

Perpetual Ball Mover
Robot Arm



x1

20cm



x2

50cm



x1



x1



x1



x1



x4

35cm



x2



x1



x1



x1



x9



x3



x12



x6



x2



Either ball
x1

x13



x2



x8



x20



x2



x38



x105



x22



x5



x10



x10



x7



x8



x22



x4



x8



x10



x1



x7



x8



x22



x2



x10



x2



x1



x7



x8



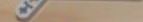
x22



x9



x4



x4



x3



x2



x4



x2



x1



x2



x9



x4



x4



x3



x2



x4



x2



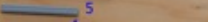
x1



x2



x4



x2



x4



x3



x2



x4



x2



x1



x2



x4



x2



x4



x3



x2



x4



x2



x1



x2



x9



x7



x3



x4



x2



x4



x2



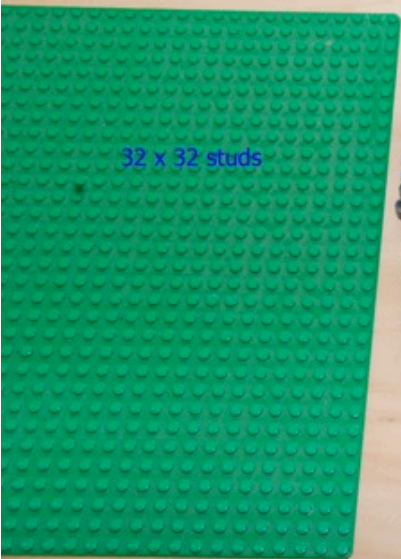
x1

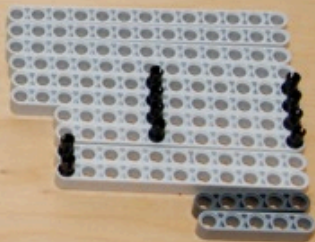
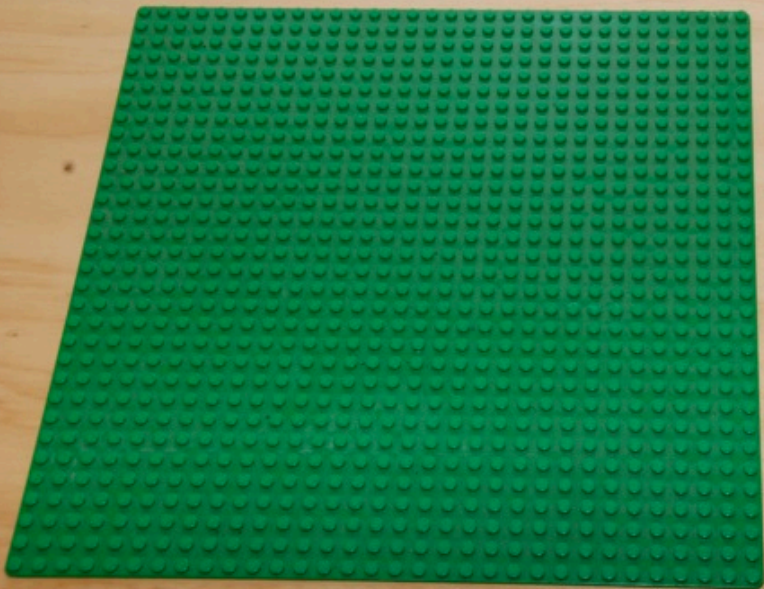


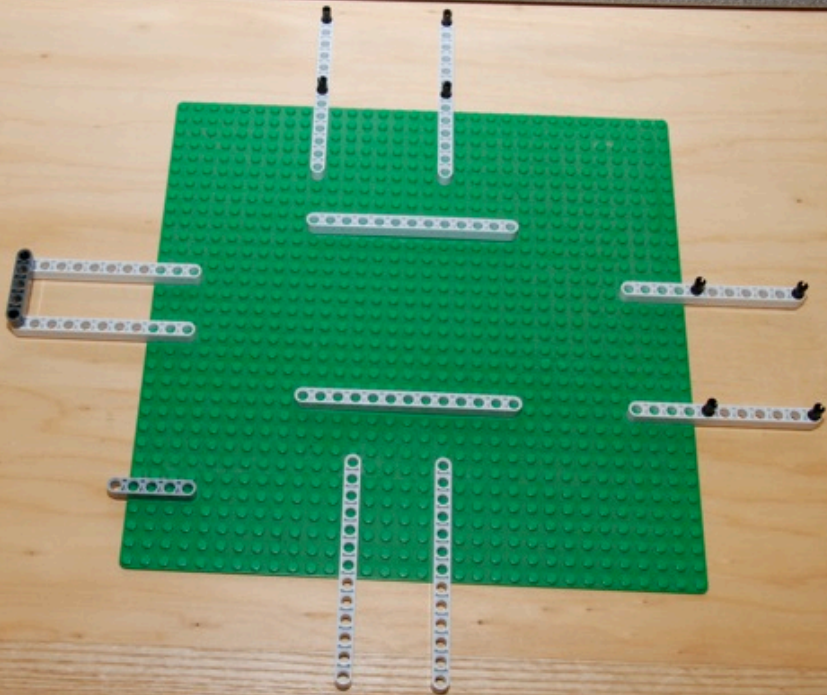
x2



Additional Item: 1x Lego base tile 32 x 32 studs







15

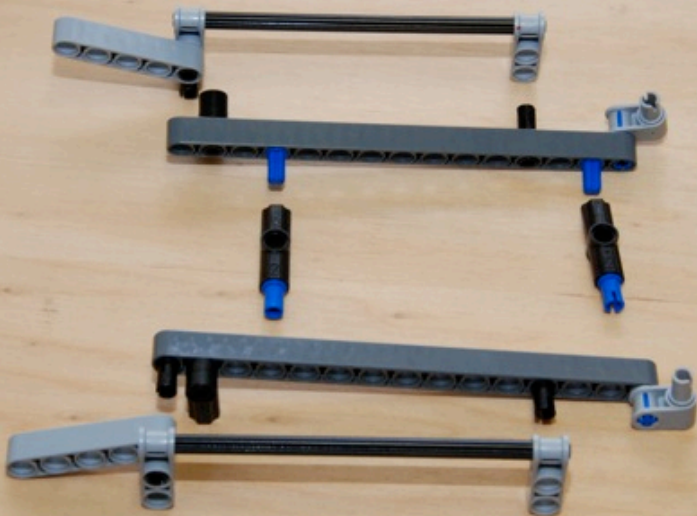
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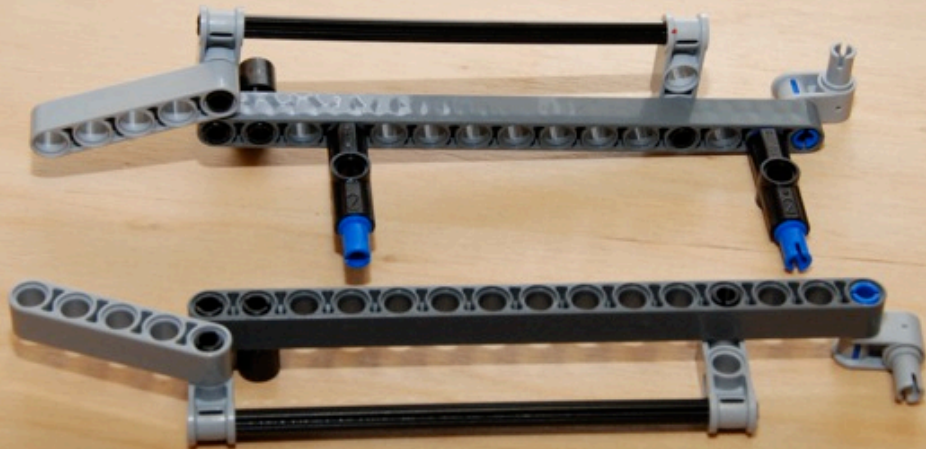
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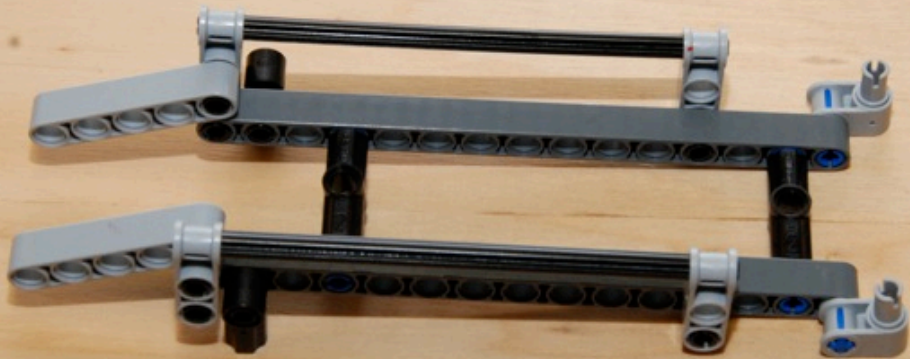
x6

x2

x8

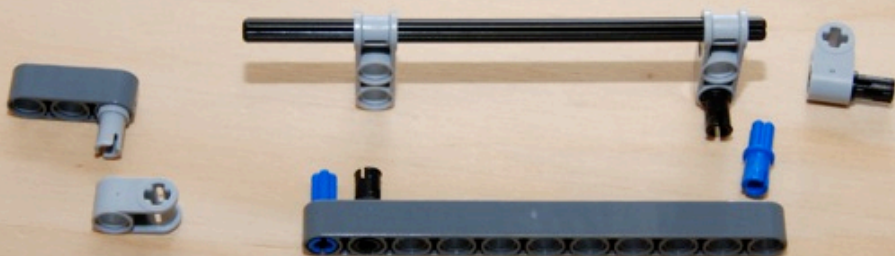






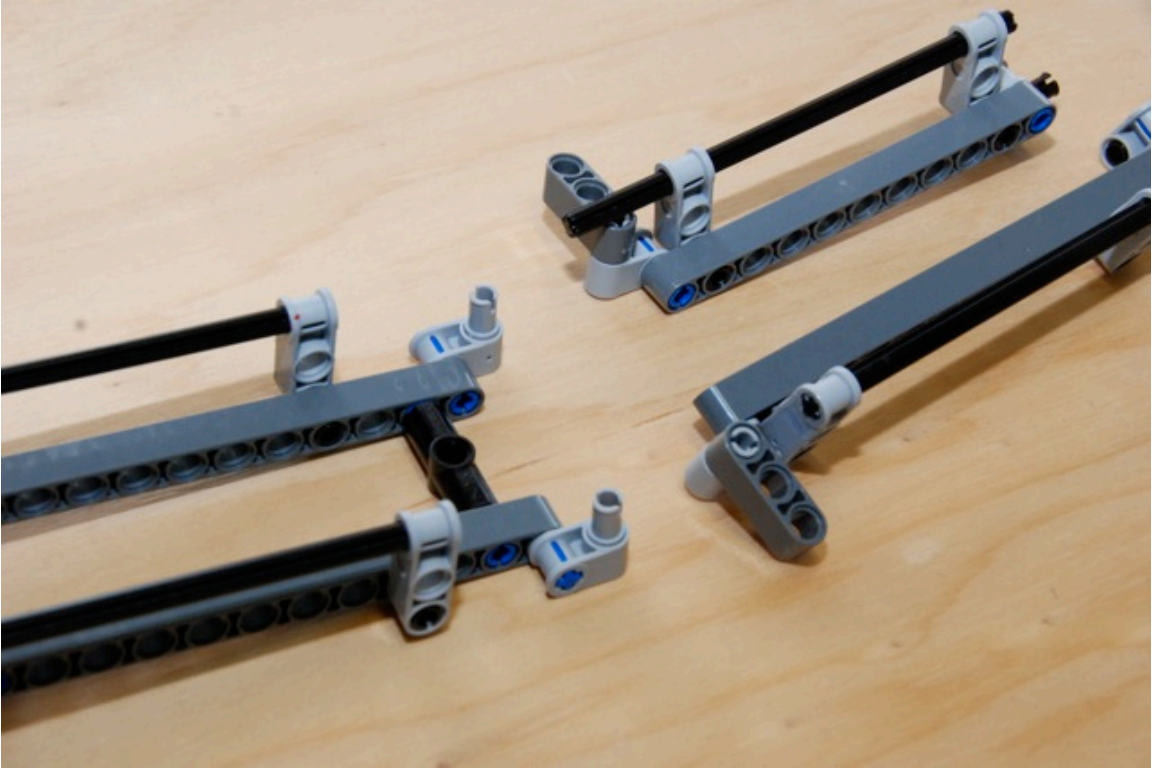


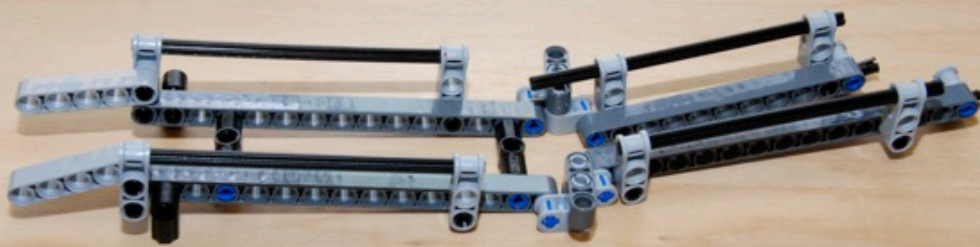












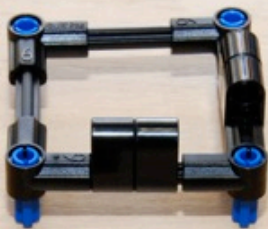


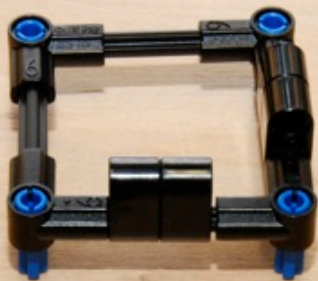
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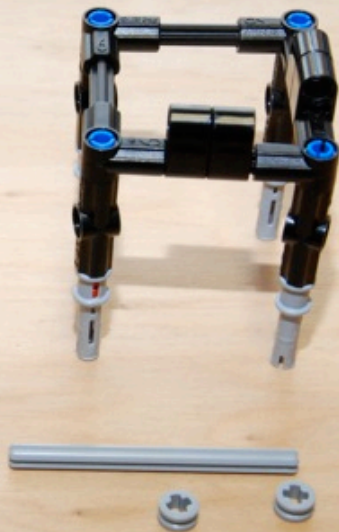
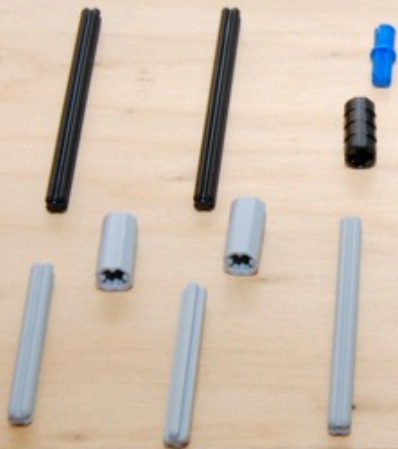


