

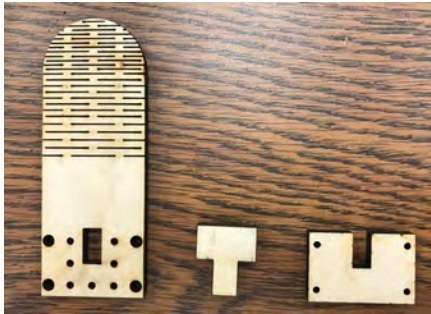

Make Your Own Woody


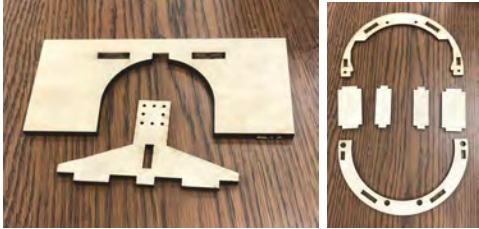



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Pieces Included

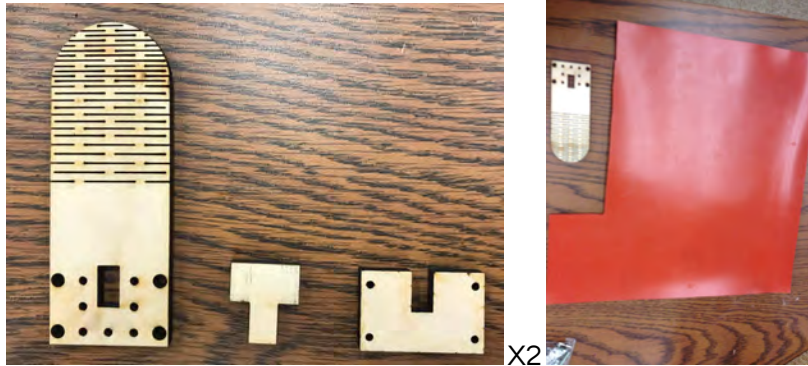
Hands	 The image shows three laser-cut wooden pieces for hands. On the left is a long, narrow piece with a semi-circular top and a series of horizontal slots. To its right are two smaller, T-shaped pieces. The text 'X2' is visible in the bottom right corner of the image area. X2
Upper Arms	 The image shows four laser-cut wooden pieces for upper arms. At the top are two circular pieces, each with a cross-shaped slot. Below them are two rectangular pieces with a central vertical slot. The text 'X2' is visible in the bottom right corner of the image area. X2
Lower Arms	 The image shows four laser-cut wooden pieces for lower arms. At the top are two circular pieces, each with a cross-shaped slot. Below them are two rectangular pieces with a central vertical slot. The text 'X2' is visible in the bottom right corner of the image area. X2
Front Cover	 The image shows a single laser-cut wooden piece for the front cover. It has a complex shape with a central rectangular opening and several smaller openings. The text 'X2' is visible in the bottom right corner of the image area. X2

Torso	 X2
Head Frame	
Face	
Camera Mount	 X2
Neck	

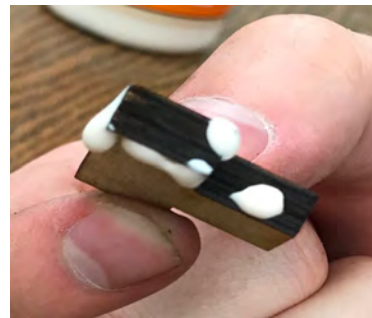
Building the Arms

Hands

Pieces Needed:



1. Take the piece that looks like a T and apply glue just to one side. Put bits of glue on the top and sides of the T.



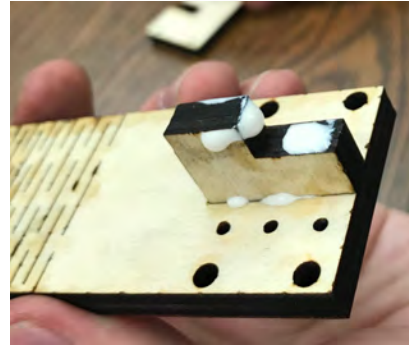
2. Place the T in the rectangular slot on the finger piece so then the side with glue is covered.



