nxtprograms.com

Fun Projects for your LEGO® MINDSTORMS® NXT!

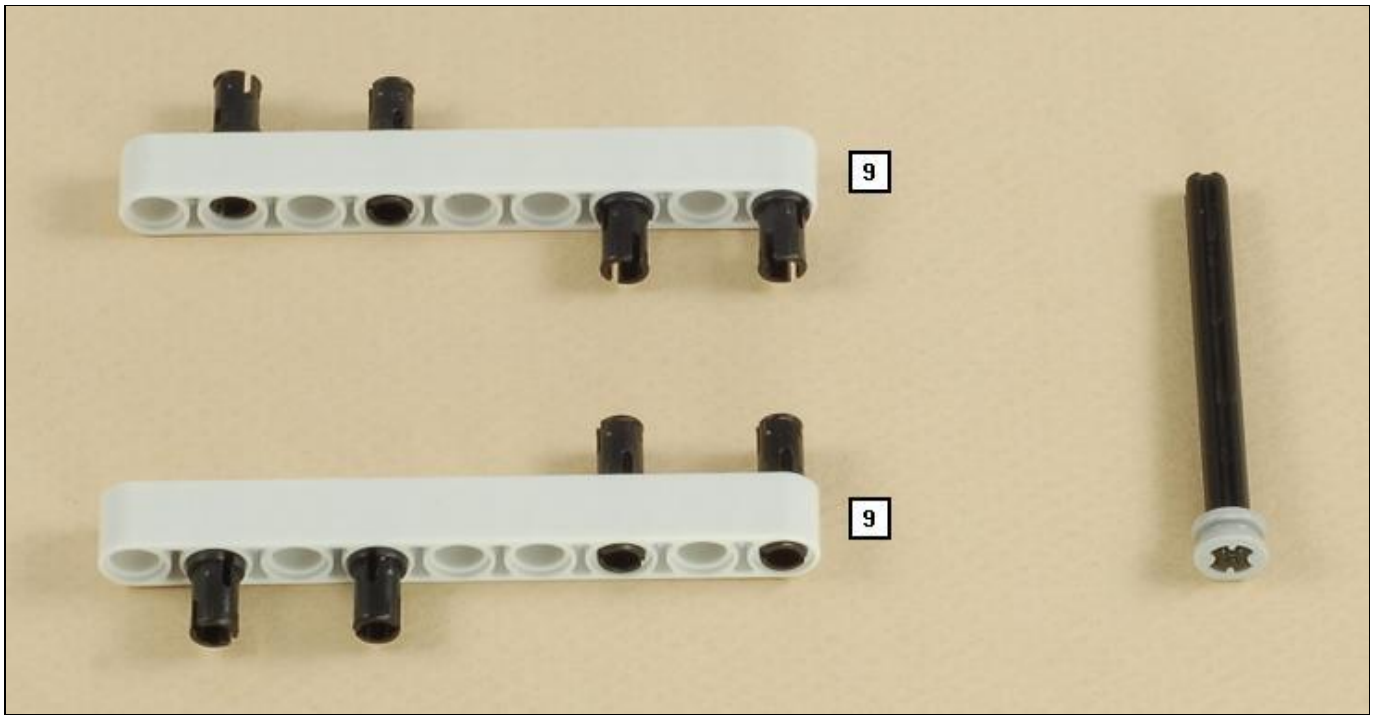
3-Motor Chassis

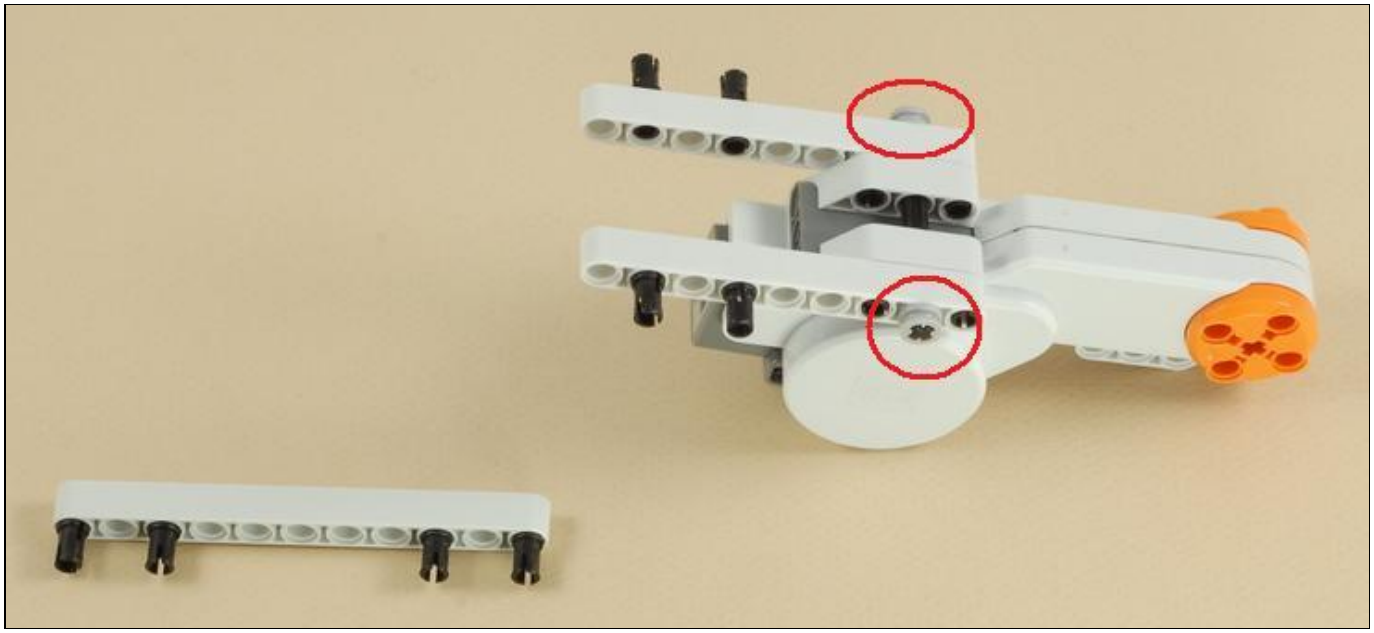
Building:
Program:

Designed for **NXT 2.0** (8547)