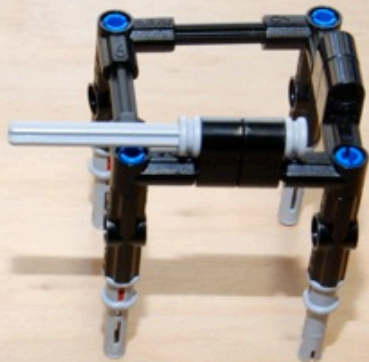


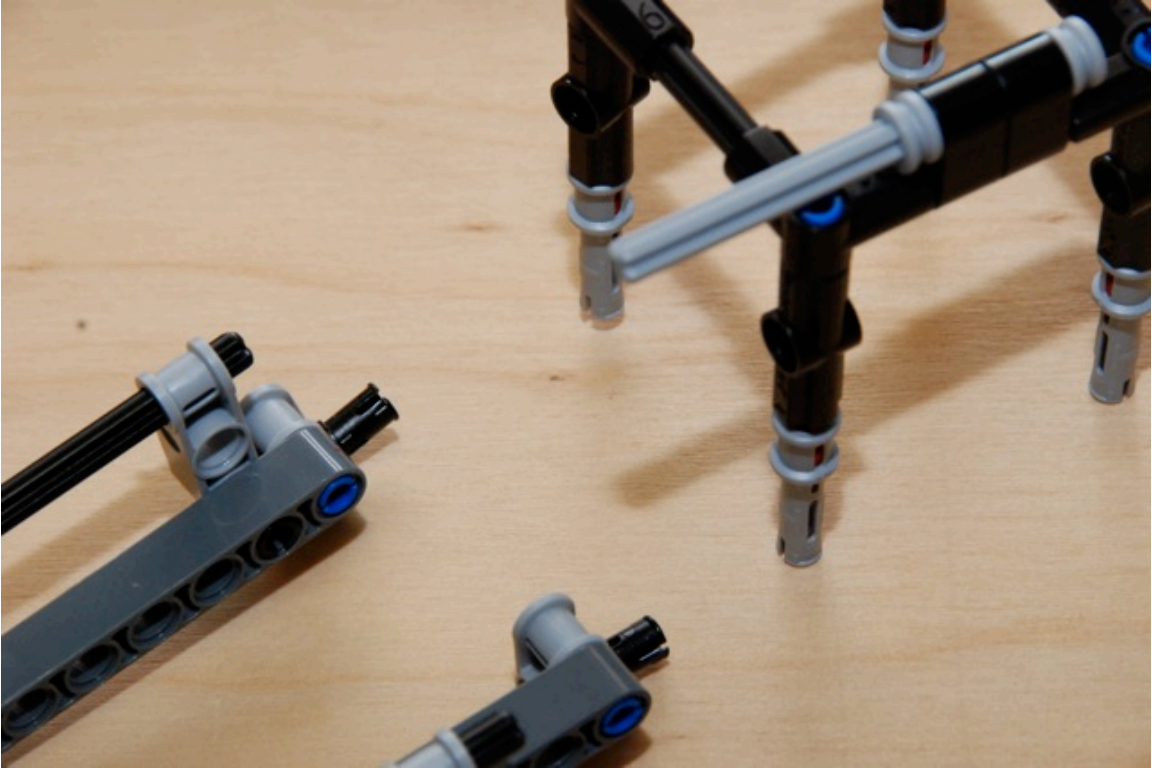


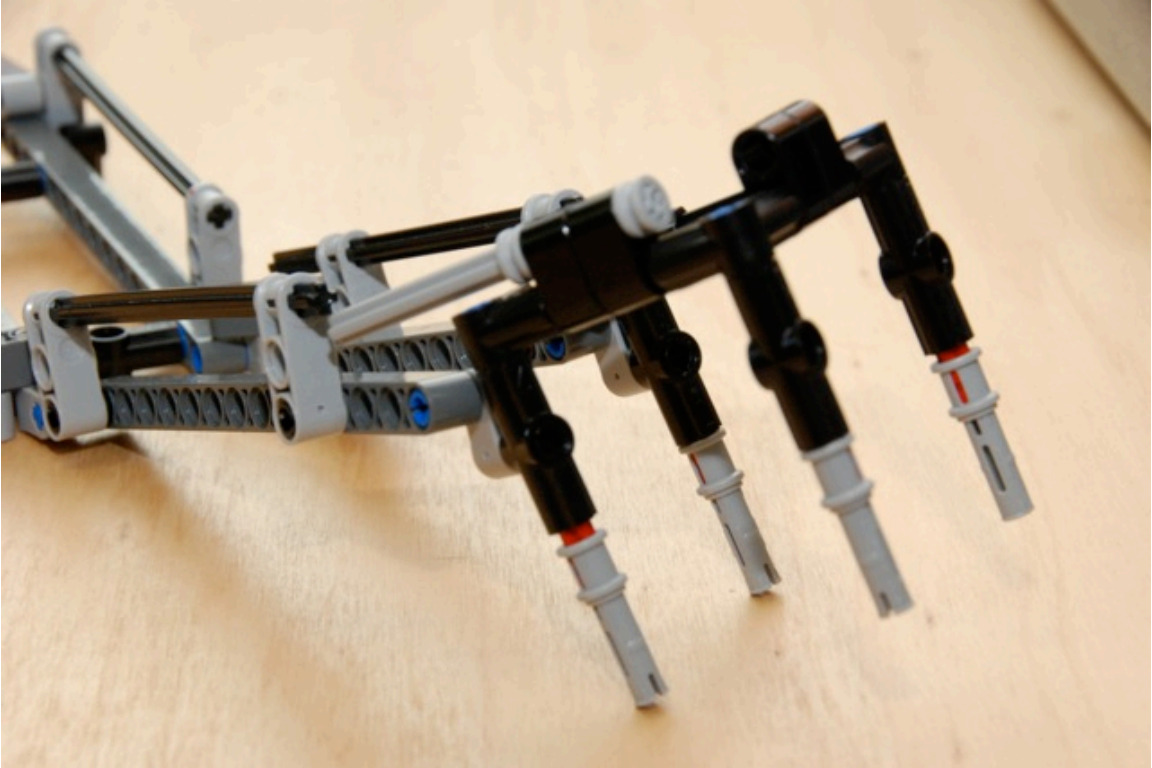


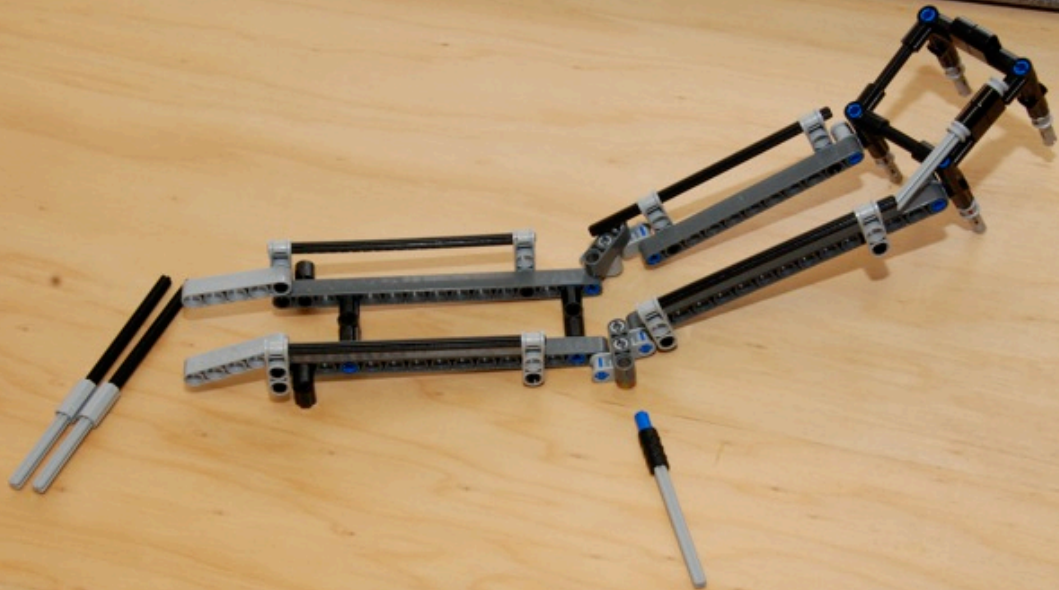


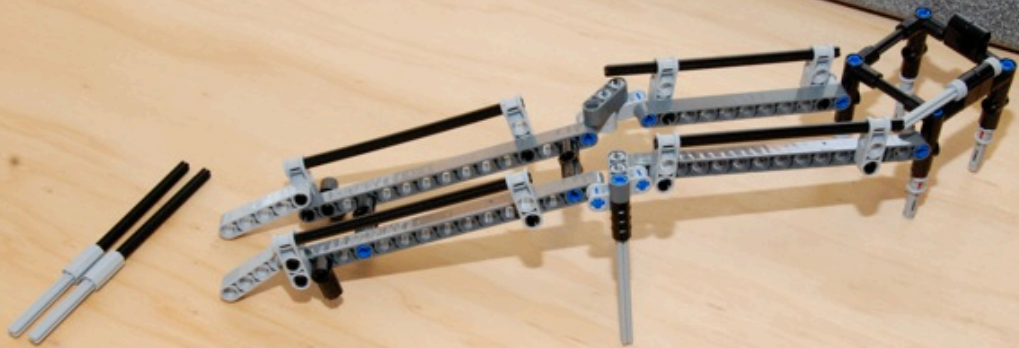


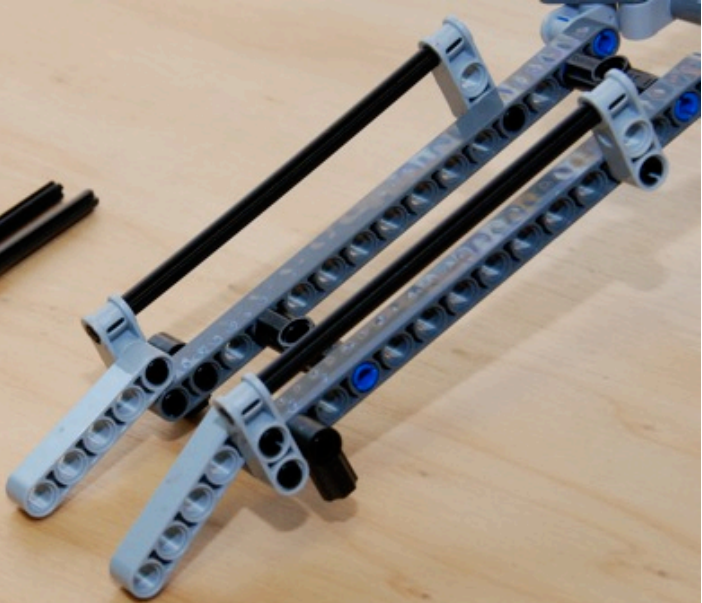


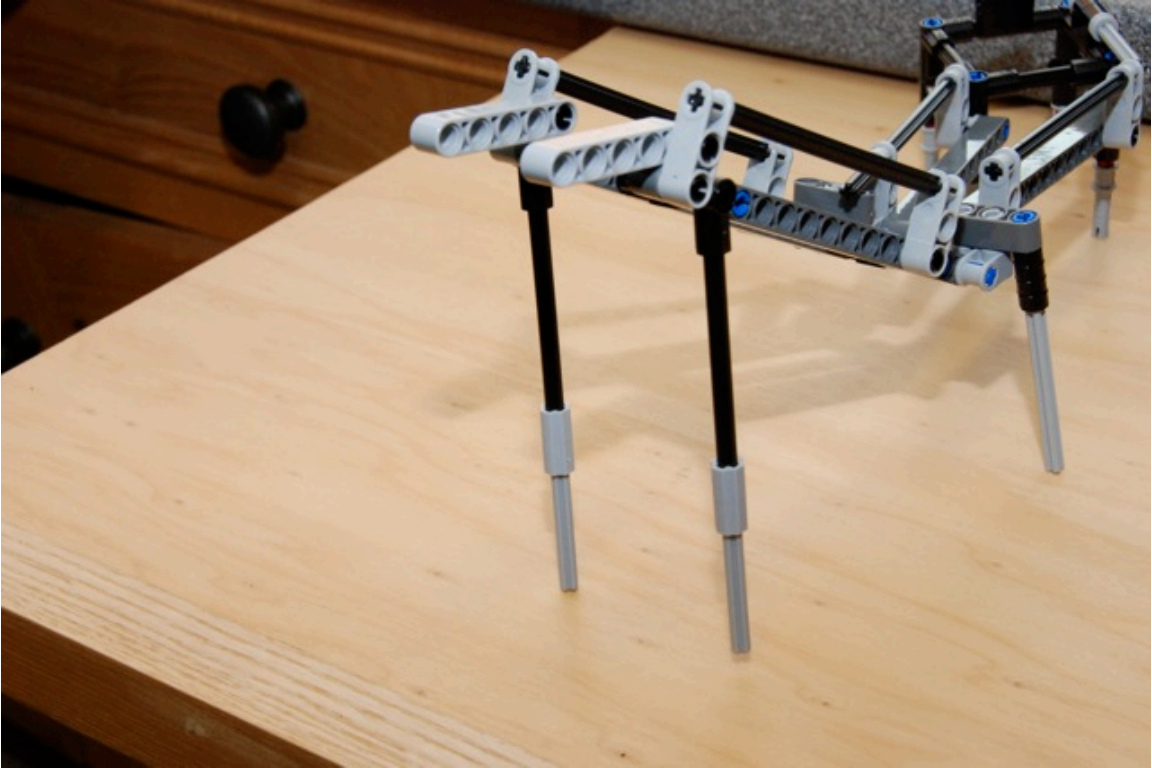














These parts all times two



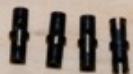
11



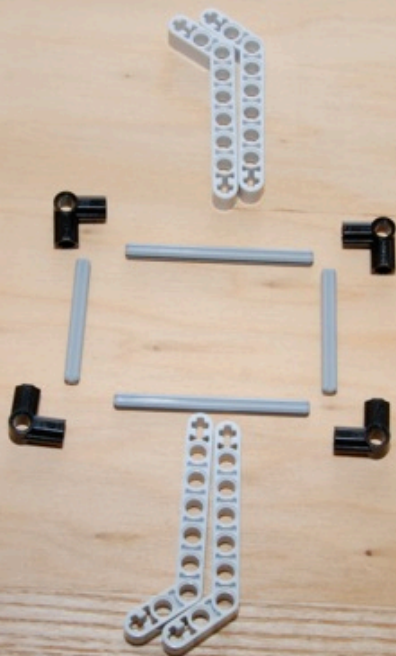
7



5



Build times two



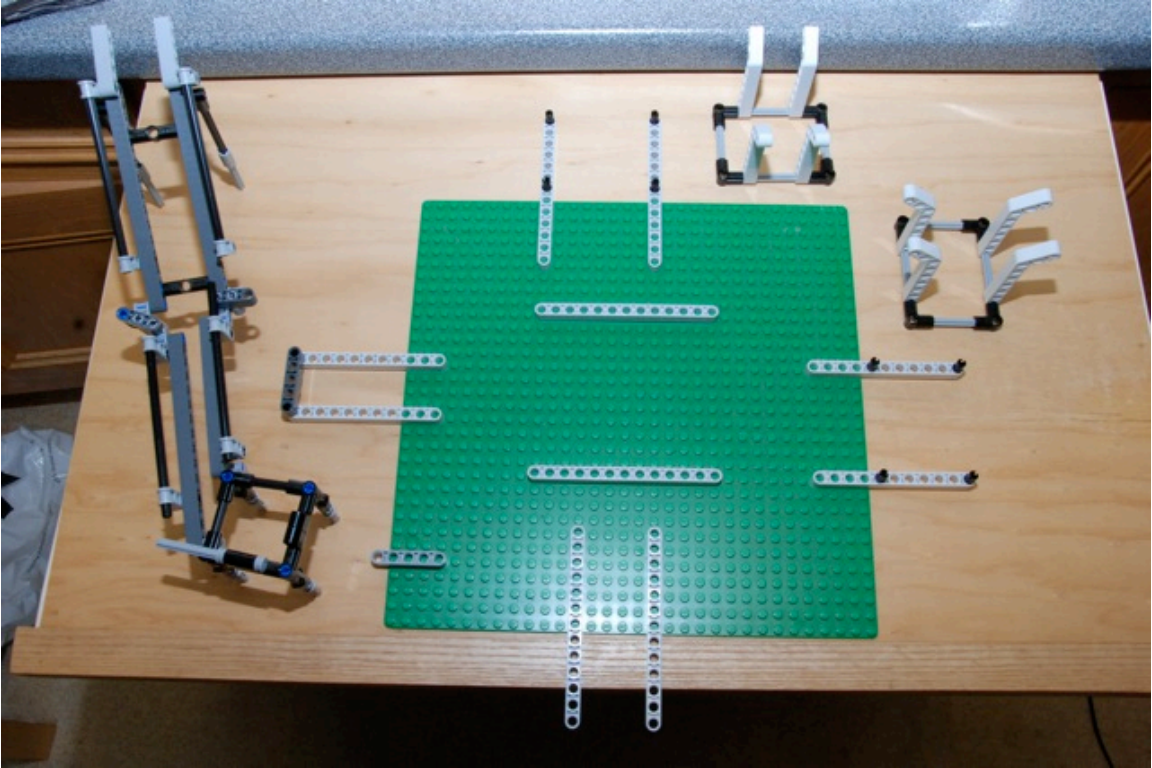
Build times two

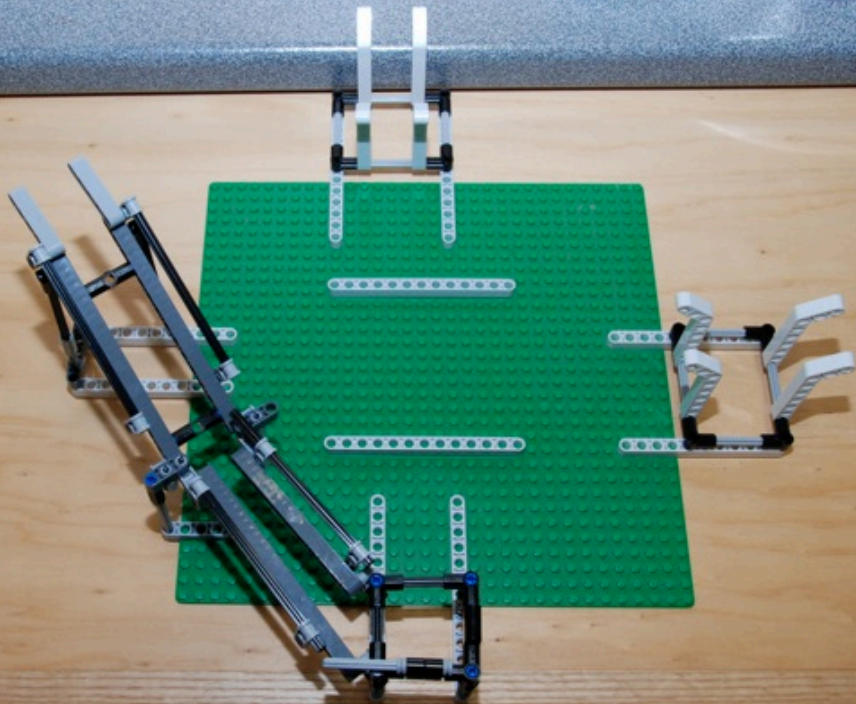


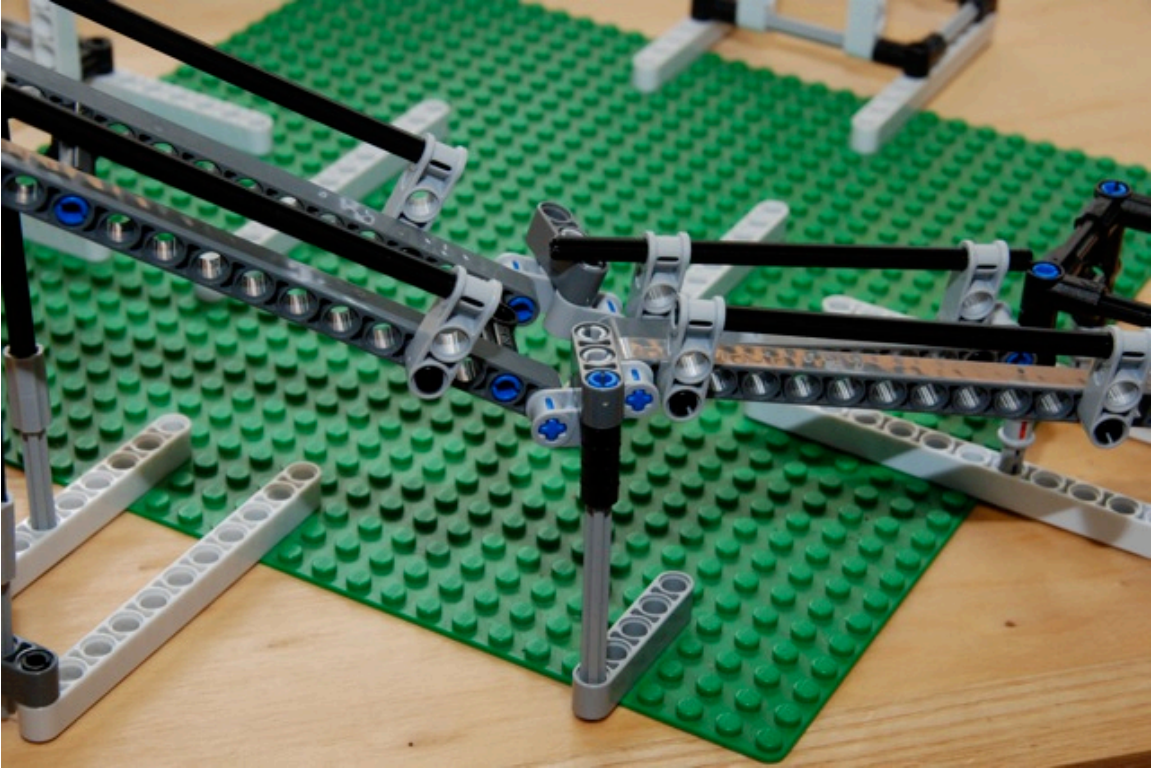
Build times two

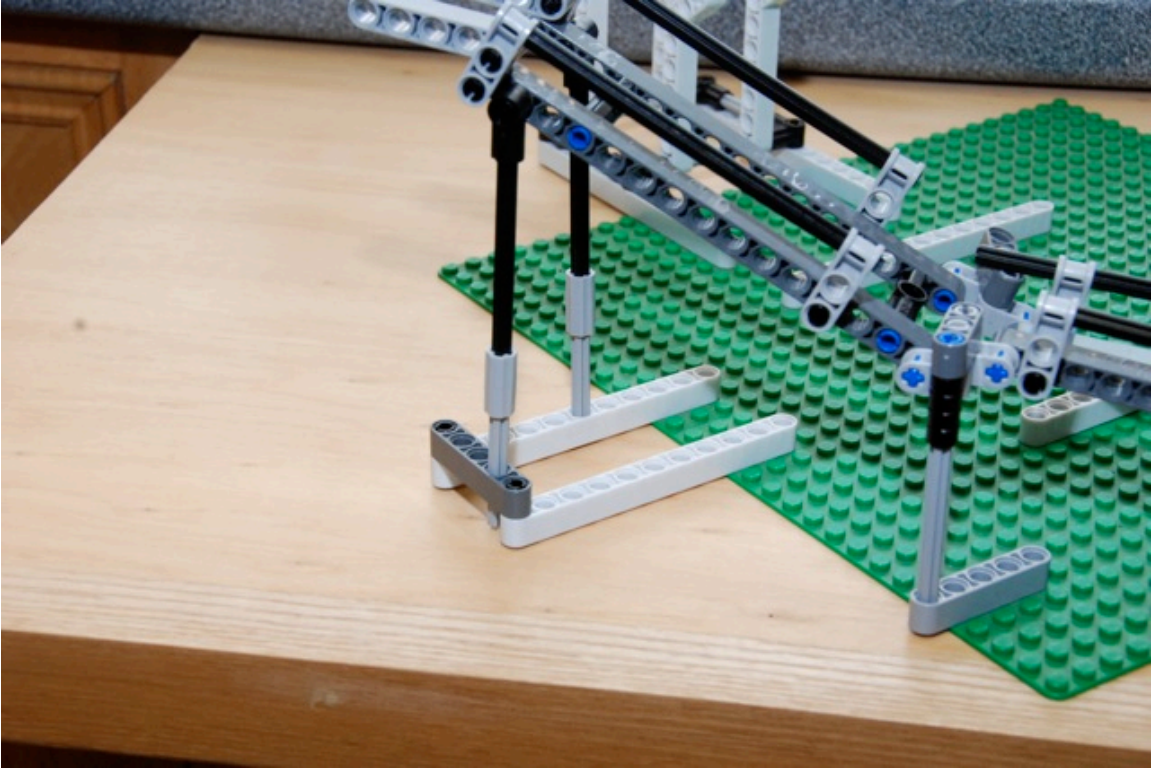










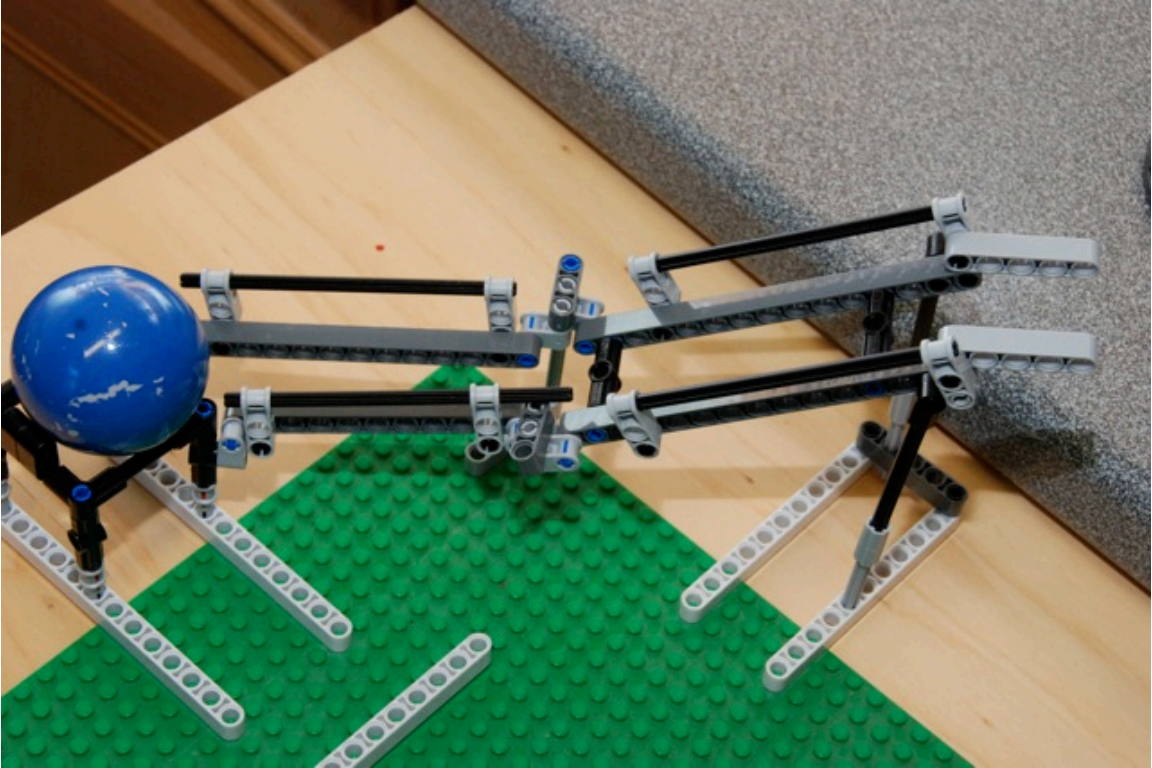


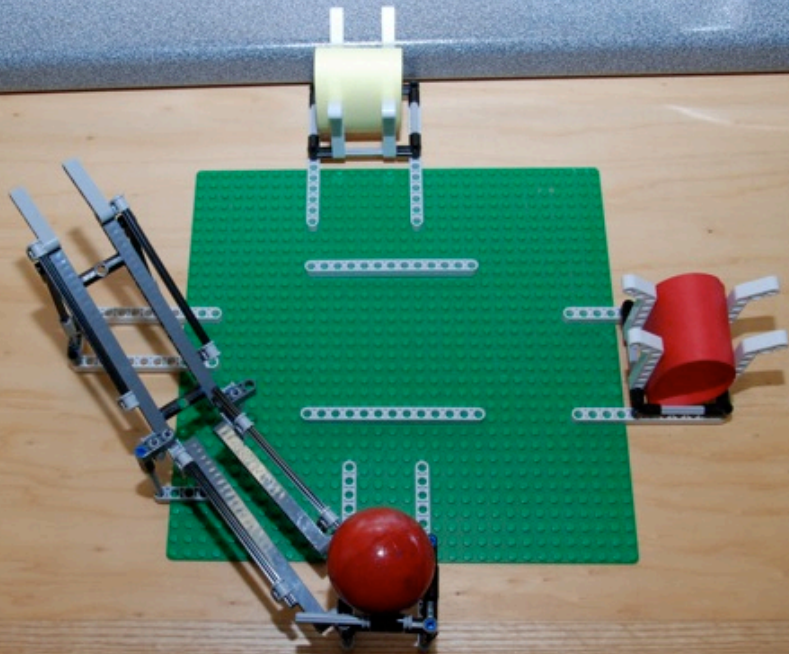


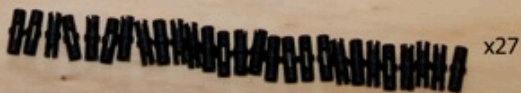
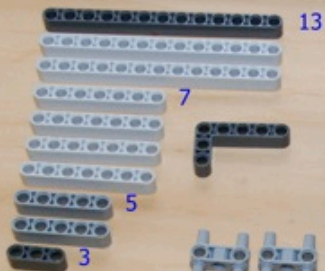
Either ball can be used

This 11 beam for setting height of card tubes

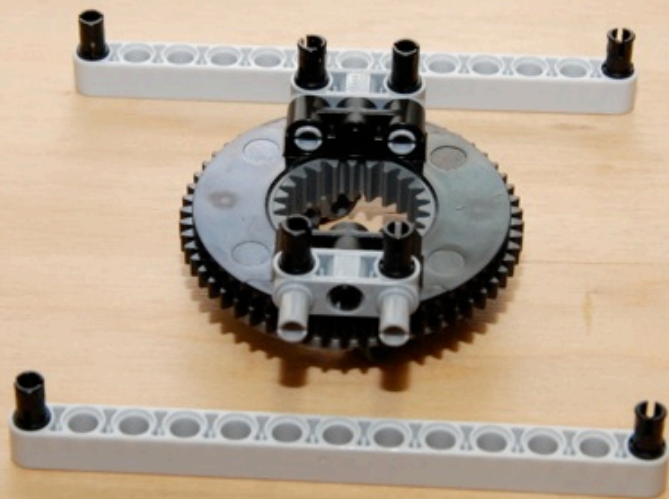


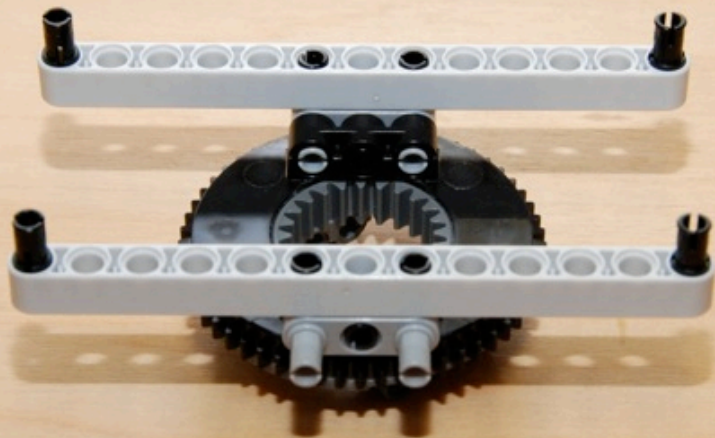


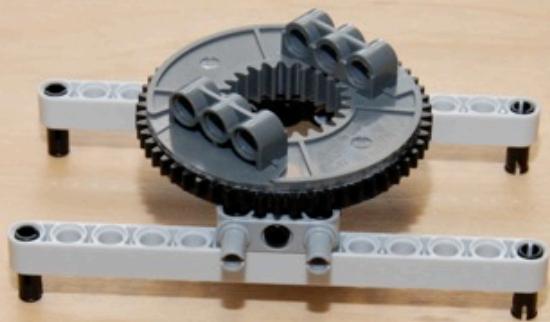


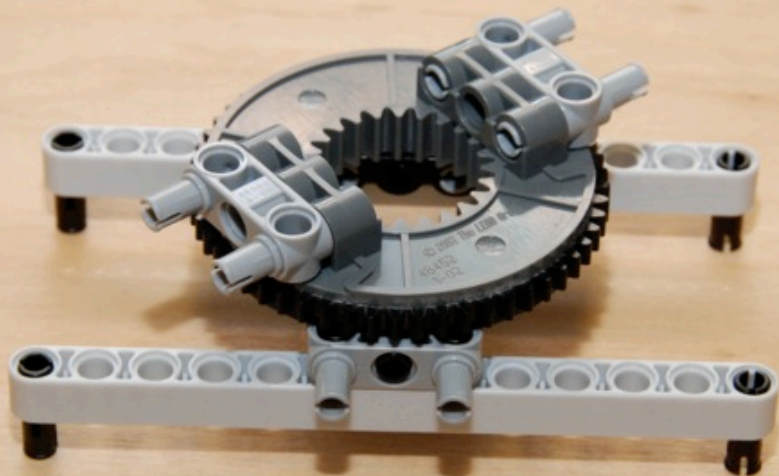


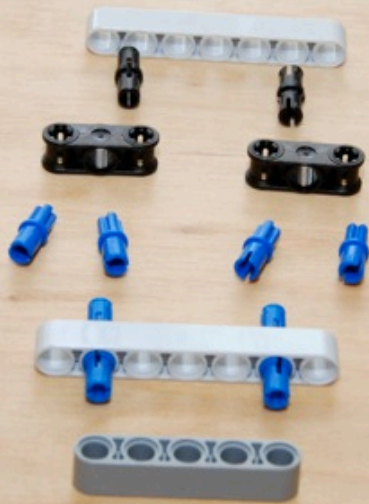




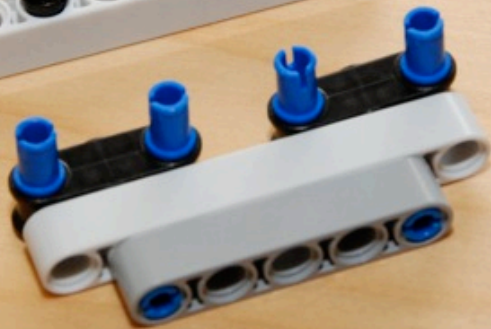


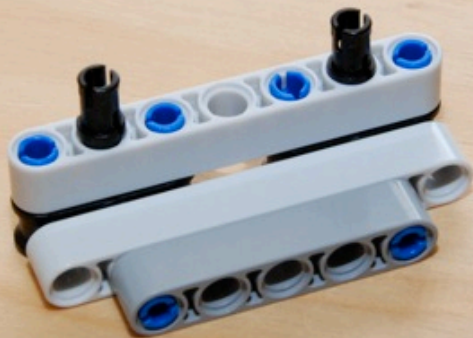


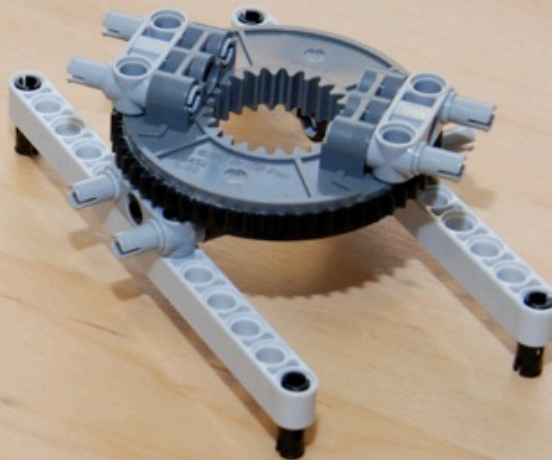


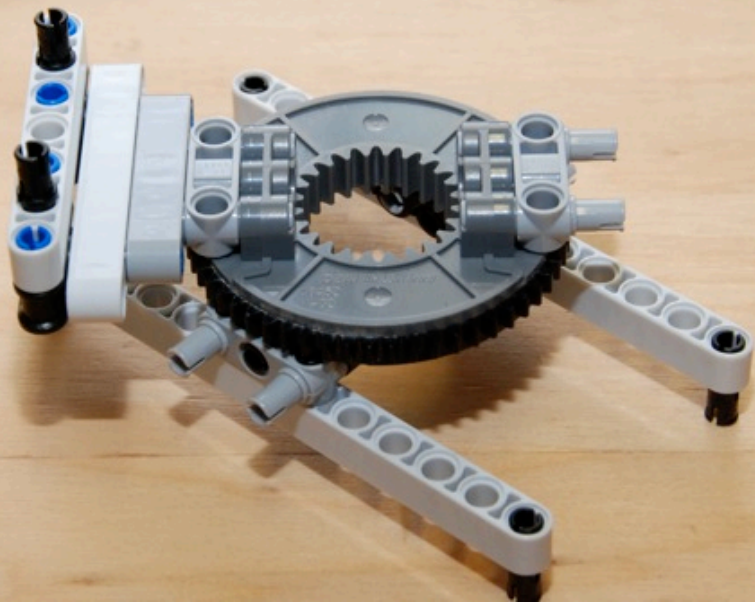




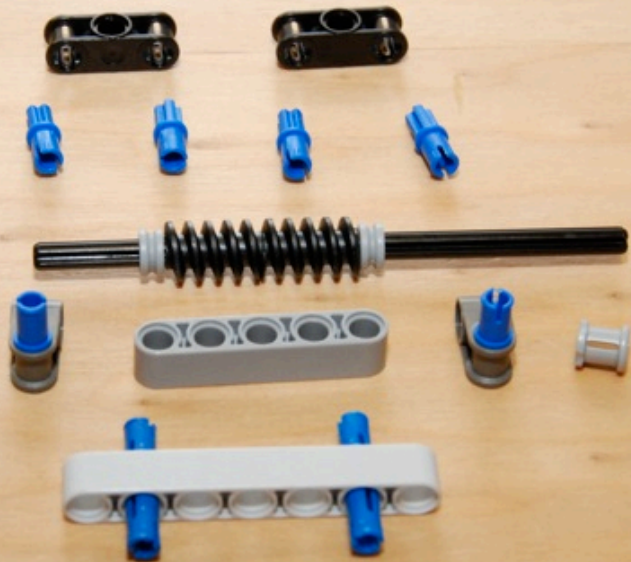


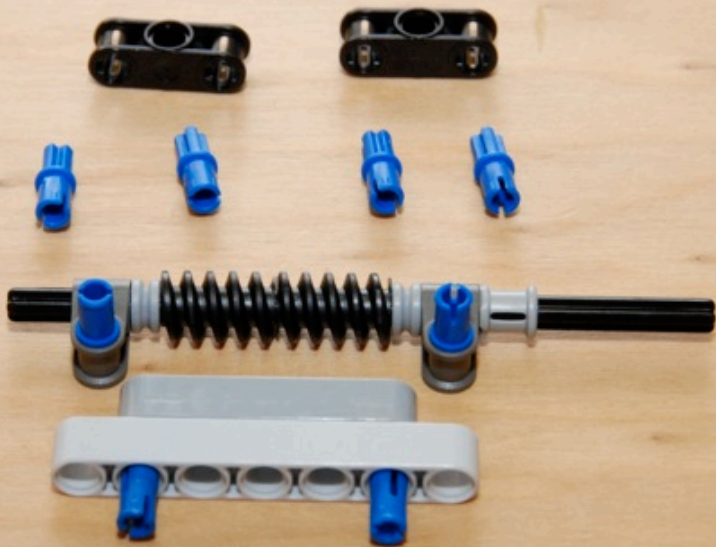






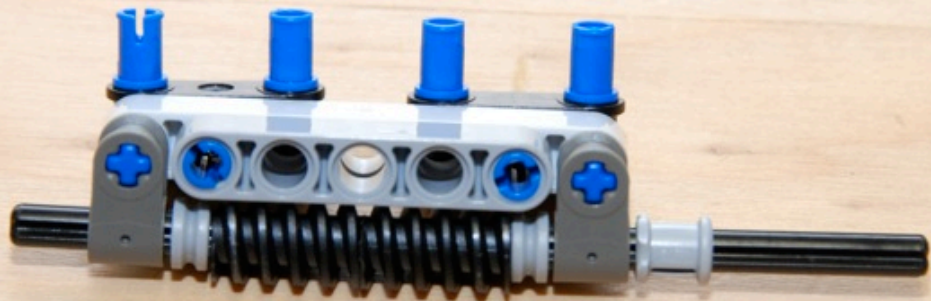


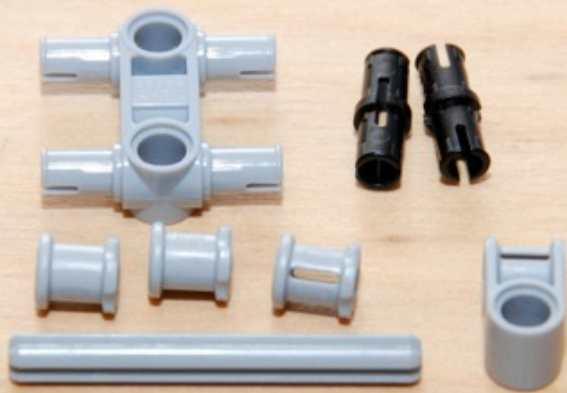


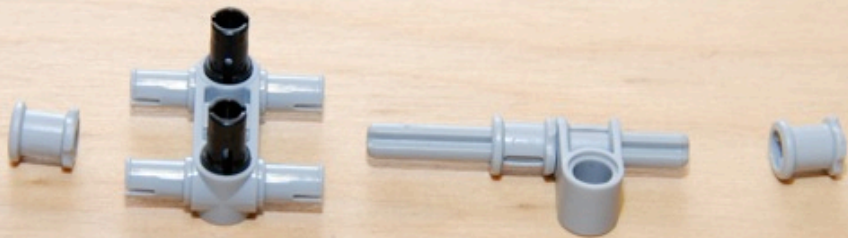


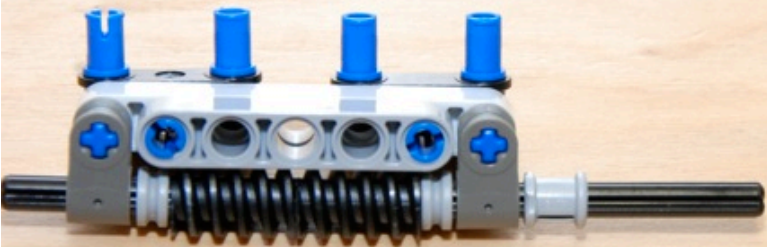


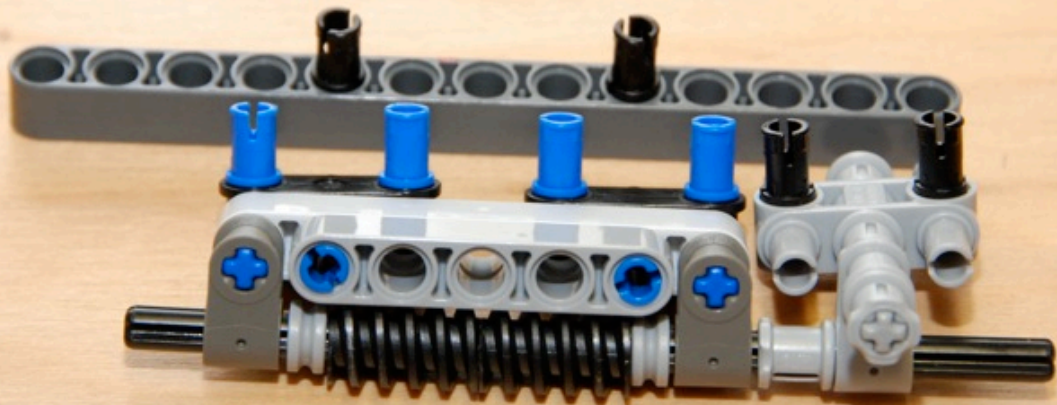


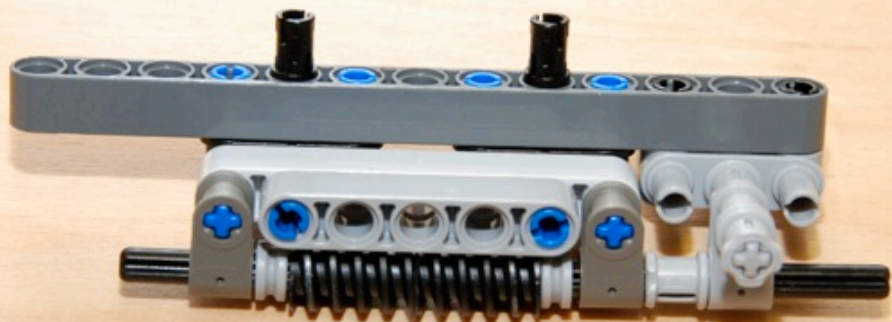


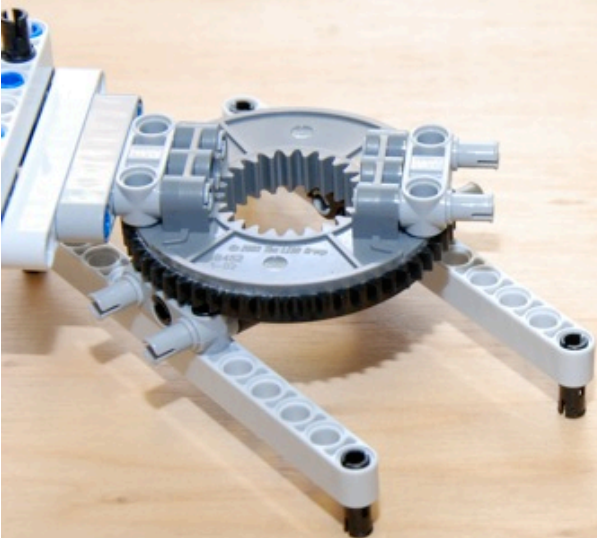


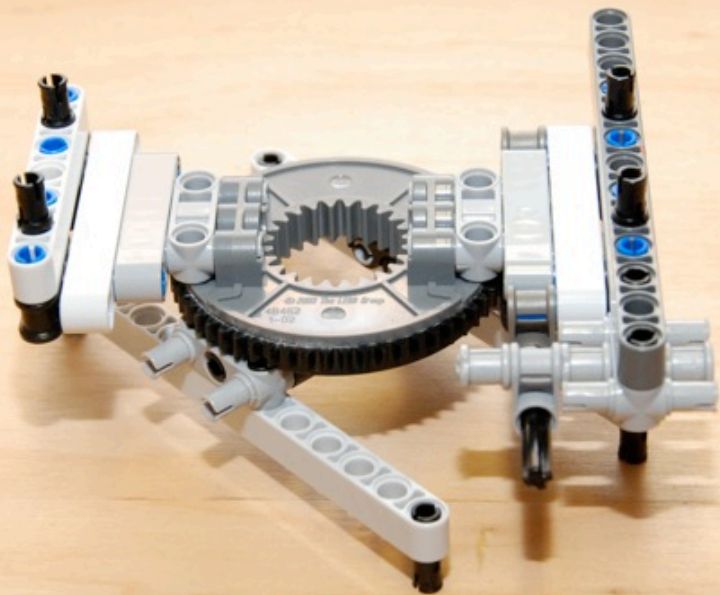
















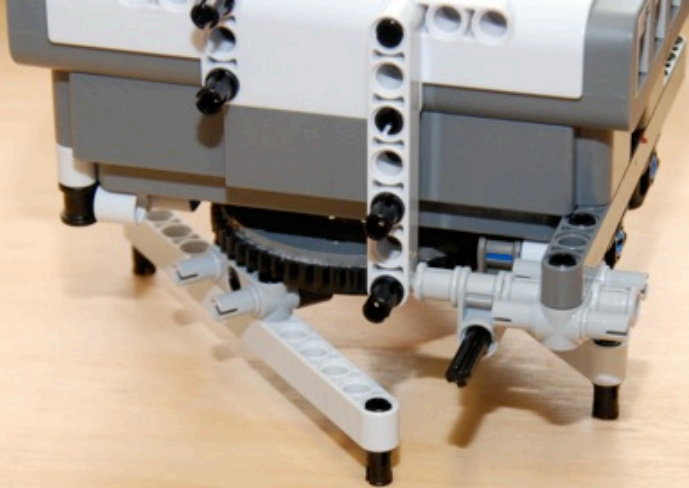




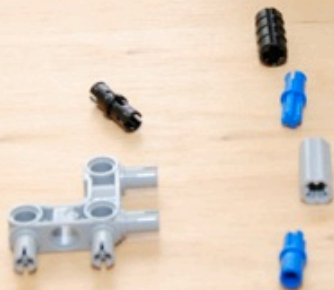
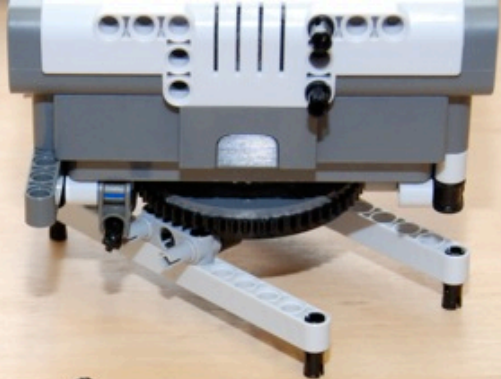


