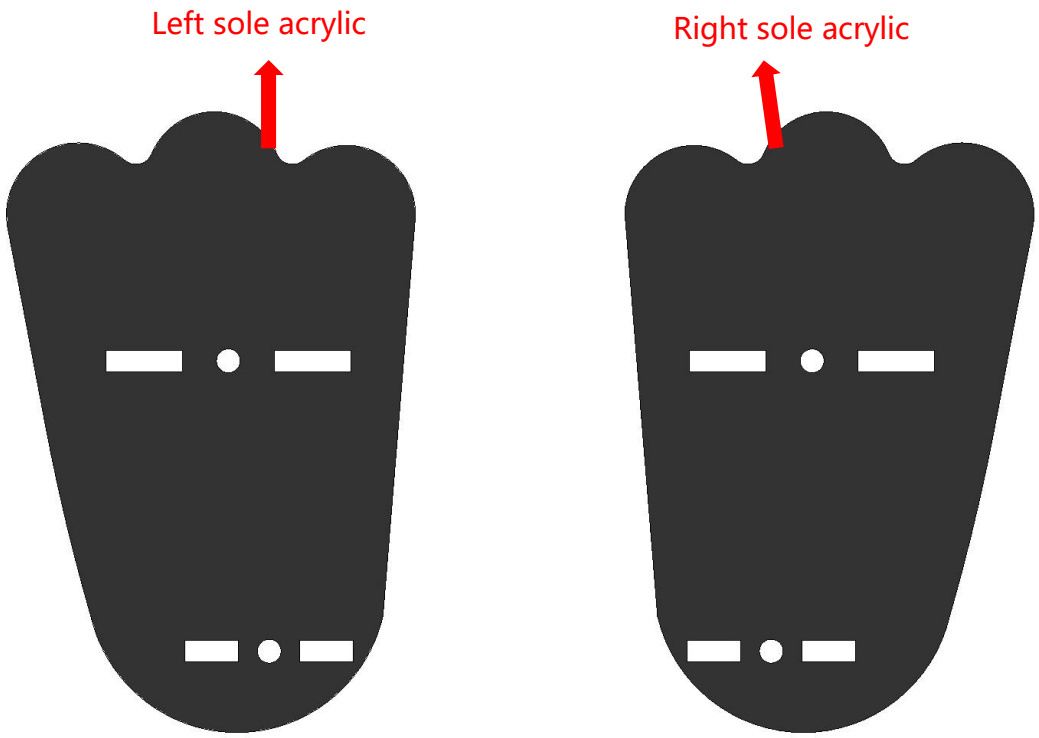
Step 1 Distinguish between the left and right soles of a biped robot in acrylic

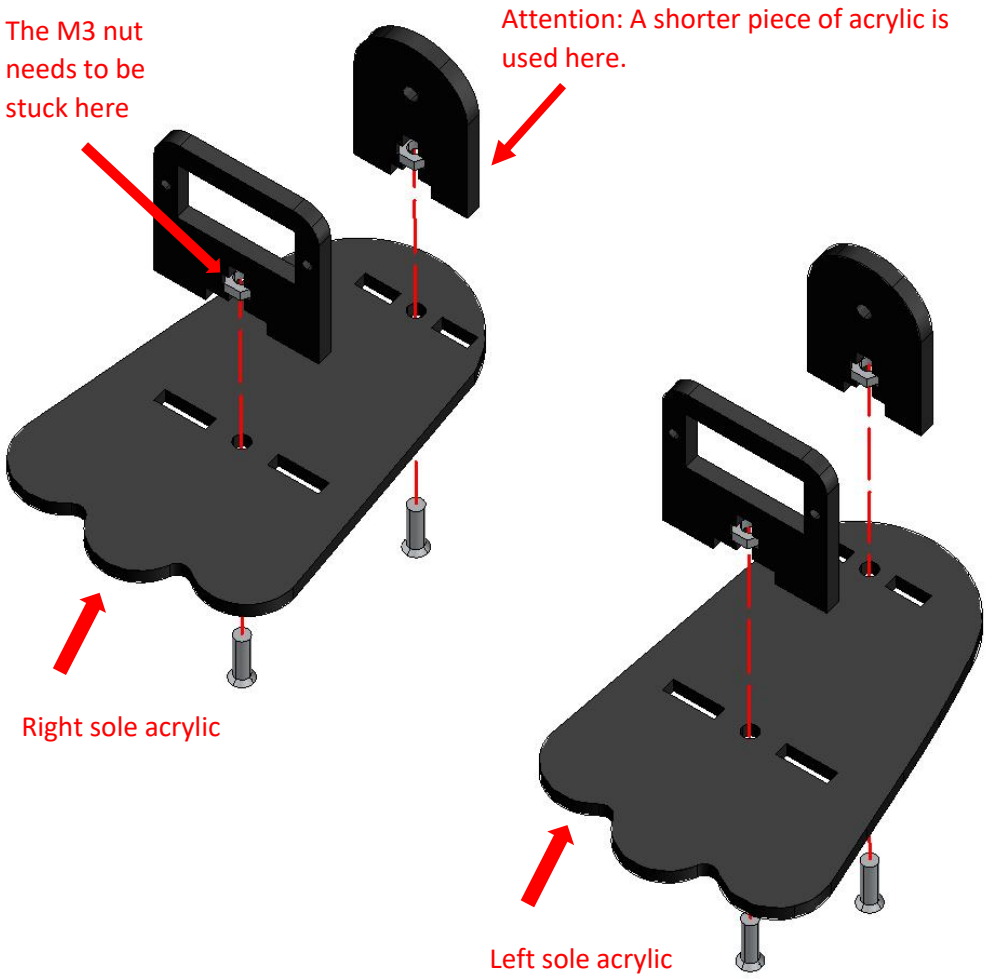


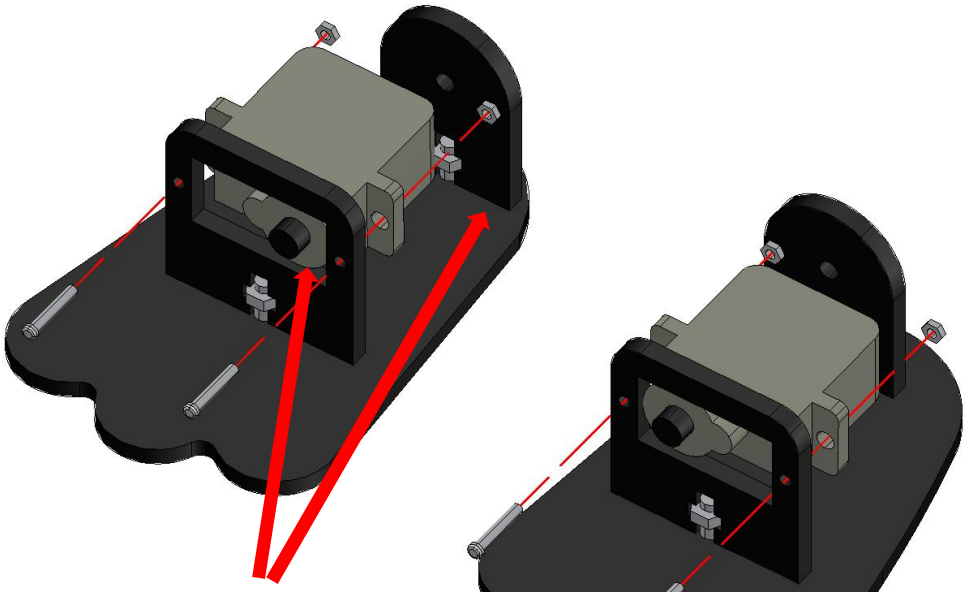
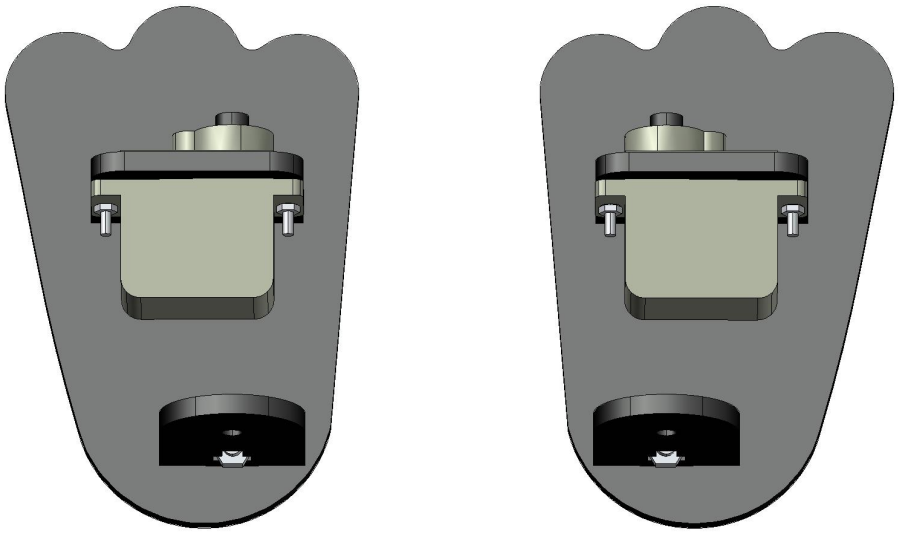
Attention:

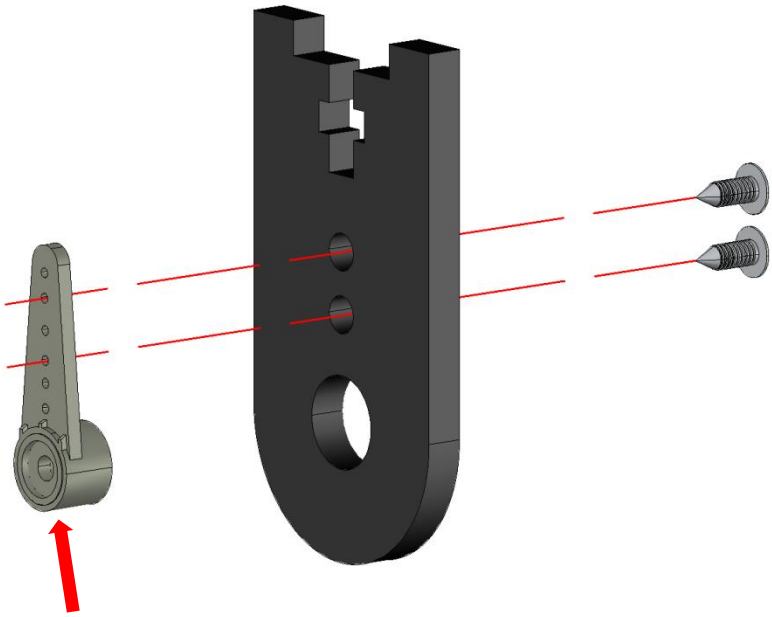
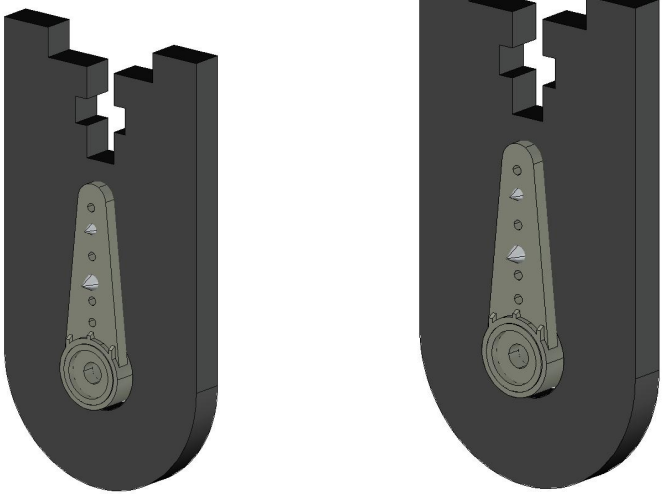
1.To distinguish between the left and right soles of the robot, observe the direction of the holes in the heel. From the perspective shown in the above image, if the hole in the heel is tilted towards the right side, it is the left sole. If it is tilted towards the left side, it is the right sole.

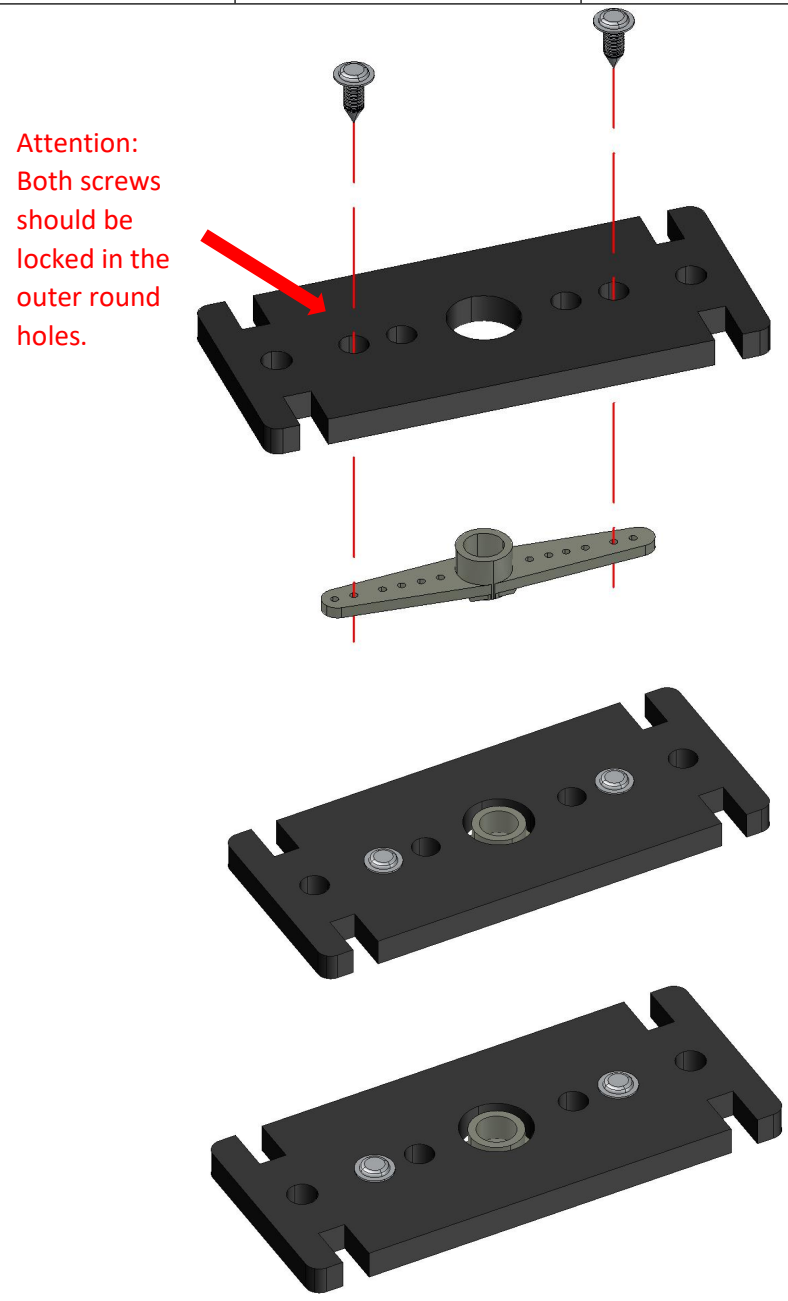
2.During assembly, make sure that the holes in the heels of both left and right soles are positioned closer to the inner side.

