



EN: This Datasheet/Document is presented by the manufacturer.

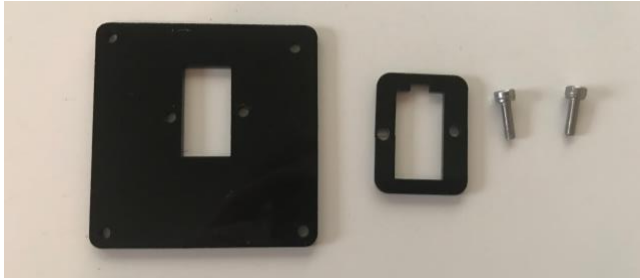
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Build Your Robotic Arm! (Part 1)

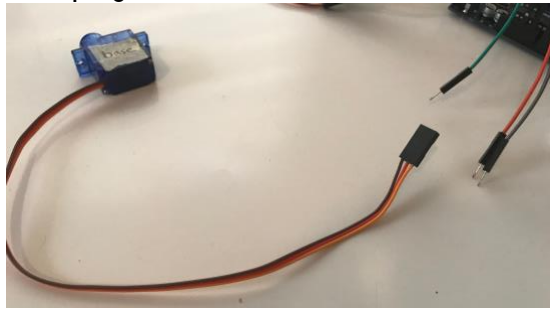
1. Stick the 4 extra-large screws up through the largest piece of plastic around the diamond. Use 4 nuts to connect them. Tighten with a screwdriver.



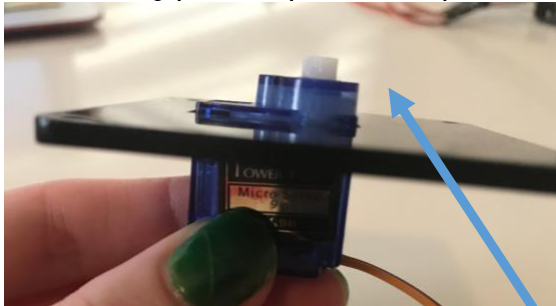
2. Find these exact objects (medium screws):



3. Unplug the Base servo from its 3 wires.

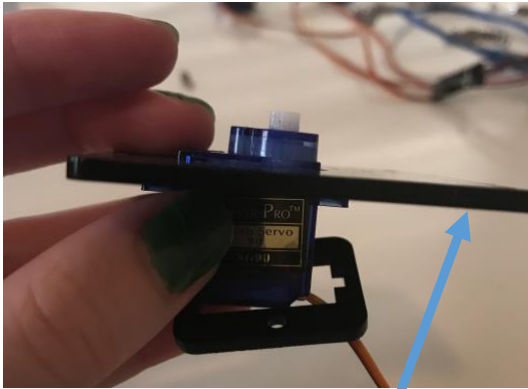


4. Fit the big piece of plastic on top of the servo.



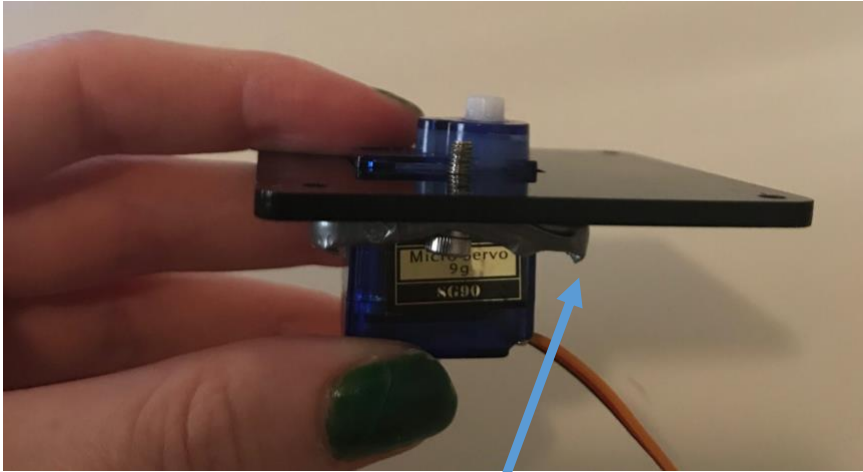
The sticking-up part faces
the longer side of the
black plastic thing.

5. Fit the other plastic thing underneath the servo motor.



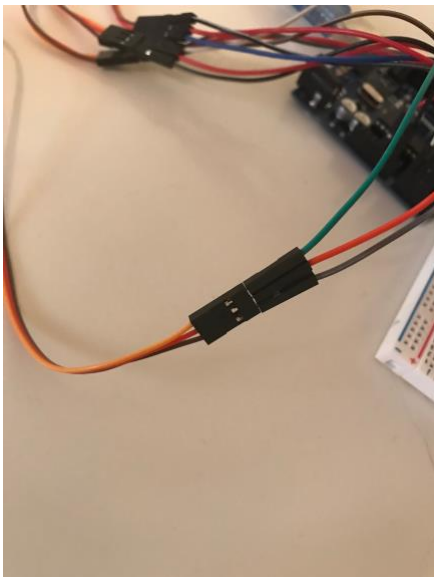
The part of the hole that sticks out faces towards the wire.

6. Use the medium screws to screw the two pieces of plastic together. Don't screw these super tight!

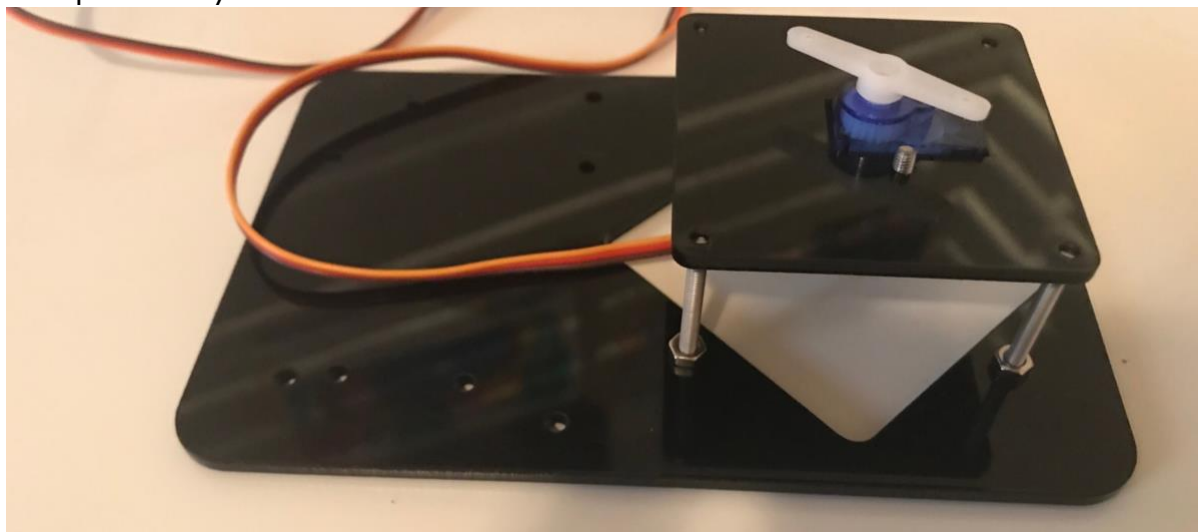


Put the screws in the bottom.

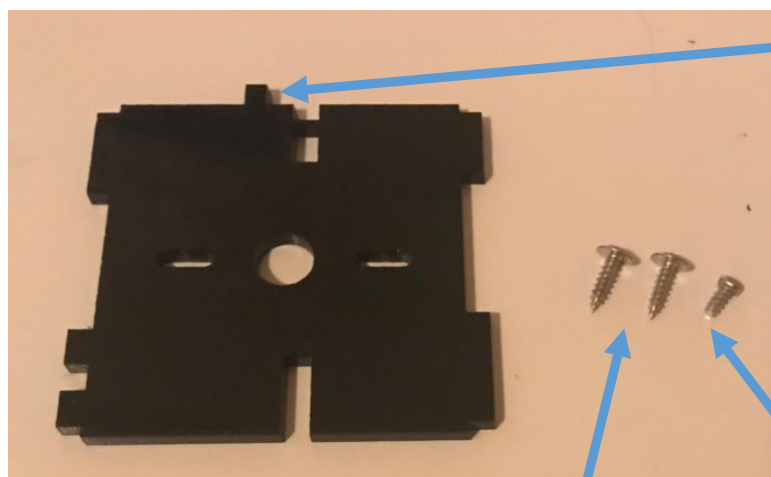
7. Reconnect the servo wires. Make sure your Arduino is plugged into a computer, and then check that the servo motor still turns when you turn the potentiometer.



8. Fit the part you just made on top of the base plate. Make sure it is facing the right way. The wire should be sticking out along the base plate. You should be able to see that all four metal screws are in the holes. It should not fall apart when you move it a little.



9. Find these objects. Line up the black thing exactly like this.

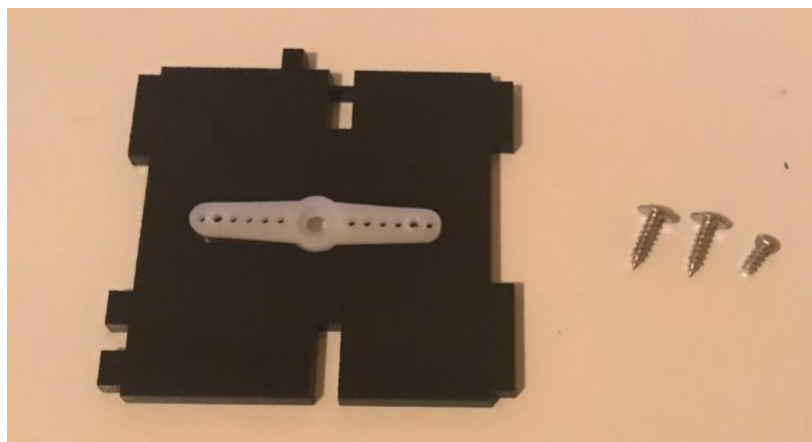


Sticking-out
thing on the left

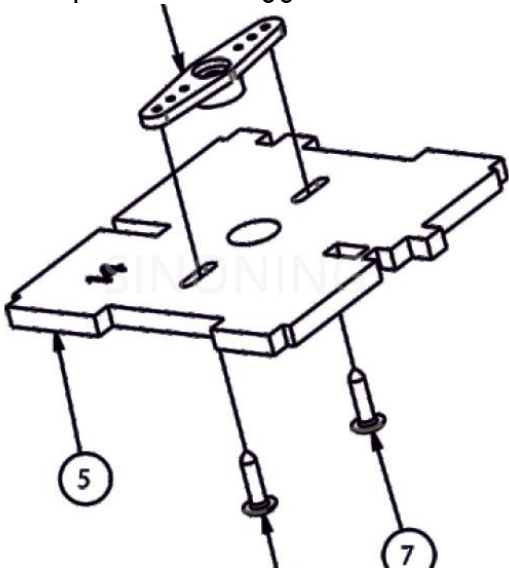
Pointy servo
screws

Very tiny
servo screw

10. Put the white thing on top. Make sure it is still lined up like this, with the sticking-out thing on the left.



11. Take the white plastic thing off the base servo and attach it to this black piece of plastic. The pointy screws will make the plastic holes bigger. That's ok!

