Lesson 7 Control the Robot Arm by the PS2 wired controller

Table

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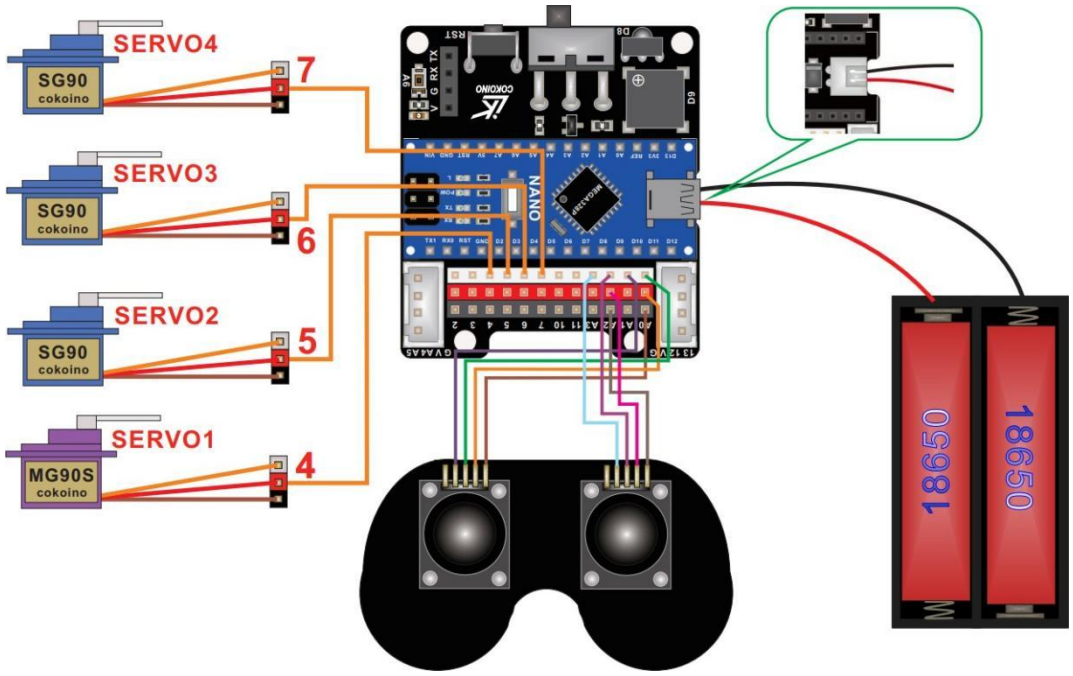
1. Wiring and assembly inspection

After assembling the robotic arm, do not immediately turn on the power or upload the code, but first check whether the wiring of the robotic arm and the assembly of each component are correct.

1.1Wiring inspection

Please refer to the following wiring diagram to check if the 4 servos are connected to the correct positions. Firstly, confirm that the signal pin of the servos is connected to the signal pin on the Nano Shield instead of GND. Secondly, confirm if each servos is connected to the corresponding pin position on the Nano Shield.



The signal pins of the 6 servos correspond to the signal pins on the Nano Shield as shown in the table below.

Servo No.	Signal Pin of Nano Shield board
Servo1	D4
Servo2	D5
Servo3	D6
Servo4	D7

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1.2 Structural inspection

Manually rotate the various axis parts of the robotic arm without turning on the power, and confirm that each axis rotates smoothly without any jamming or mechanical obstruction. If there are any problems, please carefully check where the assembly is wrong according to the assembly steps.

