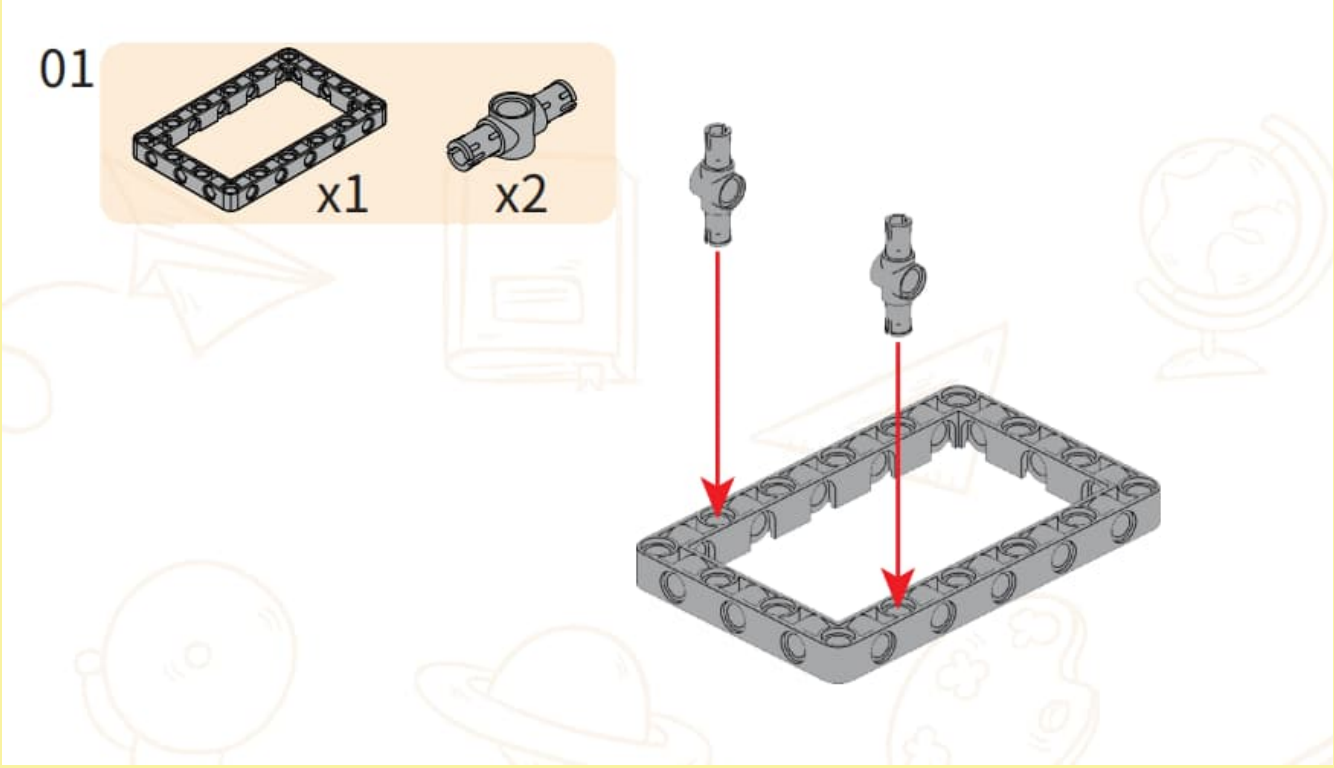
Track Trolley (1)

Target

- Learn to Use a Grayscale Sensor for Basic Line Following
- Master the Use of Conditional Structures in Programming
- Complete Learning How to Exit Loops

01 Assembly

Assembly



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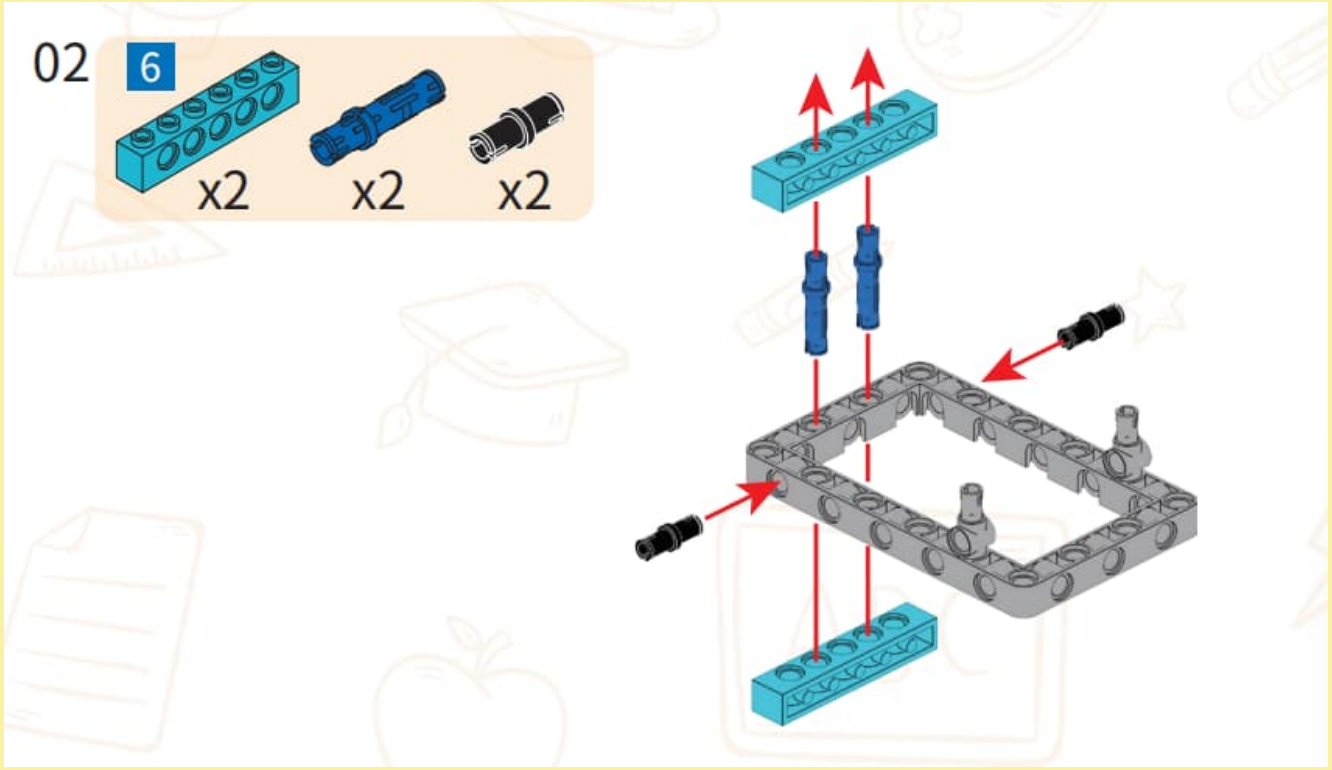