3. Wipe away excess glue and let dry. Piece should look like that to the right.



4. Place glue on the other side of the T. Put glue on the front, back, and right sides of the short end and the top and upper left sides of the long end.



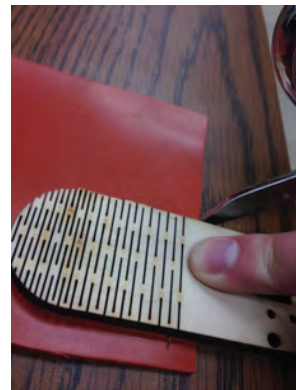
5. Take the small rectangle with a slot and slide it on top of the T where you just glued it. Make sure the backs of the rectangle and finger are align.



6. Repeat steps 1-5 to make another finger. The other two finger pieces don't need to be changed.



Cut out gripper shaped slice from rubber sheet



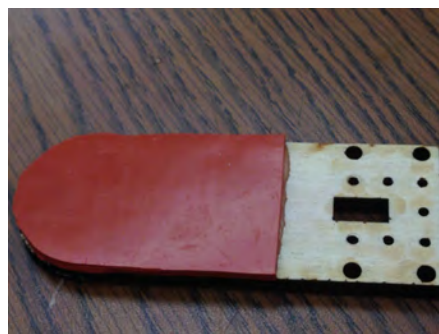
Carefully tear the piece out of the rubber sheet.



Using the same knife, make horizontal that are cuts that go halfway

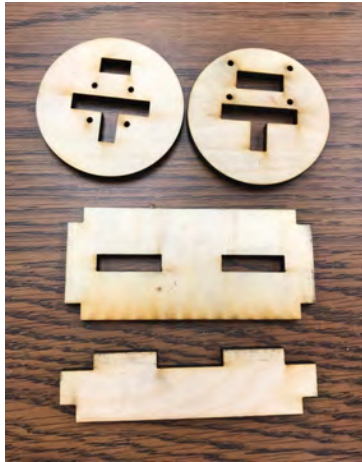


Glue rubber onto the gripper



Forearms

Pieces needed:



X2

1. Take the smaller rectangular piece (on bottom in upper photo) and apply glue to the jagged side. Place glue on all sides of the mini-rectangles on top except the top. Place glue on the top of the flat parts as well.



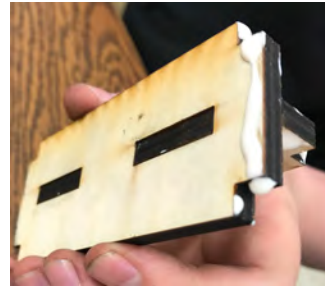
2. Push previously glued piece into the slots in the larger rectangular piece so then the flat side is facing out.



3. Wipe away excess glue. It should look like the picture to the right.



4. Hold vertically. Place small bits of glue on top sides. Make sure to keep glue off the very top face.



5. Take circular piece and place it on top of your previously made piece. Wipe away excess glue.



6. Repeat steps 4 and 5 to make it so then both sides have circles.
Repeat steps 1-6 to make two forearms.



Upper arms

Pieces needed:



1. Take a rectangular piece with a large indent. Place do the glue along the insides of the indent and straight down on either side of it.



2. Slide both rectangular pieces together until both the tops and bottoms are aligned. Wipe away excess glue.



3. Apply small bits of glue on all sides of the plus sign as shown to the right.



4. Take one of the circular pieces and place it on top of the plus. Wipe away excess glue.



5. Repeat steps 3 and 4 so then both sides have circles. Make sure the **rectangular cut-outs** of the **circles** are **aligned**!



Building the Torso

Front Cover

Pieces needed:



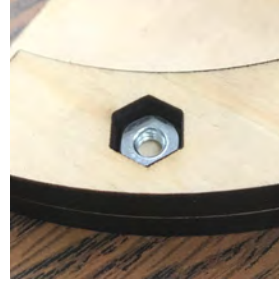
1. Glue the middle piece (shown to the right) on one side. Be careful to avoid getting glue in the holes.



