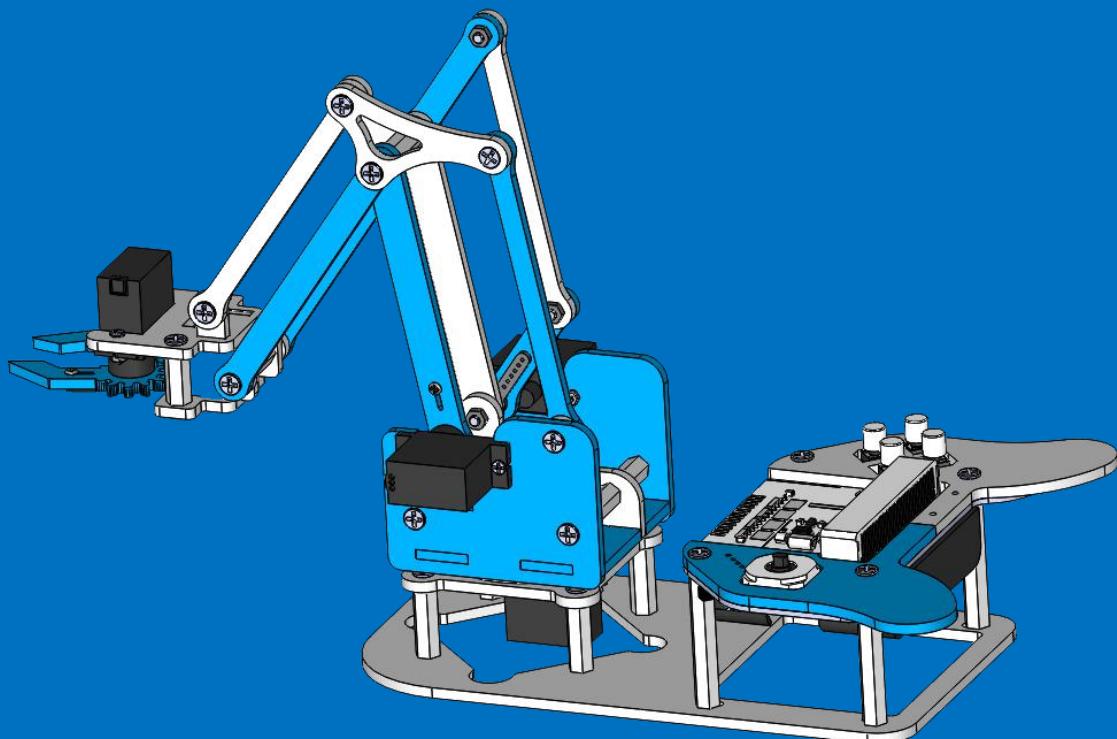


SIYEENOVE

SIYEENOVE Robot Arm Kit for Micro:bit

Instruction Manual

2025.09.14



Model No.: M1R0000

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1. Introduction to Robot Arm

The SIYEENOVE Micro:bit robotic arm is an educational and programmable robotic arm designed to teach students and hobbyists the fundamentals of robotics, coding, and automation. Powered by the BBC Micro:bit microcontroller, this robotic arm provides a hands-on learning experience in STEM (Science, Technology, Engineering, and Mathematics) fields.

1.1 Package Contents

#Part 1 : Electronics Components		
Joystick 1PCS	Servo 4PCS	3P wire 1PCS

#Part 2 : Fasteners / Accessories

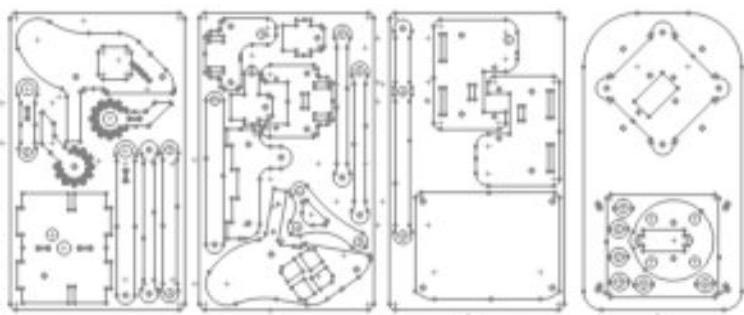
The following accessories listed in sequential order are all packaged in a small bag with a label and serial number attached. You can quickly locate them by referring to the serial number and name on the bag.

1 M3×12mm Screw 6Pcs 	2 M3×9mm Screw 43Pcs 	3 M2×8mm Screw 10Pcs
4 M1.4×5mm Screw 7Pcs 	5 M3 Nut 12Pcs 	6 M2 Nut 10Pcs
7 M3×14mm Standoff 3Pcs 	8 M3×17+6mm Standoff 2Pcs 	9 M3×26mm Standoff 2Pcs
10 M3×18mm Standoff 4Pcs 	11 M3×20mm Standoff 5Pcs 	12 M3×38mm Standoff 4Pcs

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(13) 5×3.2×3mm Spacer 8Pcs 	(14) 5×3.2×6mm Spacer 6Pcs 	(15) Spiral Conduit 
(16) Steel Ball 4Pcs 	(17) Button Cop 4Pcs 	

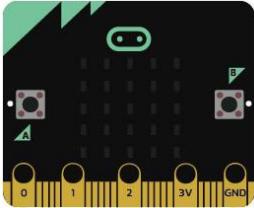
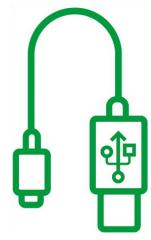
#Part 3 : Acrylic Sheet



#Part 4 : Tools

		
M3 screwdriver 1PCS	M1.5 screwdriver 1PCS	wrench 1PCS

What you'll need (not included)

			
Micro:bit V2 1PCS	Micro USB Cable	computer with internet & a USB port	1.5V AA Battery 4 pcs

1.2 Specification

Control Method: SIYEENOYE Joystick (micro:bit not included)

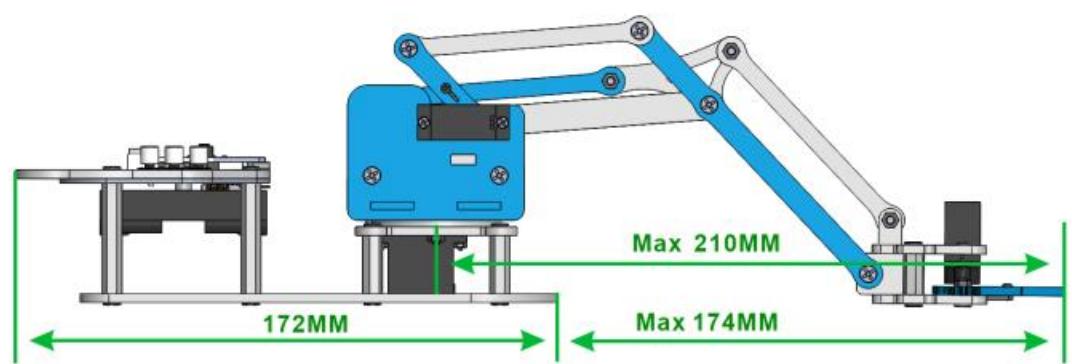
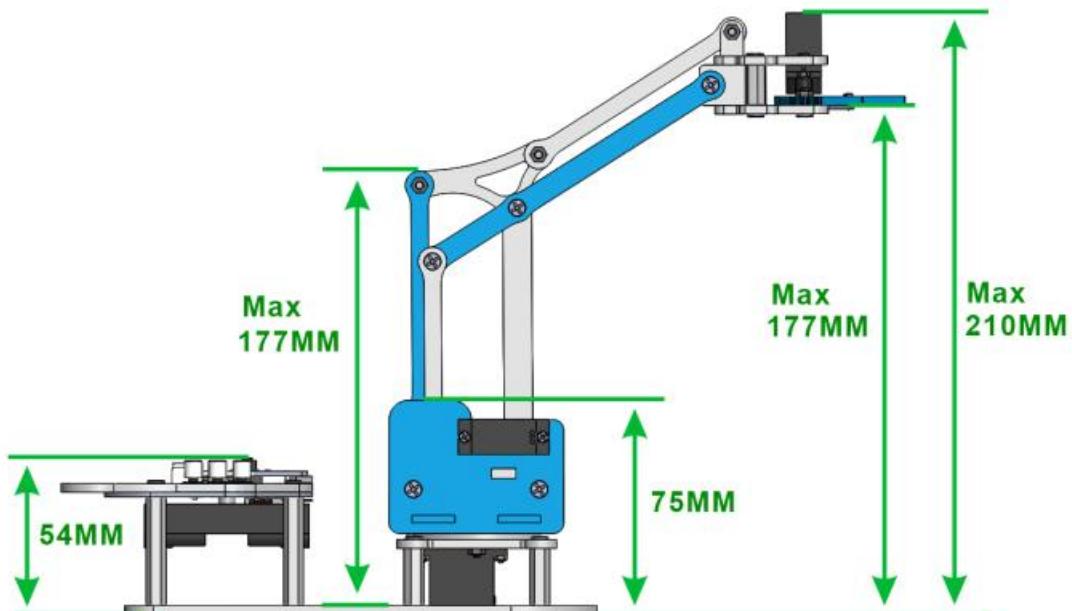
Programming Method: MakeCode

Required Battery Type: 4 × AA Batteries

Servo Type: MG90S 180°

The maximum lifting capacity: ≤60g

1.3 Product Dimensions



SIYEENOKE

1.4 SIYEENOKE Joystick Introduction

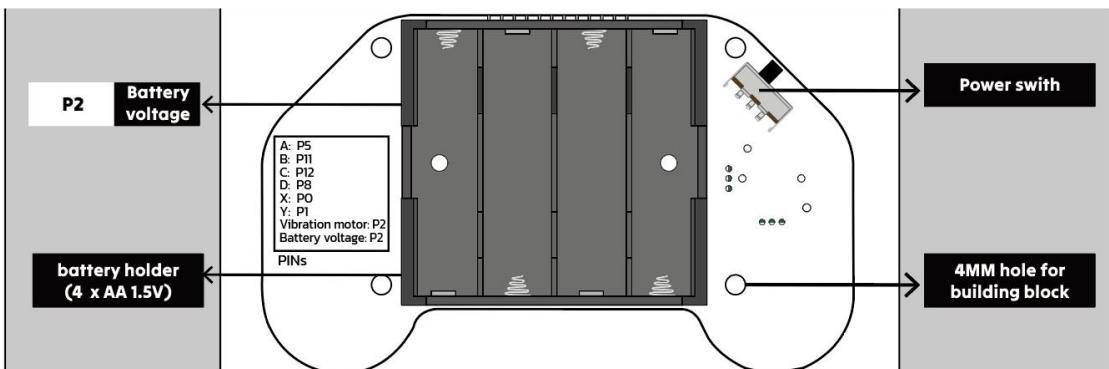
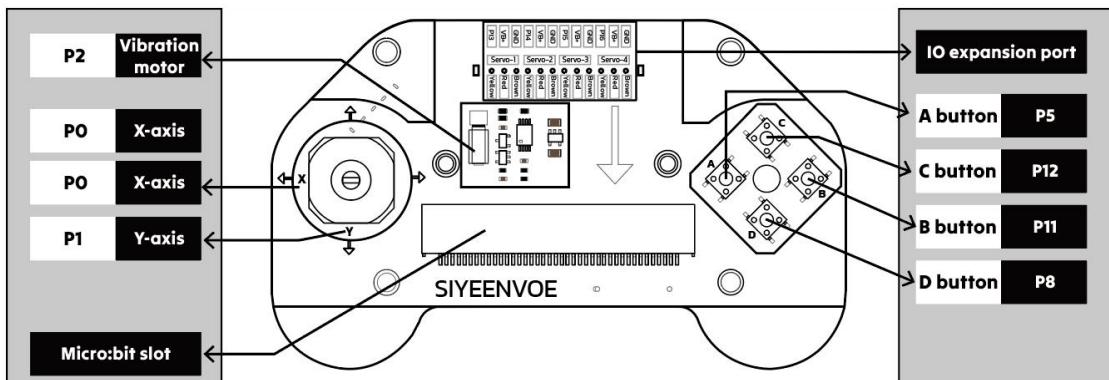
The SIYEENOKE Joystick Controller is a manual input device used in robotics, gaming, and education applications. Featuring dual-axis (X/Y/Z-axis) movement and integrated Button, it enables high-precision directional control, making it ideal for operating robotic arms, drones, and other motion-based systems.

1.4.1 Joystick Specification

Shield	
Name	mJoystick
SKU	M1E0001
USB connector	
Name	Micro USB
Applicable motherboard	
Name	Micro:bit
Pins	
Digital I/O Pins	4 (P13, P14, P15, P16)
Servo pins	4 (P13, P14, P15, P16)
Communication	
SPI	Yes (P13, P14, P15, P16)
Power	
Input voltage (nominal)	6V (4 AA batteries, 1.5V/PCS)
VB	6V (4 AA batteries, 1.5V/PCS)
Vibration motor	
Model	3610 Vibration motor
Rated voltage/current	2.7V/75mA
Rotation speed	14000±2500RPM
Dimensions	
Width	72.5 mm
Length	120 mm
Height	29mm
Weight	
	50 g

1.4.2 Interface specification

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Name	Description
Vibration motor	Provides haptic feedback to the handle, controlled by Micro:bit's P2 pin.
X-axis	The joystick's X-axis, whose analog value can be read through Micro:bit's P0 pin.
Y-axis	The joystick's Y-axis, whose analog value can be read through Micro:bit's P1 pin.
Micro:bit slot	Designed for inserting the Micro:bit main control board.
4 x AA 1.5V battery case	The battery case accommodates 4 batteries, each with standard 1.5V voltage, approximately 14.5mm in diameter and 50.5mm in height.
Battery voltage	When 4 AA batteries are installed, the voltage can be read through Micro:bit's P2 pin.
IO extension	For connecting external servos or sensors. The VB pin voltage equals the series voltage of 4 AA batteries ($1.5V \times 4 = 6V$).
A button	Its value can be read through Micro:bit's P5 pin.
B button	Its value can be read through Micro:bit's P12 pin.
C button	Its value can be read through Micro:bit's P11 pin.
D button	Its value can be read through Micro:bit's P8 pin.
Power switch	It controls the main power supply of the handle.
4MM hole	The handle features 4x4mm holes compatible with LEGO.

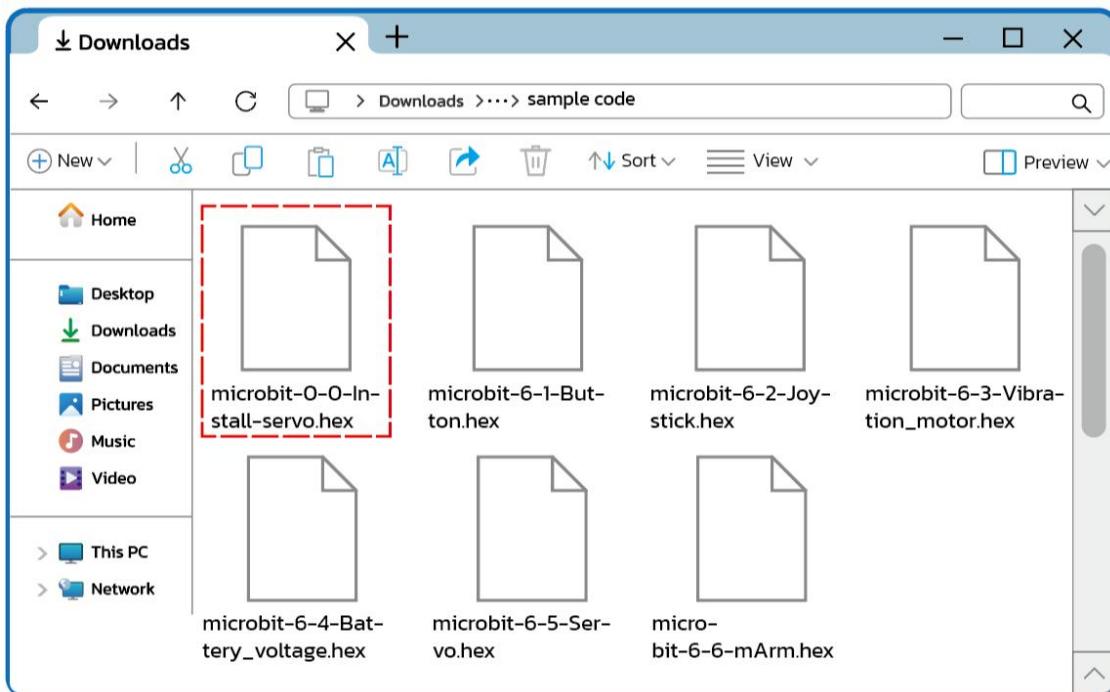
2. Assembly

2.1 Installation Preparation: Initialize servo angle.

Note!!

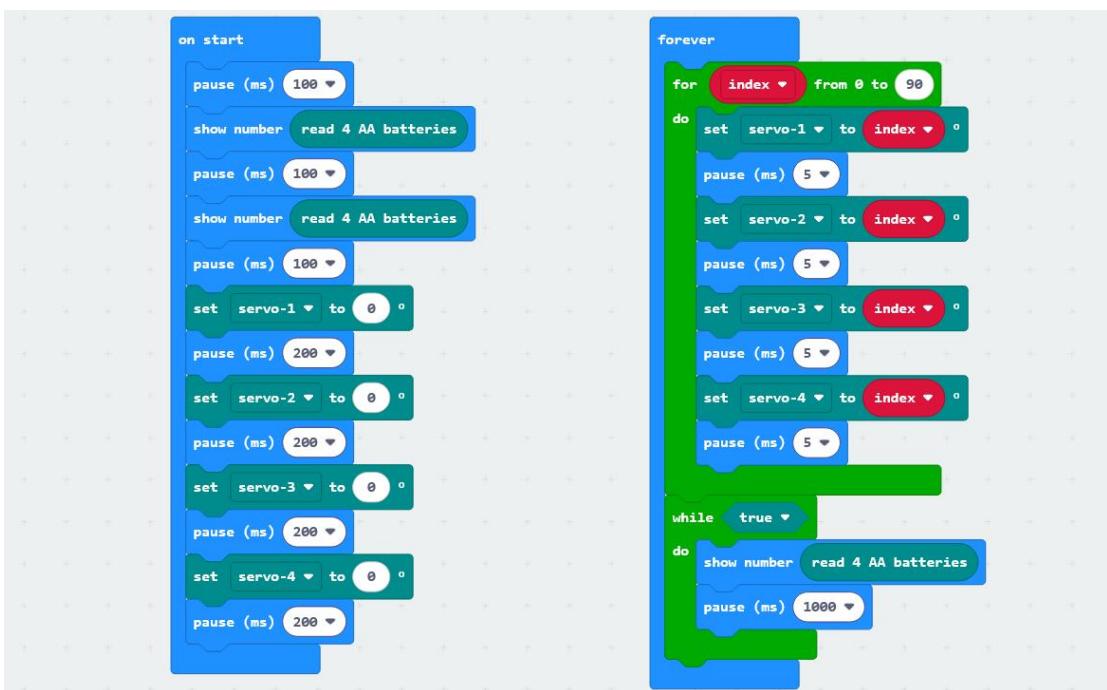
The microbit-0-0-Install-servo.hex code must be uploaded before assembly because the servos require angle initialization. If installed without proper servo initialization, the robotic arm will fail to execute preset programs and tasks. In severe cases, power-on activation may cause servo jamming, potentially damaging the servos.

The initialization code is stored in the "sample code" folder within the downloaded resource package, as shown in the image below:



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Code:



Important Notice: The above code is based on the mJoystick extension package. For details about the mJoystick extension, please refer to Lesson “[4.2.MakeCode Extension](#)” of this documentation.

Tools Required:

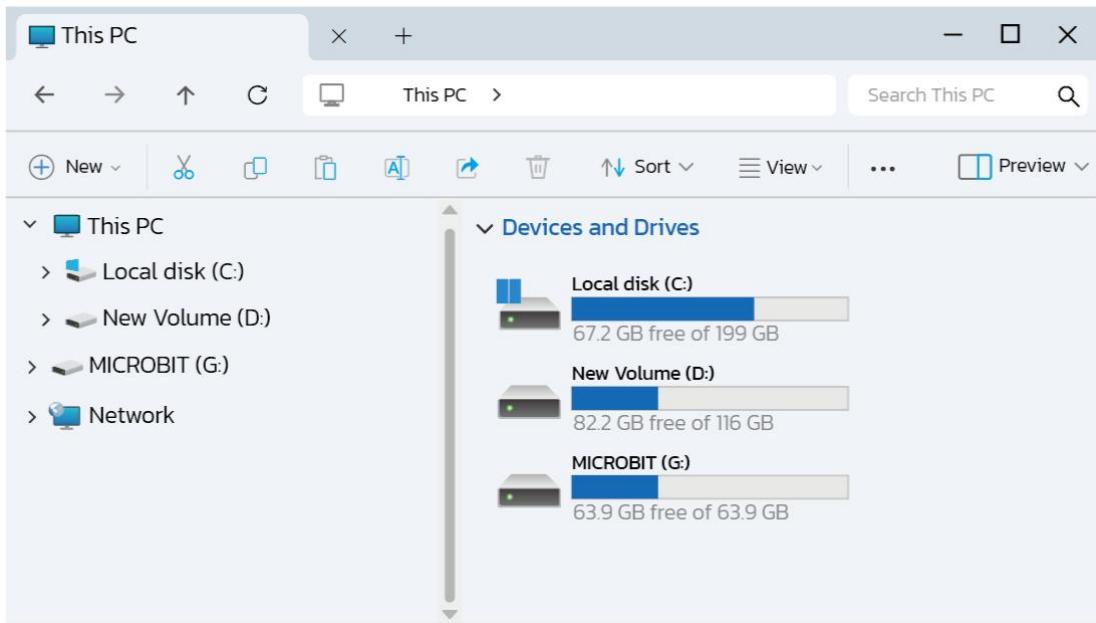
PC	Micro:bit v2.x.x	Micro USB cable

Steps:

1. Connect the micro:bit to your PC using the Micro USB cable. The PC will detect the micro:bit as a removable drive (e.g., "MICROBIT").



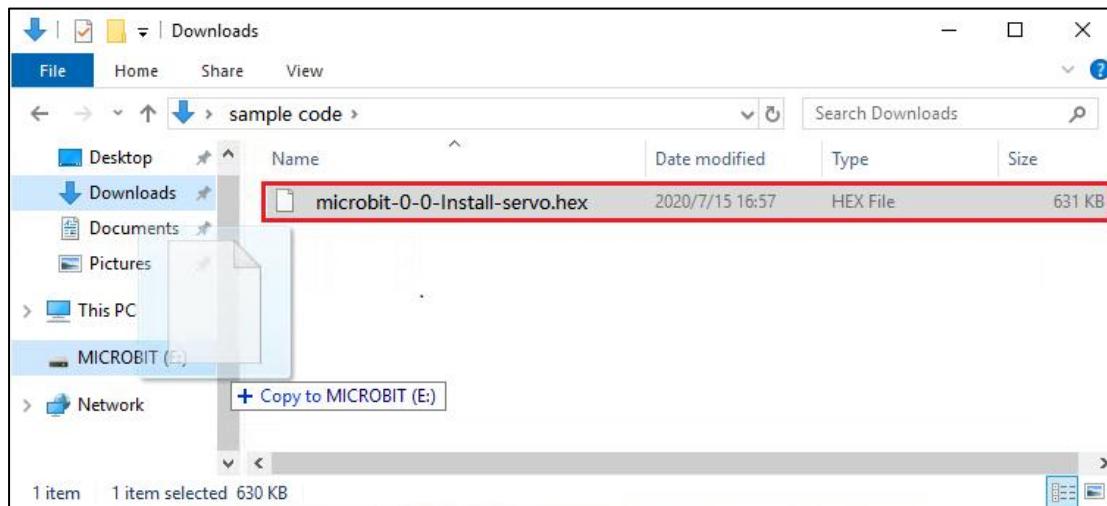
SIYEENOVE



2. Locate the HEX file (microbit-0-0-Install-servo). Use one of the following two methods to quickly upload code to the micro:bit.

Method 1 (Drag & Drop):

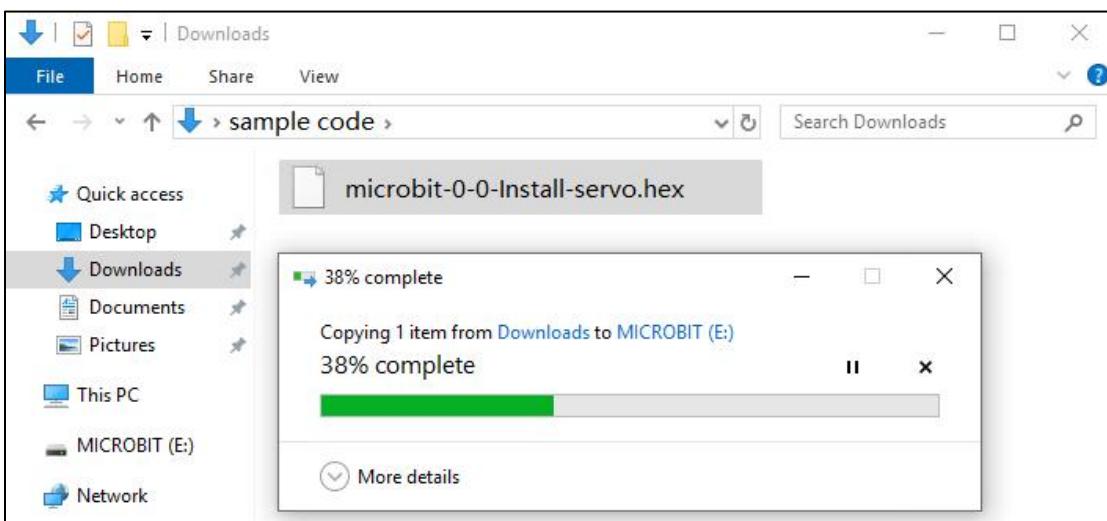
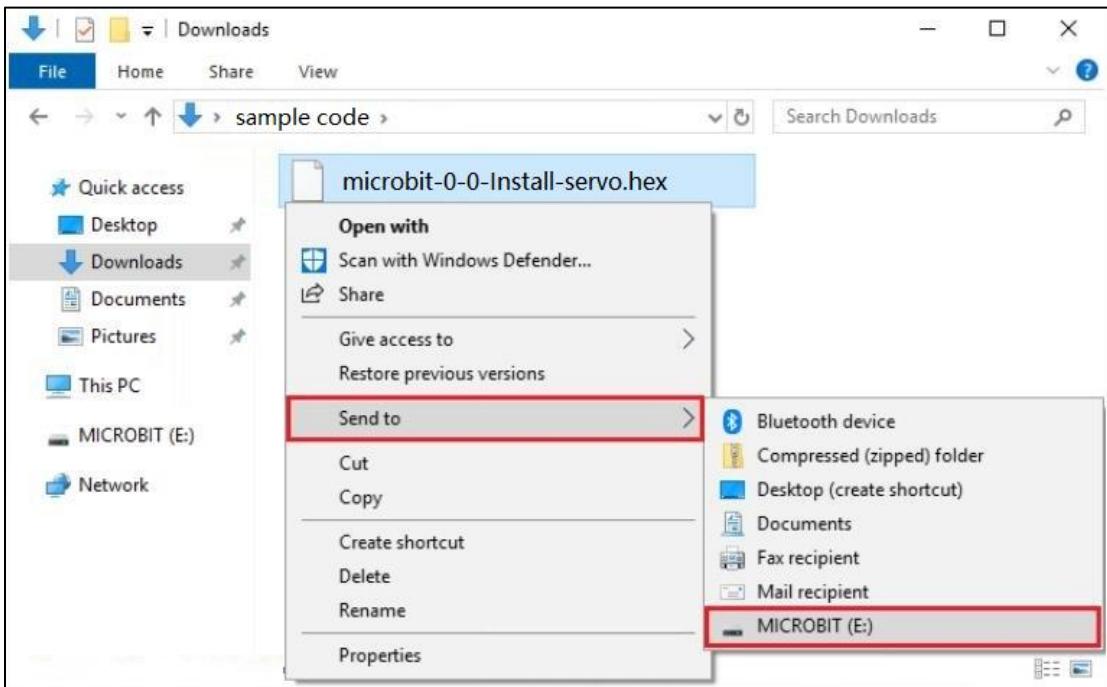
Simply drag and drop the HEX file onto the MICROBIT drive.



Method 2 (Send to):

Right-click the HEX file and select "Send to" → MICROBIT drive.

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Note:

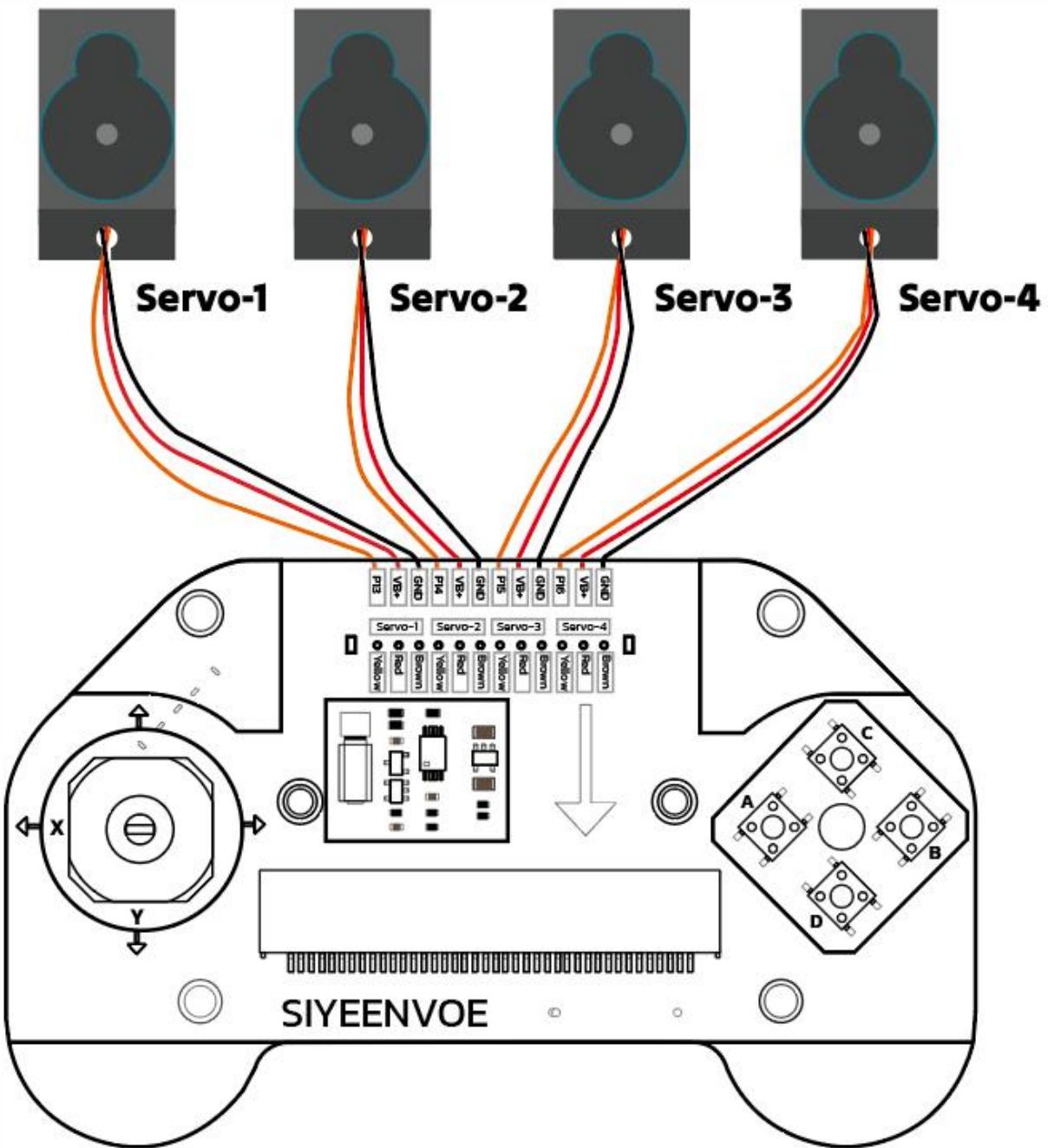
Ensure the micro:bit is properly connected before uploading.

Do not disconnect while the firmware is flashing.

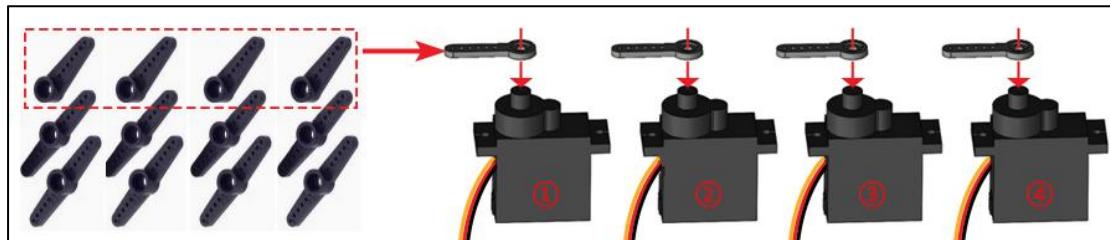
3. Connecting the Servo to the Joystick:

Servo-1			Servo-2			Servo-3			Servo-4		
P13	VB+	GND	P14	VB+	GND	P15	VB+	GND	P16	VB+	GND

SIYEENOVE

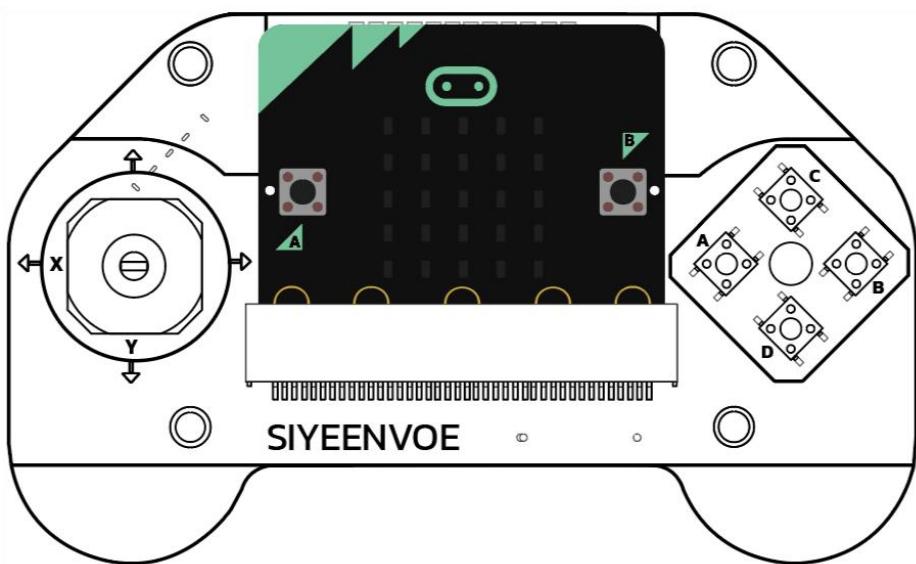


4. For easy observation of the servo shaft's rotation and its ability to stop at the initialized position, we recommend attaching a temporary servo horn (arm) to the servo shaft without screw fixation during this process.

