Meiolaniidae

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Meiolania

Let`s remind. Triceratops

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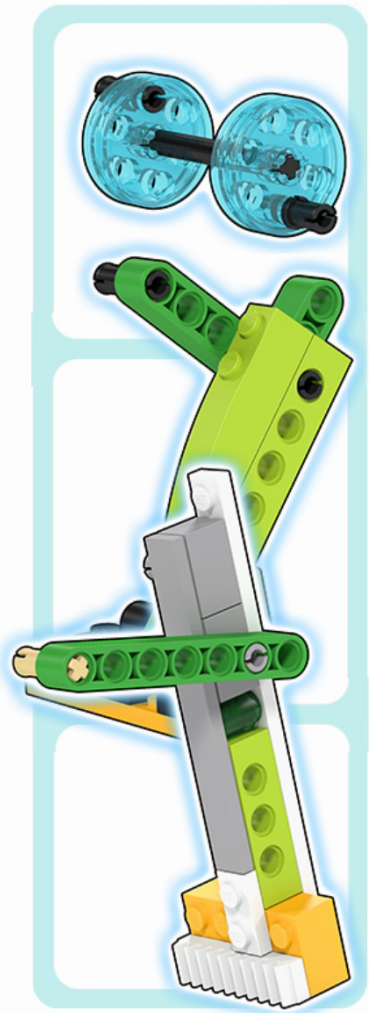

Place parts of the robot on the right places

Let`s remind. Triceratops

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Place parts of the robot on the right places

Let`s remind. Triceratops

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To which group of dinosaurs include Triceratops?

Ornithopods

Theropods

Horned dinosaurs

New day at the Robots` factory

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Dino Park

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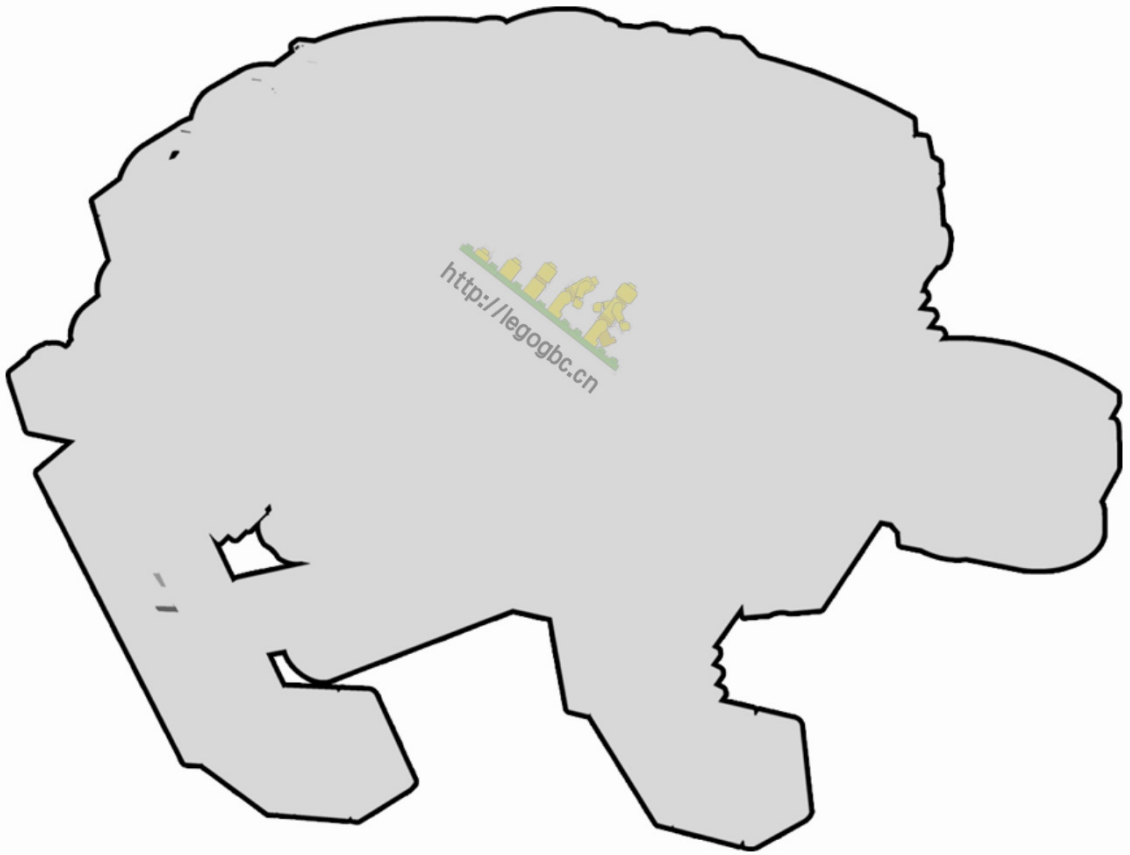
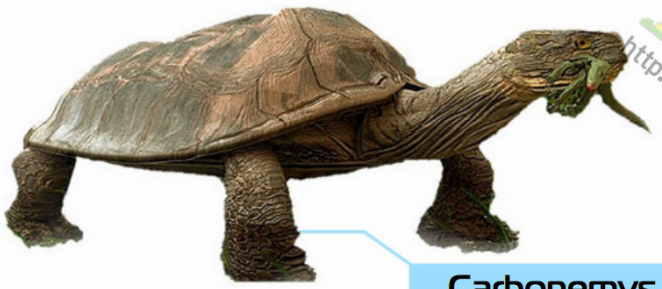
Today we continue to create a modern Dino Park. We must develop a robot for the exposition of the prehistoric turtles of Cretaceous period Mesozoic.



Turtles

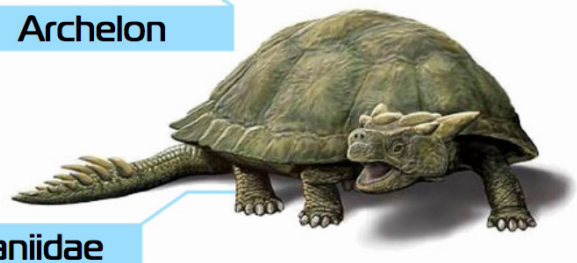
Turtles are one of the oldest creatures on the planet. They appeared about 220 million years ago. Turtles are divided into those who live on land and sea. They had huge sizes (up to 5 and more meters).



Carbonemys

Archelon

Kayentachelys aprix



Meiolaniidae

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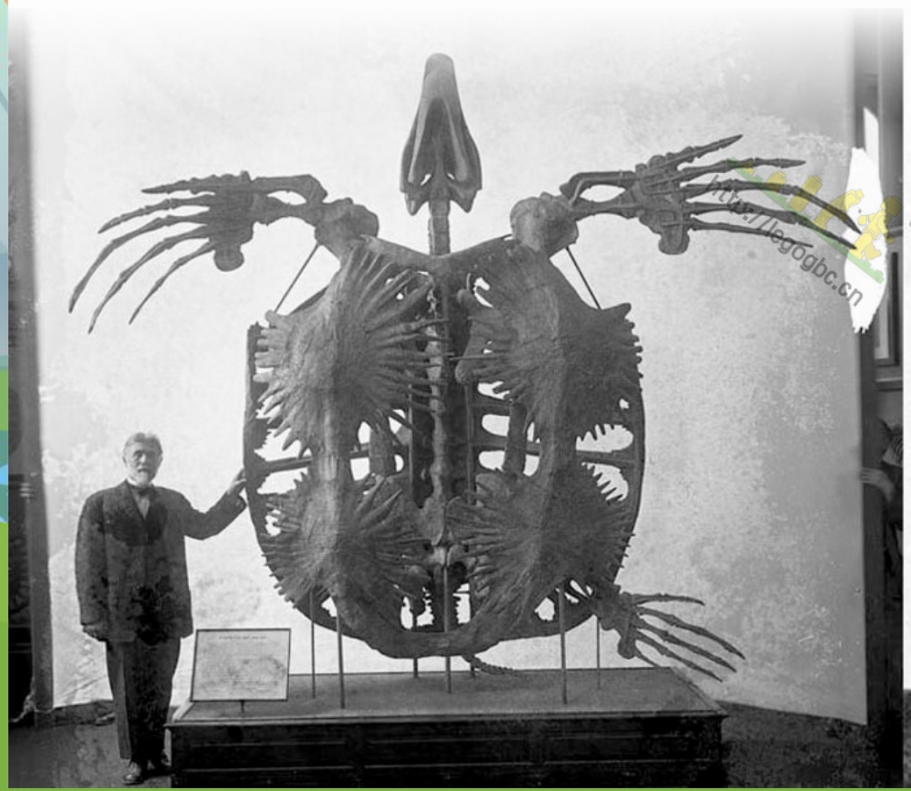
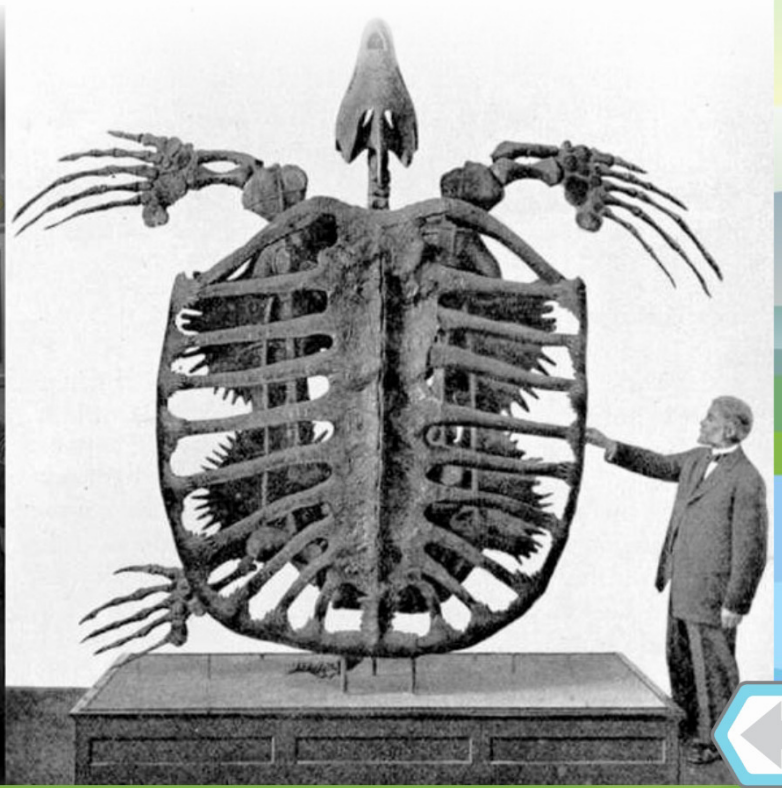
Ancient turtles

Archeon - one of the most famous turtles. It lived in the seas of the Cretaceous period by the Mesozoic. With a total length of 4.6 meters, it had a mass of over 2.2 tons. Interestingly, the shell was not solid, but covered with thick skin.





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Meiolaniidae

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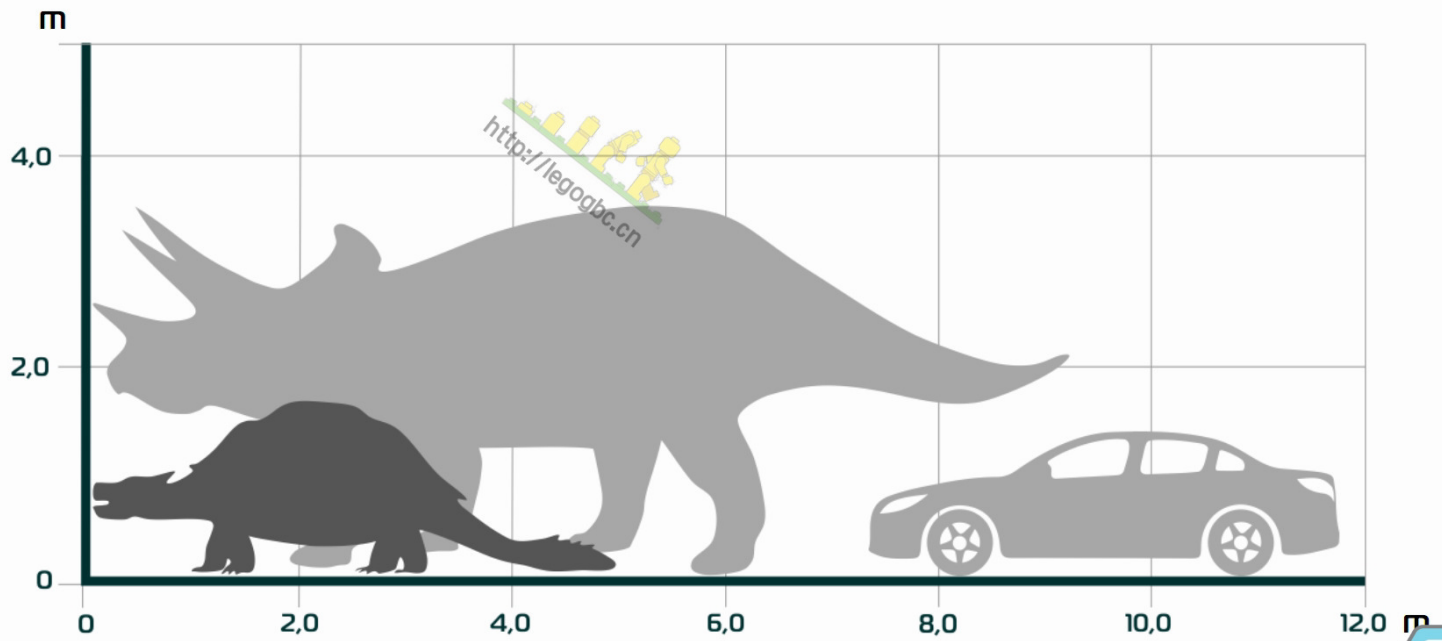
Turtles of this family lived more than 65 million years ago and died out only 3,000 years ago. That is, they lived near the dinosaurs. Meiolaniidae had a solid shell, and the head was decorated with two horns.

Meiolaniidae

The largest of the found fragments of the shell of Meiolaniidae belonged to a turtle up to 5 meters in size. Compare the size of this herbivorous turtle with Triceratops.



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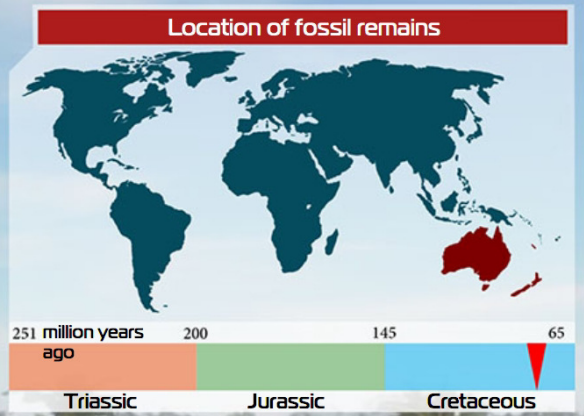
Meiolaniidae

Fossilized remains of horned turtles Meiolaniidae are found in deposits of the end of the Cretaceous period (65 million years ago). The remains of turtles that were extinct only 3,000 years ago were found on Australian and New Zealand territory.



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Turtles

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Breed the turtles, laying on the land to hundreds of eggs. In this case, they do not worry about offspring. Little turtles often have a very delicate shell.

Dino Park

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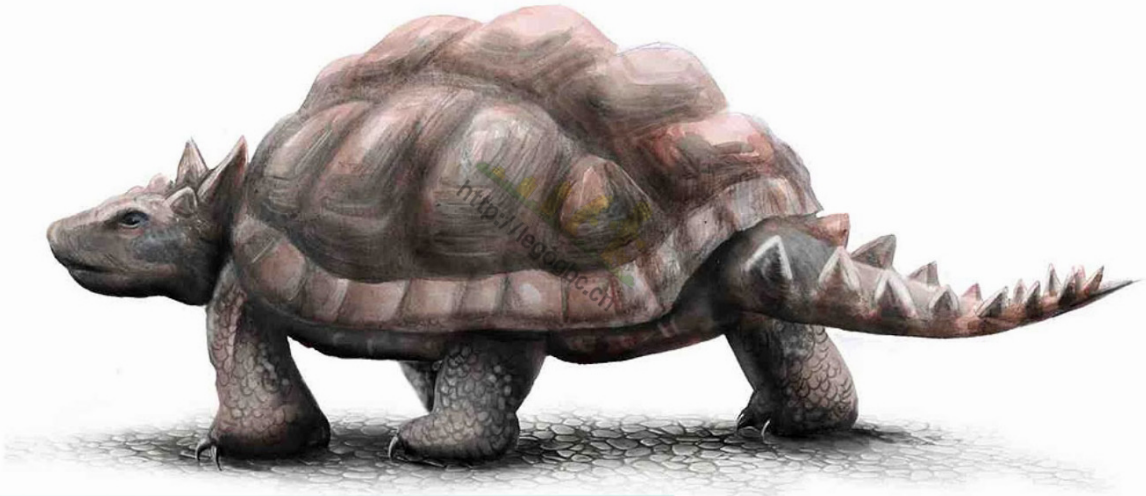
At first glance, it's surprising to find a turtle in the Dinopark. However, these creatures were neighbors with dinosaurs for tens millions of years, and have survived to this day. Therefore the turtle will become the next inhabitant of the park!



What types of modern turtles do you know? Maybe someone even keeps it at home?

TASK

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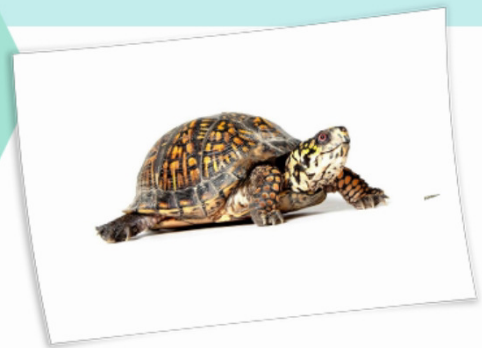
Task

- create a robot for the exposition of the Cretaceous period by the Mesozoic

Requirements

- should be a turtle
- must move on four legs and be able to hide its head in a shell

Turtle`s appearance



Design features

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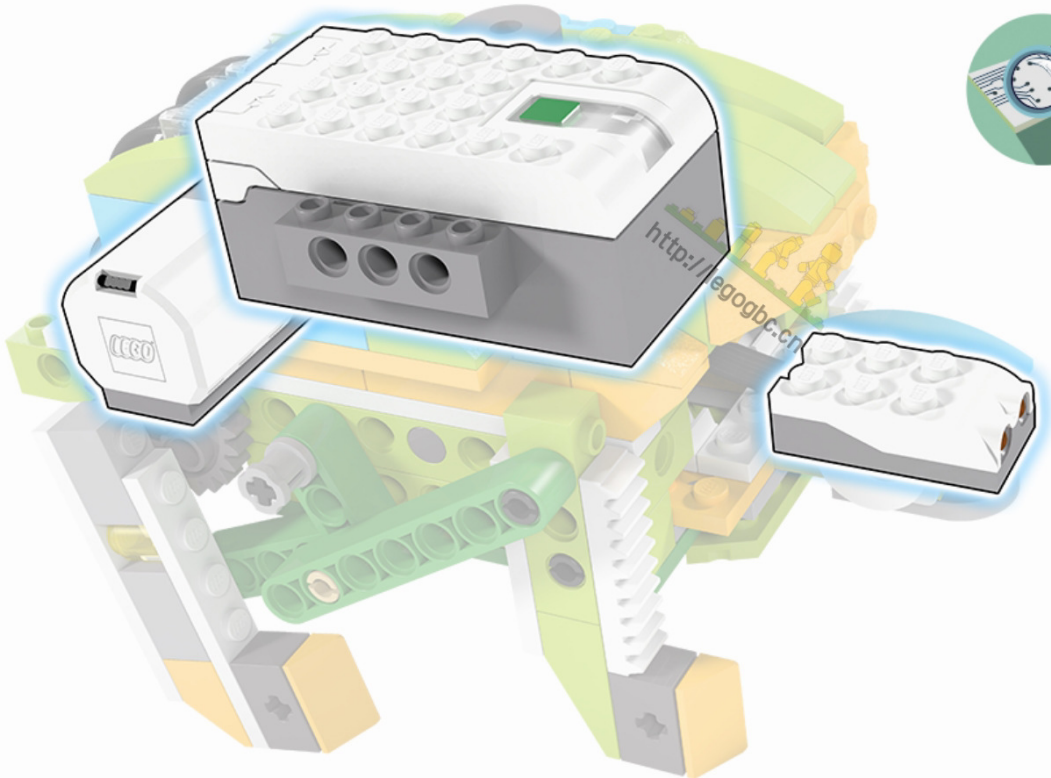
The robot`s motor is used both for walking and for the movement of the head. At the same time, the motion sensor is placed on the head, which enables the robot to detect obstacles.



Find:

- smarthub
- motor
- motion sensor

Design features

The rotation from the motor is transmitted through a direct gear to a 24-tooth gear. This gear works as a crank.

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Design features

24-tooth gears are placed on one axle, which allows you to synchronize the movement of the robot`s legs. Pay attention! The legs of the robot should be fixed in oppositely located holes of the gears!

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Design features

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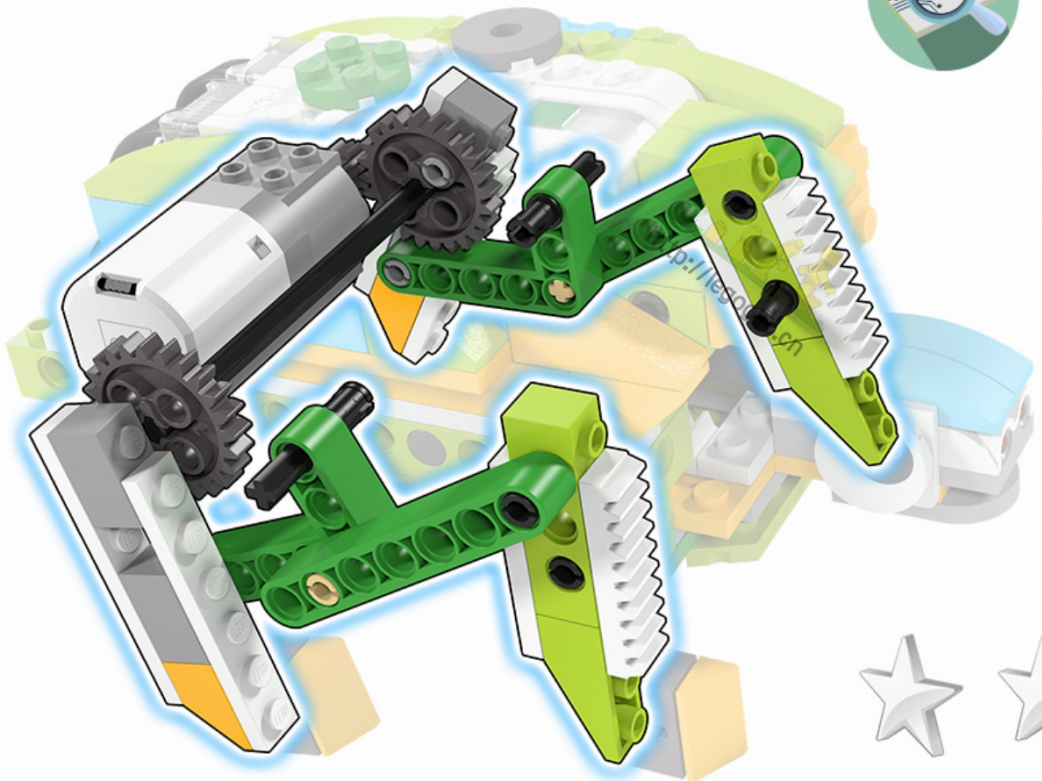
In general, the robot chassis looks like this:

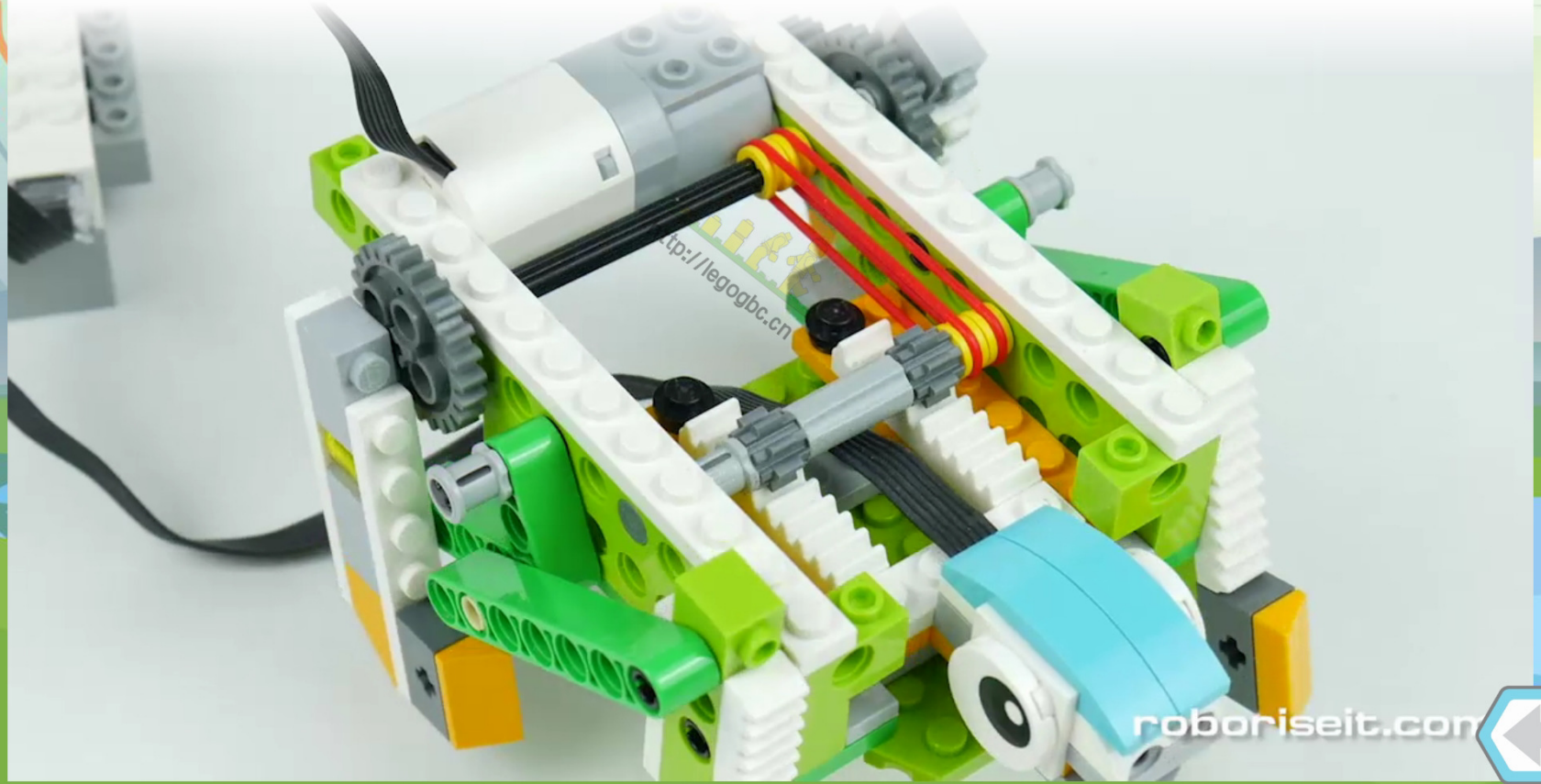


Find:

- motor and gears
- legs

Design features

The robot`s head is driven by a gear rack. The rotation of 8-tooth gear is blocked in extreme positions. This does not allow the robot to stop, because the belt drive is used that slips when the robot is walking and the head is in the extreme position.