3. Remove the protective film from the acrylic plate during assembly.

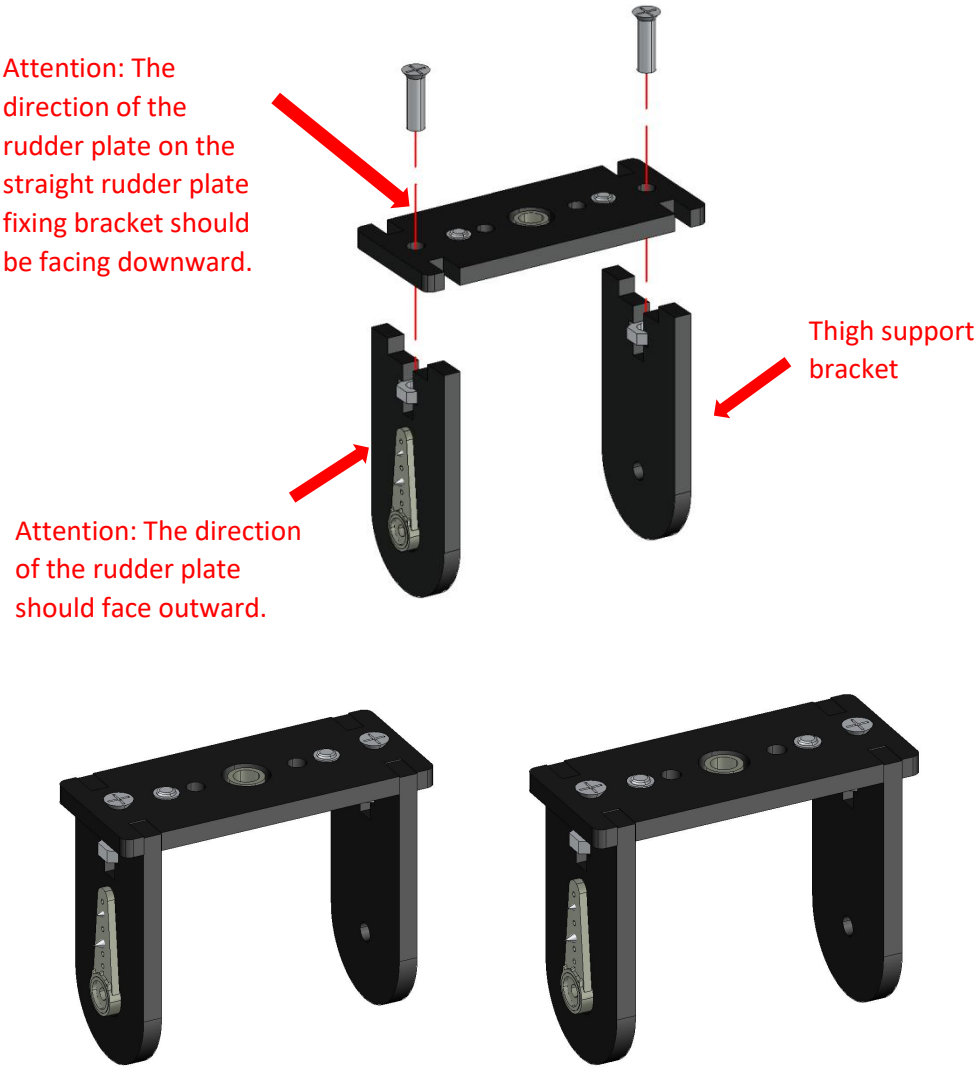
<table>
<tr><th colspan="4">Step 2 Install the robot's left and right sole structures</th></tr>
<tr><td rowspan="2">Parts list</td><td>Left sole acrylic*1</td><td>Right sole acrylic*1</td><td>Calf servo fixing plate*2</td></tr>
<tr><td>Acrylic sole support*2</td><td>M3 nut*4</td><td>M3*10mm Flat head screw*4</td></tr>
<tr><td>Splicing diagram</td><td colspan="3"> 
</td></tr>
<tr><td>Notes</td><td colspan="3">The sole acrylic support frame is somewhat similar in appearance to the thigh support frame that will be used later, but the sole acrylic support frame is shorter, so don't confuse them when using them.</td></tr>
</table>

<table>
<tr><th colspan="4">Step 3 Install the robot's left and right calf servos</th></tr>
<tr><td rowspan="2">Parts list</td><td>Assembled left sole structure</td><td>Assembled right sole structure</td><td>Servo*2</td></tr>
<tr><td>M2*10mm round head screw*4</td><td>M2 nut*4</td><td></td></tr>
<tr><td>Splicing diagram</td><td colspan="3"> 
Attention: The installation direction of the left and right servo shafts and the orientation of the heel holes should be consistent.
 </td></tr>
</table>

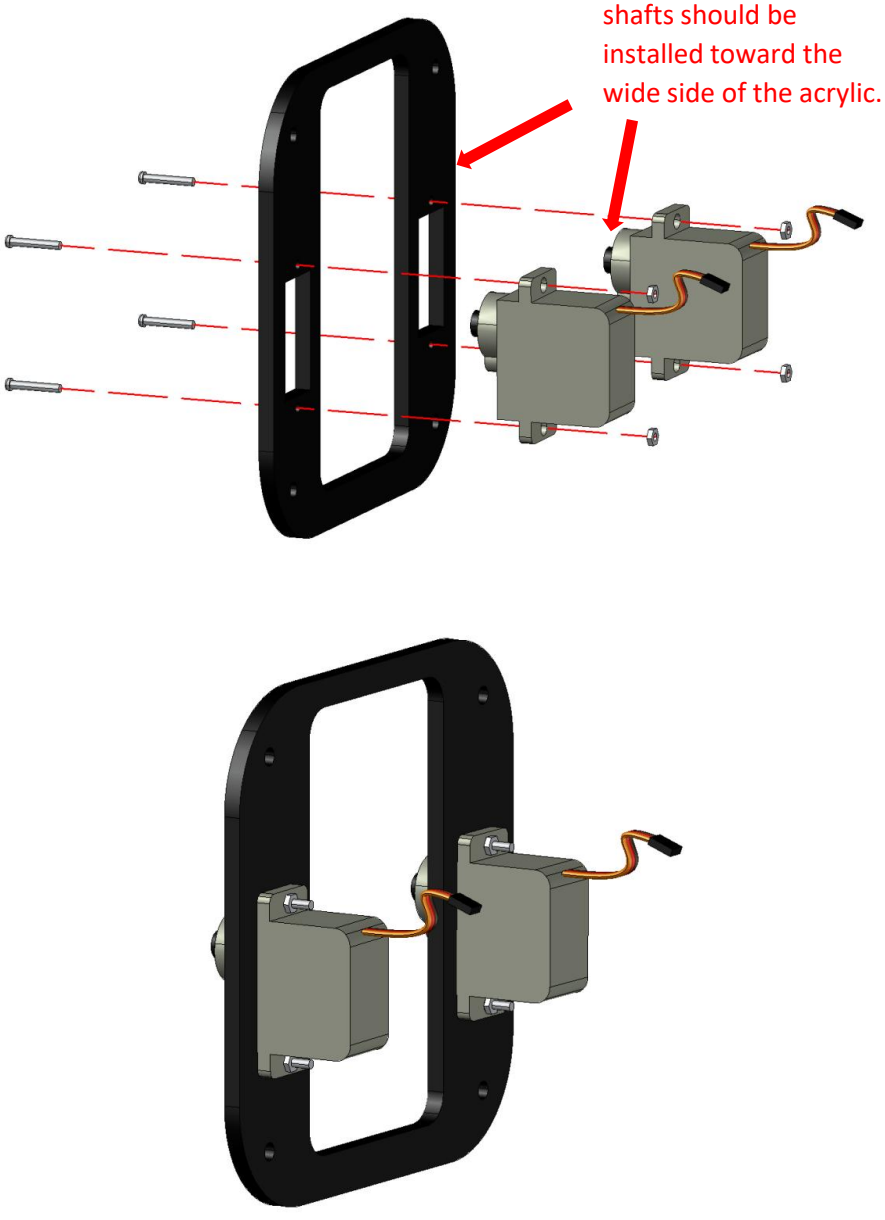
Step 4 Installing a half-slotted rudder			
Parts list	Half one-word steering wheel*2	Half-character Rudder Plate Fixing Bracket*2	M1.7*6mm Round Head Self-Tapping Screws * 4
Splicing diagram	 Attention: The raised part of the rudder plate should face the round hole. 		
Notes	Two of these structures need to be installed.		

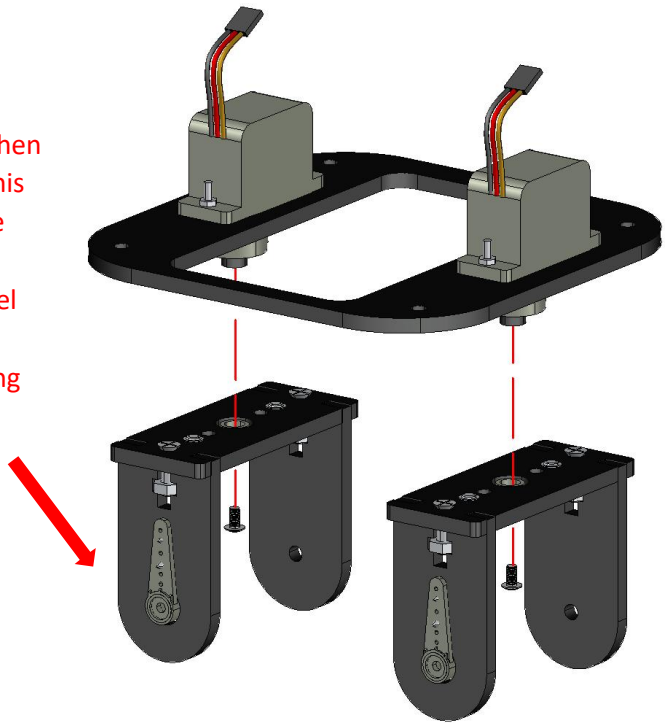
Step 5 Install the straight rudder plate			
Parts list	Straight steering wheel*2	Straight steering wheel fixing plate*2	M1.7*6mm round head self-tapping screw*4
Splicing diagram			
Notes	This structure requires two pieces to be installed.		

