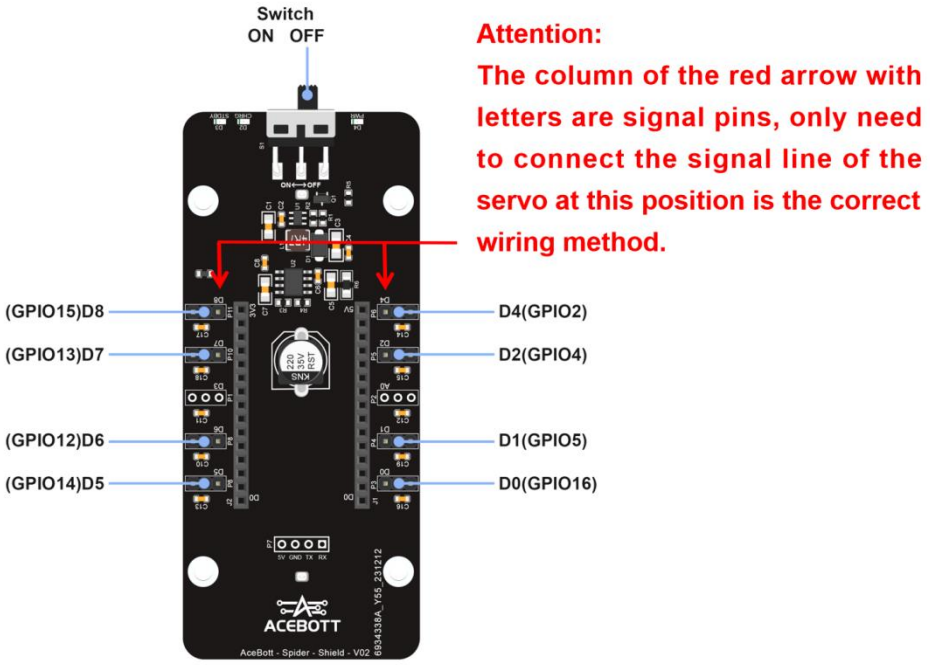
③Connect the servo and the expansion board, and the connection relationship is as follows.

Servo	Expansion board	Figure
Brown line	-	
Red line	+	
Orange line	D6(GPIO12)	

④Servo wiring diagram.



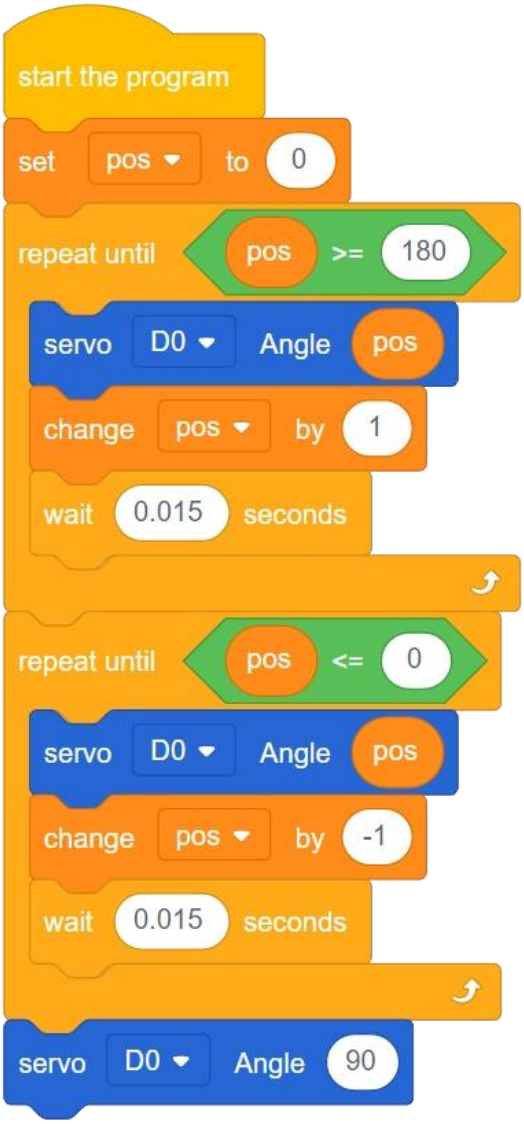
⑤The columns with letters on the expansion board are signal pins, as shown in the following figure.



(3) Servo drive steps

①Open "1.2 Servo-Test.sb3" in ″ English\ACECode\2.ACECode Program\Lesson 1″, connect ESP8266 controller board and computer with USB cable, Switch to Upload Mode.Select the correct controller board and port. Upload the code to the ESP8266 controller board.

Before uploading, turn the toggle switch of the servo expansion board to OFF gear; After uploading, put the toggle switch of the servo extension board to the ON gear, at the same time, unplug the USB cable.



②If the steering gear is normal, it should rotate from 0 degrees to 180 degrees, then from 180 degrees to 0 degrees, and finally to 90 degrees.

③Take apart the 8 servos provided in the kit and test them respectively according to the same operation to ensure that each servos is normal and in good condition.

3.Upload servo zero program

Before assembling the quadruped robot, in order to install its structure smoothly, we need to upload the zero program in advance.

Open "1.3Zero_0.sb3" in ″ English\ACECode\2.ACECode Program\Lesson 1″ , connect ESP8266 development board and computer with USB cable, select the correct development board, processor and port, and upload the code to the ESP8266 development board.

Lesson 2 Assembling the Robot

Ⅰ.List of Parts

Ⅱ.List of Structural Parts

Body x1

Body -Top x1

Coxa x8

Femur x4

Tibia x4

Ⅲ.Assembly Steps

Attention: If you need to watch the assembly video, please click the link below and select the corresponding construction video to watch.

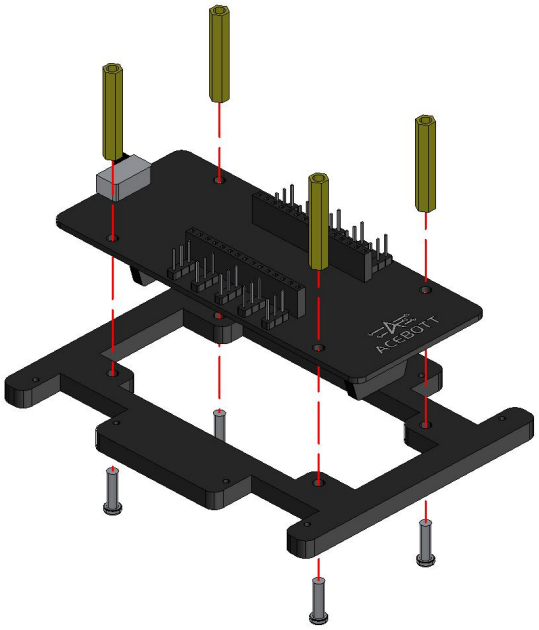
https://www.youtube.com/playlist?list=PLkW5fEtHNu6JIQVJpGalnKdkuk6Er4dIN

Or scan the QR code below.

1.Remove the protective paper attached to the acrylic structure

2.Install servo expansion board on the Body

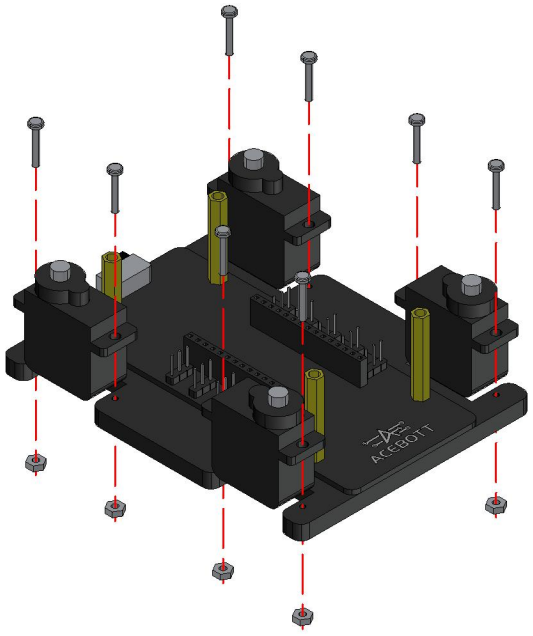
Parts List	
Name	Quantity
ESP32 Expansion board	1
Body Acrylic	1
M3*25MM Dual-Pass Copper Pillar	4
M3*10MM Round Head Screw	4



3.Install steering gear on the Body

Parts List	
Name	Quantity
Servo	4
M2*14MM Round Head Screw	8
M2 Nut	8

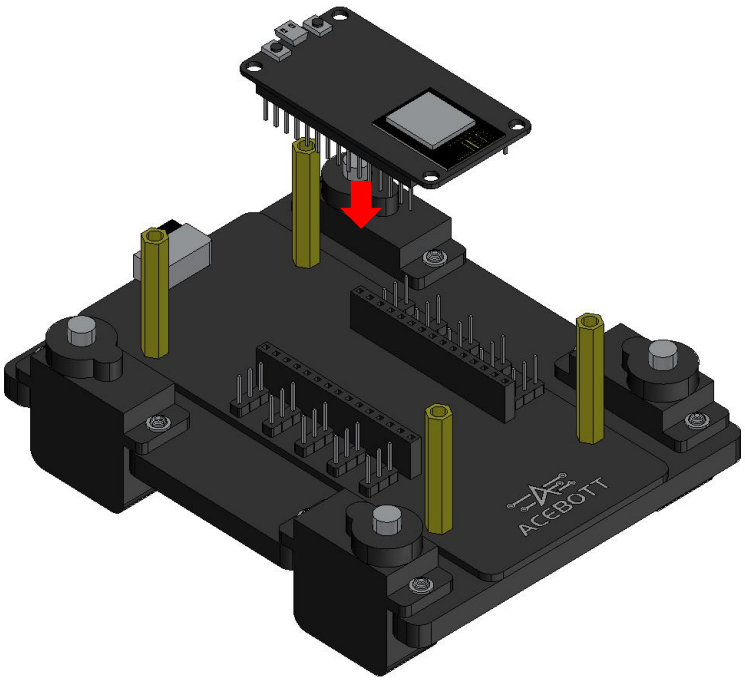
Attention: The direction of the servo axis should be closer to the outer edge of the long axis of the Body.



4.Install esp8266 controller board

Parts List	
Name	Quantity
esp8266 Controller Board	1

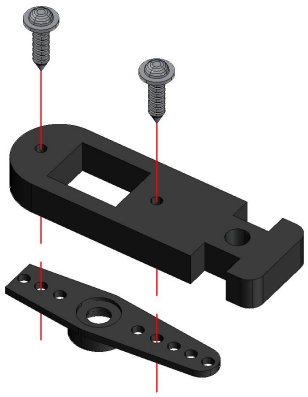
Attention: The USB port on the esp8266 Controller Board is on the same side as the switch on the steering gear expansion board.