2. Learn and use src files

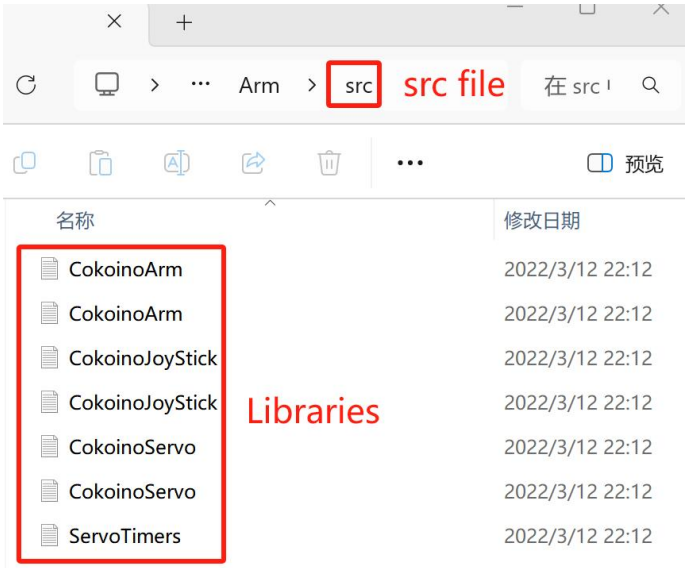
2.1 Understand the src folder

The src folder of Arduino is mainly used to store the source code files of the library. In the development process of Arduino library, the src folder is an essential part, which contains the main C++source code files (. cpp files) of the library. These source code files define the classes and functions of the library and are the core part of implementing the library's functionality.

By organizing the code in the src folder, modularization of the code can be achieved, making it clearer and easier to manage. In addition, the code in the src folder can be shared and reused by multiple Arduino projects, improving the reusability and development efficiency of the code.

2.2 How to use src files correctly

Our robotic arm uses four servos, and using Arduino's existing Servo library to program and control the actions of the four servos would result in complex and cumbersome code. To simplify the code, we wrote the CokoinoServo library and CokoinoArm library ourselves. Put them all in the src folder, as shown in the following figure:



How to use the library written by oneself?

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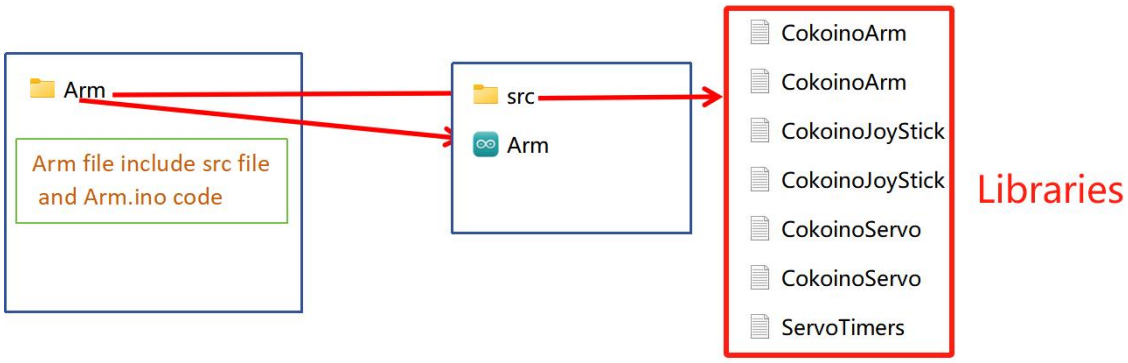
The first method is to install the library into the Arduino IDE and then use #include <xxx.h> in the code to reference it.

The second method is to directly use the functions in the library in the code, and then place the src folder containing the library in the folder where the code is located. This way, opening the code can directly call the library in the src folder.

The code required for this Lesson is Arm.ino

This code uses functions from the CokoinoServo and CokoinoArm libraries that we have written ourselves. When using them, we need to place the src folder containing the CokoinoServo and CokoinoArm libraries in the same folder as Arm'ino, as shown in the following figure:



3. Compile and upload code

3.1 Open the Code

Find the "Arm" code from the following path, open it with the Arduino IDE and select the board type and com port of the IDE.

Note: The src folder cannot be moved, it must be placed in the Arm folder with the "Arm" code, otherwise, your code will not be uploaded.