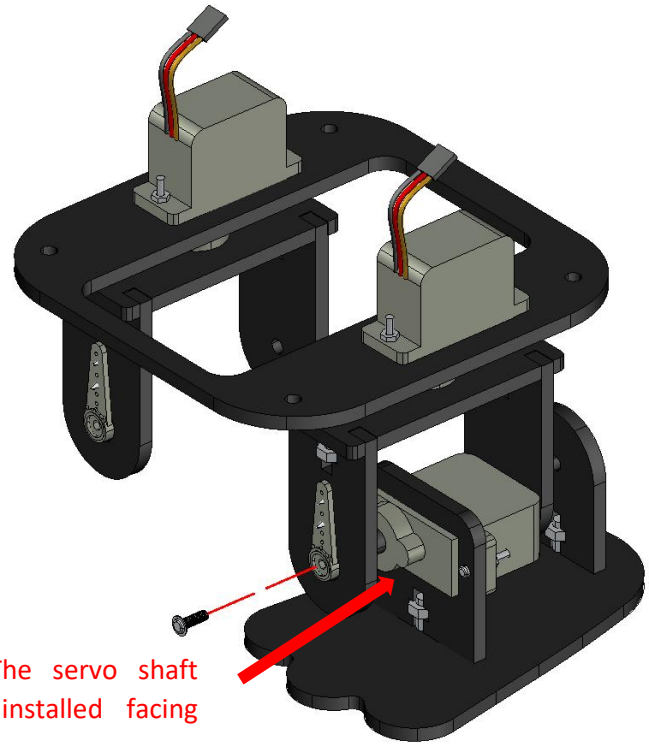
Step 6 Install the support structures for the robot's left and right thighs

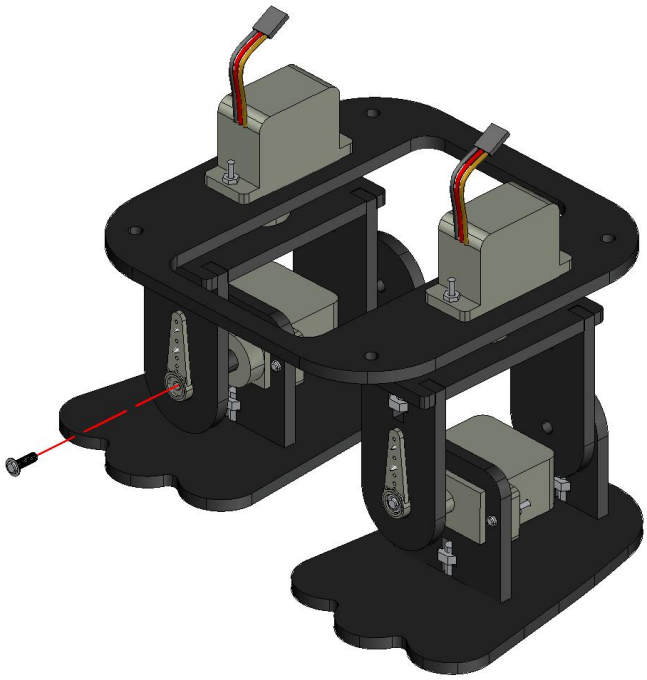
Parts list	Assemble straight rudder plate fixing bracket*2	Assemble half-character rudder plate fixing bracket*2	Thigh support brackets * 2
	M3*10mm Flat head screws * 4	M3 Nut*4	
Splicing diagram			
Notes	This structure requires two pieces to be installed.		

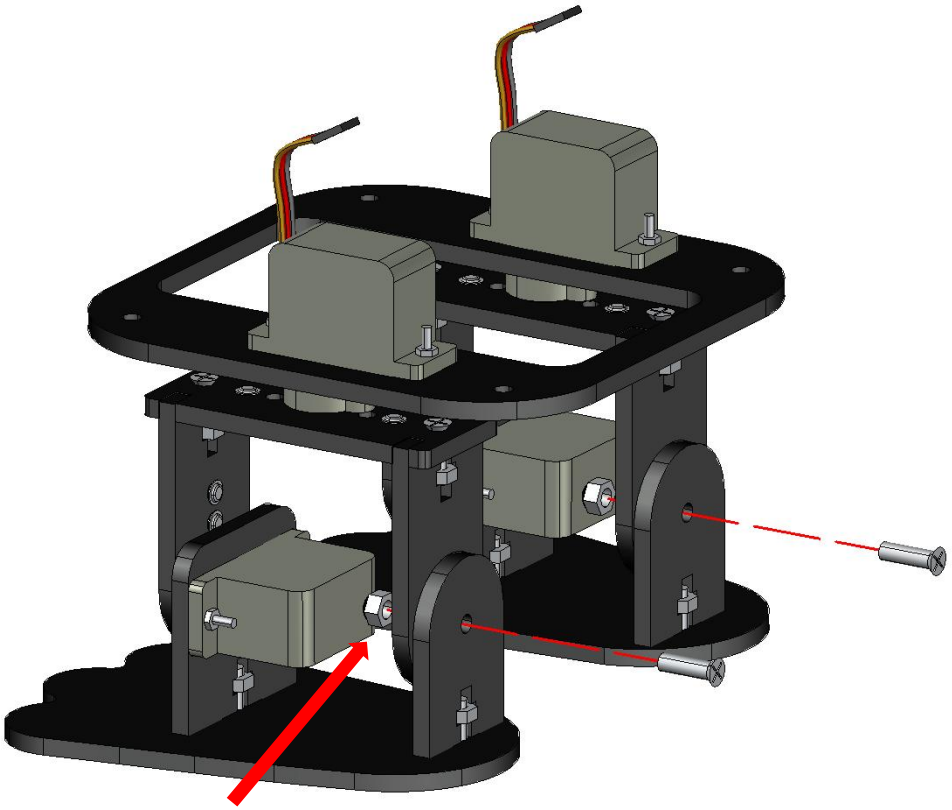
Step 7 Fixed robot thigh servo

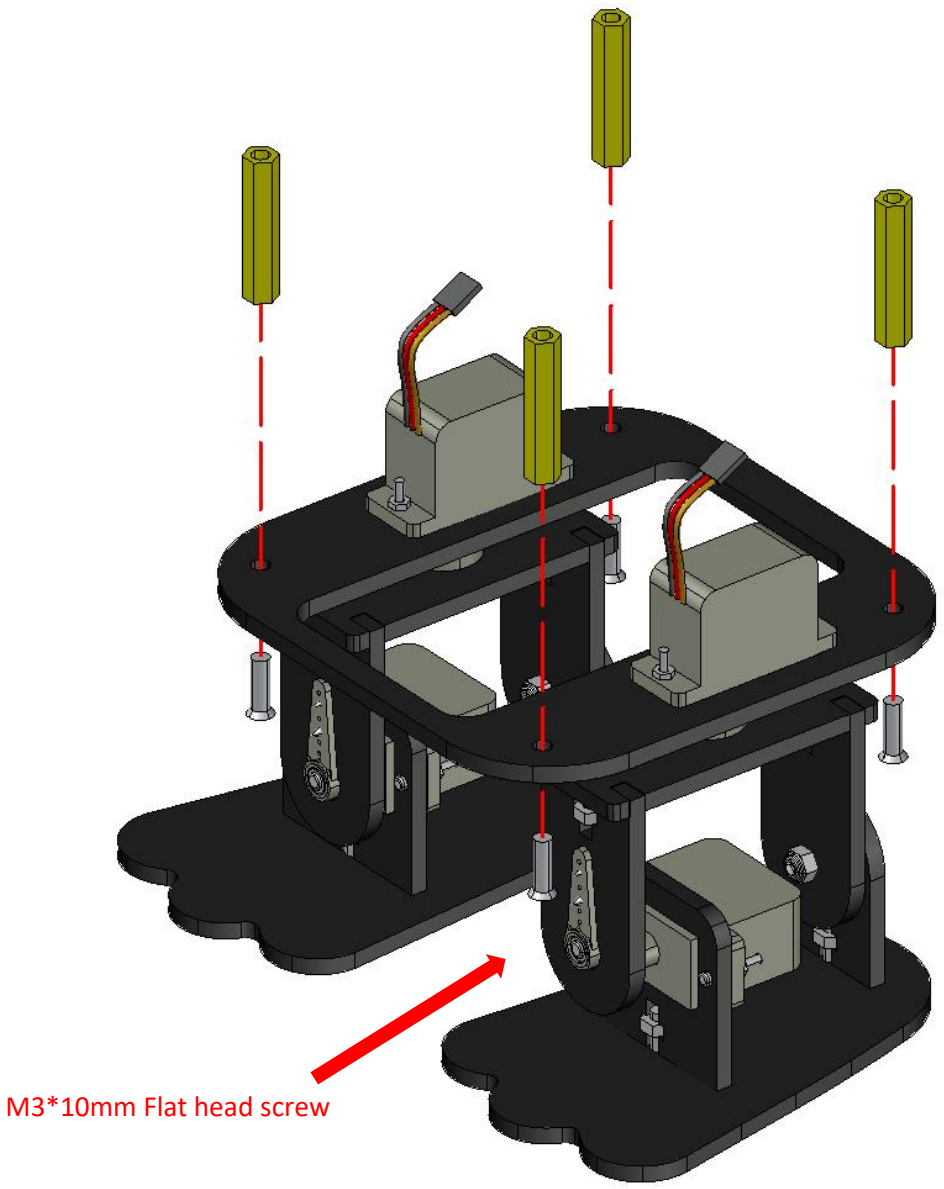
Parts list	Servo*2	Thigh servo fixing plate*1	M2*10mm round head screw*4
	M2 Nut*4		
Splicing diagram			