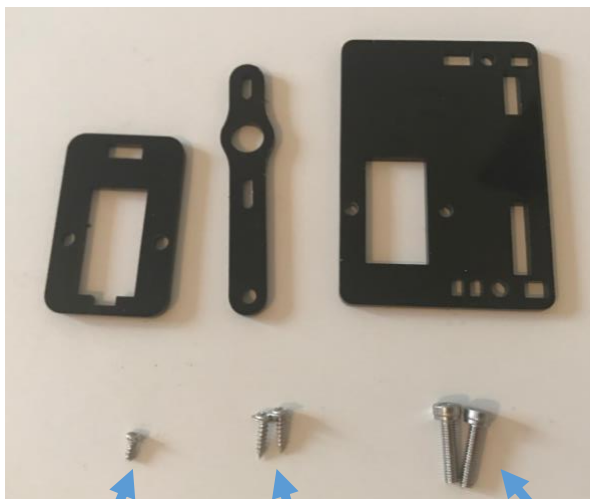


12. Use the very tiny screw to attach this black piece of plastic to your base. Make sure it is facing the right way!



13. Plug your Arduino board into a computer and make sure your base servo still works.

14. Find these exact objects:

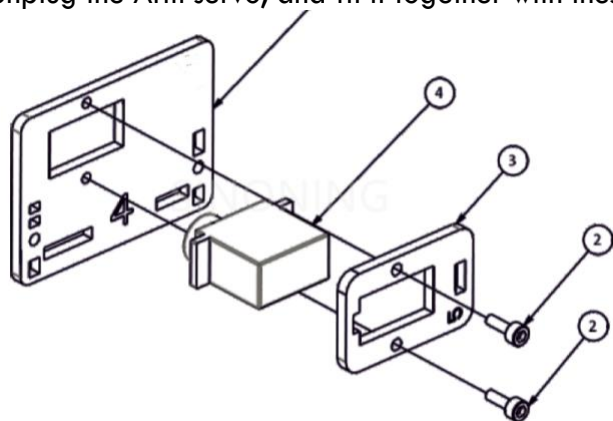


Very tiny
servo screw

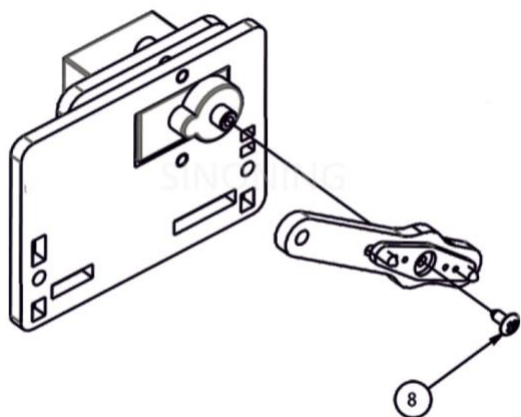
Pointy servo
screws

Medium screws

15. Unplug the Arm servo, and fit it together with these objects.

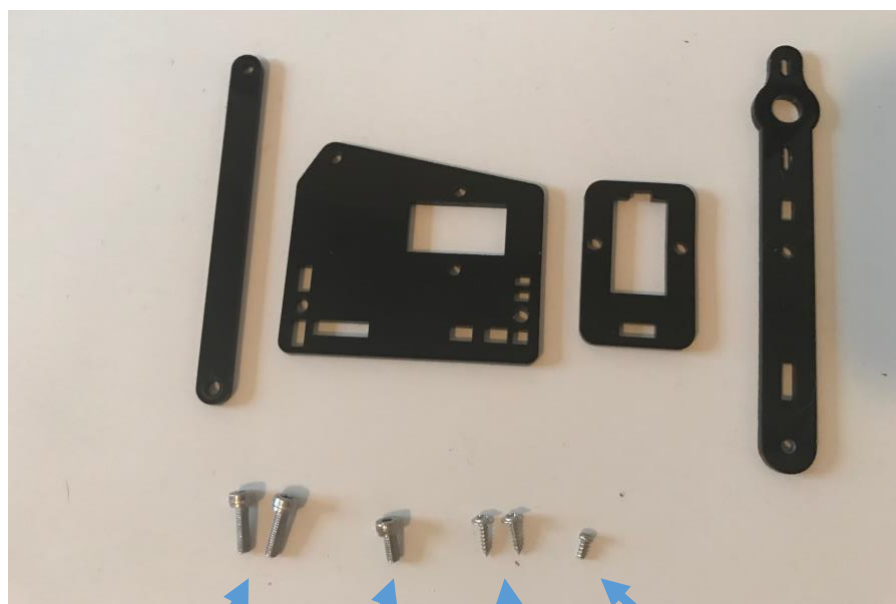


16. Attach these parts:



17. Plug the servo back in, and check that it still works. Then, set that part aside. You will use it later.

18. Find these exact objects:



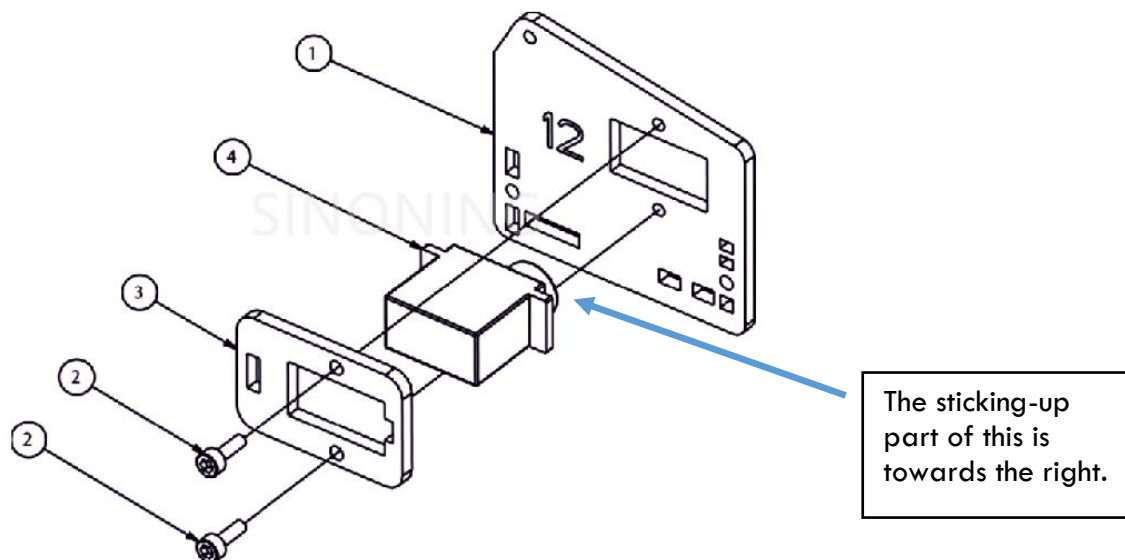
Medium
screws

Small
screw

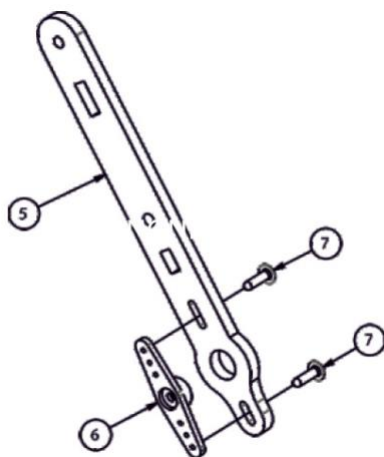
Pointy
servo
screws

Very tiny
servo screw

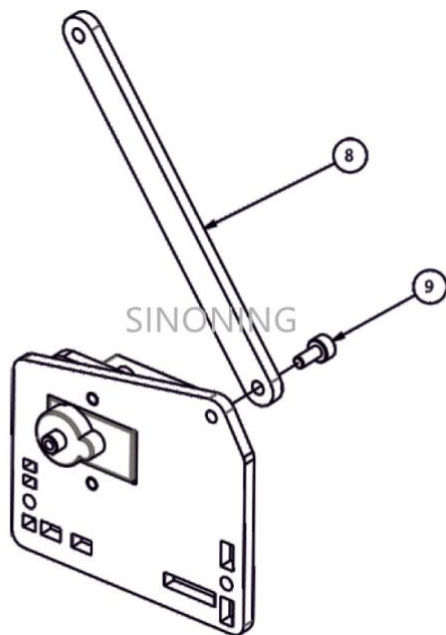
19. Unplug the Wrist servo, and fit it together with these objects.



