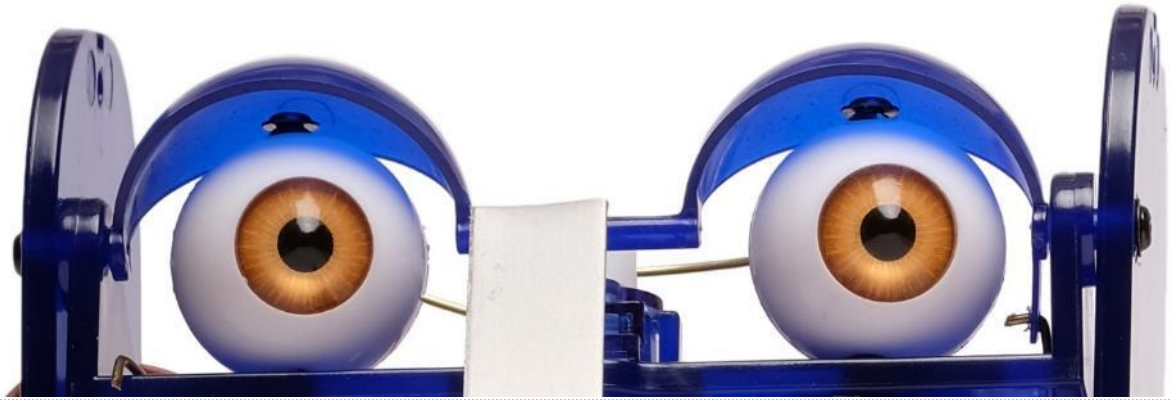
oHBoT®
make program learn

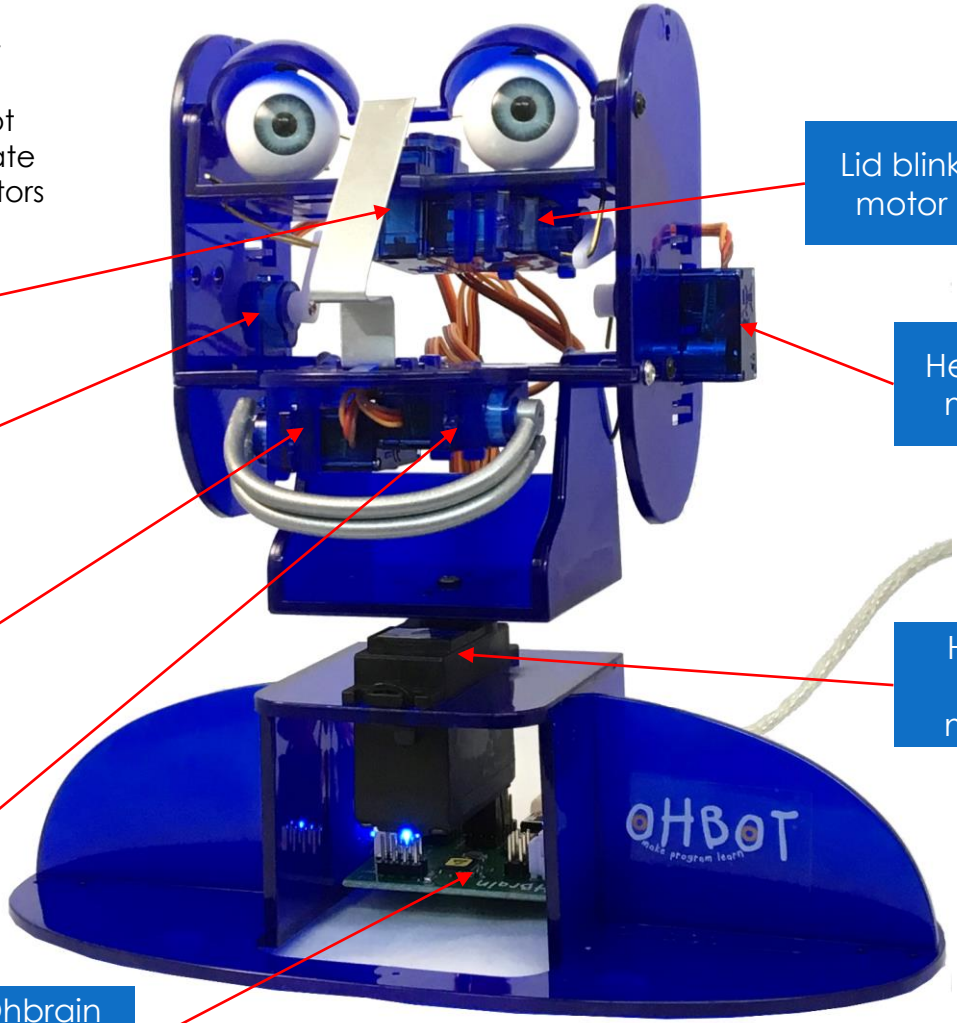
Making Instructions

Version 2.1 for Raspberry Pi



About

Ohbot has seven motors. Each connects to the Ohbrain circuit board and this connects to a computer using a cable. Ohbot software allows humans to create programs to make Ohbot's motors move.

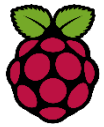


Kit Parts

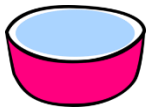
You will need…

- The Ohbot V2.1 kit
- scissors

- Long nose pliers
- The Ohbot Part Finder sheet
- A Raspberry Pi computer

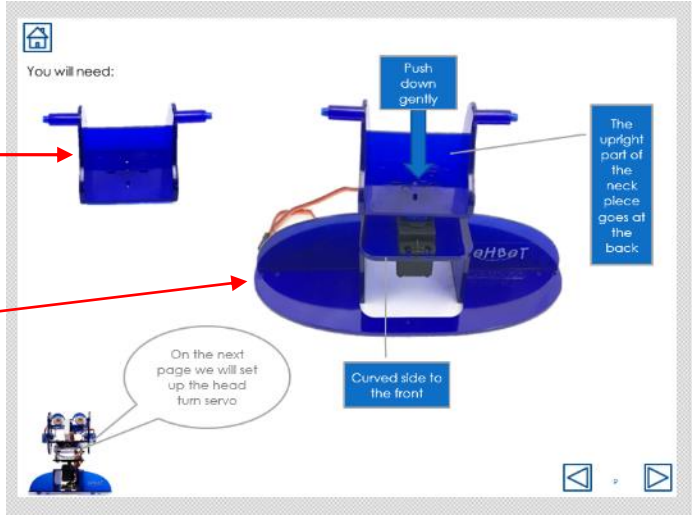


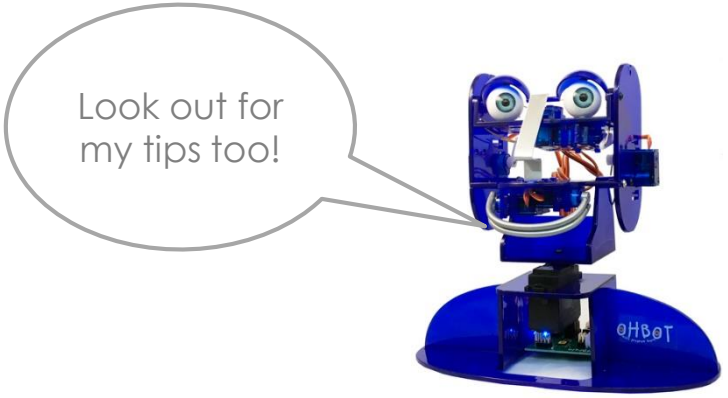
- An hour or possibly a little more
- A bowl to hold small parts until they are needed



Instructions

- Each page is a step in constructing Ohbot
- The parts needed are shown on the top left of each page
- If you need tools it will show this too
- The main picture or pictures show how to assemble

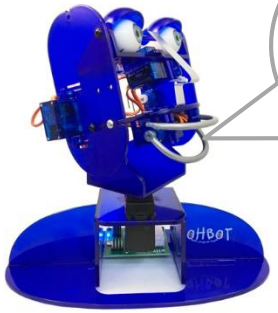




Feet

You will need:

underside of base



Nice work! I don't want to brag, but Ohbots do have two more feet than you do!

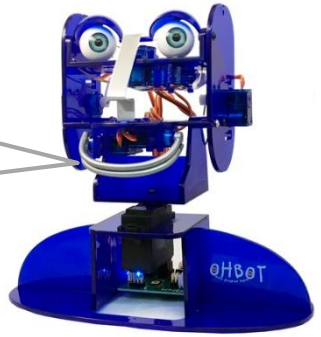
Neck turn motor

You will need:

1. Place the base so that the Ohbot sticker is facing toward you

2. Thread the motor's cable through the big hole on the top of the base then put the motor in so that the writing on the label is the right way up.

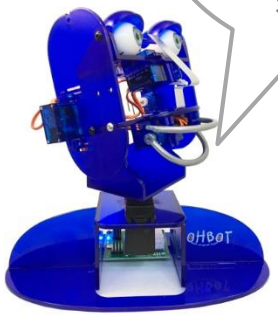
This motor allows me to shake my head. No really, it does!



Fixing the neck turn motor

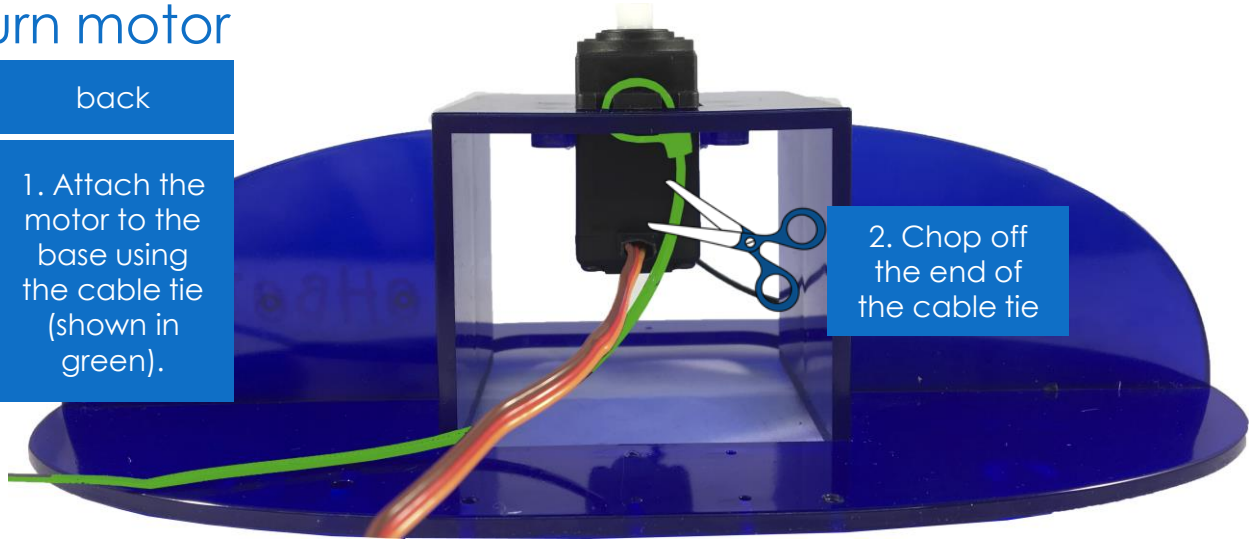
You will need:

Don't chop your finger off while cutting the ties. Just saying!



back

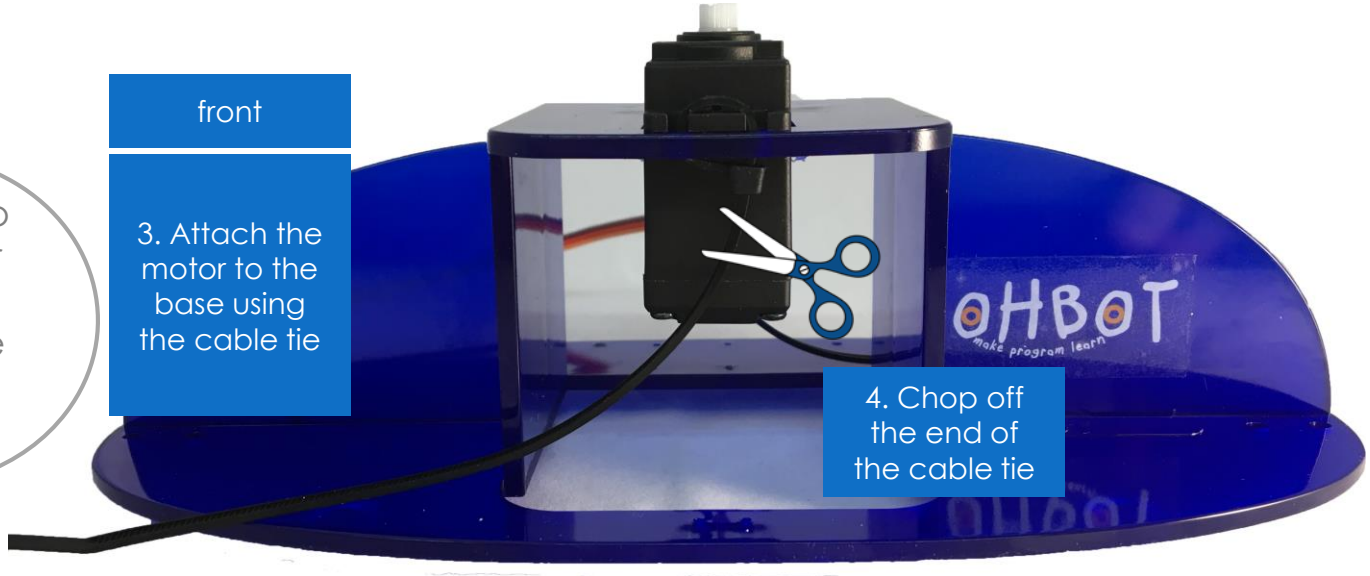
1. Attach the motor to the base using the cable tie (shown in green).



2. Chop off the end of the cable tie

front

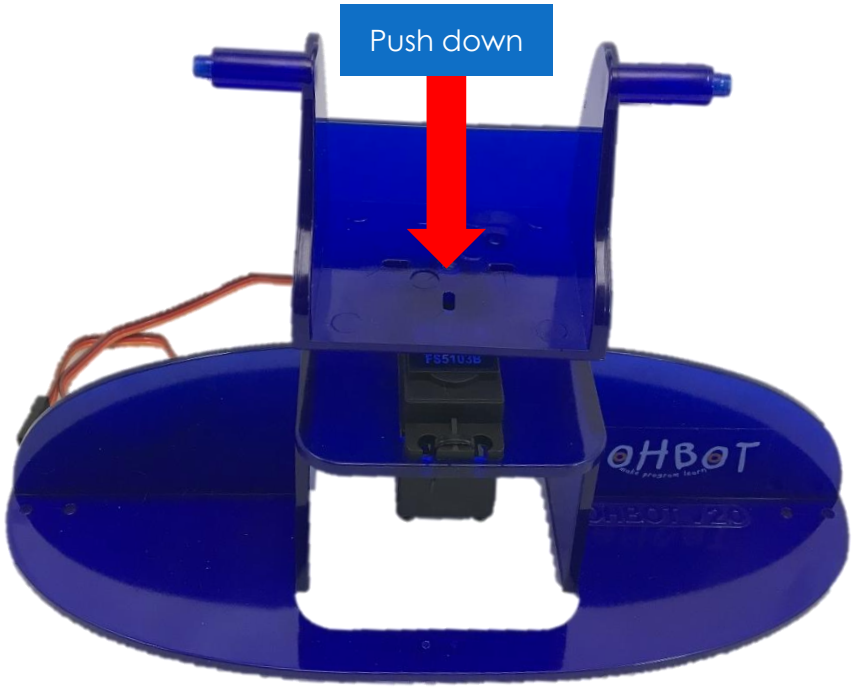
3. Attach the motor to the base using the cable tie

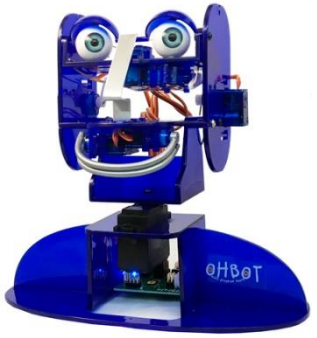


4. Chop off the end of the cable tie

Attaching the neck

You will need:



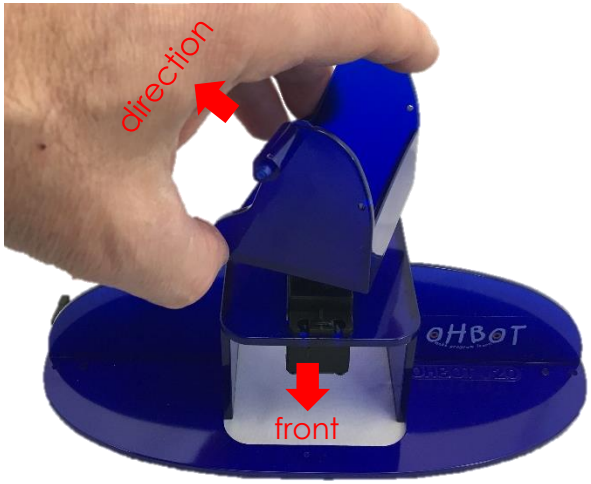


Setting up the neck turn motor

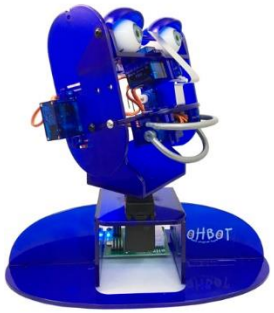
1. Make sure the base is facing you with the Ohbot sticker to the front. Gently turn the neck piece clockwise as far as it will go

2. Lift off the neck piece

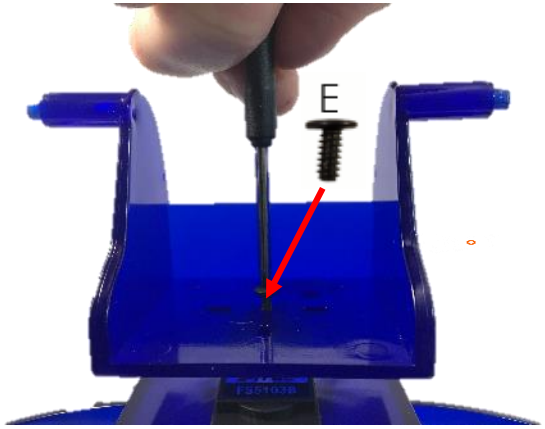
3. Orient the neck piece in the position shown, then push it back onto the motor



You will need:

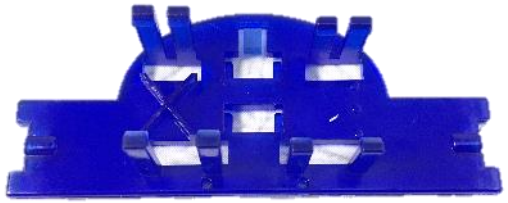


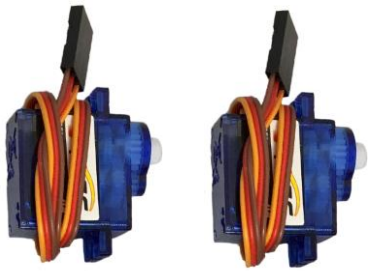
4. Screw the neck piece onto the motor

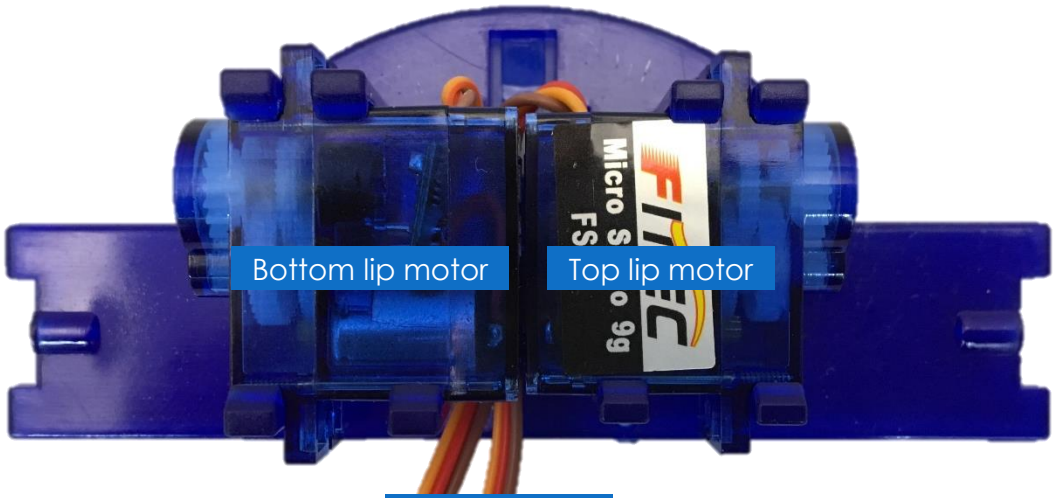


Attaching lip motors

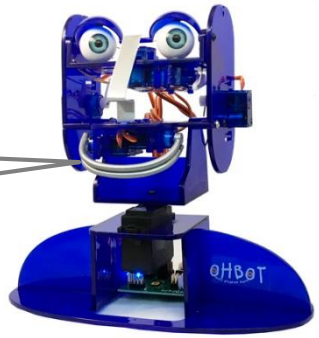
You will need:



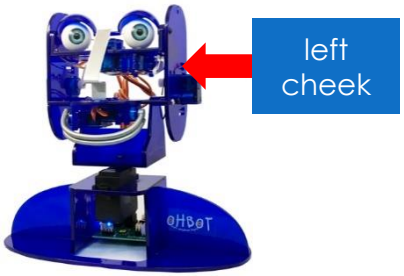




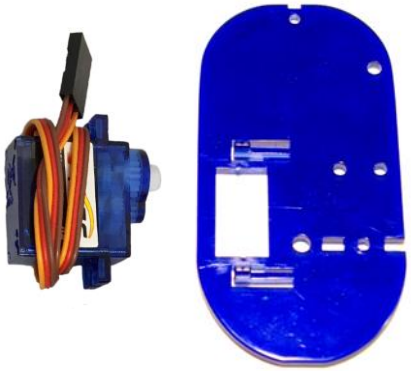
Make sure the wires come out of the motors on the curved side of the jaw and go underneath the bottom lip motor. Label the wires for the top and bottom lip to make them easier to identify later.