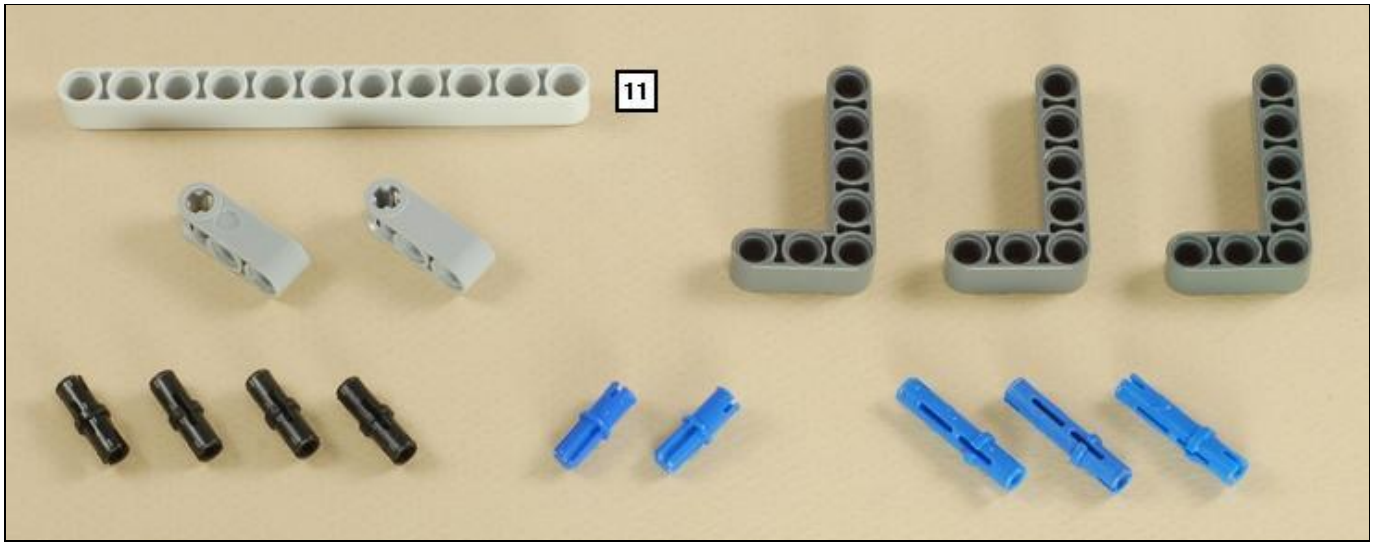
Building Instructions

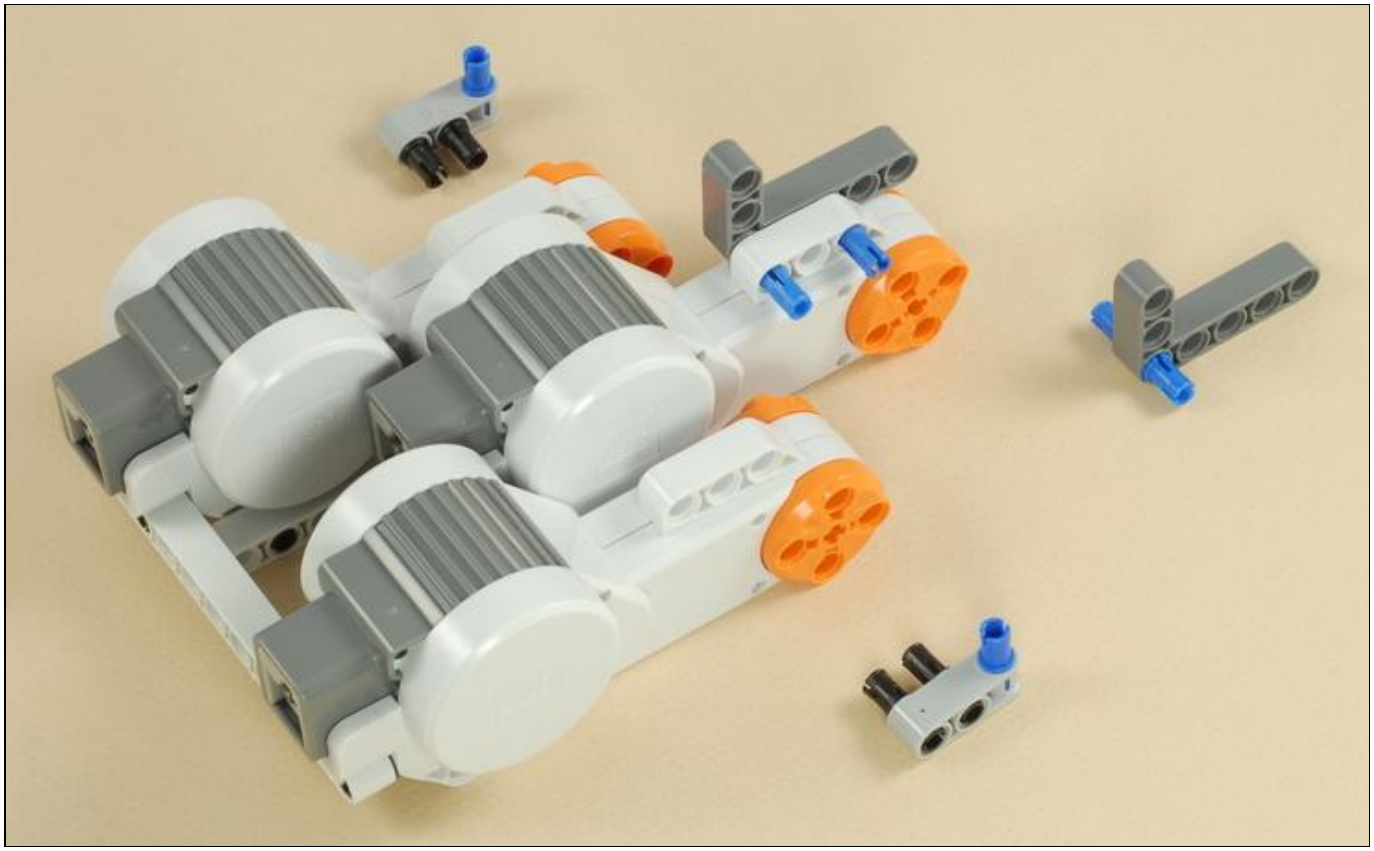
1

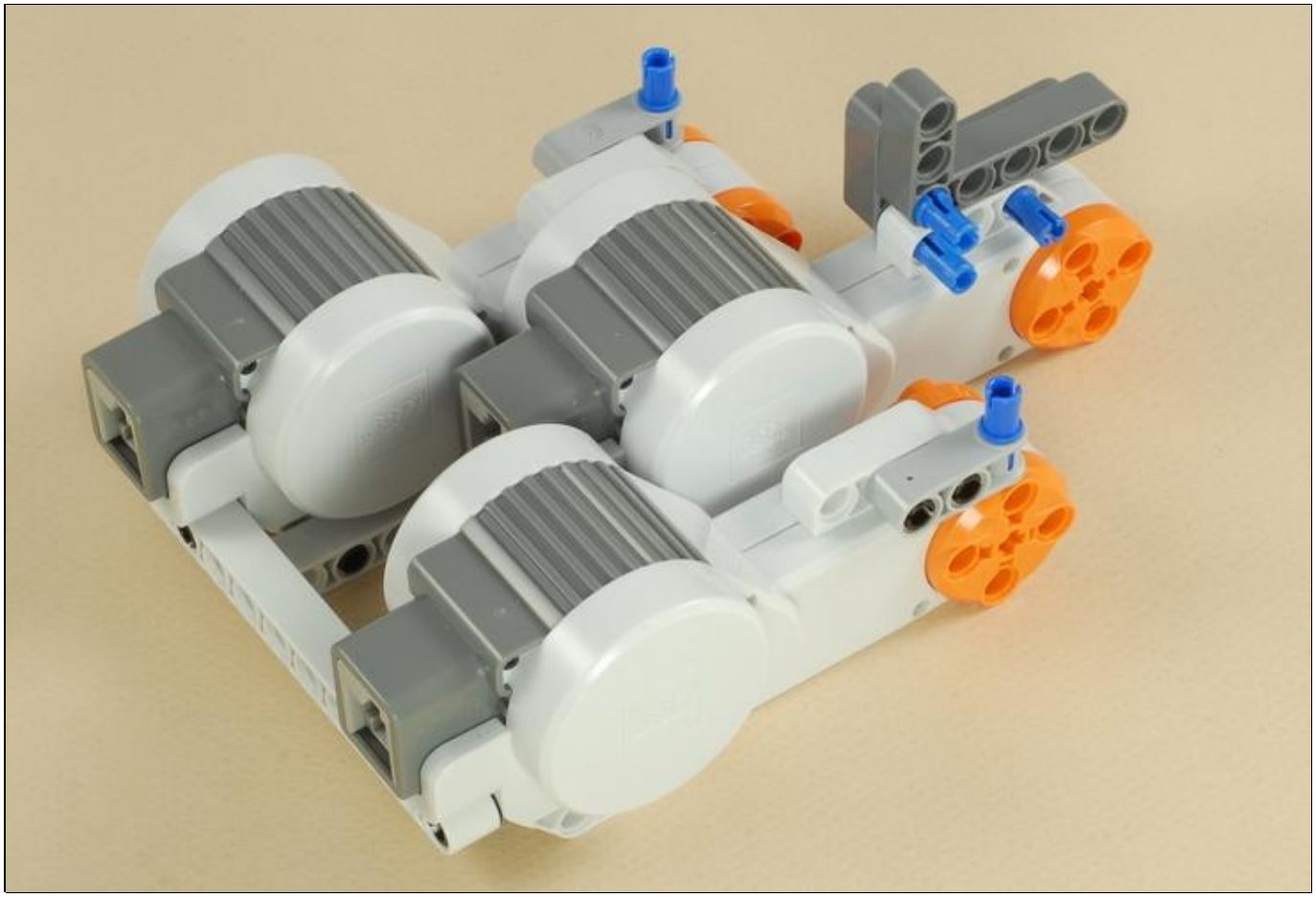


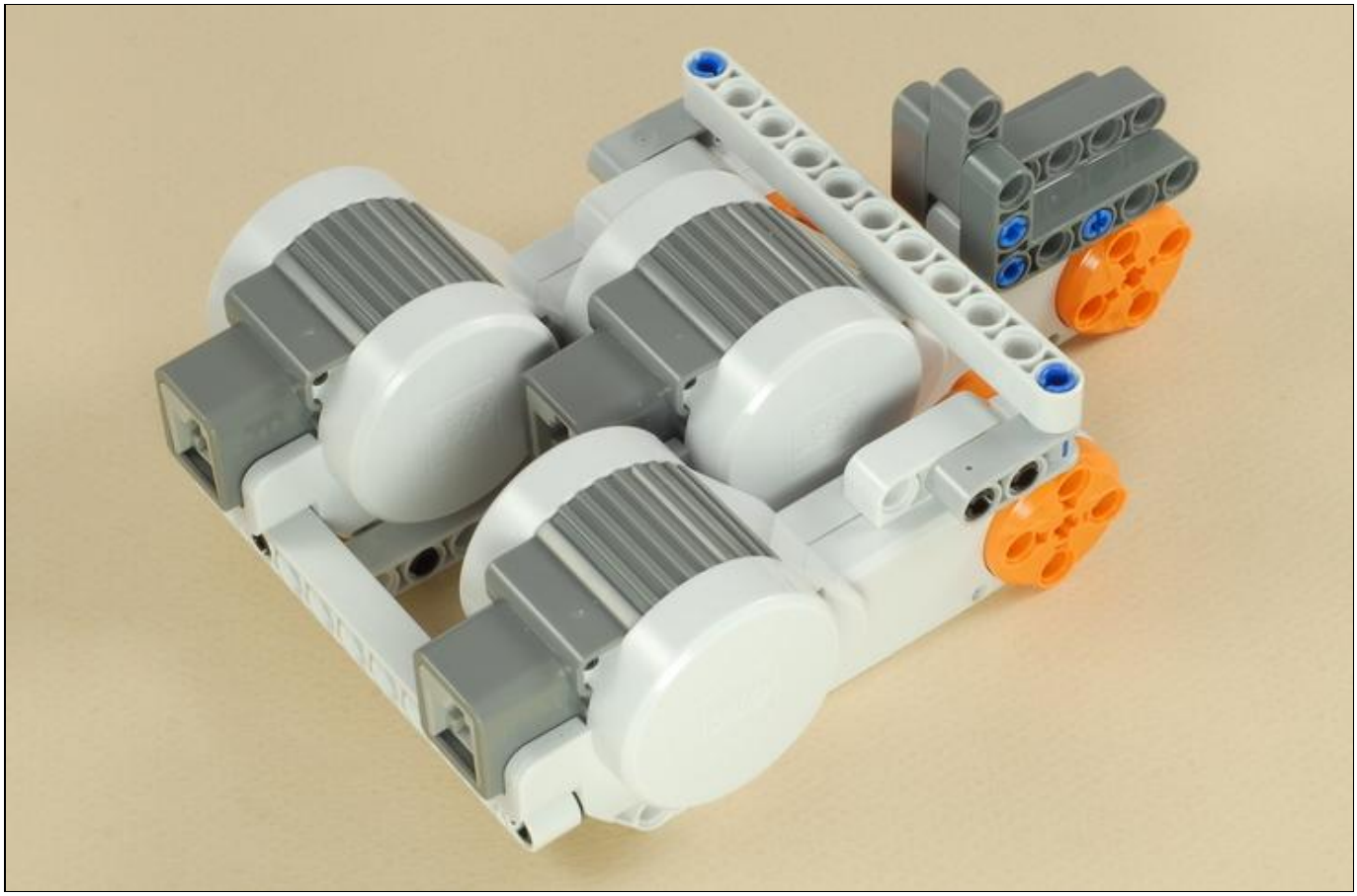


2

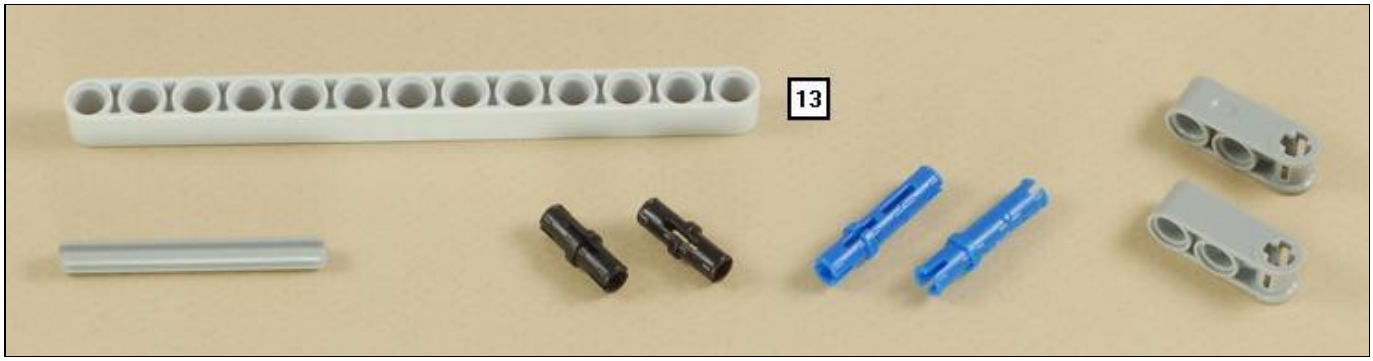

11