5.Install steering rocker arm to Coxa

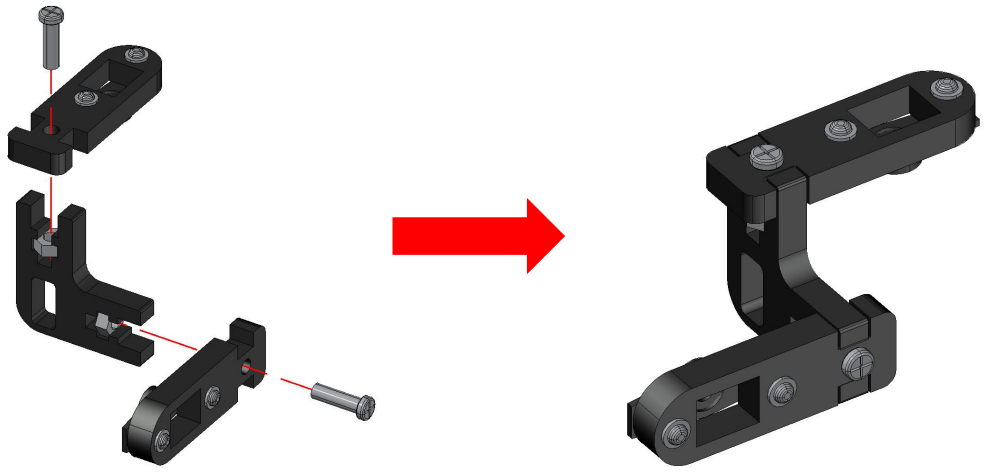
Parts List	
Name	Quantity
Coxa Structure	1
M2*8MM Round Head Tapping Screw	2
Single-axis Servo Horn	1

Attention:
(1) The M2*8MM Round Head Tapping Screw used in this kit are all in the steering gear package;
(2) A total of 8 structures are assembled.

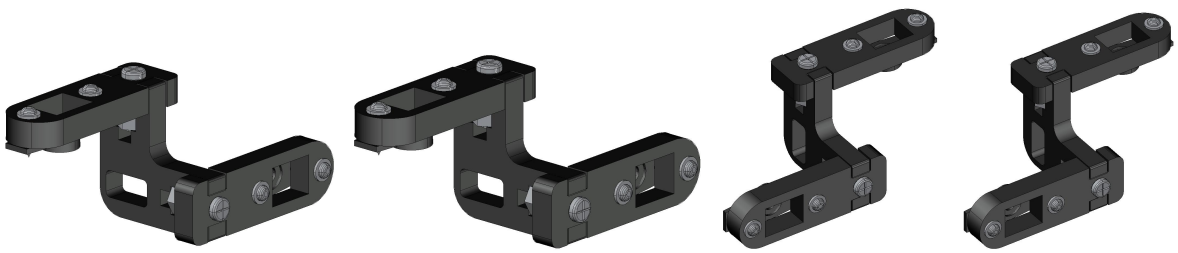


6.Install Coxa and Femur together

Parts List	
Name	Quantity
Femur Structure	1
M3*10MMRound Head Screw	2
M3 Nut	2



Attention: Similarly, install the remaining three, the effect after installation is shown below, pay attention to the direction, be sure to be consistent with the picture (2 to the left, 2 to the right).

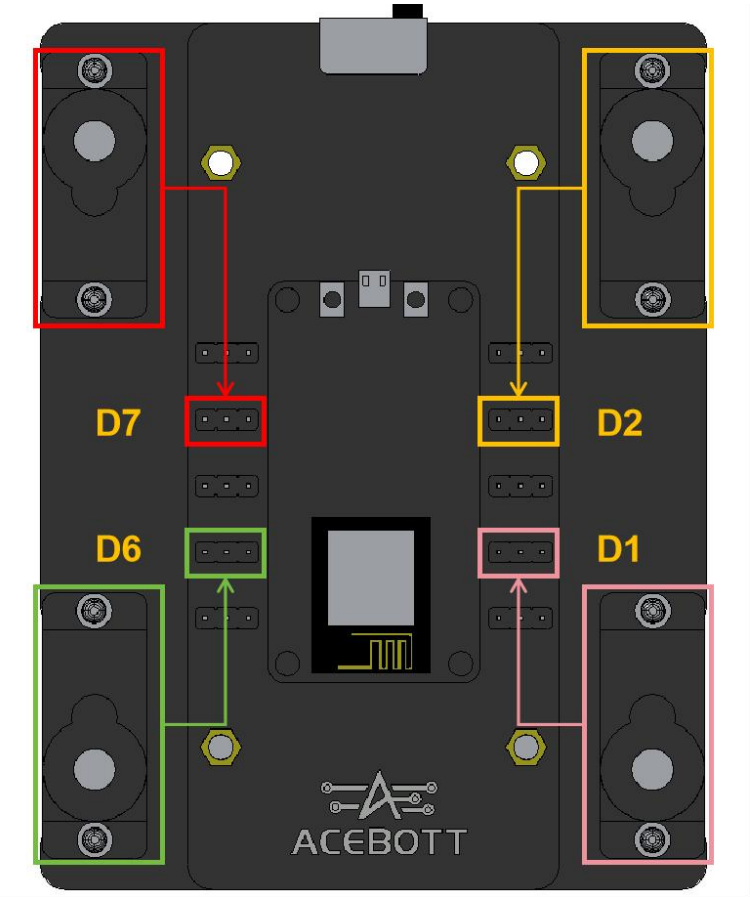


7.Connect the four servos on the Body to the servos expansion board

Insert the servo wire into the controller board as shown below (Attention the wiring sequence of the servo, the brown is GND, the red is VCC, and the orange is the signal wire in the servo wire, remember not to connect the reverse).

Attention:

The brown wire of the servo needs to be connected to the outermost pin. (The pin farthest from the center of the robot)



Attention:

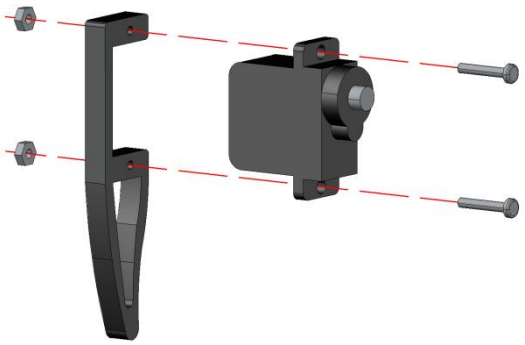
（1）This step requires installing a fully charged 18650 battery into the battery slot of the steering gear expansion plate, and then turning the toggle switch to ON gear. Because when installing the arms and claws of the quadruped robot, it needs to be powered on and installed.

（2）Important!!! Avoid damage to the servo, please don't turn the shaft of the servo when the power is on!!!

(3)Please make sure to strictly follow the wiring instructions when connecting the module to the expansion board. Incorrect wiring may cause a short circuit and damage the controller board.

8.Install four calves

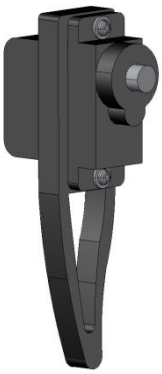
Parts List	
Name	Quantity
Tibia Structure	1
M2*14MMRound Head Screw	2
M2 Nut	2

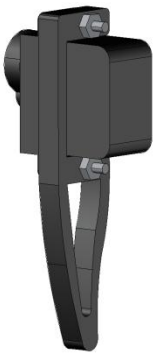


Attention:

(1)There are two Tibia installation as shown on the left, the other two Tibia installation as shown on the right.

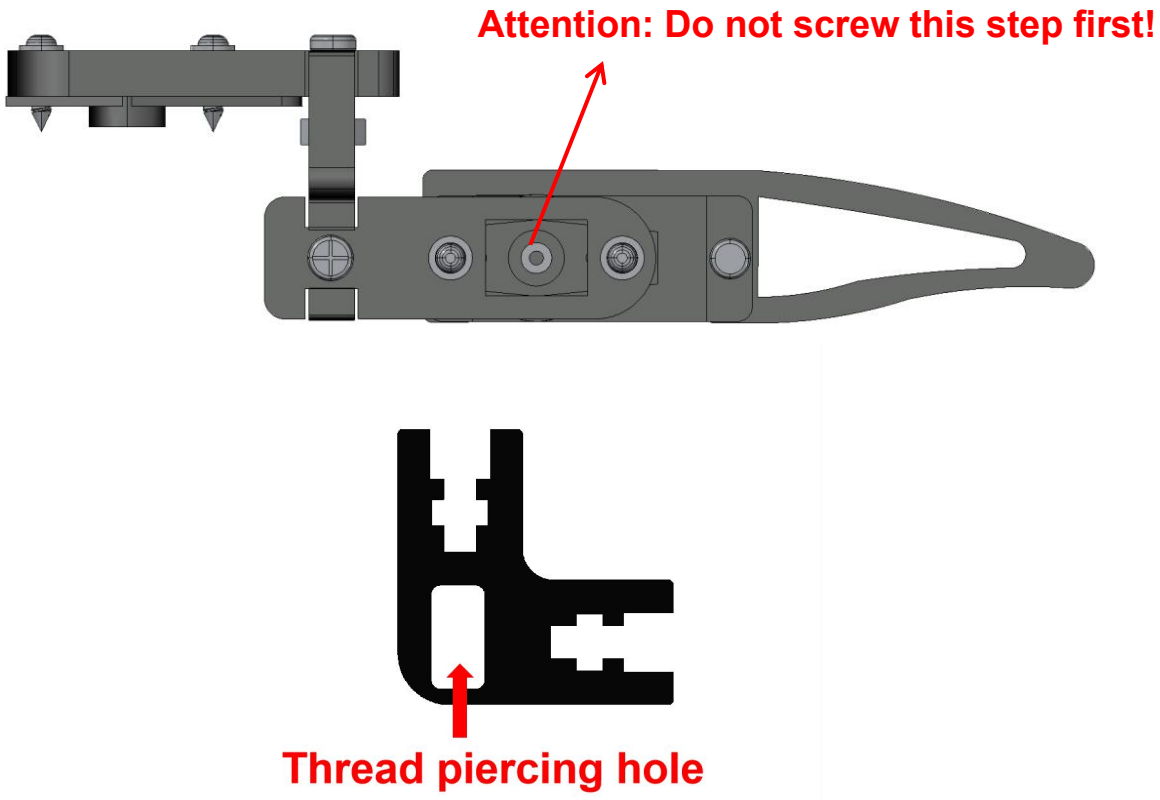
(2)After installation, you can see the following screenshot.





(3)Install the four paws and attach them to the calves, taking care to keep them as level as possible.