Fixing left cheek motor



You will need:

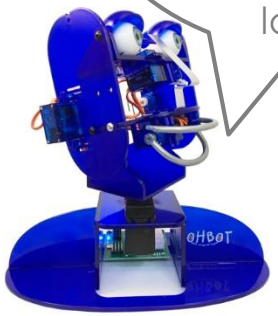


1. Orient the motor with the cable coming out towards the top of the cheek. Thread the cable through the hole.

2. Push the motor through at an angle, starting with the end of the motor where the cable comes out

3. Clip the motor in place

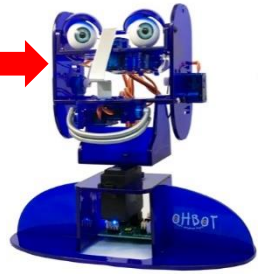
It's easy to muddle right and left cheeks later. Why not label this one 'Ohbot's lovely left cheek' so you can find it later.



Fixing right cheek motor

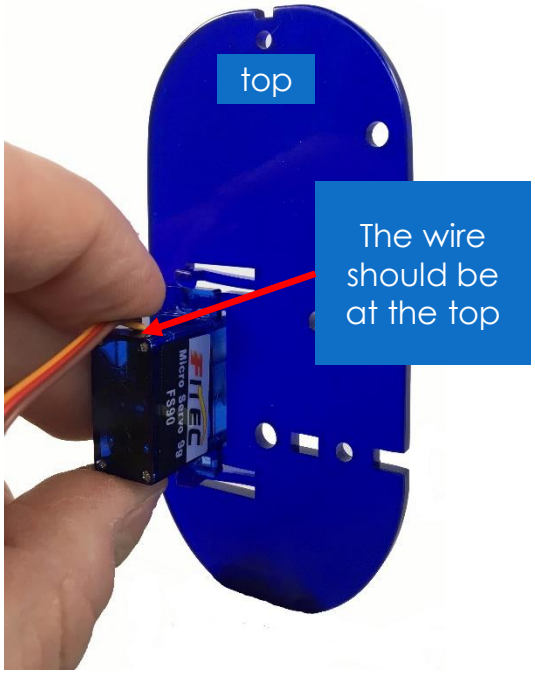
You will need:

right cheek

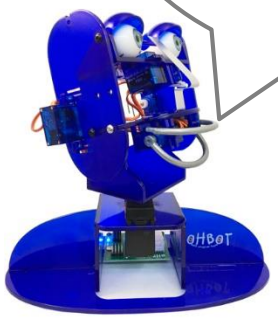


1. Orient the motor this way round, with the wire coming out of the motor to the top of the cheek.

2. Clip in place

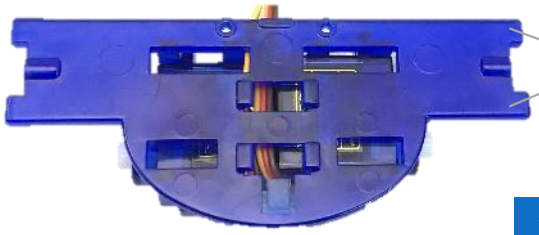


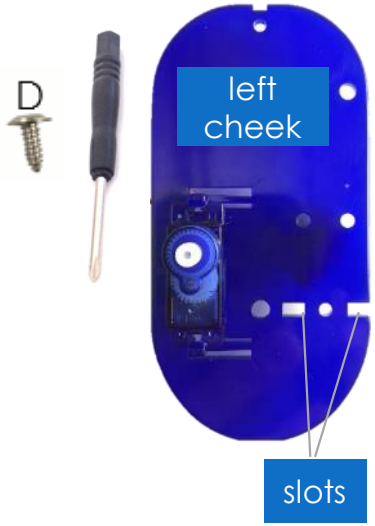
This motor allows me to roll my eyes. I know it's not polite, but Ohbots only do what they are programmed to do



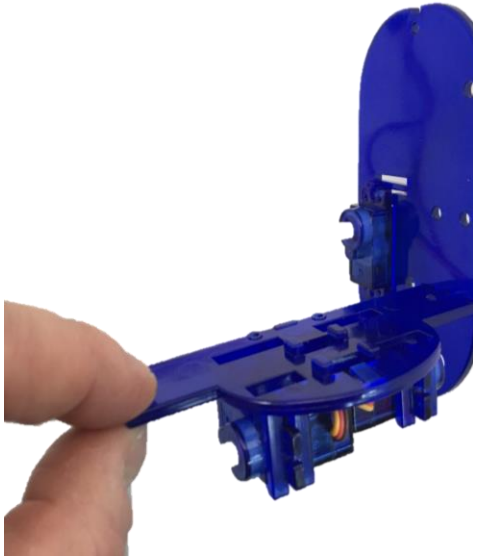
Attach the left cheek to the jaw

You will need:

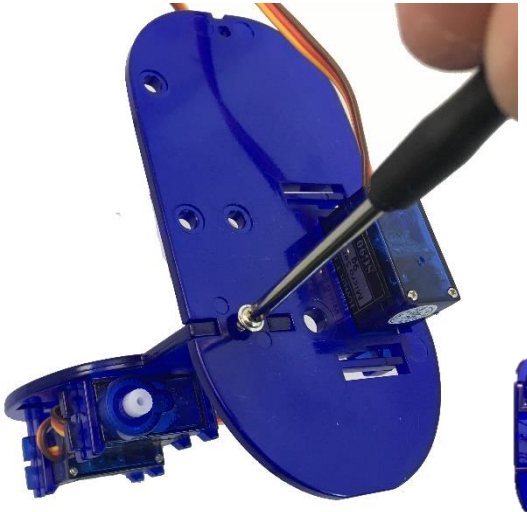


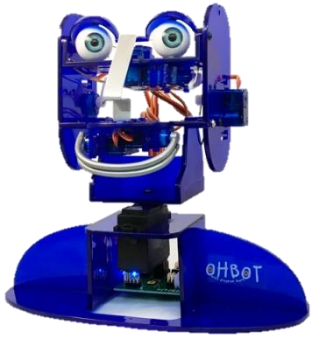


1. Locate the lugs of the jaw in the slots on the cheek



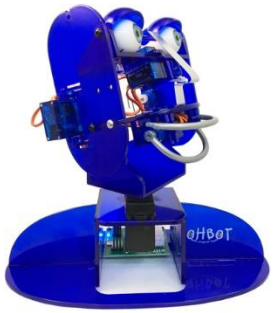
2. Fasten the screw



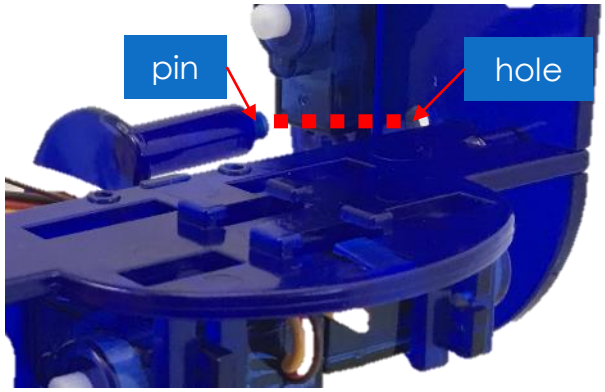


Locating the jaw and cheek on the neck

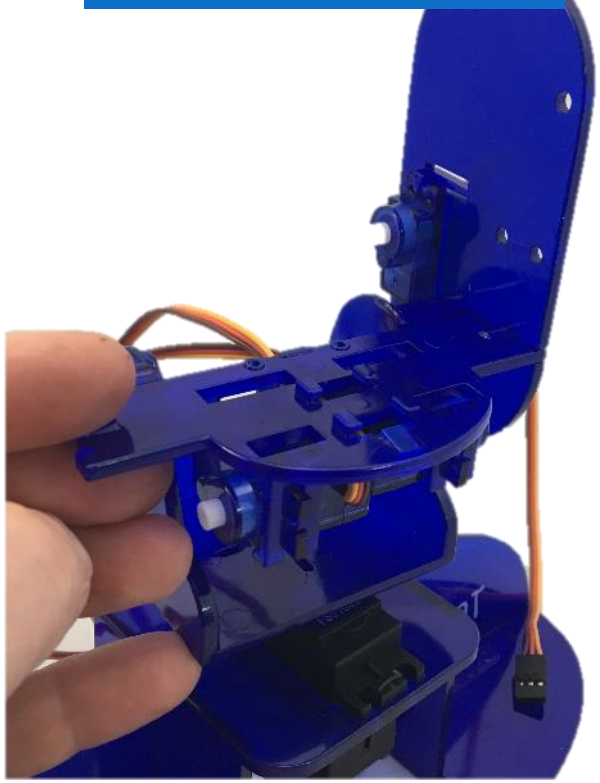
You will need:



1. Locate the pin on the neck in the hole in the left cheek

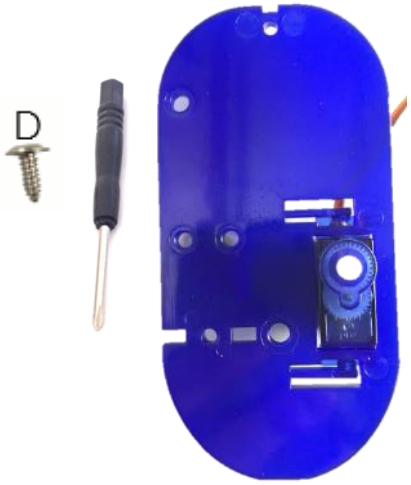


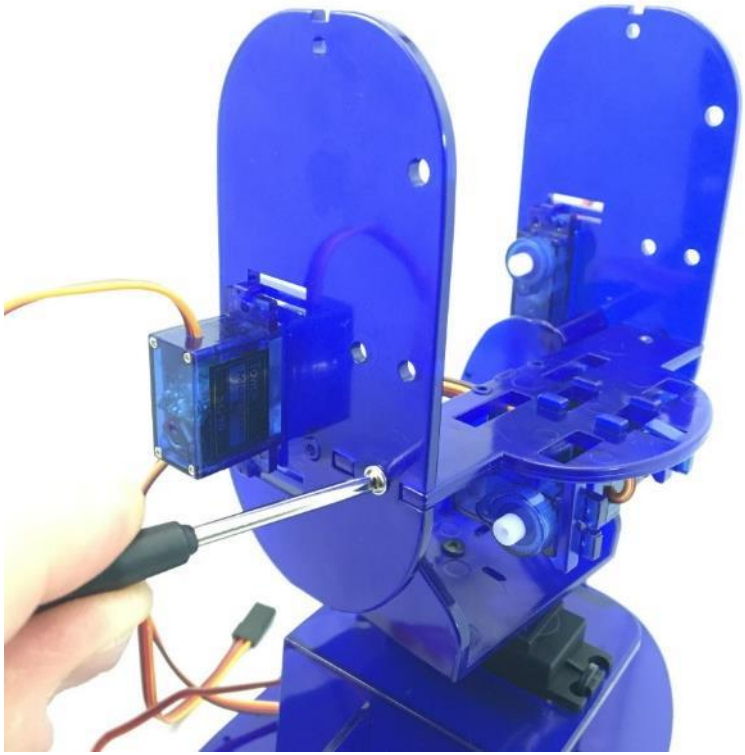
2. Hold in place ready for the next step