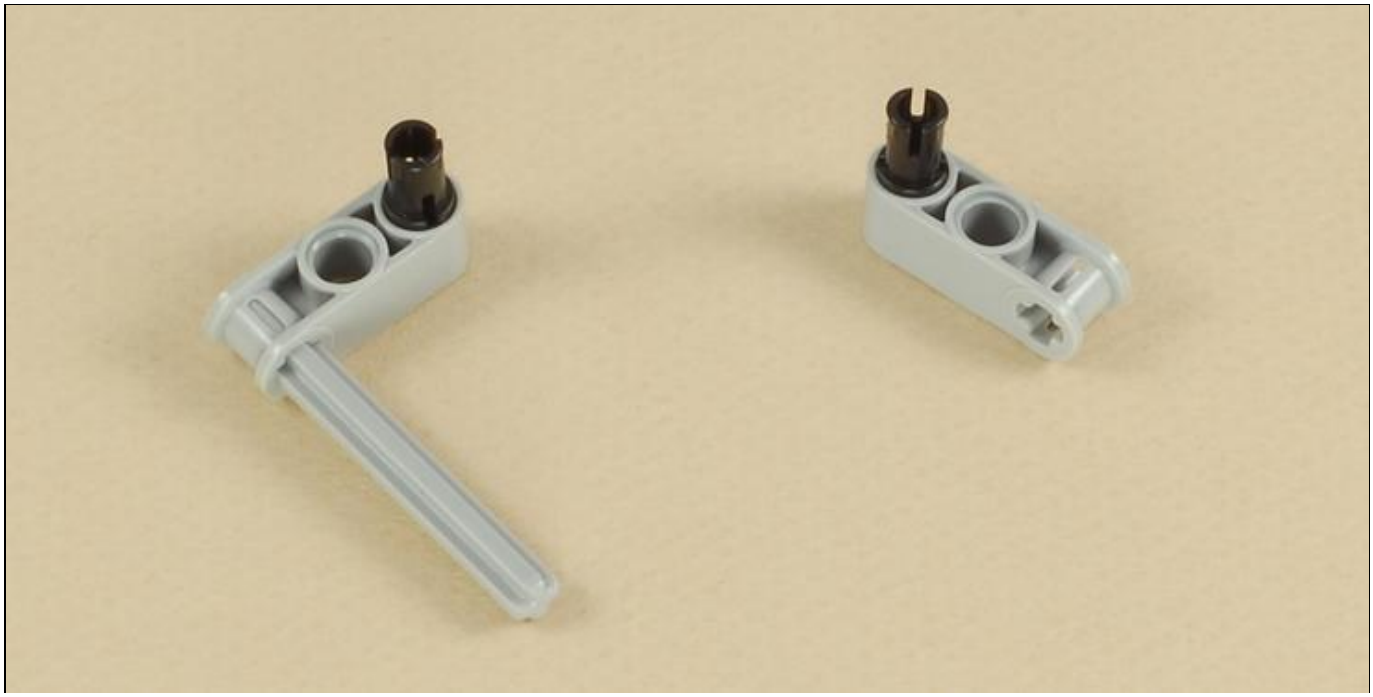


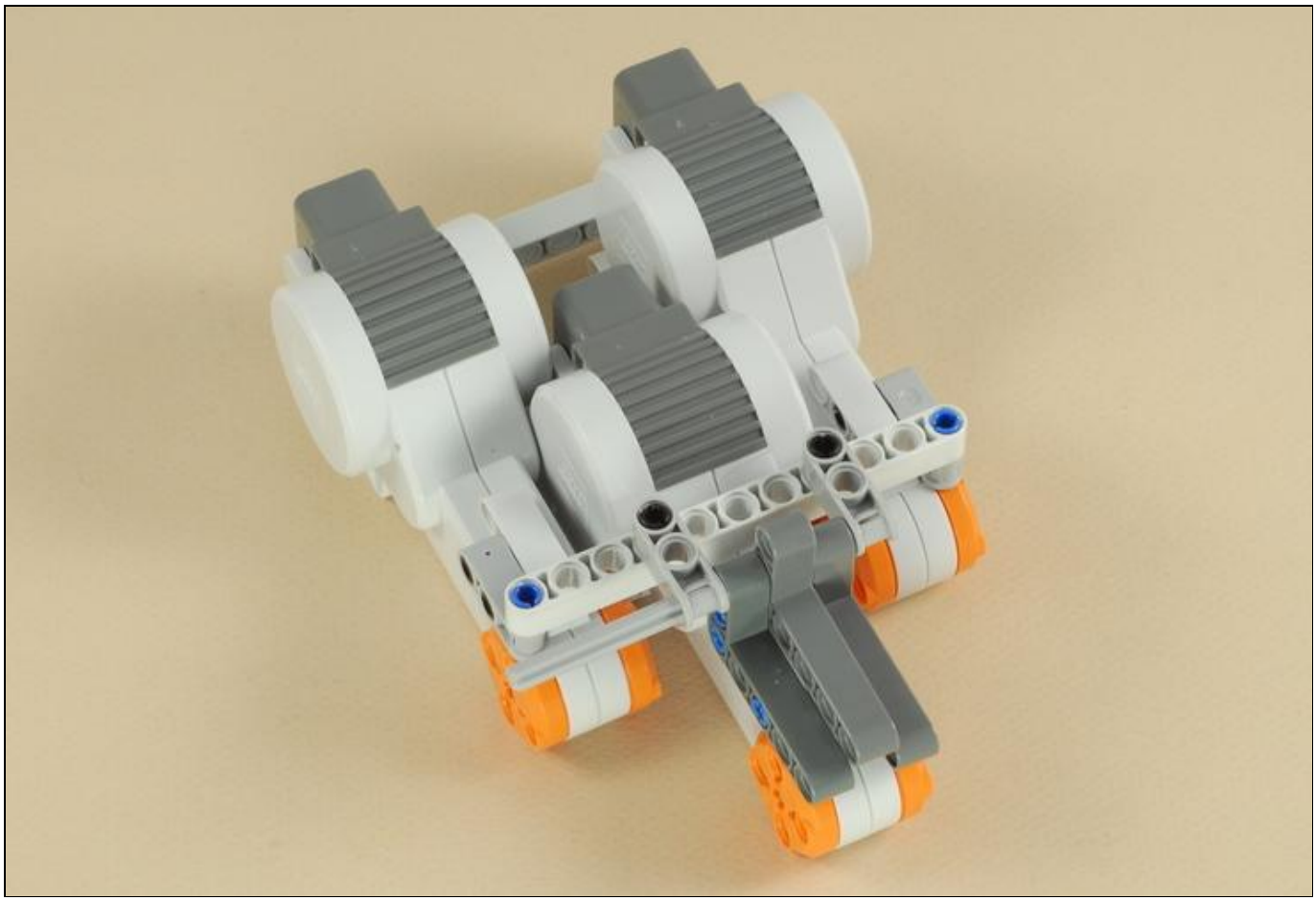


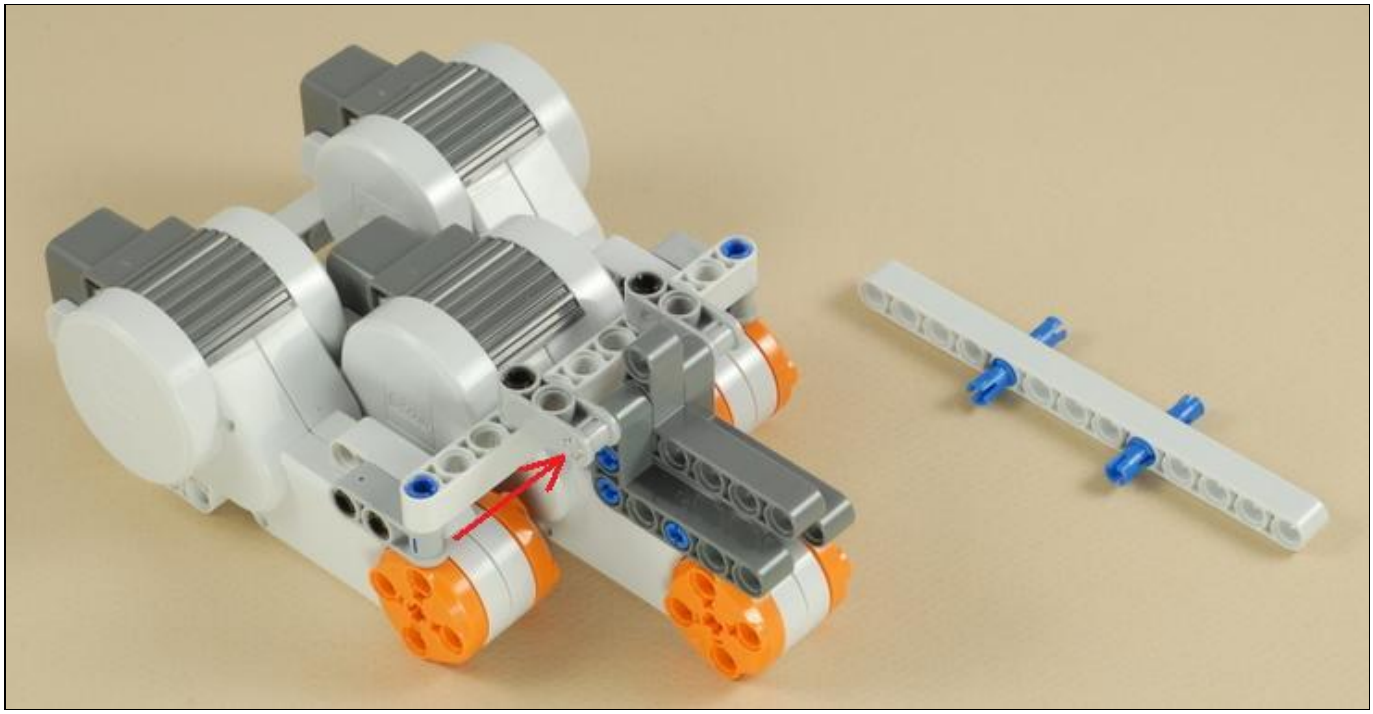


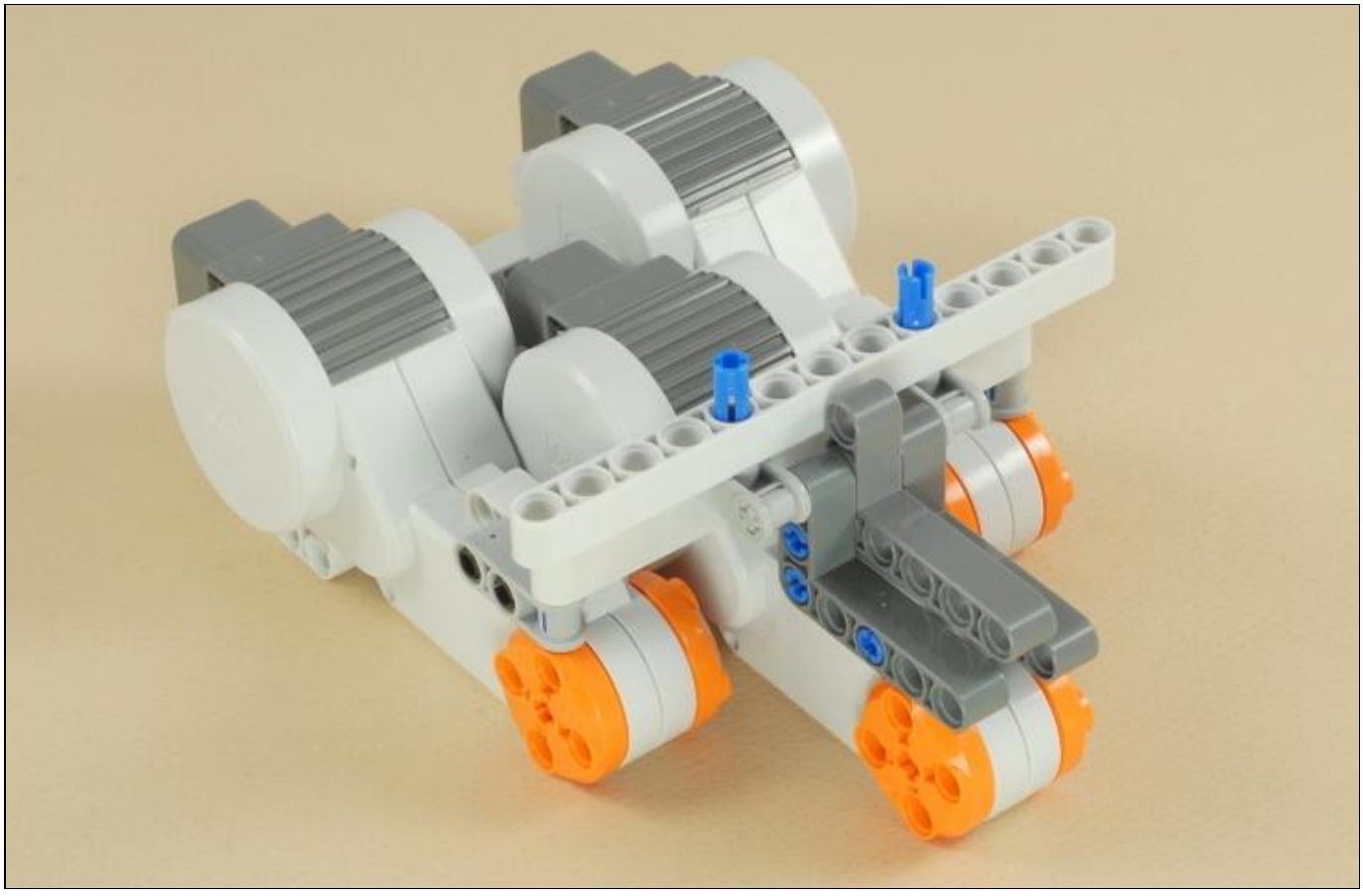
3



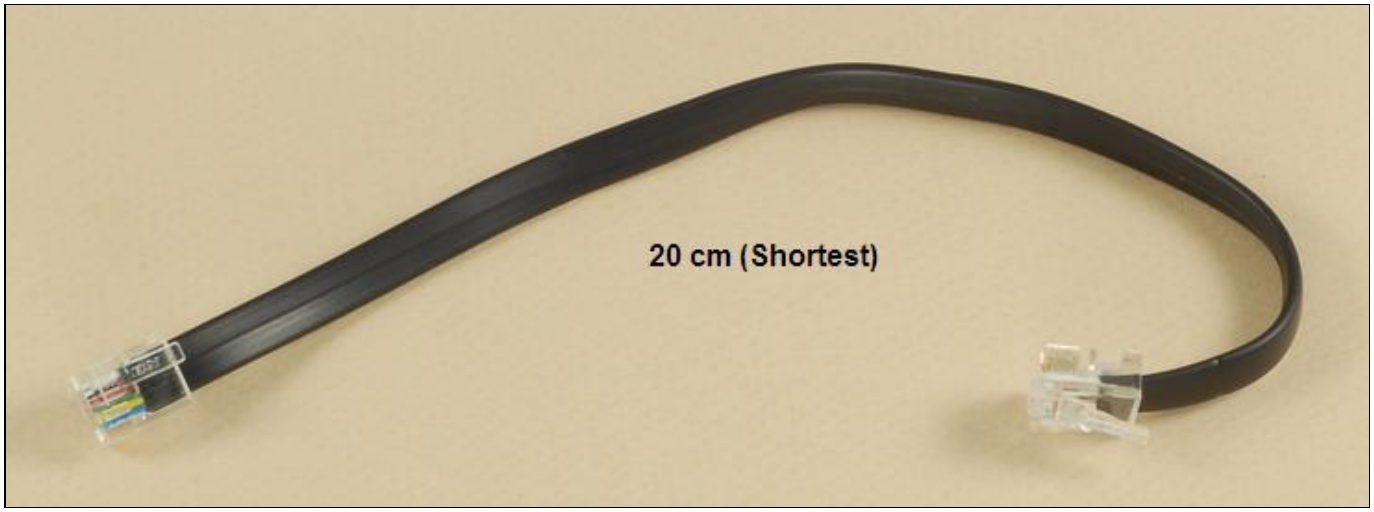


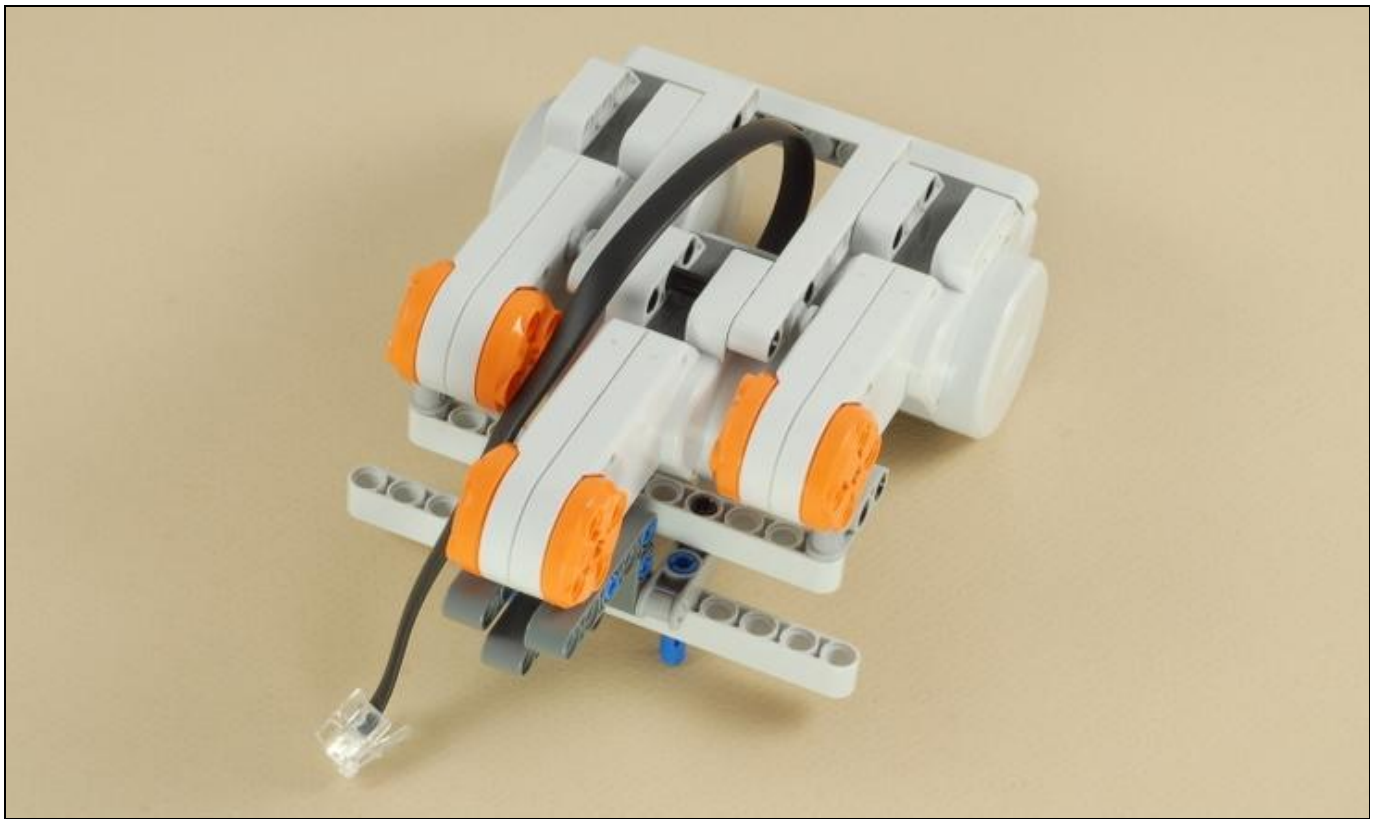