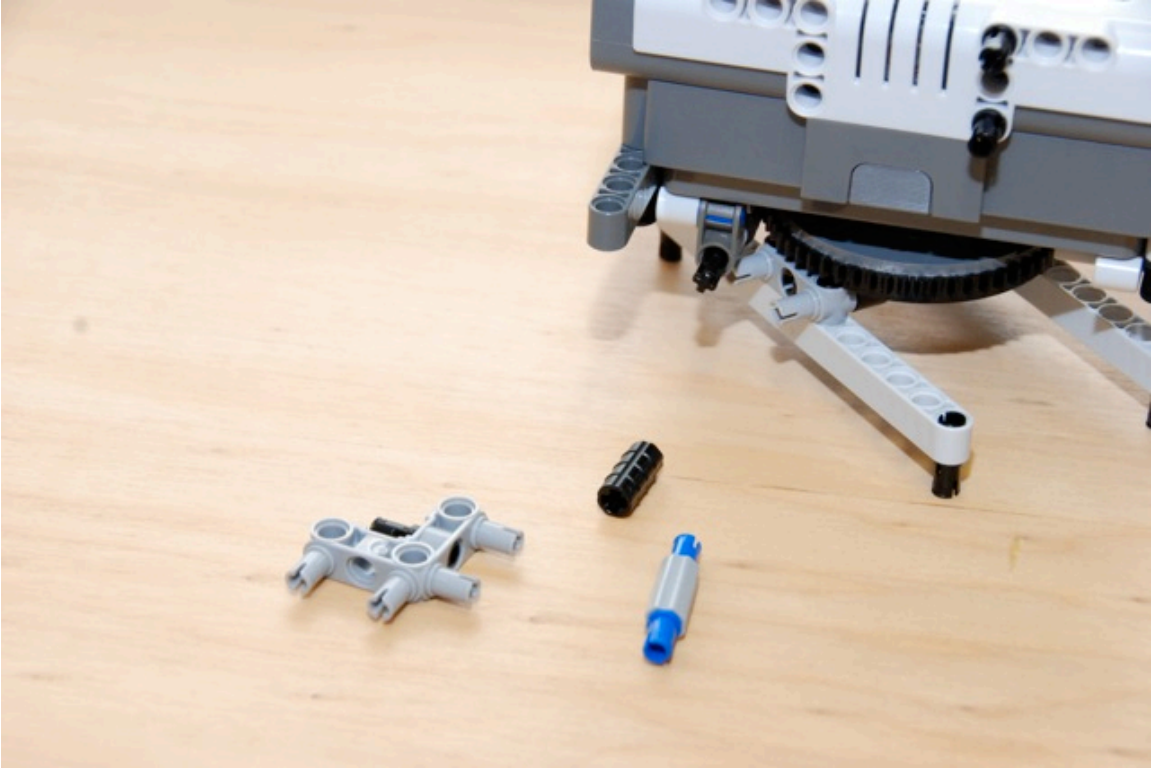










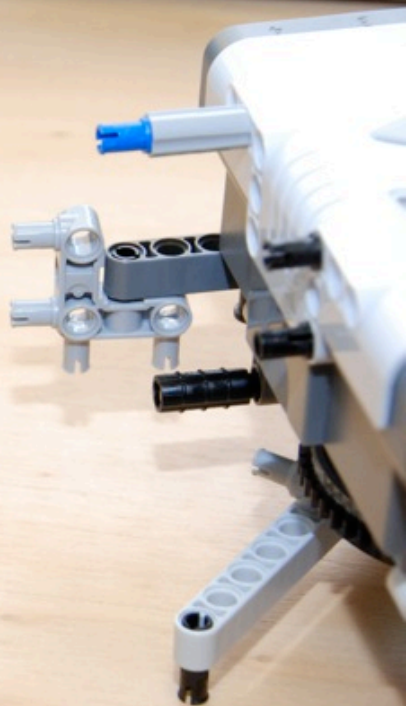










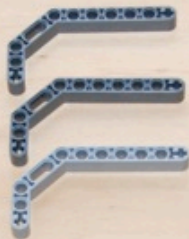








11



7



5



3



10

5



x12



x18

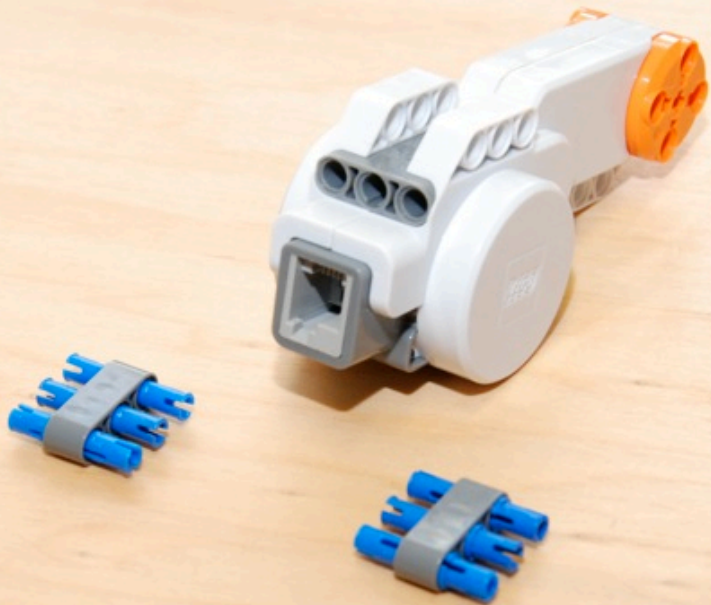


x11



x11

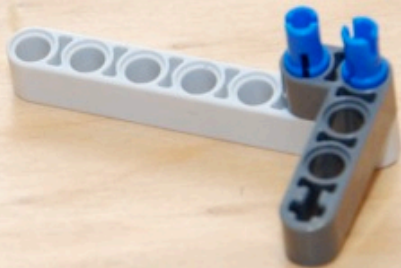






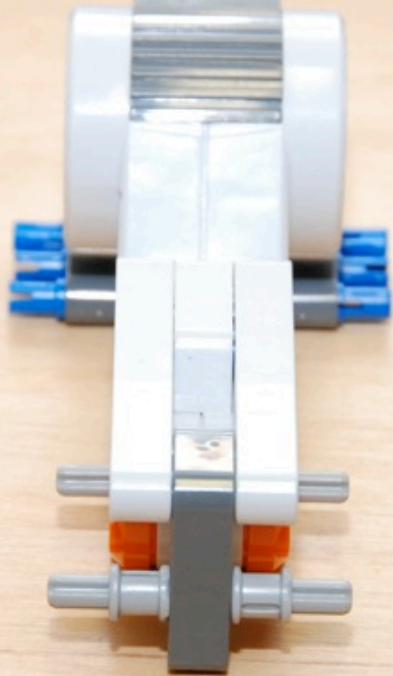


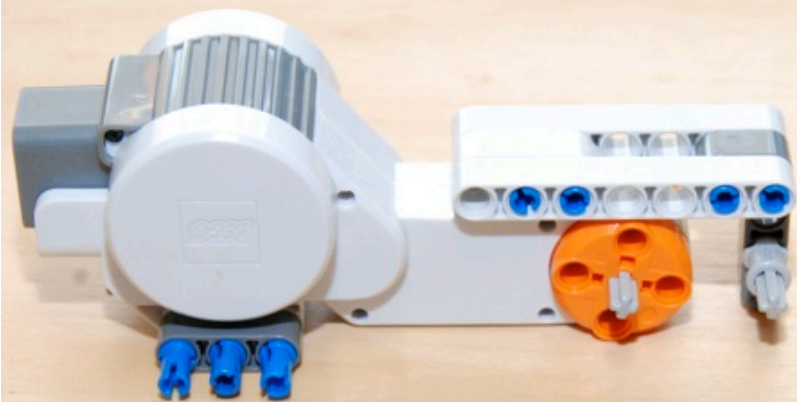


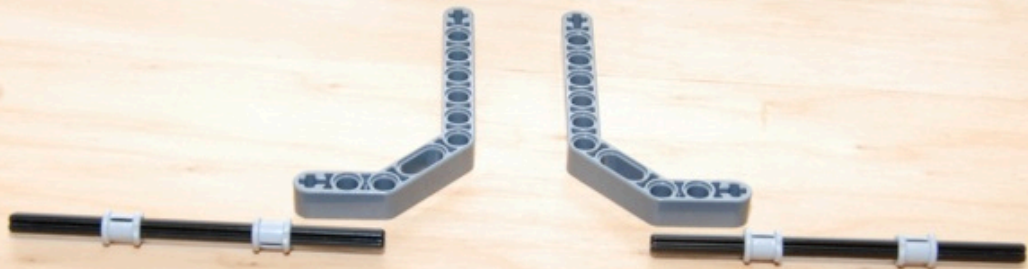


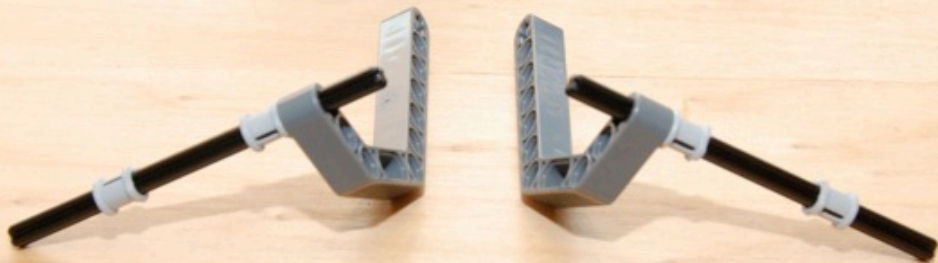


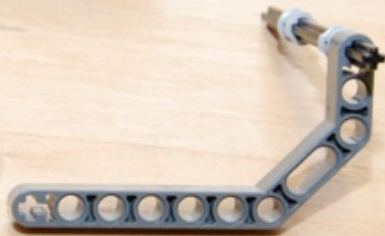
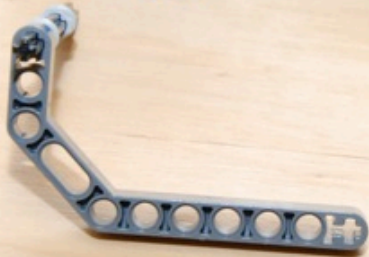
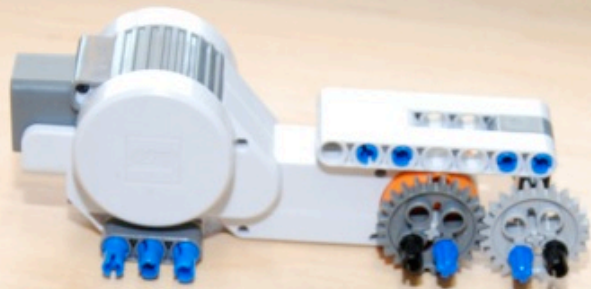


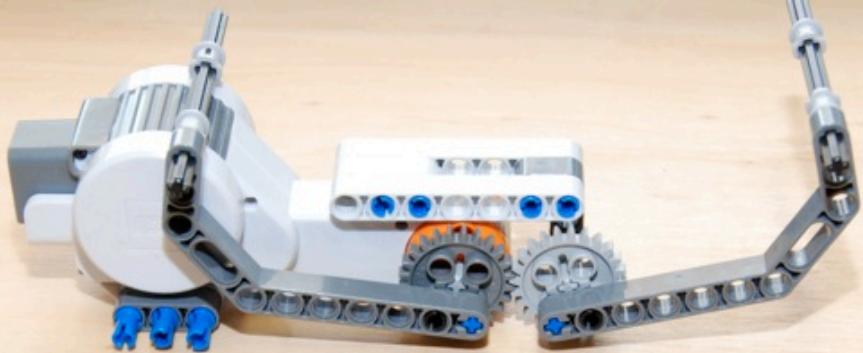


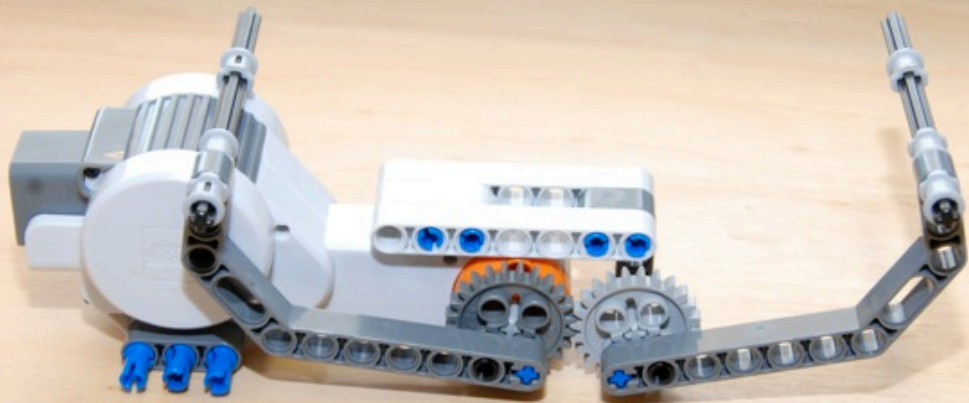




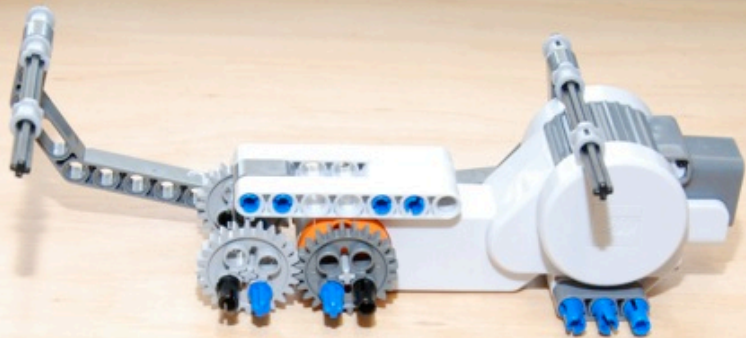


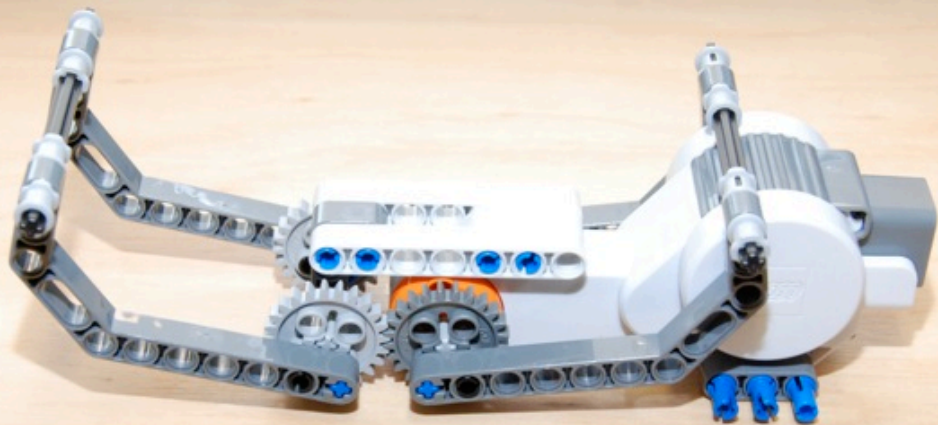




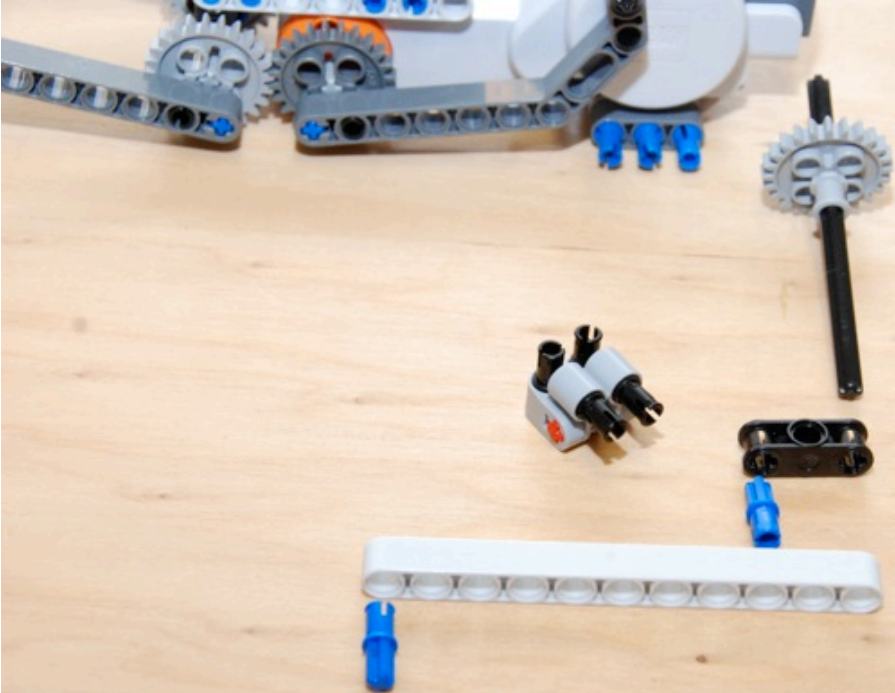


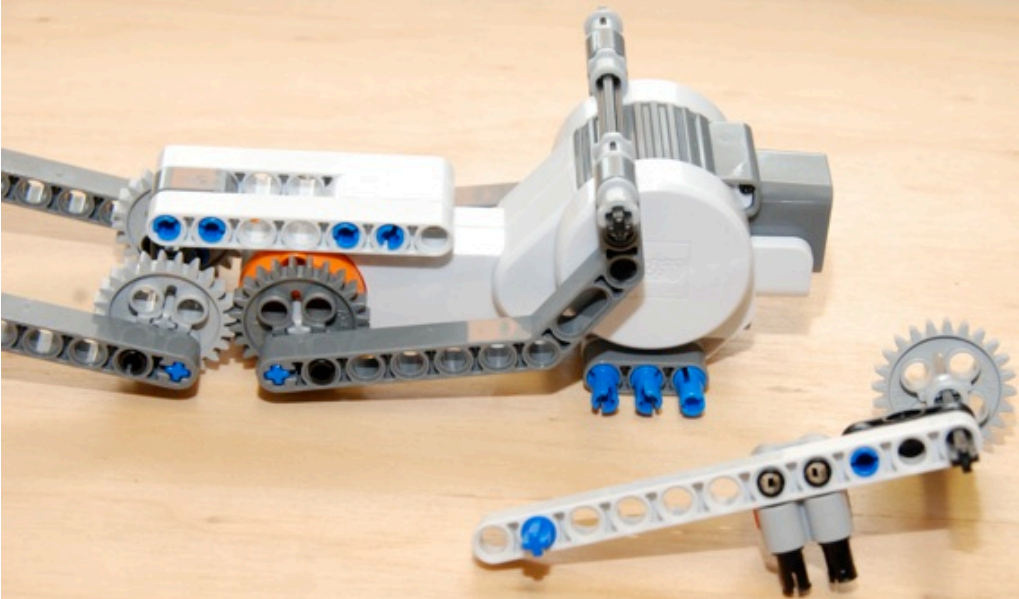


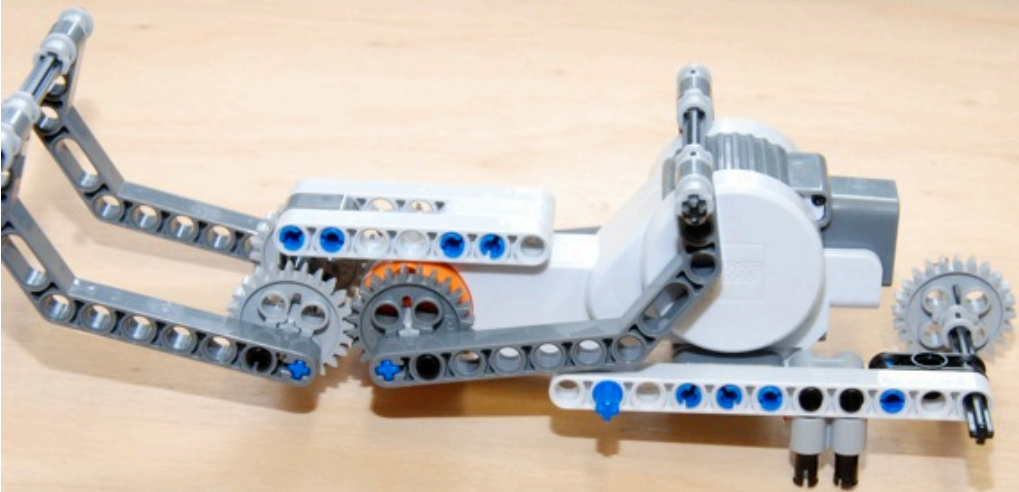


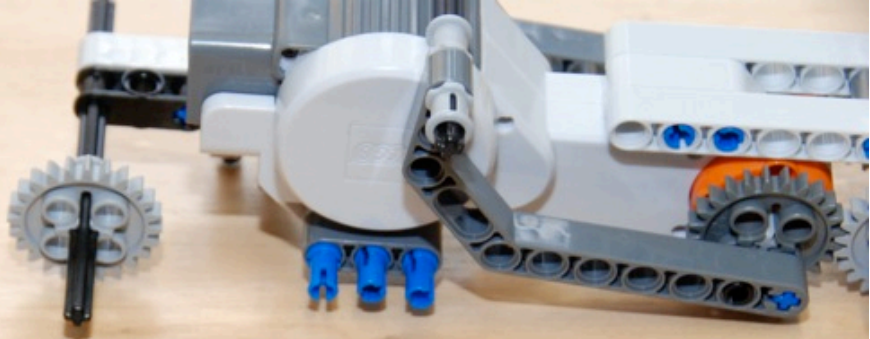




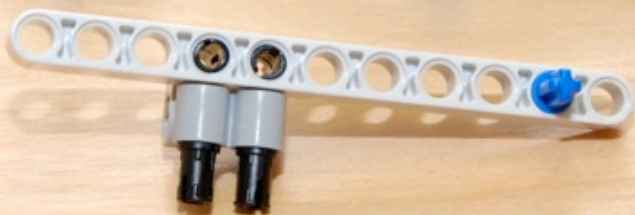
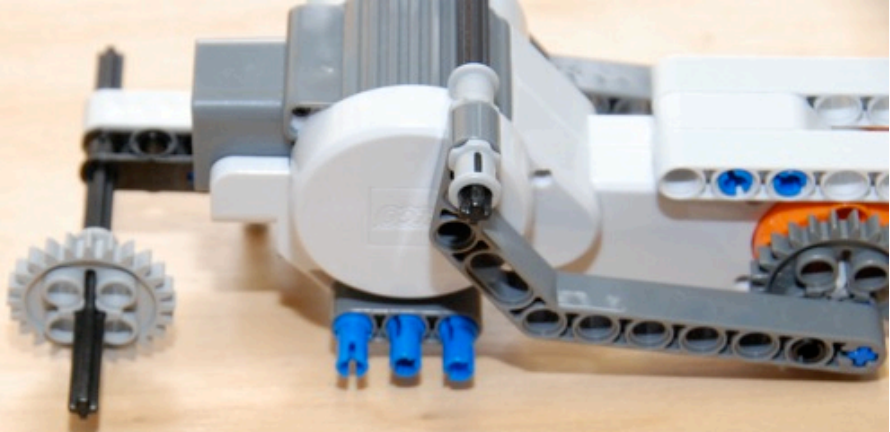






