



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

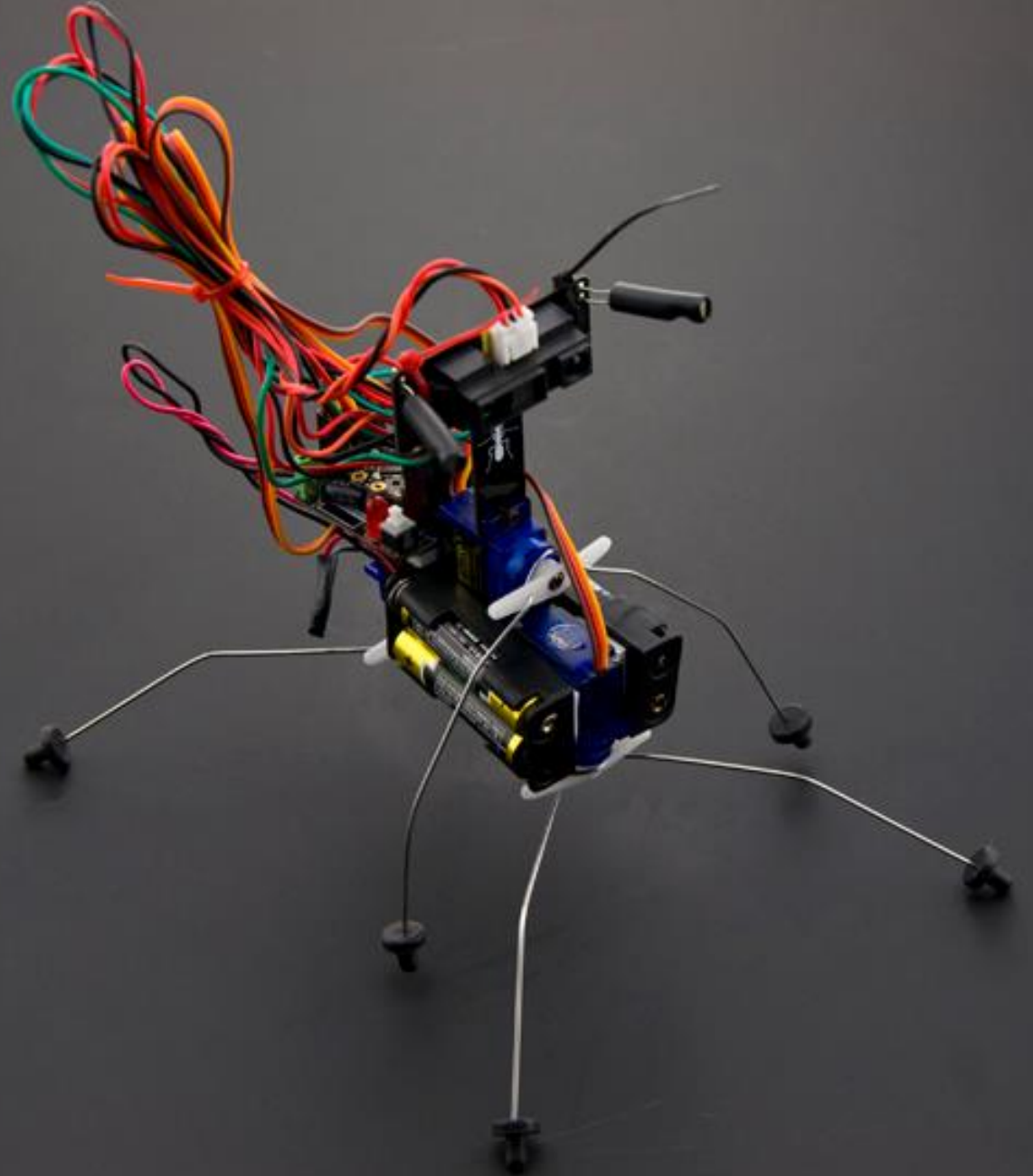




**DFROBOT**  
DRIVE THE FUTURE

How to build  
an Insectbot!

Once you pick up an Insectbot, you won't be  
able to put it down!





# Contents

## ➤ Tools Required

## ➤ Assembly Instructions

- [STEP 1 Insectbot Body](#)
- [STEP 2 Insectbot Legs](#)
- [STEP 3 Battery Holder](#)
- [STEP 4 Insectbot Eyes](#)
- [STEP 5 Insectbot Brain](#)
- [STEP 6 Hardware Connections](#)
- [STEP 7 Battery Installation](#)
- [STEP 8 Testing](#)
- [STEP 9 Heat Shrink](#)

## ➤ Ways to play with your Insectbot





# Tools Required

## Screwdriver

A screwdriver is used to tighten and loosen screws. It is an essential tool for making your Insectbot. You can get yourself a screwdriver kit with various types of fittings for making robots!



## Long-nose Pliers

Long nose pliers are used to bend and cut things. We use long nose pliers in this project to twist steel wire. They can also be used to cut steel wire.



## Scissors

Scissors are used to cut paper and other components.





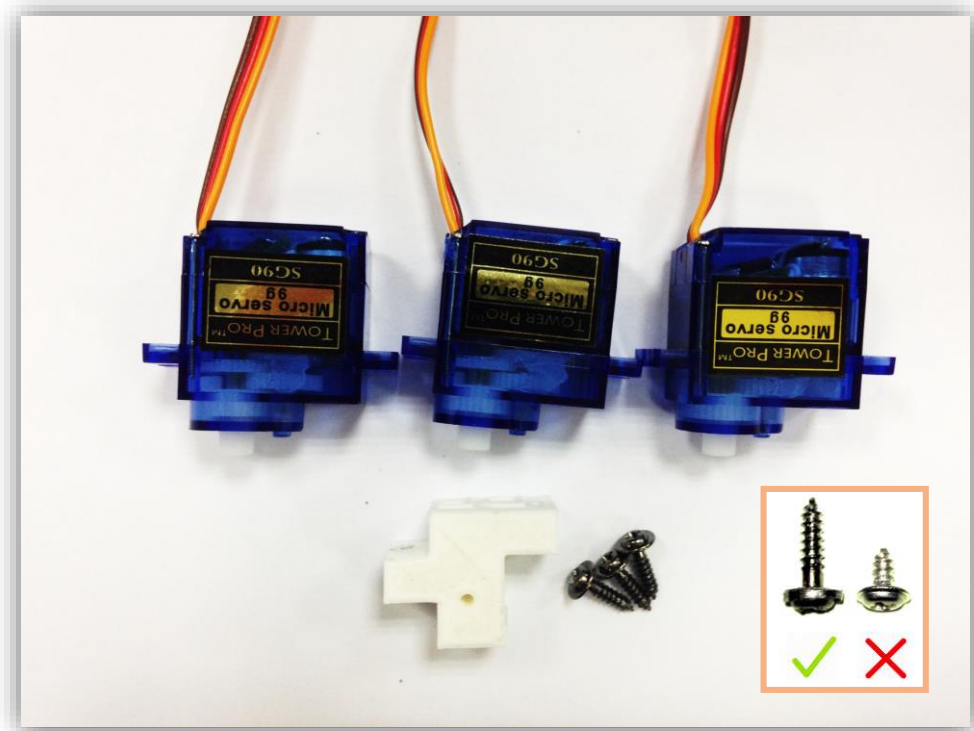
# Assembly Instructions

## STEP 1: Insectbot Body

You will need:

- 3 x 9G Micro servos
- 1 x Block
- 3 x Long Screws (included in the servo accessory bag)

**Note:** see diagram for correct screws



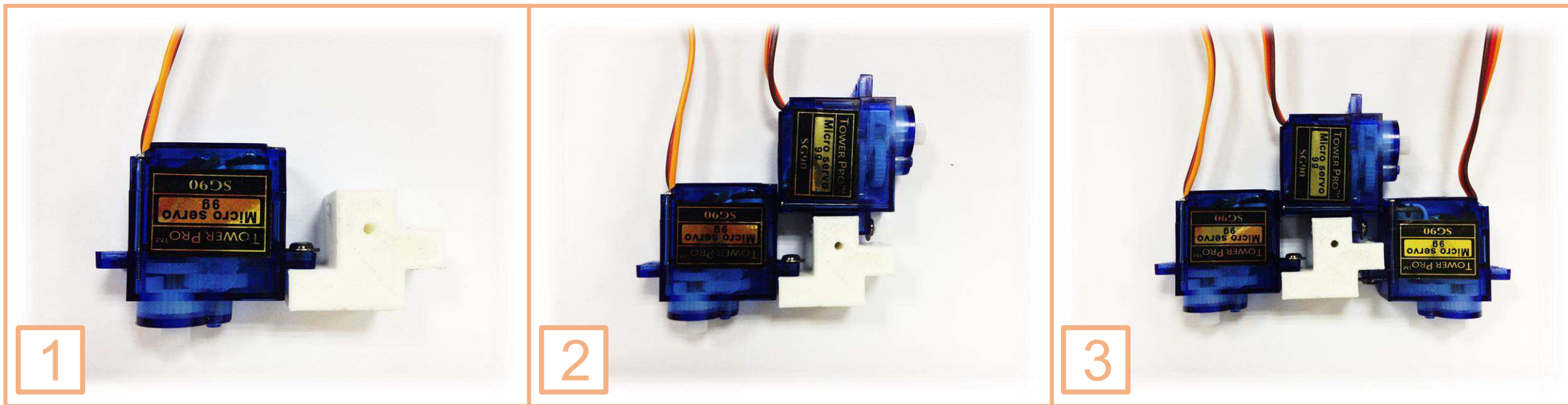


# Assembly Instructions

## STEP 1: Insectbot Body

Firmly attach the 3 micro servos to the block as pictured using long screws and a screwdriver. Pay careful attention to the direction that each micro servo faces