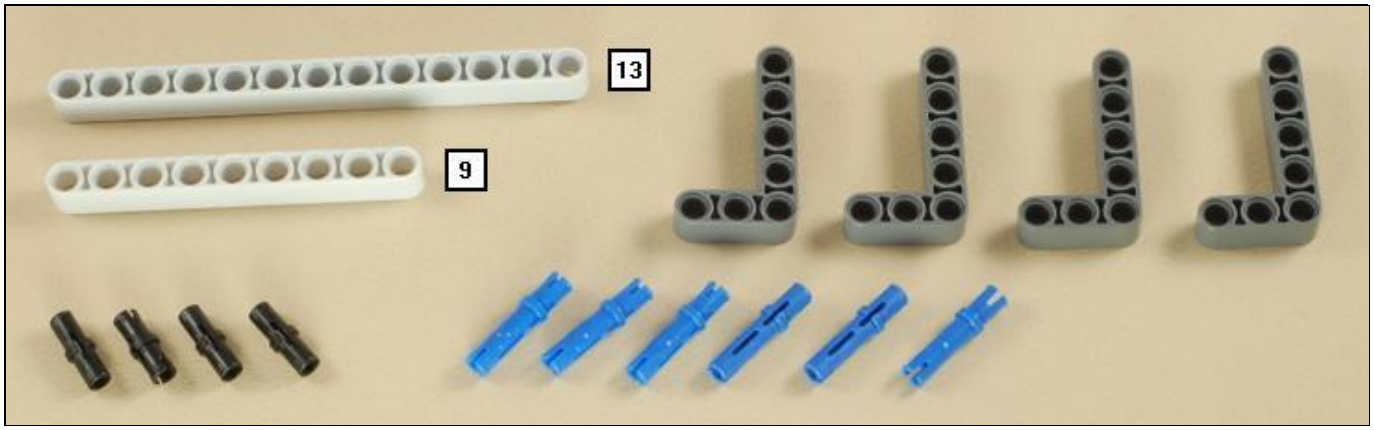


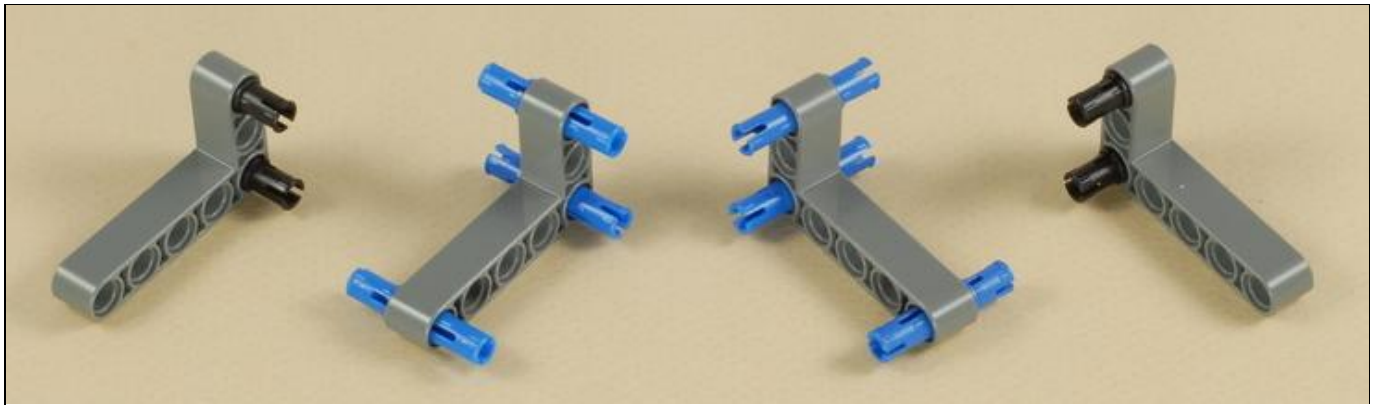
4

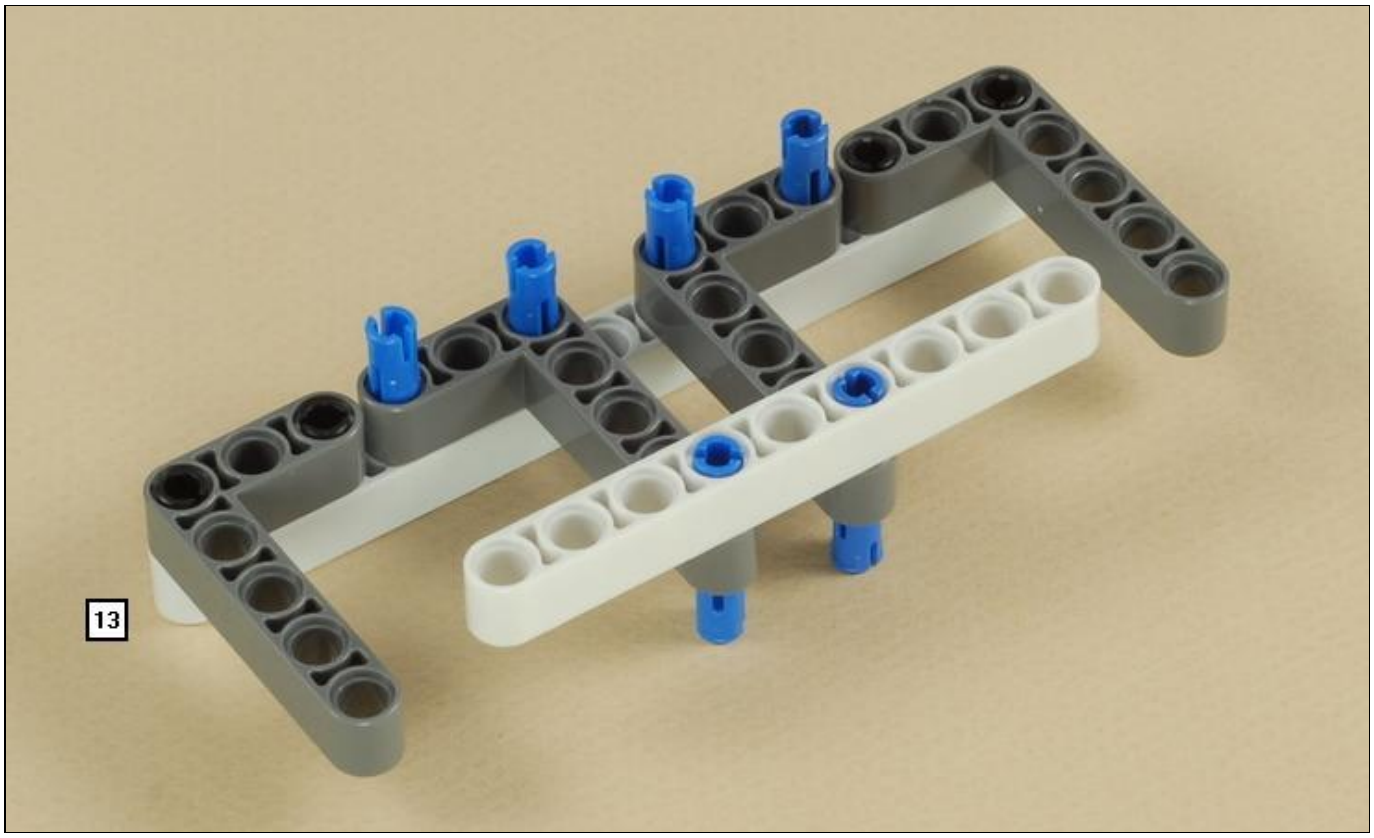




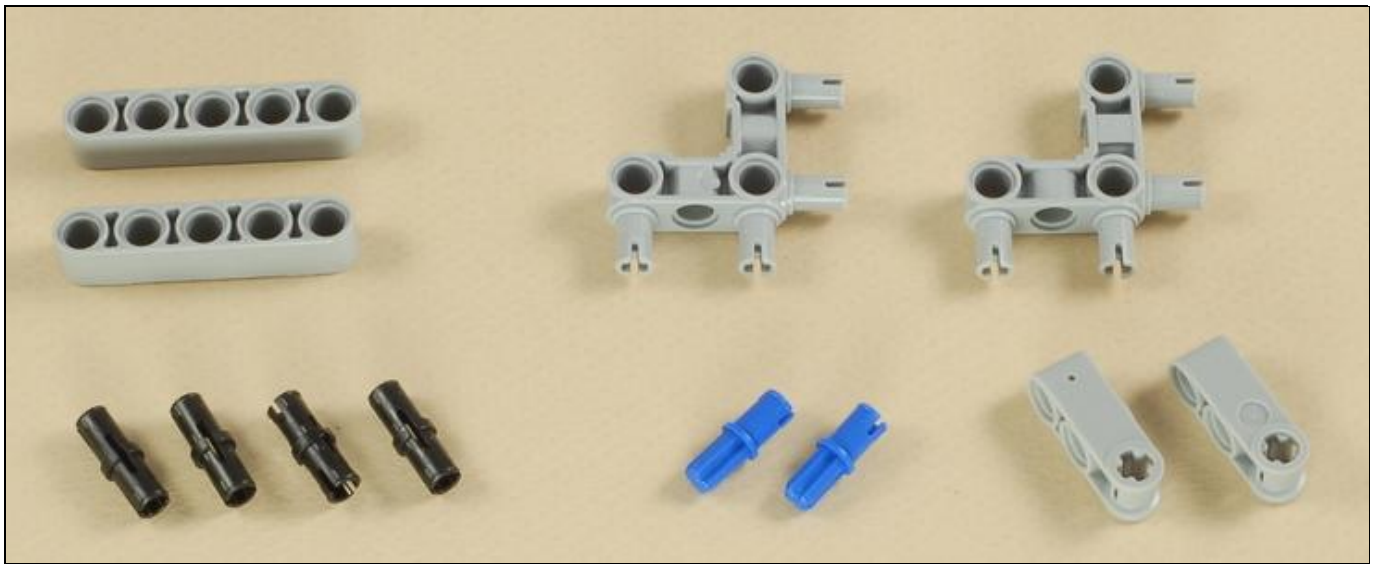
5

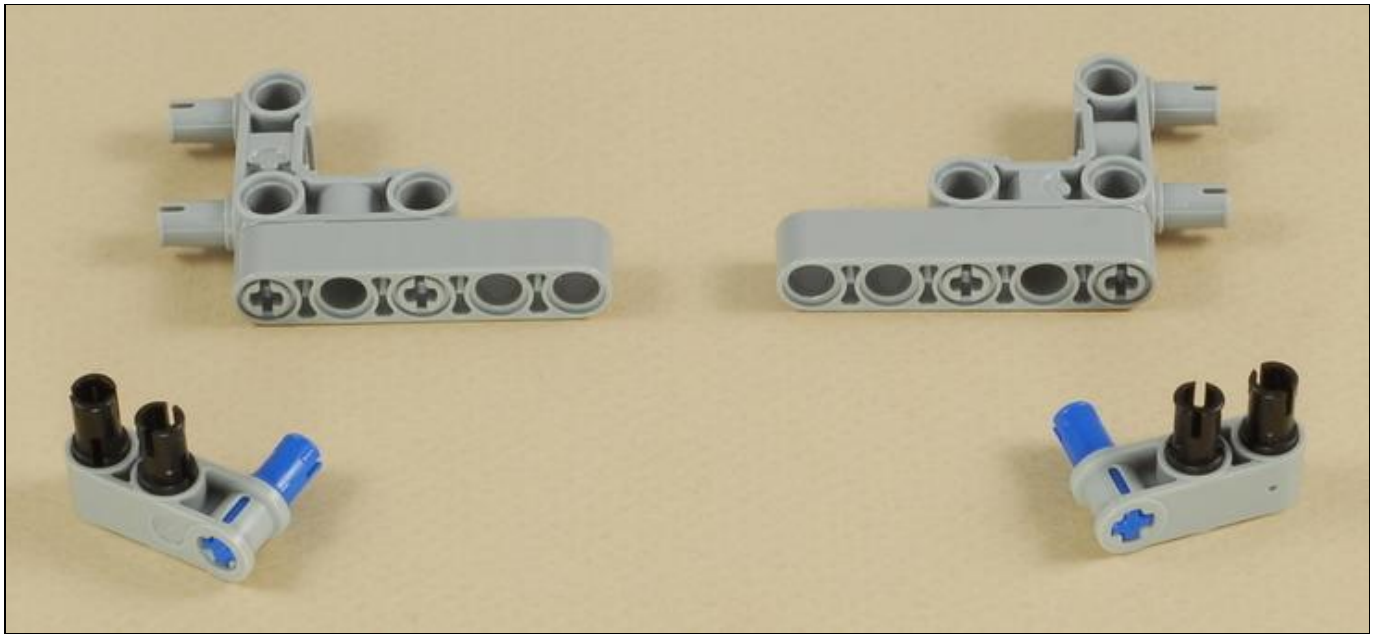


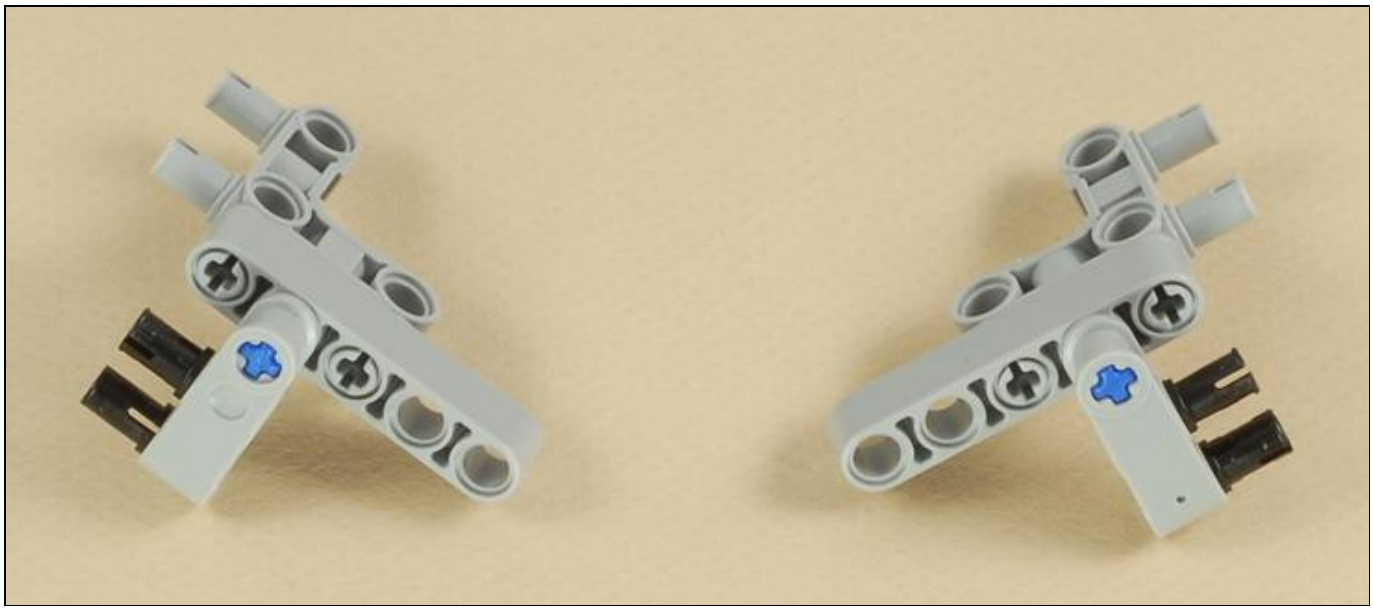


