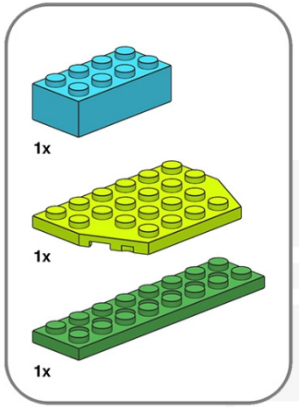

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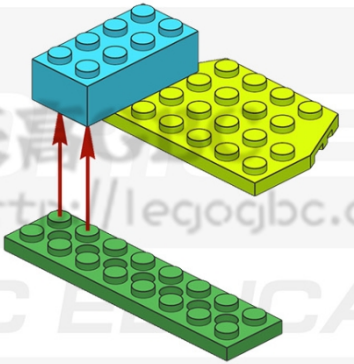

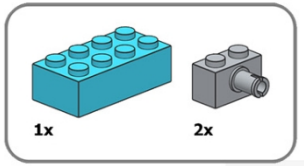

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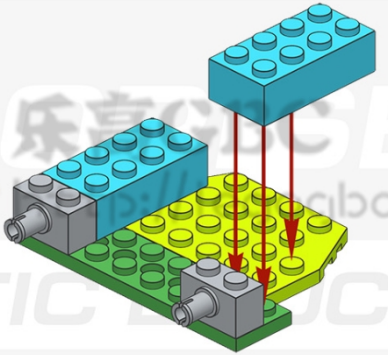

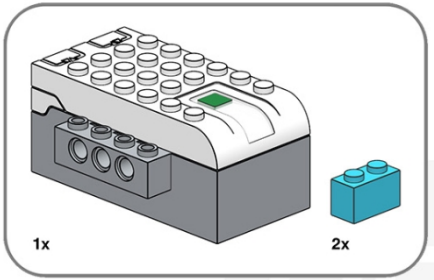

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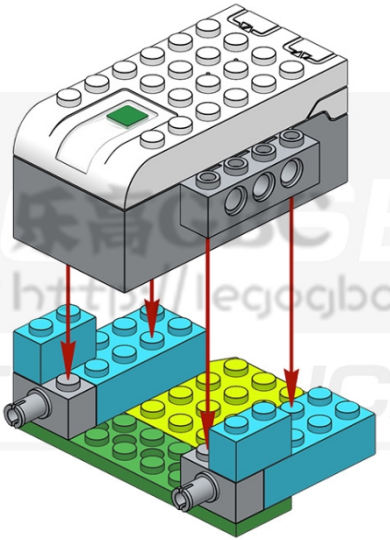

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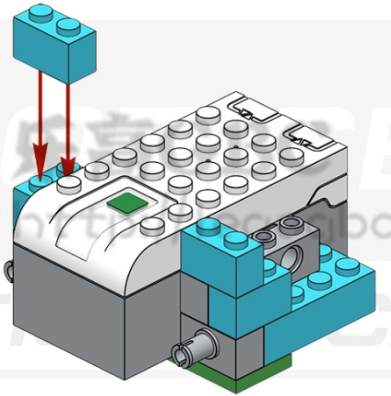

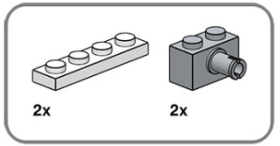

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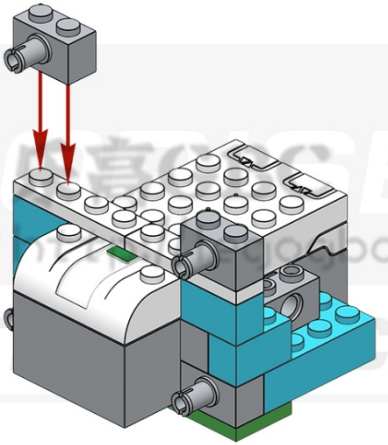

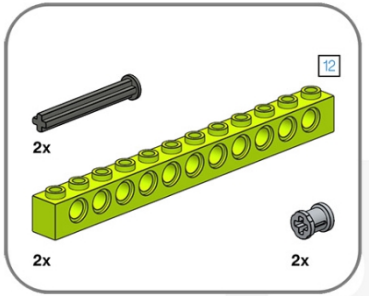

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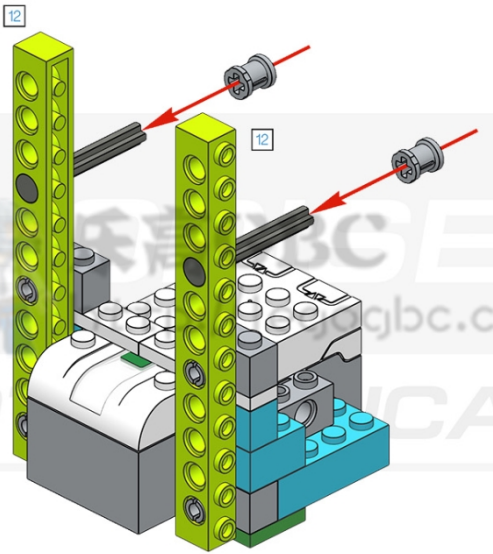

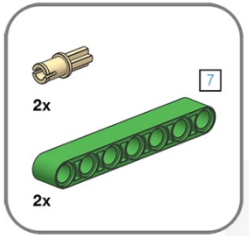

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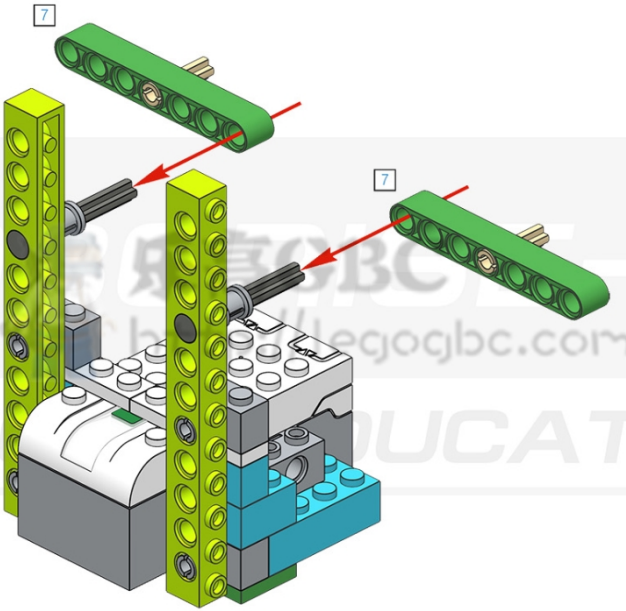

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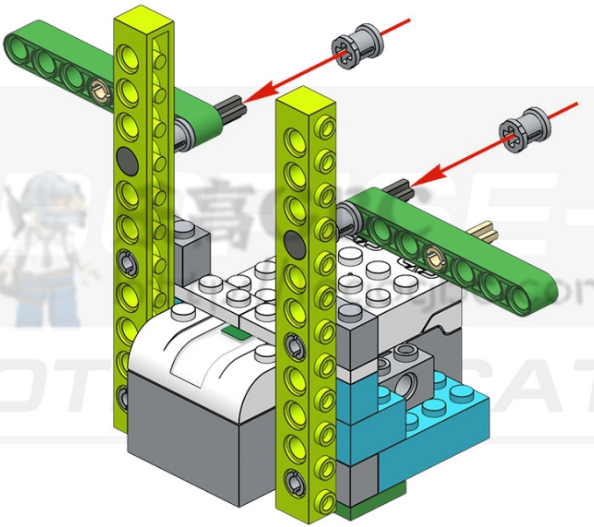

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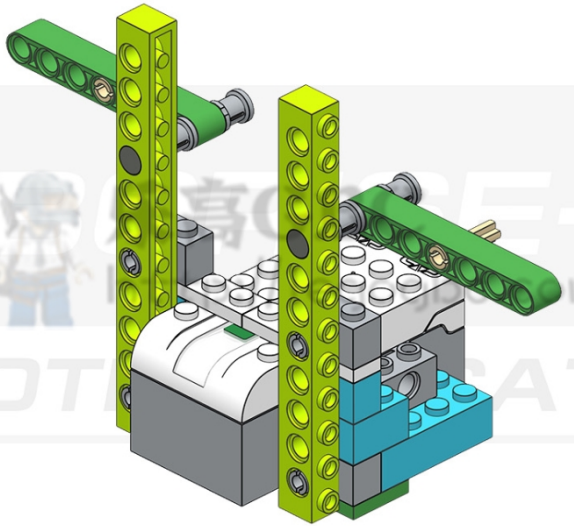

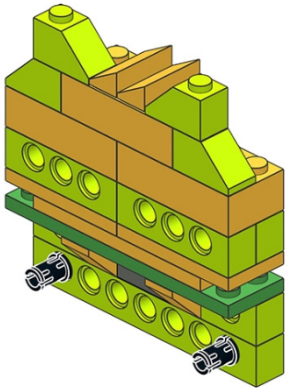

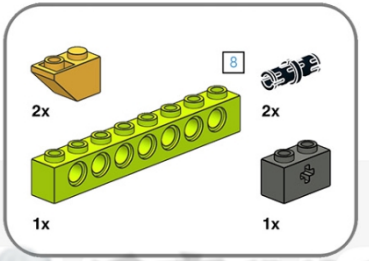

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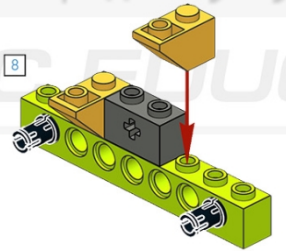

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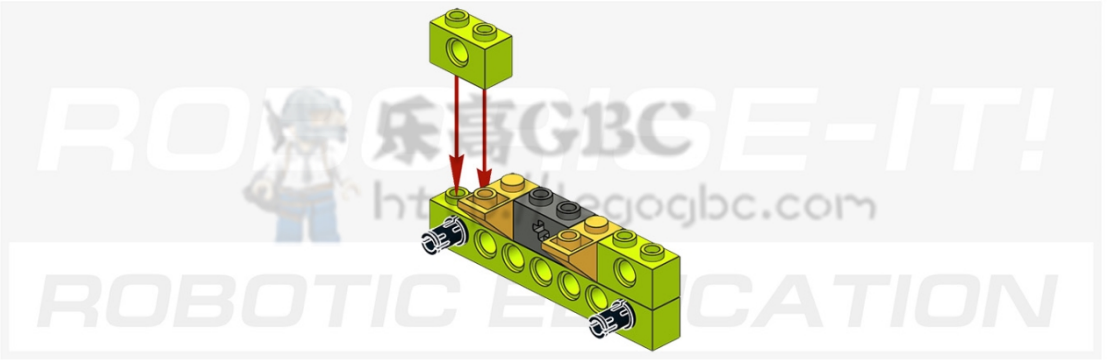

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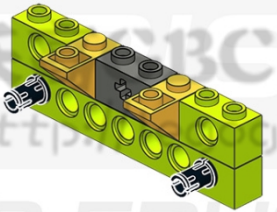

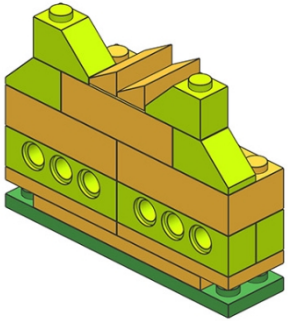

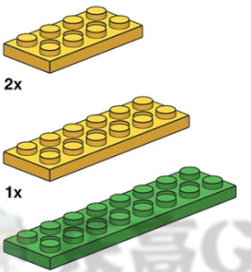

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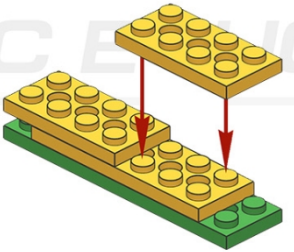

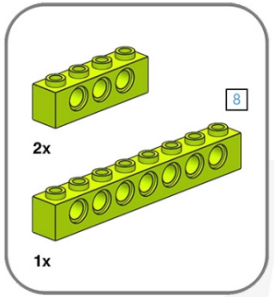

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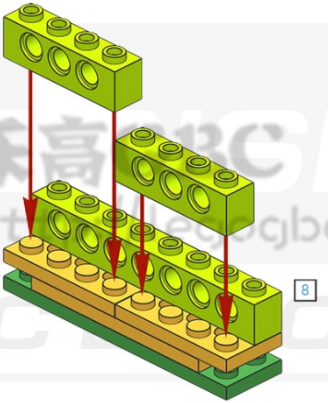