**Note: Make sure each micro servo is securely fastened to the block so that it can't move**

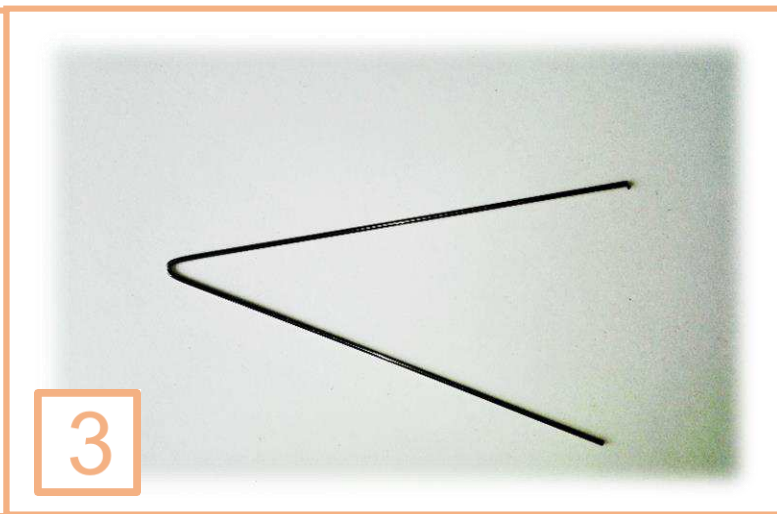
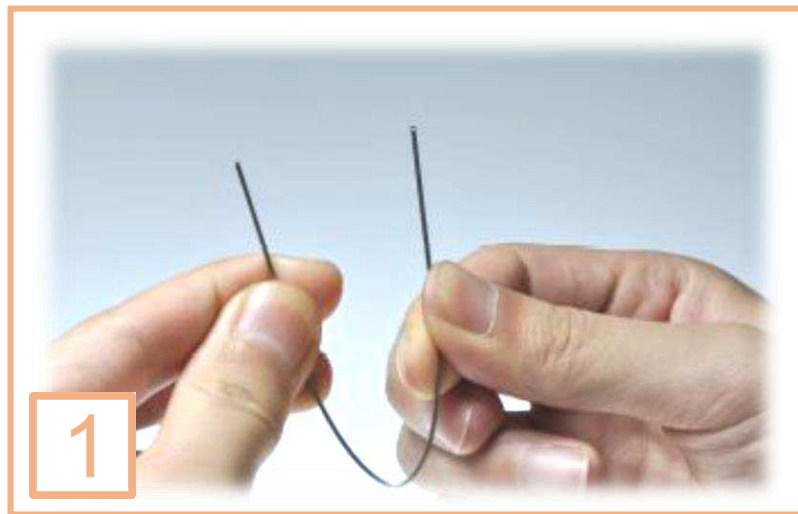




# Assembly Instructions

## STEP 2: Insectbot Legs

You will need steel wire. Find the midpoint of one piece of steel wire and then use the long-nose pliers to bend it in to a “v” shape, just like picture 3.



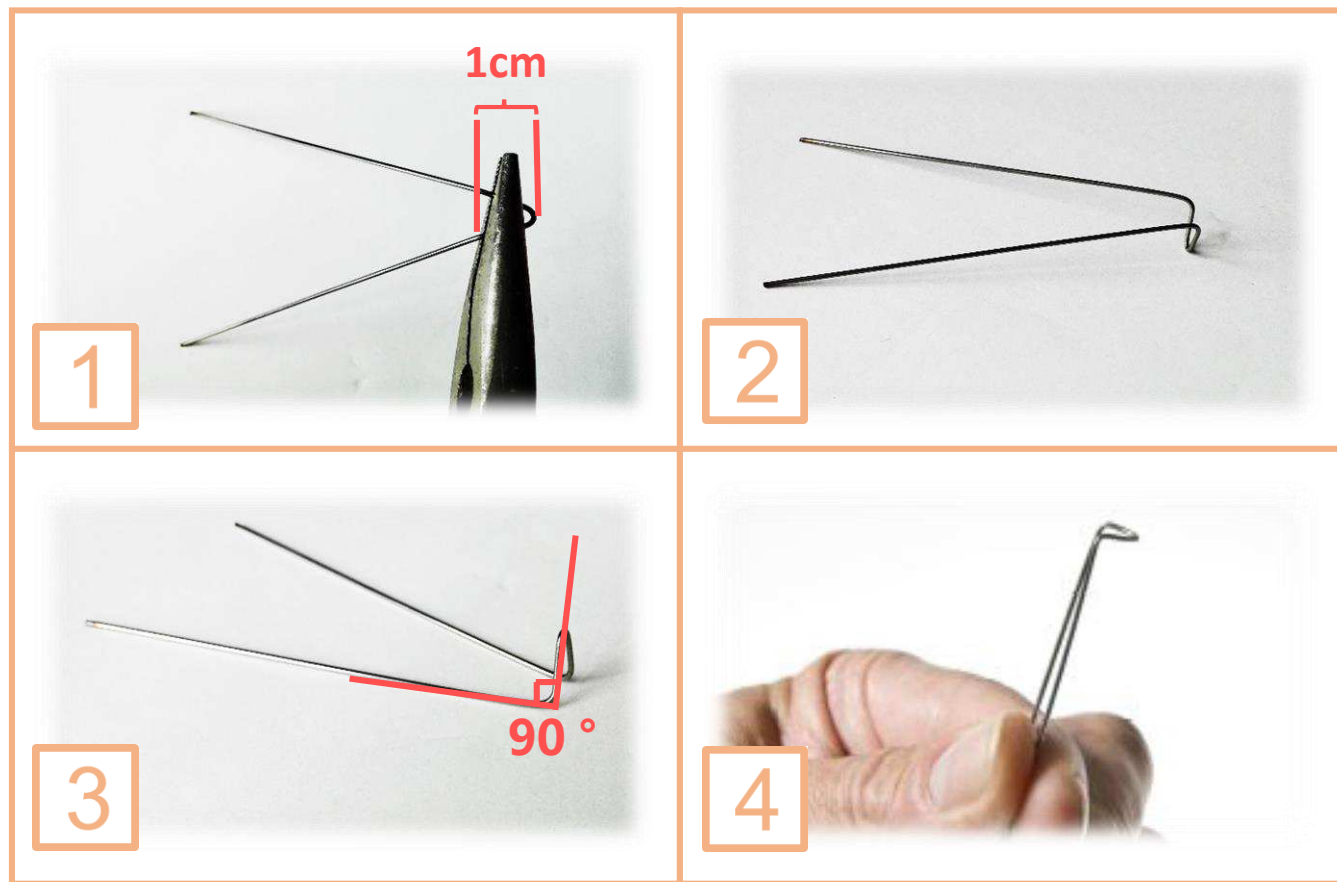


# Assembly Instructions

## STEP 2: Insectbot Legs

Twist the tip of the wire 1cm from the narrow edge of the “v” shape

Make three bent pieces of wire using this method







# Assembly Instructions

## STEP 2: Insectbot Legs

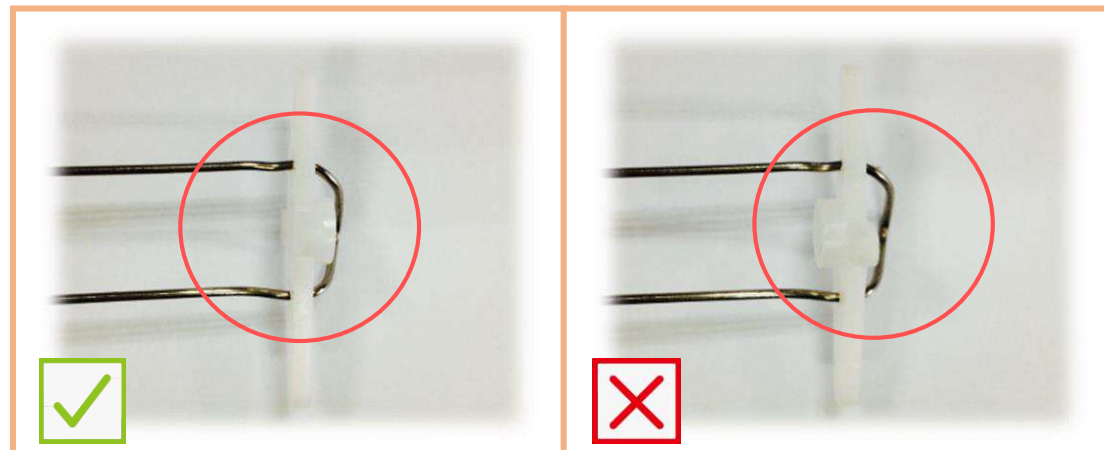
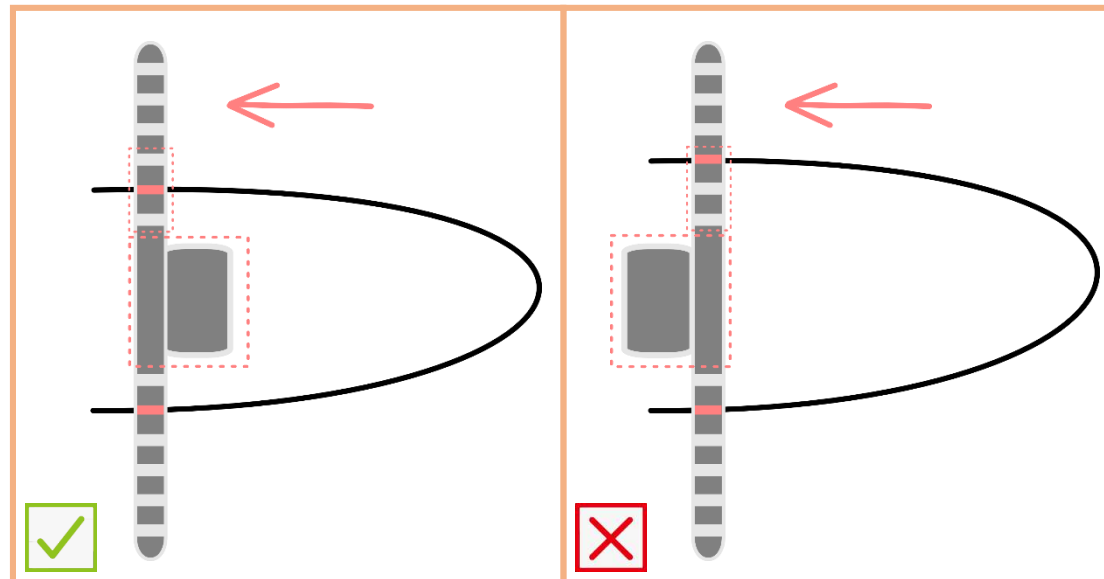
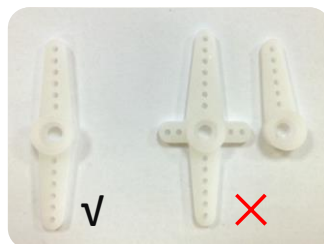
Your micro servos come with accessories. Take a look inside the accessories bag and you will find some servo horns

Thread each piece of twisted wire through the holes on the servo horns as pictured on the right

Note:

Be careful that the servo horn is the correct way around - see the diagram for reference