2. Take the large piece with text and line cut outs on it. Flip it so the text is face down. Attach the piece you just glued so the side curves are aligned with those of the front piece. Note that the tops and bottoms of the pieces will not be aligned.



3. Insert nuts into the hex holes.



4. Repeat 6x for all holes.



5. Line the sides of the smaller piece with glue. Do **not** put glue around the oval cut out or in the holes.



6. Take the long, bent pieces without rectangle cut-outs. Place them on top on the piece you just glued so the sides are aligned.



Main Structure

Side Structure

Pieces needed:



X2

1. Take a rectangular shaped piece with a rectangular cut-out. Hold so cut-out is on top. Place glue on the sides of the indents and around the sides of the rectangle sticking out.



2. Attach the slot side to the long piece with the smaller holes at the highest rectangular cut-out. (The one farthest from the large bend)



3. Repeat steps 1 and 2 twice for the slotless bars. Attach in the other two rectangular slots.



4. Glue the three pieces the same way you did in steps 1 and 3 on the side sticking out.



5. Attach the side piece with the larger holes.



6. Repeat step 1, but attach on the other side to ensure a mirror image.



7. Repeat steps 1 through 5 making sure that everything is a mirror image



8. Final result: Two side pieces



Speaker mount

Pieces needed:



1. Glue the rectangular piece around the right slot. (on right when held horizontally so the flat side is on top) Place a little bit of glue going straight down from the slot on either side as well as a bit inside the slot.



2. Take the rounded piece and slide it into the previously glued slot.



3. Glue the end of the rectangular piece by placing dots of glue on either side of the rectangle sticking up and lines of glue around the rectangle sticking up.



4. Attach the piece you glued to the rectangular hole in the side piece. Place it so then the flat side is farthest away from the side piece with smaller holes.

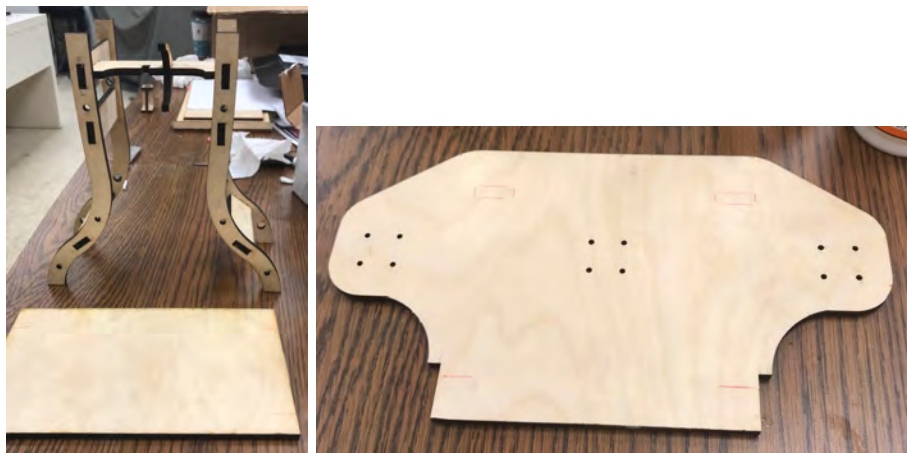


5. Repeat steps 3 and 4 for the other side. It is recommended to line this up with the front cover for proper alignment, but make sure to not glue the front cover and main structure together.



Top and Bottom Pieces

Pieces needed:



1. Glue rectangular piece with a small line of glue going from the edge and out a bit.
Recommended: Take front cover and align it with the structure just made. Place so the front of the cover is touching the side of the rectangle. Draw lines around the bottom of the side structure. Put glue on those lines.



2. Attach side structure to rectangular piece by placing the bottoms of the piece on top of the glue. Make sure it is in place before it dries.



3. Put glue at the top of the main structure.



4. Attach top shoulder piece by placing it on top of the glue.
Recommended: Slide front cover in front and adjust shoulders so they short end is touching the front and the sides of the short end are flat. Avoid gluing the front cover to the main torso.