(4)Before fixing the four servos on the steering wheel, the servo line should be passed through the line hole, in addition, the steering wheel is not fixed here, and do not turn the servo during installation, as shown in the following figure.



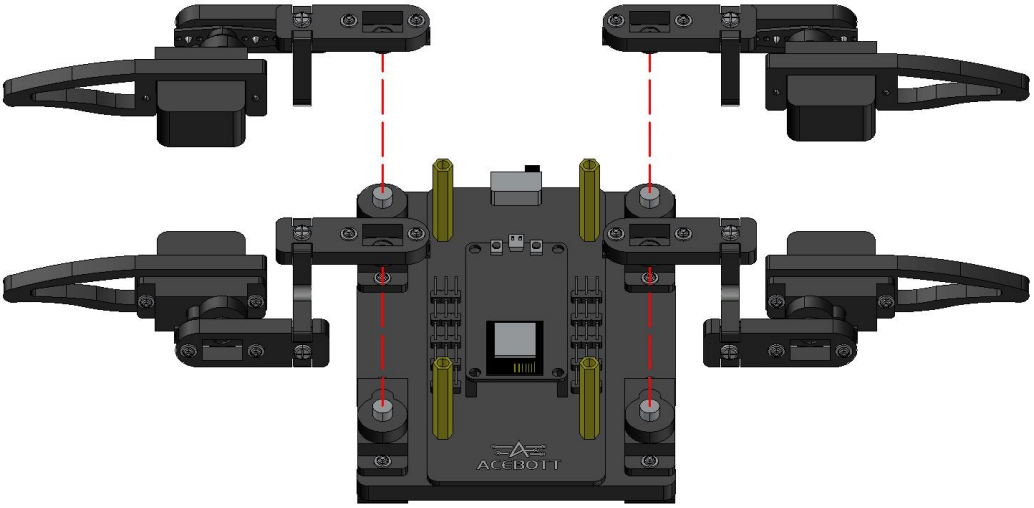
9.Connecting the four thighs

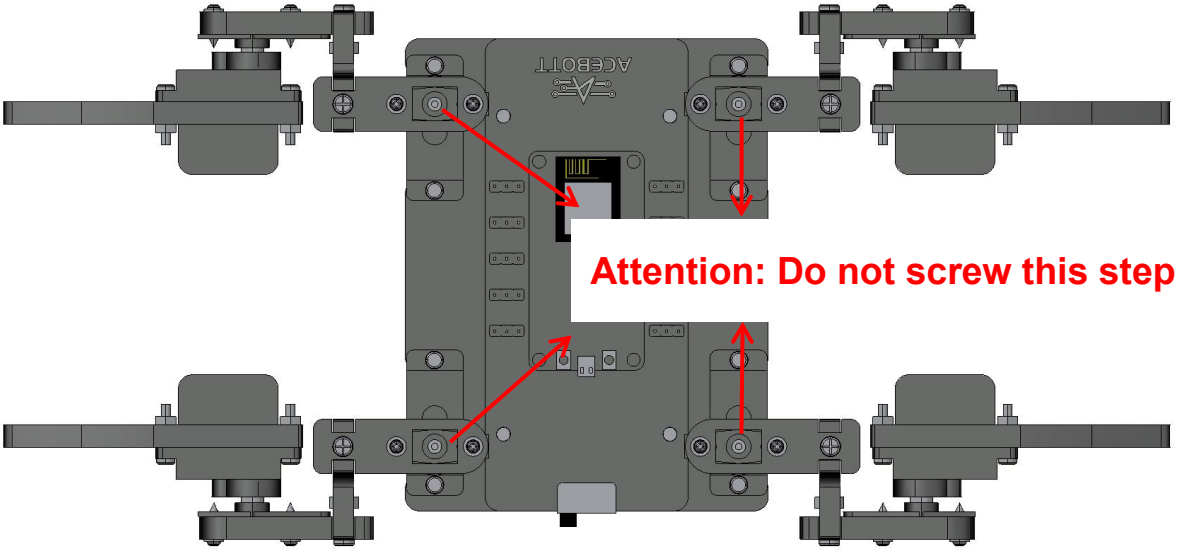
Attention:

(1)Install the steering wheel according to the Angle shown below, keeping it as vertical as possible.

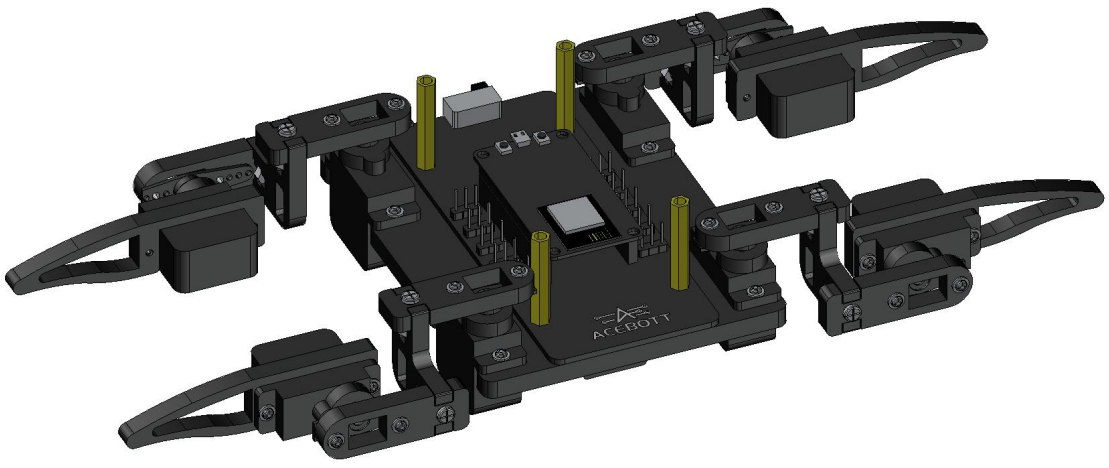
(2)Do not fix the steering wheel here.

(3)Important!!! Avoid damage to the servo, please don't turn the shaft of the servo when the power is on!!!





After installation, you can see the following screenshot.

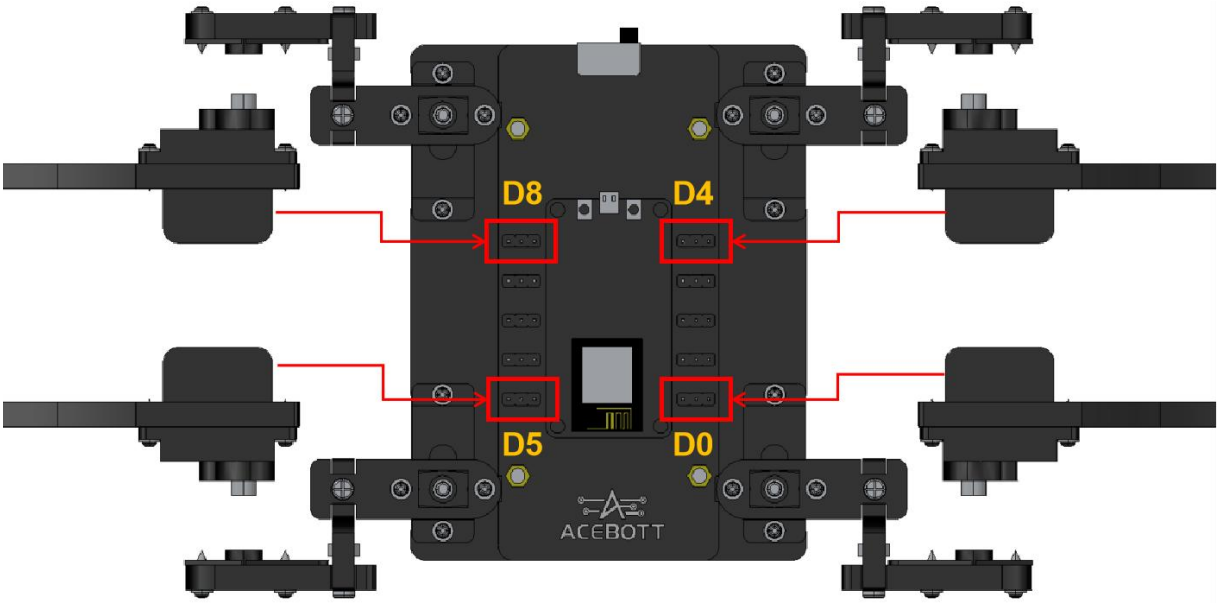


10.The servo is wired at the shank

Insert the servo wire into the controller board as shown below (Attention the wiring sequence of the servo, the brown is GND, the red is VCC, and theorange is the signal wire in the servo wire, remember not to connect the reverse).

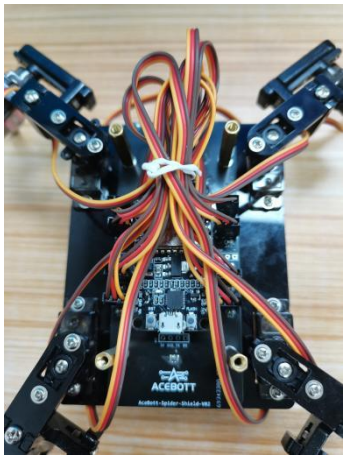
Attention:

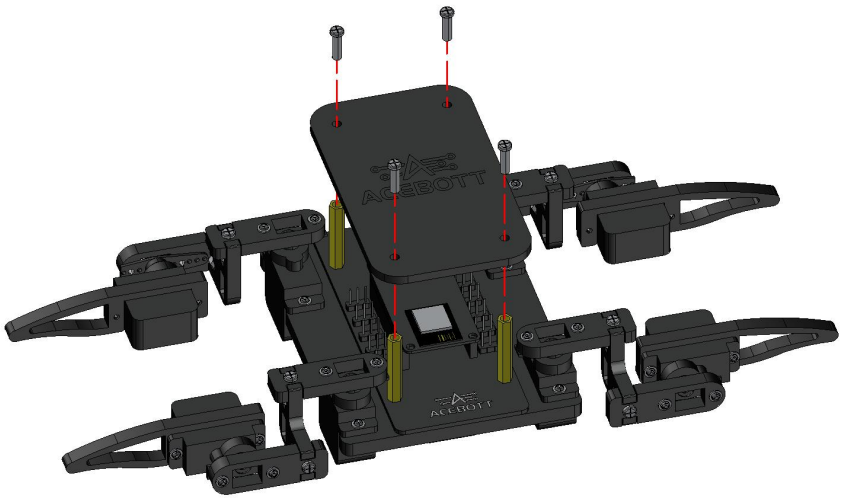
The brown wire of the servo needs to be connected to the outermost pin. (The pin farthest from the center of the robot)