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Design features

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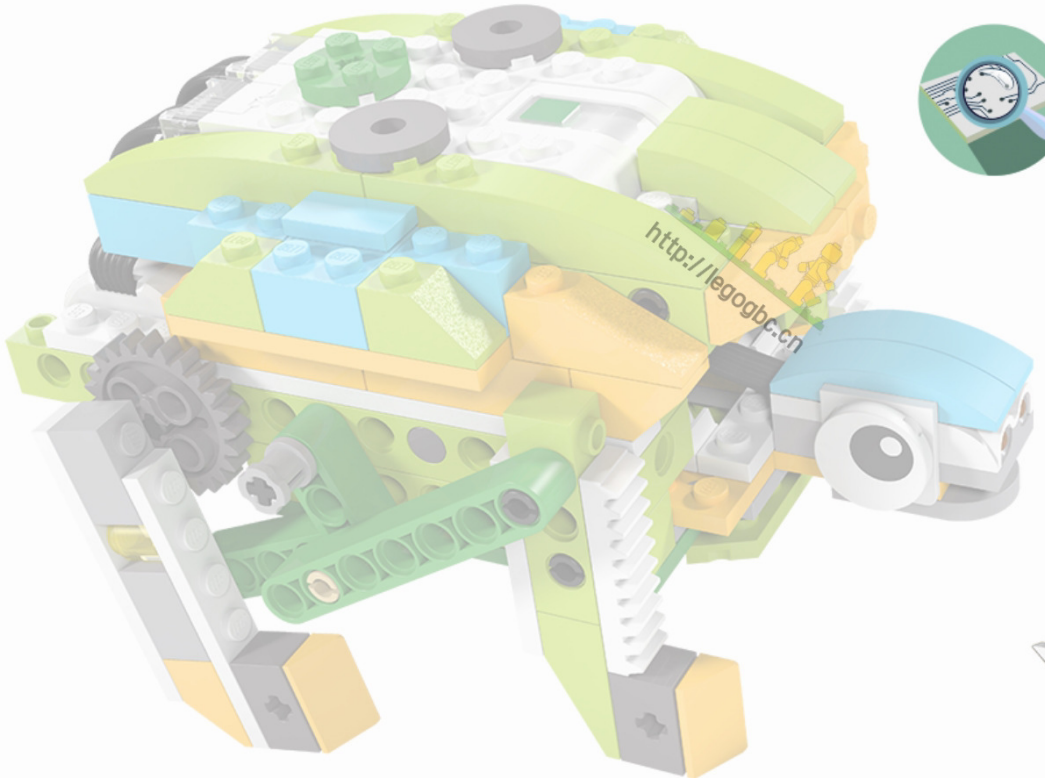
The drive head of the robot uses a belt drive that works thanks to the two rubber belt. It doubles the effort that is transmitted through the belt drive.

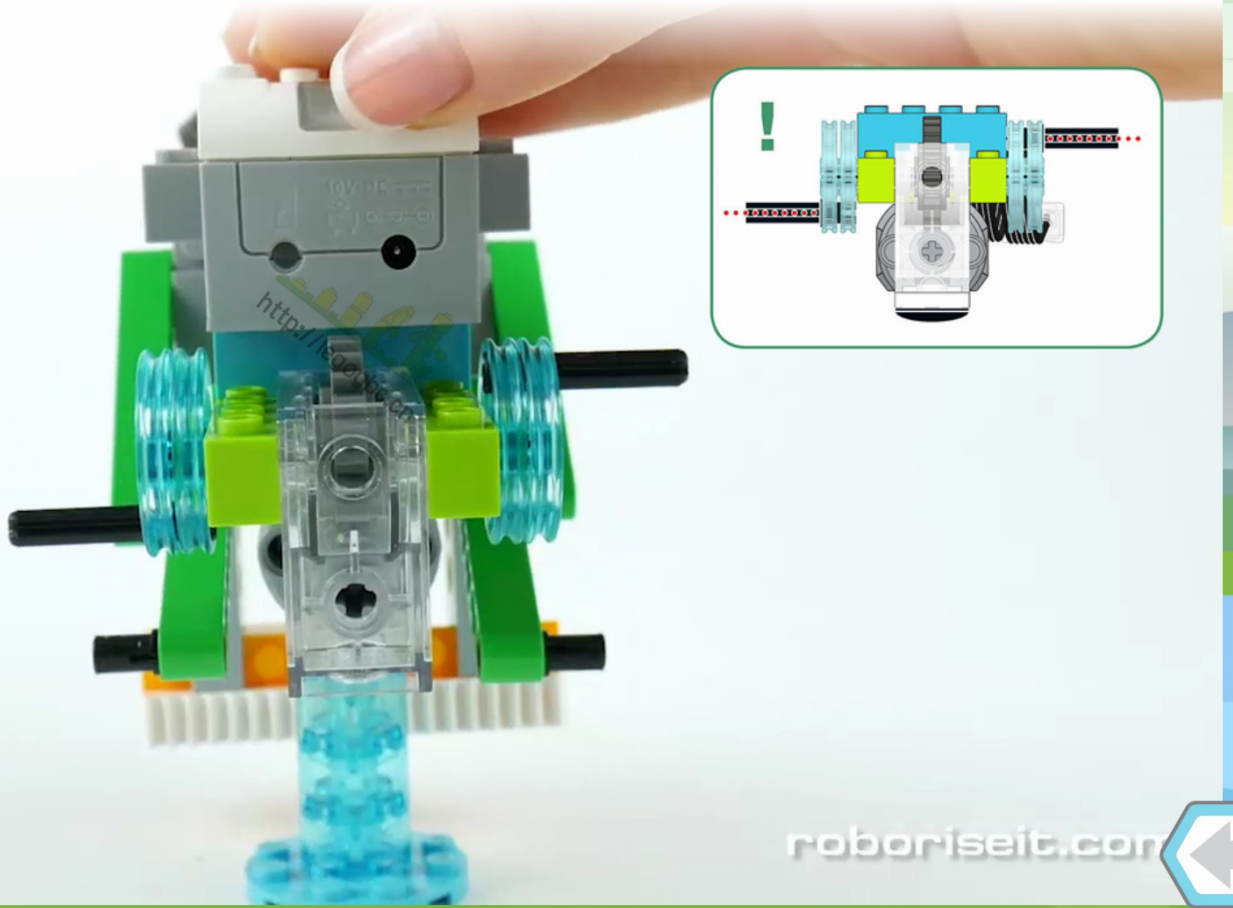


Find:

- motor
- direct gear
- belt drive

Pay attention!

When building the robot correctly fix the crank mechanism. If on the left it is at the top point, on the right it should be in the bottom, and vice versa:



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Build the robot!

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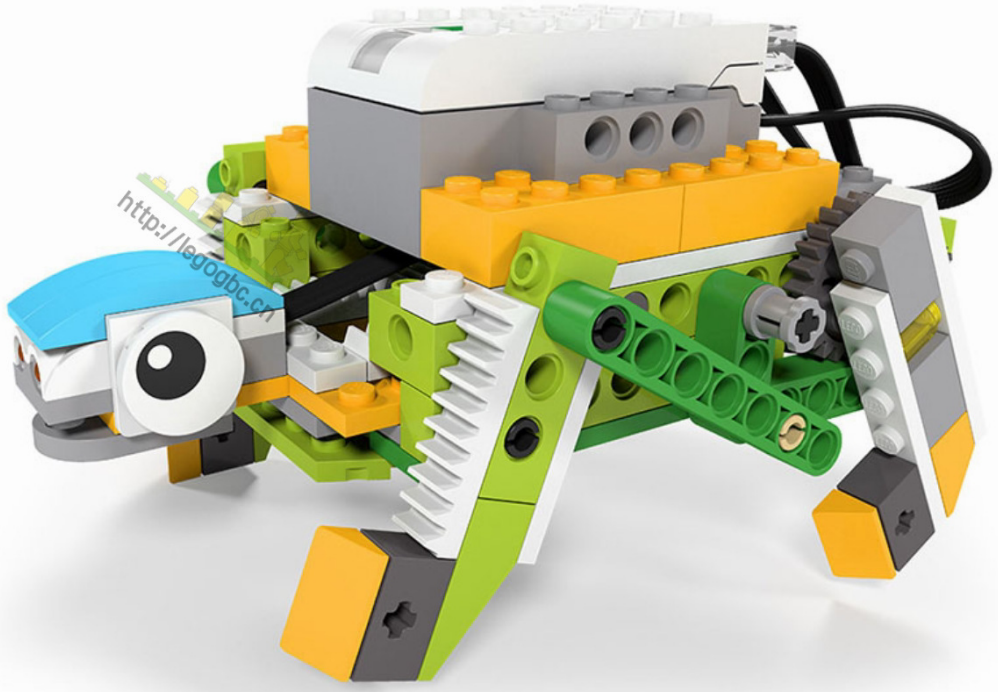

Meiolania

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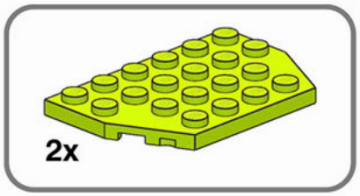

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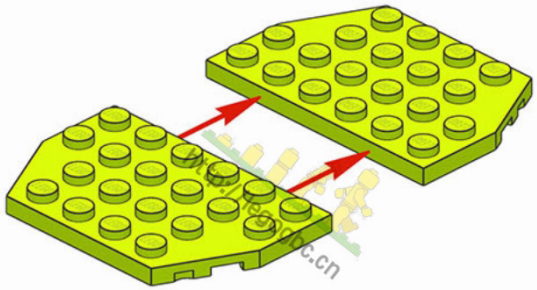

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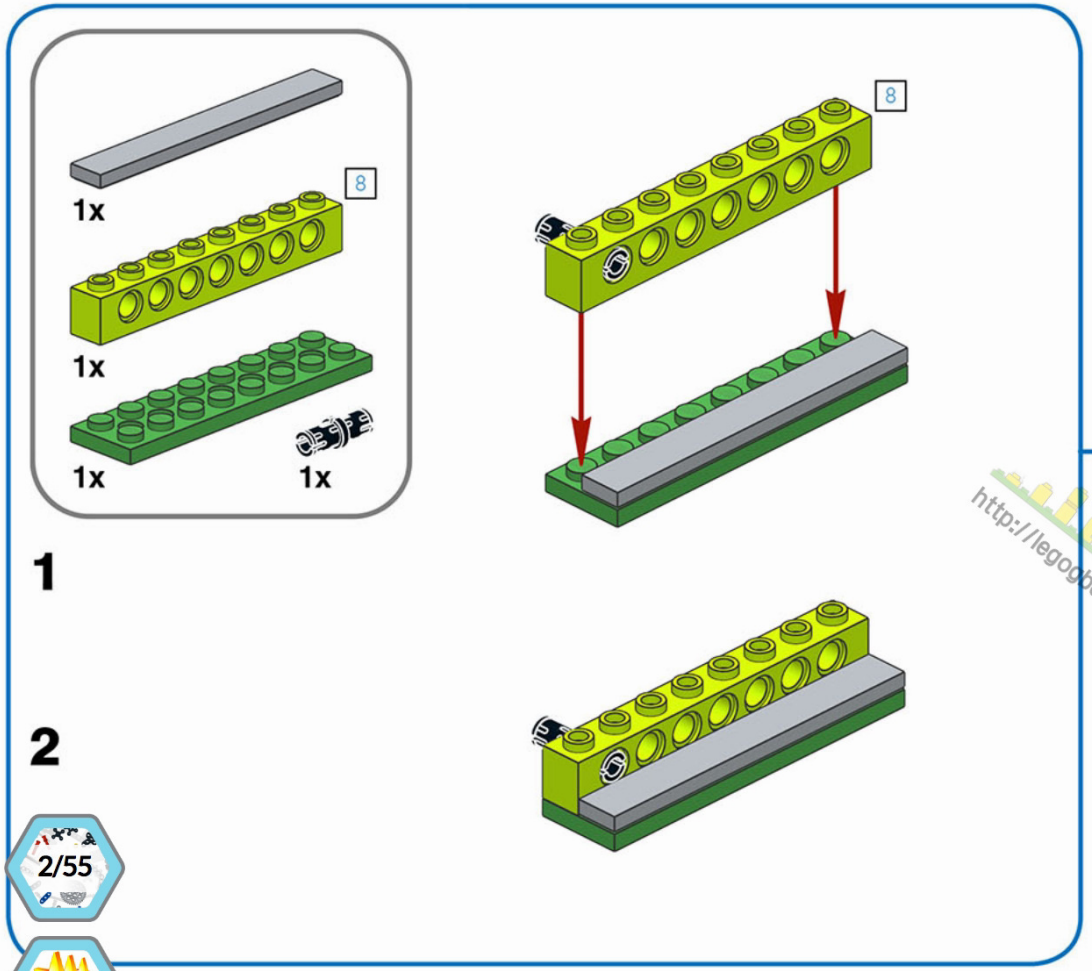

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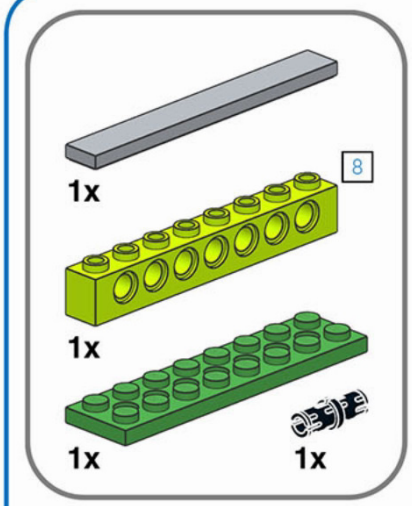

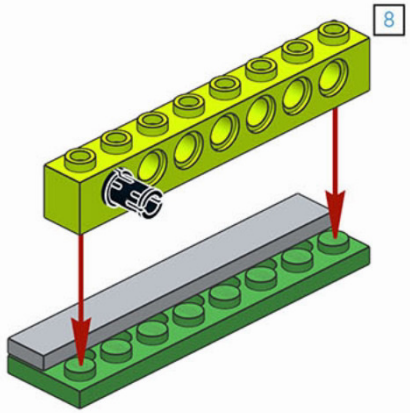

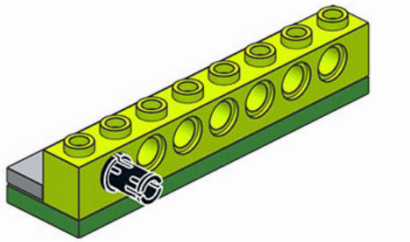

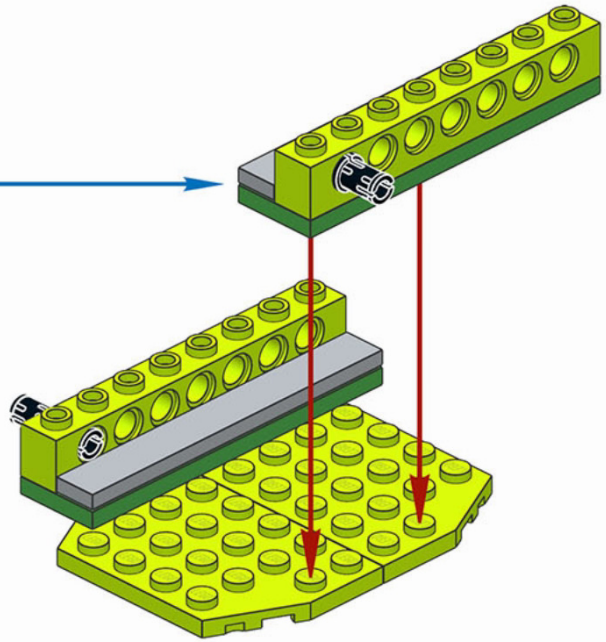

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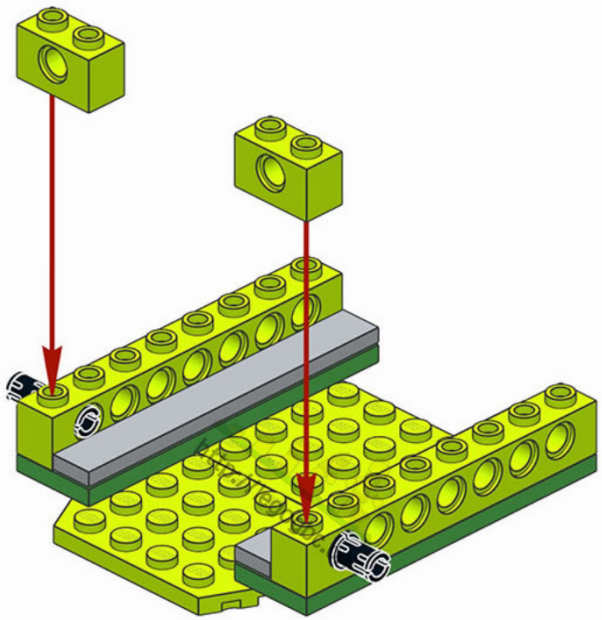

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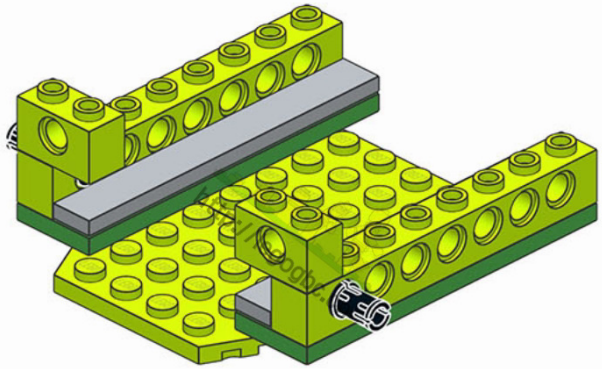

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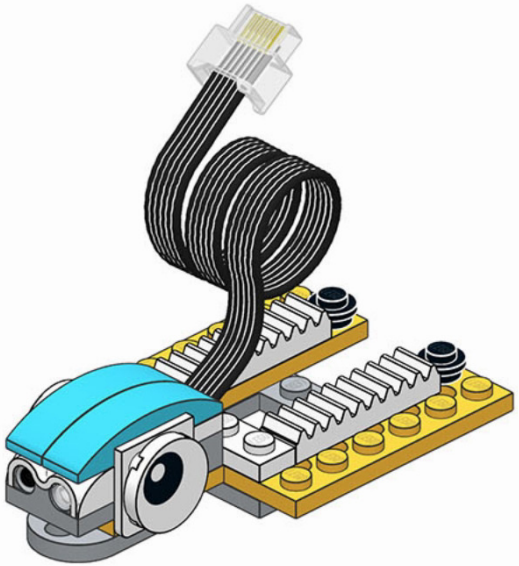

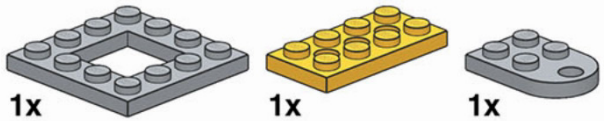

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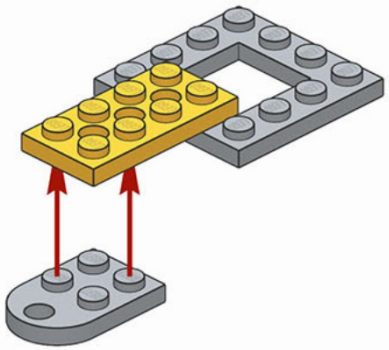

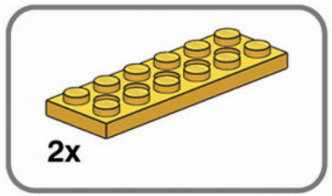

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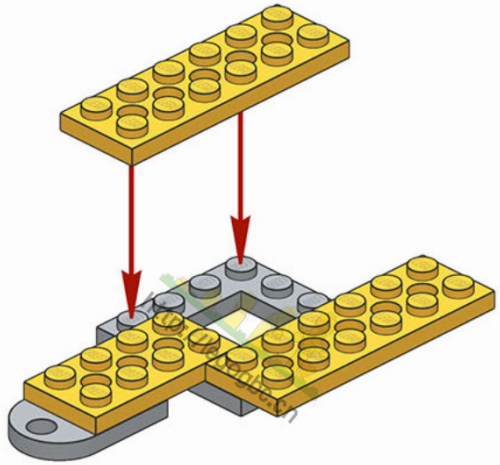

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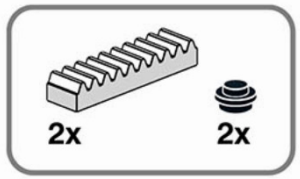

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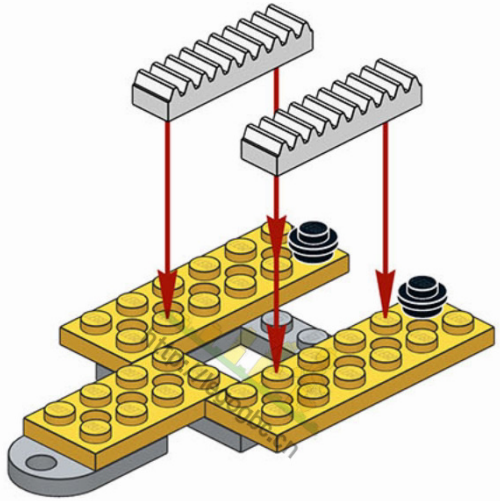

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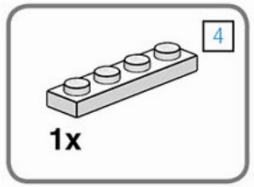

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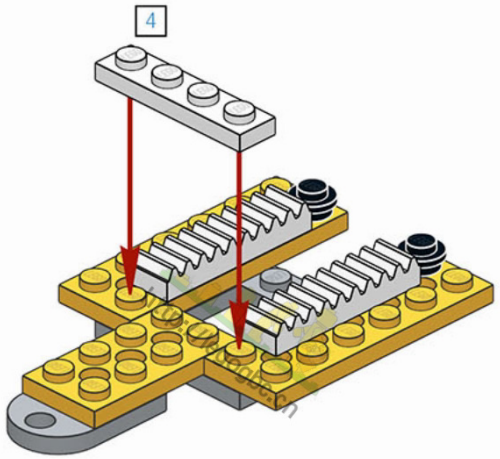

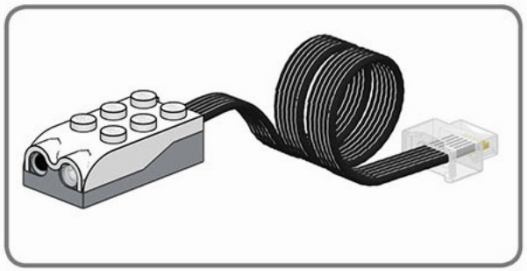

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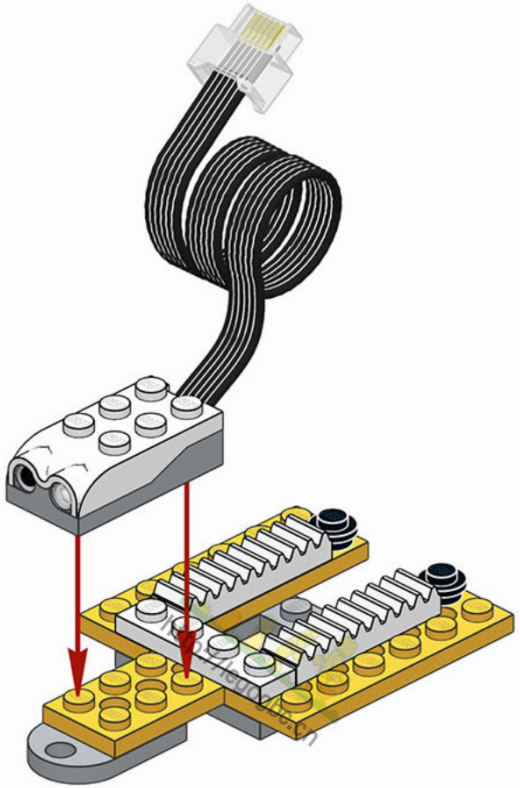

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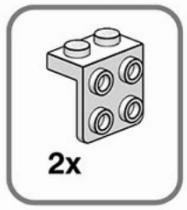

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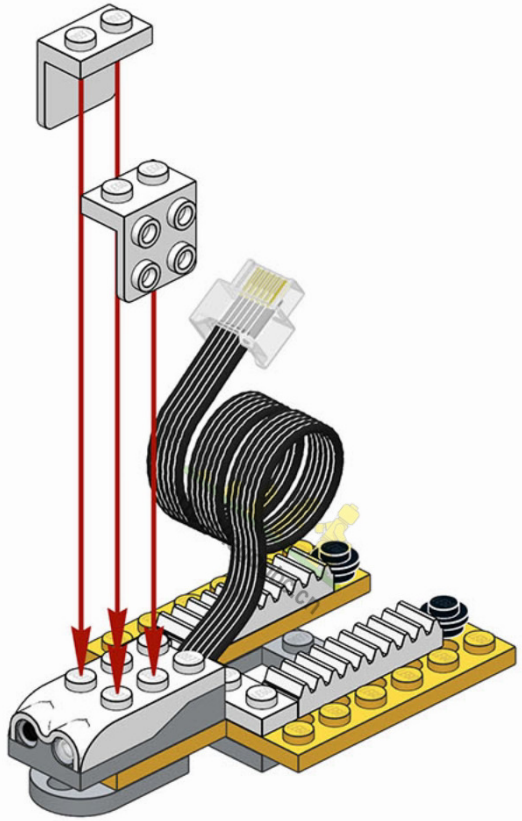

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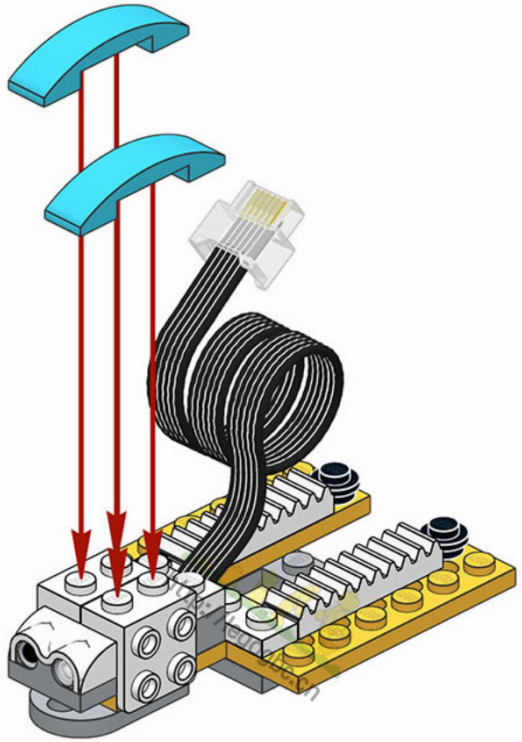

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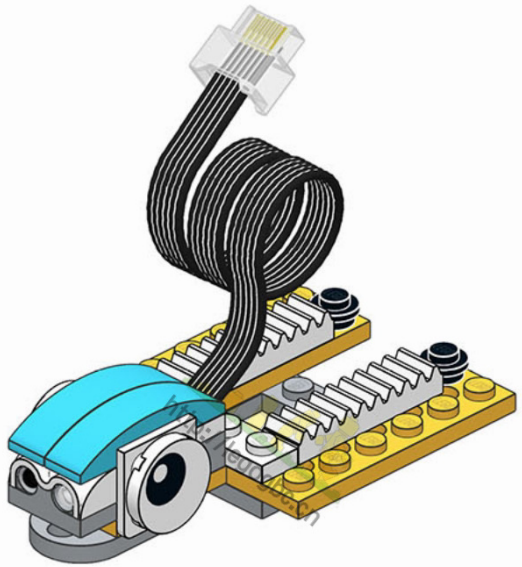

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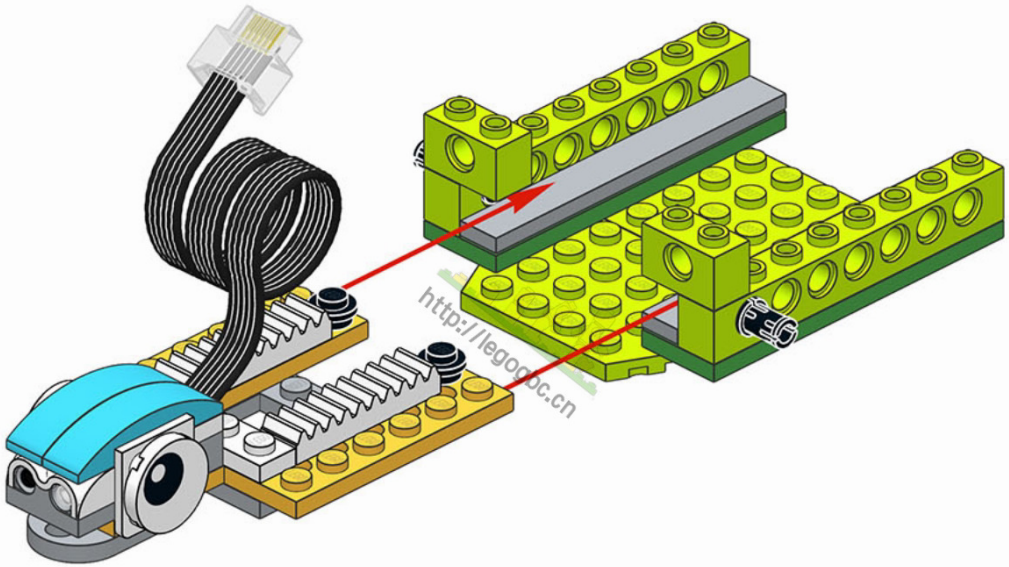