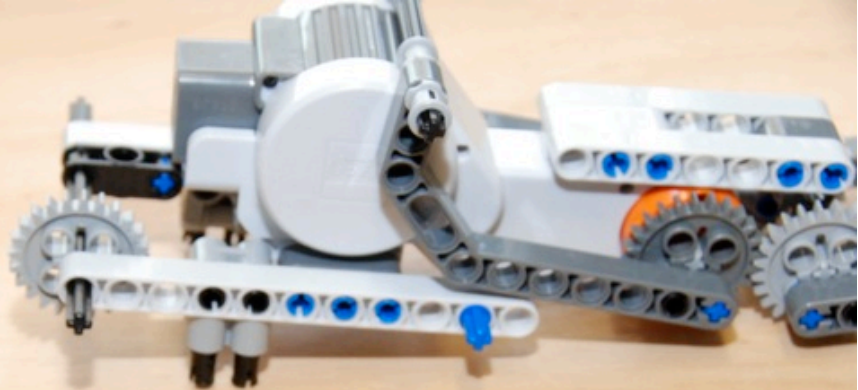


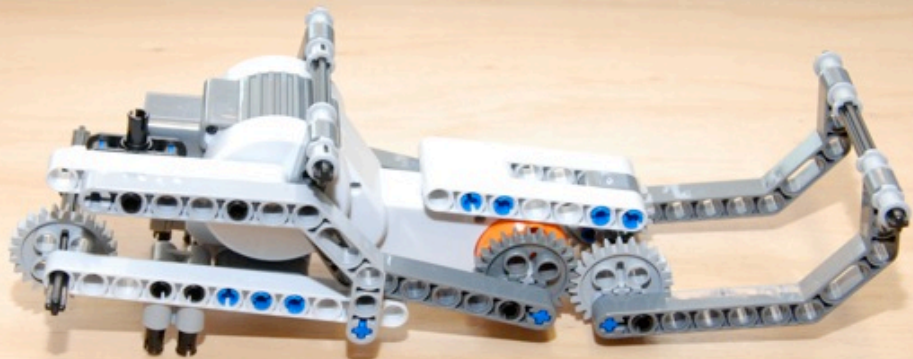


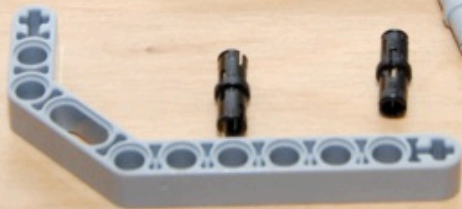


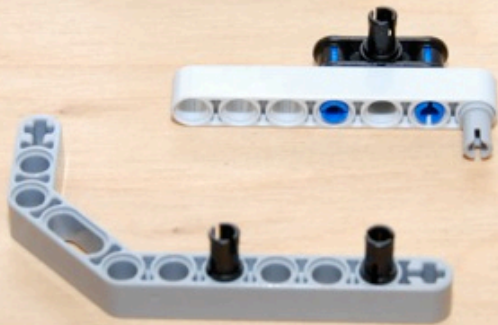


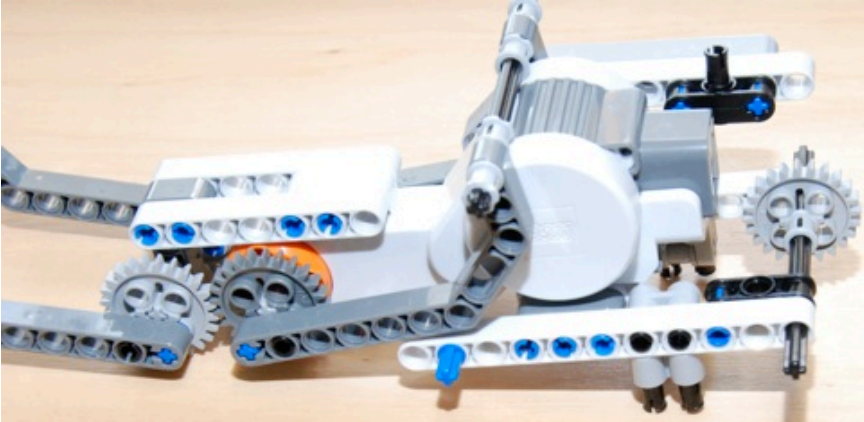


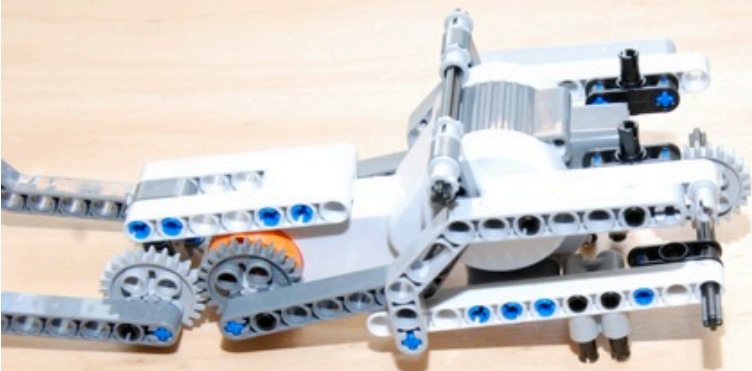


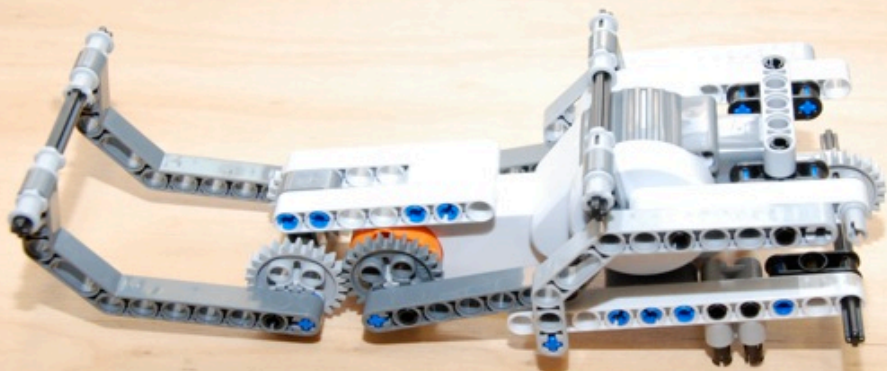


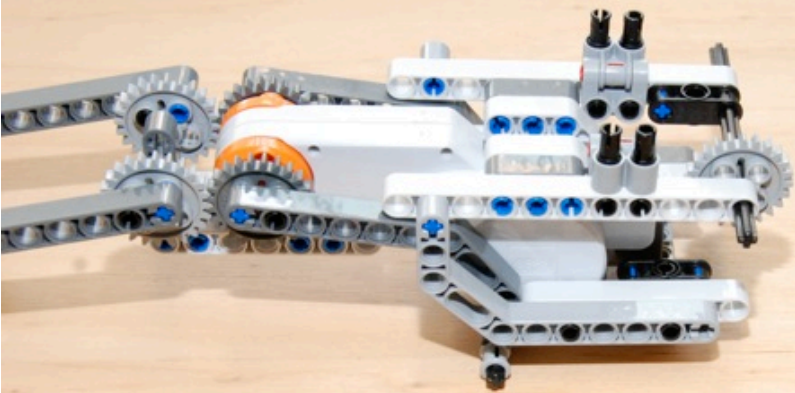


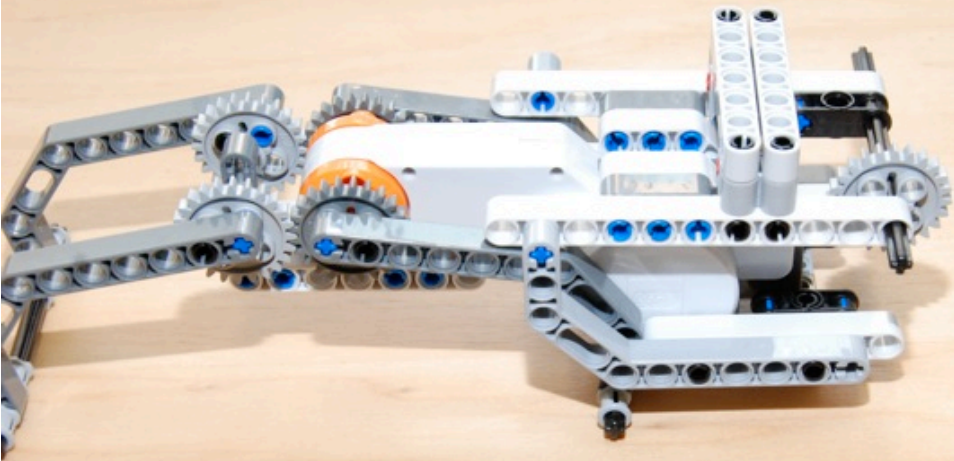


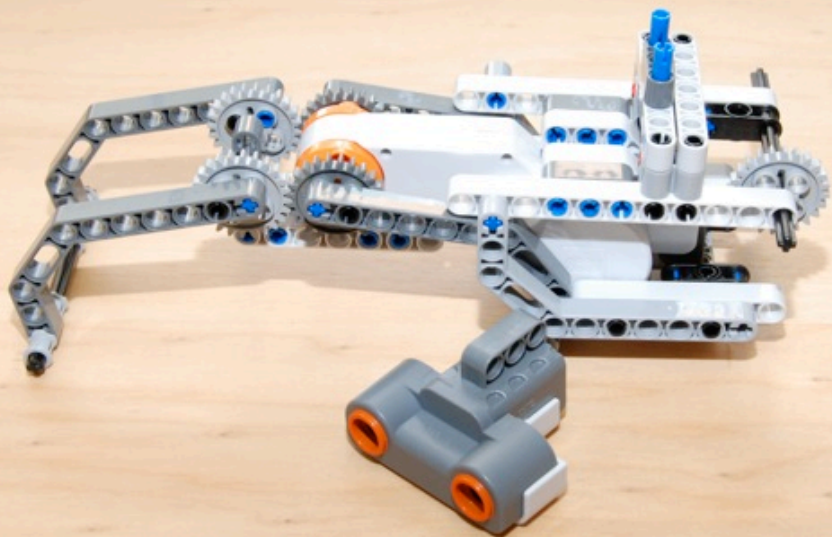


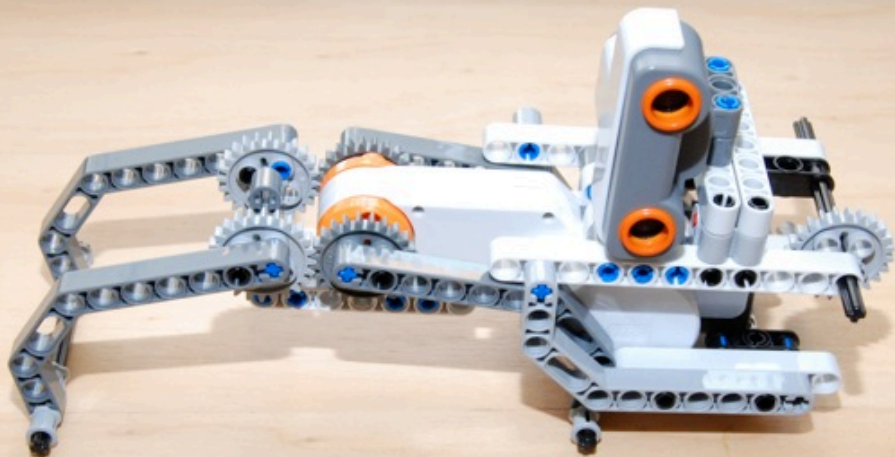


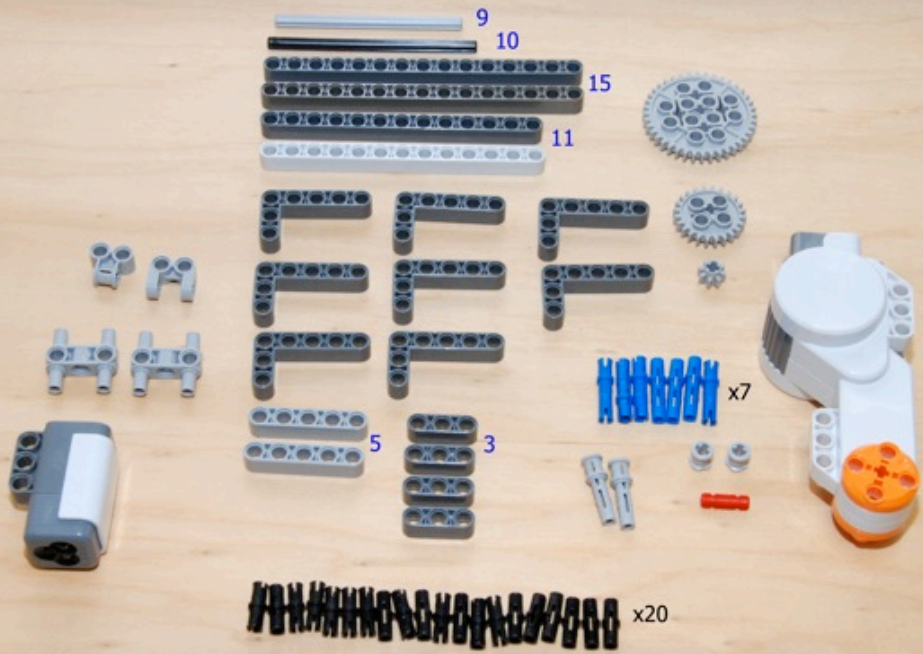




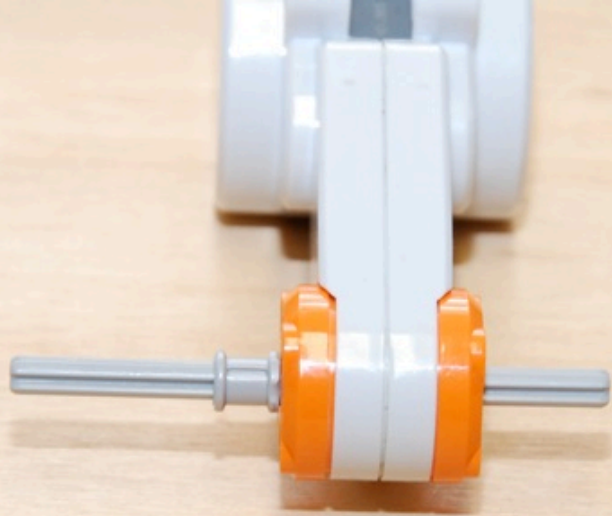










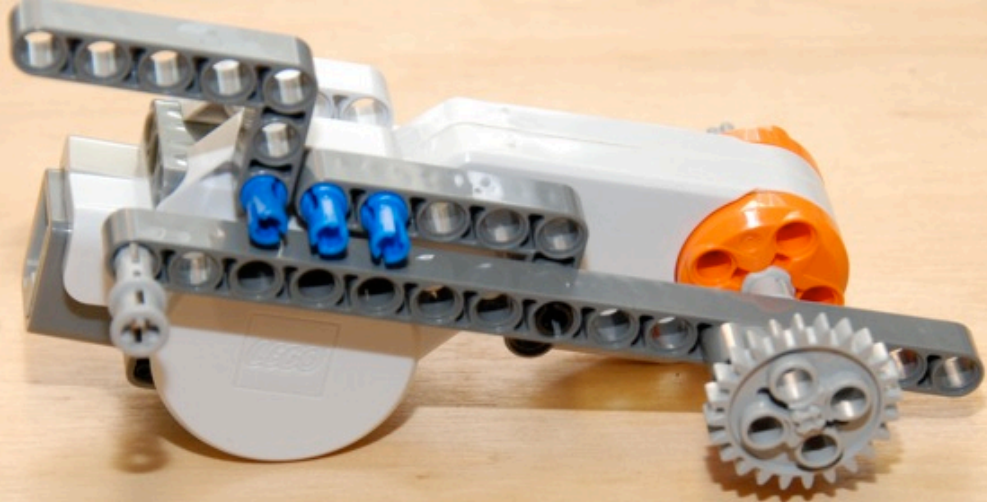


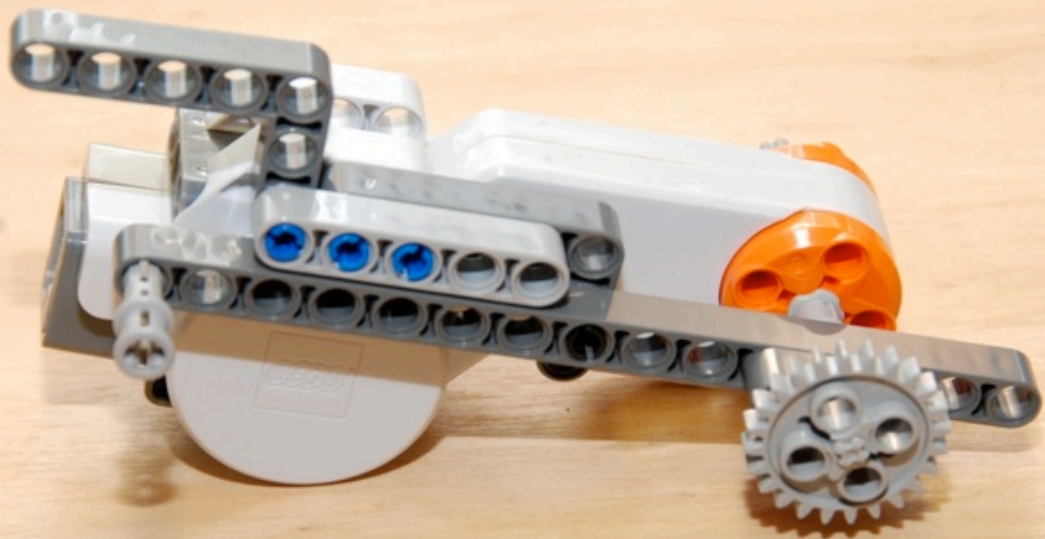


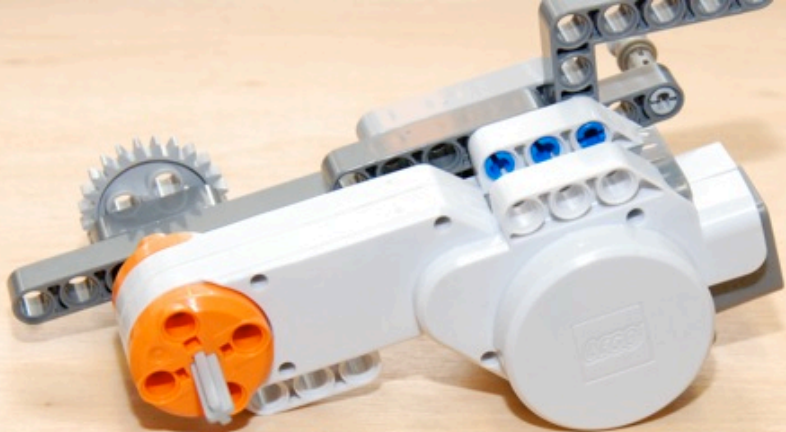


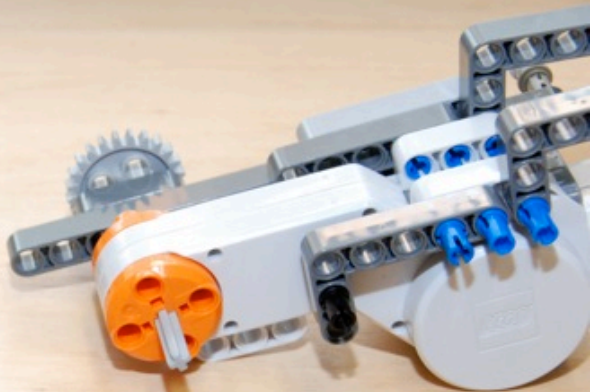


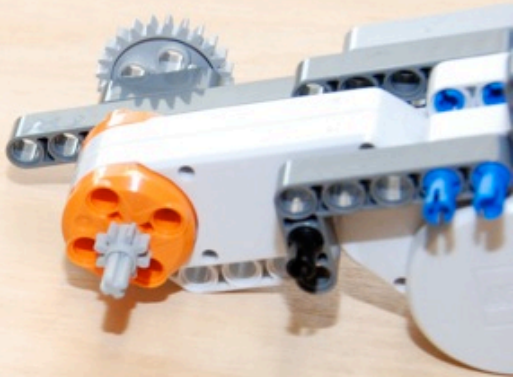


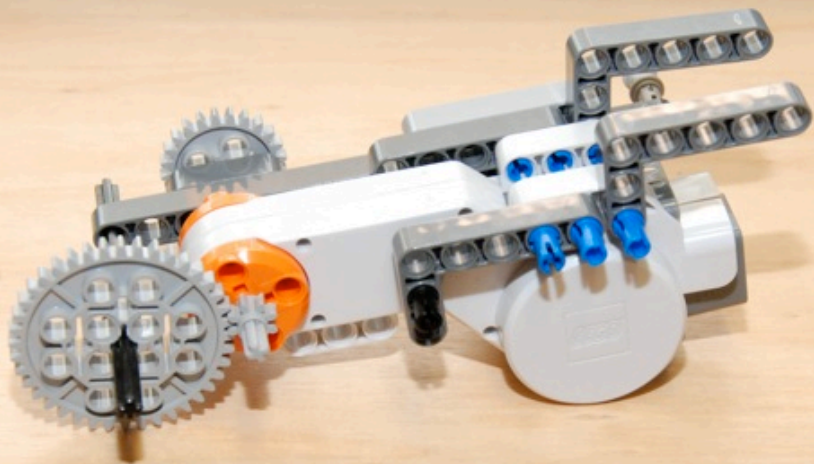


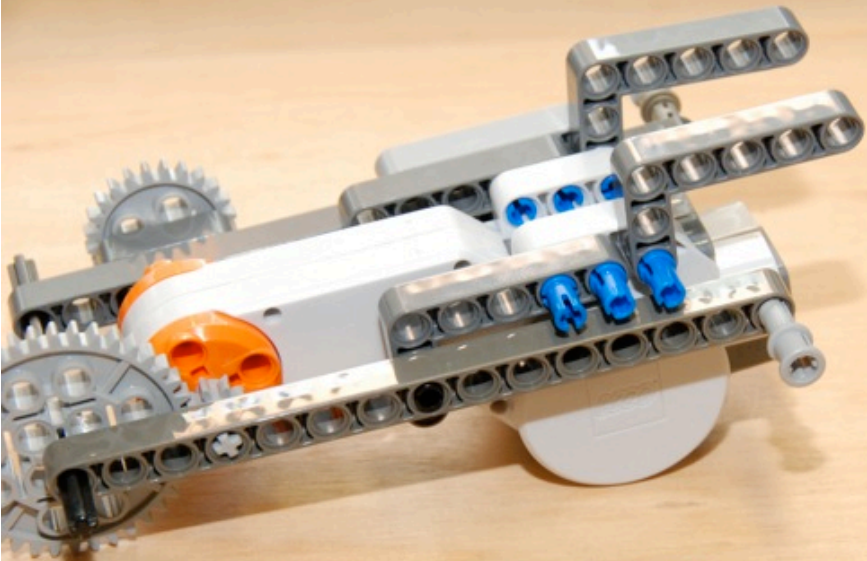


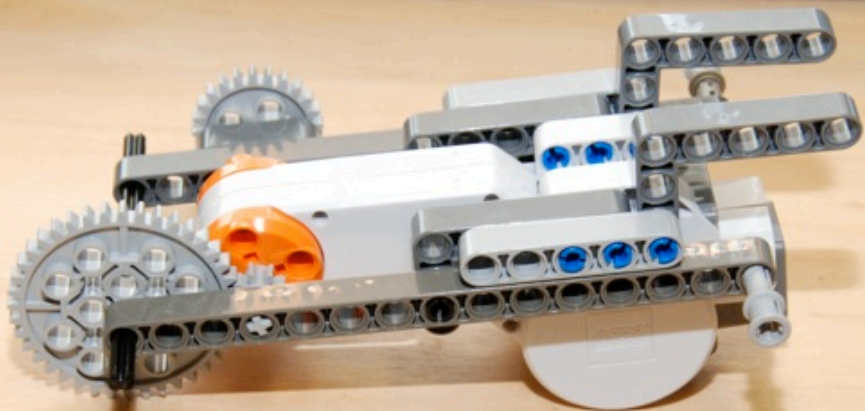


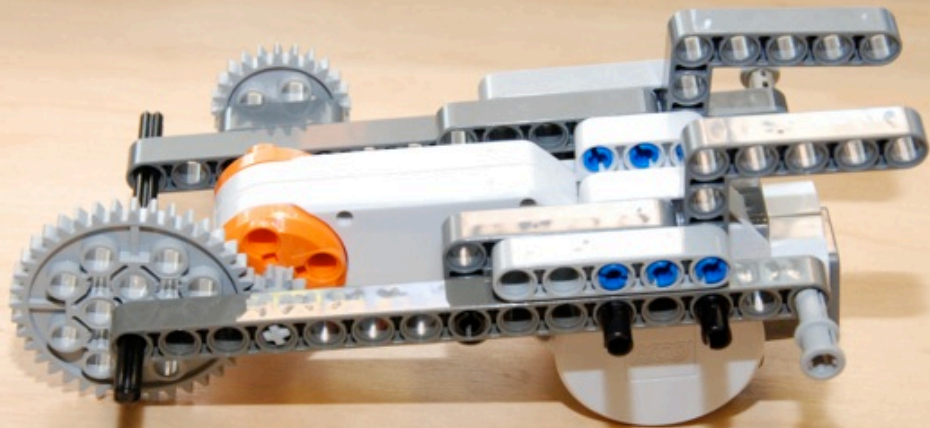




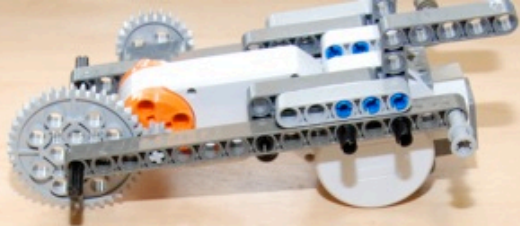


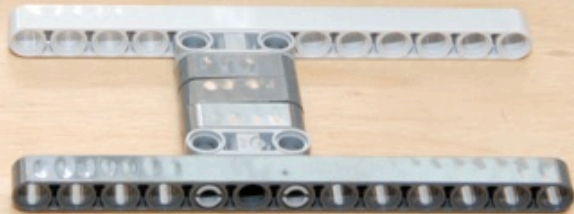
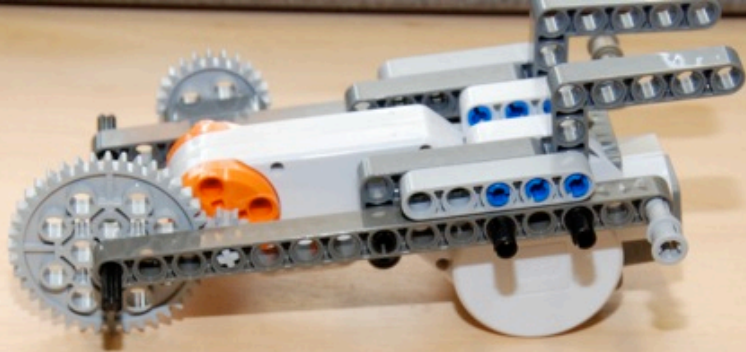