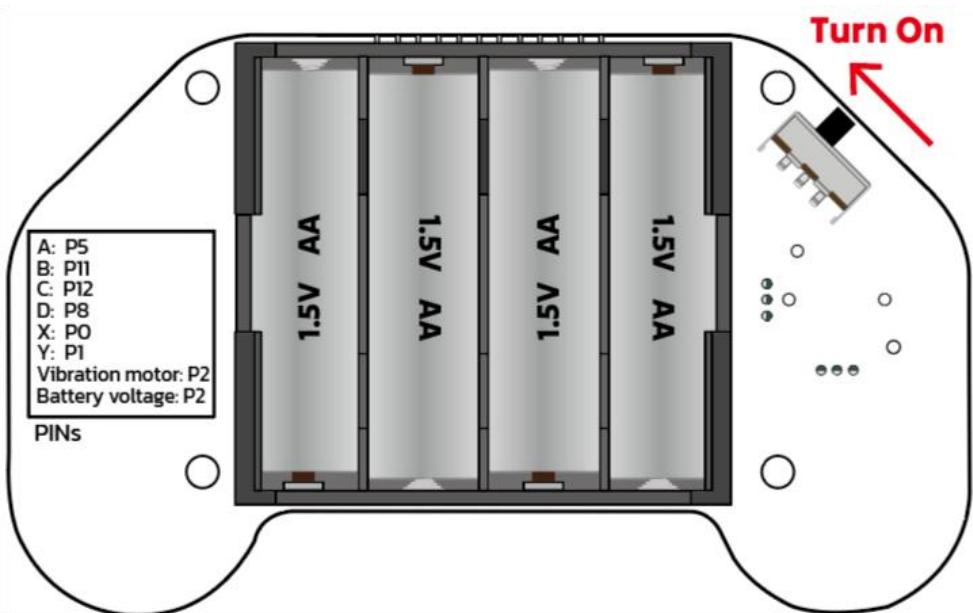


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5. Insert the micro:bit to the joystick



6. Insert 4*AA batteries and turn on the power switch



7. Result:

1) Battery Level Indication:

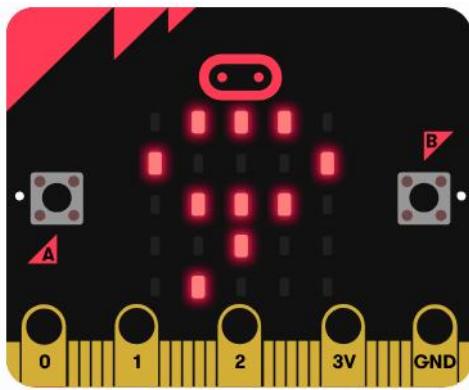
After powering on, the Micro:bit's LED matrix will continuously cycle through displaying the battery level (0%-100%).

Important: When the battery level drops below 30%, replace all batteries immediately.

If no battery level is displayed:

Check if the Micro:bit is fully inserted into the handle

Verify correct battery installation



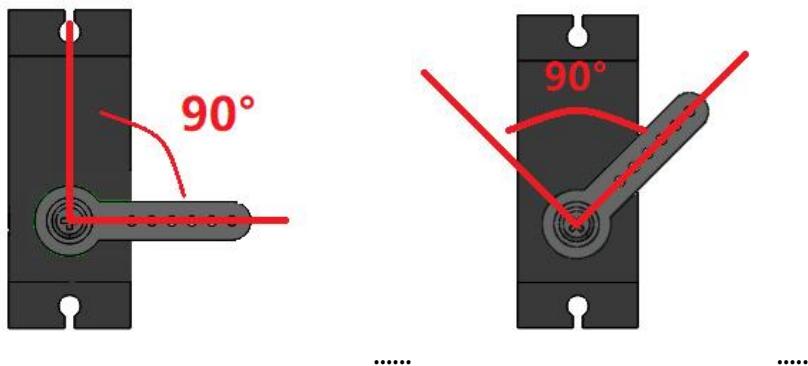
2) Servo Initialization Sequence:

First Power-On:

Allow 5 seconds to pass, all 4 servos will rotate from random positions → 0° → slowly to 90° (holding at 90°)

On subsequent power-ups:

Allow 5 seconds to pass, all servos will move from 90° → 0° → slowly back to 90° (holding position)



If servos fail to rotate:

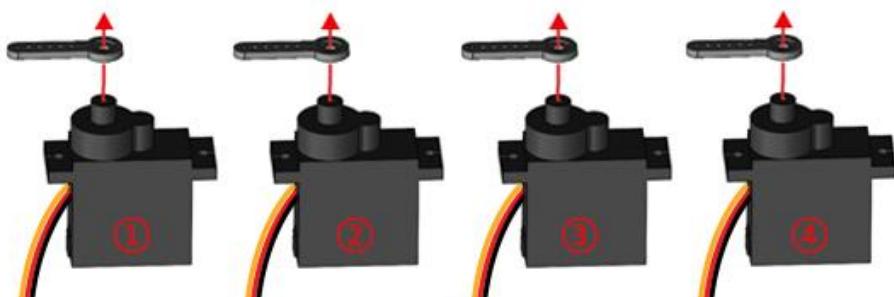
Inspect servo wiring connections

Re-upload the code if wiring is correct but servos remain unresponsive

Clean Micro:bit's edge connectors and reinsert firmly

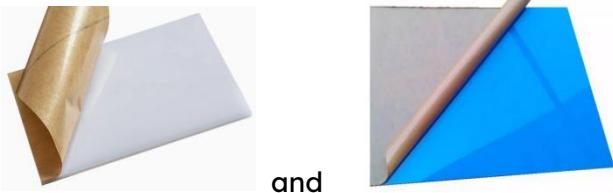
Contact support if issues persist (possible servo defect)

8. After the servo angle initialization is completed, gently remove the servo horn from each servo for subsequent installation. Don't rotate the servo shaft to avoid damage gear trains or disrupt calibrated positions.



2.2 Precautions before robot assembly

- 1) Remove protective film before assembly! Both top and bottom surfaces are coated with protective film



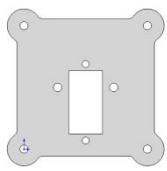
and

- 2) Do not empty all parts from their bags at once to avoid mixing and confusion. Open part bags sequentially according to the instructions in the manual to prevent mixing small components. Some screws may be included as spares.
 3) Assemble facing same direction as diagrams; colors of components may vary.
 4) If any parts are missing or damaged, do not assemble or use the product. Please contact us for after-sales support.

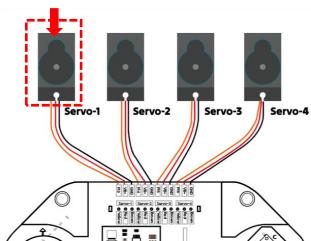
2.3 Start Assembly

Step 1-Install the Servo-1

Acrylic board
1PCS



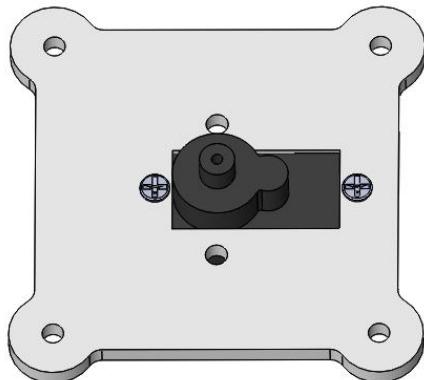
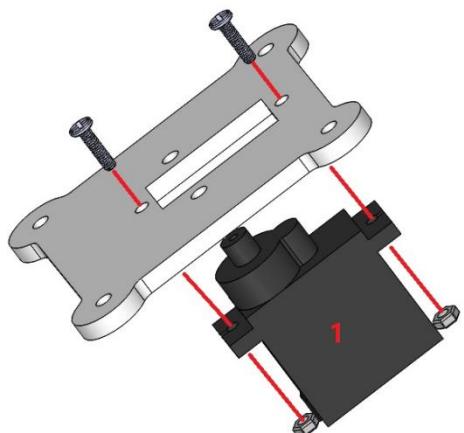
Servo-1



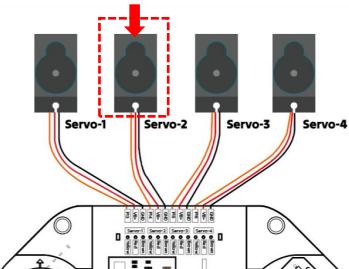
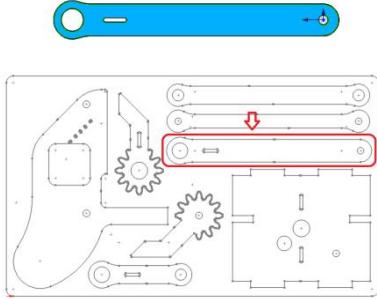
Bag No.③
M2x8mm screw 2PCS

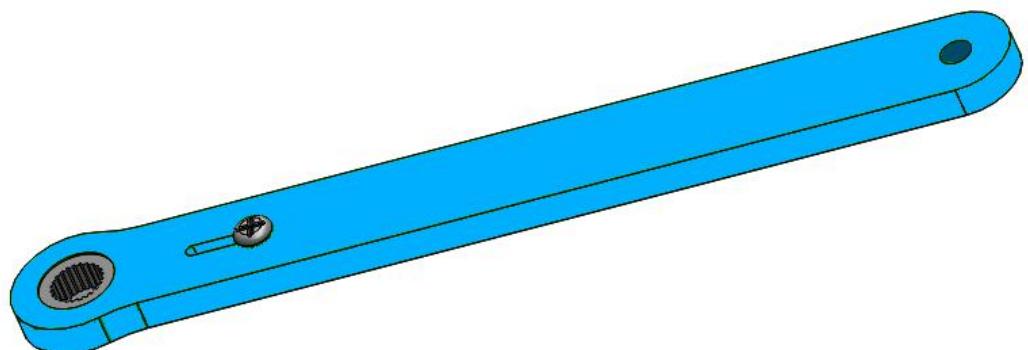
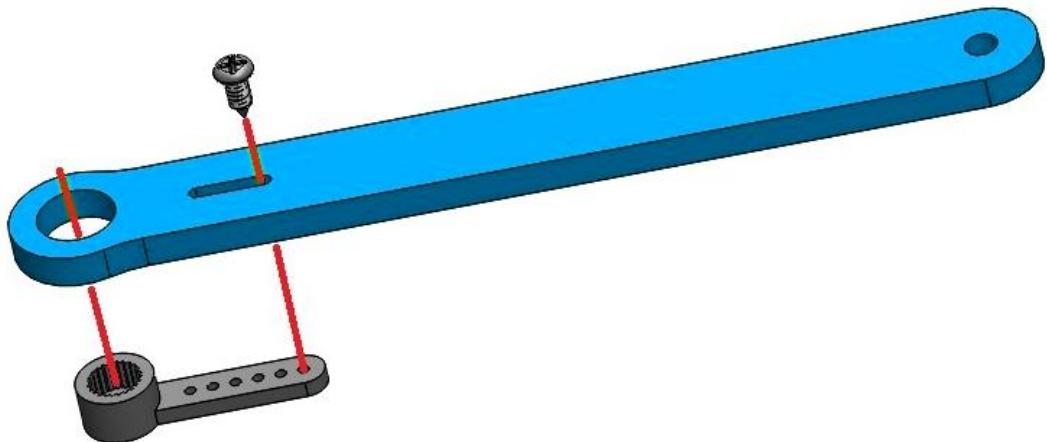


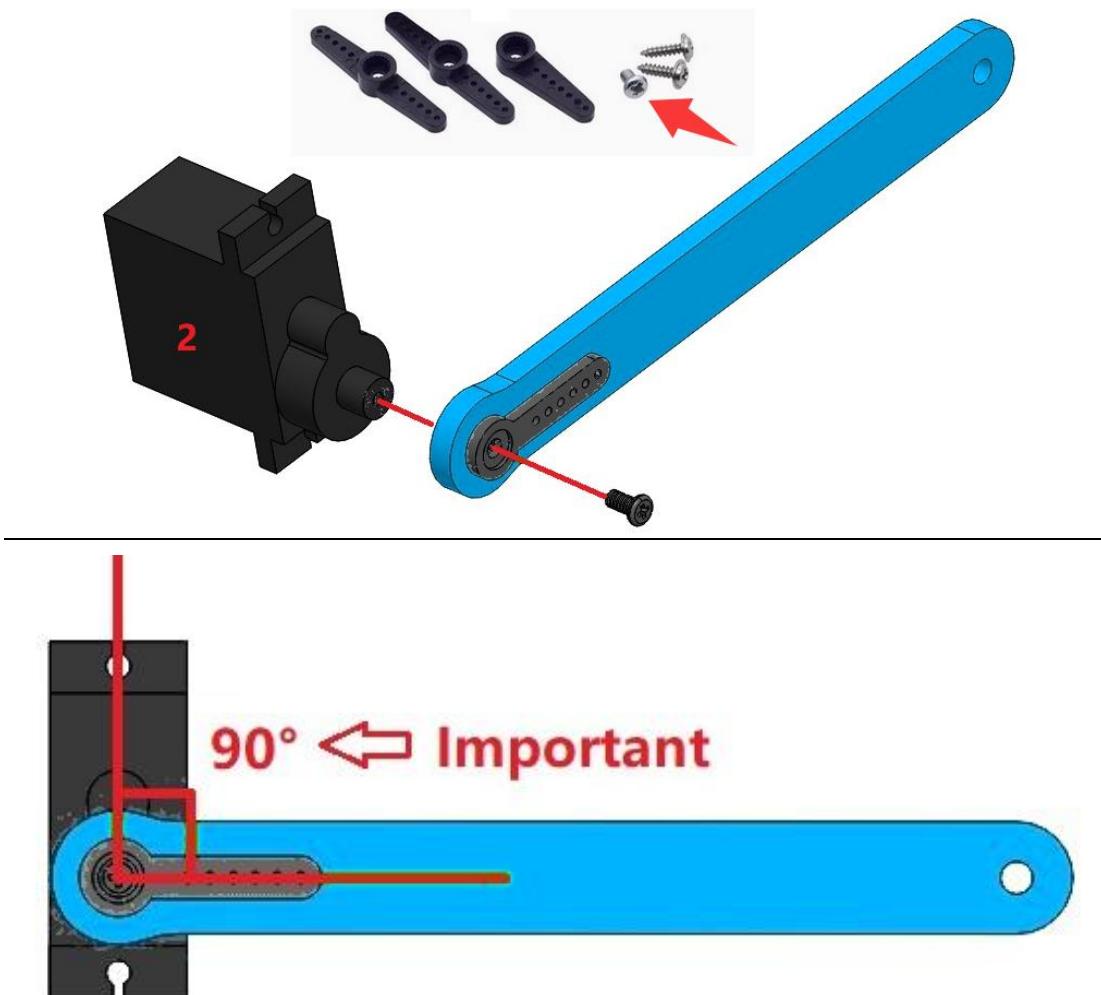
Bag No.⑥
M2 nut 2PCS



Step 2-Install the Servo-2

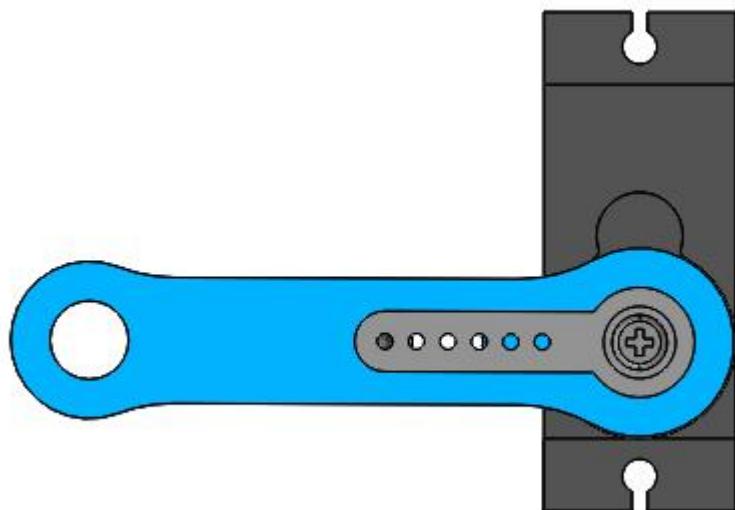
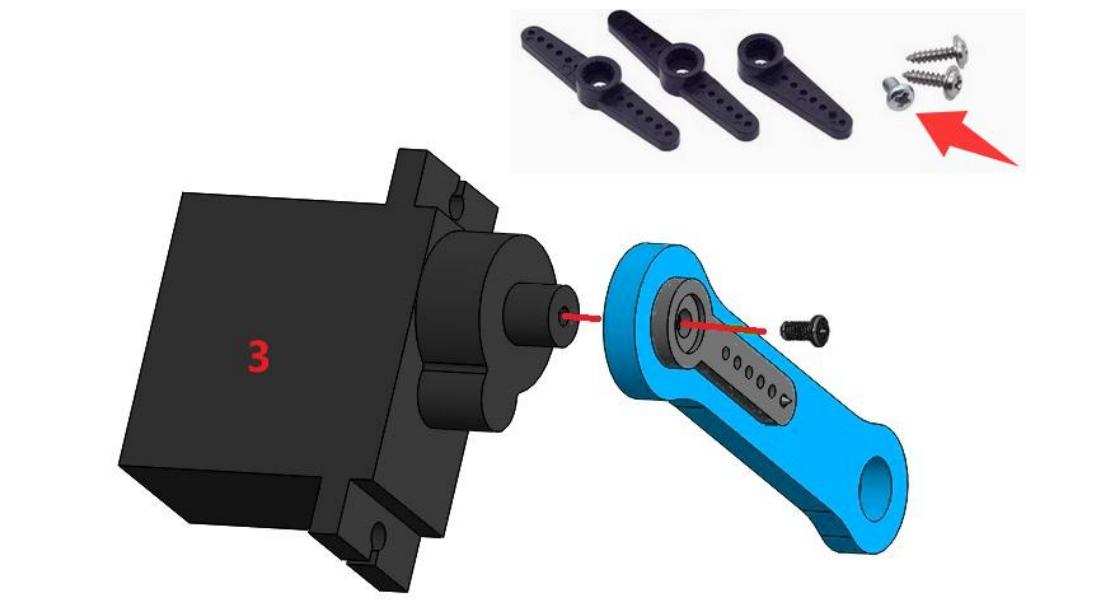
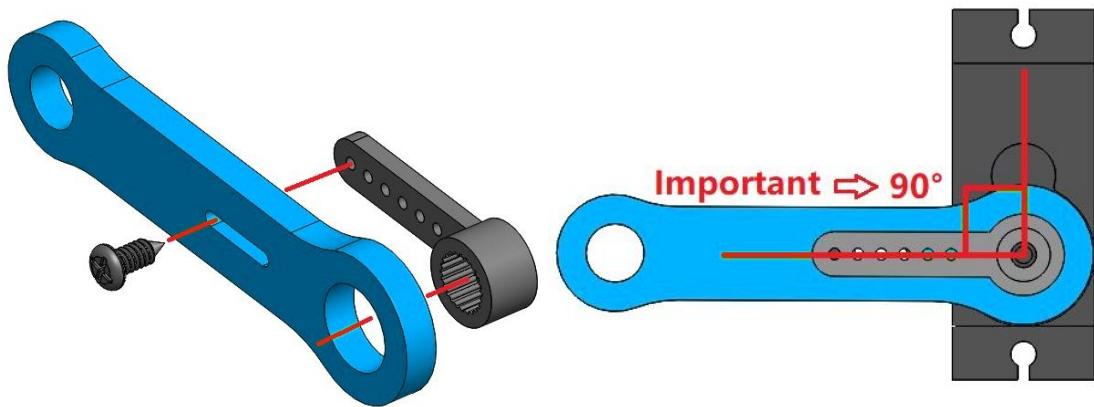
Servo-2	Acrylic board 1PCS	
		
Servo horn 1PCS	Bag No.④ M1.4X5 Self-tapping screw 1PCS	M2.5X4mm screw 1PCS
		



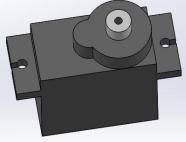
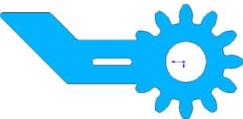


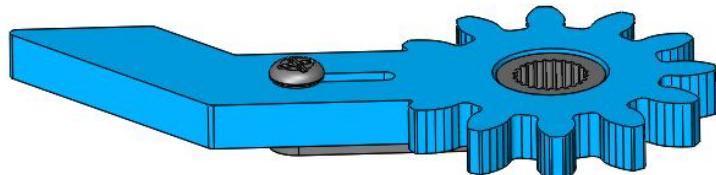
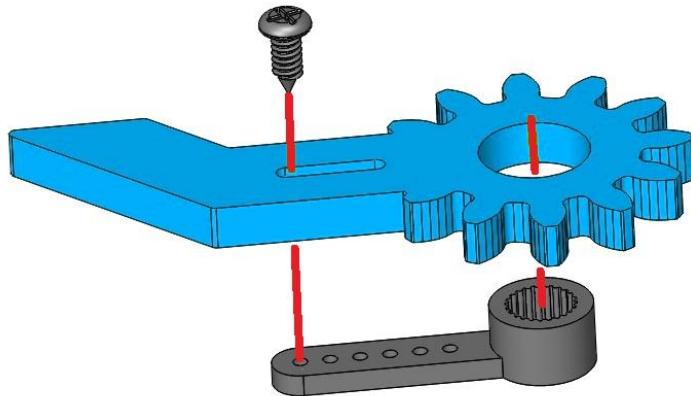
Step 3-Install the Servo-3

Servo-3	Acrylic board 1PCS	
Servo horn 1PCS	Bag No.④ M1.4X5 self-tapping screw 1PCS	M2.5X4mm screw 1PCS

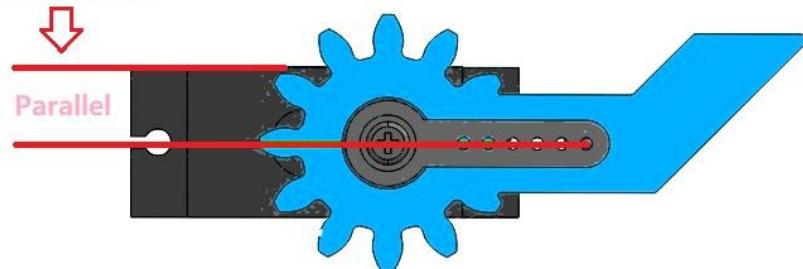


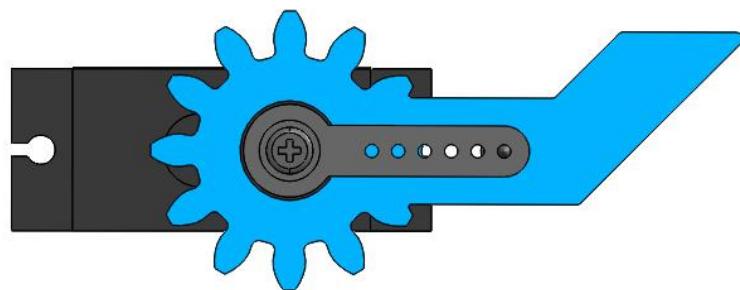
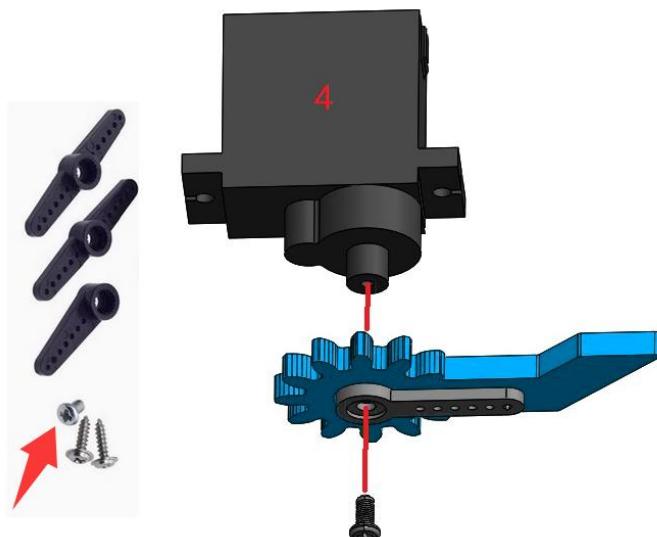
Step 4-Install the Servo-4

Servo-4	Acrylic board 1PCS	
		
Servo horn 1PCS	Bag No.④ M1.4X5 self-tapping screw 1PCS	M2.5X4mm screw 1PCS
		



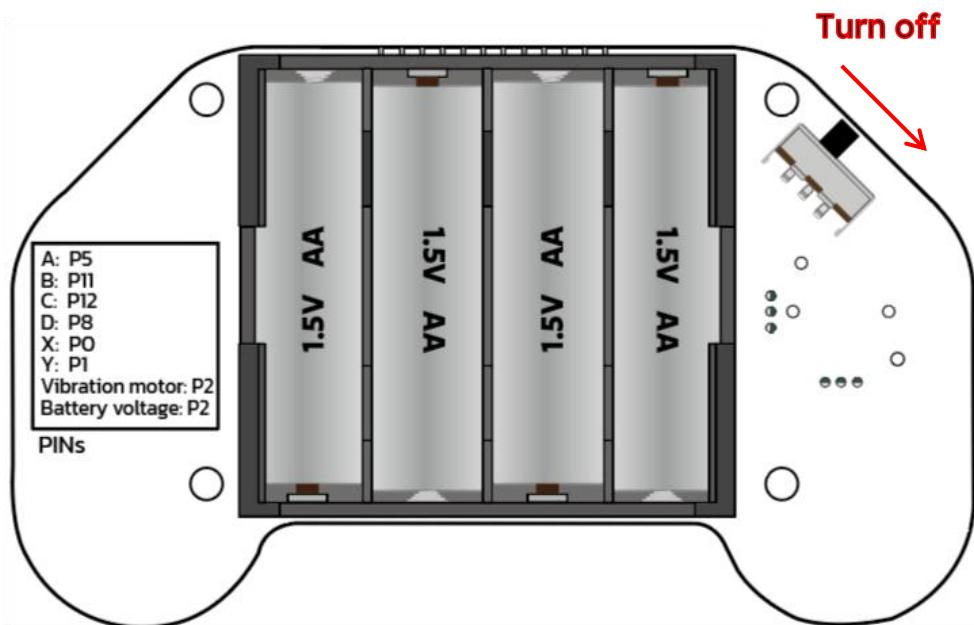
Important





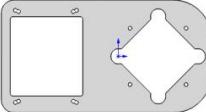
Step 5 - Power off the Joystick and disconnect servos

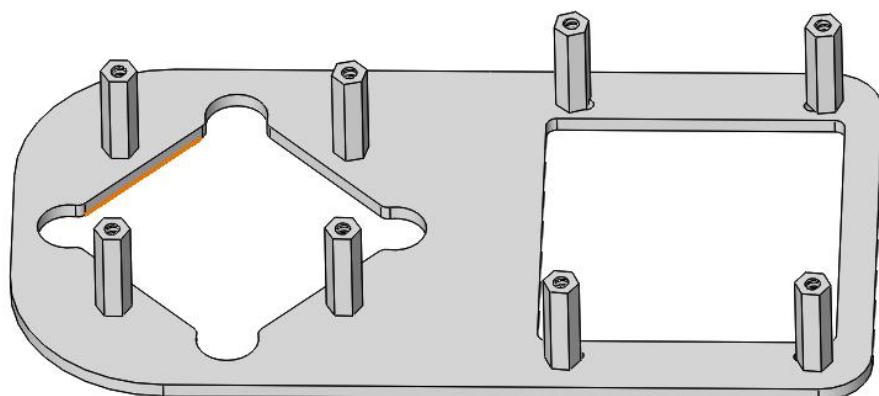
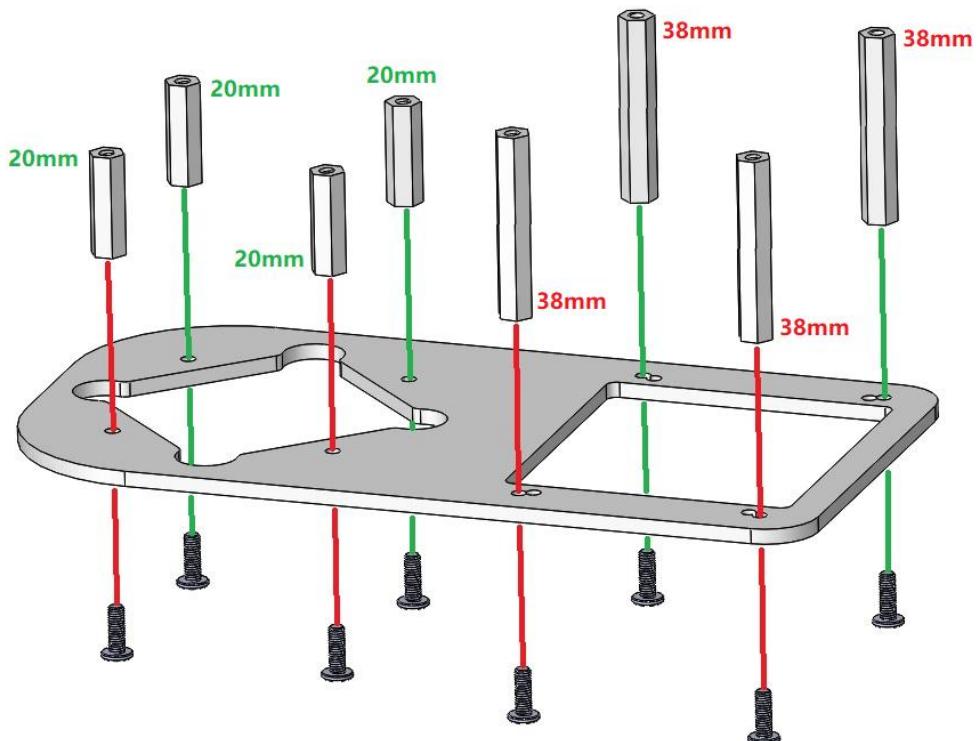
To prepare for the next installation steps: Power off the Joystick and unplug all servo cables from its ports.