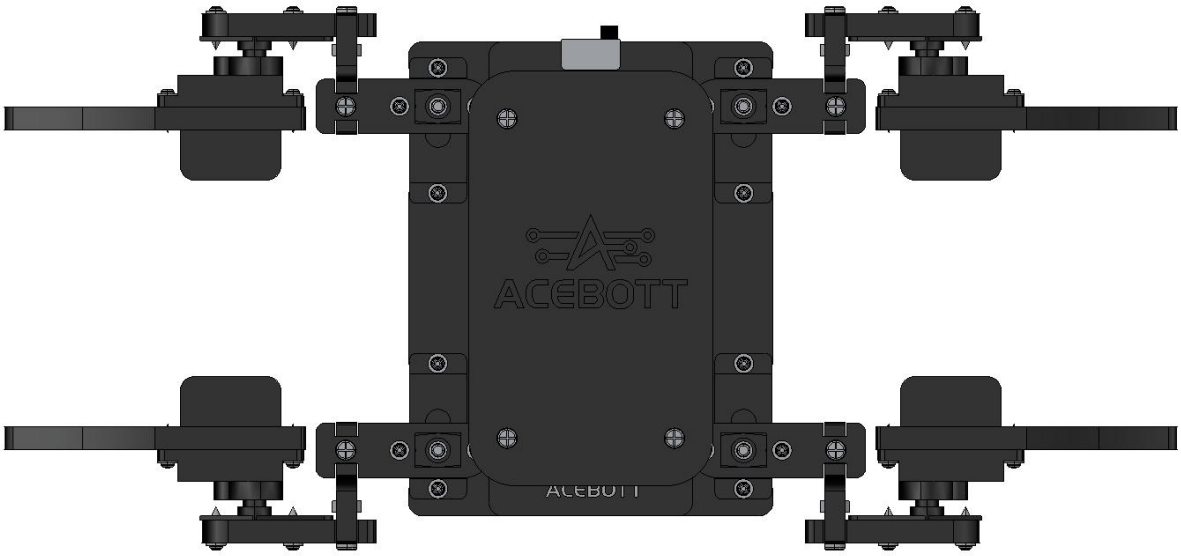
11.Install Body-Top

After finishing the wires, tie them with cable ties and install the Body-Top structural part with 4 M3*10 round head screws, as shown in the following picture.





12.The effect after installation



At this point, the four-legged bionic spider installation is complete!

Attention:

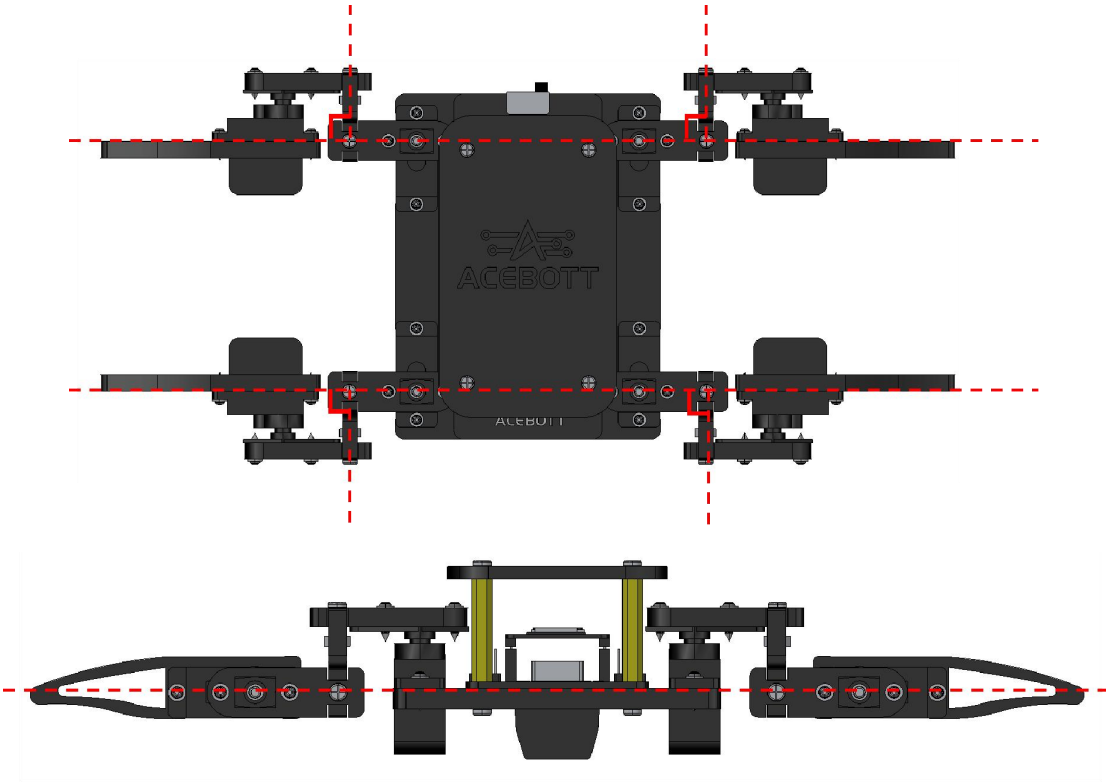
(1)Since the servo accessory kit comes in a standard packaging, the remaining parts such as the control disc are not required for use in this product;

(2)Please install one 18650 battery in the battery compartment of the spider robot, ensuring that the positive and negative poles are not reversed.

Lesson 3 Position Initialization

Ⅰ.Return to Zero Position

1.The zeroing position is shown in the figure



Before assembly, we have uploaded the zeroing program of the servo. During assembly, we have installed the robot as shown in the figure. This is the initial posture of the robot, that is, the zeroing position.

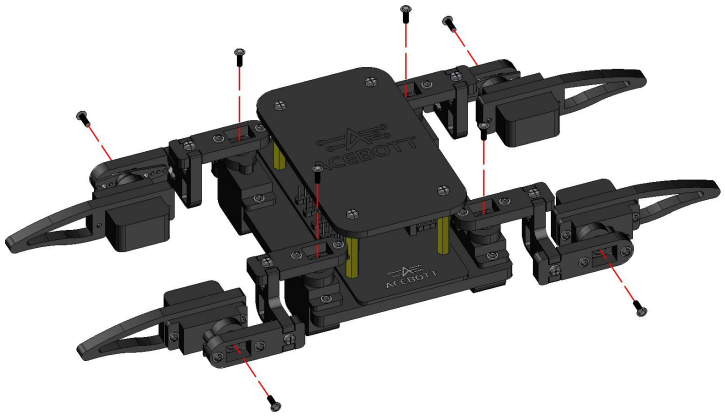
Turn on the battery switch, keep the quadruped robot in the power state, and then observe whether the posture of the quadruped robot remains at the zero position as shown in the figure. Because the last screw is not locked, if the posture of individual positions is very different, we can remove the structure with the difference and install it after corresponding to the posture again, but the axis of the servo can not be rotated during this process.

Attention:

Because the gear of the servo is clearance, not necessarily can be just installed to the most ideal state, there may be a slight deviation, this is a normal phenomenon.

2.Install steering wheel screws

After the final adjustment, eight servos are fixed with eight M2.5*4 round head screws.



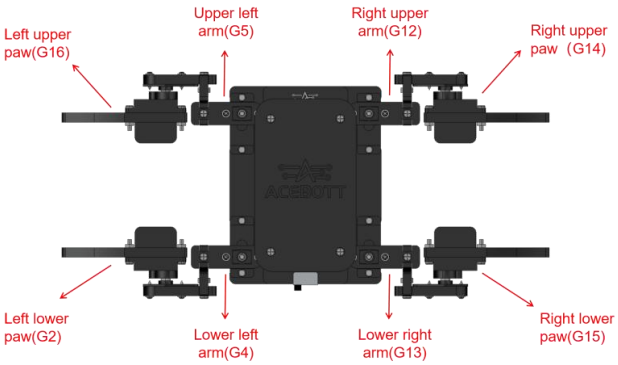
3.Corresponding position of servo pin

After installing the robot, each servo assumes different functions of the robot. If we want to control the Angle of each servo through the program and realize different functions, we must know the corresponding pin number of each servo.

The robot uses a total of eight servos, four on the inside and four on the outside. For the sake of memory, we refer to the inner actuator as the robot arm and the outer actuator as the robot paw. At the same time, based on different servos are distributed in the position of up and down and left and right. So we distinguish the eight servo positions, which are divided into: right upper paw, right upper arm, right lower paw, right lower arm, left upper paw, left lower paw, and left lower arm.

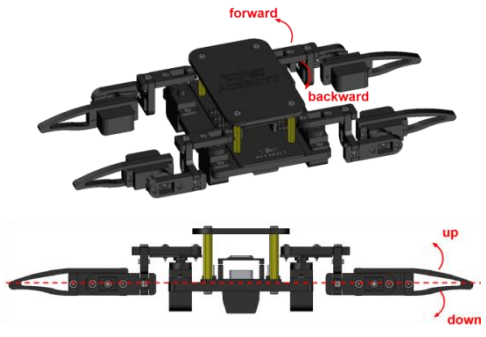
The corresponding pin numbers are shown in the following table:

NO.	Pin number	Expansion Board	Servo position	Figure

		Pin		
1	GPIO14	D5	Right upper paw	
2	GPIO12	D6	Right upper arm	
3	GPIO13	D7	Lower right arm	
4	GPIO15	D8	Right lower paw	
5	GPIO16	D0	Left upper paw	
6	GPIO5	D1	Upper left arm	
7	GPIO4	D2	Lower left arm	
8	GPIO2	D4	Left lower paw	

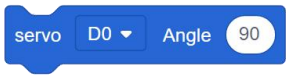
Ⅱ.The Motion of the Servo

In addition, the motion law of the servo at each position is shown in the following table:

NO.	Expansion Board Pin	Servo position	Law of motion	Figure
1	D5	Right upper paw	The larger the Angle, the more the servo moves up	
2	D6	Right upper arm	The larger the Angle, the more forward the servo moves	
3	D7	Lower right arm	The larger the Angle, the more forward the servo moves	
4	D8	Right lower paw	The larger the Angle, the more the servo moves down	
5	D0	Left upper paw	The larger the Angle, the more the servo moves down	
6	D1	Upper left arm	The larger the Angle, the more the servo moves backward	
7	D2	Lower left arm	The larger the Angle, the more the servo moves backward	
8	D4	Left lower paw	The larger the Angle, the more the servo moves up	