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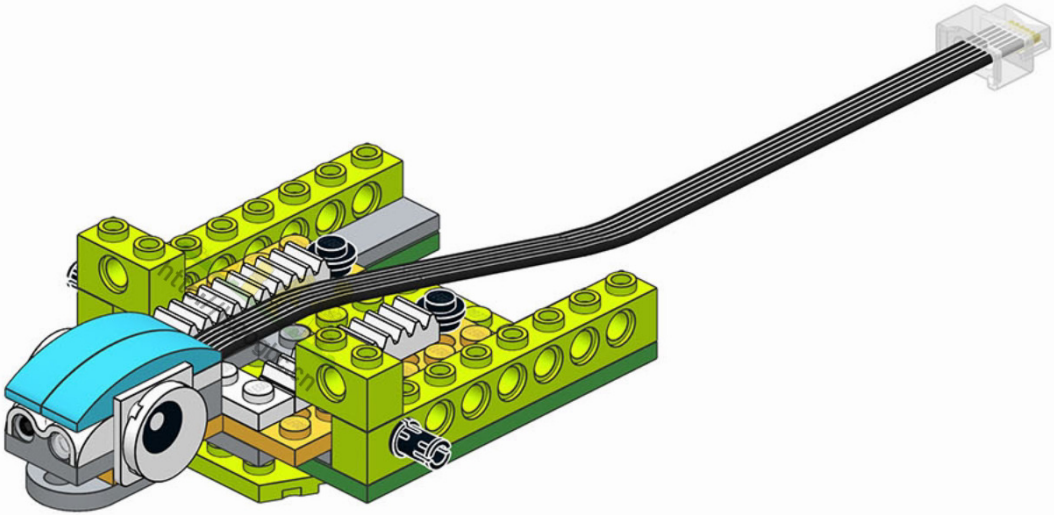

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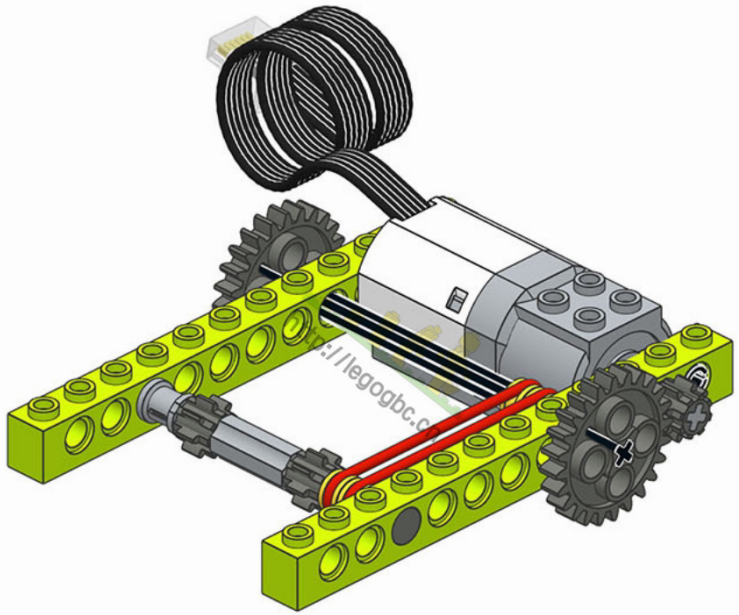

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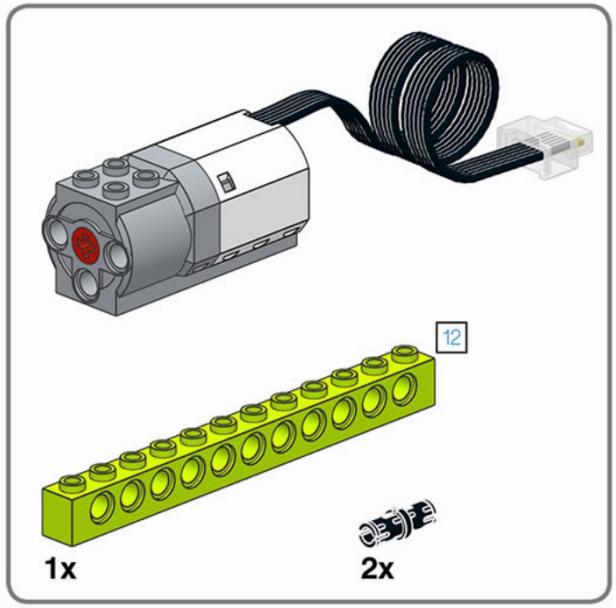

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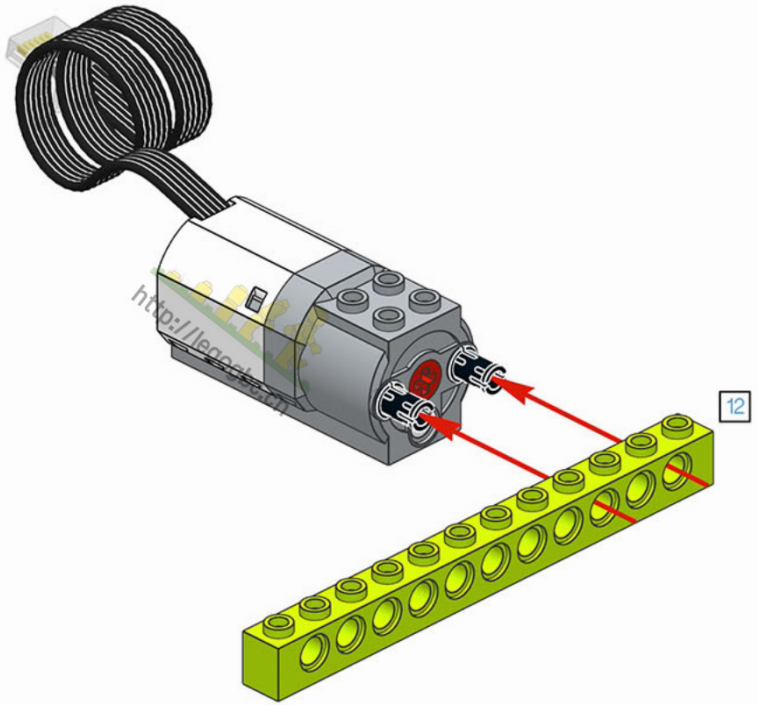

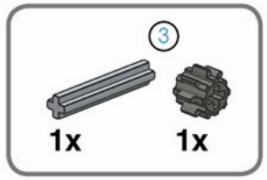

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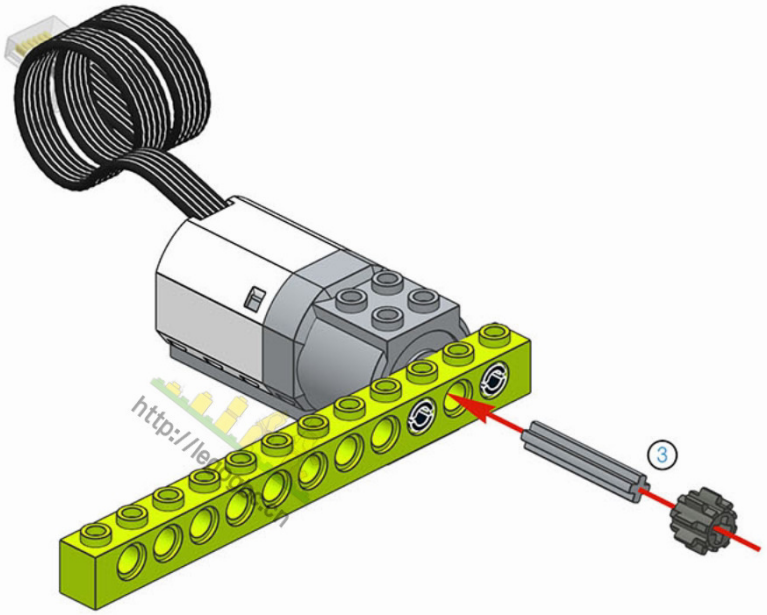

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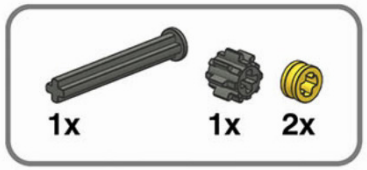

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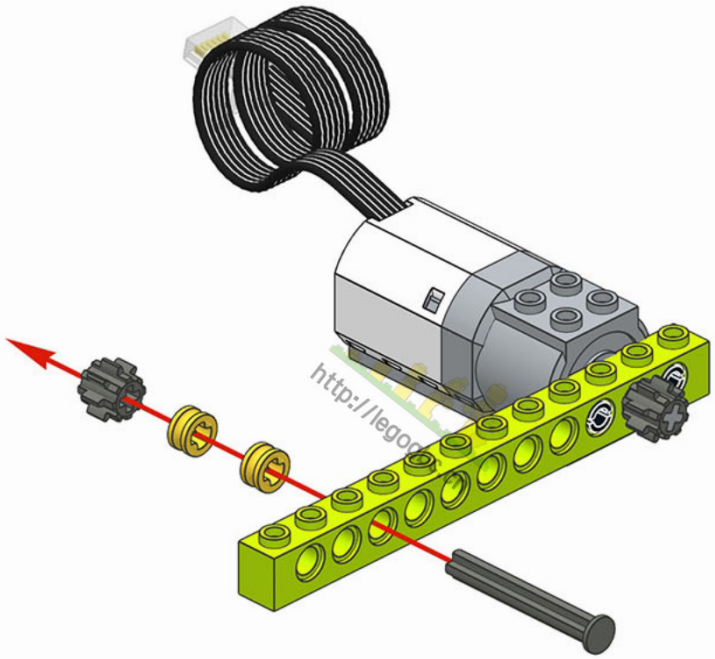

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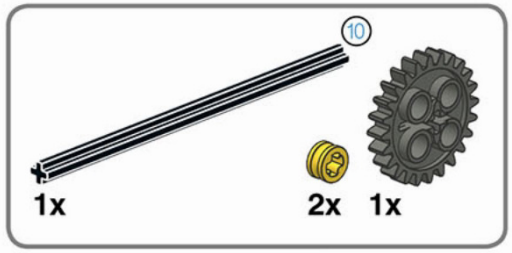

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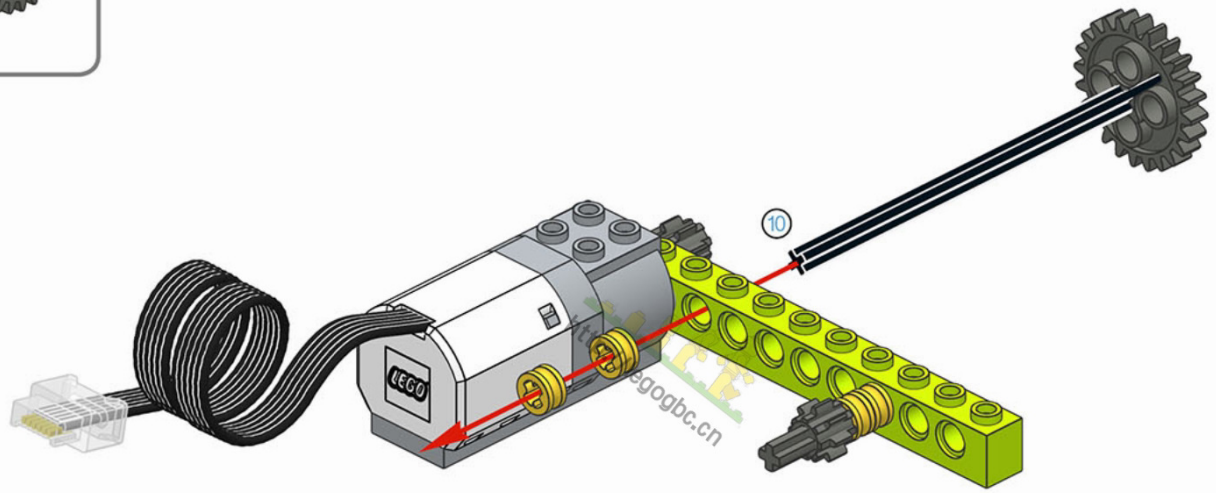

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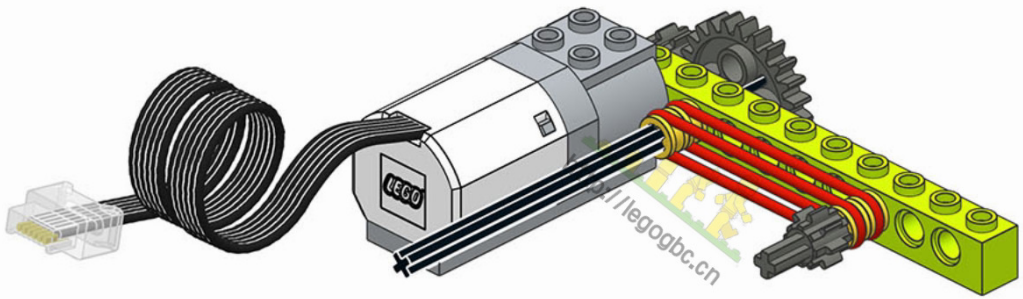

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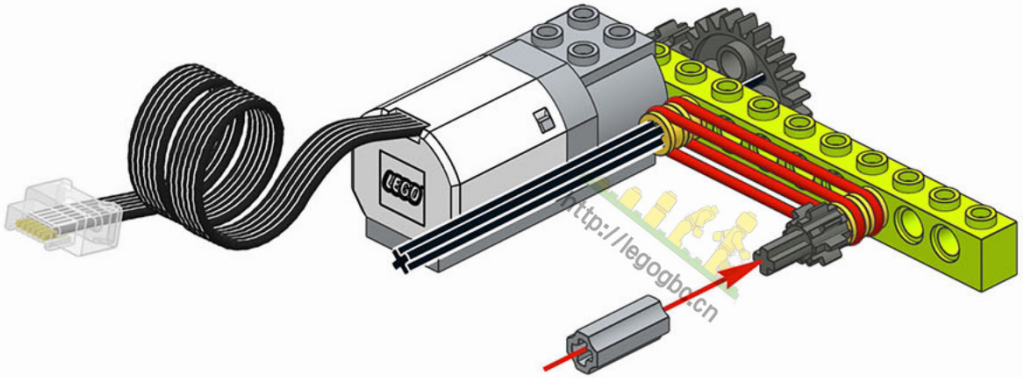

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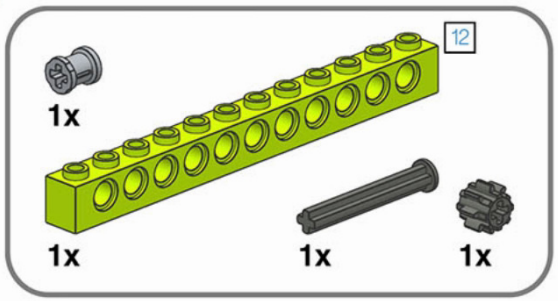

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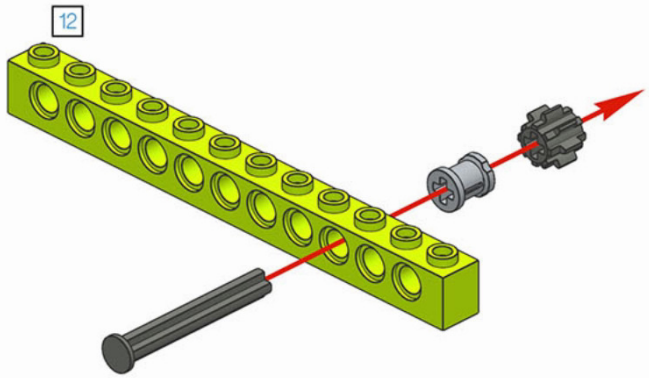

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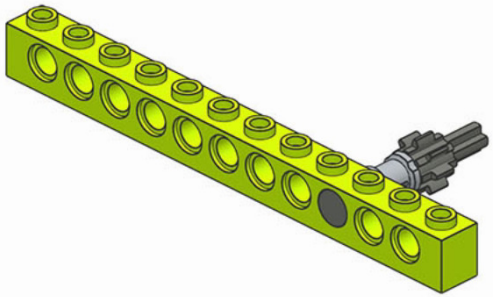

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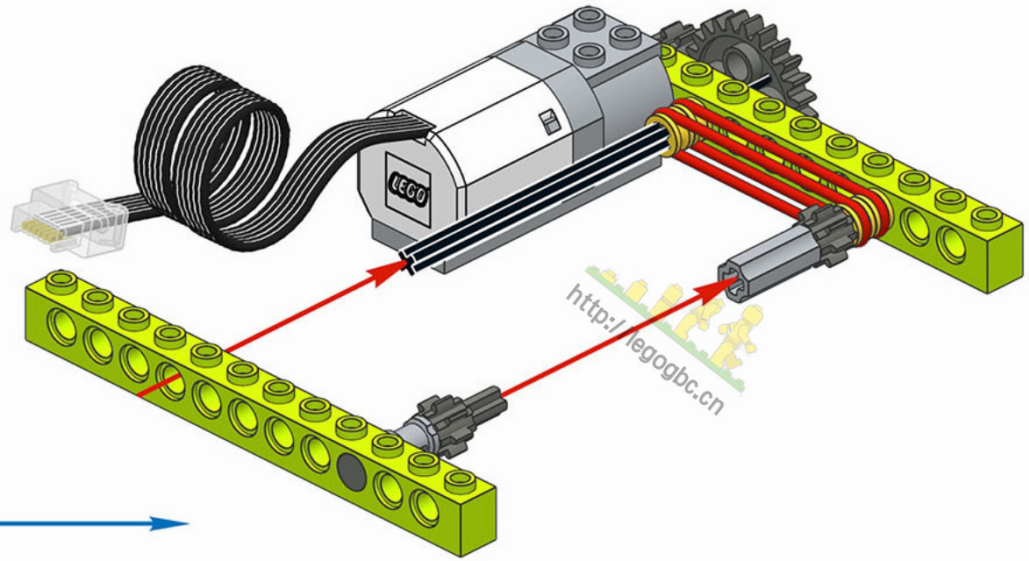

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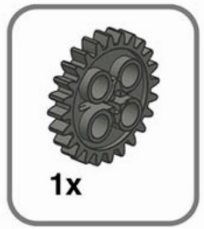

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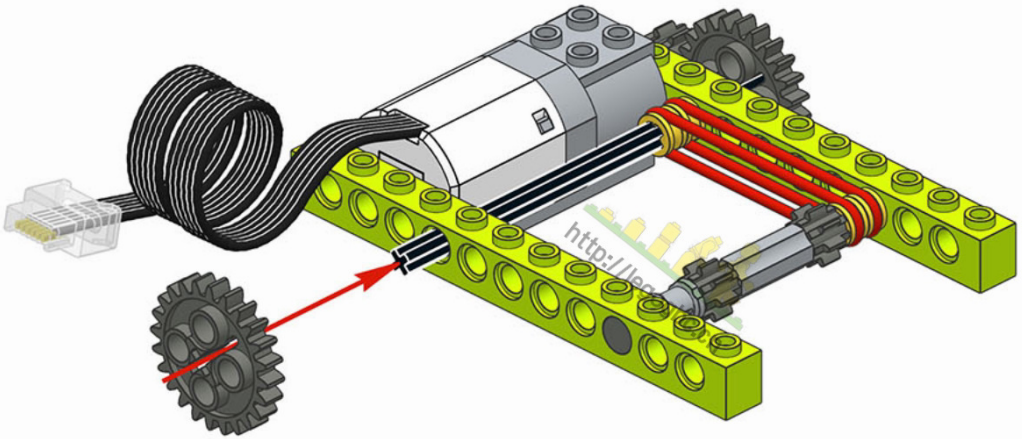

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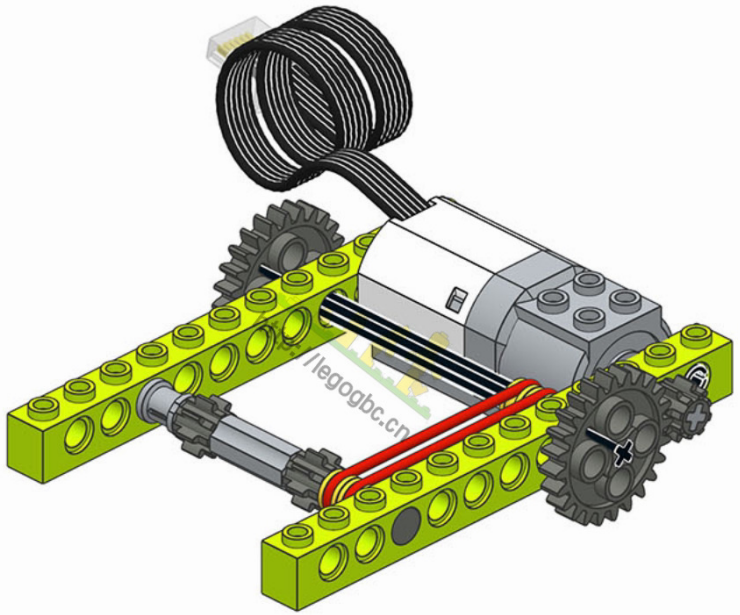

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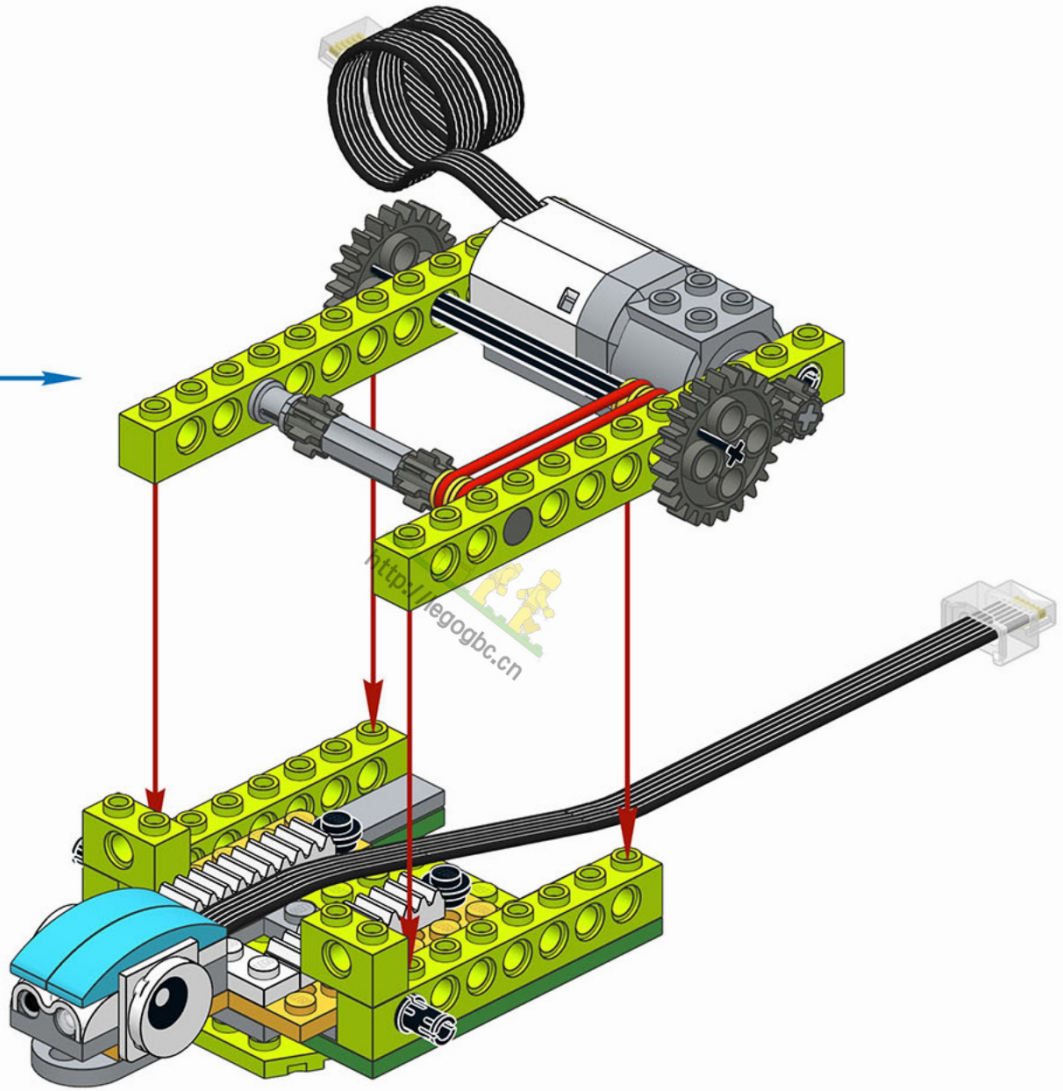

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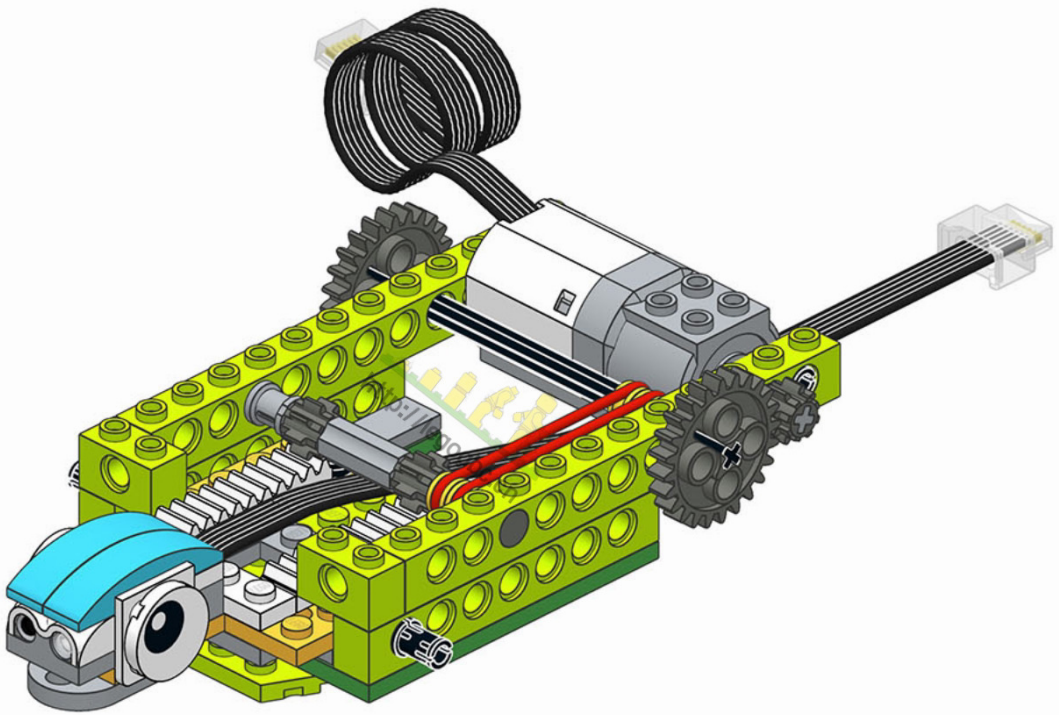

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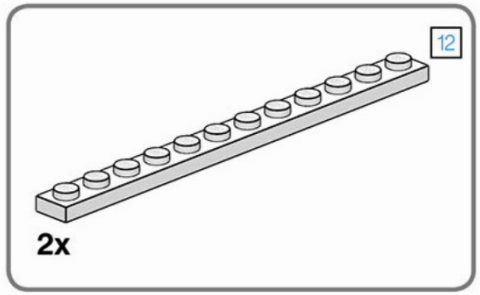

