Ball Kicker

Building:
Program:

Designed for **NXT 1.0** (8527, or 9797 + 9695/9648)

Building Instructions

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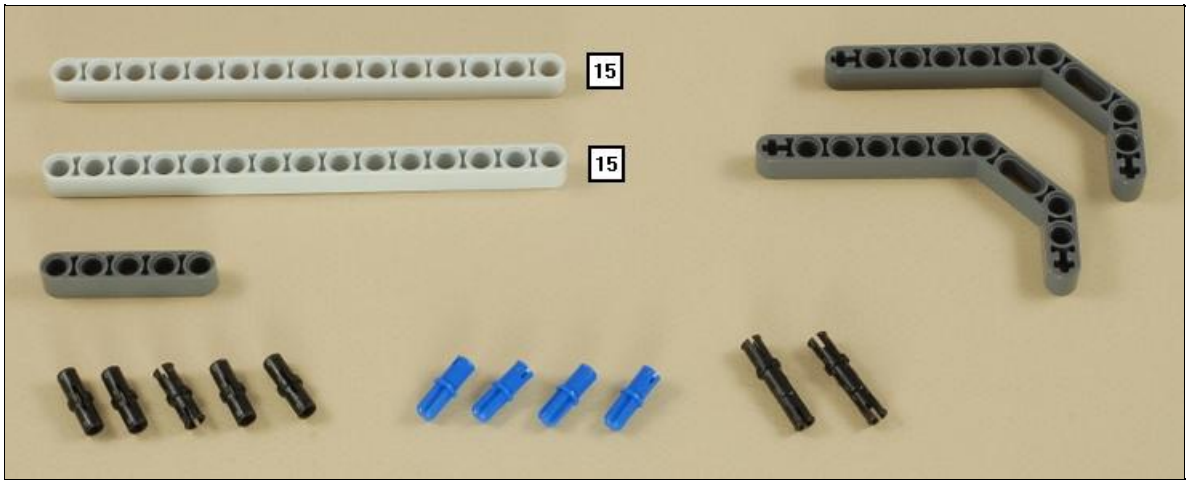

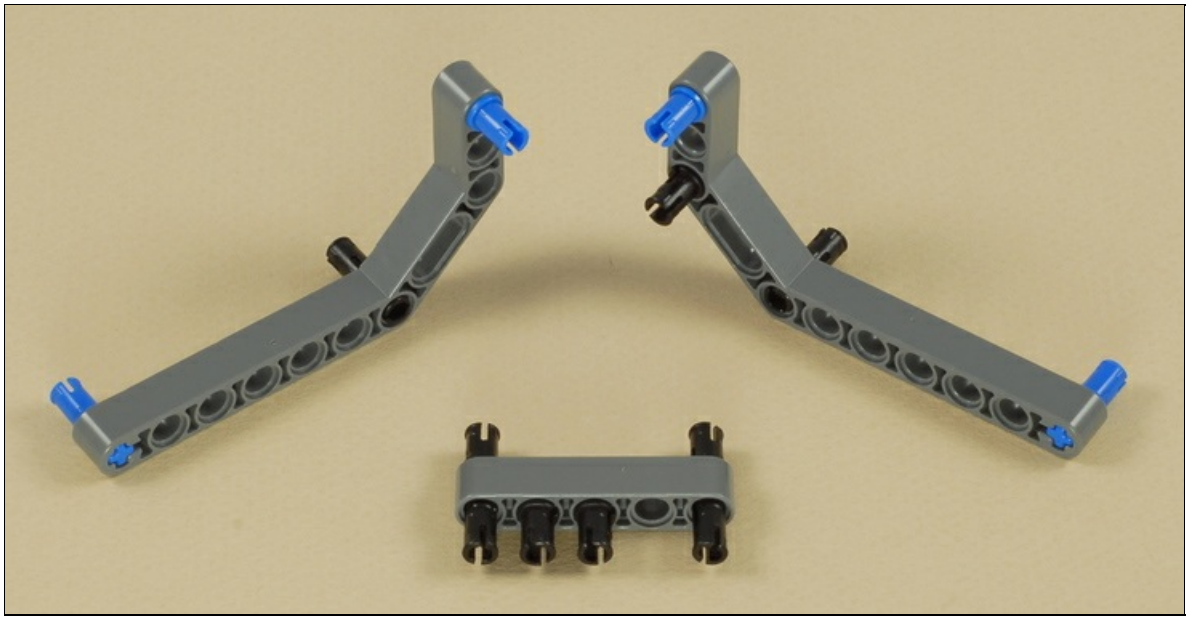

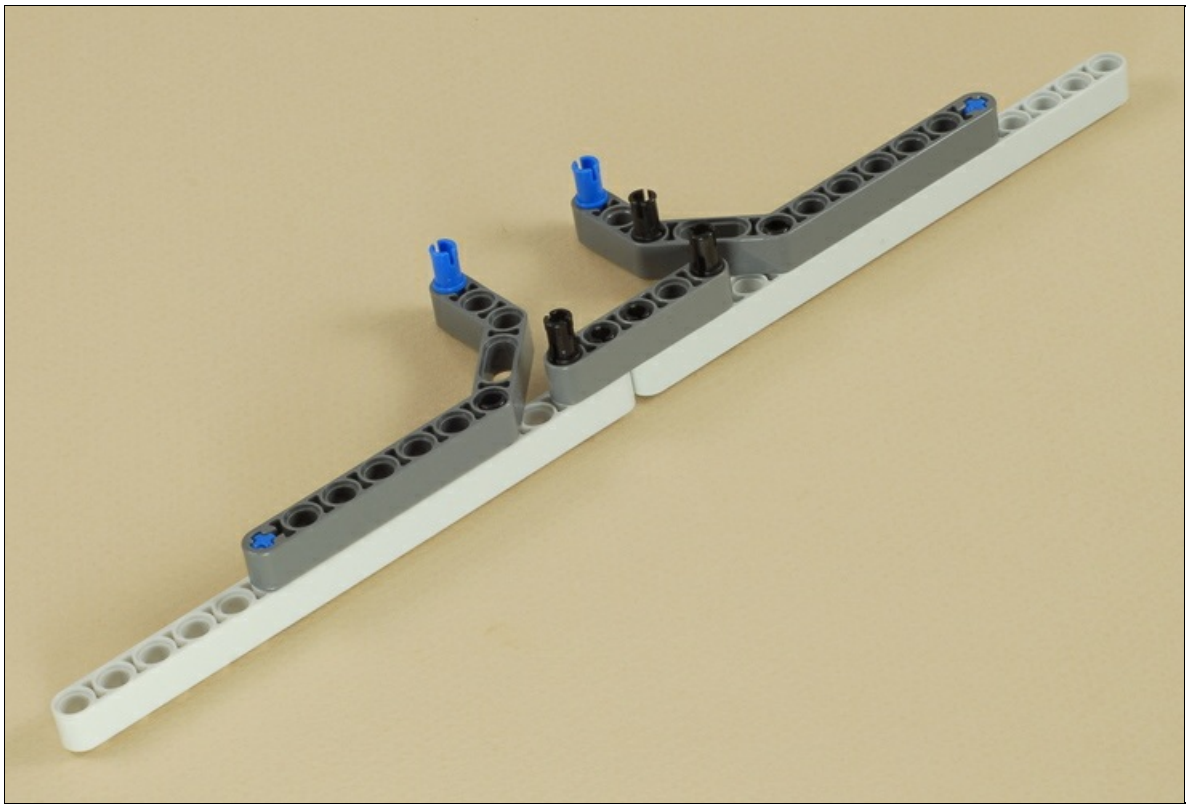

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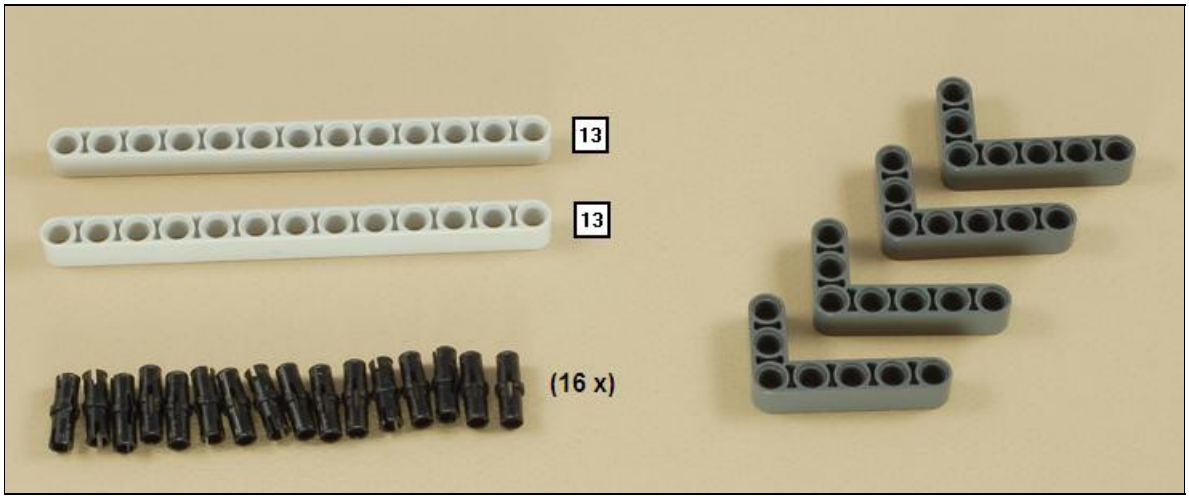