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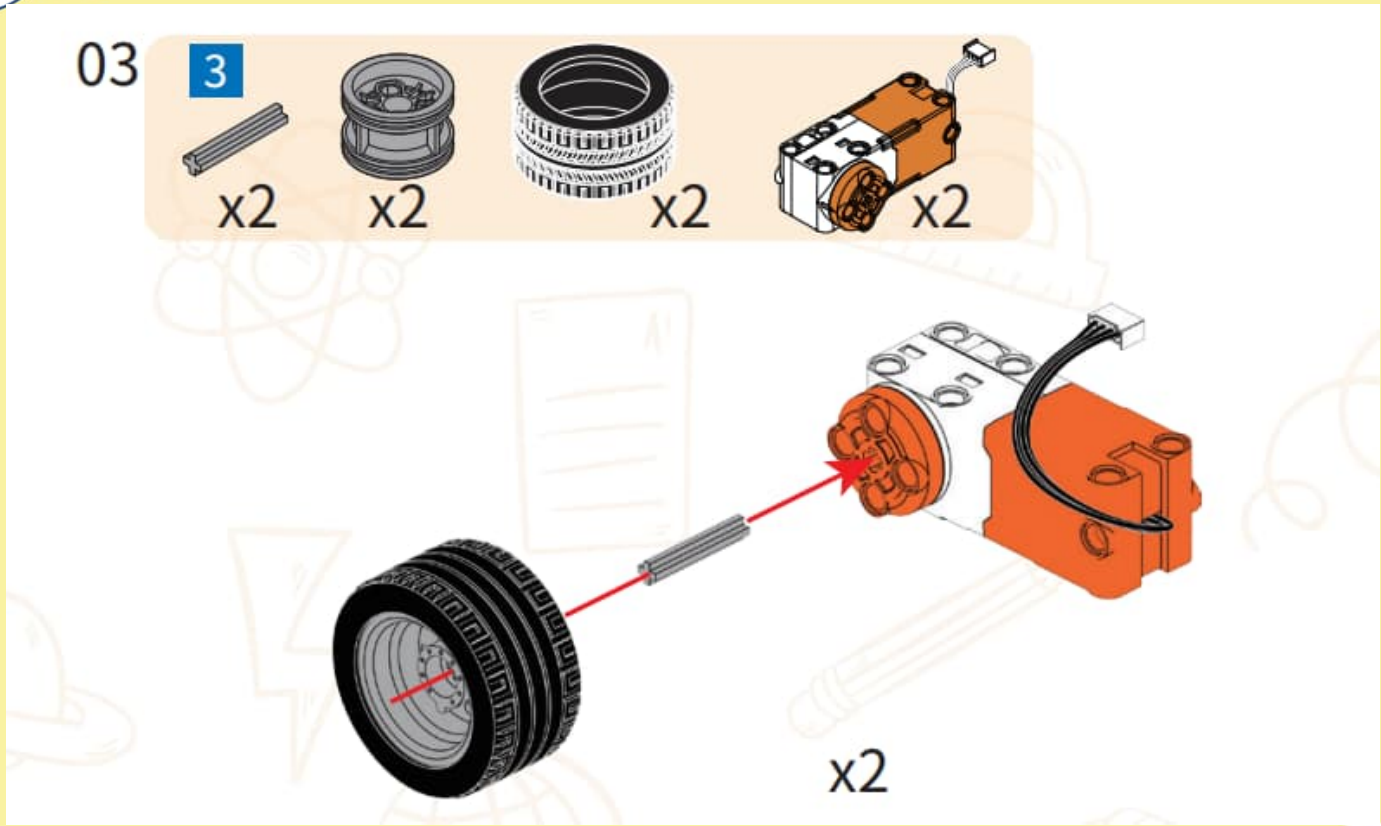
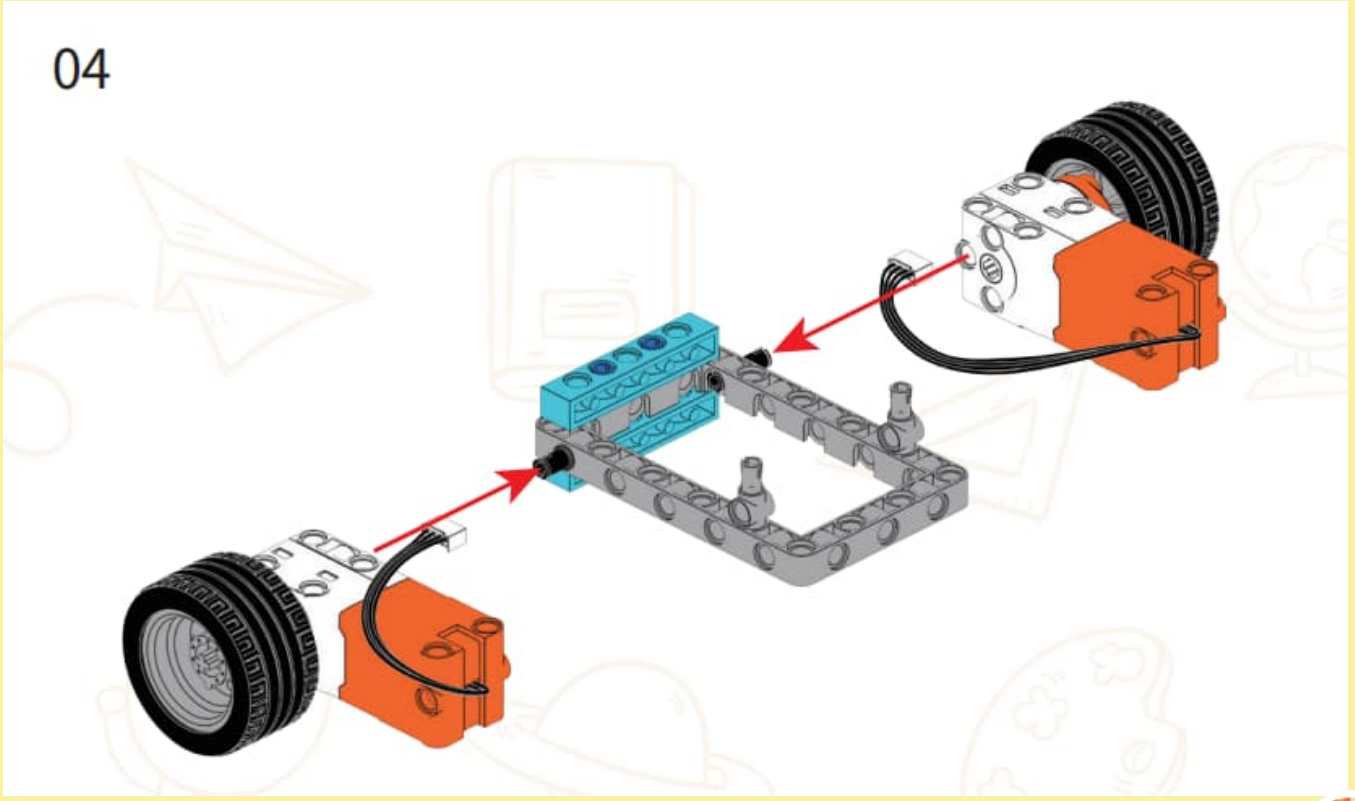


Assembly

04



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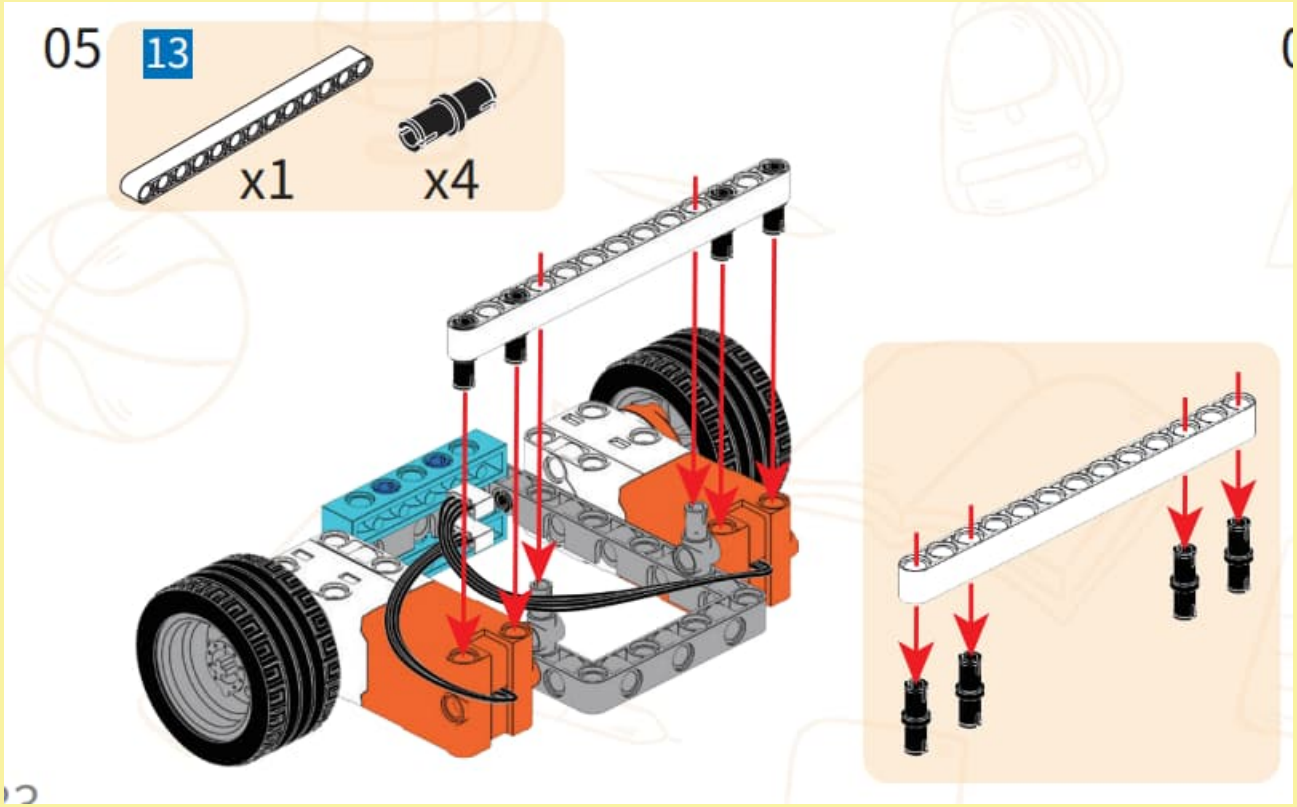