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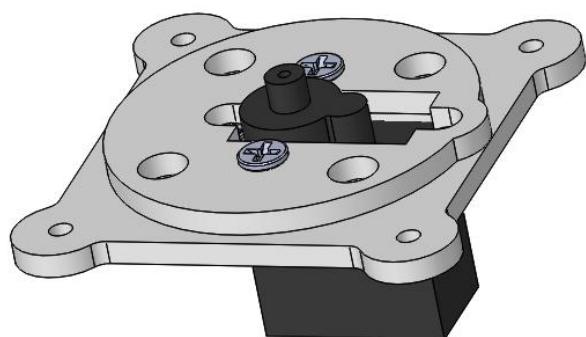
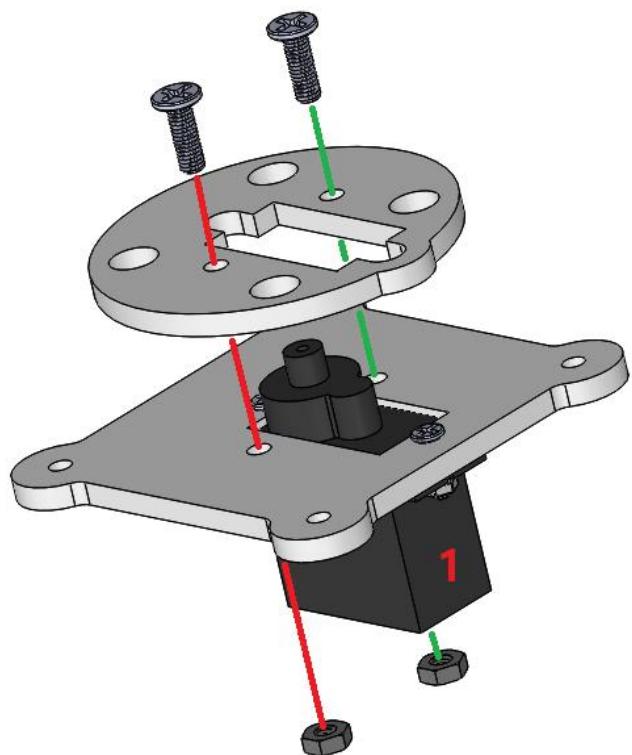
Step 6 - Install Base (Nylon Standoffs)

Acrylic board	Bag No.⑪ M3x20MM Nylon Standoff 4PCS	Bag No.⑫ M3x38MM Nylon Standoff 4PCS	Bag No.⑬ M3X9MMscrew8 PCS
			

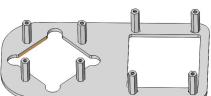


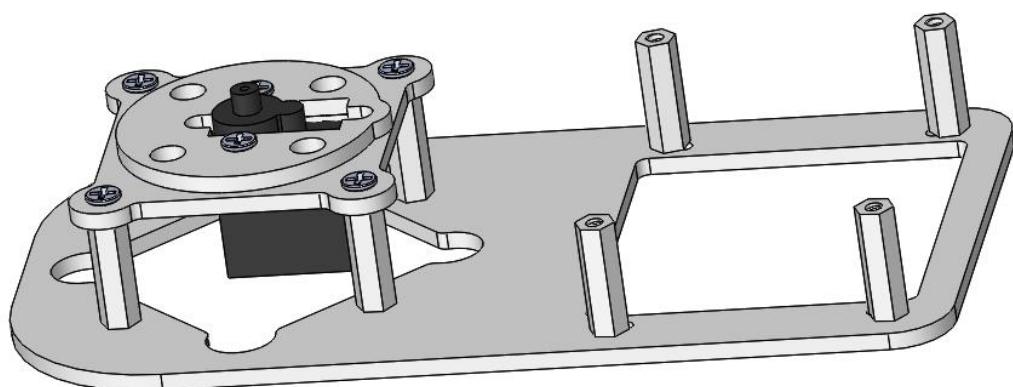
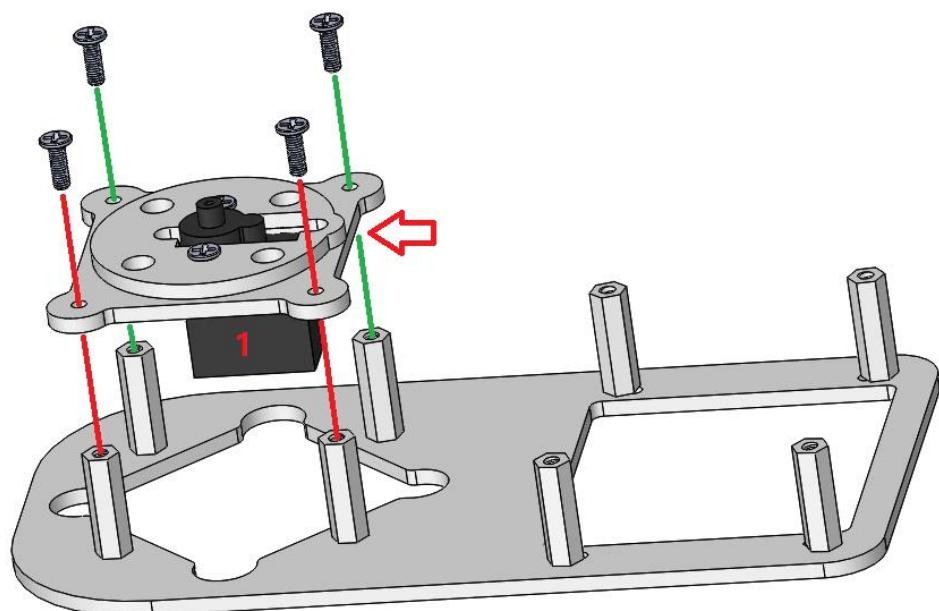
Step 7 - Install Base (Steel Ball Bearing Plate)

The structure in Step 1	Acrylic board	Bag No.② M3X9MMscrew2PCS	Bag No.⑤ M3 nut 2 PCS

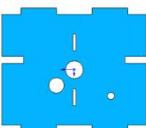


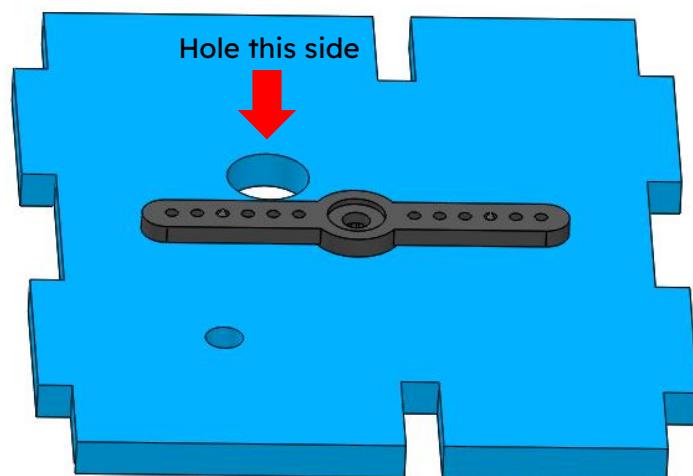
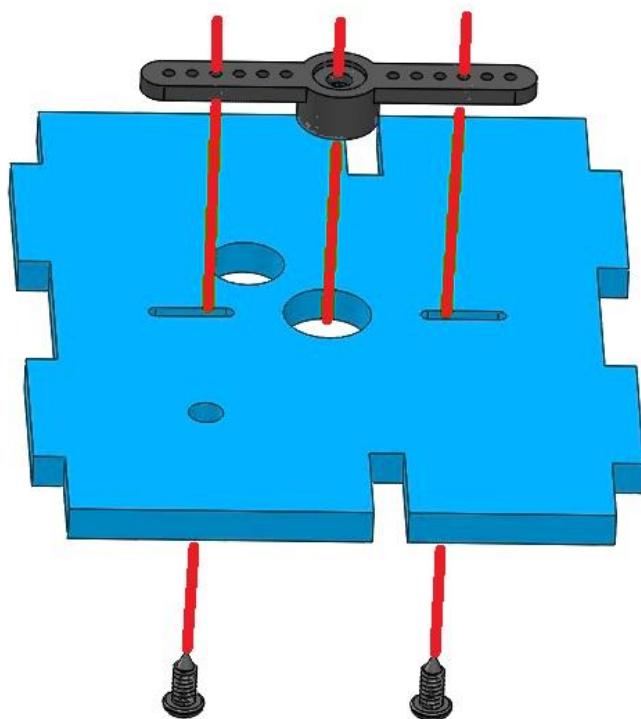
Step 8 - Install Base (Servo Structure)

The structure in Step 6	The structure in Step 7	Bag No.② M3X9MMscrew4PCS
		



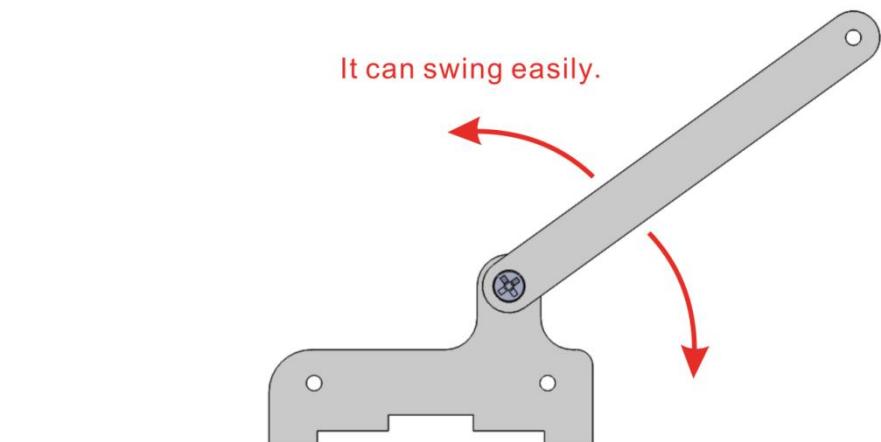
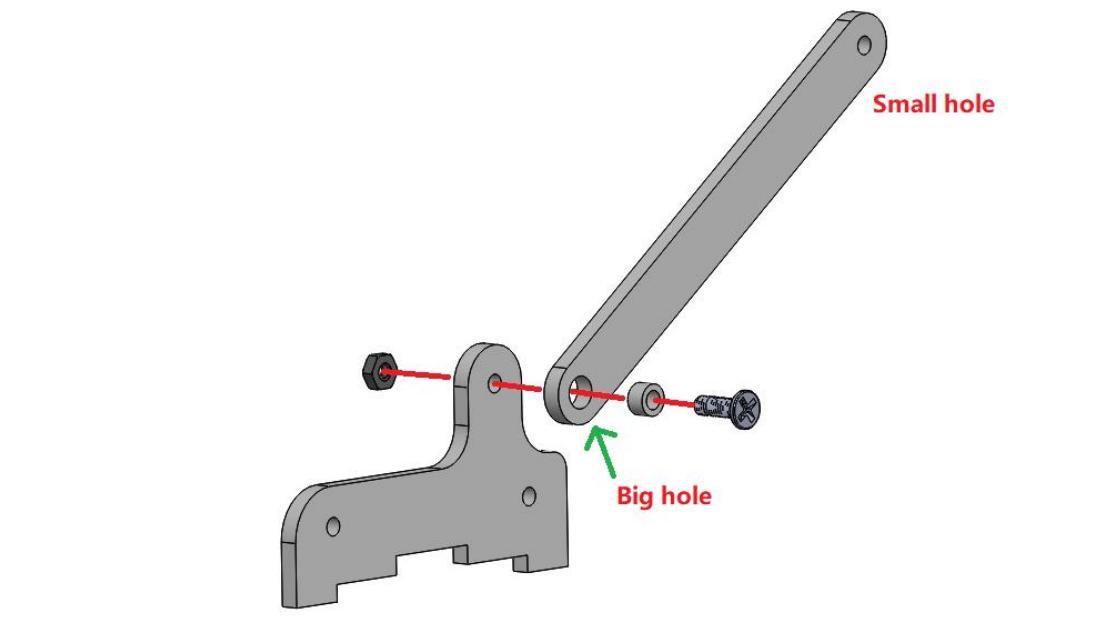
Step 9 - Attach Servo Horn to Rotating Base

Acrylic board	Servo horn 1PCS	Bag No.④ M1.4X5 self-tapping screw 2PCS
		



Step 10 - Upper Arm Linkage Installation

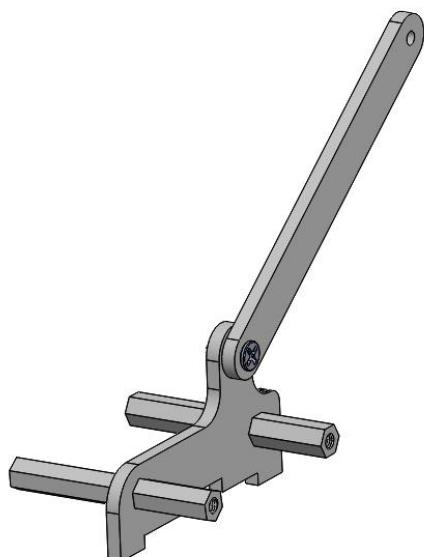
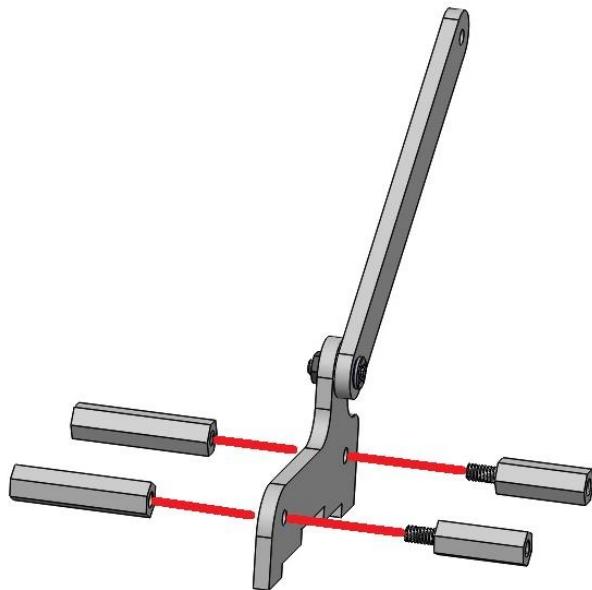
Acrylic board	Acrylic board	
Bag No.⑯ 5x3.2x3MM spacer 1PCS	Bag No.⑰ M3X9MM screw 1PCS	Bag No.⑮ M3 nut 1PCS

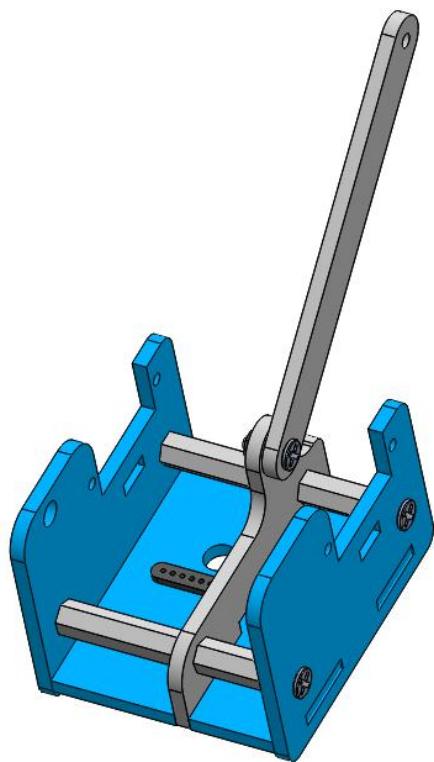
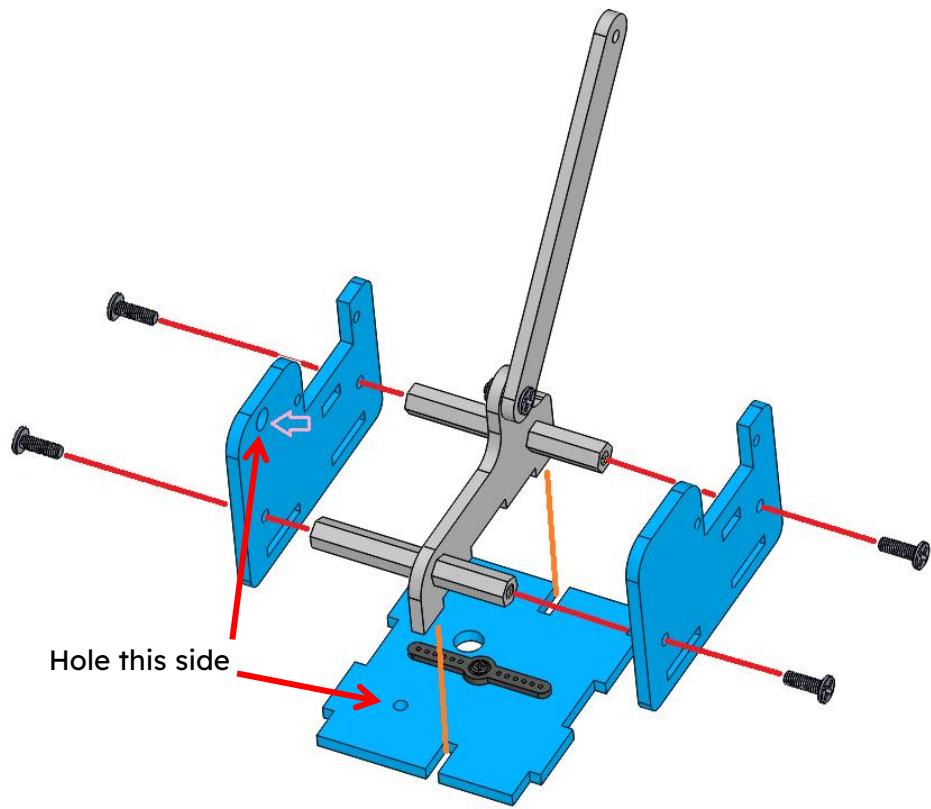


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Step 11 - Assemble Rotating Base

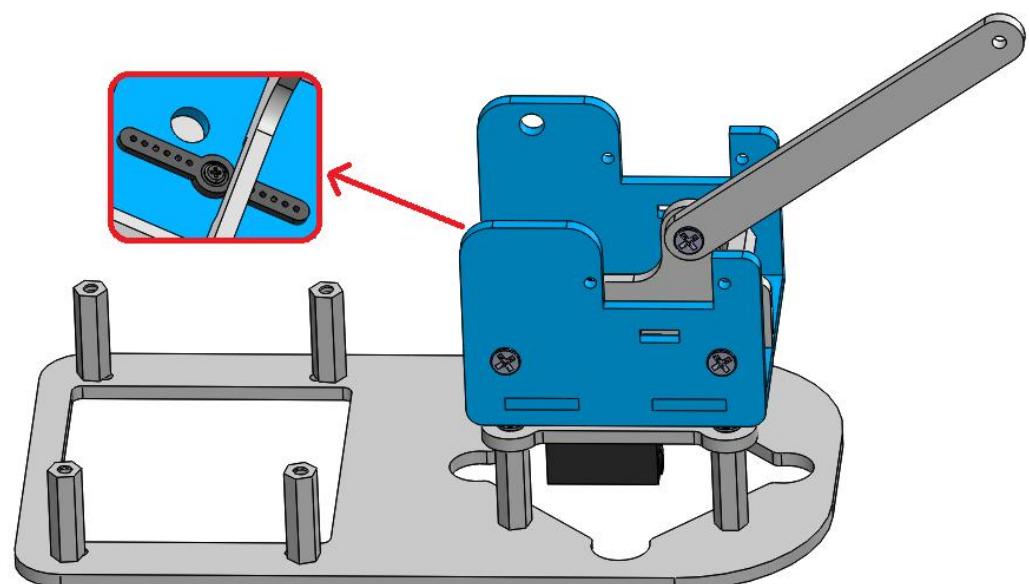
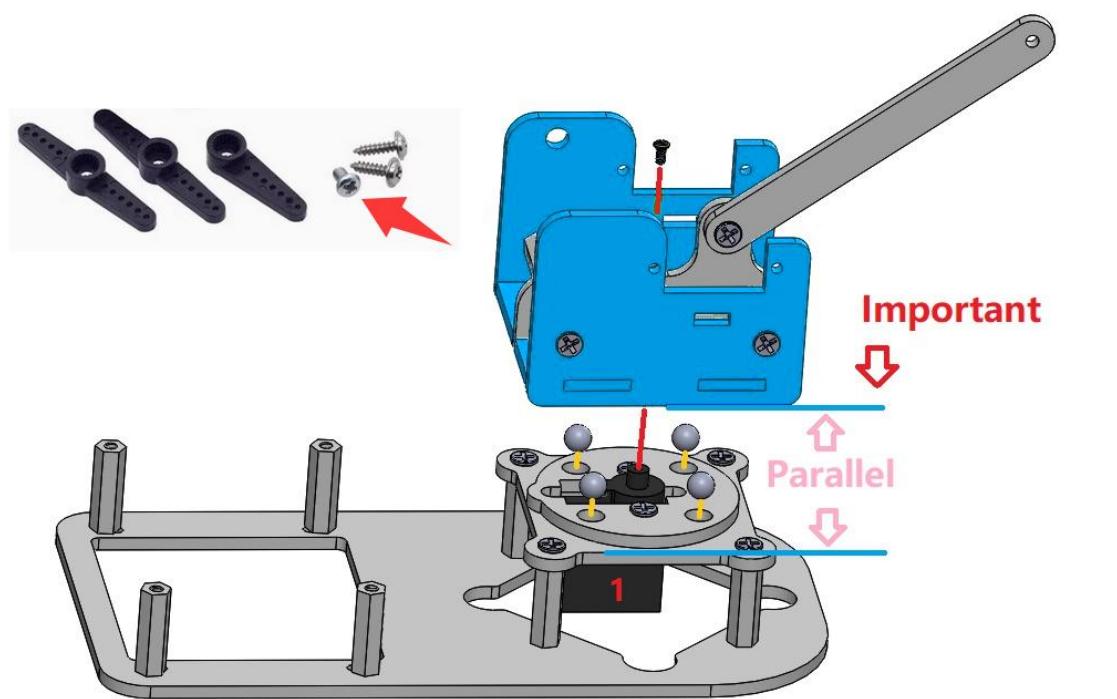
The structure in Step 9	The structure in Step 10	Acrylic board 1PCS	
Acrylic board 1PCS	Bag No.⑧ M3x17+6MMNylon Standoff 2PCS	Bag No.⑨ M3x26MMNylon Standoff 2PCS	
			Bag No.② M3X9MMscrew4PCS



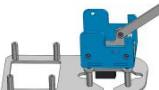


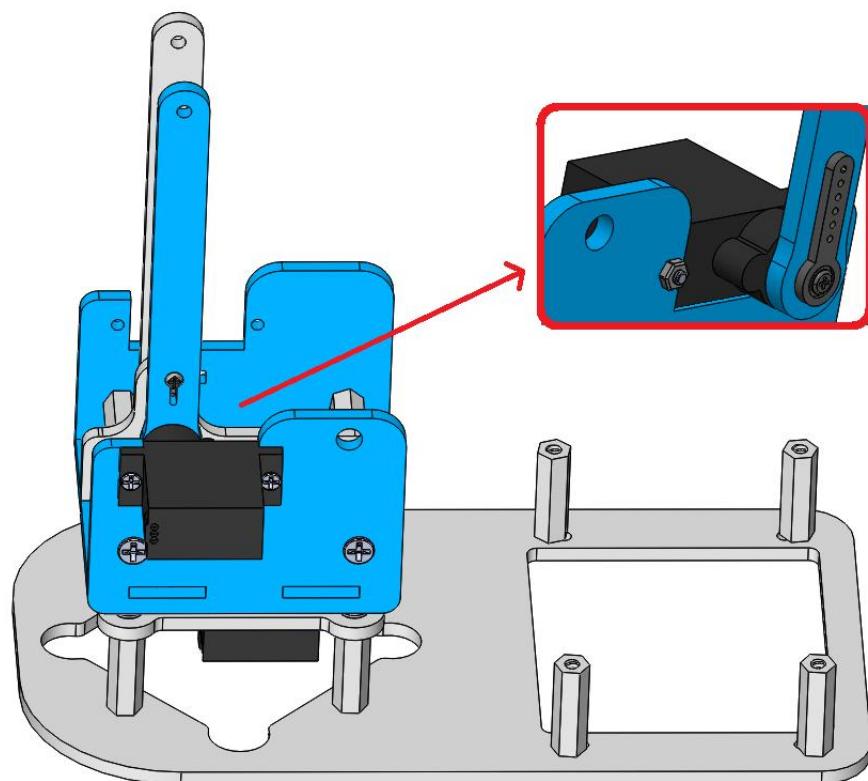
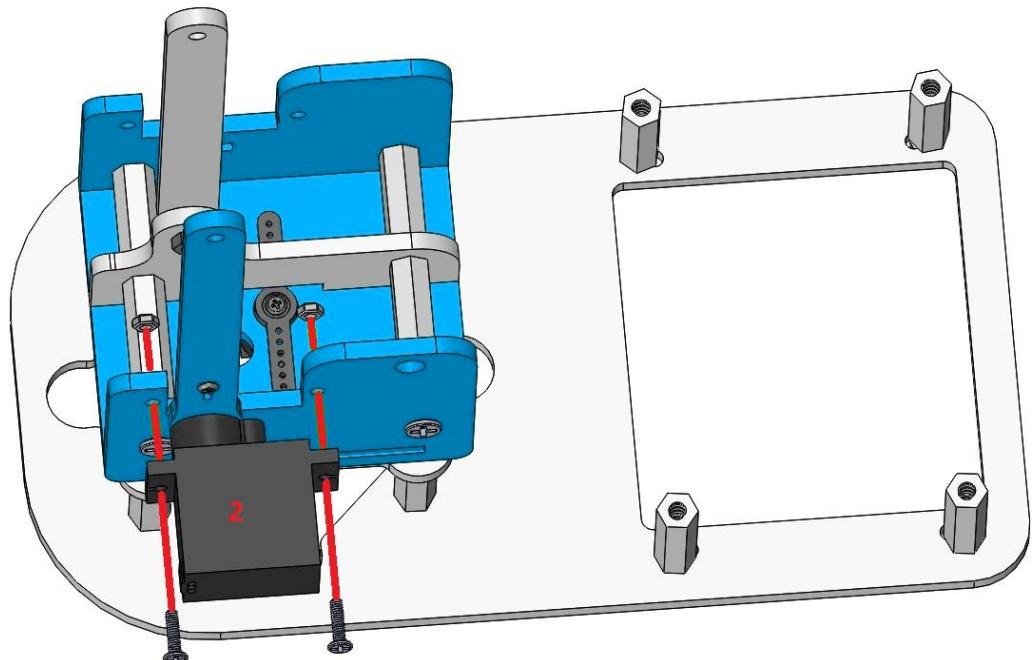
Step 12 - Mount Rotating Base to Main Frame

The structure in Step 8	The structure in Step 11	Steel board 4PCS	M2.5X4mm screw 1PCS



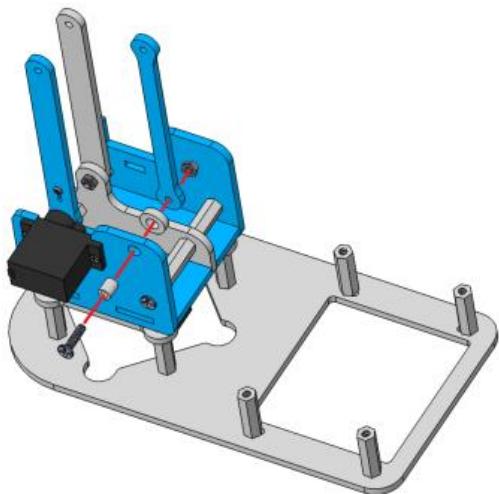
Step 13 - Install Left Servo Structure on Turntable

The structure in Step 2	The structure in Step 12	Bag No.③ M2x8mm screw 2PCS	Bag No.⑥ M2 nut 2PCS
			

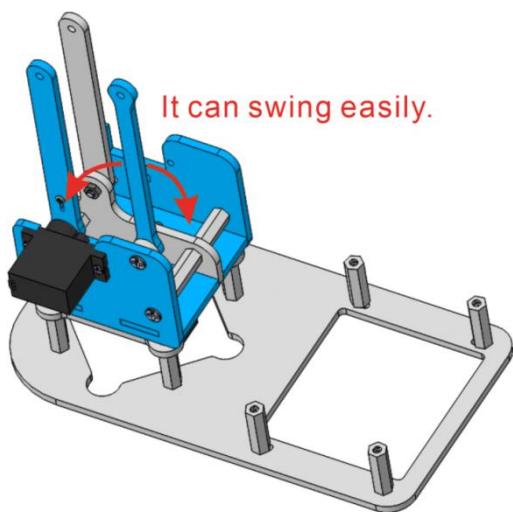


Step 14 - Attach Upper Arm Linkage (Left Side)

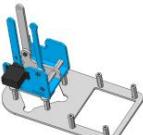
The structure in Step 13	Acrylic board 1PCS	Acrylic spacer 1PCS
Bag No.⑭ 5x3.2x6MM spacer 1PCS	Bag No.① M3X12MM screw 1PCS	Bag No.⑤ M3 nut 1PCS

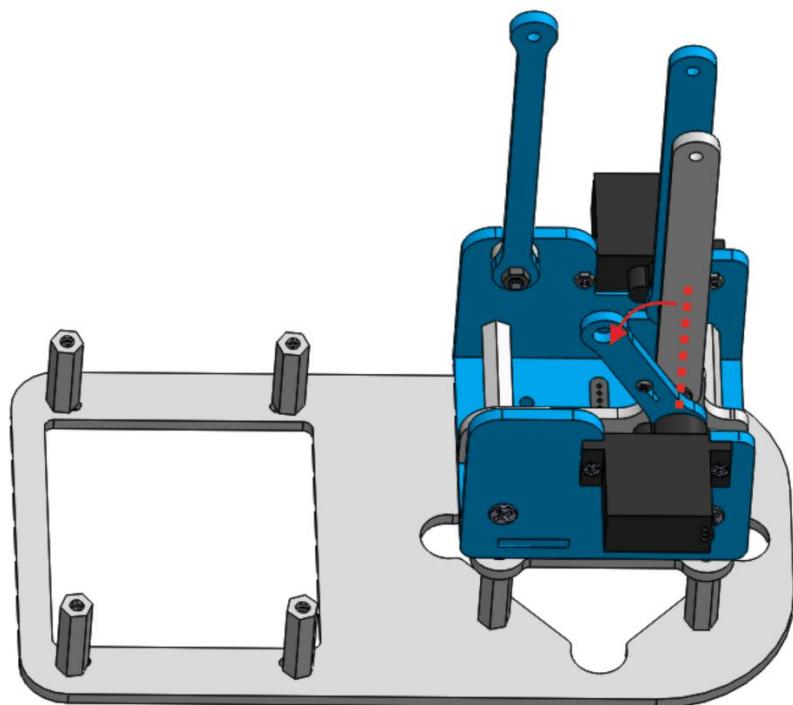
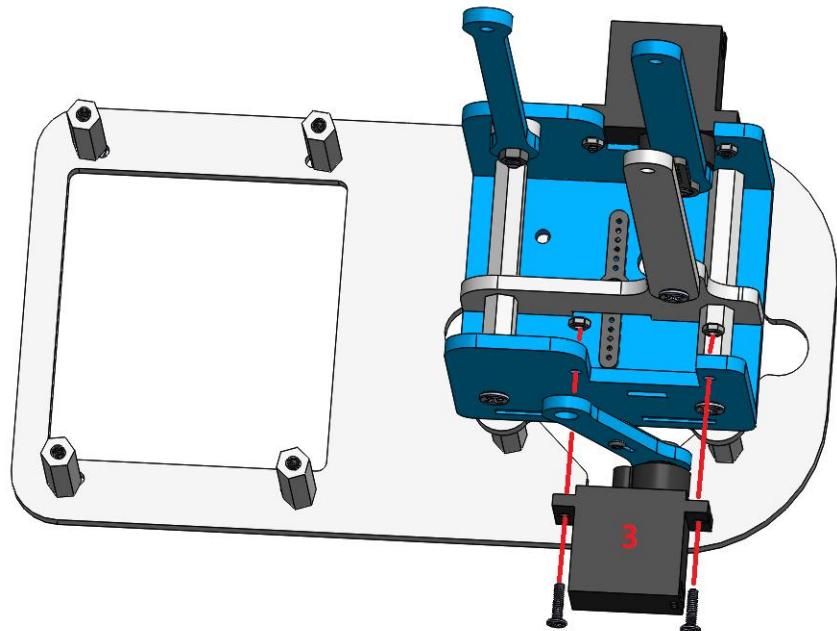


It can swing easily.