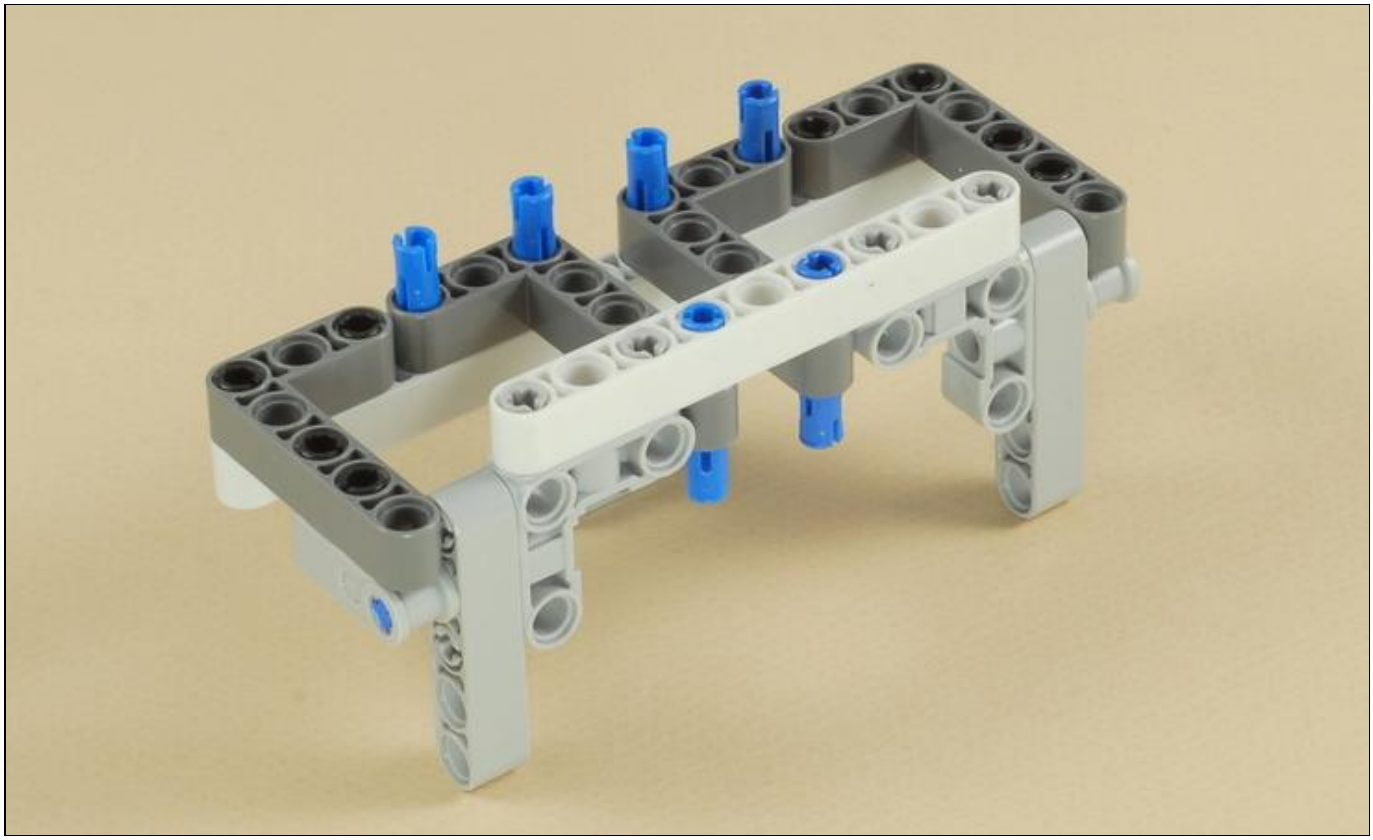


6

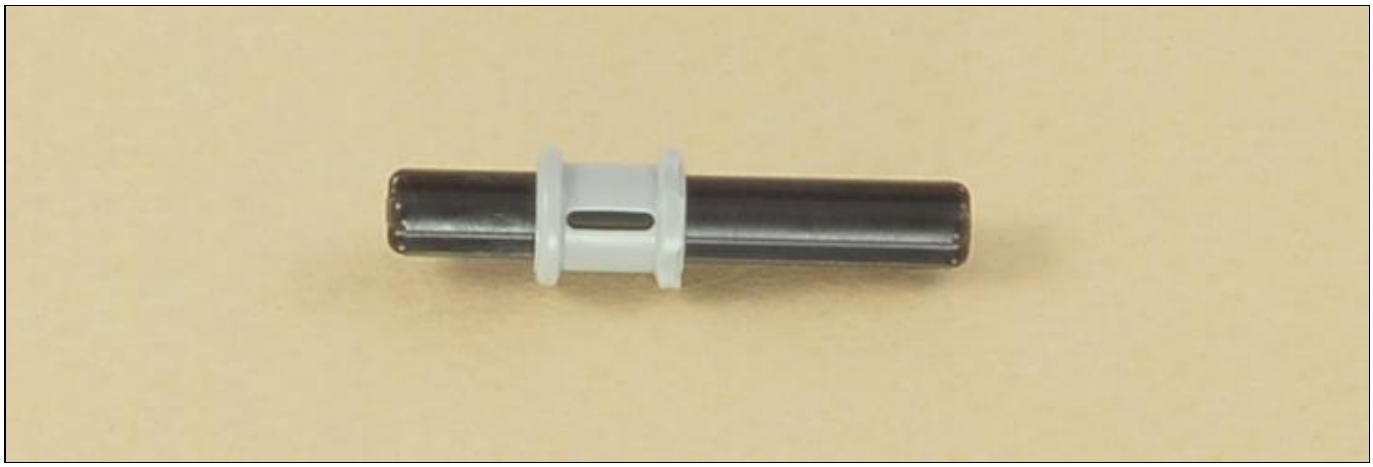


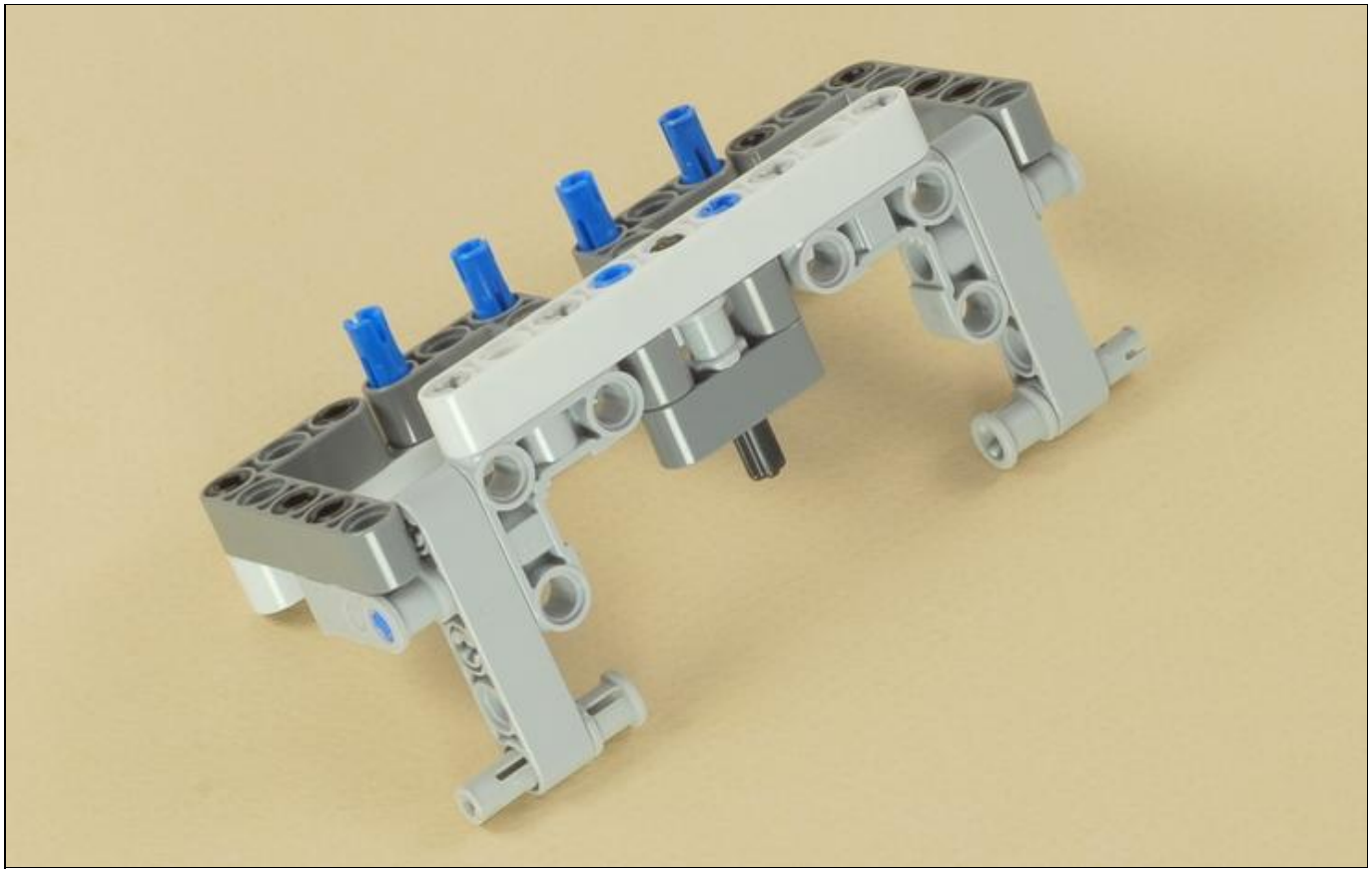




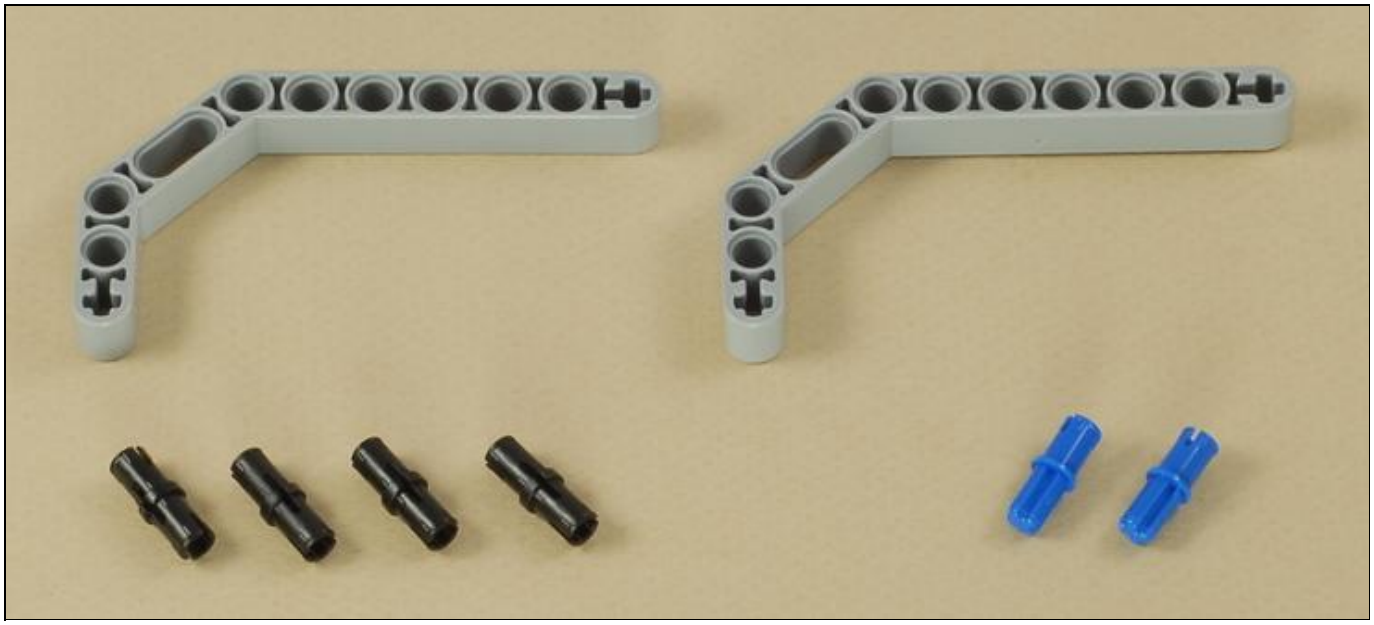


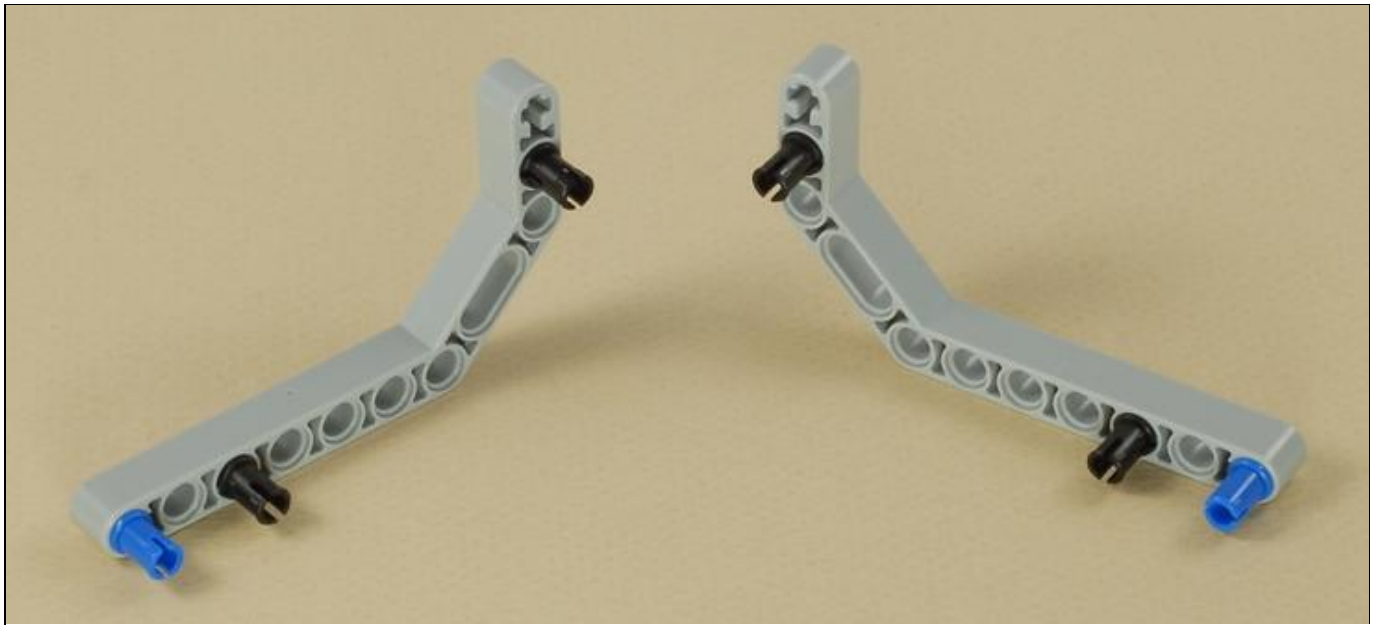
7

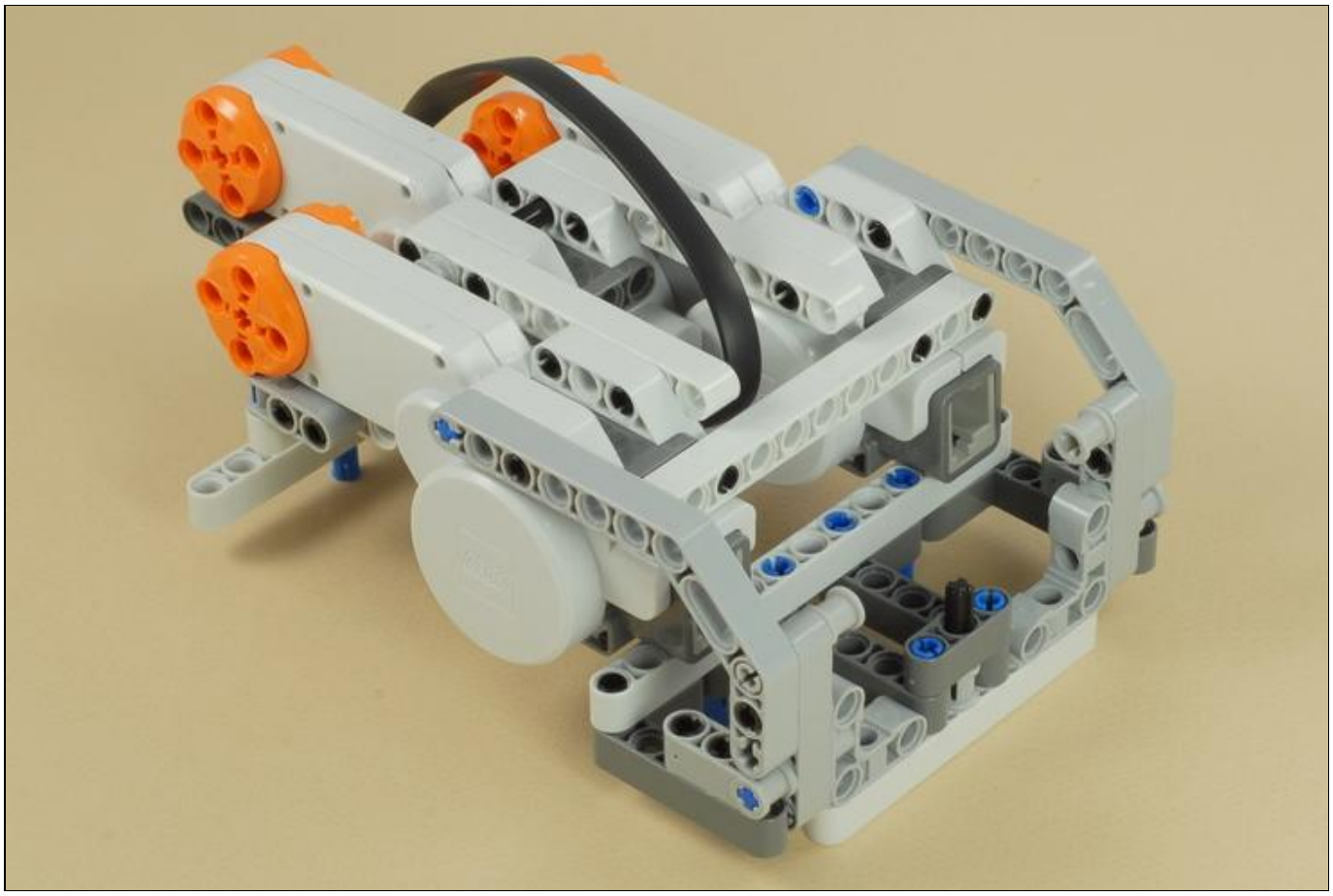




8



