



# Making Instructions

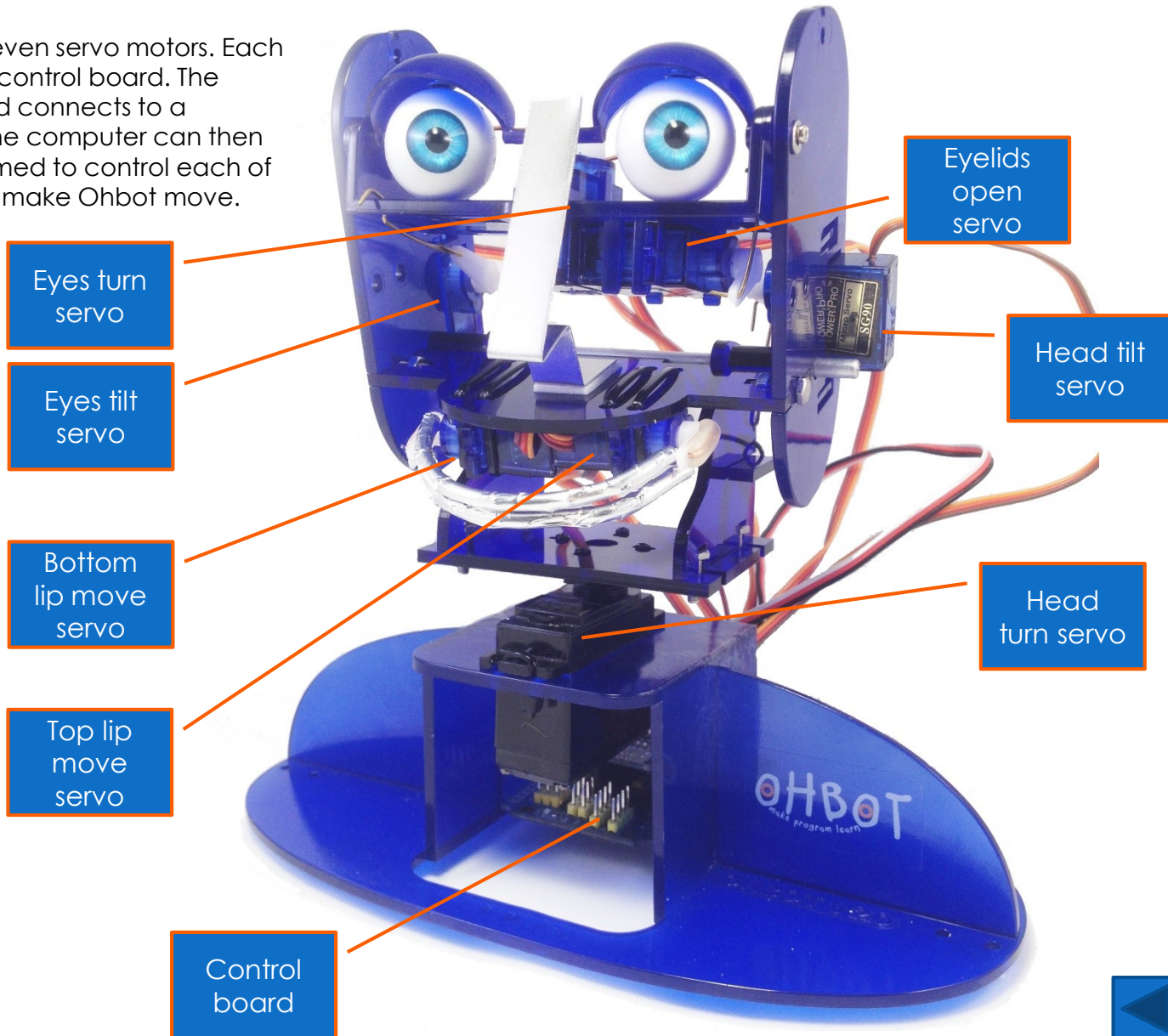
For Ohbot Version 2





# Ohbot

Ohbot has seven servo motors. Each plugs in to a control board. The control board connects to a computer. The computer can then be programmed to control each of the servos to make Ohbot move.





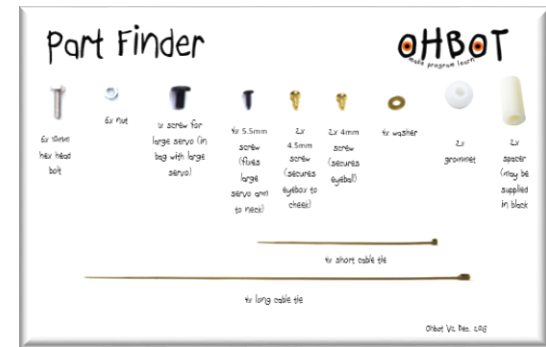
# You will need...

- The Ohbot V2 kit

- A pair of sharp scissors

- Long nose pliers

- The Ohbot Part Finder sheet



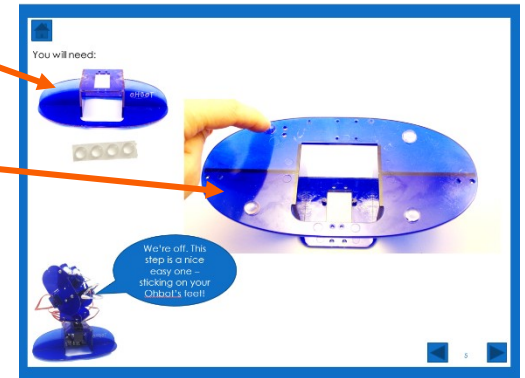
- A Win 7 or later PC and user rights that allow you to install software
- Time, Ohbot will take an hour or more to construct
- A bowl may be useful to keep small parts during assembly





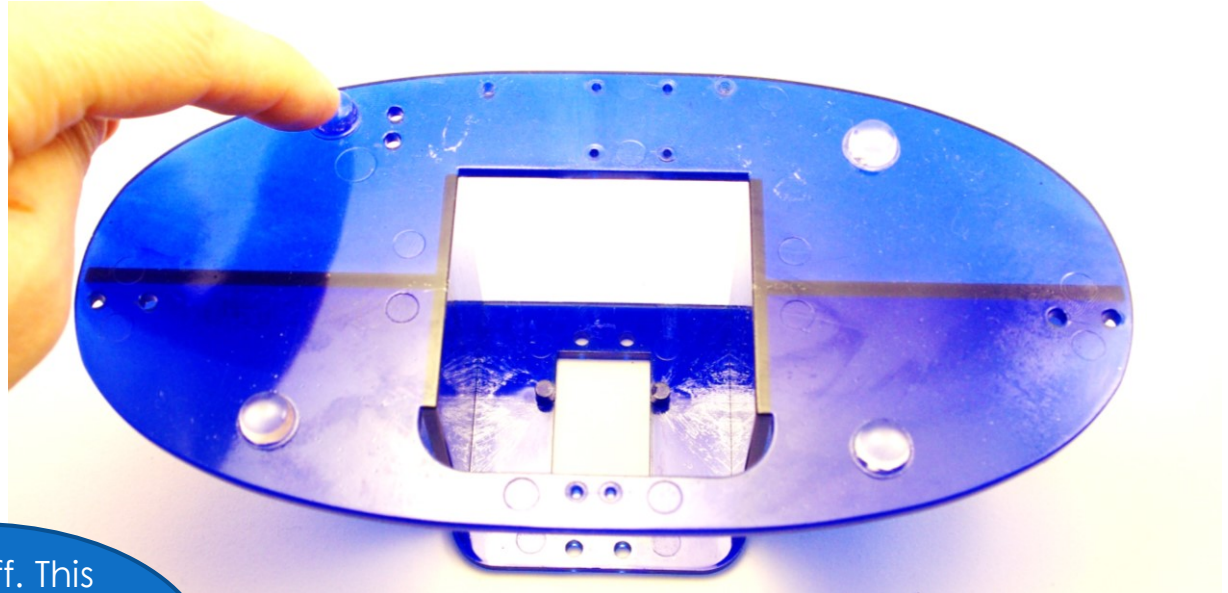
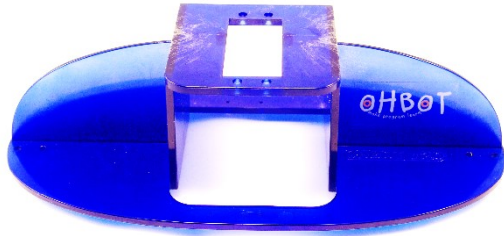
# How the instructions work

- Each page is a step in constructing Ohbot.
- It shows the parts needed for that step in the top left
- The main picture or pictures show how it should be assembled
- If you need tools it will show this too
- For support email us at [www.info@ohbot.co.uk](mailto:www.info@ohbot.co.uk) and we'll do what we can to help.

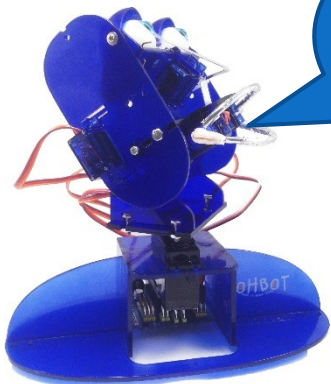




You will need:



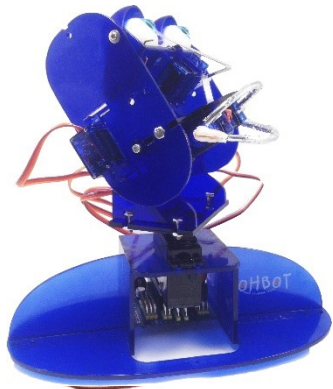
We're off. This step is a nice easy one – sticking on your Ohbot's feet!





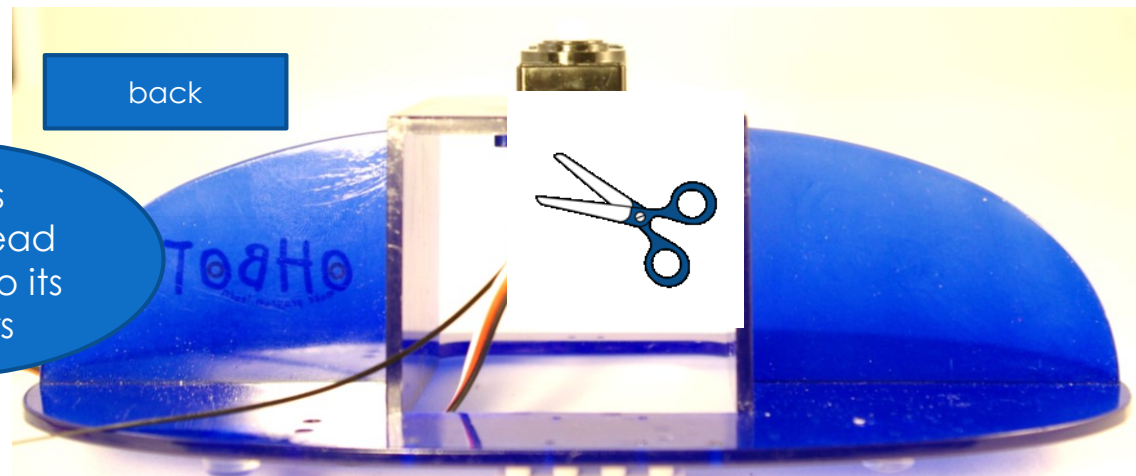
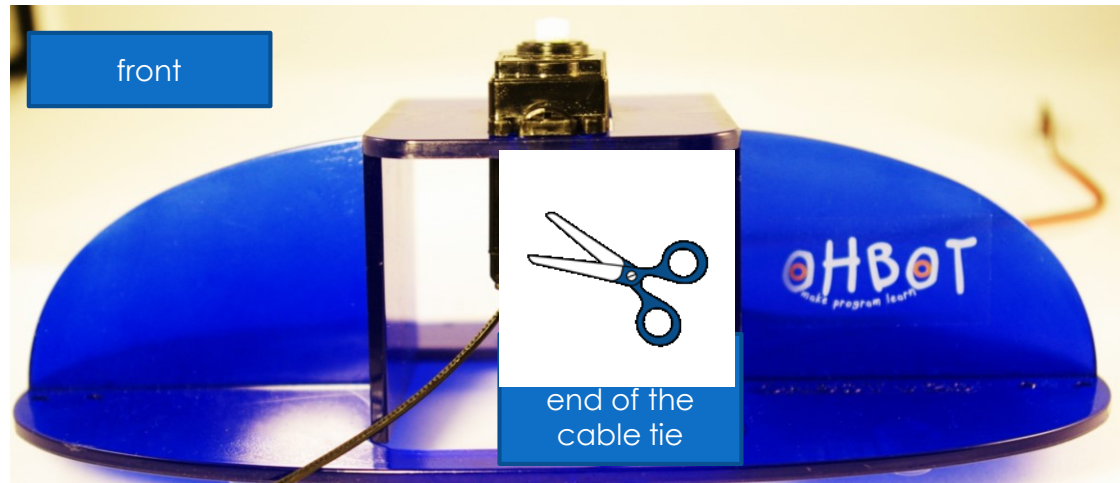


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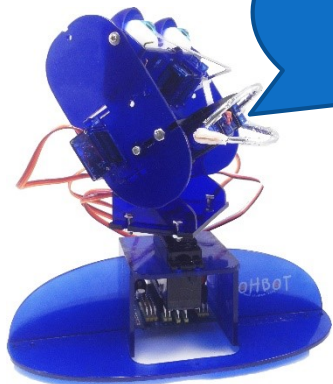




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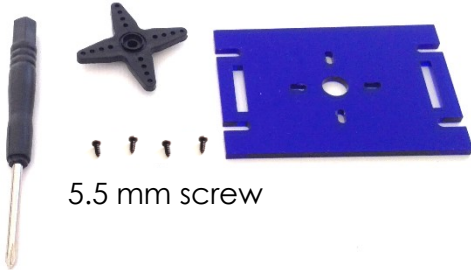