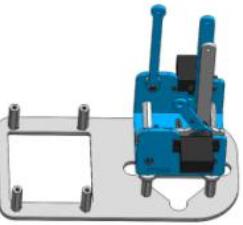
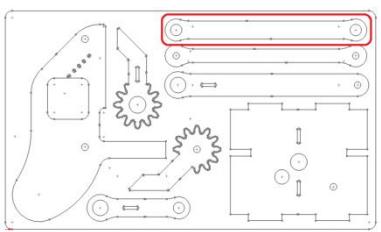
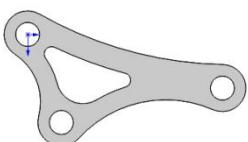
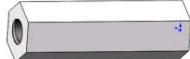


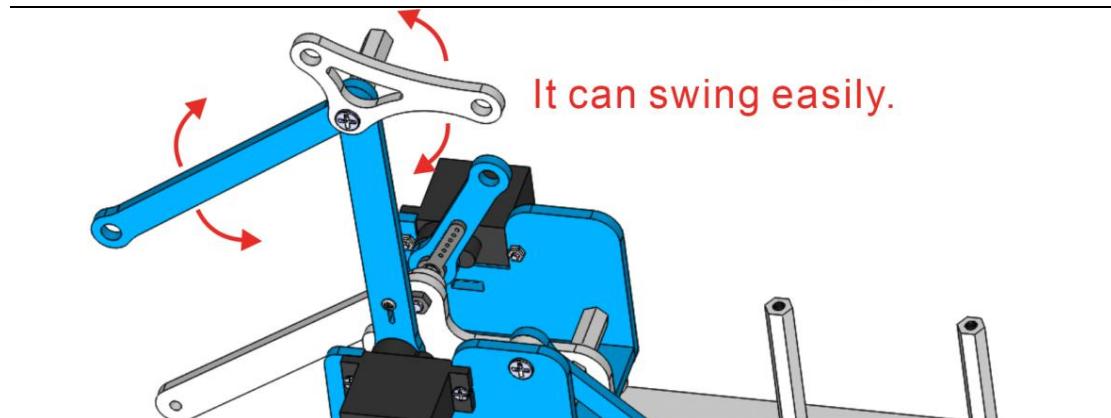
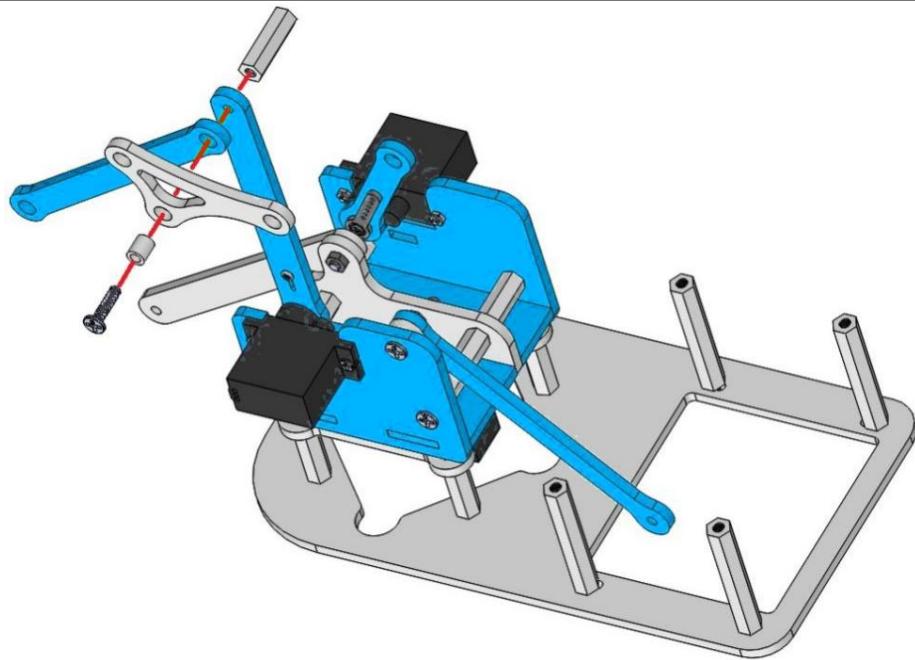
Step 15 - Install Right Servo Structure on Turntable

The structure in Step 14	The structure in Step 3	Bag No.③ M2x8mm screw 2PCS	Bag No.⑥ M2 nut 2PCS
			



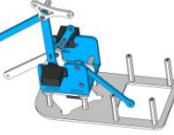
Step 16 - Install Primary Arm/Elbow Connector(1)

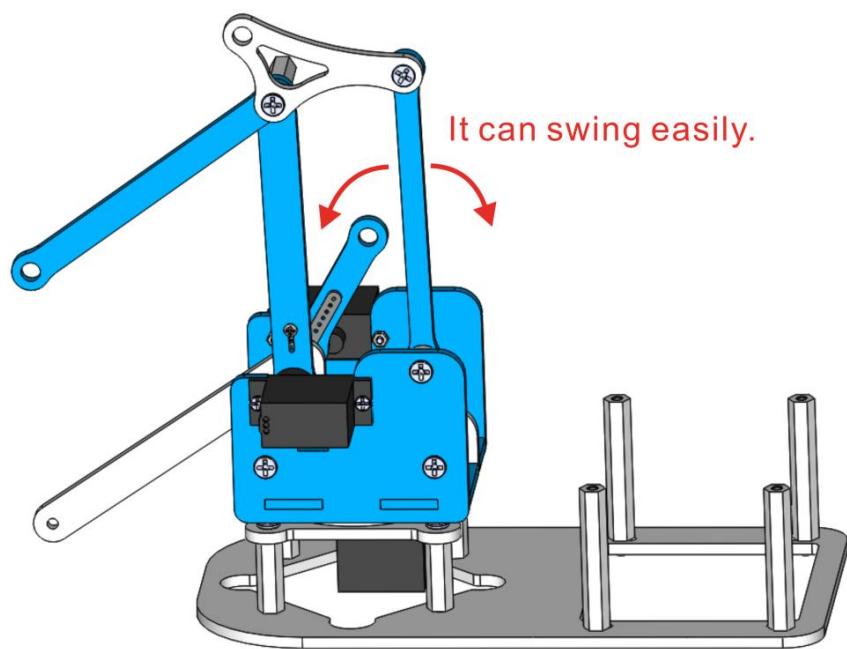
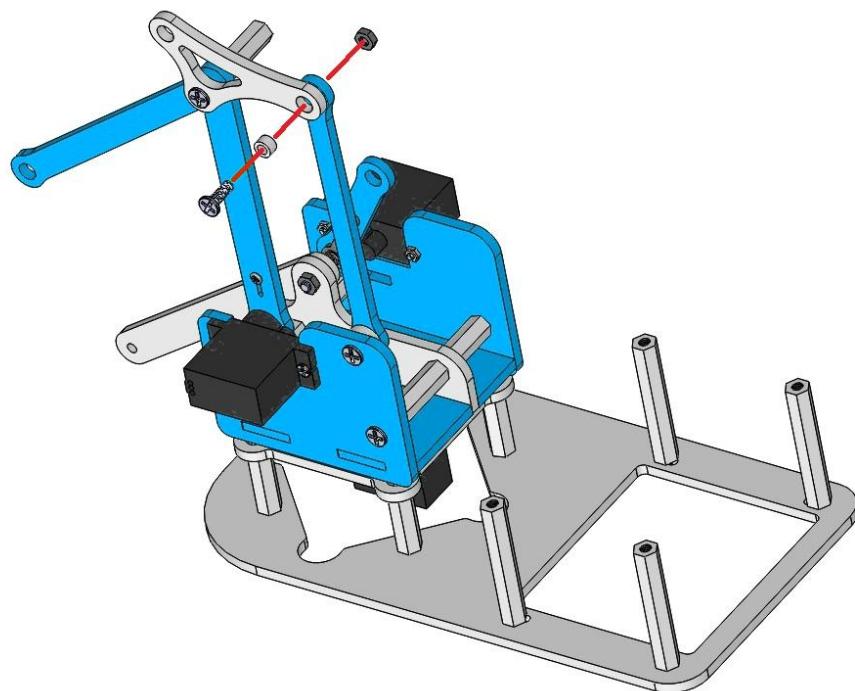
The structure in Step 15	Acrylic board 1PCS	Acrylic board 1PCS
	 	
Bag No.14 5x3.2x6MM spacer 1PCS	Bag No.11 M3x20MM Nylon Standoff 1PCS	Bag No.① M3X12MM screw 1PCS
		



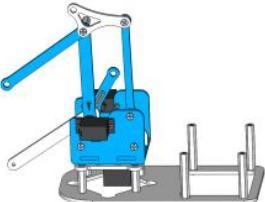
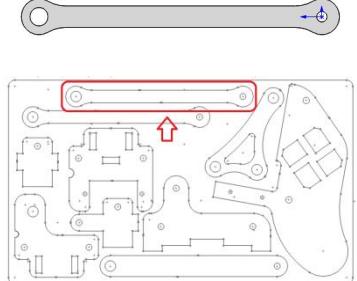
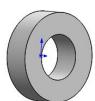
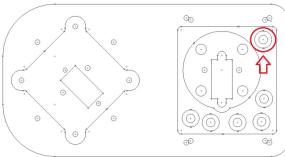
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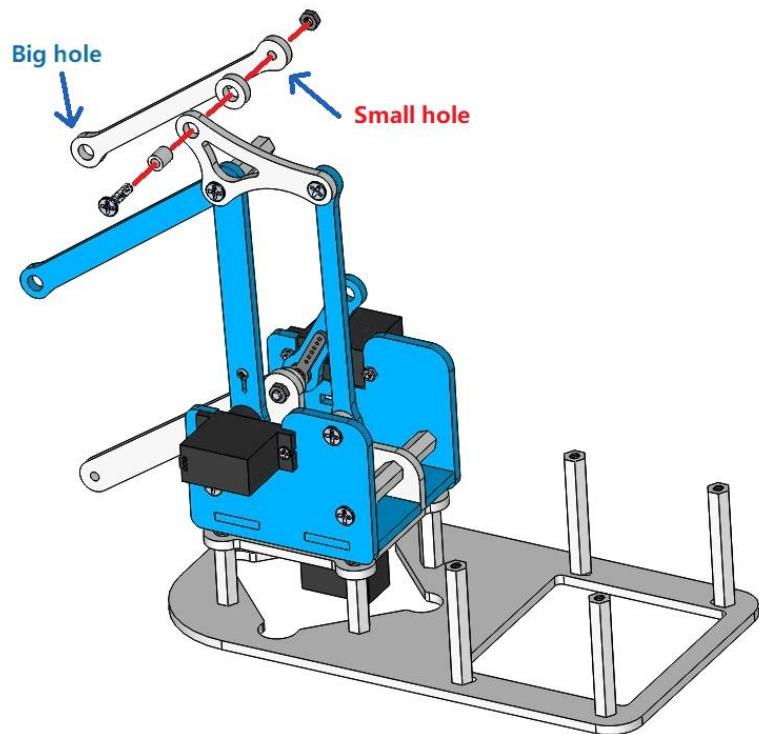
Step 17 - Install Primary Arm/Elbow Connector(2)

The structure in Step 16	Bag No.⑯ 5x3.2x3M Mspacer 1PCS	Bag No.⑰ M3X9MM screw 1PCS	Bag No.⑮ M3 nut 1PCS
			

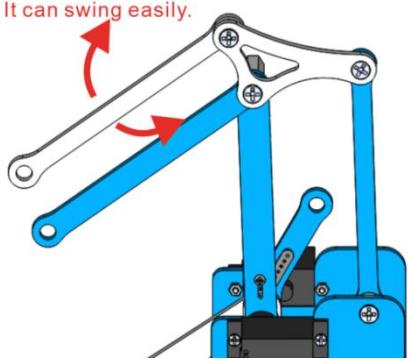


Step 18 - Attach Forearm Linkage (First Position)

The structure in Step 17	Acrylic board 1PCS	Acrylic spacer 1PCS
		 
Bag No.14 5x3.2x6MM spacer 1PCS	Bag No.① M3X12MM screw 1PCS	Bag No.⑤ M3 nut 1PCS
		

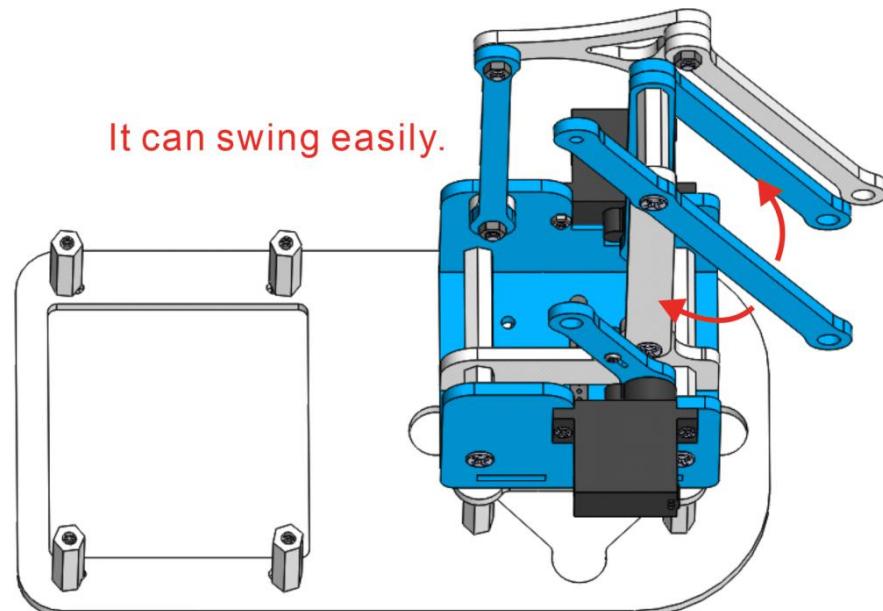
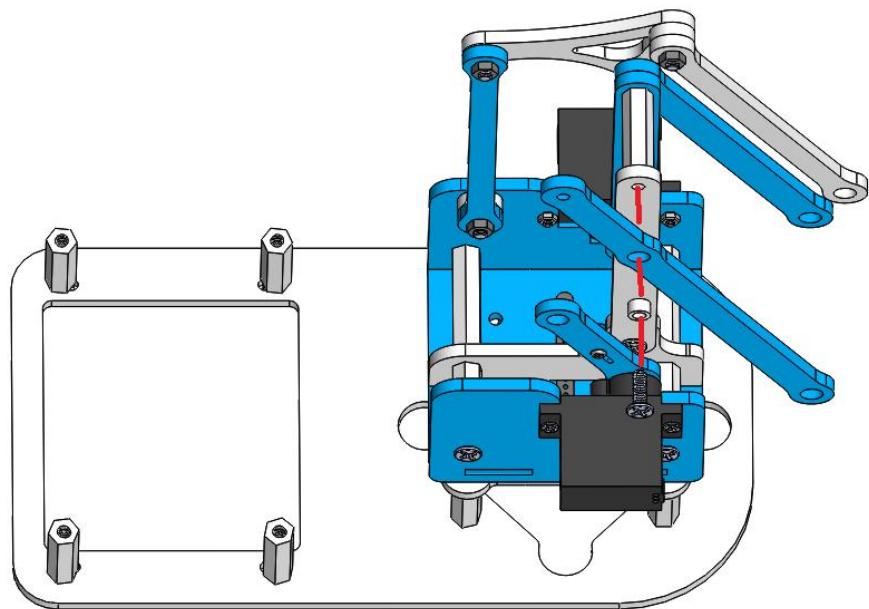


It can swing easily.



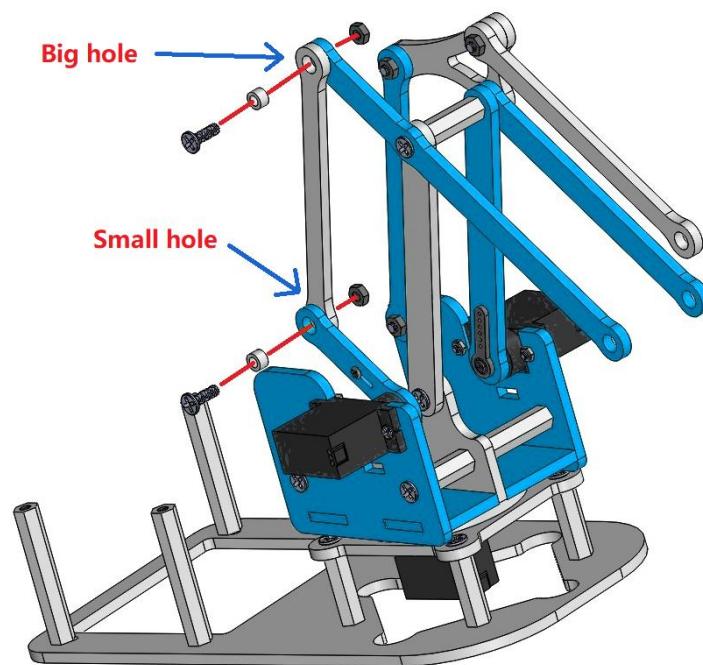
Step 19 - Attach Forearm Linkage (Second Position)

The structure in Step 18	Acrylic board 1PCS
Bag No.⑬ 5x3.2x3MM spacer 1PCS	Bag No.② M3X9MM screw 1PCS

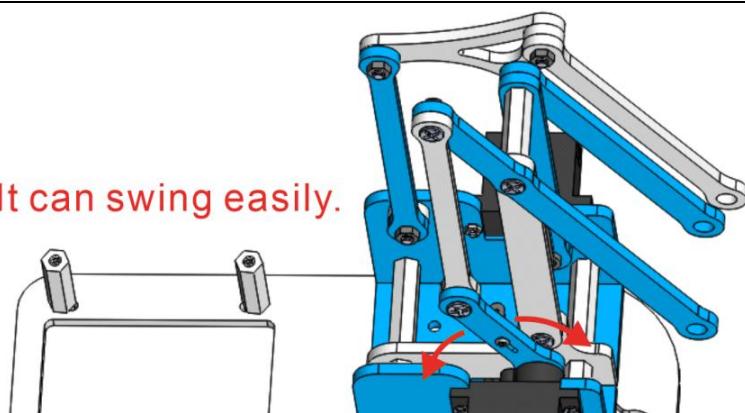


Step 20 - Connect Linkage between Upper Arm and Forearm

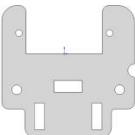
The structure in Step 19	Acrylic board 1PCS	
Bag No.⑬ 5x3.2x3MM spacer 2PCS	Bag No.② M3X9MM screw 2PCS	Bag No.⑤ M3 nut 2PCS

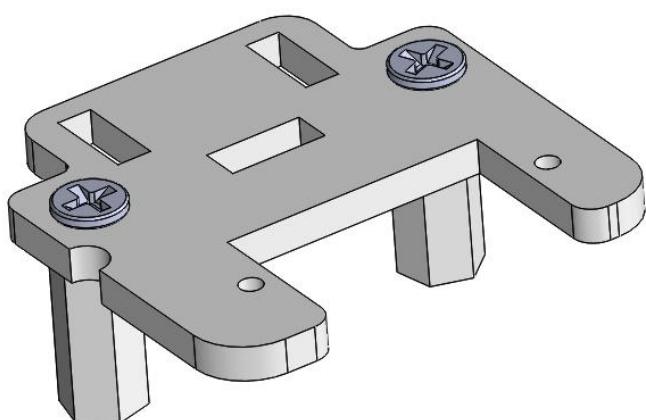
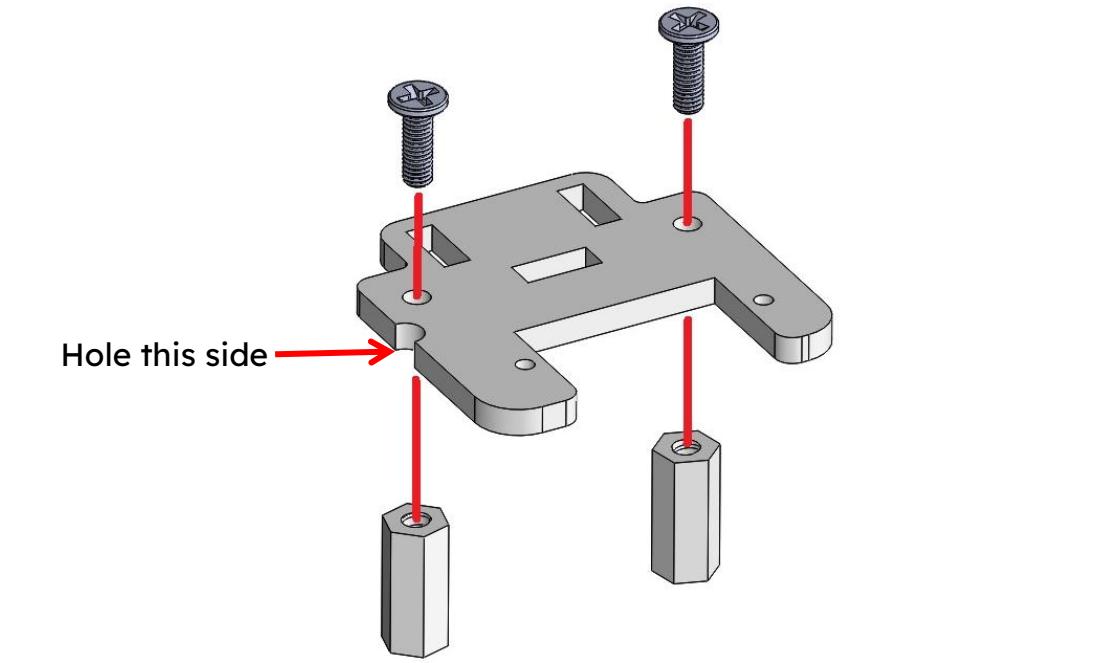


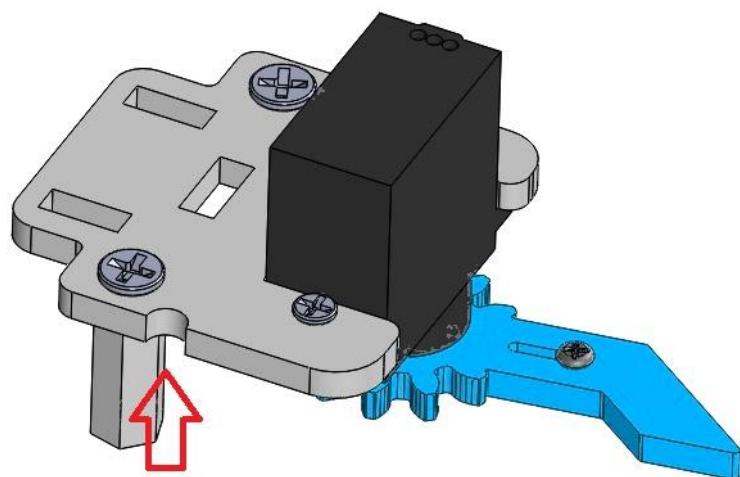
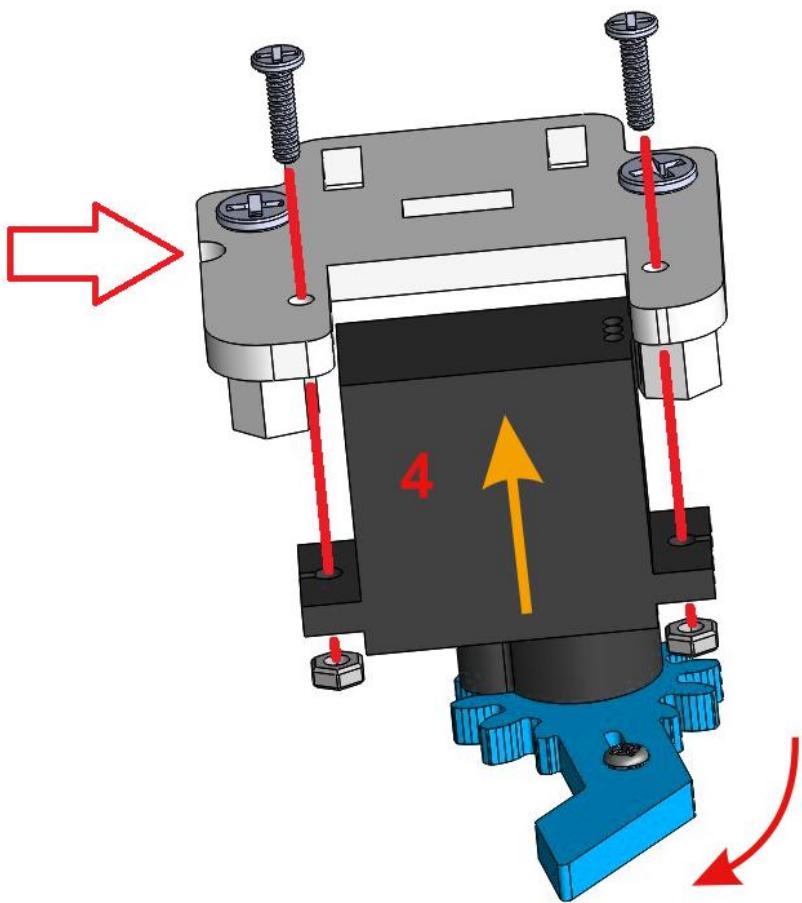
It can swing easily.



Step 21 - Mount Left Gripper Jaw

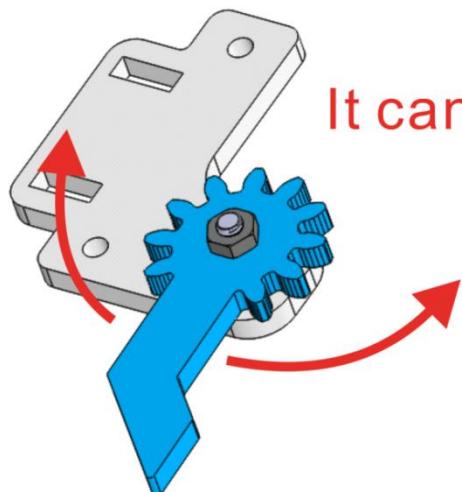
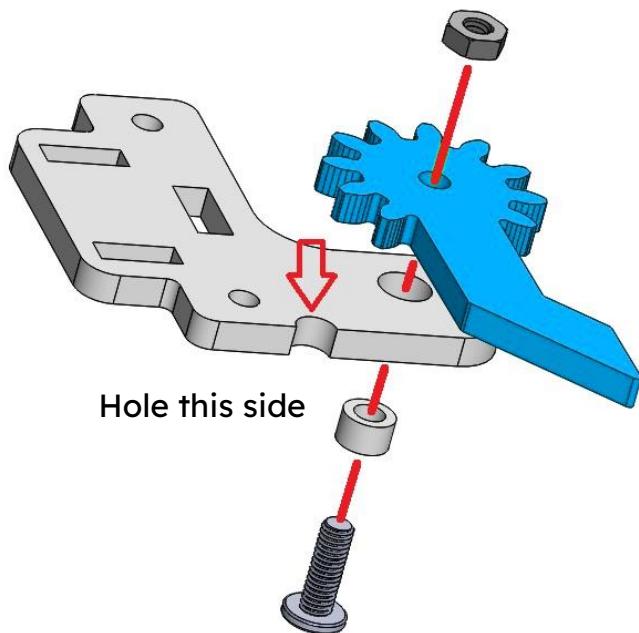
Acrylic board 1PCS	Bag No.② M3X9MM screw 2PCS	Bag No.⑦ M3x14MM Nylon Standoff 2PCS
		
The structure in Step 4	Bag No.③ M2x8mm screw 2PCS	Bag No.⑥ M2 nut 2PCS
		





Step 22 - Mount Right Gripper Jaw

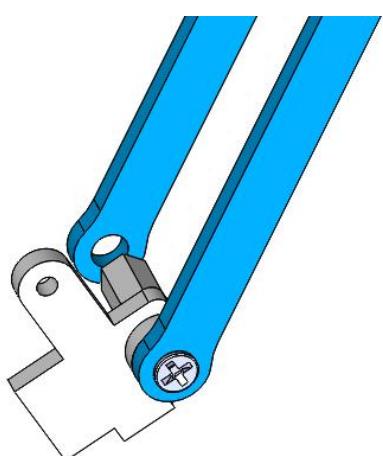
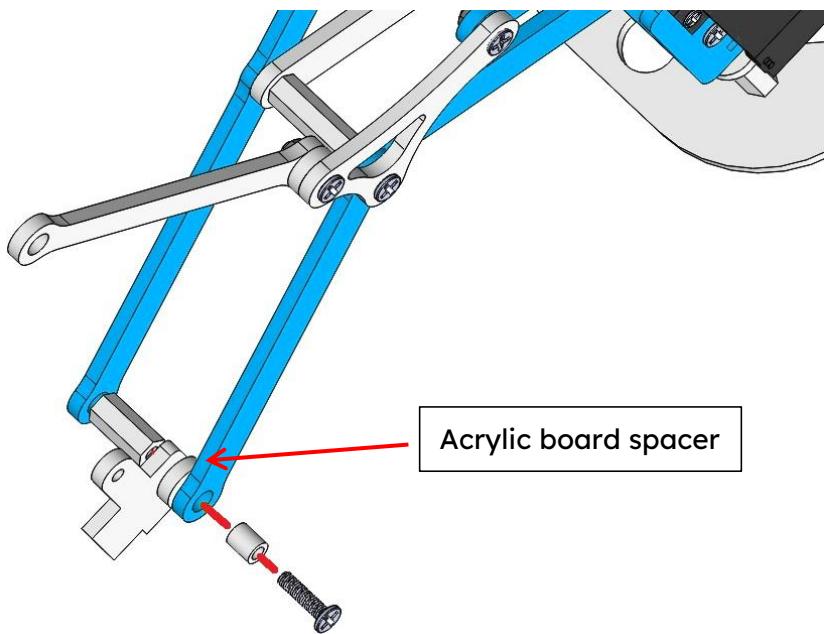
Acrylic board 1PCS	Acrylic board 1PCS	
A grey metal plate with a central slot and two circular holes on the left side.	A blue plastic gear with a matching slot and hole on the left side.	
Bag No.⑯ 5x3.2x3MM spacer 1PCS	Bag No.② M3X9MM screw 1PCS	Bag No.⑤ M3 nut 1PCS
A small grey cylindrical spacer.	A silver screw with a hex head.	A grey hex nut.

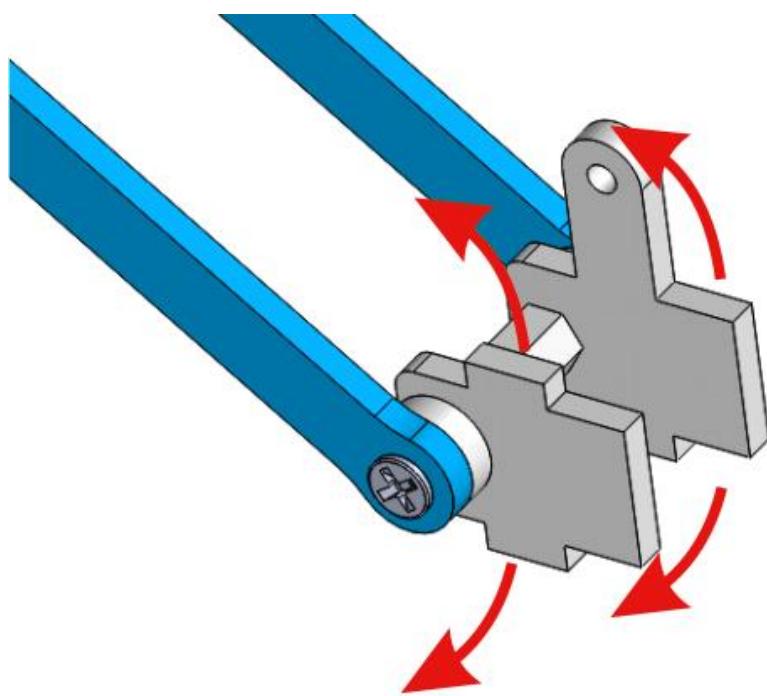
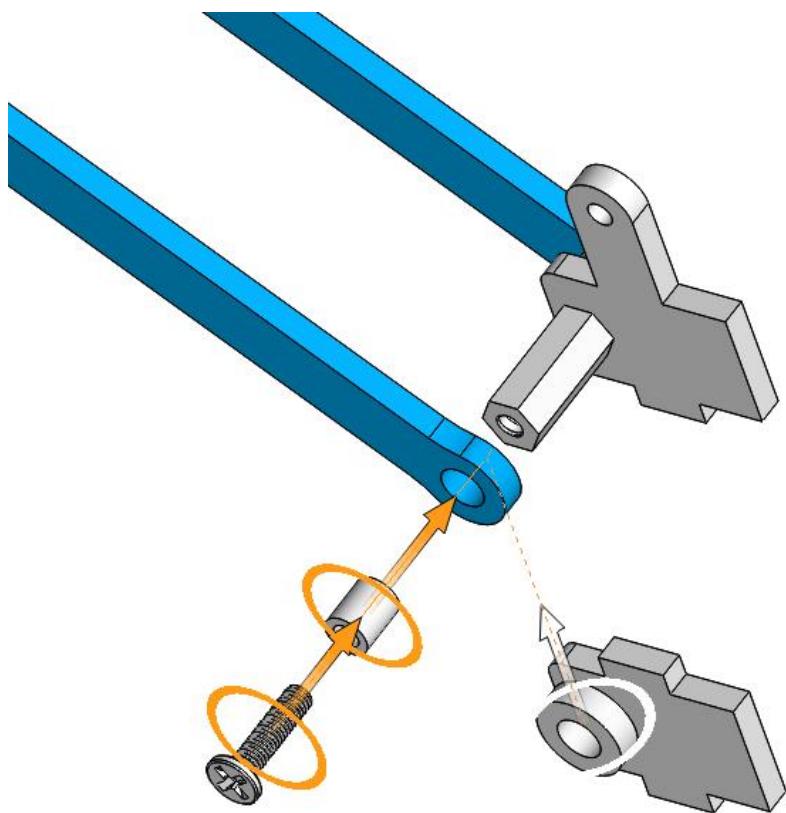


It can swing easily.

Step 23 - Install Wrist Structure

The structure in Step 20	Acrylic board 1PCS	Acrylic board 1PCS	Acrylic board spacer 2PCS
Bag No.① M3X12MM screw 2 PCS	Bag No.⑦ M3x14MM Nylon Standoff 1PCS		Bag No.⑭ 5x3.2x6MM spacer 2PCS

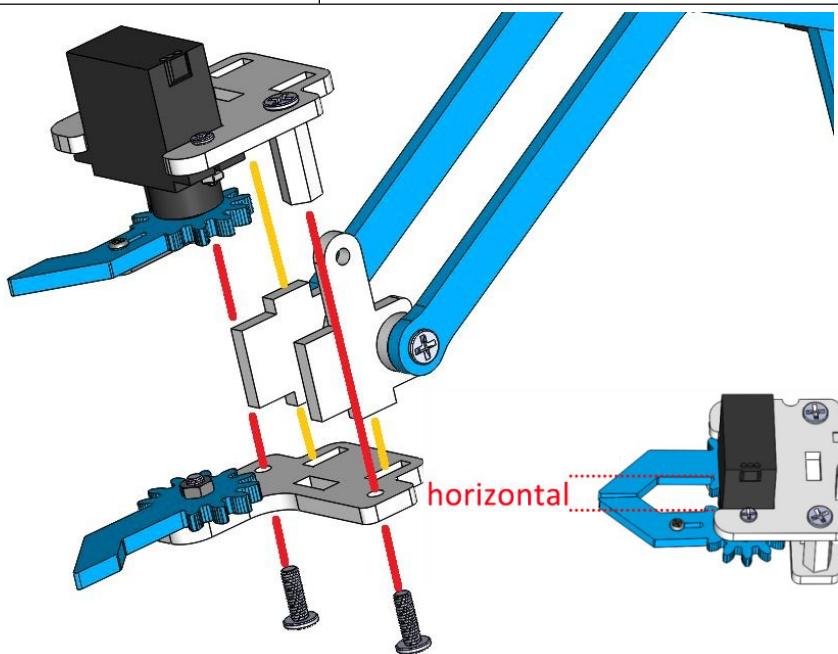




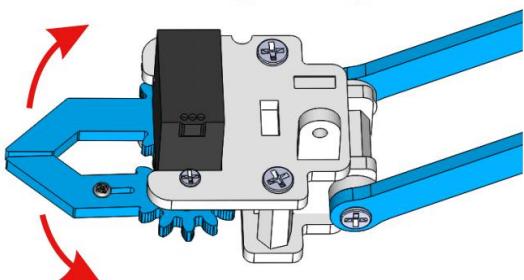
It can swing easily.