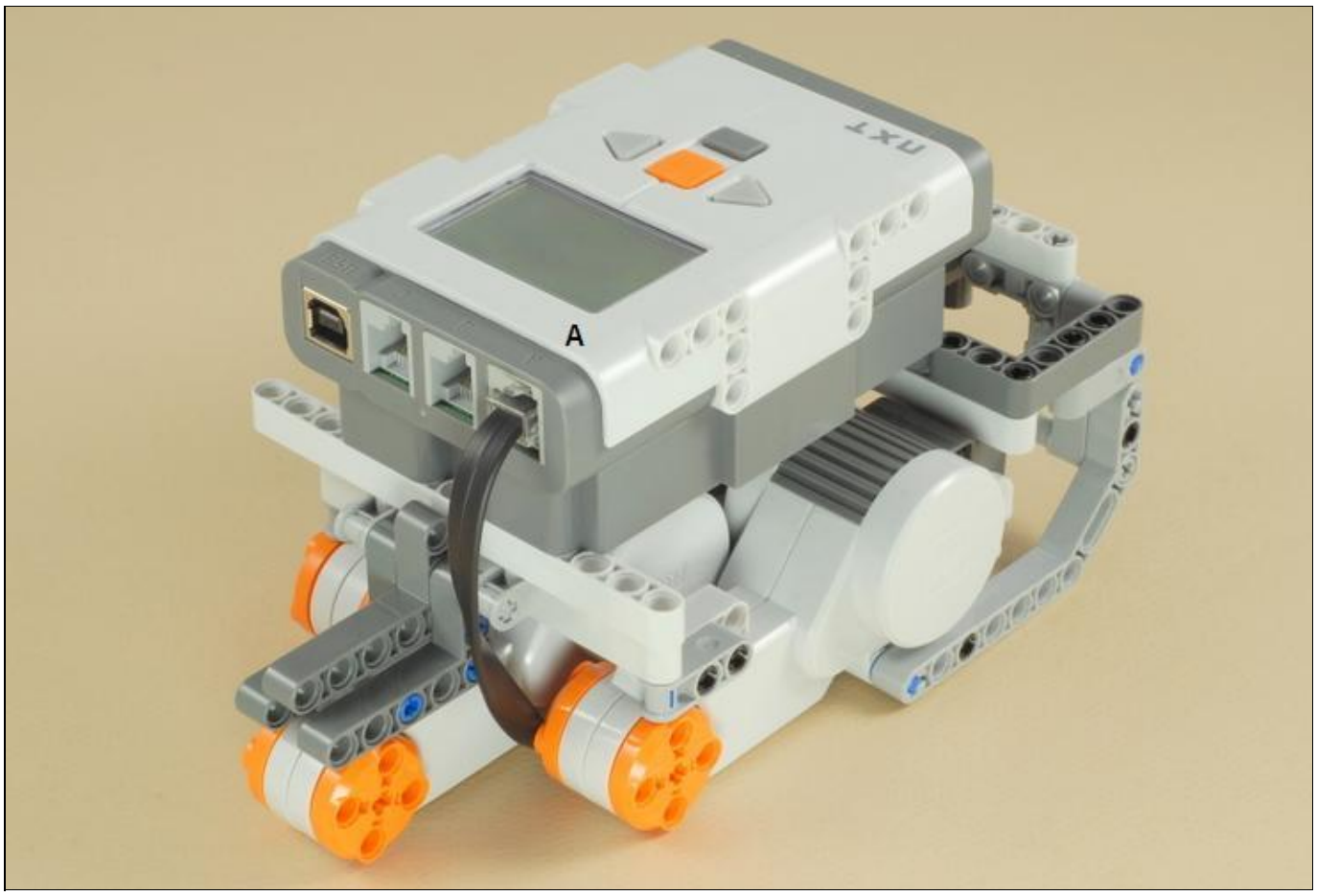




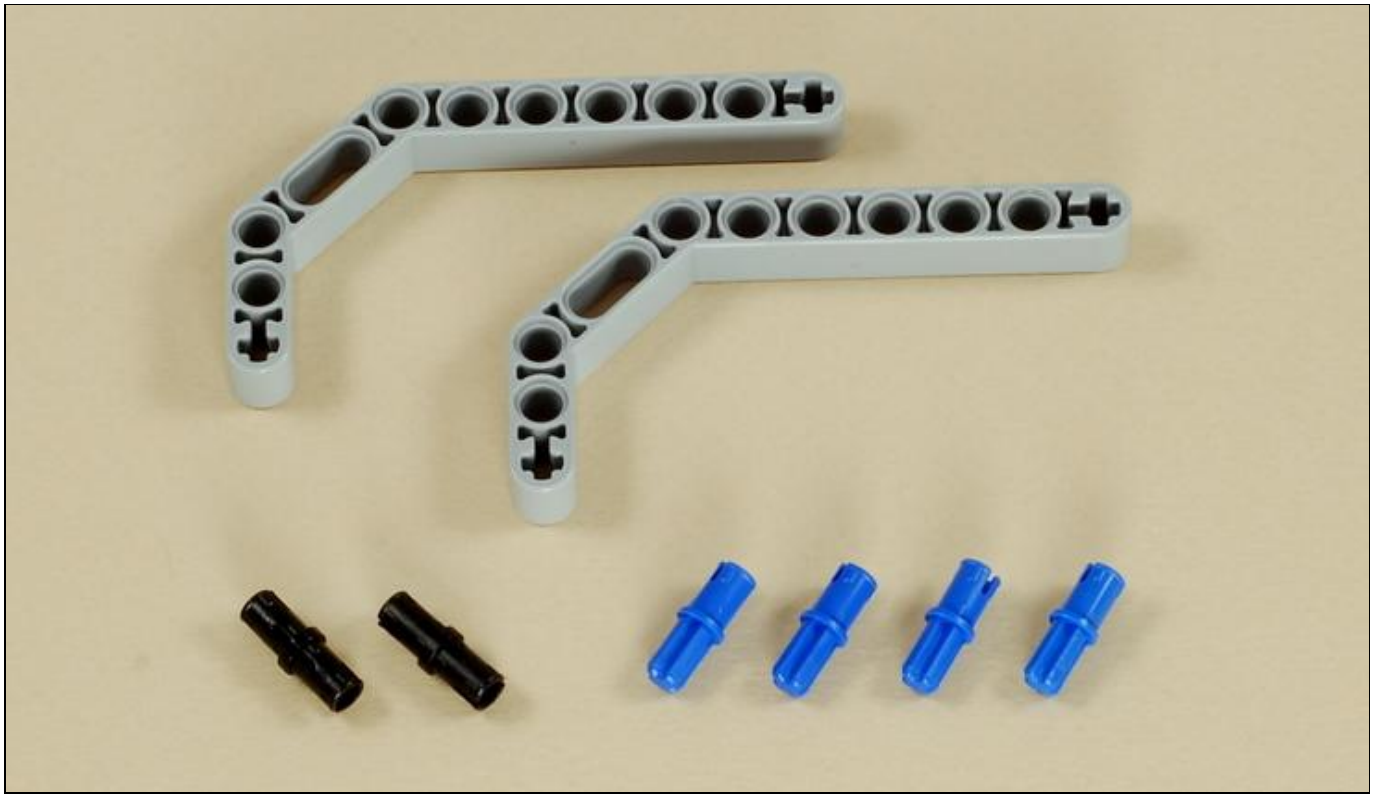
9

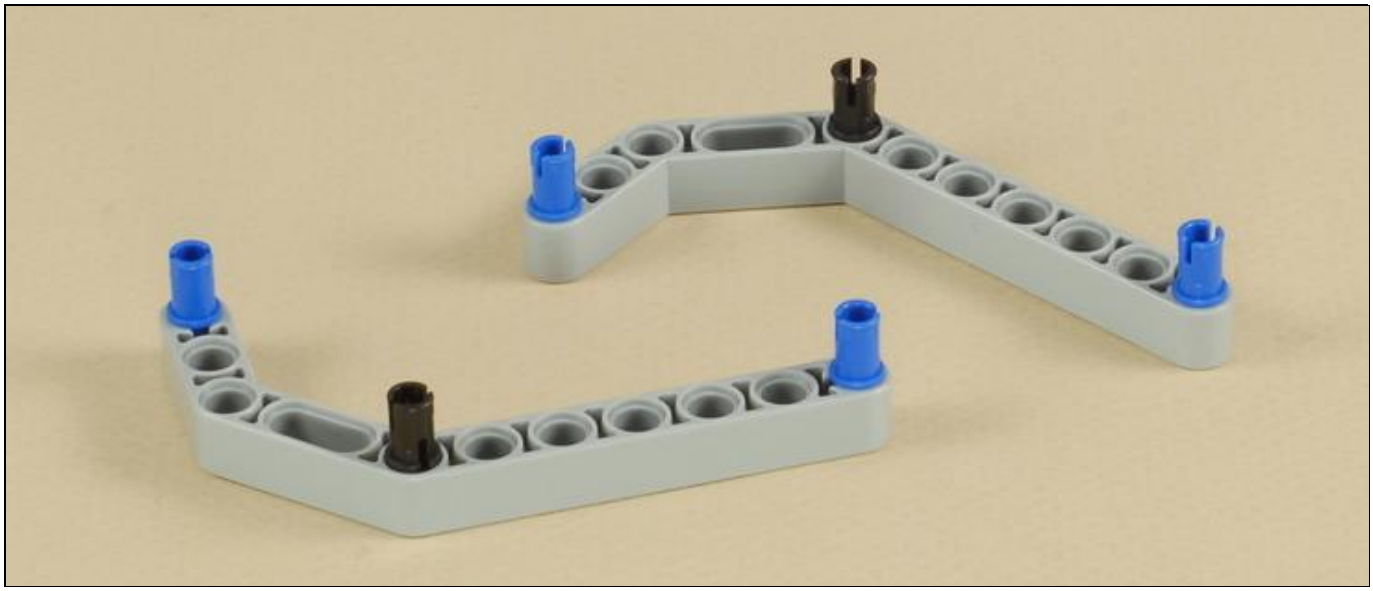
OR

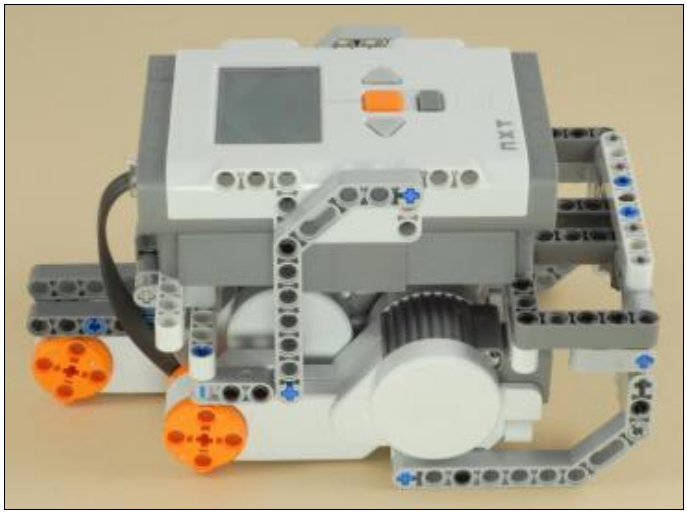
You can use the NXT with either AA batteries or the NXT Rechargeable Battery Pack.