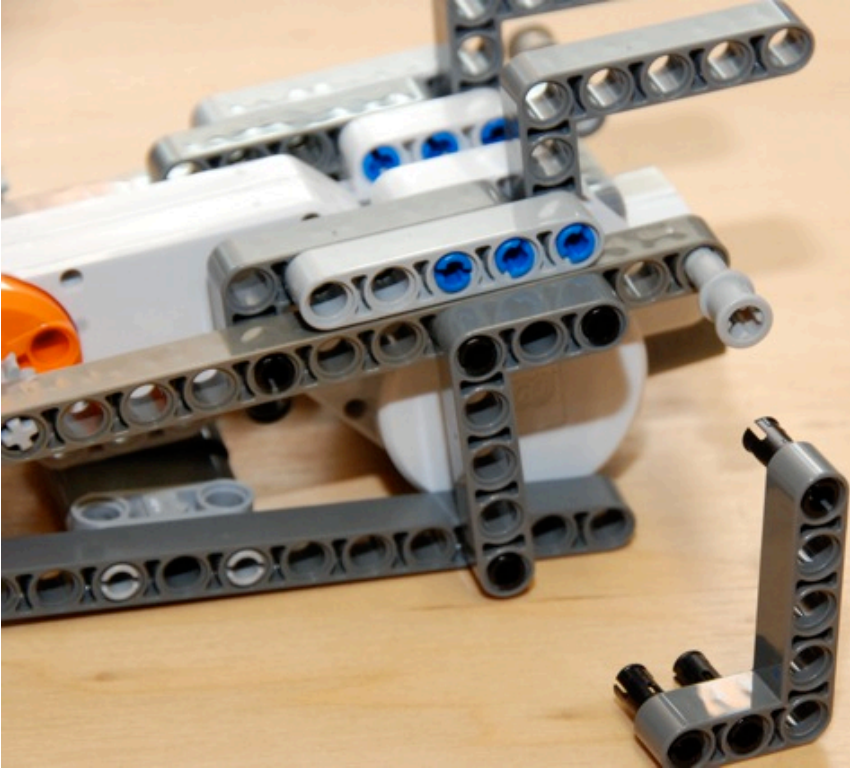


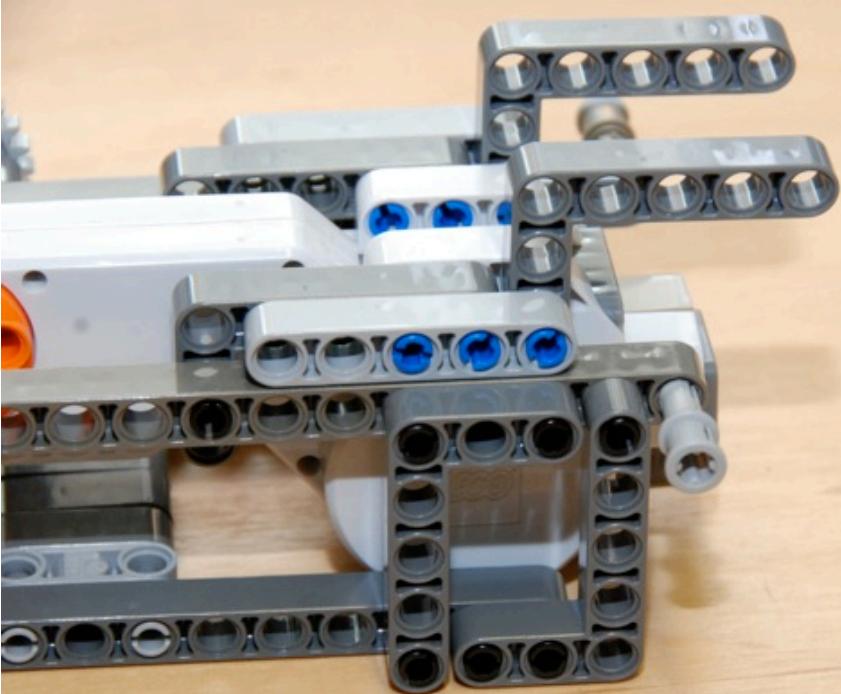


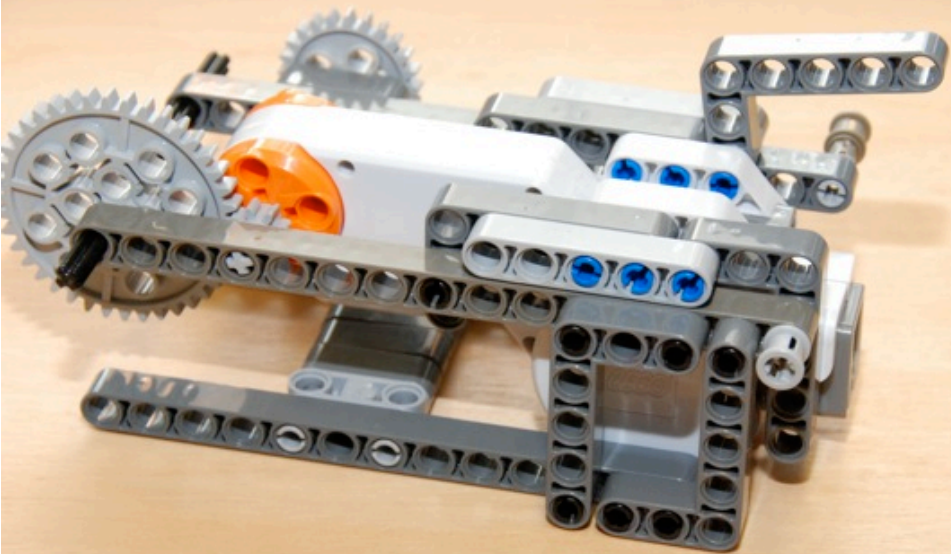


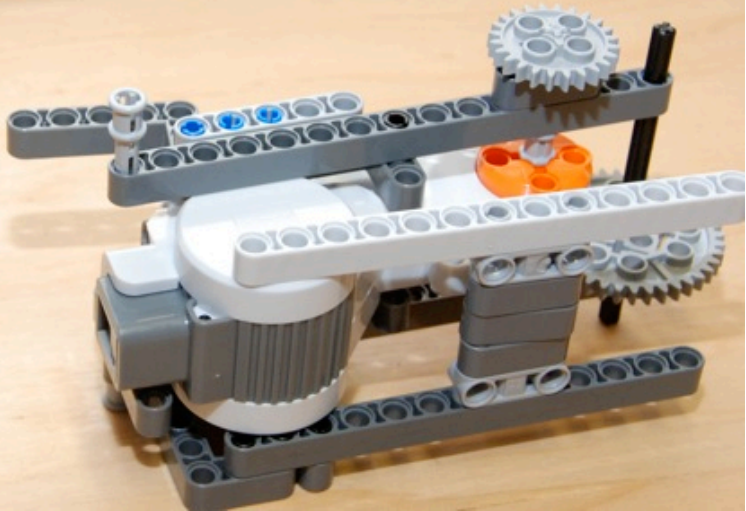


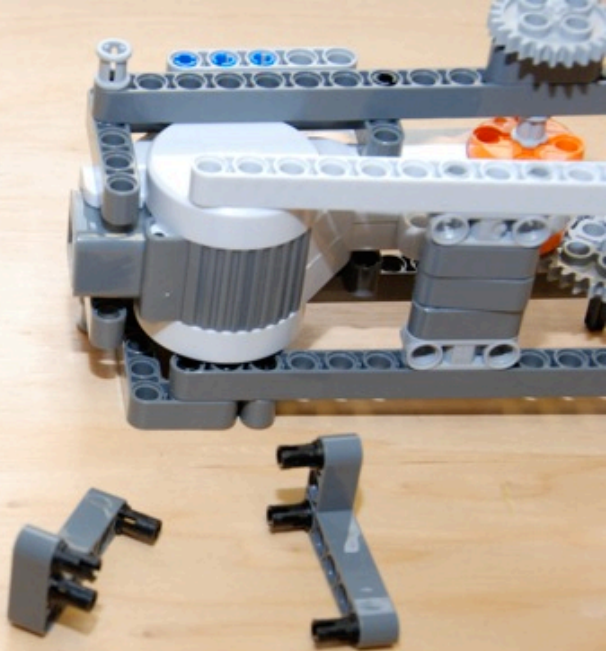


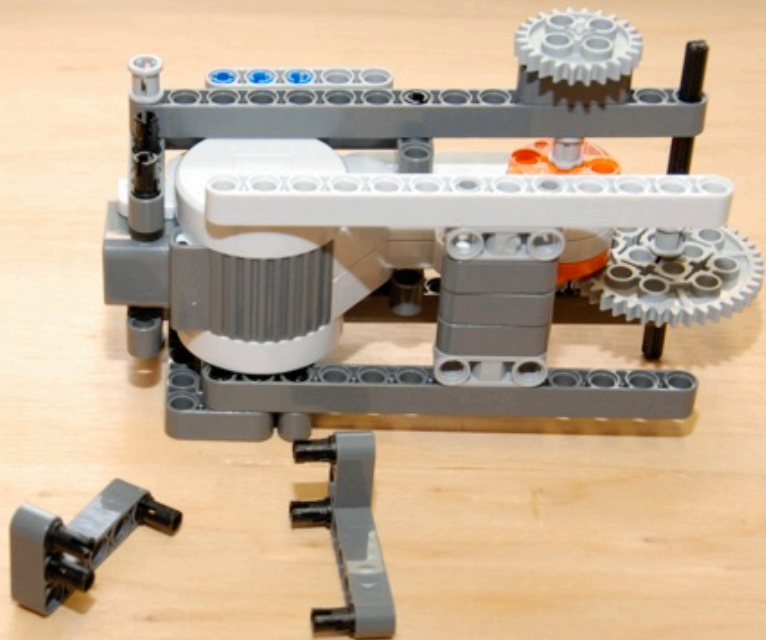


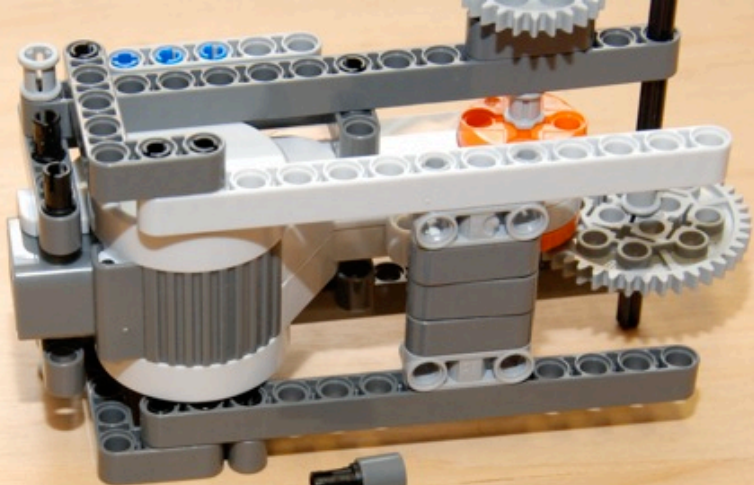


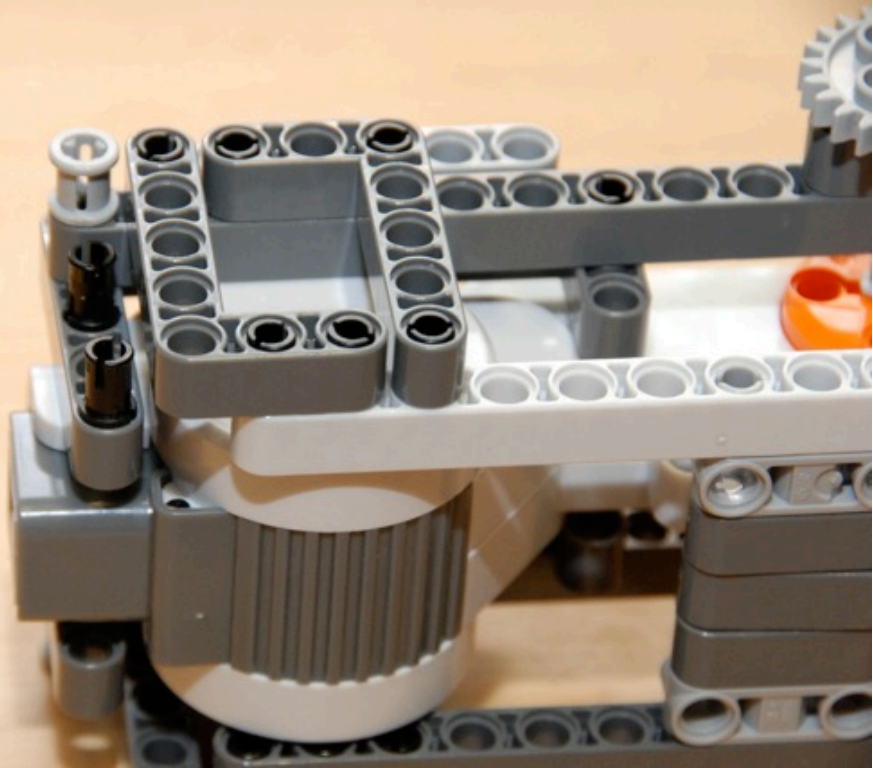






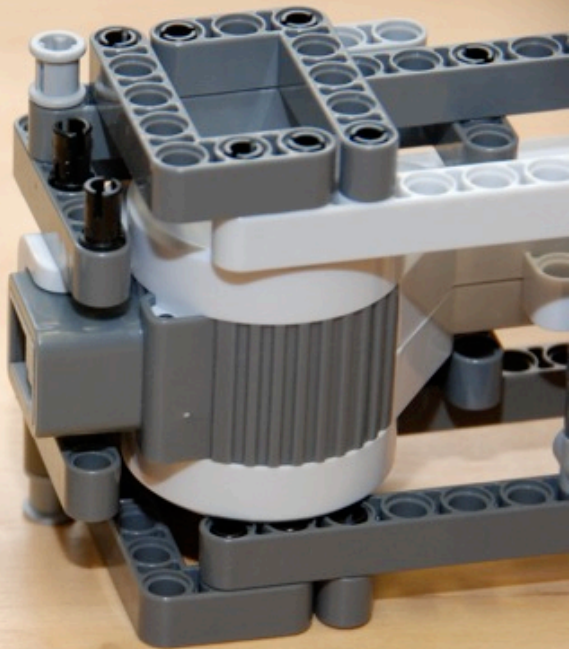


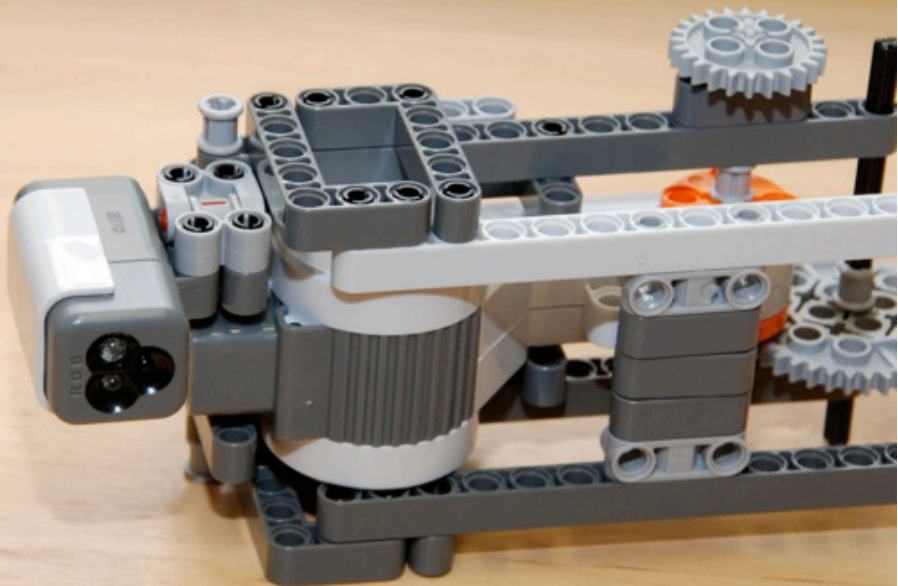


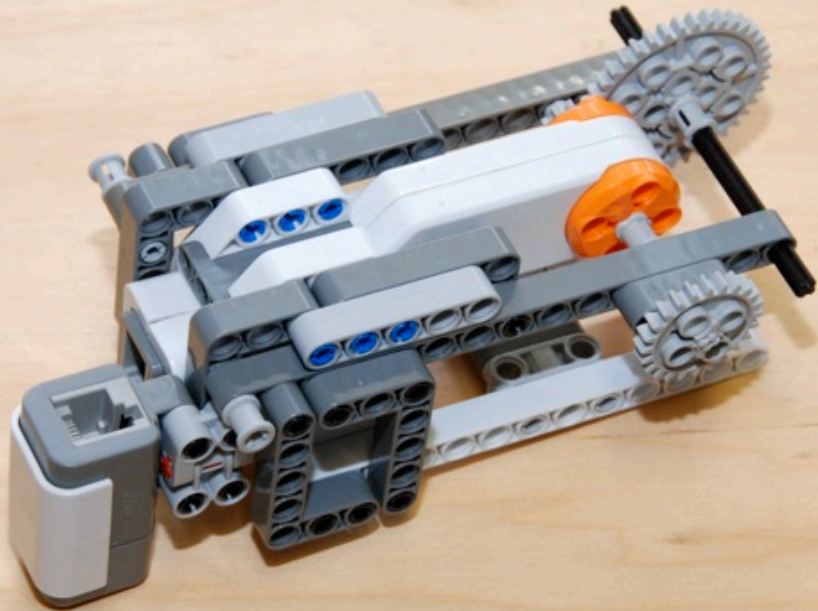


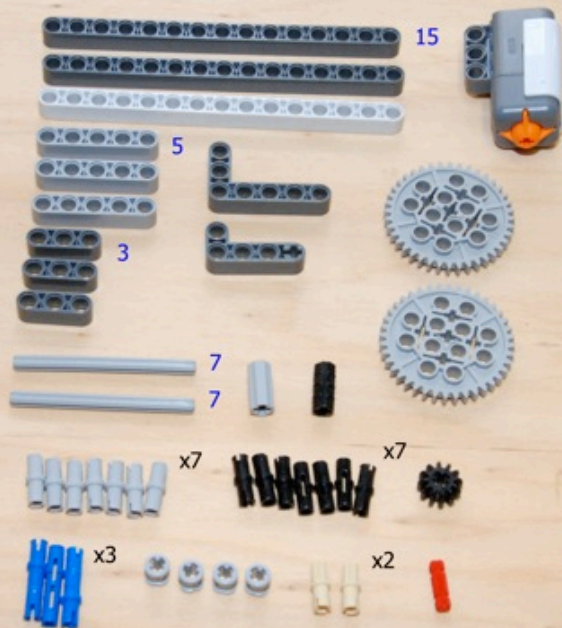


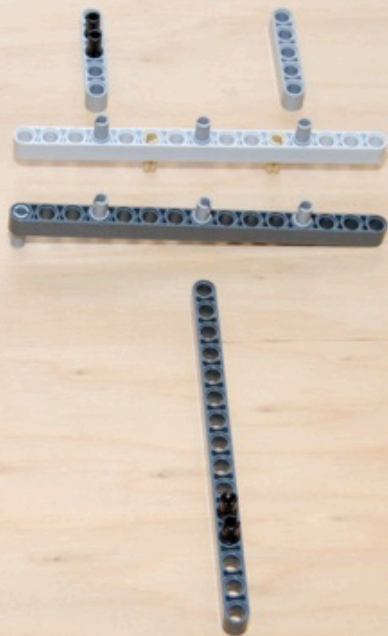


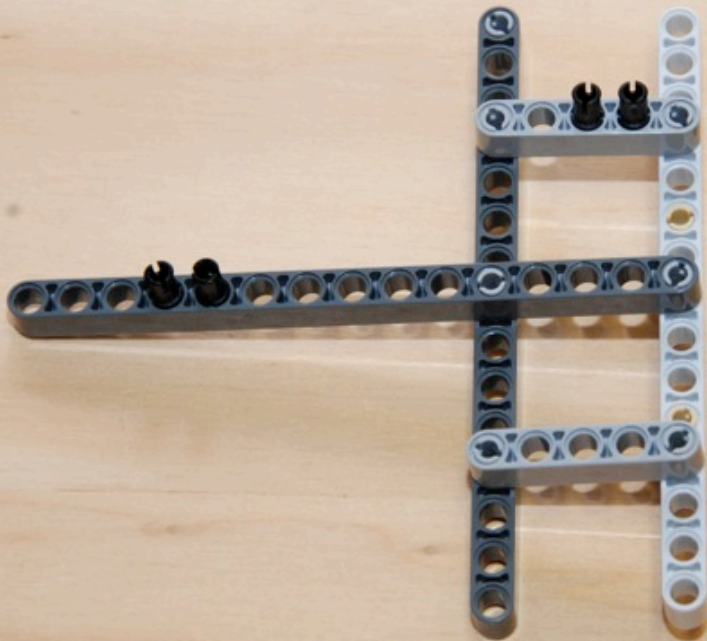


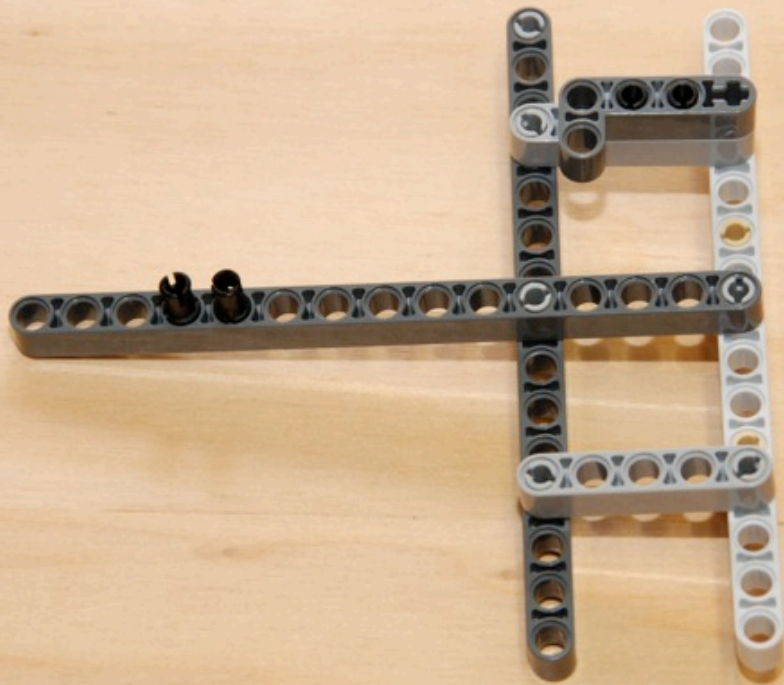


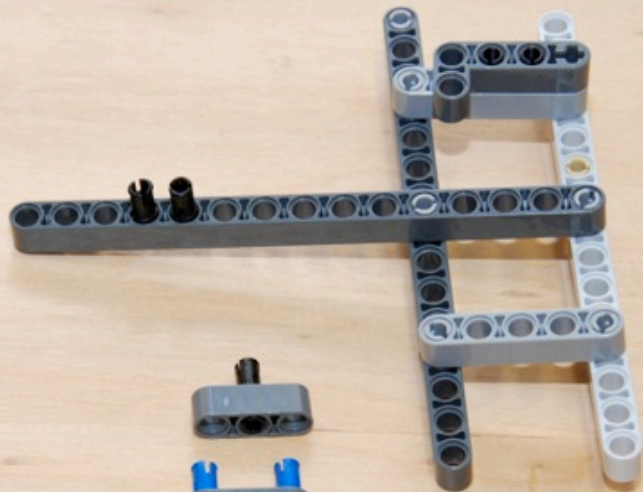


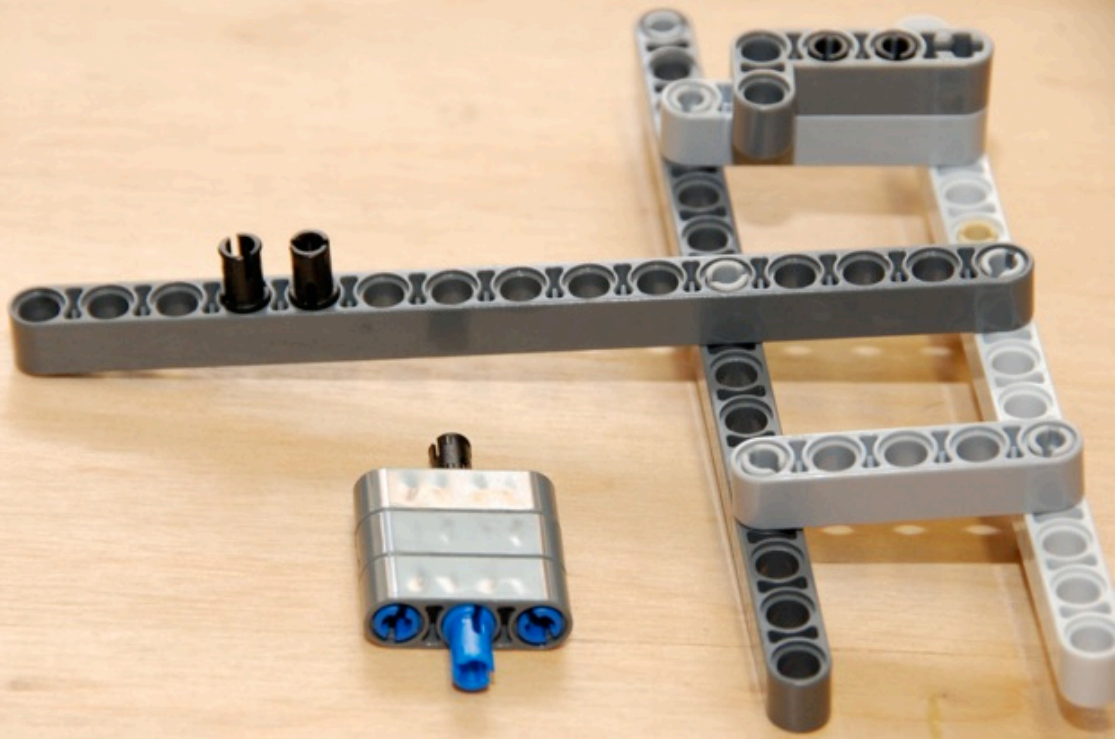


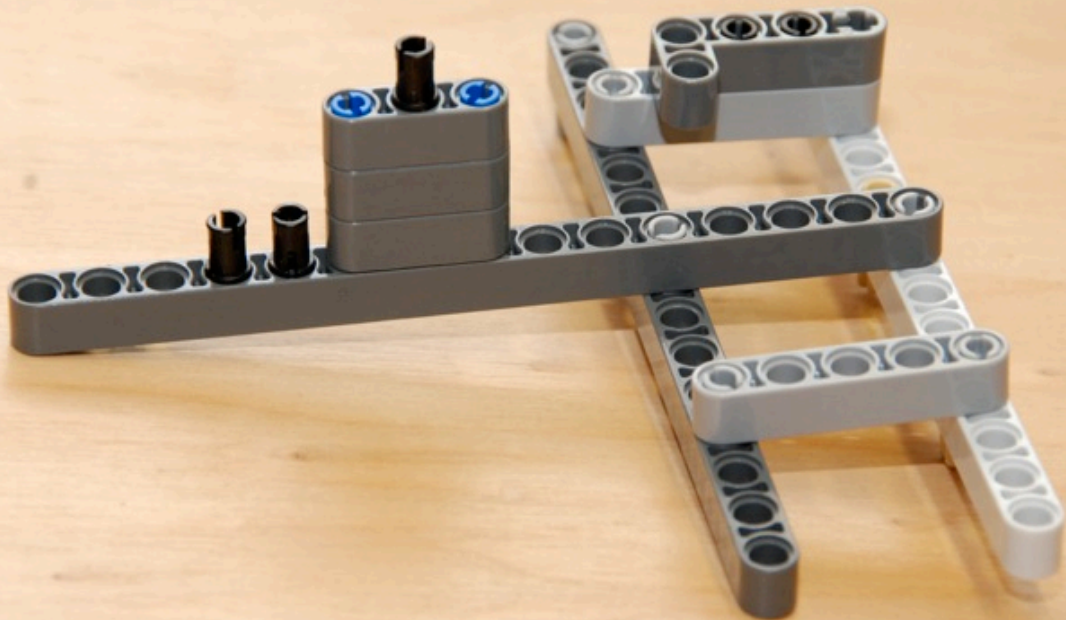


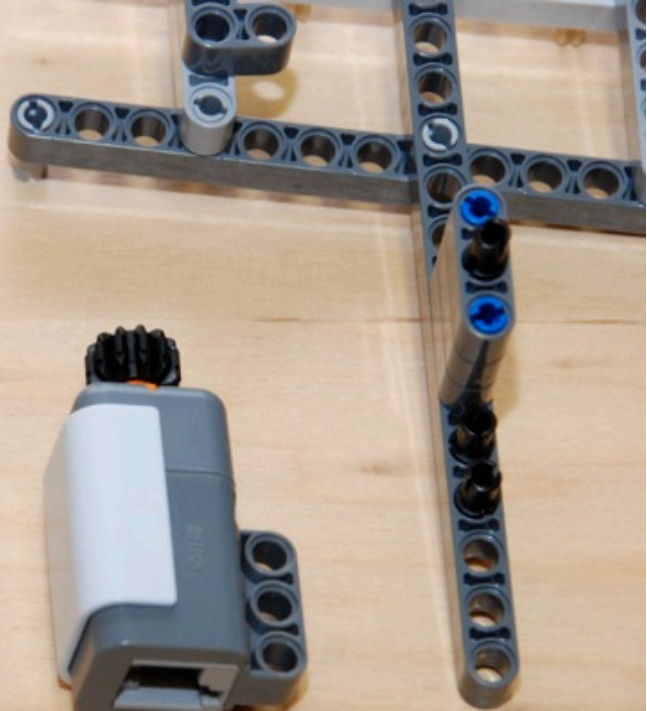
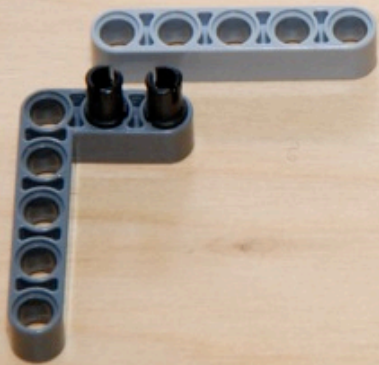


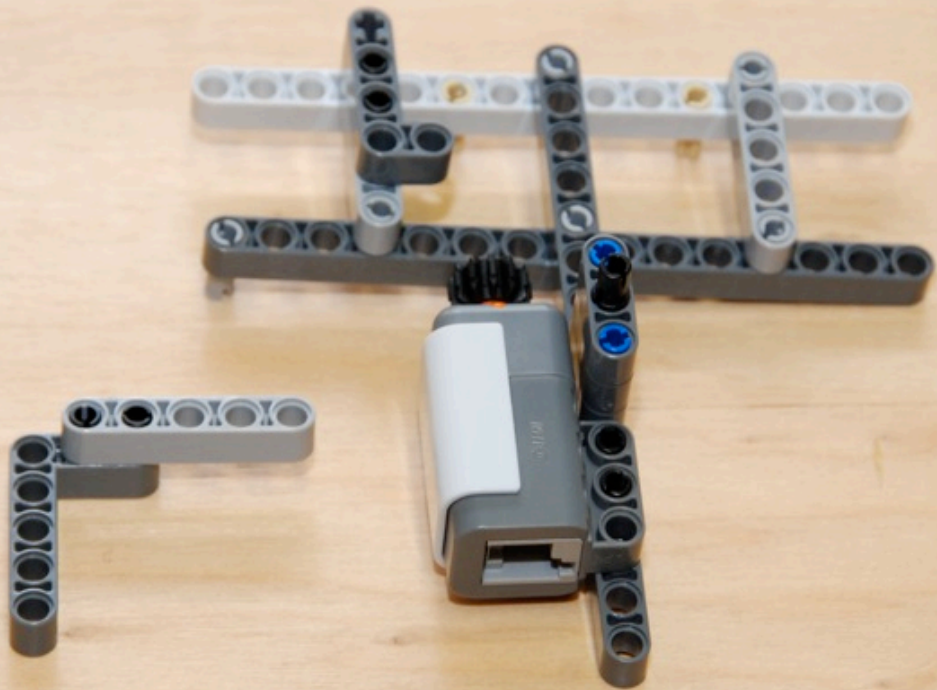


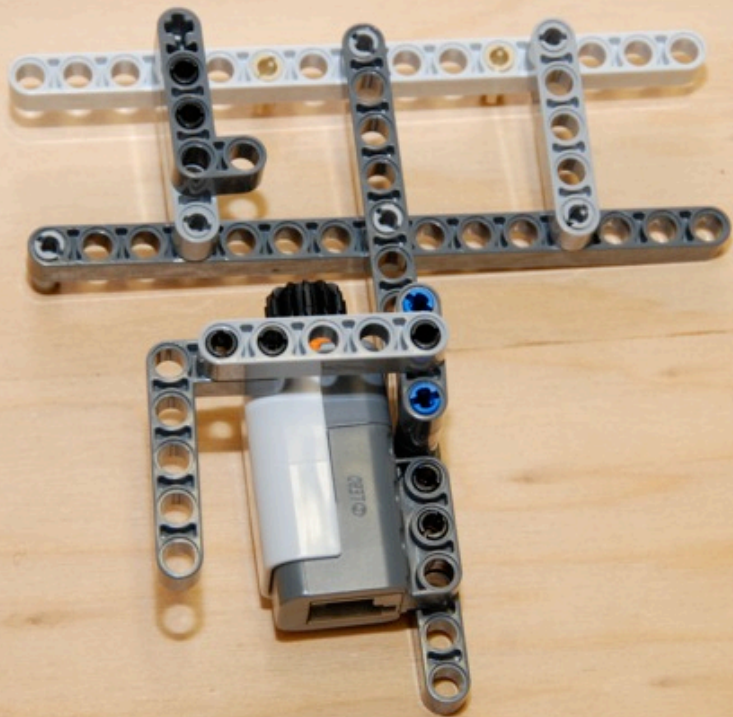


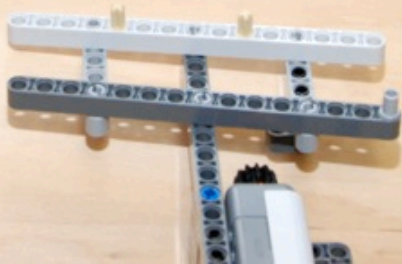


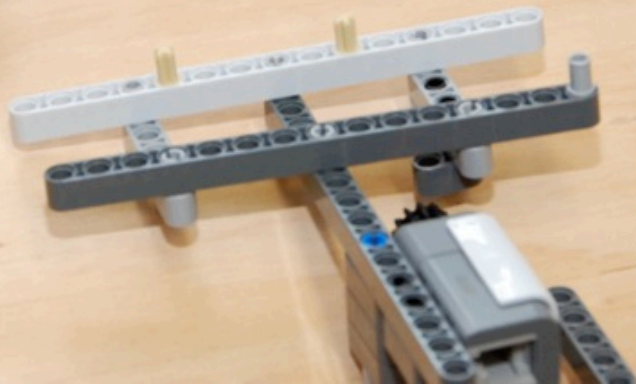


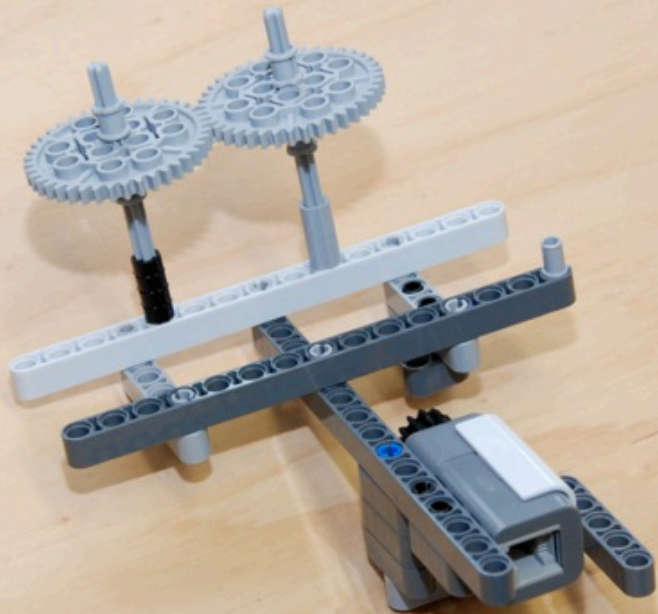


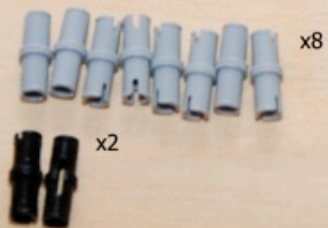
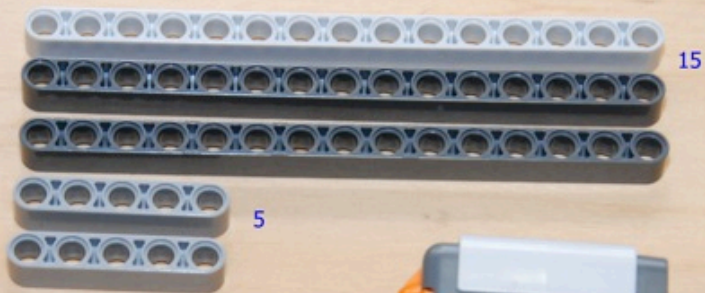