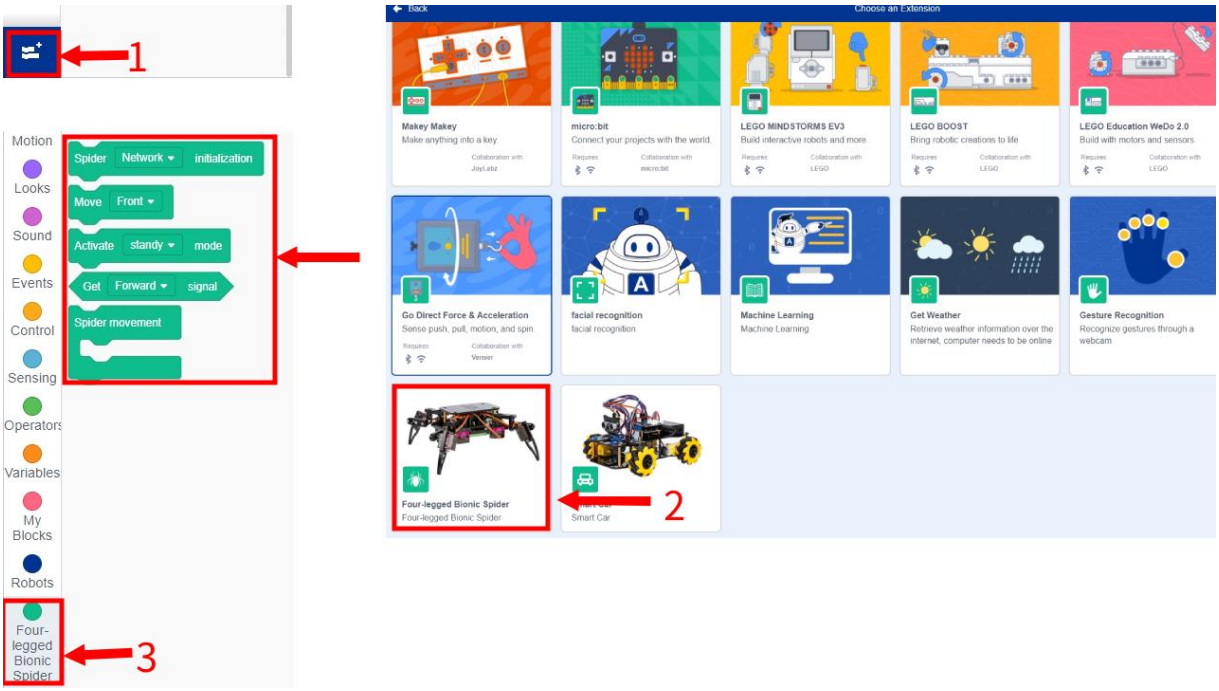
Lesson 4 The Forward and Backward Movement of Robots

The basic control actions of the robot include forward, backward, left, right and rotation. As long as you master the use of these basic actions, other actions can be combined according to the basic actions. In the previous course of debugging the servo, we completed the setting of different angles of the servo through



instructions. When it is necessary to set the action for the robot, that is, to set different angles for the robot's arms and claws, this requires a large number of servo setting instructions to complete, and the code is inevitably redundant. In order to simplify the code and improve the readability of the code, ACECode encapsulates some common actions and motion modes of the robot in a building block instruction. As long as you use one building block, you can complete the setting of a robot action group.

Here you need to add the "Four-legged Bionic Spider" extension in ACECode, click "Add Extension" in the lower left corner, and then click and select "Four-legged Bionic Spider". After adding, you can see the relevant building block instructions about the quadruped bionic spider on the left side of ACECode. It should be noted that the quadruped bionic spider extension is only supported in upload mode.



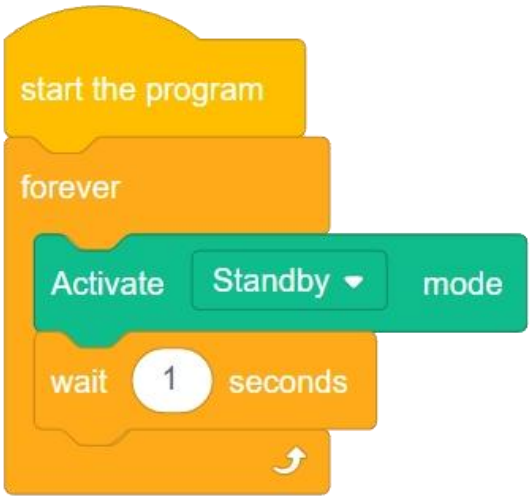
After adding the Four-legged Bionic Spider extension, you can use these two blocks to set the robot to complete a specified action or motion mode. You can also click the drop-down box in the command to select a different motion or mode.

Ⅰ.Standby Mode Program

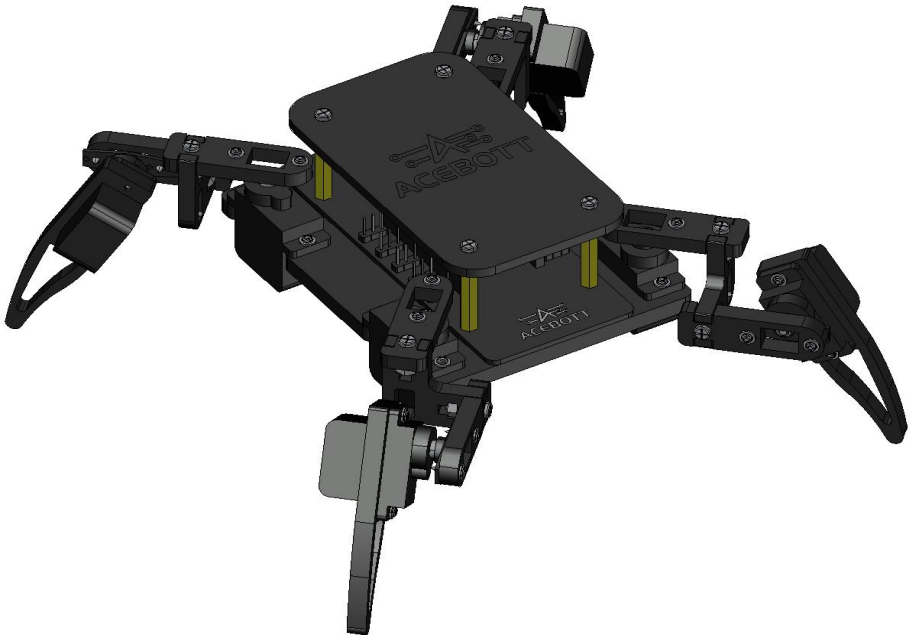
Standby state is a state of preparation before the robot does other actions, it can quickly let the robot into other states.

Open "4.1standby.sb3" in "English\ACECode\2.ACECode Program\Lesson 4", connect ESP8266 controller board and computer with USB cable.Switch to Upload Mode. Select the correct controller board and port, Upload the code to the ESP8266 controller board.

Before uploading, turn the toggle switch of the servo expansion board to OFF gear; After uploading, put the toggle switch of the servo extension board to the ON gear.



After uploading the program, we will find that the four arms of the robot are arranged in the shape of "X", and the four paws are also changed into the state of internal button to control the posture of the robot standing up. This is the standby state.



Ⅱ.Move Forward Program

Open "4.2forward.sb3" in "English\ACECode\2.ACECode Program\Lesson 4", connect ESP8266 controller board and computer with USB cable.Switch to Upload Mode. Select the correct controller board and port. Upload the code to the ESP8266 controller board.

Before uploading, turn the toggle switch of the servo expansion board to OFF gear; After uploading, put the toggle switch of the servo extension board to the ON gear.

After uploading the program, it can be found that the arm paws on the diagonal side of the robot do the same action, and the two diagonal arm paws move forward in an alternate running action.

Ⅲ.Move Backward Program

Open "4.3back.sb3" in "English\ACECode\2.ACECode Program\Lesson 4", connect ESP8266 controller board and computer with USB cable, select the correct controller board and port, and upload the code to the ESP8266 controller board.

Before uploading, turn the toggle switch of the servo expansion board to OFF gear; After uploading, put the toggle switch of the servo extension board to the ON gear.

After uploading the program, it can be found that the arm paws on the diagonal side of the robot do the same action, and the two diagonal arm paws move backward in an alternate running action.

Ⅳ.Extending Tasks

You've already seen how the robot moves forward and backward in the tutorial, so let's test your learning on an extended task. I suggest you try it first and then follow the tutorial.

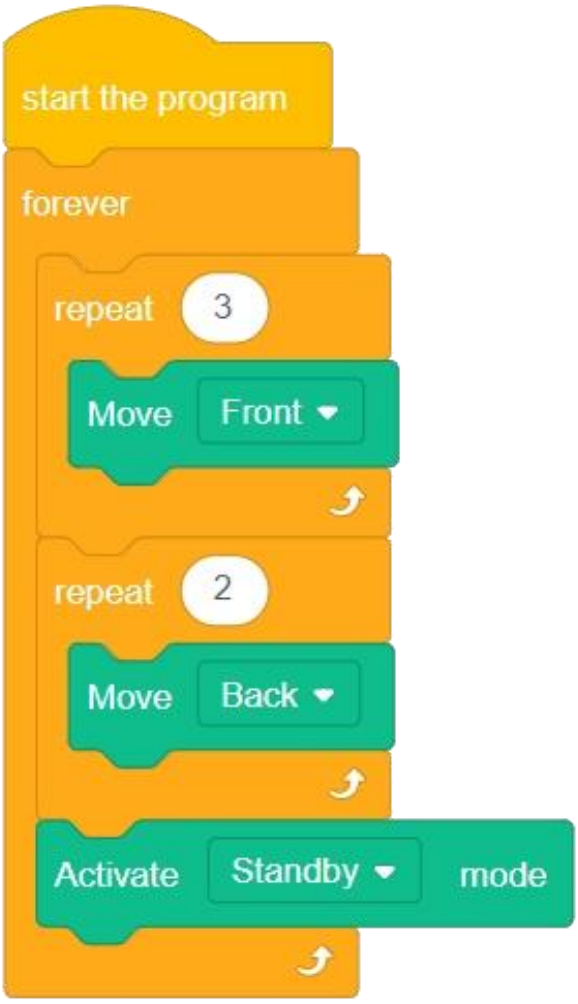
(1) Task Description:

The loop realizes that the robot moves forward three times, then moves backward two more times, and finally enters the standby state.

(2) Reference program:

Open "4.4expand.sb3" in "English\ACECode\2.ACECode Program\Lesson 4", connect ESP8266 controller board and computer with USB cable, select the correct controller board and port, and Upload the code to the ESP8266 controller board.