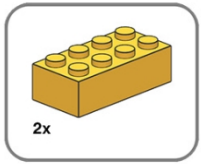

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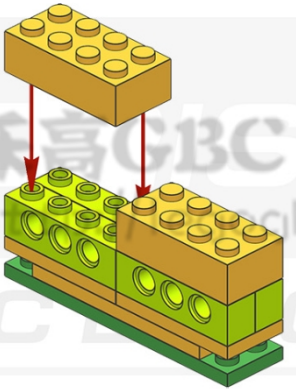

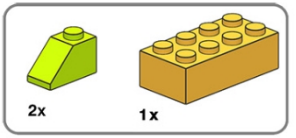

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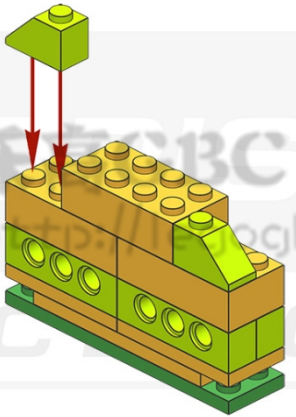

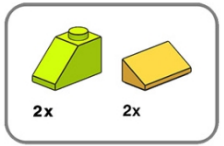

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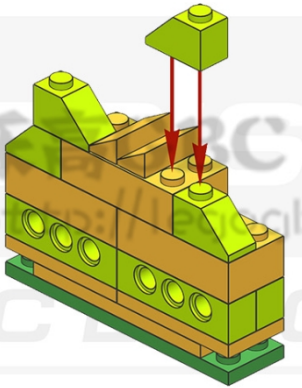

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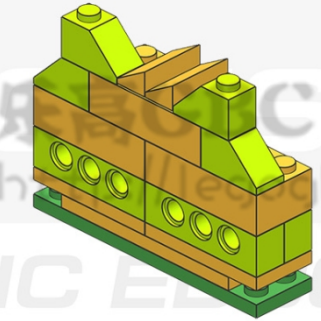

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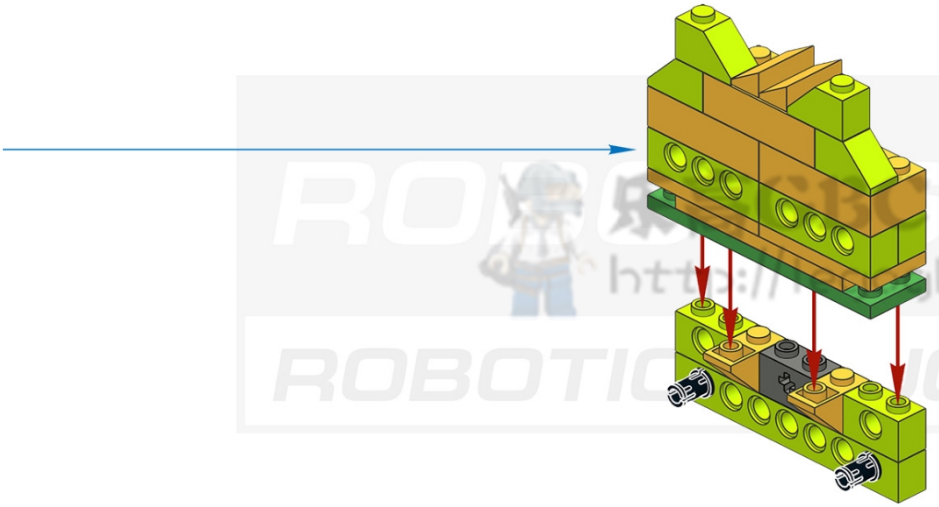

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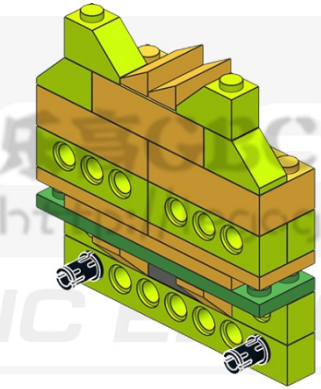

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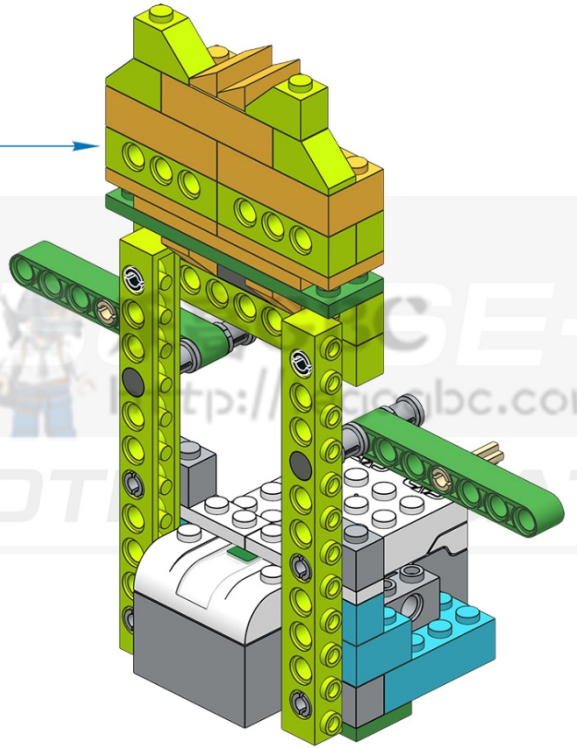

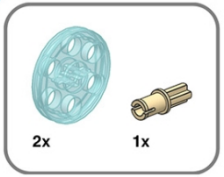

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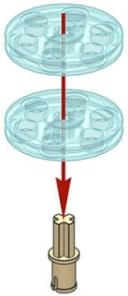

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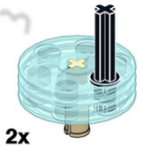

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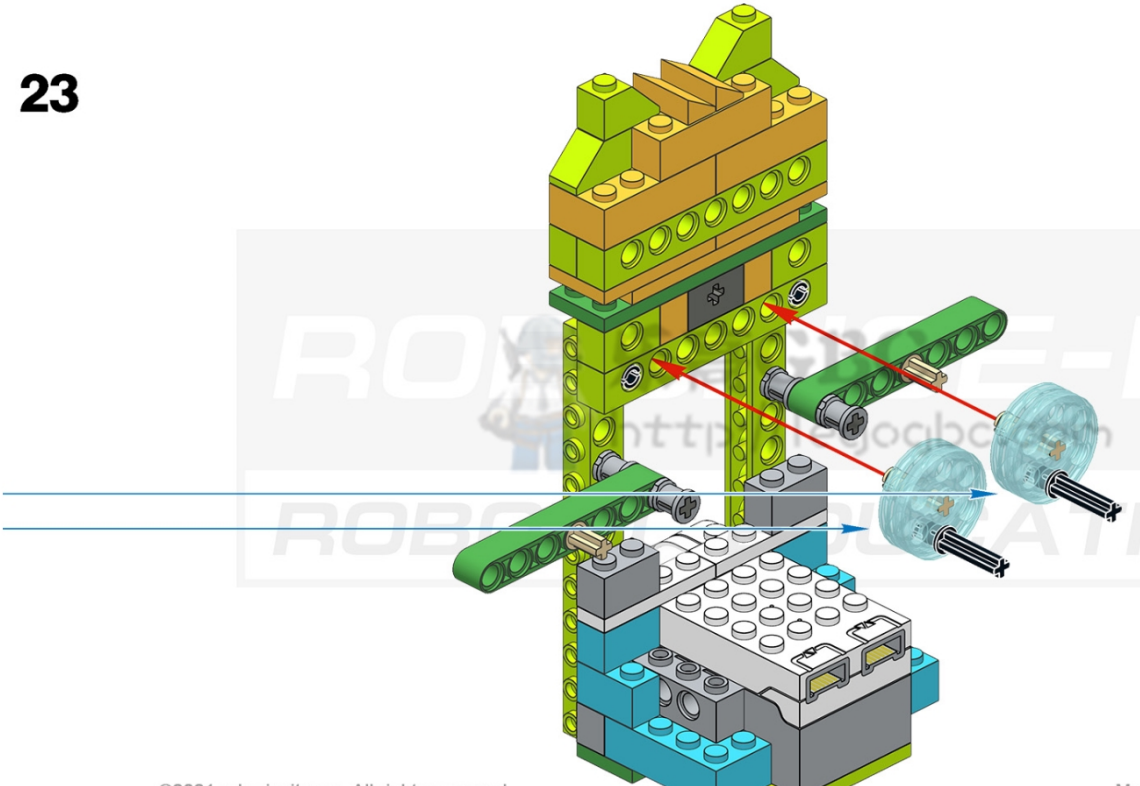

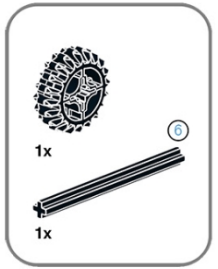

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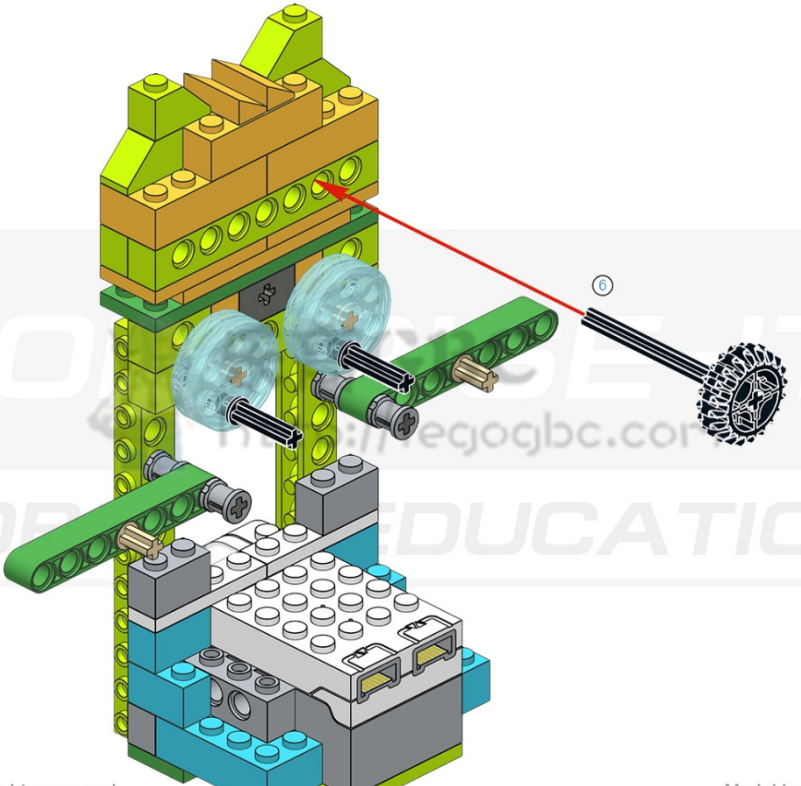