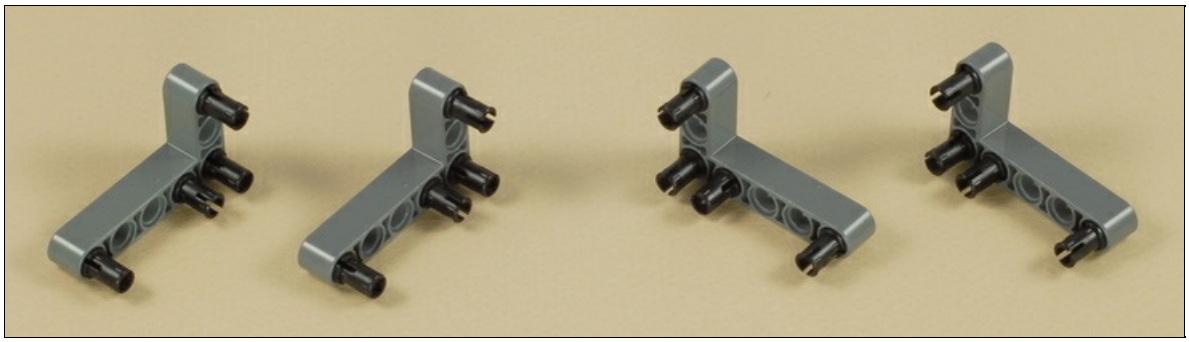

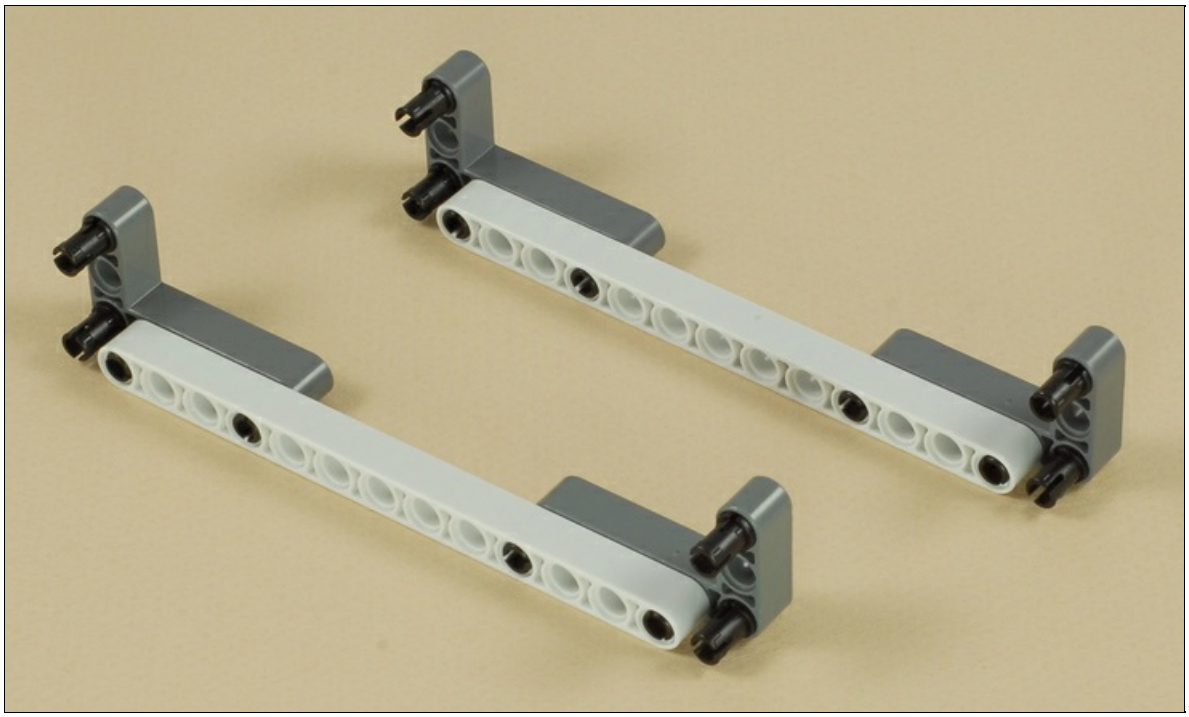

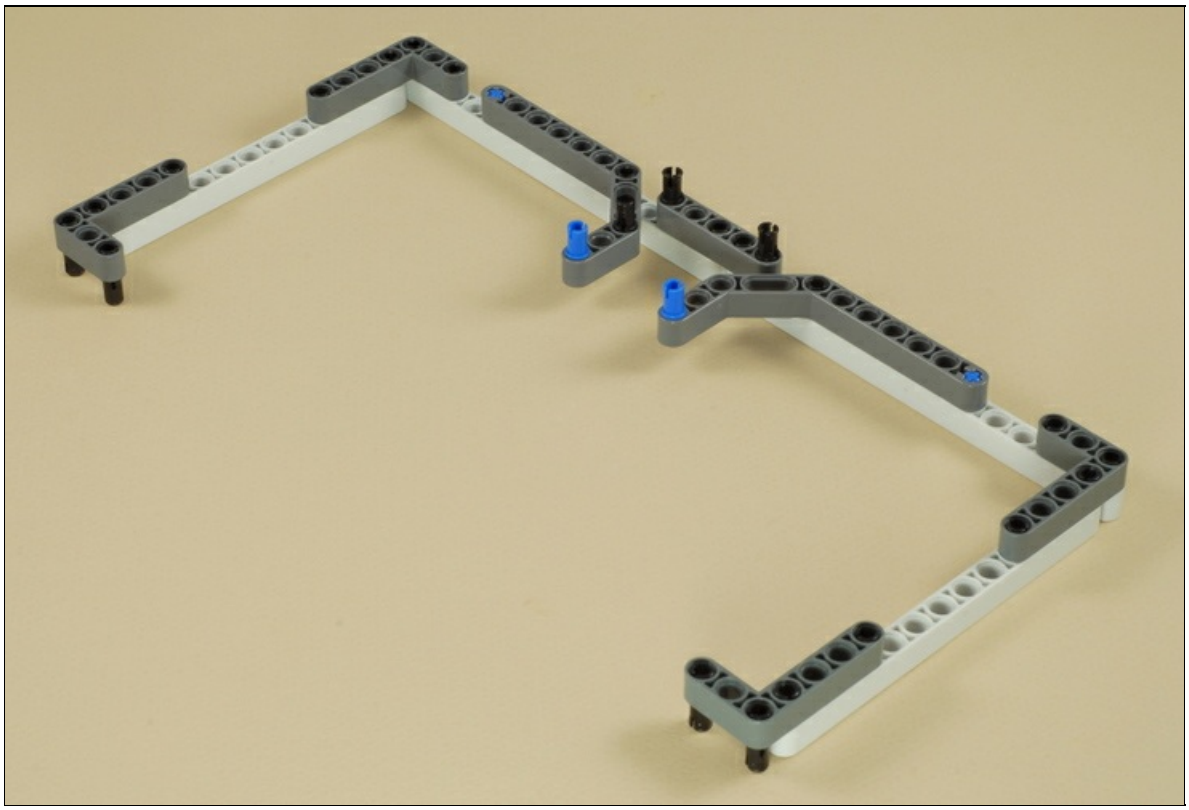

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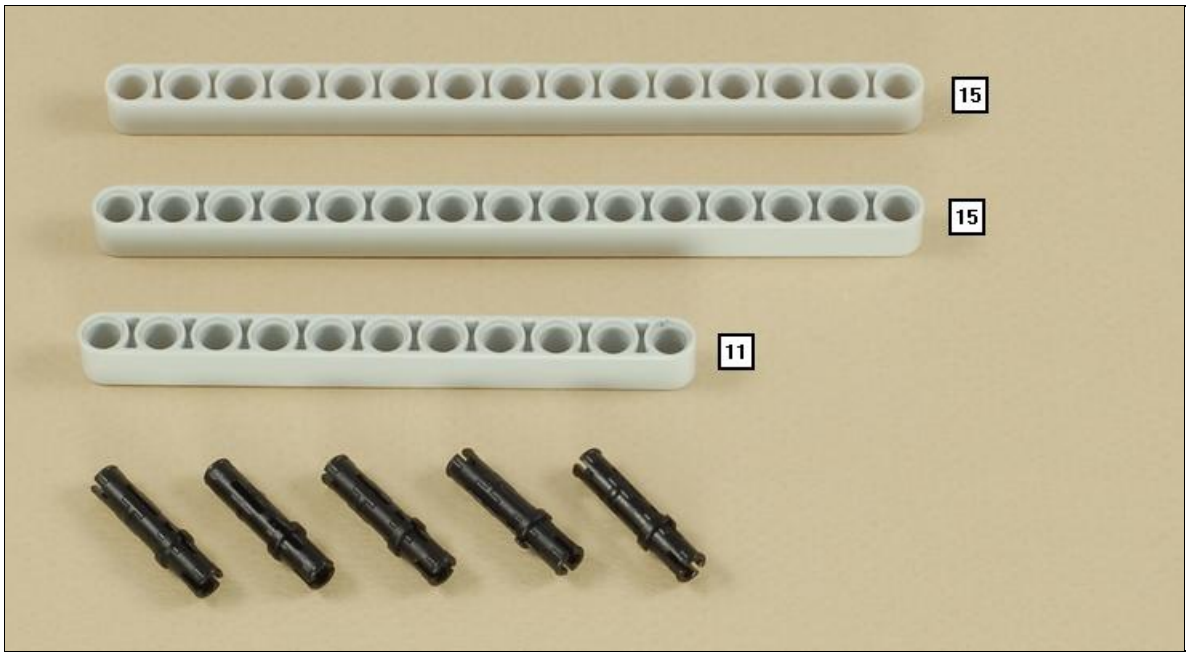

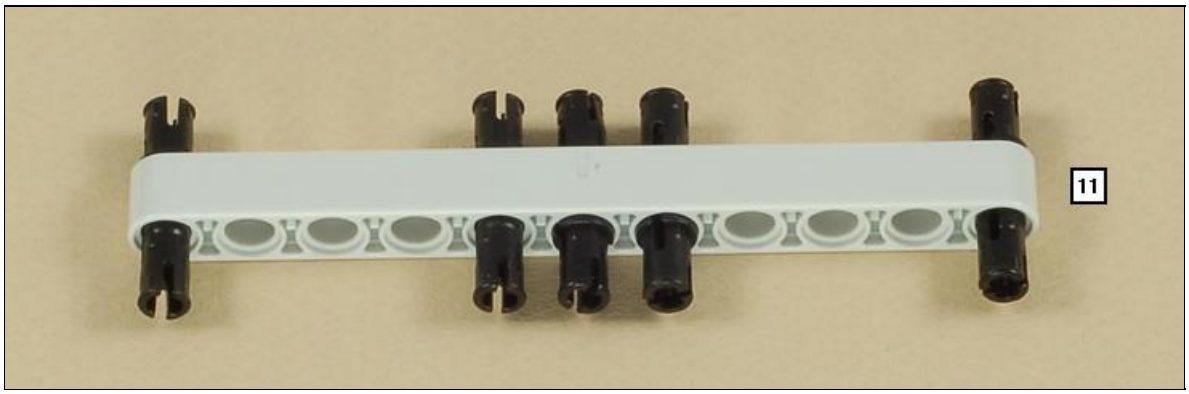

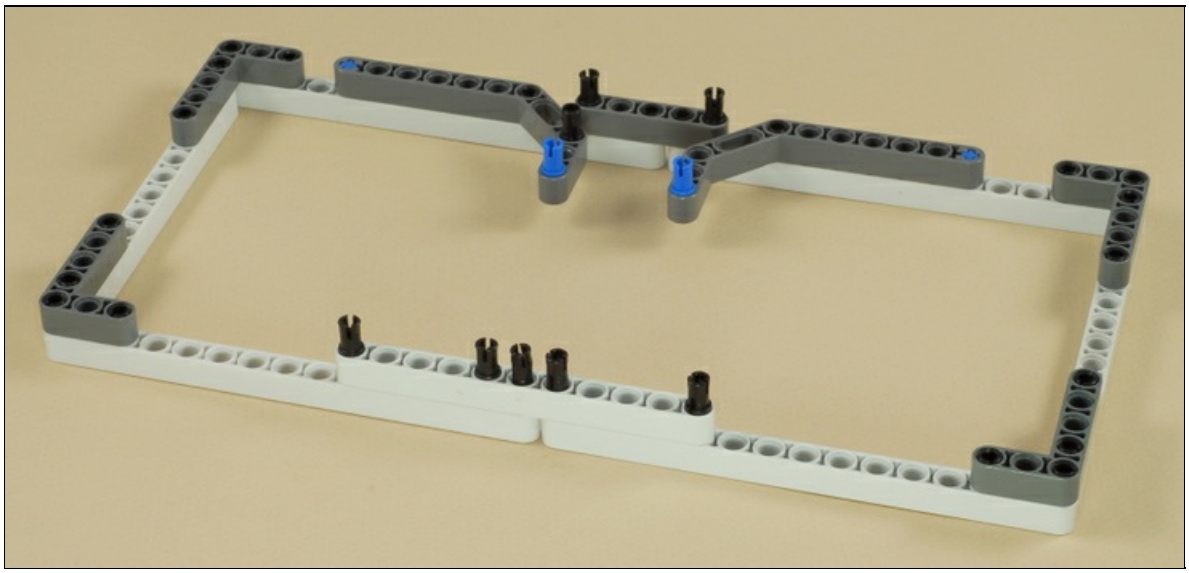

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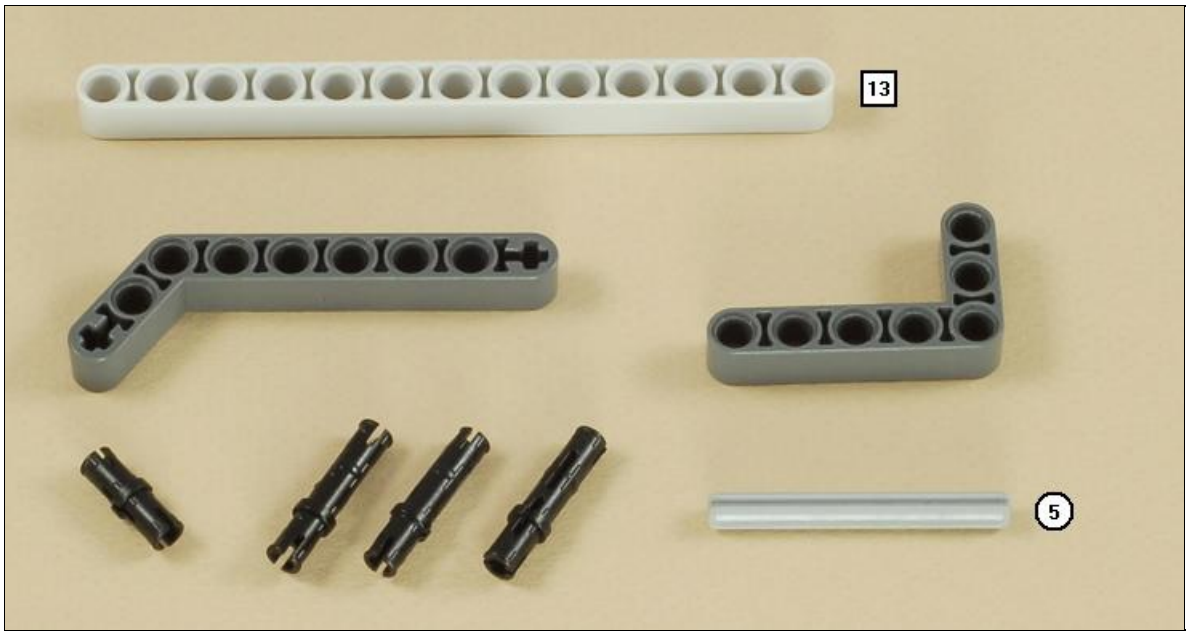
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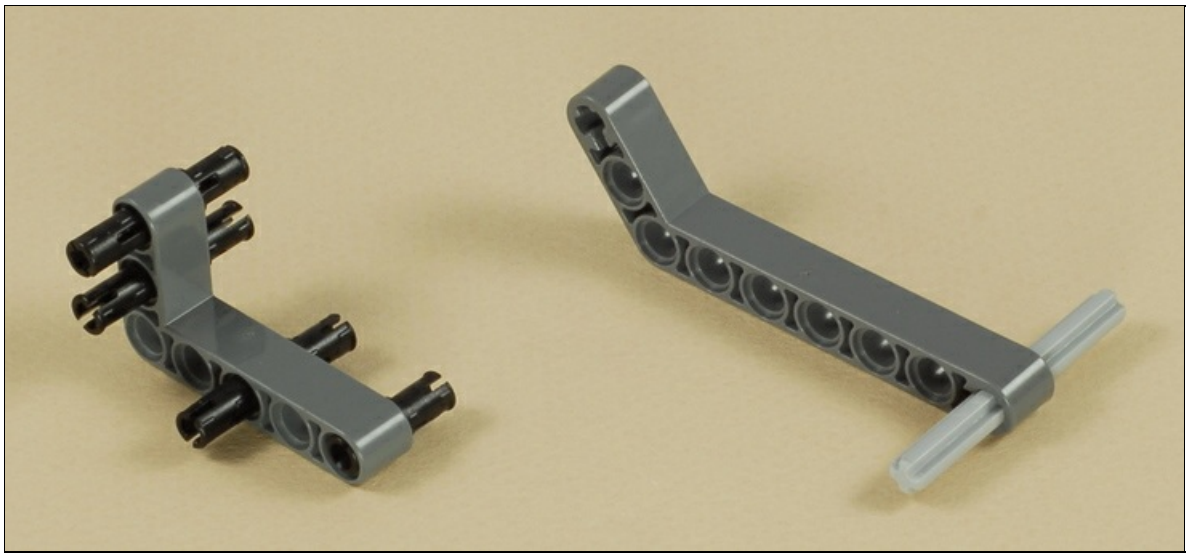