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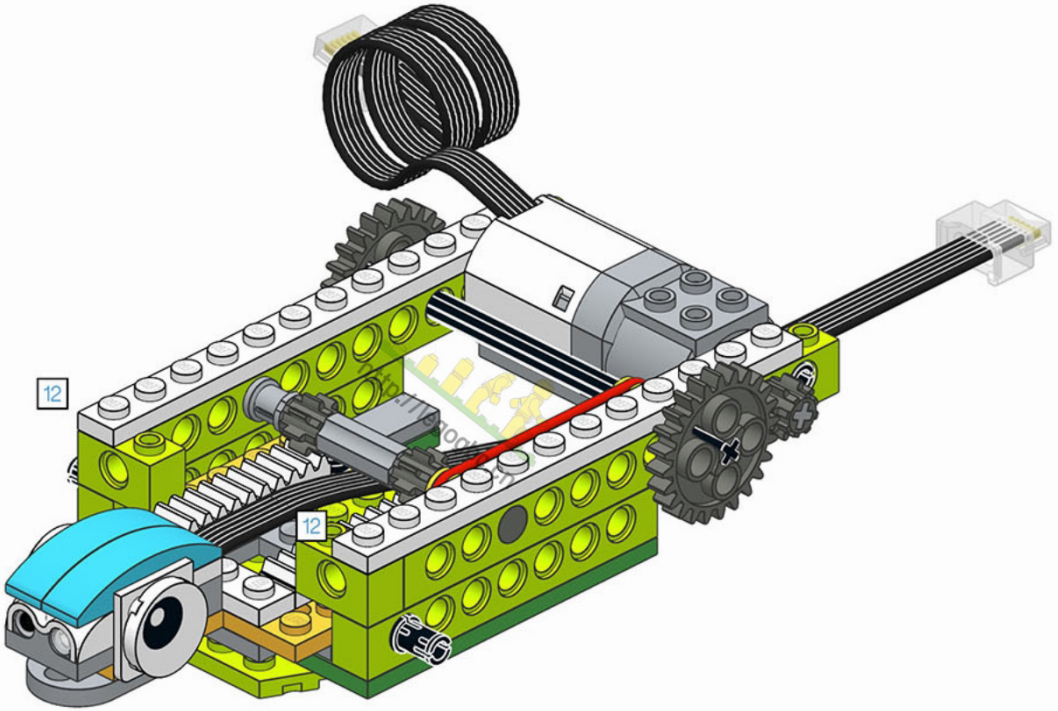

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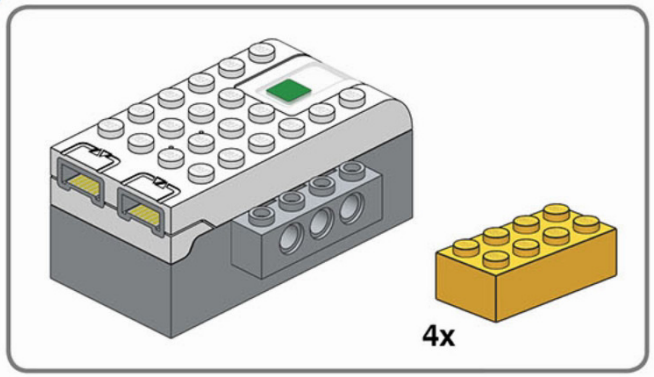

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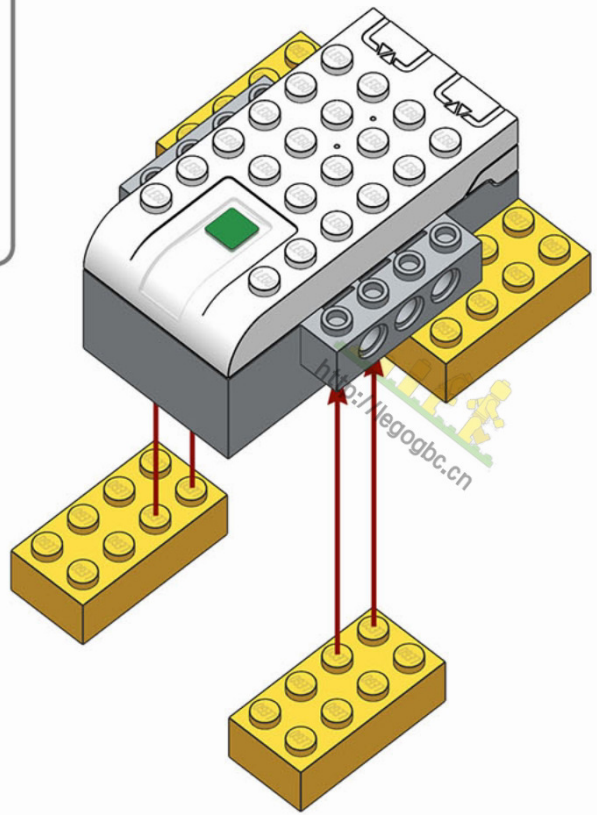

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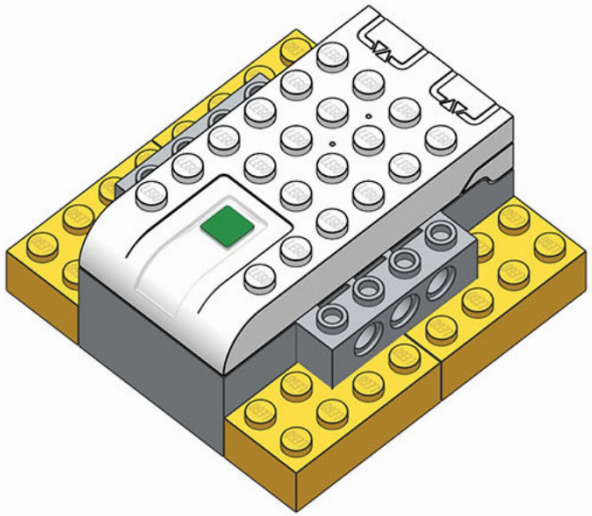

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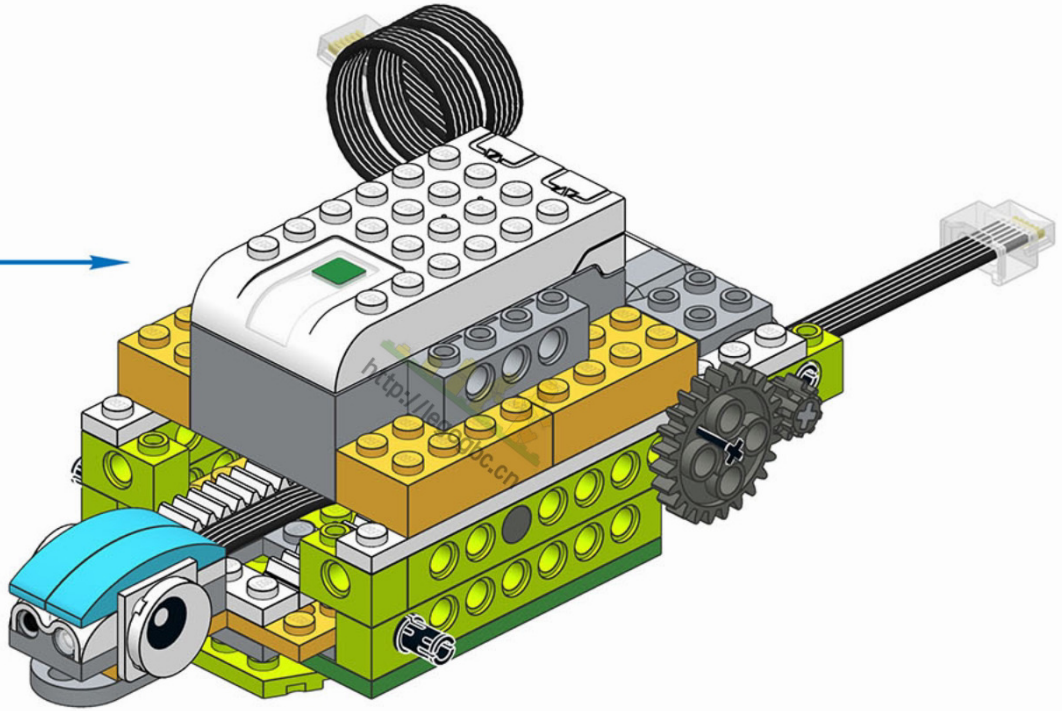

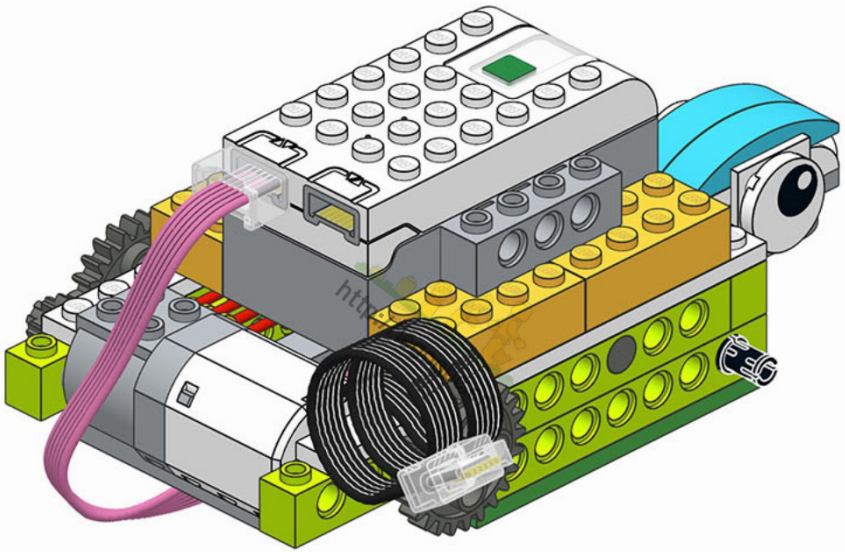

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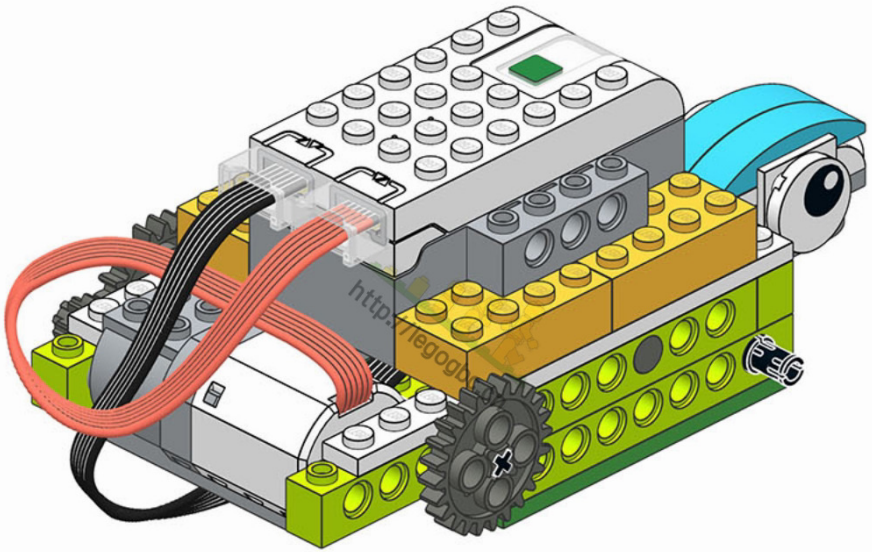

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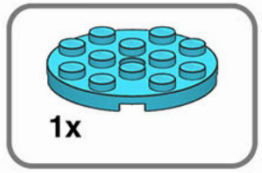

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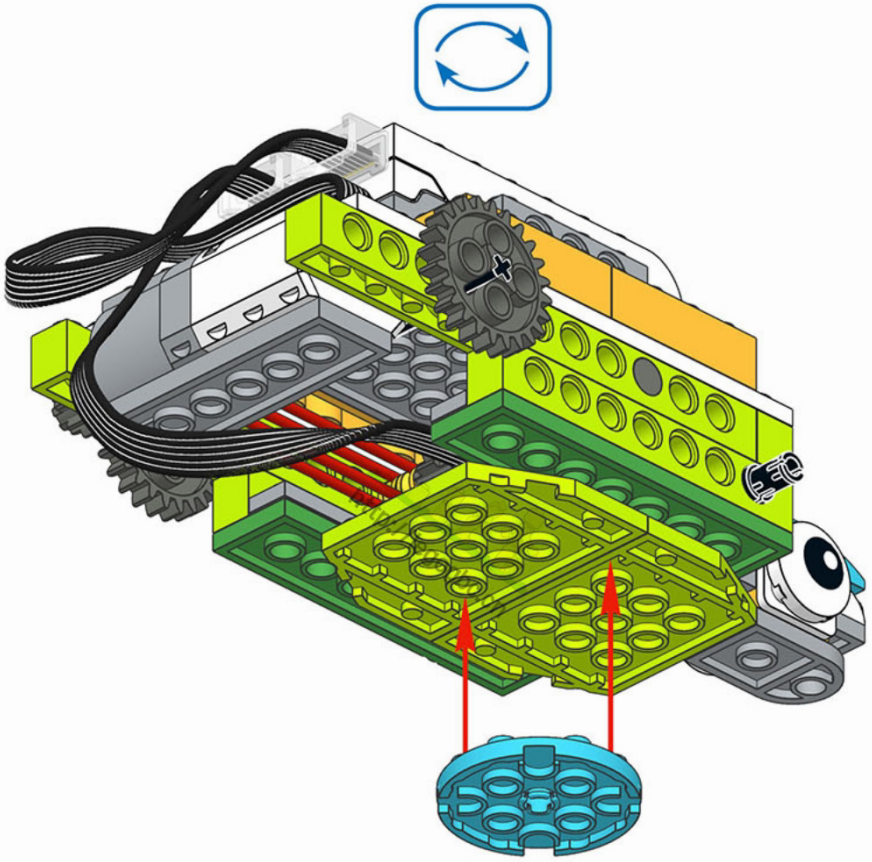

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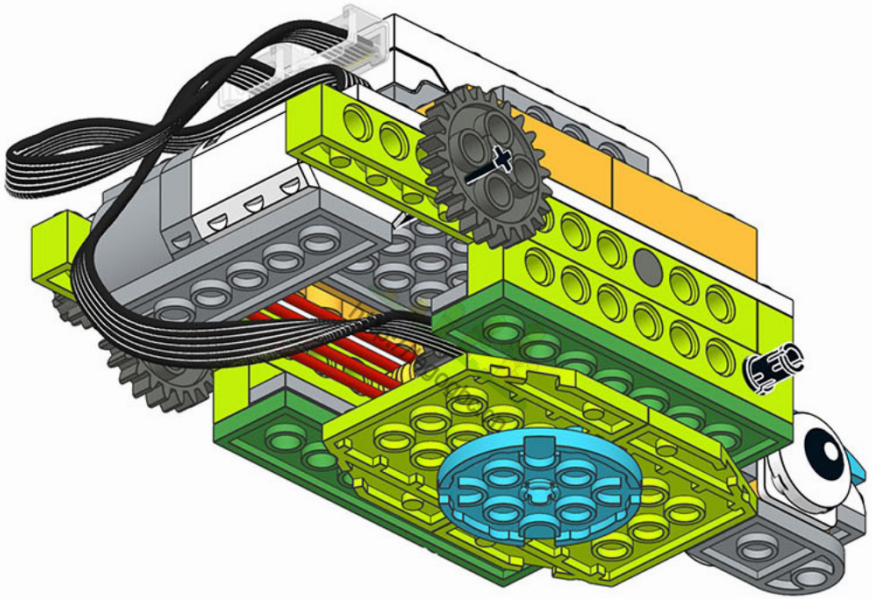

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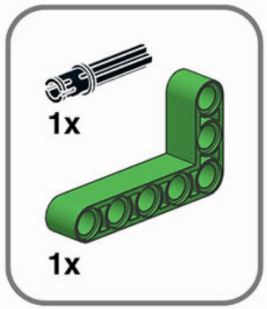

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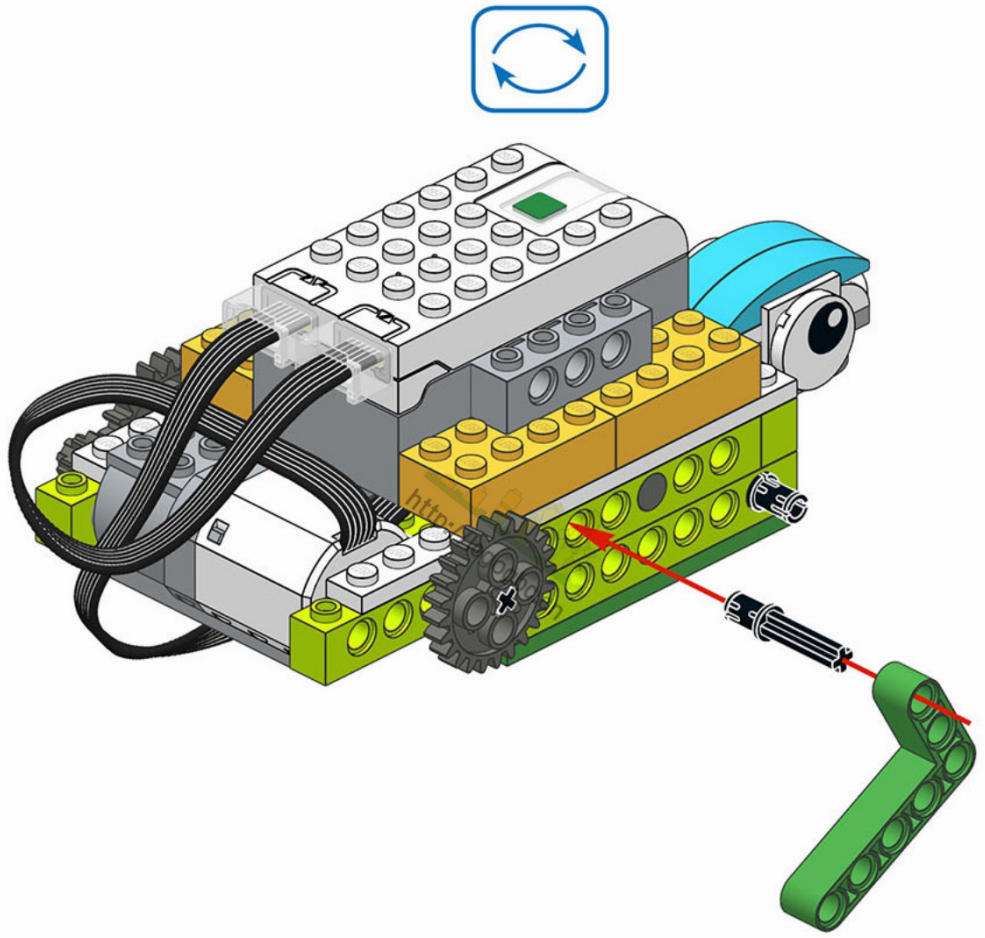

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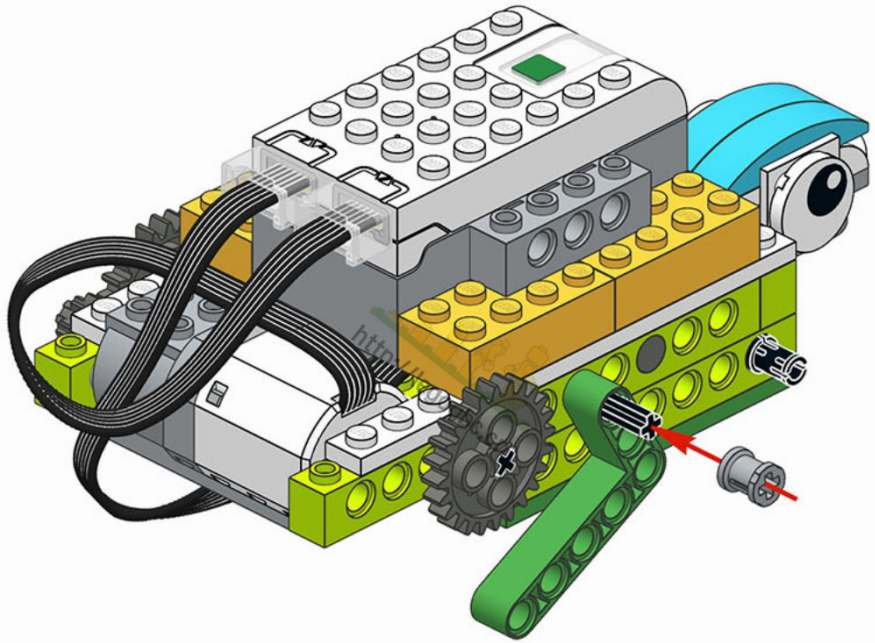

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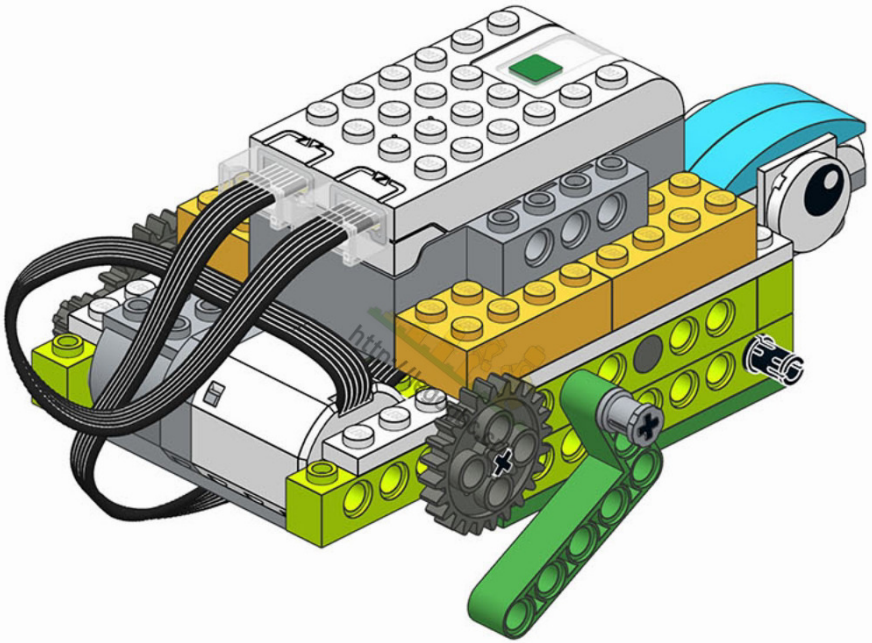

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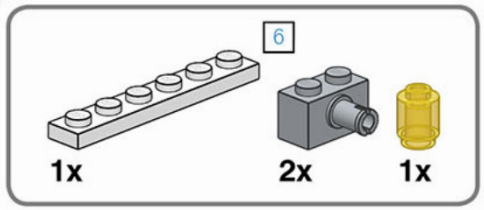

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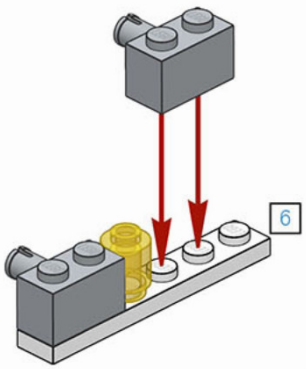

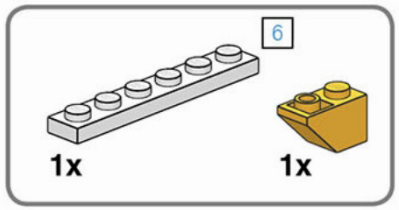

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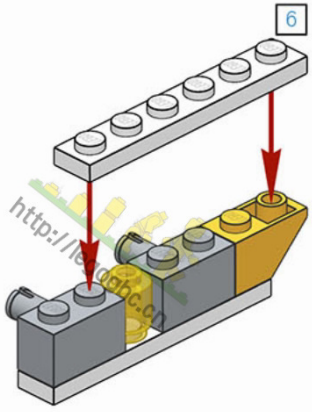

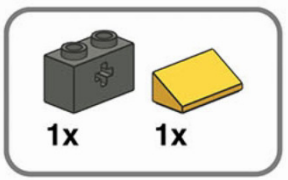

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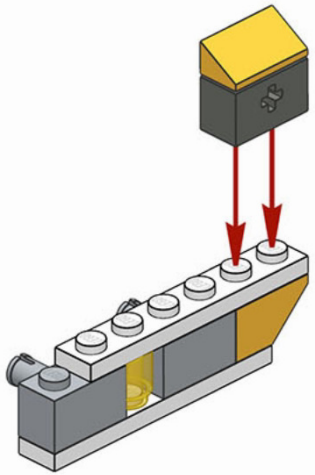

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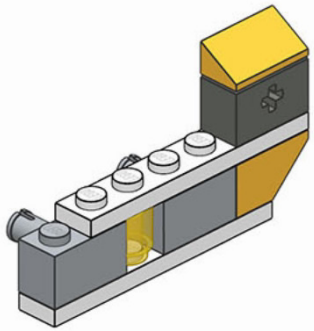

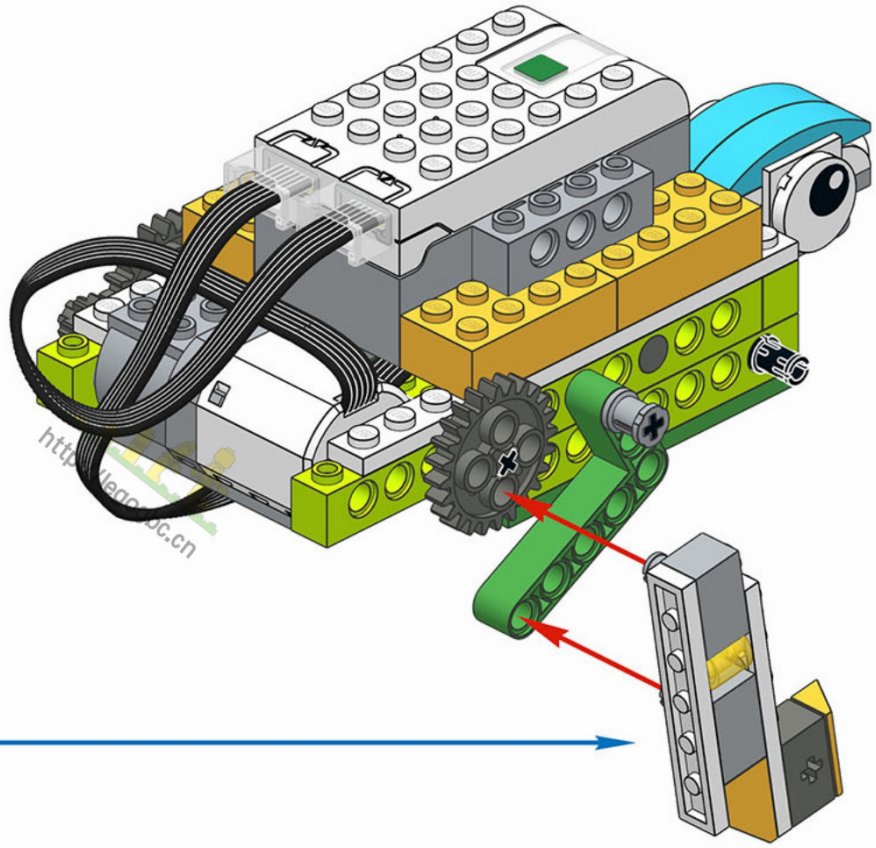

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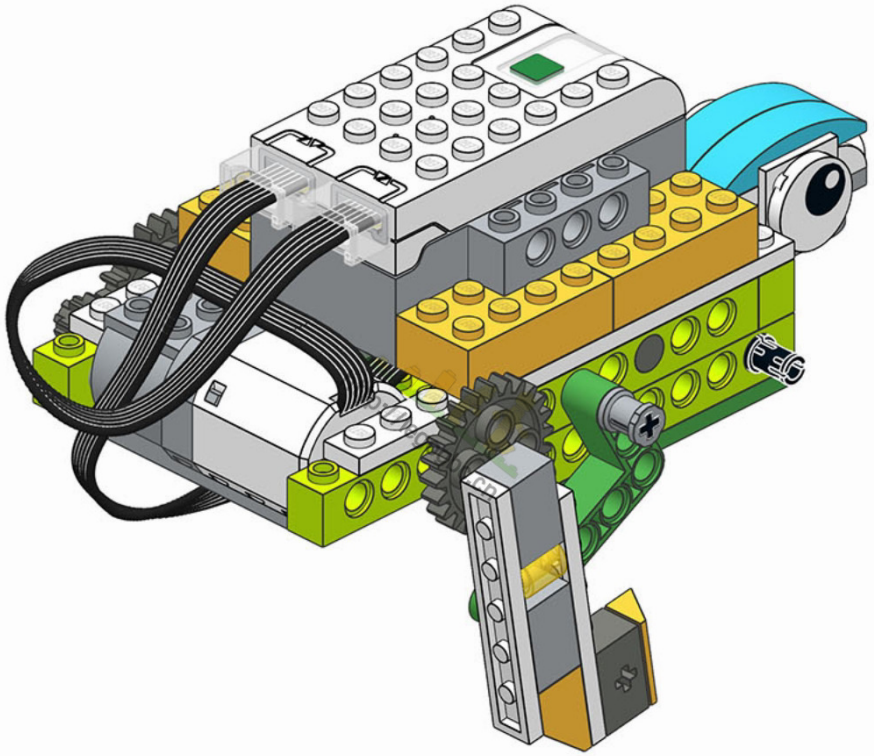