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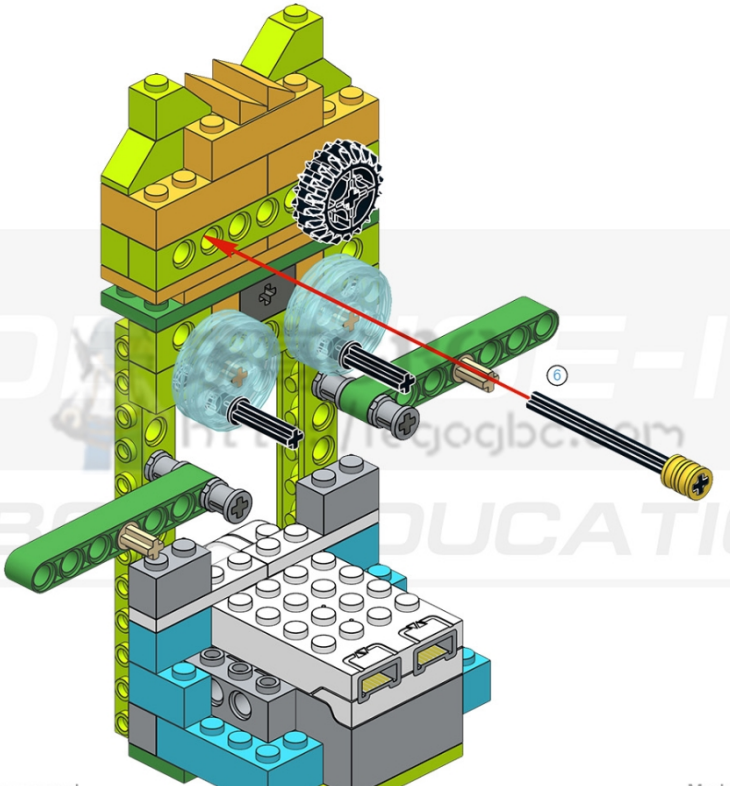

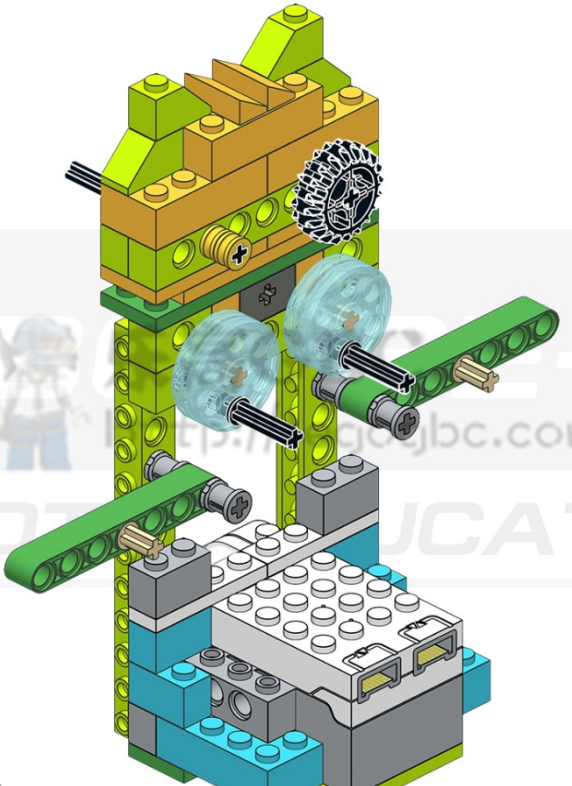

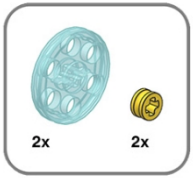

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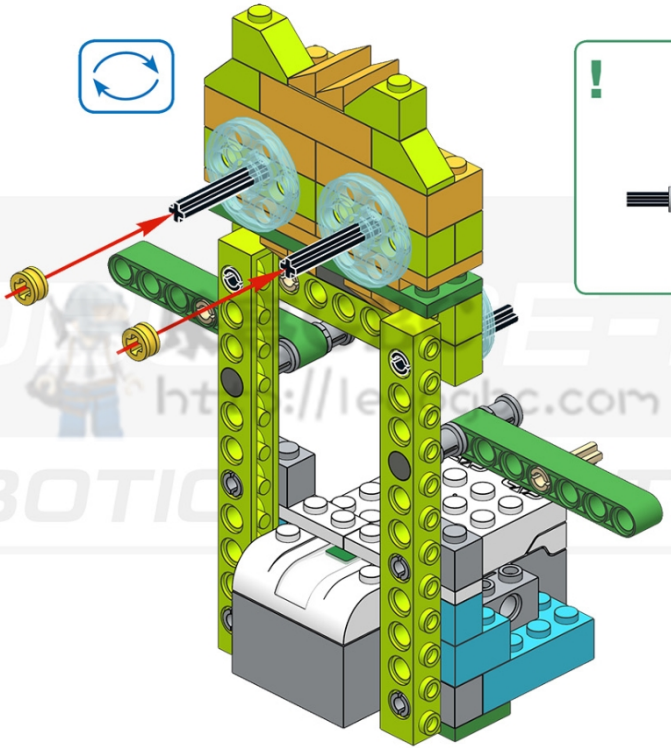

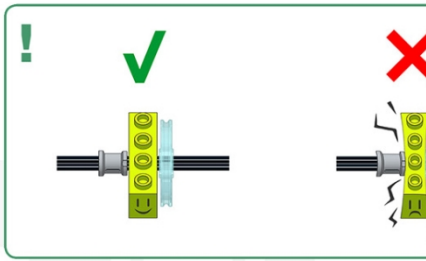

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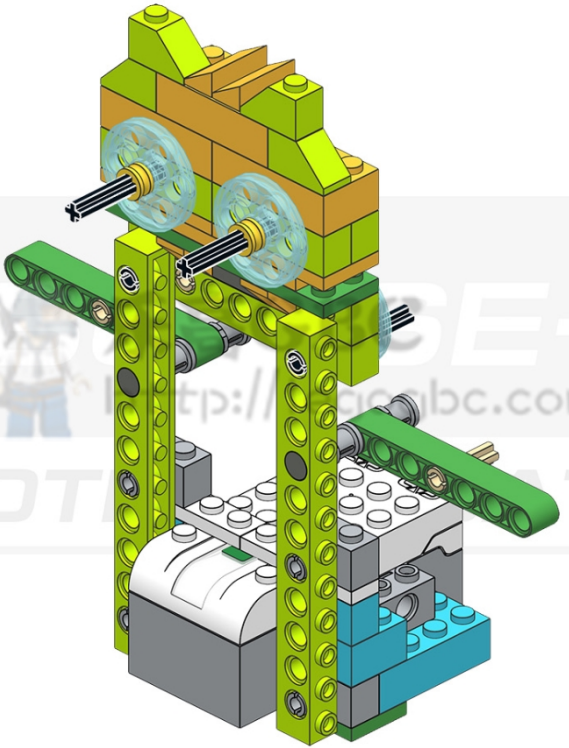

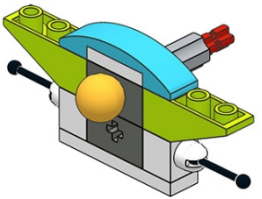

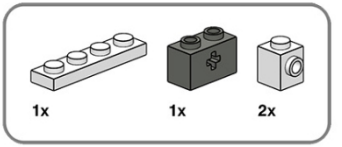

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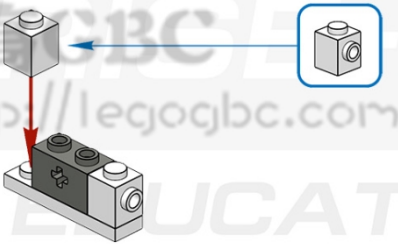

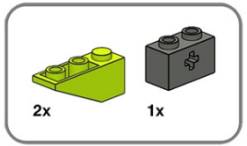

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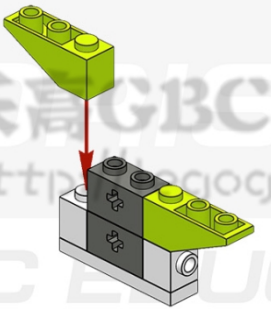

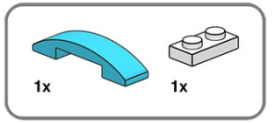

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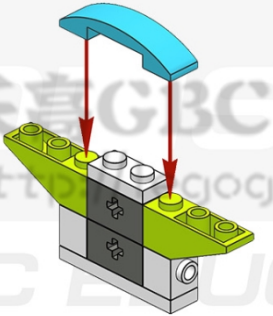

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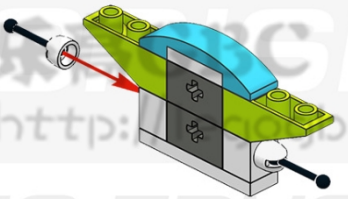

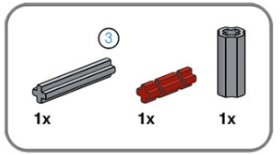

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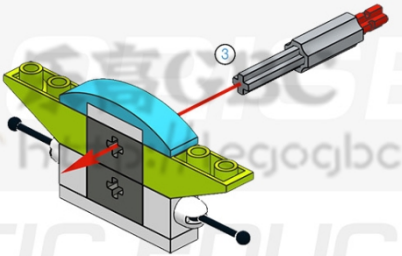

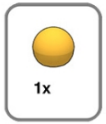

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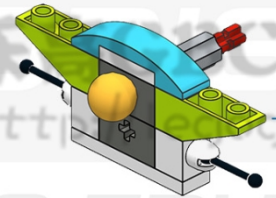

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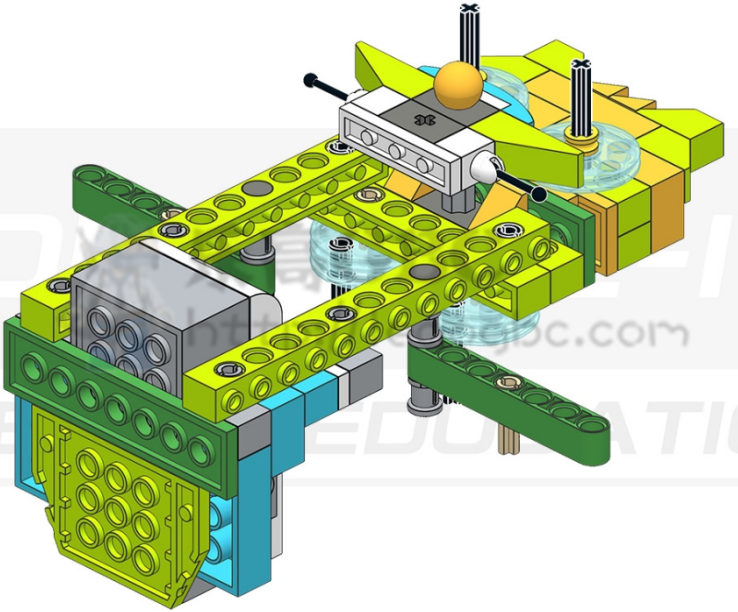