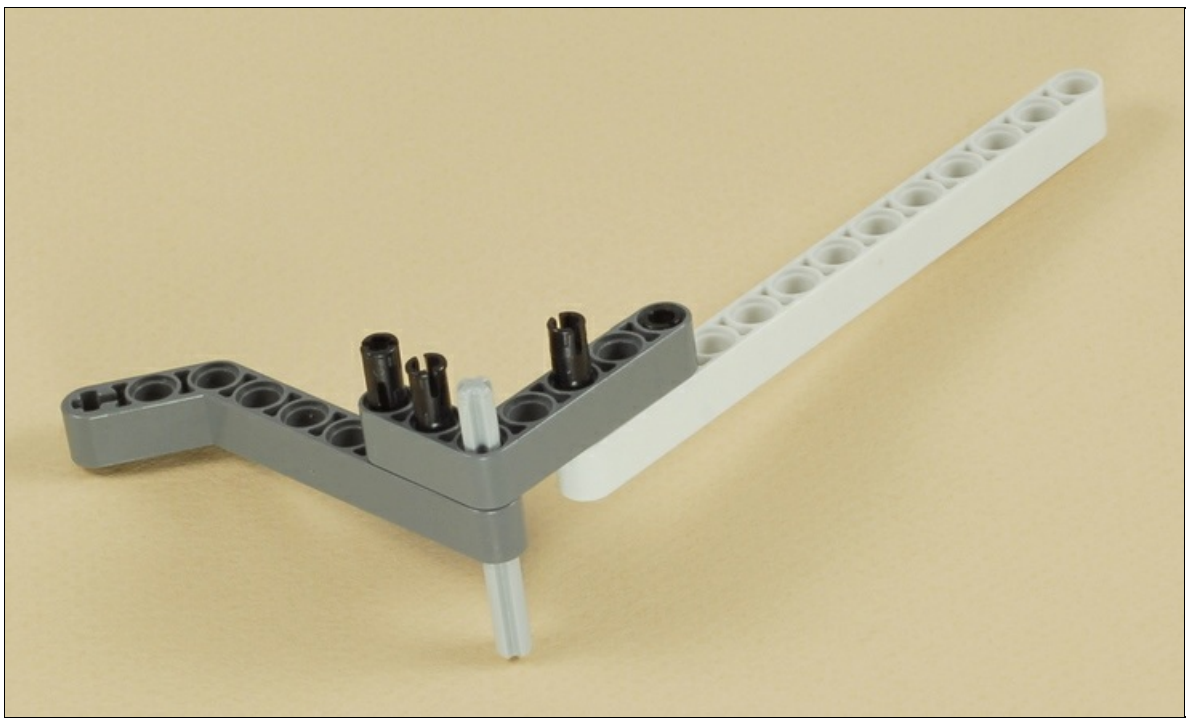

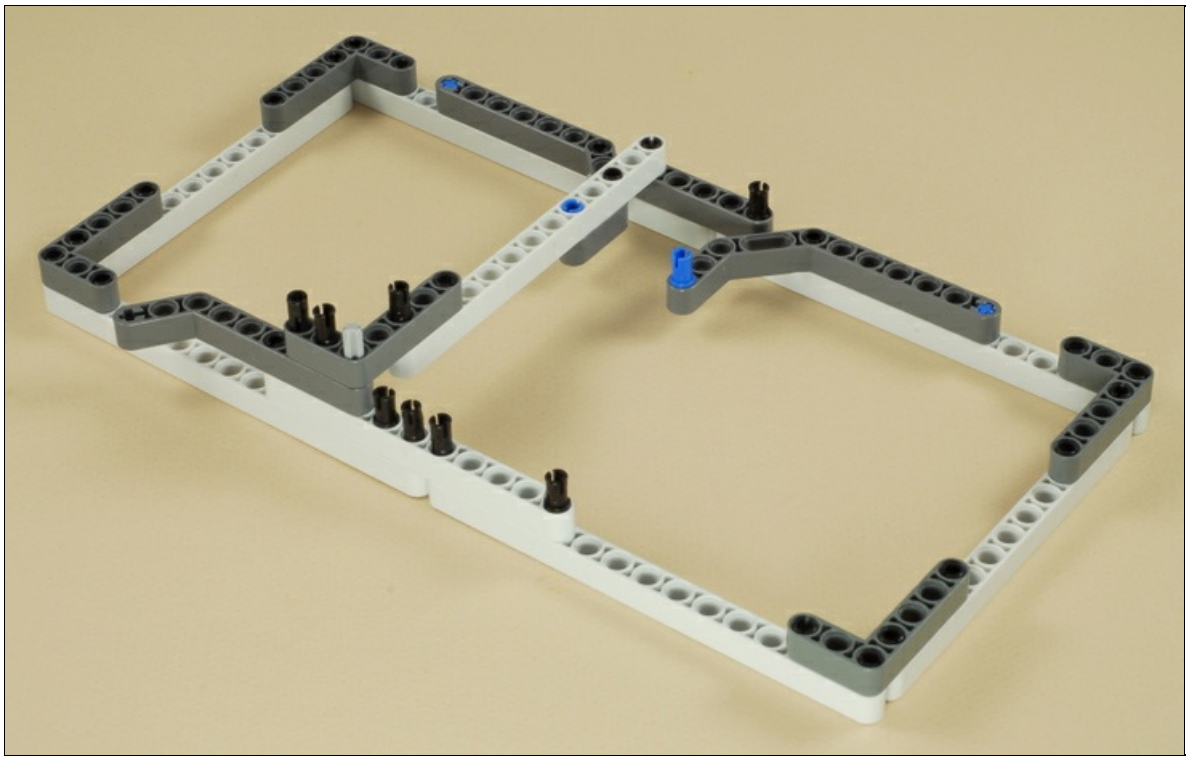

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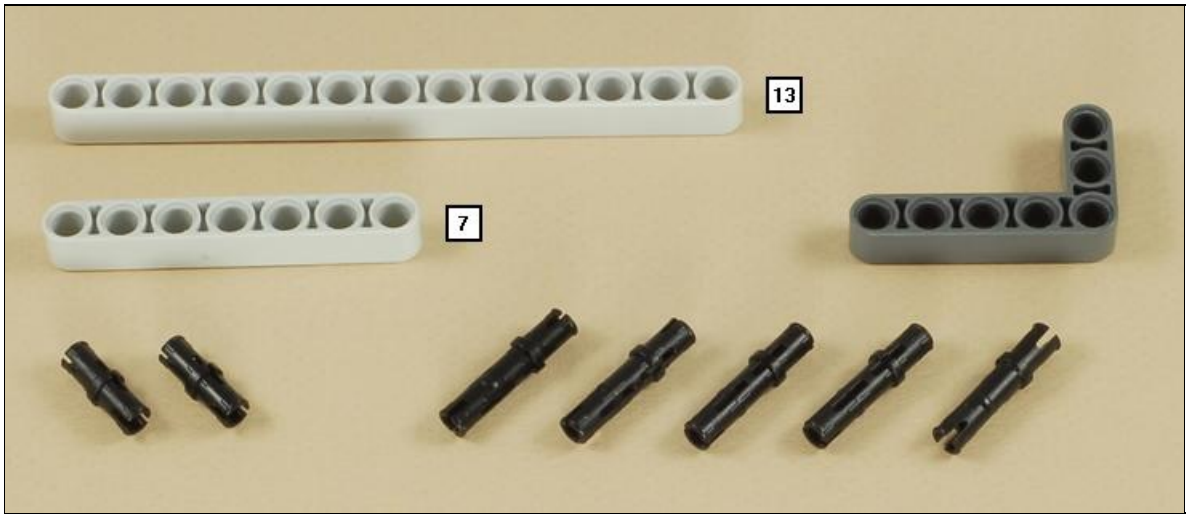