 **Caution: Adult supervision required!**



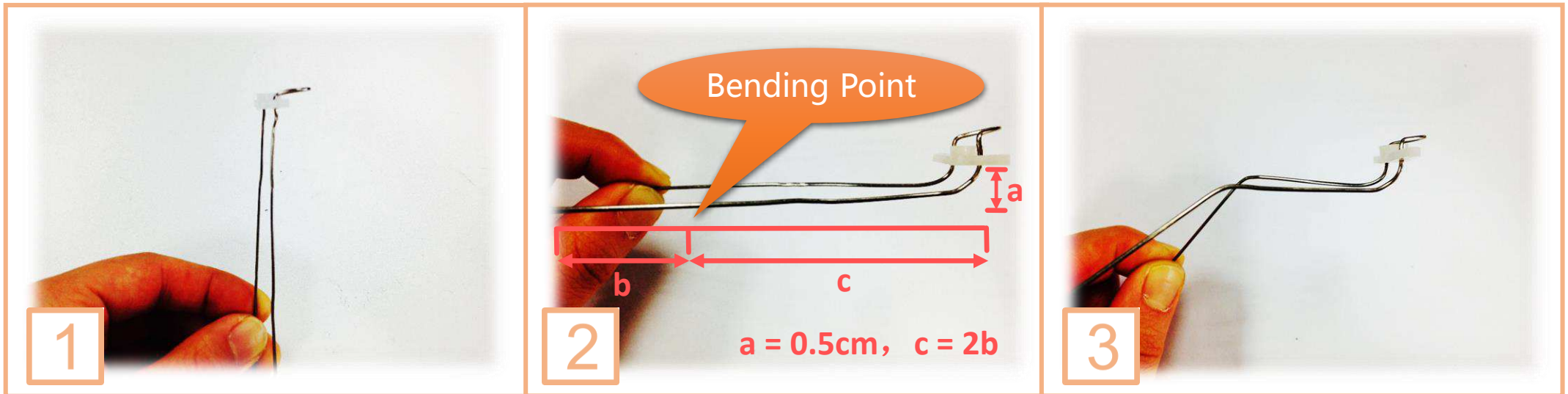


# Assembly Instructions

## STEP 2: Insectbot Legs

Let's make the Insectbot's front and hind legs. They are both made of steel wire that is bent in the same way as before

- 1) Bend the narrow end of the "v" shape of the steel wire forward as in picture 1. Pay attention that the bent section is no longer than 0.5 cm
- 2) Find the bending point as it is shown in picture 2. This point is between  $b$  and  $c$ . Bend the wire so that it looks like picture 3
- 3) Repeat the process so that you have two sets of legs



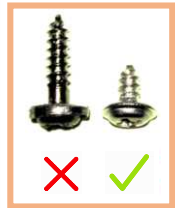
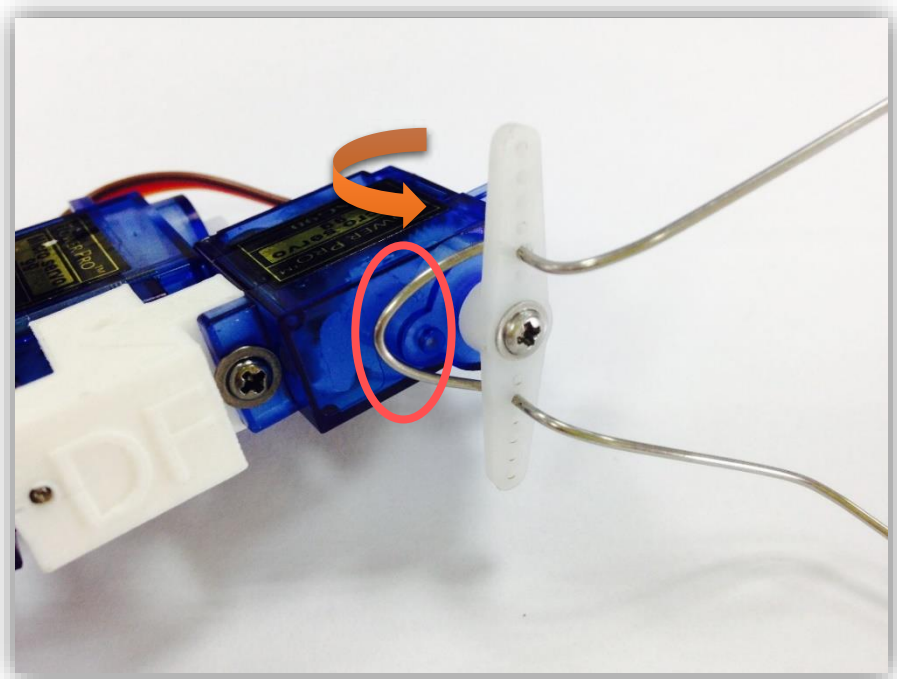


# Assembly Instructions

## STEP 2: Insectbot Legs

Attach the front legs and hind legs to the Insectbot body by attaching each leg's servo horn to a servo using a short screw. Pay attention to the diagram below to make sure you are using the correct length of screw!

Check to see that the servo horns can move freely when attached to the servo. Check that there are no obstructions caused by the bent steel wire that stop the servo horn moving. The red circle in the diagram below shows one possible obstruction. If this happens, you can simply bend the wire forwards out of the way.



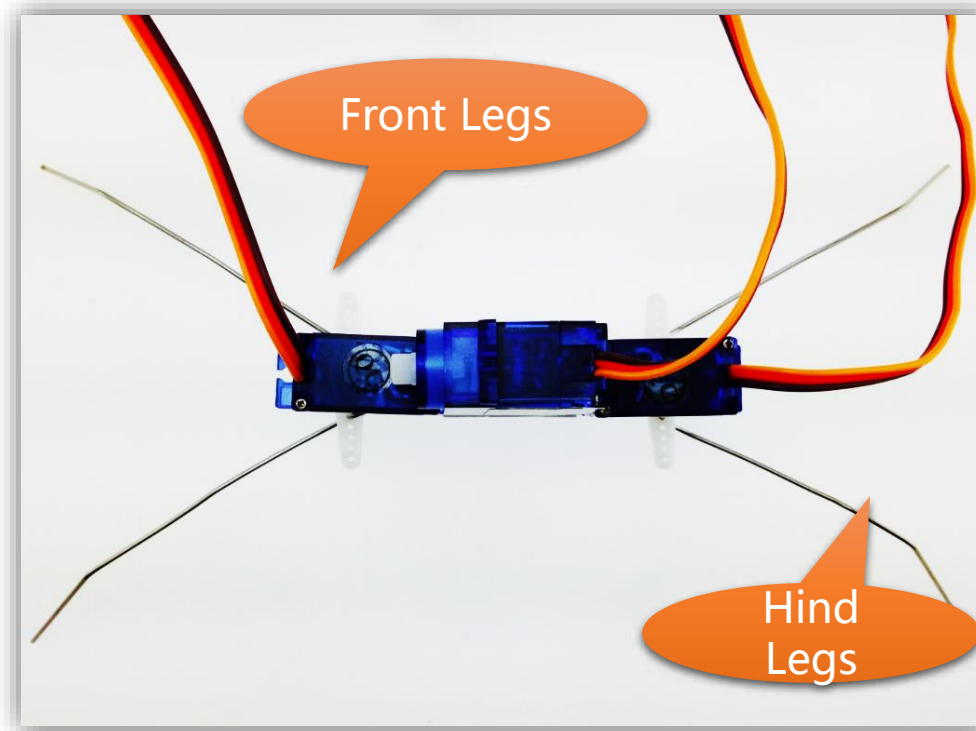
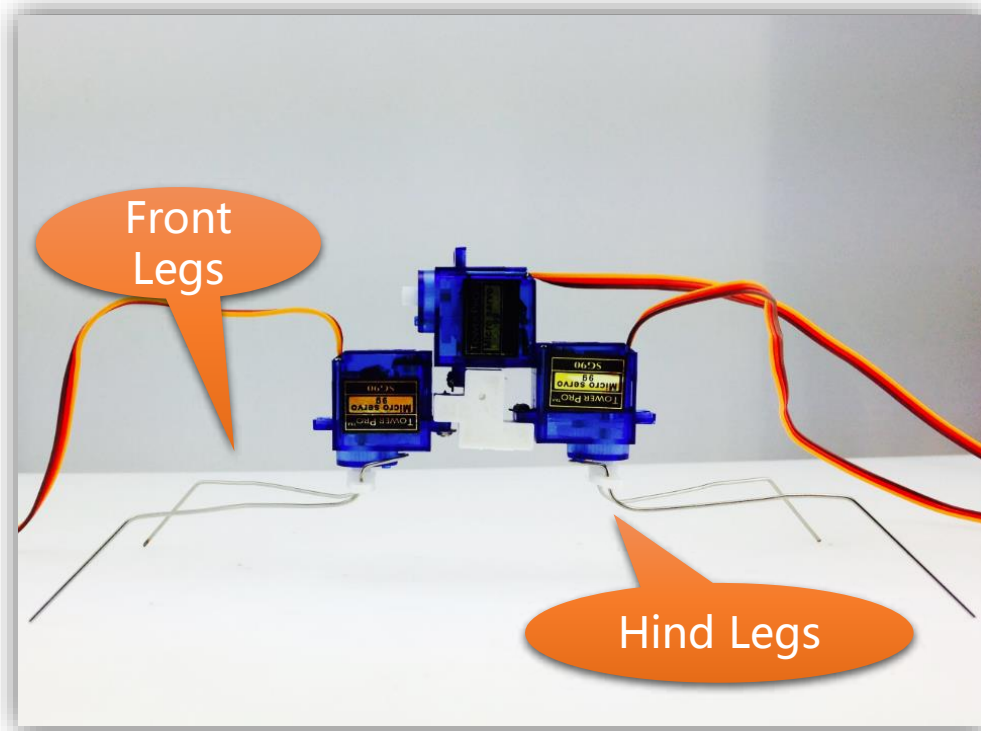


# Assembly Instructions

## STEP 2: Insectbot Legs

Place the Insectbot on a flat surface to make sure that it can stand flat and stable

Check that both the front and hind legs can touch the surface of the table



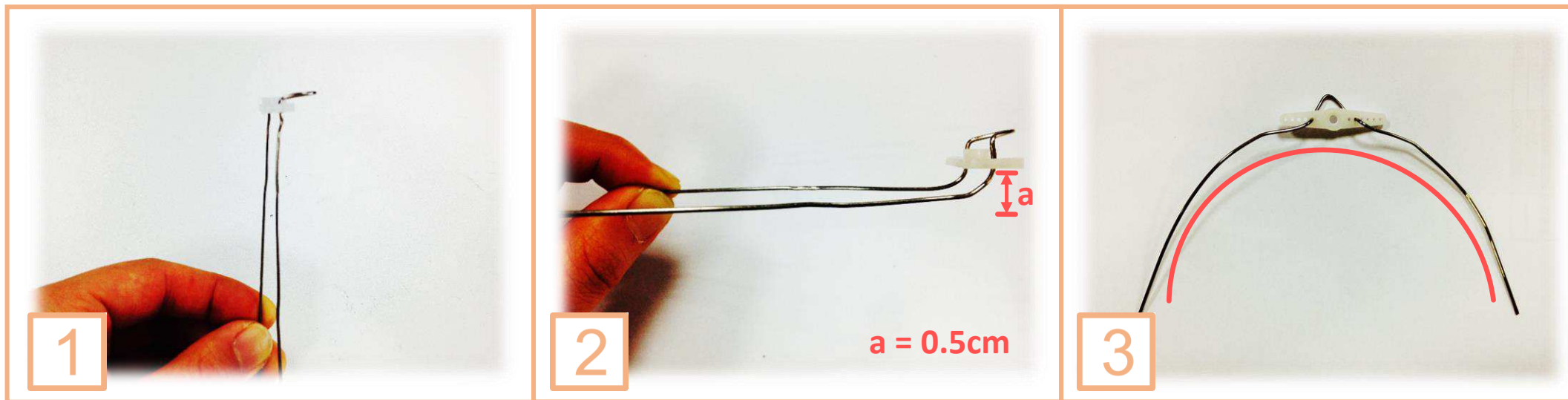


# Assembly Instructions

## STEP 2: Insectbot Legs

Now let's make the Insectbot's middle legs.