Side sheeting

Pieces needed:



X2(Rectangular piece not torso)

1. Glue one side of the frame by tracing a line of glue around the side. Remember to trace a line of glue between the two bendy pieces, on the side of the rectangle, and on the indent of the top piece.

Recommended: Do only one side at a time. Wait for the first side to dry before doing the other side



2. Add clamps on the most curvy part of the wood on both sides. Position downwards so all parts are pushed down. If necessary place something on top of the piece to weigh it down. This keeps the piece from flattening itself and coming out of place. Repeat steps 1 and 2 to create the other side.








Building the Head

Face

Pieces needed:



<p>1. Glue the head piece with rectangular cut-outs on top and hexagonal holes. Put glue on one side only. Line the glue around the entire face but be careful to keep it out of the holes.</p>	
<p>2. Place on top of large face piece so then the curves are aligned.</p>	
<p>3. Add nuts to the hexagonal holes so they fit with the holes.</p>	
<p>4. Apply glue to the smaller piece, going around the entire side.</p>	
<p>5. Add a securing piece on top so the nuts don't move/fall out</p>	

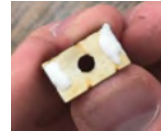
Camera Mount

Pieces needed:



X2

1. To make the camera holder, attach glue to the tiny blocks on one side.



2. Attach the blocks onto the main camera holder, making sure the holes line up.



Head Frame

Head base

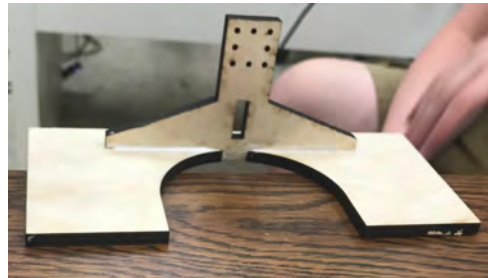
Pieces needed:



1. Glue the bottom of the piece that looks like a T including the sides of the parts that stick out and the indents



2. Insert the T into the slots on the base of the rectangular piece with a large, rounded cut in the middle.



Head Arches

Pieces needed:

1. Glue the rectangular piece on one end making sure to surround the slot



and the side.



2. Insert into hole on one of the half-circles. Repeat steps 1 and 2 with all 4 pieces.



3. Glue the other sides of the rectangles like you did in step 3 and slide the other half-circle frame on.



Final Frame

Pieces needed:



1. Take the crescent shaped head frame and apply glue to the bottom.
Recommended: Slide face in front of structure so it is closest to the round cut-out. Make marks of where the arches' bases are. This is where you will place it on the base.



2. Put the frame on the base.









3. Glue the top of the arches of the head frame.
Recommended: Slide face in front of structure so it is closest to the round cut-out. Before gluing, put the head cover on top. Make marks on the bottom of the head cover to show where to put it in step 3.



4. Attach the large, rectangular piece with dashed lines to the top of the frame. It will not touch the ground. Use clamps at the base on both sides to hold it down. Make sure to either hold it down or find something heavy that can balance on top of it to keep it in place.



Neck

<p>1. Apply glue to the triangular neck piece. Put a line of glue going straight down from the cut on both sides. Also, put a little bit of glue on the inside of the cut.</p>	
<p>2. Slide the rectangular neck piece in the cut of the piece you just glued</p>	
<p>3. Add glue to the larger end of the neck piece along the sides but not on the bottom.</p>	
<p>4. Slide the cross made by the neck into the larger neck base.</p>	
<p>5. Apply glue to the smaller cross on top on the sides but not on top. Put glue on the indents just below the cross as well.</p>	
<p>6. Put the smaller neck base on the smaller cross.</p>	

Eyebrows

Pieces needed:



X2

1. Add a small drop of glue to the middle of the long piece, preferably on the less attractive side.



2. Press the first small cylinder onto the glue, making sure it is in the center. Wipe away excess glue.



3. Put glue on top of cylinder.



Cut and file the wings of the servo gear so it is round.