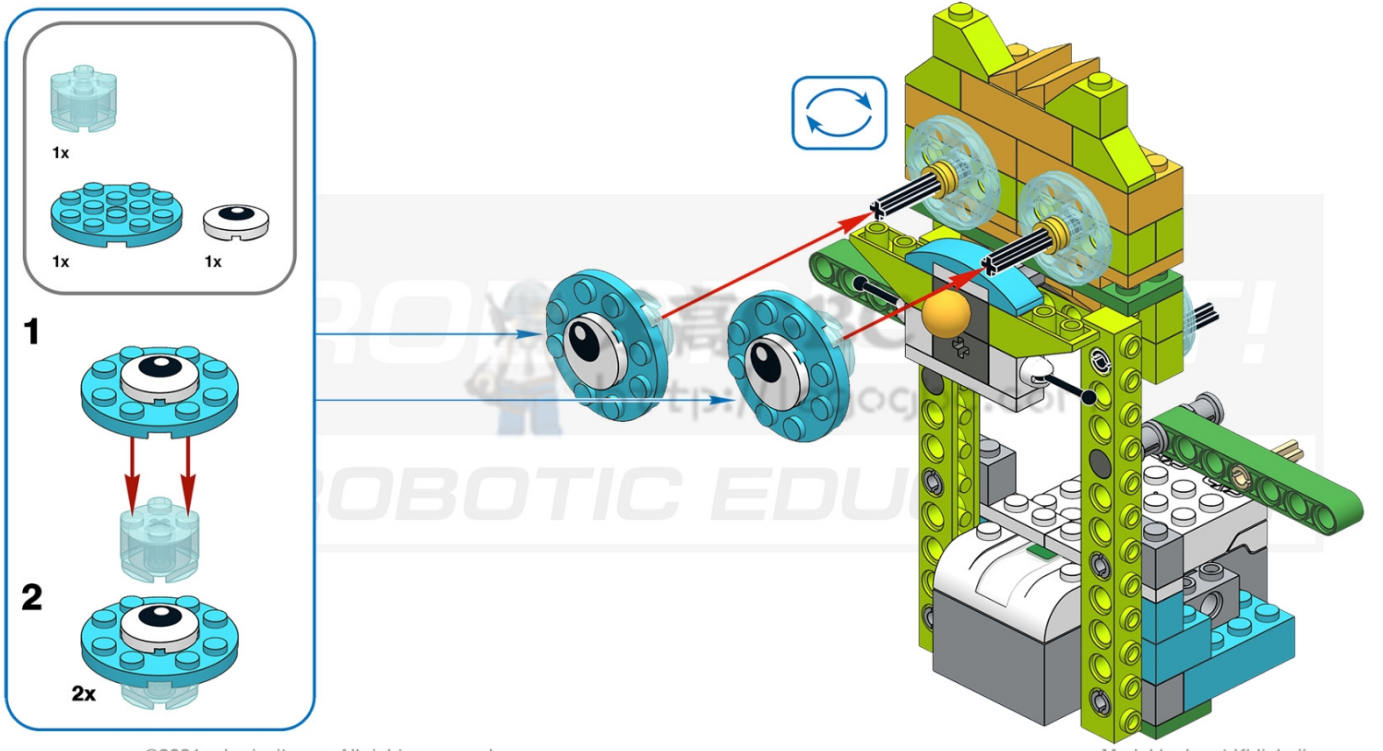
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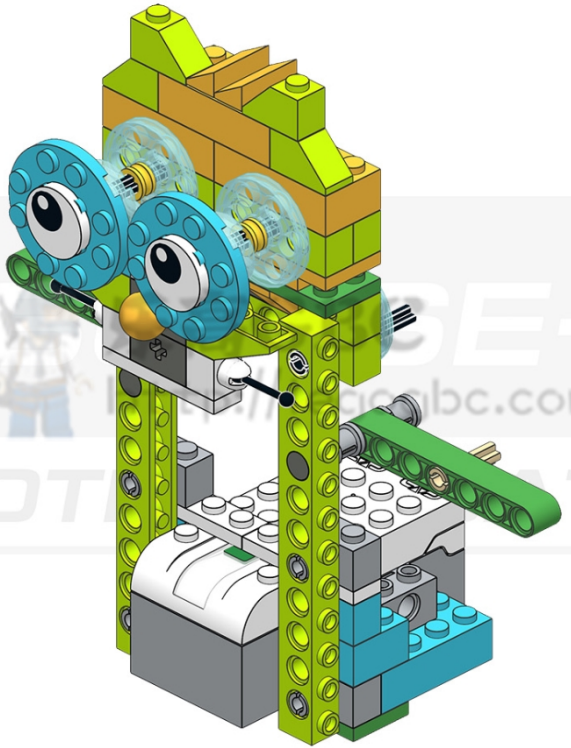

Extended version

Finish the robot's legs

Go to the first slide of the instruction

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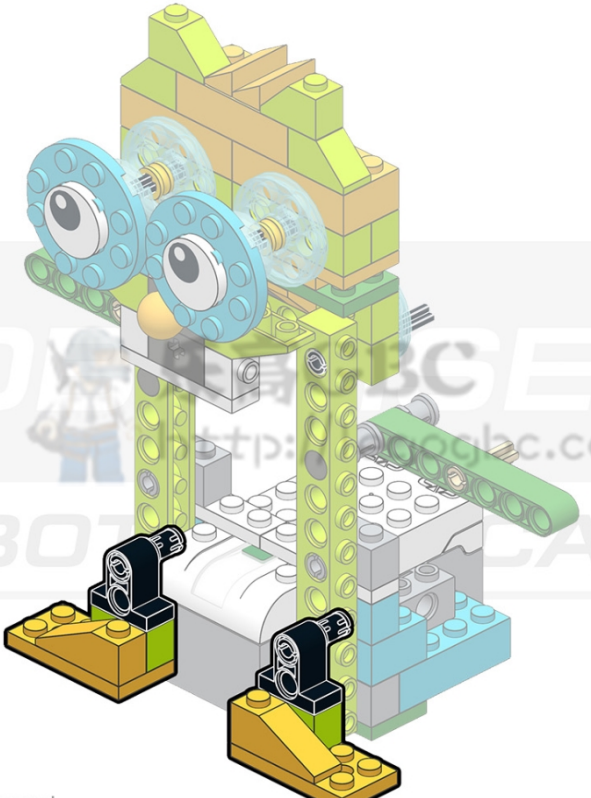

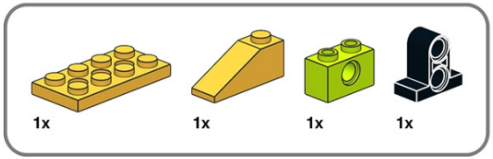

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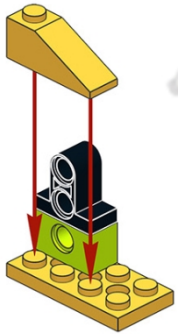

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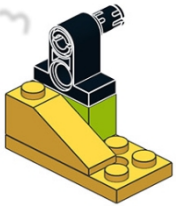

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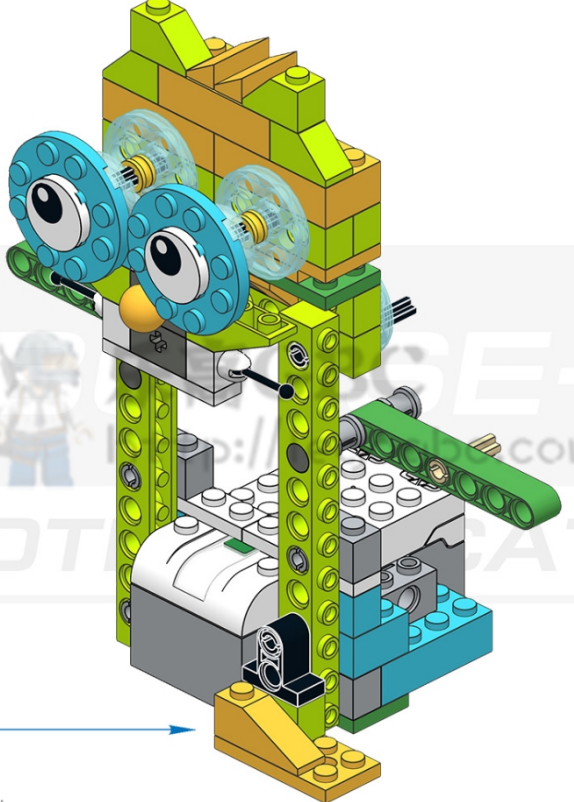

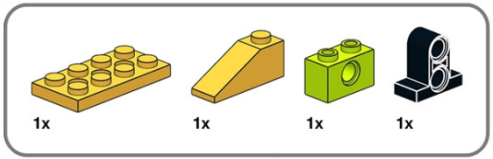

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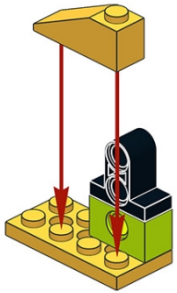

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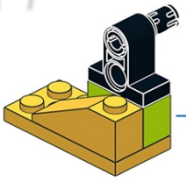

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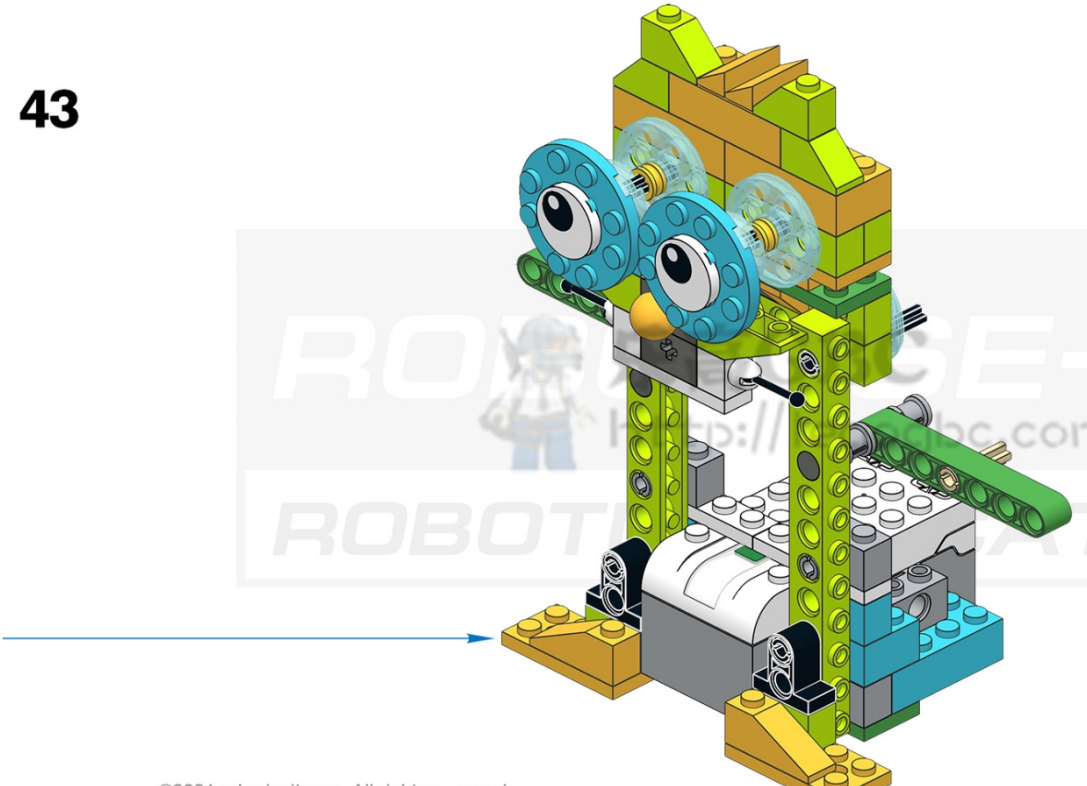
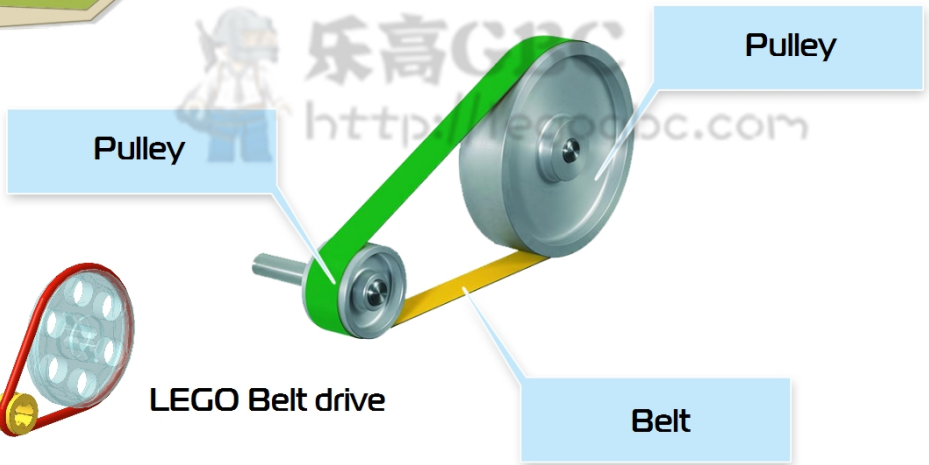


Task 1

Use a belt drive to transfer rotation to the axis of the robot's left eye.

Belt drive

Belt drive is widely used for transmission of rotation. It consists of at least two pulleys and a belt. This transmission has minimal vibration and noise, but cannot transmit much power. The speed of rotation of the pulley depends on the ratio of the pulley diameters.

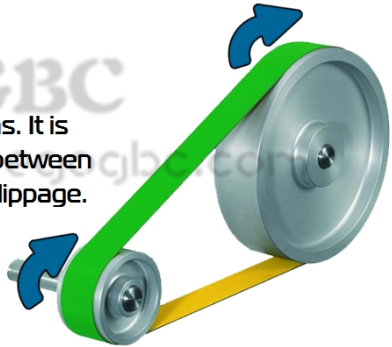


LEGO Belt drive

Belt drive

Note! Because the belt may slip, the original axle may not always rotate as you would expect. For example, a heavy robot may not move at all, although if it is lifted, the wheels will rotate.