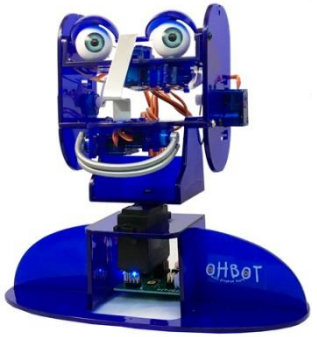


Attaching the right cheek to the jaw

You will need:



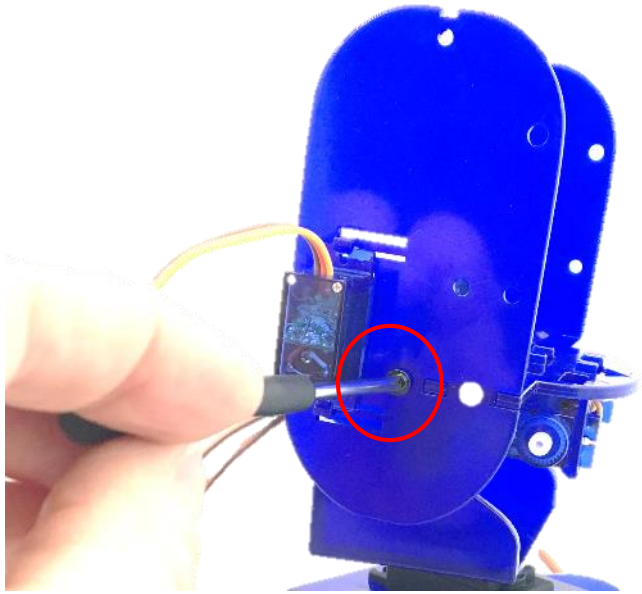




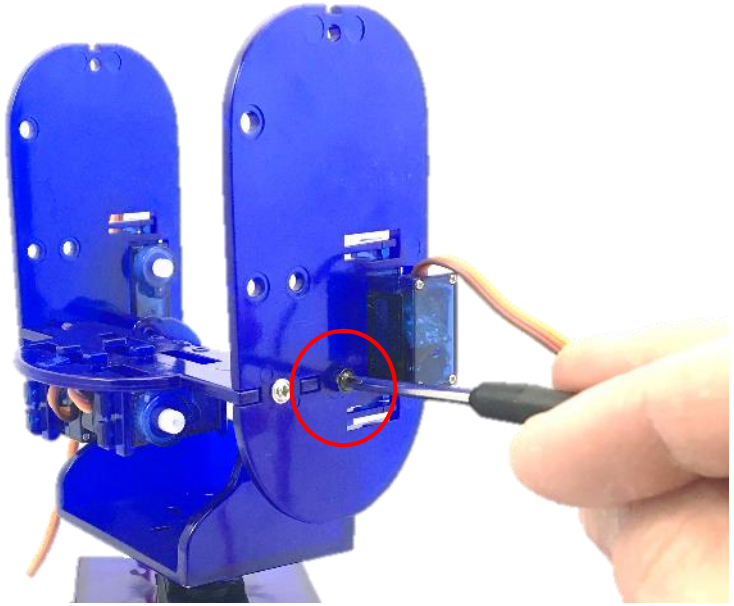
Fixing the cheeks to the neck

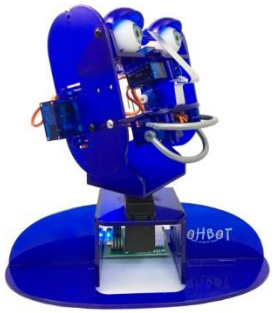
You will need:

1. Use screw to fasten the right cheek to the neck



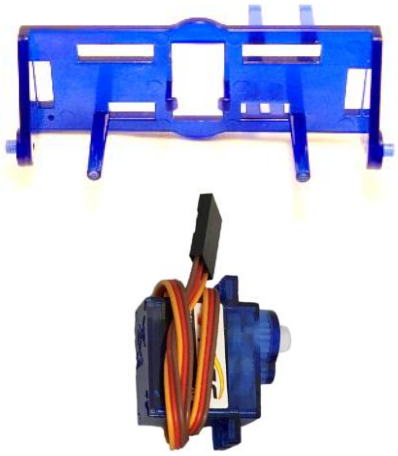
2. Do the same for the left cheek



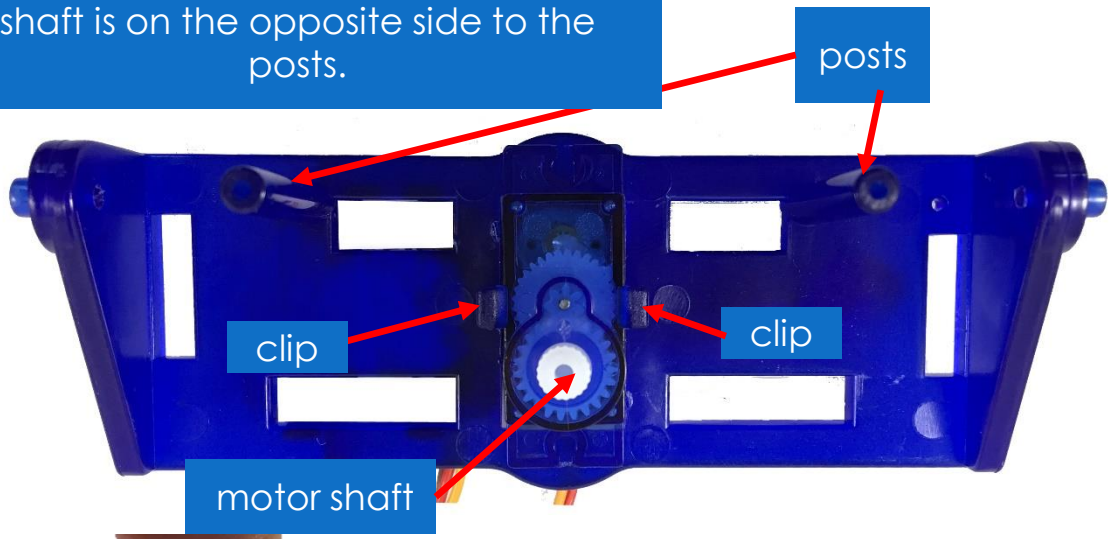


Fixing the eye turn motor

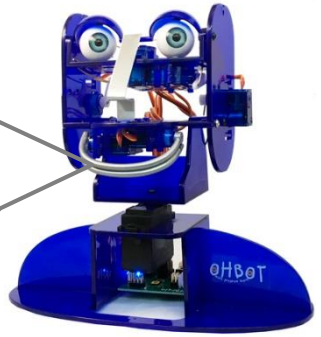
You will need:



Place the motor so that the motor shaft is on the opposite side to the posts.

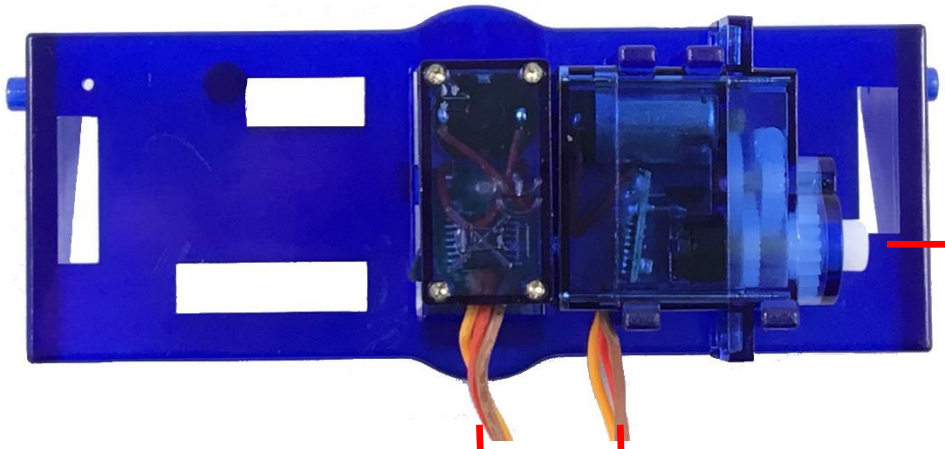


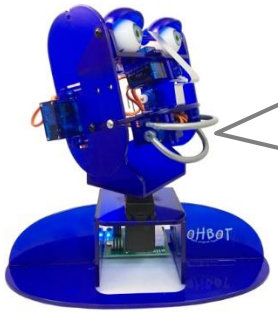
To clip the motor in use the motor to push the clips apart. Find the end of the motor where the wire comes out and push this through the hole first. If it is tricky try taking the sticker off the motor.



Fixing the lid blink motor

You will need:

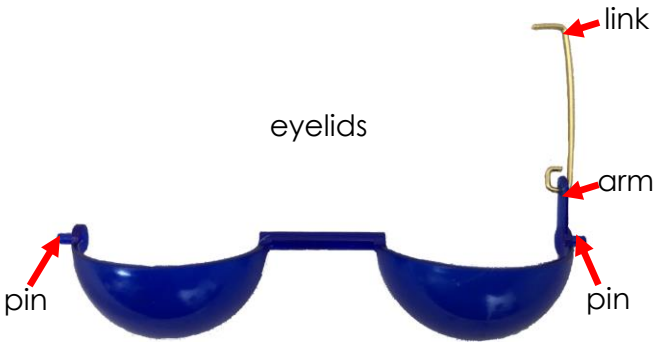




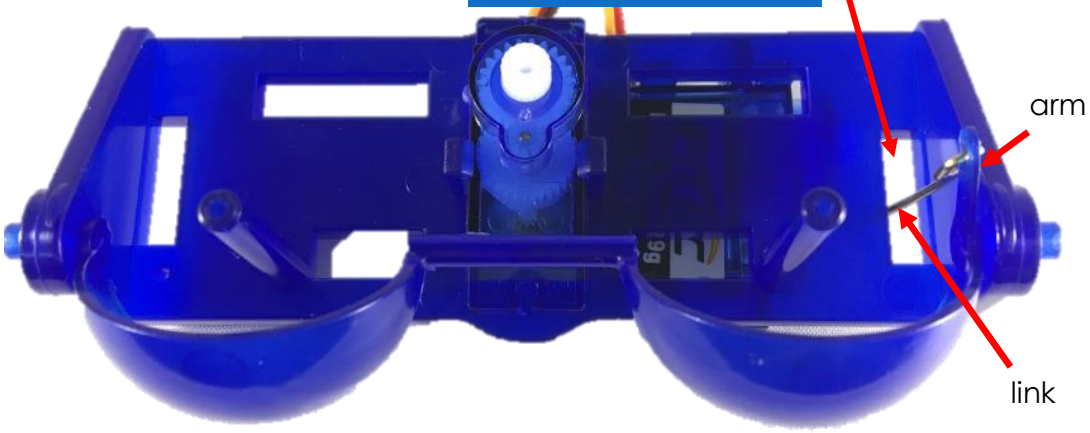
Make sure the cables for both the eye turn motor and the lid blink motor come out on the same side.