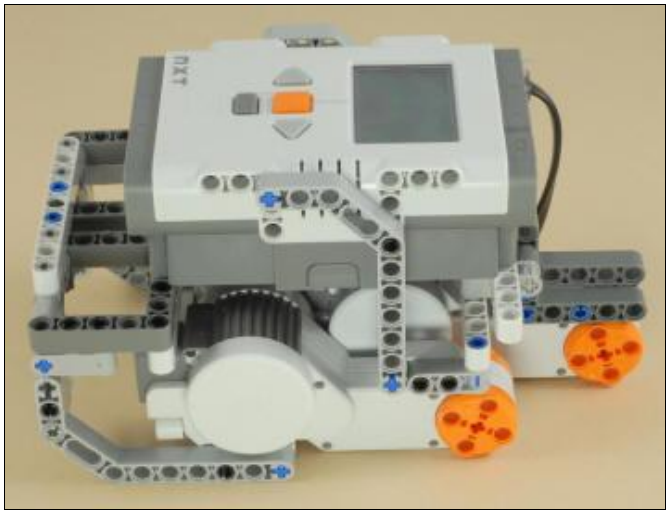


10



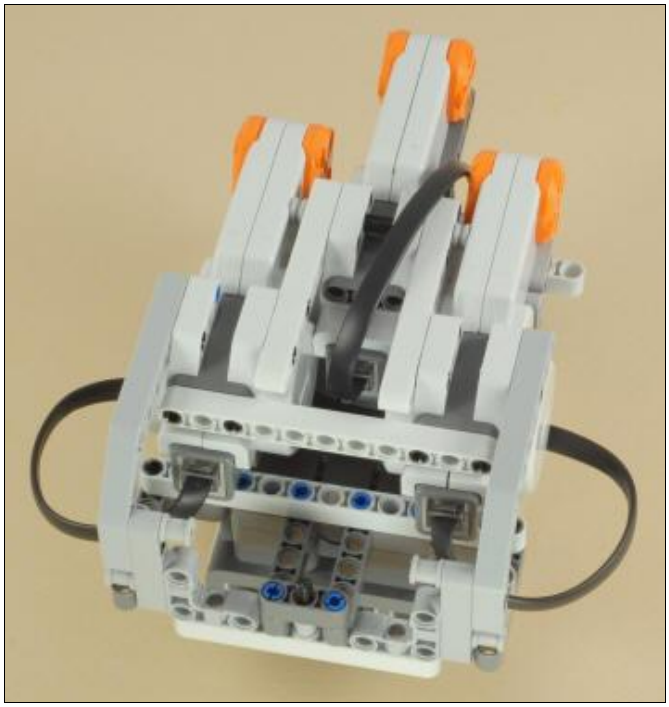




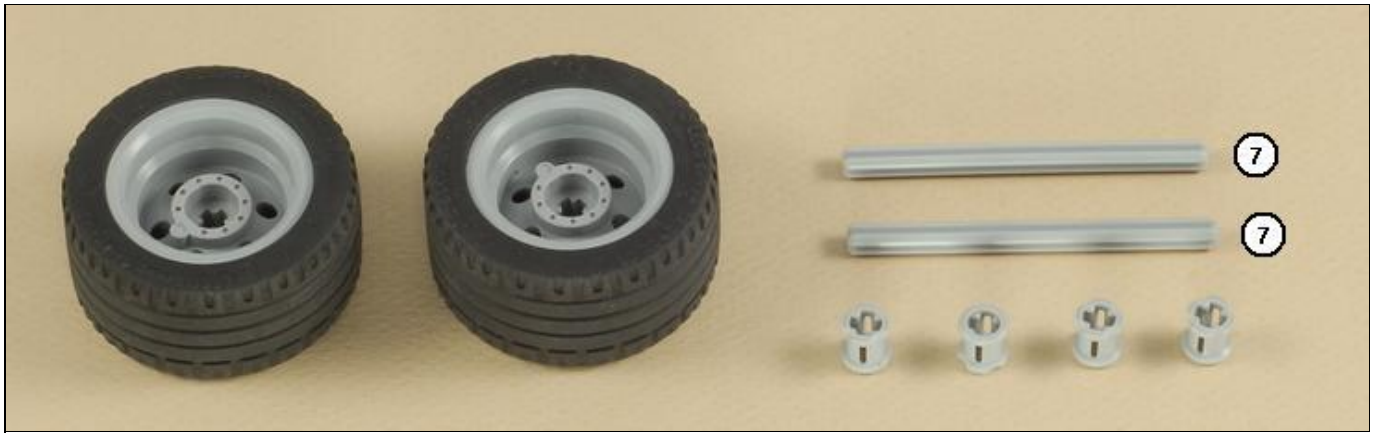


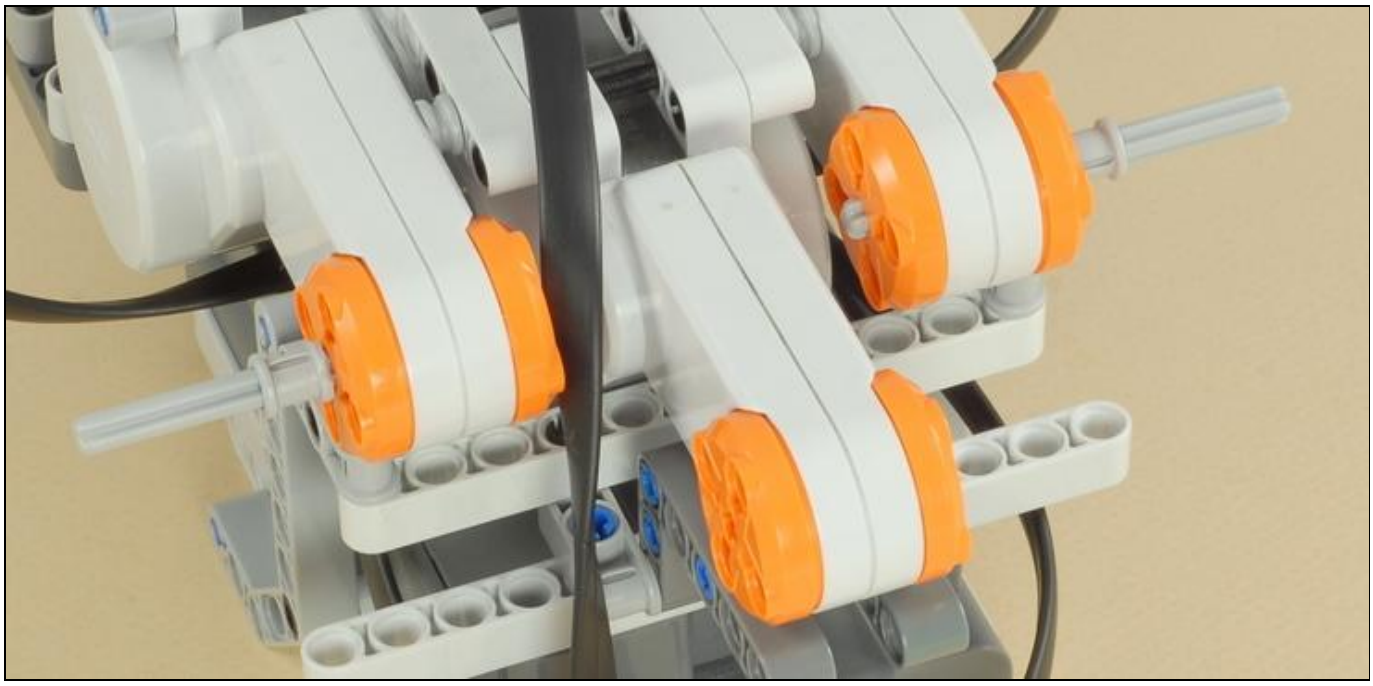
11

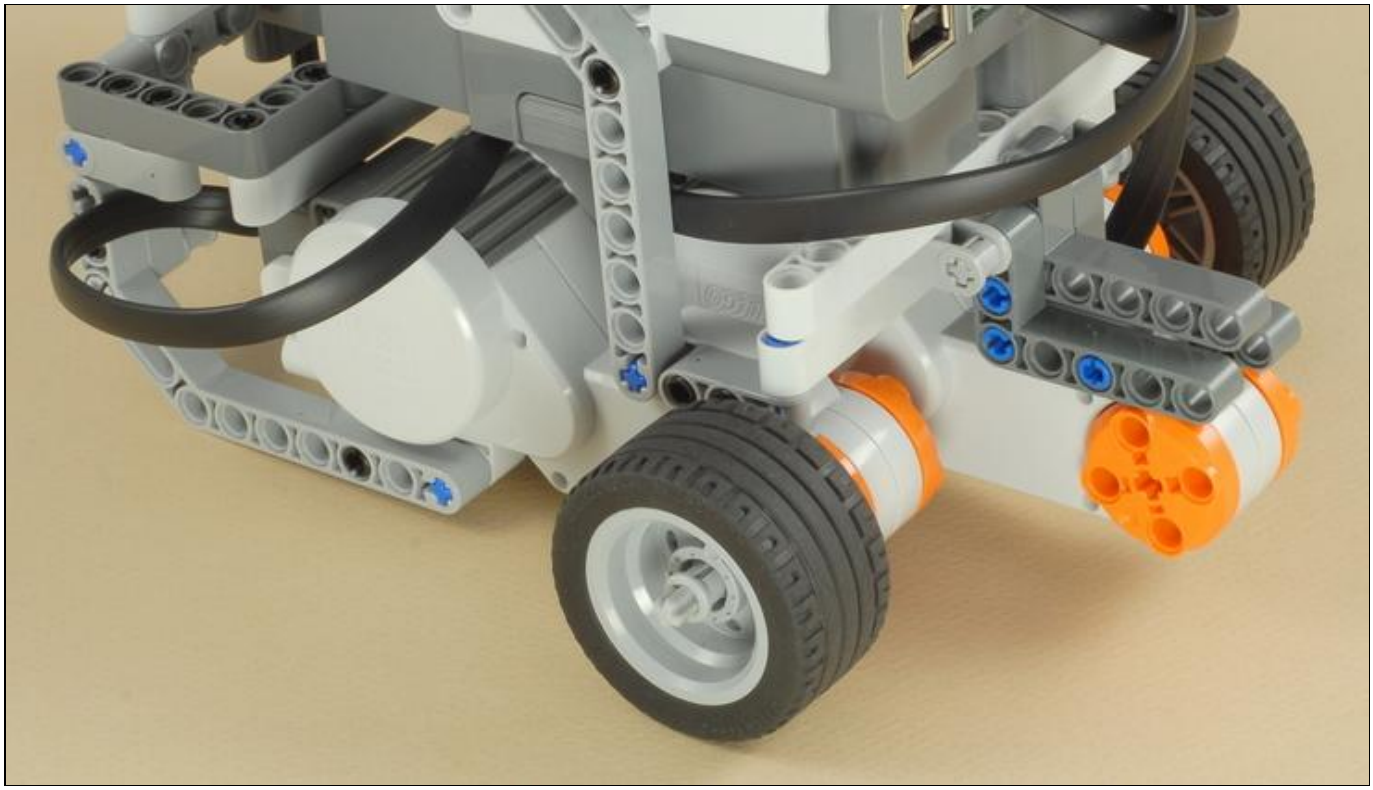
Use two medium (35 cm) wires to connect the two drive motors to ports **B** and **C** on the NXT. Cross the wires under the NXT to help keep them out of the way, then cross them again in front so that port B is connected to the motor on the B side, and port C is connected to the motor on the C side. Pull the wire slack out away from the center motor.