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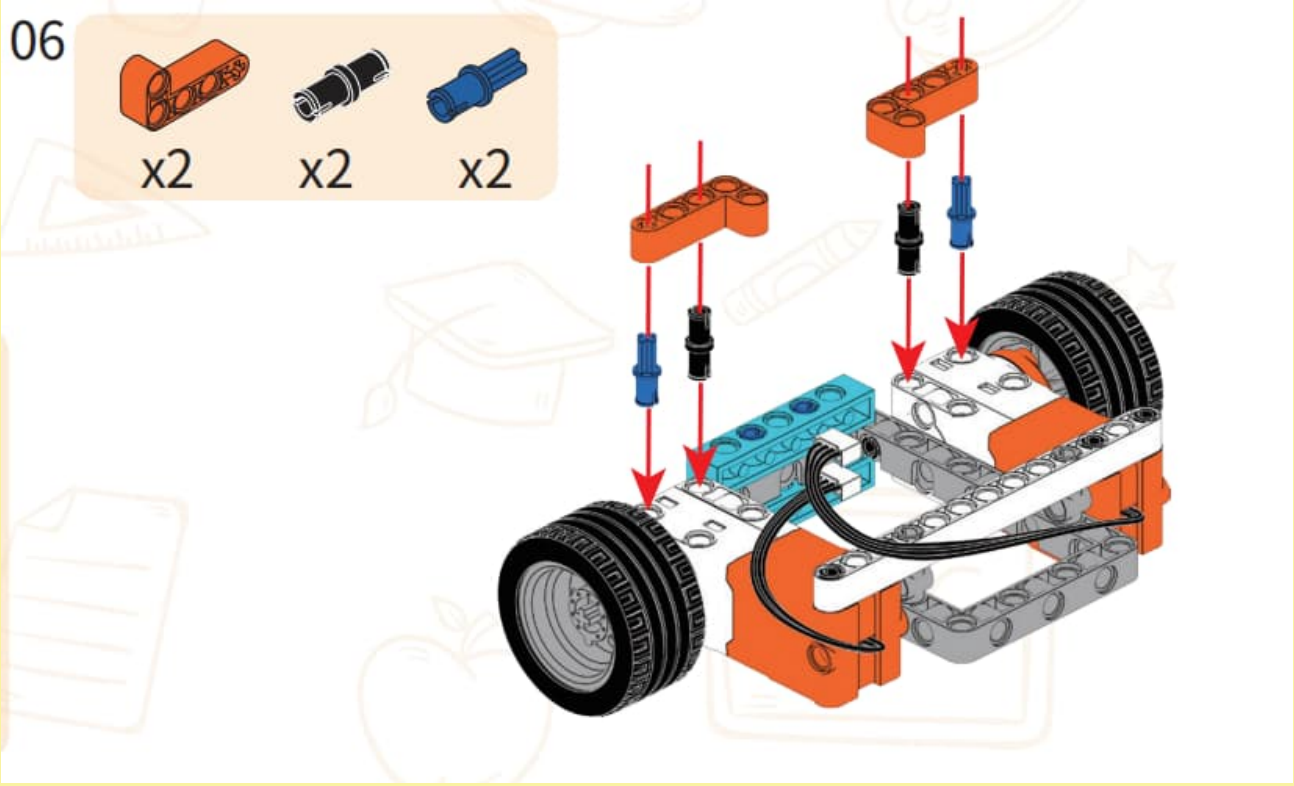

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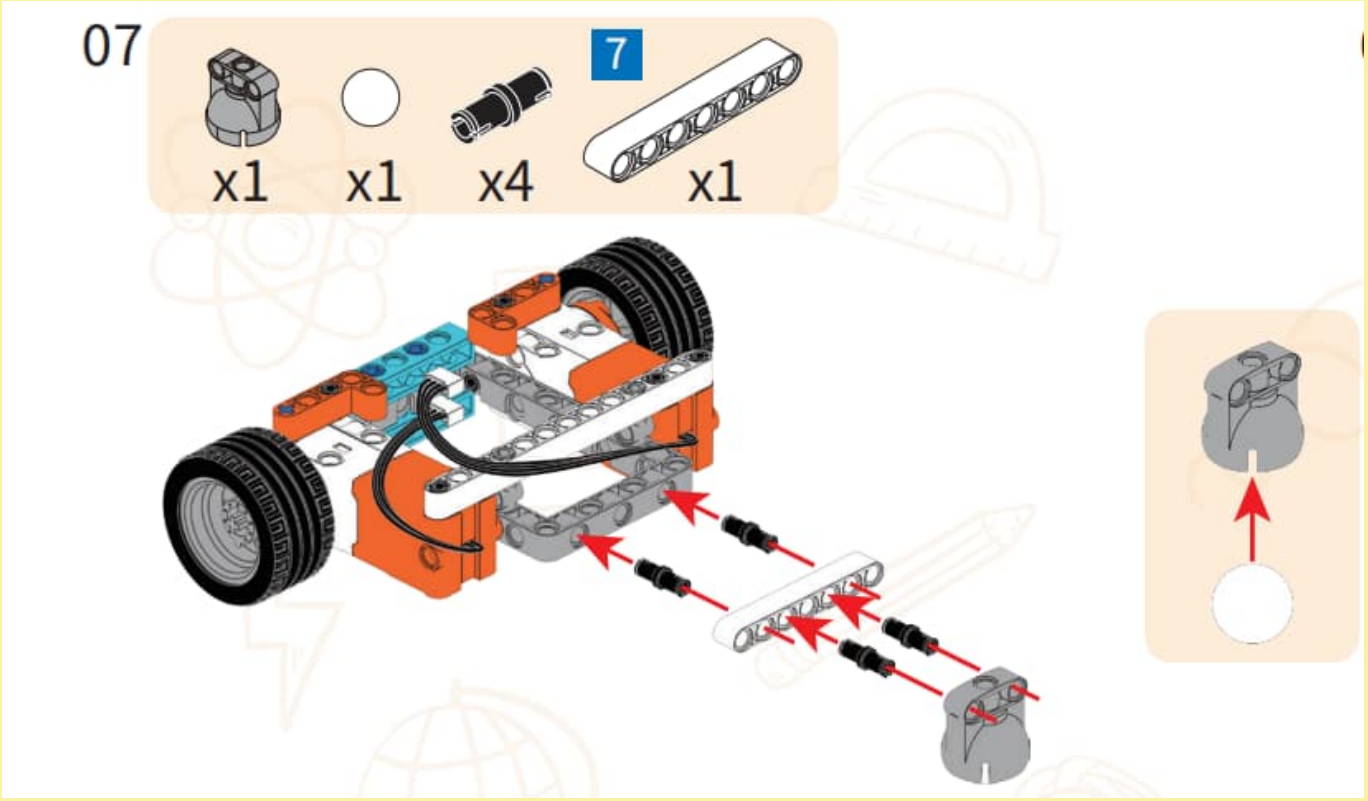