- 1) Bend the narrow end of the "v" shape of the steel wire forward as in picture 1, as you did with the other legs
- 2) Pay attention that the bent section is no longer than 0.5 cm
- 3) Bend the wire in to an arch shape, as in picture 3



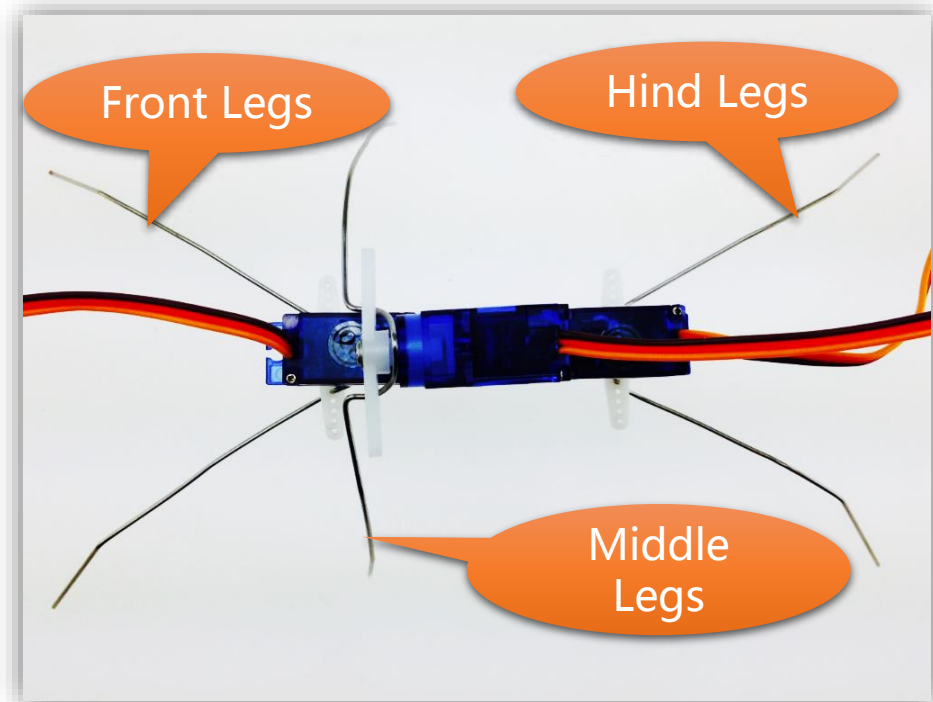
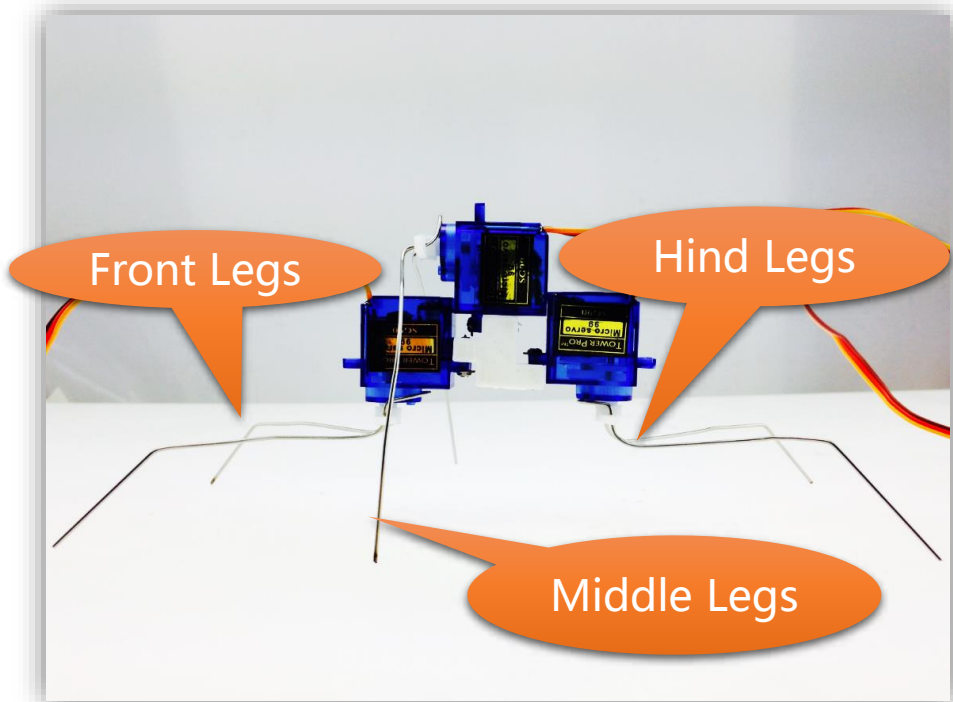


# Assembly Instructions

## STEP 2: Insectbot Legs

Attach the Insectbot's middle legs to the body using the same process as you did for the front legs and hind legs

Make sure that the Insectbot can stand firmly on a flat surface and that all six legs touch the surface. If the legs do not, bend them so that they do.





# Assembly Instructions

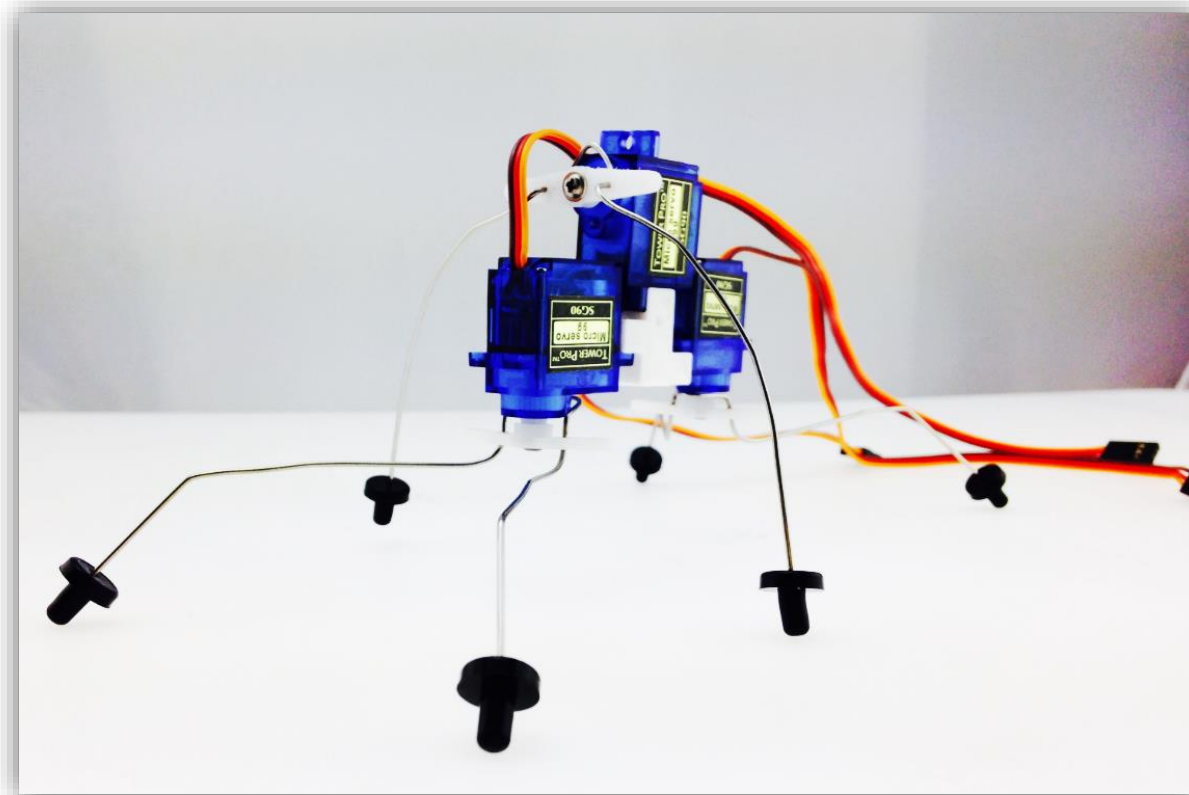
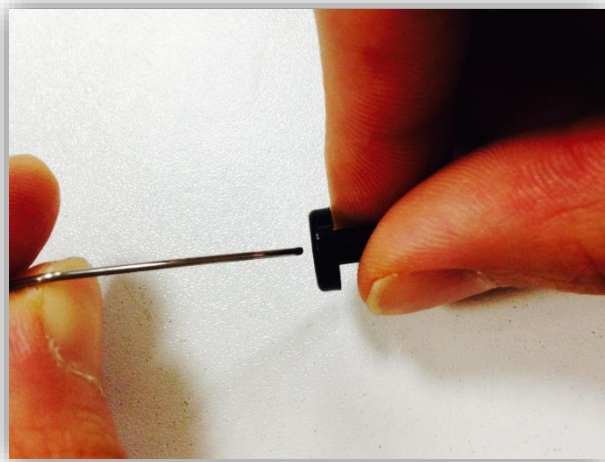
## STEP 2: Insectbot Legs

Carefully poke the end of each leg in to a rubber foot so that the sharp ends of the steel wire don't scratch your floors and furniture

Your Insectbot should look like the picture on the right when finished.