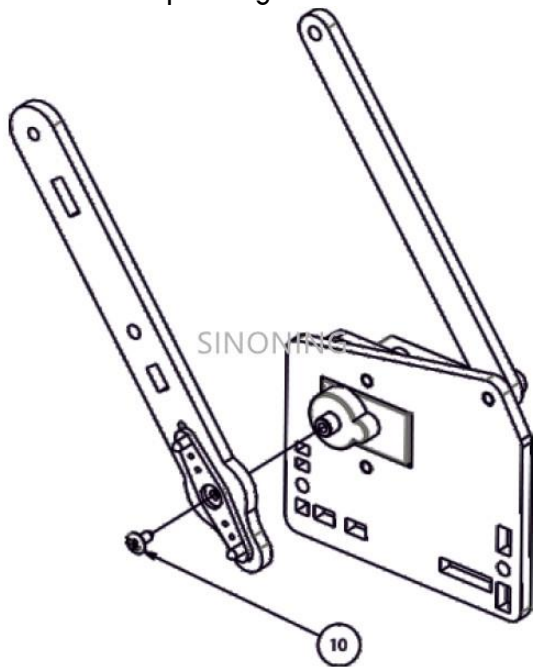
20. Fit these objects together:



21. Fit these objects together:

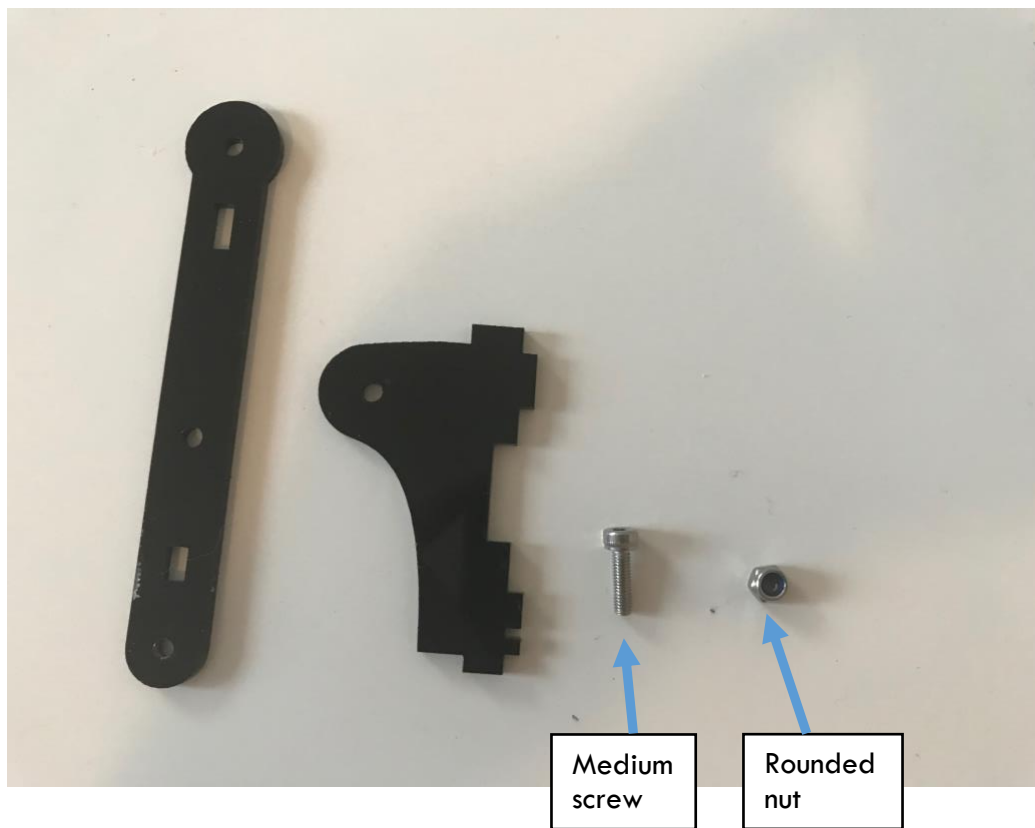


22. Fit these objects together:



23. Plug the servo back in and check that it still works. Put this part aside. You will use it later.

24. Find these objects:



25. Fit them together like this:

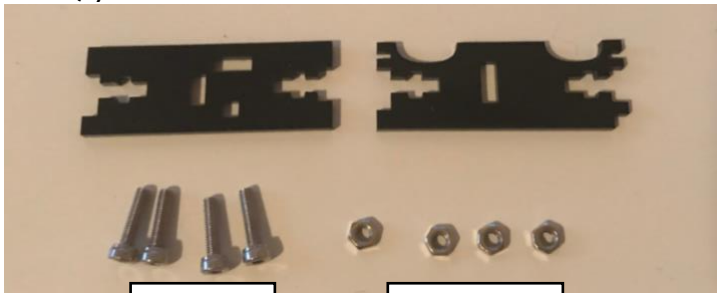
Front



Back



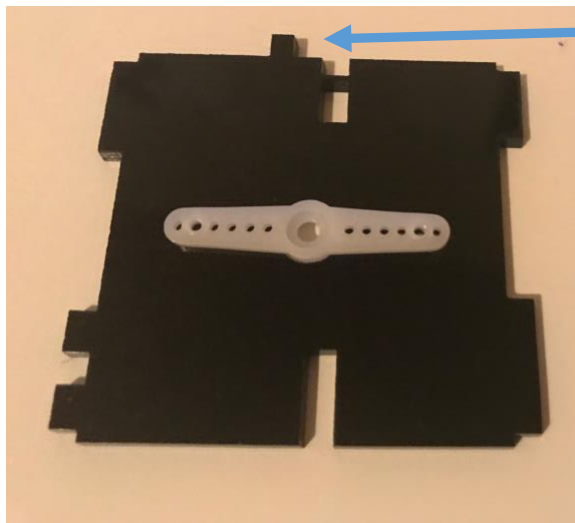
26. Now we are going to use a skill you practiced earlier to make a 3-D object! In addition to the things you already made, you will need these:



Large
screws

Flat nuts

27. Unscrew the tiny servo screw and remove this piece from the base. Put it on the desk exactly like this.



Sticking-out part
points away from
you.

28. Put this piece on the desk right above it. Make sure you put it down exactly like this.



See how the little hole is right by the little bump?

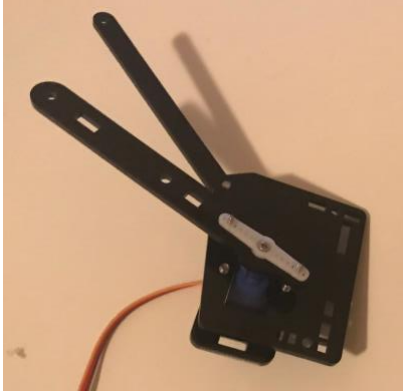
29. Fit this other piece together with the larger piece. If you line them up right, they fit into each other and they will stand up on their own.



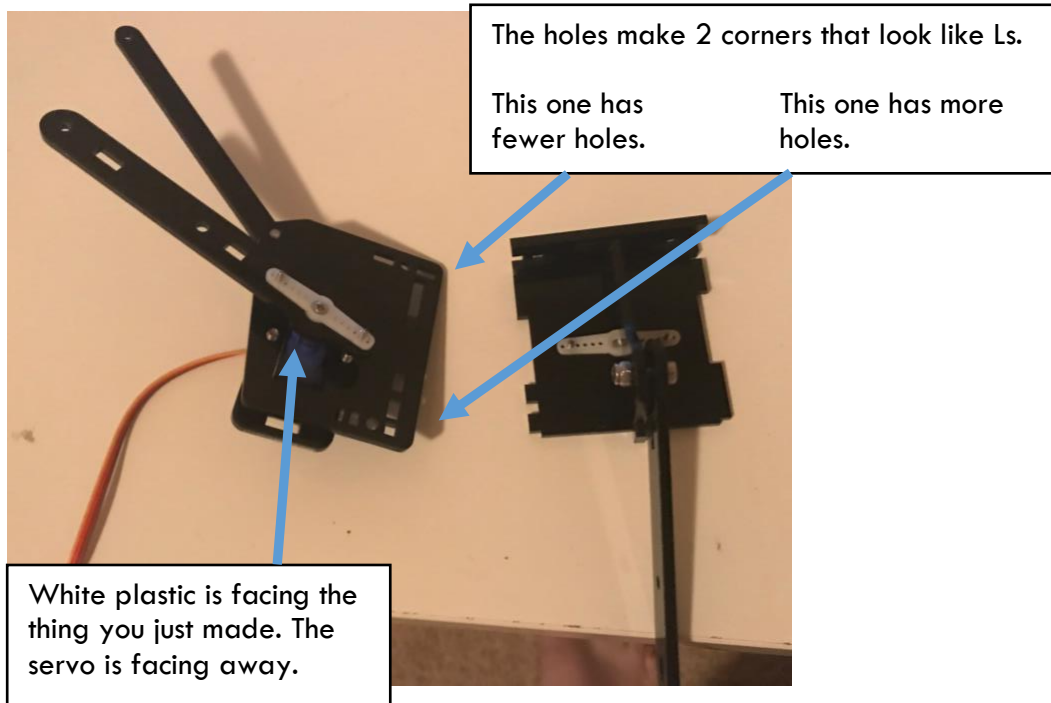
30. Flip up the smaller piece to make the back of the object. Again, if you line these things up right, they will fit into each other, and it will stand up on its own.



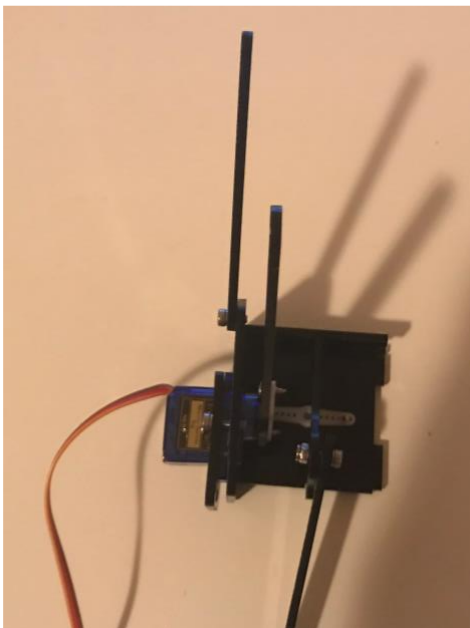
31. Find this object that you made. Unplug the servo motor.