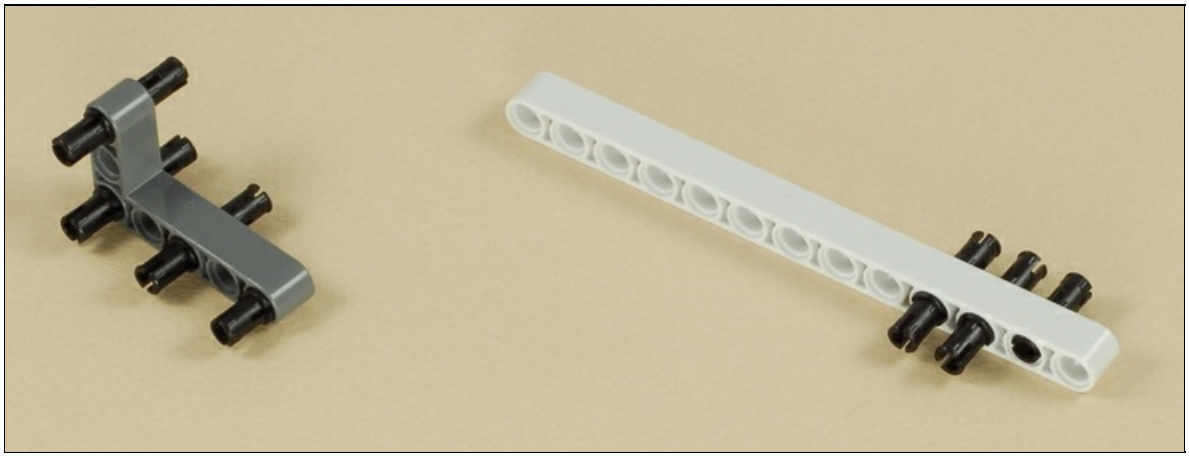

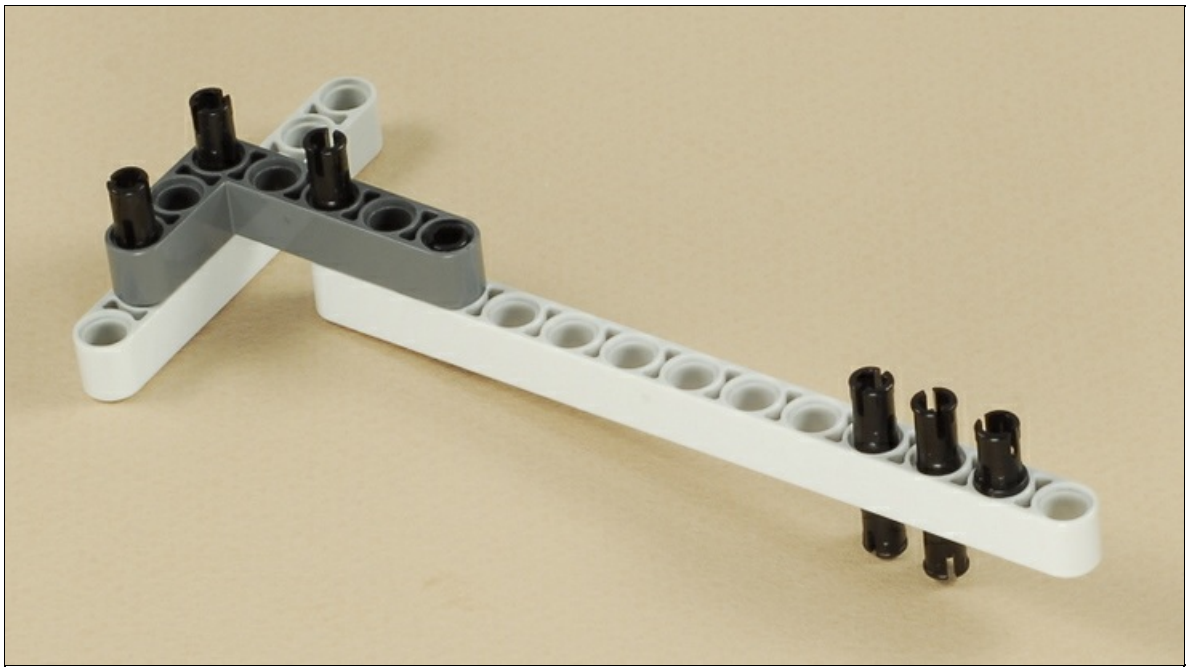

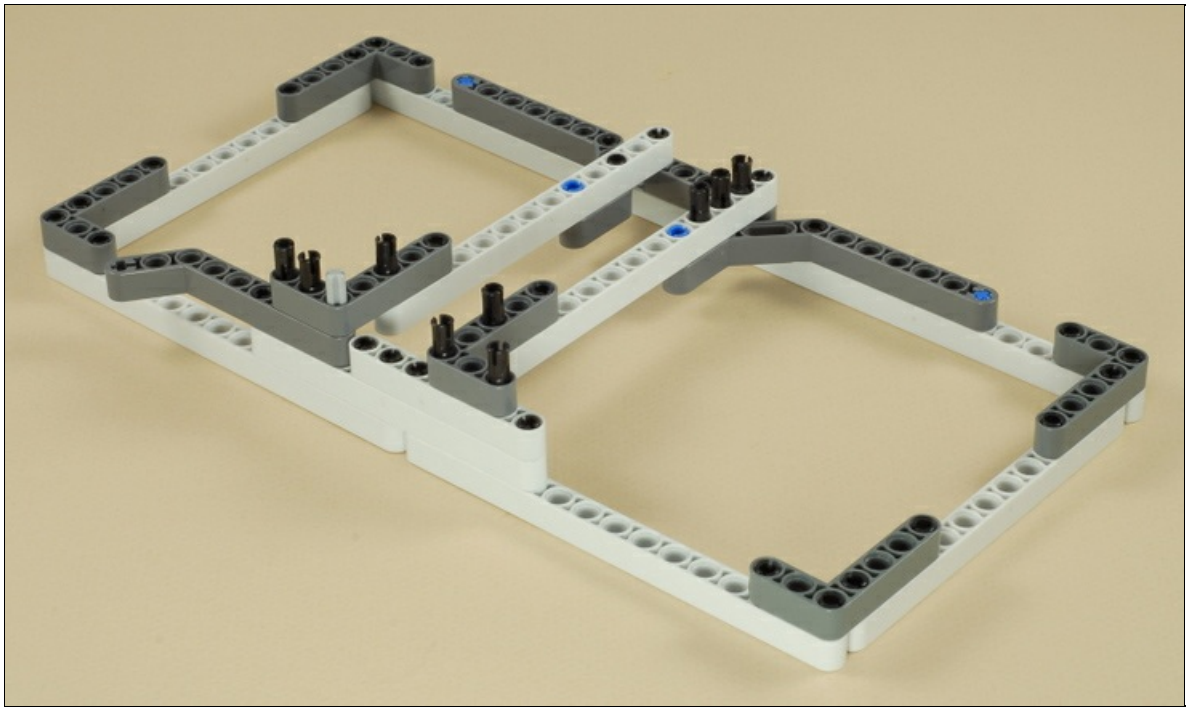

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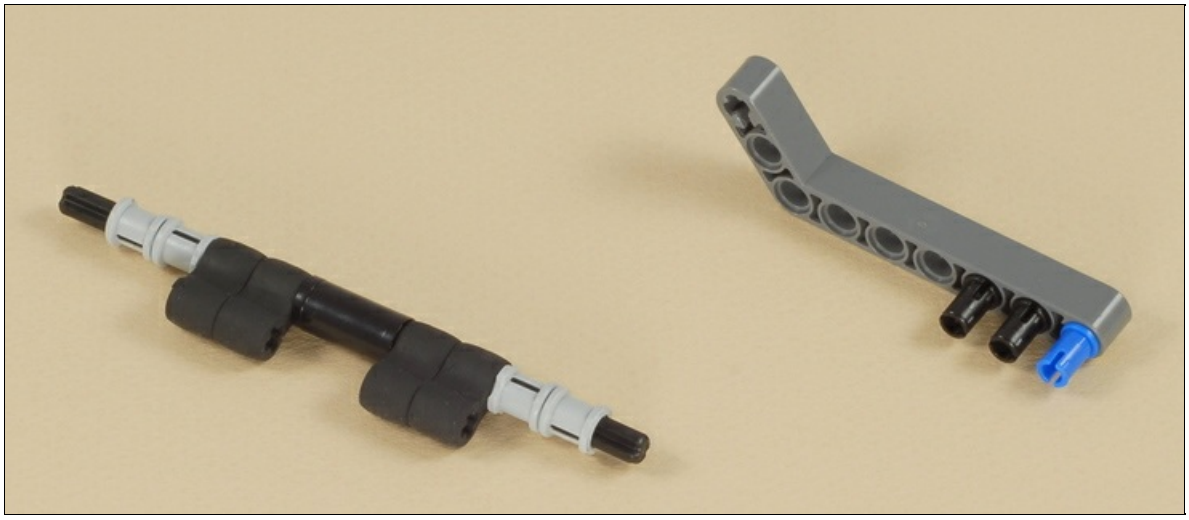


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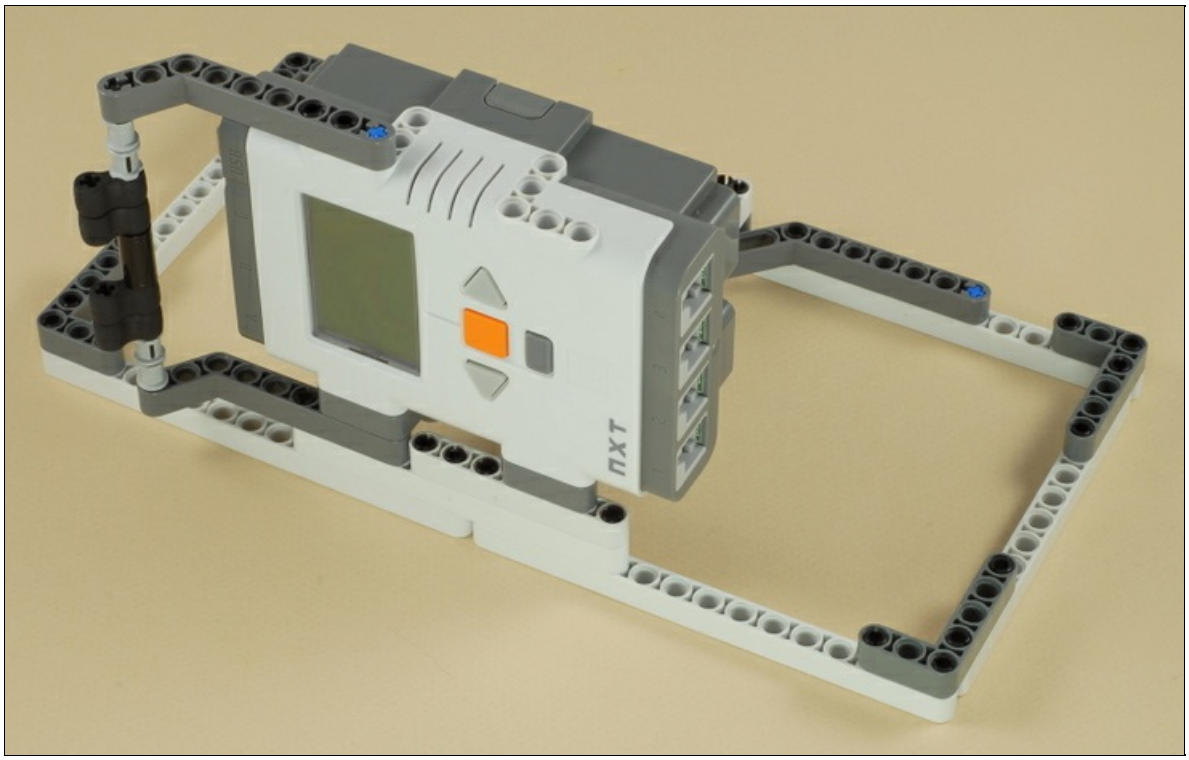

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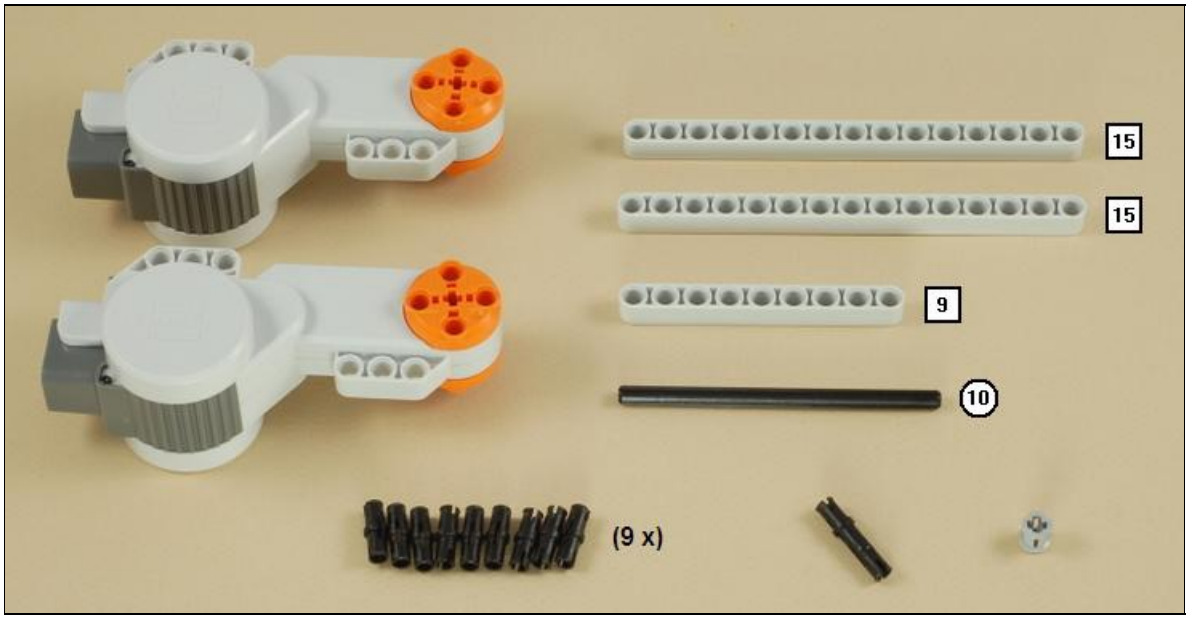