3.1.1 Double-click the Arduino IDE shortcut on the desktop to open it

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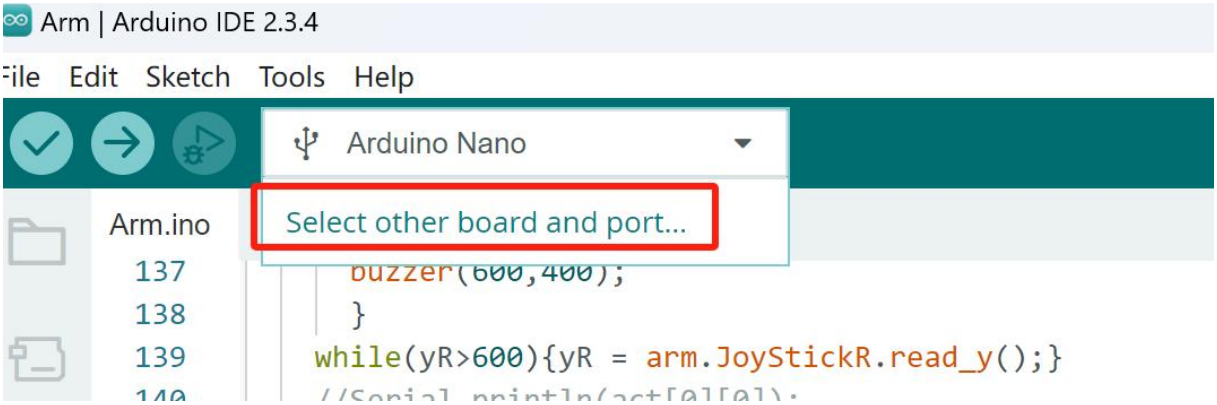
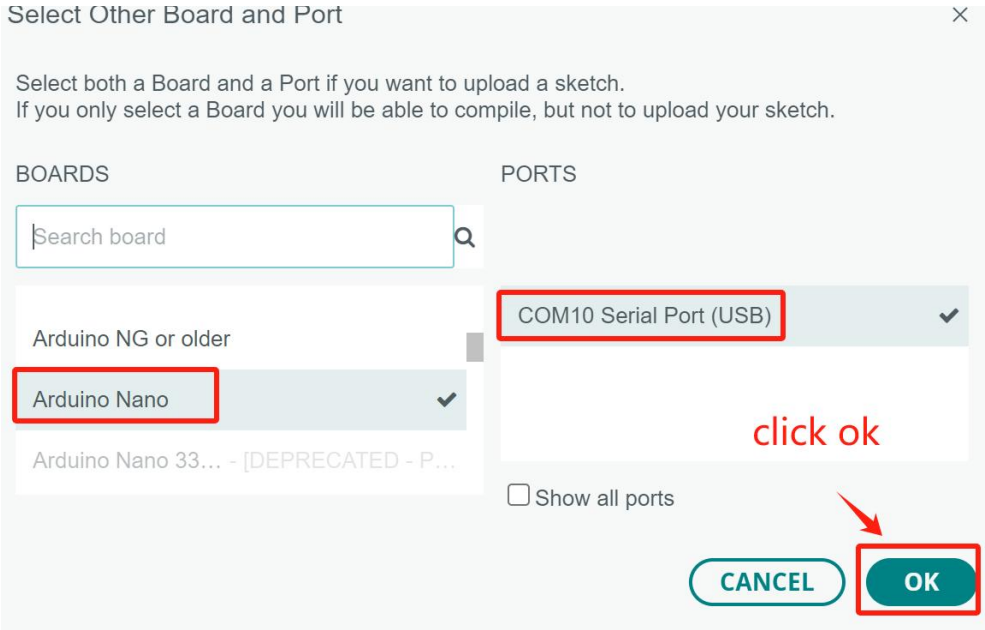
3.2 Select development board type and Port