4. Press servo gear thing on top of said cylinder



Motor Tutorial

U Bracket

Pieces Needed:



1. Put the flanged piece in the bracket.



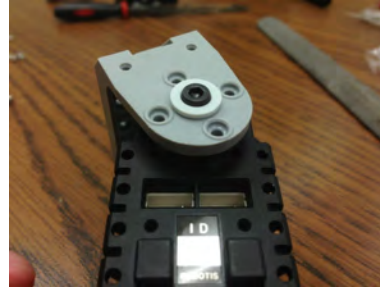
2. Turn upside down. Fit the plastic ring to the bottom.



3. Slide onto motor.






4. Screw in.



5. Line up the four holes on the other side of the U bracket with the four holes of the motor. Screw screws into the four holes and in the center.



Adding Nuts

<p>1. Put Nuts into LT bracket with screwdriver.</p>	
<p>2. Put Nuts into U bracket with screwdriver.</p>	
<p>3. Push Nuts into the side of the motor with screwdriver or small pole.</p>	

Brackets and Motors

1. Screw LT bracket onto nuts in the motor.



2. You can also screw motors into the holes on the rotating plate.



Assembling the Torso

Installing Raspberry Pi

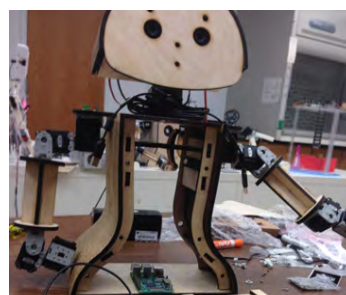
Pieces Needed



1. Push the SD card into the slot



2. Position the Raspberry Pi in the front, center of the robot, with the USB ports facing the back of the robot.



3. Insert screws from the bottom of the robot through the holes in the Raspberry Pi.

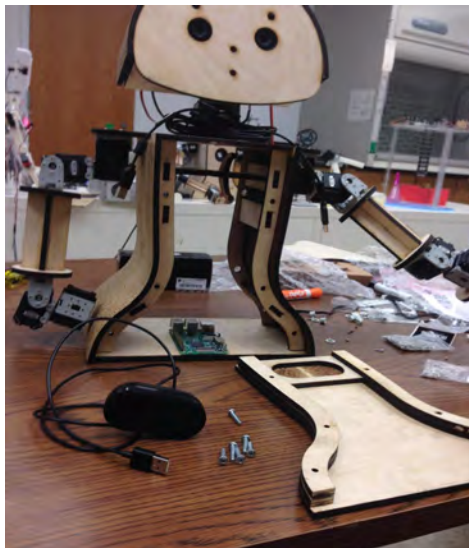


4. Add nuts to secure the Raspberry Pi in place.



Speaker and Cover

Pieces Needed



1. Align the speaker with the space in the front cover.



2. Align the front cover with the main torso. The speaker should slide securely into the rib piece.



3. Secure the cover with six 8-32 x 3/4" screws.



Assembling the Head

Neck

Pieces Needed



1. Screw U bracket into the bottom of the neck piece.



2. Attach U bracket to motor as seen in the motor tutorial.



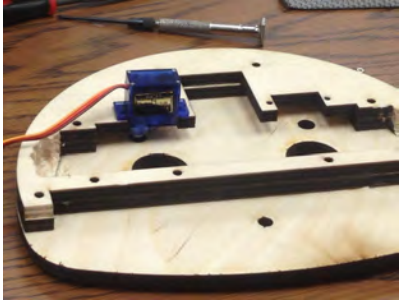
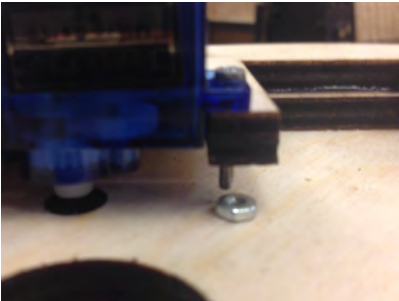
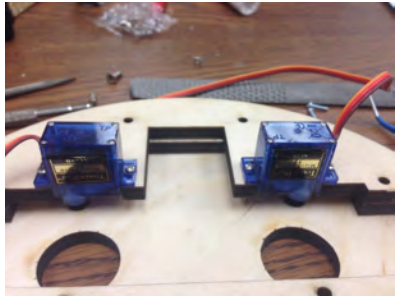
3. Attach the smaller part of the neck to the rotating plate on the motor by screwing it in through the holes.