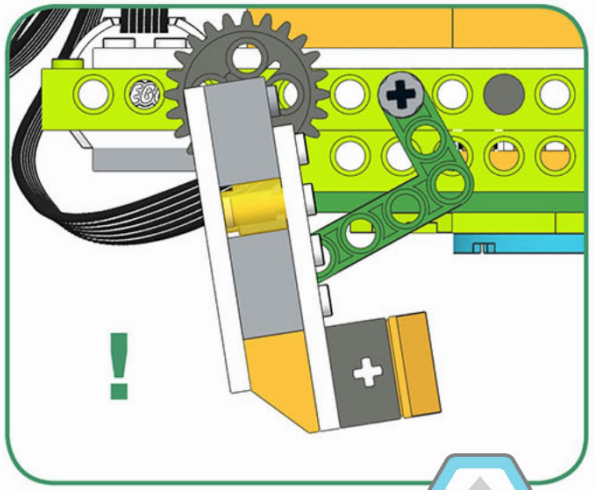

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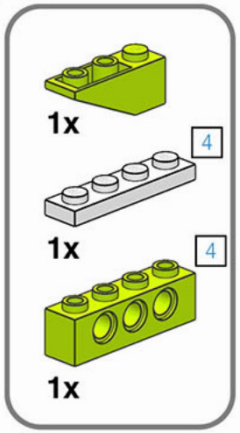

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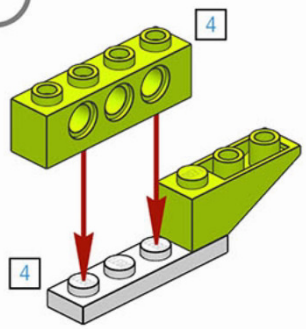

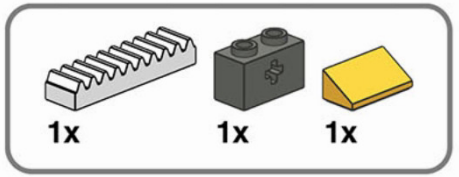

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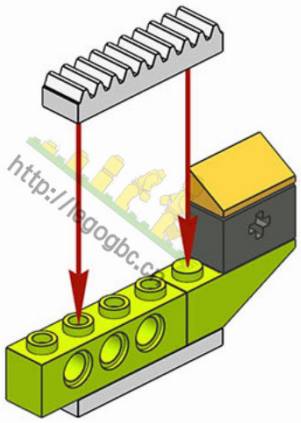

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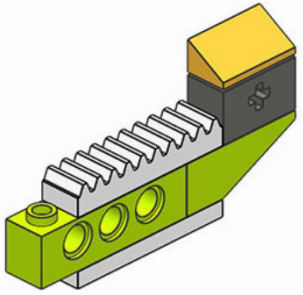

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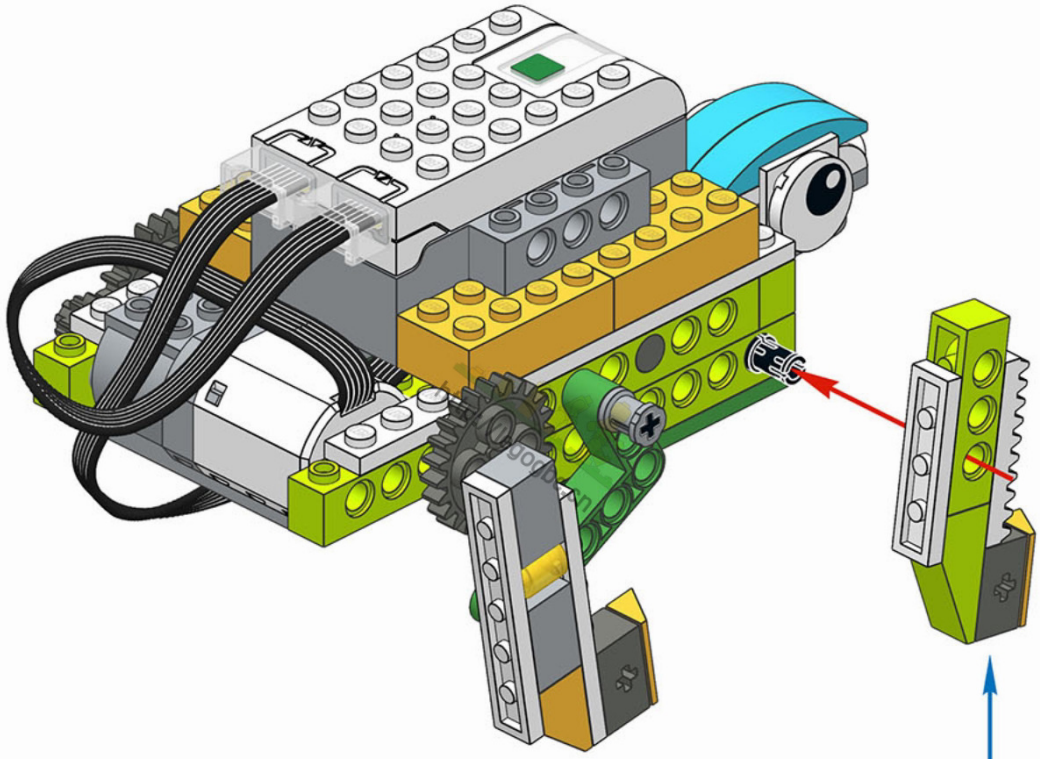

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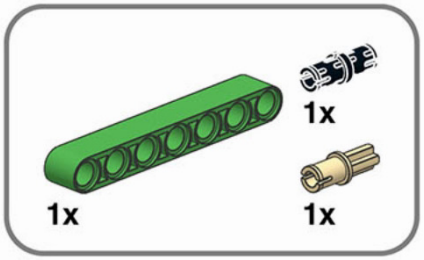

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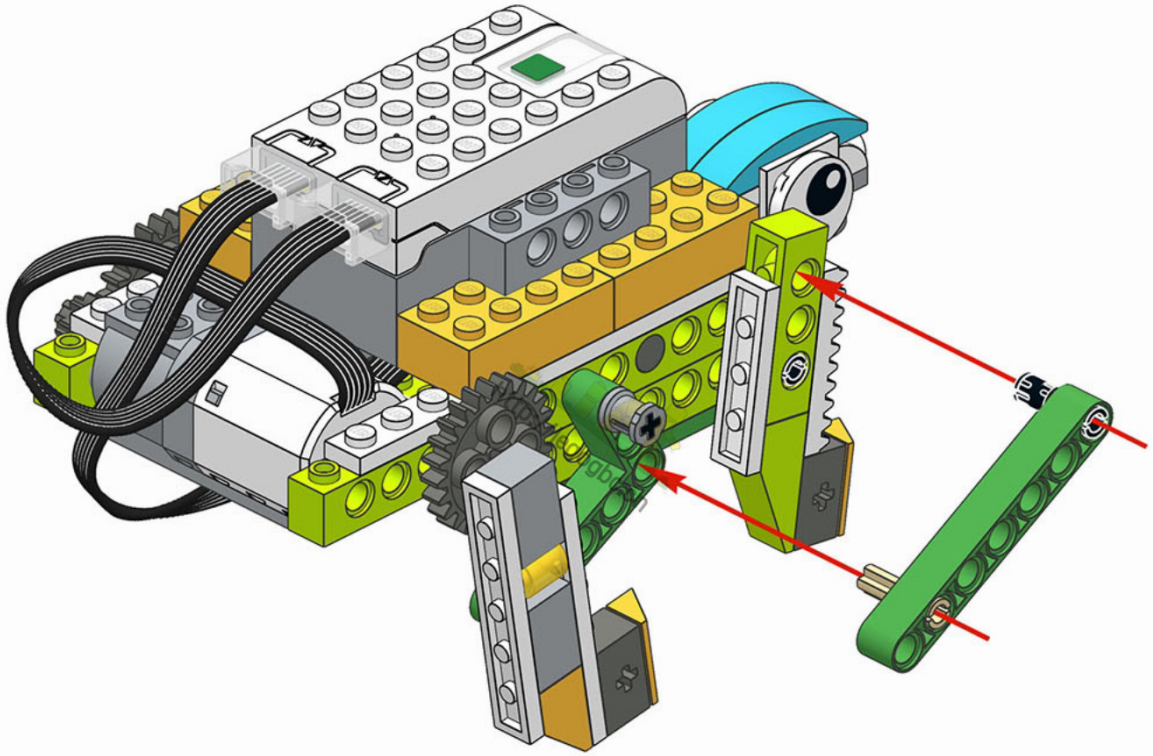

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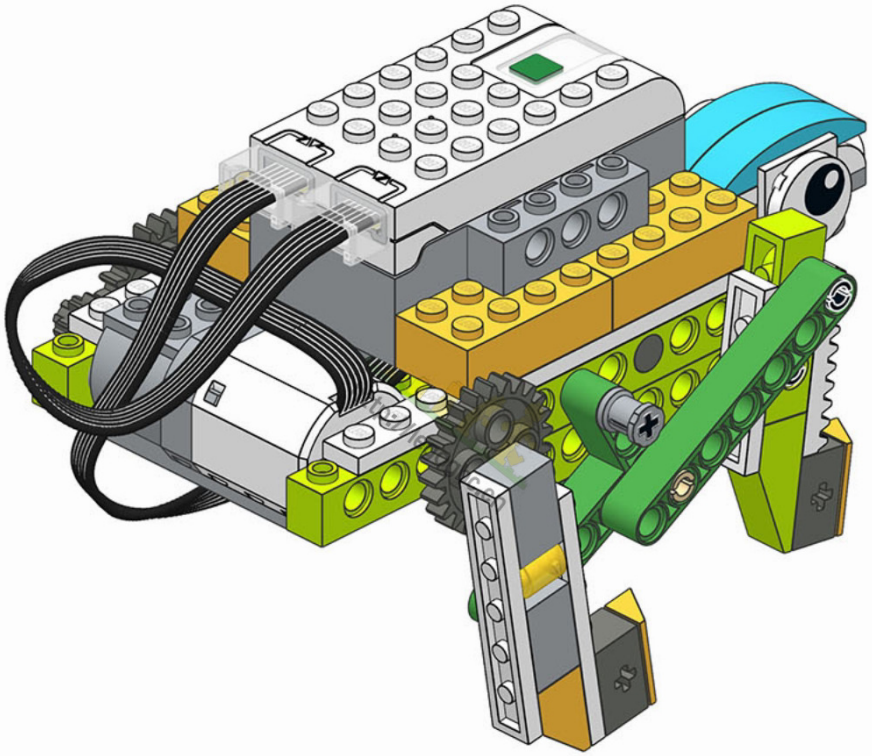

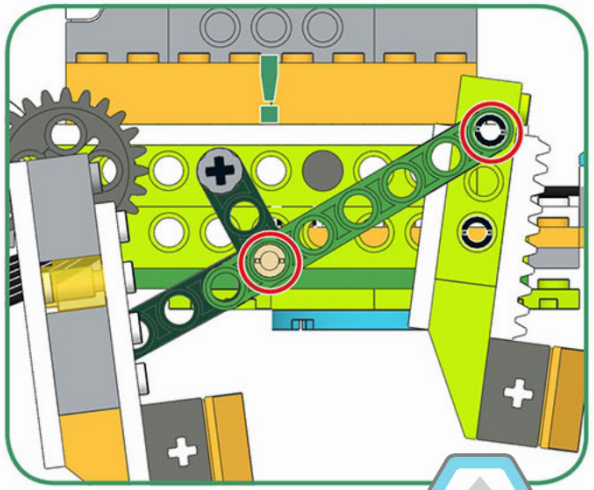

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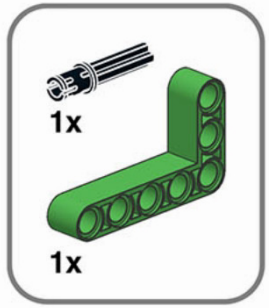

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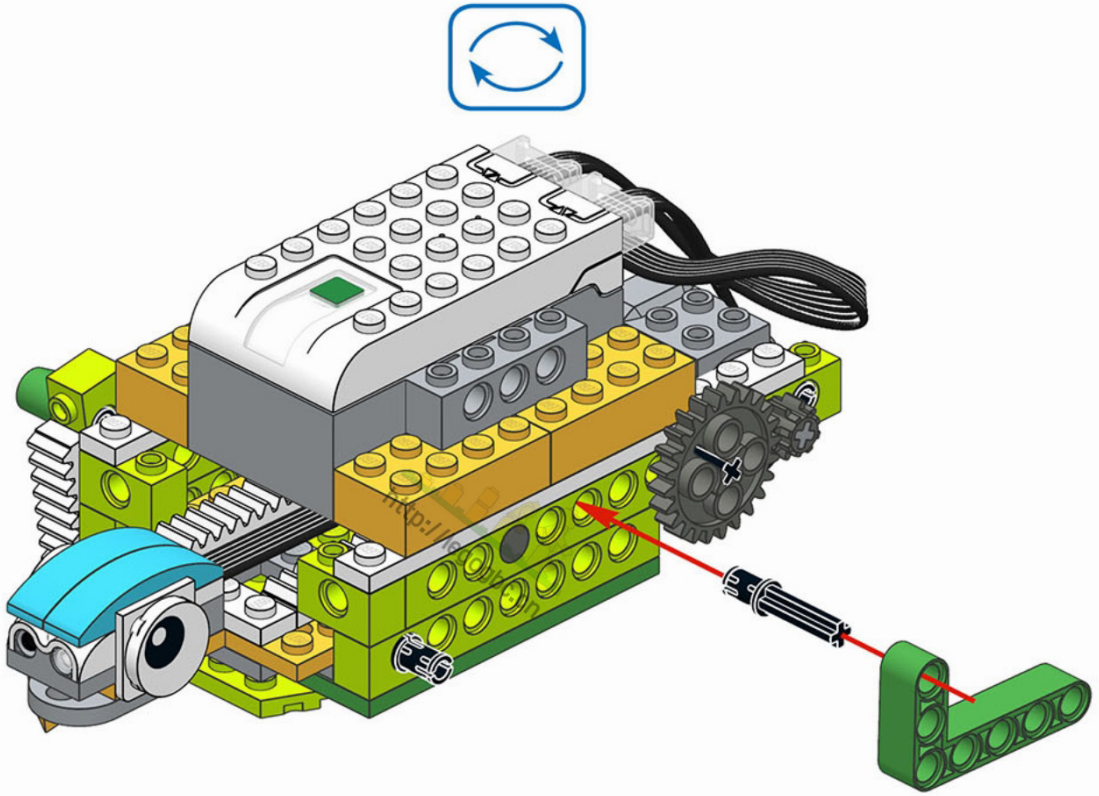

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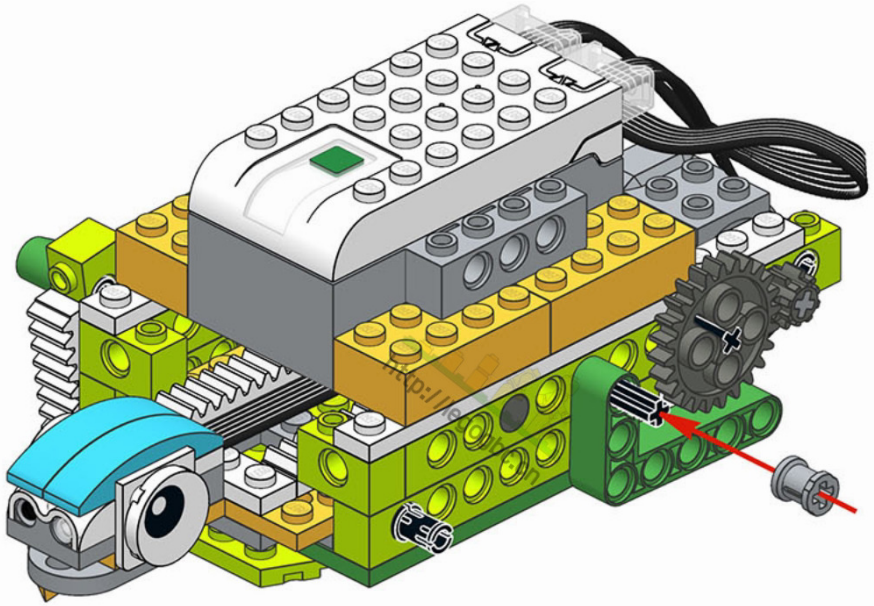

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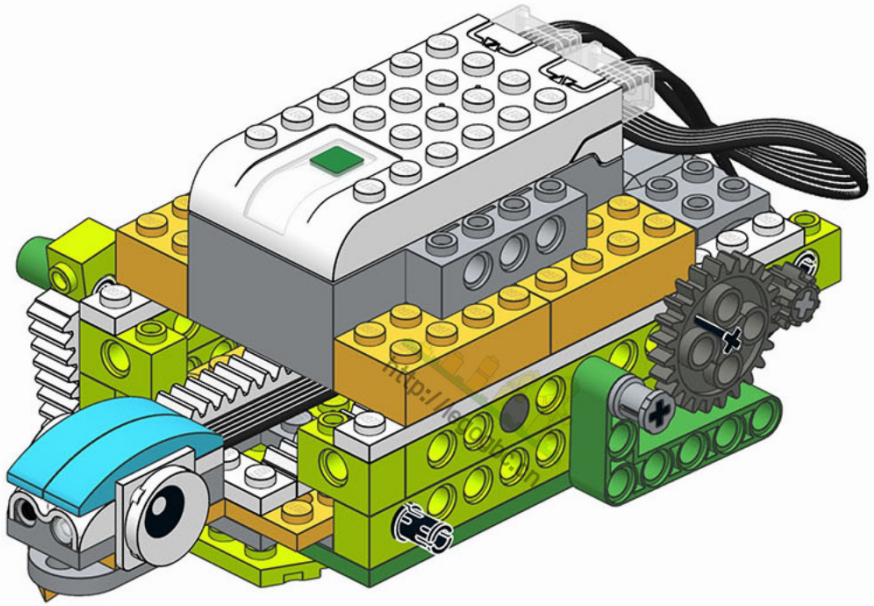
48



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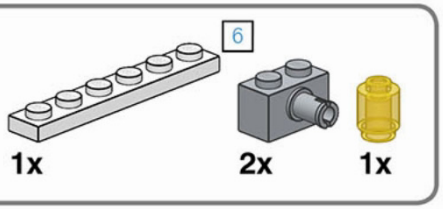

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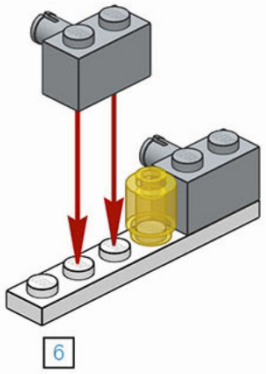

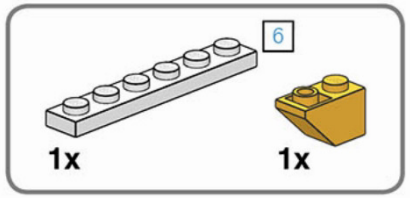

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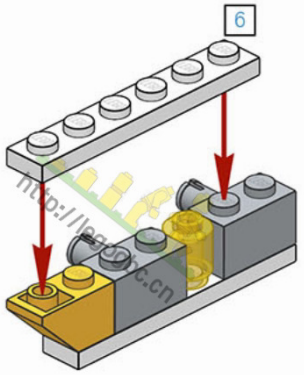

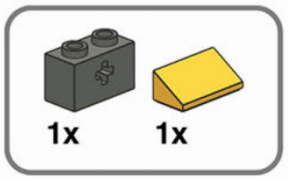

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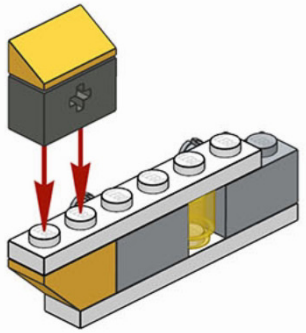

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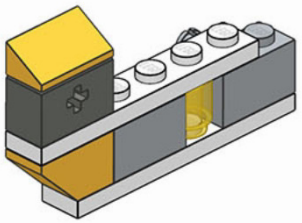

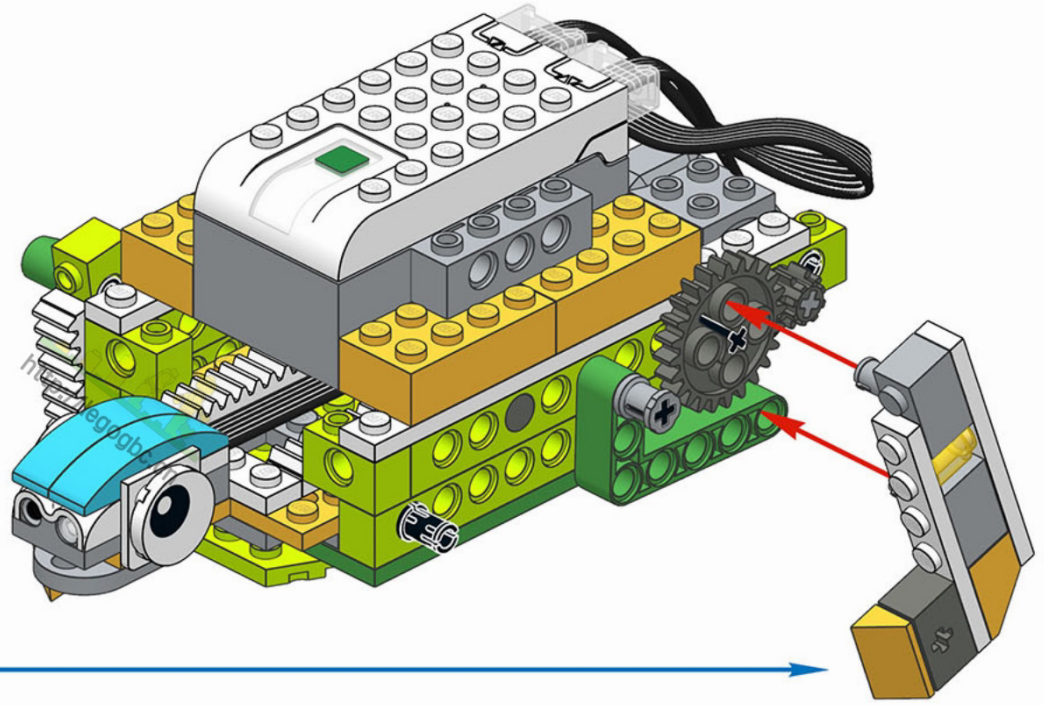

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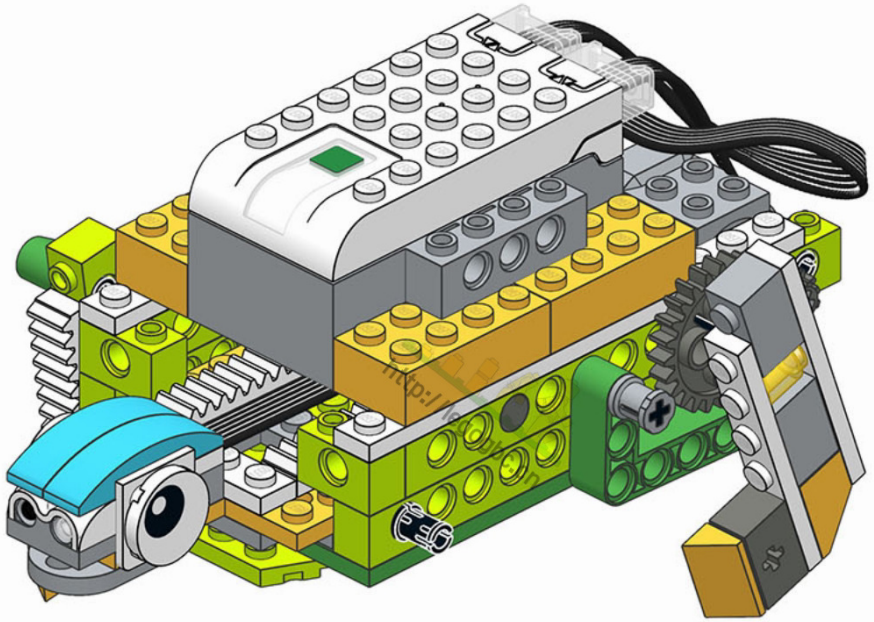

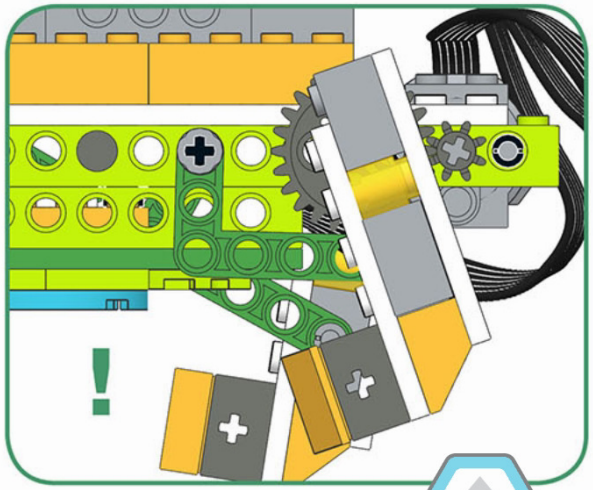

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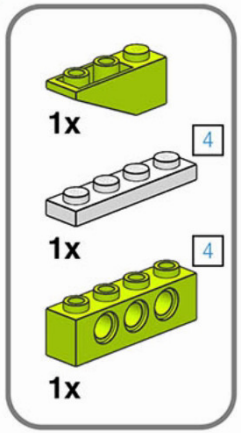

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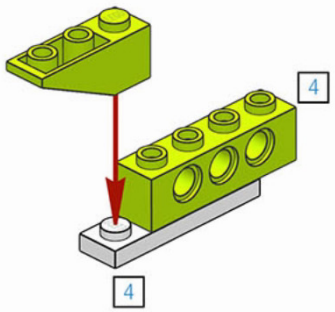

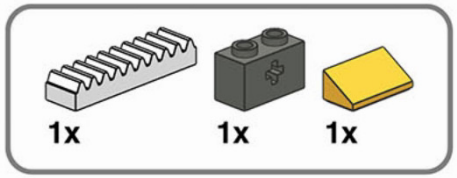

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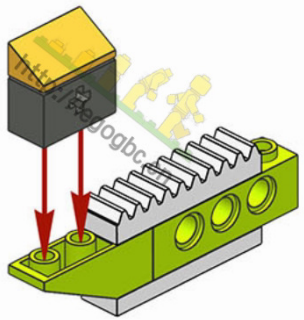

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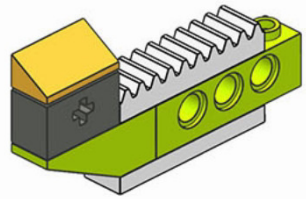

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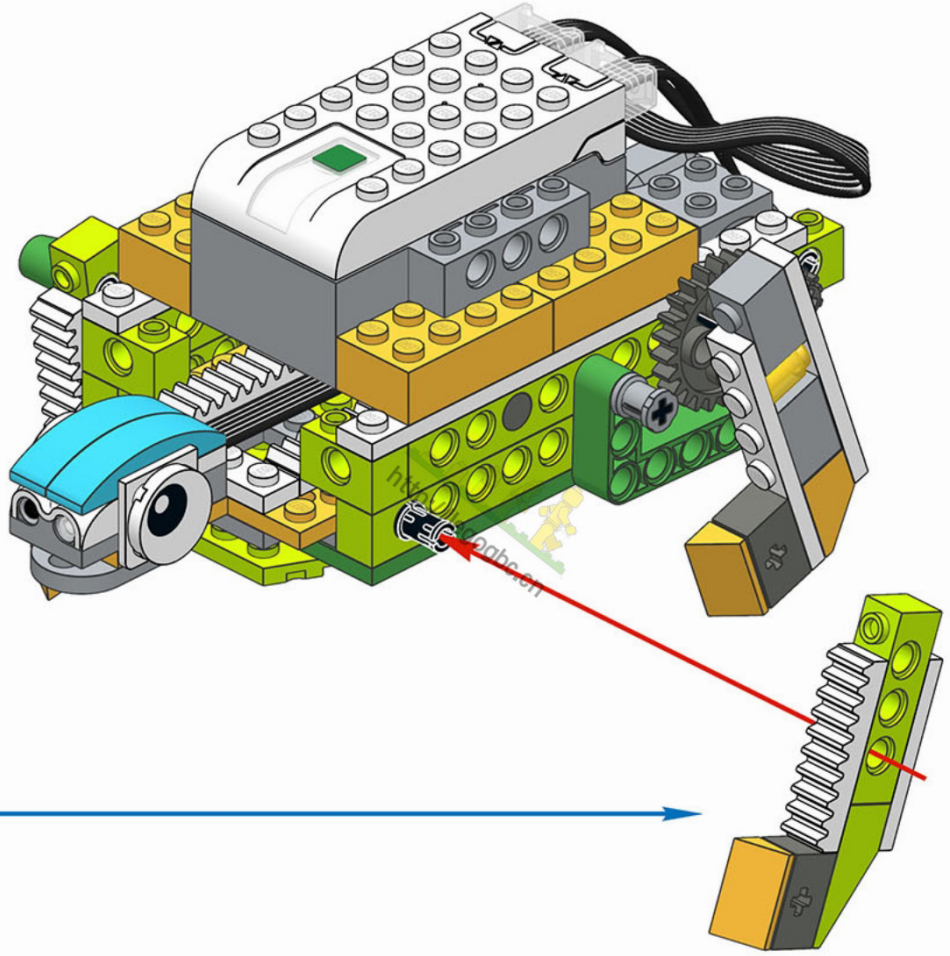