3.2.1 Click the “Select Board”,then click “Select other board and port...”

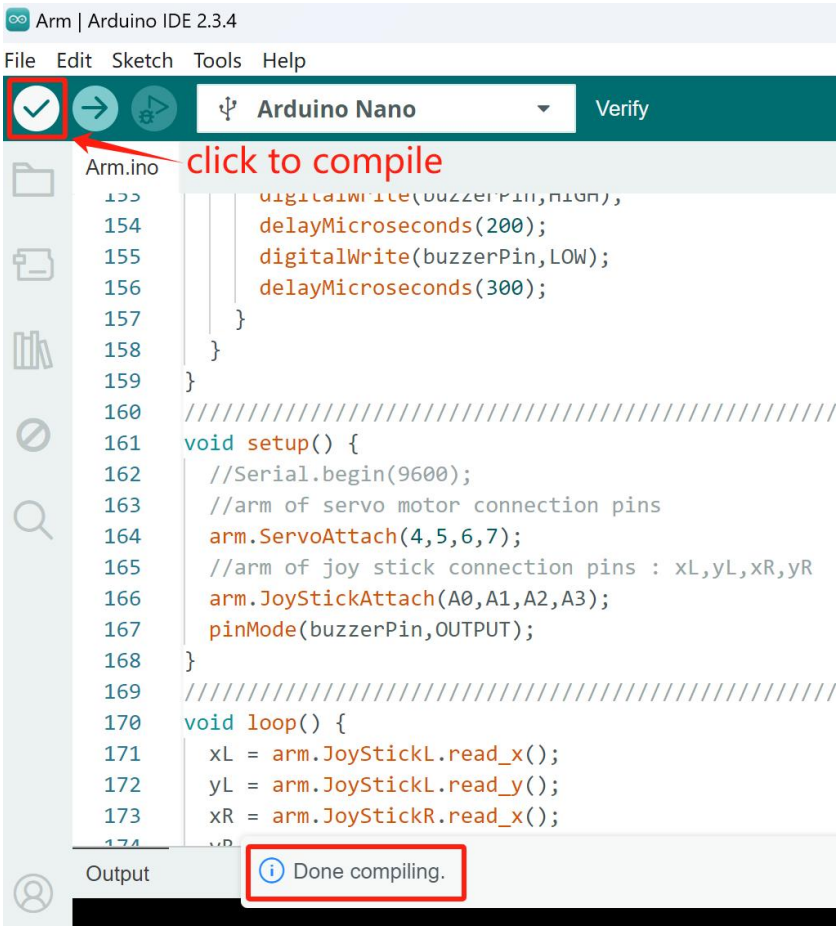


3.2.2 Click on the "BOARDS" dropdown menu to select Arduino Nano, and then select the corresponding COM port of Nano on the computer in the "PORTS" menu. This is COM10(COM port is commonly known as an input output port for a device normally PC which enables communication between Arduino and PC. You can check your arduino com number in device manager, the com port of our arduino board is recognized as COM10 in this tutorial), Then click " OK"。