The pulley has a recess in which the belt runs. It is made in order to increase the contact area between the belt and the pulley and thereby reduce slippage.

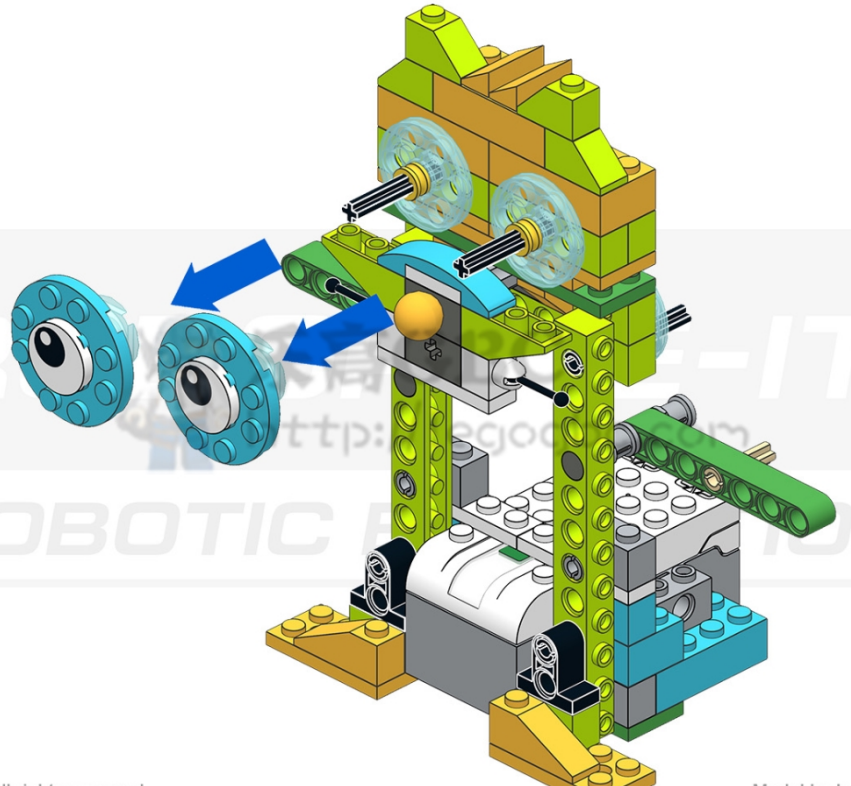


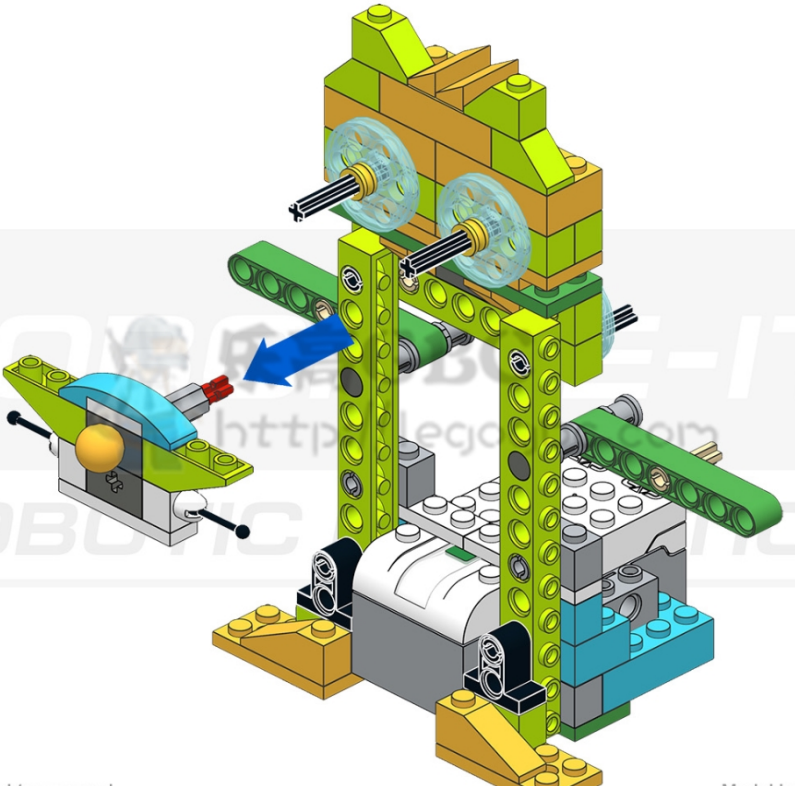
When using a belt drive, keep in mind that the direction of rotation of the input and output axles is the same.

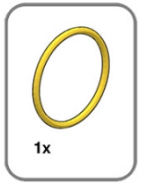
Drive of the robot eyes

Implement rotation transfer from one robot eye to another

Go to the first slide of the instruction







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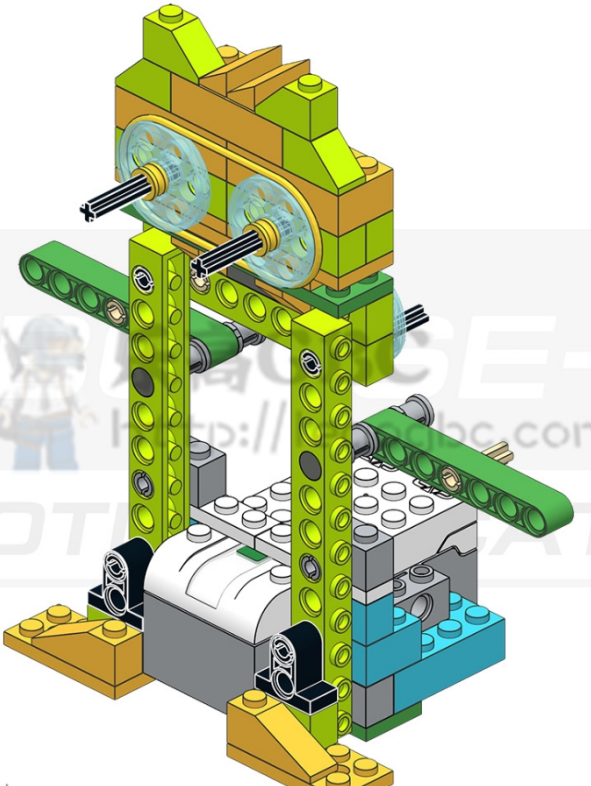


Task 2

Test eyes rotation. As you can see, they rotate in the same direction. How can the rotation of the eyes be realized in opposite directions?

Belt drive

The crossed belt drive, in contrast to the direct one, changes the direction of rotation of the driven axle.

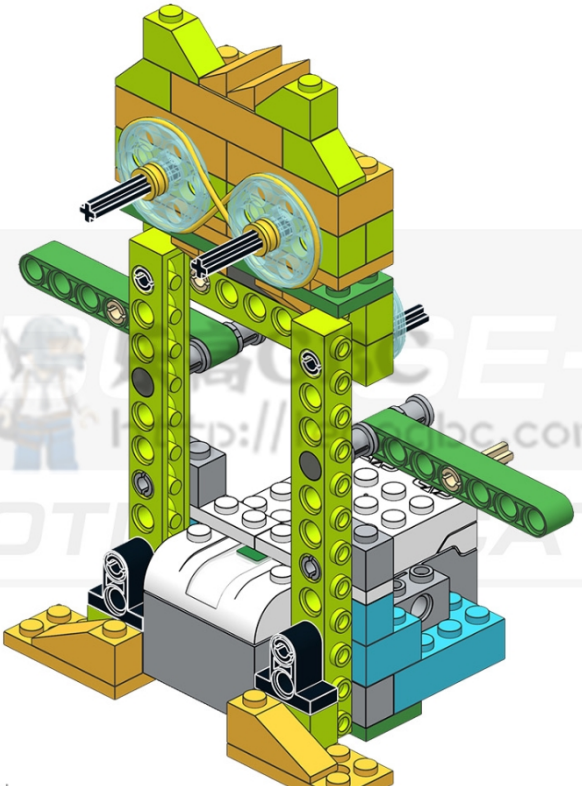
Task 3

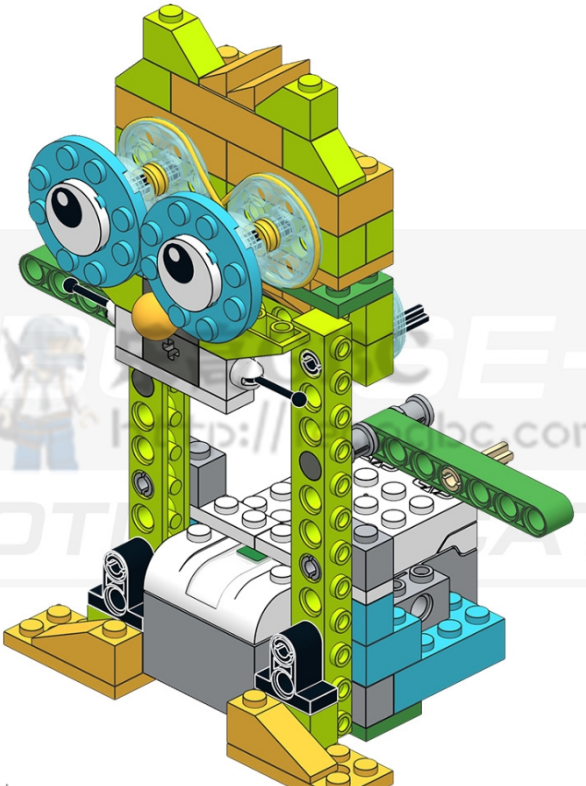
Change the direct belt drive to a crisscross.

Drive of the robot eyes

Experiment with belt drive. Change the direction of rotation of the driven axis

Go to the first slide of the instruction





Task 4

Test eyes rotation. They must rotate in opposite directions.

Task 5

Use a step-down belt drive to drive the left arm of the robot.

Belt drive

By using pulleys of different diameters, it is possible to get step-down and step-up gear transmission.

Task 6

Test the shoulder drive. Notice how slower it rotetes than the gear knob. The threefold decrease in speed was due to the use of pulleys, the diameters of which differ threefold.

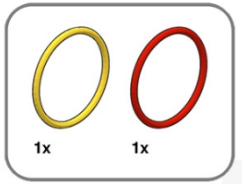
Task 7

Move the robot's right shoulder as well. In general, the arms should move at the same speed, so pulleys of the same diameter will be used here.