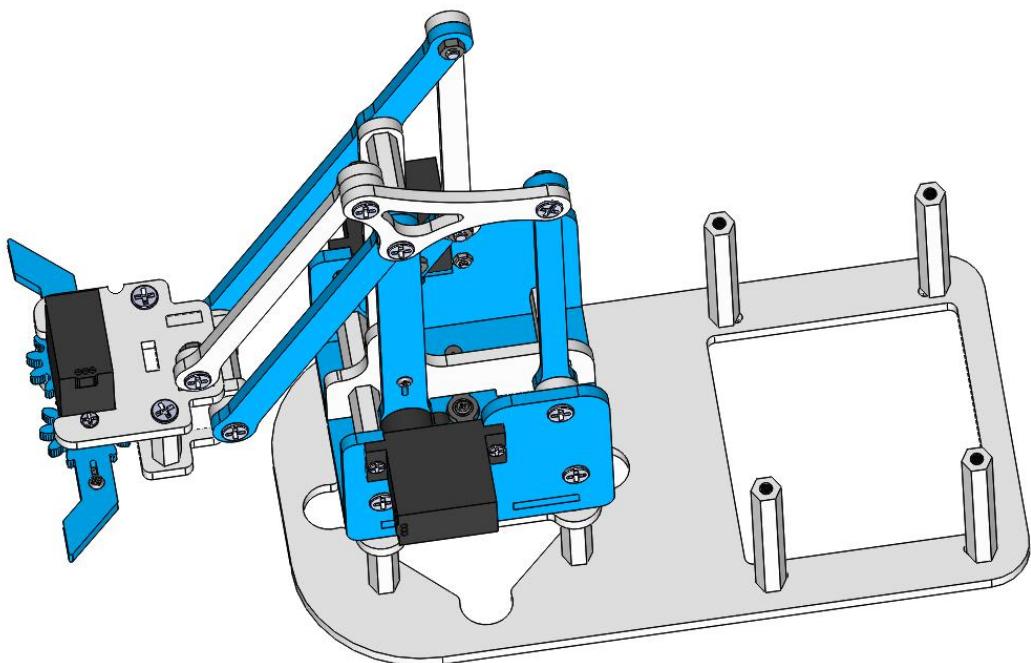
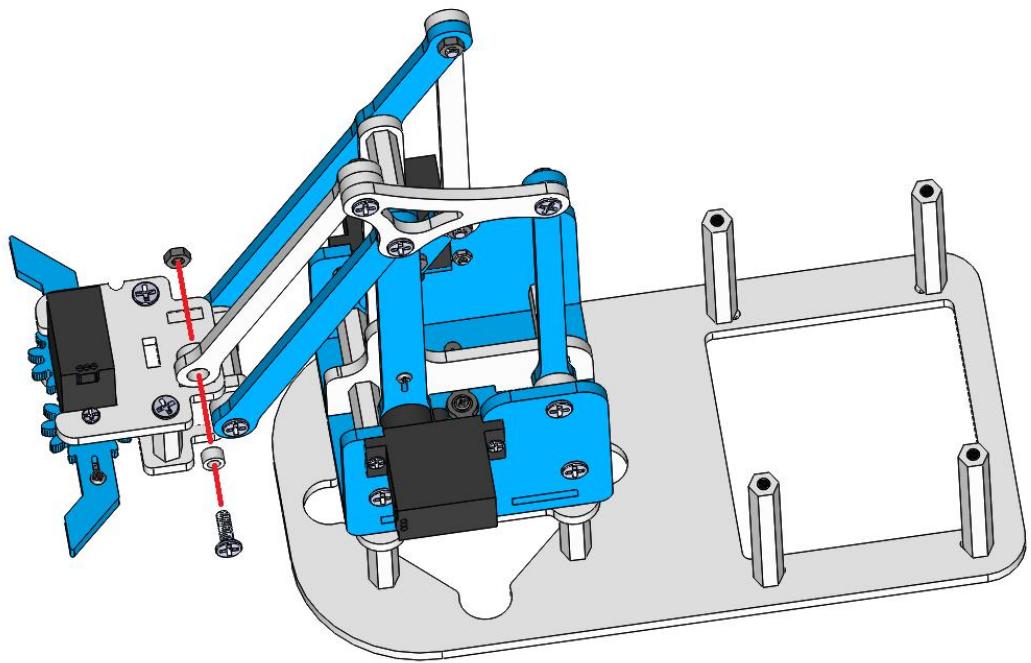
Step 24 - Attach Gripper to Wrist

The structure in Step 21	The structure in Step 22
The structure in Step 23	Bag No.(2) M3X9MMscrew3PCS
Bag No.(5) M3 nut 1PCS	Bag No.(13) 5x3.2x3MM spacer 1PCS



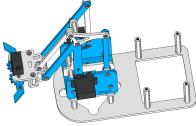
It can swing easily.

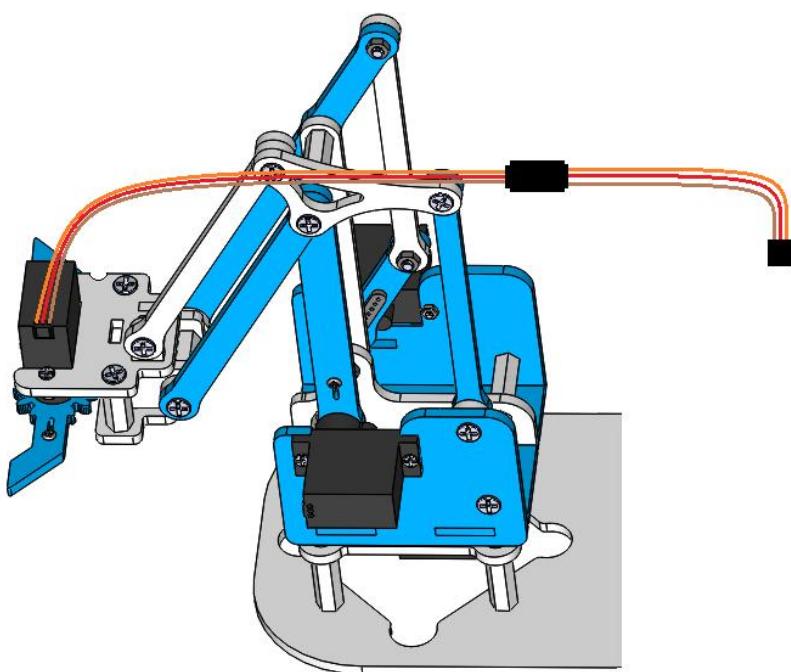
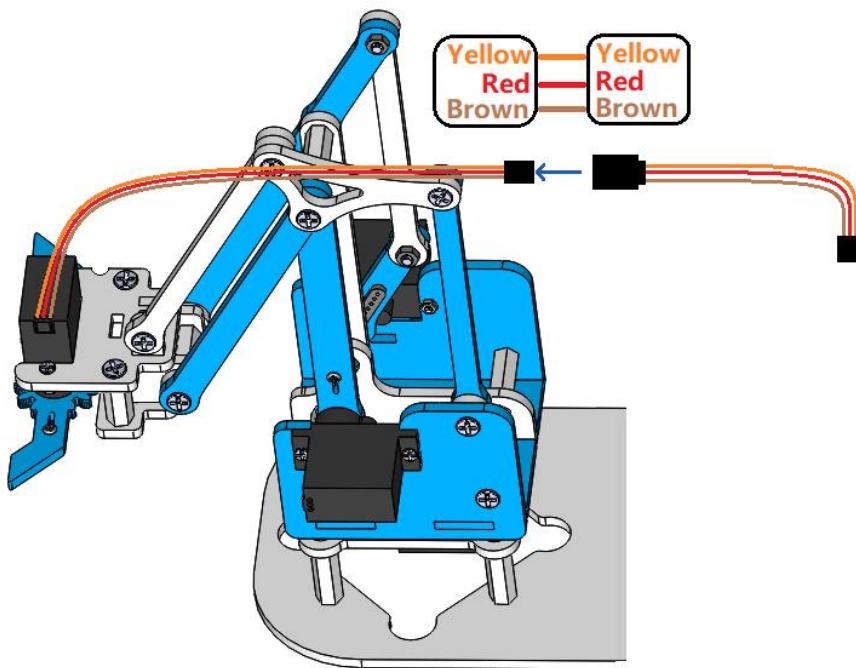




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Step 25 - Connect Servo-4 with Extension Cable

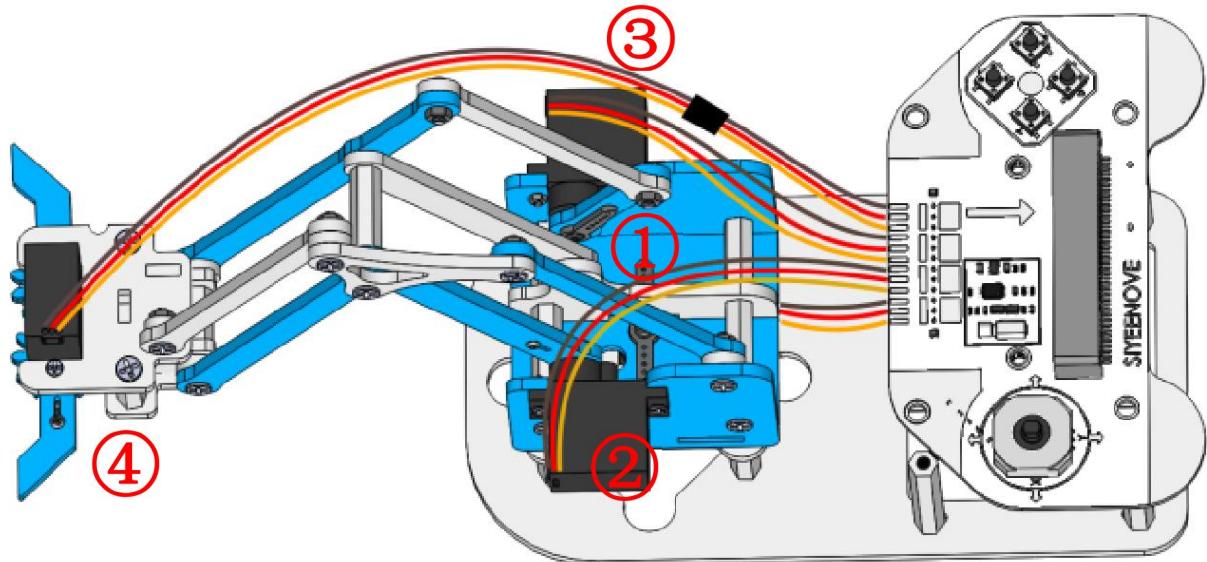
The structure in Step 24	3P servo extension cable 1PCS
	



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Step 26 - Wire Servos to Joystick Controller

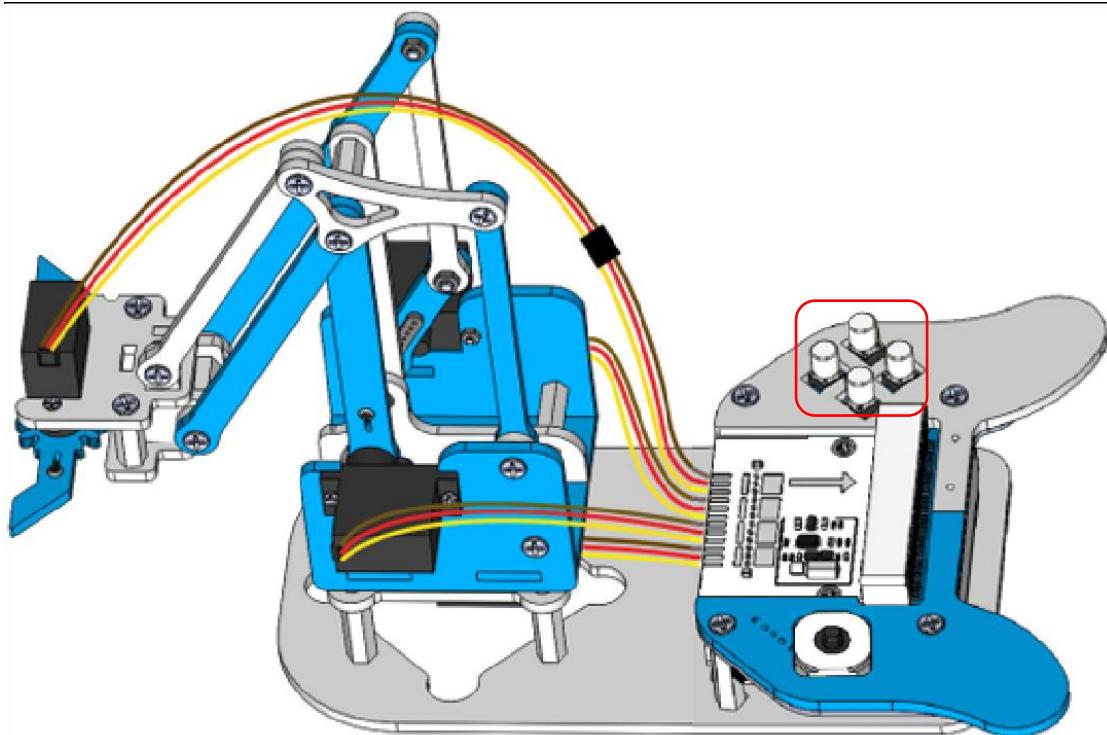
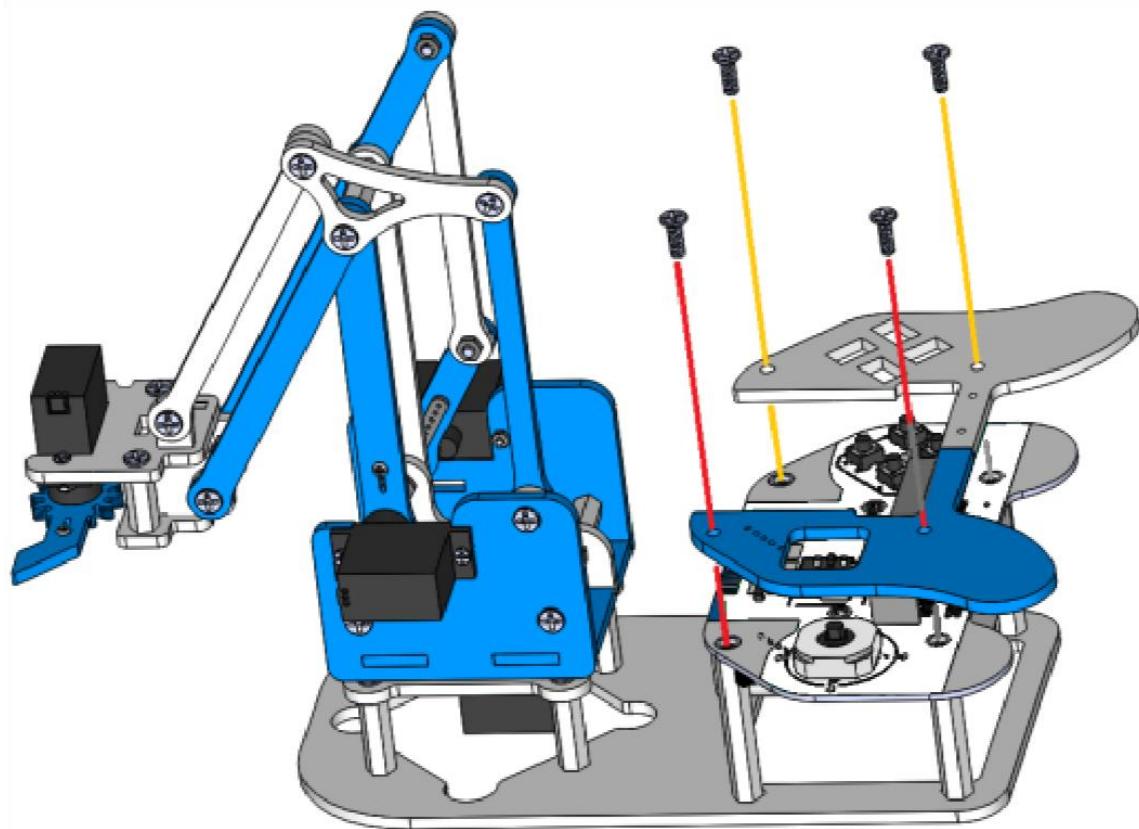
The structure in Step 25			mJoystick								
Wiring											
Servo-1 on the turntable			Servo-2 on the left		Servo-3 on the right		Servo-4 on the gripper				
P13	VB+	GND	P14	VB+	GND	P15	VB+	GND	P16	VB+	GND
Servo-1	Servo-2	Servo-3	Servo-4								
<p>The diagram illustrates the wiring for four servos (Servo-1, Servo-2, Servo-3, Servo-4) connected to an mJoystick. Each servo is connected to a specific pin on the mJoystick's connector board. The connections are as follows:</p> <ul style="list-style-type: none"> Servo-1: Pin P13 (Yellow), Pin P13 (Red), Pin P13 (Brown), Pin P14 (Yellow), Pin P14 (Red), Pin P14 (Brown) Servo-2: Pin P14 (Yellow), Pin P14 (Red), Pin P14 (Brown), Pin P15 (Yellow), Pin P15 (Red), Pin P15 (Brown) Servo-3: Pin P15 (Yellow), Pin P15 (Red), Pin P15 (Brown), Pin P16 (Yellow), Pin P16 (Red), Pin P16 (Brown) Servo-4: Pin P16 (Yellow), Pin P16 (Red), Pin P16 (Brown) <p>The mJoystick also includes a central potentiometer, a Y-axis button, and a circular trackball.</p>											



Step 27 - fix mJoystick to Base Frame

The structure in Step 26	mJoystick	Bag No.② M3X9MM screw 4PCS
Acrylic board 1PCS	Acrylic board 1PCS	Bag No.⑪ Button cup 4PCS

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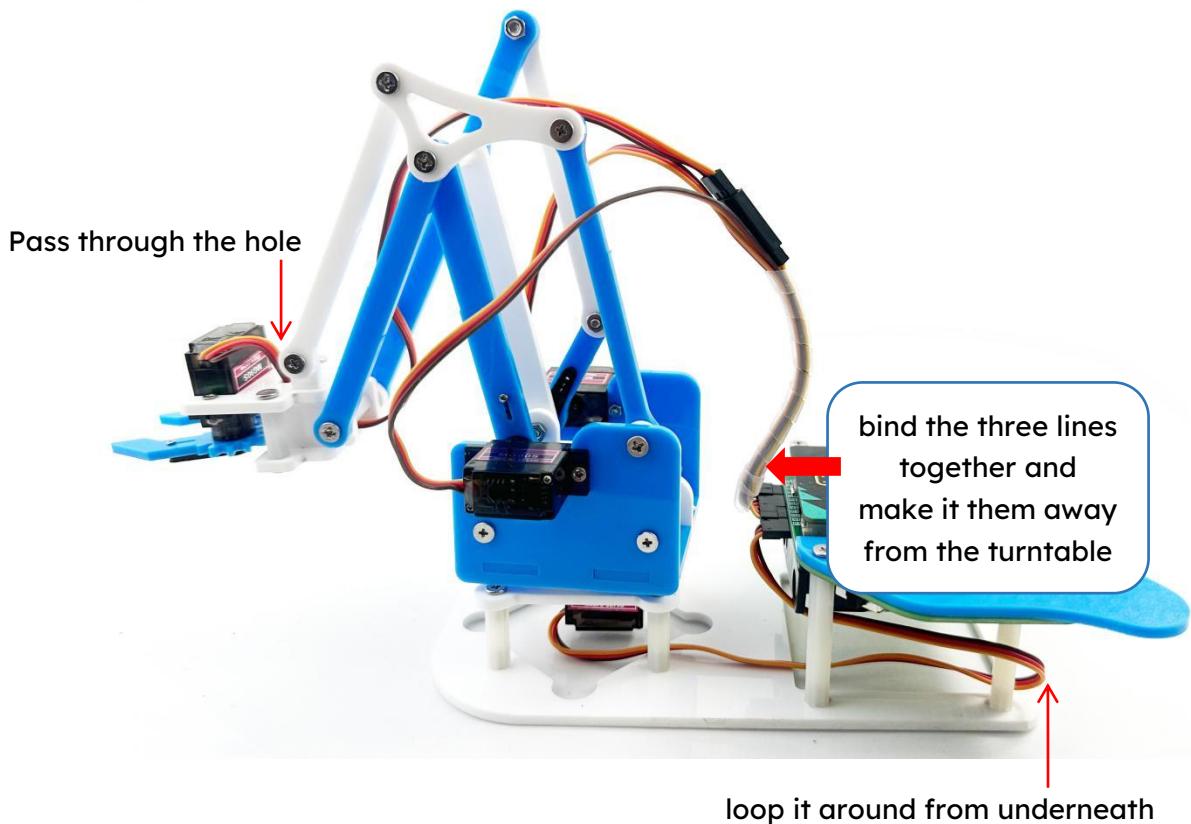
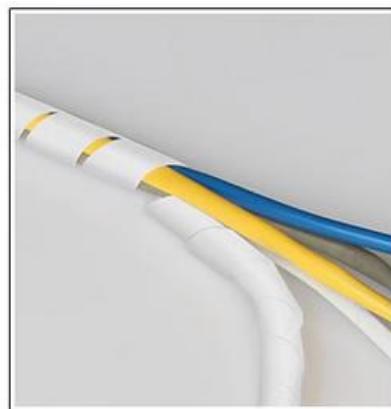
Step 28 - Cable Management:

► Spiral Wrap Tube Application:

Bundles multiple servo wires for cleaner aesthetics

Prevents cable interference with moving parts

Customizable length (trim with scissors as needed)



Assembly complete!

Function of the Remaining Acrylic Board

After assembly completion, you will have **1 spare acrylic board** and **M3x18mm Standoff 4pcs** for the joystick. This component serves critical purposes when using the joystick independently:

Primary Functions:

Battery Compartment Cover

Securely retains 4×AA batteries in position

Prevents accidental dislodgement during operation

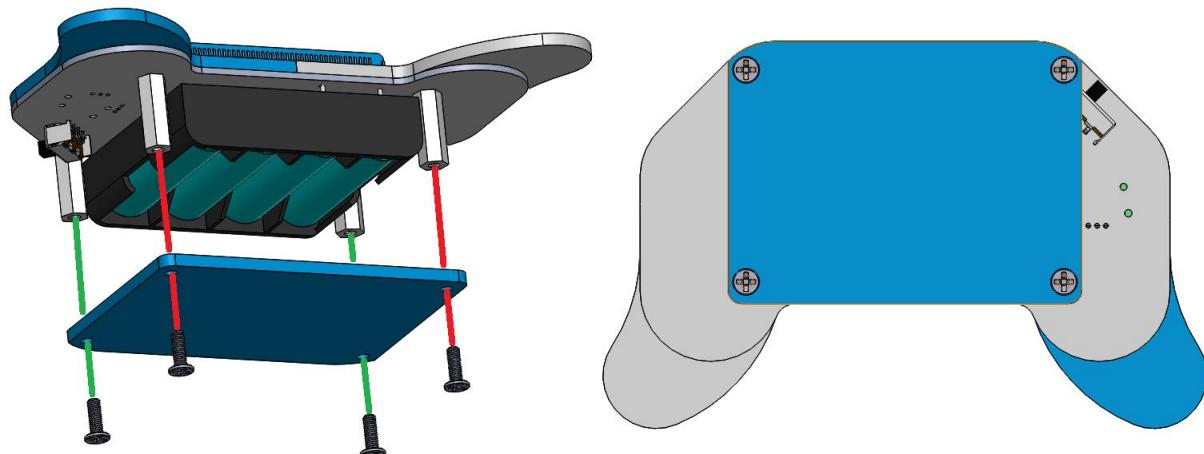
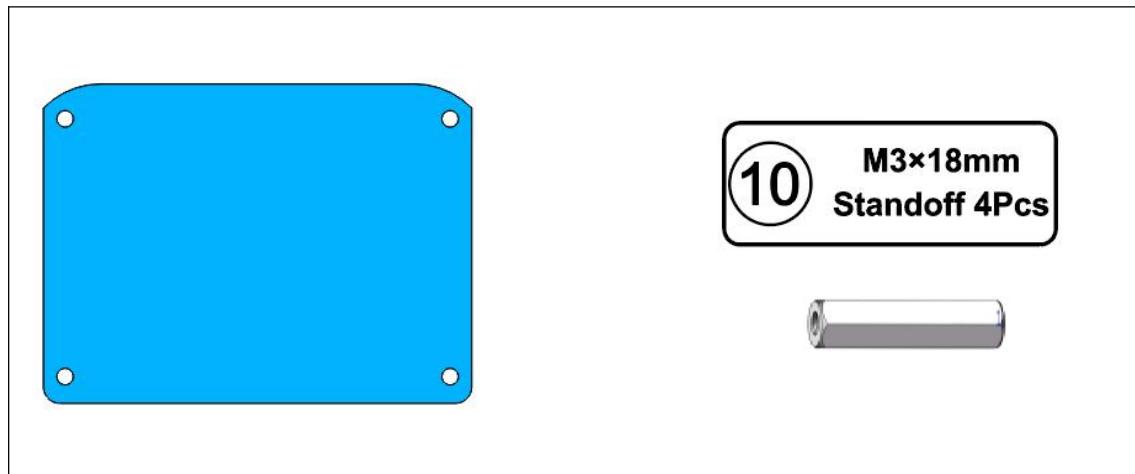
Safety Barrier

Blocks direct finger contact with battery terminals

Eliminates short-circuit risks from metallic objects

Structural Reinforcement

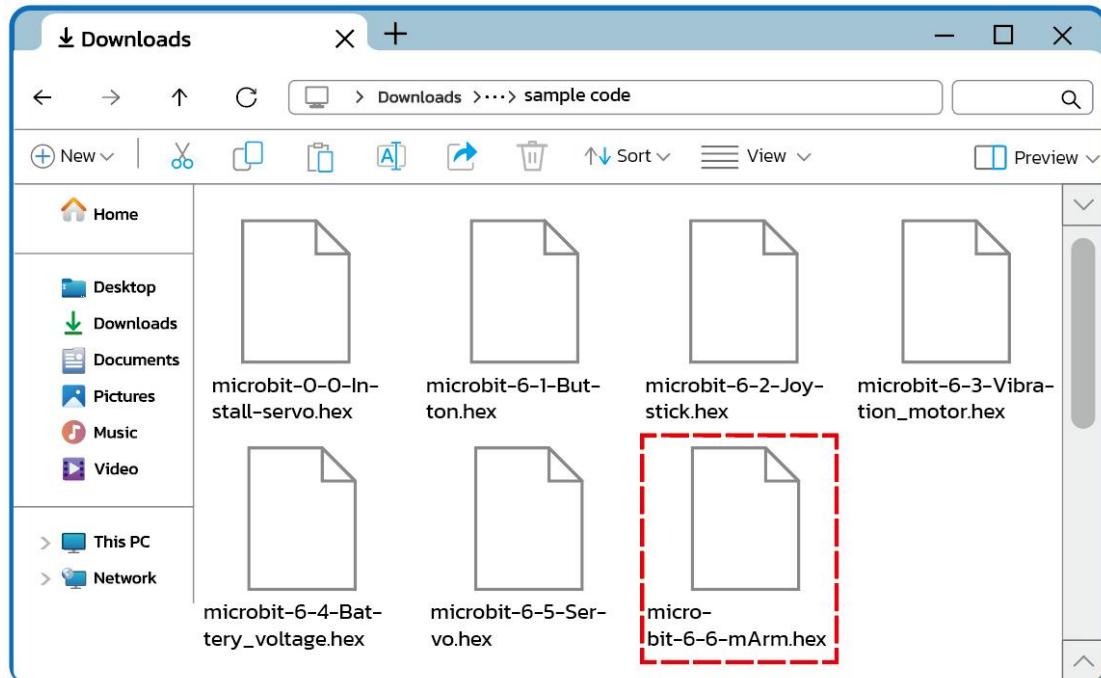
Adds rigidity to the handle's battery housing



3. Control the Robot Arm

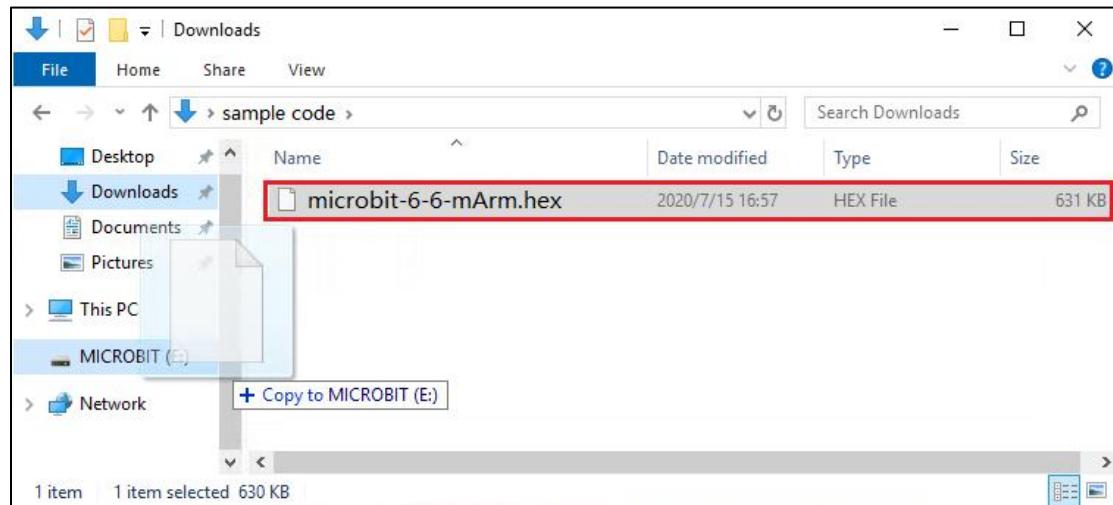
3.1 Upload the control code

The control code for the robotic arm, [microbit-6-6-mArm.hex](#), is stored in the "sample code" folder of the downloaded tutorial package.



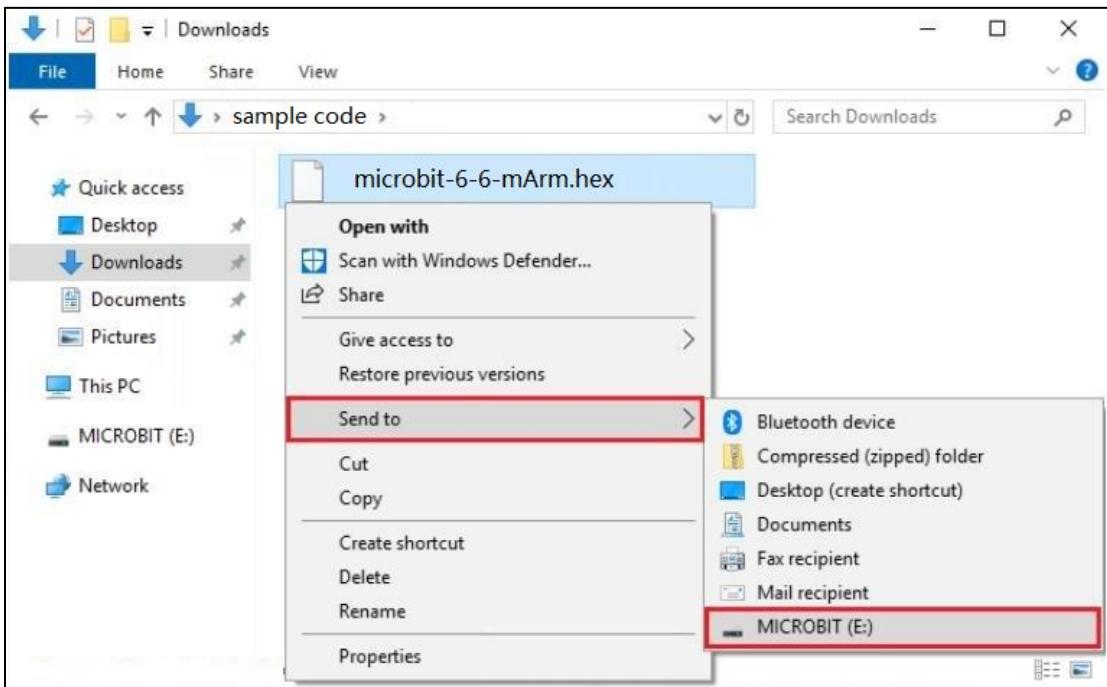
If you are using Micro:bit V1, please refer to Section 6.6 to regenerate the ".hex" file and then burn it into Micro:bit V1!!!

Simply drag and drop the HEX file onto the **MICROBIT** drive.

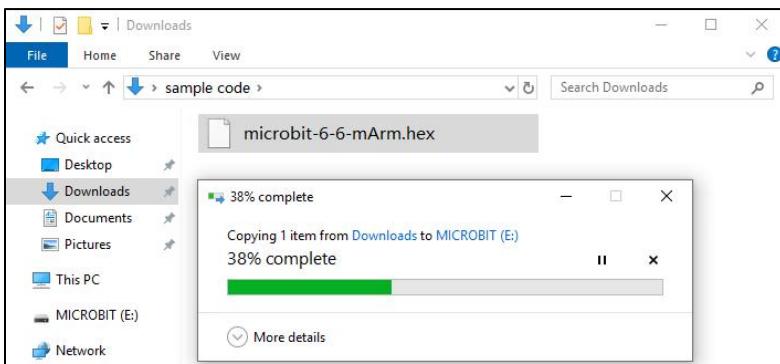


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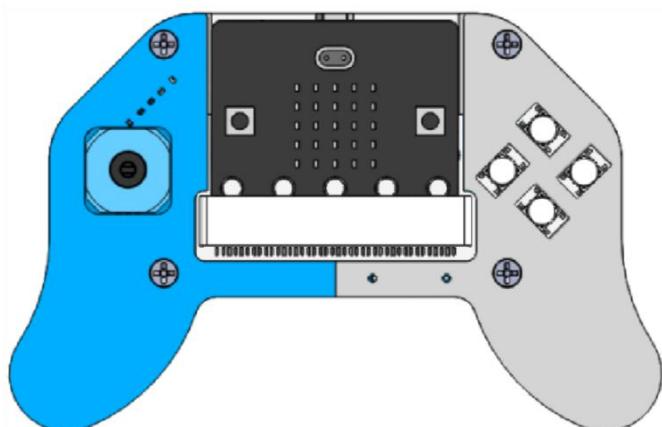
Or right-click the HEX file and select "Send to" → **MICROBIT** drive.



Wait for the upload to complete (the micro:bit LED will blink during the process).

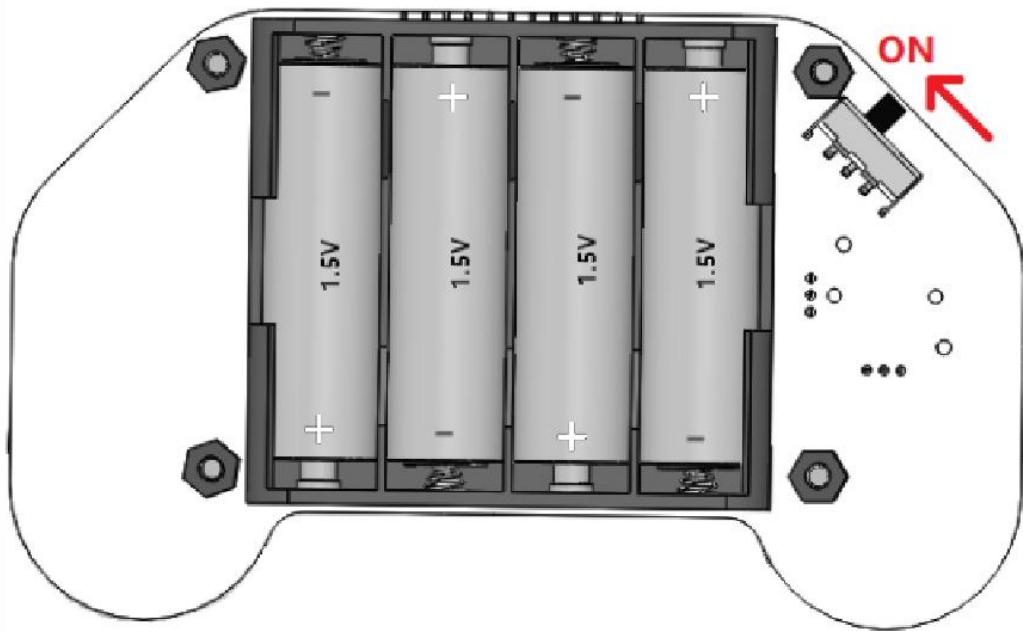


After the code is successfully uploaded, insert the micro:bit board into the robot arm slot.