This fixes  
Ohbot's head  
turn servo to its  
shoulders

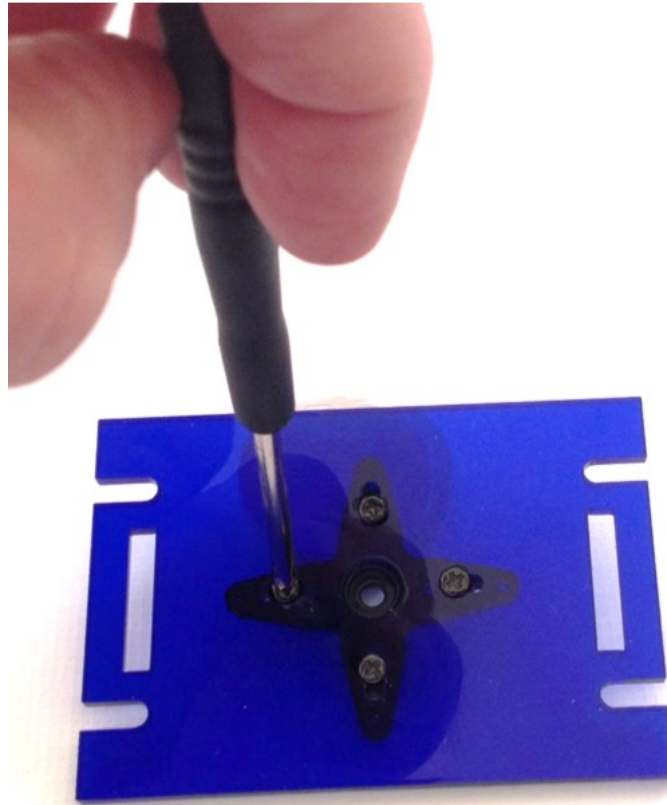
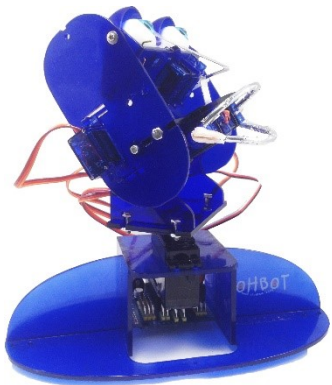




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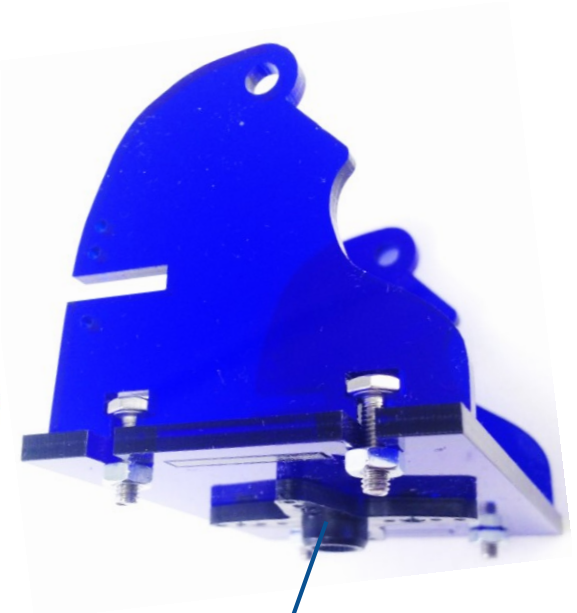
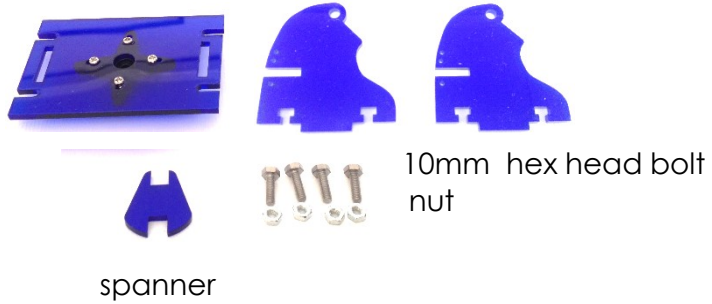
5.5 mm screw



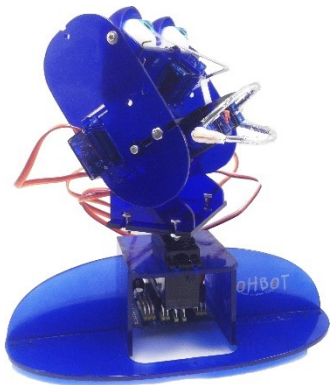




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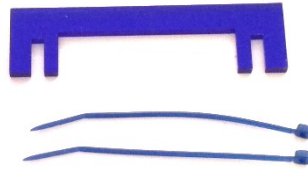


The black  
servo cross  
arm should be  
on the  
underside

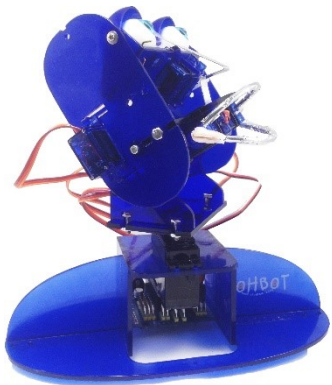




You will need:

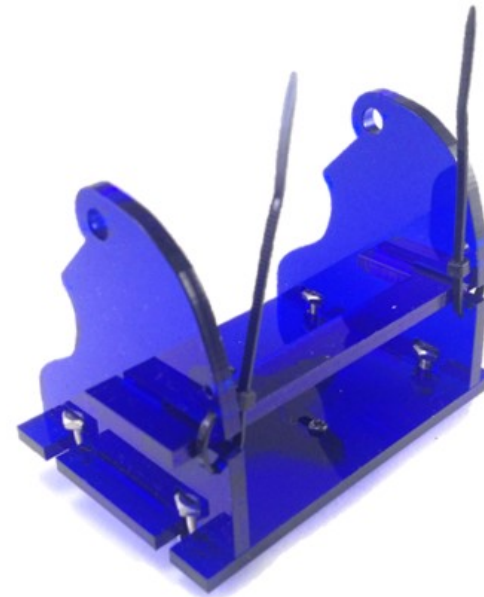
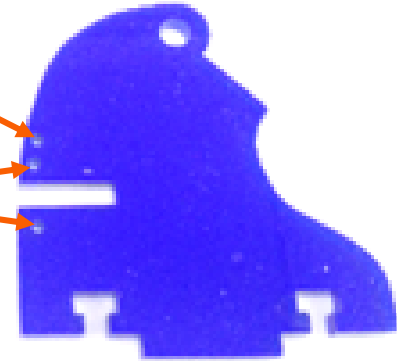


short cable ties



Don't use  
this hole.

Thread one  
cable tie  
through these  
holes

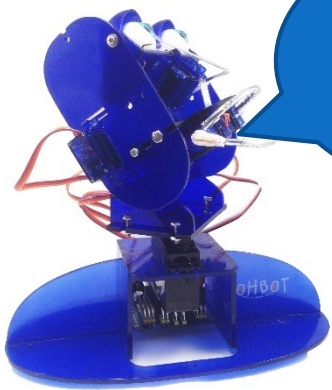
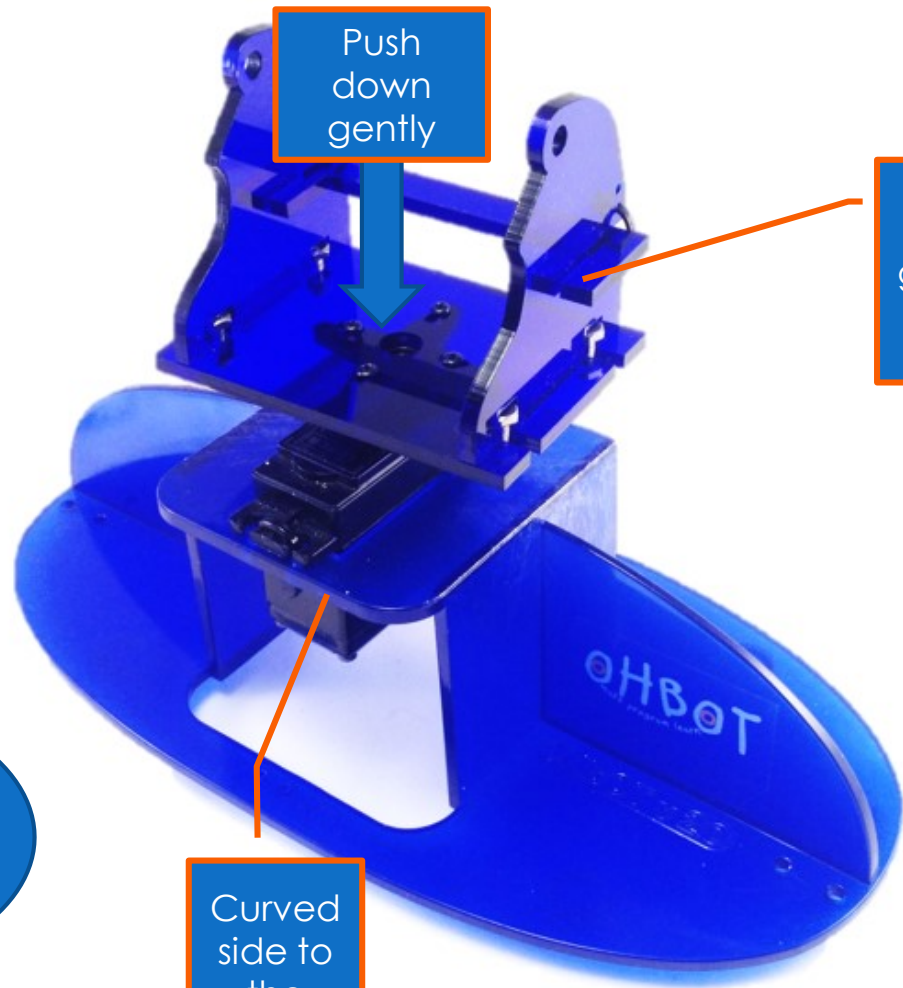


Chop off the  
ends of the  
cable ties





You will need:

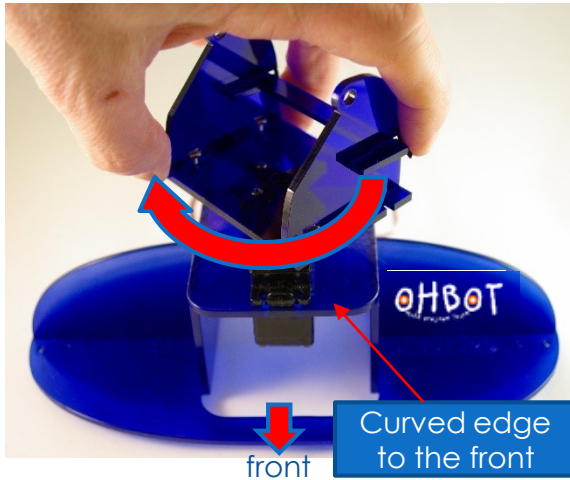


On the next page we will set up the head turn servo

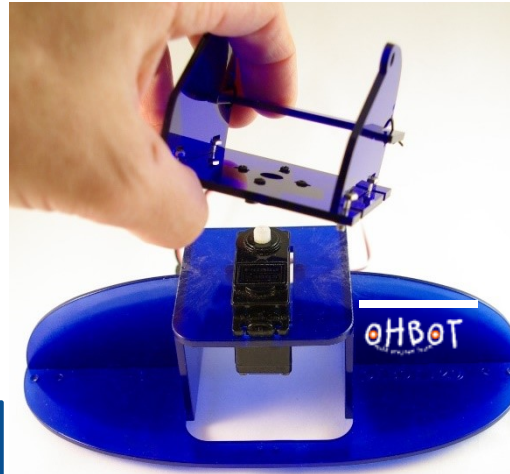




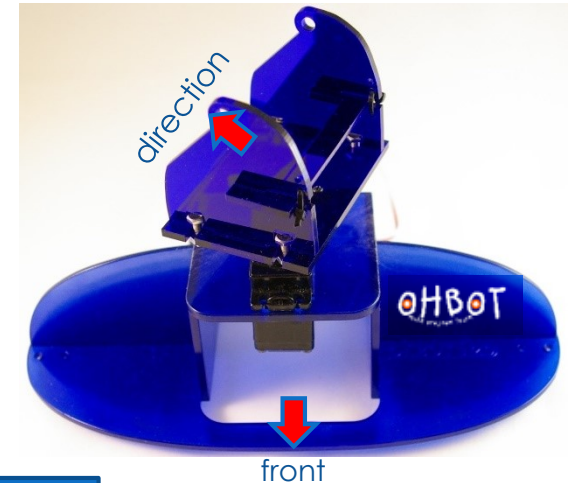
1. Gently turn the neck piece clockwise as far as it will go



2. Lift off the neck piece



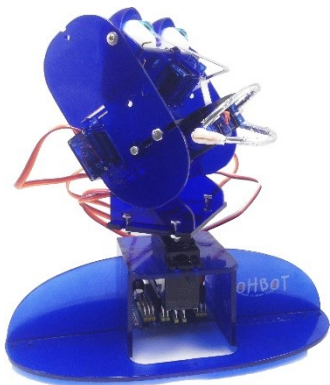
3. Orient the neck piece in the position shown, then push it back onto the servo



4. Screw the neck piece onto the servo



You will need:



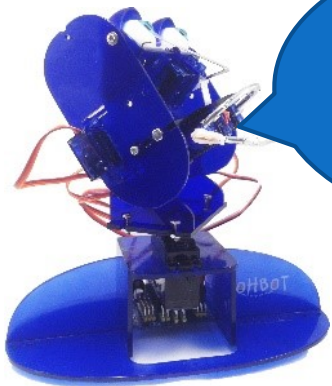
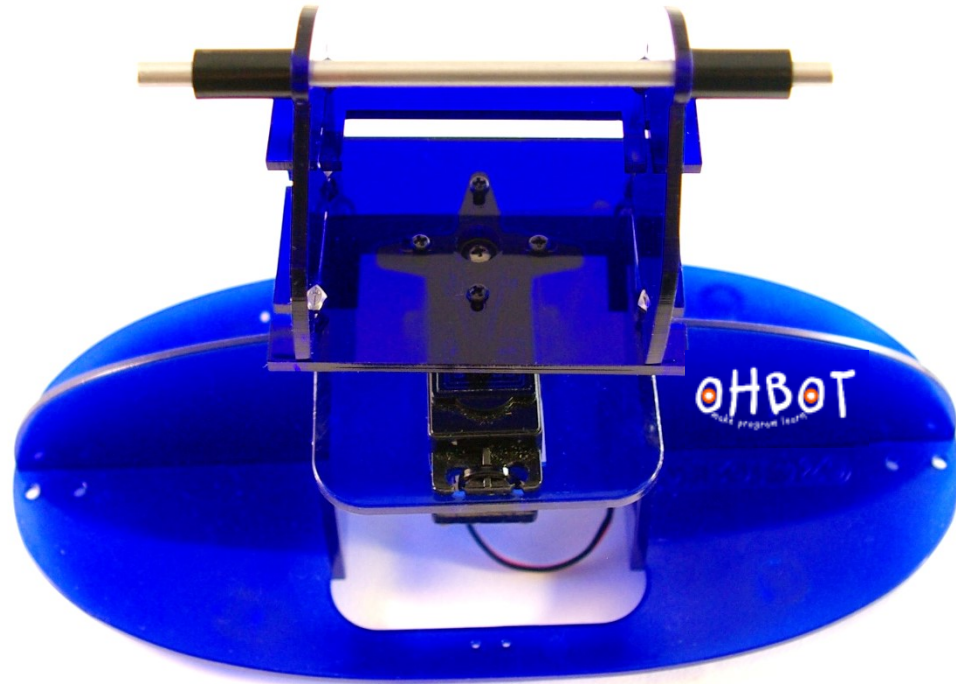
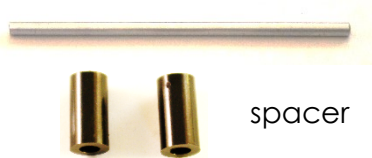
Large servo screw. It's in the bag with the large servo







You will need:



This pin allows  
Ohbot's head  
to tilt up and  
down







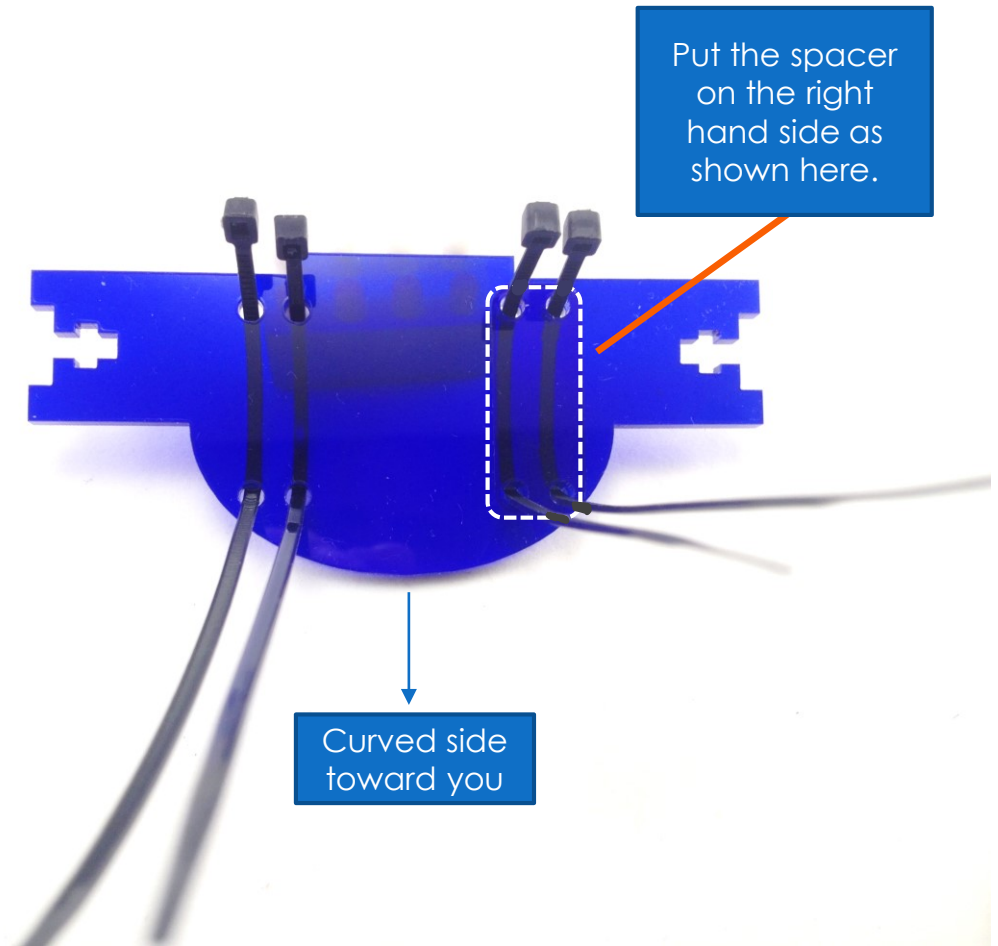
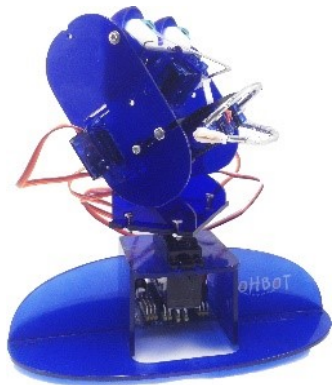
You will need:



spacer



long cable ties



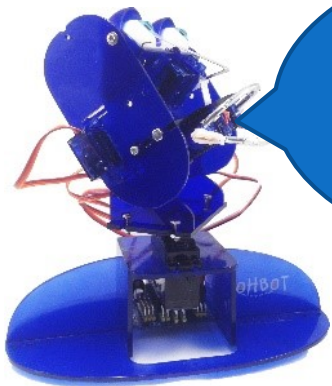
Put the spacer  
on the right  
hand side as  
shown here.

Curved side  
toward you

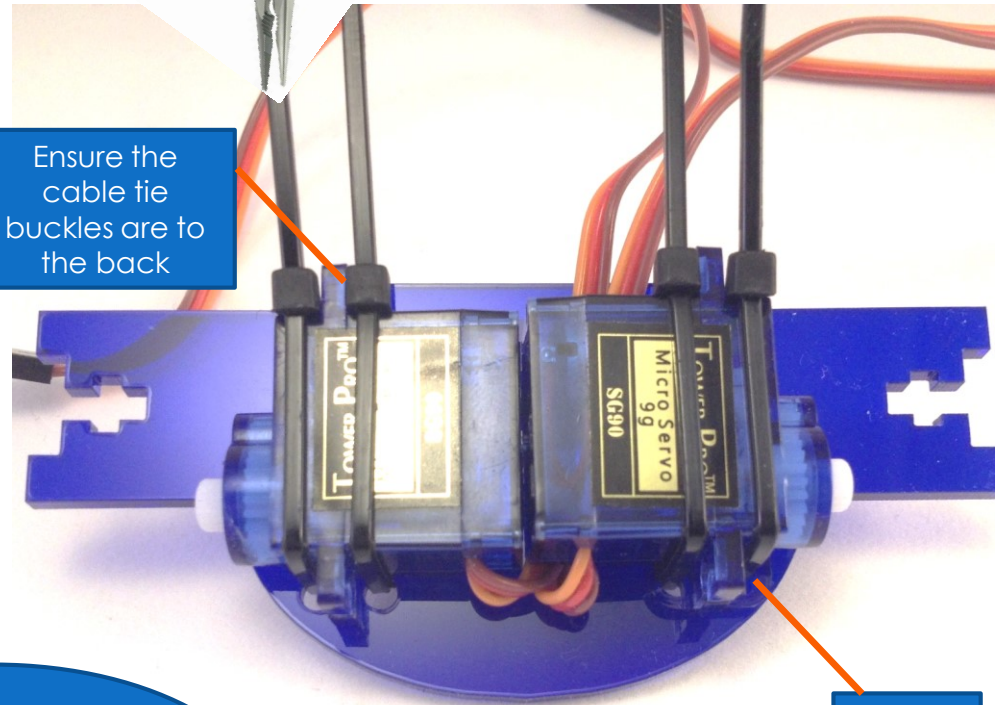




You will need:



Try using pliers to pull the cable ties really tight before cutting off the ends.



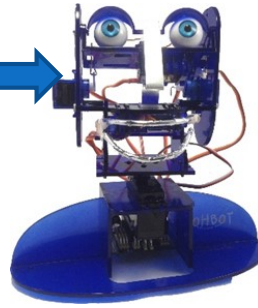
Chop off the ends of the cable ties



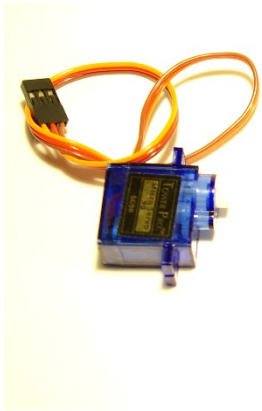


## Right cheek

right  
cheek

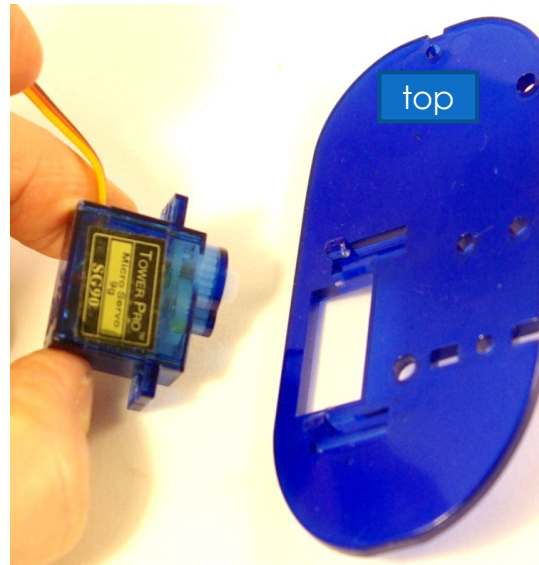


You will need:

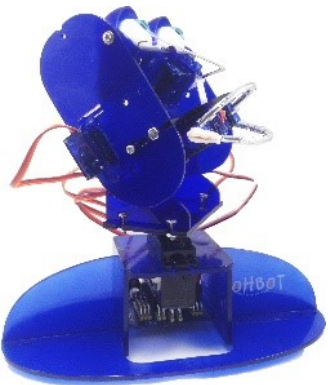
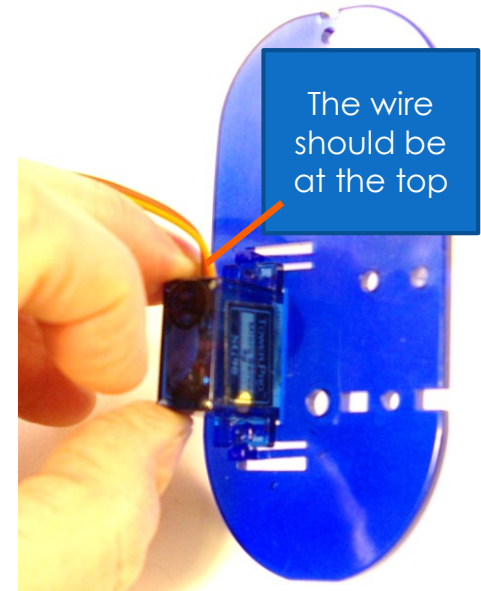


1. Orient the servo this way round,  
with the wire coming out of the  
servo to the top of the cheek.

2. Clip in  
place



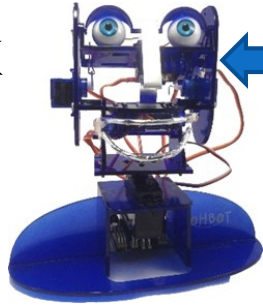
The wire  
should be  
at the top





## Left cheek

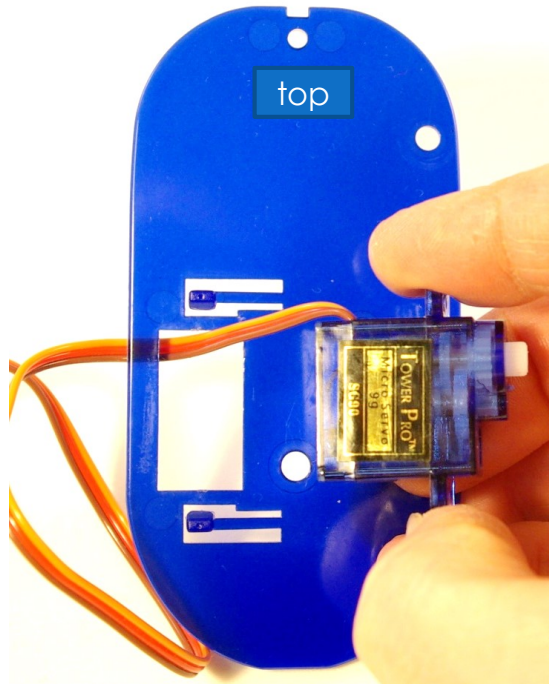
You will need:



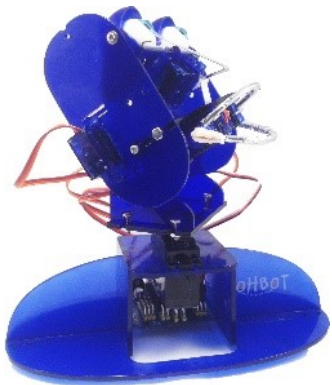
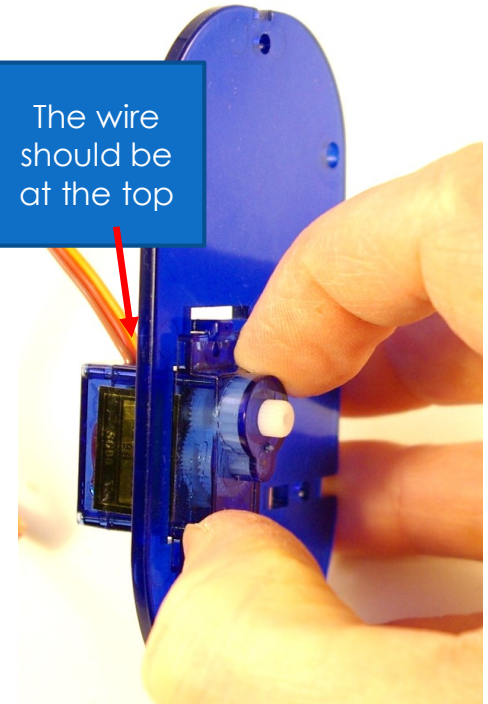
left  
cheek

1. Orient the servo this way round, with the wire to the top of the cheek.

2. Clip the servo in place



The wire  
should be  
at the top

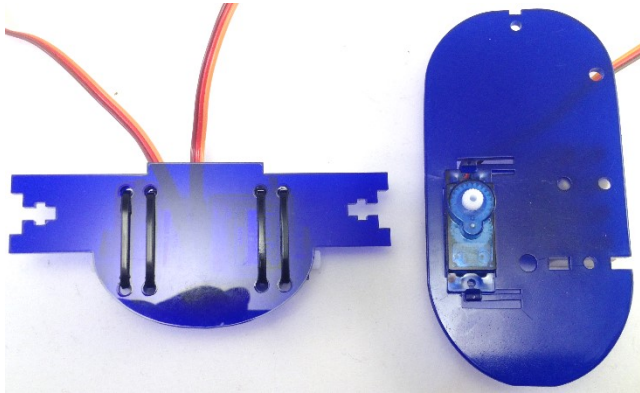






# Attaching the left cheek

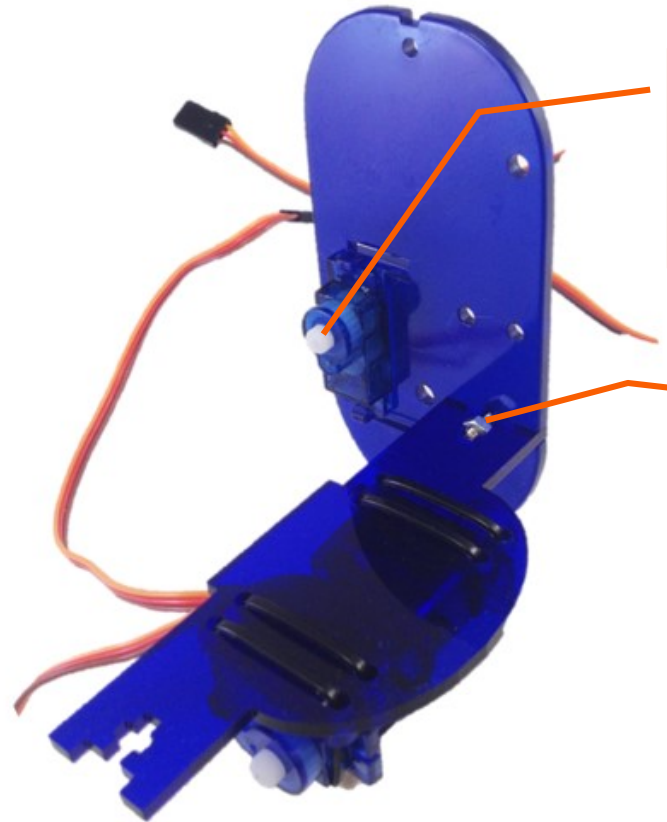
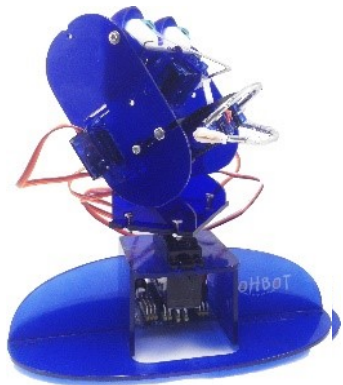
You will need:



10mm bolt



nut



White cylinder should point in

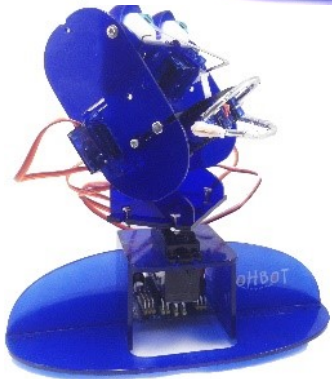
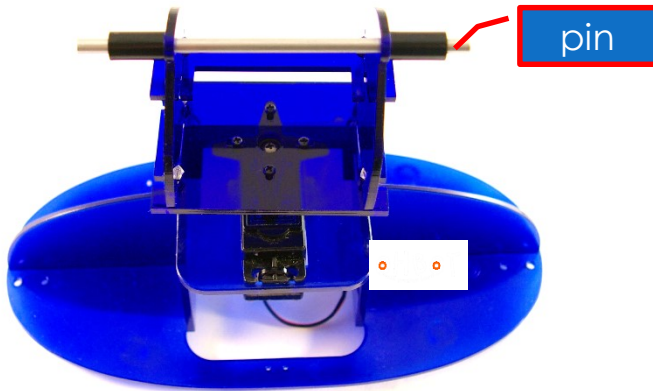
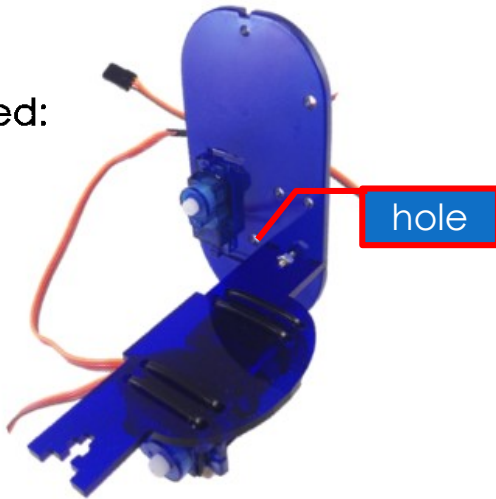
Nut and bolt fasten the cheek to jaw







You will need:





# Attaching the right cheek

You will need:



Ohbot's right cheek



10mm bolt

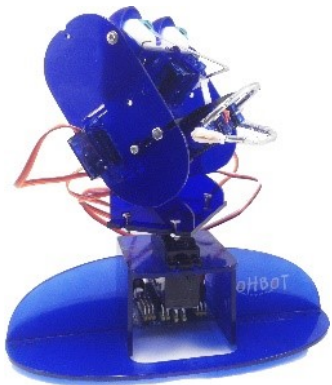
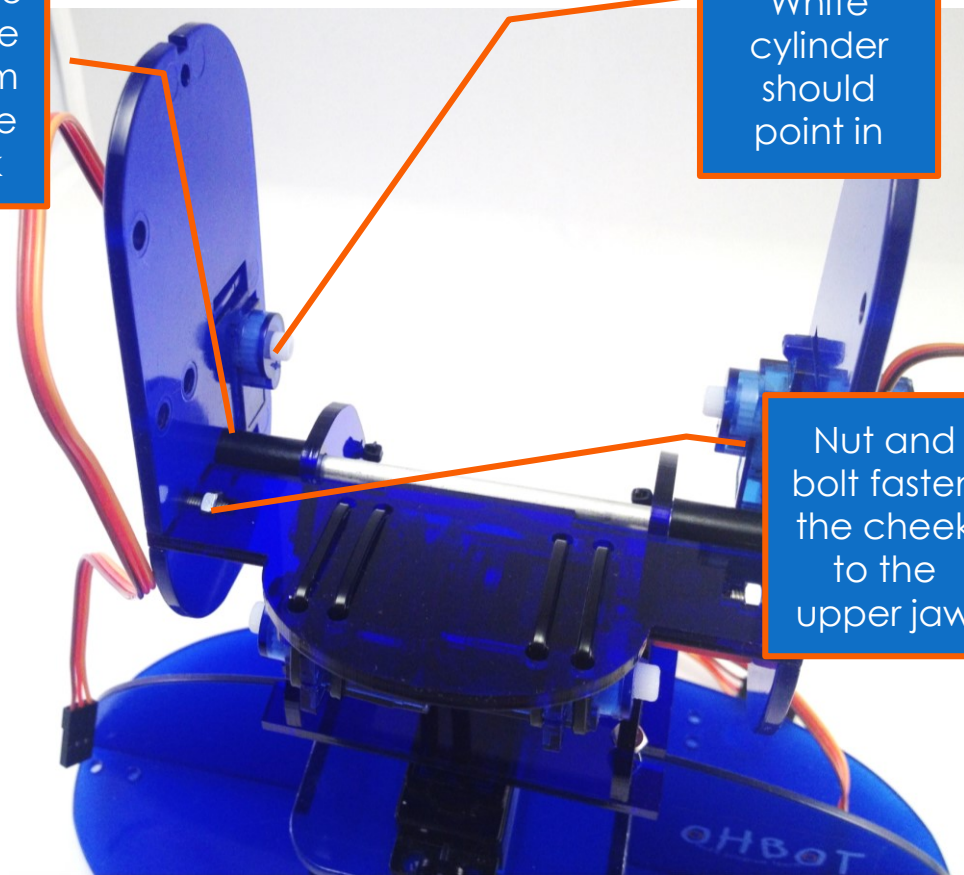


nut

Locate the end of the aluminium pin in hole in cheek

White cylinder should point in

Nut and bolt fasten the cheek to the upper jaw



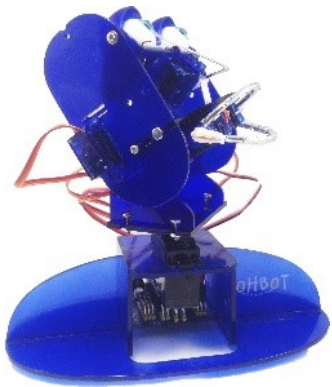
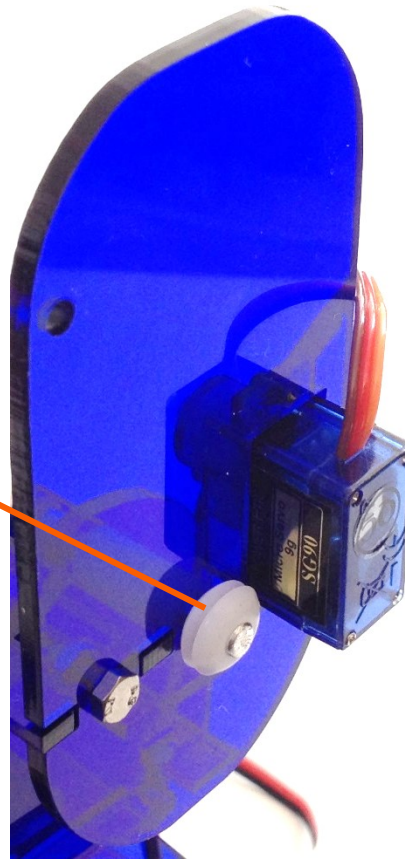


You will need:



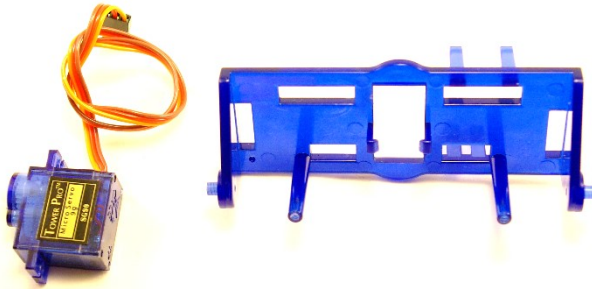
grommet

Push a  
grommet  
onto each  
end of the  
pin

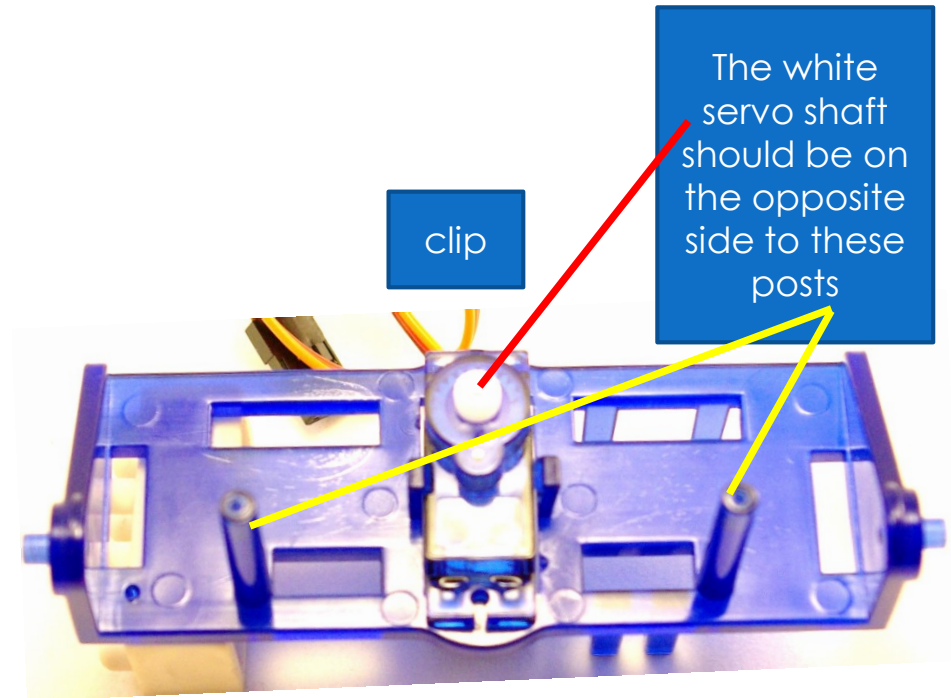
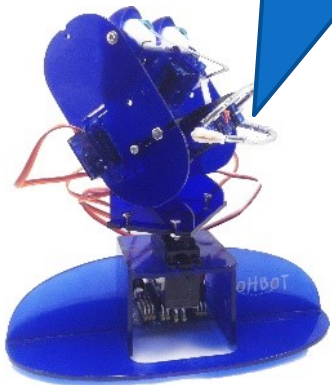




You will need:



You may find we've already done this for you so you can skip this page.