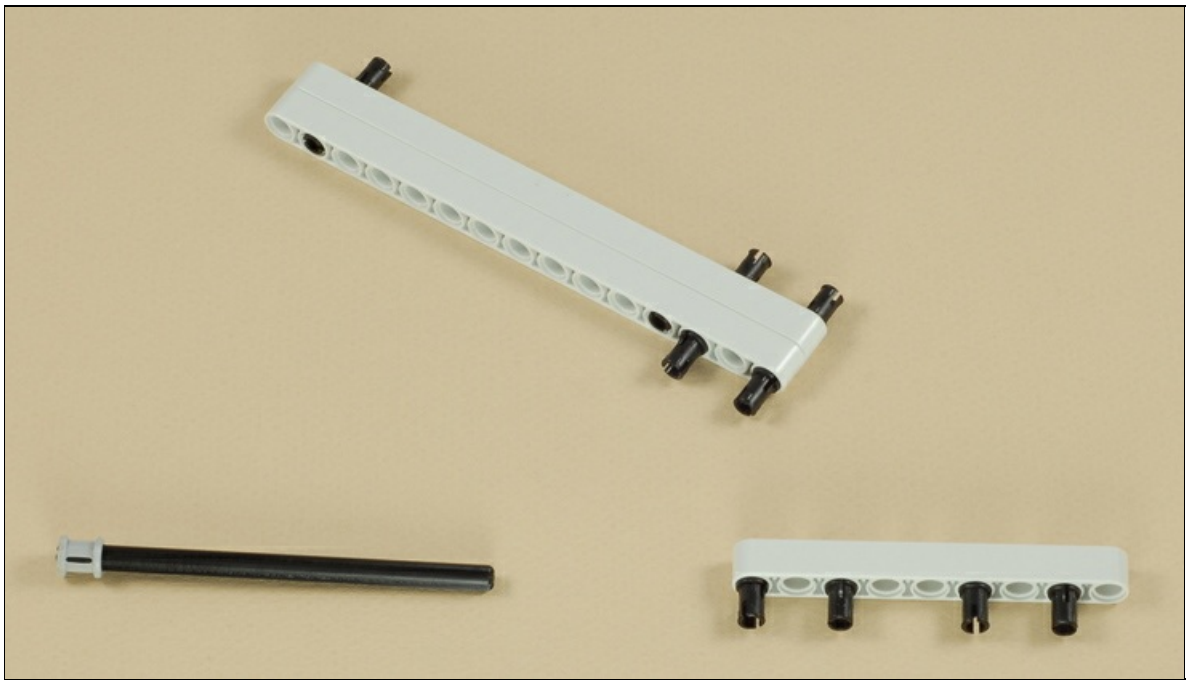

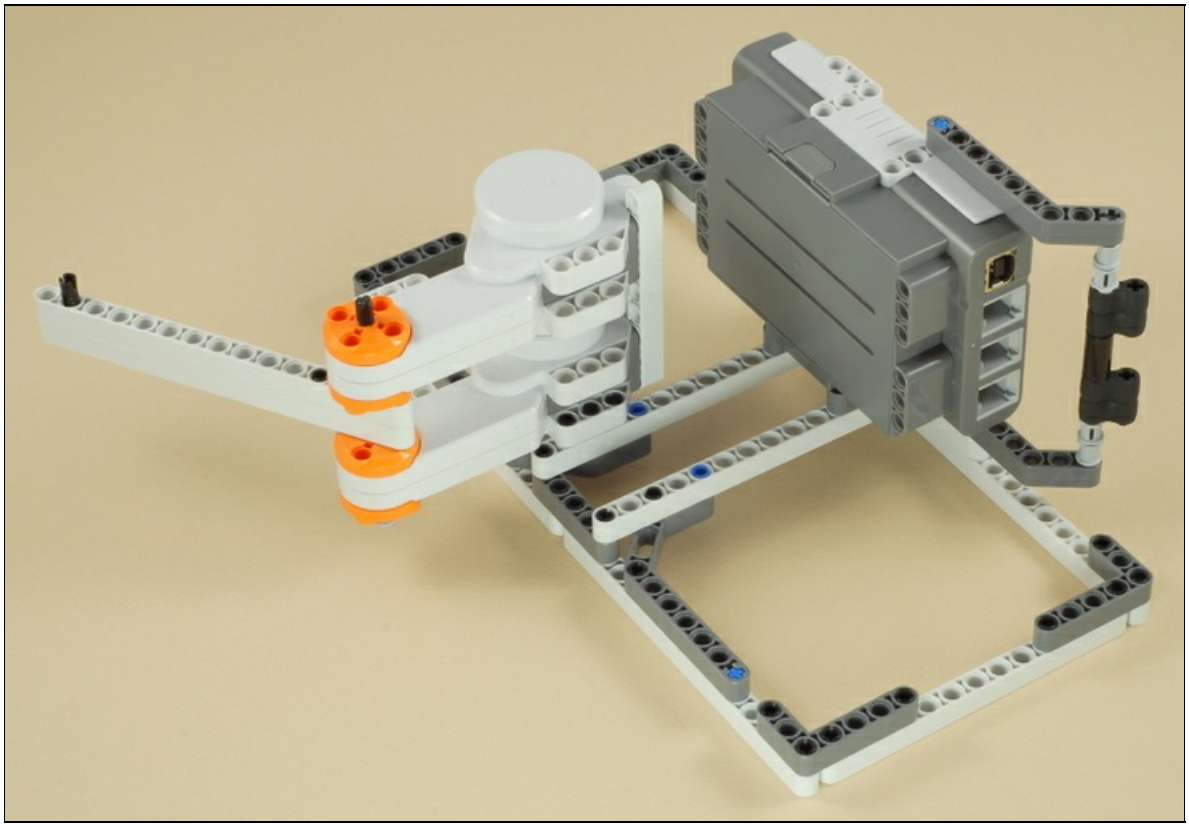

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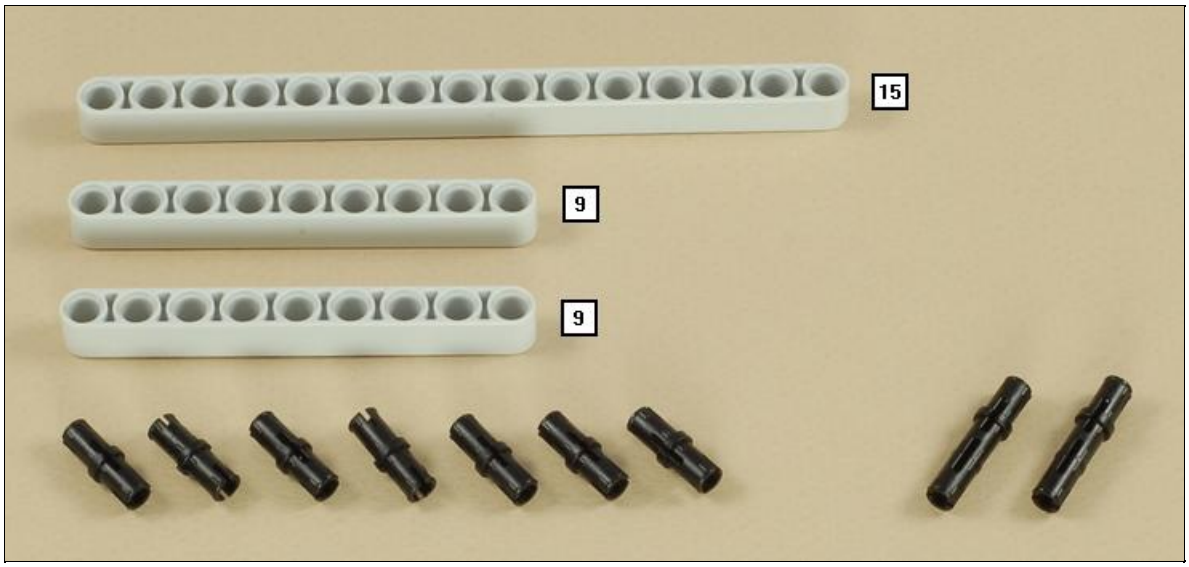
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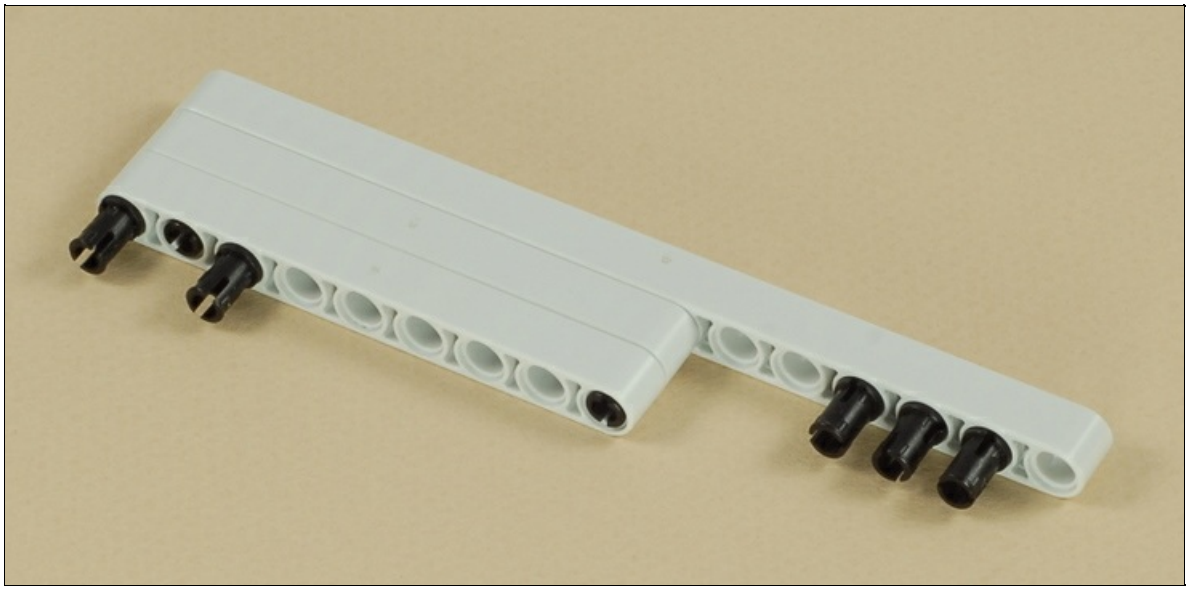

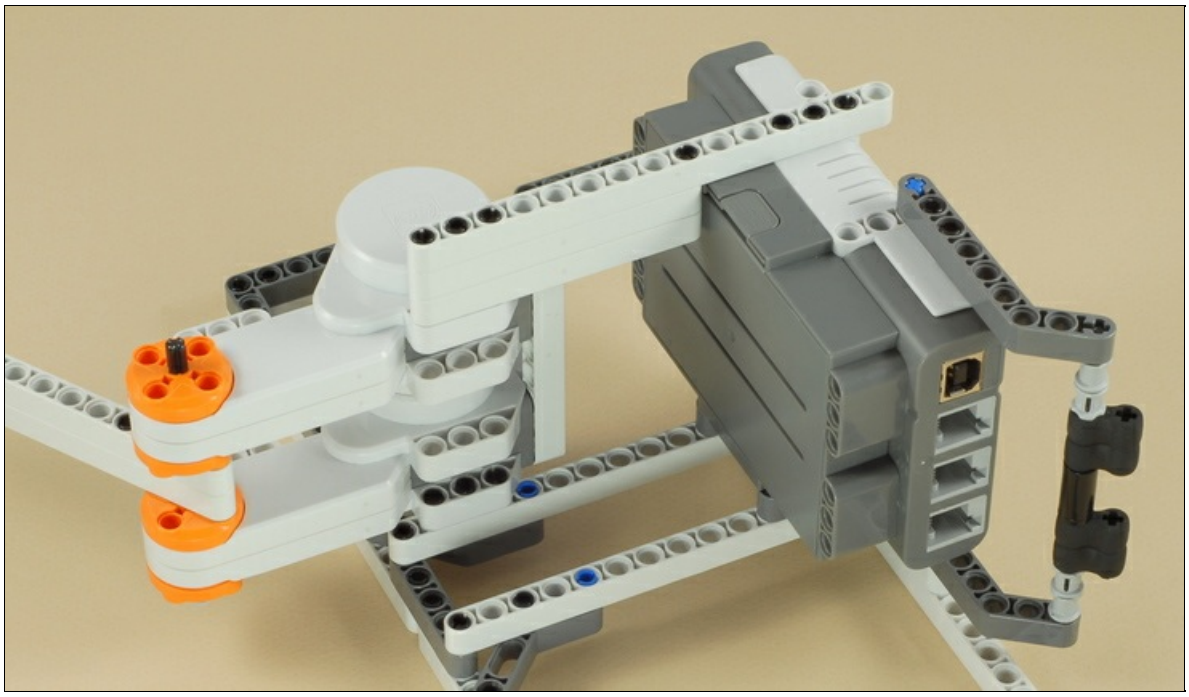

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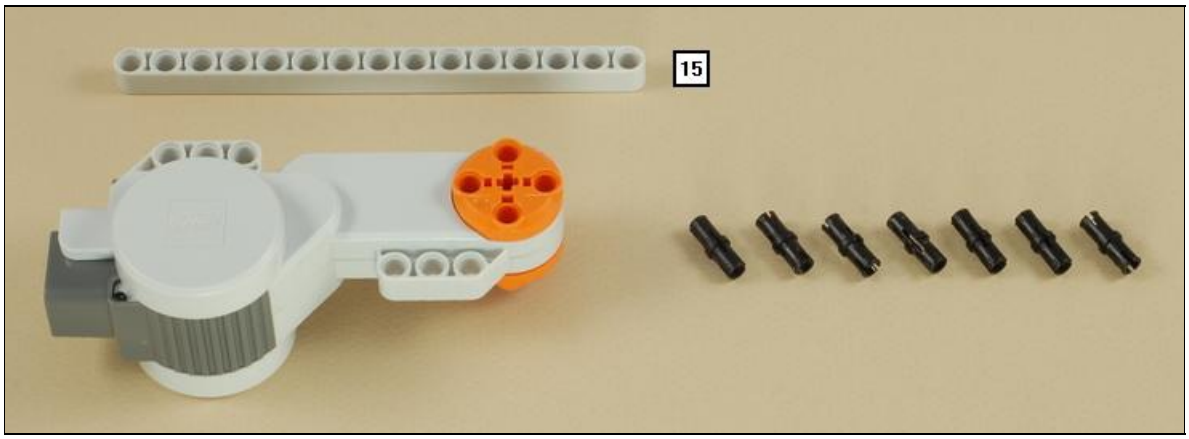