3.4 Compile and upload code

3.4.1 Click compile button, successfully compiled the code will display "Done compiling"



3.4.2 Click upload button, successfully uploading the code will display "Done uploading".

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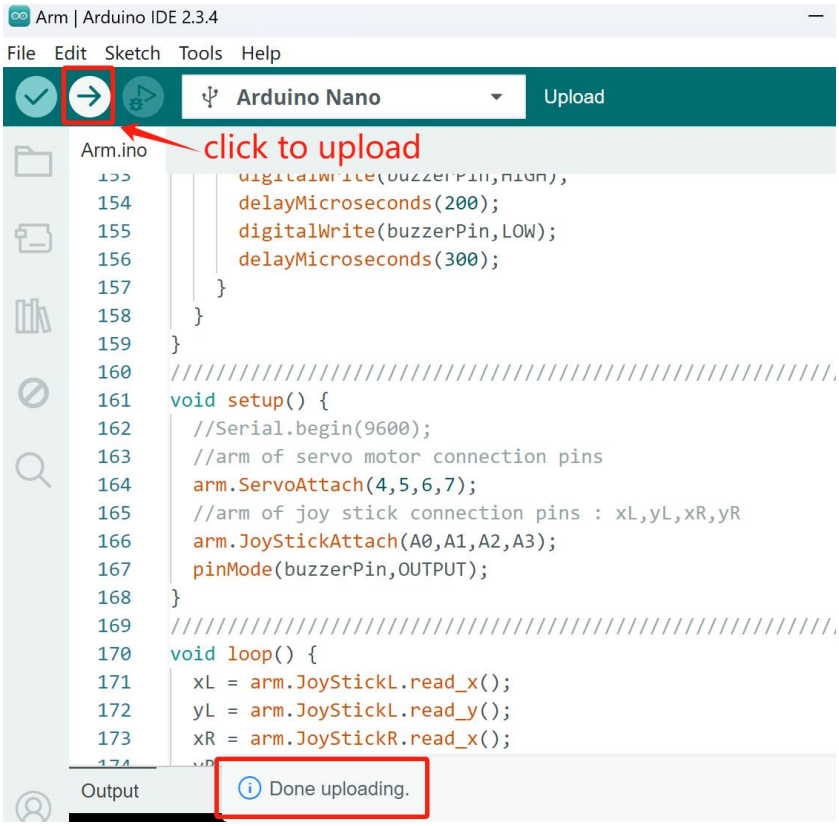
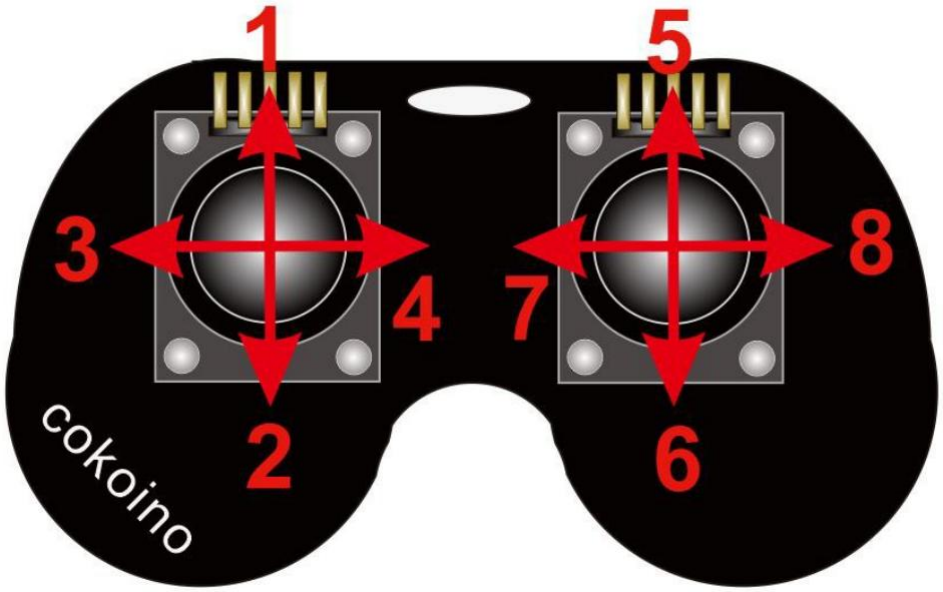


4. How to control the robotic arm

The following explains how the joystick controller controls the robot work by marking the direction of the joystick controller with numbers:



Number 1：The robotic arm stretches forward

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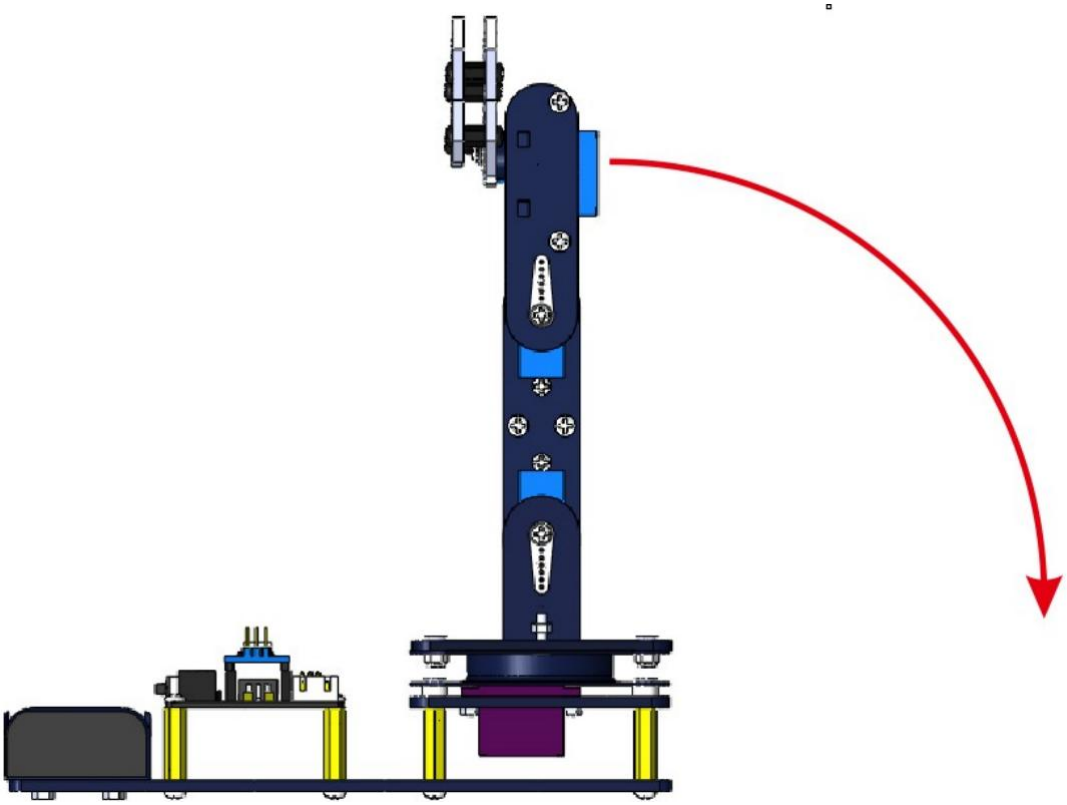
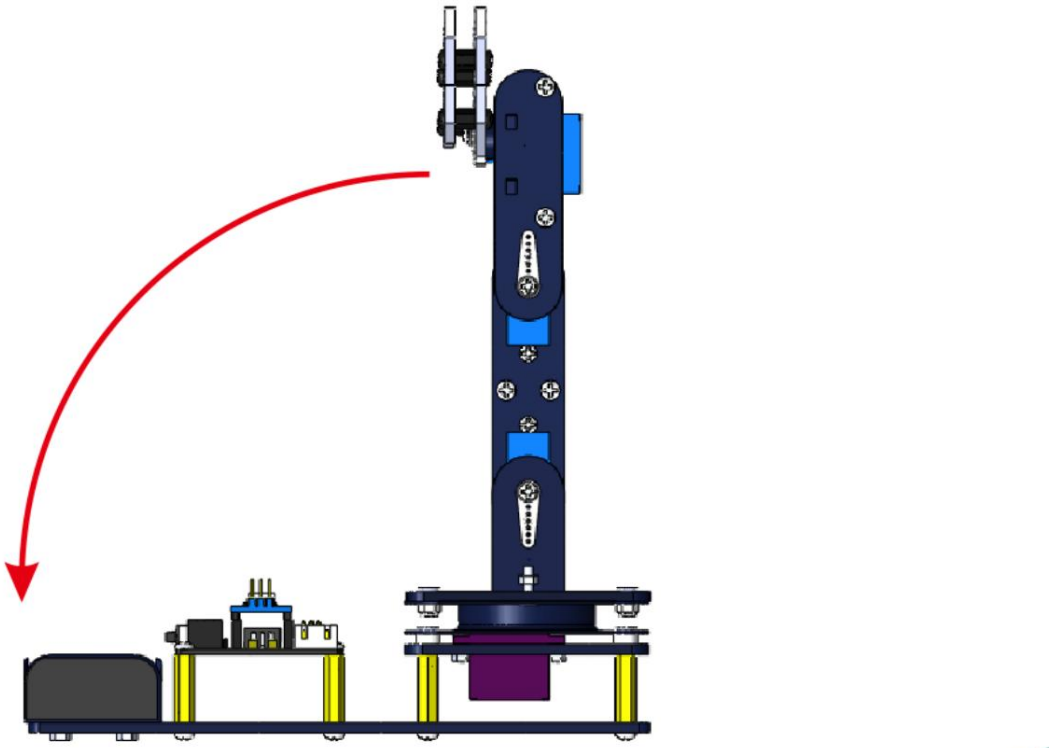
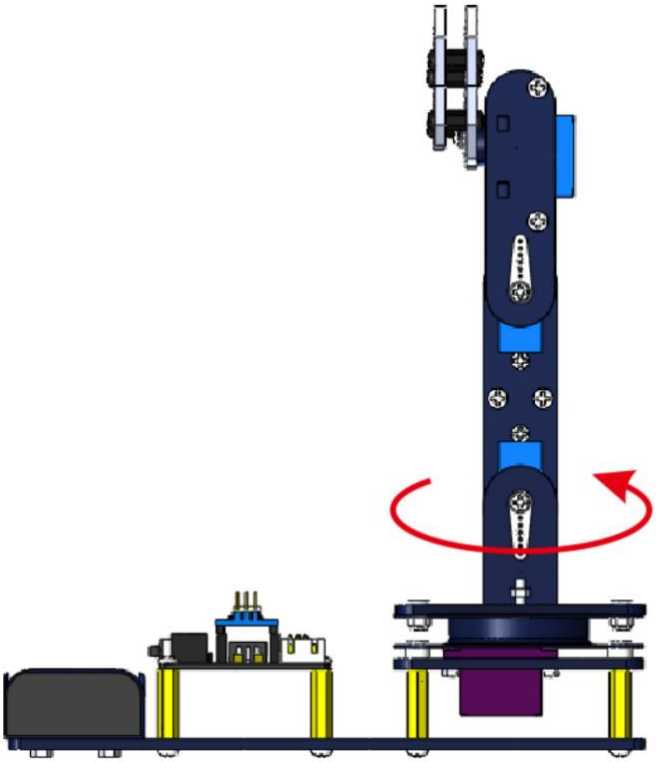