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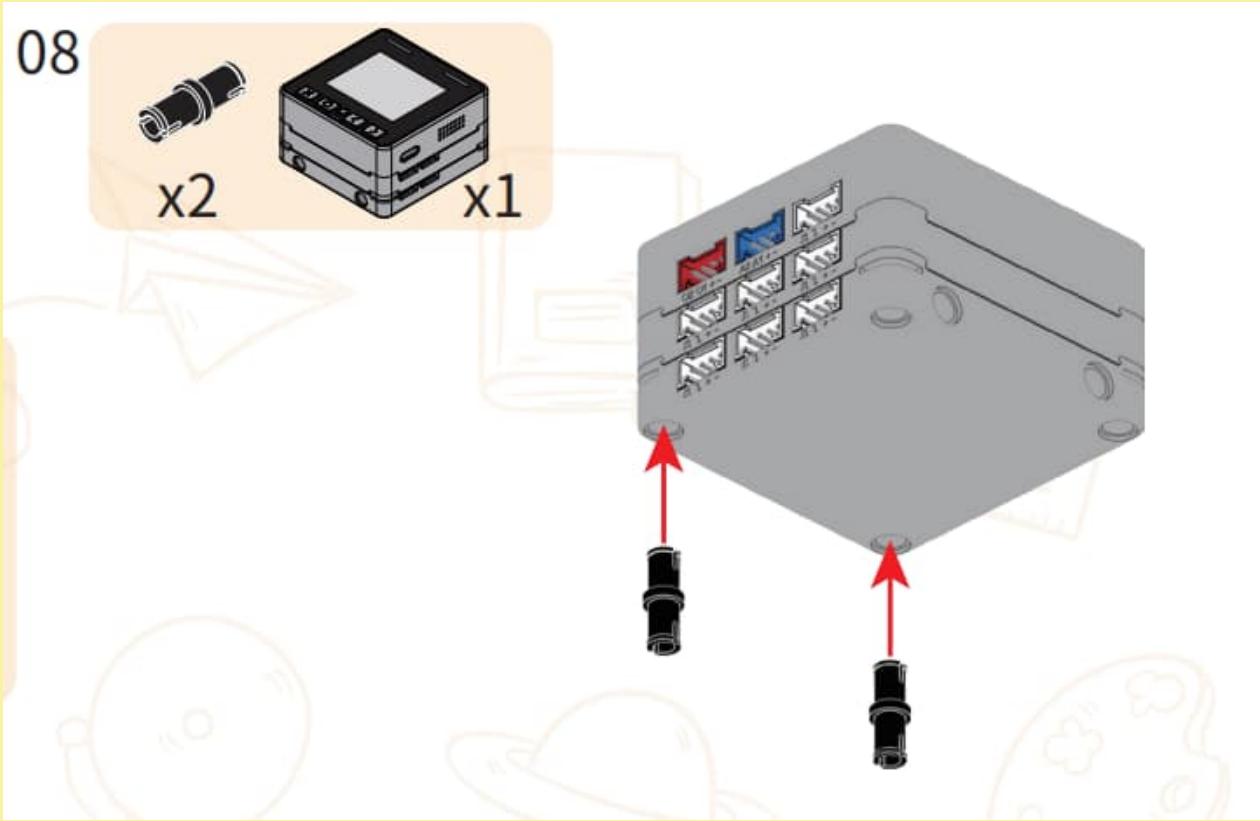

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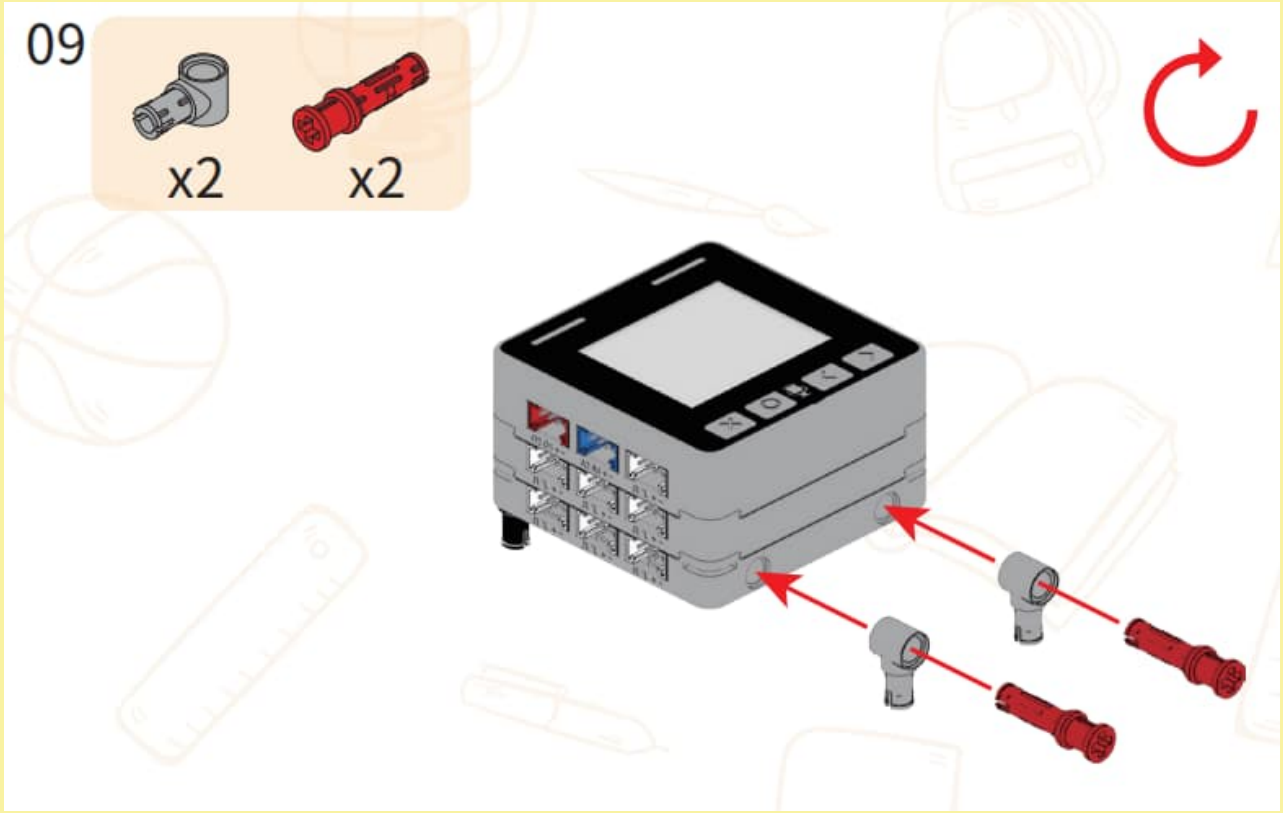