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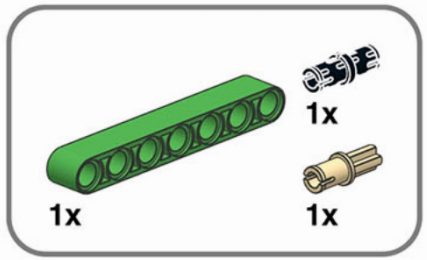

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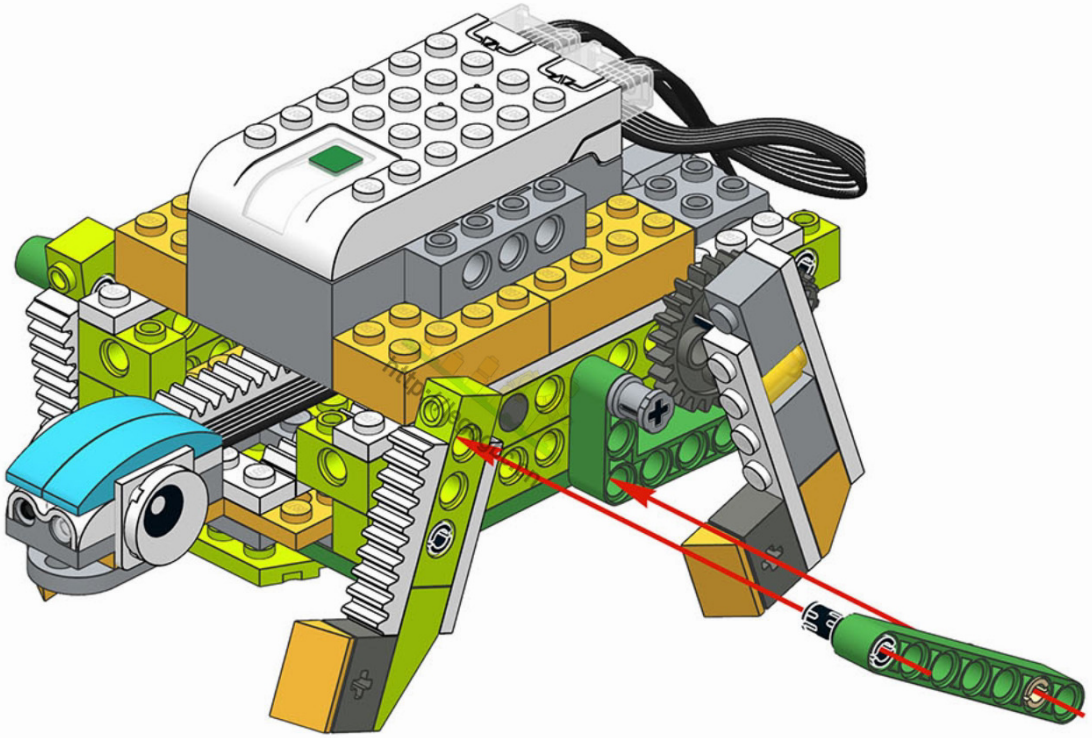

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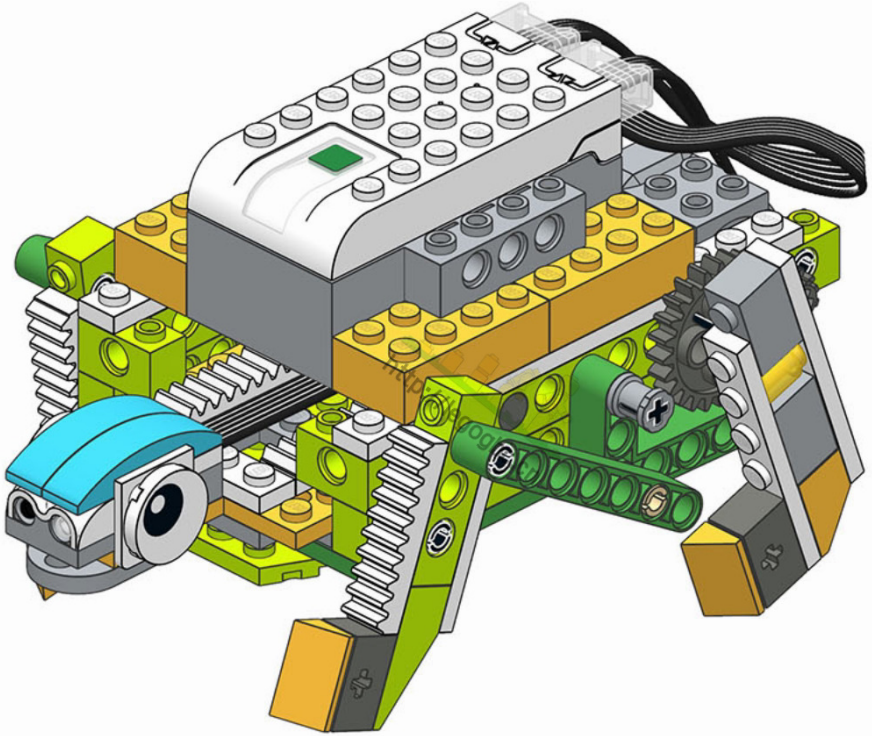

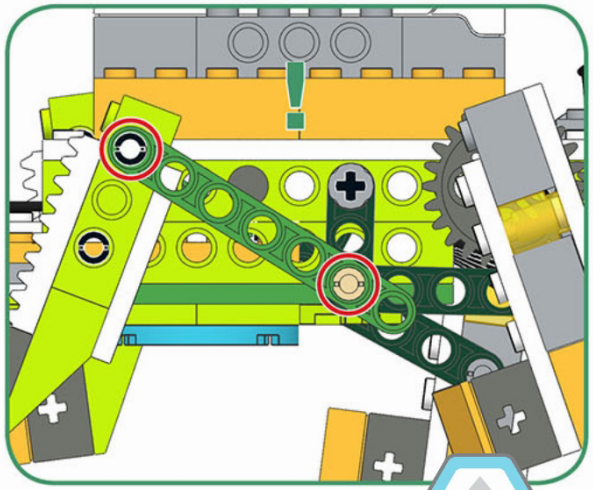

Enhanced version

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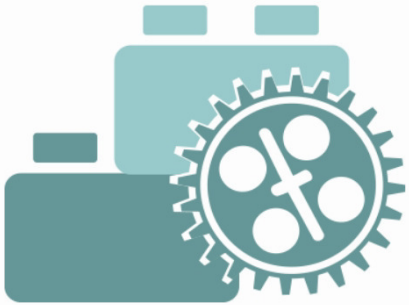
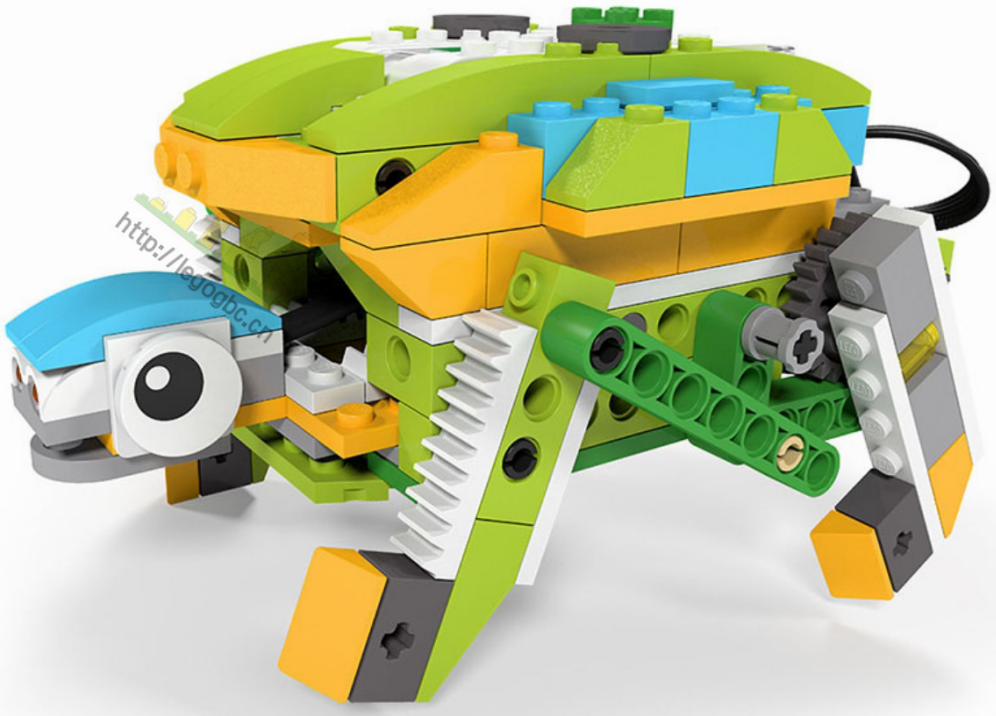
Add the decorative elements of the robot`s shell.





Meiolania

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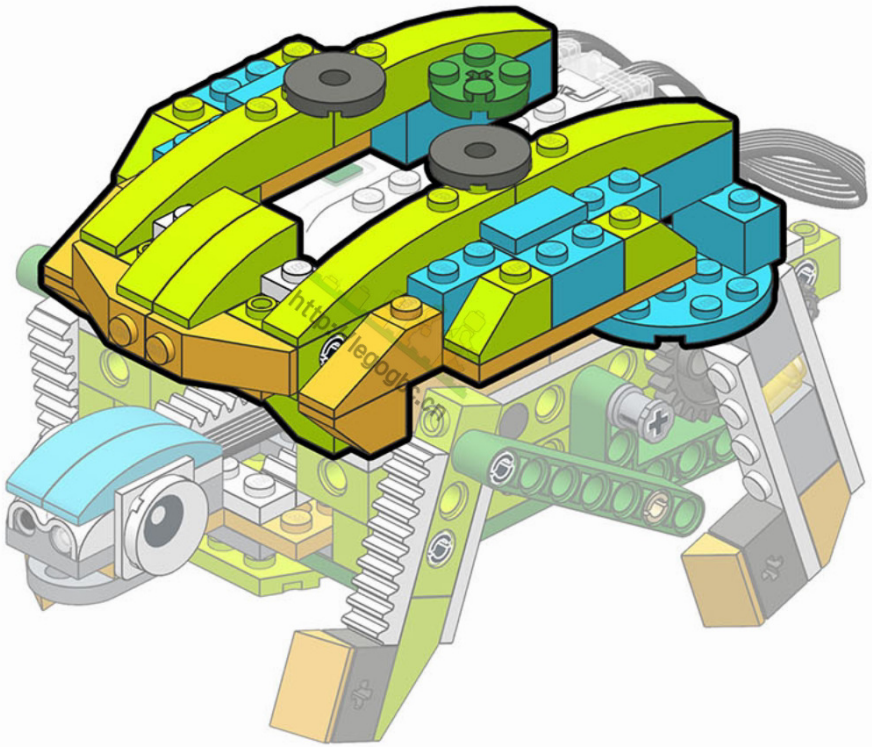

关注公众号获取更多

2x

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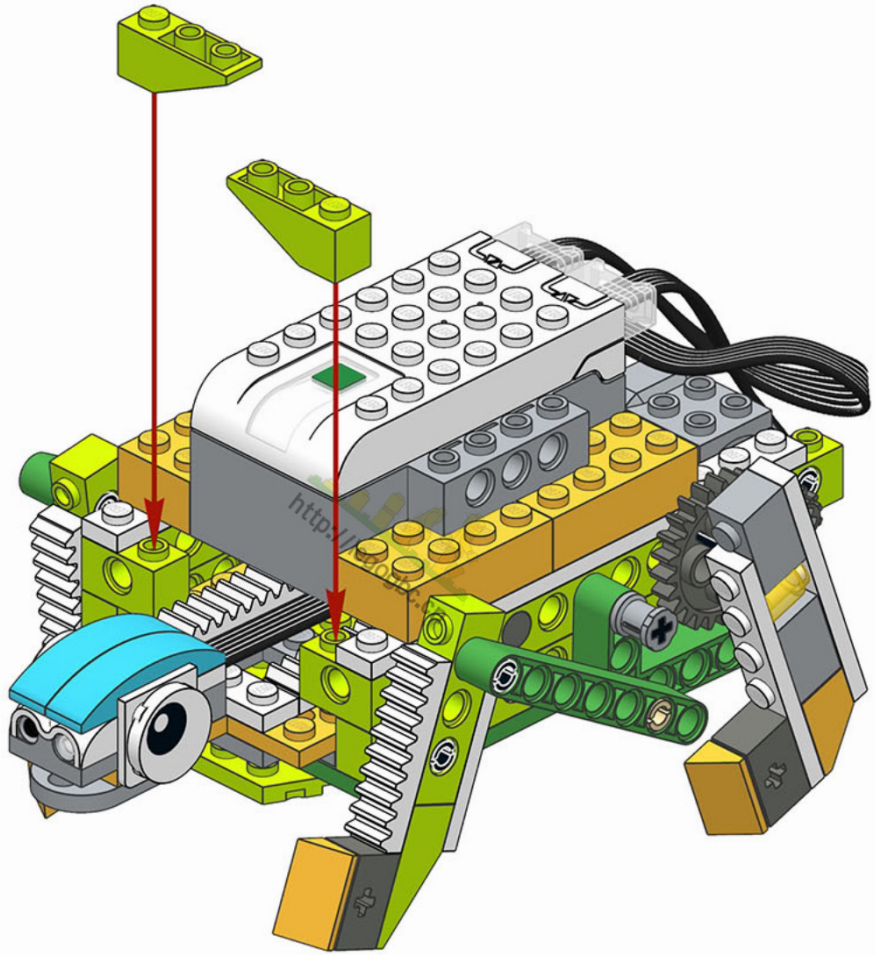

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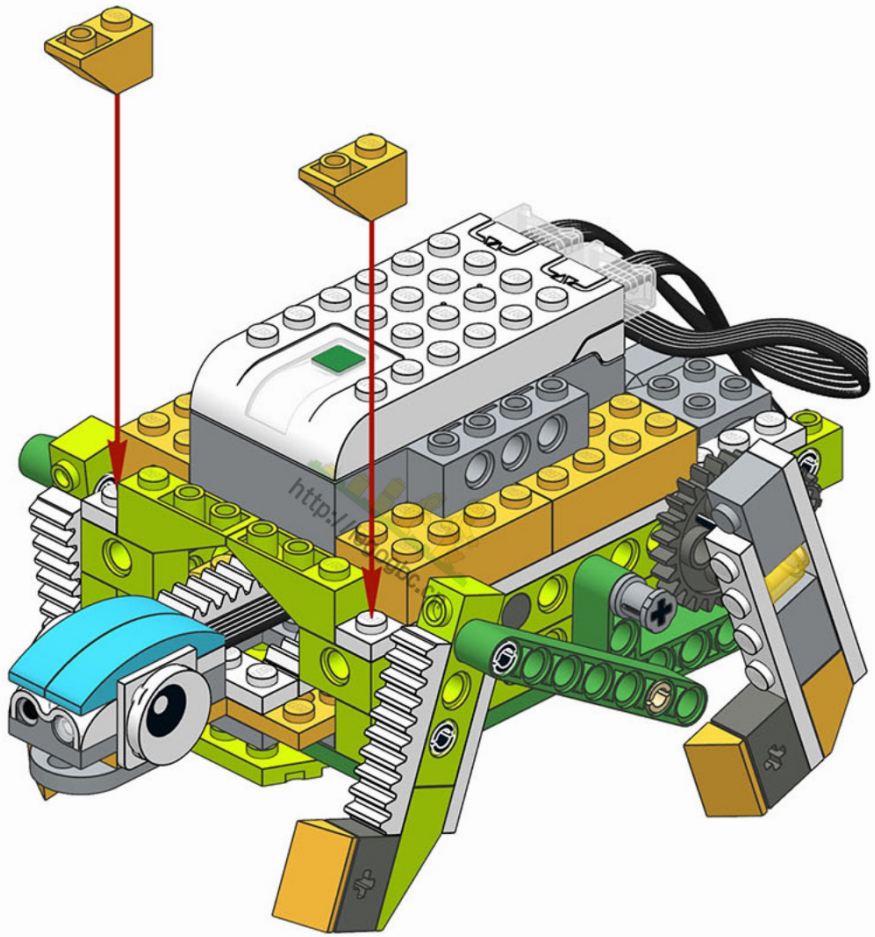

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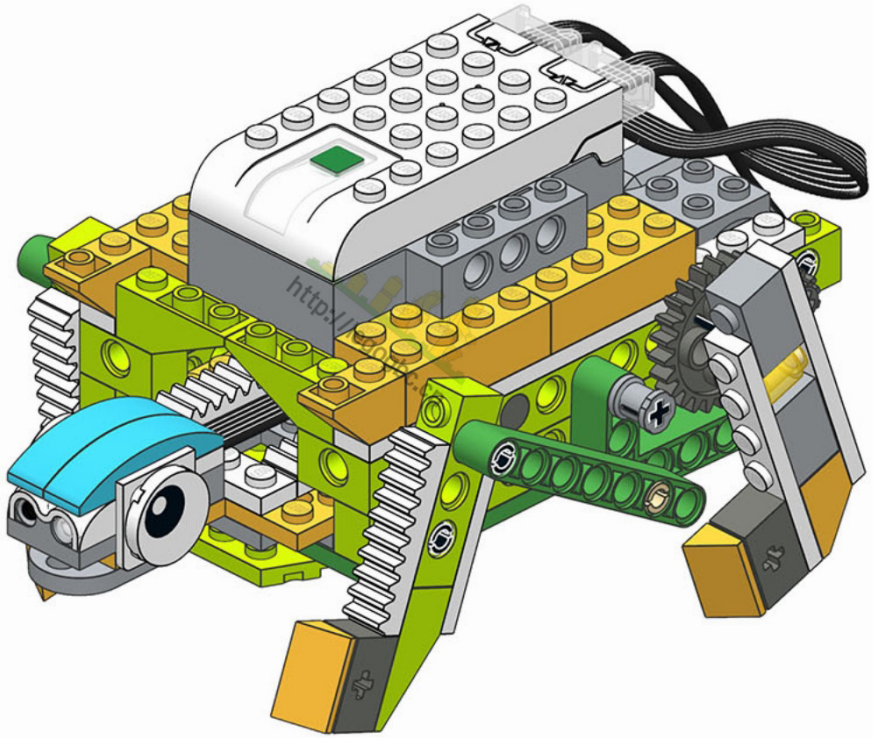

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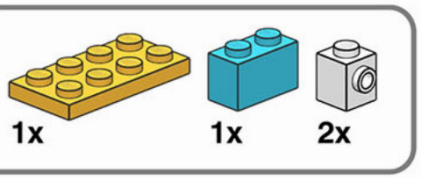

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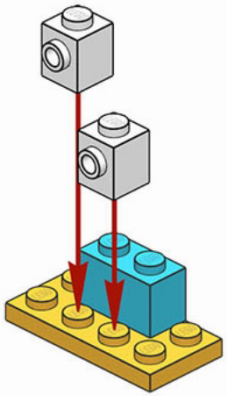

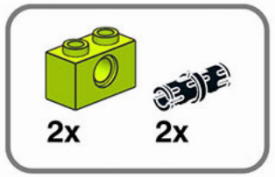

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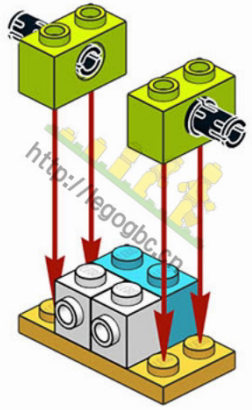

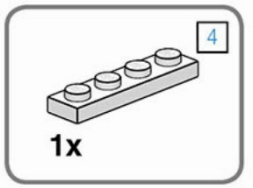

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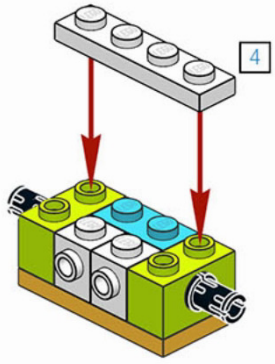

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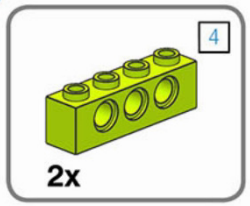

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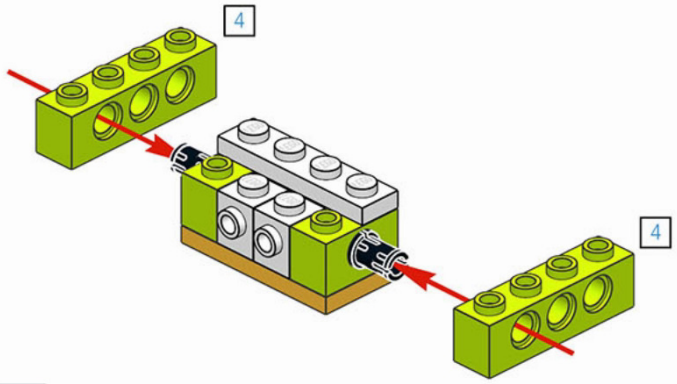

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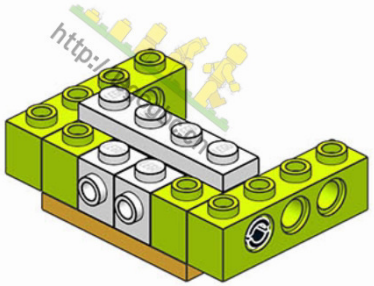

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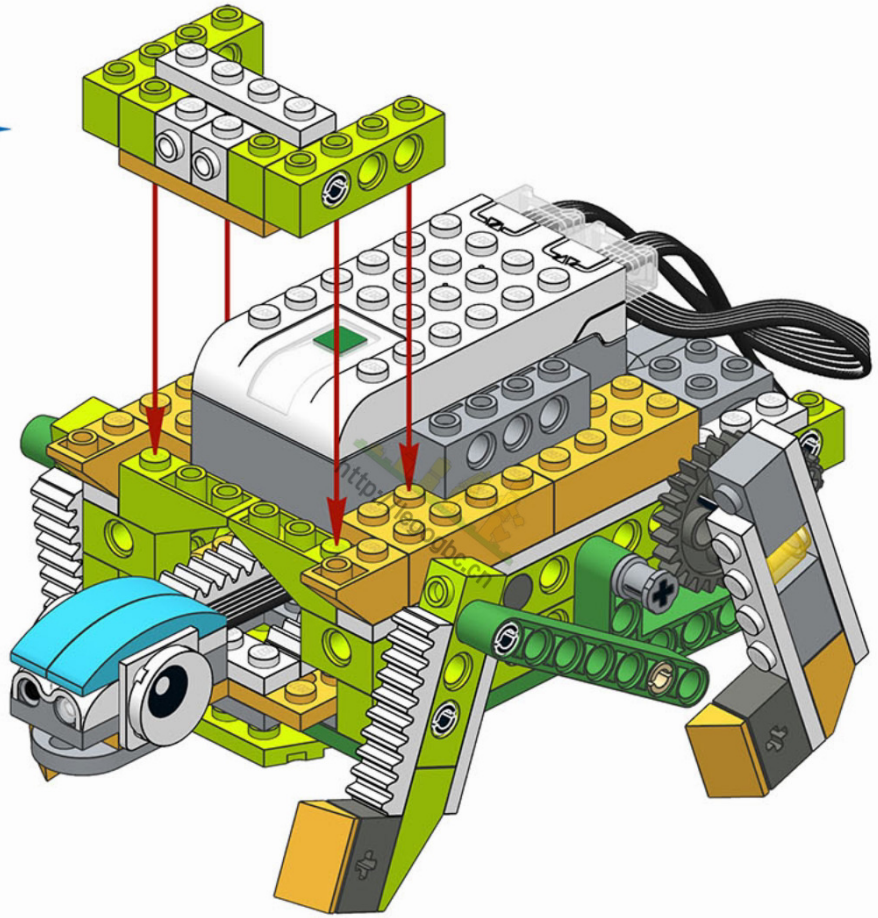

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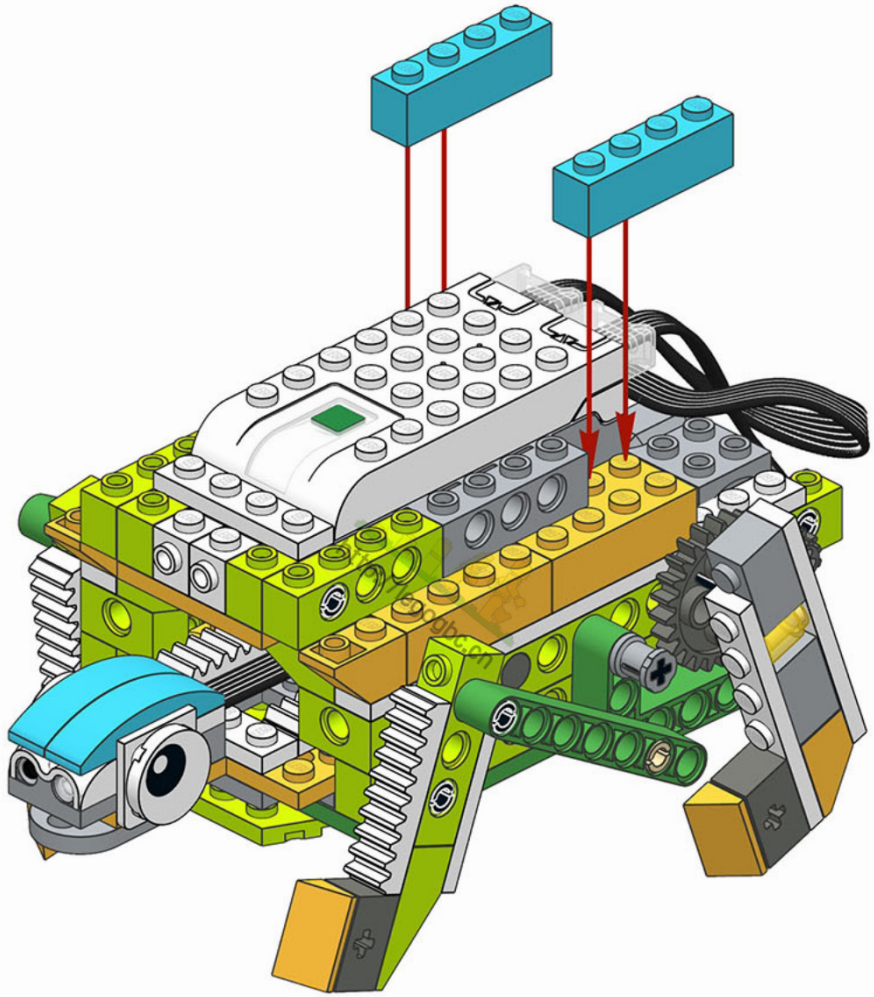

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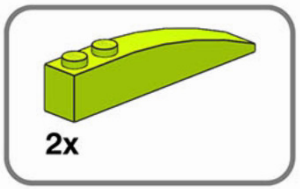