<table>
<tr><th colspan="4">Step 8 Installing the robot's thigh structure</th></tr>
<tr><td>Parts list</td><td>Assembled thigh servo</td><td>Assembled thigh support</td><td>M2.5*4mm round head screw*2</td></tr>
<tr><td>Splicing diagram</td><td colspan="3">Attention: When assembling this structure, the side with the steering wheel needs to be installed facing forward.
  </td></tr>
<tr><td>Notes</td><td colspan="3">1.Please make sure that the servo has completed the initialization angle before installing this step;
2.When fixing the thigh servo, you can connect the two thigh servos of the robot to the Controller board, the left thigh servo to GPIO5, and the right thigh servo to GPIO18. After the servo is powered on, fix the thigh support frame to ensure that the servo shaft is assembled at a 90-degree angle. It is forbidden to swing the servo vigorously after powering on.</td></tr>
</table>

<table>
<tr><td colspan="4">Step 9 Install the robot's left leg</td></tr>
<tr><td>Parts list</td><td>Assembled robot thigh structure</td><td>Assembled left calf structure</td><td>M2.5*4mm round head screw*1</td></tr>
<tr><td>Splicing diagram</td><td colspan="3"> 
Attention: The servo shaft should be installed facing inwards.</td></tr>
<tr><td>Notes</td><td colspan="3">1.Please make sure that the servo has completed the initialization angle before installing this step;
2.When fixing the calf servo on the left side of the robot, you can connect the calf servo of the robot to the Controller board, and connect the left calf to GPIO16. After the servo is powered on, fix the half-slot rudder to ensure that the servo shaft is assembled at a 90-degree angle. It is forbidden to swing the servo vigorously after powering on.</td></tr>
</table>

Step 10 Install the robot's right leg			
Parts list	Assembled robot thigh structure	Assembled right calf structure	M2.5*4mm round head screw*1
Splicing diagram			
Notes	1.Please make sure that the servo has completed the initialization angle before installing this step; 2.When fixing the calf servo on the right side of the robot, you can connect the calf servo of the robot to the Controller board, and connect the left calf to GPIO17. Fix it after the servo is powered on to ensure that the servo shaft is assembled at a 90-degree angle. It is forbidden to swing the servo vigorously after powering on.		

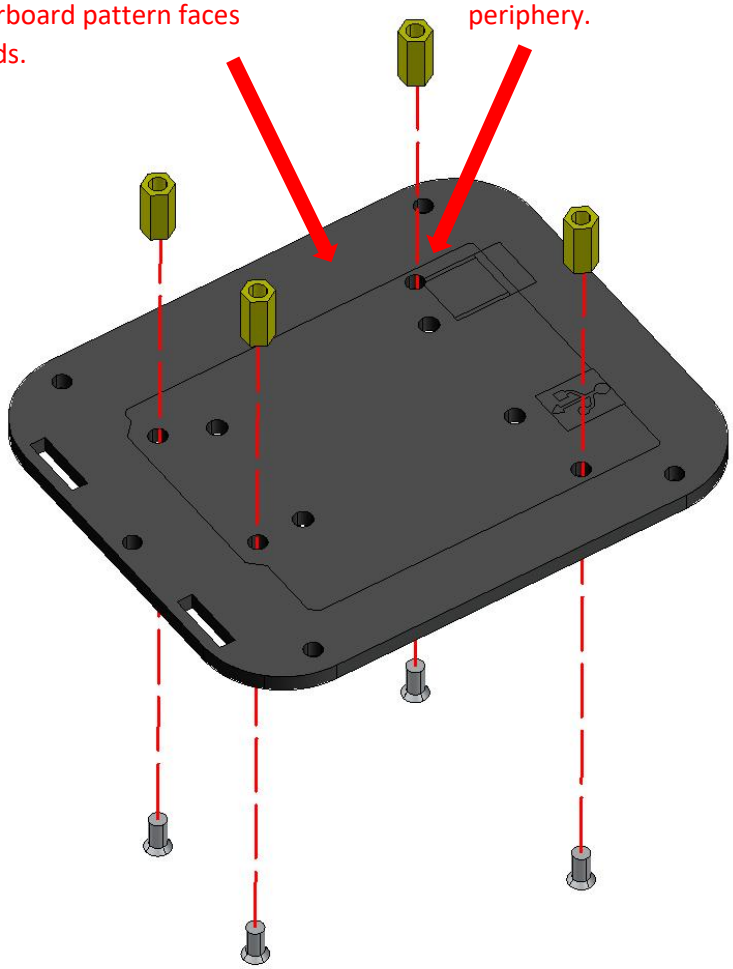
Step 11 Install the leg screws			
Parts list	M3*10mm Flat head screw*2	M3 Nickel-Plated Lock Nut*2	
Splicing diagram	 M3 Nickel-Plated Lock Nut		
Notes	The M3 Nickel-Plated Lock Nut can be fixed with a "7-shaped" wrench, but it does not need to be tightened too much, just enough to ensure that the calf structure can rotate freely.		

Step 12 Installing double-pass copper pillars			
Parts list	M3*10mm Flat head screw*4	M3*25mm double-pass nut*4	
Splicing diagram			

Step 13 Install ESP32 Controller board (1)

Parts list	Controller board fixed acrylic plate * 1	M3*10mm double-pass copper column*4	M3*6mm Flat head screw*4