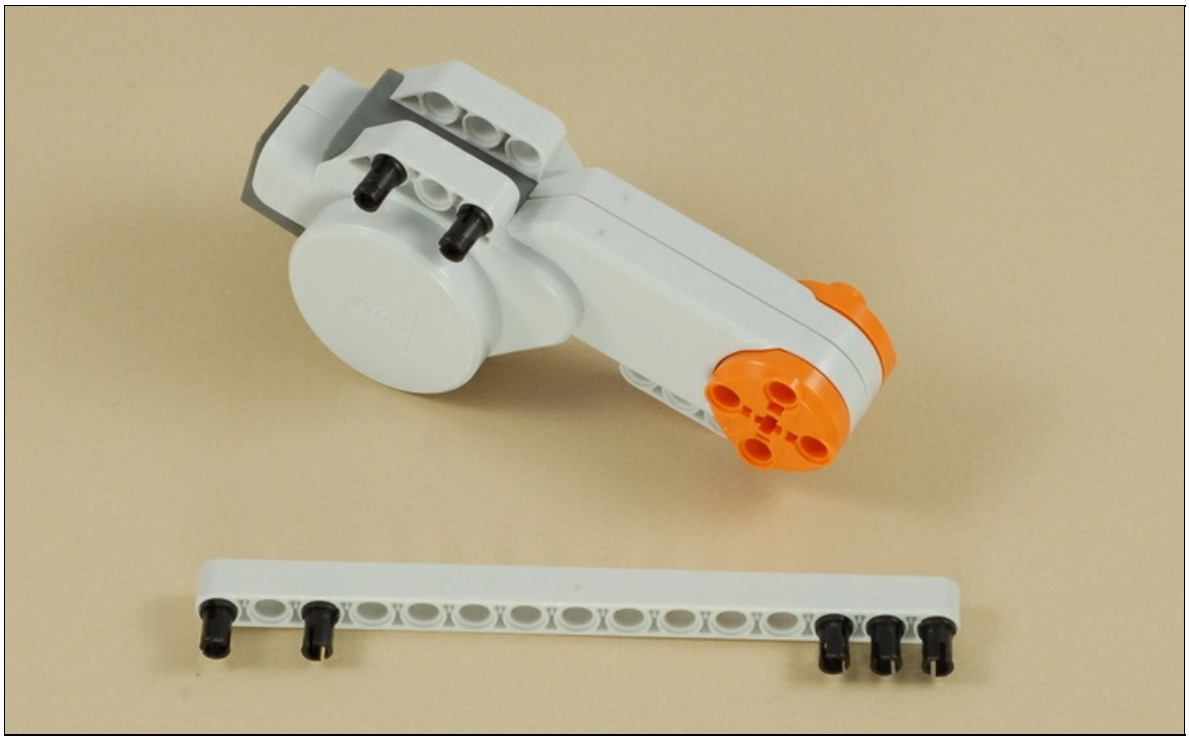

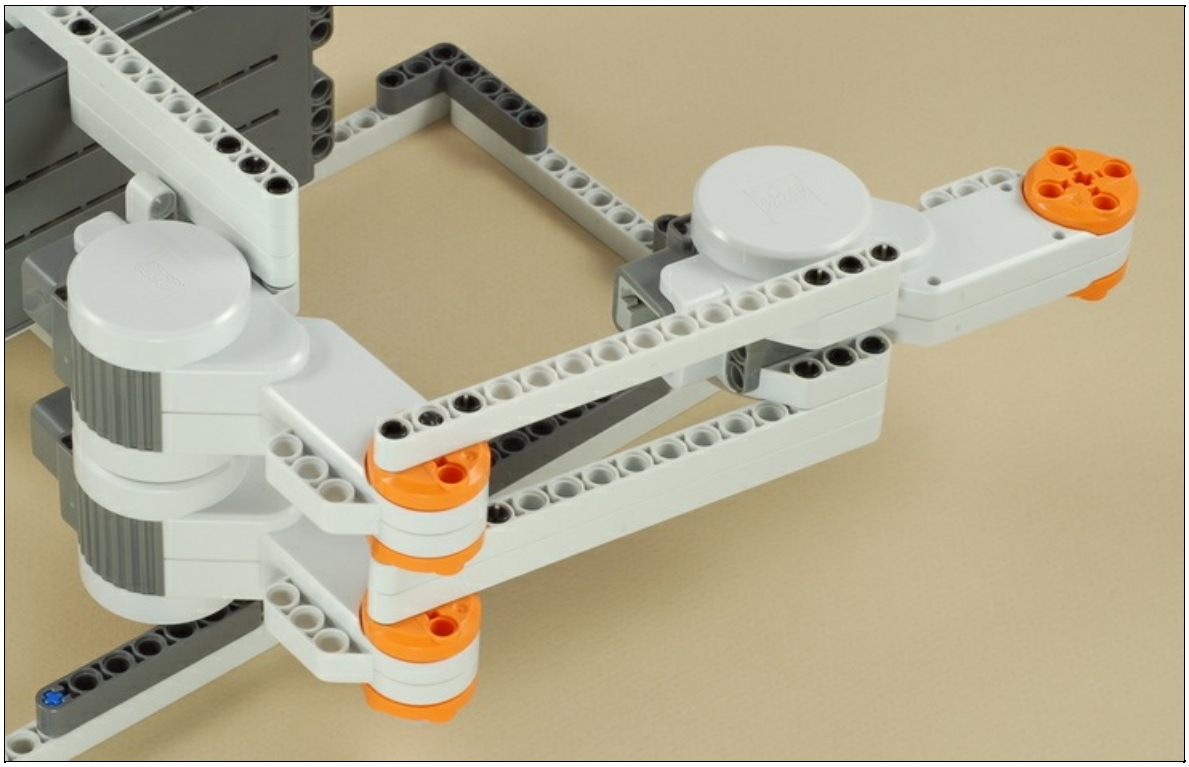

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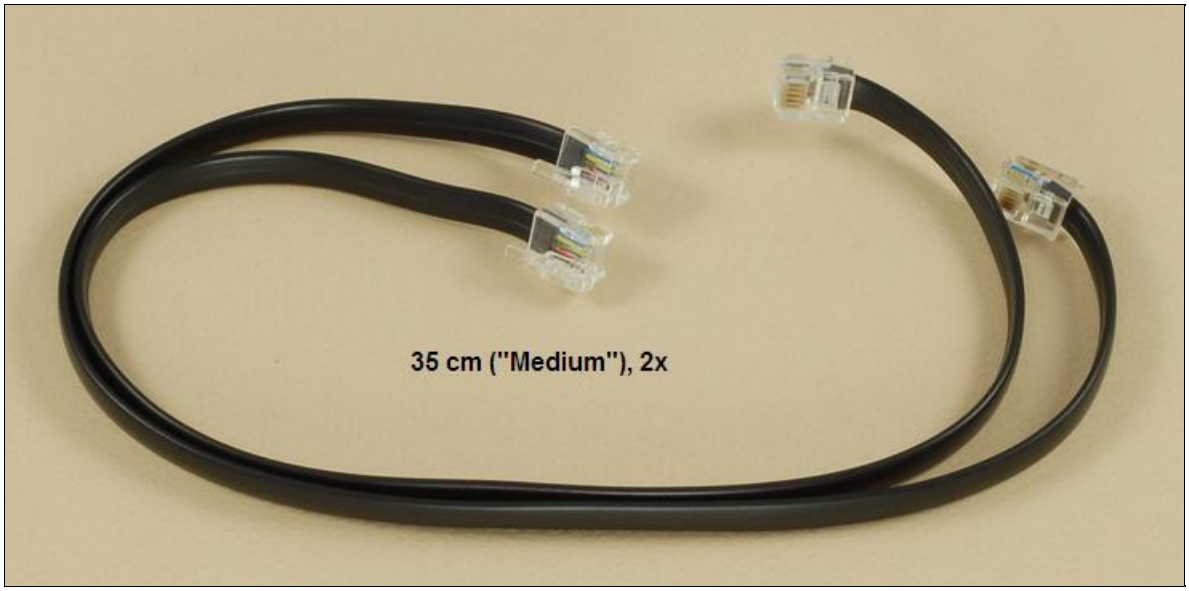
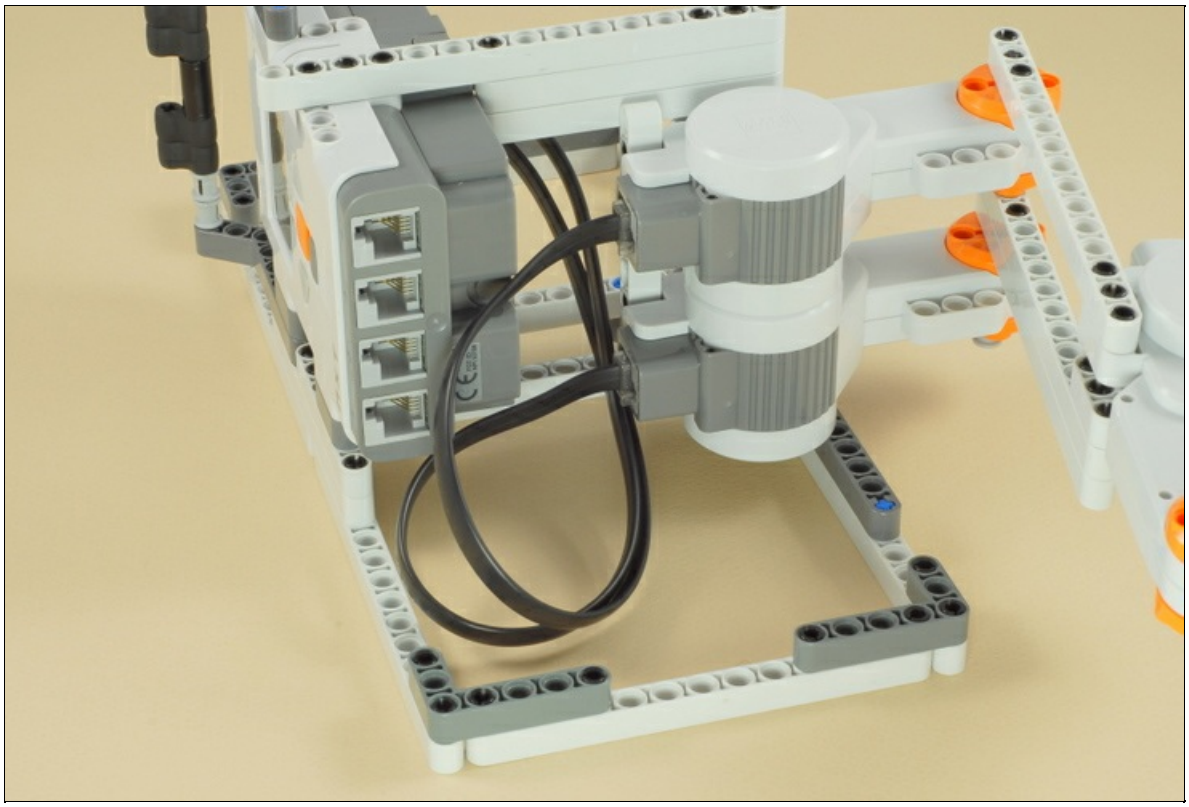
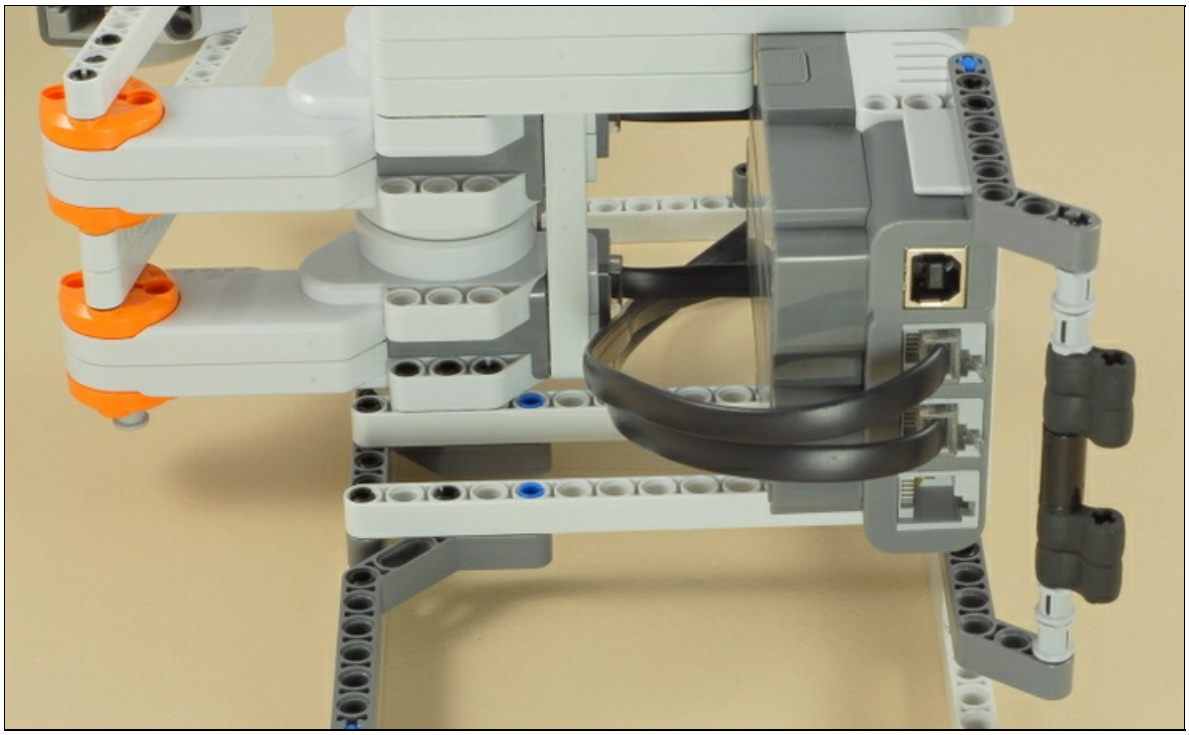




Connect the two motors to ports **B** and **C** on the NXT. It doesn't matter which is which.



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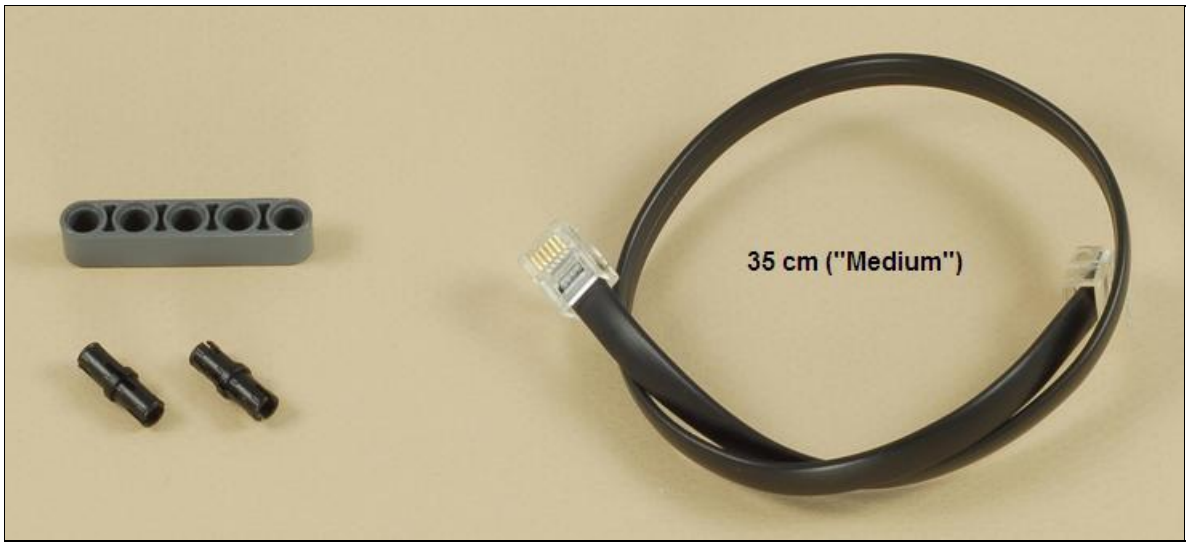
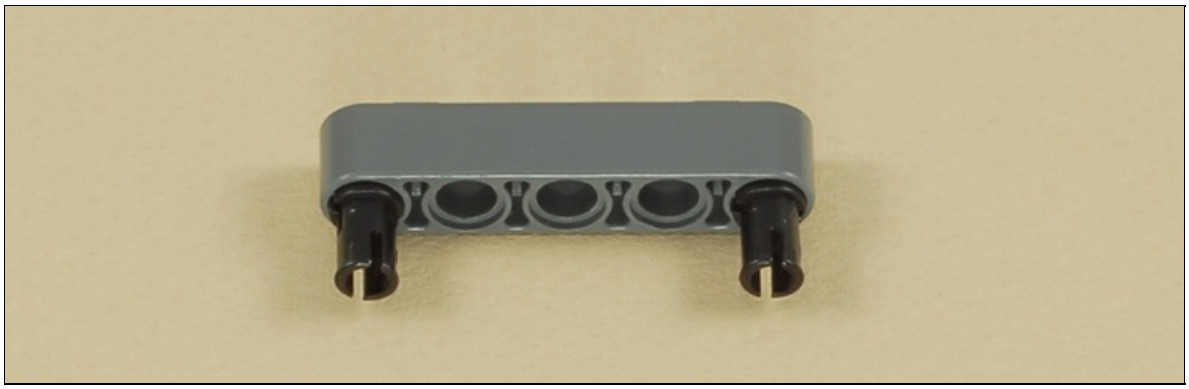
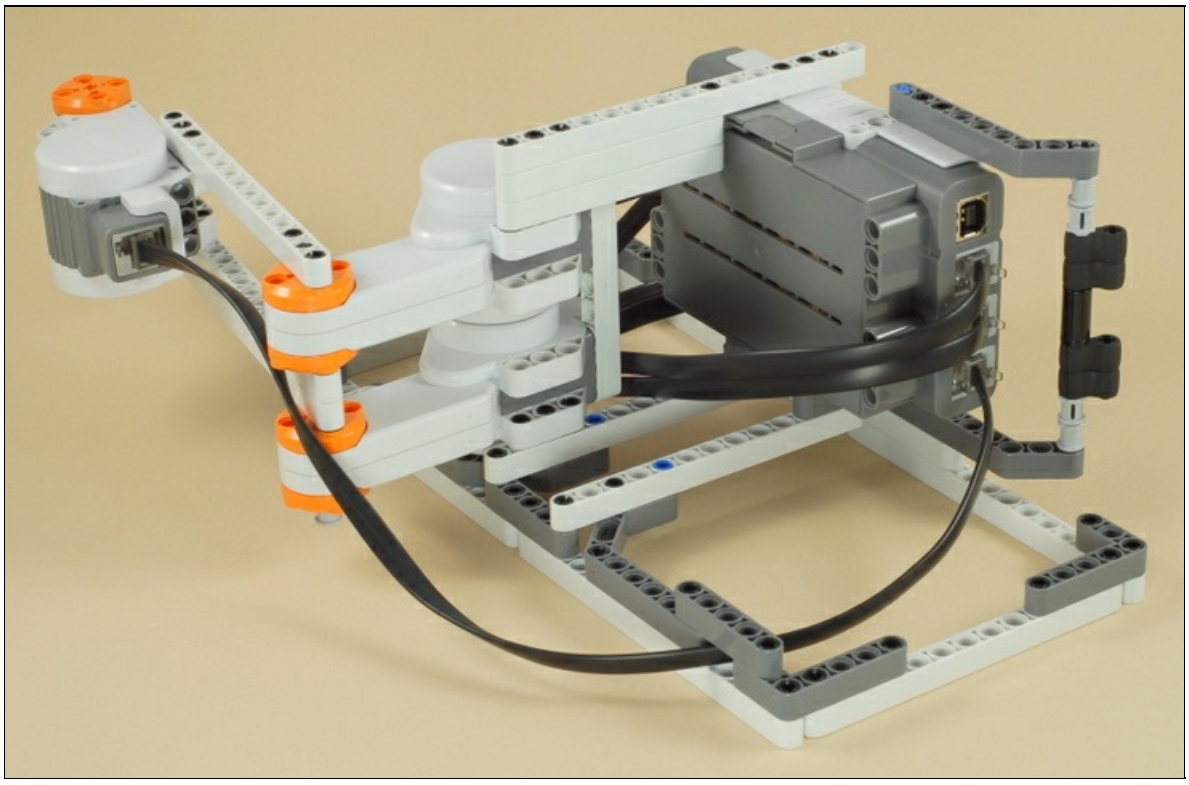