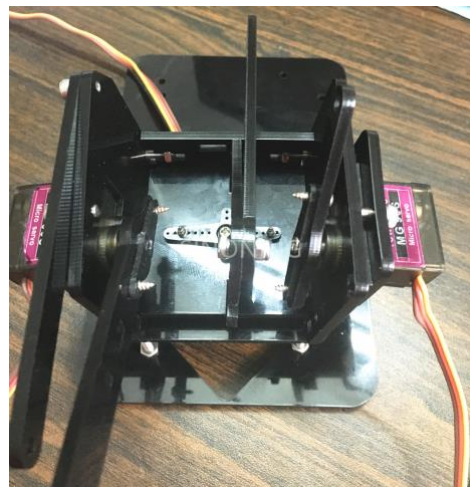
32. Put this on the left of the piece you were working on. Line it up just like this.



33. Flip this new piece up so that it becomes the left side of your 3-D object. Parts of the other pieces will fit into those L-shaped holes.

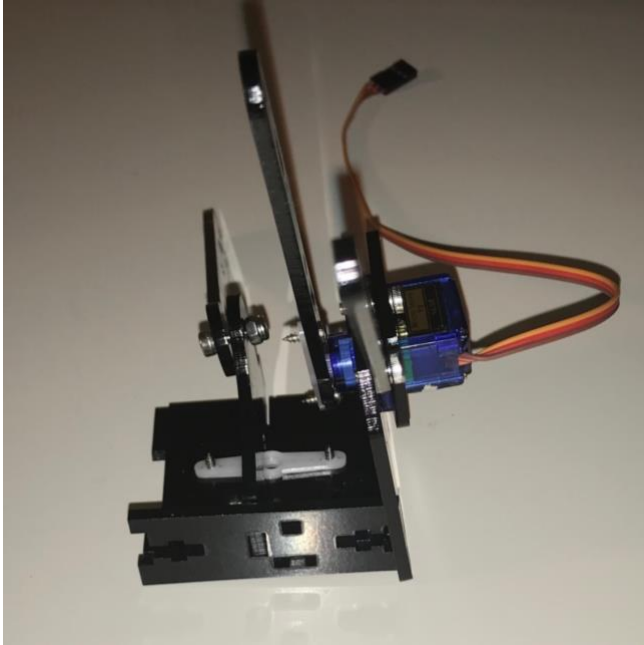


Here's another picture in case that helps. We haven't made the right side of this yet.

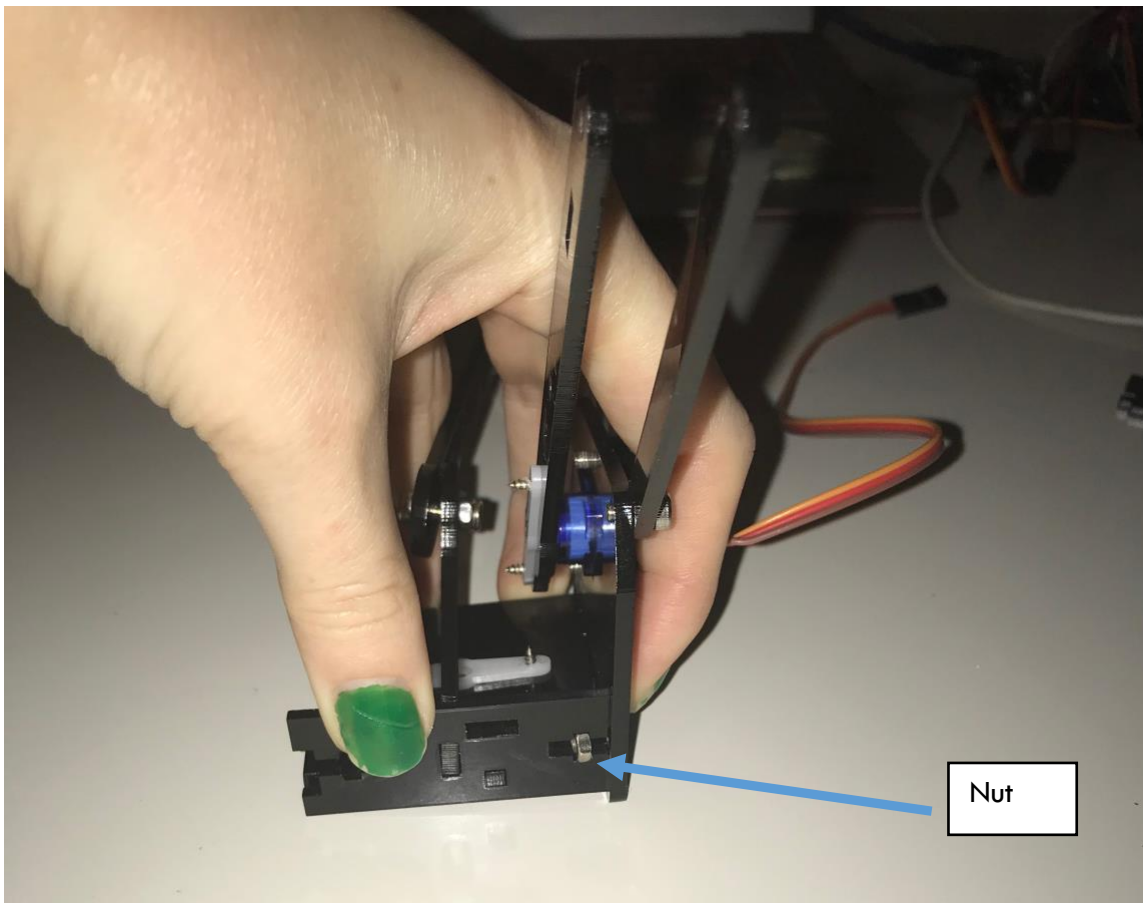


Build Your Robotic Arm! (Part 2)

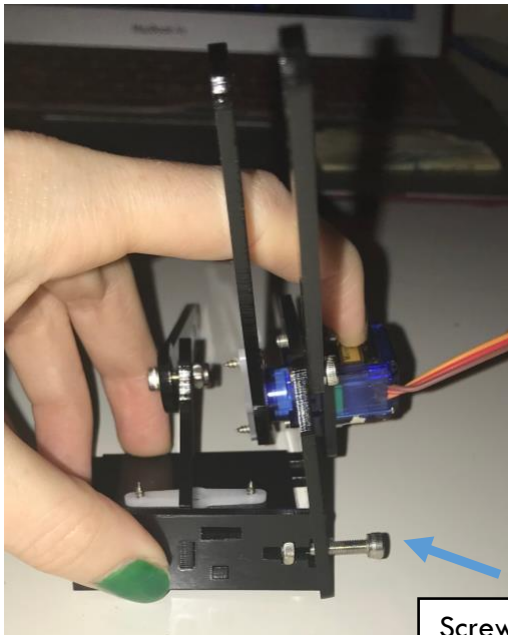
34. Turn this around so you are looking at the back.



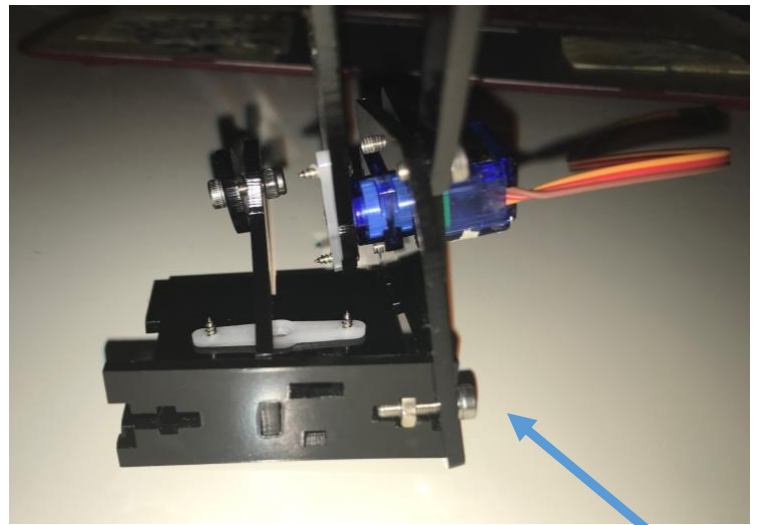
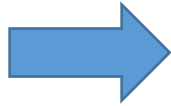
35. Hold this in place while you put a nut in this little hole. I know this is tough! If it falls apart, we can put it back together.



36. Put a screw in the hole at the side. Use the Allen wrench to screw it into the nut.

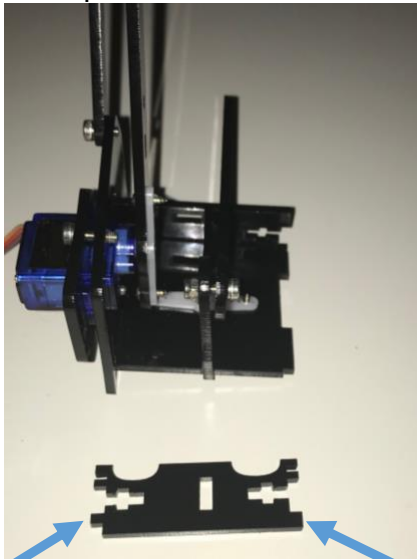


Screw



Tightened

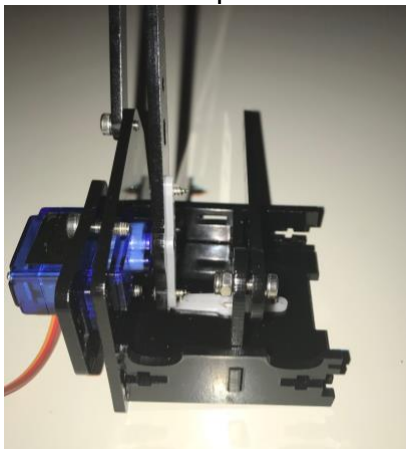
37. Flip this back to the front. Put this smaller piece of plastic by it just like this.