**Caution: Wire ends are sharp! Adult supervision required!**



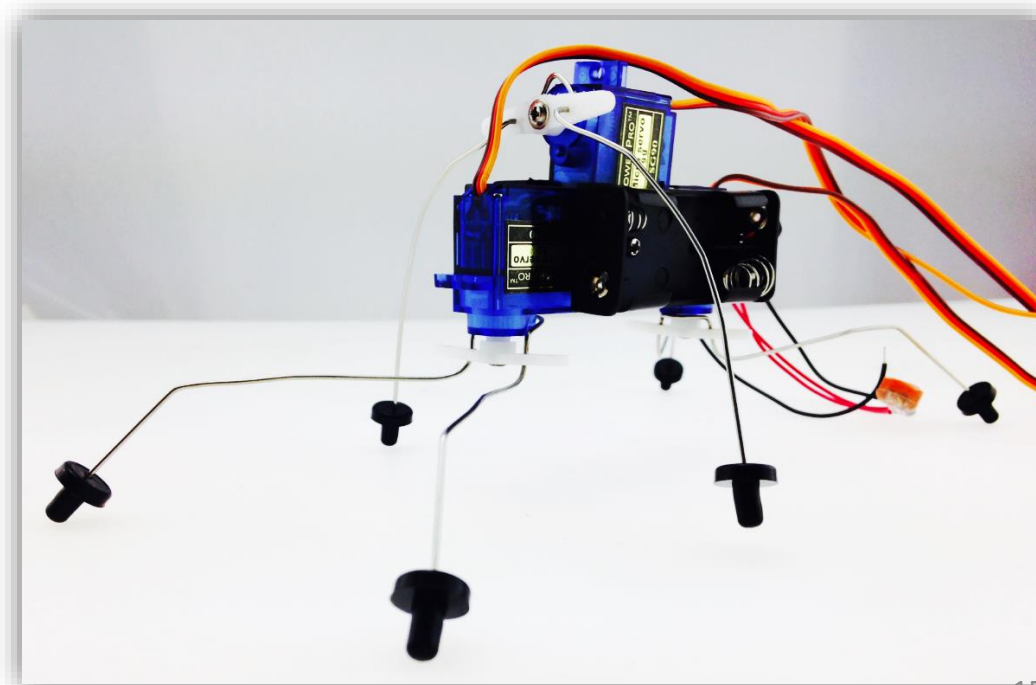
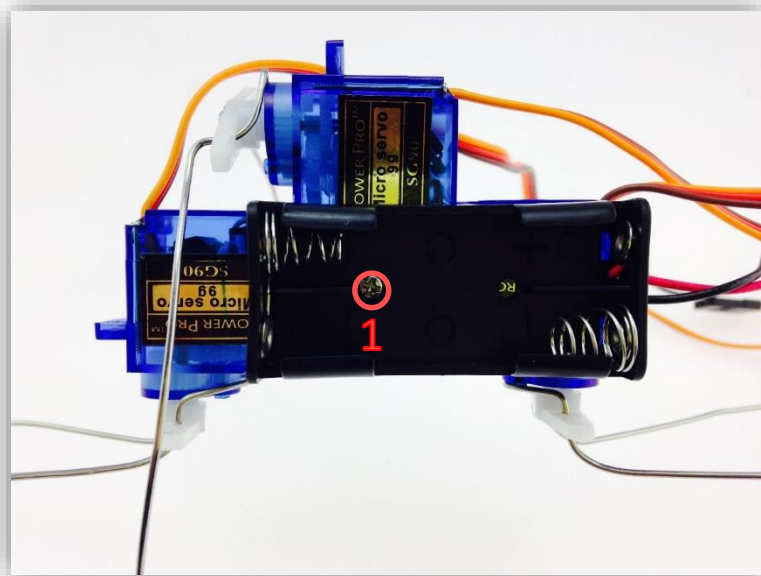


# Assembly Instructions

## STEP 3: Battery Holder

We need to add a battery holder to each side of Insectbot to give it power

Take out the screws inside the box and then fix them on to both sides of the its body. Be sure to use the correct sized screws as pictured. The first hole should be in line with the hole of the top servo's screw-hole on the body (picture 1)



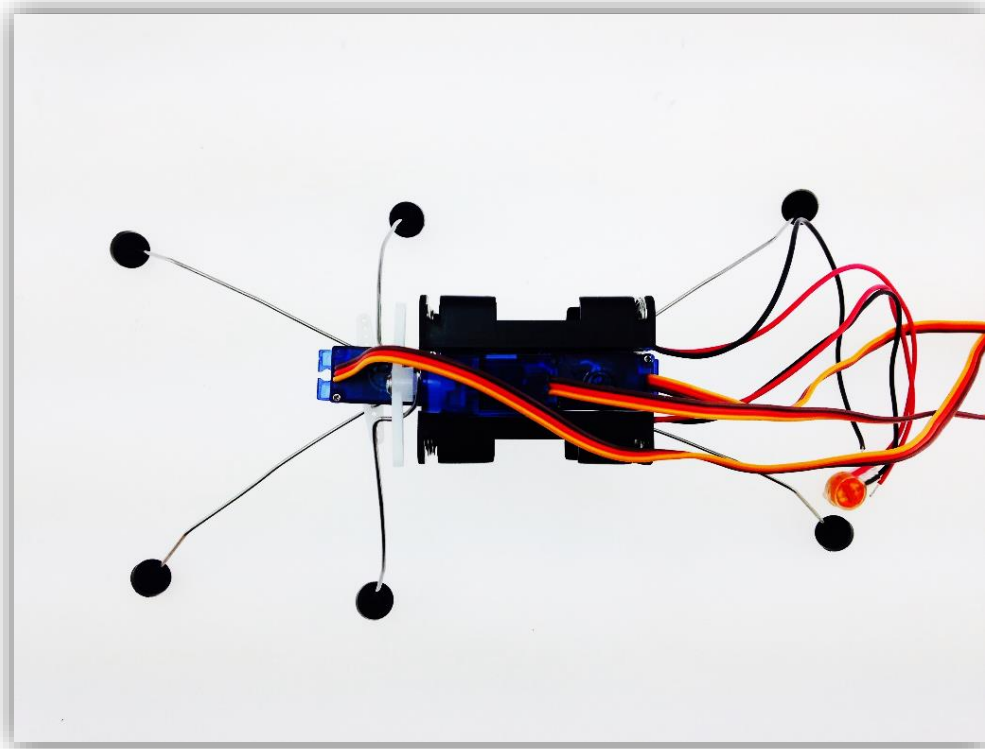
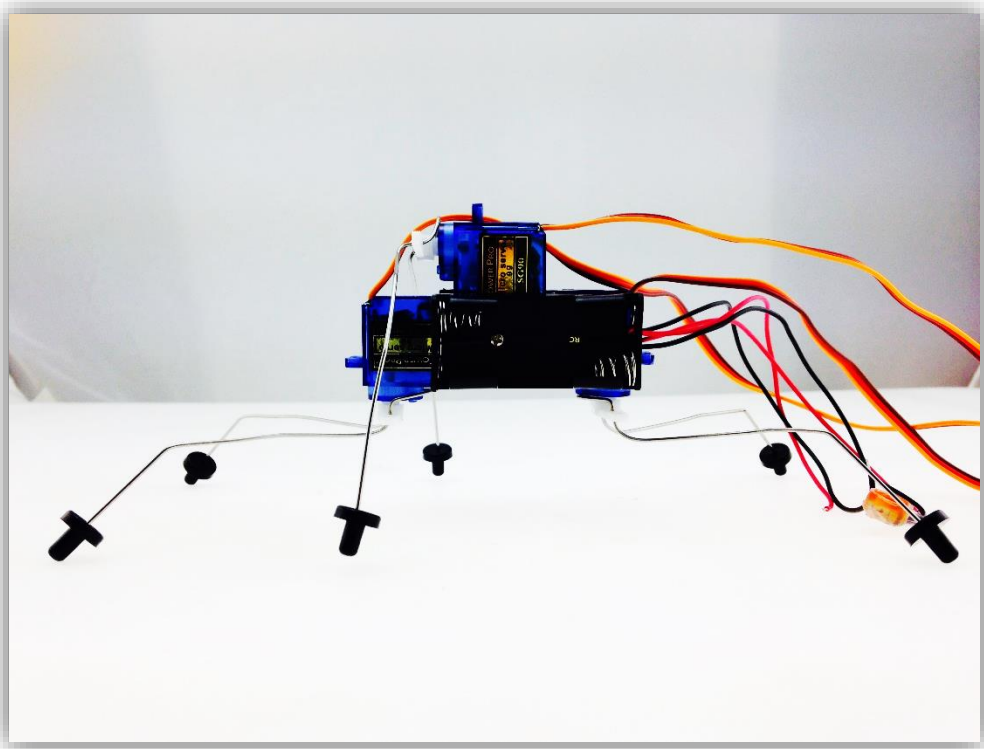




# Assembly Instructions

## STEP 3: Battery Holder

Use these photos as a reference to see if each battery holder is located in the right place



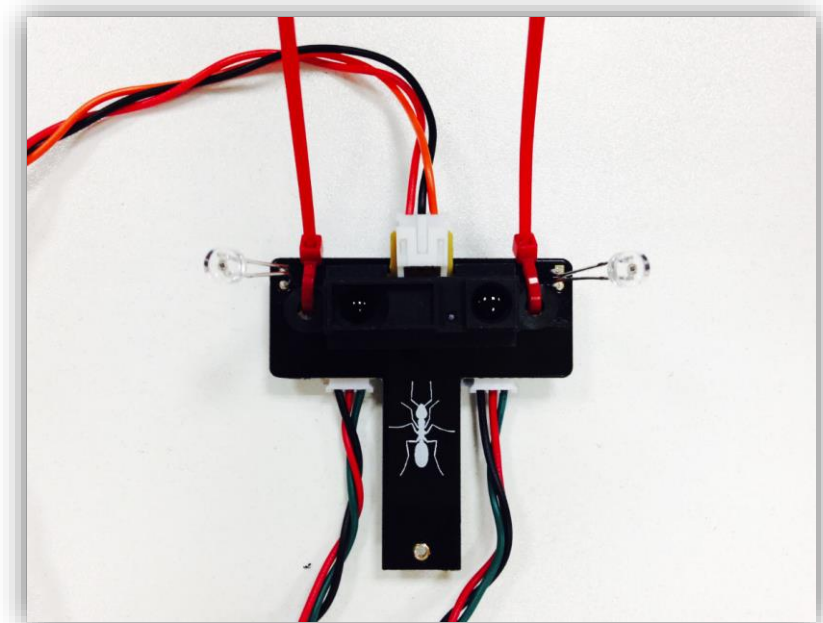
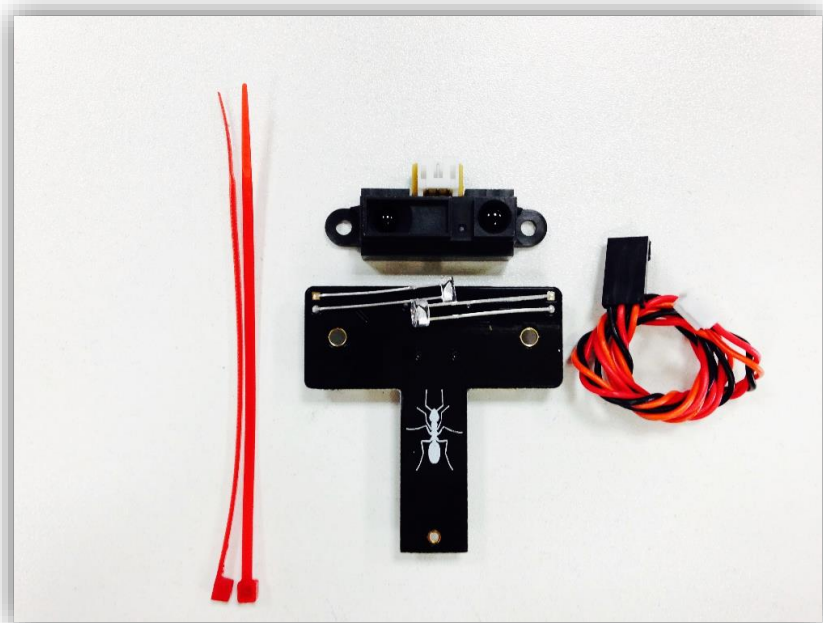


# Assembly Instructions

## STEP 4: Insectbot Eyes

Now let's make the Insectbot's eyes.