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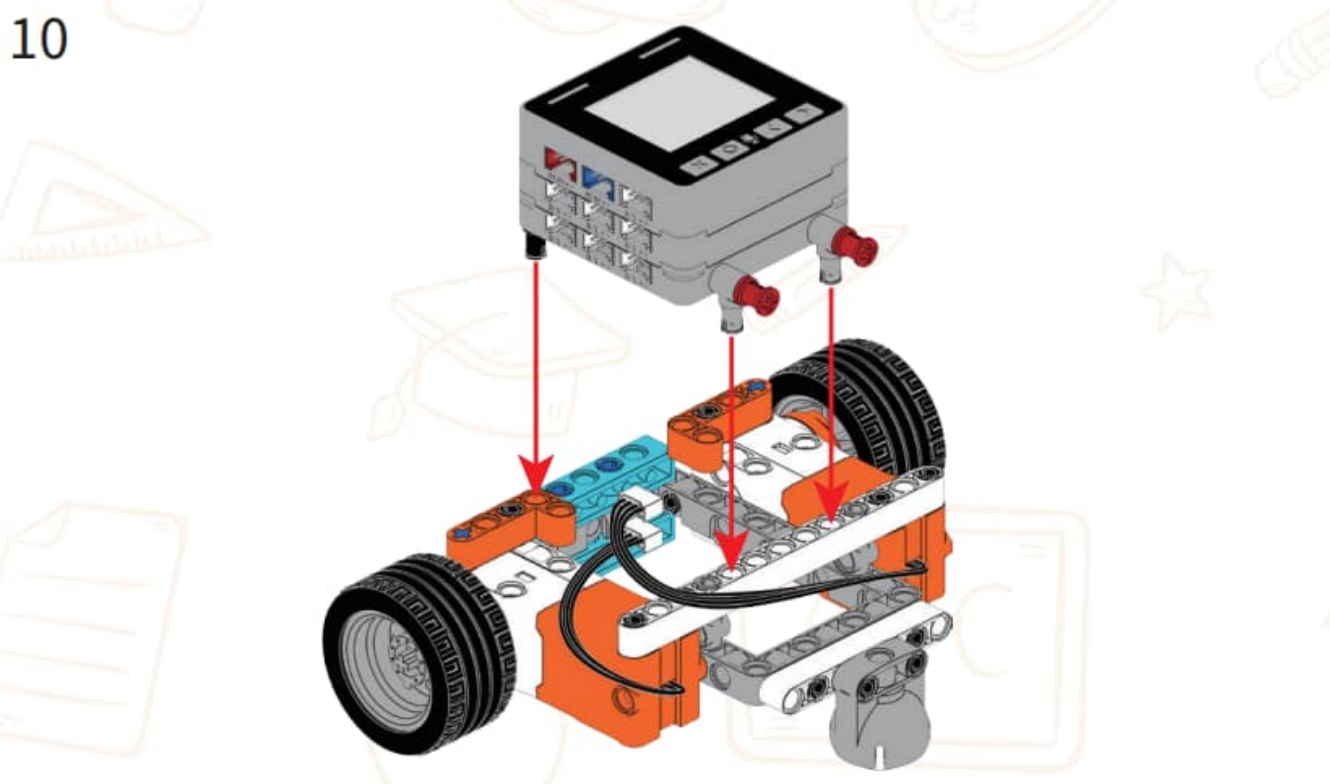
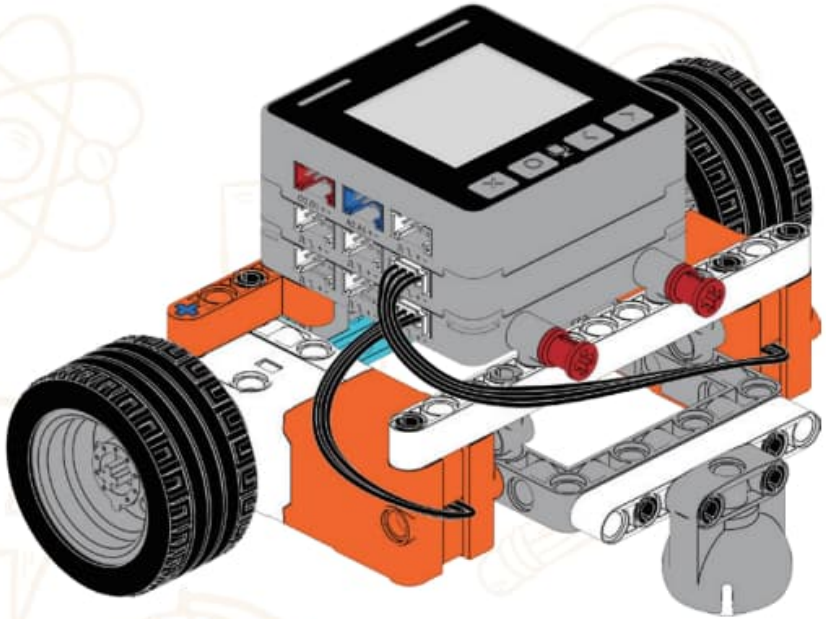


Assembly

11



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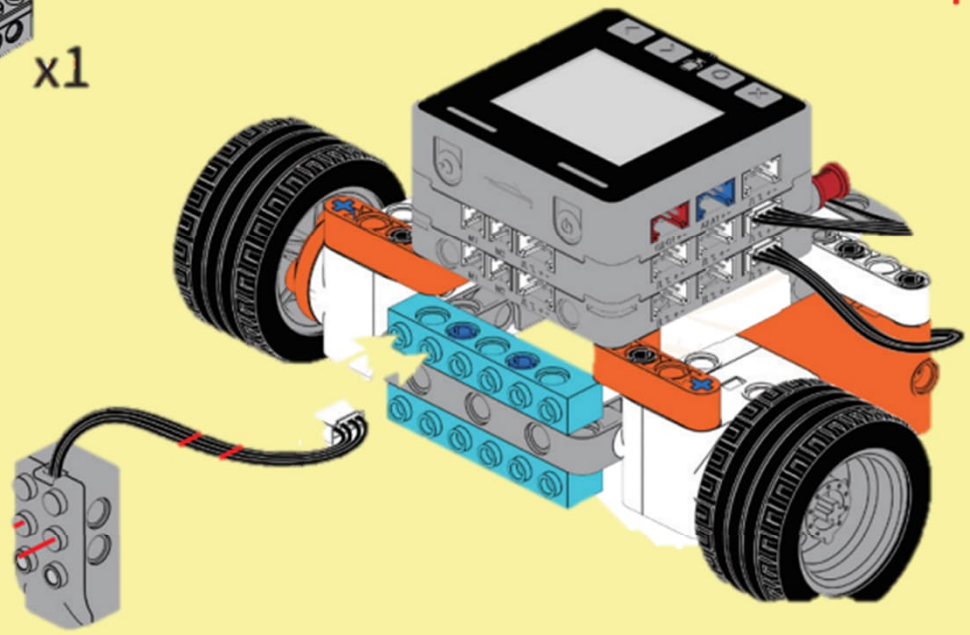