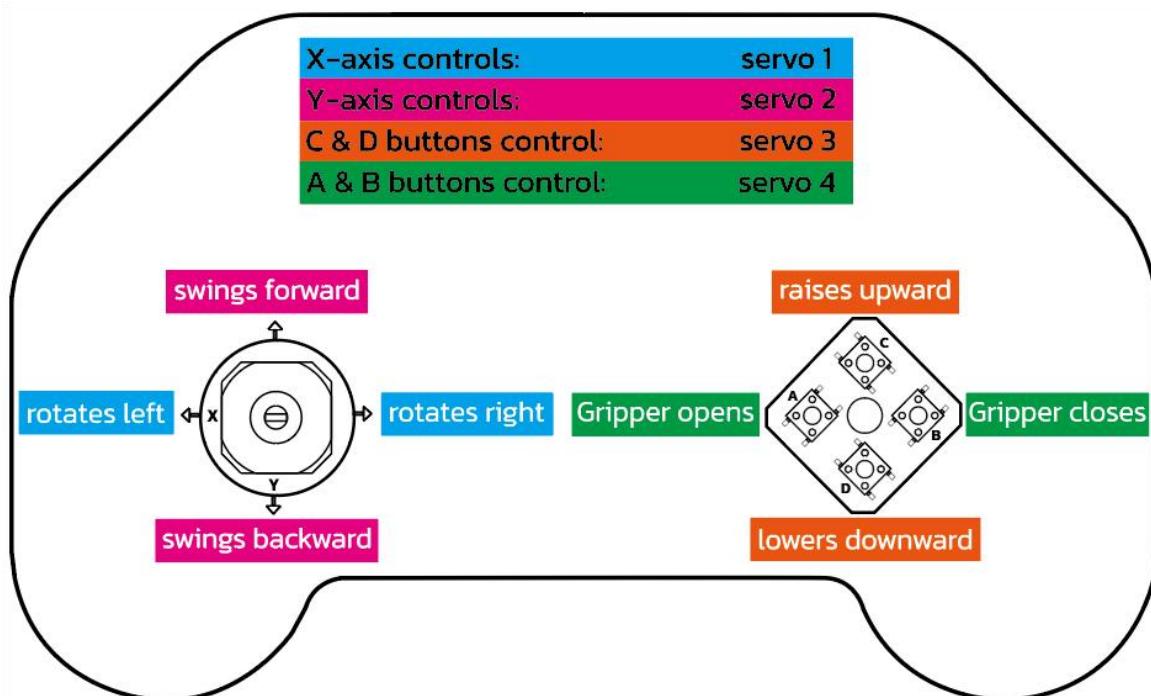


3.2 Quick Start to Robot Arm Control

Turn on the power switch of the Robot Arm.



- After powering on, the Micro:bit's LED matrix will continuously cycle through displaying the battery level (0%-100%). When the battery level drops below 30%, replace all batteries immediately.
- You can control the robotic arm's movement using the joystick and four buttons.
- Pressing the touch logo on the micro:bit will activate the vibration motor on the controller.



4.Learn MakeCode Programming

In previous chapters, we covered the fundamental process of assembling the robotic arm and implementing basic motion control.

In the sections that follow, we will provide a comprehensive introduction to Makecode programming, with an emphasis on establishing a clear and practical understanding of how code translates into physical movement.

4.1Getting Started with MakeCode

Microsoft's MakeCode editor is the perfect way to start coding with the BBC micro:bit. MakeCode is free and works across all platforms and browsers.

We recommend using Chrome or Edge browsers. WebUSB is a recent and developing web feature that allows you to access a micro:bit directly from a web page. It also lets you directly receive data into the MakeCode editor from the micro:bit. It works in Google Chrome and Microsoft Edge browsers.

WebUSB support for your micro:bit

If you're not using a current version of the Chrome or Microsoft Edge browsers, make sure they are this version or newer:

Chrome (version 79 and newer) browser for Android, Chrome OS, Linux, macOS and Windows 10.

Microsoft Edge (version 79 and newer) browser for Android, Chrome OS, Linux, macOS and Windows 10.

Link to download the latest Google Chrome:

<https://www.google.com/chrome/>

Link to download the latest Microsoft Edge:

<https://www.microsoft.com/en-us/edge/download>

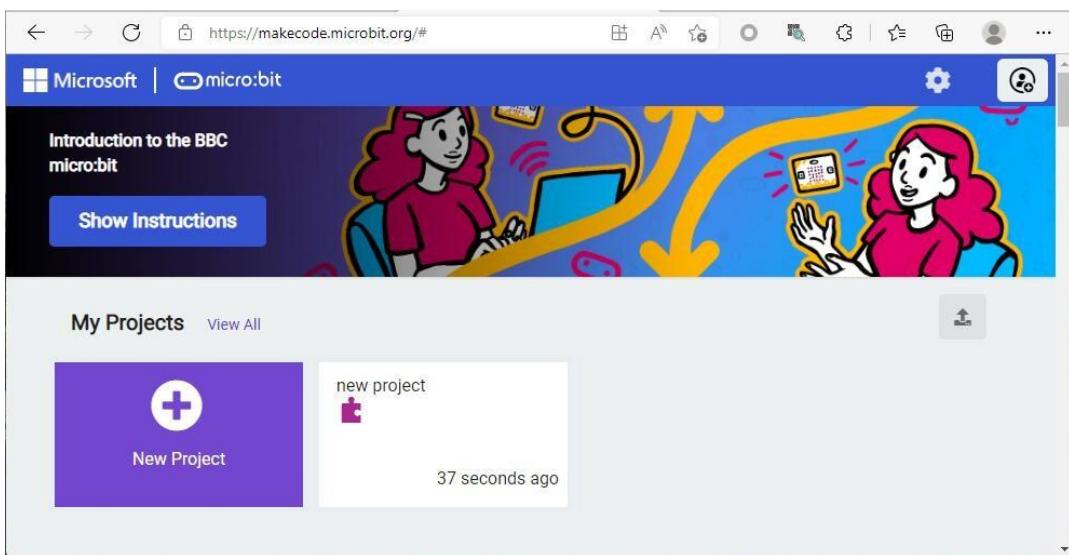
SIYEENOVE

4.1.1 Create a new project

Open the Makecode editor on your browser: <https://makecode.microbit.org>, click “**New Project**”, Then you can **give a name** for your project.



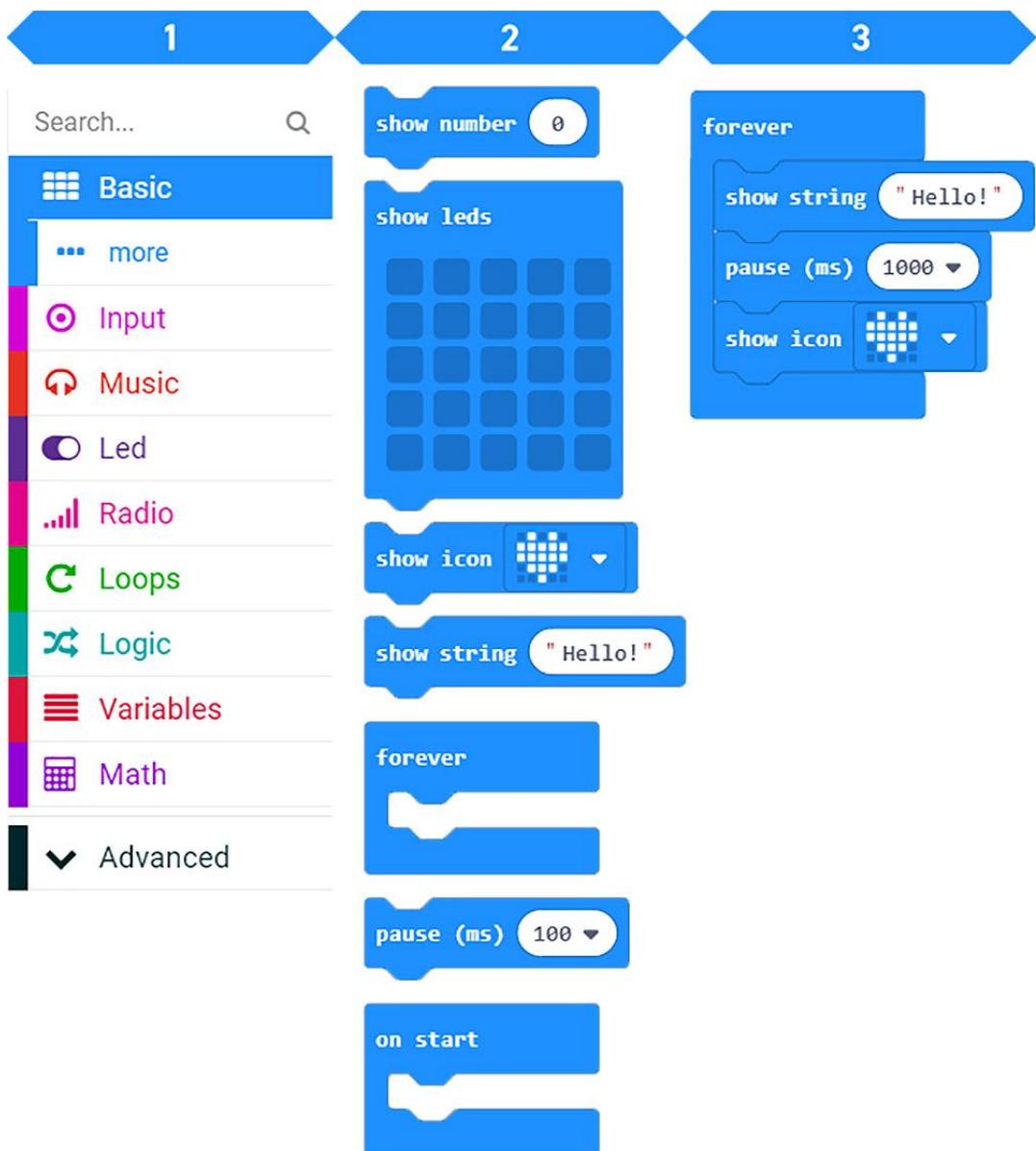
The newly created projects will be saved in the current browser. Just revisit the <https://makecode.microbit.org> website and find them in the project list.



SIYEENOYE

Selecting Blocks:

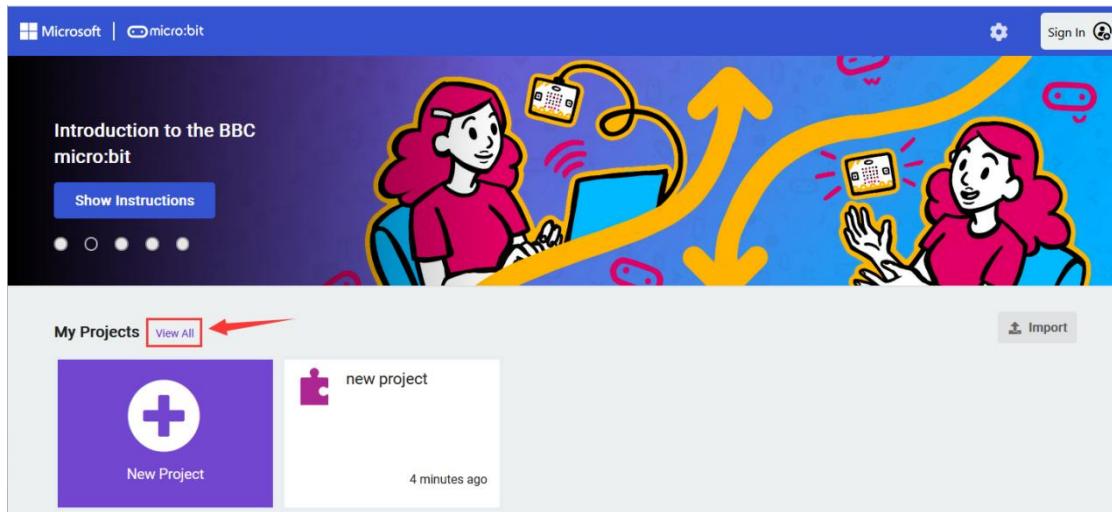
1. Select a block category from the list on the left-hand side of the page.
2. Select a block from the selected category, then drag it to the workspace area on the right.
3. Snap new blocks onto existing blocks in the workspace area. As the new blocks are dragged into the workspace, the editor highlights the connecting parts of each block when they are in a valid position to snap to existing blocks. Also, the shape of the blocks gives you an indication of where they might fit into your code blocks.



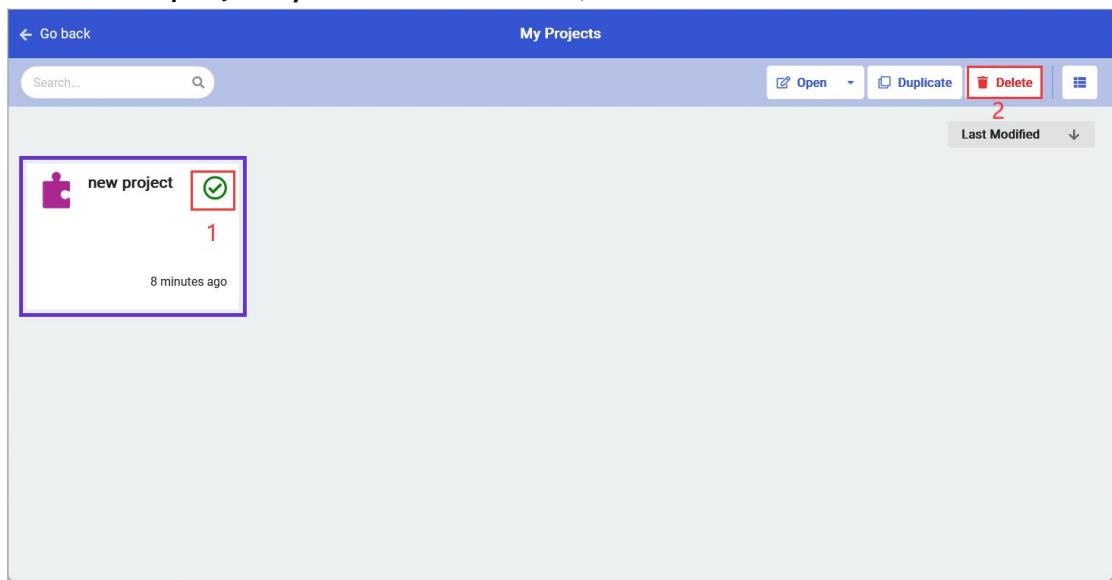
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4.1.2 Delete a Project

Click “View All”:

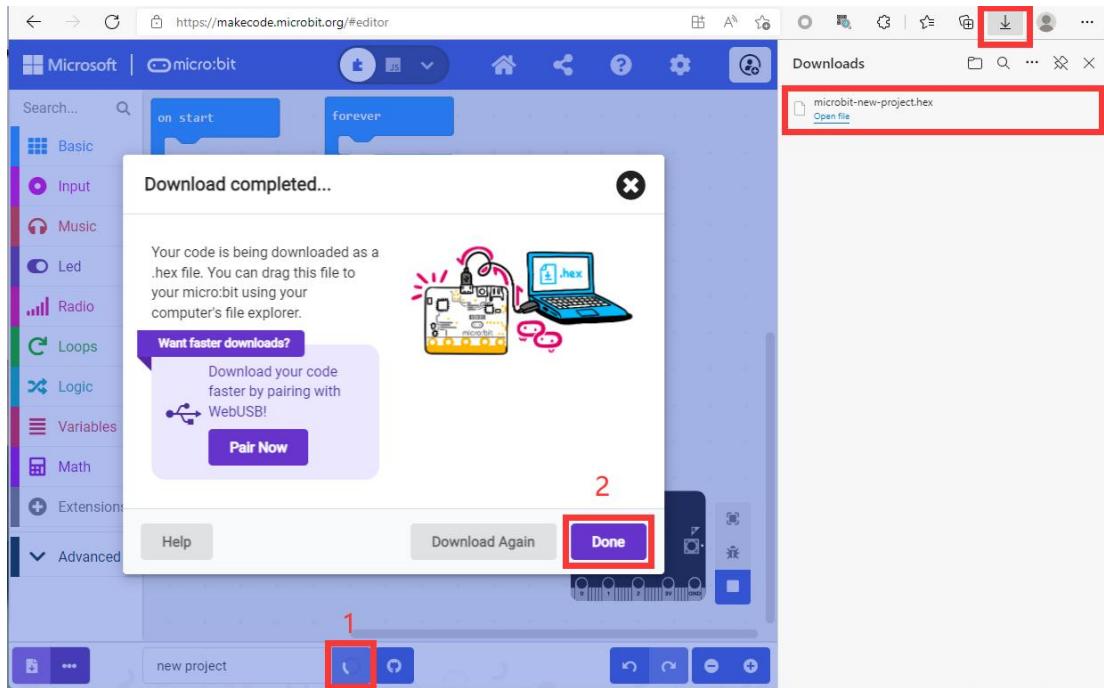


Select the project you want to delete, and click **Delete** button.



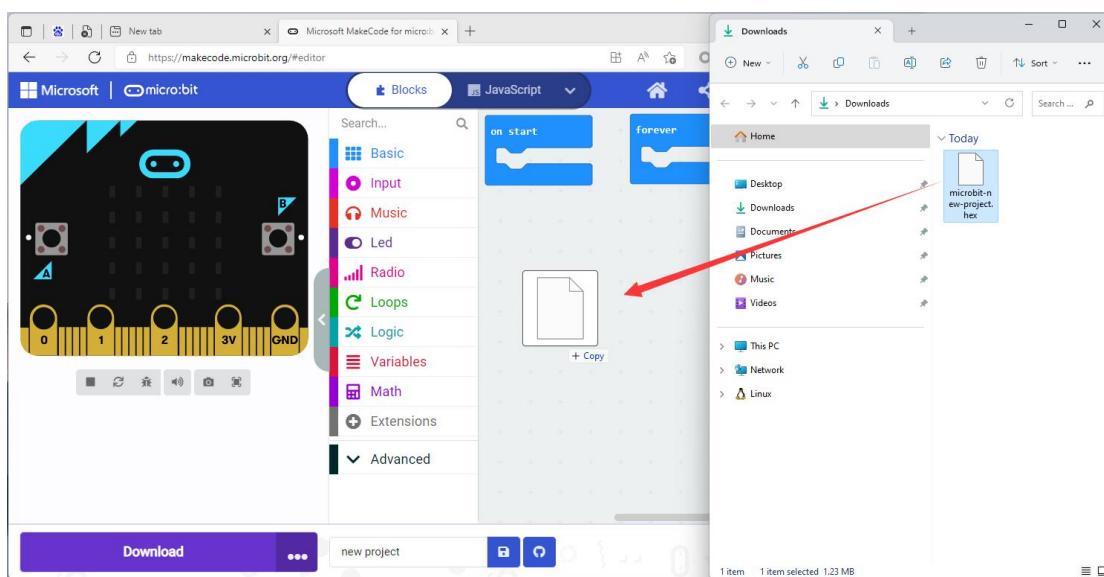
4.1.3 Save a project

Click the "Save" button, and then click the "Done" button to save the project to your computer, as shown below:



4.1.4 Import Files

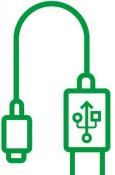
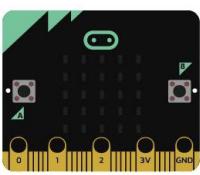
Simply drag the local "HEX" project file to the work area of the MakeCode editor, as shown below:



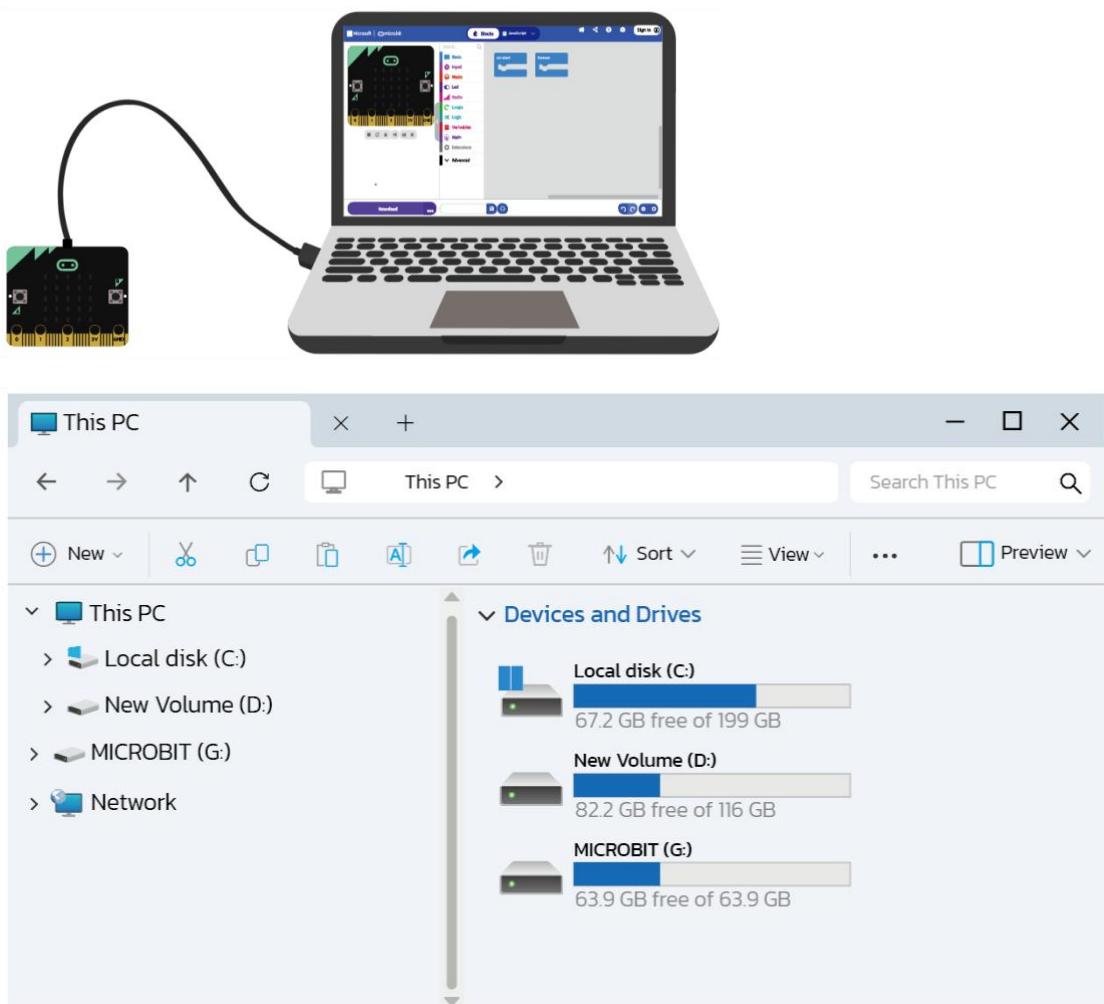
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4.1.5 Upload code

Things you need:

PC	Micro:bit v2.x.x	Micro USB cable
		

Connect the micro:bit to your PC using the Micro USB cable. The PC will detect the micro:bit as a removable drive (e.g., "MICROBIT").

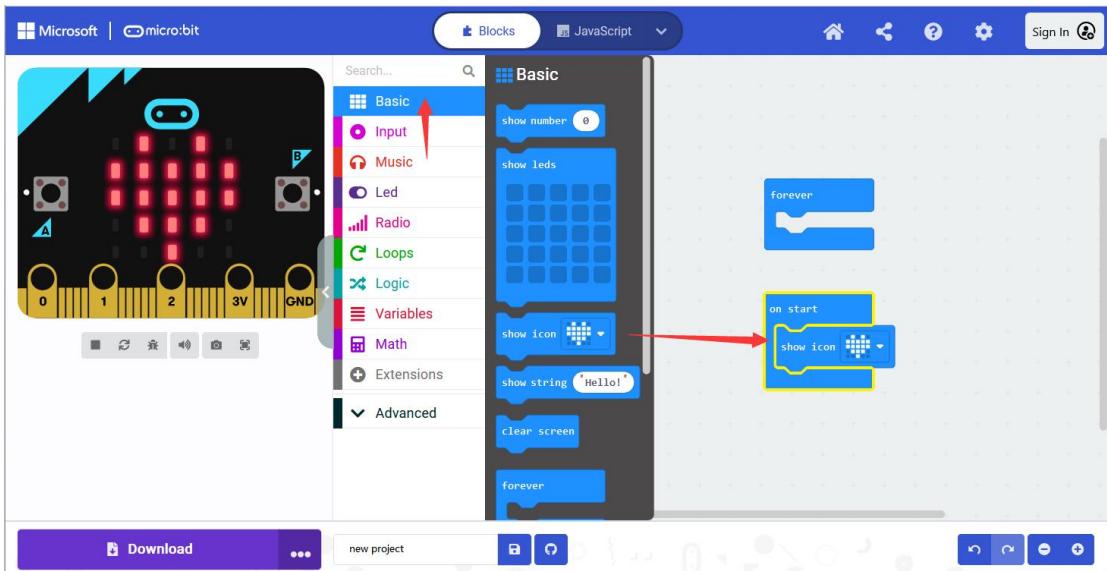


Open the MakeCode editor on your browser

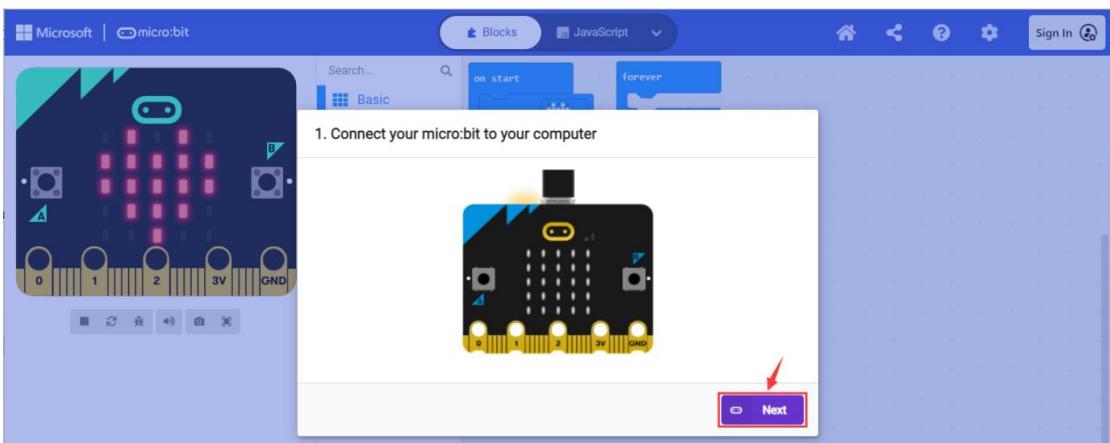
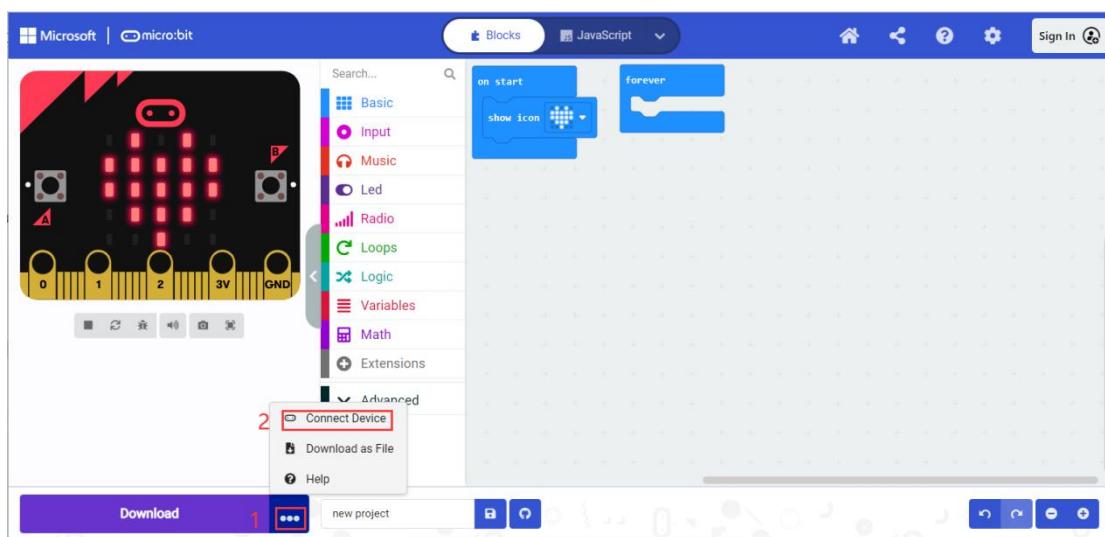
<https://makecode.microbit.org/#editor>

hold down the left mouse button, and drag the **show icon** statement on the left to the working area on the right:

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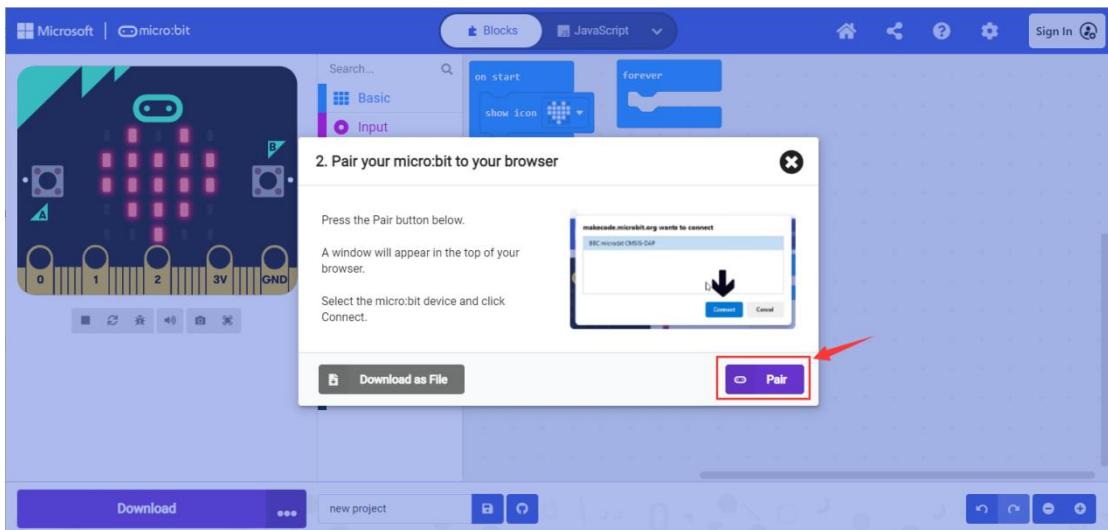


Next, you will need to click the "Connect Device" button and then the "Next" button.

