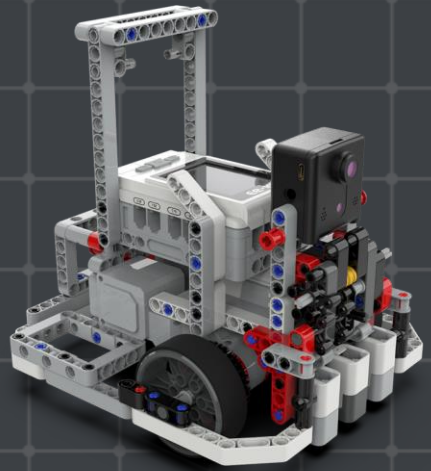


Lesson 5 | Electric Fan |

Key points from this lesson:

1. Understand the motor and learn to set the speed in the built-in test

2. Learn to set the speed of the motor through programming

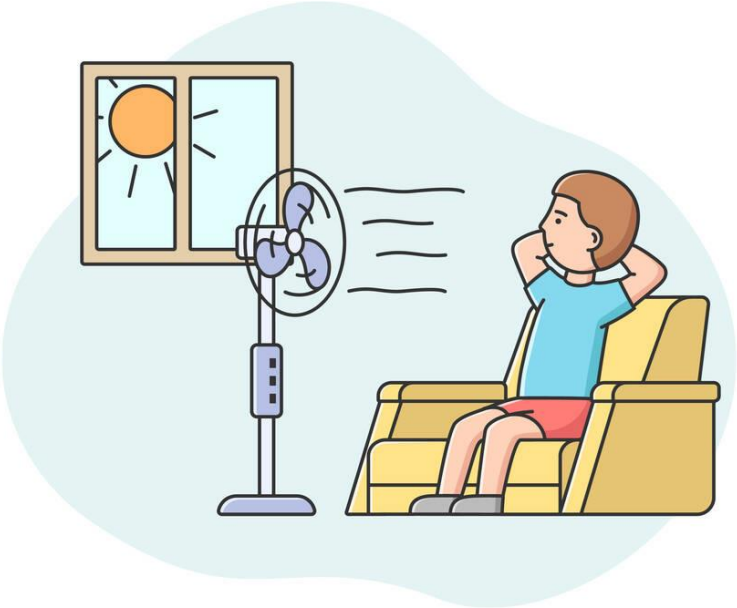
Possible difficulties from this lesson:

1. Understand the program logic of parallel branch structure

2. Understand the program logic of increasing waiting time to delay judgment

Electric Fan

Every hot summer, we will use a household appliance to keep people cool, it is the electric fan. When it is turned on, the fan blades will rotate and blow out gusts of wind continuously.



Types of electric fans

There are many kinds of electric fans in our daily life. The more common ones are oscillating fans, handheld fans, tower fans, and bladeless fans where you can't see the fan blades.



Oscillating fan



Handheld fans



Tower fan



Bladeless fans

Effect Demonstration



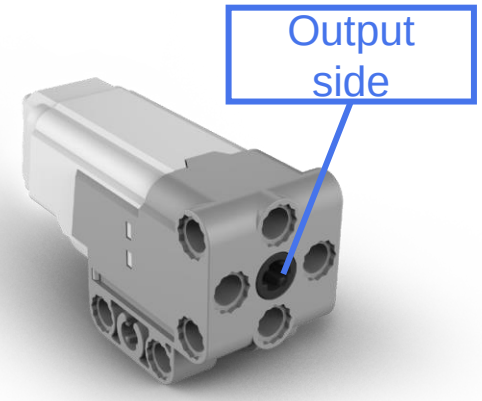
Project Tasks

Design an electric fan model and use the buttons on the controller to control the fan switch and gear position.

Functional requirements:

1. Press the left button to make the fan run at low speed
2. Press the right button to make the fan run at high speed
3. Press the left and right buttons at the same time to turn off the fan

Medium Motor



The medium motor (medium-sized motor) is a device that provides power to the robot. It can realize functions such as clockwise rotation, counterclockwise rotation, and braking (stopping) through the signal control of the controller.