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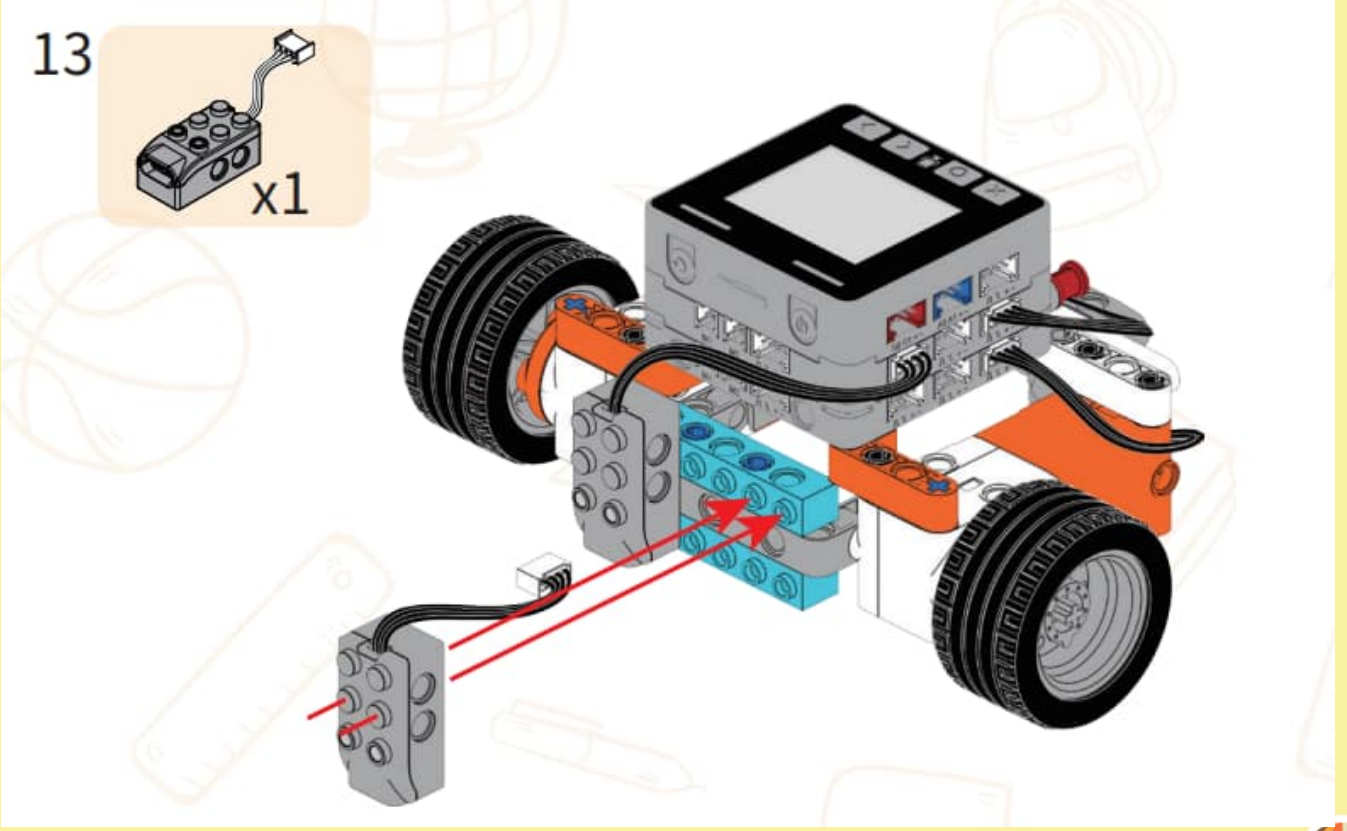
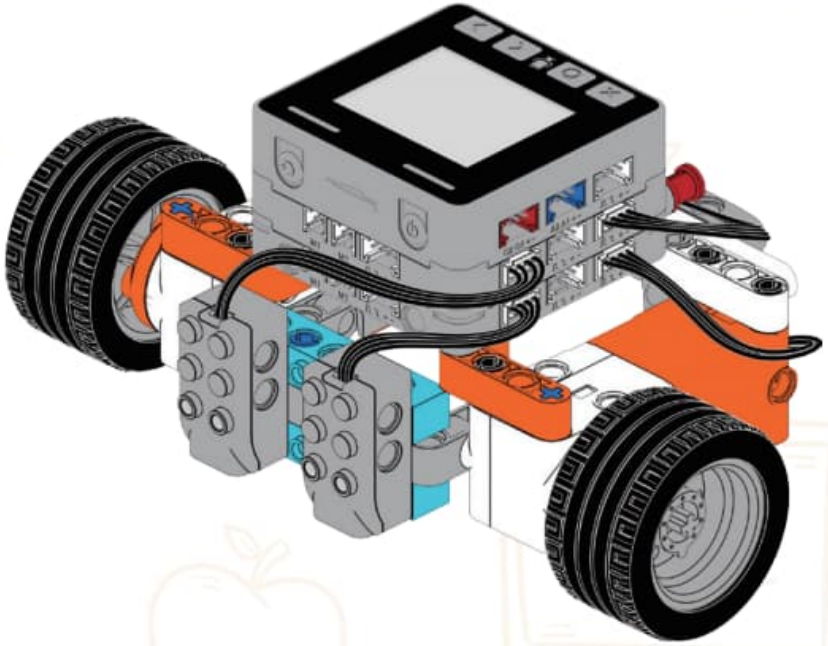


Assembly

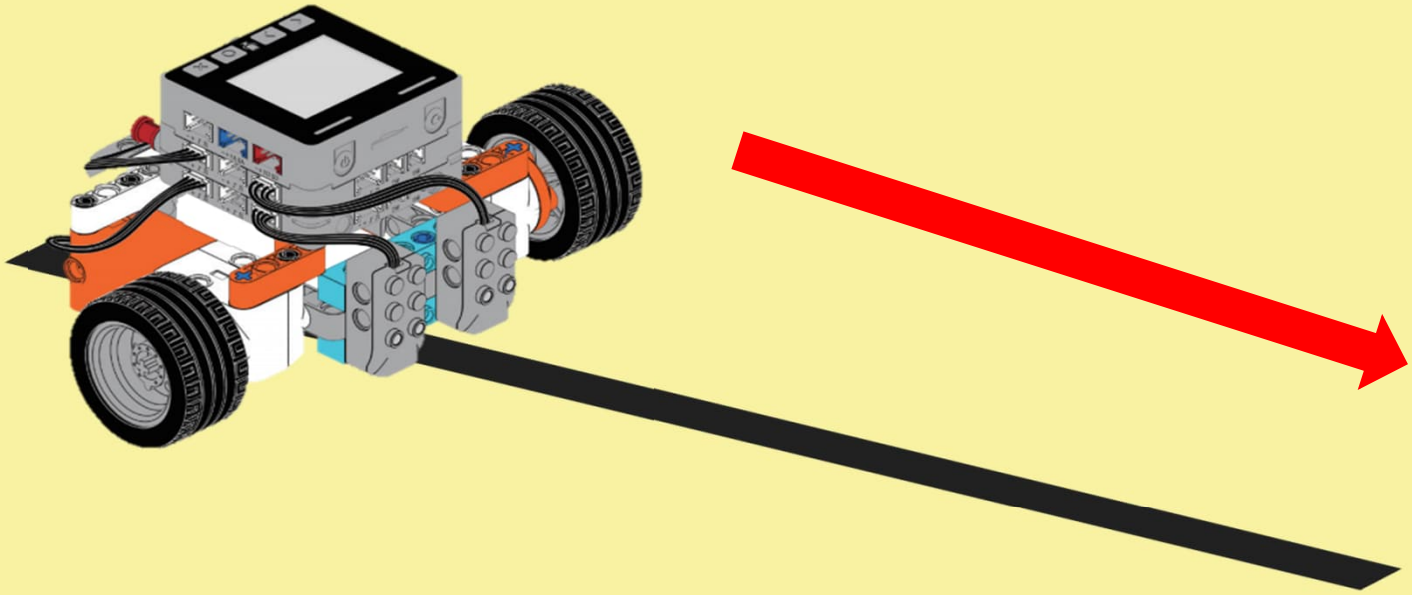
14



02 Task

Task

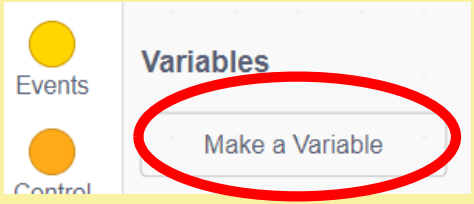
- Task 1: Use the Grayscale Sensor to Follow the Black Line

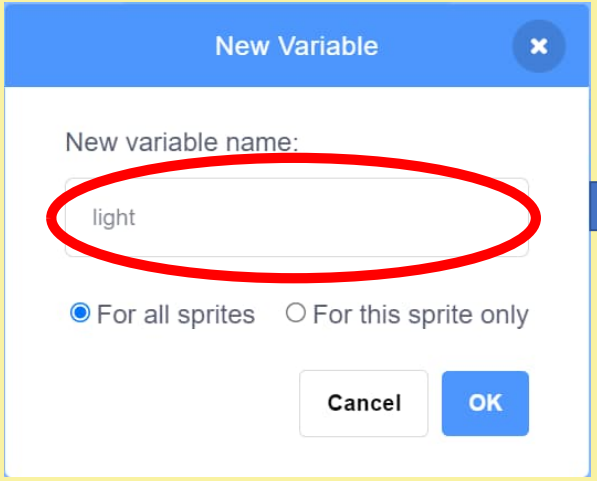


Coding Technique 1

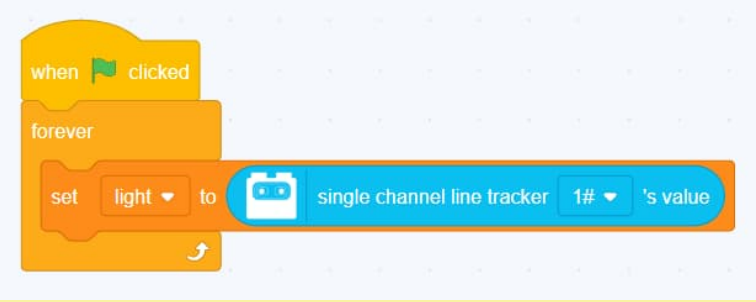
Using Variables and Viewing Sensor Values

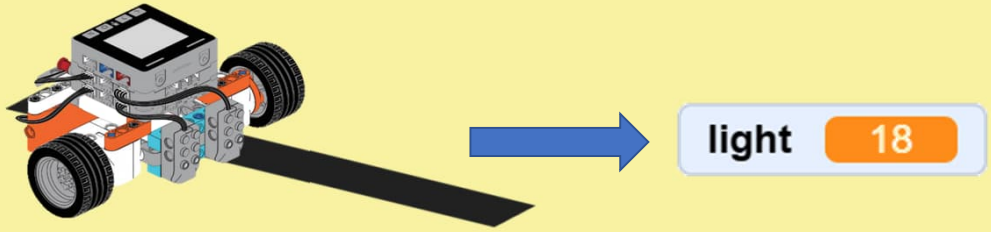
Note: Variable names should use only English letters.