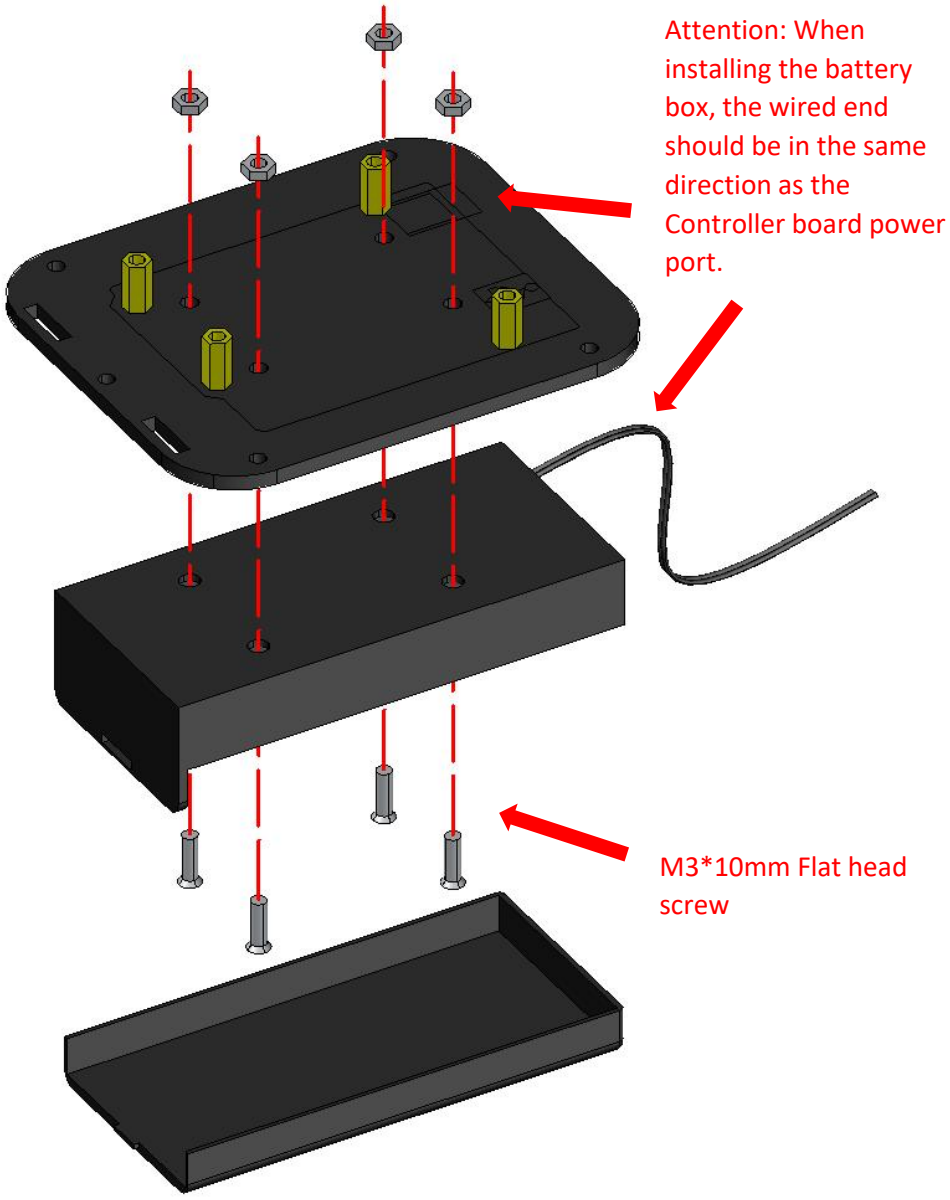
Splicing diagram

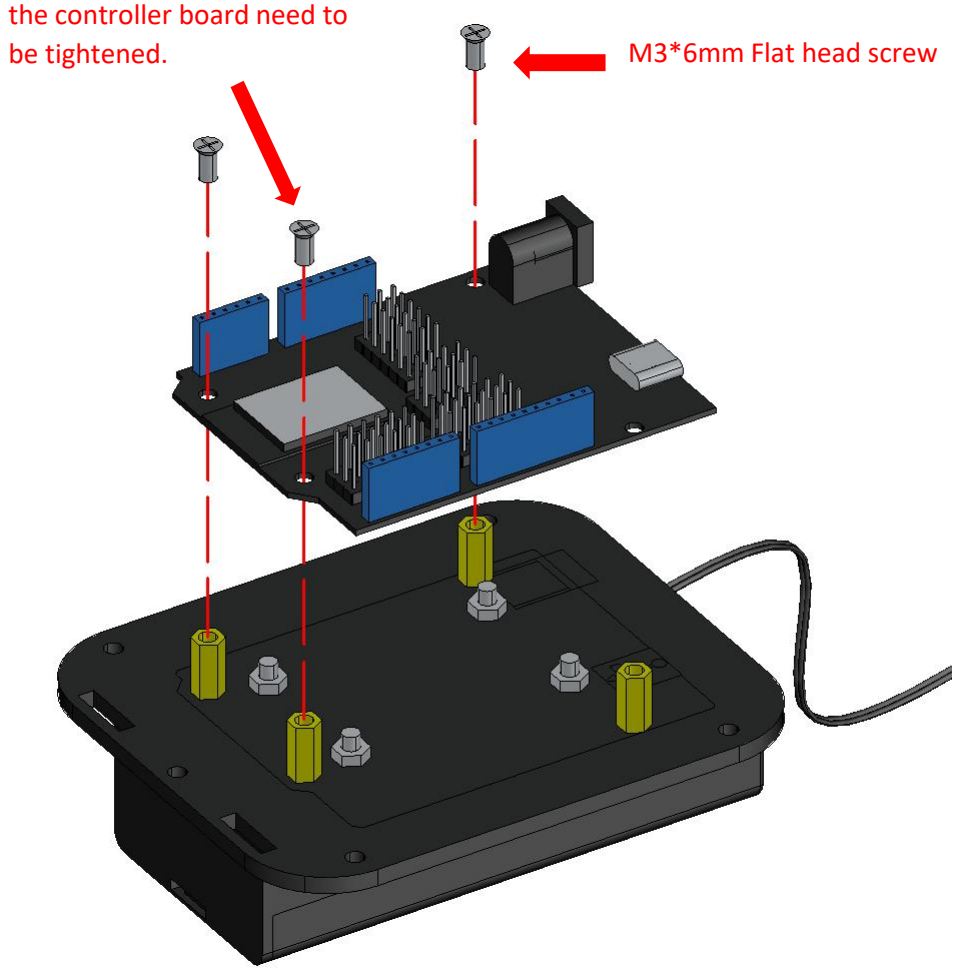


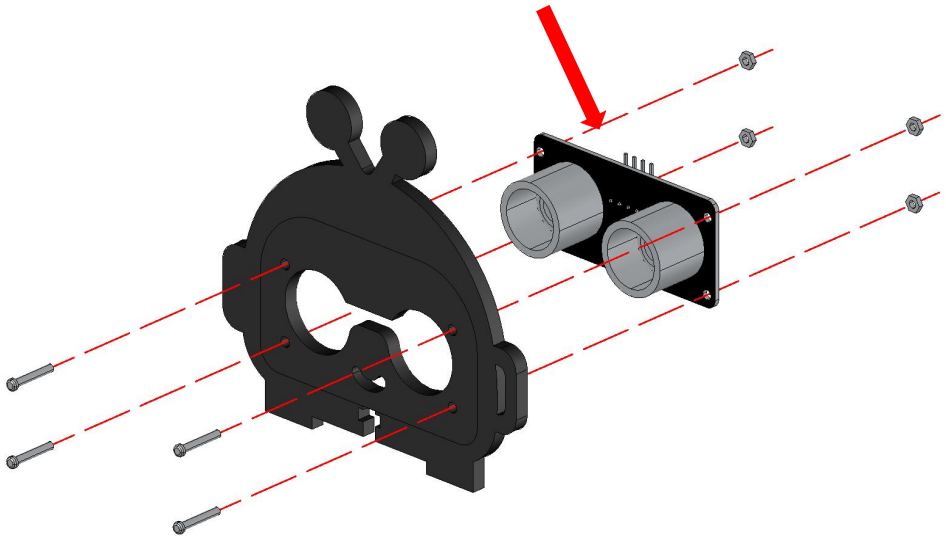
Step 14 Install ESP32 Controller board (2)

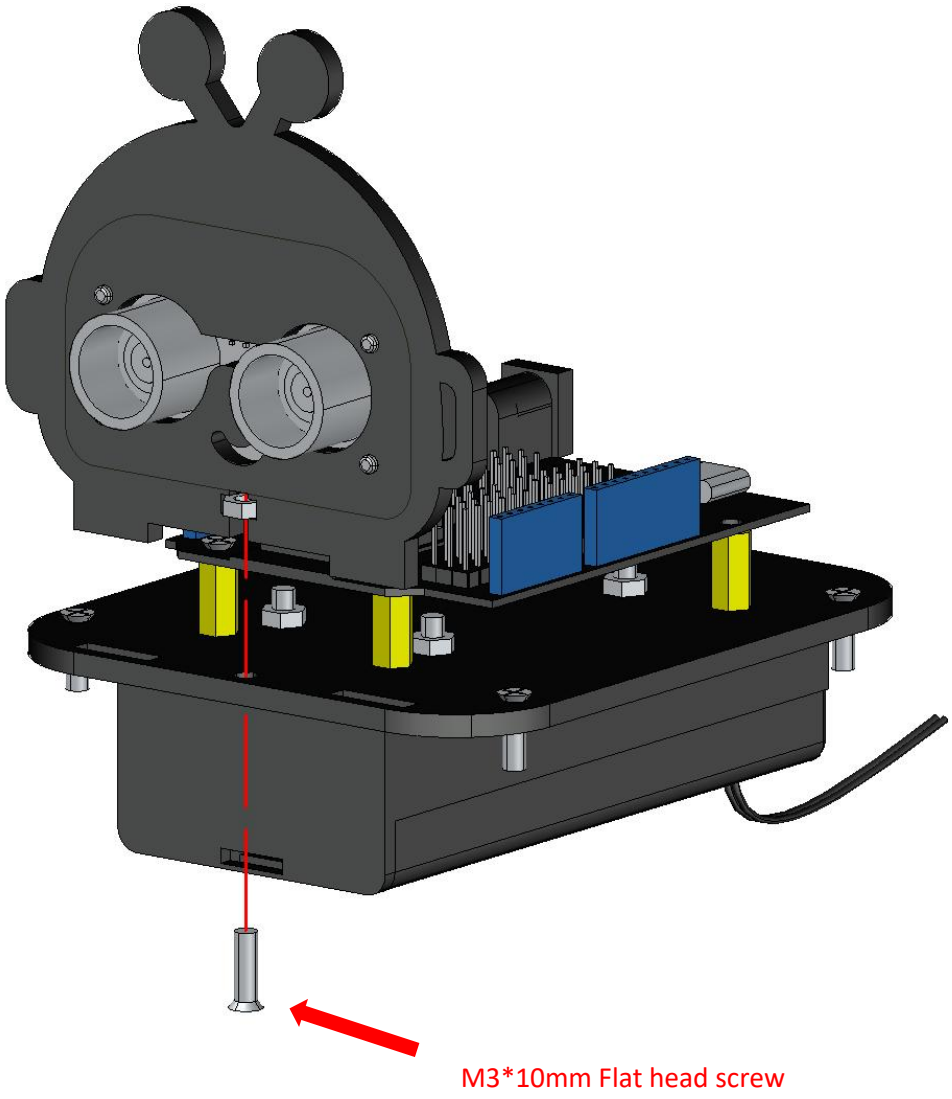
Parts list	M3*10mm Flat head screw*4	M3 Nut*4	Battery Box*1