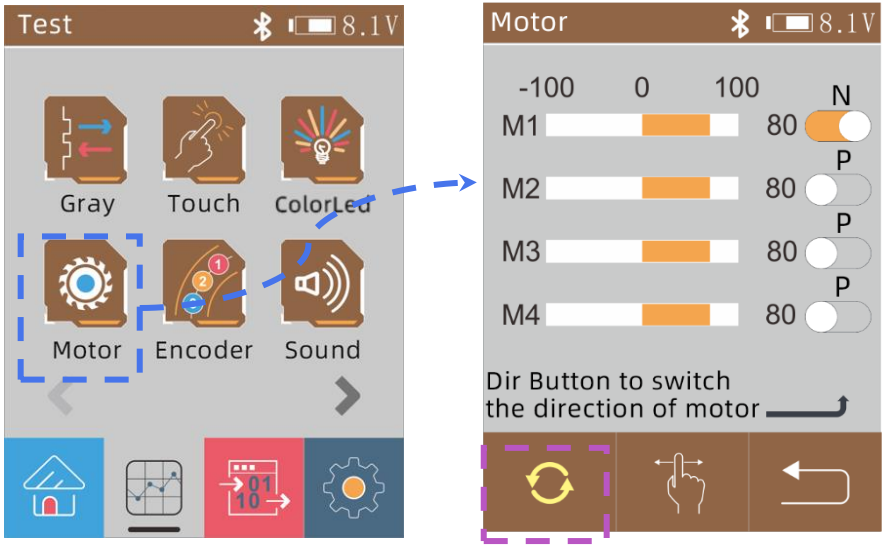
The speed can be adjusted from 0 to 100 levels during the movement from static to the highest speed.

Connecting to the controller



The medium motor can be connected to any motor port (M1-M4) of the controller, such as the M1 port.

Test - Motor

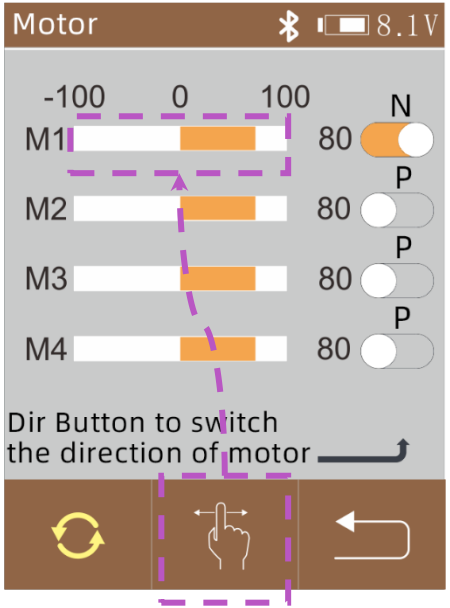


Automatic mode/reset speed to zero

In the "Test" interface, click "Motor" to enter the motor test interface.

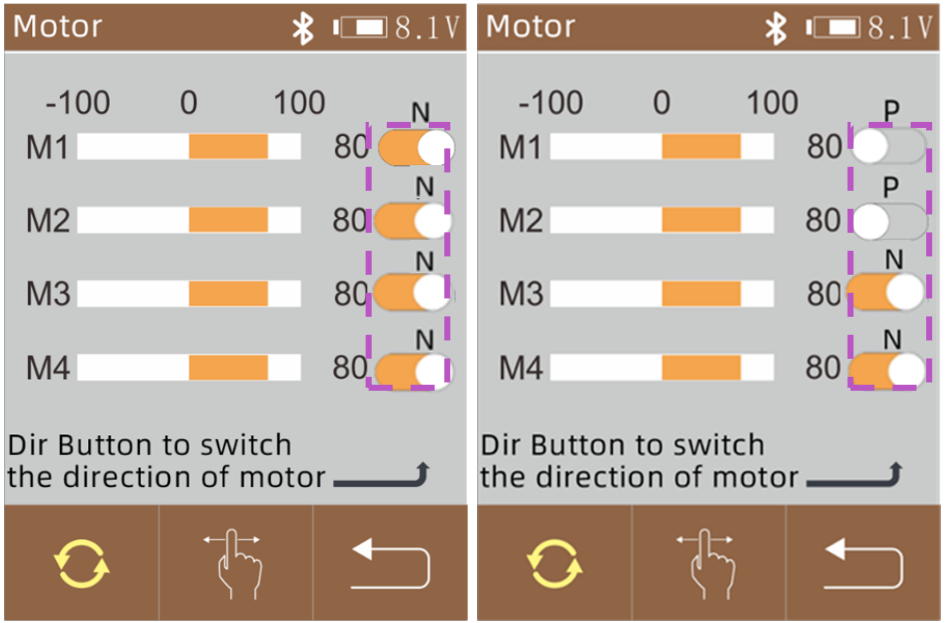
At this time, the motor rotates automatically.