Before uploading, turn the toggle switch of the servo expansion board to OFF gear; After uploading, put the toggle switch of the servo extension board to the ON gear.


start the program
forever
repeat
3
Move
Front
repeat
2
Move
Back
Activate
Standby
mode

Lesson 5 Right and Left Rotation of the Robot

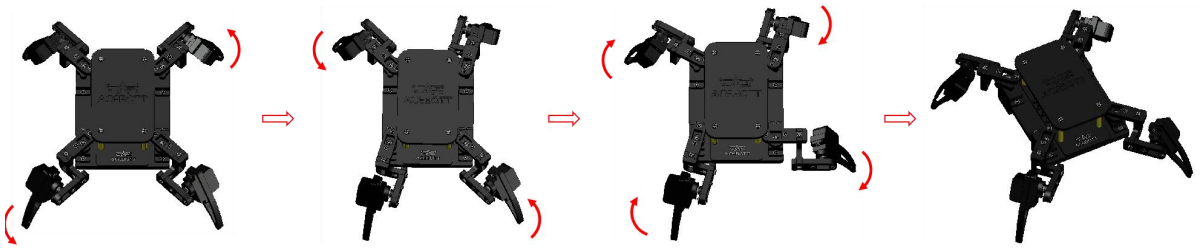
Now that you have learned the procedure for the robot to go forward and backward, in this lesson, you will continue to learn about the left and right rotation of the robot. The left and right rotation function is very important for the movement of the robot, and it allows the robot to go to any position on the plane.

Ⅰ.Rotate Left Program

Open "5.1turn_left.sb3" in "English\ACECode\2.ACECode Program\Lesson 5", connect ESP8266 controller board and computer with USB cable.Switch to Upload Mode. Select the correct controller board and port, Upload the code to the ESP8266 controller board.

Before uploading, turn the toggle switch of the servo expansion board to OFF gear; After uploading, put the toggle switch of the servo extension board to the ON gear.

After uploading the program, it can be found that the robot first rotates the four arms, and finally realizes the rotation action of the body to the left.

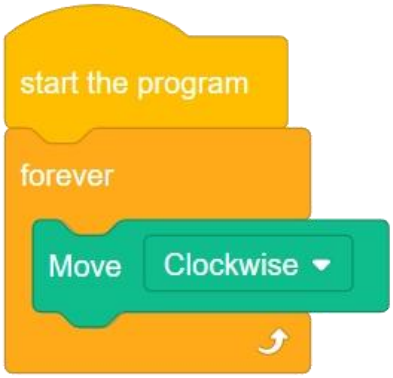


Ⅱ.Rotate Right Program

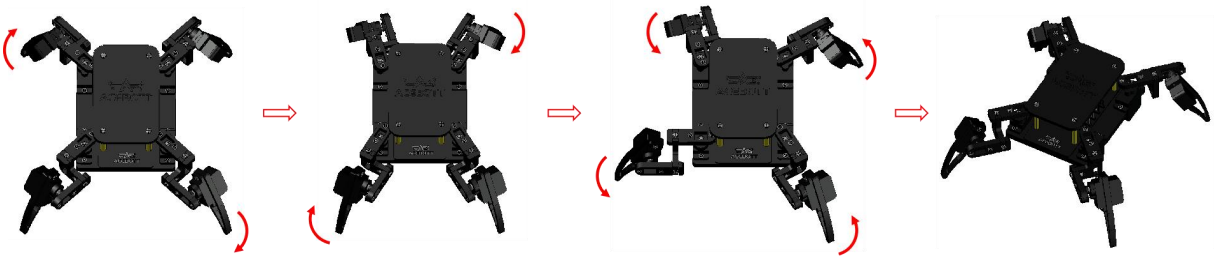
Open "5.2turn_right.sb3" in "English\ACECode\2.ACECode Program\Lesson 5", connect ESP8266 controller board and computer with USB cable.Switch to Upload

Mode. Select the correct controller board and port. Upload the code to the ESP8266 controller board.

Before uploading, turn the toggle switch of the servo expansion board to OFF gear; After uploading, put the toggle switch of the servo extension board to the ON gear.



After uploading the program, it can be found that the robot first performs the arm rotation, and finally realizes the body rotation action to the right.

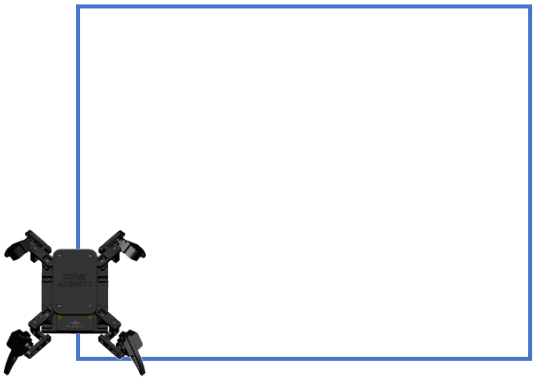


Ⅲ.Extending Tasks

You've already seen how the robot moves left and right in the tutorial, so let's test your learning on an extension task. I suggest you try it first and then follow the tutorial.

(1) Task Description:

Based on the content of the previous lessons, program the robot to walk a figure similar to a square.



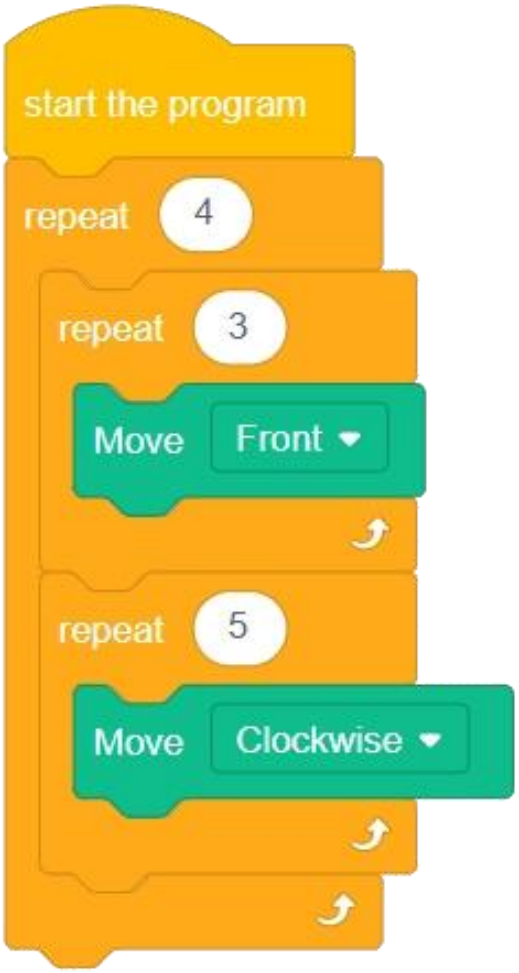
(2) Reference program:

Open "5.3expand2.sb3" in "English\ACECode\2.ACECode Program\Lesson 5", connect ESP8266 controller board and computer with USB cable, select the correct controller board and port, and upload the code to the ESP8266 controller board.

Before uploading, turn the toggle switch of the servo expansion board to OFF gear; After uploading, put the toggle switch of the servo extension board to the ON gear.

Attention:

The parameters of the program should be adjusted according to the actual operation effect.



Lesson 6 Left and Right Movement of the Robot

We've already seen how the robot can move backwards and forwards and rotate from side to side, but there are more interesting ways the robot can move, such as walking side-to-side. So follow this tutorial to learn how to make your robot move left and right.

Ⅰ.Move Left Program

Open “6.1left_move.sb3” in "English\ACECode\2.ACECode Program\Lesson 6", connect ESP8266 controller board and computer with USB cable.Switch to Upload Mode. Select the correct controller board and port, Upload the code to the ESP8266 controller board.

Before uploading, turn the toggle switch of the servo expansion board to OFF gear; After uploading, put the toggle switch of the servo extension board to the ON gear.

After uploading the program, we can see that moving left is very similar to moving forward or backward, but in a different direction.

Ⅱ.Move Right Program

Open "6.2right_move.sb3" in "English\ACECode\2.ACECode Program\Lesson 6", connect ESP8266 controller board and computer with USB cable.Switch to Upload Mode. Select the correct controller board and port, Upload the code to the ESP8266 controller board.

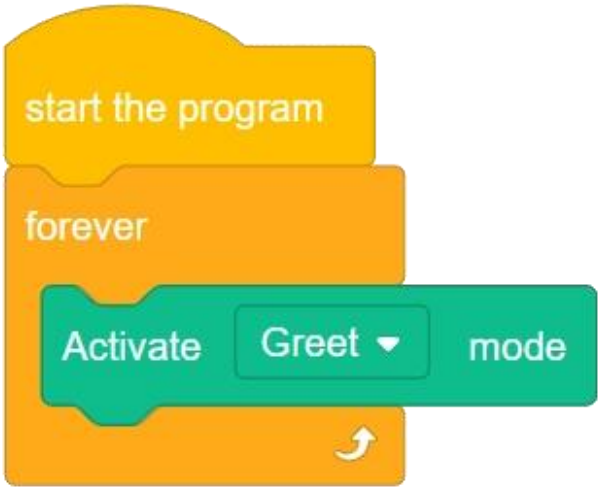
Before uploading, turn the toggle switch of the servo expansion board to OFF gear; After uploading, put the toggle switch of the servo extension board to the ON gear.

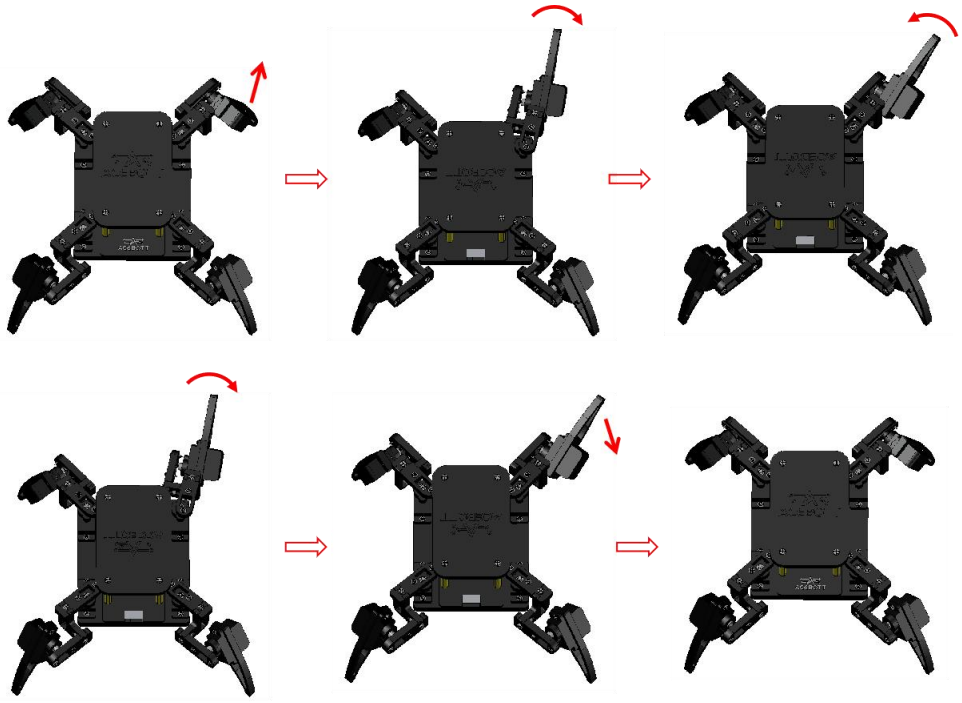
Ⅲ.Extending Program

Moving left and right is relatively easy, so wouldn't it be more fun if the robot could also say hello to the audience after moving?