- Take out the IR distance sensor, PCB and two red nylon cable ties from the component bag
- Turn the PCB over so that the back is facing you
- Fix two red cable ties into the two holes along the top of the PCB and tighten them around the edge of it as pictured
- Connect the IR distance sensor to the PCB using the provided wire. Make sure the wire is fully seated in its socket

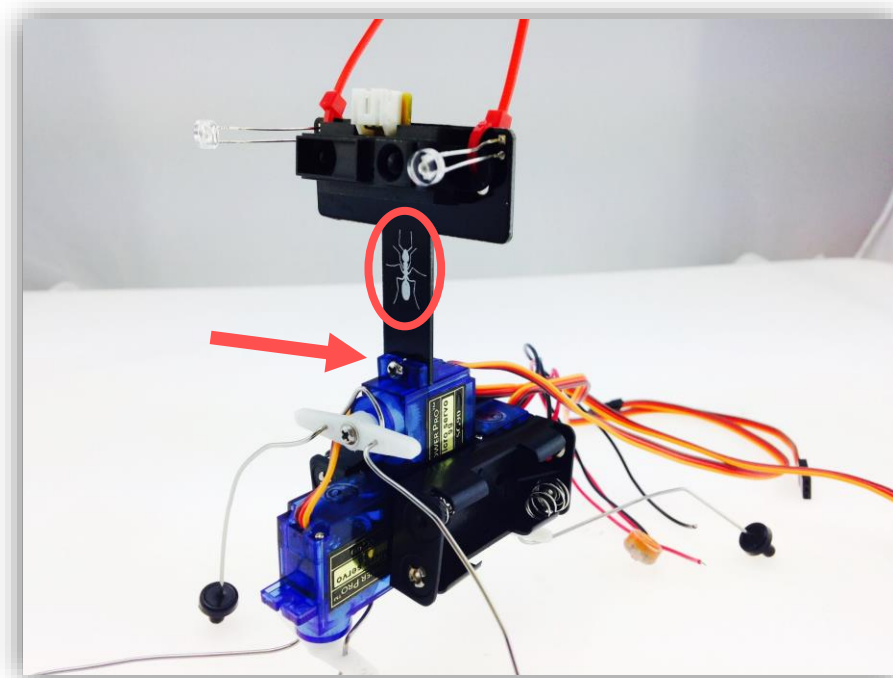
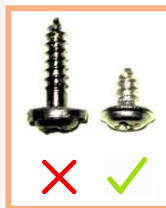
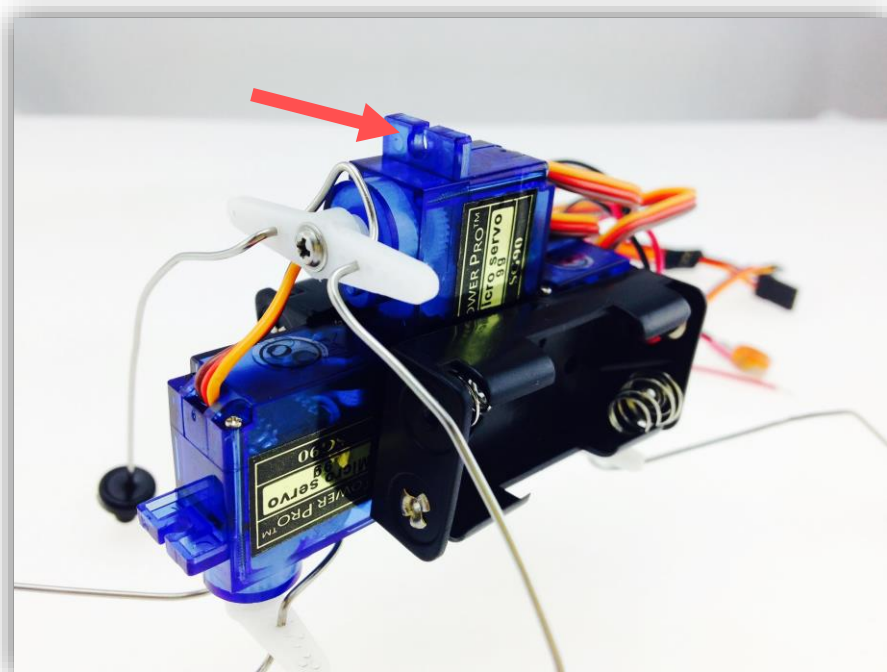




# Assembly Instructions

## STEP 4: Insectbot Eyes

Fix the eye assembly on to the top of Insectbot's body with the same short screws used for the battery holder. The lower picture shows what the completed assembly should look like – note the direction of the PCB

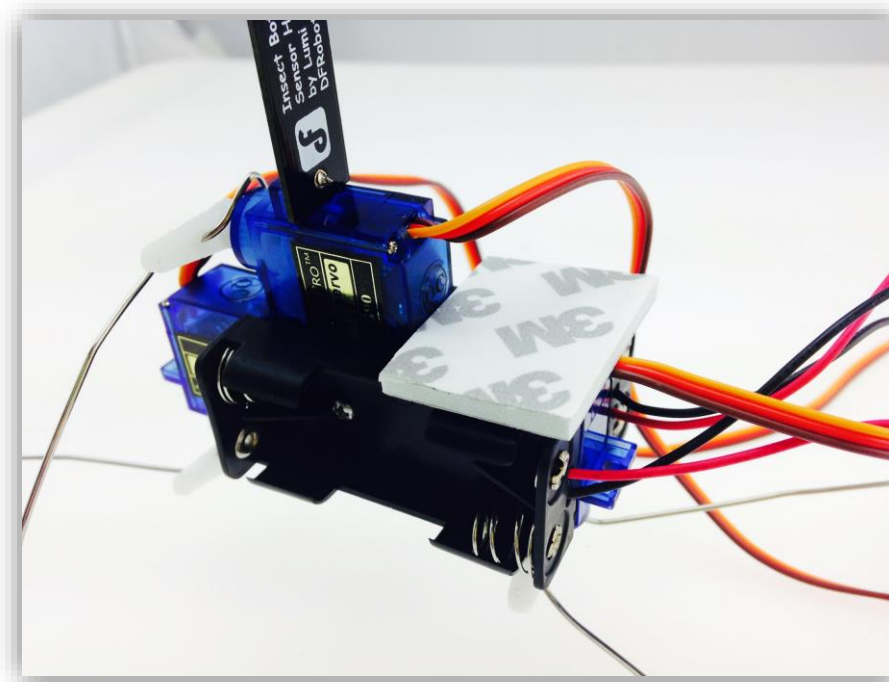
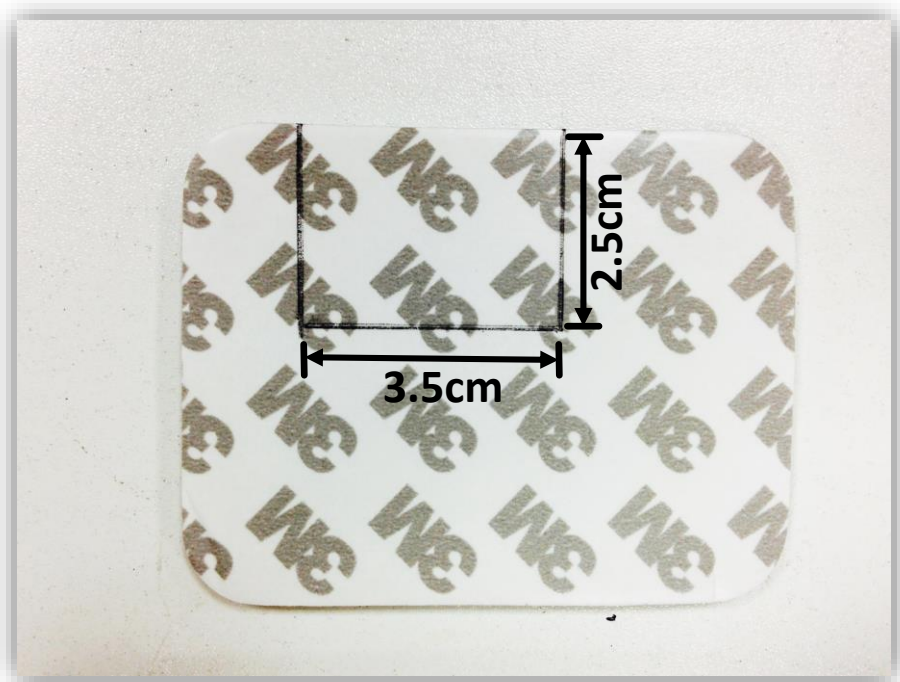




# Assembly Instructions

## STEP 5: Insectbot Brain

Take the provided 3M double sided tape and draw a 3.5 x 2.5cm square on it. Cut it out using scissors. Stick one side of the tape to the back of the Insectbot's body as pictured