Manually control motors' speed



Switch to manual mode and click the left and right ends of the speed bar to adjust the motor speed within the range of -100~100.

Built-in Test



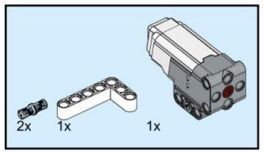
There is a forward/reverse switch on the right side of the motor test interface, which can switch the direction of the motor (forward or reverse, i.e. clockwise or counterclockwise).

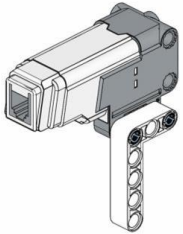
In this lesson, M1 will be set to forward.

Note: Forward means P, and Reverse means N.

Build a robot

1





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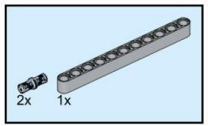
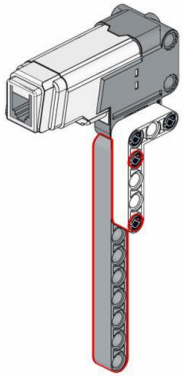
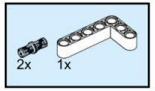
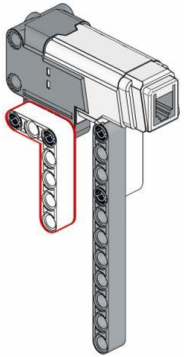




Build a robot

3





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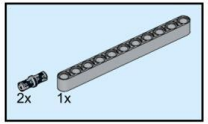
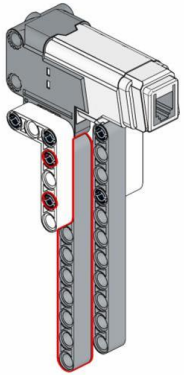
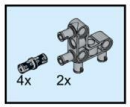
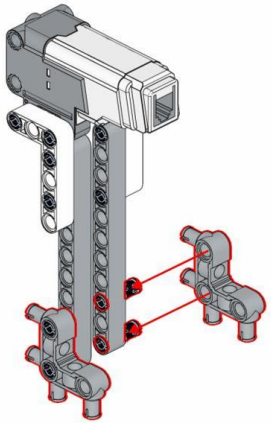




Build a robot

5





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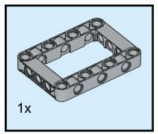
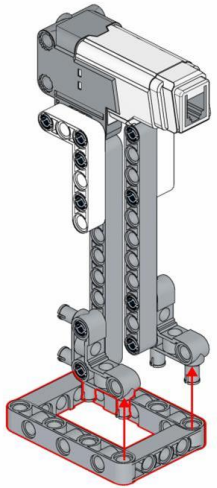


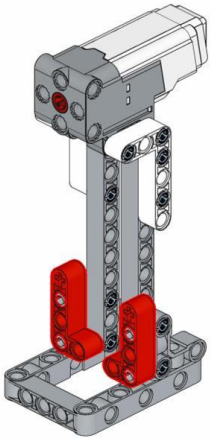


Install the base

Build a robot

7





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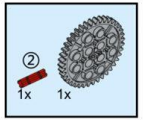
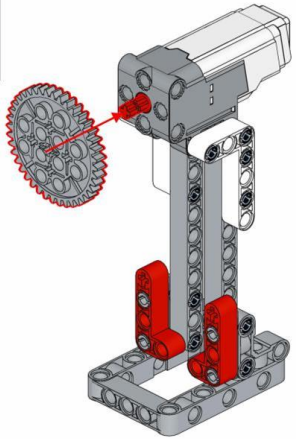
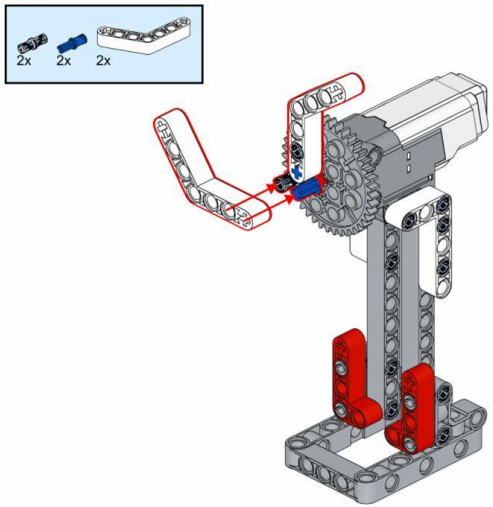