Connect the third motor to port **A** on the NXT, and route the wire under the 5-hole beam as shown below.



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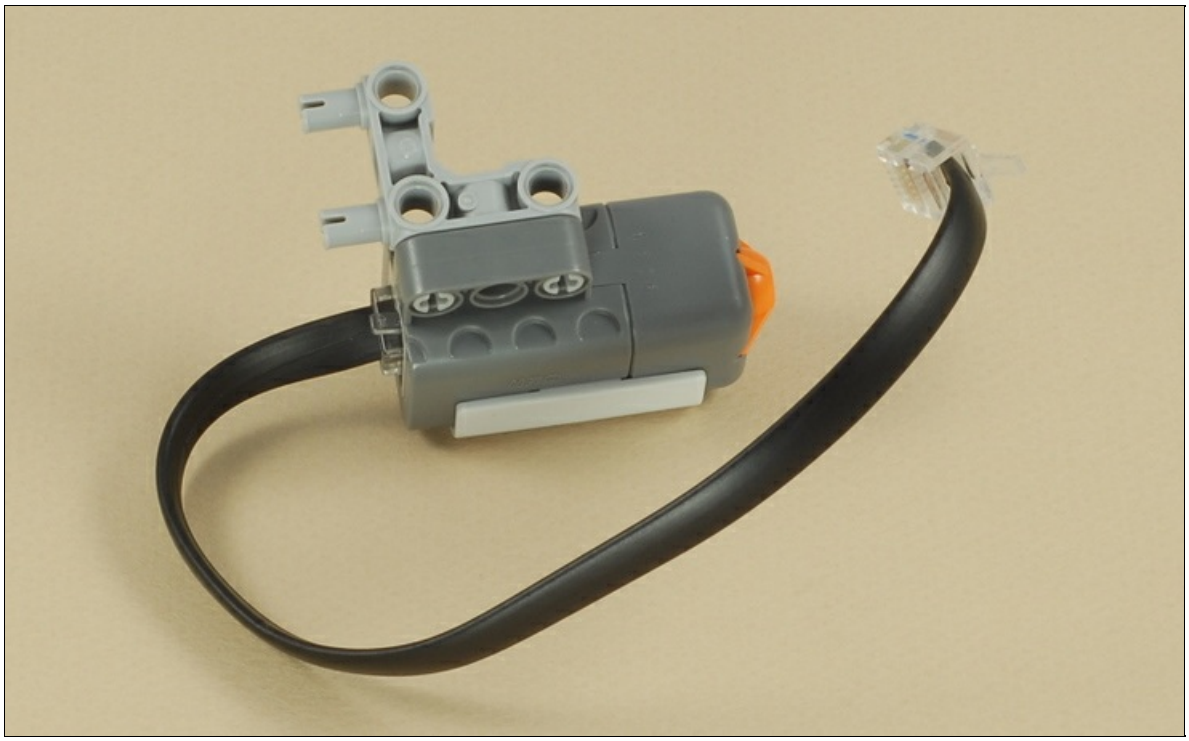
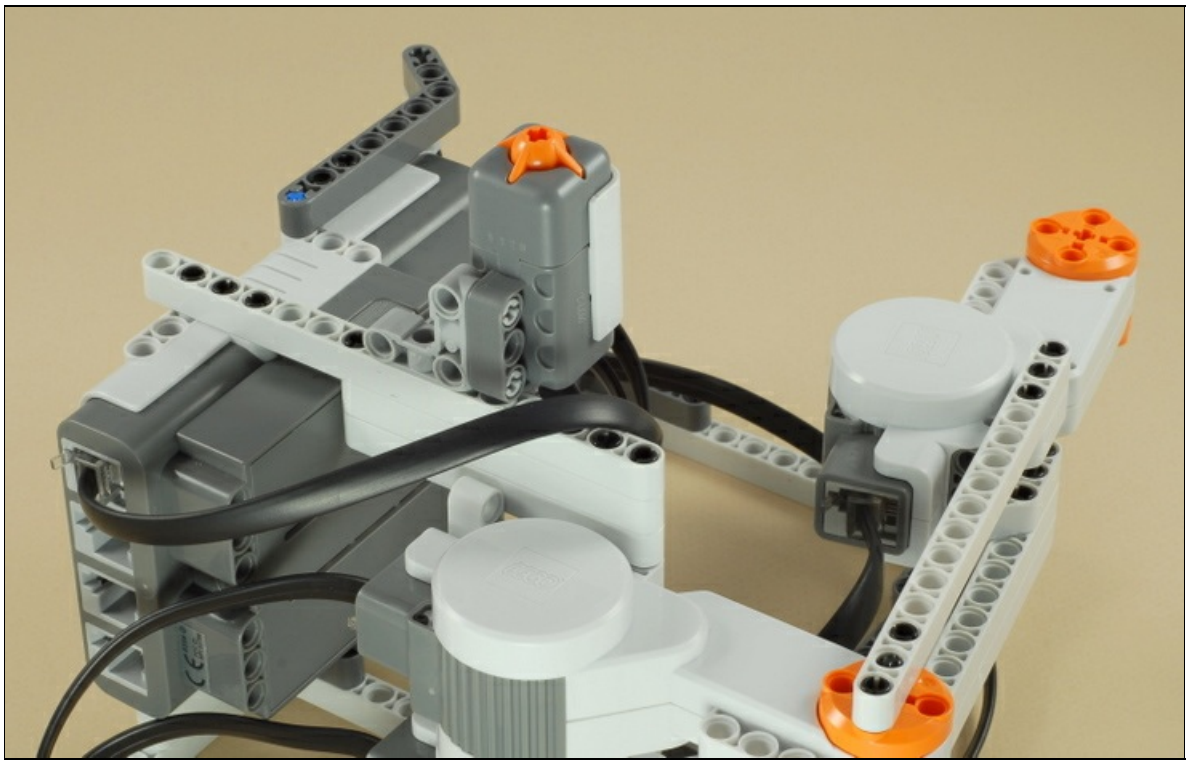
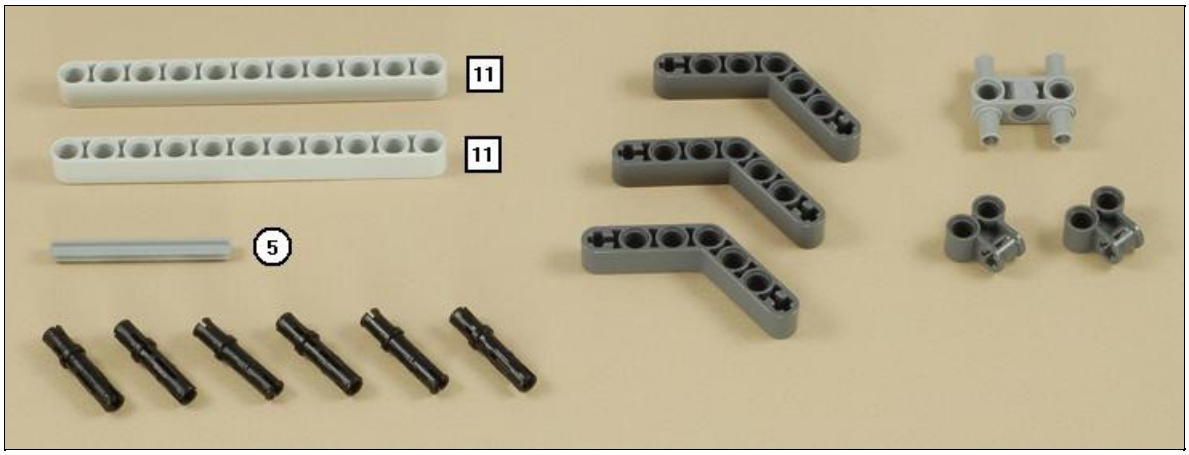


Connect the touch sensor wire to port **4** on the NXT.

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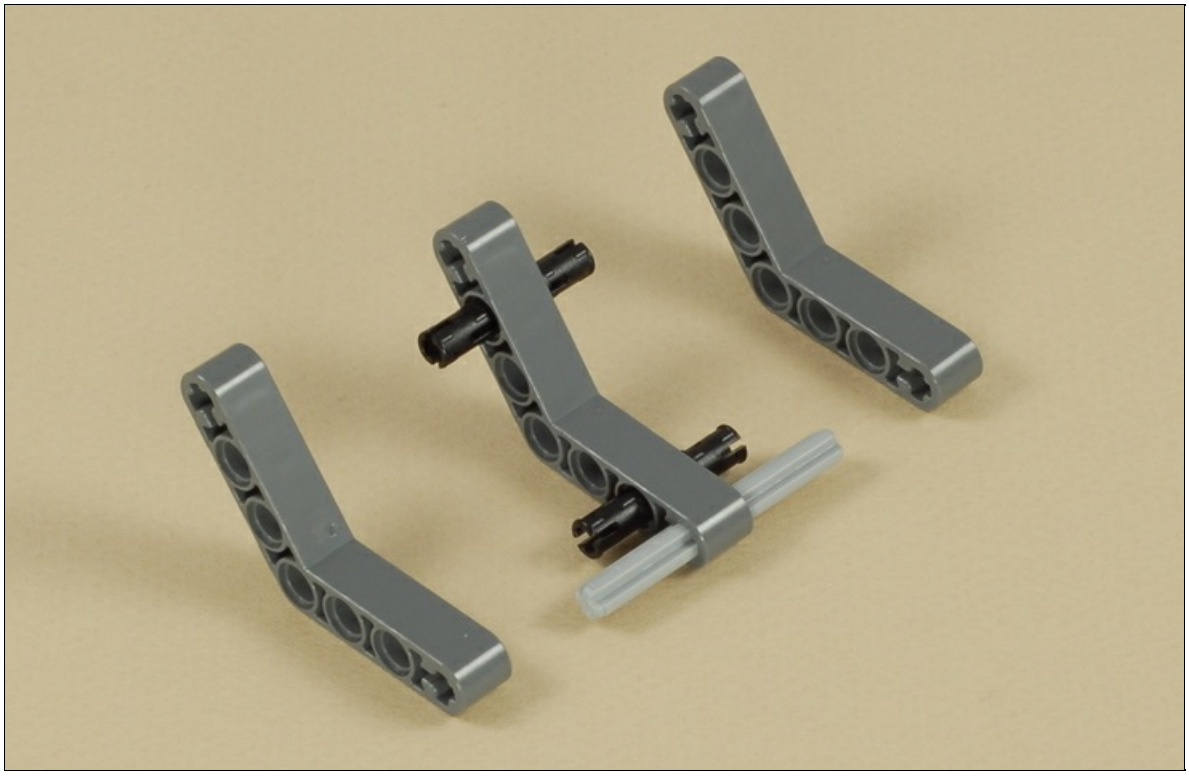