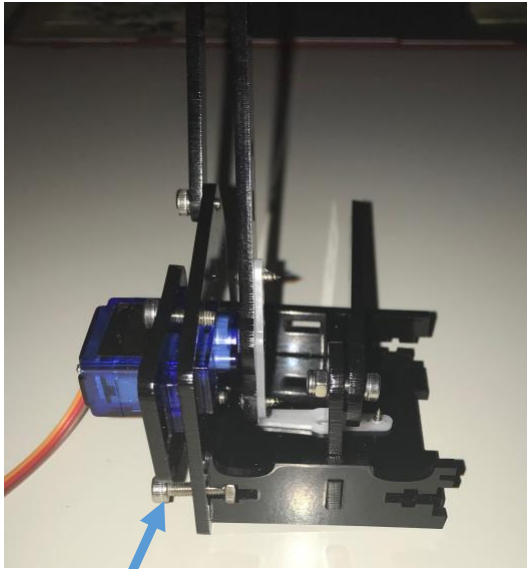
Sticking-out
piece is higher.

Sticking-out
piece is lower.

38. Fit this small piece into the holes.

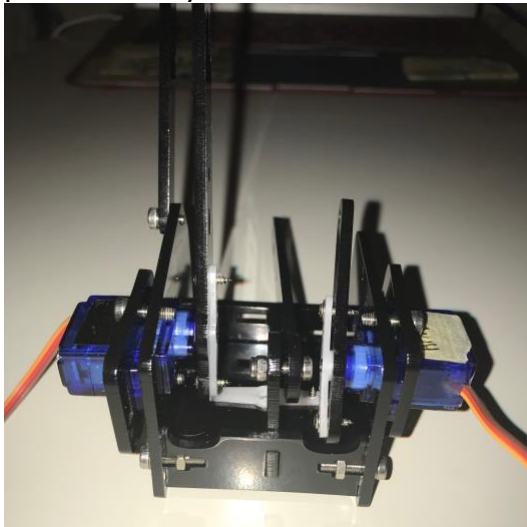


39. Use a screw and nut to connect this like you did before. Use the Allen wrench to tighten the screw.



Screw and nut

40. Fit the piece with the other servo into the holes. Connect it with the other two screws and nuts. Way to go! This part was really difficult!



41. Plug the servos back in and test them to make sure they still work. It actually doesn't matter if you mix up the Arm and Wrist servos.

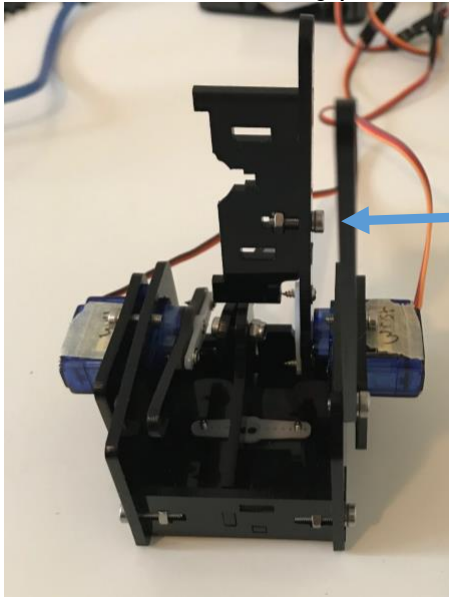
42. Find these exact objects.



Medium screw and nut

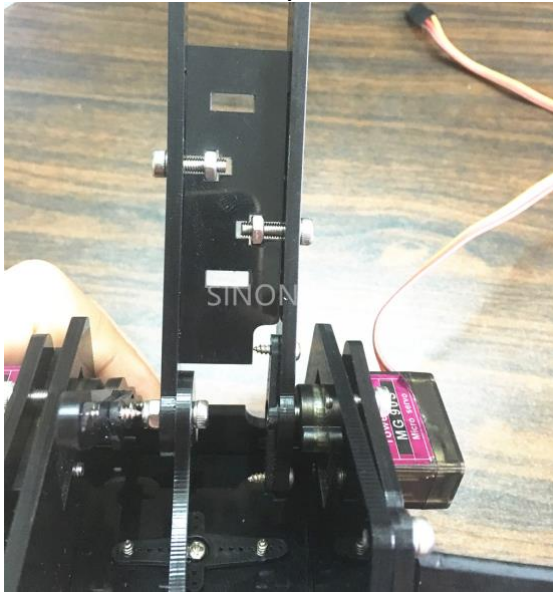
The curved part like this:  will go on top of the white plastic thing so nothing will bump the pointy servo screws.

43. Attach this to the long piece of plastic that is connected to the Wrist servo. There's only one way that it fits.



Medium screw and nut

44. Use another medium screw and nut to connect the other side of the flat piece to the other long piece in the center. Check and make sure your wrist servo now controls this whole arm!



45. Find these exact objects. Use the screw to attach the plastic object.



Make yours look just like this.

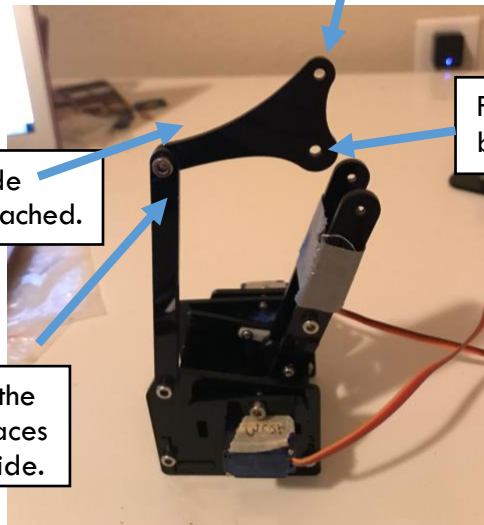
Small screw

Long side gets attached.

Hole in the screw faces the outside.

Skinny part at the top

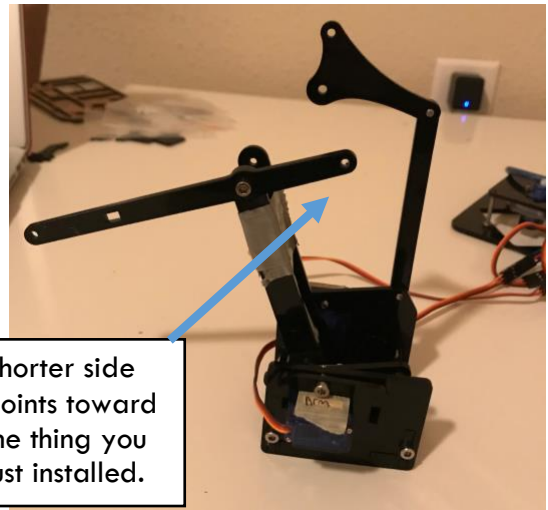
Fatter part below



46. Find these exact objects. Flip your robotic arm around. Use the screw to attach the middle of the plastic piece to the other arm on the other side.

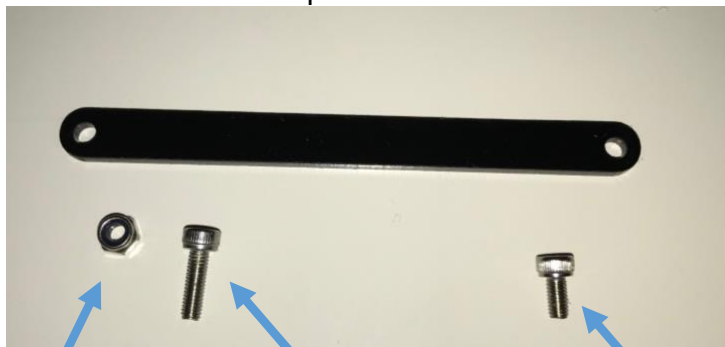


Small screw



Shorter side points toward the thing you just installed.

47. Find these exact objects.

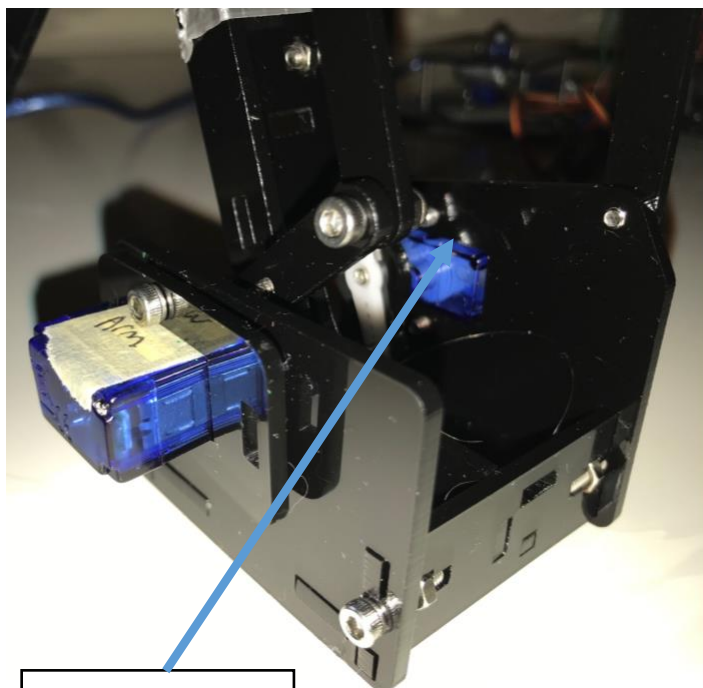


Rounded nut

Medium screw

Small screw

48. Use the medium screw and the nut to attach one side of the plastic piece to the piece that is connected to the Arm servo. If you need the servo to move, use the potentiometer instead of moving it with your hands.



Nut on the inside



We are not done making this yet, but you can see this part down here.

49. Use the small screw to connect the other side of the plastic to the long piece you just installed. Test to make sure your servo can move fully. We want these screws to be pretty loose.



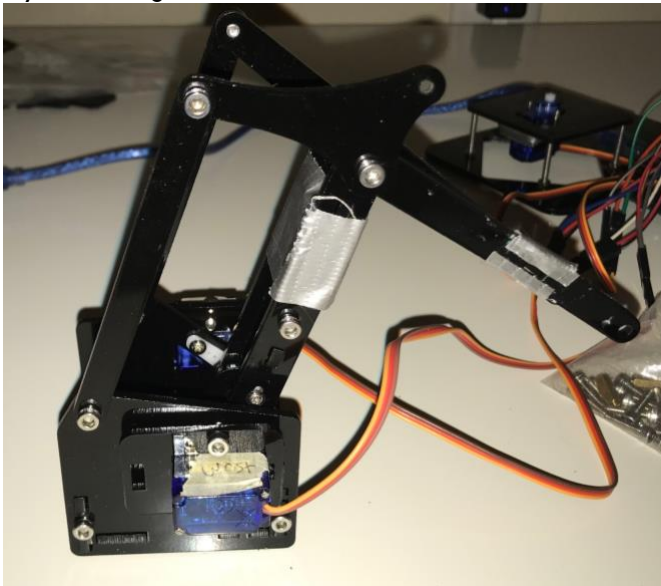
50. Find these exact objects:



Medium screw

51. Attach this piece of plastic to the bottom hole on the 3-sided piece. The 3-sided piece is on the outside, this new piece is in the middle, and then the screw goes through the main arm on the inside.