Build a robot

9



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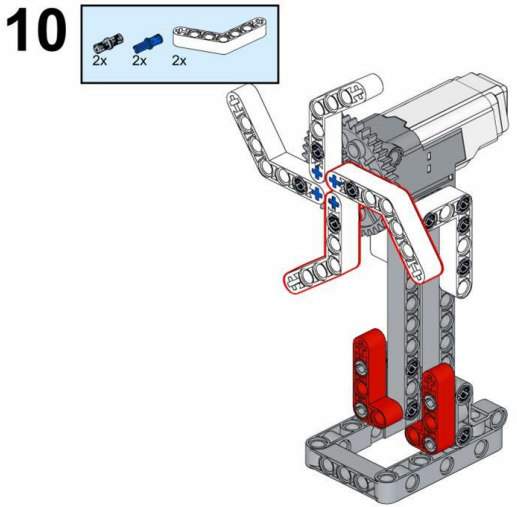
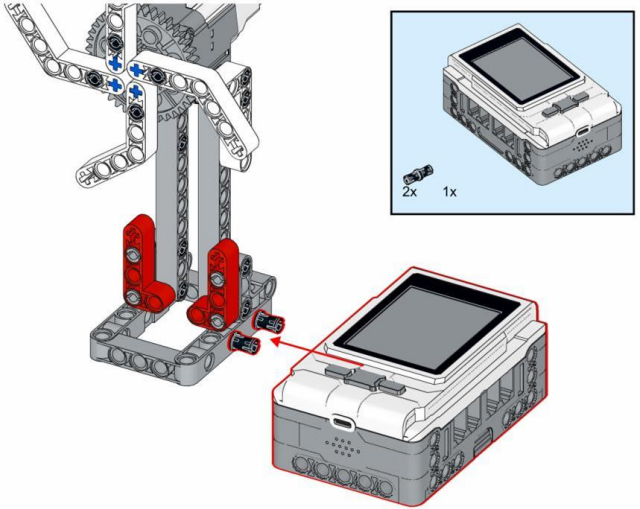


Install the blades

Build a robot

11



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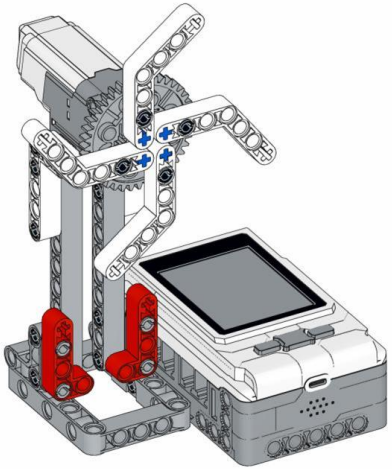
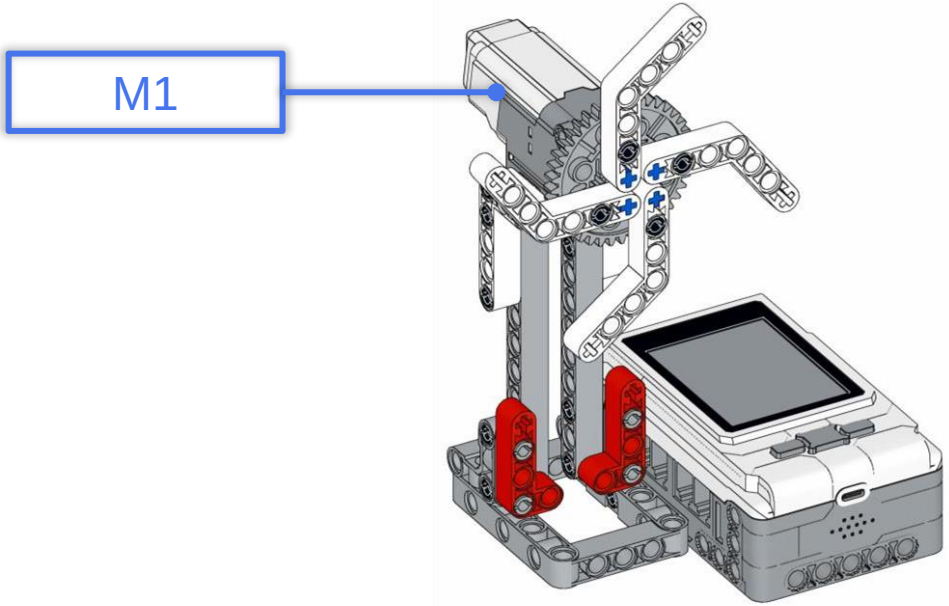