Drive of the robot shoulders

Implement the drive of robot shoulders

Go to the first slide of the instruction



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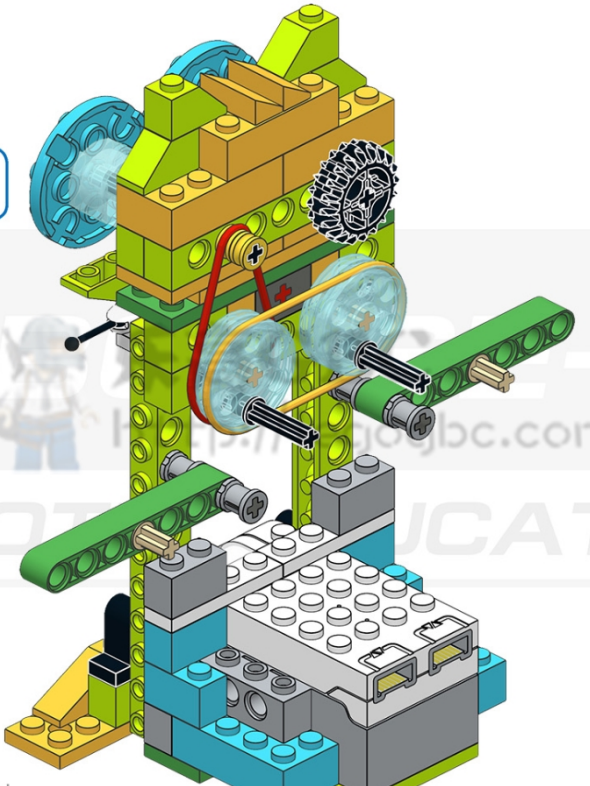


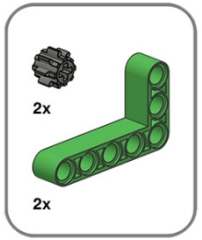
Task 8

To ensure the movement of the robot's arms, tractions are used, attached to the shoulders. Fix them at the robot

Hand connection

Convert shoulder rotations to up and down movement using cams

Go to the first slide of the instruction



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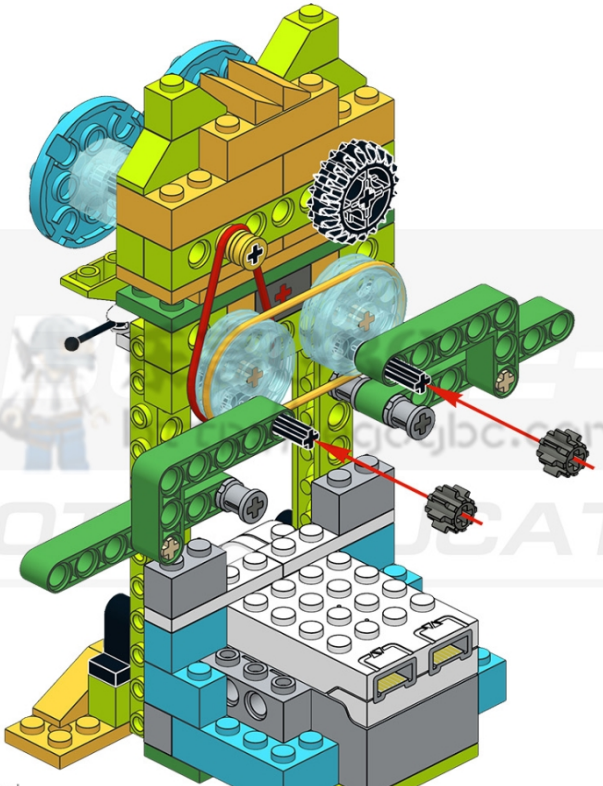
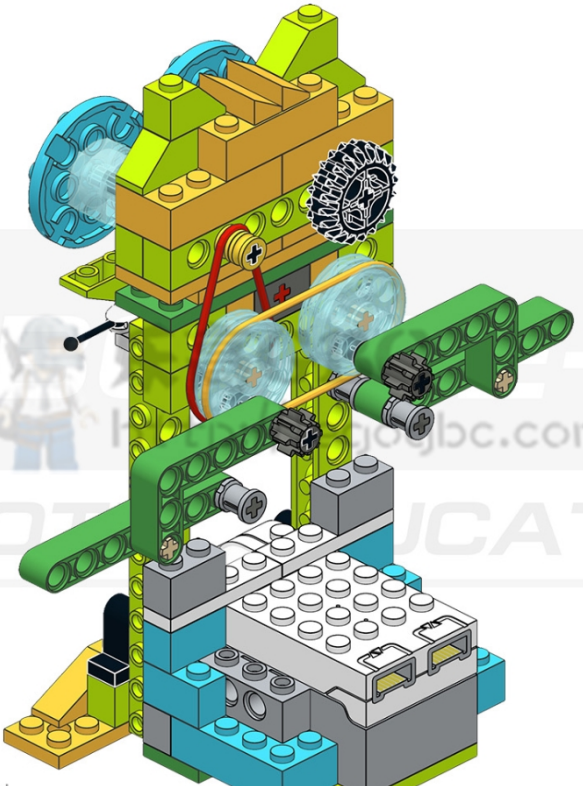




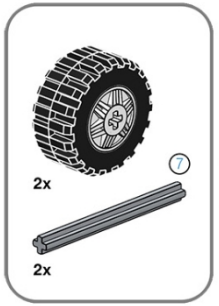
Task 9

Test the operation of all constructed belt drives. If at any of the stages the rotation is not transmitted, check whether the pulleys are too tightly clamped and whether the axles rotate freely.

Dumbbells

Build fitness dumbbells

Go to the first slide of the instruction



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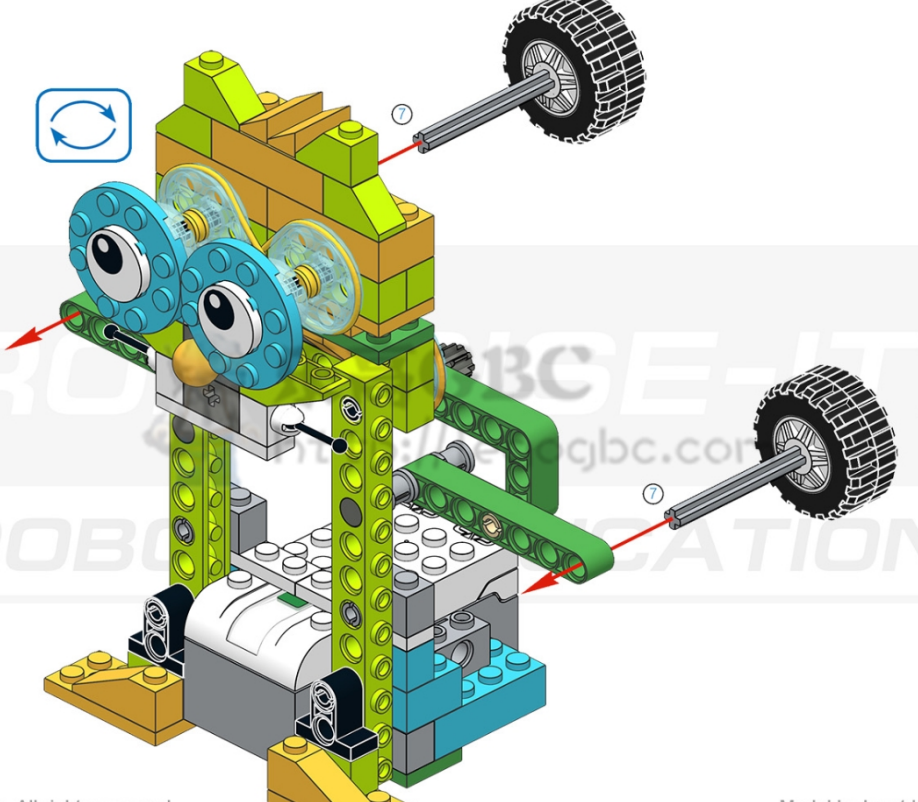

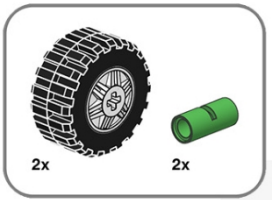

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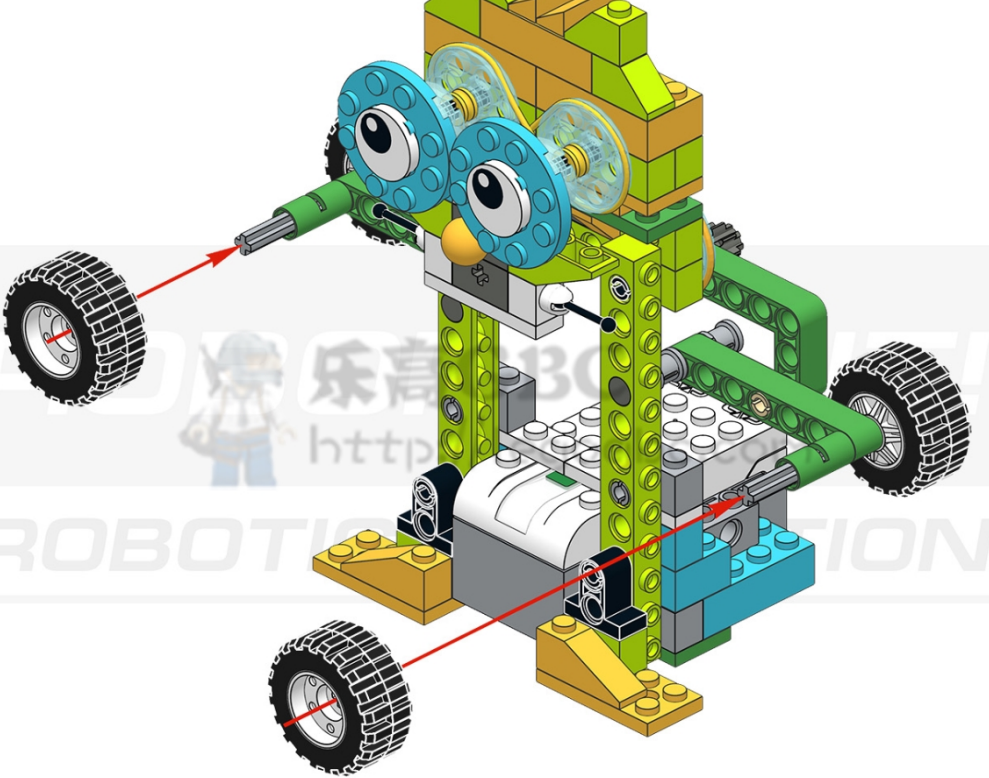

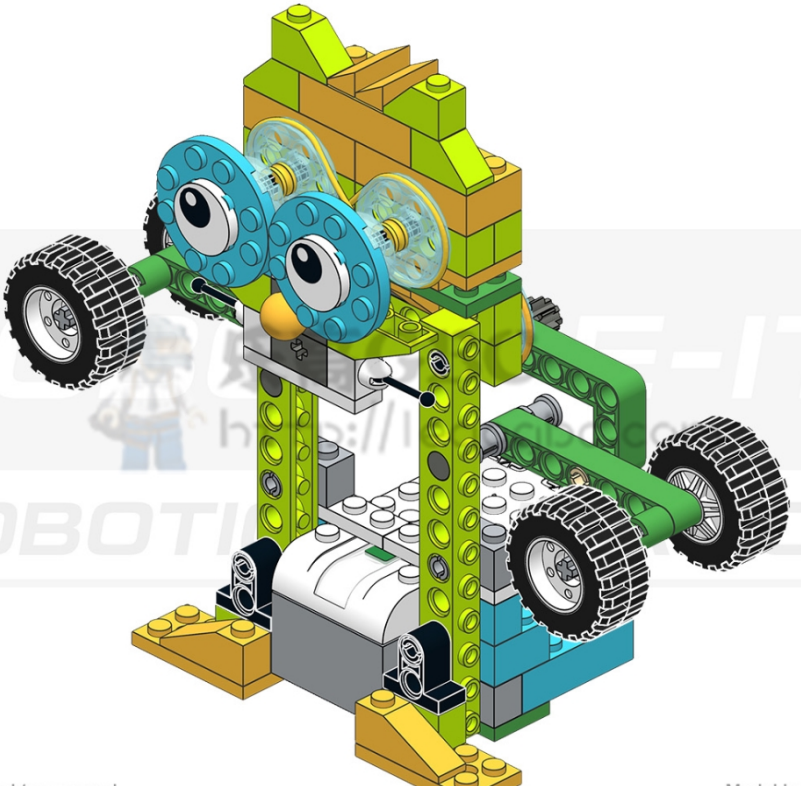

Task 10

Test the robot with dumbbell. Is it ready to connect the motor?

Task 11

Replace gear to test robot with a motor.

Task 12

Add a tail with a tilt sensor to control the intensity of your workout.