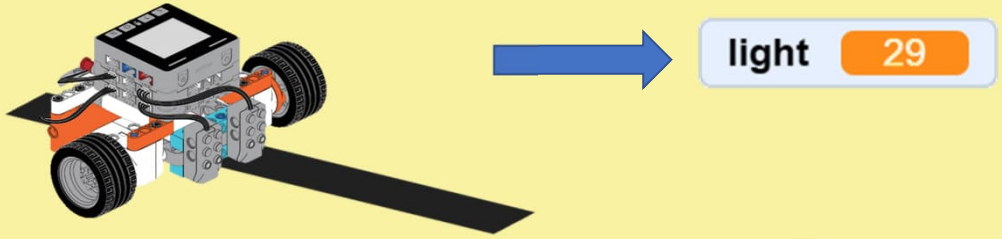


Coding Technique 1

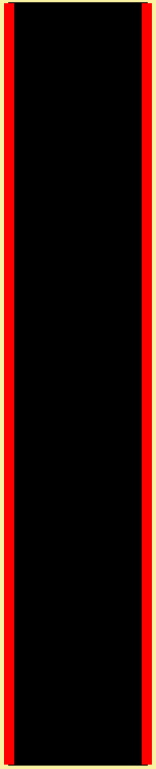




Pay close attention to the difference between detecting the black line and not detecting it.



Coding Technique 1

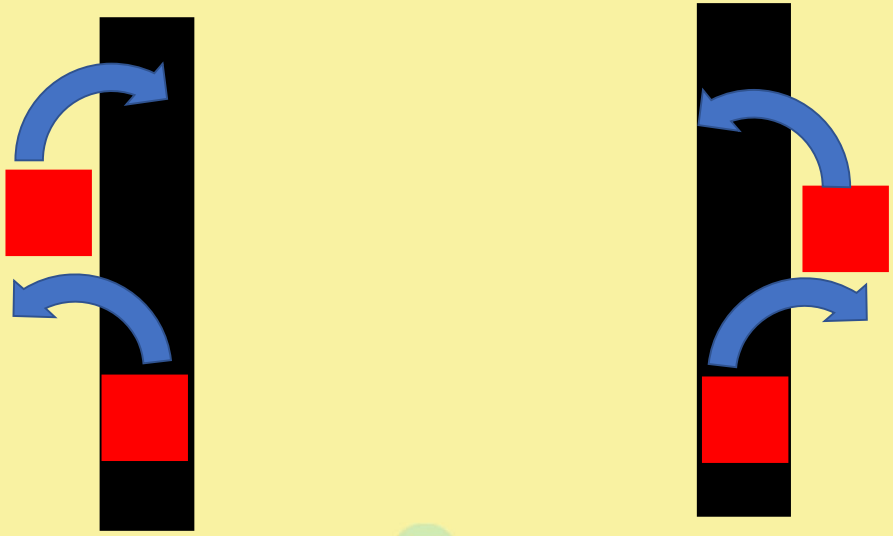


- A robot with a single grayscale sensor does not follow the black line itself.
- Instead, it follows the line where the black line meets the white area
- (the red line in the left image).
- Since there are two lines where the black line meets the white area,
- which one should the robot follow?

Coding Technique 1

- Which side to follow depends on your actions on the black line. Observe the diagram below.

- Currently, only two states are detected, so there can only be two corresponding actions.



Task

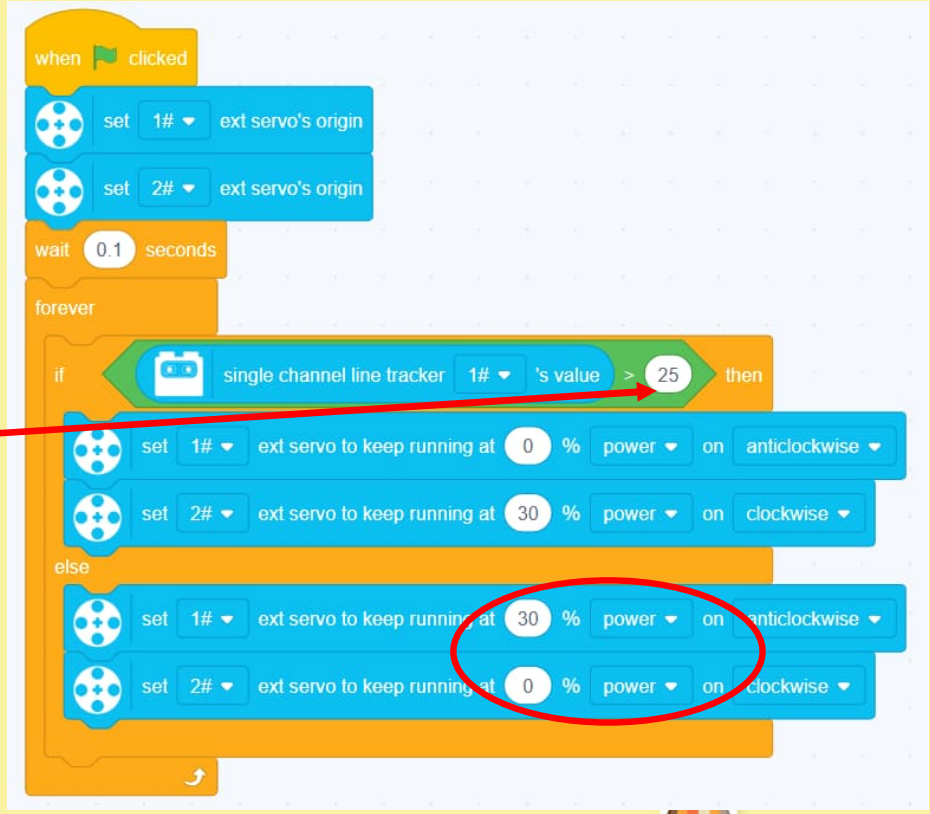
Referrable Program

(Walk along the left side of the black line)

Don't forget to upload the robot's program. Otherwise, it might not work successfully.

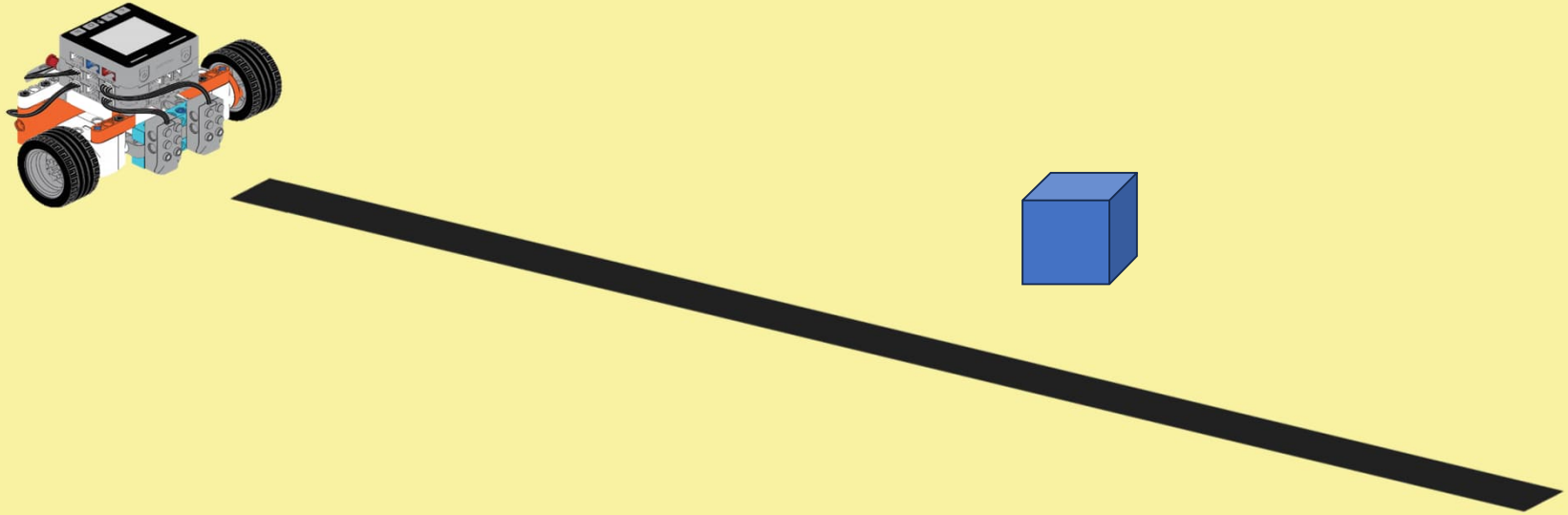
Threshold = $\frac{(black\ line\ value + white\ value)}{2}$

It is recommended to switch to the power mode.