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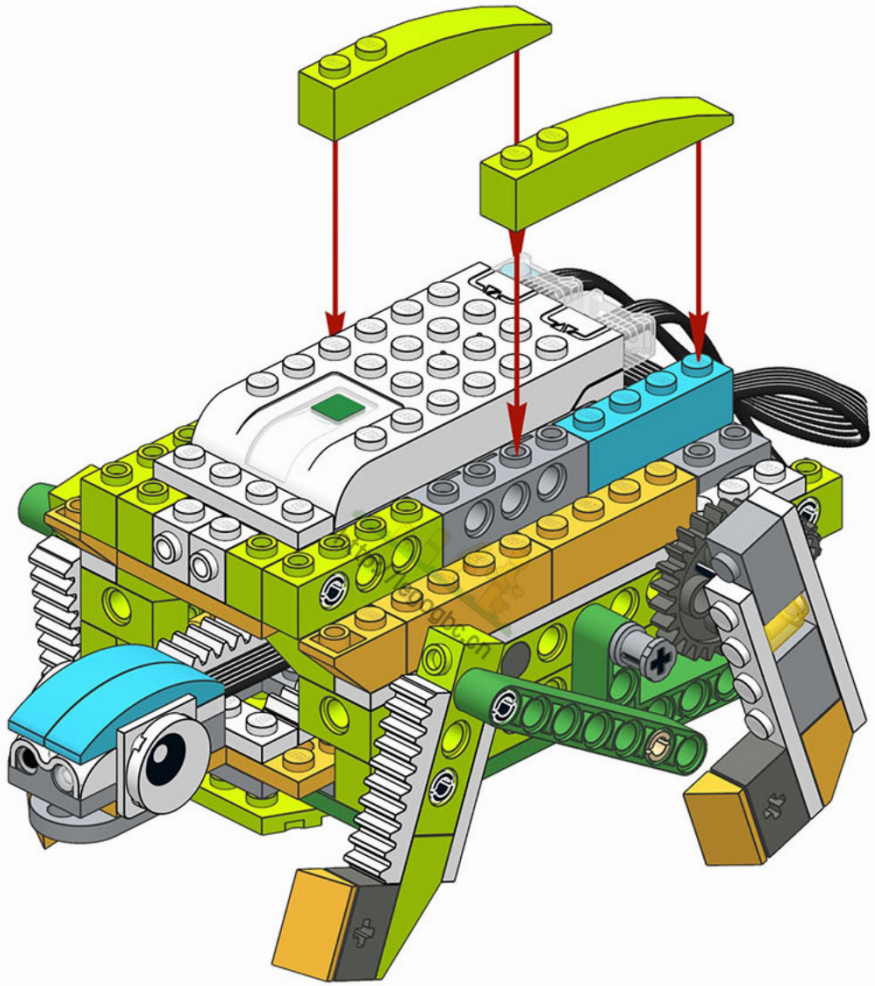

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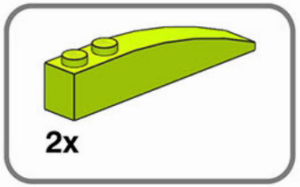

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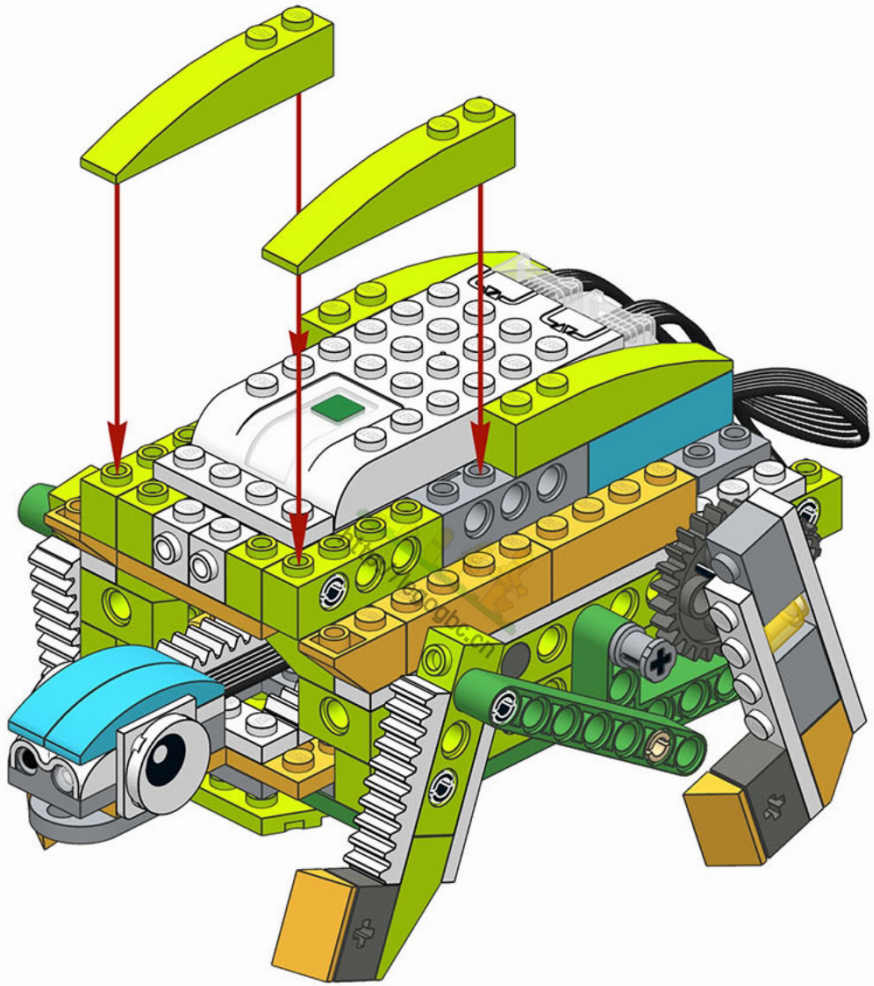

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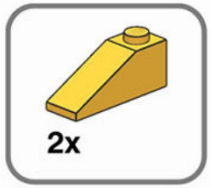

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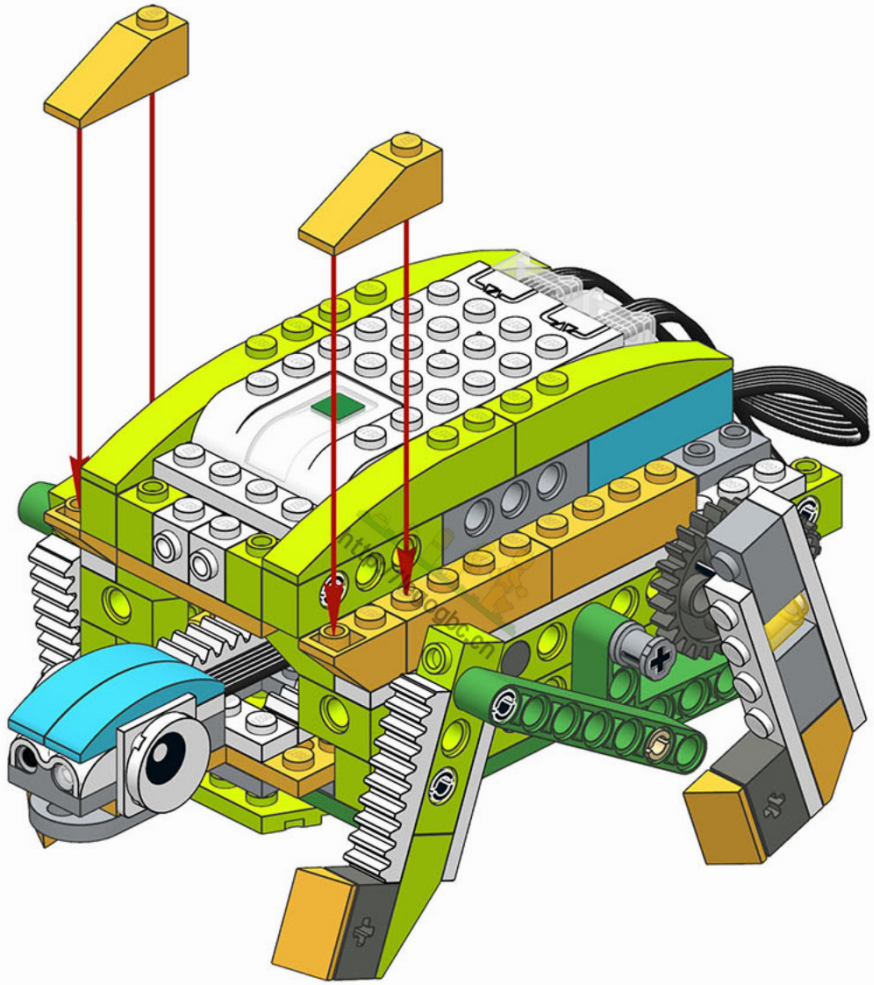

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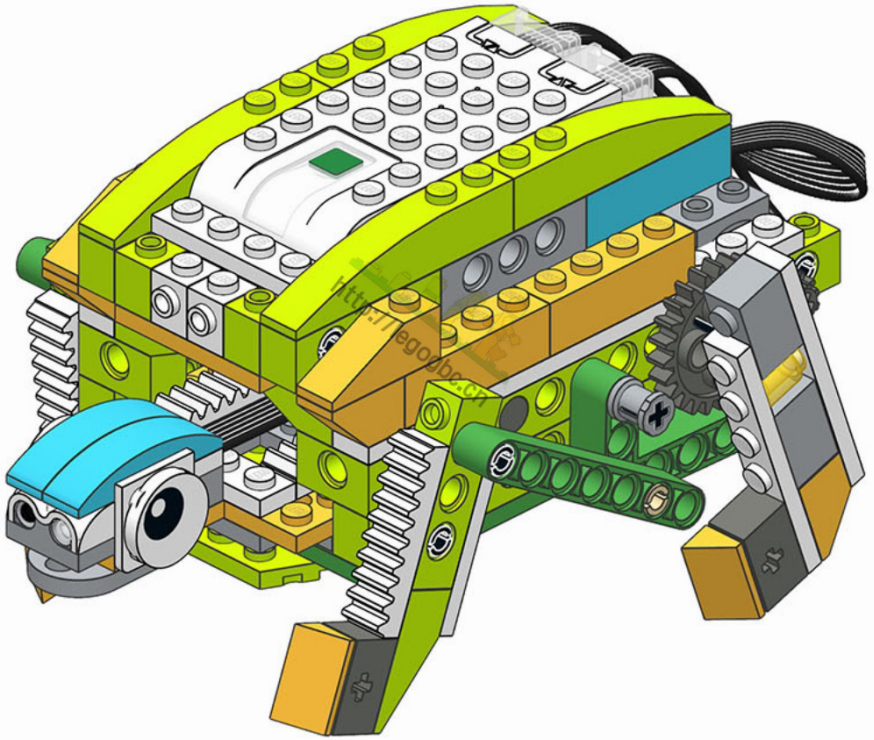

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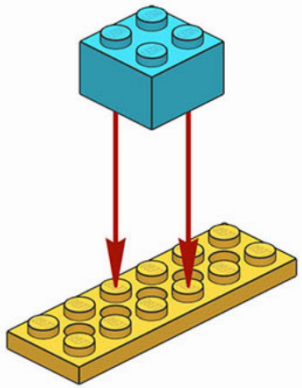

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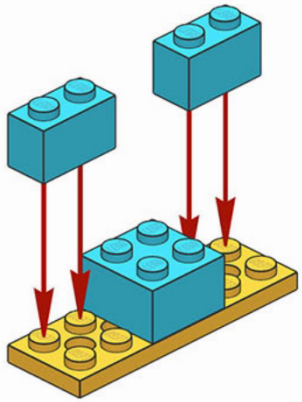

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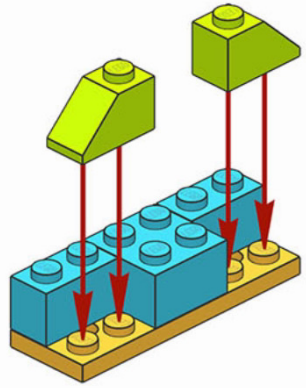

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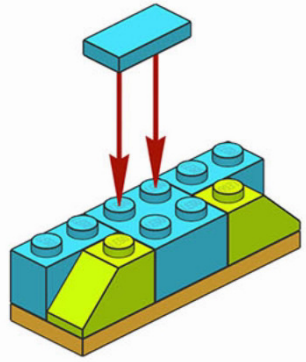

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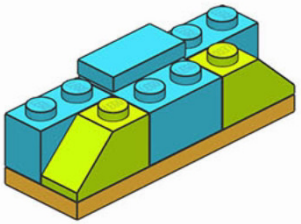

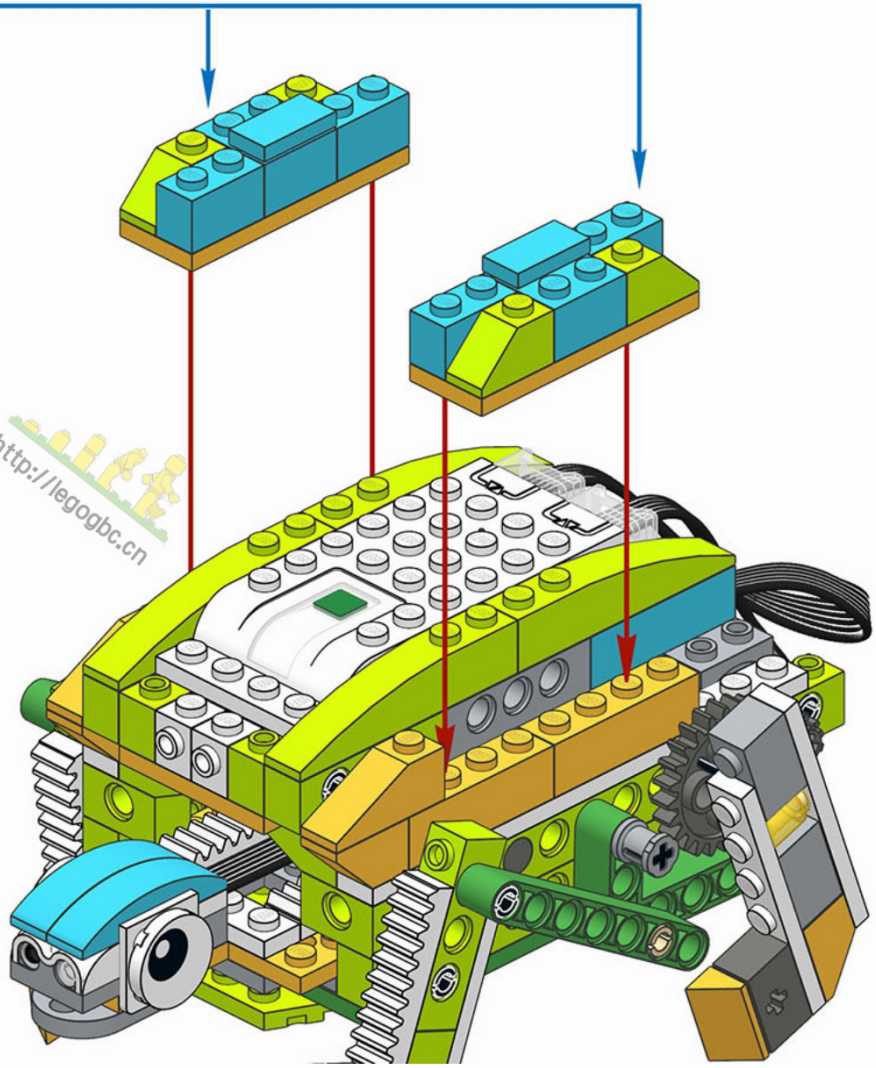

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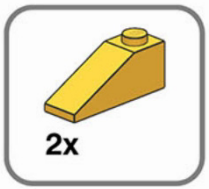

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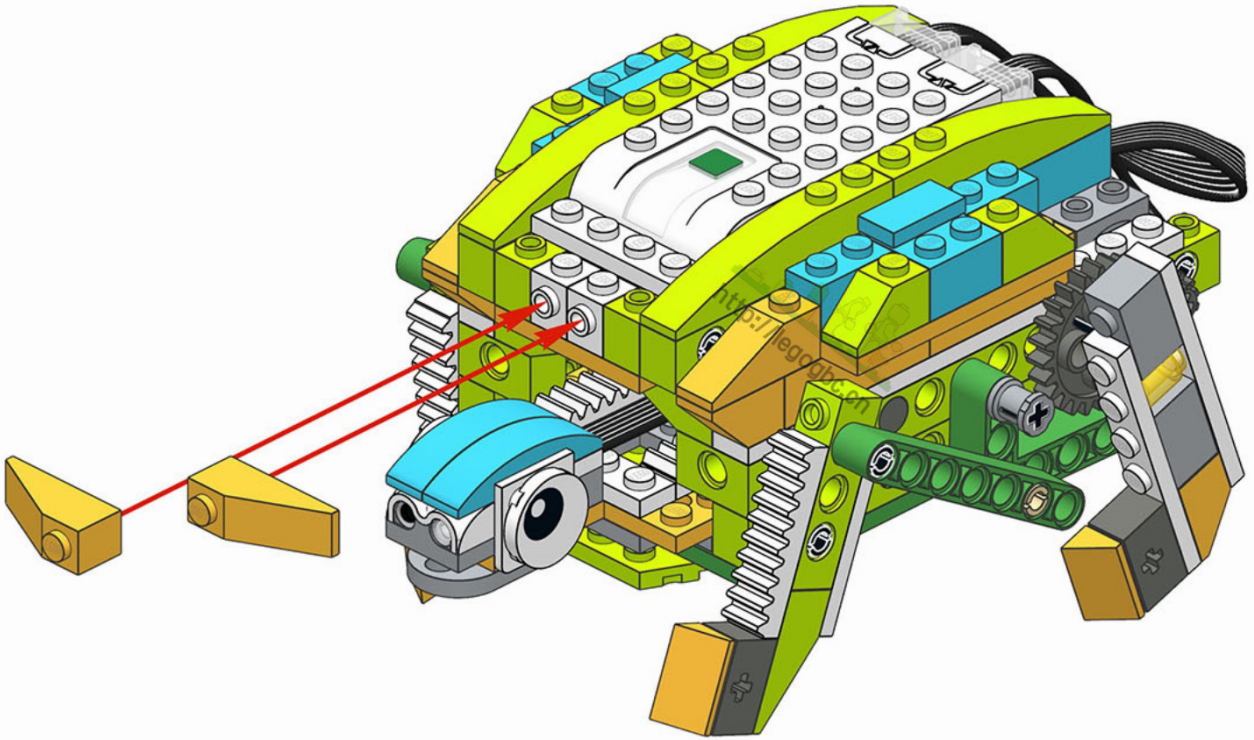

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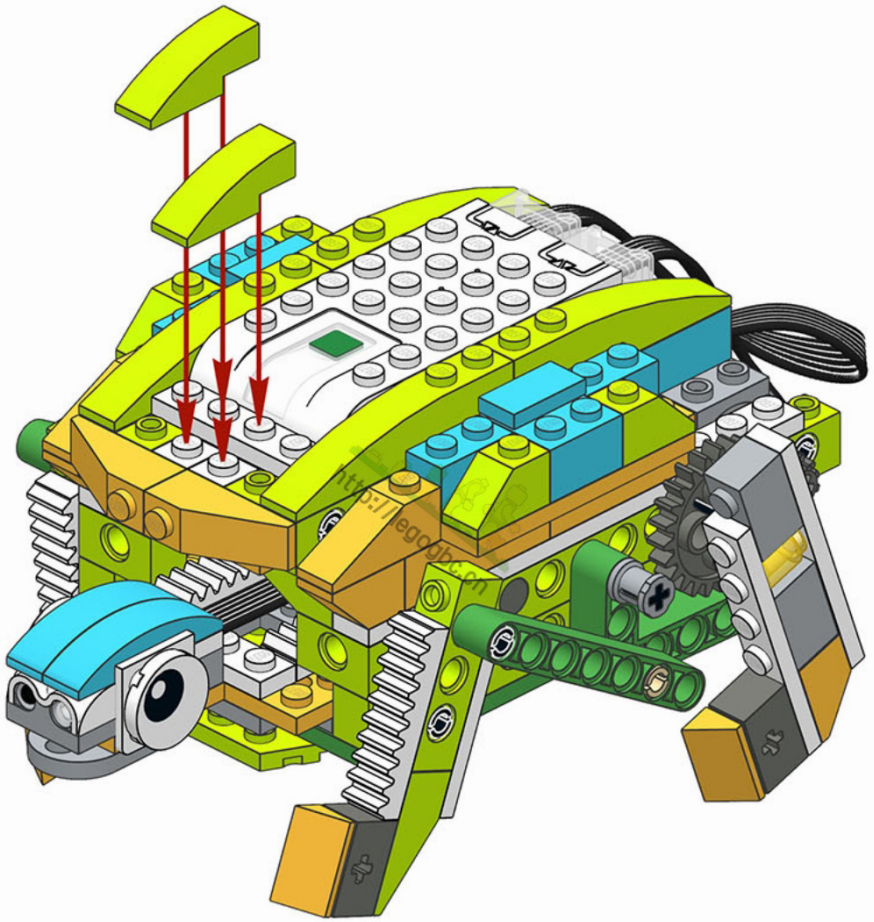
2x

70



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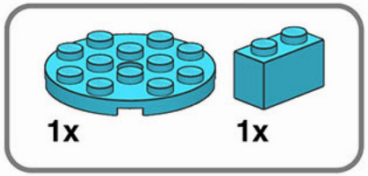
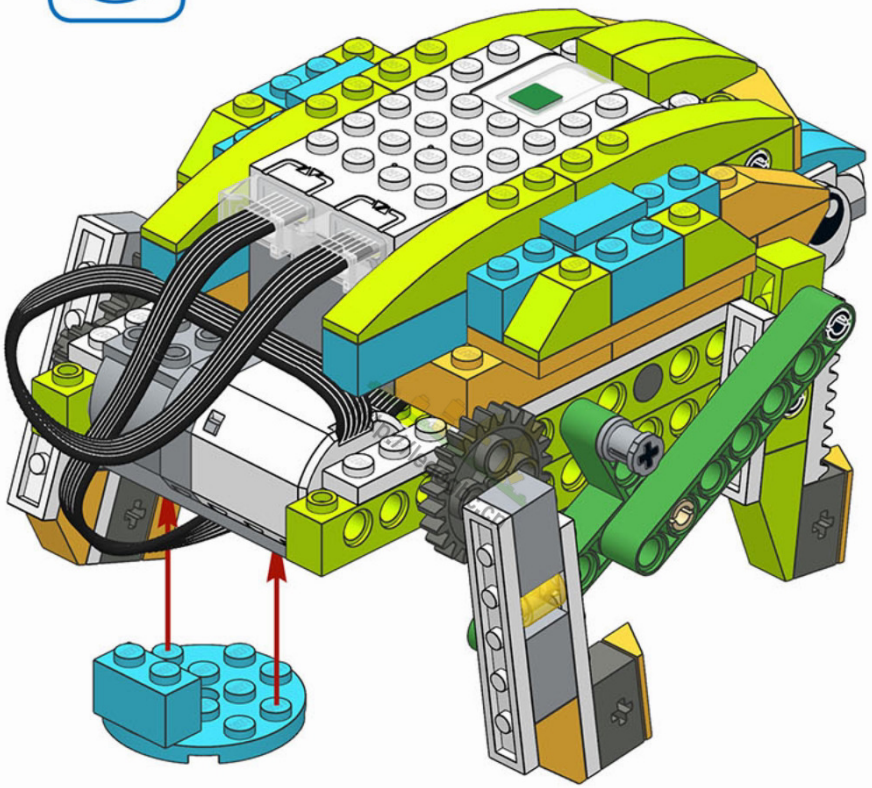


71



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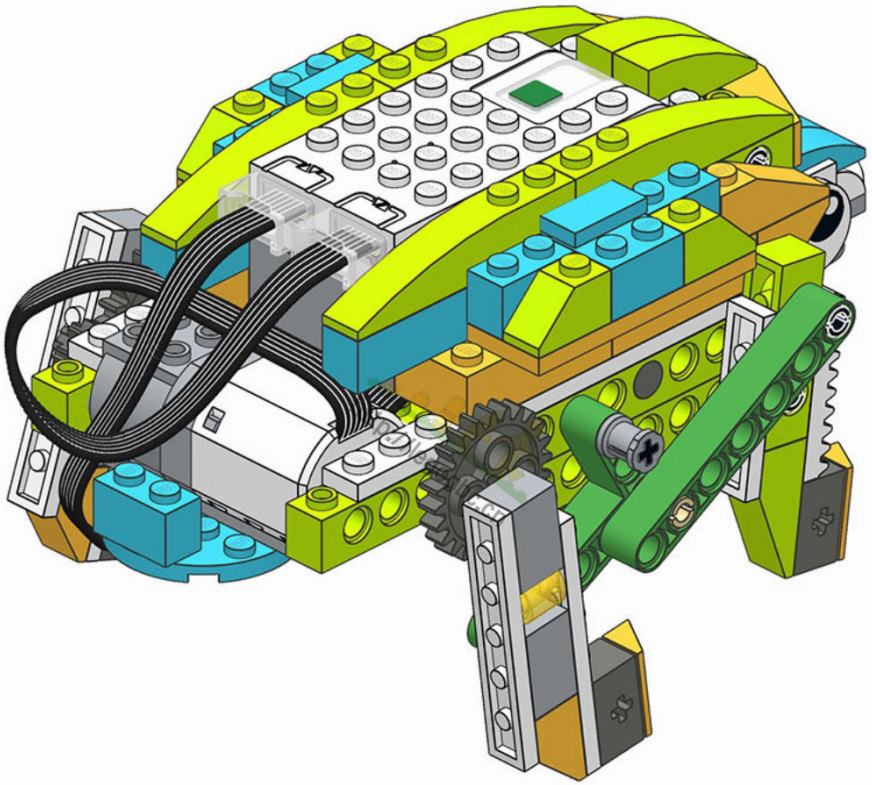

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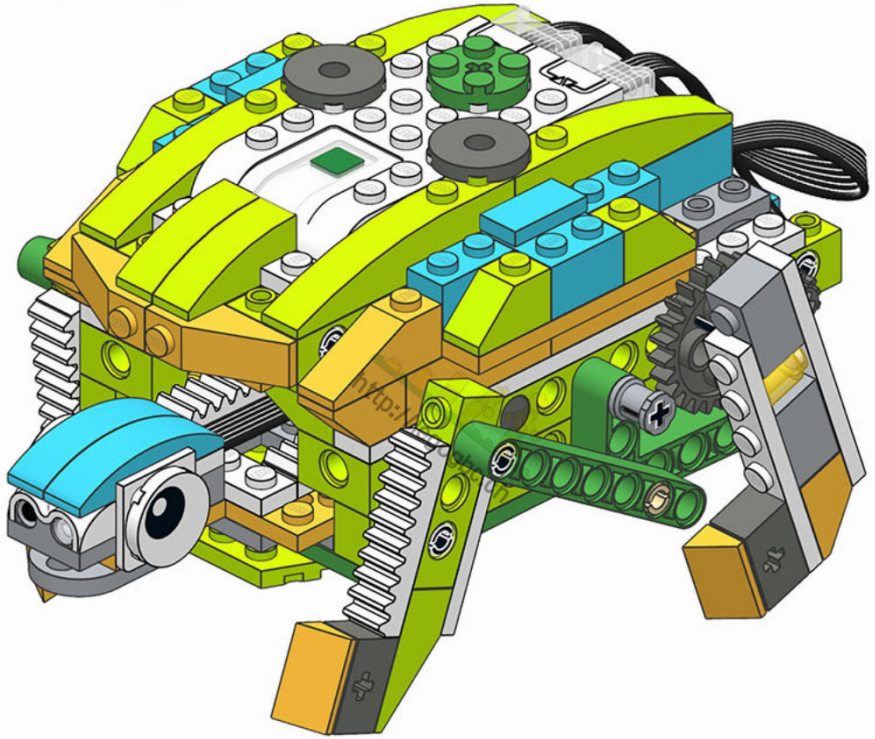
1x 2x

73



Check it out!