Open "6.3say_hello.sb3" in "English\ACECode\2.ACECode Program\Lesson 6", connect ESP8266 controller board and computer with USB cable.Switch to Upload Mode. Select the correct controller board and port, Upload the code to the ESP8266 controller board.

Before uploading, turn the toggle switch of the servo expansion board to OFF gear; After uploading, put the toggle switch of the servo extension board to the ON gear.


start the program
forever
Activate
Greet
mode



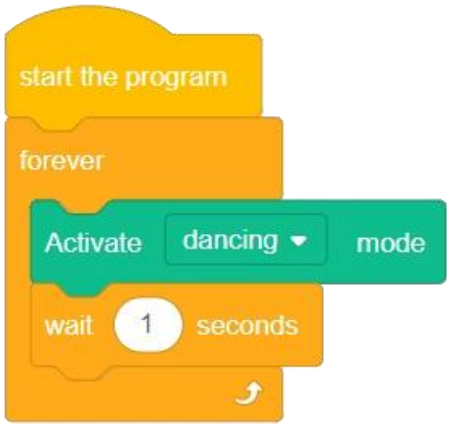
Lesson 7 Robot Dance Program

We finally covered the basic movement, rotation and translation of the robot. I believe you already have some ideas that you can't wait to implement on the robot. This tutorial will teach you how to implement a few dance movements for the robot.

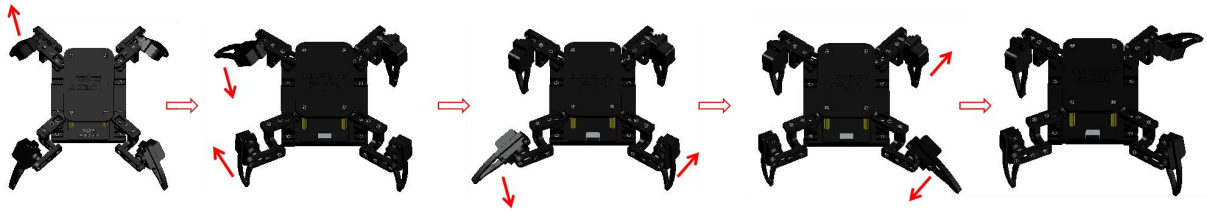
Ⅰ.Primary Dance Steps

Open "7.1dance1.sb3" in "English\ACECode\2.ACECode Program\Lesson 7", connect ESP8266 controller board and computer with USB cable, select the correct controller board and port, and upload the code to the ESP8266 controller board.

Before uploading, turn the toggle switch of the servo expansion board to OFF gear; After uploading, put the toggle switch of the servo extension board to the ON gear.



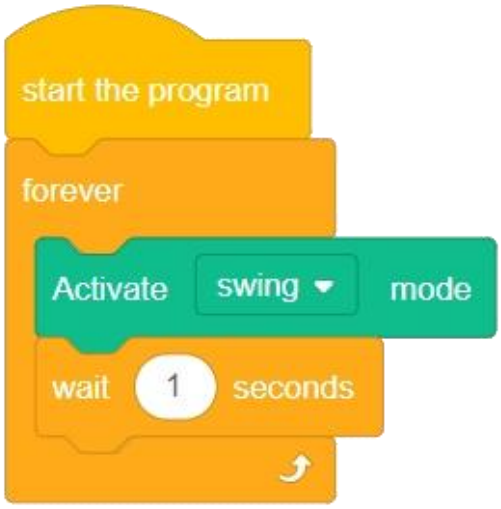
In the above elementary step, you can see that each paw of the robot in order to do the action of lifting and falling, relatively simple, next on this basis to add a little more difficulty.



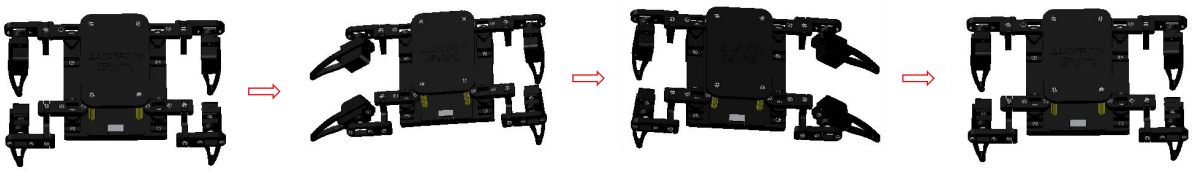
Ⅱ.Intermediate Dance Steps

Open "7.2dance2.sb3" in "English\ACECode\2.ACECode Program\Lesson 7", connect ESP8266 controller board and computer with USB cable, select the correct controller board and port, and upload the code to the ESP8266 controller board.

Before uploading, turn the toggle switch of the servo expansion board to OFF gear; After uploading, put the toggle switch of the servo extension board to the ON gear.



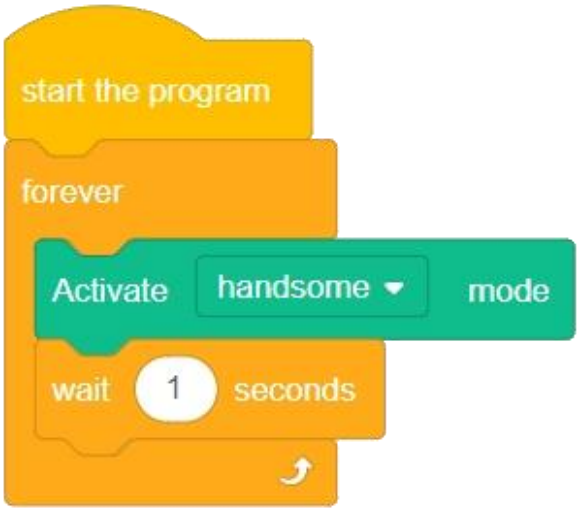
How about intermediate steps? You can see the effect of the robot swinging from side to side continuously, the movement has been enriched, and then there are advanced dance steps.



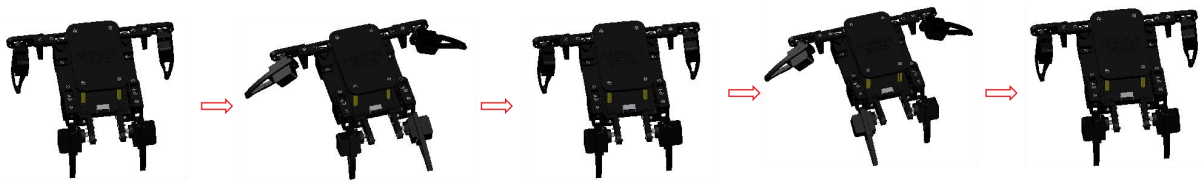
Ⅲ.Advanced Dance Steps

Open "7.3 Dance3.sb3" in "English\ACECode\2.ACECode Program\Lesson 7", connect ESP8266 controller board and computer with USB cable, select the correct controller board and port, and Upload the code to the ESP8266 controller board.

Before uploading, turn the toggle switch of the servo expansion board to OFF gear; After uploading, put the toggle switch of the servo extension board to the ON gear.



Advanced dance step can see the robot in a push-up position, the left lower arm and the right lower arm alternately fall and rise, show "hands and one leg" to support the body to rise and fall action, very cool.



IV.Extending Tasks

Learning the above three kinds of dance steps, is not found that the robot is quite interesting, through different arrays can let the robot make a variety of flexible movements, I believe you have been eager to try. The next step is to improve your mastery by expanding your tasks.

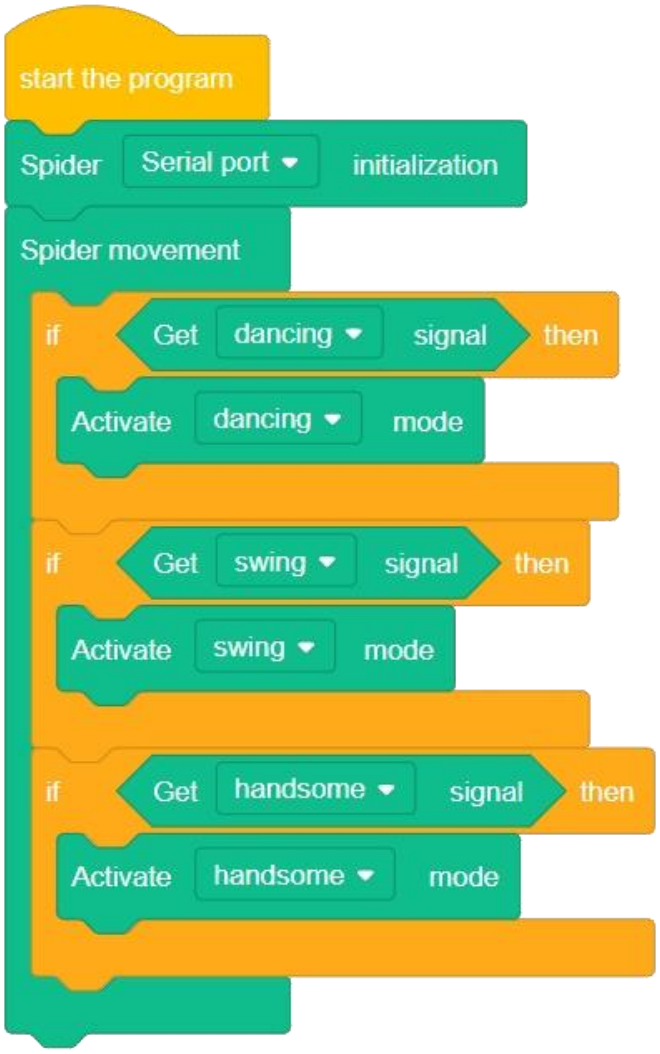
(1) Task Description:

Application of serial communication to control the robot dance, such as serial input dancing, the robot dance primary dance steps; Enter swing, jump intermediate dance steps; Enter handsome jump advanced dance steps.