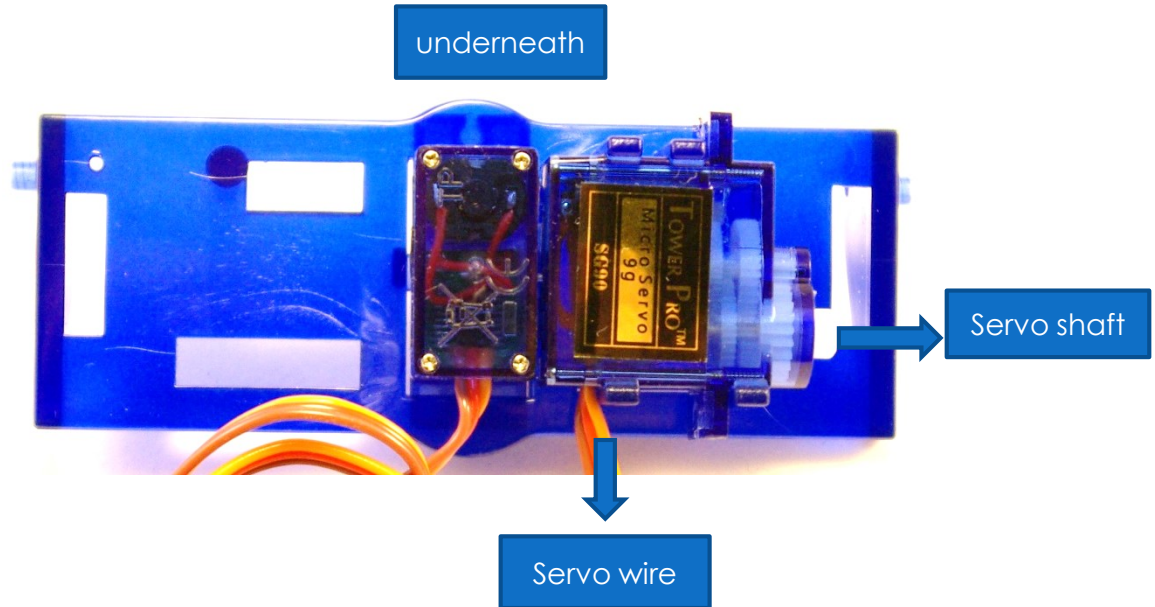
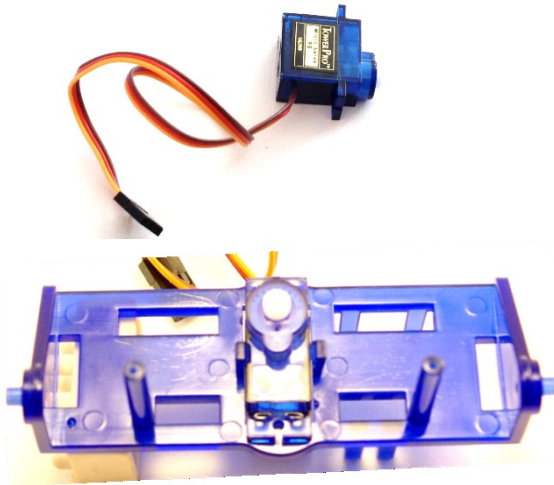






## Eyelid Servo

You will need:



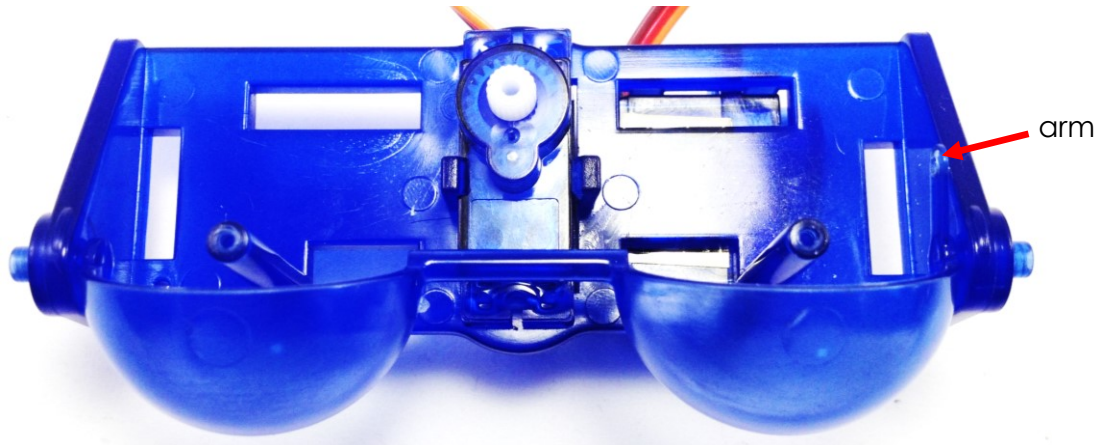
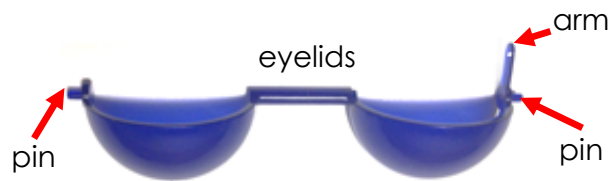
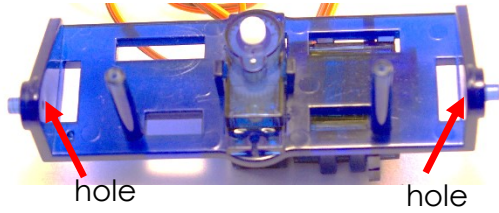




## Eyelid Servo

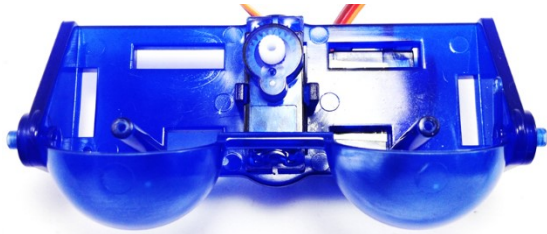
You will need:

eyebox





You will need:



4mm screws

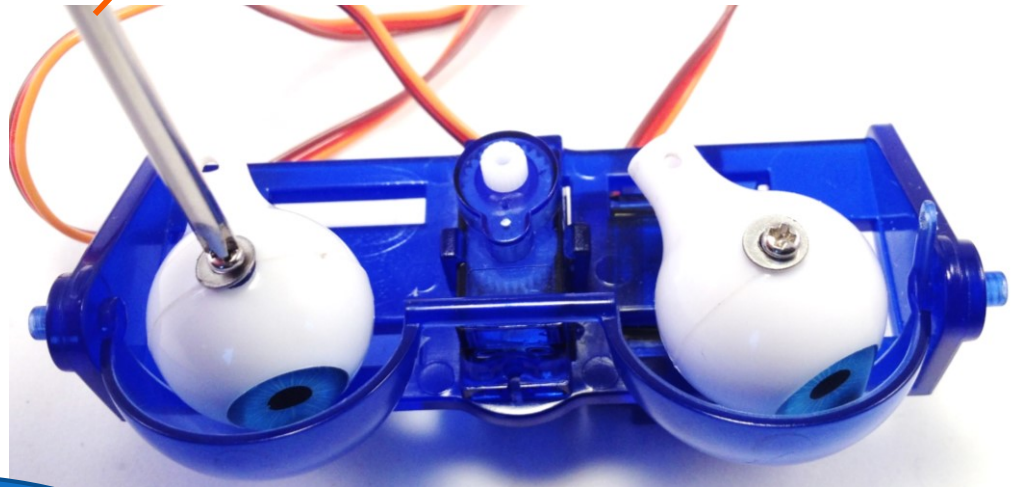


washers

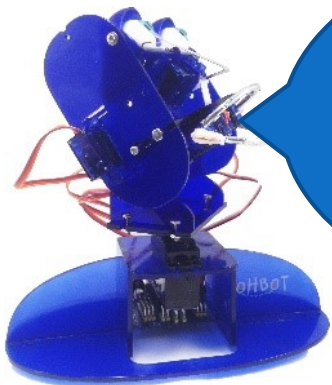
or



4.5mm  
washer head  
screws



Avoid over  
tightening, the  
eyeball should still  
be able to move  
freely

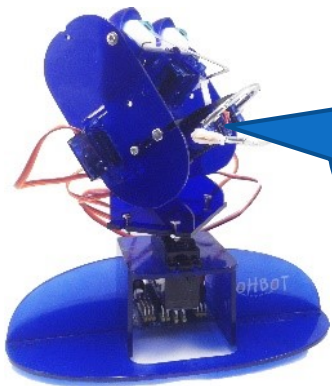
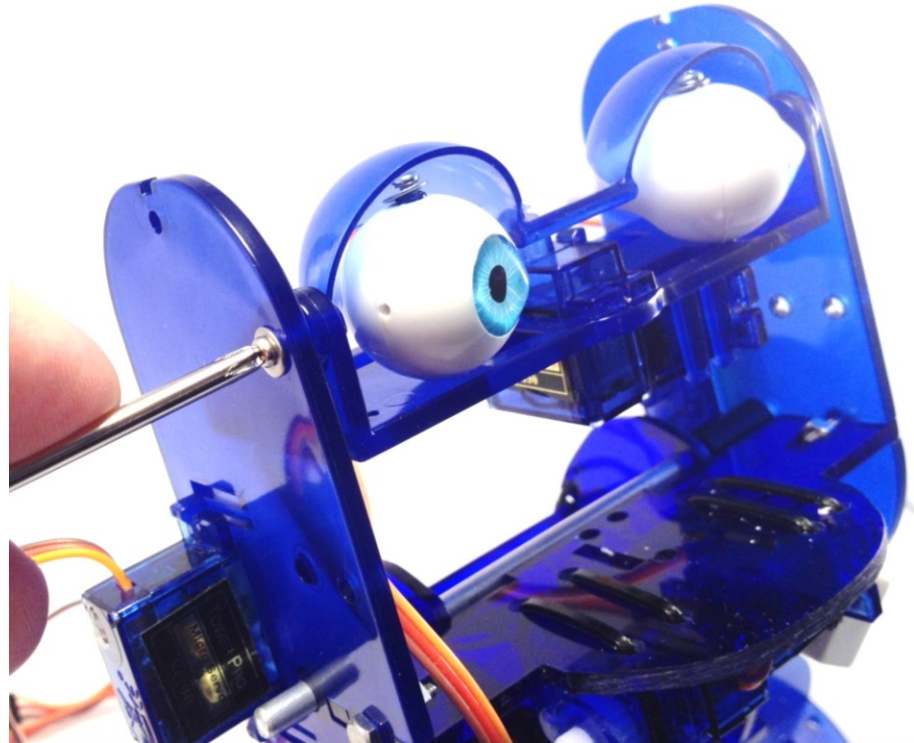
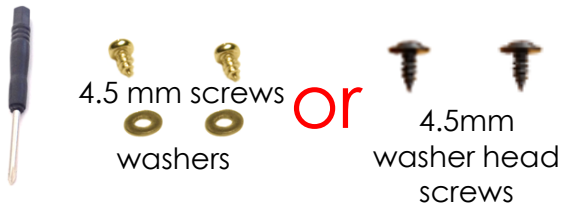
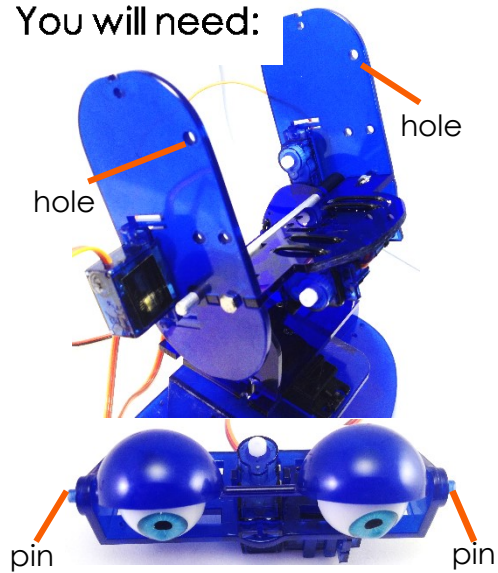


The holes in the  
eyeballs are two  
different sizes. Try the  
eyeballs both ways up  
and choose the way  
that allows the eyeball  
to move most freely.