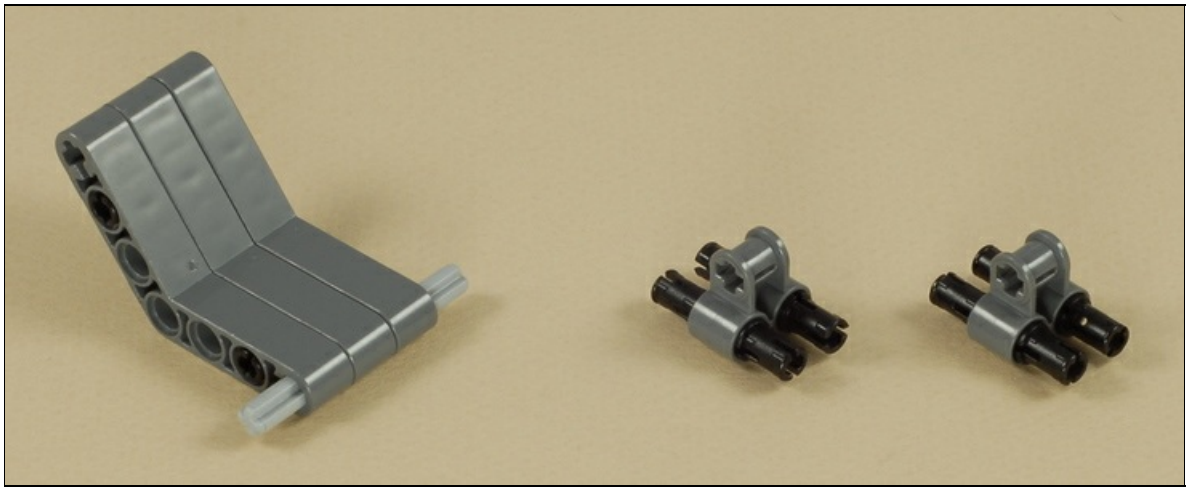

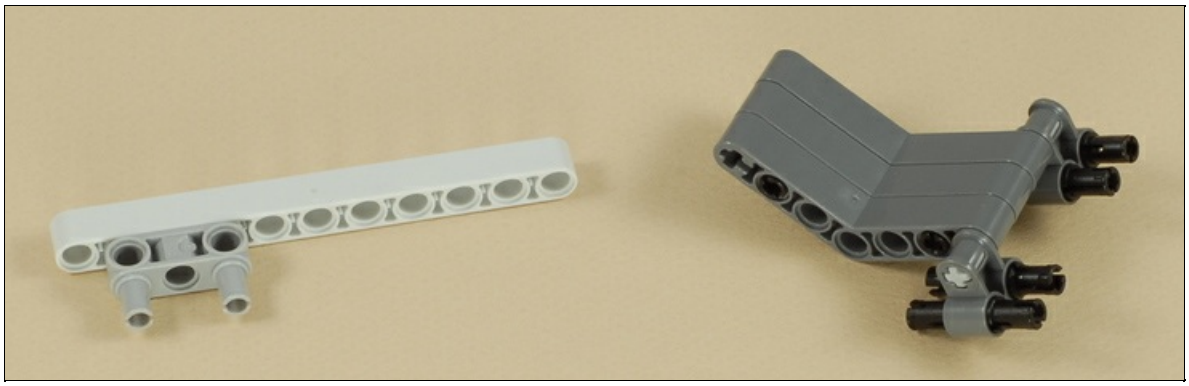

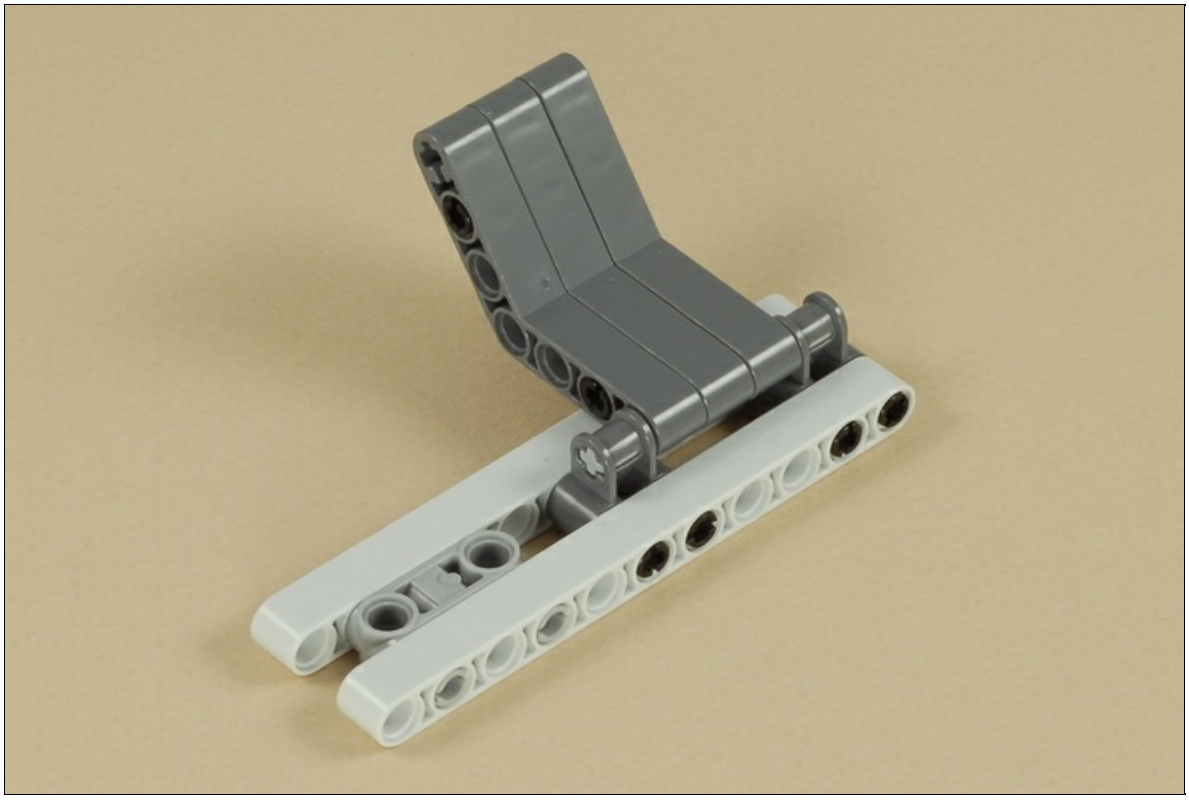

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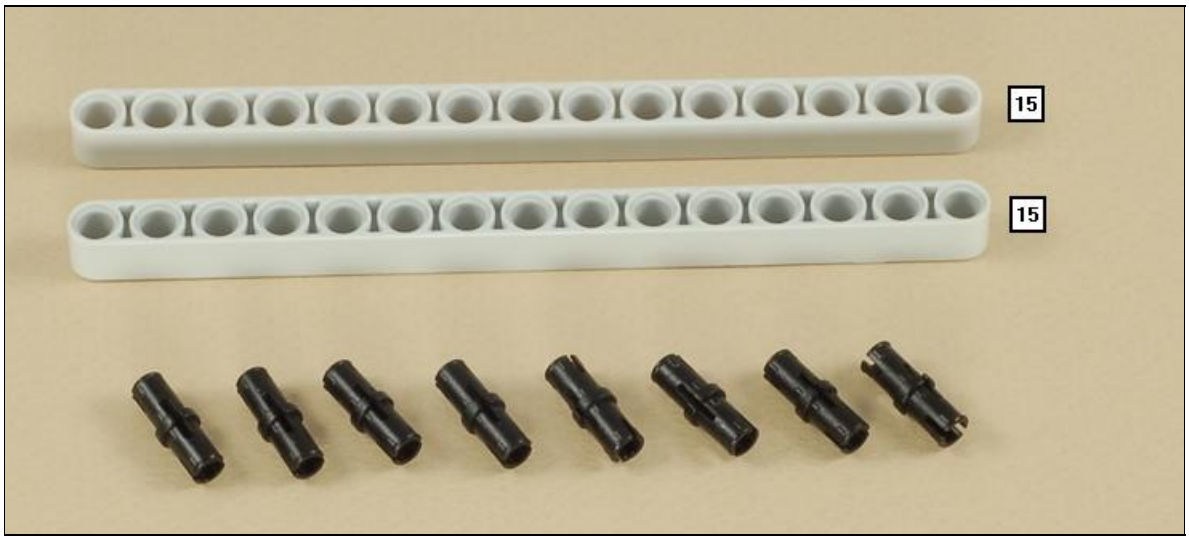
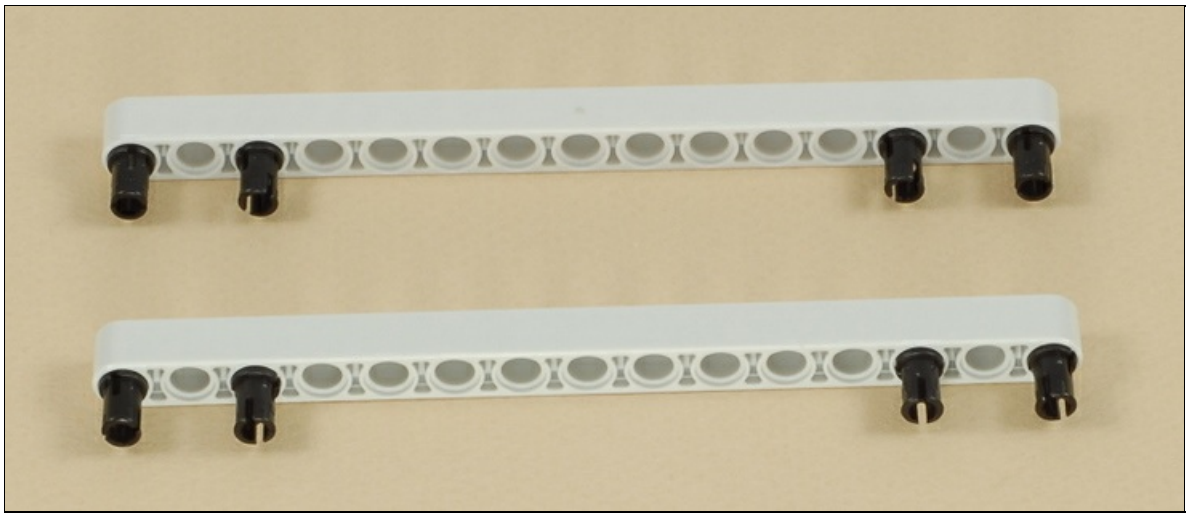


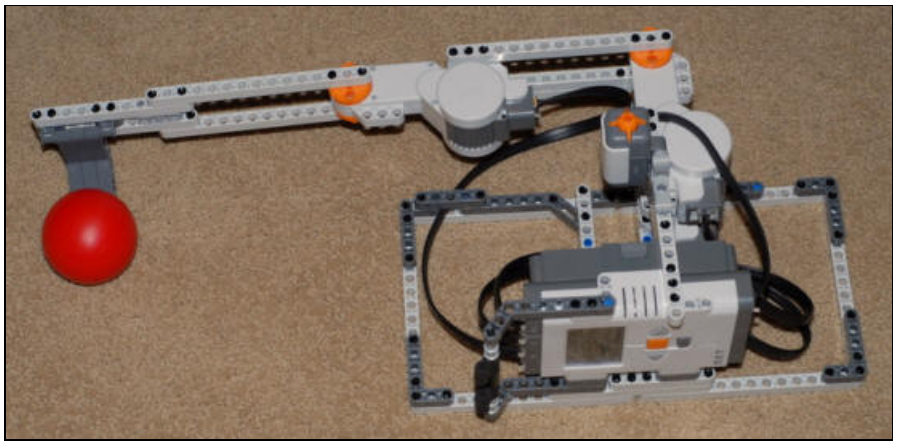


Ball Kicker Programming

Use the Kicker program for the Ball Kicker. This program uses two different ways to synchronize the motions of the hip and knee joints. On the retraction, the joints are synchronized by using different power levels, and on the strike swing the joints are synchronized by using the rotation sensor in one of the motors.

Using the Ball Kicker

1. Put the Ball Kicker on a flat surface and extend the leg so that it goes straight out to the left when facing the NXT display, as shown in the picture below.
2. Place a ball directly in front of the "foot".
3. Run the Kicker program.
4. Press the touch sensor. The program will retract the leg and then swing it.



Challenges

- Can you make any refinements to the mechanical design or the program to hit the ball farther?
- It would be cool if the leg on this Ball Kicker was vertical like a real leg instead of horizontal, because then it would look like a real leg, and gravity would also be helping out to make the kick much stronger, but there are not enough beams in the standard NXT set to build a frame strong enough to support a long vertical leg. If you have a lot of extra parts, you could give it a try. Take a look at the Flipping Gymnast project for an idea of how to design a strong frame that won't knock over under force, but the frame for a vertical Ball Kicker will need to be even higher and more reinforced. You could also consider supporting the leg with something like two chairs to get it up high instead of using all LEGOs for the frame.
- Some arm movements, such as throwing a baseball or spiking a volleyball, produce an even stronger crack-the-whip effect by synchronizing three joints: shoulder, elbow, and then wrist. Can you design an arm that synchronizes three joints to throw or hit something?