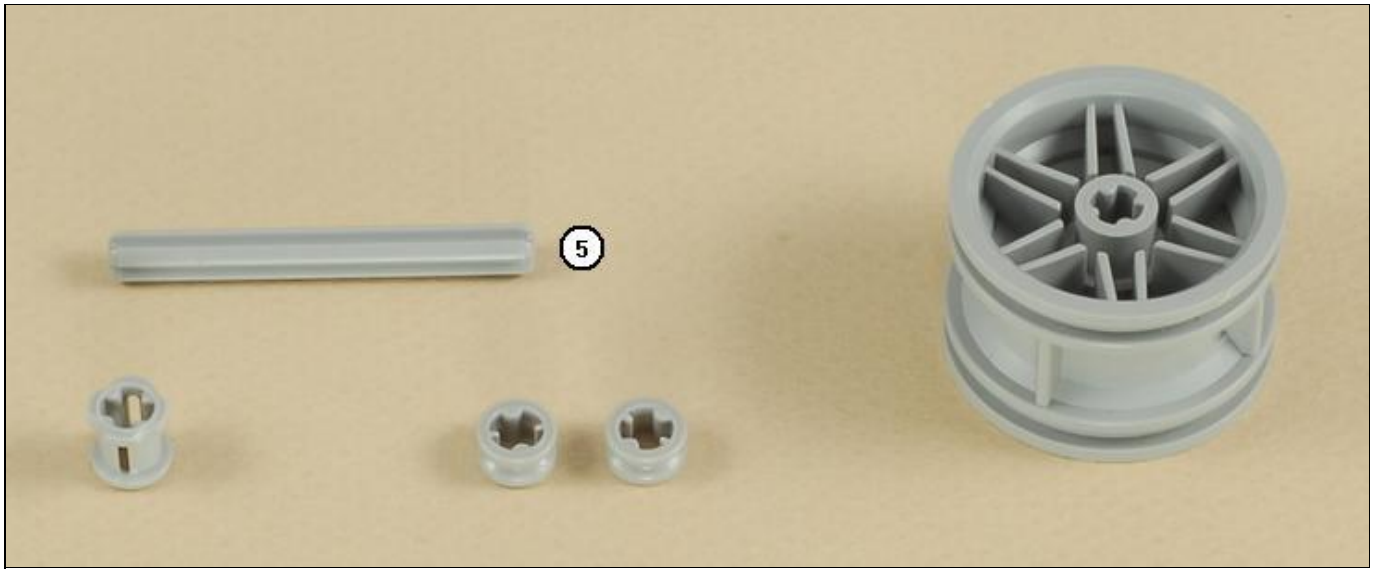
12

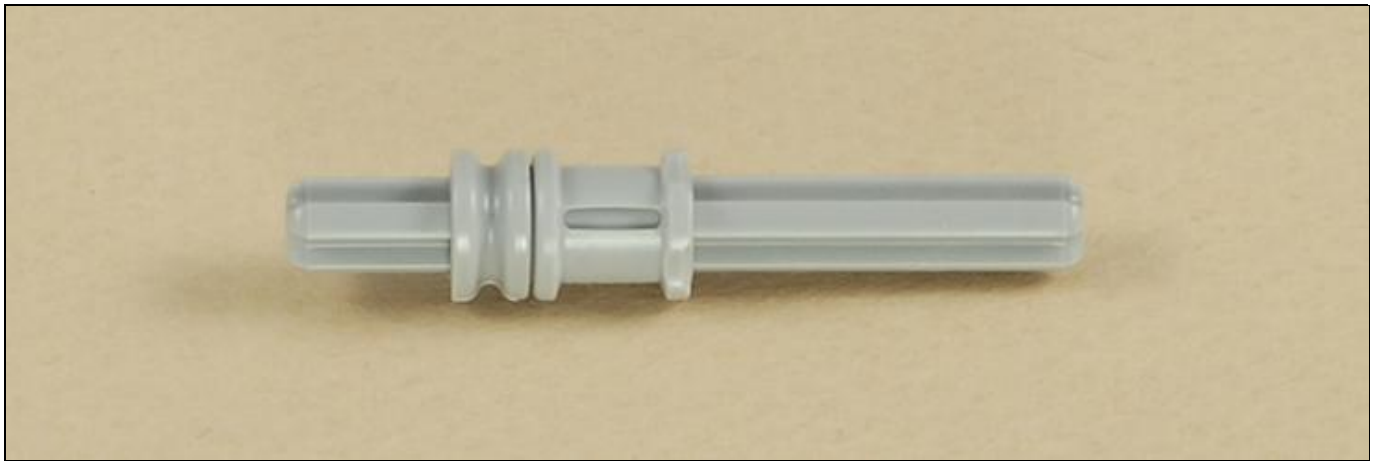

7
7

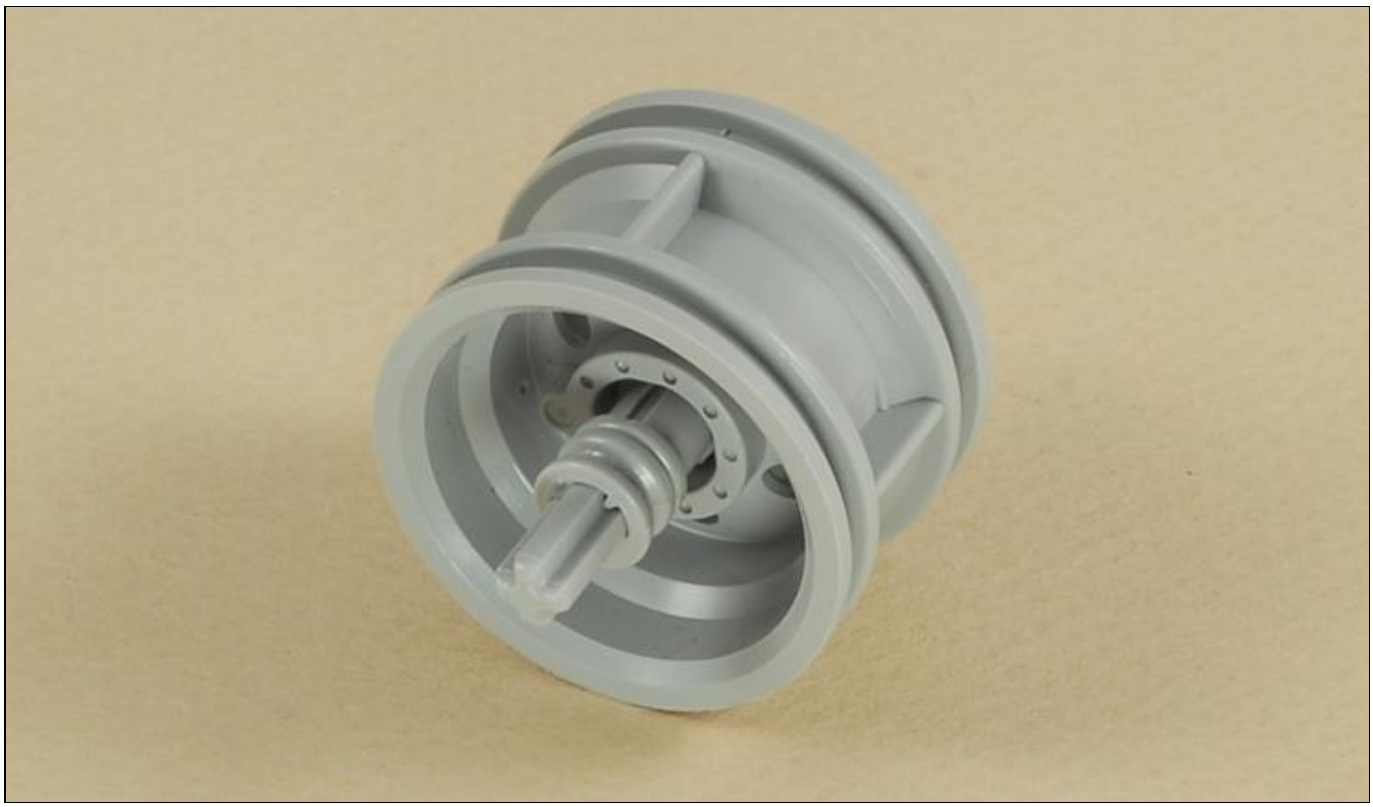


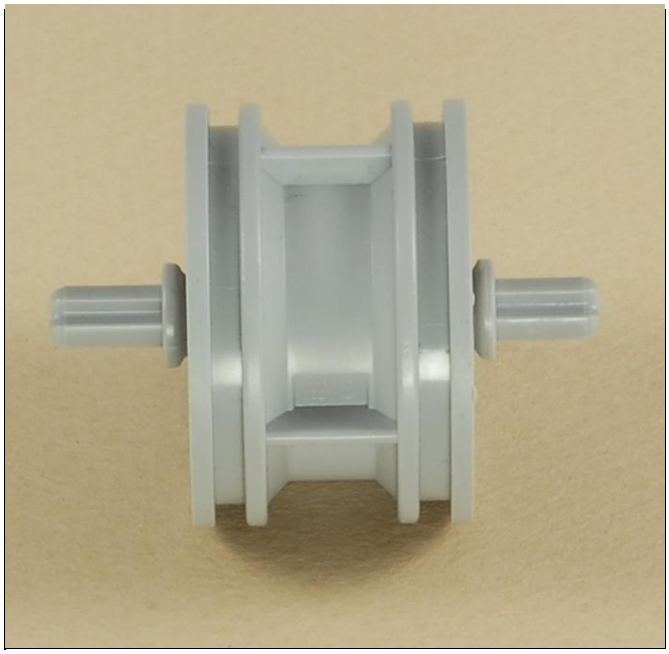


13

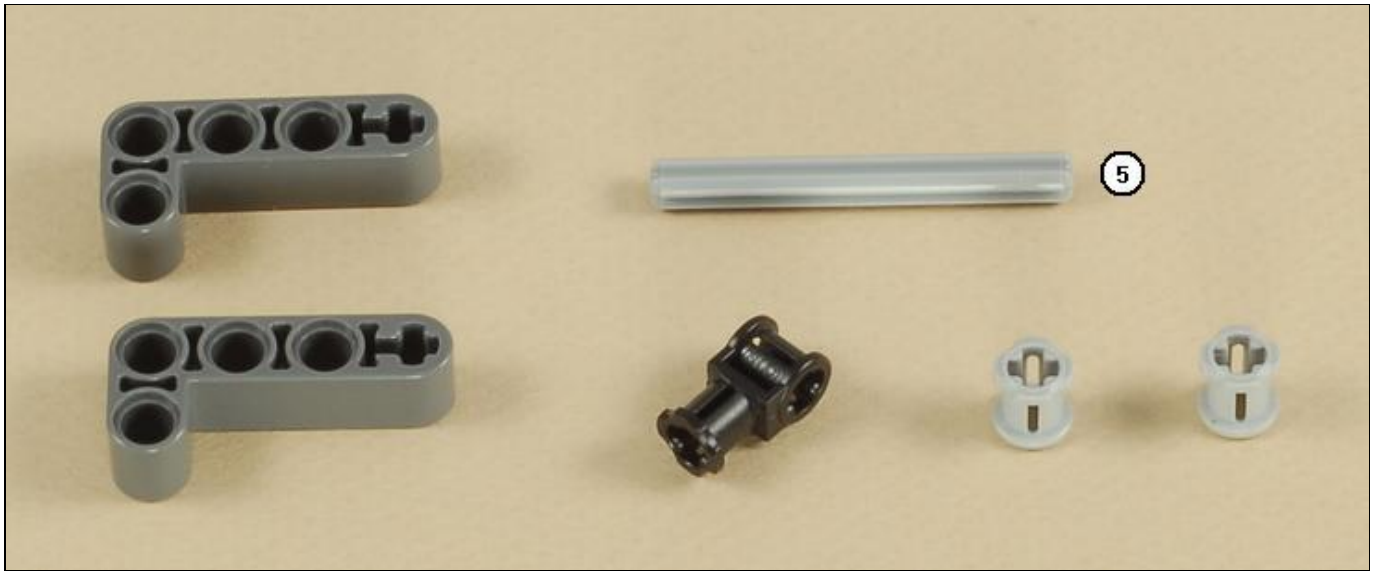


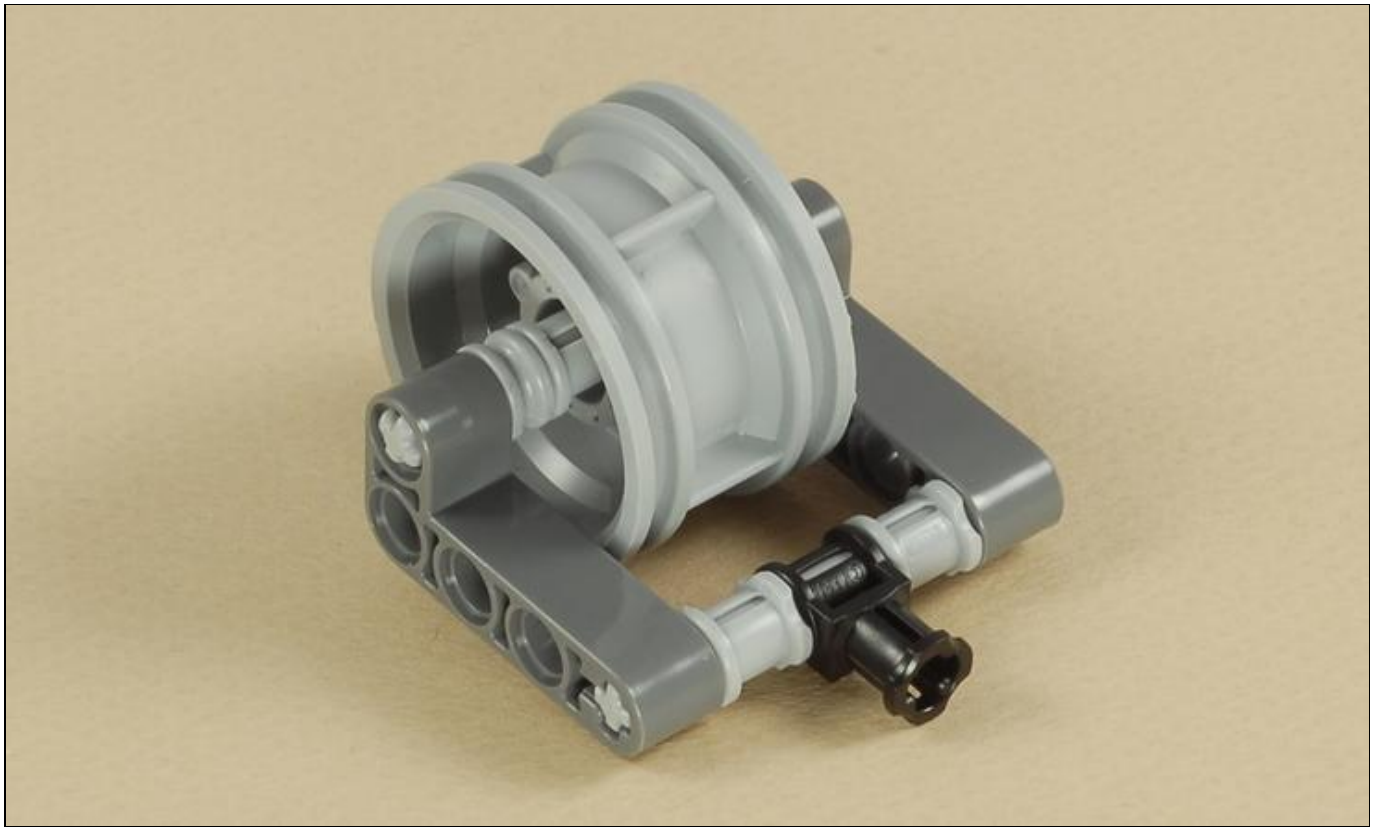


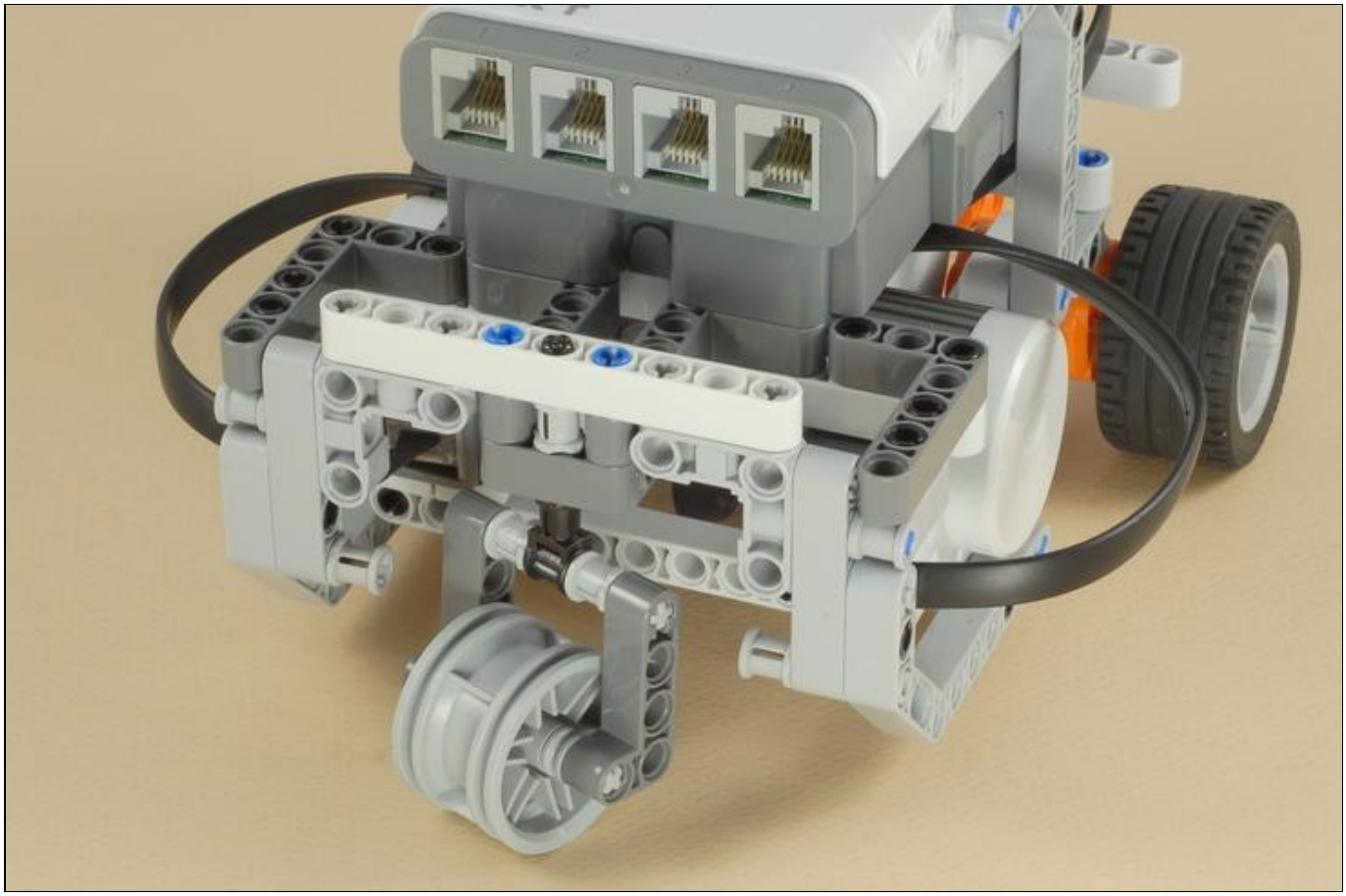




14







3-Motor Chassis Programming

The 3-Motor Chassis is sturdy and level and can be used as a base for other projects that need a third motor down low in the front (or back) of the robot (note that you can drive the robot in either direction). You can use it as a starting point for your own projects, and program it however you want.

To get you started on basic driving, here are a couple of programs that demonstrate the use of the Move block to do different kinds of turns.

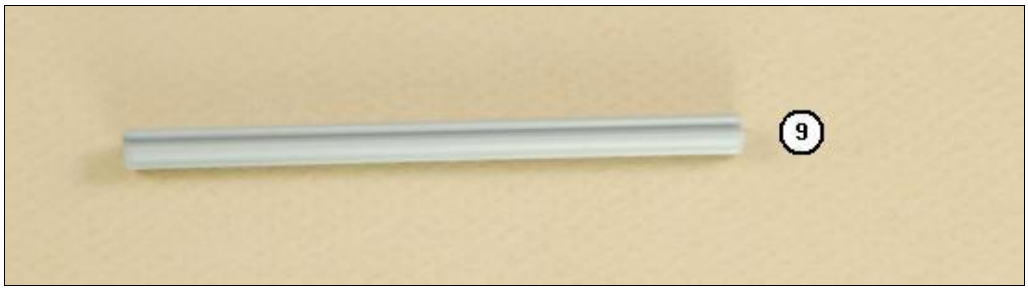
The TurnDemo3 program (Easy) shows three kinds of turns using the Move block:

- **Pivot turns**, where the wheels turn in opposite directions to make the robot make a very right turn.
- **One-wheel turns**, where the robot turns by moving one wheel and keeping the other stopped. These turns take more room than pivot turns but are usually more accurate.
- **Curve turns**, where the robot makes a gradual turn by moving one wheel faster than the other one.

The Spiral program (Intermediate) demonstrates using the Steering parameter on the Move block's data hub to numerically control the amount of turning. It makes the robot drive in a spiral of steadily decreasing radius.

Alternative Design with Fixed Third Wheel

As a variation on the castor wheel design of the 3-Motor Chassis, you can add an axle to prevent the castor wheel from pivoting, as shown below. This will create a straight third wheel that is suitable for use on on hard smooth surfaces by rolling when going straight and sliding from side to side when turning. This will eliminate the little nudge created by a castor wheel when it changes direction, which can lead to more accurate driving. However, without the pivoting castor, the robot will not turn well on carpet.



Partially take apart one side of the castor wheel frame in order to insert the 9-axle through the castor wheel in the position shown below, then reassemble it. Point the castor wheel to the rear as shown to make it more stable.

Challenges

- Try writing your own programs to make the 3-Motor Chassis move and turn. Can you program the robot to follow a pre-determined path of straight and turn segments that will get it where you want it? Use "Move" blocks with the motors set to B and C. As built, the castor is on the back of the robot, so motor B is on the left and motor C is on the right, but you can just as easily drive it "backwards" if you want.
- Experiment with the two different variations with the pivoting and the straight third wheel on different driving surfaces. Which one turns easier or more accurately on each surface?
- Try making some attachments to add to the third motor, or some other non-motorized attachments.
- Try adding some sensors to the robot. For example, you could add a touch sensor sensor to make the robot alternate between going and stopping whenever the button is pressed, or an ultrasonic sensor to make the robot stop before running into a wall.