You will need:

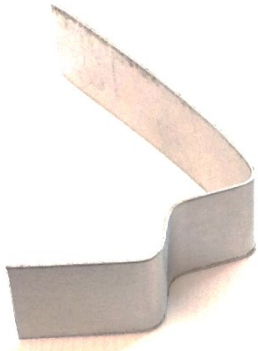


Locate the pins on  
the sides of the  
eyebow in the holes  
on the cheeks.

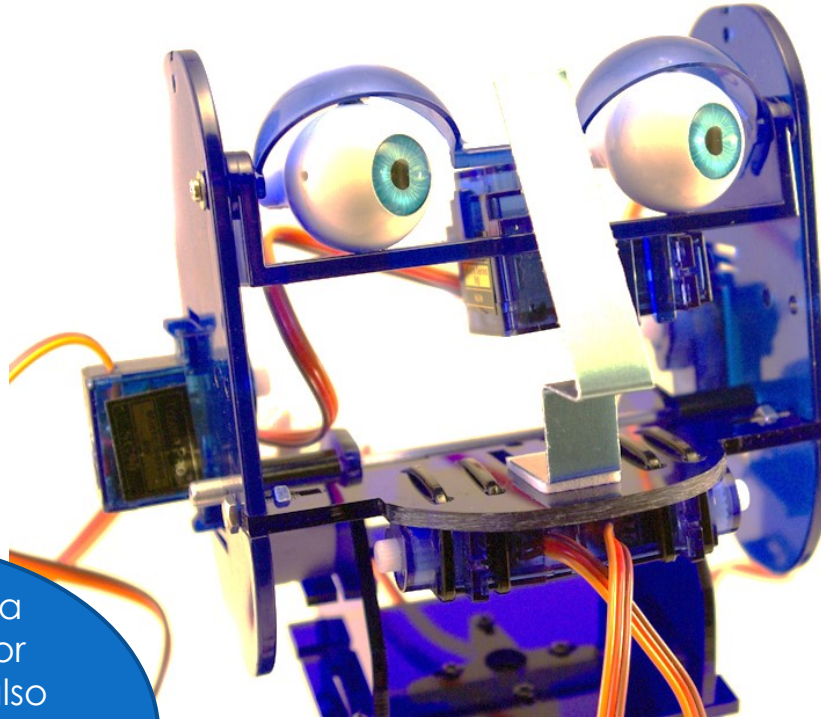




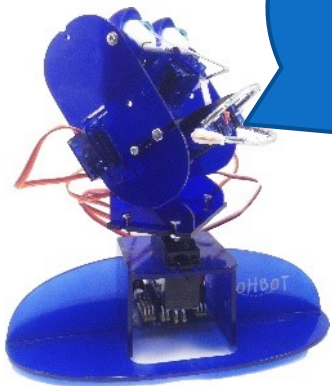
You will need:



double  
sided sticky  
pad



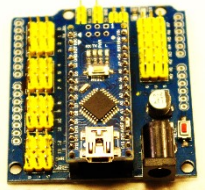
Why not make a  
different nose for  
Ohbot? Ohbot also  
has plenty of holes  
to attach any other  
accessories you  
make



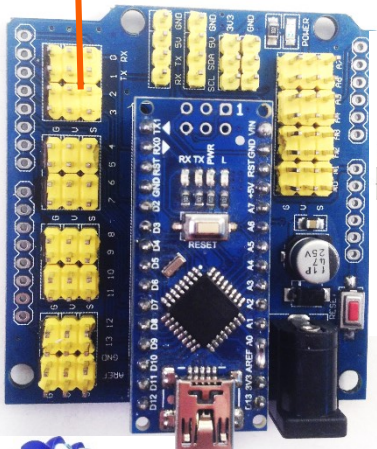




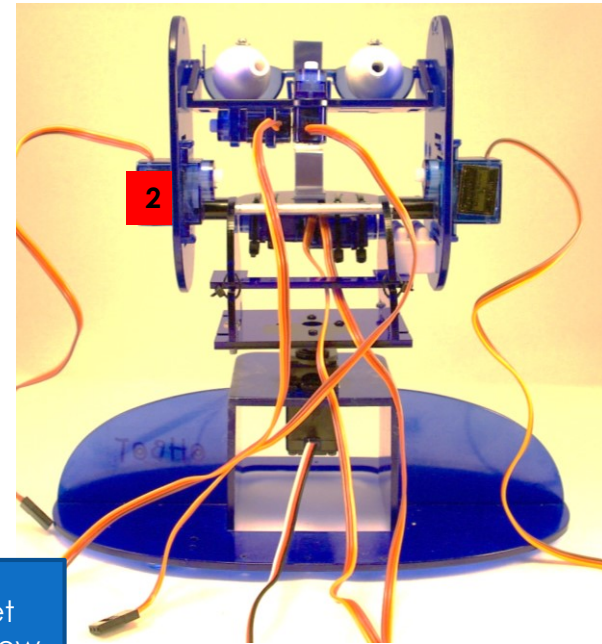
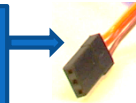
You will need:



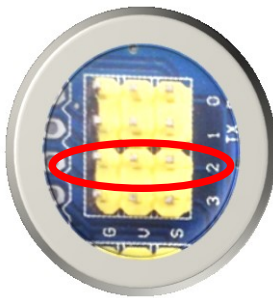
2. Locate the pins marked 2, on the left hand side of the board.



1. Find the socket at the end of the wire for the servo marked **2** (the head nod one) as shown on photo.

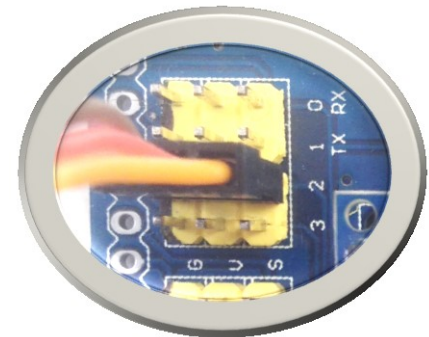
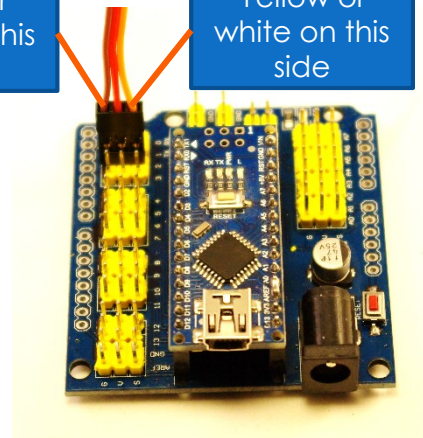


3. Attach the socket ensuring that the yellow or white wire is to the right and the brown or black wire is to the left



Brown or black on this side

Yellow or white on this side



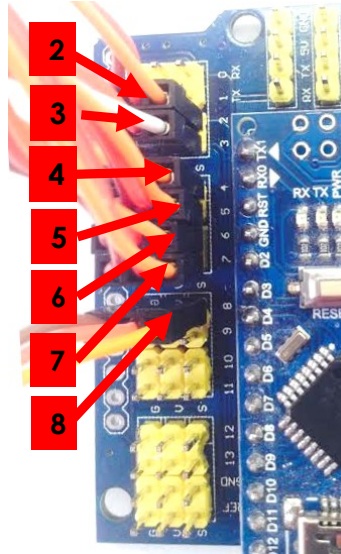




You will need:



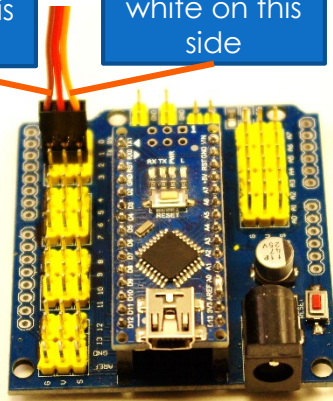
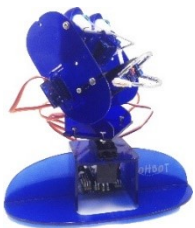
1. Find the socket for servo **3** (head turn) and attach it to the pins on the control board marked 3. Continue this with the remaining servo sockets following the order shown here.



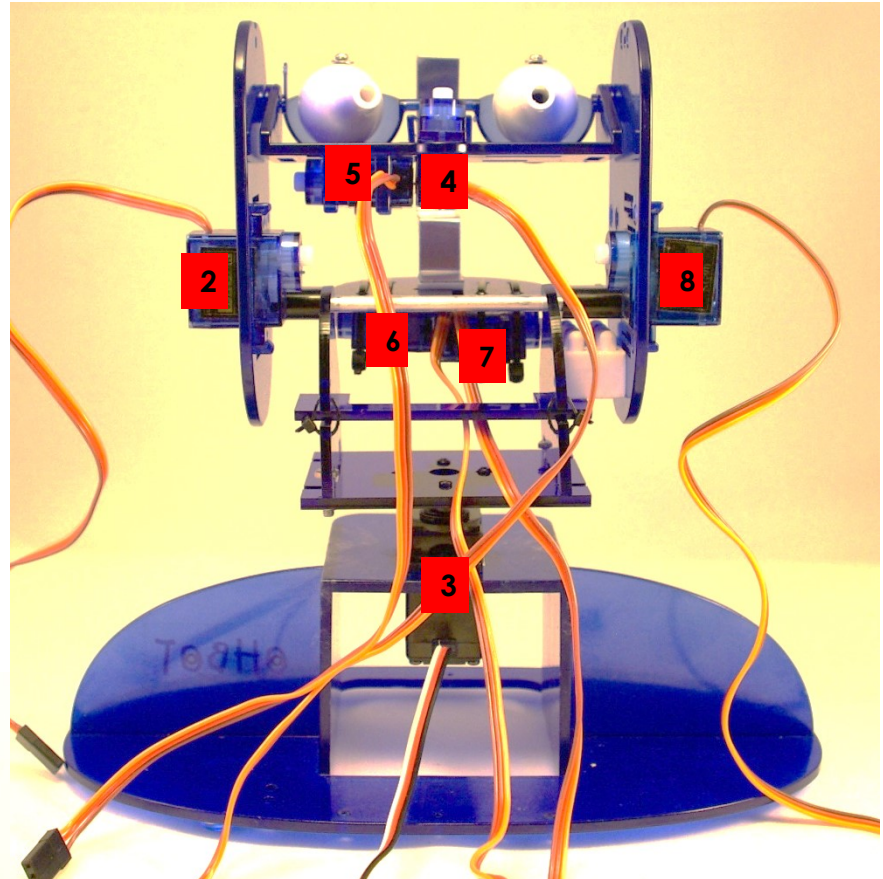
Take care to ensure that all sockets are connected this way:

Brown or black on this side

Yellow or white on this side



Note that servo 6 is the upper lip (without the spacer) and servo 7 is the lower lip (with the spacer)

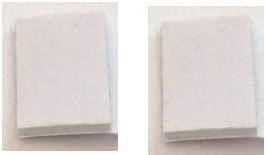




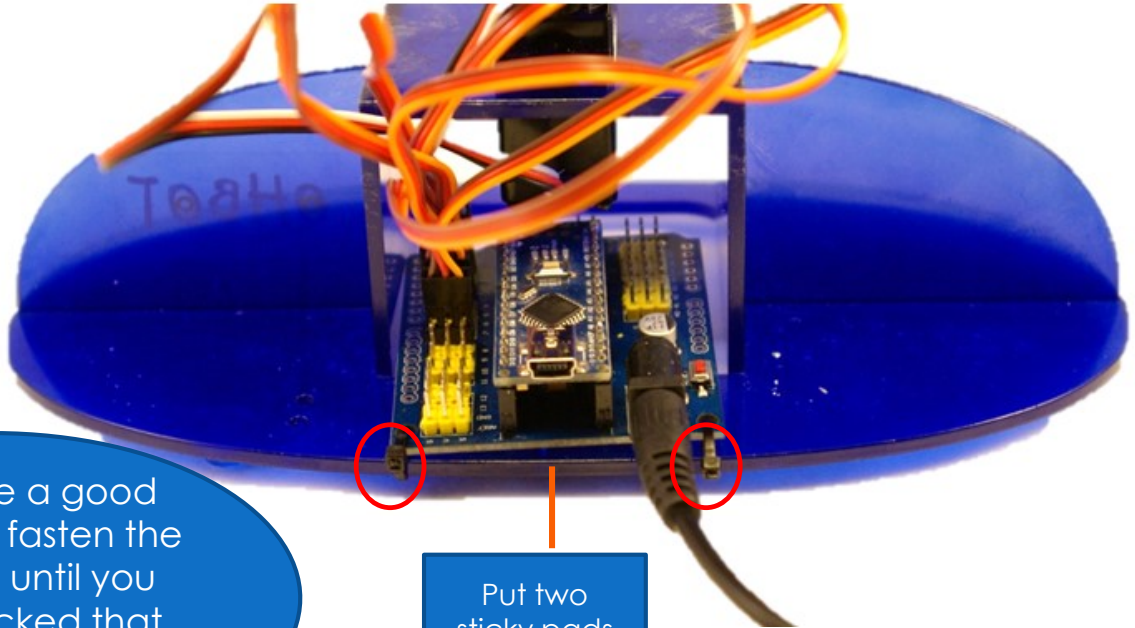
You will need:



short cable ties

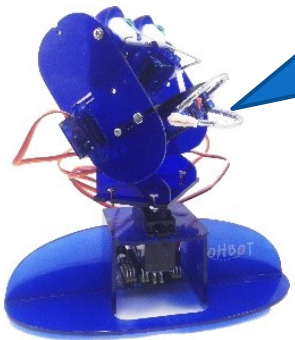


double sided  
sticky pad



Put two  
sticky pads  
between  
the base  
and the  
bottom of  
the board

It might be a good  
idea not to fasten the  
cable ties until you  
have checked that  
the servos are all in  
the right places