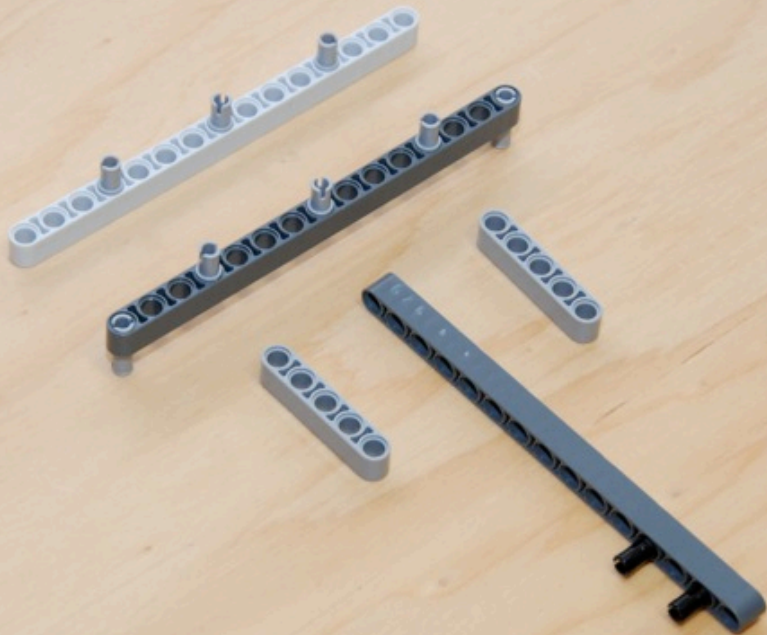


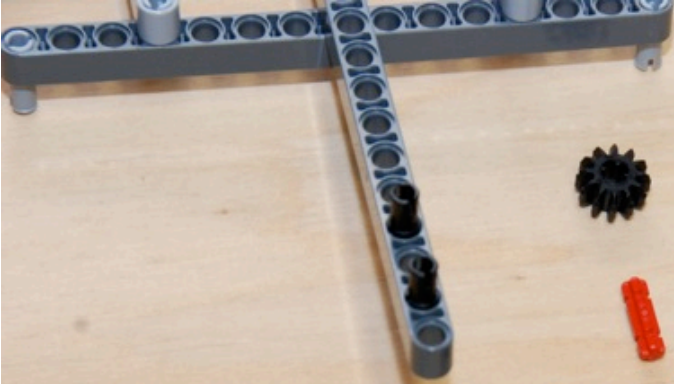


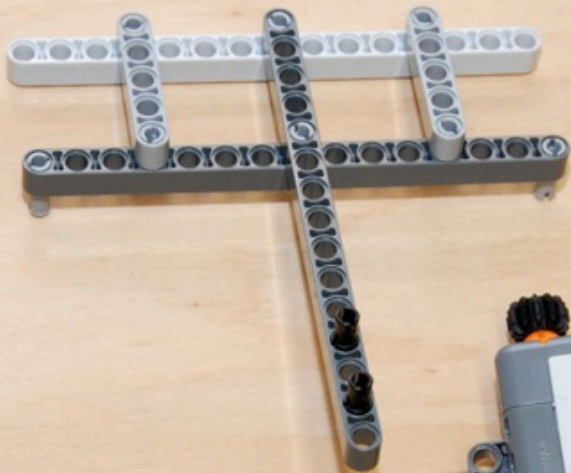


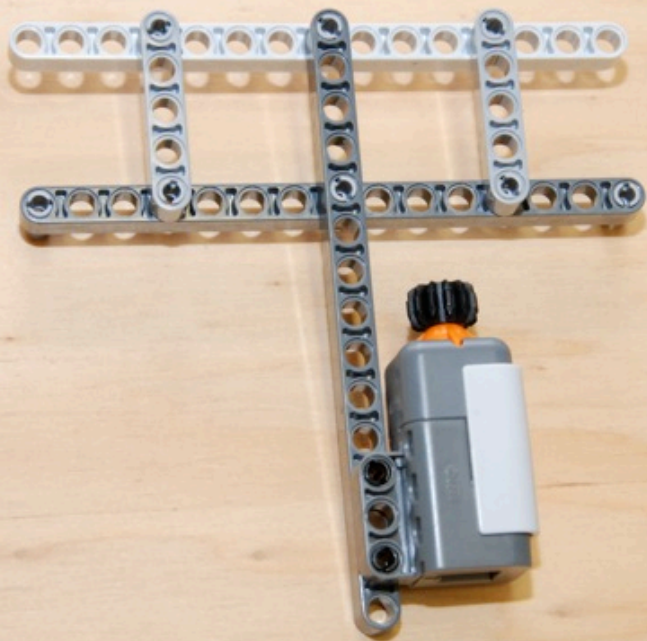








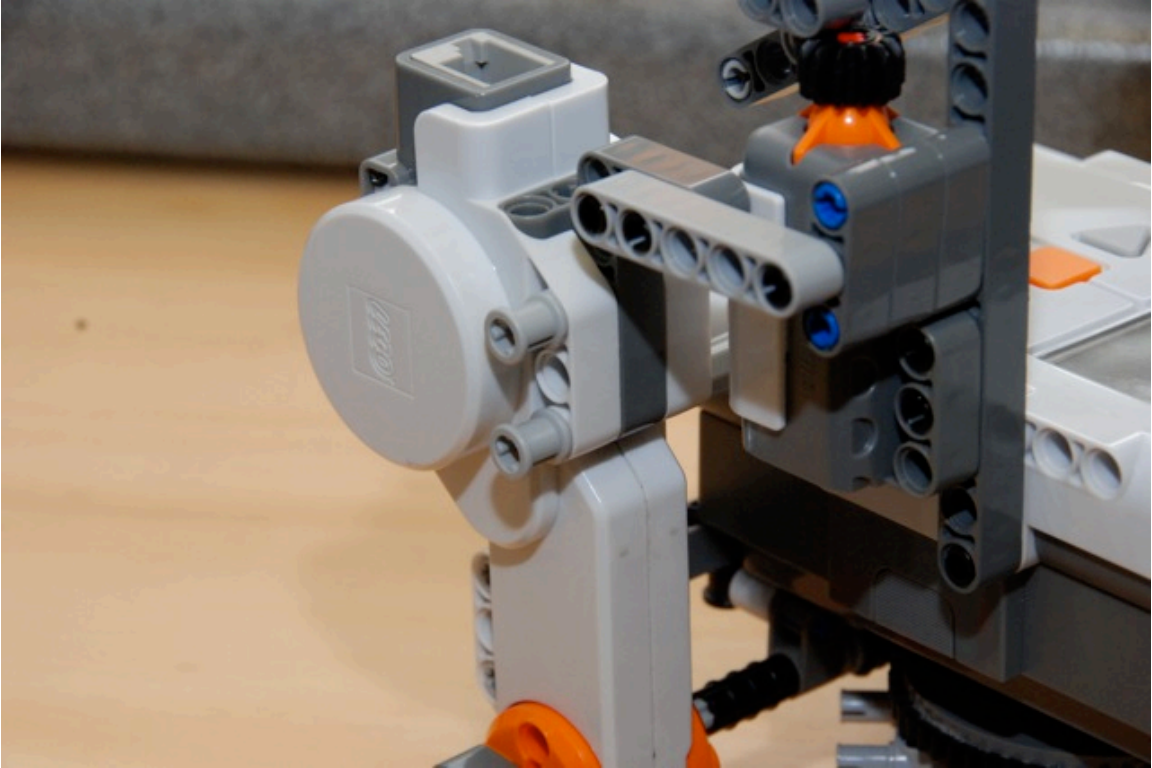


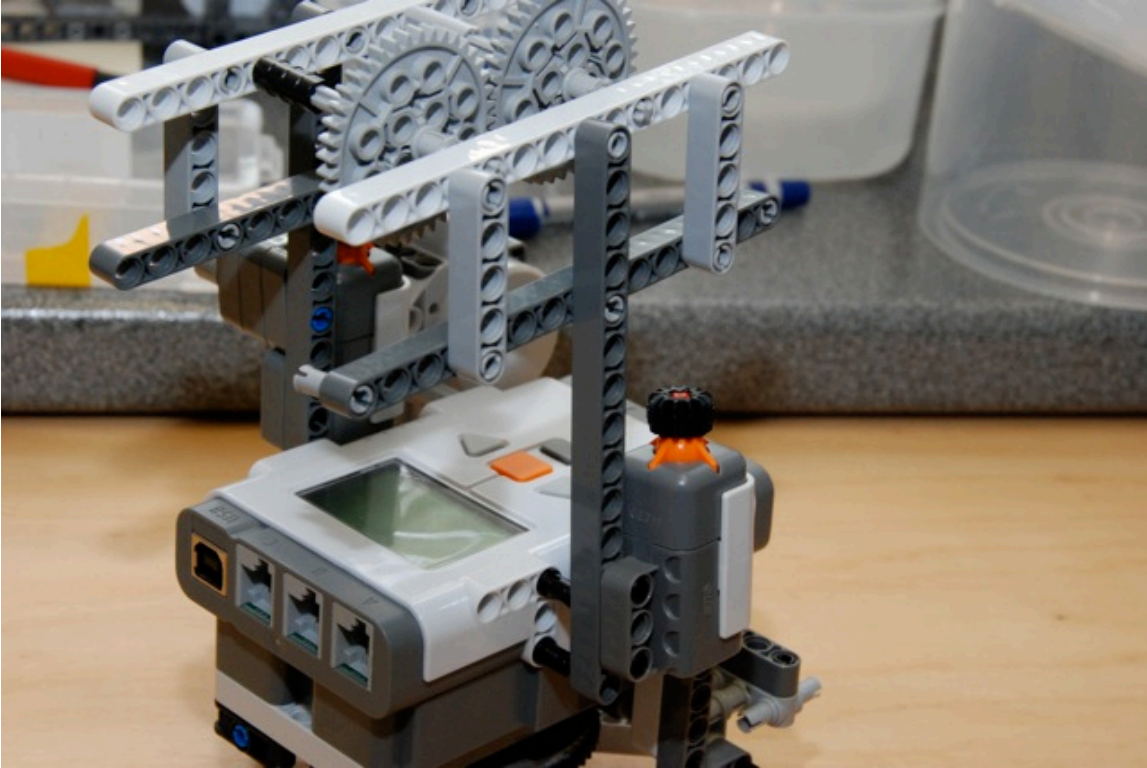


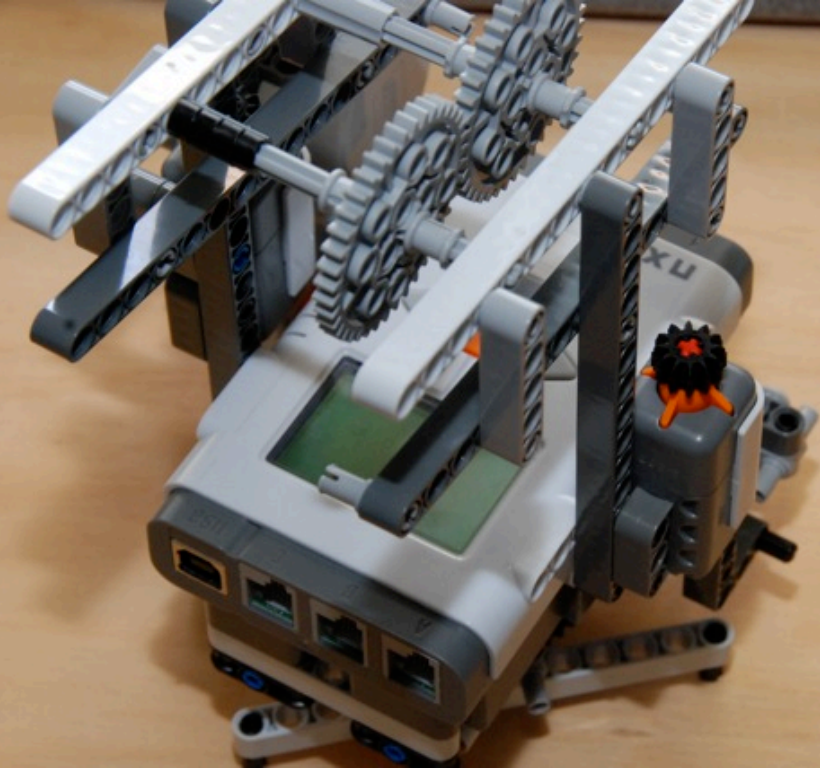


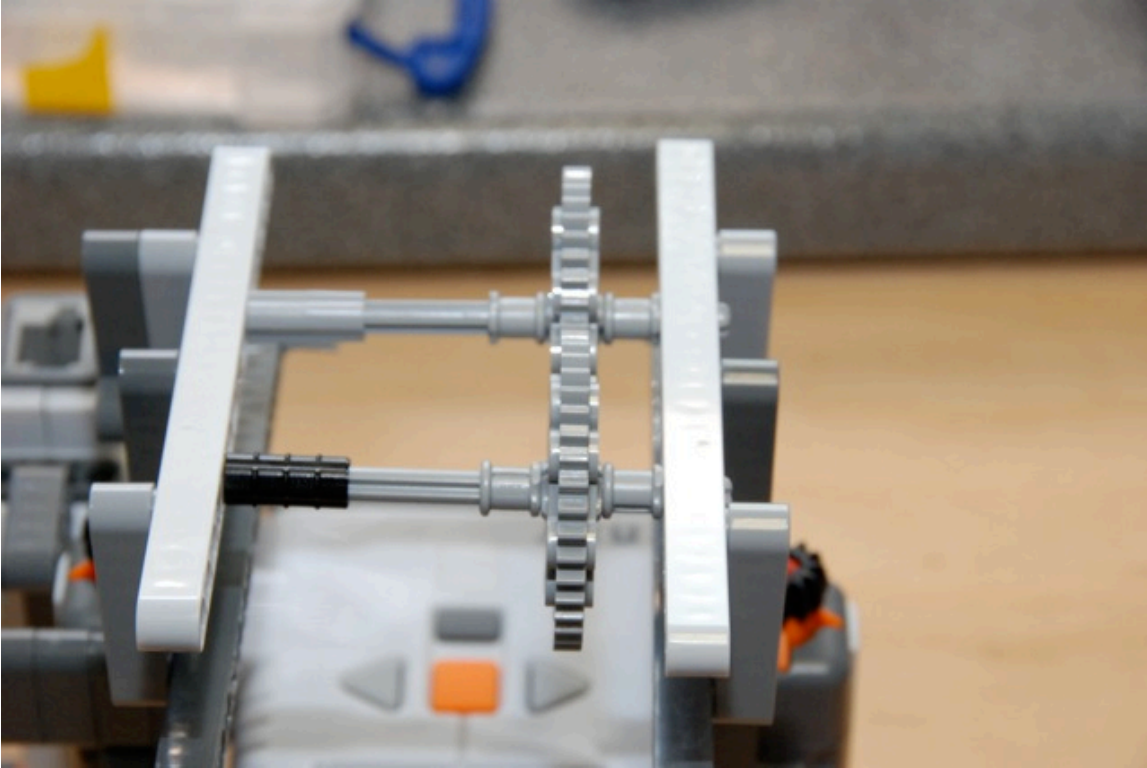


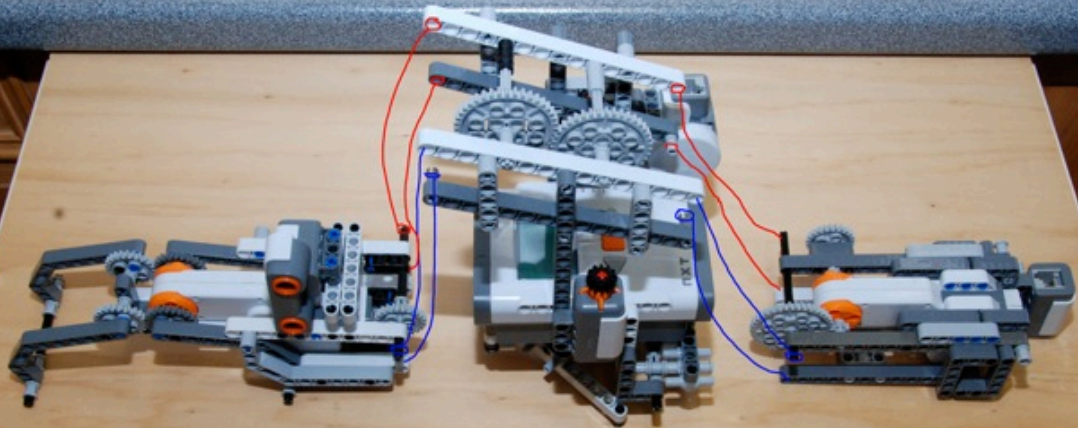






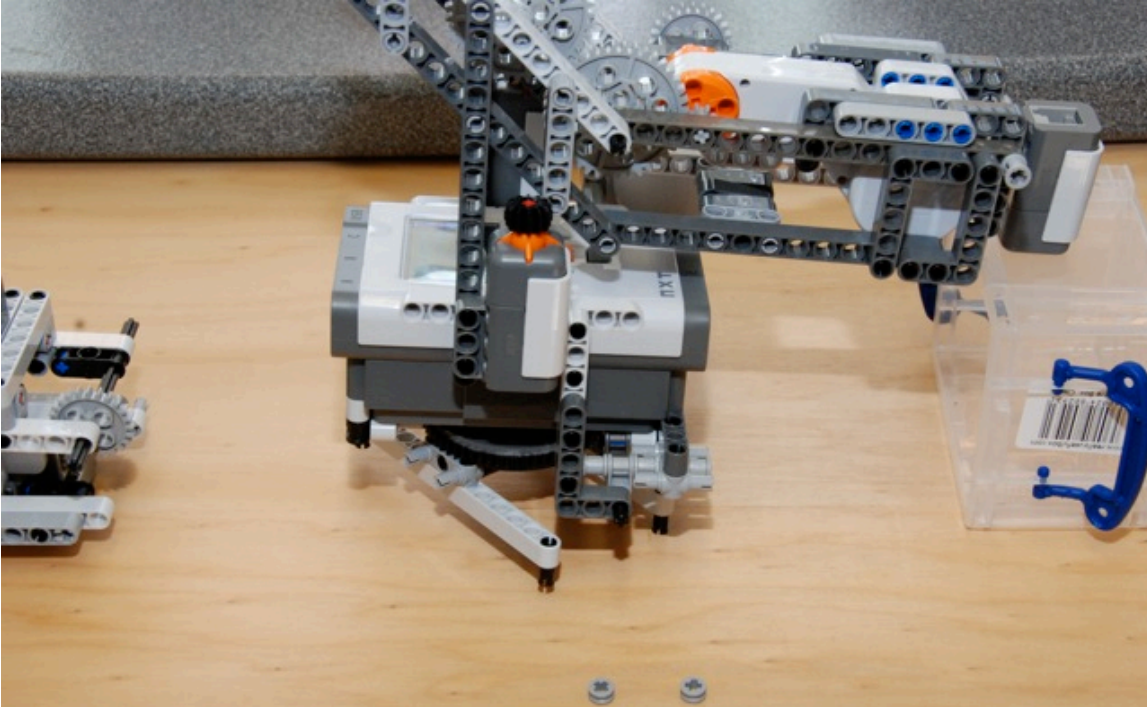


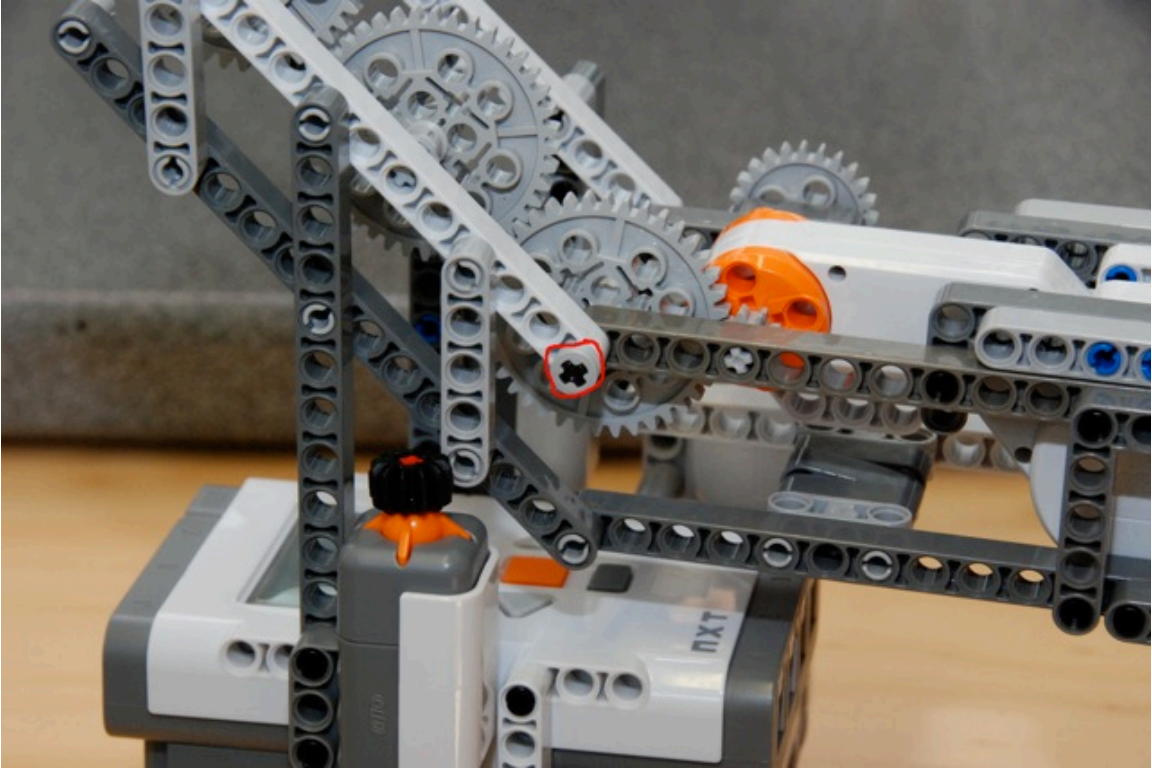


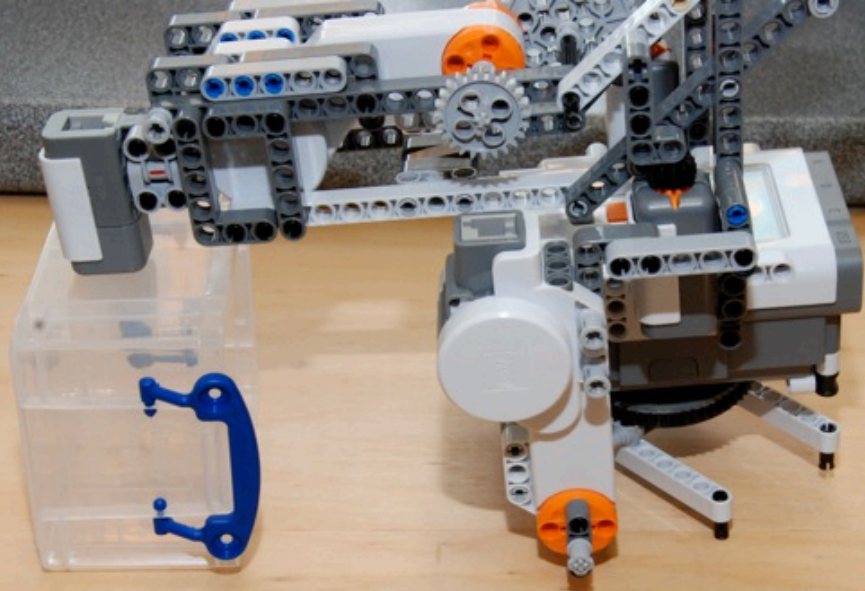


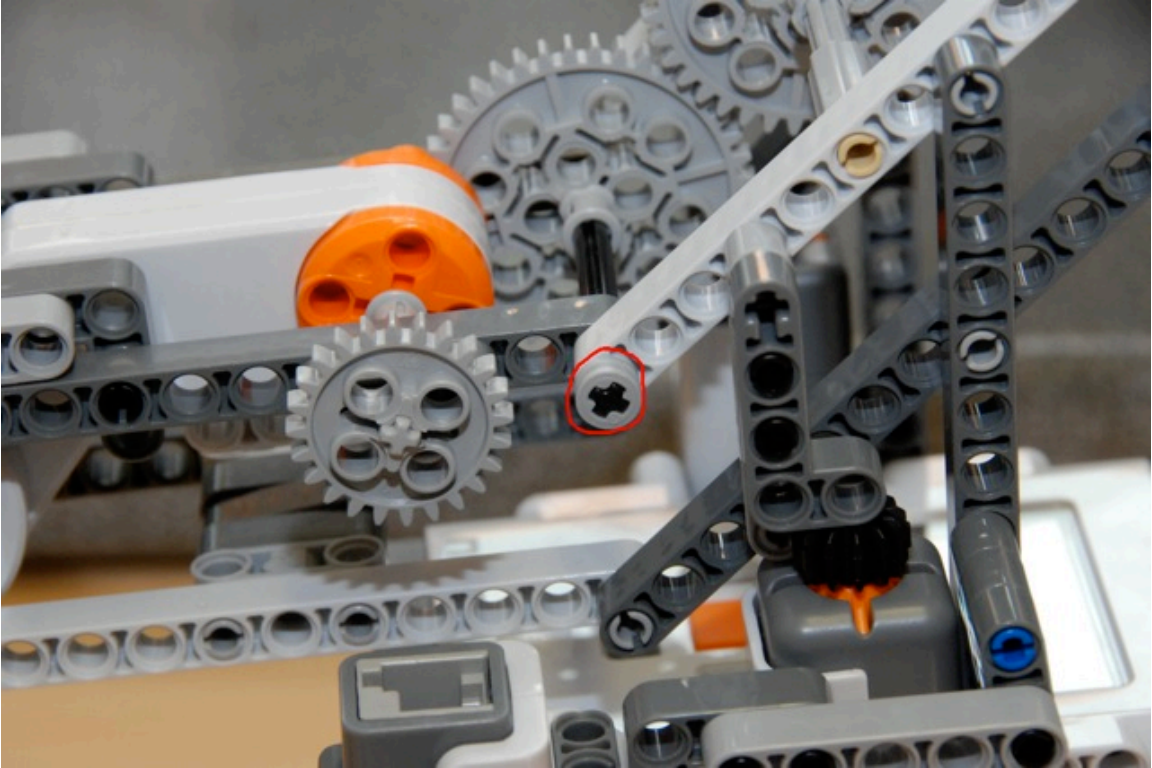
Parts to assemble three main structures together