4. Put nuts in the nut holes in the bottom of the motor and screw L bracket into nuts.

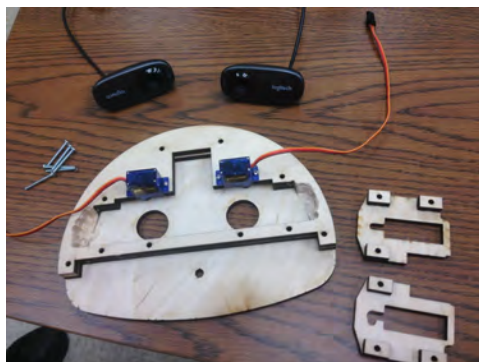


Eyebrow Motors

<p>1. Put the smaller servo in the servo holes.</p>	
<p>2. Prepare the screw and nut, put screw through hole as shown.</p>	
<p>3. Screw the servo into the servo hole. Repeat all steps (mirrored) for the other side.</p>	

Camera

Pieces Needed



1. Start to remove the back clip by peeling off the rubber circle from both sides as shown.



2. Unscrew the screw that was covered by the rubber circle.



3. Use a long solid object to push out the axis in the middle, and pull out the other side with pliers.



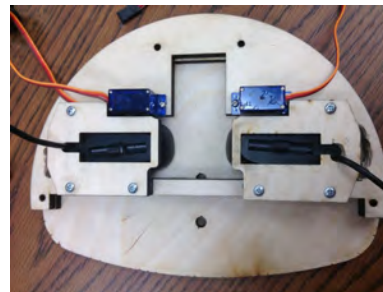
4. Remove the back clip.



5. Put wire of camera through camera hole so the part with the blocks is facing the same way as the camera lense.

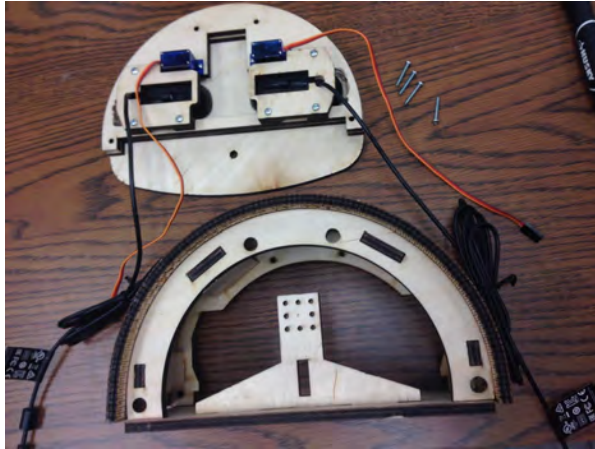


6. Reattach camera holders with the camera, so the lenses are visible through the eye holes.



Attaching the Face

Pieces needed:



1. Put the on the frame so the large piece with 8 holes is in the back.

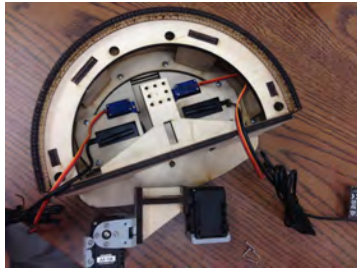


3. Fasten the face to the frame with four 4-40x3/4" screws in the holes along the arch. Use the larger holes at the back of the frame to guide the screwdriver if desired.

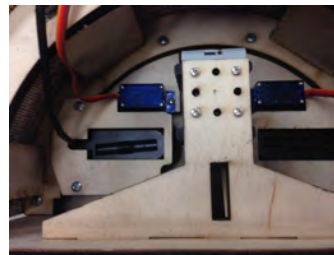


Attaching The Neck

Pieces needed:



1. Screw the motor towards the smaller part of the neck onto the head so the rest is facing downward.



Head to Torso

Pieces needed:



1. Put nuts into L bracket, then screw onto the top of torso.



2. Put nuts into the motor as shown in the motor tutorial, then screw the motor onto both the neck piece and the shoulder piece.