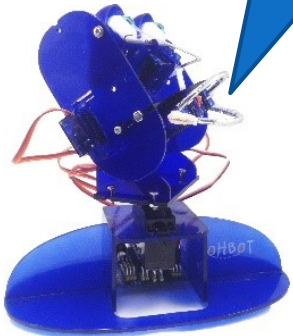
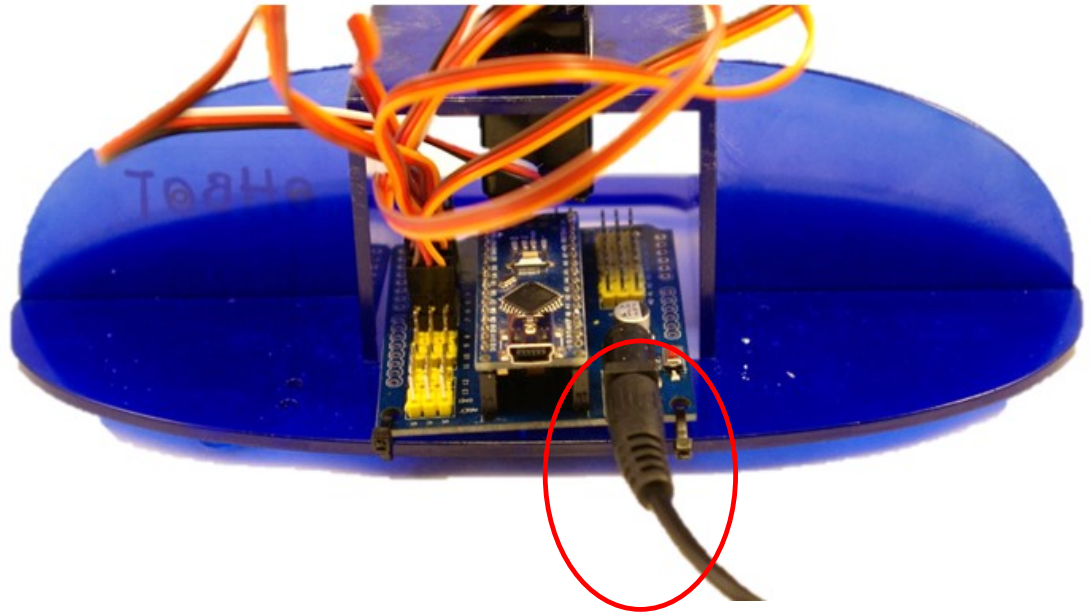




You will need:



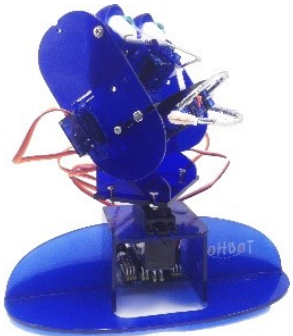
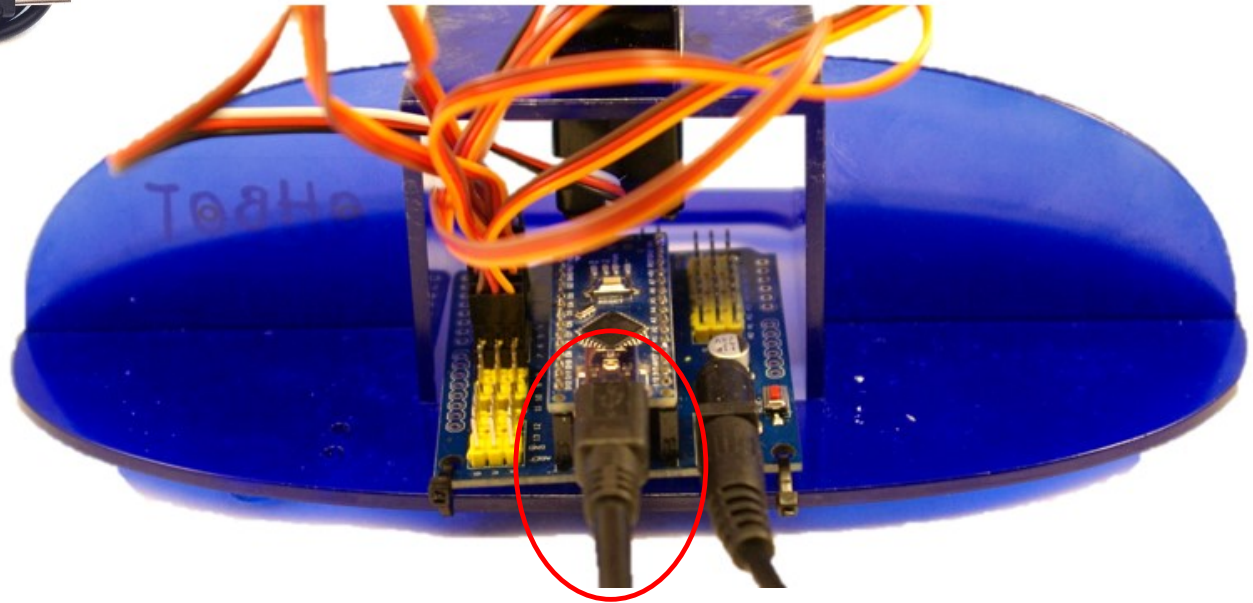
This power supply  
is needed to  
power the servos







You will need:







## Install Ohbot Software

Go to [www.ohbot.co.uk](http://www.ohbot.co.uk)

HOME CONTACT ABOUT **MAKE** BUY TALK

HOW TO MAKE  
OHBOT

**HOW TO INSTALL  
OHBOT SOFTWARE**

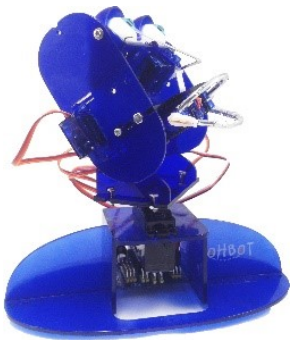
GETTING STARTED +

HELP



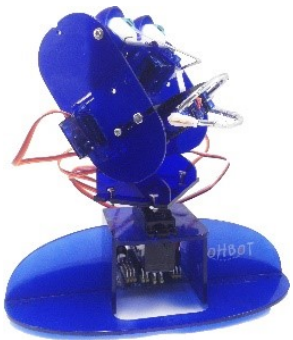
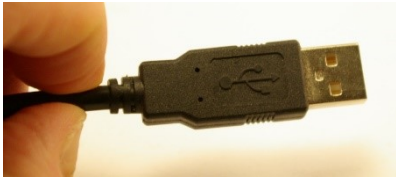
A robot head kit. Make it. Bring it to life.

Learn programming and computational thinking.

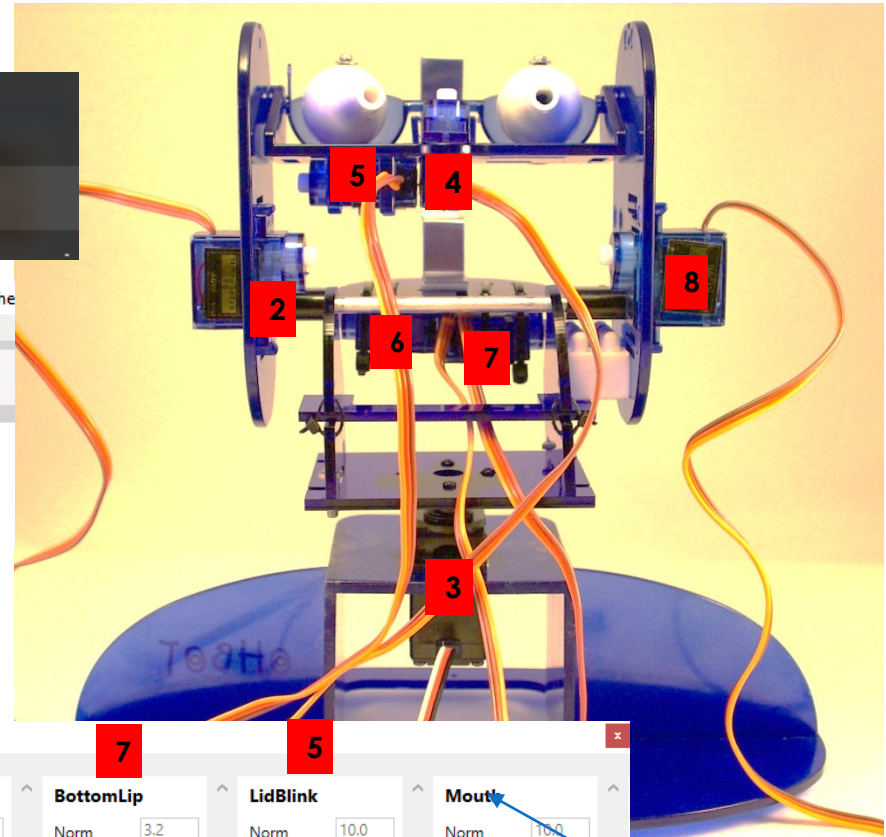
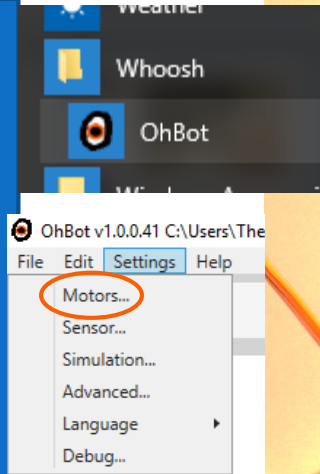




You will need:



1. Run the Ohbot software (it should be listed on the All Programs/All Apps menu in the Whoosh folder. For Win 8 it is easiest to run a search for Ohbot)
2. On the Settings menu click on Motors...
3. Enter the password- Einstein or Ctrl + Alt + E to unlock the motor settings dashboard. Tick the Motors On box.
4. Without the servo arms attached check that the corresponding servo moves as you drag the slider. If they don't then check the servos are plugged into the correct pins as shown on P29.



Motor	HeadTurn	HeadNod	EyeTurn	EyeTilt	TopLip	BottomLip	LidBlink	Mouth
Norm	5.0	5.0	5.0	5.0	6.1	3.2	10.0	10.0
Raw	500	425	580	720	214	374	340	460
Rest Pos.	5.0	5.0	5.0	5.0	5.0	5.0	10.0	10.0
Min	0	0	260	440	0	0	0	80
Max	1000	850	900	1000	550	550	340	460
Speed	40	0	0	0	0	0	0	0
Motor	1	0	2	6	4	5	3	7
Reverse	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Avoid					Bottom	TopLip		

☒ Motors On

This motor control is only used if using Ohbot V1



## Set up head nod (servo 2)

You will need:



1. Adjust the HeadNod slider until Norm reads 5.0. Ensure there is a tick in the Reverse checkbox.

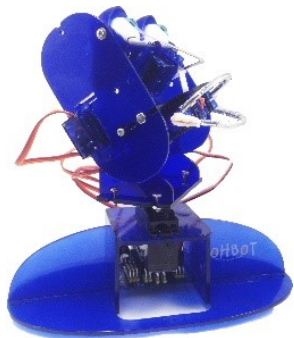
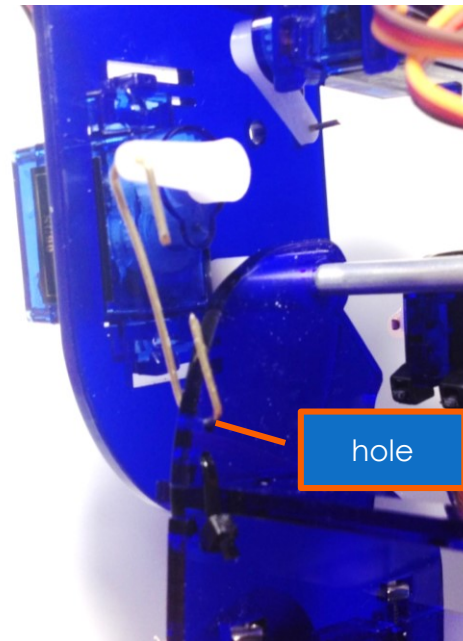
**HeadNod**

Norm	5.0
Raw	425
Rest Pos.	5.0
Min	0
Max	850
Speed	0
Motor	0
<input checked="" type="checkbox"/> Reverse	
Avoid	



3. Use a small screw to secure the servo arm in place

2. Thread one end of the servo wire through the hole in the neck first then attach the arm. Finally push the arm onto the servo so that the head is level, not tilted up or down.