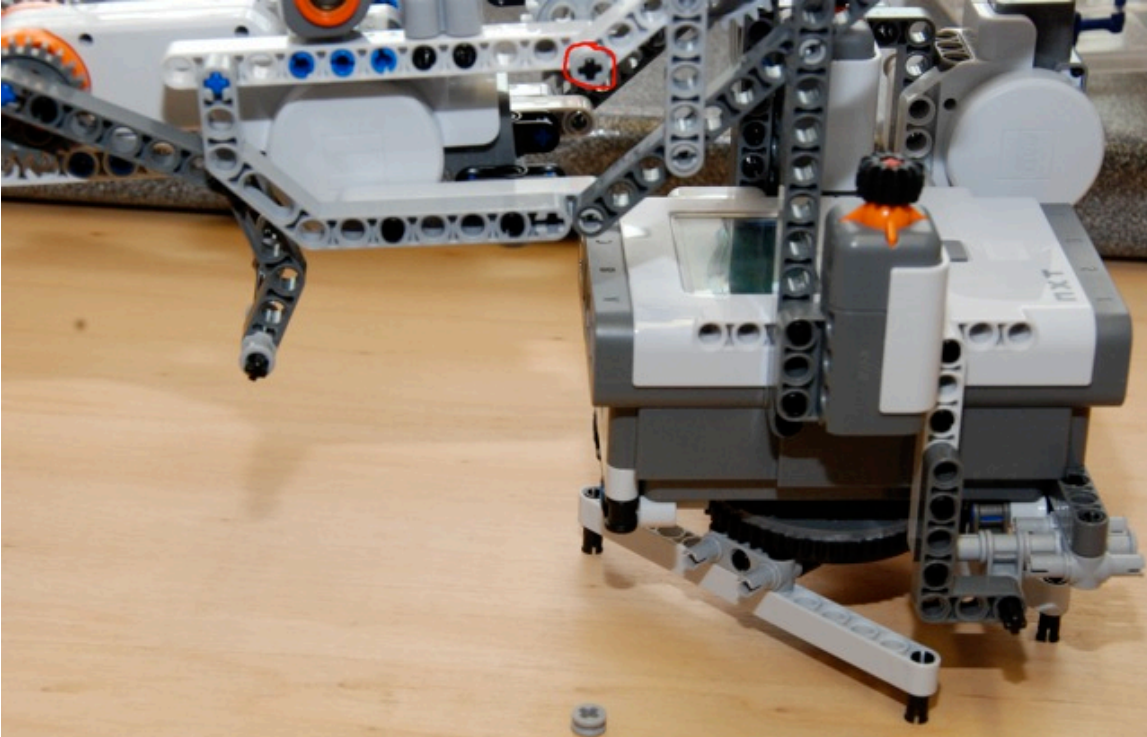


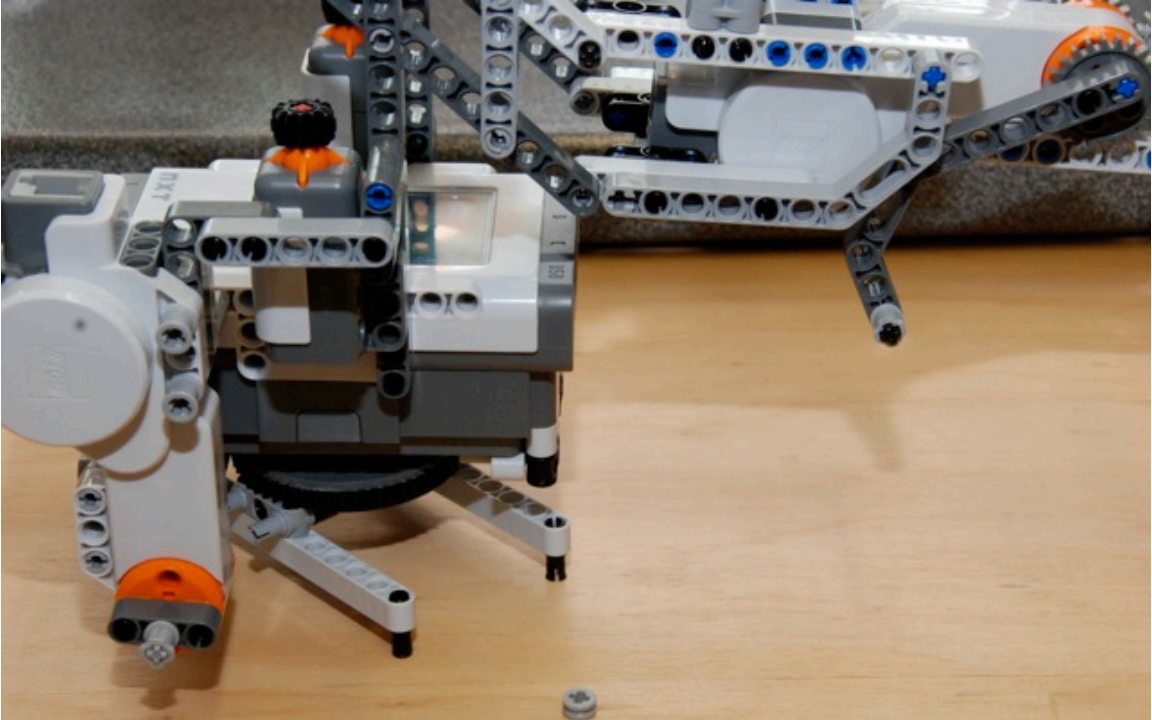


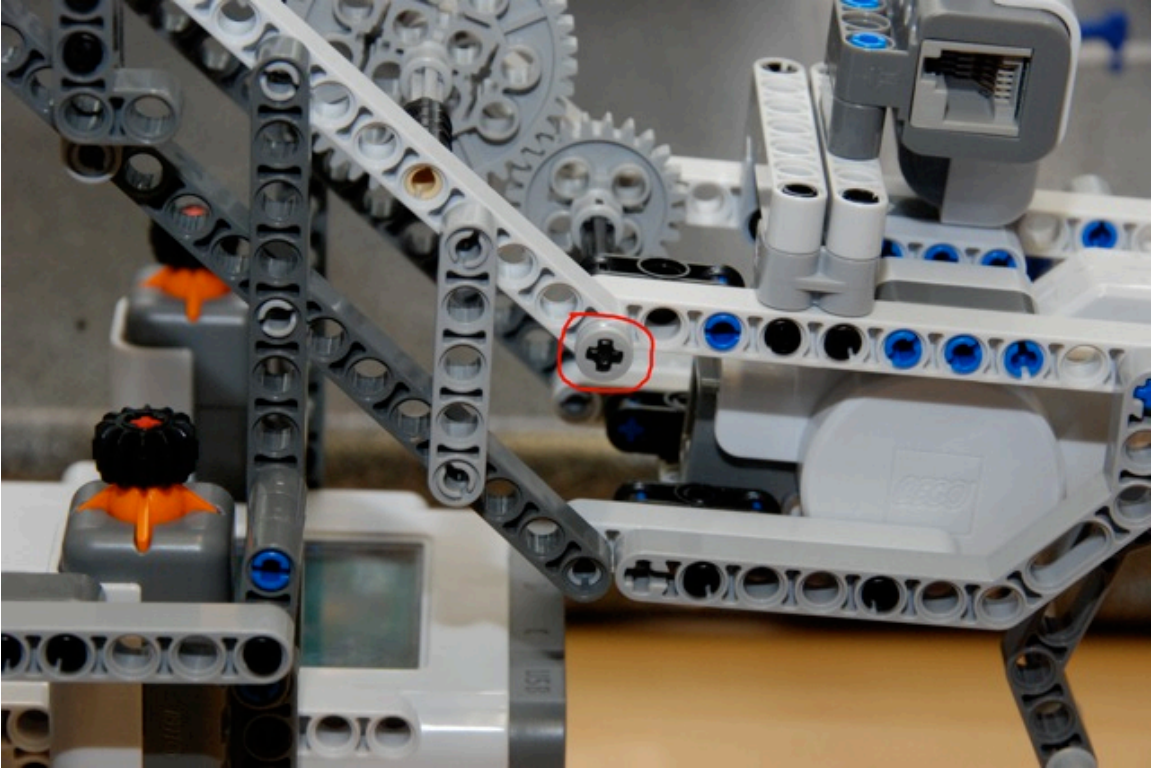


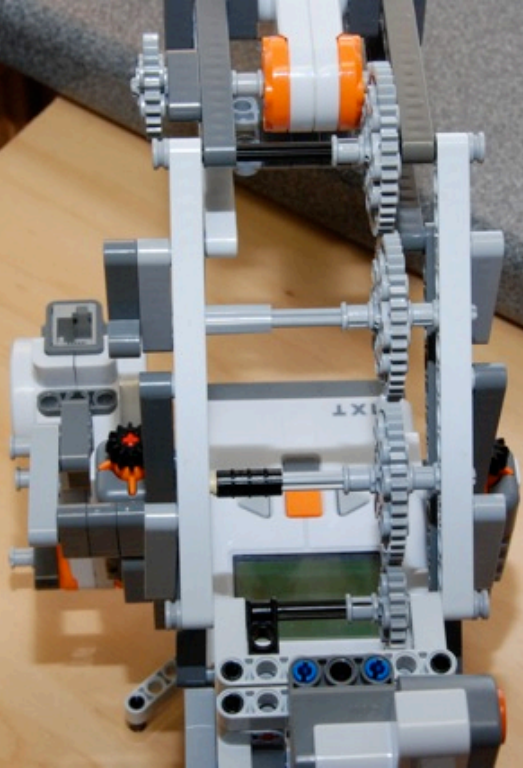












50cm

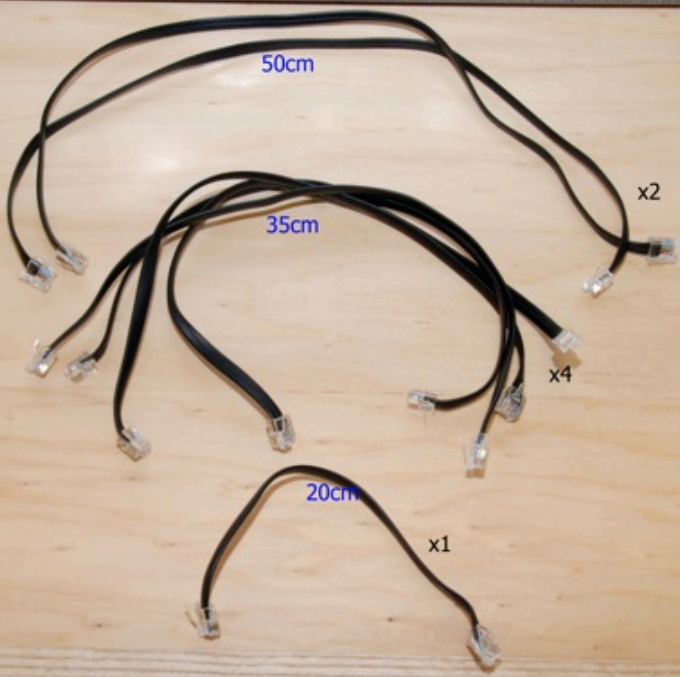
x2

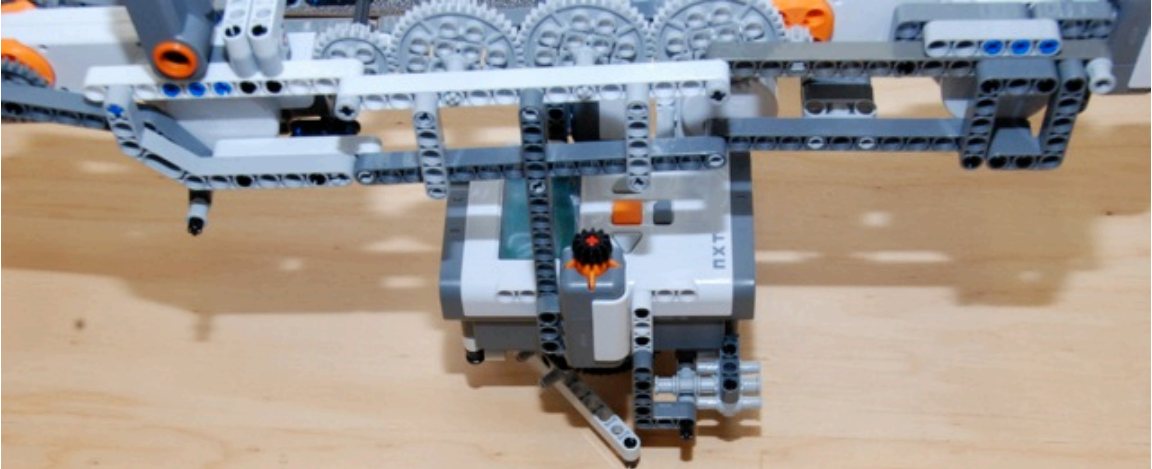
35cm

x4

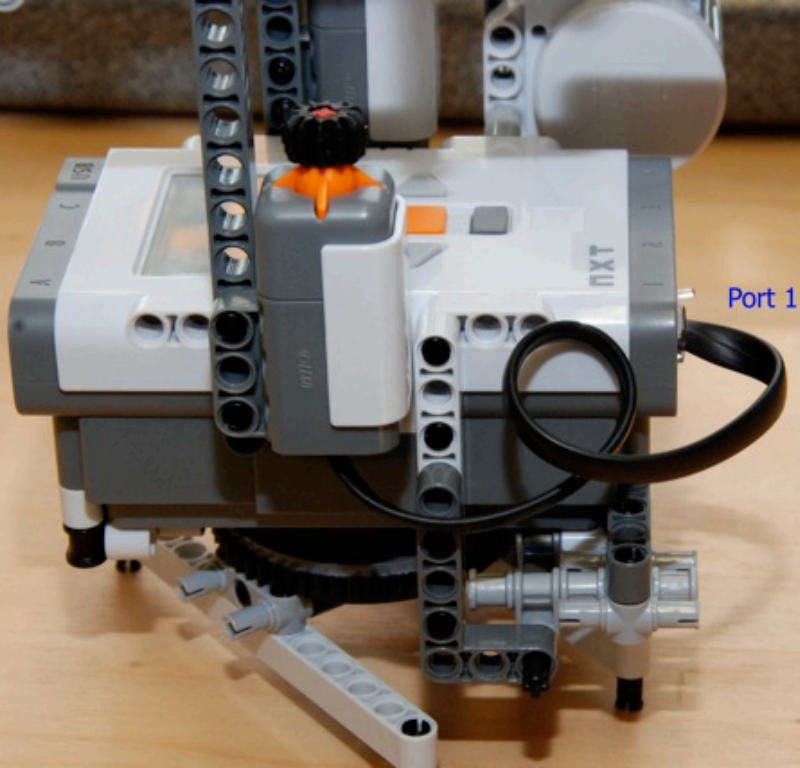
20cm

x1

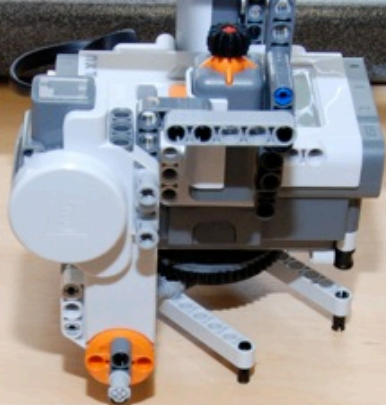




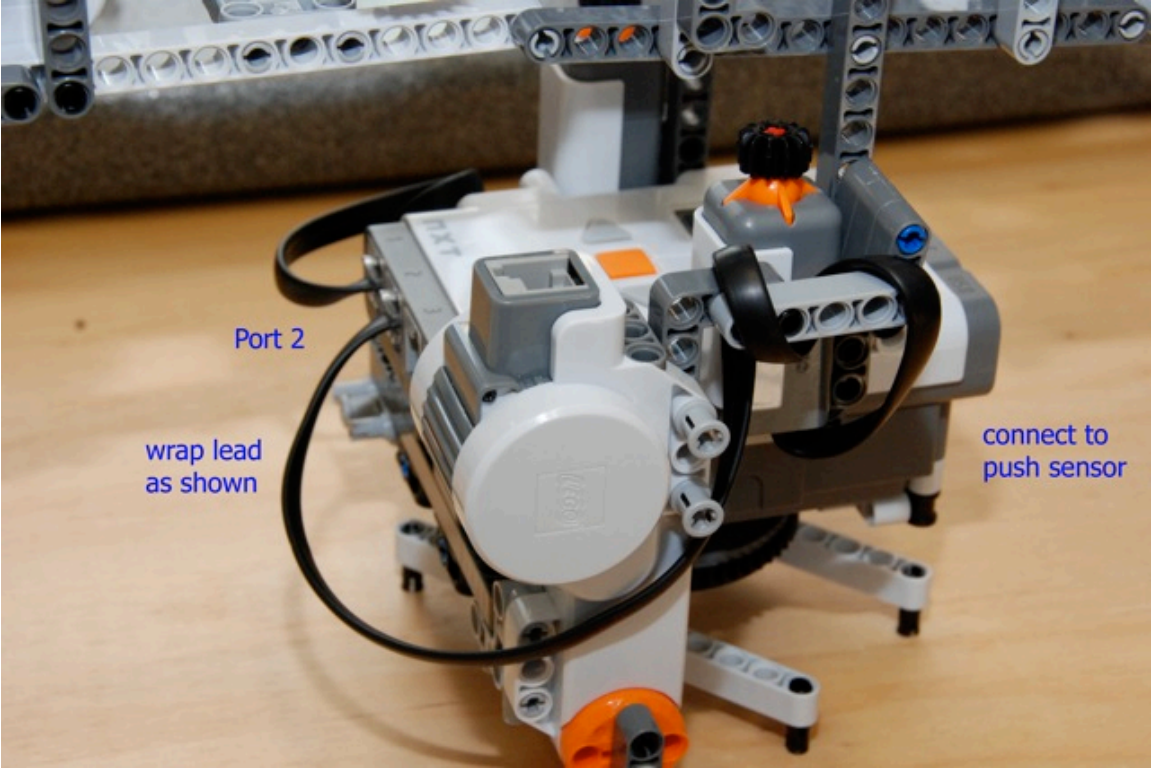
20cm



Port 1



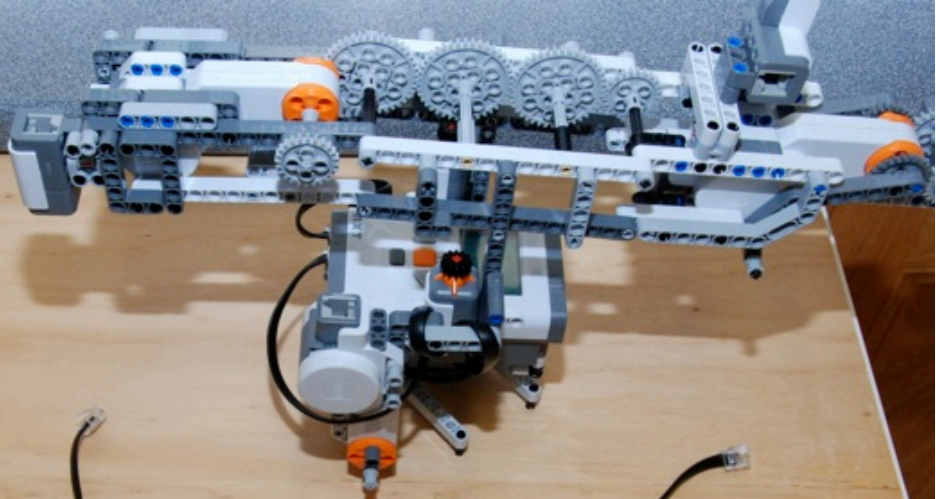
35cm



Port 2

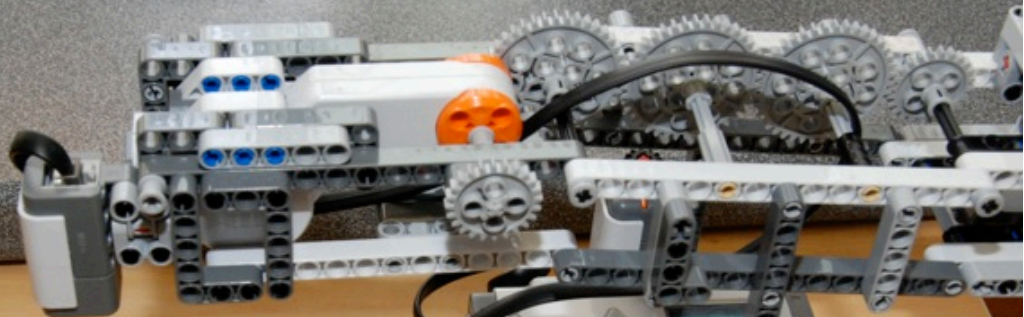
wrap lead
as shown

connect to
push sensor

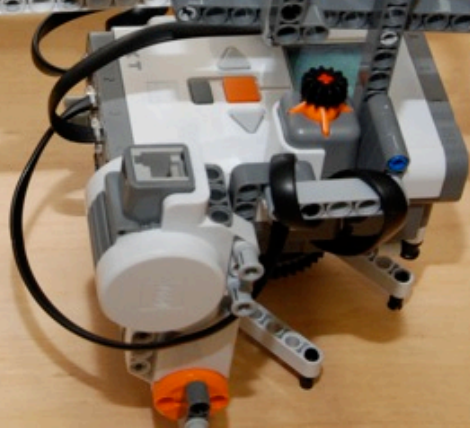


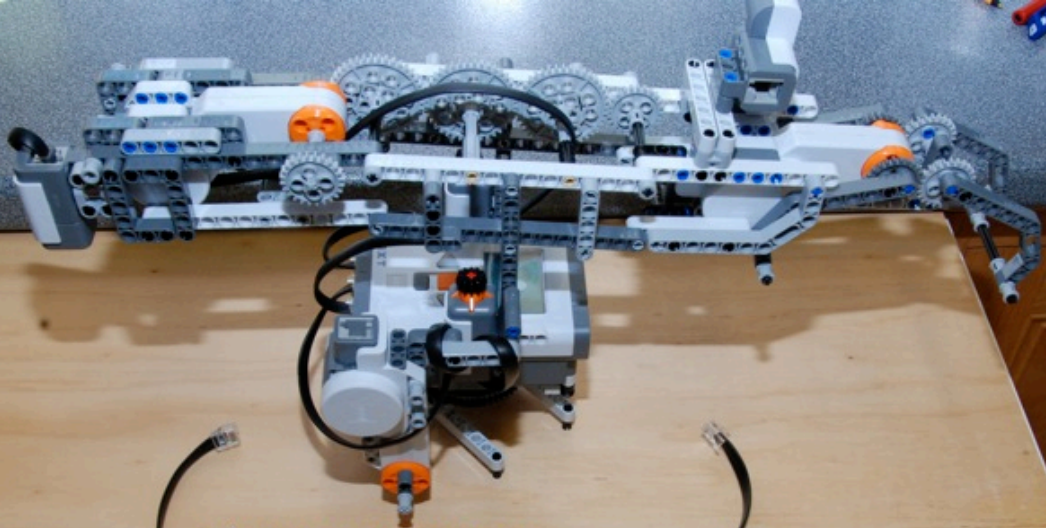
colour sensor to port 3

50cm



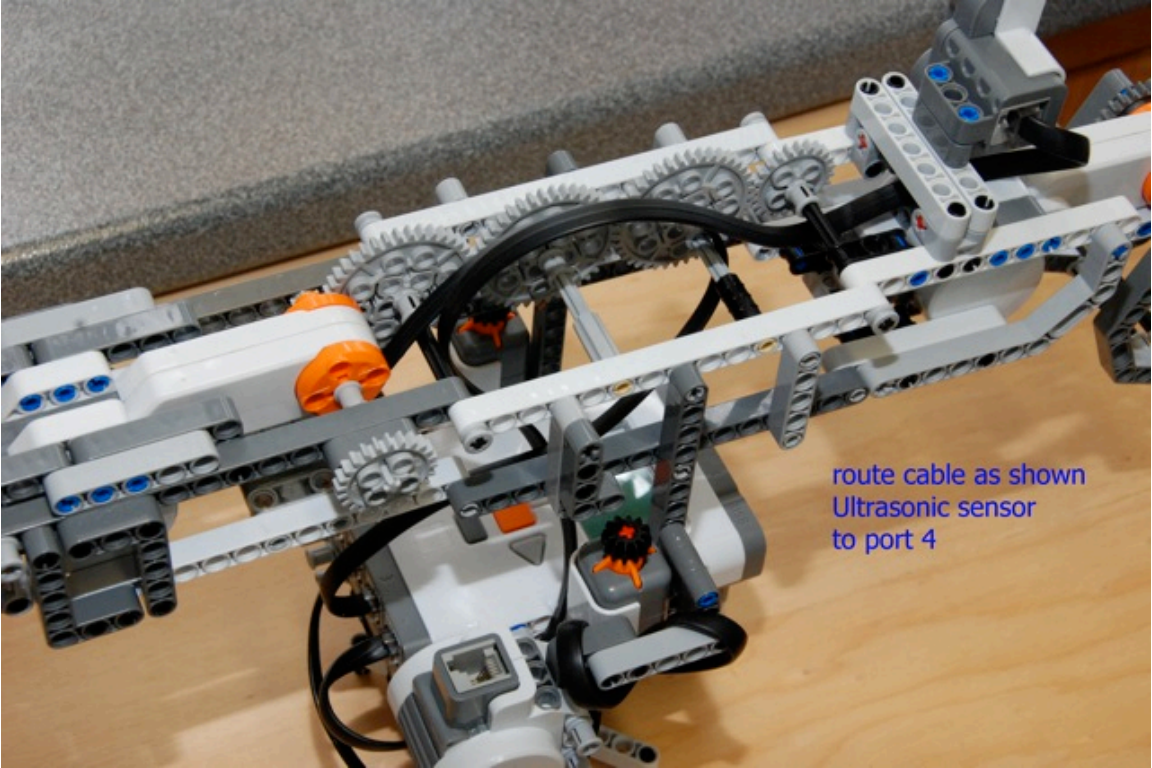
route cable as shown
between colour sensor
and port 3



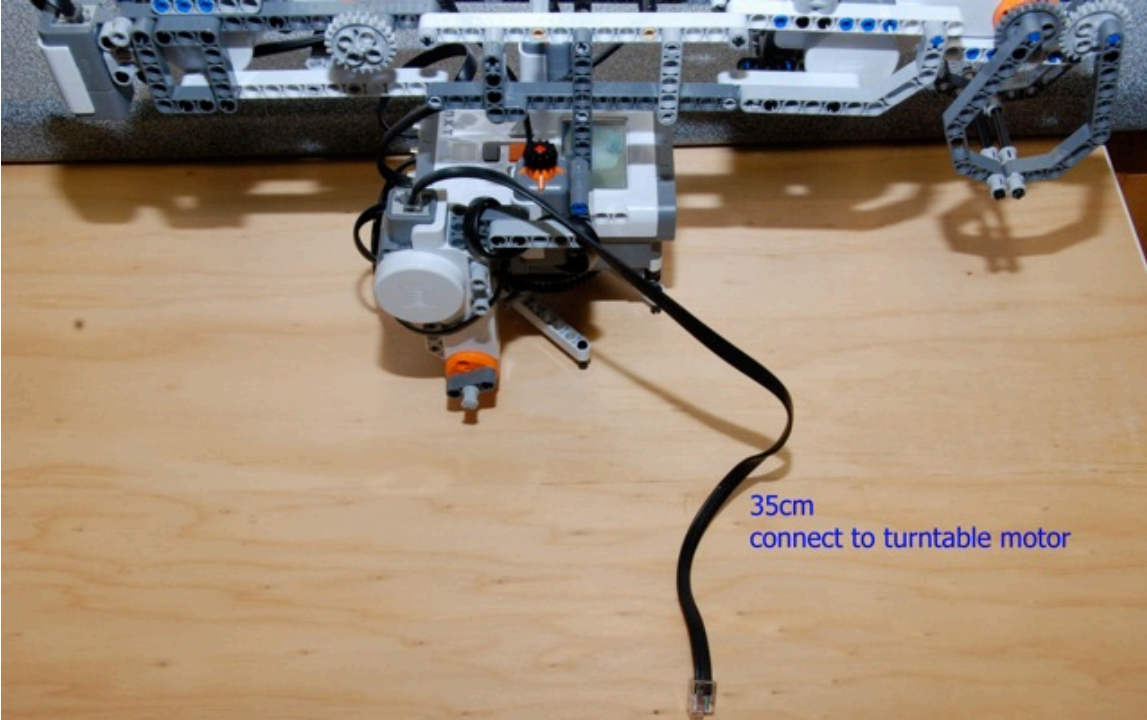


Ultrasonic sensor to port 4

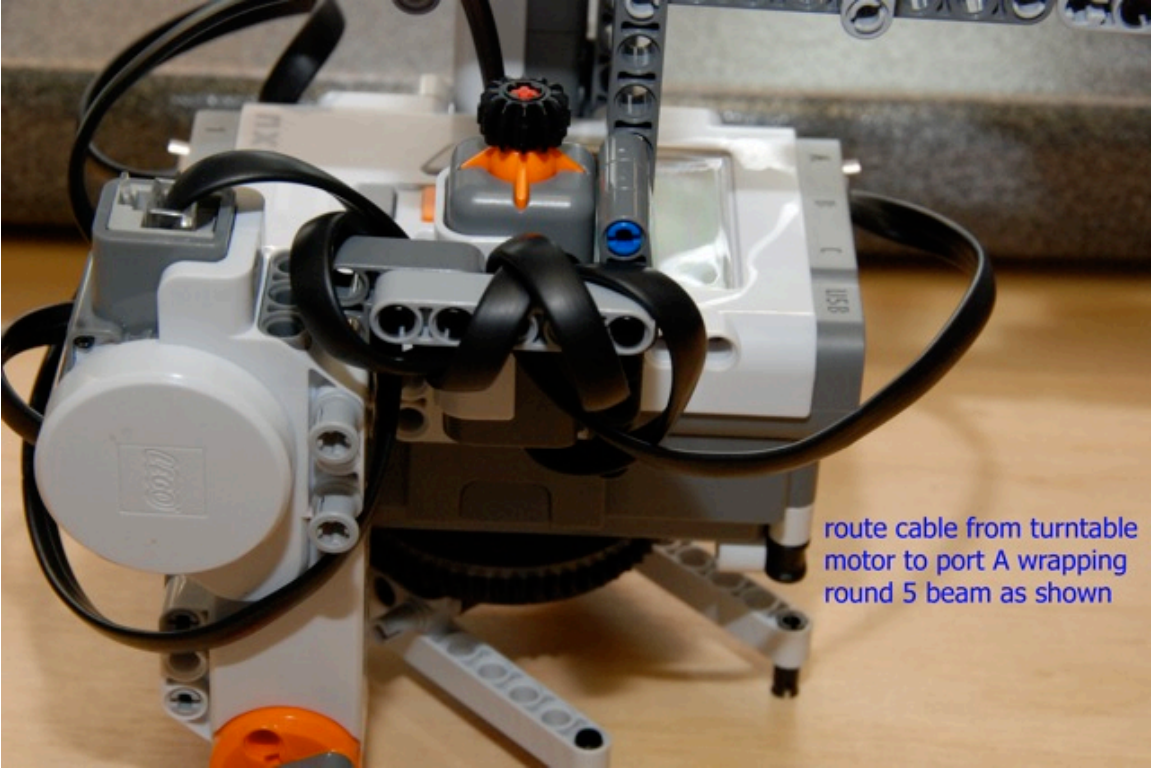
50cm



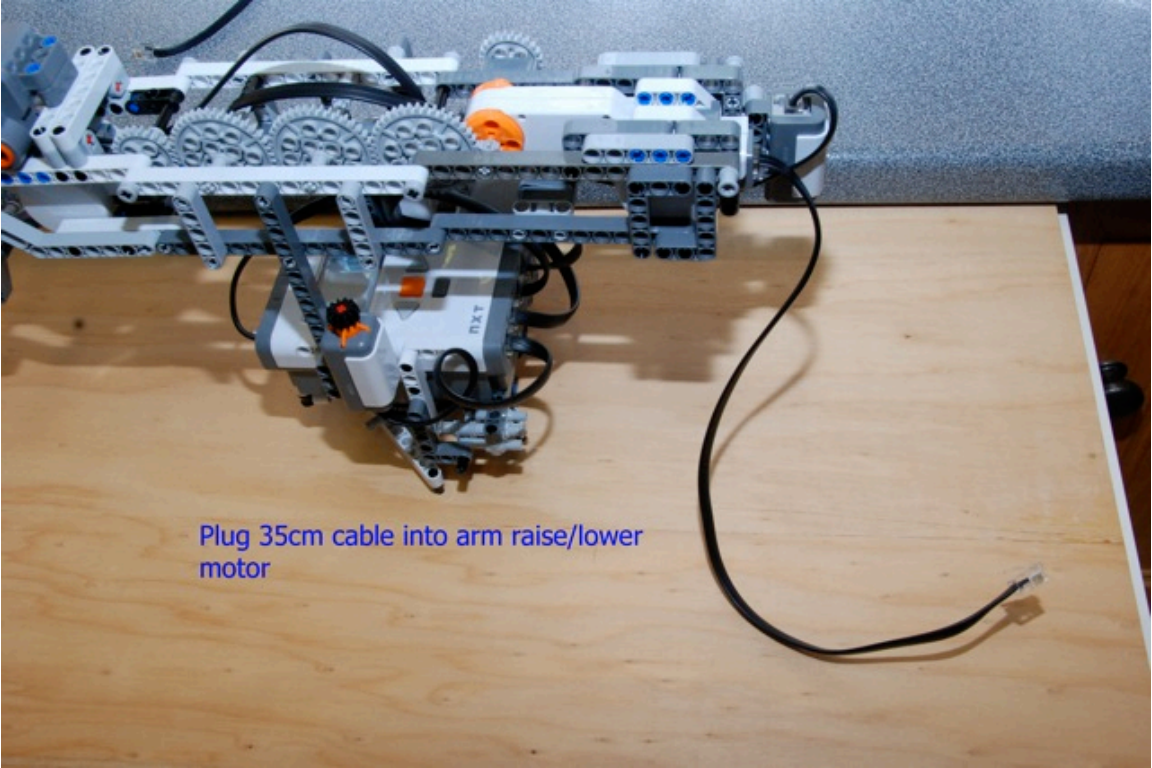
route cable as shown
Ultrasonic sensor
to port 4