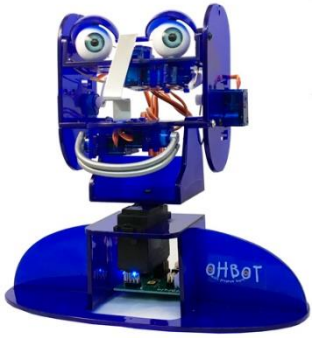
Attaching the eyelids

You will need:



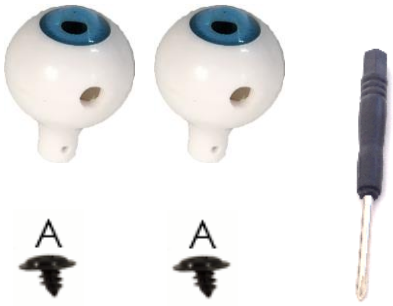
Thread the link through this hole before clipping in the eyelid

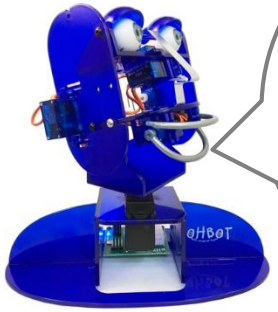




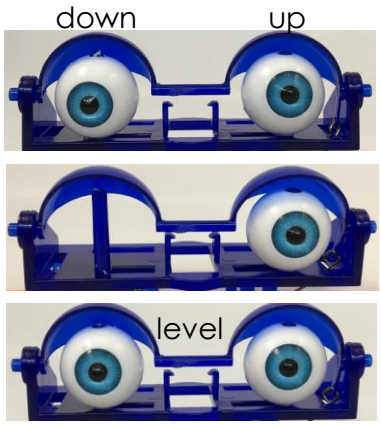
Attachng the eyeballs

You will need:



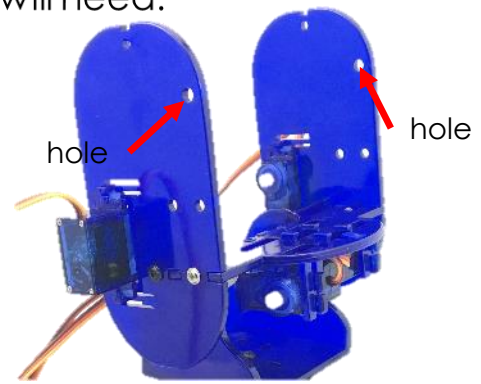


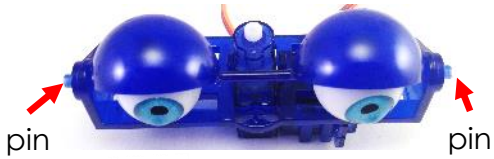
If you find one of Ohbot's eyes is looking up and the other one down turn one of the eyeballs up the other way.



Attaching eyebox to the cheeks

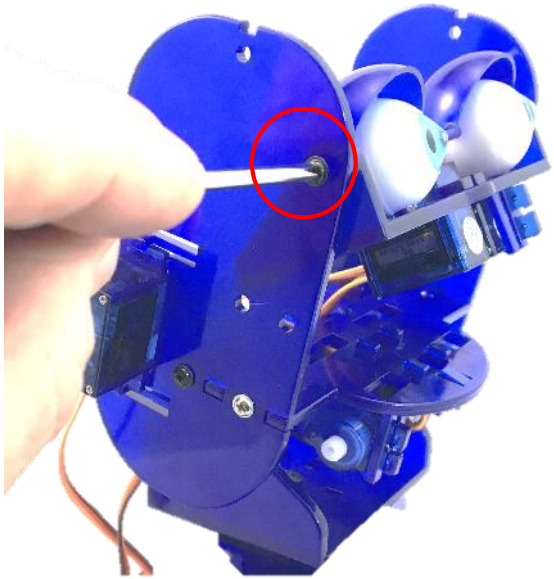
You will need:

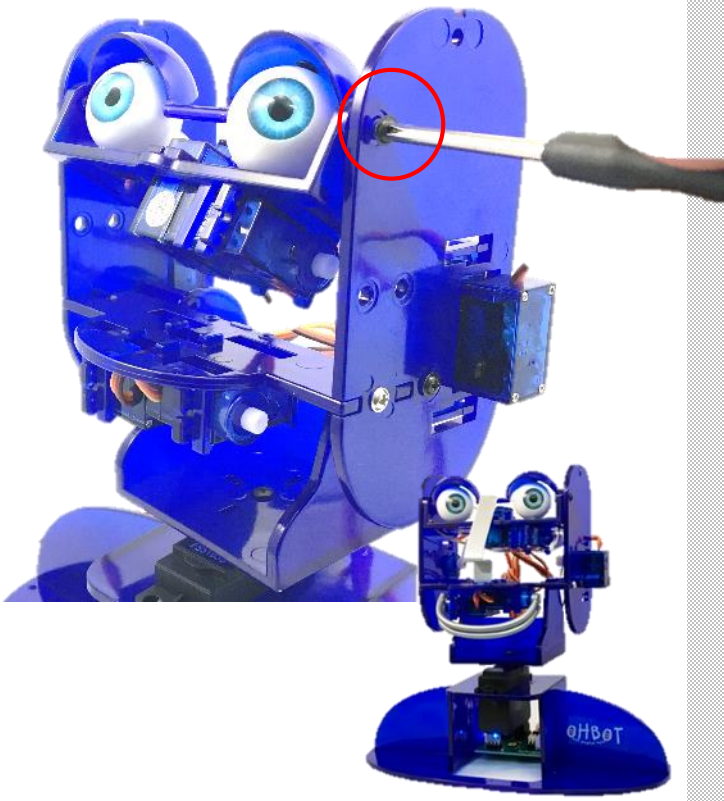




1. Put the pins for the eyebox into the holes shown on the cheeks

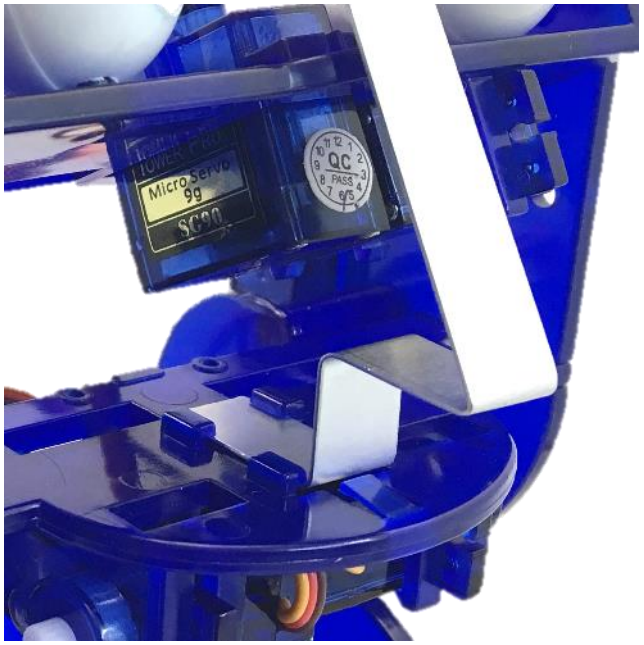
2. Use screws to attach each cheek to the eyebox.

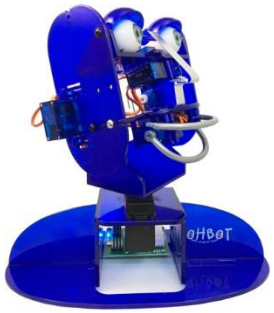




Nose fitting

You will need:



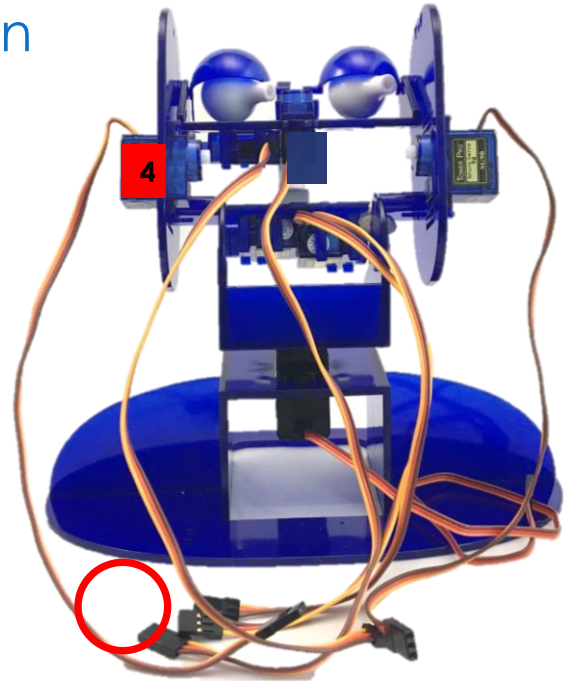


Connecting motor 4 to Ohbrain

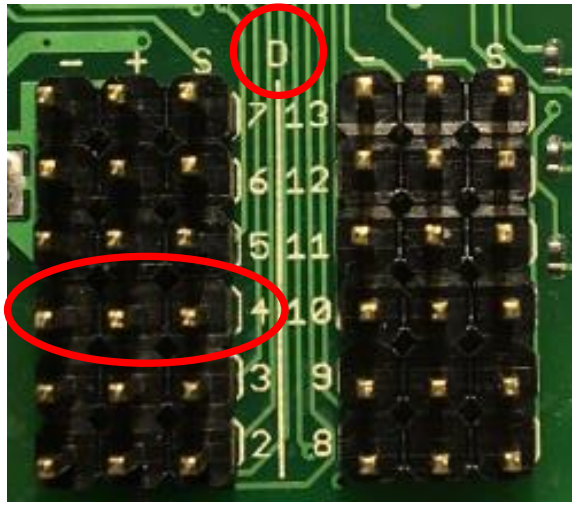
You will need:

Find the socket

at the end of the wire for the motor marked. 4



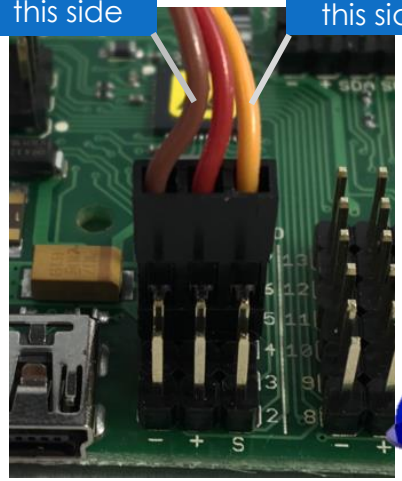
2. On the Ohbrain board locate the set of pins marked D4.