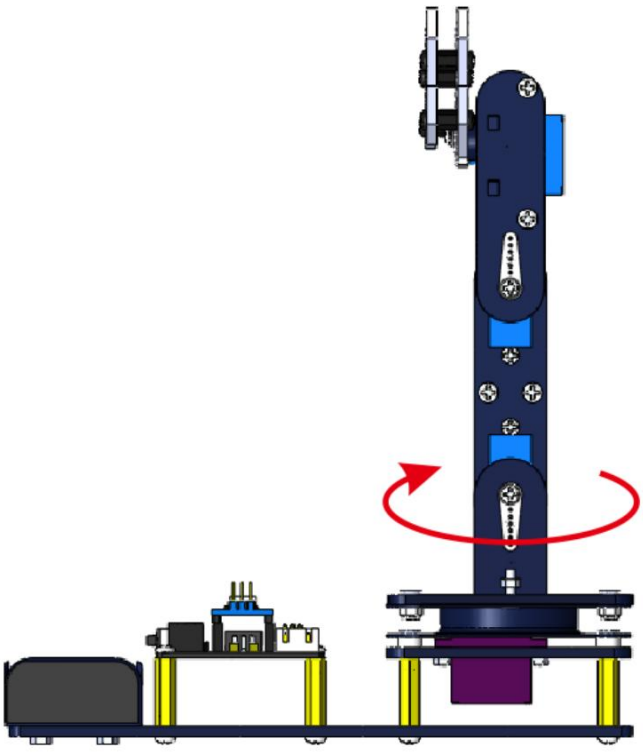
Number 2：Robot arm stretches back



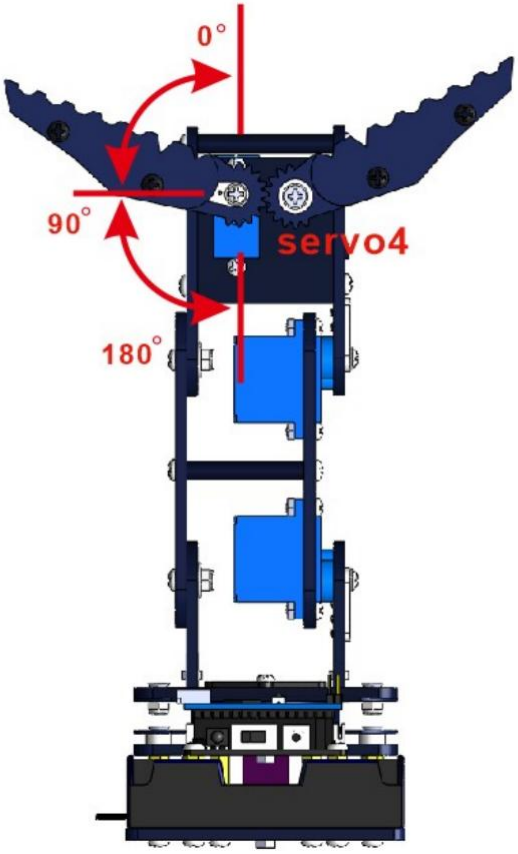
Number 3：The base of the robotic arm rotates to the left



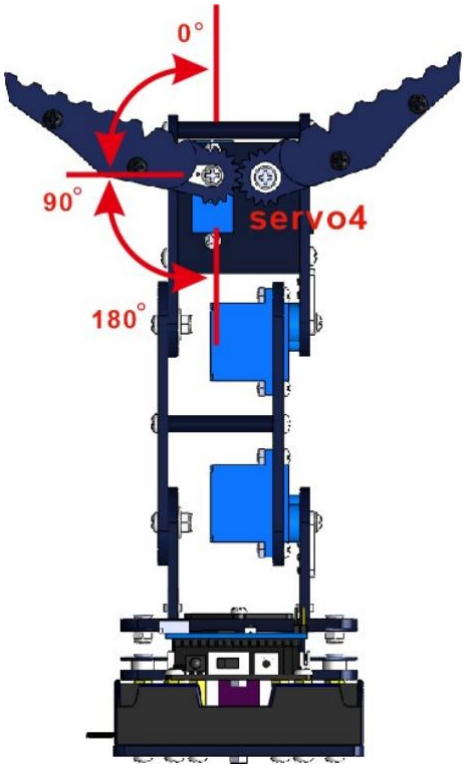
Number 4：The base of the robotic arm rotates to the right



Number 5：Claw of robotic arm close up



Number 6：The claw of the robot arm opens



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5. Record more actions

By modifying the numbers in the base code, you can record up to 170 actions, as shown in the image below:

6. Any questions and suggestions are welcome

Thank you for reading this document!

If you find any errors and omissions in the tutorial, or if you have any suggestions and questions, please feel free to contact us:

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We will do our best to make changes and publish revisions as soon as possible.

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