Motor and sensor

Motorize your robot and use the tilt sensor to control your exercise speed

Go to the first slide of the instruction

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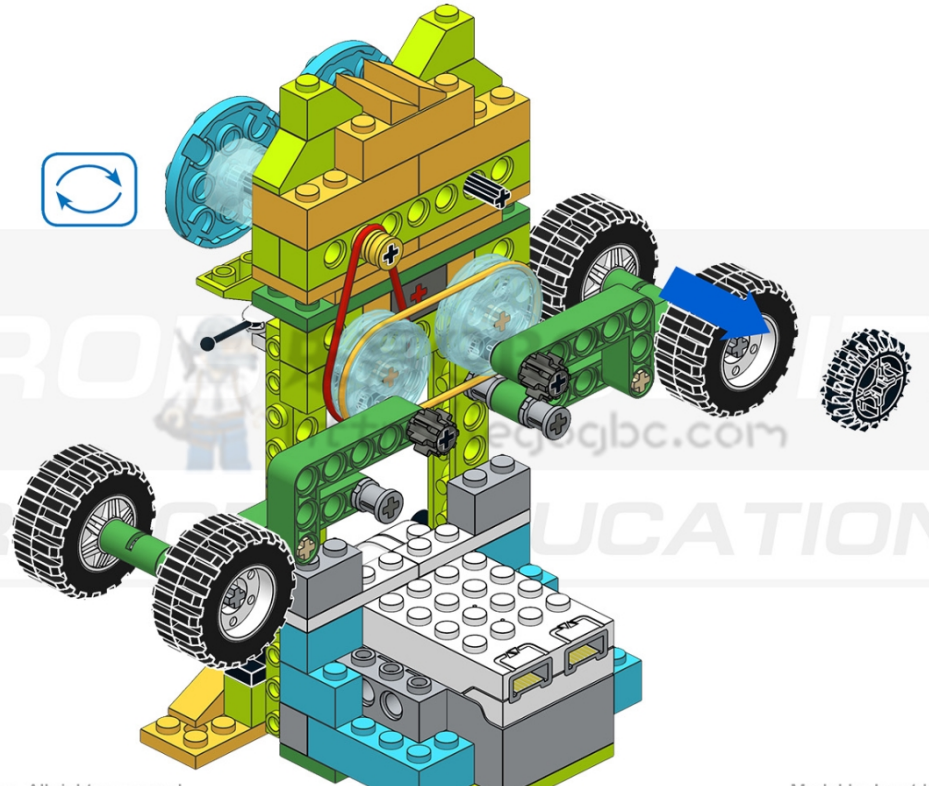

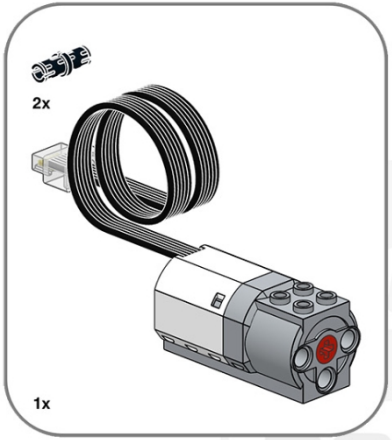

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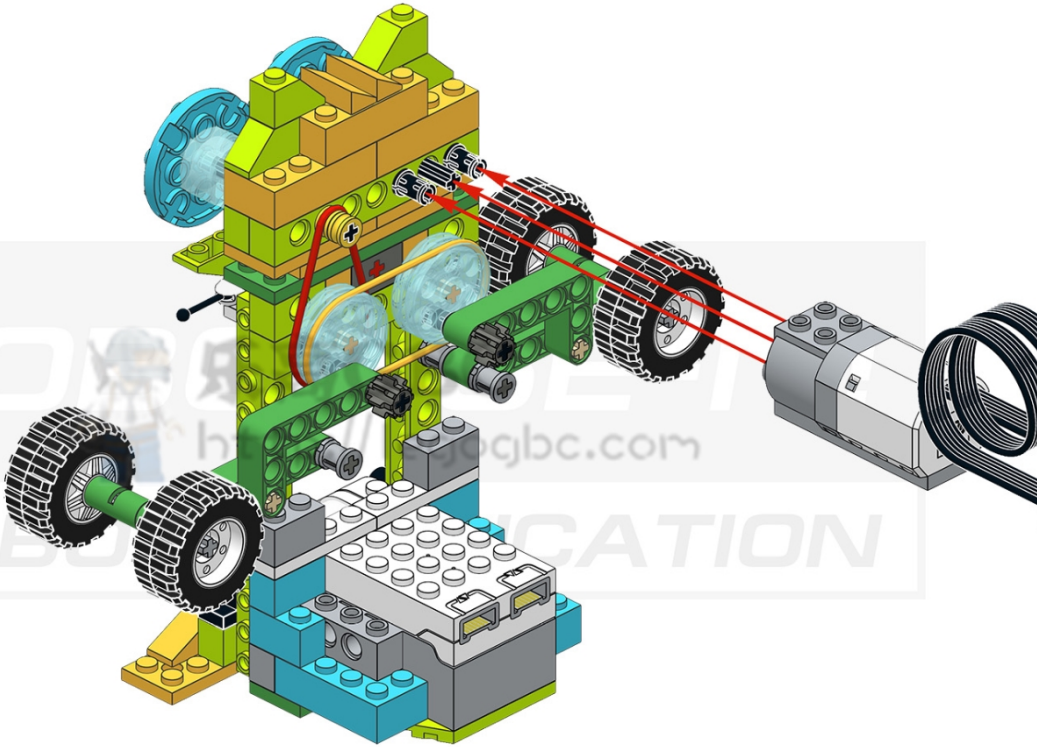

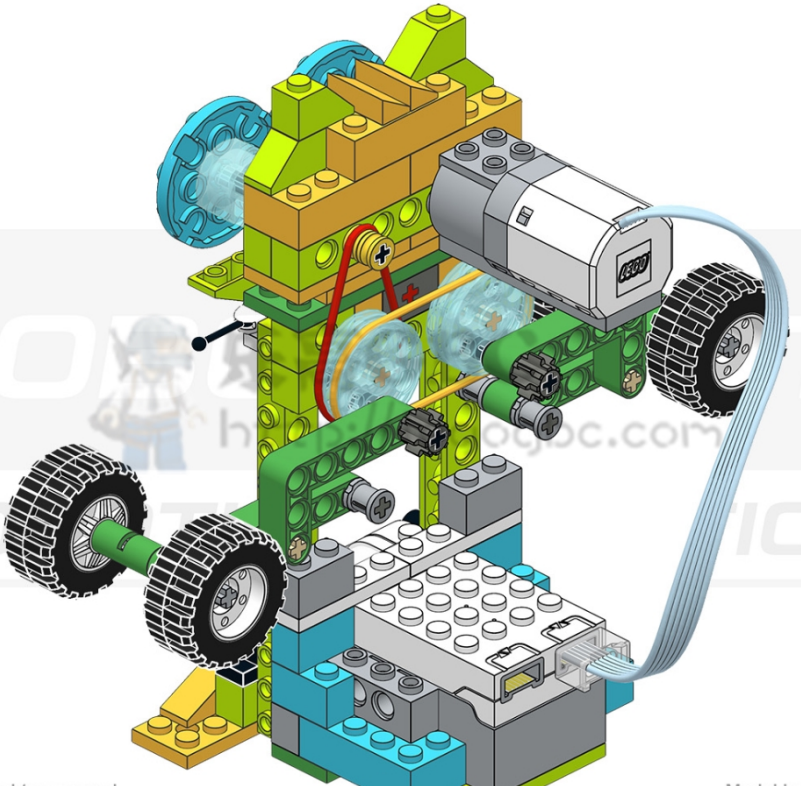

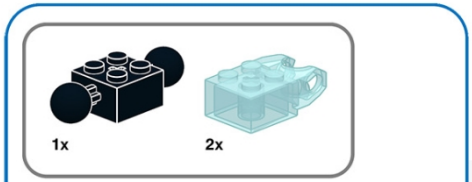

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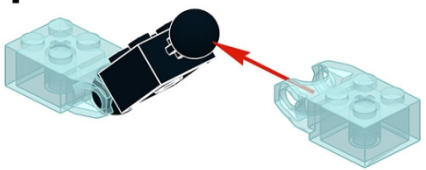

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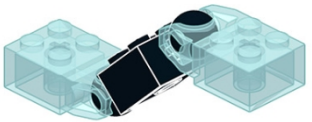

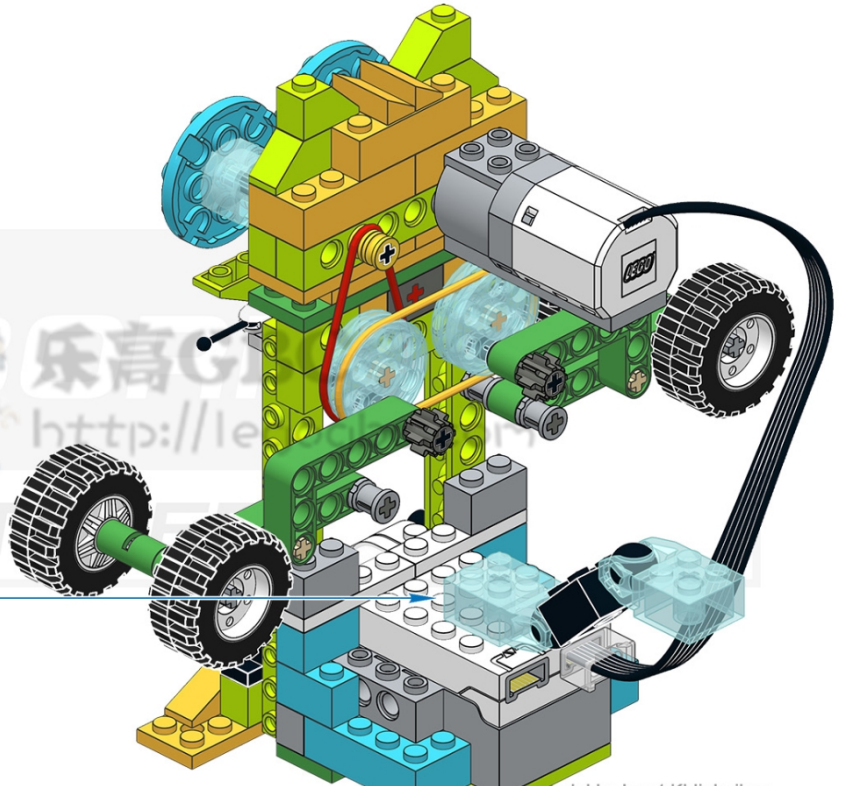

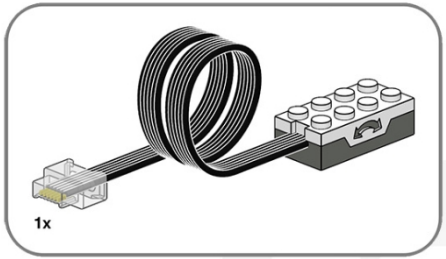

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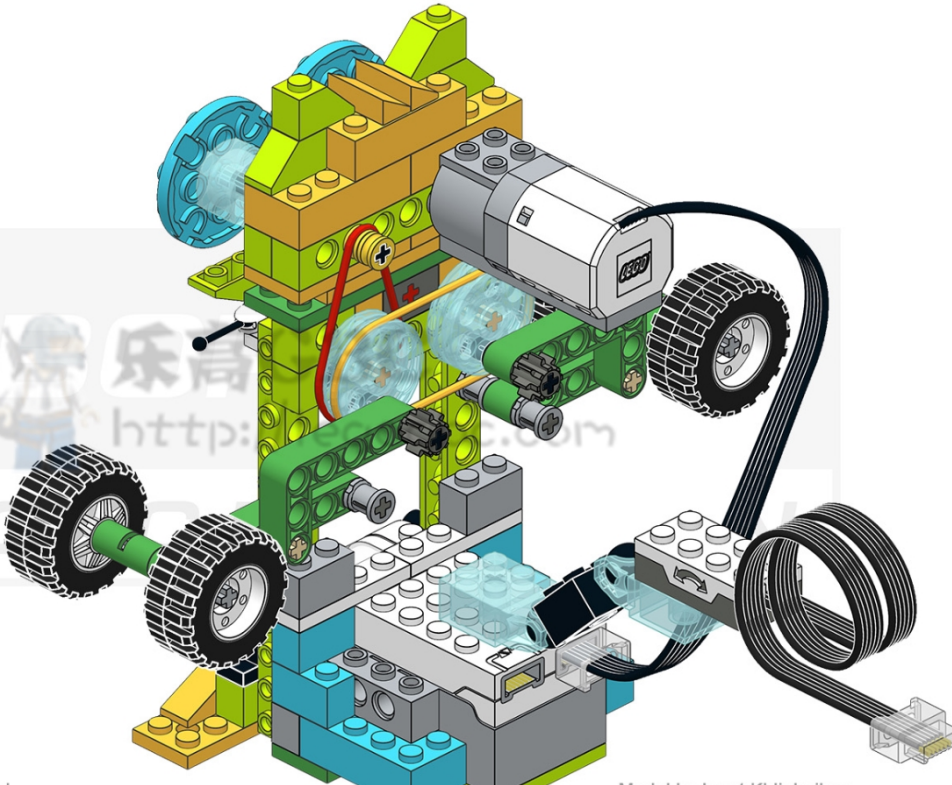