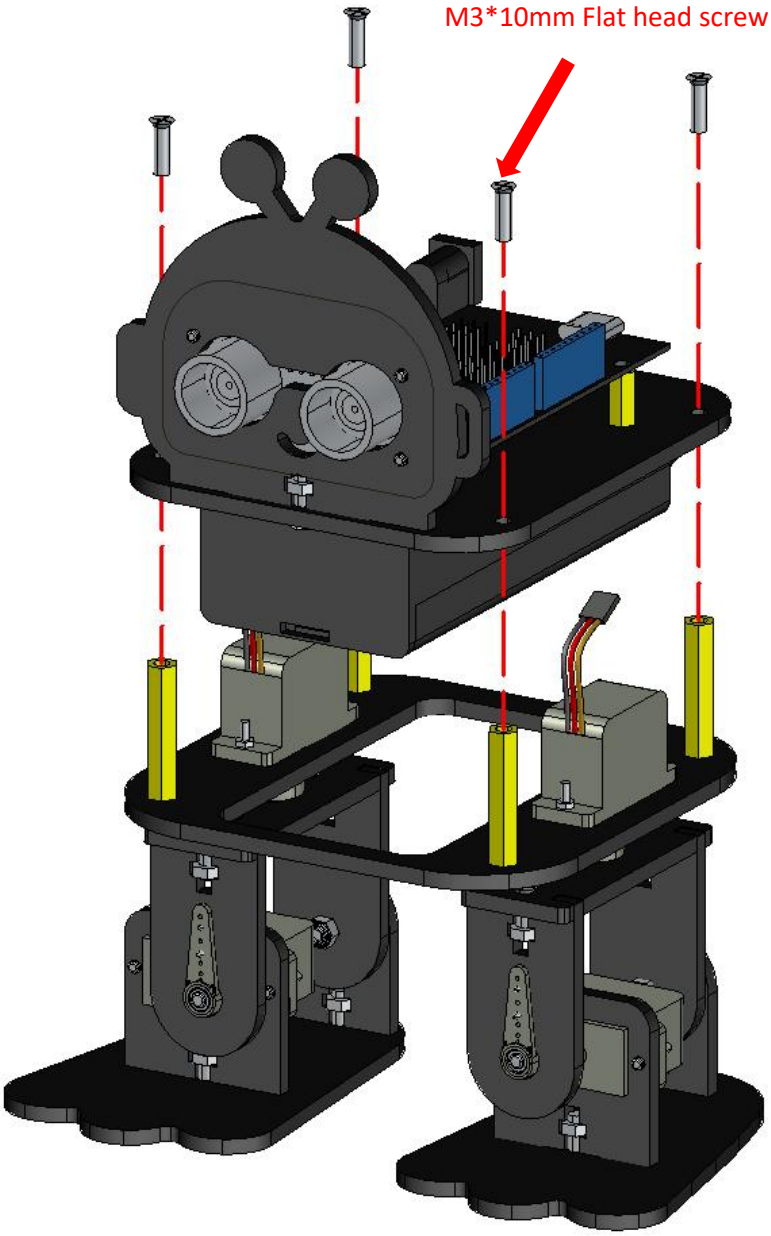
Splicing diagram

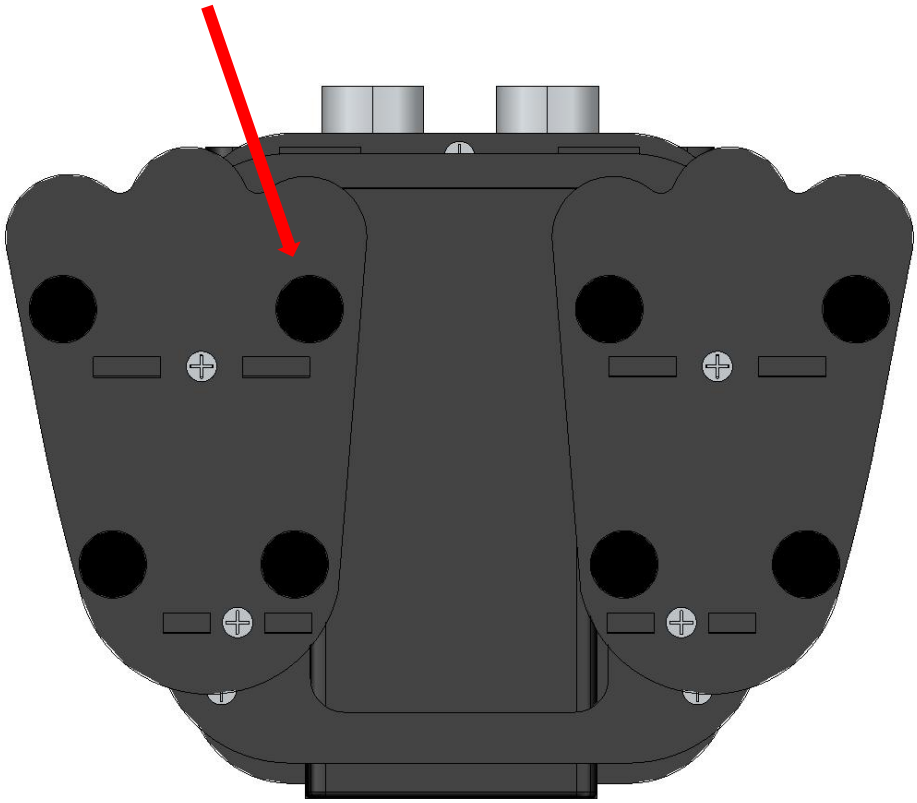


Step 15 Install ESP32 Controller board (3)			
Parts list	esp32 controller board*1	M3*6mm Flat head screw*3	
Splicing diagram			