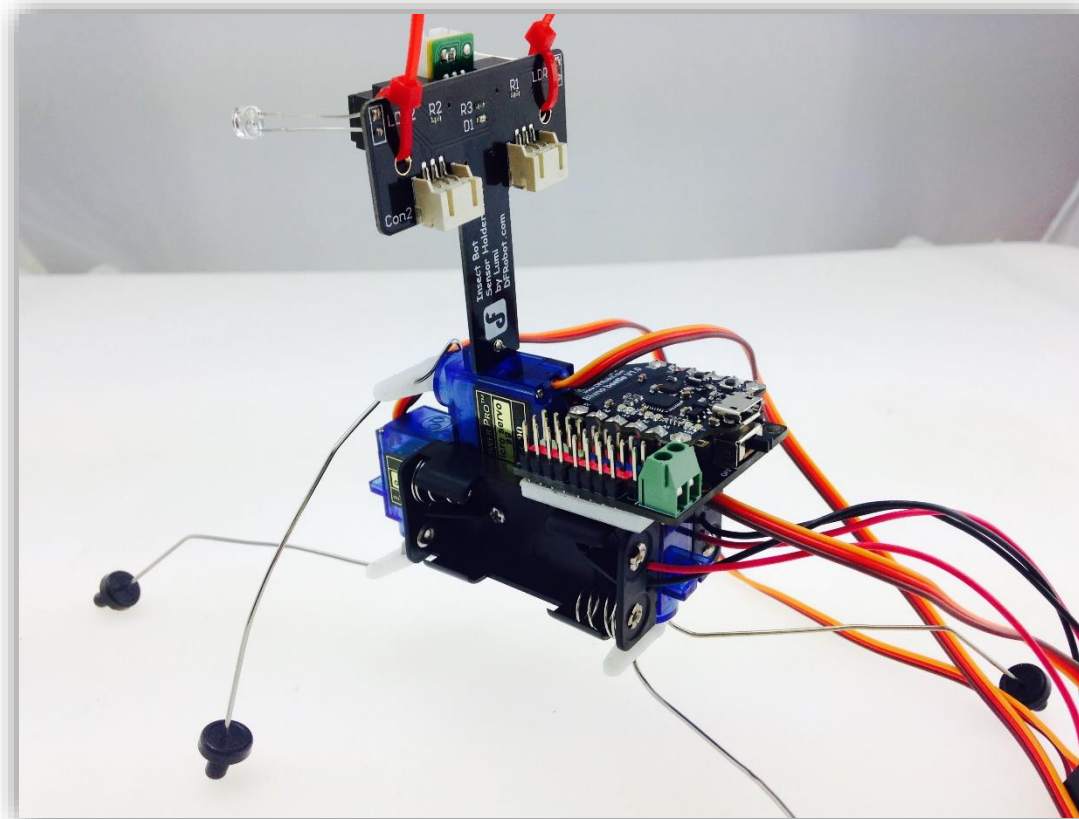
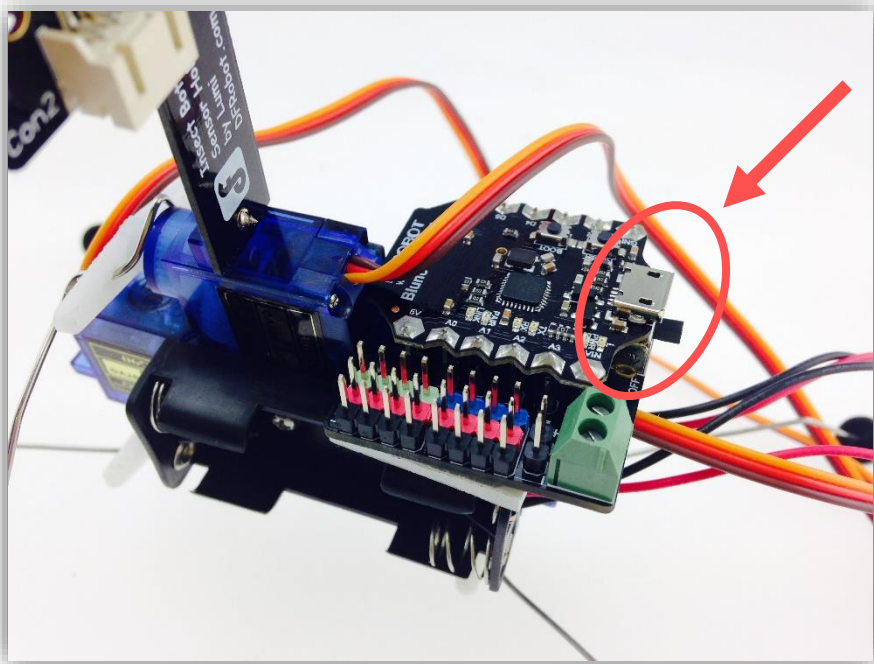


# Assembly Instructions

## STEP 5: Insectbot Brain

Take out the Beetle Shield. This is the Insectbot's brain!

Stick the shield on to the adhesive pad with the power switch and USB connector of the shield facing towards the rear of the Insectbot





# Assembly Instructions

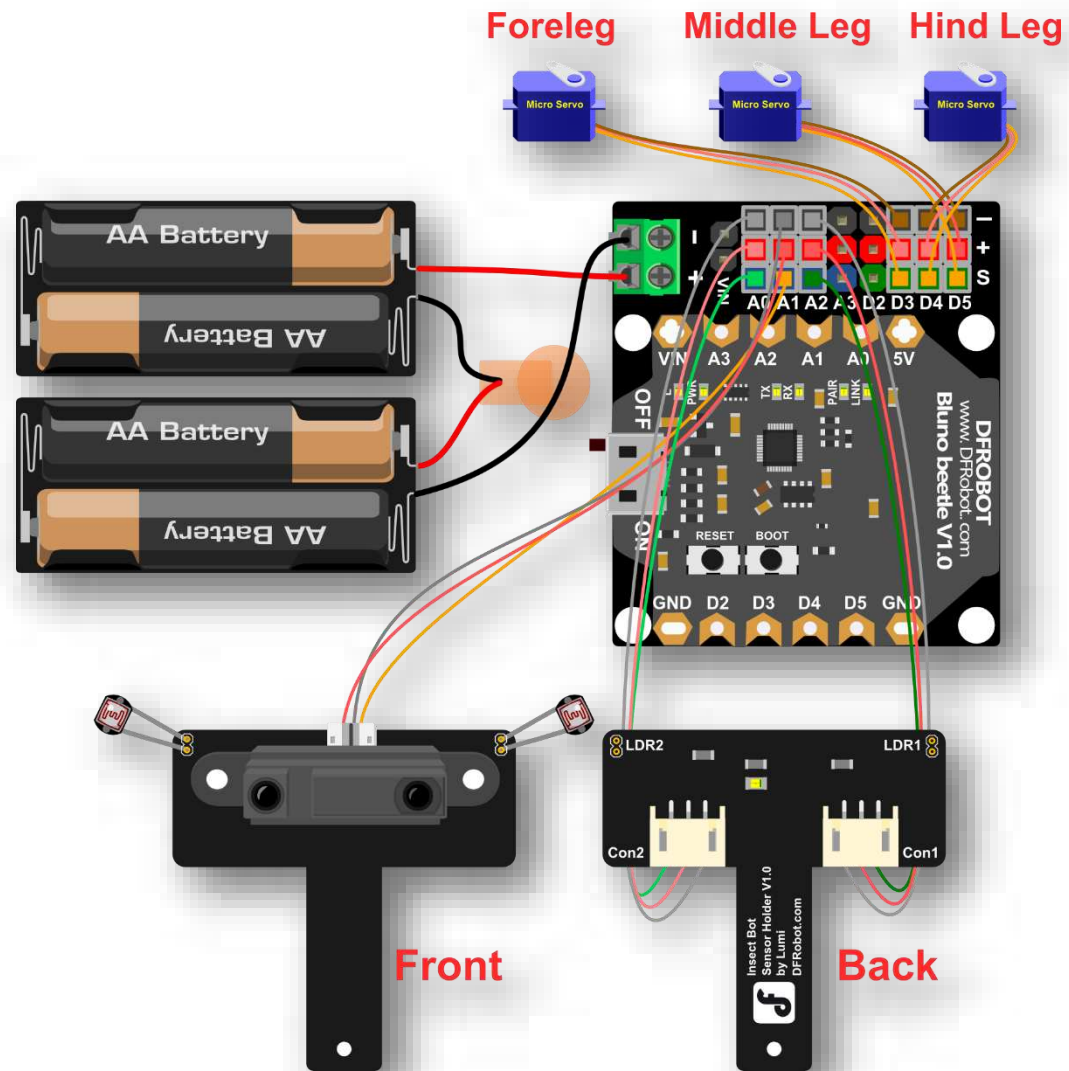
## STEP 6: Hardware Connections

You are only one step away from getting your Insectbot moving! All you have to do is complete the circuit connections according to the diagram on the right. Then you can install batteries and play!

**NOTE:** When connecting the cables, please pay attention to the order of the connections. They must be attached exactly as shown in the map.

Pay particular attention to the upper right of the circuit board with the following symbols: + (red wire), - (black/brown wire) and S (orange/green wire).

- Infrared Sensor – A1
  - S = Orange
  - + = Red
  - = Black
- Light Sensor Con2 – A0
  - S = Green
  - + = Red
  - = Black
- Light Sensor Con1 – A2
  - S = Green
  - + = Red
  - = Black
- Forelegs' Steering Gear– D3
  - S = Orange
  - + = Red
  - = Brown
- Middle legs' Steering Gear– D5
  - S = Orange
  - + = Red
  - = Brown
- Hind Legs' Steering Gear– D4
  - S = Orange
  - + = Red
  - = Brown
- Battery Holder Red Wire – Beetle terminal +
  - S = Orange
  - + = Red
  - = Brown
- Battery Holder Black Wire – Beetle terminal -
  - S = Orange
  - + = Red
  - = Brown



Be sure that all cables are connected correctly or you risk damaging your components!



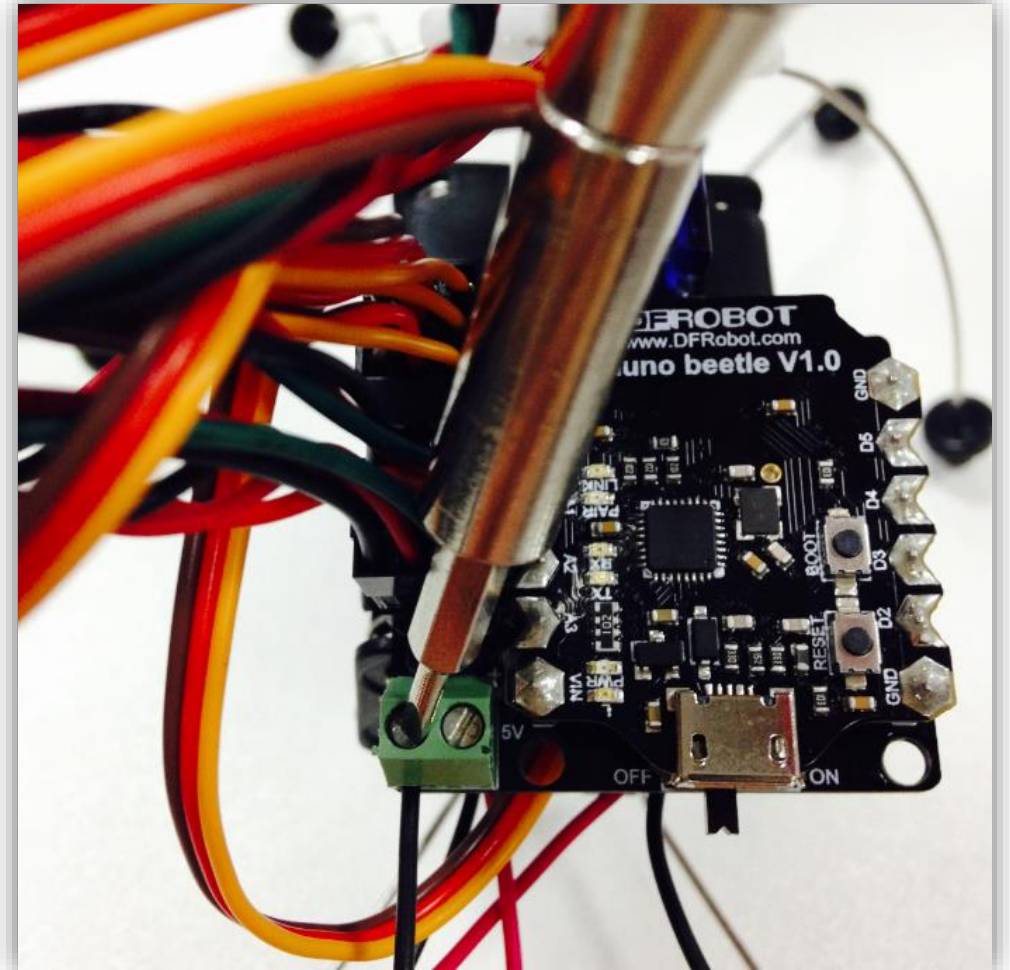


# Assembly Instructions

## STEP 6: Hardware Connections

How to use screw terminals:

1. Loosen the screws on the terminal with a screwdriver
2. Place wires inside holes in terminal. Be sure that the red and black wires are in the correct holes:
  - Battery Holder Red Wire – Beetle terminal +
  - Battery Holder Black Wire – Beetle terminal –
3. Tighten the screws of the terminal with a screwdriver



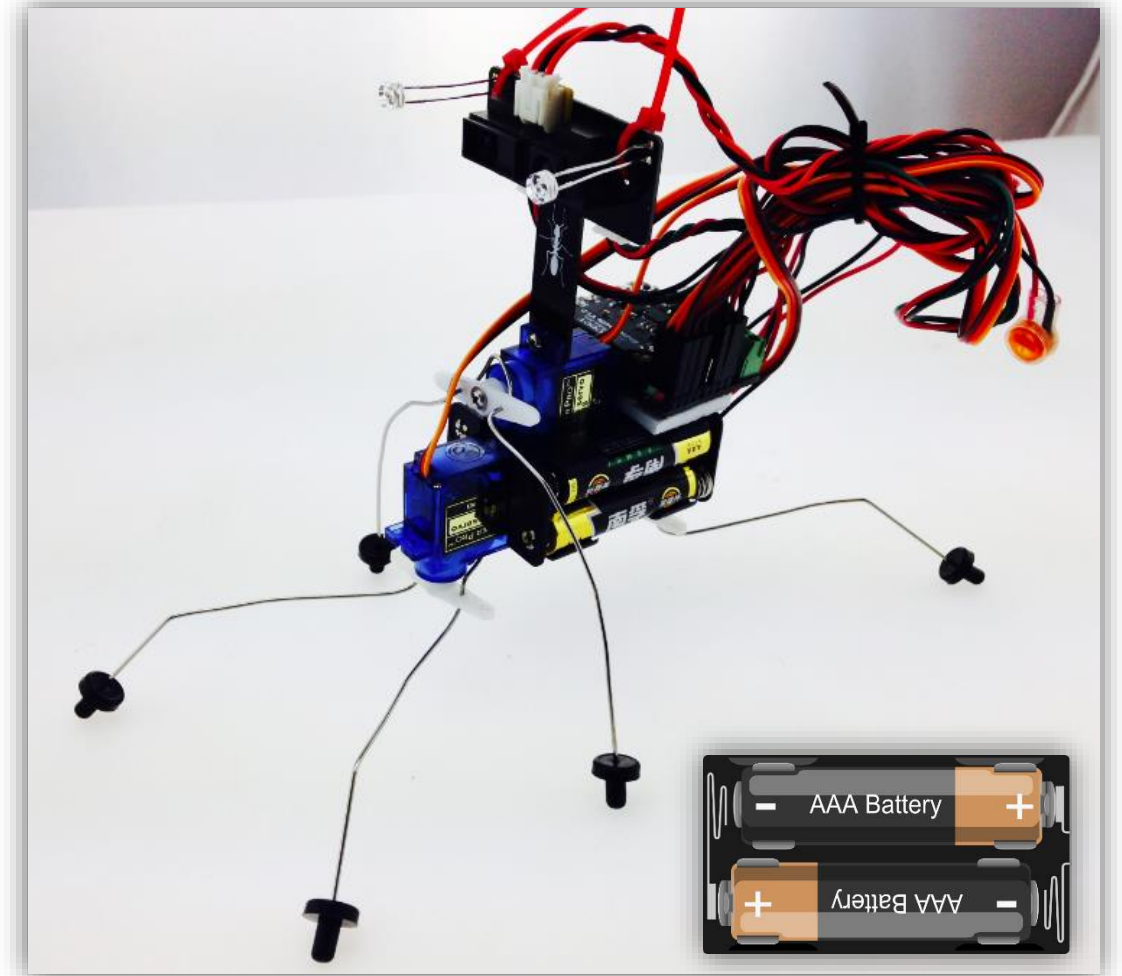
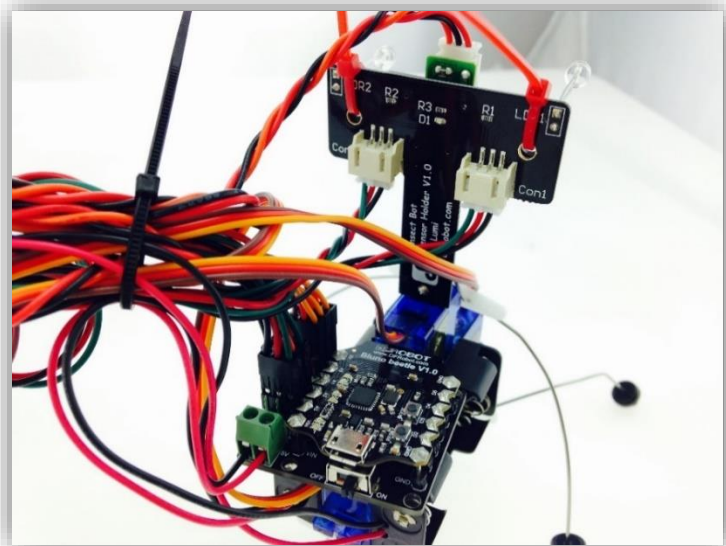


# Assembly Instructions

## STEP 7: Battery Installation

Place 4 x AAA batteries in to the battery holders. Be sure that they are installed the correct way around (see diagram to the right for reference)

Turn on your Insectbot using the power switch. Does it work? If so, congratulations! You can now tidy the wiring with cable ties.



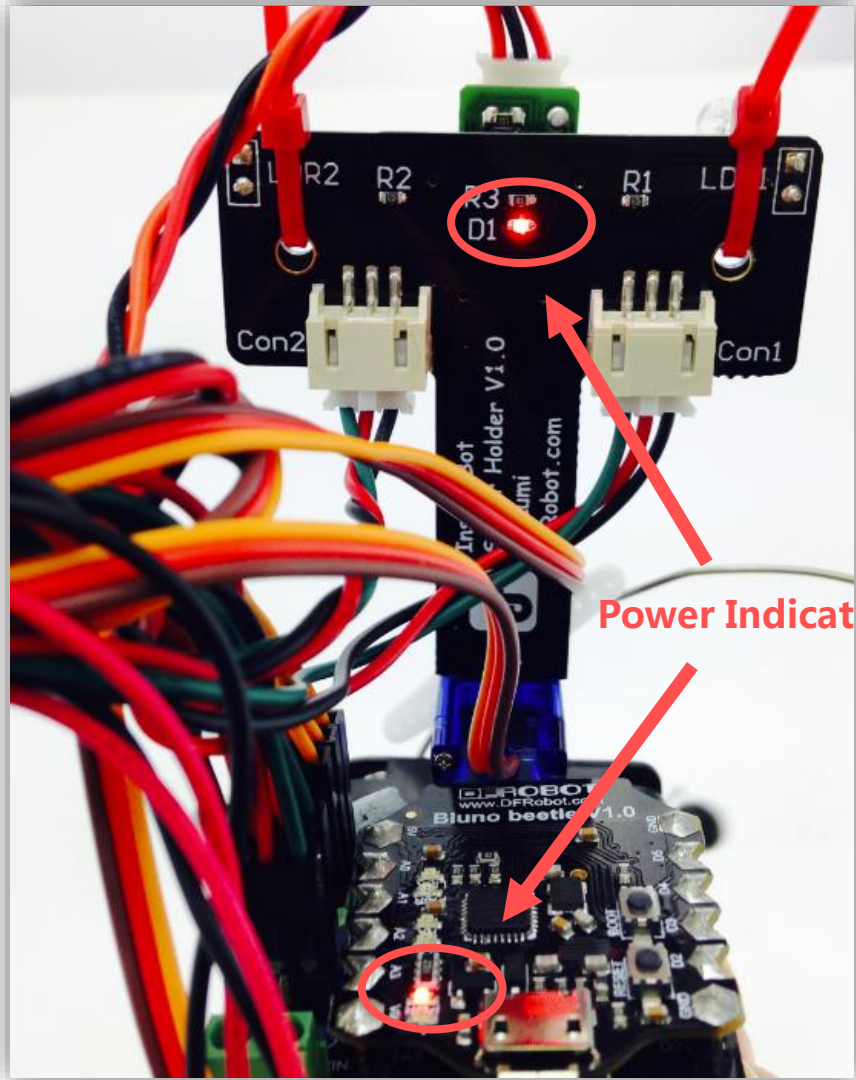
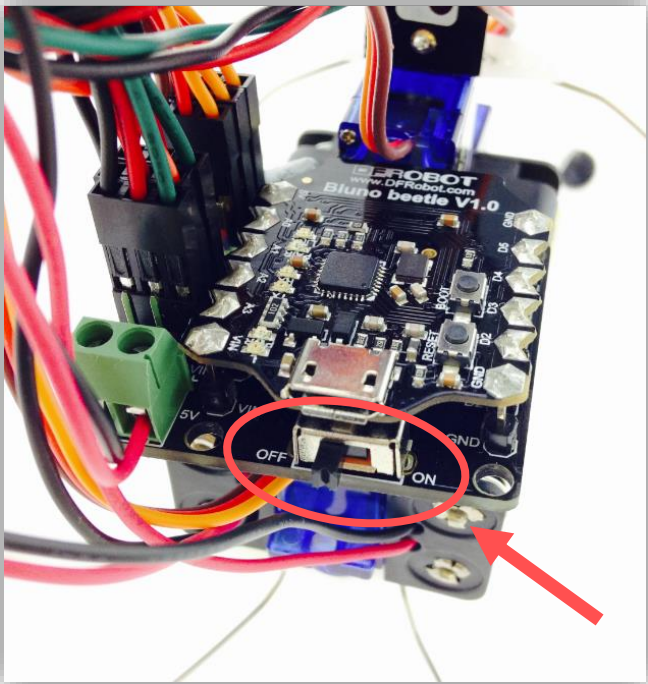




# Assembly Instructions

## STEP 8: Testing

Turn on your Insectbot using the power switch (as shown in the diagram). You should see a red power indication light.





# Assembly Instructions

## STEP 8: Testing

Once powered on, your Insectbot can move.  
If it can't walk properly, don't worry – you just need to adjust the servos.  
Refer to the next page for details...