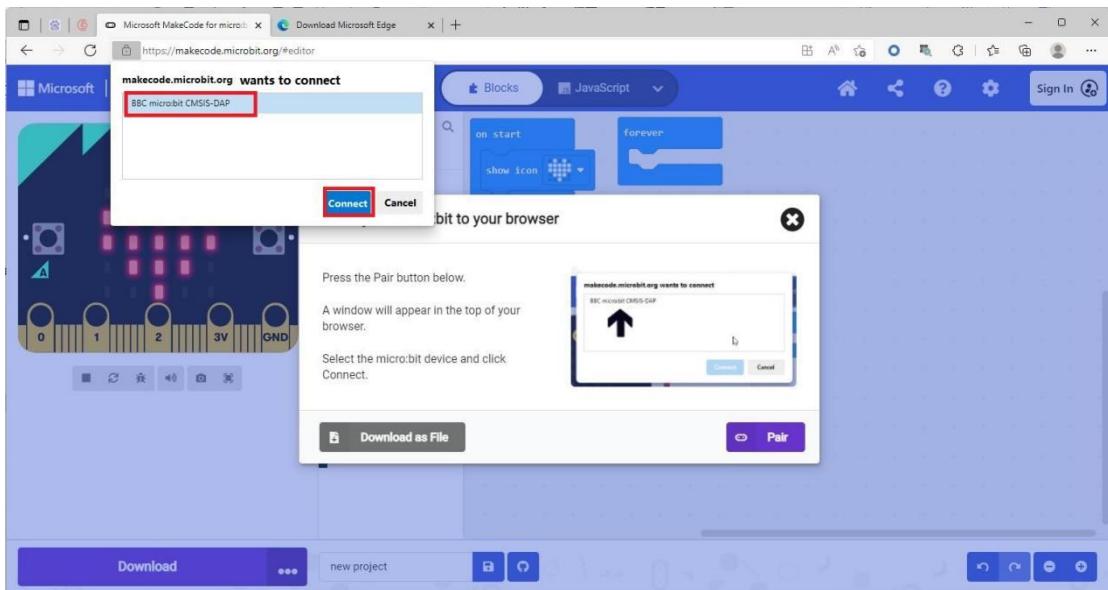


SIYEENOVE

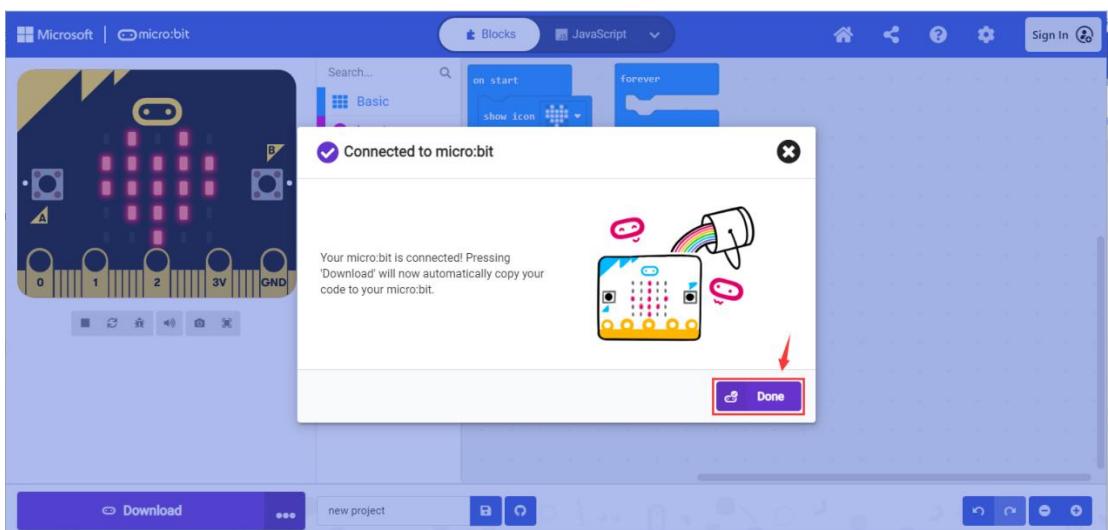
Click the “Pair” button:



Select the Micro:bit board you want to connect to, and then click "Connect":

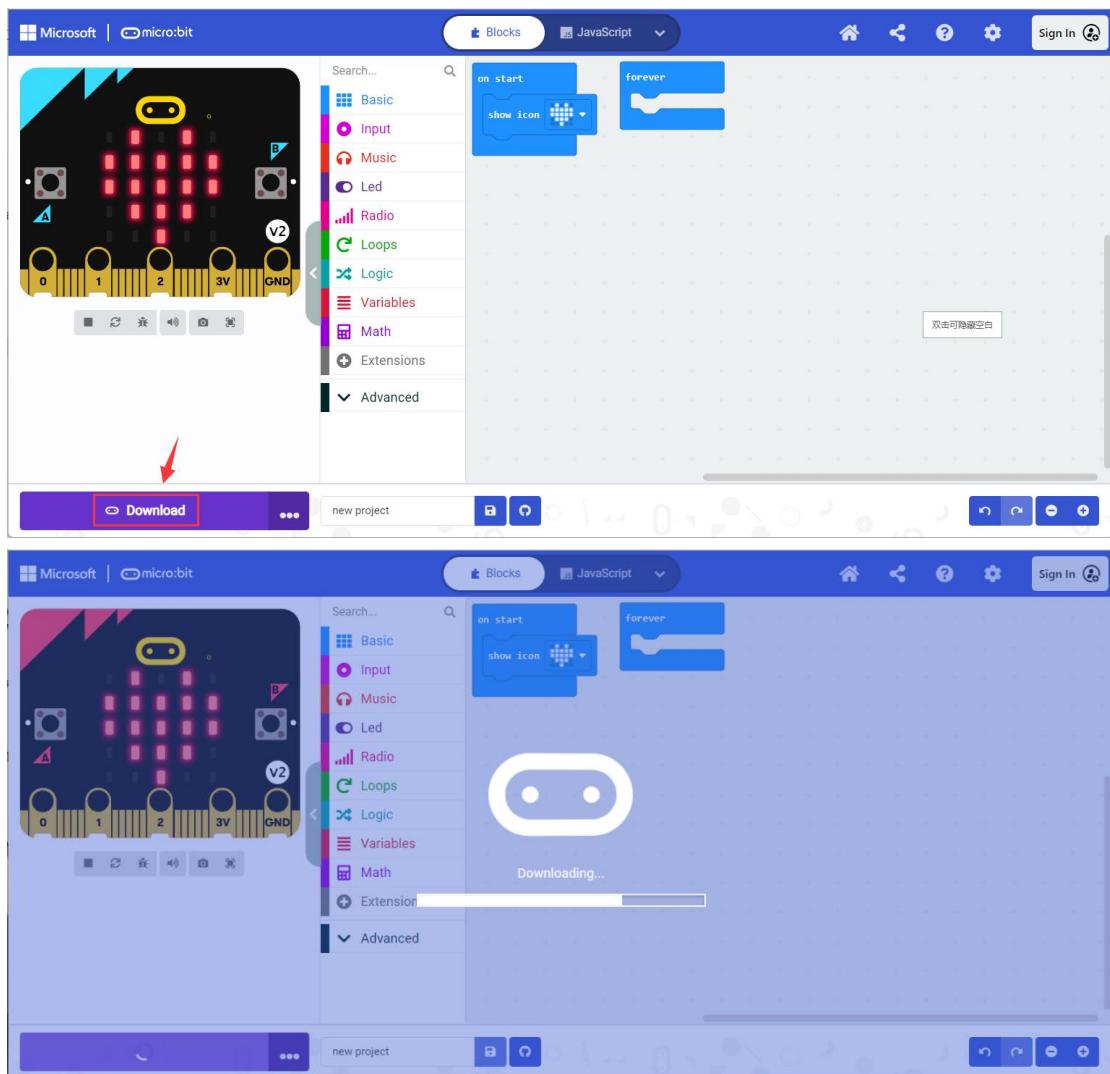


The connection is successful, click “Done”:

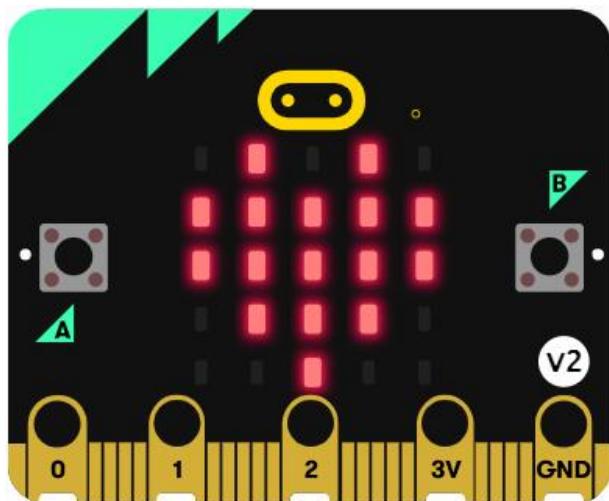


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Click the “Download” button, you can flash the code to the Micro:bit with WebUSB.

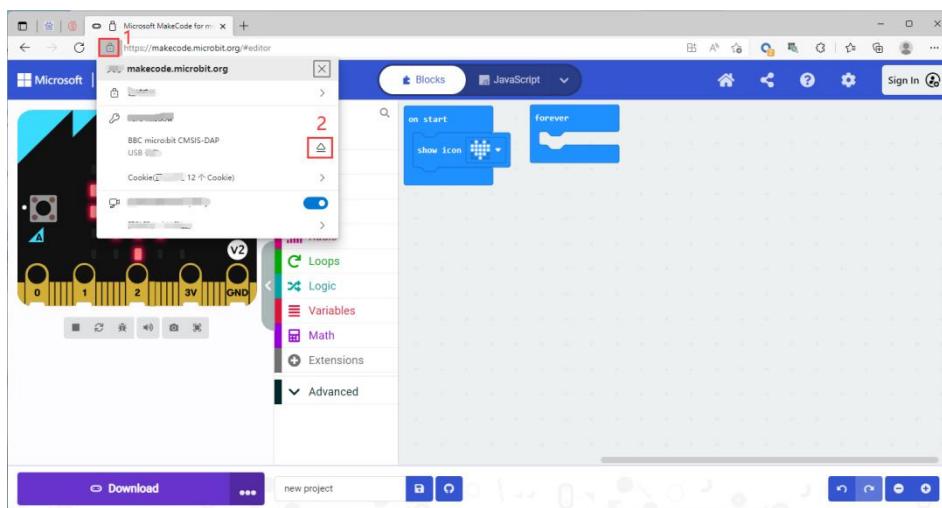


After uploading the code, the dot matrix of the Micro:bit board displays a heart shape:



4.1.7 Unpairing Micro:bit

- Click the button to the left of your browser's search box.
- Select the Micro:bit device you want to disconnect and click the button to the right of it.



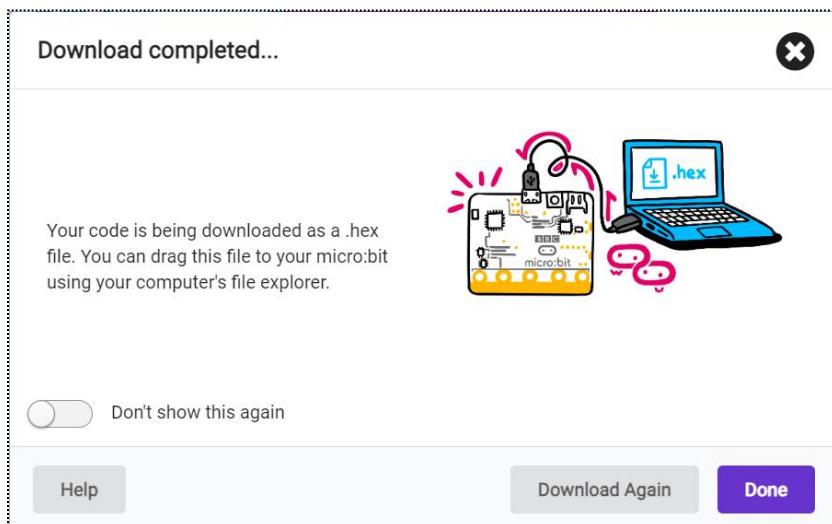
4.1.8 Upload the HEX file to the Micro:bit

If the Micro:bit is not paired with Microsoft Edge or Google Chrome browser, or if you are using Safari/Firefox/Other browser that may not support Web USB, directly click the "[Download](#)" button, the code won't transfer directly to your micro:bit, it will be downloaded as a .hex file. Just like click the save icon to save a copy of the hex file to your computer.

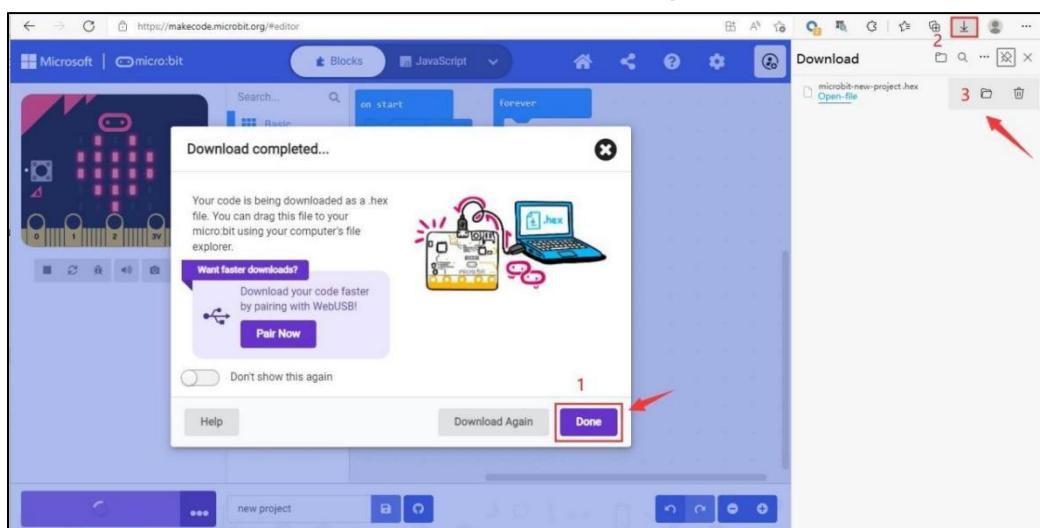


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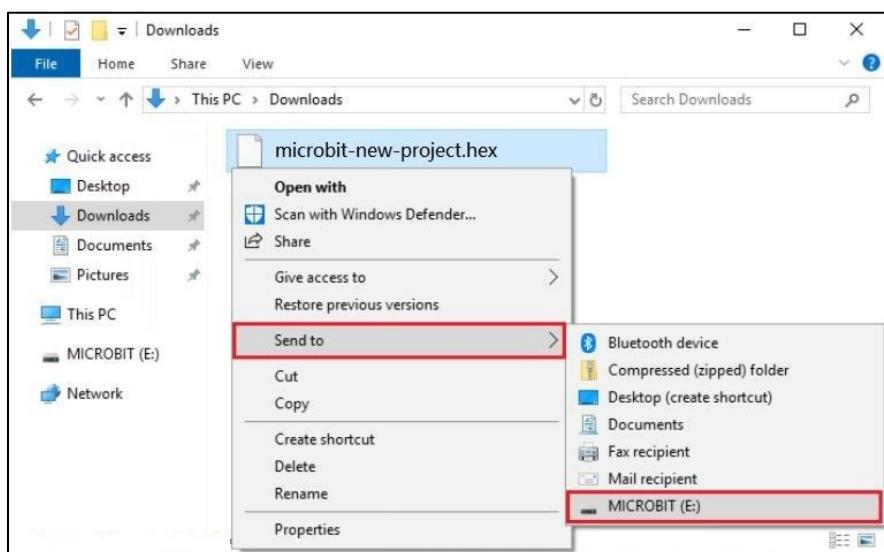
When the following interface appears, click the "X" button and click "Done":



Find the downloaded hex file in the default save path of browser.

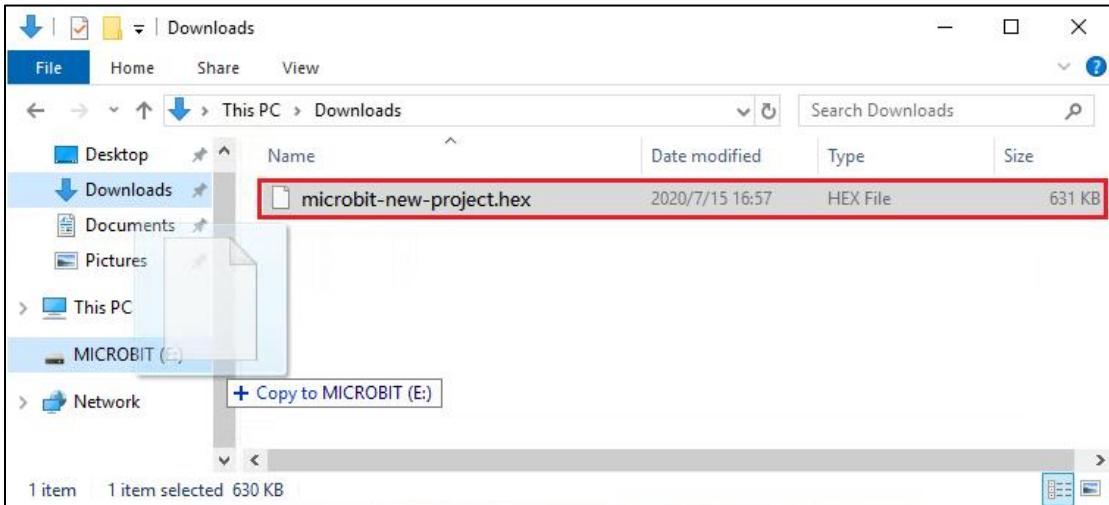


Then select the downloaded hex file, right click the mouse and click "Send to", then you can send the hex file to your Micro:bit:

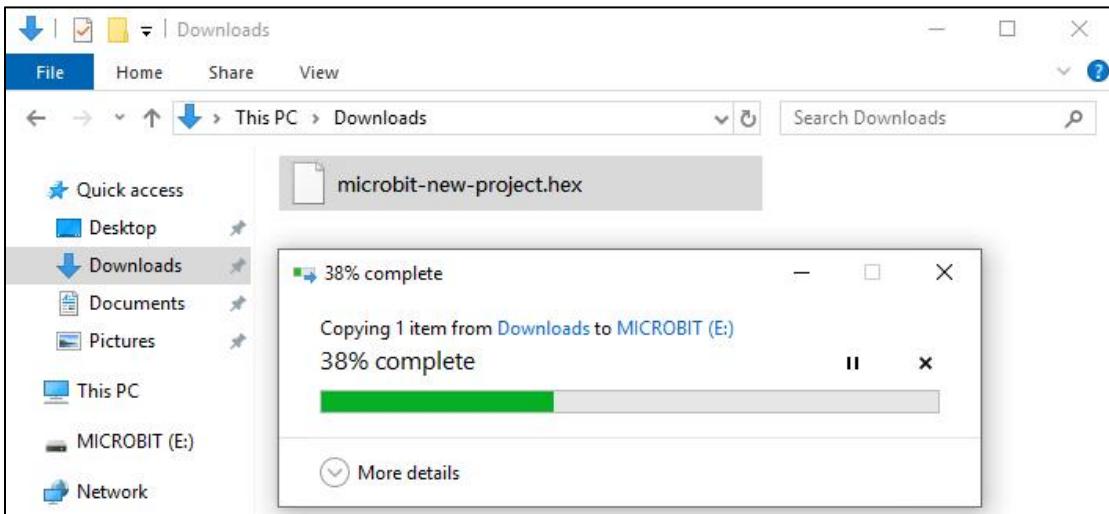


SIYEENOVE

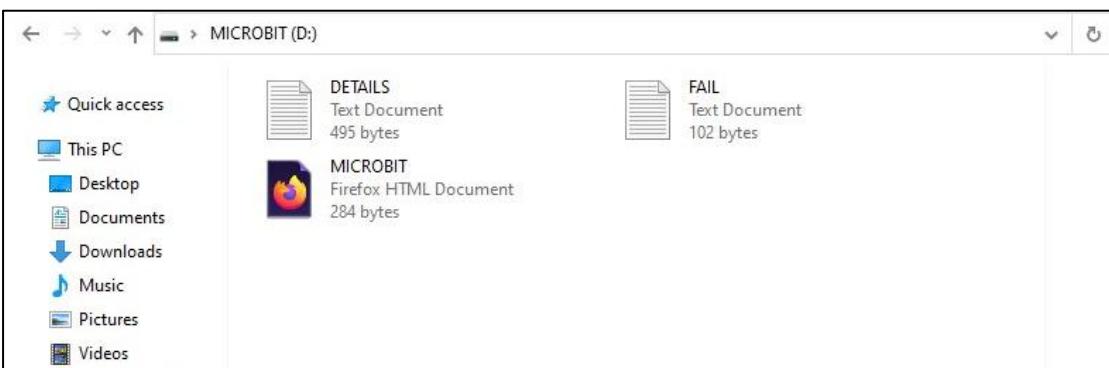
If you do not use the "Send to" button, you can directly drag the hex file to the Micro:bit:



The following interface indicates that the code is being uploaded, at the same time, the yellow LED on the back of the Micro:bit will also flash rapidly until the code upload is complete.



After the code upload is complete, the Micro:bit will disconnect and reconnect. If you look at the contents of the MICROBIT drive, you will not see the .hex file listed, this is normal, but your hex file will start automatically.



4.1.9 Learn the basic syntax of Makecode

The Micro:bit platform provides official MakeCode API and device usage documents for your reference.

To use APIs: <https://makecode.microbit.org/reference>

To use device: <https://makecode.microbit.org/device>

Logic and data types: <https://makecode.microbit.org/blocks>

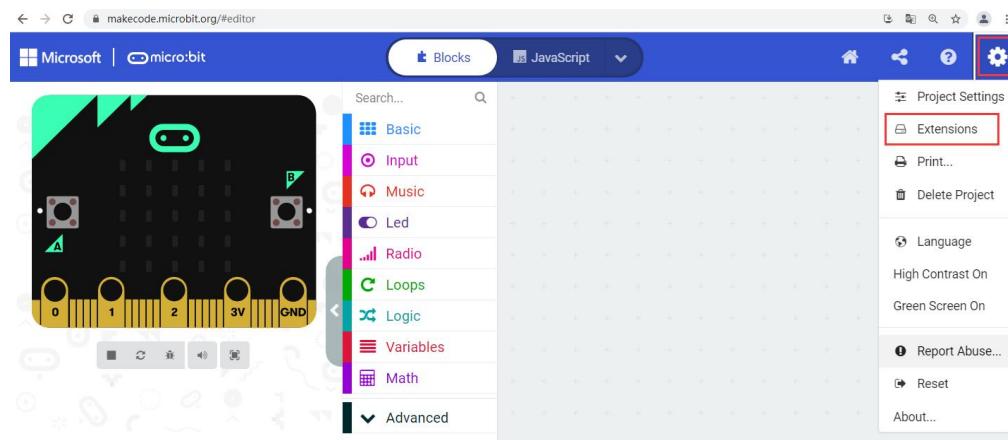
4.2 MakeCode Extension

We have developed an extension for mArm, which makes it easier for us to use MakeCode to program mArm.

4.2.1 Add mJoystick extension

The steps to add the extension to the Makecode are as follows:

Click the **Settings** button in the upper right corner of the interface and click "Extensions"

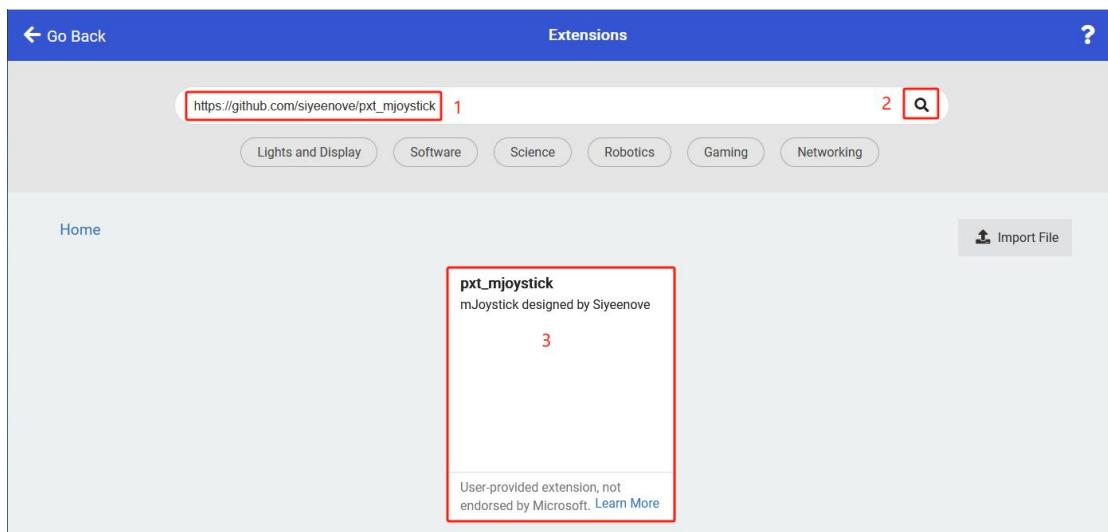


Extension link for mArm: https://github.com/siyeenove/pxt_mjoystick

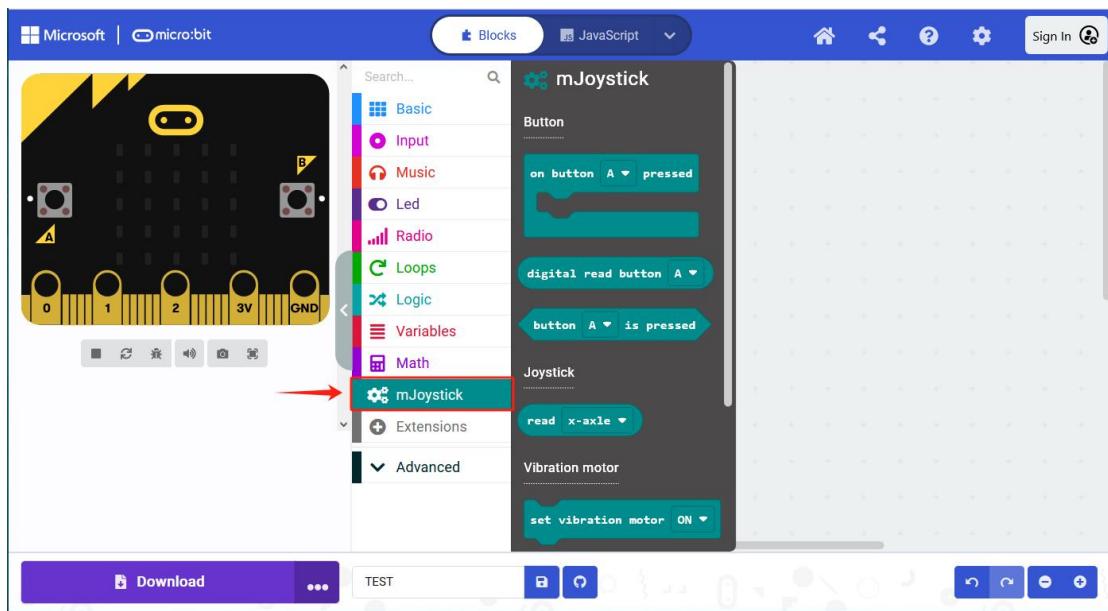
SIYEENOVE

Copy the above link into the search box on the extension page and click the search button on the right.

Click on the extension named **pxt_mjoystick** in the search results.

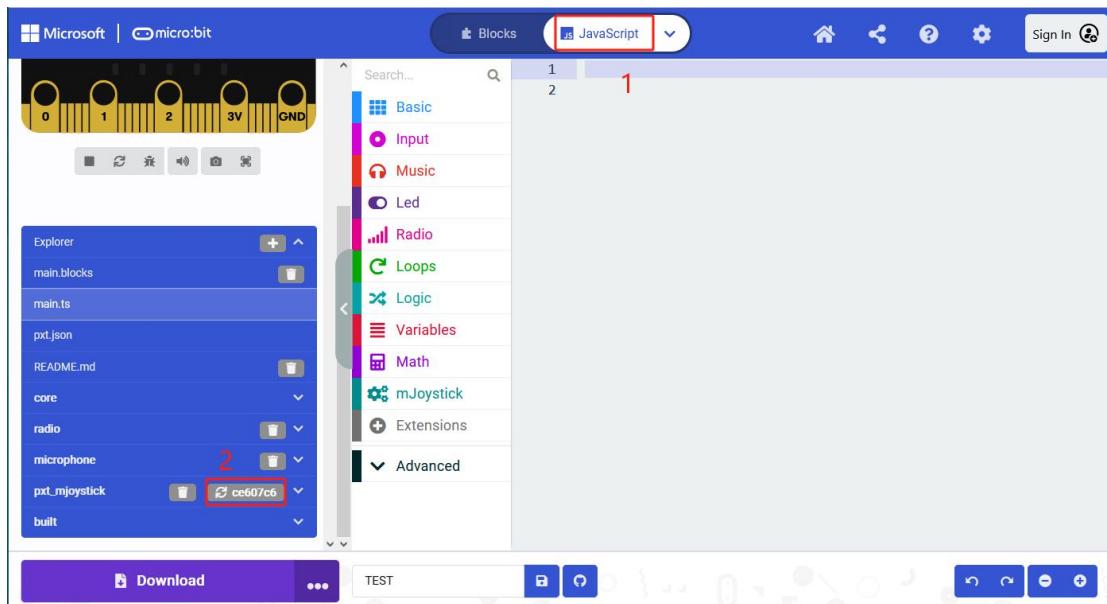


After a few seconds the page will jump to the Makecode main interface, and you will see the added **mJoystick** extension in the toolbox list.



4.2.2 Refresh mJoystick extension

Open the project with the mJoystick extension added, and switch to the JavaScript programming interface to refresh the extension:



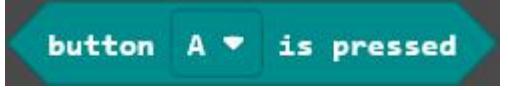
After refreshing, switch back to the "Blocks" interface.

4.2.3 Parsing of mJoystick extension statement

All Makecode statements based on mJoystick are integrated in the mJoystick extension package. The statement analysis is as follows:

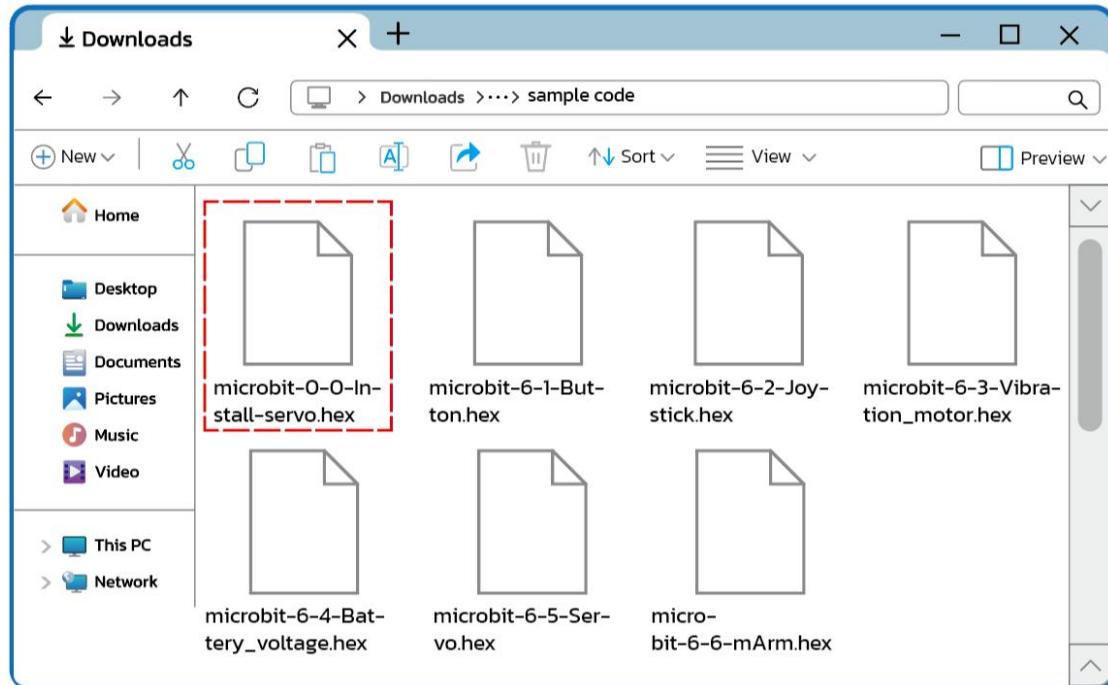
Buttons	An image of a blue rectangular block with the text 'on button A pressed' and a small downward arrow next to the 'A'.
	This is a Micro:bit background running thread that can be triggered by pressing buttons A, B, C, or D. Each button press triggers one execution.
	An image of a teal rectangular block with the text 'digital read button A' and a small downward arrow next to the 'A'.
	Read the value of buttons A, B, C, or D on the joystick, returning 0 or 1.

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	Determine whether buttons A, B, C, or D on the joystick are pressed, returning true or false.
	
	Read the values of the joystick's X and Y axes, returning a range of -100 to +100.
Vibration motor	
	Start or stop the vibration motor on the joystick. (Shares P2 pin)
Battery	
	Read the battery level of 4 AA batteries, returning a range of 0% to 100%. (Shares P2 pin)
Servo	
	When external servos are connected to the controller, set the angle of the servos, with support for up to 4 servos.

4.3 Robot Programming

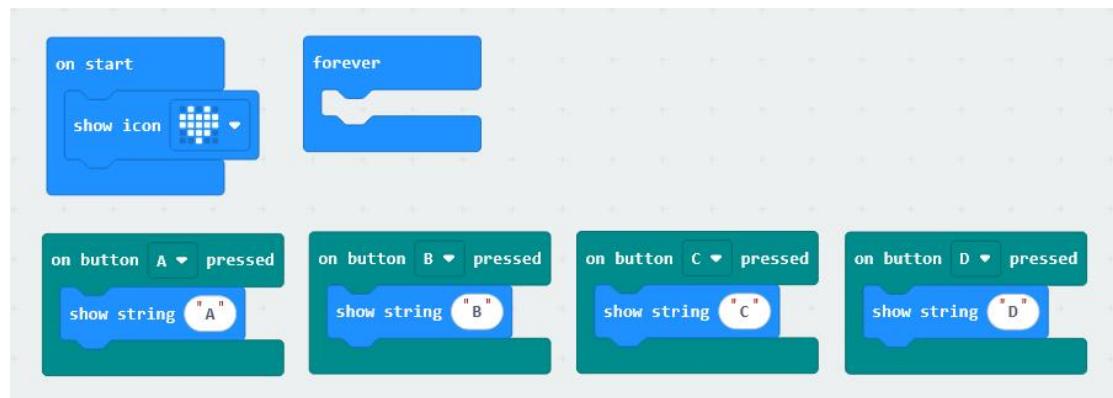
All example code for this section can be found in the sample-code folder of the provided tutorial package.



Warning: Flashing a new program to the micro:bit will replace any existing code. The previous program will be lost. To regain control of the robotic arm after flashing new code, ensure you flash the final program provided in this chapter.