Task

- Task 2: Use the Grayscale Sensor to Follow the Black Line for a Certain Distance and Stop Near the Block.



Task

Referrable Program

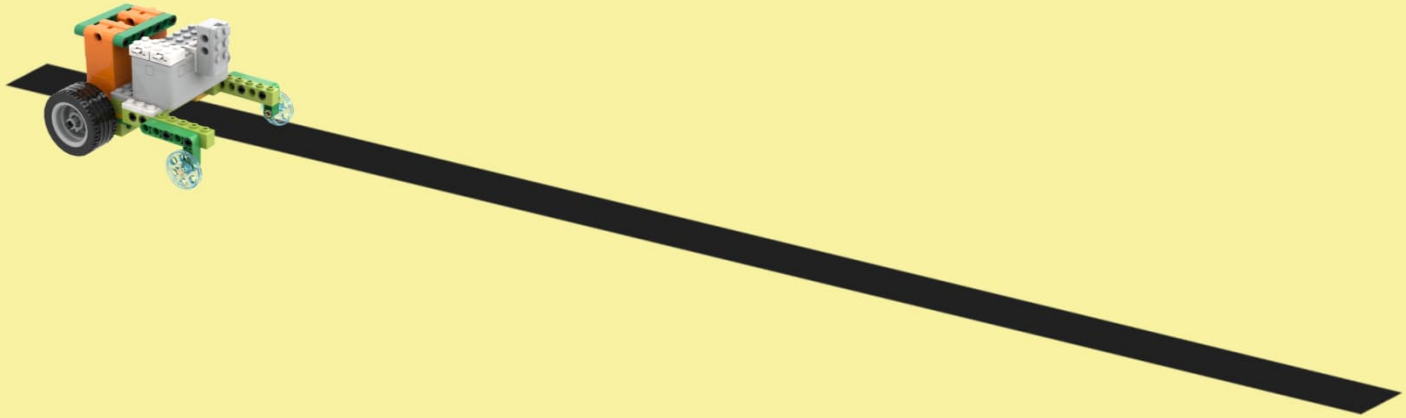
First, walk straight to the black line.

Repeat the command until the relative angle of the motor rotating clockwise is greater than 2600, and then stop the loop. (Parameter 2600 is modified according to the actual line patrol distance)

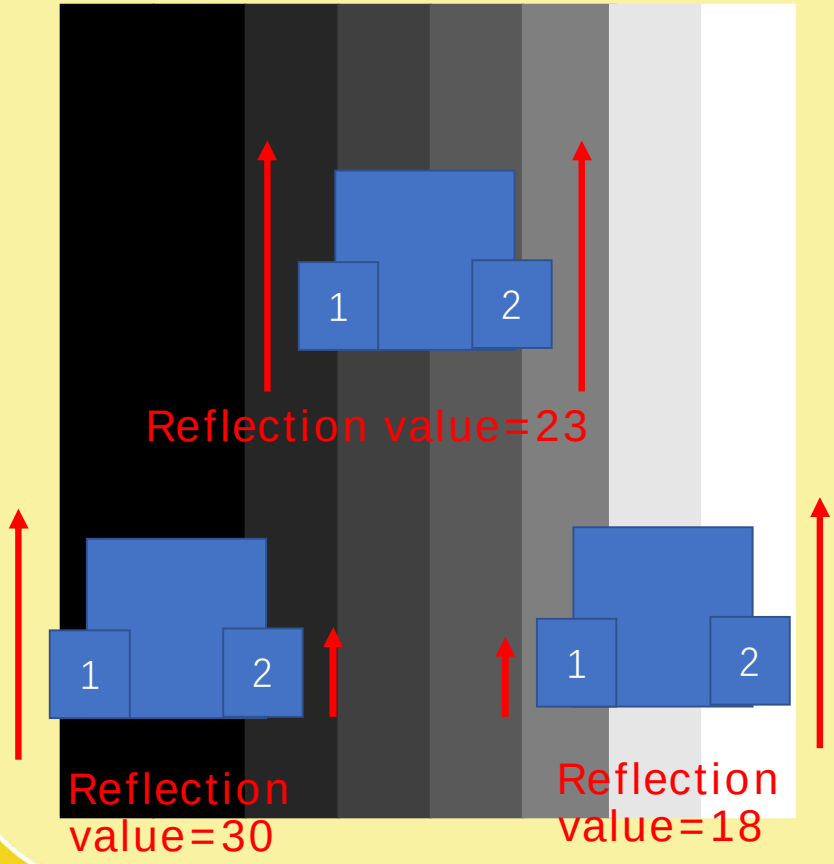
Additional Task

- Note: This task is not mandatory for learning. You only need to know which parameters to adjust.

- Additional Task: Use the proportional control mode to perform line-following a**ctions with a single color sensor.**



Coding Technique 2

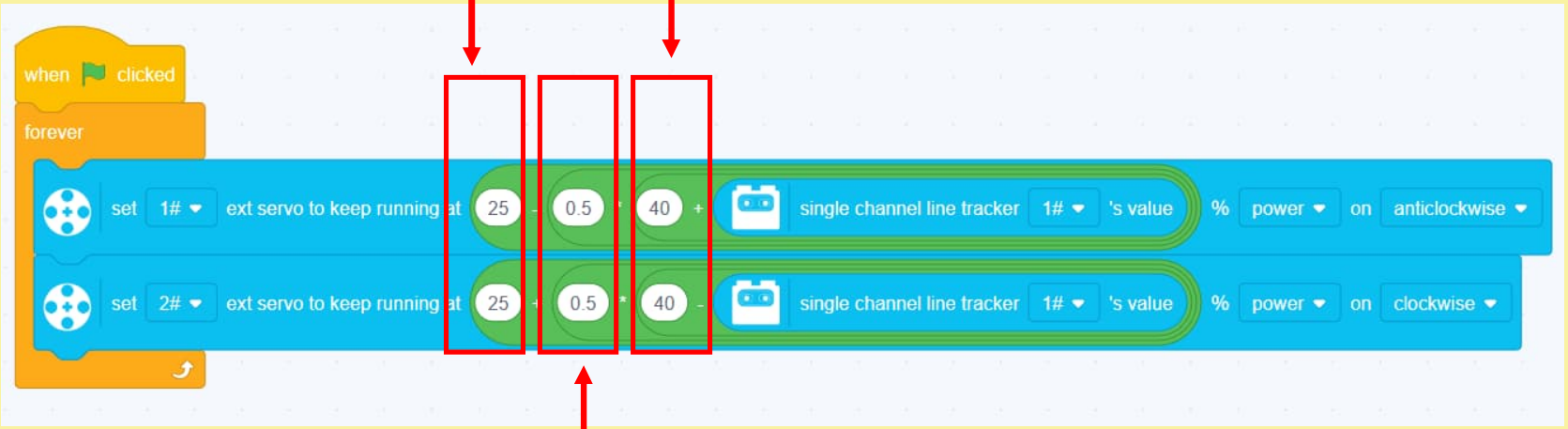


- The boundary between black and white is a gradient pattern.
- The arrows represent the power levels.
- Have you noticed the proportional relationship between the reflection value and the motor power?

Coding Technique 2

Original Power (20~30)

Threshold = $\frac{(black\ line\ value + white\ value)}{2}$



The larger the proportional value, the more intense the oscillation.