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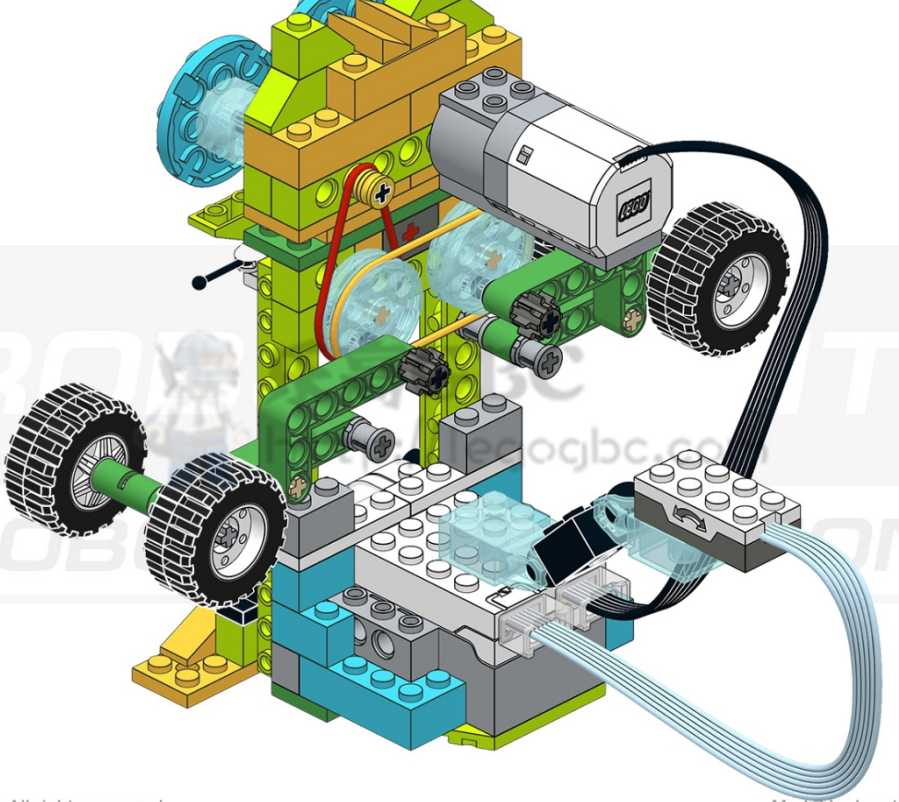
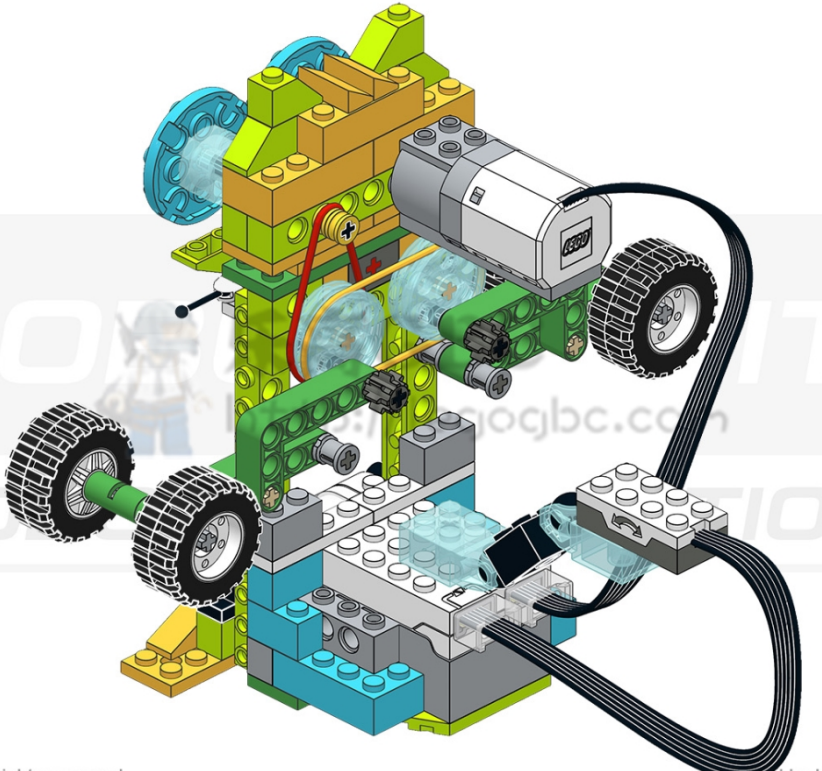
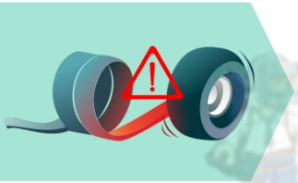




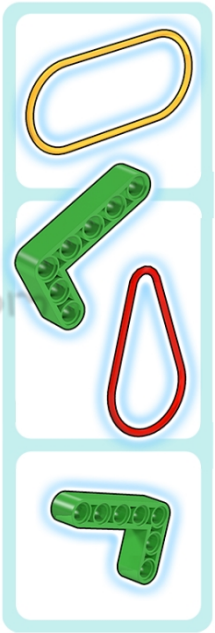
Note!

The cabels must not rub while the robot is moving!



Tasks

Place the robot parts in the correct places



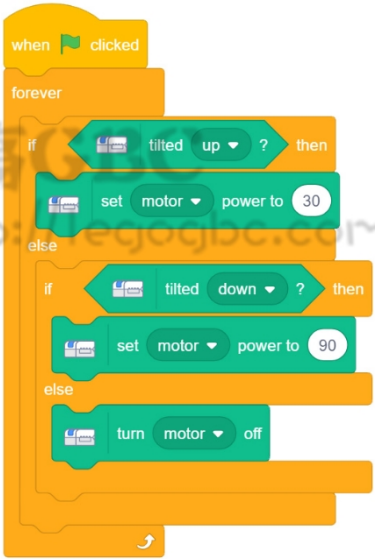
Task 13

Write and test a program to control the speed of rotation of the motor depending on the position of the tilt sensor

Task 13. Program

Scratch | WeDo Software

Write and test the following program:



Task 13. Program

Scratch | WeDo Software

Write and test the following program:

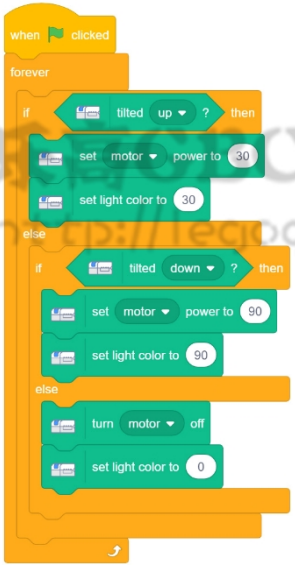
Task 14 *

Add a robot mode indication to your program. Change the color of the center button according to the position of the tilt sensor.

Task *. Program

Scratch | WeDo Software

Update your program as follows:



Task *. Program

Scratch | WeDo Software

Update your program as follows:

Task 15 *

Decorate your robot. Draw, cut and fasten the T-shirt

T-shirt

Attach a T-shirt to the robot and paint it with your own ornament

Go to the first slide of the instruction

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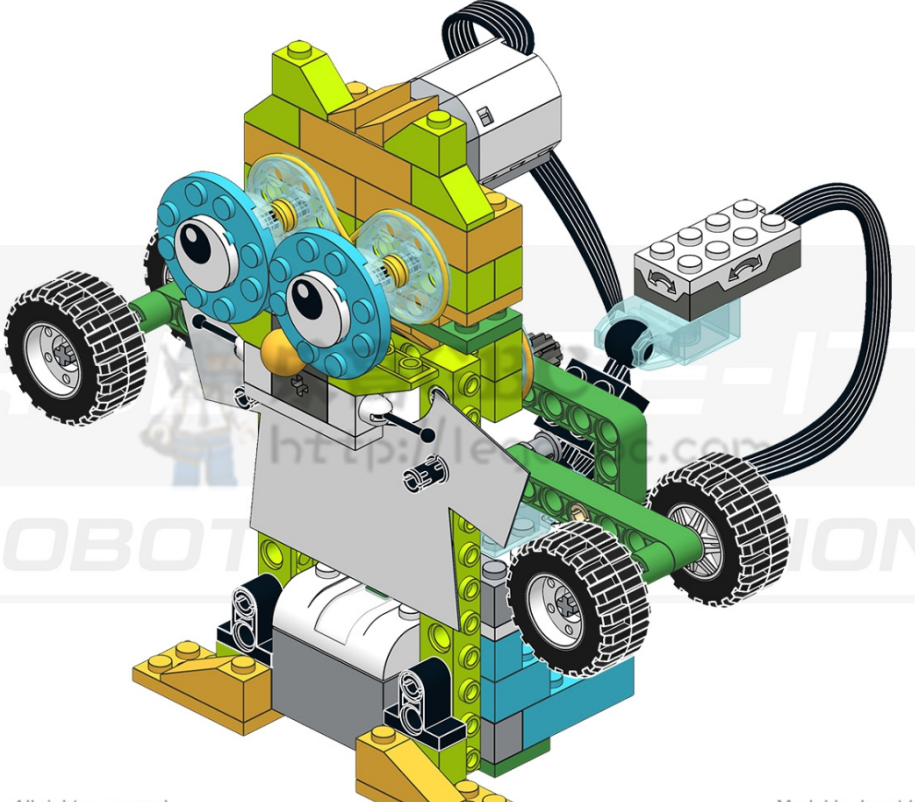
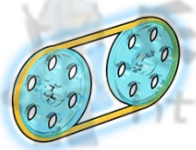


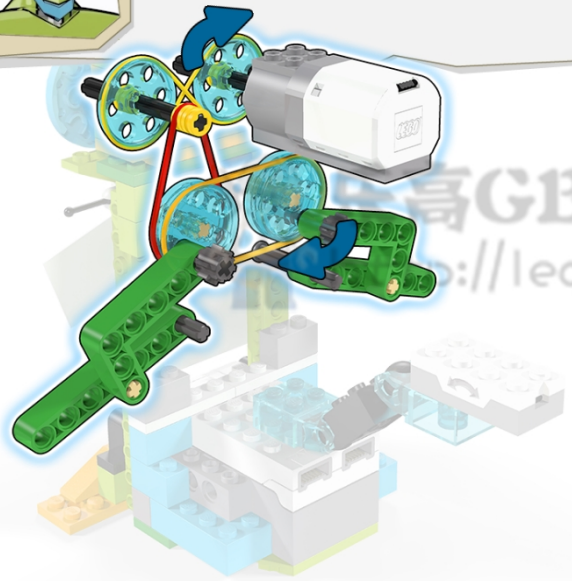
Question

Which of these mechanisms can convert rotations into translational motion?



Tasks

Set the correct direction of rotation of the last driven axle shaft

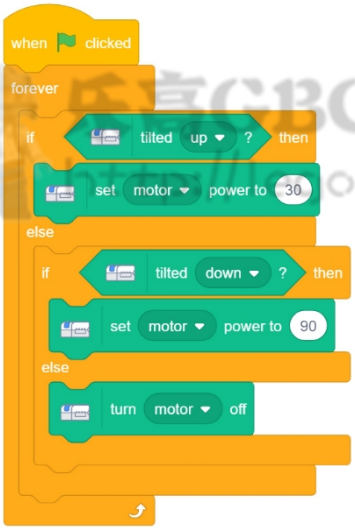


Check answer

Question

Scratch | WeDo Software

Which program block is used to receive data from the tilt sensor?



Question

Scratch | WeDo Software

Which program block is used to receive data from the tilt sensor?

Discuss!

- What do you think, what professions specialists in the near future can be replaced by robots?
- What gears did you use to connect the mechanisms of the robot?
- How to change the direction of rotation of the driven shaft in a belt drive without changing the direction of rotation of the motor?
- What can the tilt sensor detect? How did you use it?

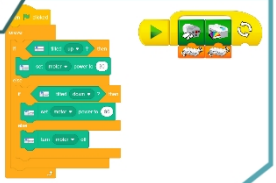
Your achievements

Total: 0

1

2

3



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