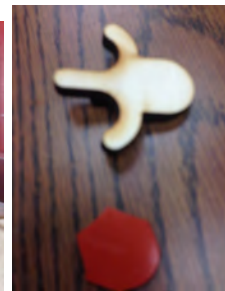


Face Customization

Pieces Needed:



Cut out tongue shaped piece from rubber







Glue rubber onto the tongue.



Arm Assembling

Arms

<p>1. Attach L bracket to bottom of shoulder and screw a motor onto it.</p>	
<p>2. Attach L bracket to motor.</p>	
<p>3. Put nuts into the holes at the bottom of the motor then screw the motor into the L bracket.</p>	
<p>4. Take the upper arm and screw U bracket onto one side so then the rectangular hole is to the bottom left.</p>	

5. Attach U bracket on arm to a motor.



6. Screw in a U bracket onto the other side of the arm.



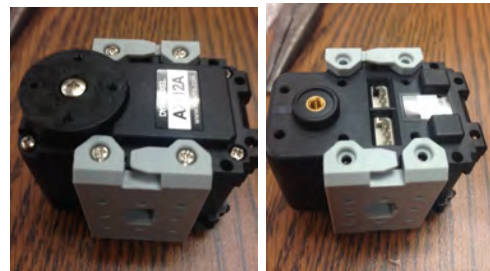
7. Attach motor.



8. Put nuts in the 1st and 3rd rows of the nut holes on the sides of the motor.



9. Take another motor and attach 2 L brackets. Put nuts on both sides but screw in ONLY the side facing the rotating plastic part



10. Screw in L bracket to the plastic circle, match up the holes.



11. Screw the L bracket to the previous motor mentioned 2 steps earlier, so that the nuts line up with the holes in the bracket and screw screws through the arm leading to the unscrewed section of the motor.



12. Attach an L bracket to another motor and screw it into the previous arm so that the rotating part is opposite of the hole.

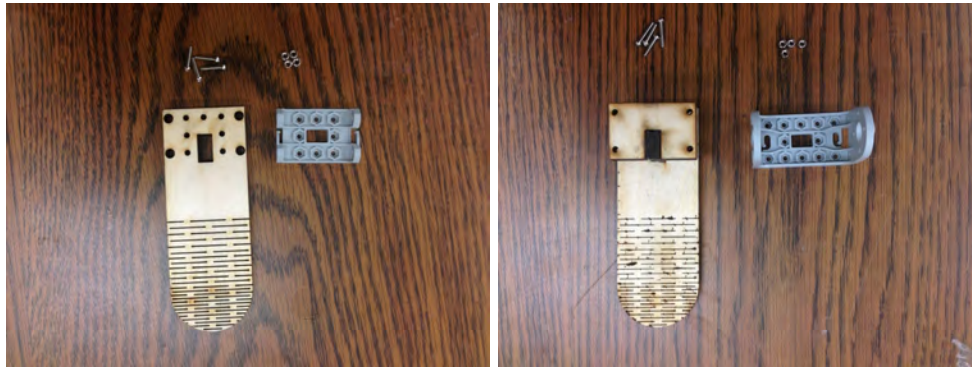


13. Put nuts in the bottom of the motor in preparation for the hands.



Hands

Pieces Needed



1. Attach U bracket to the gripper with the elevated base.



2. Attach L bracket to the other gripper



3. Screw both grippers onto respective sides of the motor.



Electronics

Motor wiring

1. Run a wire from the gripper to the elbow rotator and a wire from the elbow rotator to the elbow joint.



2. Run a wire from the elbow joint to the up-down shoulder joint, from the up-down shoulder joint to the forward-back shoulder joint, and a wire out from behind the forward-back joint.

Repeat steps 1 and 2 for the other arm



3. Run a wire from the upper neck motor to the lower neck motor, and add a wire coming out from the lower neck motor.



Final wiring