Check to make sure your servos can still move completely when you twist the potentiometers. If something is buzzing, try loosening screws.

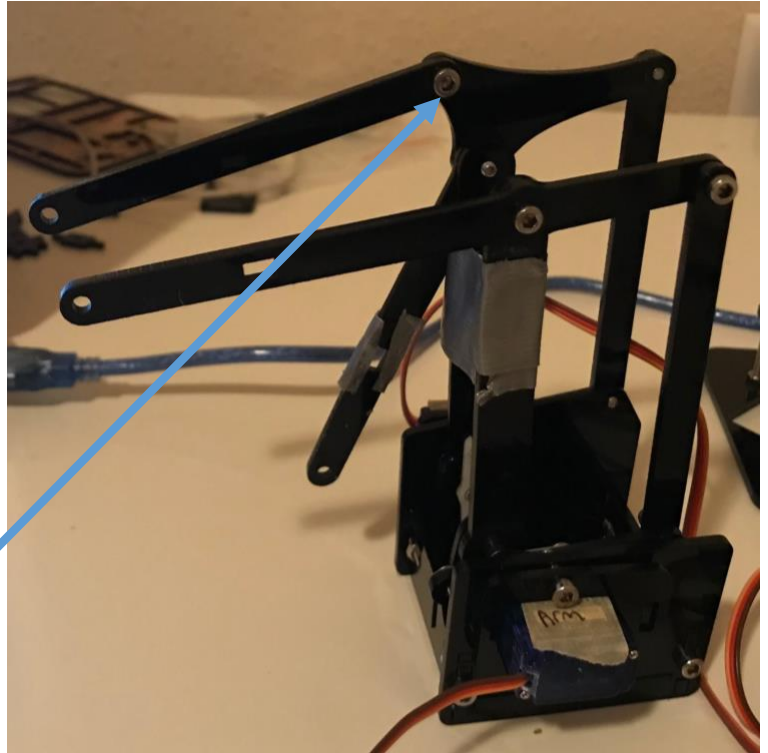


Build Your Robotic Arm! (Part 3)

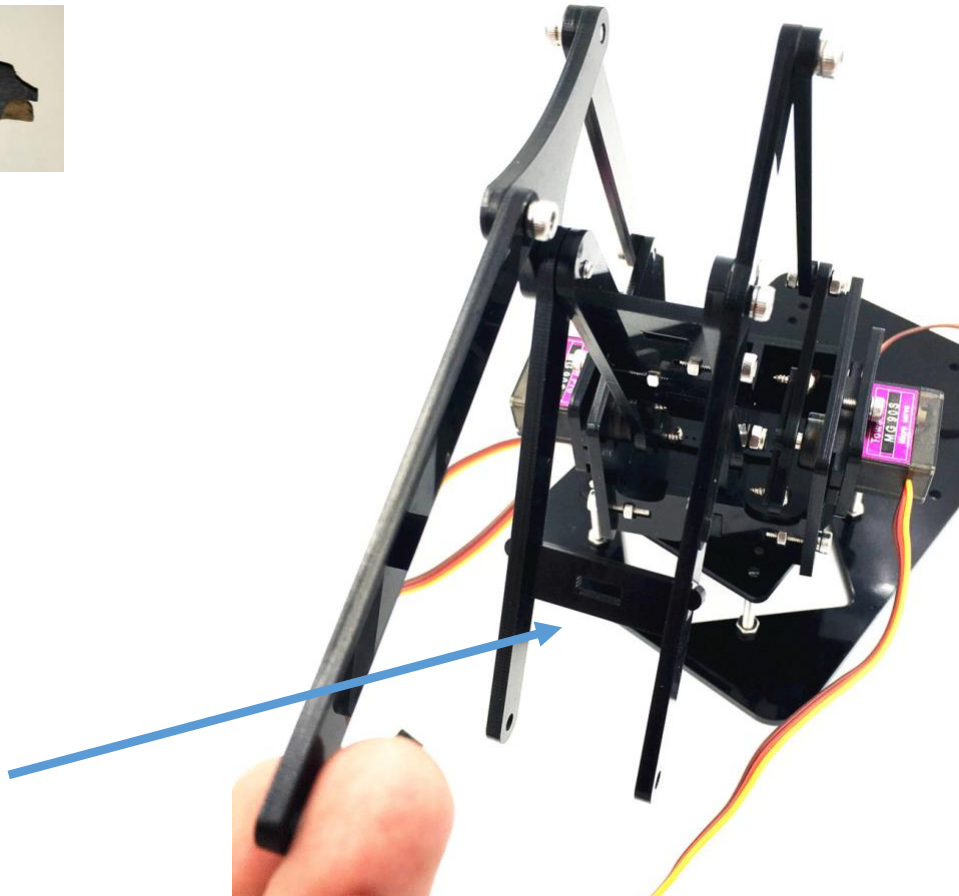
52. Find these objects. Attach the plastic piece to the top of the 3-holed piece. The hole in the screw and the new piece should be on the inside, not the outside.



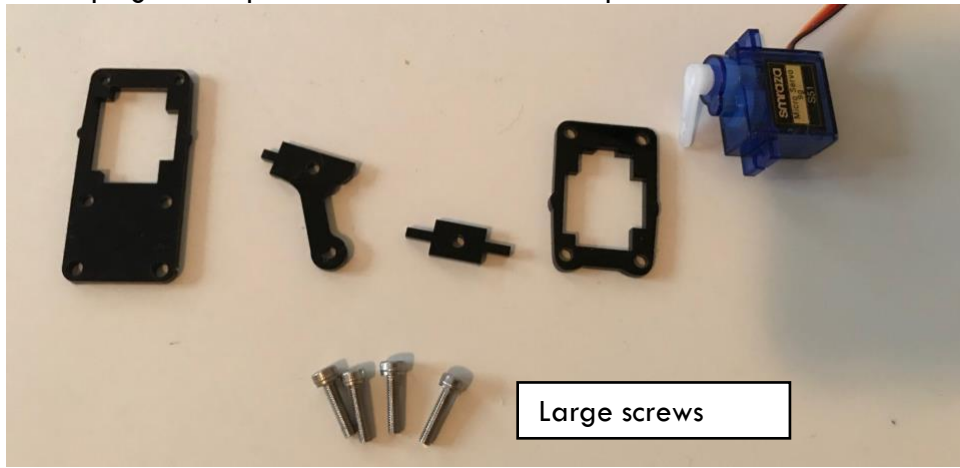
Small screw



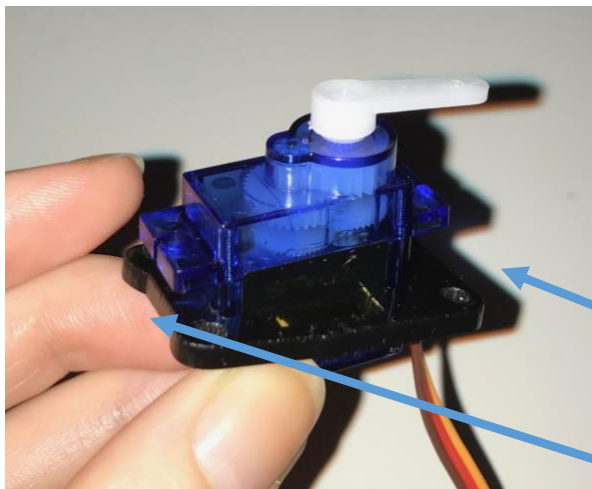
53. Find this piece. Use it to connect the two long pieces of plastic with the holes.



54. Unplug the Grip servo. Find these exact objects:



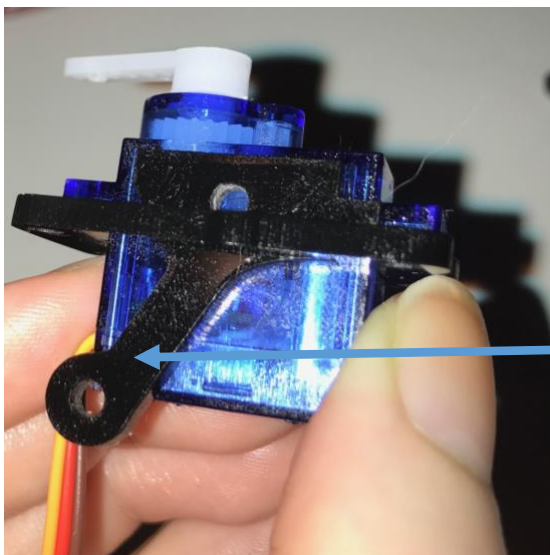
55. Put this black piece of plastic through the bottom of the servo.