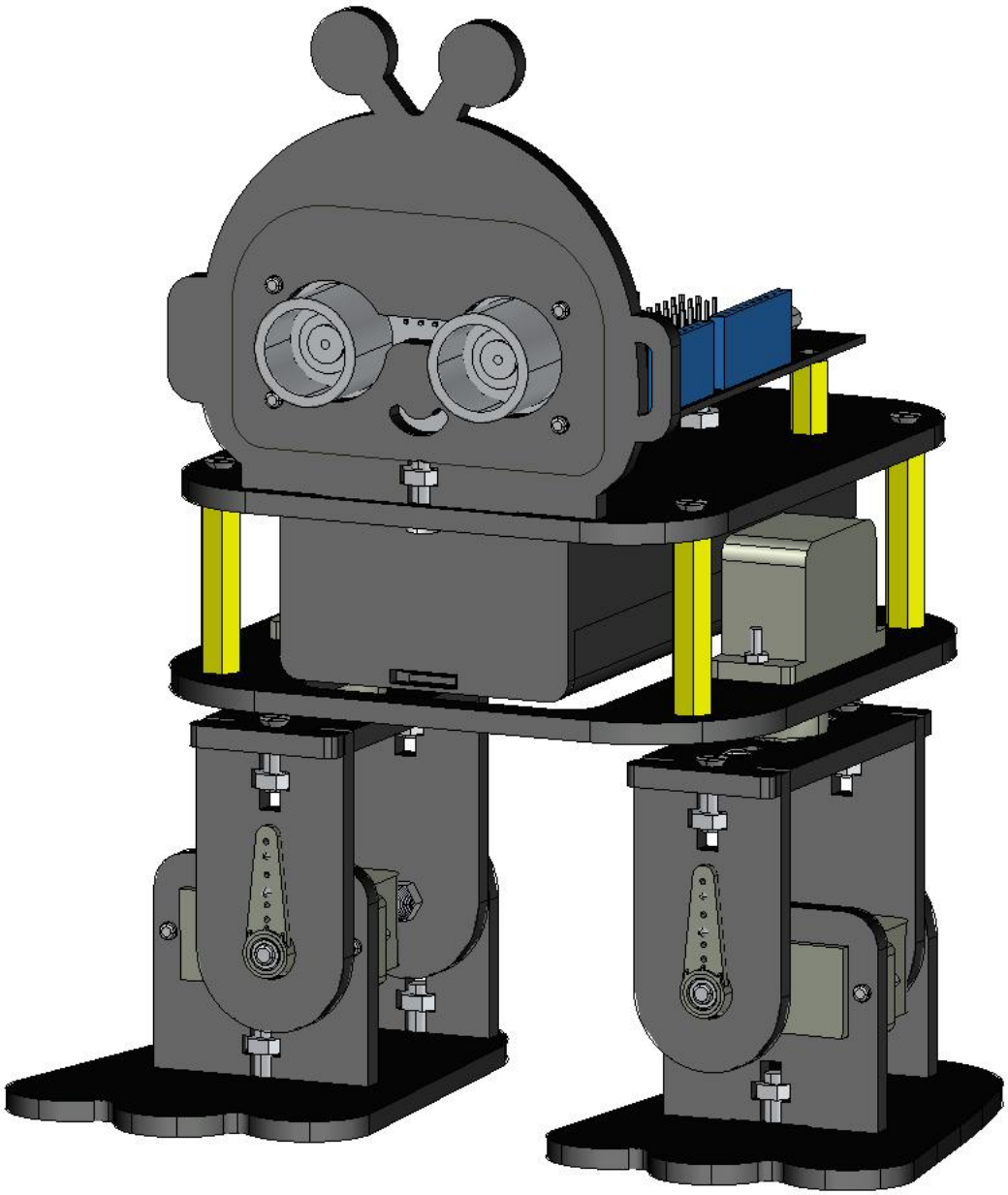
<table>
<tr><th colspan="4">Step 16 Install the ultrasonic sensor (1)</th></tr>
<tr><td rowspan="2">Parts list</td><td>Ultrasonic Sensor*1</td><td>Ultrasonic fixing plate*1</td><td>M2*10mm round head screw*4</td></tr>
<tr><td>M2 Nut*4</td><td></td><td></td></tr>
<tr><td>Splicing diagram</td><td colspan="3">Attention: When installing the ultrasonic sensor, the pin header should face upwards.
  </td></tr>
</table>

Step 17 Install the ultrasonic sensor (2)			
Parts list	Assembled ultrasonic fixing plate	Assembled ESP32 controller board fixing plate	M3*10mm Flat head screw*1
	M3 Nut*1		
Splicing diagram			

Step 18 Assemble the upper and lower body of the robot			
Parts list	Assembled robot upper body	The assembled robot lower body	M3*10mm Flat head screw*4
Splicing diagram			

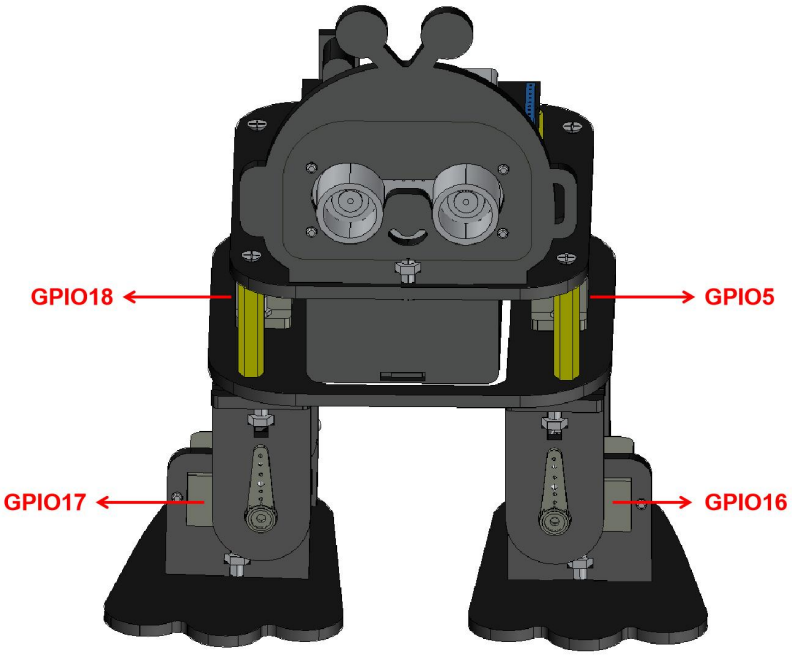
Step 19 Stick on spacer			
Parts list	Spacer*8		
Splicing diagram	Attention: Stick 4 spacers on each foot as shown. 		

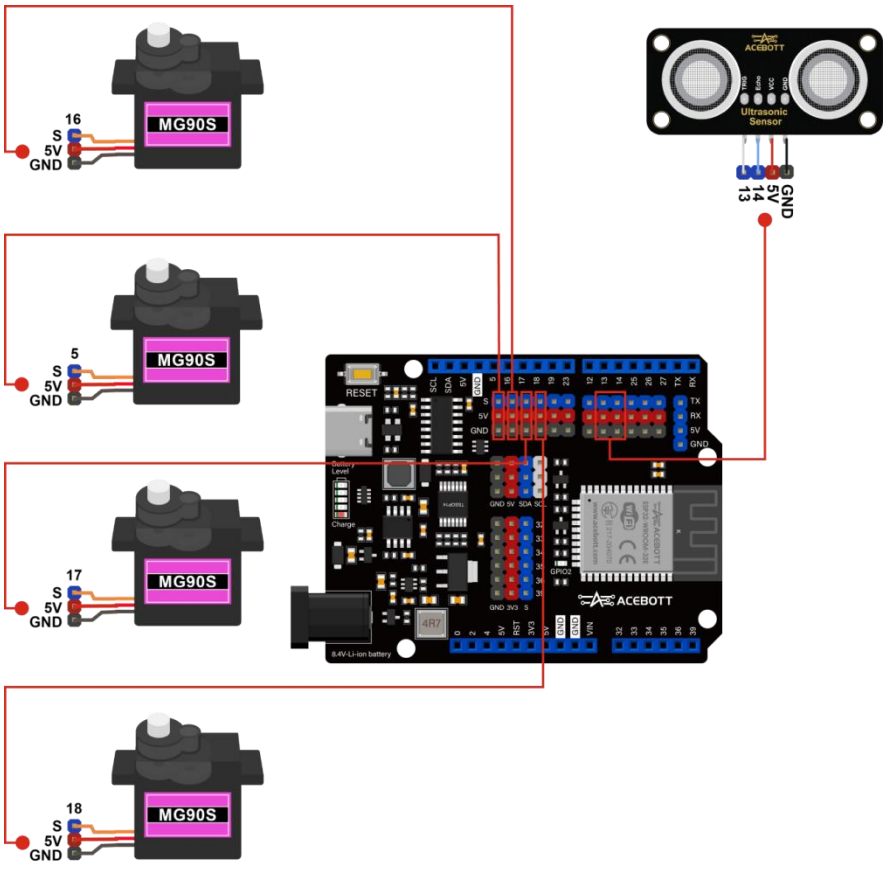
Step 20 Complete structure diagram



Step 20 Biped robot mask			
Parts list	Cartoon Mask*6		
Splicing diagram			
Notes	1.Align the eyes of the mask with the ultrasonic sensor of the bipedal robot and fix it on the robot. The kit also comes with a short piece of double-sided tape. If it is already fixed tightly, then there is no need to stick the double-sided tape; if the mask is very loose and easy to fall off, you can tear off the appropriate length and stick it on the mask, and then fix it on the bipedal robot; 2.Because it is difficult to tear off the double-sided tape on the mask, it affects the replacement of the mask again, so it is recommended not to stick the double-sided tape;		

Step 21 Wiring Diagram





1.The red wire of the servo wire is connected to the 5V pin of ESP32, the brown wire is connected to the GND pin, and the orange wire is connected to the S pin;

2.The white wire (TRIG) of the ultrasonic wave is connected to the GPIO13 pin of ESP32, the blue wire (ECHO) is connected to the GPIO14 pin of ESP32, the red wire (VCC) is connected to the 5V pin of ESP32, and the black wire (GND) is connected to the GND pin of ESP32;

3.The corresponding pins of the servos of the bipedal robot: left thigh servo--GPIO5, left calf servo--GPIO16, right thigh servo--GPIO18, right calf servo--GPIO17.

4.Please make sure to strictly follow the wiring instructions when connecting the module to the ESP32 controller board. Incorrect wiring may cause a short circuit and damage the ESP32 controller board.