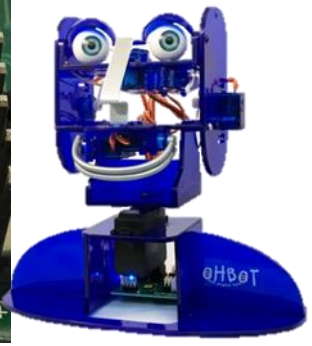


3. Attach the socket to the pins marked D4. Make sure the brown wire is to the left (-) and the yellow wire is to the right (S)

Brown on this side

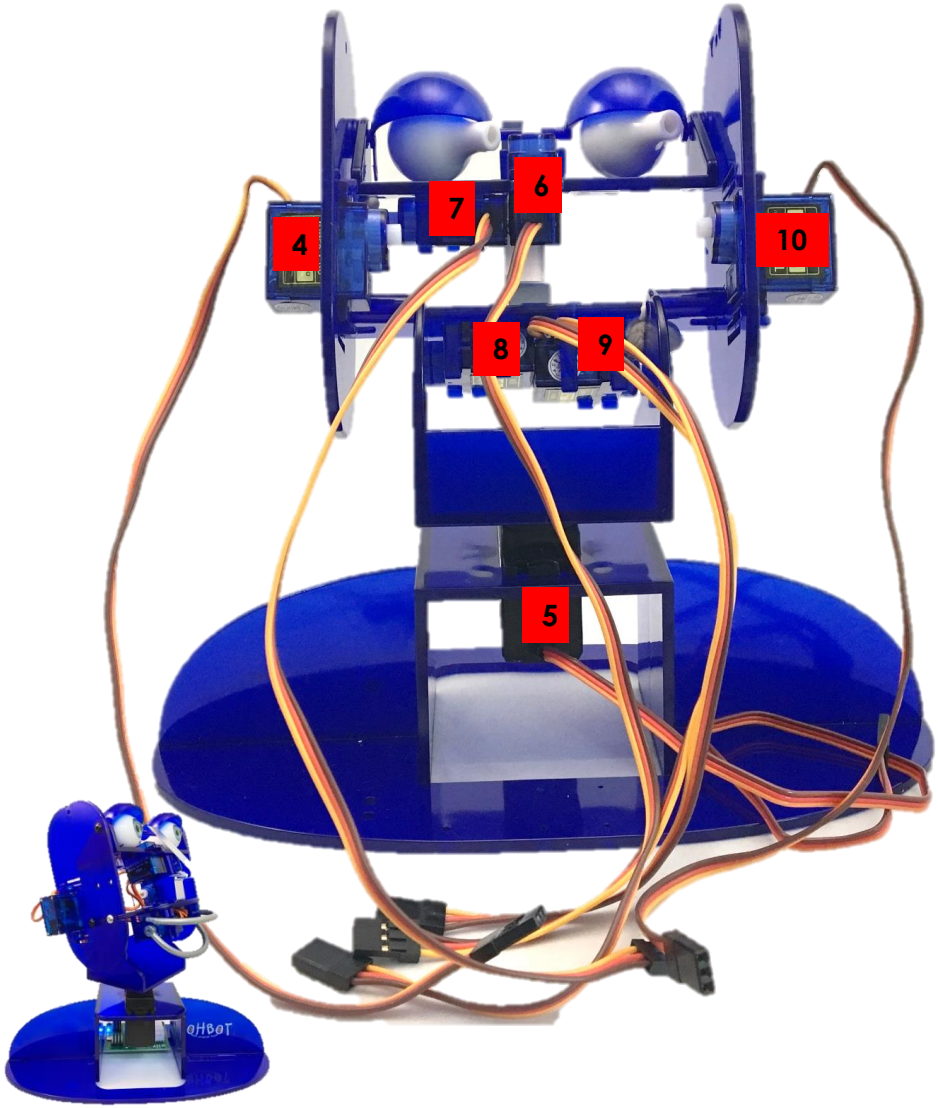
Yellow on this side

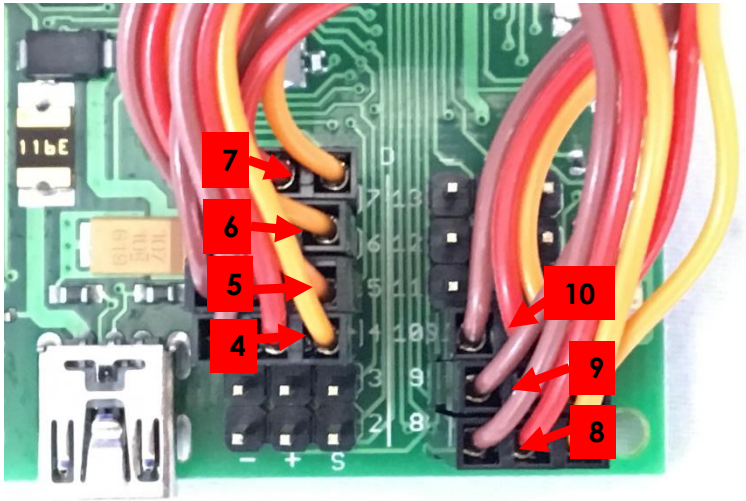




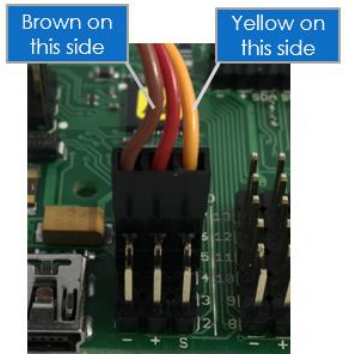
Connecting motors to Ohbrain

Find the socket for each motor in turn and plug it into the matching D numbered pins on the Ohbrain circuit board. Motor 5 goes to D5, Motor 6 to D6, Motor 7 to D7, Motor 8 to D8, Motor 9 to D9 and Motor 10 to D10.



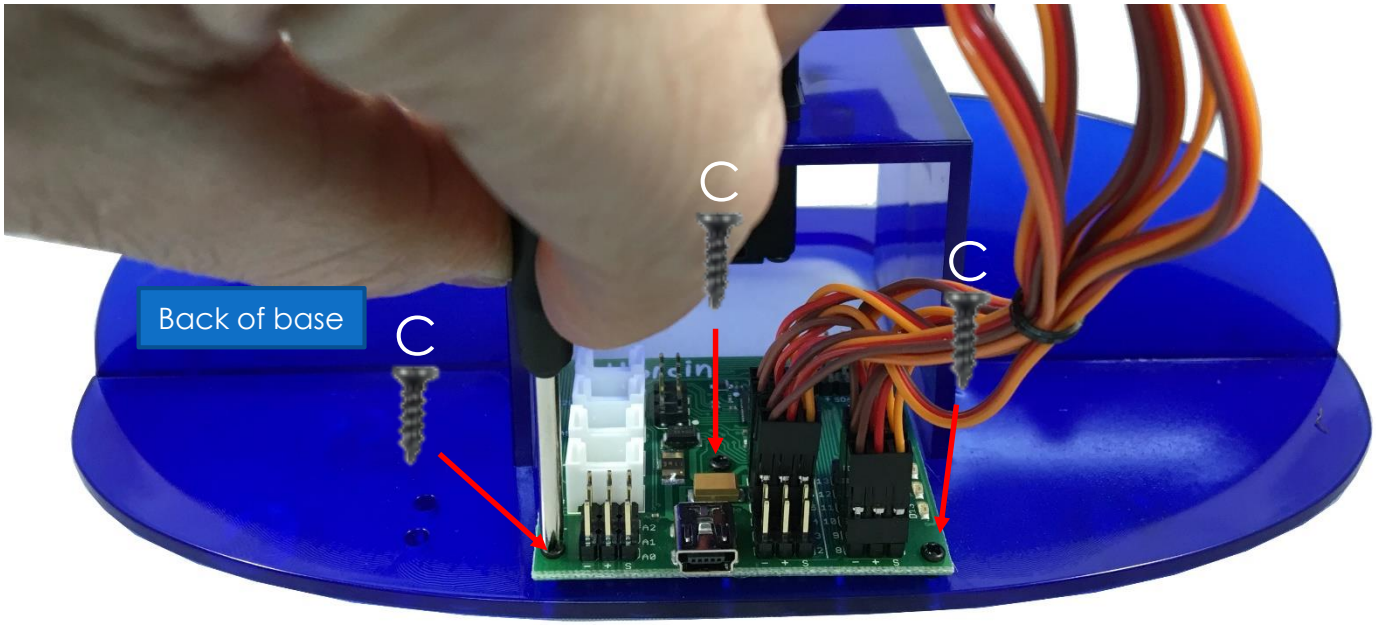


Take care to ensure that all sockets are connected this way:

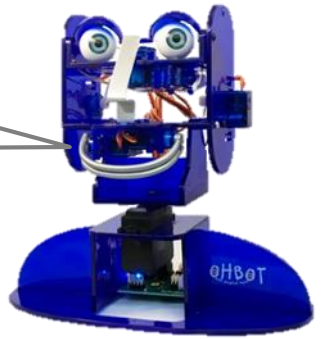


Fixing Ohbrain to the base

You will need:

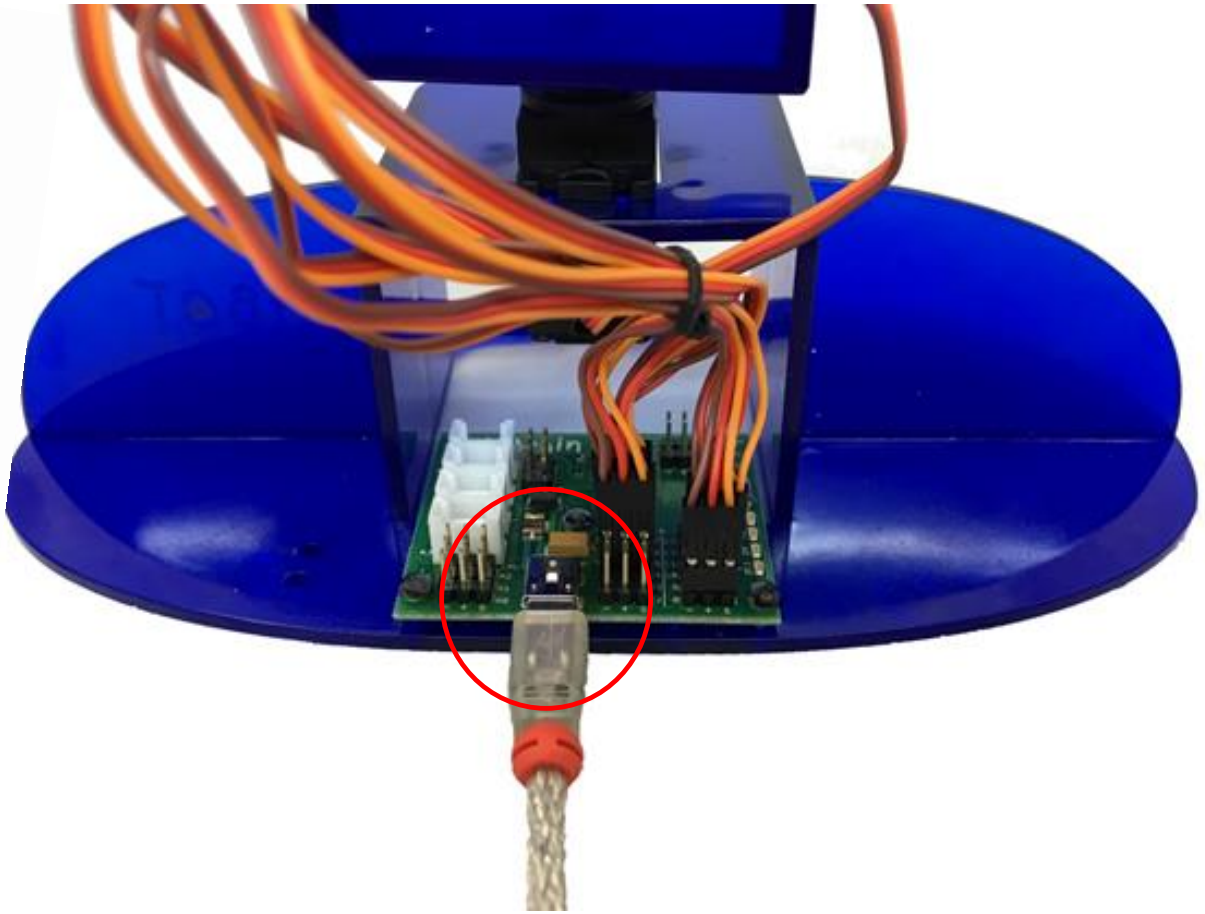


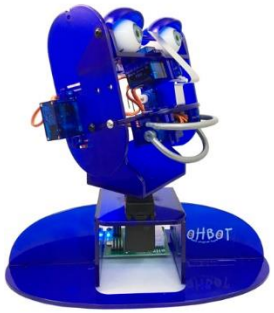
Don't do these up too tight, just tighten enough to stop the board being wobbly.



Connecting the cable to Ohbrain

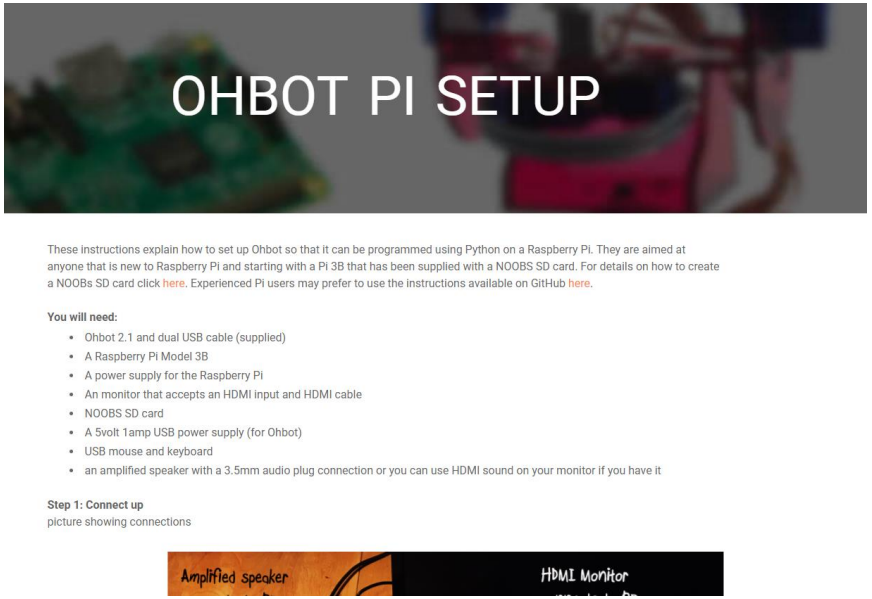
You will need:



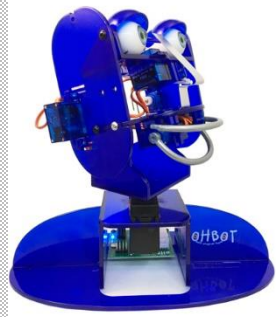


Installing the Python library onto the Raspberry Pi

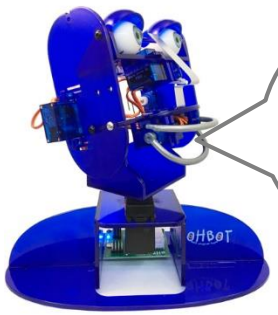
If are new to Pi go to www.ohbot.co.uk/ohbotpisetup and follow the setup instructions



Pi enthusiasts can visit the Ohbot GitHub site for more detail on installation and use of the Ohbot Python module www.github.com/ohbot

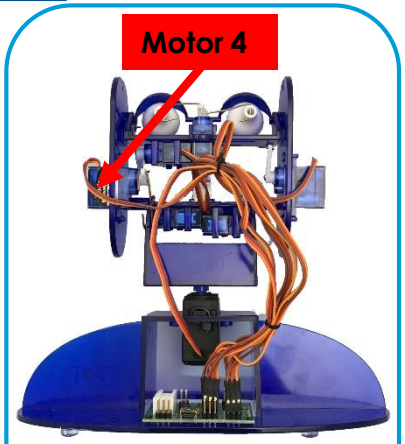


Connecting Ohbot to a Raspberry Pi

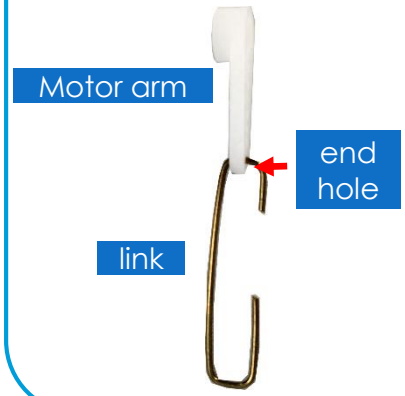


Ohbot needs one USB plug connected to your Raspberry Pi and one connected to a 5V power supply rated 1amp or more which has a USB socket on it (not supplied)

Setting up Motor 4 (makes Ohbot's head nod)



1. Thread the **link** through the end hole of the **motor arm**



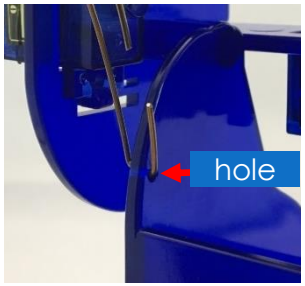
2. Create a reset program:

```
from ohbot import ohbot
ohbot.reset()
```

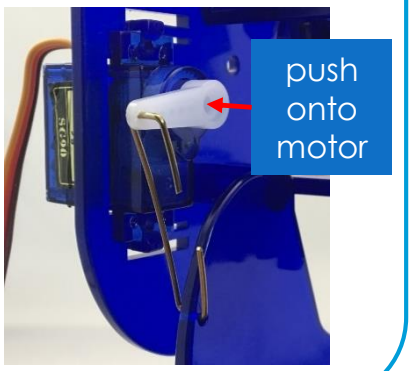
Run the program

3. Hold Ohbot's head upright

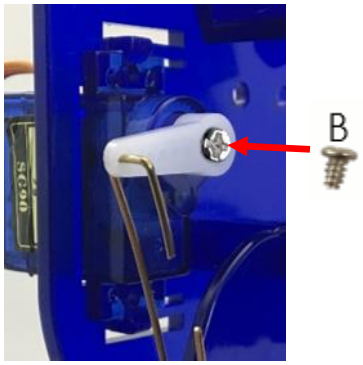
4. Thread the link through the hole on the side of the neck



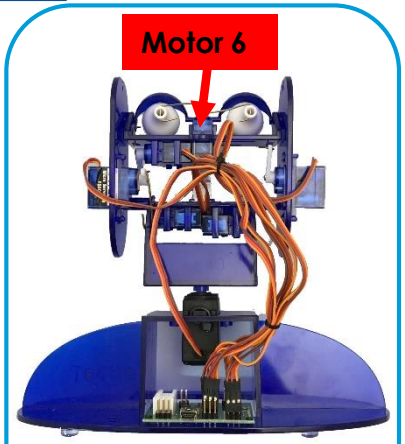
5. Find **Motor 4**. Push the arm onto the motor so it holds Ohbot's head **upright**.

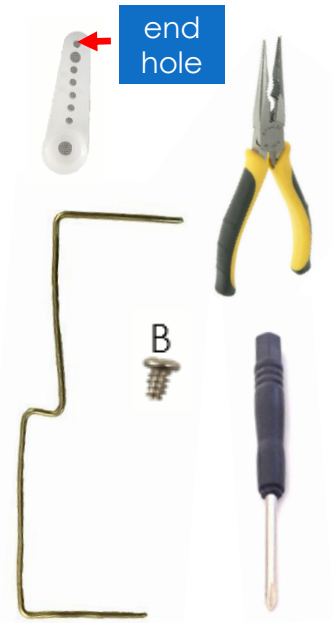


6. Fix the arm onto the motor using screw B

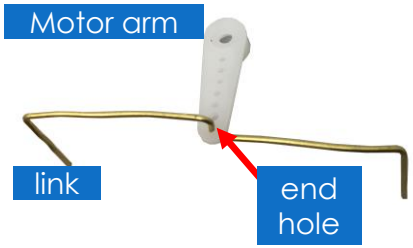


Setting up Motor 6 (makes my eyes turn)





1. Thread the **link** through the end hole of the **motor arm**

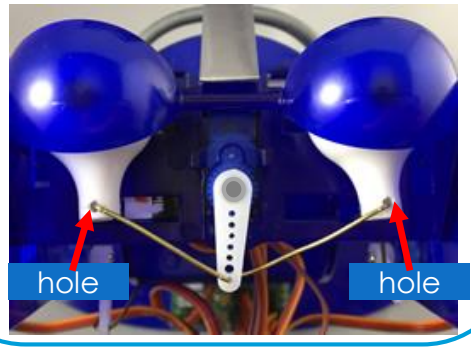


2. Create a reset program:

```
from ohbot import ohbot
ohbot.reset()
```

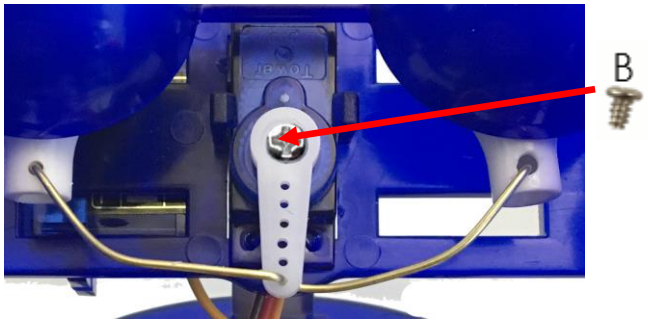
Run the program

3. Find **Motor 6**. Push the motor arm on in the position shown in the photo. Put the ends of the link through the holes in the eyeballs.