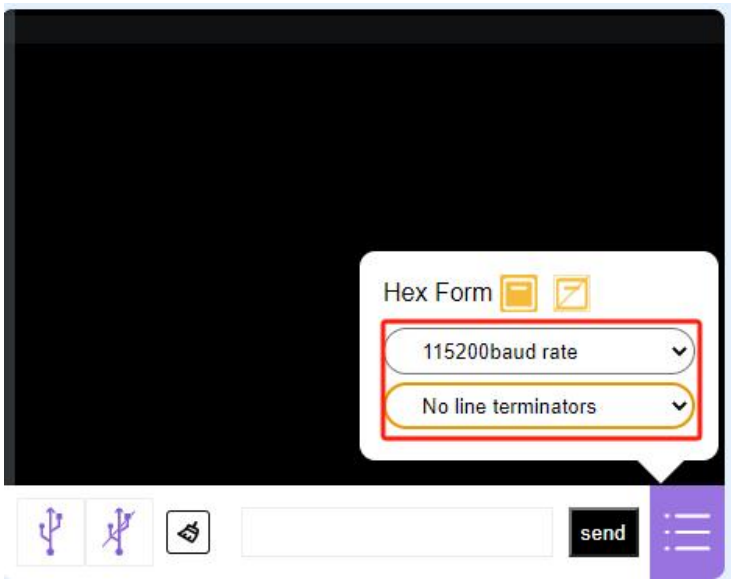
(2) Refer to the program:

Open "7.4 Expand.sb3" in "English\ACECode\2.ACECode Program\Lesson 7", connect ESP8266 development board and computer with USB cable, select the correct development board and port, and upload the code to ESP8266 development board.

Before uploading, turn the toggle switch of the servo expansion board to OFF gear; After uploading, put the toggle switch of the servo extension board to the ON gear.



Note that the serial port monitor has no terminator and the baud rate is set to 115200.



Lesson 8 Robot WiFi Control

Ⅰ.APP Download

（1）For an IOS device, search for ACEBOTT in the APP Store and download it. For Android phones, search the Google Play Store for ACEBOTT and download it. The icon is shown below.

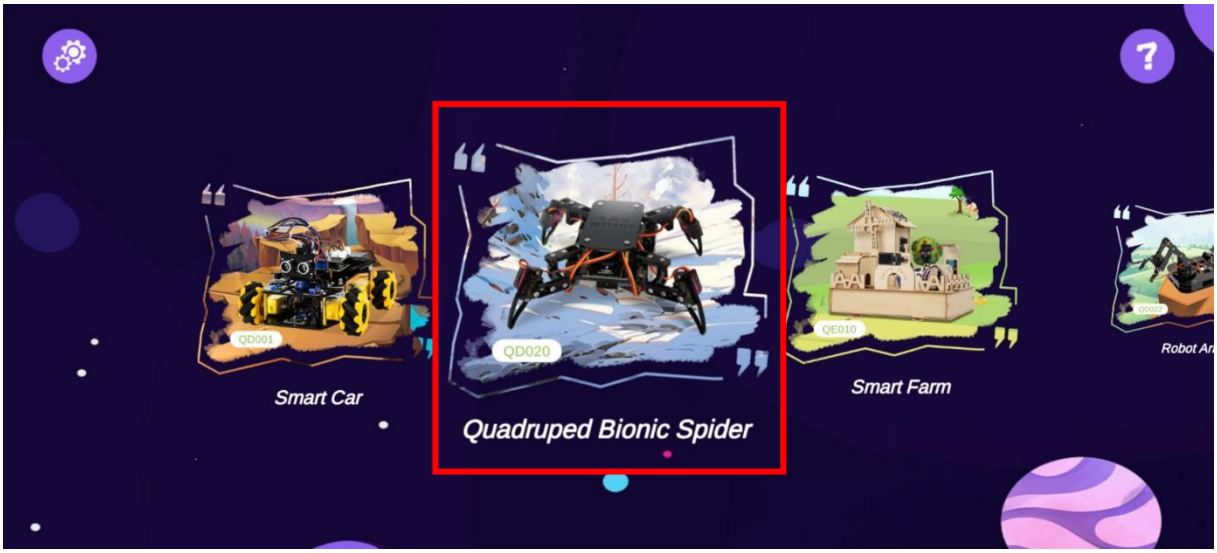
Attention:

1. This tutorial is applicable to ACEBOTT APP version 2.0 and above. You can click the settings button in the upper left corner of the APP to view the software version number. Please make sure that the software version you are using meets the requirements;

2. If you need to update the ACEBOTT software version, you can refer to the method prompted in this tutorial to download the latest APP version.

（2）Open the APP and enter the screen interface.

（3）Enter the selection interface and select the quadruped robot.



（4） Enter the robot control interface (now can not be directly controlled, need to Upload the program).

Ⅱ.Program Download

1. Robot WiFi control program

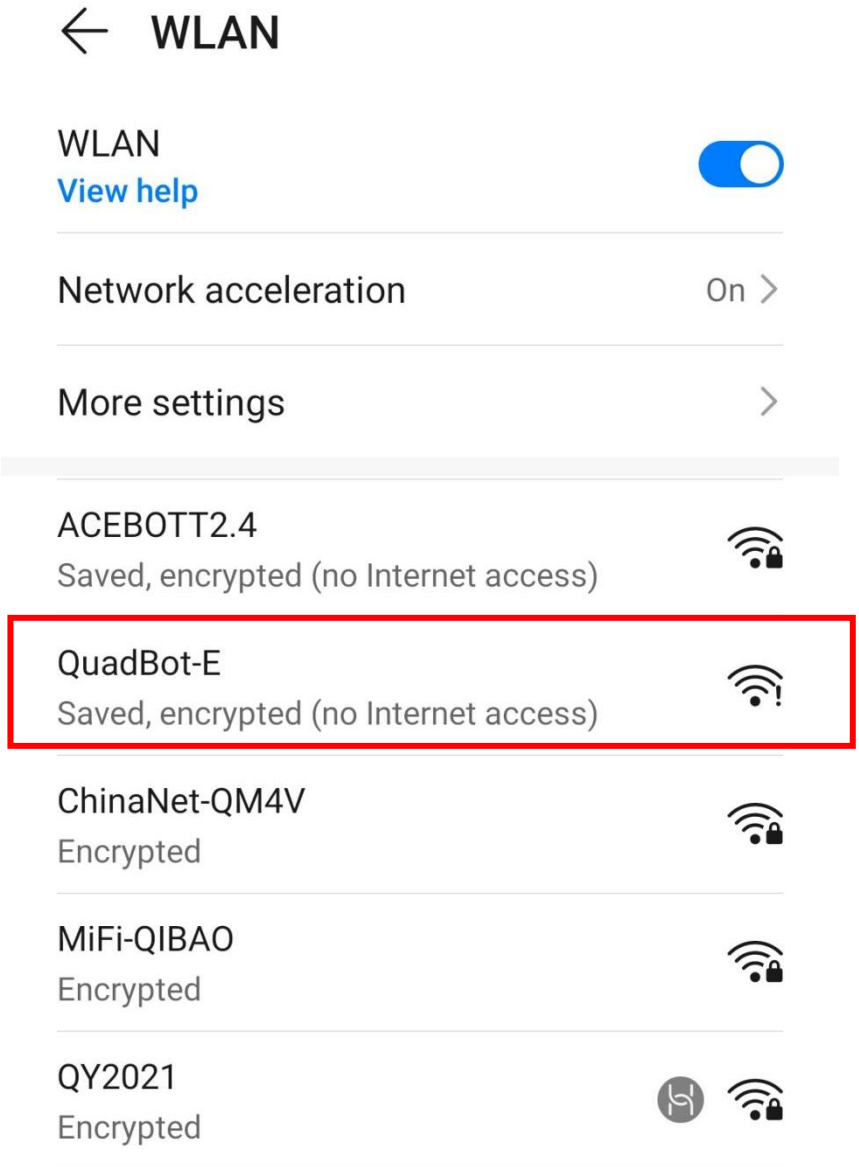
At present, it is not possible to control the robot directly with the APP, and the control program of WiFi needs to be burned to the robot to control it.

Open "8.1app_control.sb3" in "English\ACECode\2.ACECode Program\Lesson 8", connect ESP8266 controller board and computer with USB cable, Select the correct controller board and port and Upload the code to the ESP8266 controller board.

Before uploading, turn the toggle switch of the servo expansion board to OFF gear; After uploading, put the toggle switch of the servo extension board to the ON gear.

2. Connect to WiFi

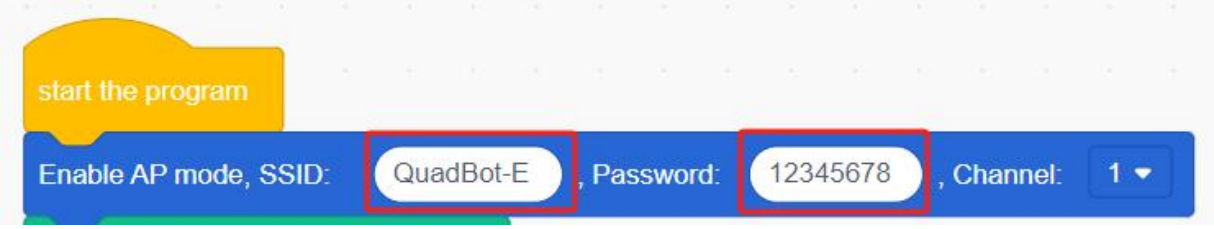
Mobile phone wireless network scan WIFI (turn off GPRS and other shared networks, make sure WIFI is the only network used) (specific operation in "Settings" → "WLAN" of the mobile phone), connect to the wifi hotspot named "QuadBot-E", the password is 12345678, as shown below.



Attention:

The name and password of the hotspot have been defined in the program, but the user can customize and modify it.

When we have multiple quadruped robots, we can distinguish each quadruped robot by different WiFi names.



3. Using APP controls

After connecting the WiFi, click the connection icon in the upper right corner of the APP to complete the connection.

Note: If you need to watch the APP operation video, please click the link below.

https://youtu.be/rzBv5HevS2M

After completing the aforementioned operations, return to the interface shown below, and then you can control the robot according to the button prompts.

The left panel is for the basic motion control of the robot: forward, backward, left move, right move, turn left, turn right.

The right panel is for the robot's action group control: standby, lying, sleep, greet, push-up, fighting, dancing, swing, and handsome.

In the upper right corner of the APP operation interface, there is a gyroscope control provided. After clicking this button, you can control the movement of the robot through the smartphone's gyroscope. If the phone does not have a built-in gyroscope, this feature can be ignored.


Quadruped Bionic Spider
Standby
Lying
Sleep
Hi
Greet
Push-up
Fighting
Dancing
Swing
Handsome

Follow Us

Scan the QR codes to Follow Us for troubleshooting & the latest news.

We have a very large community that is very helpful for troubleshooting and we also have a support team at the ready to answer any questions.

ACEBOTT FB Group QR Code

YouTube QR Code