Flat part by the
blade

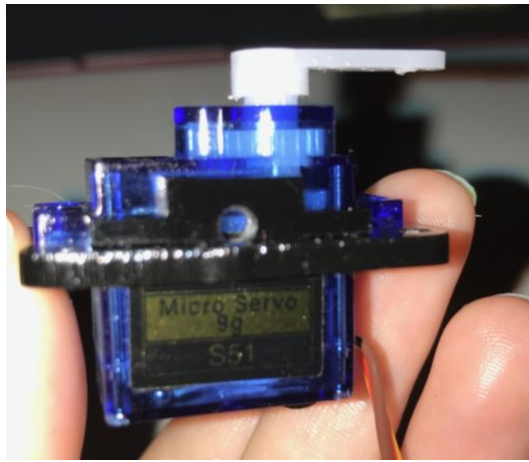
Curvy part at the
back

56. Put this part in the opening on the left side.

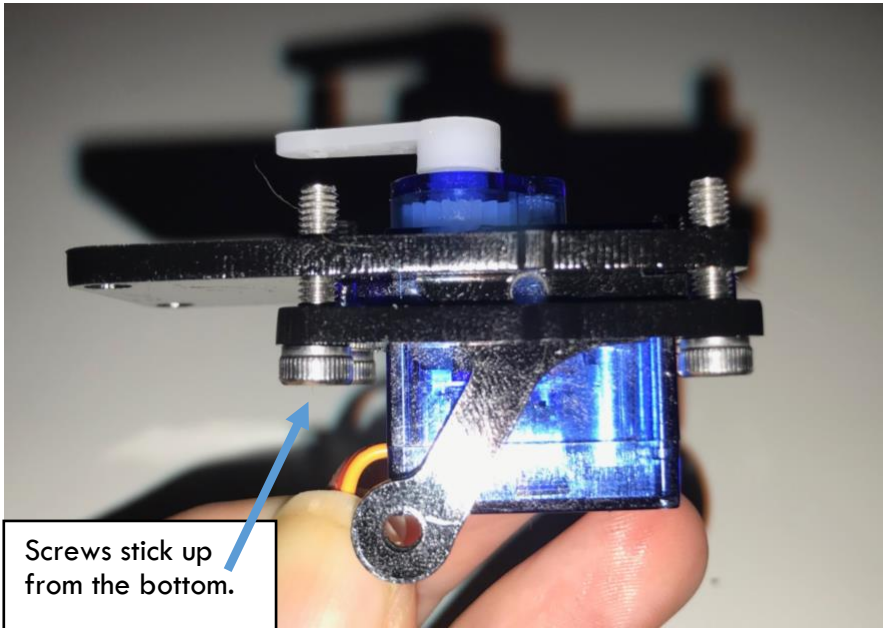


"Tail" part faces
down and toward
the wire

57. Put this part in the opening on the right side.



58. Put the large piece on the top. The bigger part should be facing the white blade and the wires. Use the 4 screws to hold it in place. Plug the grip servo back in and check that it still works.



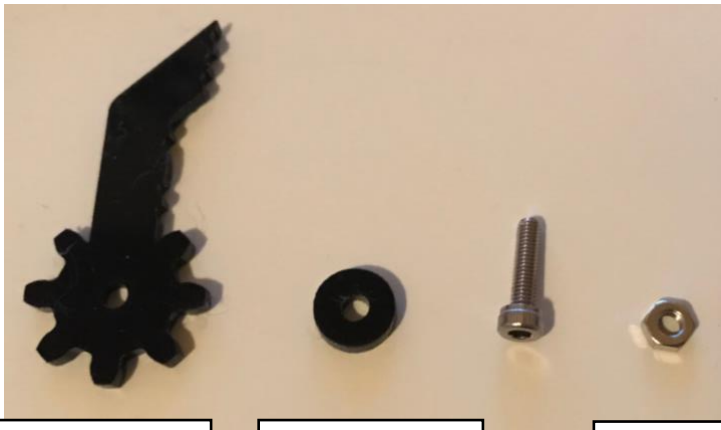
Screws stick up
from the bottom.

59. Take the white blade off the Grip servo. Use a pointy servo screw to connect it to this object.



Screws stick up
from underneath.

60. Find these exact objects.

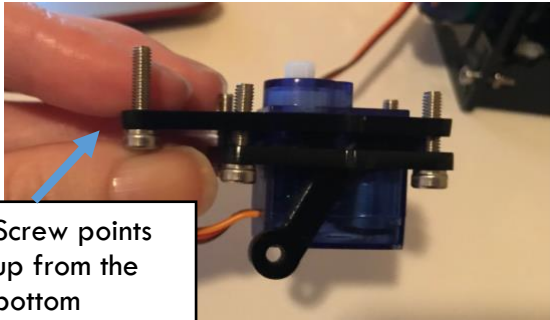


Claw with
only one hole

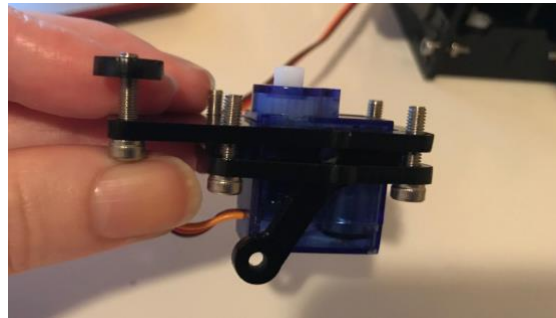
Large screw

Flat nut

61. On the left side of the Grip servo, put in the screw, then the plastic circle, then the claw, then the flat nut. Screw it just tight enough that the claw doesn't move around.



Screw points
up from the
bottom



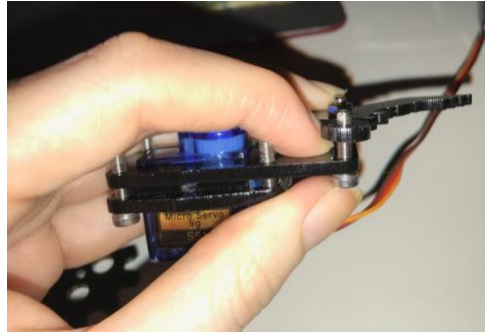
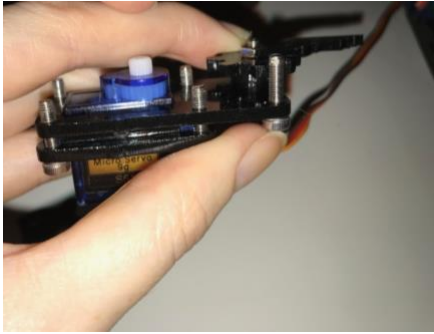
62. Find these exact objects.



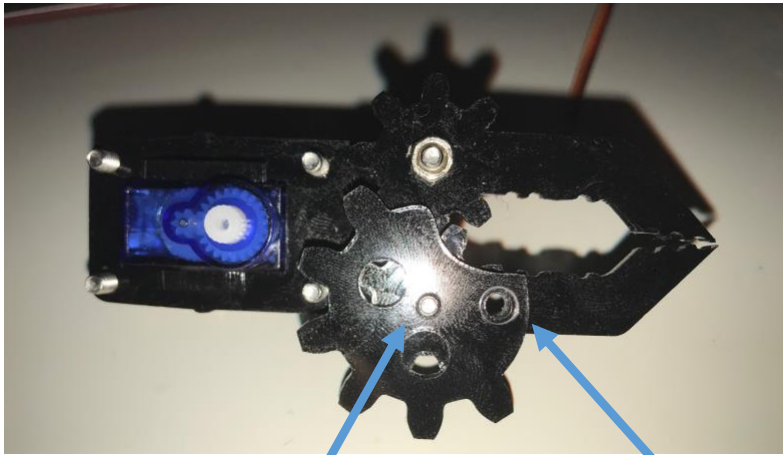
Large
screw

Claw with
2 holes

63. On the right side of your grip servo, put in the screw, then the circle, then the grip. Make the grip fit nicely with the other one grip.



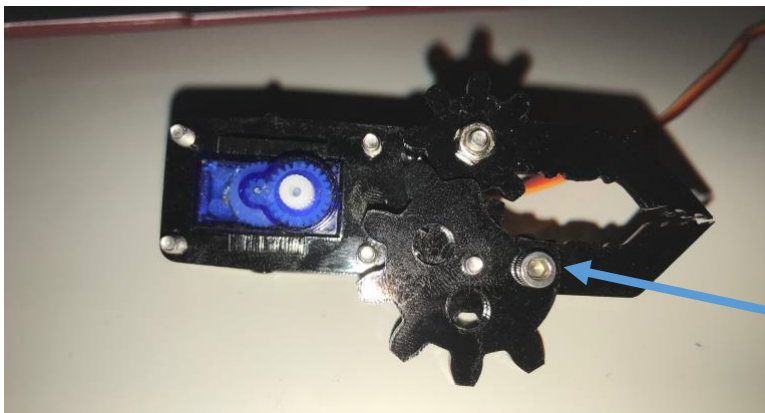
64. Add the last object that you got out. Use the Allen wrench to tighten the screw, but not super tight.



The screw goes in the little hole between the 2 big holes.

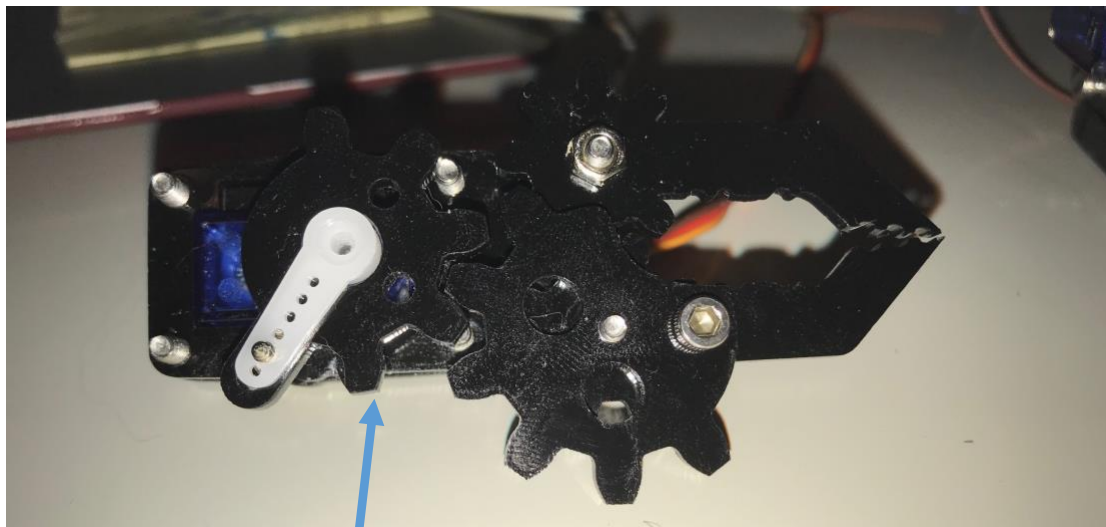
Line this hole up with the one below it on the grip.