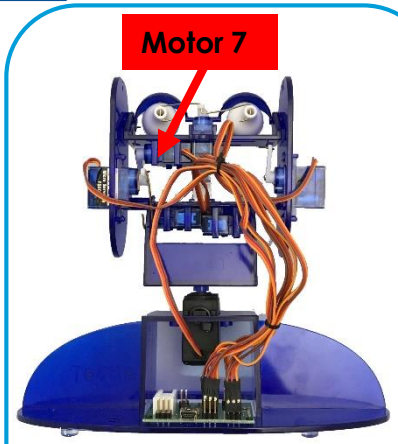


4. Use pliers to bend the ends of the wires

6. Fix the arm onto the motor using screw B



Setting up Motor 7 (blinks my eyelids)

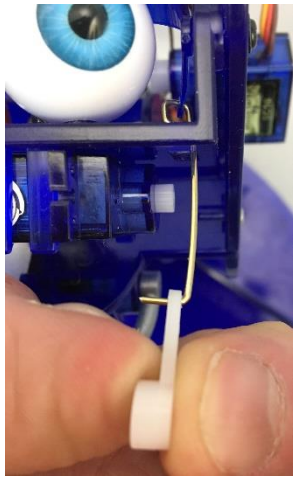


2. Create a reset program:

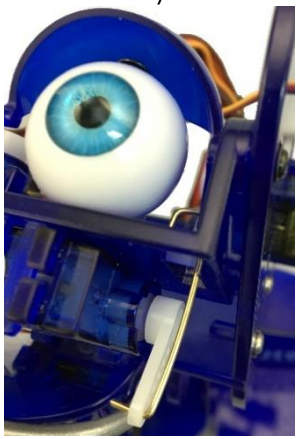
```
from ohbot import ohbot
ohbot.reset()
```

Run the program

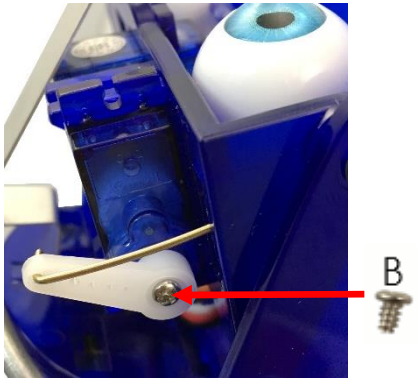
2. Thread the link onto the end hole on the arm.



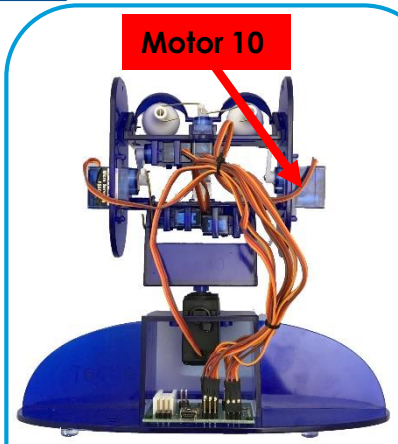
3. Push the arm onto the servo so that it holds the eyelids wide open

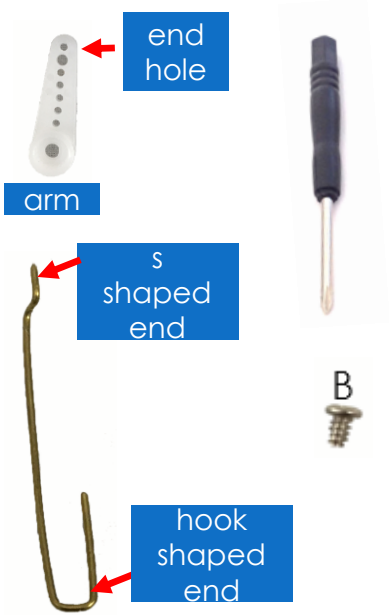


4. Tilt the eyebox up fix the arm onto the motor using screw B



Setting up Motor 10 (tilts my eyes)





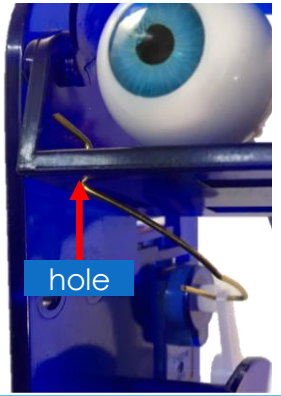
1. Thread the **hook end** of the **link** through the end hole of the **motor arm**

2. Create a reset program:

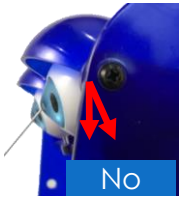
```
from ohbot import ohbot
ohbot.reset()
```

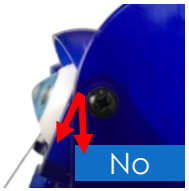
Run the program

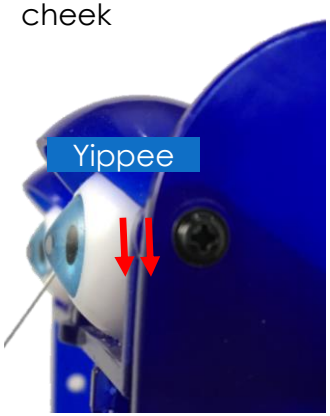
3. Thread the S shaped end of the link into the hole at the front corner of the eye box



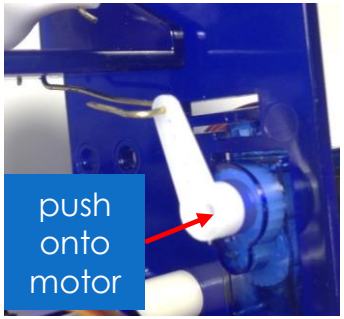
5. Hold the eyebox so the upright on its front edge is flush with the cheek



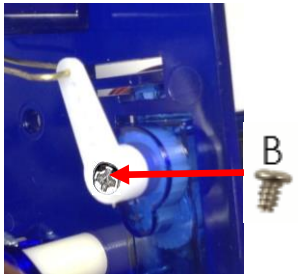




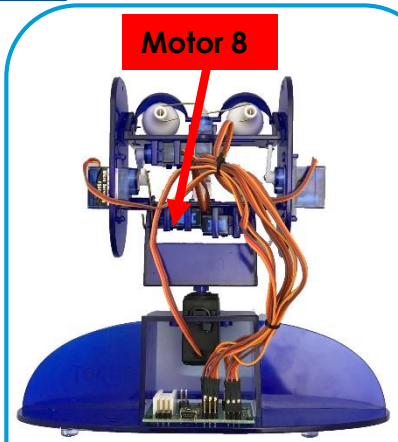
6. Find **Motor 10**. Push the arm onto the motor so it holds the eyebox horizontal.



6. Fix the arm onto the motor using screw B



Setting up Motor 8 (moves my top lip)



Ohbot's lips are identical and either can be used for top or bottom

2. Create a reset program:

```
from ohbot import ohbot
ohbot.reset()
```

Run the program

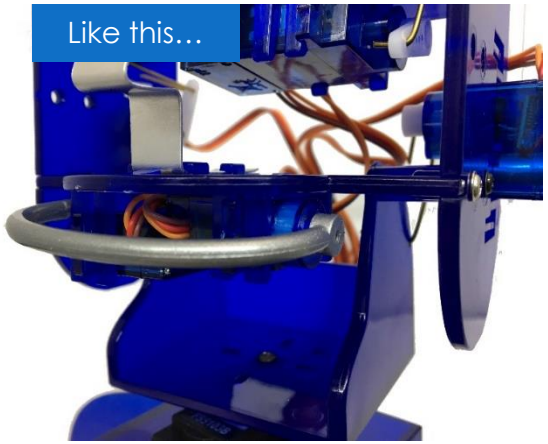
2. Create a program containing the command ohbot.reset() and run the program.

2. Attach the lip onto the servo so that it is horizontal

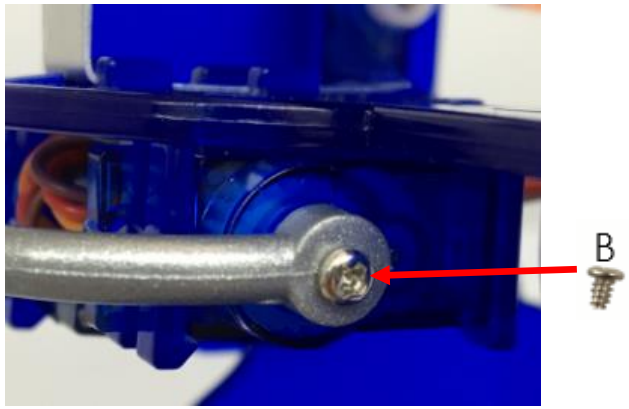
Not like this…

…or this

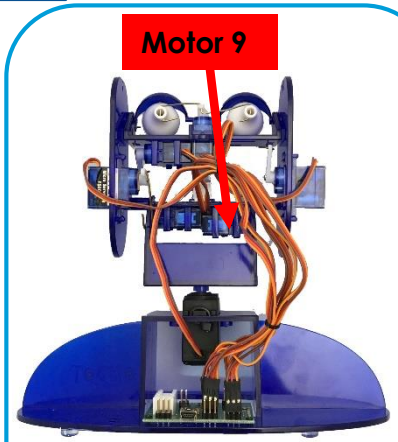
Like this…



4. Use screw B to secure the lip in place



Setting up Motor 9 (moves my bottom lip)



Ohbot's lips are identical and either can be used for top or bottom

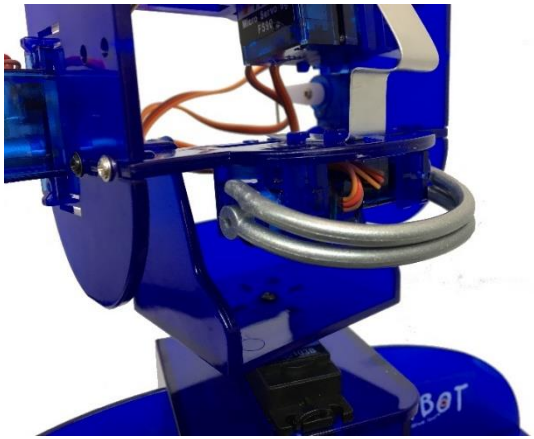
2. Create a reset program:

```
from ohbot import ohbot
ohbot.reset()
```

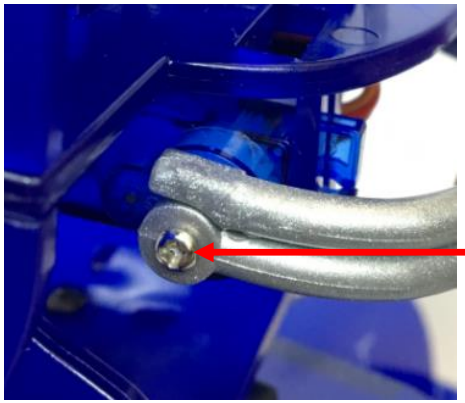
Run the program

2. Create a program containing the command ohbot.reset() and run the program.

2. Push the the Bottom Lip onto the the servo so that it is horizontal beneath the top lip just like in the picture



4. Use screw B to secure the lip in place



Hooray! You've assembled an Ohbot!

This is just the start though. How your Ohbot behaves depends on on your imagination and programming.

Happy inventing!