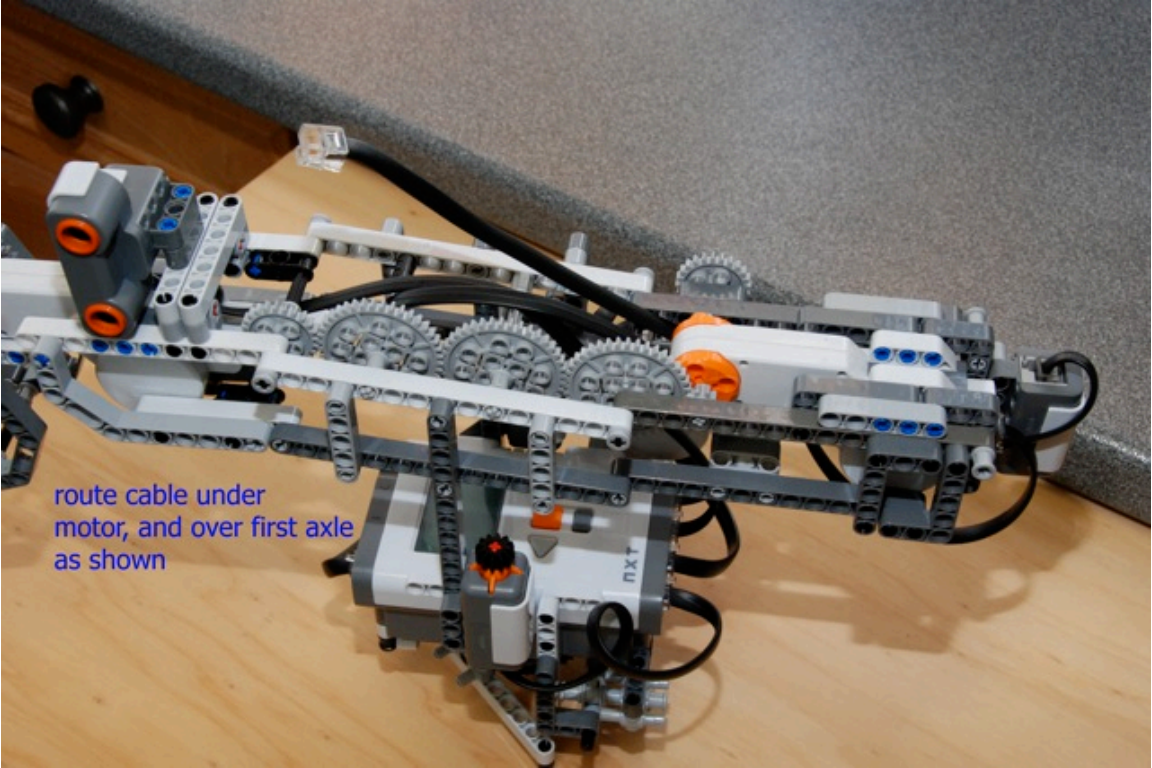
35cm
connect to turntable motor



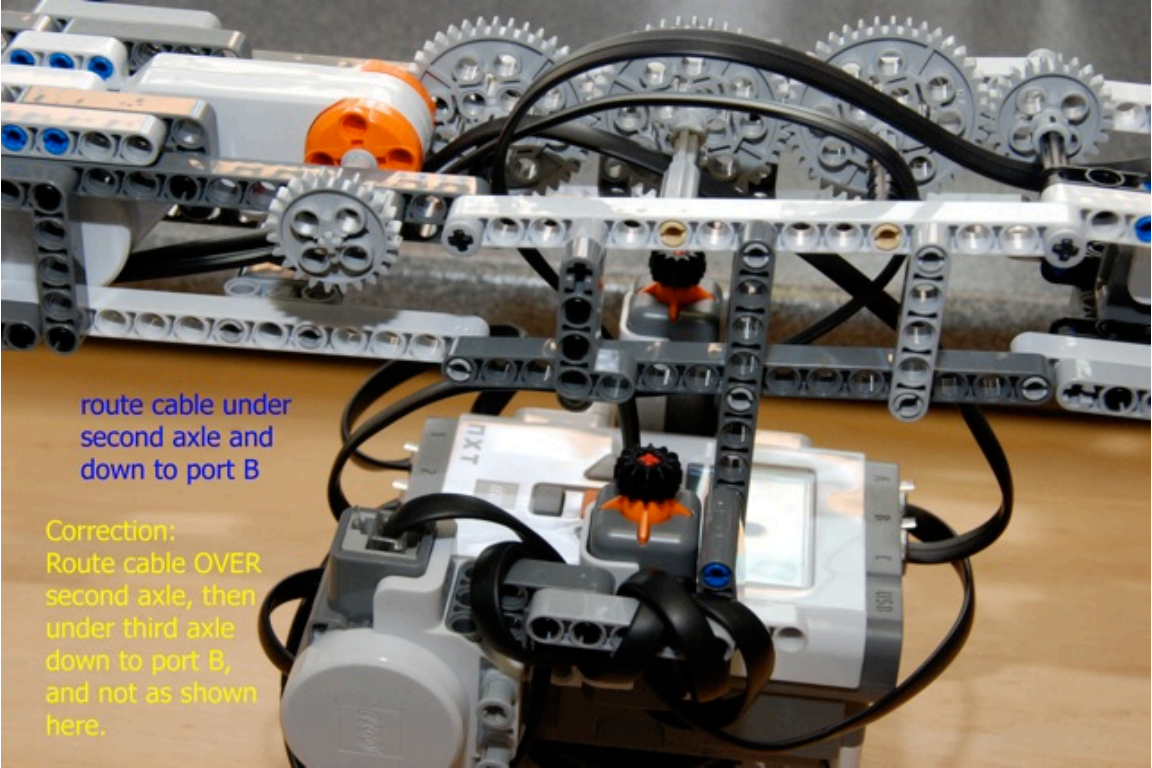
route cable from turntable motor to port A wrapping round 5 beam as shown



Plug 35cm cable into arm raise/lower motor

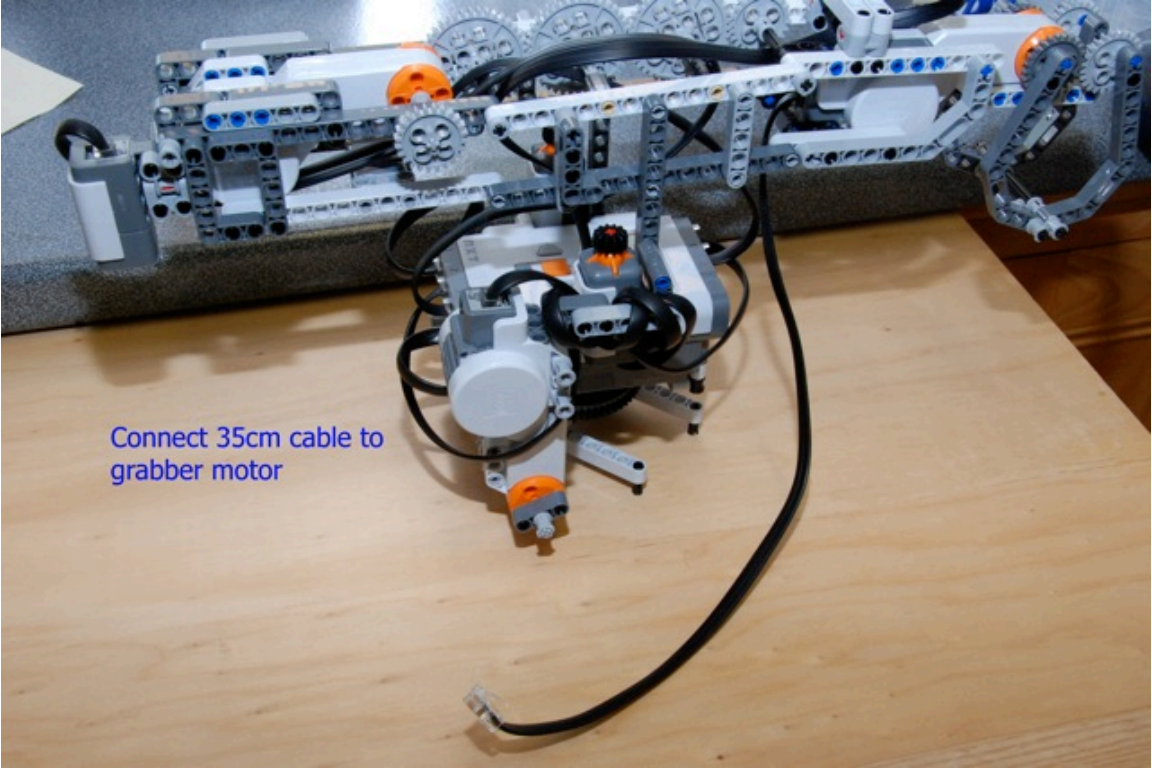


route cable under motor, and over first axle as shown

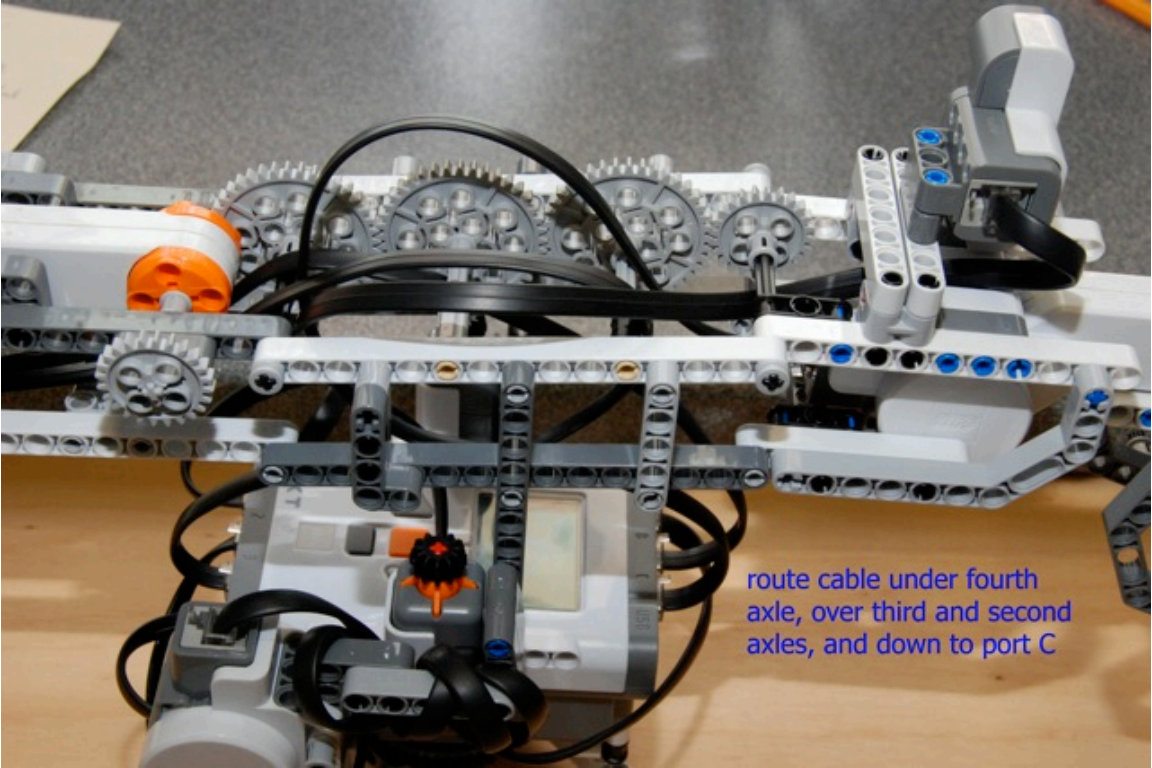


route cable under
second axle and
down to port B

Correction:
Route cable OVER
second axle, then
under third axle
down to port B,
and not as shown
here.

A photograph of a LEGO Technic assembly on a wooden surface. The assembly consists of a grey motor at the front, connected to a complex structure of grey and white Technic beams and gears. A long black cable is connected to the motor and extends across the wooden surface towards the right. The background shows a grey surface.

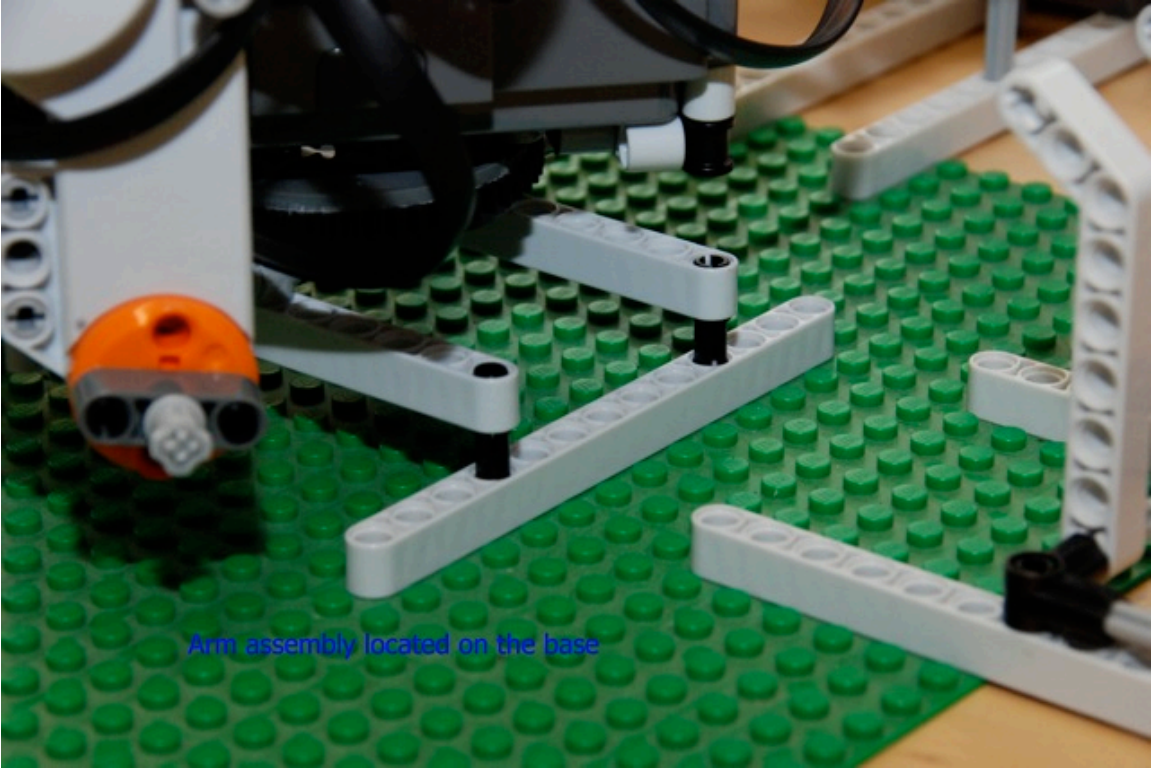
Connect 35cm cable to
grabber motor



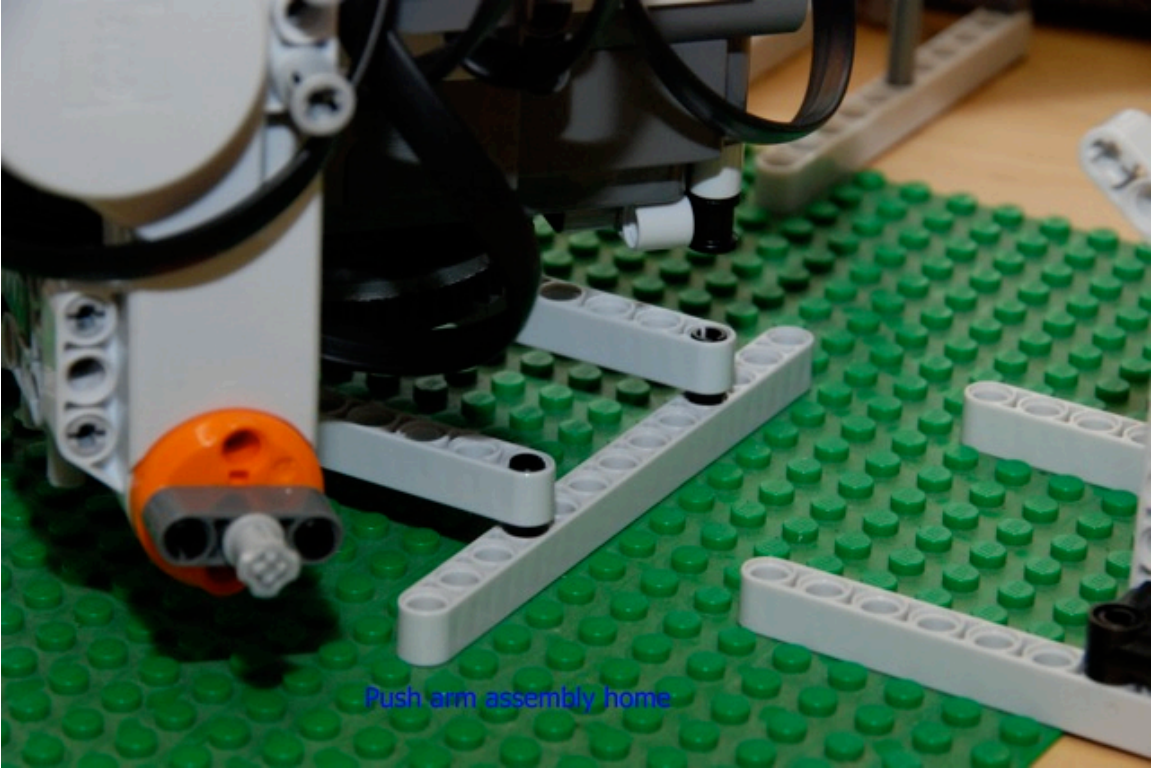
route cable under fourth
axle, over third and second
axles, and down to port C



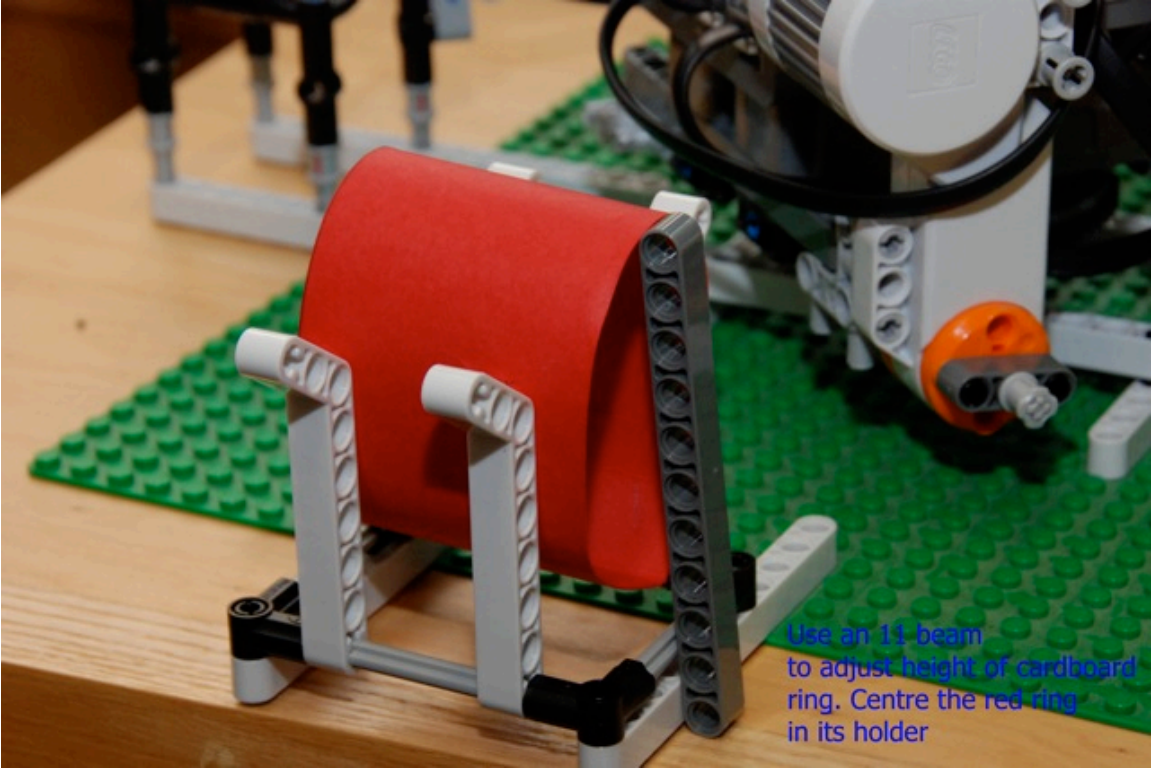
Locate completed arm assembly
on the base



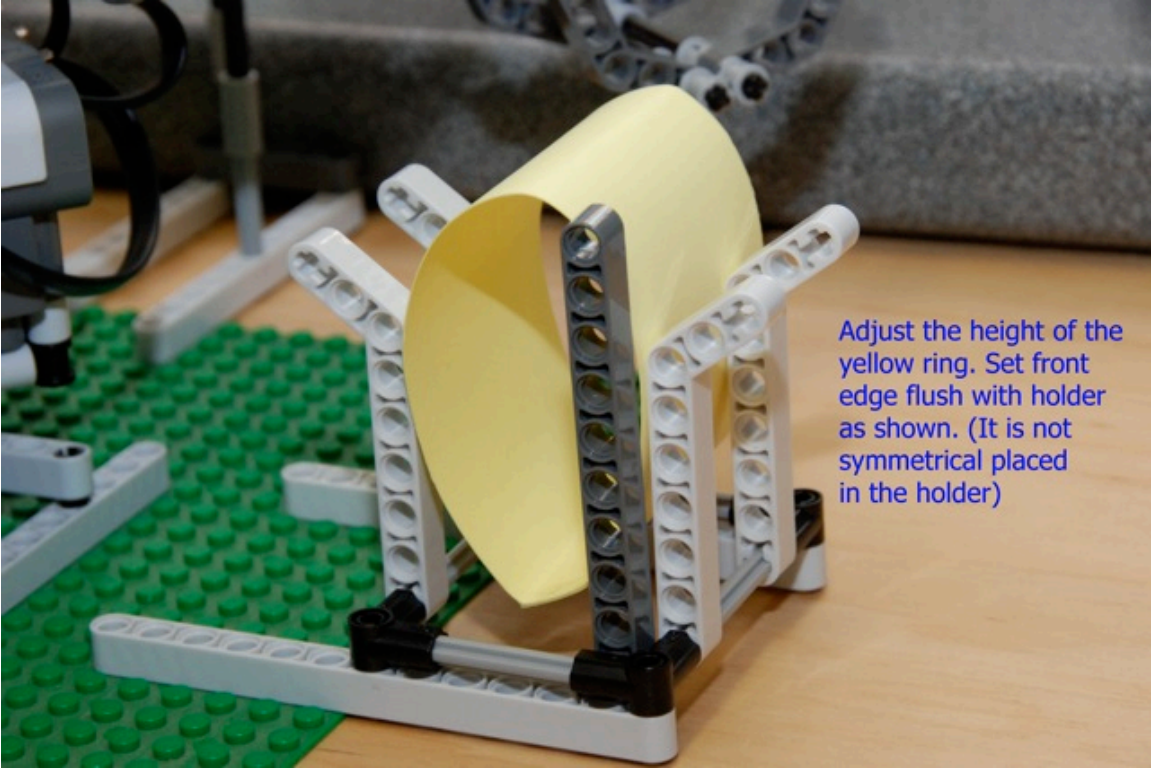
Arm assembly located on the base



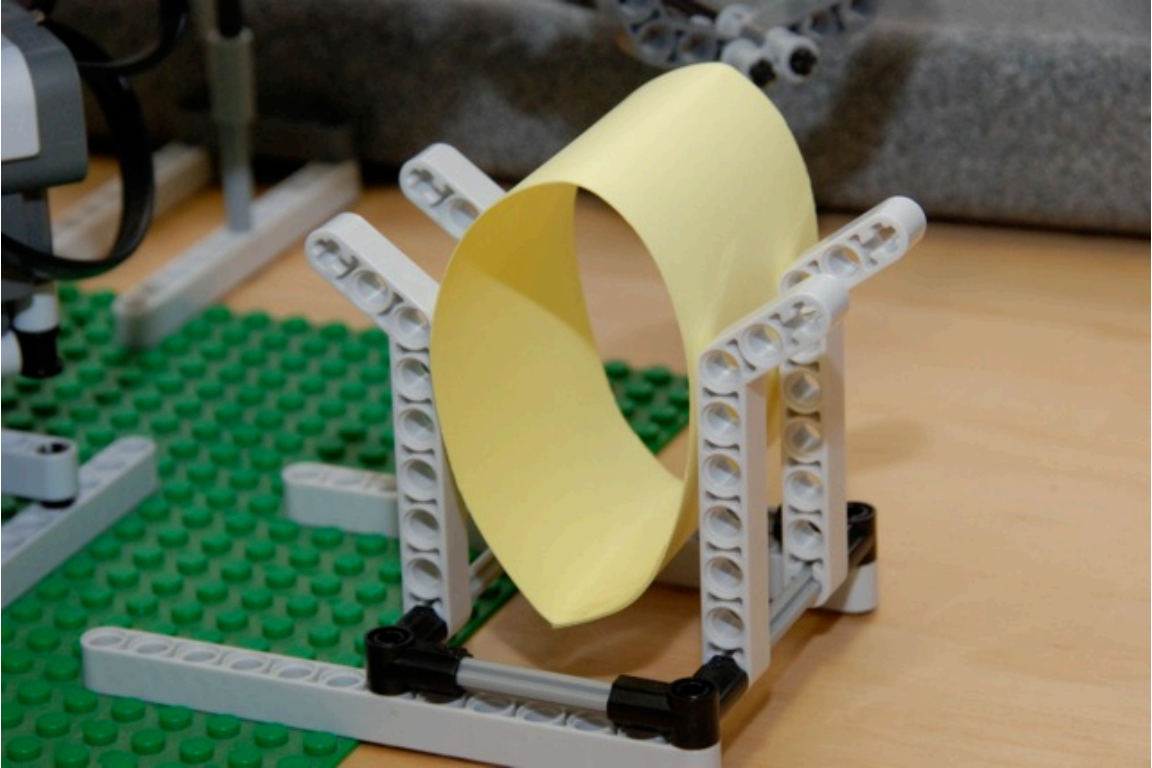
Push arm assembly home

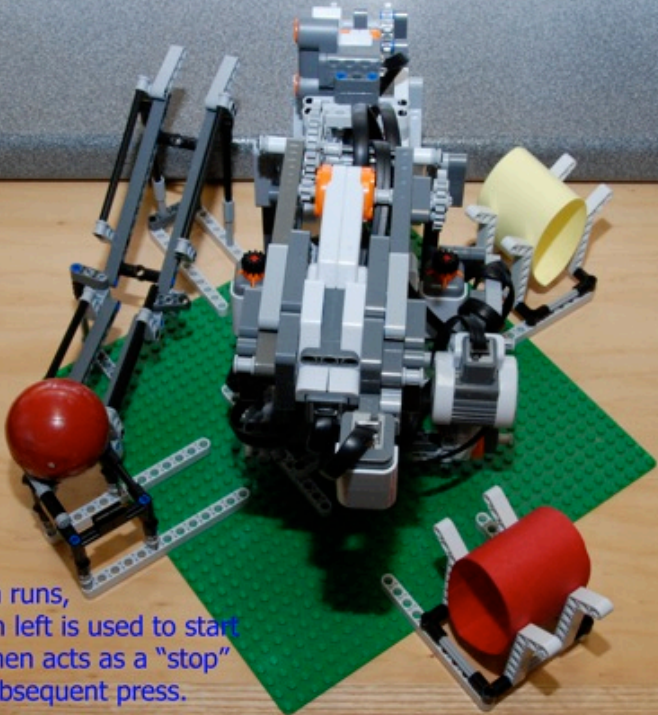


Use an 11 beam
to adjust height of cardboard
ring. Centre the red ring
in its holder



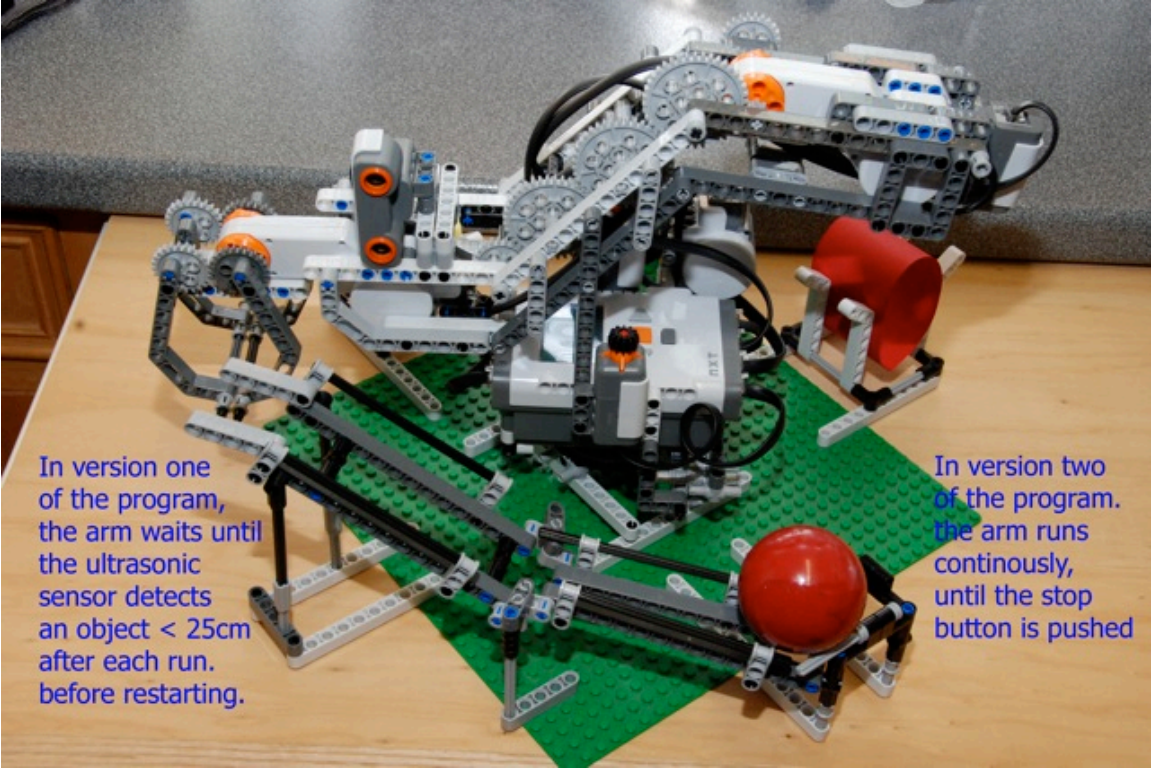
Adjust the height of the yellow ring. Set front edge flush with holder as shown. (It is not symmetrical placed in the holder)



A LEGO Technic robot is shown from a top-down perspective, resting on a green Technic baseplate. The robot is primarily grey and white, with a central motor. On the left side, there is a red ball mounted on a vertical post. On the right side, there is a red cup-like structure. The robot is built with various Technic beams, pins, and connectors. The entire assembly is on a light-colored wooden table.

Overview of
completed
project

When program runs,
push sensor on left is used to start
operation. It then acts as a "stop"
button on a subsequent press.

A LEGO Technic robot is shown on a green baseplate. It features a central white motor, two grey arms with orange gears, and a red ball on a platform. The robot is built with various grey and white Technic parts, including beams, pins, and gears. The background is a wooden surface.

In version one of the program, the arm waits until the ultrasonic sensor detects an object $< 25\text{cm}$ after each run before restarting.

In version two of the program, the arm runs continuously, until the stop button is pushed