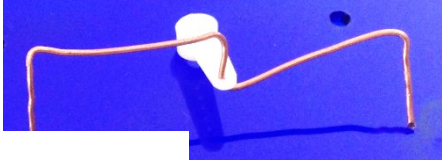






## Set up eye turn (servo 4)

You will need:



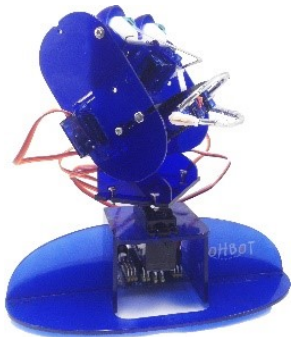
1. Adjust the slider until Norm reads 5.0

pliers



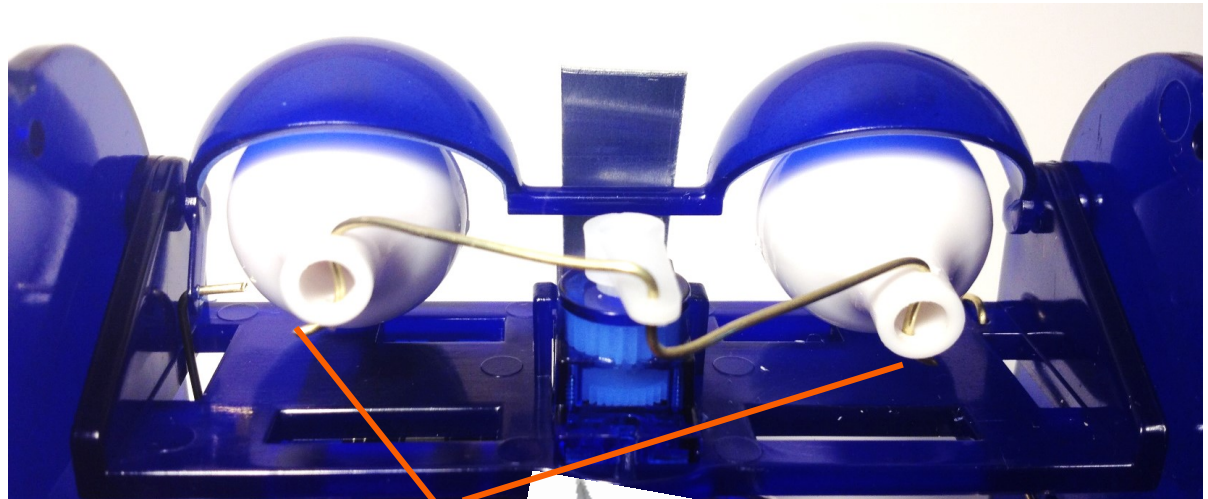
3. Use a small screw to secure the servo arm in place

2. Attach the servo arm so the eyes are looking straight forward. If the eyes point in different directions bend the wire between the eyeball and servo arm until they are straight.



### EyeTurn

Norm	5.0
Raw	580
Rest Pos.	5.0
Min	260
Max	900
Speed	0
Motor	2
<input type="checkbox"/> Reverse	
Avoid	



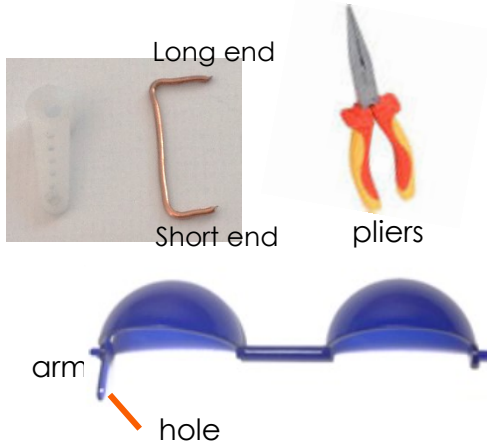
Use pliers to bend the end of the wire





## Set up lid blink (servo 5)

You will need:



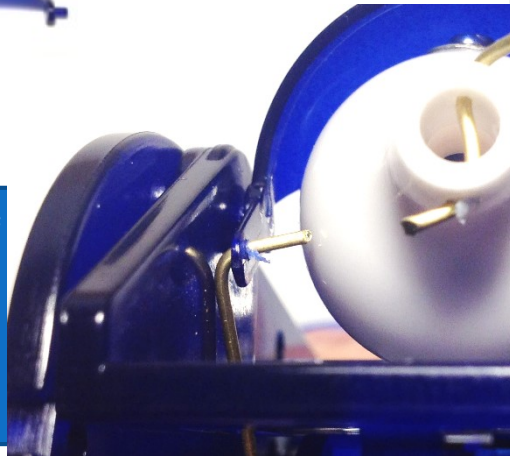
1. Adjust the LidBlink slider until Norm reads 10

LidBlink	
Norm	10.0
Raw	340
Rest Pos.	10.0
Min	0
Max	340
Speed	0
Motor	3
<input type="checkbox"/> Reverse	
Avoid	

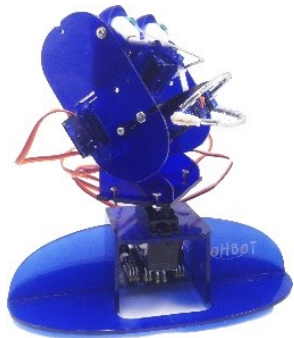
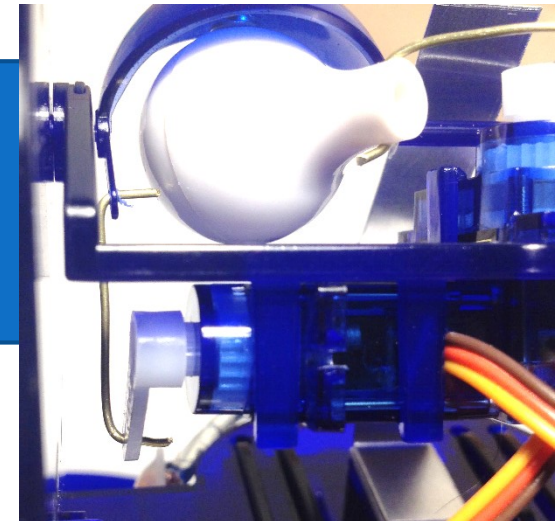


4. Use a small screw to secure the servo arm in place

2. Thread the shortest end of the C shaped wire into the hole in the eyelid arm. Put the servo wire through the hole at the bottom of the eye box.



3. Pull wire down to open the eyelids as far as they will go. Use pliers to attach the arm onto the servo in this position





## Set up eye tilt (servo 8 )

You will need:



1. Adjust the EyeTilt slider until Norm reads 5.0

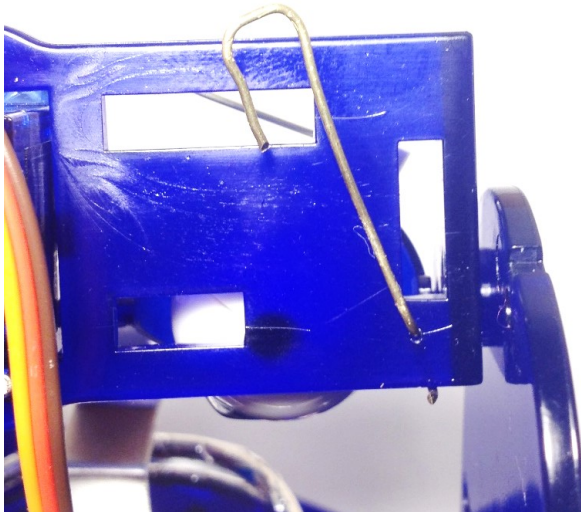
EyeTilt

Norm	5.0
Raw	720
Rest Pos.	5.0
Min	440
Max	1000
Speed	0
Motor	6
<input type="checkbox"/> Reverse	
Avoid	

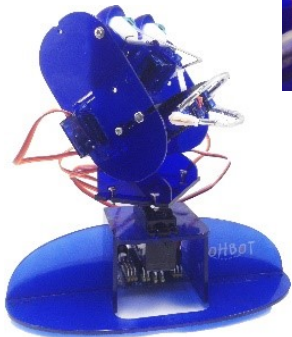
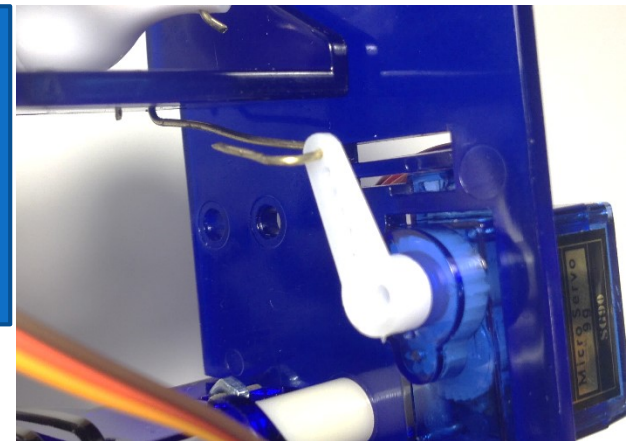


4. Use a small screw to secure the servo arm in place

2. Thread the S shaped end of the servo wire into the hole at the front corner of the eye box



3. Thread the other end of the servo wire onto the servo arm. Push the servo arm onto the servo in a position so that the eye box is horizontal.

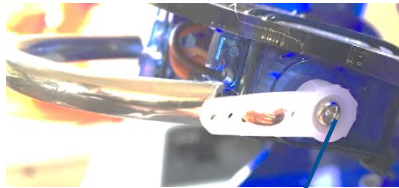






## Set up Top Lip (servo 6)

You will need:



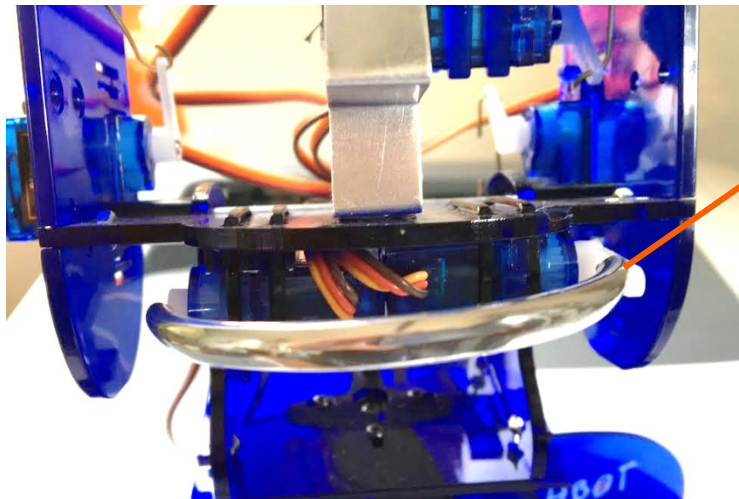
1. Adjust the Top Lip slider until Norm reads 5.0  
Ensure there is a tick in the Reverse checkbox

**TopLip**

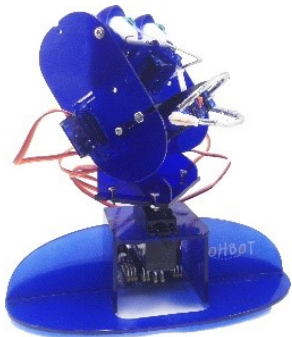
Norm	5.0
Raw	275
Rest Pos.	5.0
Min	0
Max	550
Speed	0
Motor	4
<input checked="" type="checkbox"/> Reverse	
Avoid	Bottom

3. Use the smallest screw (find in the bag with the servo) to secure the lip in place

2. Attach the lip onto the servo so that it is horizontal (neither smile or frown)



The top lip attaches on this side







## Set up Bottom Lip (servo 7)

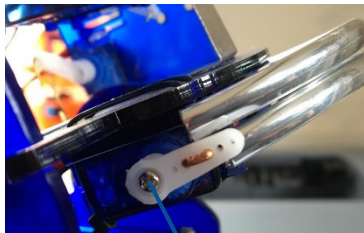
You will need:



1. Adjust Bottom Lip slider until Norm reads 5.0  
Ensure there is a tick in the Reverse checkbox

**BottomLip**

Norm	5.0
Raw	275
Rest Pos.	5.0
Min	0
Max	550
Speed	0
Motor	5
<input checked="" type="checkbox"/> Reverse	
Avoid	TopLip

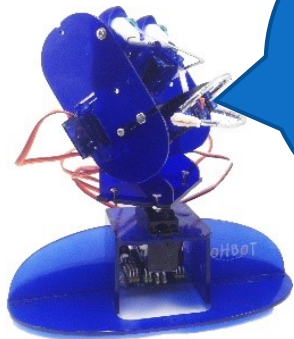
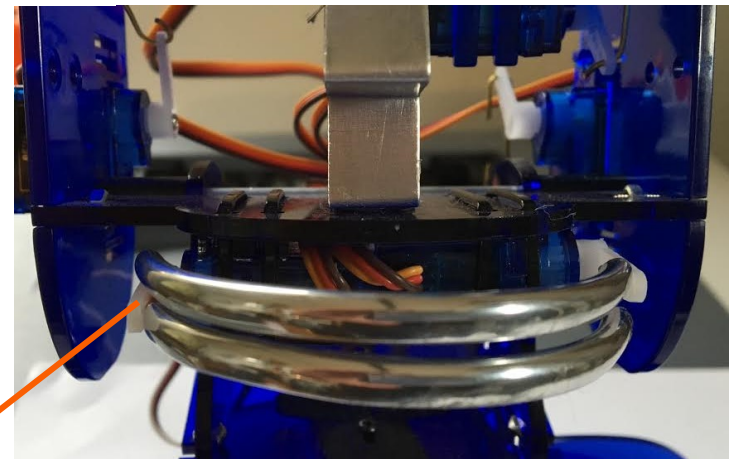


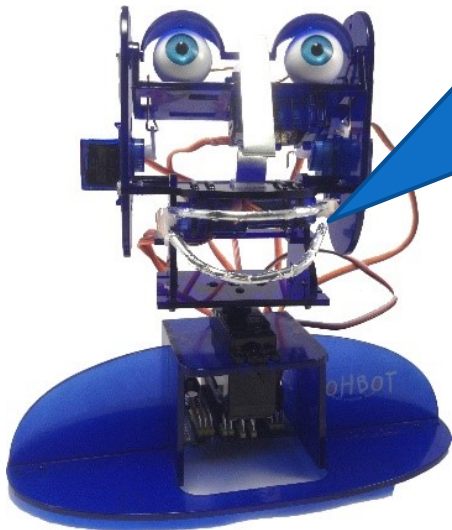
3. Use the smallest screw (find in the bag with the servo) to secure the lip in place

Ohbot's lips are made from copper wire so they can easily be reshaped or shortened to match

2. Attach the Bottom Lip onto the servo so that it is beneath the top lip as shown.

The Bottom Lip attaches to the servo on this side





Hooray, you've  
constructed Ohbot!  
Now let the  
programming  
begin...