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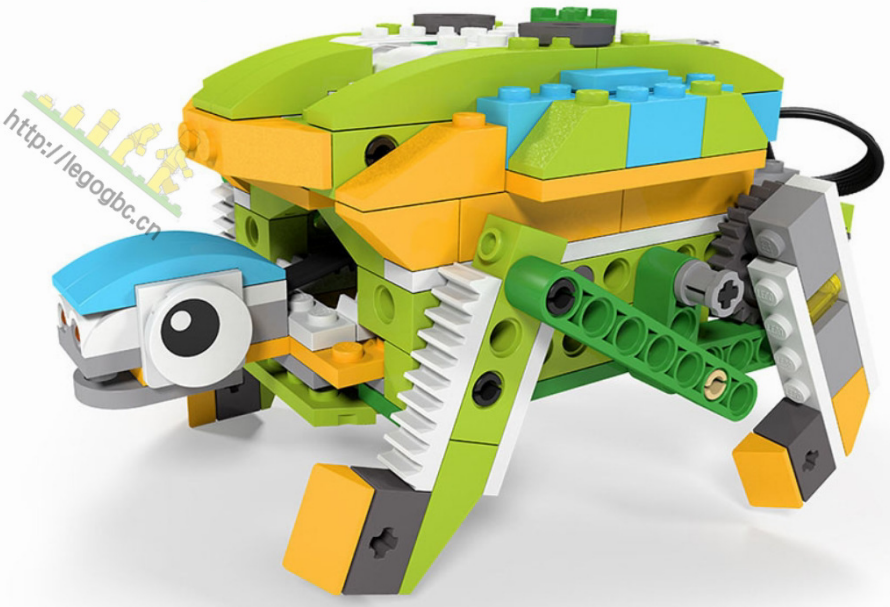
Avoid any friction between the cables while robot is moving.



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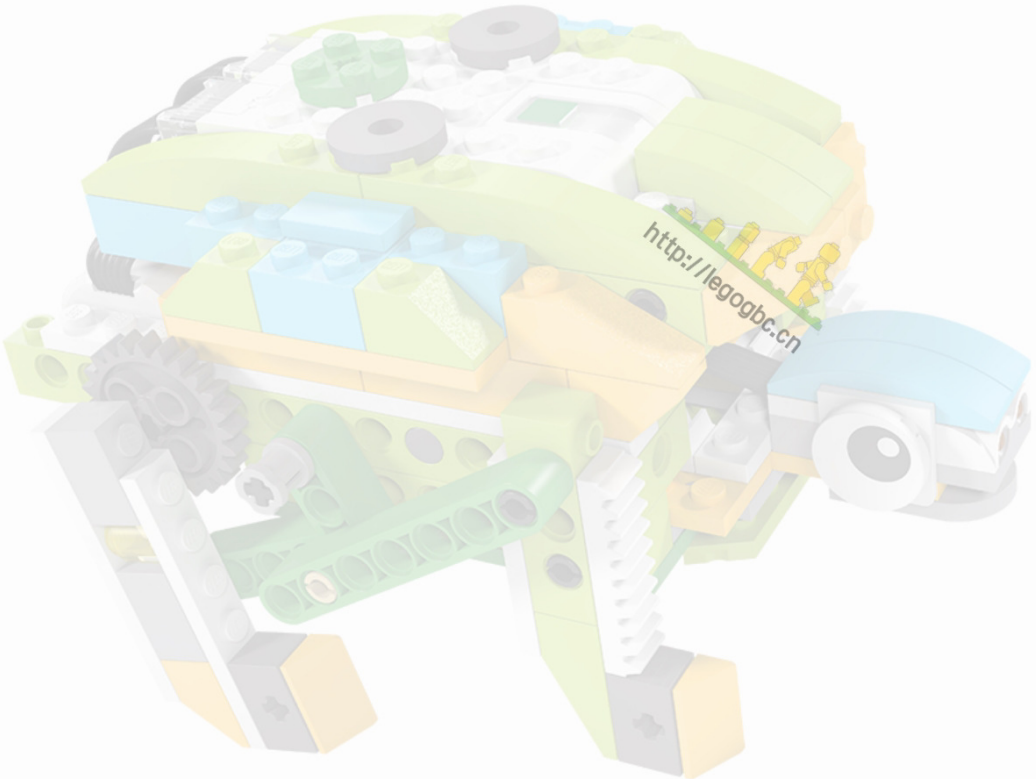
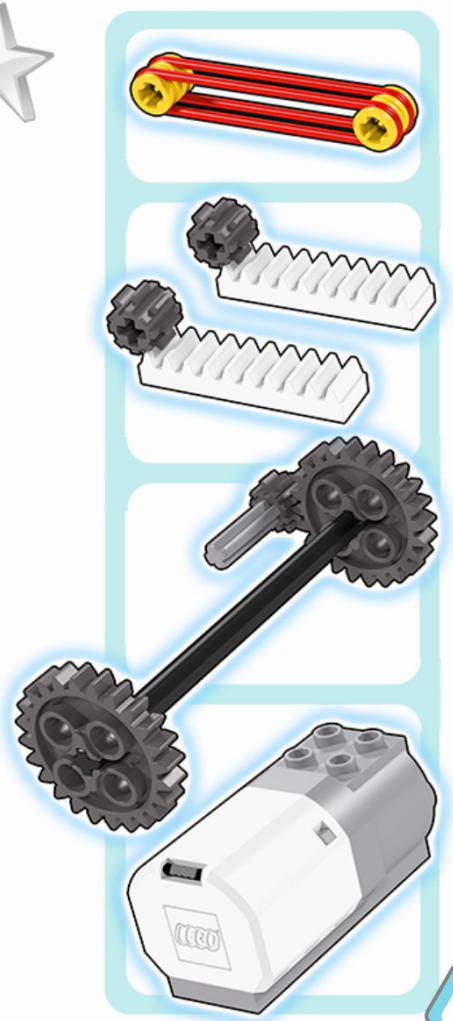
Task

Place parts of the robot on the right places





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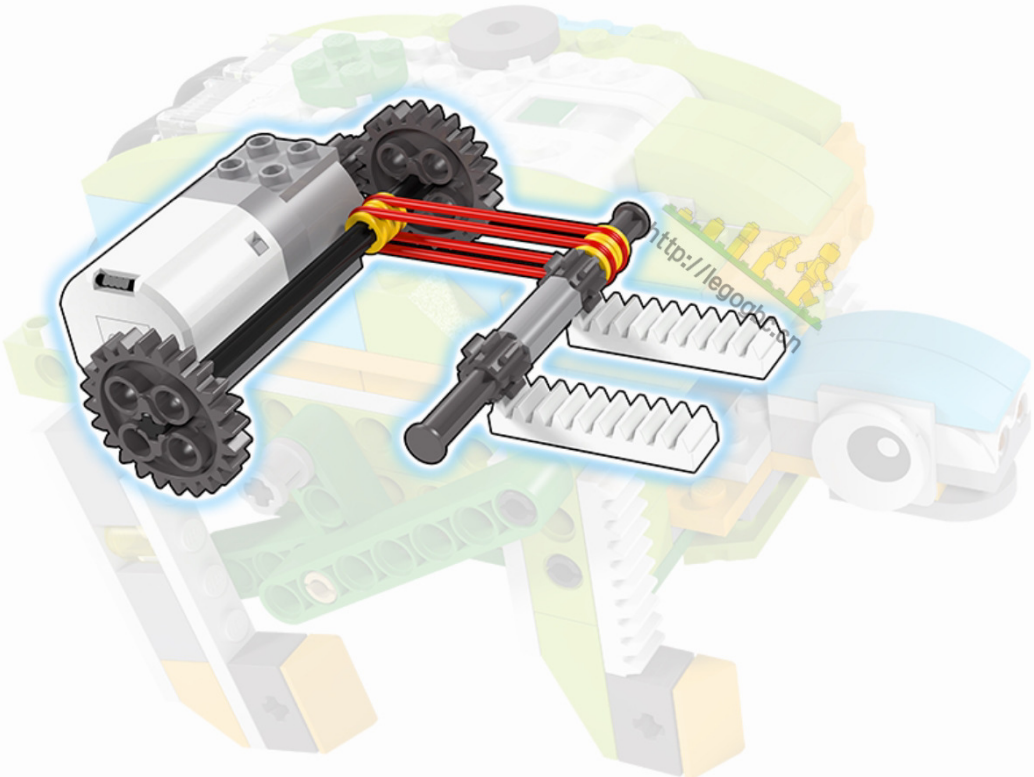
Task

关注公众号获取更多

Place parts of the robot on the right places



Task 1

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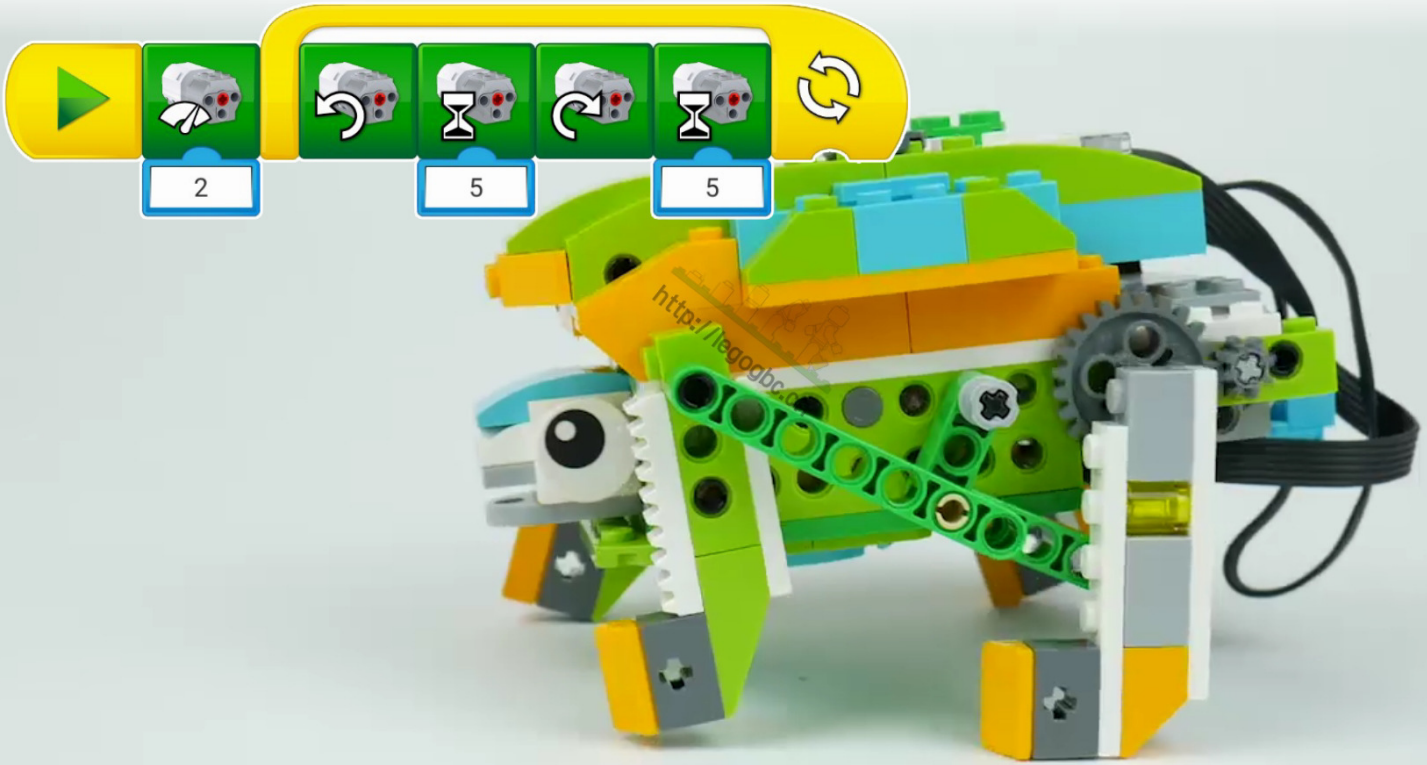
To test the work of the mechanisms of the robot, write a program for which the robot moves forward and back in 5 seconds:



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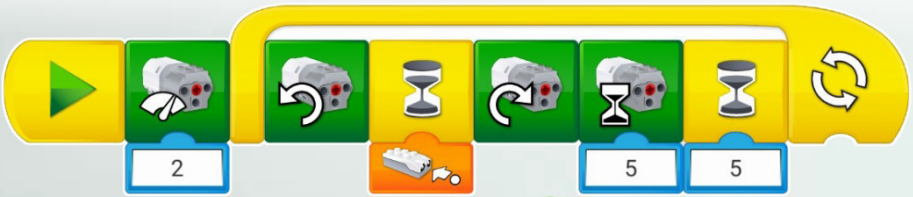
Task 2

When a turtle encounters danger, it can not escape. However, the turtle can hide in its shell. Program the such robot`s behavior when detecting various obstacles, such as dinosaurs:



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Task 2. Algorithm

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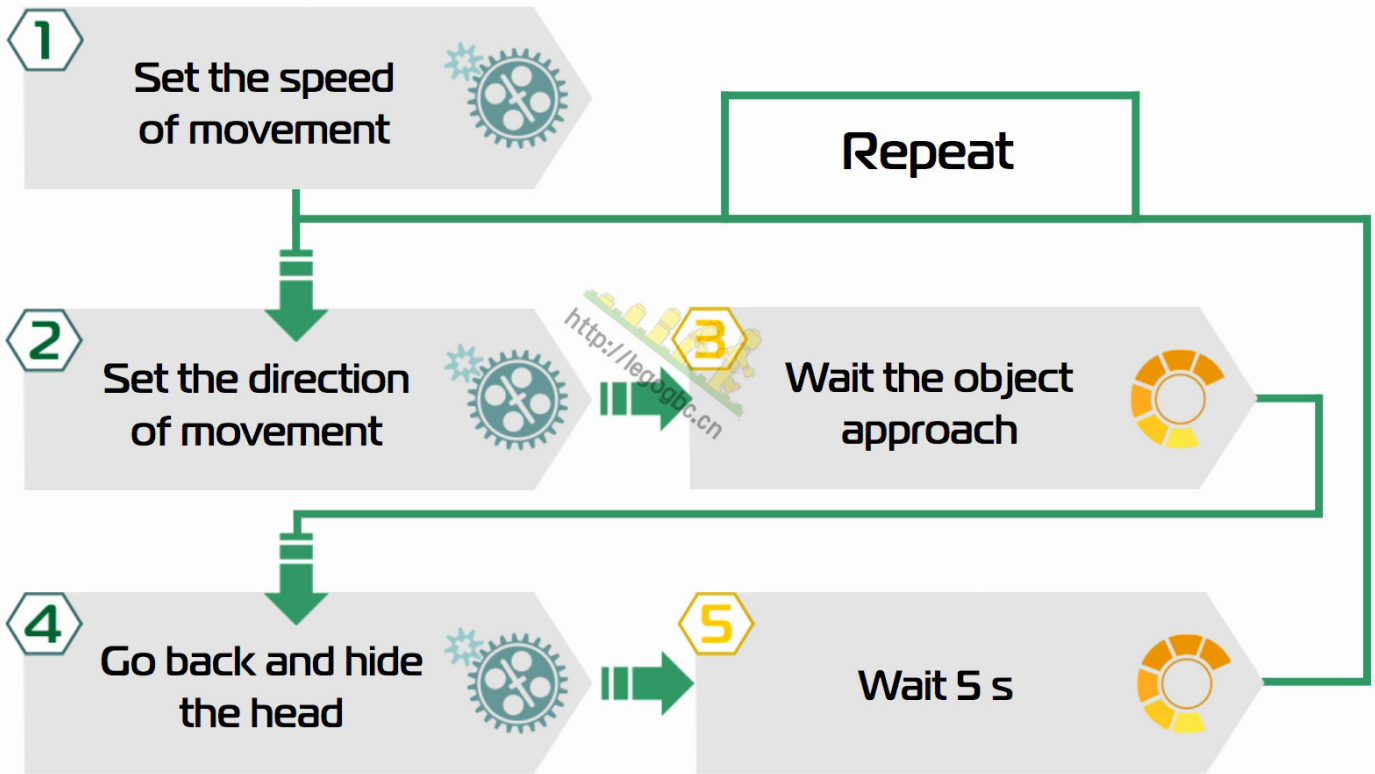
The program is run by the following algorithm:



Task 2. Program

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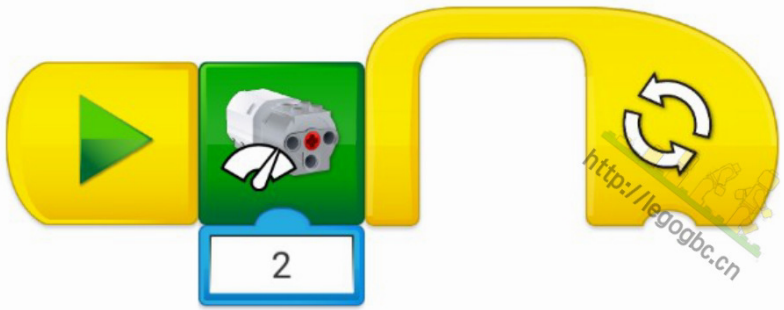
1 Set the speed of movement



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Step: 1 2 3 4 5

Task 2. Program

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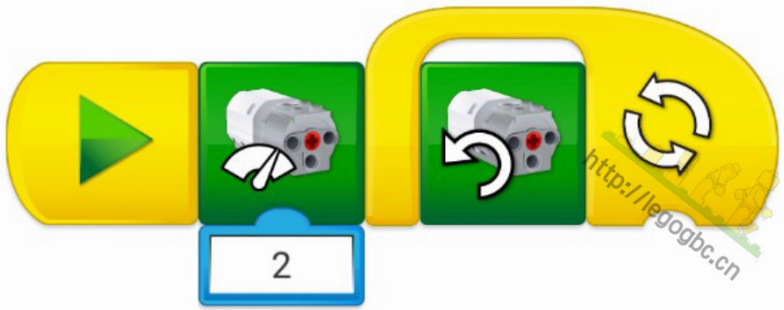
1 Set the ... of move

2 Set the direction of movement



Step: 1 2 3 4 5

Task 2. Program

1 Set the ! of move 2 Set the di of move 3 Wait the object approach

Step: 1 2 3 4 5

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Task 2. Program

关注公众号获取更多

1 Set the ... of move

2 Set the di... of move

3 Wait the ... appro

4 Go back and hide the head

Step: 1 2 3 4 5

Task 2. Program

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1 Set the ... of move
2 Set the di... of move
3 Wait the ... appro
4 Go back a... the he
5 Wait 5 s

Step: 1 2 3 4 5

Task 3 *

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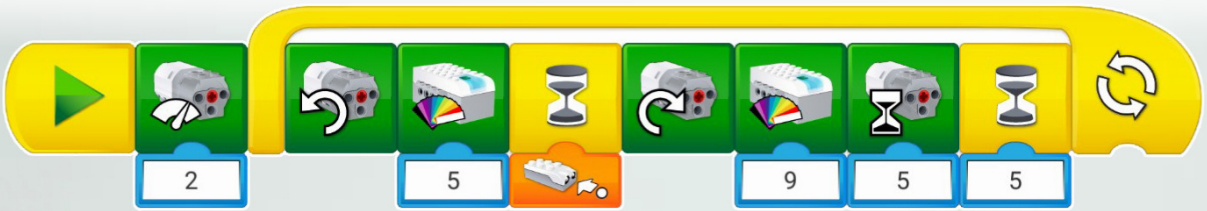
Program a change the color of the Smarthub`s backlight when turtle moves forward and backward.



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Task 4

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Although the turtles are well protected, they still have to beware of predators. Program the hide of the robot's head while detecting a loud sound:

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Task 4. Algorithm

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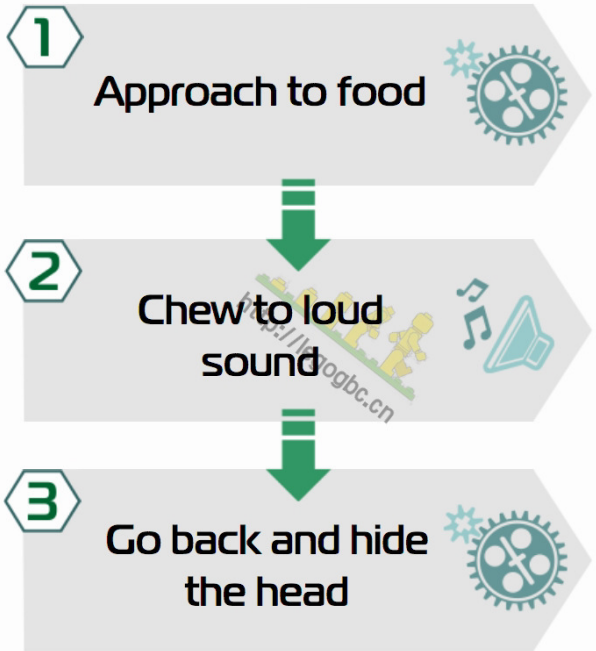
The program is run by the following algorithm:



Task 4. Program

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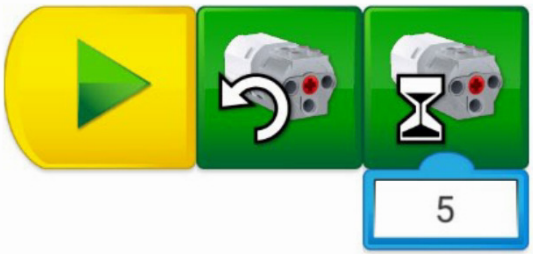
1 Approach to food



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Step: 1 2 3

Task 4. Program

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1 Approach 2 Chew to loud sound

Step: 1 2 3

Task 4. Program

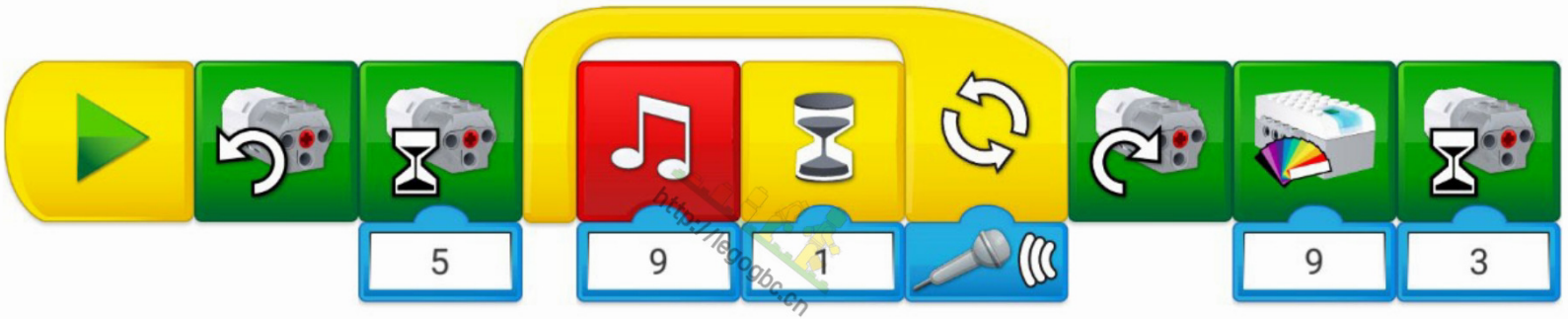
关注公众号获取更多

1 Approach 2 Chew tc sour 3 Go back and hide the head

Step: 1 2 3

Task 4. Question

What part of the program is repeated several times?



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Task 5 *

Program a more complex turtle behavior. The robot must change the color of the smarthub depending on the direction of movement, react to the danger, and simultaneously with the sound reproduction to hide the head. Inside the shell the turtle should hide each time a different amount of time.

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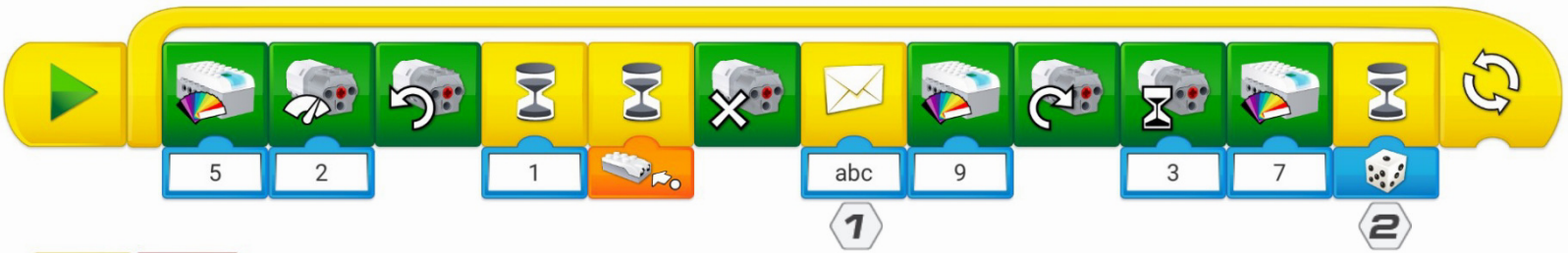
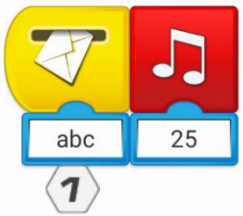
Task 5 *. Program





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1 You can use the sending of a message to play sound and move back at the same time. In this example sending an "abc" message leads to sound playback.

2 Every time a robot has to wait a different amount of time in a shell. This can be programmed using random numbers. The last block Wait is exactly the same setted up. We do not know in advance how many the turtle will wait after each detecting of the danger.

Question

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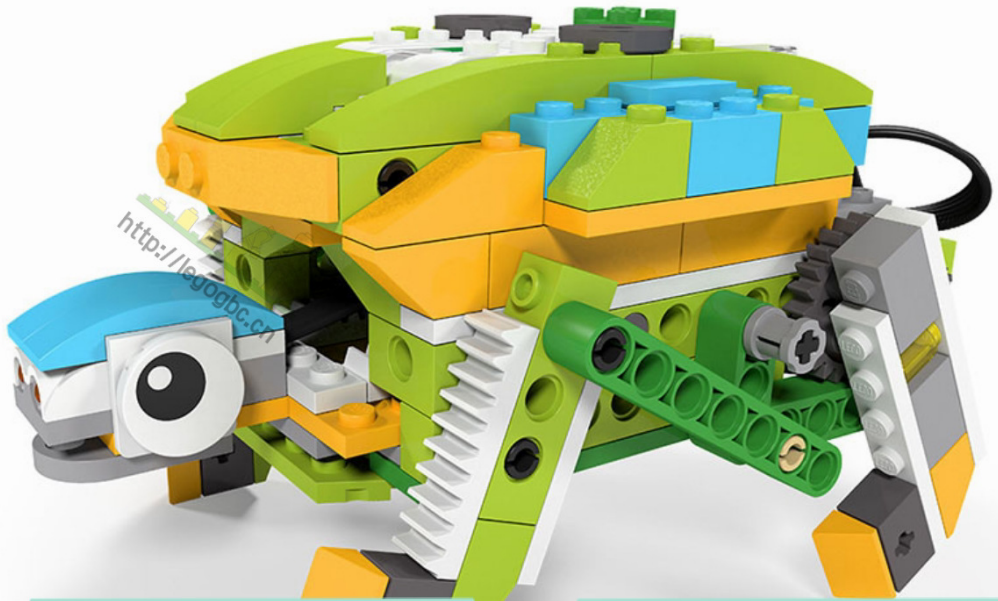
How do turtles breed?



Lay eggs

The live turtles are born

Lay caviar

Task

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Place the eras of life on Earth in the right order. On the left should be the oldest era, to the right - the closest to our time.

PROTEROZOIC

CENOZOIC

MESOZOIC

PALEOZOIC

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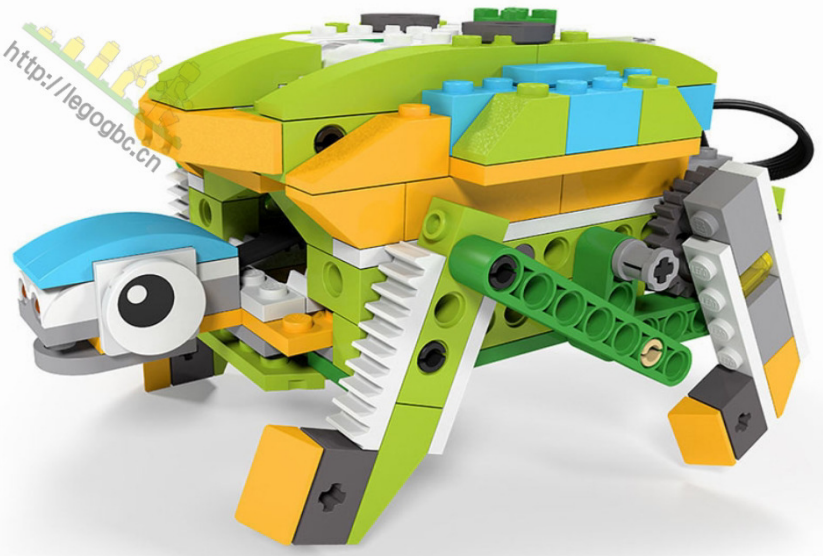
1	2	3	4

PREHISTORIC LIFE

Discuss!

- How do you think, what did turtles help to continue to live in our time?
- What problems do people create for turtle life?
- What makes the robot`s head move? What is used in the drive?



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