4.3.1 Button

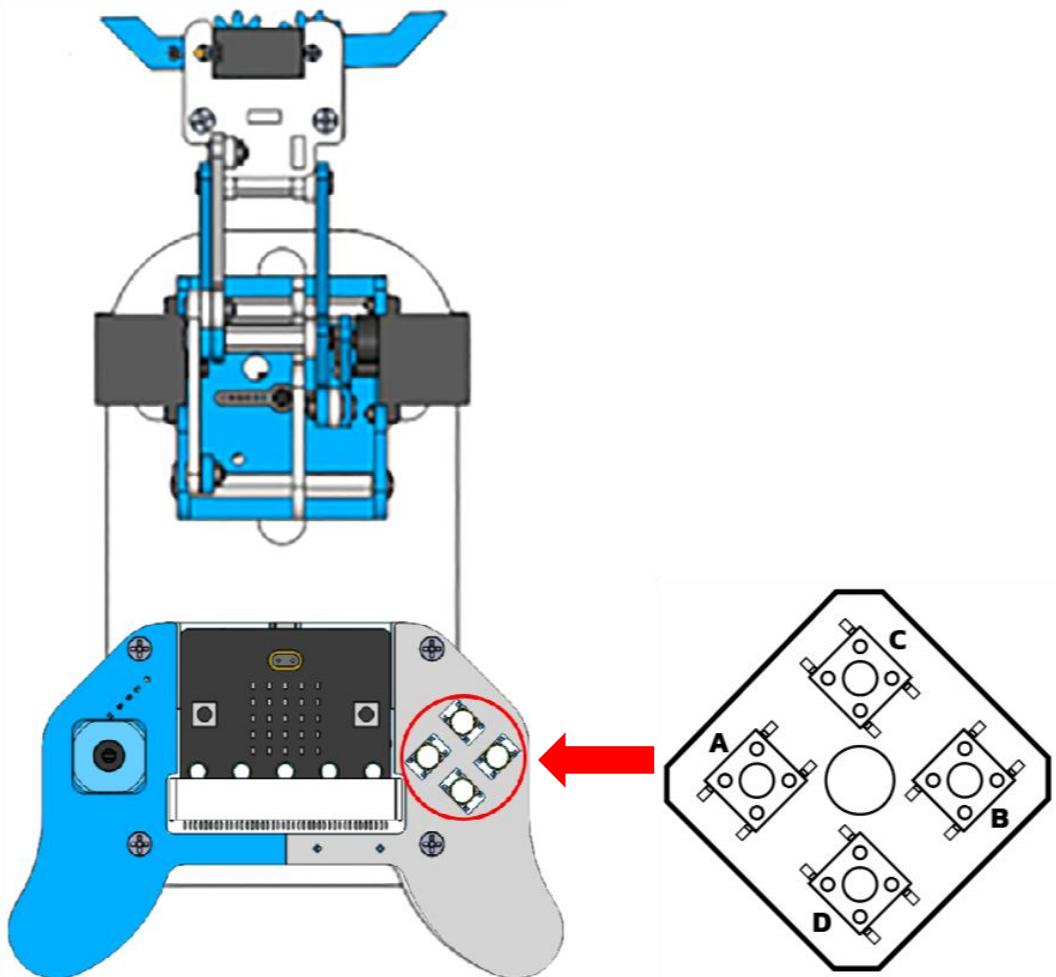
Code:



SIYEENOVE

- ▶ When the micro:bit powers on, the LED matrix displays a heart icon (the "on start" block executes once at power-up).
- ▶ The "forever" block runs continuously in an infinite loop after power-on - the above code shows an empty loop.
- ▶ When button A on the joystick is pressed, the "on button A pressed" block executes, displaying letter A on the micro:bit matrix.
- ▶ When button B on the joystick is pressed, the "on button B pressed" block executes, displaying letter B on the micro:bit matrix.
- ▶ When button C on the joystick is pressed, the "on button C pressed" block executes, displaying letter C on the micro:bit matrix.
- ▶ When button D on the joystick is pressed, the "on button D pressed" block executes, displaying letter D on the micro:bit matrix.

Result:

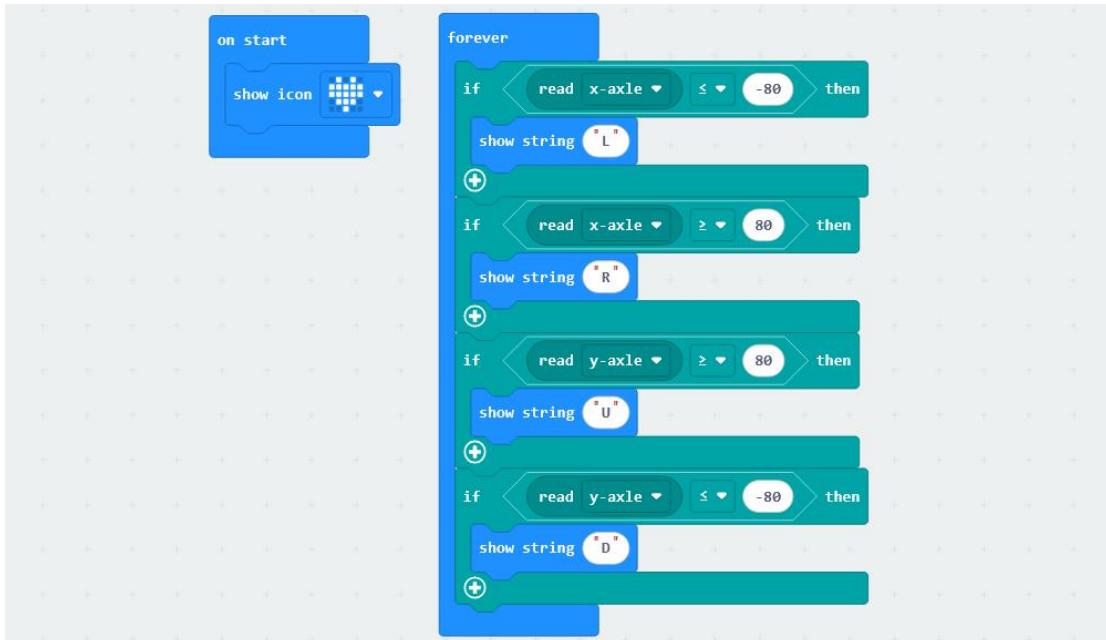


When powered on, the Micro:bit dot matrix displays a heart shape. Press the A key, B key, C key or D key on mJoystick, and the Micro:bit dot matrix displays "A", "B", "C" or "D" respectively.

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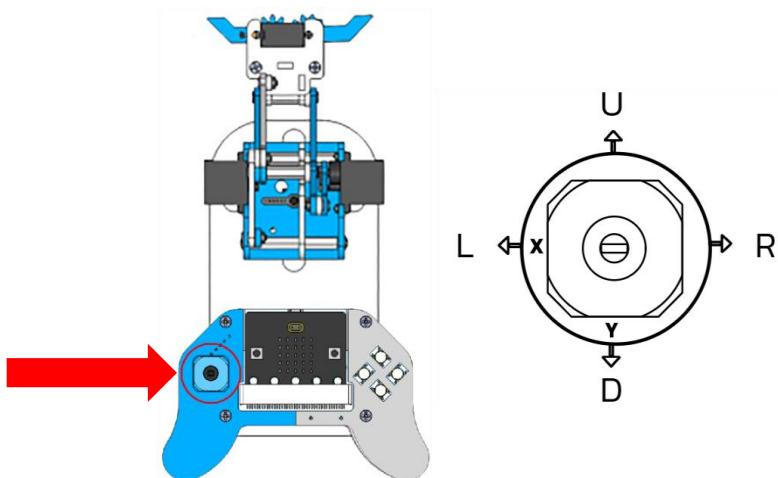
4.3.2 Joystick

Code:



- When the micro:bit powers on, the LED matrix displays a heart shape (the "on start" block executes once upon power-up).
- The "forever" block runs in an infinite loop after the micro:bit powers on.
- Check if the joystick's X-axis value is less than -80; if true, the micro:bit LED matrix displays the letter "L".
- Check if the joystick's X-axis value is greater than 80; if true, the micro:bit LED matrix displays the letter "R".
- Check if the joystick's Y-axis value is greater than 80; if true, the micro:bit LED matrix displays the letter "U".
- Check if the joystick's Y-axis value is less than -80; if true, the micro:bit LED matrix displays the letter "D".

Result:

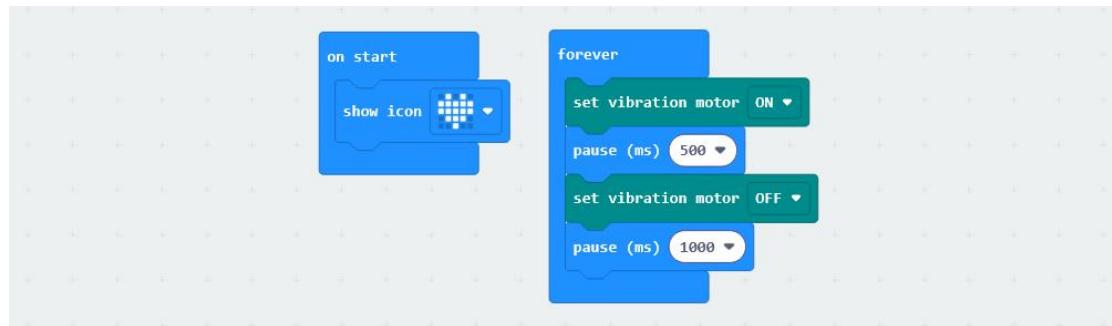


SIYEENOVE

When the micro:bit powers on, its dot matrix displays heart shape, push the joystick on mJoystick up and down, left and right, Micro: bit dot matrix displays L, R, U and D respectively.

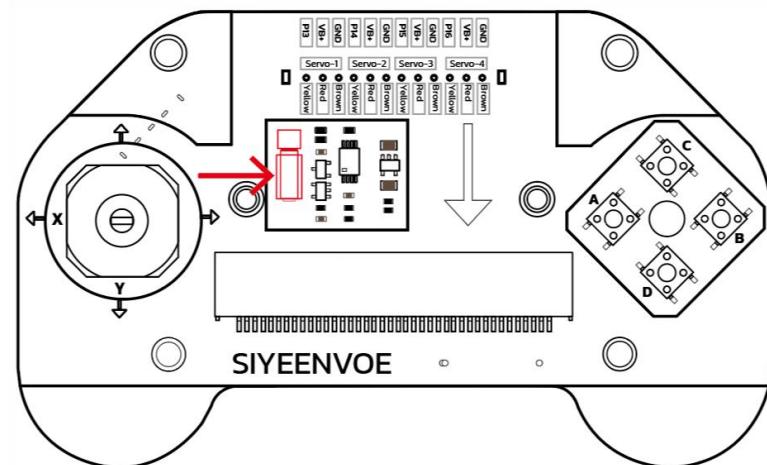
4.3.3 Vibration motor

Code:



- ▶ When the micro:bit powers on, the LED matrix displays a heart icon (the "on start" block executes once at power-up).
- ▶ The "forever" block runs continuously in an infinite loop after power-on.
- ▶ Activate the joystick's vibration motor.
- ▶ Delay for 500 milliseconds.
- ▶ Deactivate the joystick's vibration motor.
- ▶ Delay for 1000 milliseconds.

Result:



When the micro:bit powers on, its dot matrix displays heart shape, the vibration motor on mJoystick vibrates for 0.5 seconds every 1 second.

4.3.4 Battery voltage

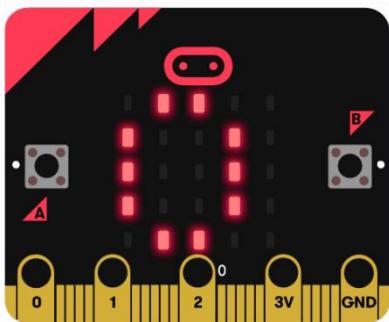
Code:



- ▶ When the micro:bit powers on, no statements are executed.
- ▶ The "forever" block runs in an infinite loop after power-on.
- ▶ The micro:bit read the battery level of the 4 AA batteries and display the power value on the dot matrix.
- ▶ Delay for 1000 milliseconds.

Result:

Note: The mjoystick must be equipped with 4 AA batteries and open the power switch!



The Micro: bit matrix displays the battery level value, ranging from 0 to 100.

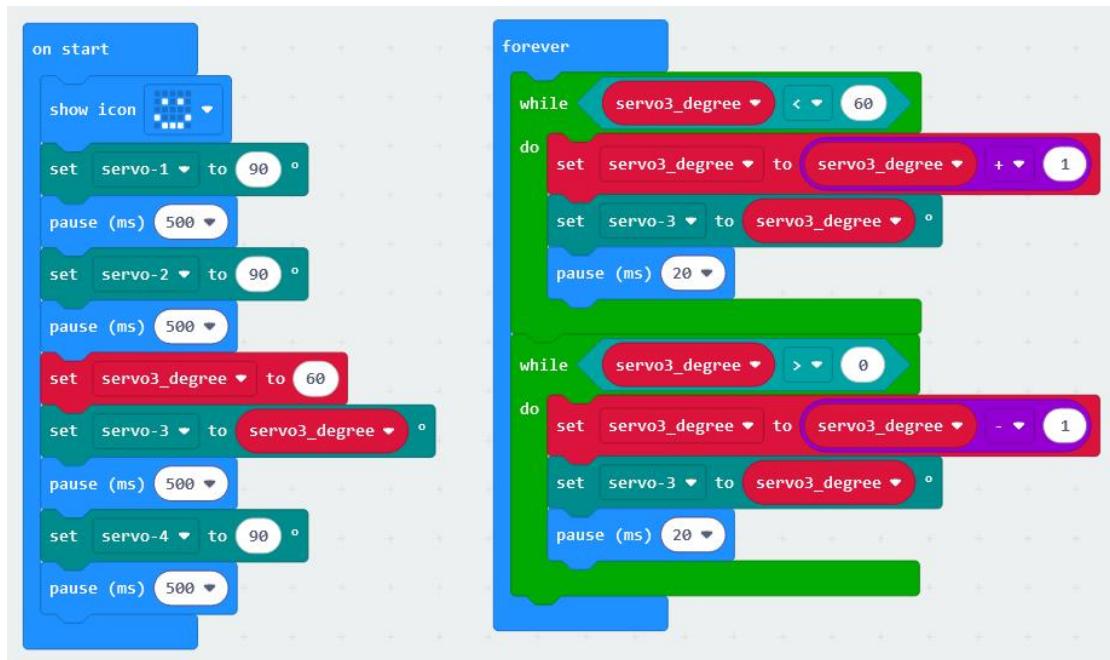
Warning!

The battery voltage reading and vibration motor control share the same P2 pin on the Micro:bit. Avoid frequent switching between these two functions, as it may affect the accuracy of battery voltage measurements. For optimal results, after controlling the vibration motor, take multiple consecutive voltage readings and use the last recorded value.

SIYEENOVE

4.3.5 Servo

Code:



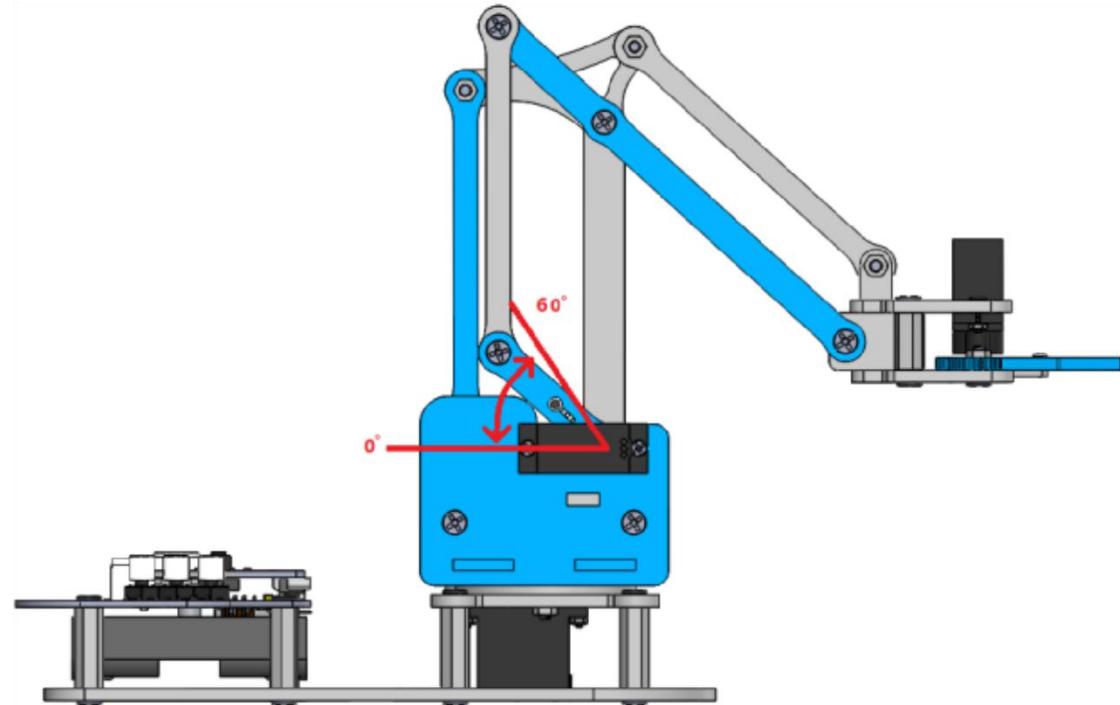
- ▶ Execute the "on start" block once when the micro:bit is powered on.
- ▶ The micro:bit LED matrix displays a smiling face.
- ▶ Set the angle of servo-1 to 90 degrees.
- ▶ Delay for 500 milliseconds.
- ▶ Set the angle of servo-2 to 90 degrees.
- ▶ Delay for 500 milliseconds.
- ▶ Set the value of the variable "servo3_degree" to 120.
- ▶ Set the angle of servo-3 to the value of "servo3_degree".
- ▶ Delay for 500 milliseconds.
- ▶ Set the angle of servo-4 to 90 degrees.
- ▶ Delay for 500 milliseconds.

- ▶ The "forever" block loops indefinitely after the micro:bit is powered on.
- ▶ In the first "while" loop condition, check whether the value of the variable "servo3_degree" is less than 180.
- ▶ If the first "while" condition is true:
 - Increase the value of the variable "servo3_degree" by 1.
 - Set the angle of servo-3 to the value of "servo3_degree".
 - Delay for 20 milliseconds.
 - Return to check the Boolean value of the first "while" condition.
- ▶ If the first "while" condition is false, execute the second "while" block.
- ▶ If the second "while" condition is true:
 - Decrease the value of the variable "servo3_degree" by 1.
 - Set the angle of servo-3 to the value of "servo3_degree".

SIYEENOVE

- Delay for 20 milliseconds.
- Return to check the Boolean value of the second "while" condition.

Result:



The swing arm of servo-3 oscillates between 120 and 180 degrees. The robot repeatedly performs the action of lifting and lowering its mechanical arm.

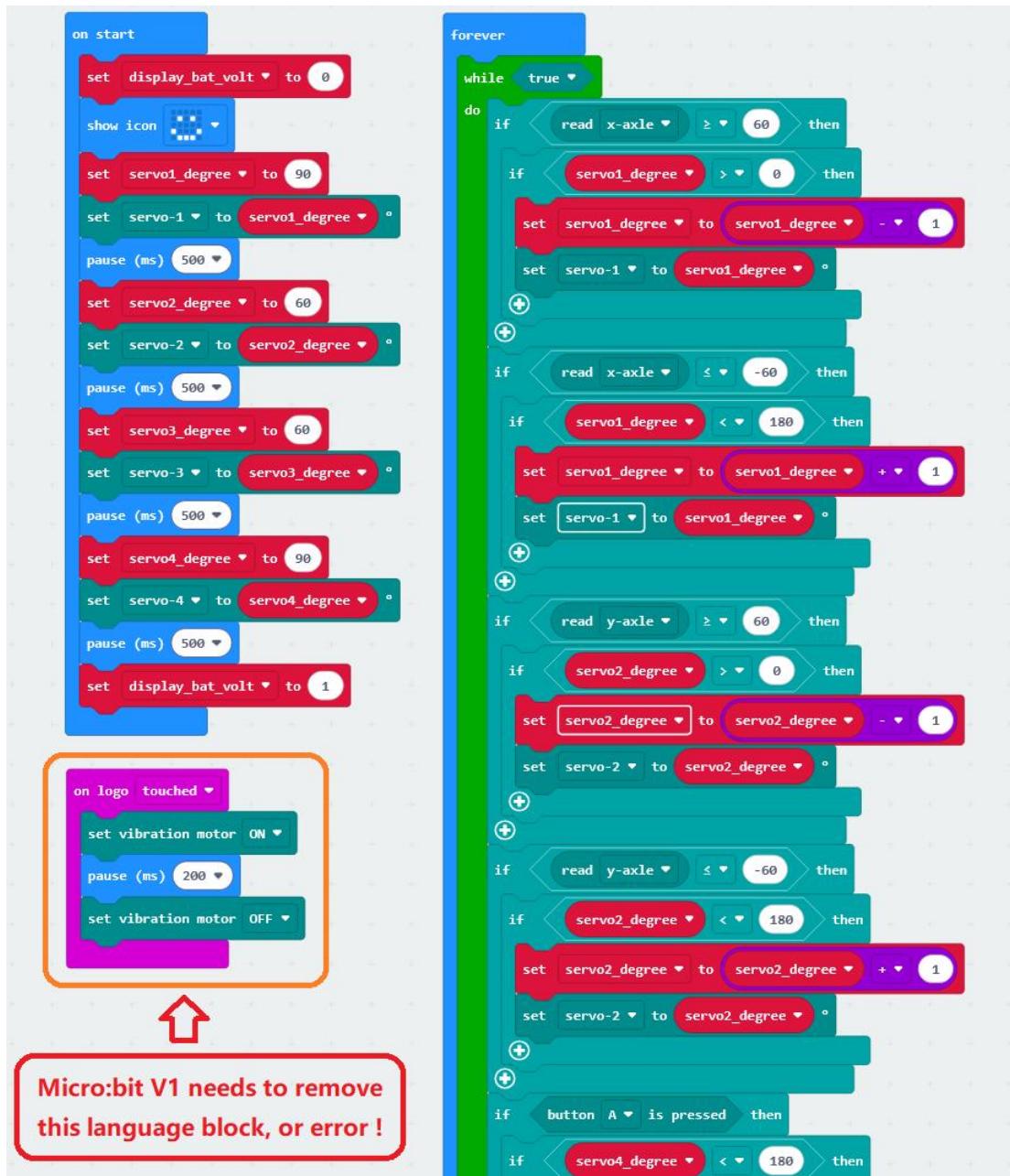
Note: The mJoystick must be equipped with 4 AA batteries and have its power switch turned on!

SIYEENOVE

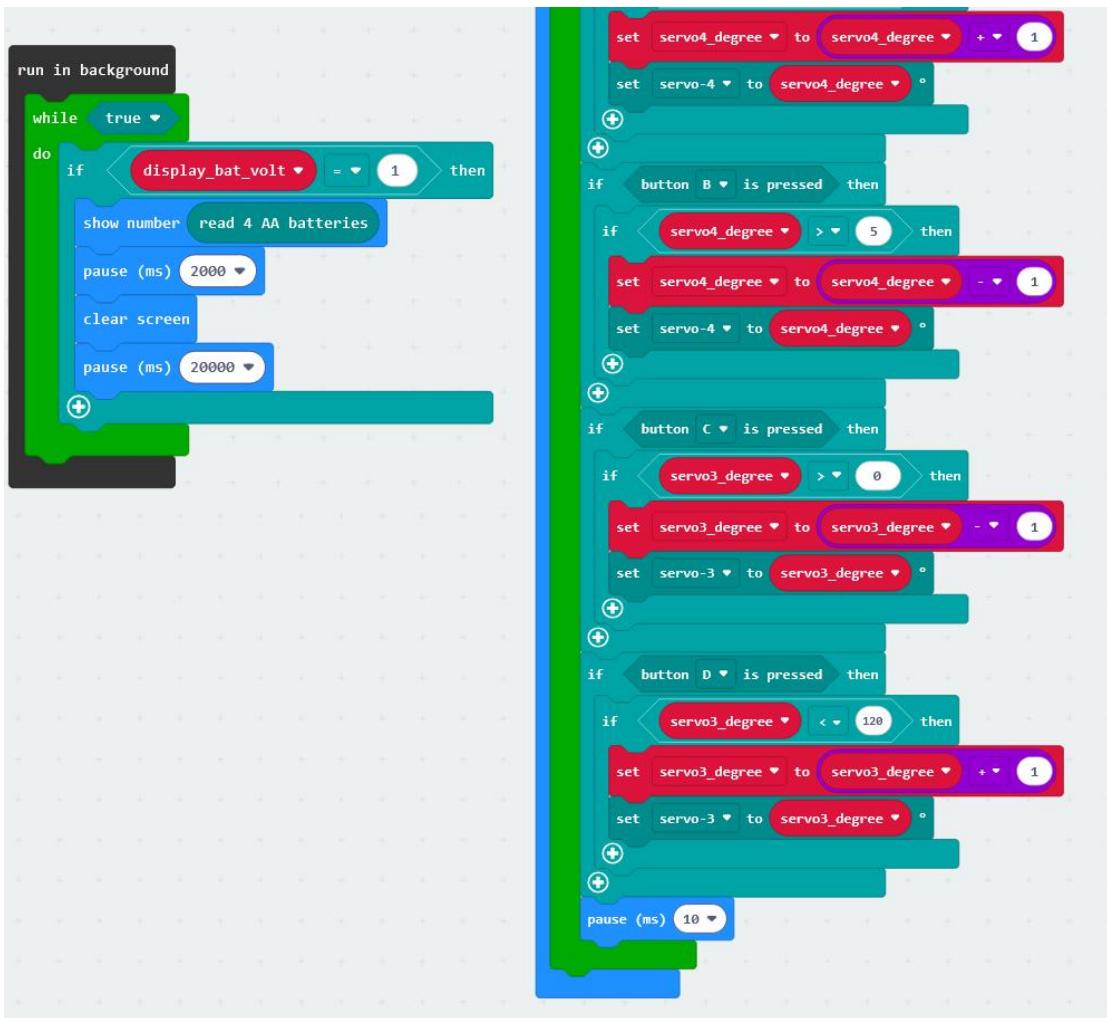
4.3.6 mArm

This section will provide a detailed explanation of the code used in Chapter 3.2 Quick Start to Arm Control. If you wish to operate the robotic arm again after uploading other programs, please upload this code.

Code:



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- When the micro:bit is powered on, set the variable "display_bat_volt" to 0 to disable background battery level display.
(The "on start" block is executed once when the micro:bit is powered on).
- The LED matrix displays a smiling face.
- Set the variable "servo1_degree" to 90.
- Set the angle of servo-1 to 90 degrees.
- Delay for 500 milliseconds.
- Set the variable "servo2_degree" to 60.
- Set the angle of servo-2 to 60 degrees.
- Delay for 500 milliseconds.
- Set the variable "servo3_degree" to 60.
- Set the angle of servo-3 to 60 degrees.
- Delay for 500 milliseconds.
- Set the variable "servo4_degree" to 90.
- Set the angle of servo-4 to 90 degrees.
- Delay for 500 milliseconds.
- Set the variable "display_bat_volt" to 0 to enable background battery level display.

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- ▶ The "forever" block loops indefinitely after the micro:bit is powered on, with a nested "while" infinite loop inside the "forever" block.
 - ▶ Check if the joystick's X-axis value is greater than or equal to 60. If true:
 - Check if the variable "servo1_degree" is less than 180. If true:
 - Increase the value of "servo1_degree" by 1.
 - Set the angle of servo-1 to the value of "servo1_degree".
 - ▶ Check if the joystick's X-axis value is less than or equal to -60. If true:
 - Check if the variable "servo1_degree" is greater than 0. If true:
 - Decrease the value of "servo1_degree" by 1.
 - Set the angle of servo-1 to the value of "servo1_degree".
 - ▶ Check if the joystick's Y-axis value is greater than or equal to 60. If true:
 - Check if the variable "servo2_degree" is less than 180. If true:
 - Increase the value of "servo2_degree" by 1.
 - Set the angle of servo-2 to the value of "servo2_degree".
 - ▶ Check if the joystick's Y-axis value is less than or equal to -60. If true:
 - Check if the variable "servo2_degree" is greater than 0. If true:
 - Decrease the value of "servo2_degree" by 1.
 - Set the angle of servo-2 to the value of "servo2_degree".
 - ▶ Check if button A is pressed. If true:
 - Check if the variable "servo3_degree" is less than 180. If true:
 - Increase the value of "servo3_degree" by 1.
 - Set the angle of servo-3 to the value of "servo3_degree".
 - ▶ Check if button B is pressed. If true:
 - Check if the variable "servo3_degree" is greater than 5. If true:
 - Decrease the value of "servo3_degree" by 1.
 - Set the angle of servo-3 to the value of "servo3_degree".
 - ▶ Check if button C is pressed. If true:
 - Check if the variable "servo4_degree" is greater than 0. If true:
 - Decrease the value of "servo4_degree" by 1.
 - Set the angle of servo-4 to the value of "servo4_degree".
 - ▶ Check if button D is pressed. If true:
 - Check if the variable "servo4_degree" is less than 120. If true:
 - Increase the value of "servo4_degree" by 1.
 - Set the angle of servo-4 to the value of "servo4_degree".
 - ▶ Delay for 10 milliseconds.
 - ▶ Continuously check in the background whether the micro:bit's logo is touched.
If true:
 - Activate the vibration motor.
 - Delay for 200 milliseconds.
 - Deactivate the vibration motor.
 - ▶ Execute a "while" infinite loop in the background to read and display the

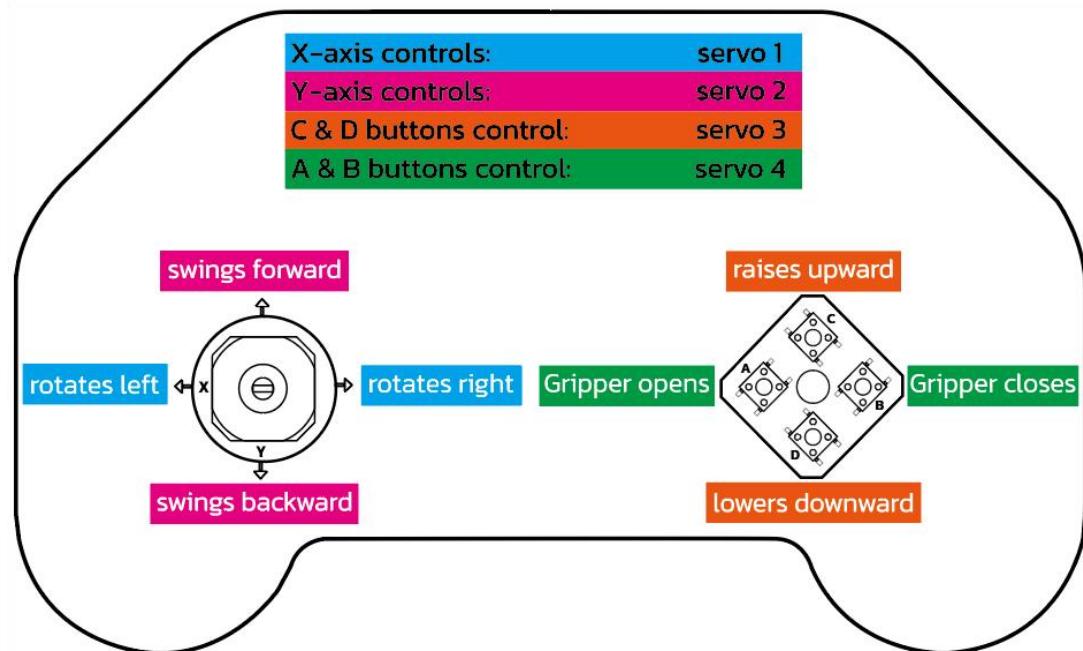
SIYEENOVE

battery level:

- Check if the variable "display_bat_volt" is equal to 1. If true:
- Read the battery level and display it on the LED matrix.
- Delay for 20000 milliseconds.

Result:

- After powering on, the Micro:bit's LED matrix will continuously cycle through displaying the battery level (0%-100%). When the battery level drops below 30%, replace all batteries immediately. The display updates every 20 seconds.
- You can control the robotic arm's movement using the joystick and four buttons.
- Pressing the touch logo on the micro:bit will activate the vibration motor on the controller.



5.QA

7.1 Micro:bit Code Upload Failure

- 👉 Verify USB cable supports data transmission (charge-only cables will not work)
- 👉 Inspect USB cable and ports for physical damage or connectivity issues

7.2 Robotic Arm doesn't work

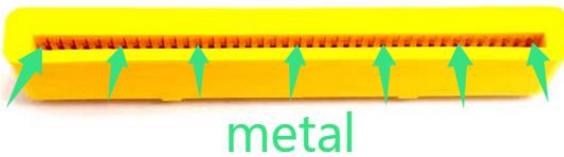
- 👉 Confirm 4×AA batteries are properly installed and power switch is in ON position
- 👉 Check battery voltage levels (recommended minimum: 5.5V)
- 👉 Verify servo initialization sequence was completed per tutorial guidelines

7.3 Abnormal Micro:bit Drive Presentation

- 👉 Drive labeled "MAINTENANCE" (instead of "MICROBIT") indicates accidental entry to firmware recovery mode. Resolution:
 - Reflash firmware using official tool: <https://microbit.org/get-started/user-guide/firmware/>
 - Prevent recurrence by avoiding reset button depression during power cycling

7.4 Buttons or Joystick Not Responding

- 👉 Ensure the Micro:bit is fully inserted into the mJoystick slot.
- 👉 Ensure the edge connector of the Micro:bit is clean.
- 👉 Ensure the mJoystick slot is clean



7.5 Errors When Using Micro:bit V1

👉 If errors occur when using the example code "microbit-6-6-mArm.hex" from Chapter 6.6 with Micro:bit V1, this is because the code uses the "on logo pressed" block, which is only available on Micro:bit V2. Micro:bit V1 does not have logo touch functionality, causing the error. Simply delete the "on logo pressed" block, regenerate the ".hex" file, and upload it to the Micro:bit V1 board.

7.6 Other Issues

- 👉 Please check if the assembly is correct.
- 👉 Please check if the batteries used meet the specifications.

6. Contact Us

If you couldn't find a solution above, please contact our support team.

To help us assist you quickly, please have the following information ready:

- Your order number.
- Product model (e.g., Robot Arm Kit M1R0000) and software version (e.g., MakeCode v3.0.XX).
- A detailed description of the issue or your question.
- Steps you have already tried.
- Any relevant error message screenshots, photos, or code snippets.

Other Inquiries?

We value your input and are always looking to improve. Please feel free to reach out for:

- Tutorial Errors & Feedback: Help us make our documentation better.
- Product Ideas & Suggestions: We'd love to hear your great ideas.
- Partnerships & Collaboration: Interested in working together? Let's talk.
- Discounts & Promotions: Inquire about educational or bulk pricing.
- Anything Else: For all other non-technical questions.

Support Channels

✉️ support@siyeeenove.com

🌐 <http://siyeeenove.com>