65. With a small screw, connect the two holes that you just lined up.



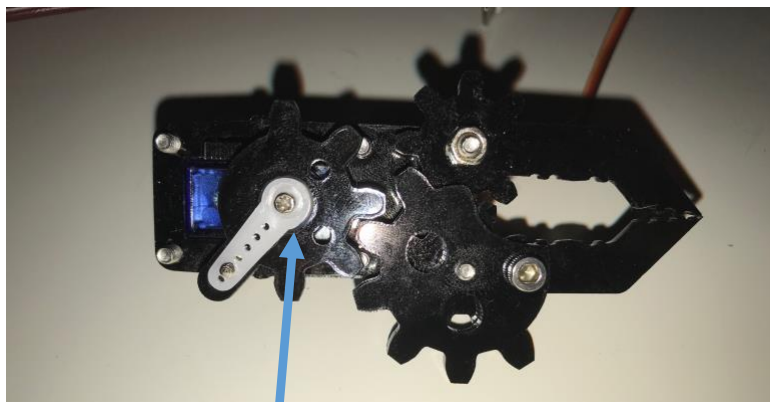
Small screw

66. Snap the other piece into place like this.



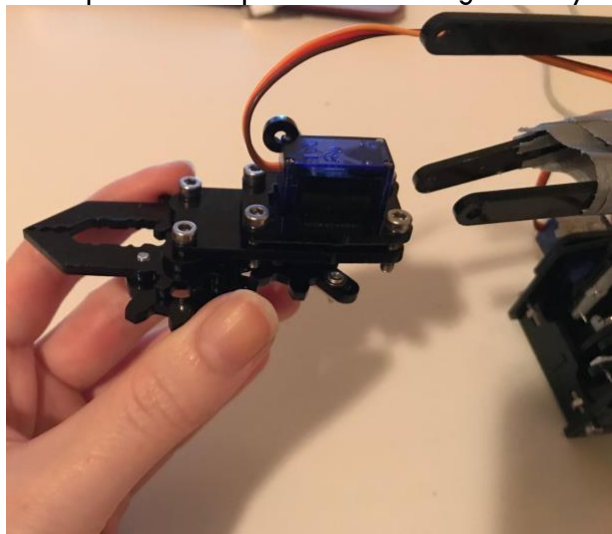
One spike is not touching other spikes.

67. Use a tiny servo screw to connect the white blade. Test the servo and see if it causes the claw to open and close. If it doesn't work, things might be too tight.

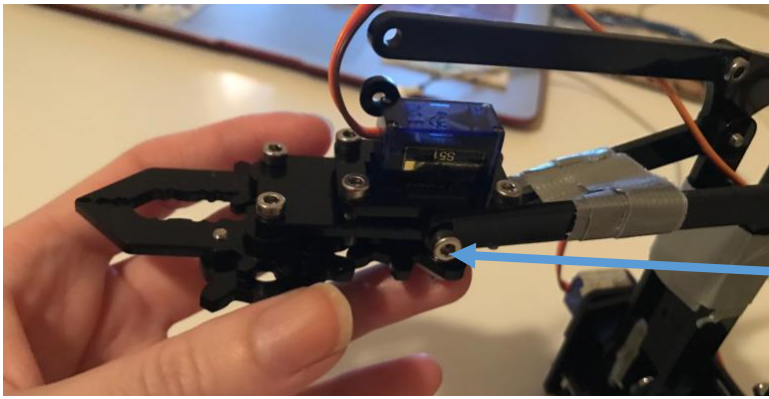


Tiny servo screw

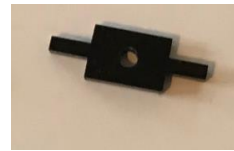
68. Flip the claw upside-down and get ready to attach it to the robotic arm.



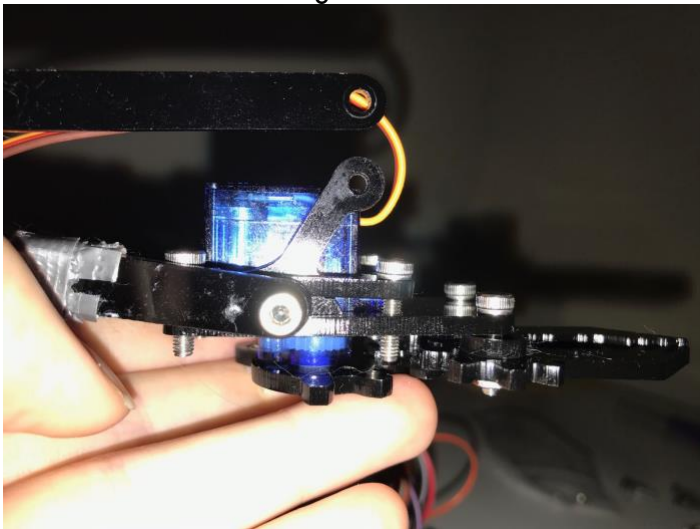
69. Use a medium or large screw to attach the left side. Do not make this very tight.



The screw needs to go into a hole in this piece. You may need to loosen other screws to make this work.



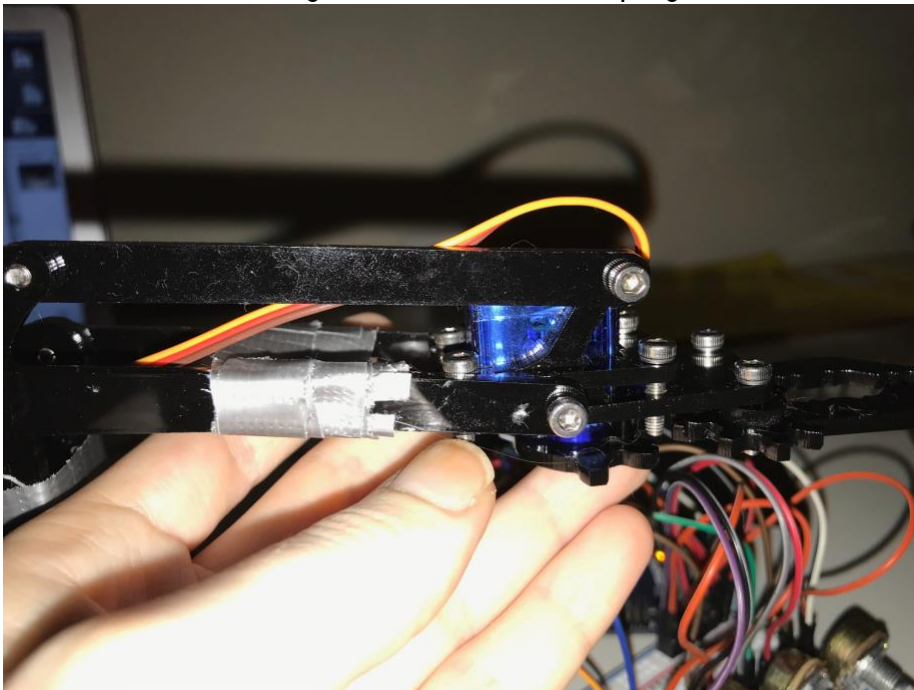
70. Use a medium or large screw to attach the bottom-right side. Do not make this very tight.



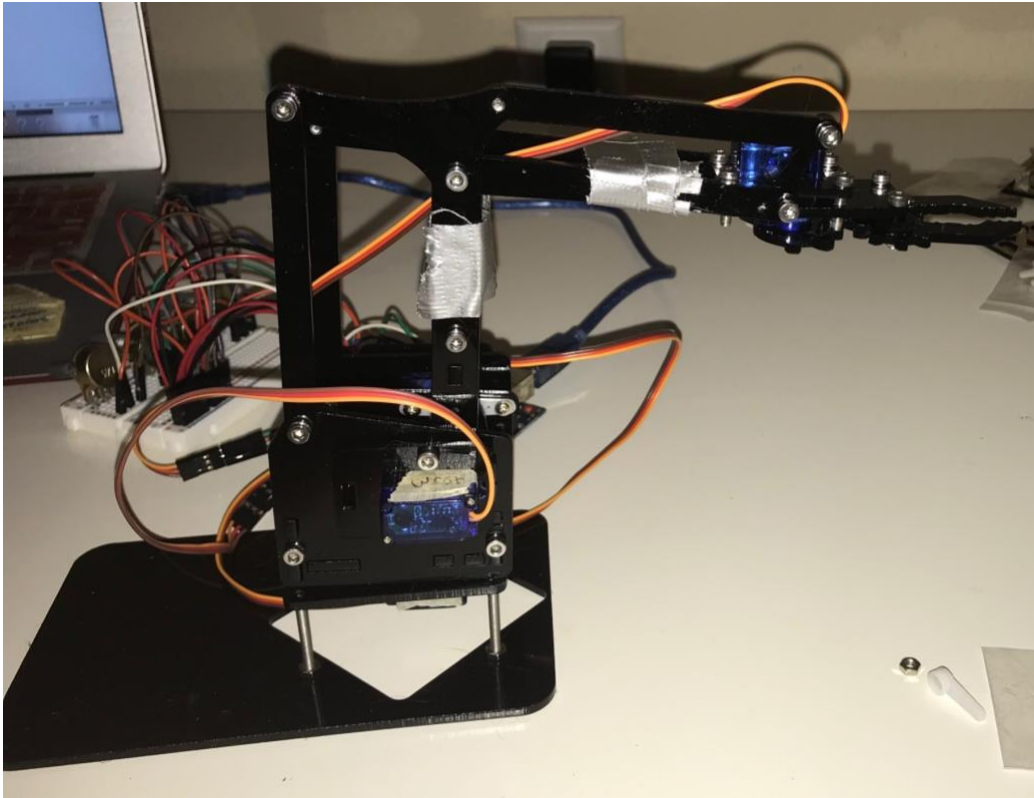
The screw needs to go into a hole in this piece. You may need to loosen other screws to make this work.



71. Use a medium or large screw to attach the top right side. Test to make sure the servo still works.



72. Put the robotic arm back on the base. Press down to pop the servo blade into the servo below it.



73. Use a tiny servo screw to secure the blade to the servo.