Hardware Connection



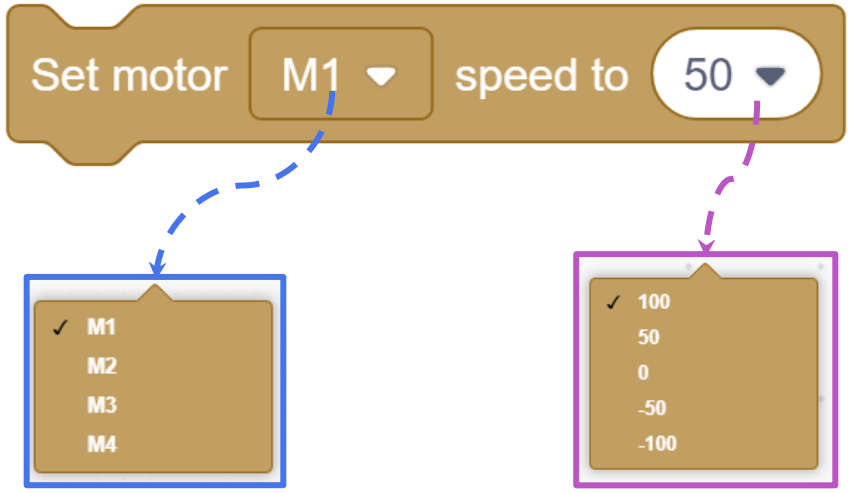
“

How to control the fan by buttons?

”

Coding block - set motor speed

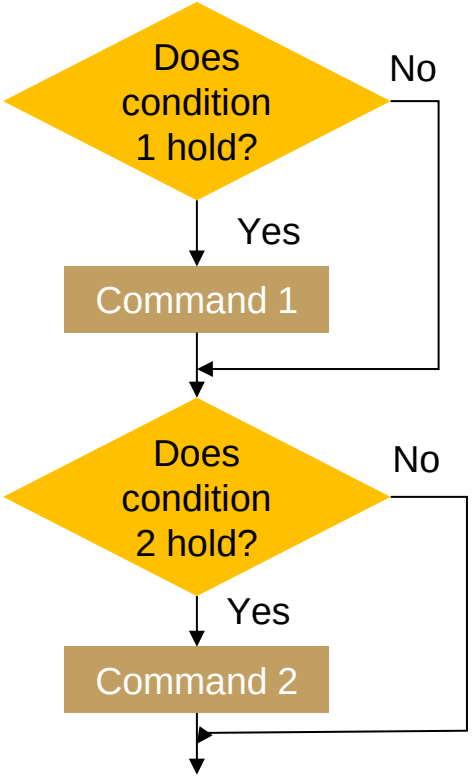
Please make the motor run at the specified speed. The larger the speed value, the faster the speed. If the speed is 0, it will stop. If it is less than 0, it will reverse. If it is greater than 0, it will run forward.

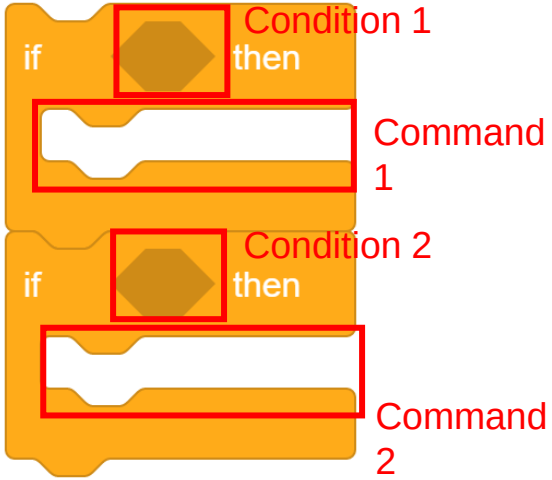


Motor ports, optional “M1-M4”

Motor speed, range: -100~100, the positive or negative value represents the direction of motor rotation

Parallel branch structure

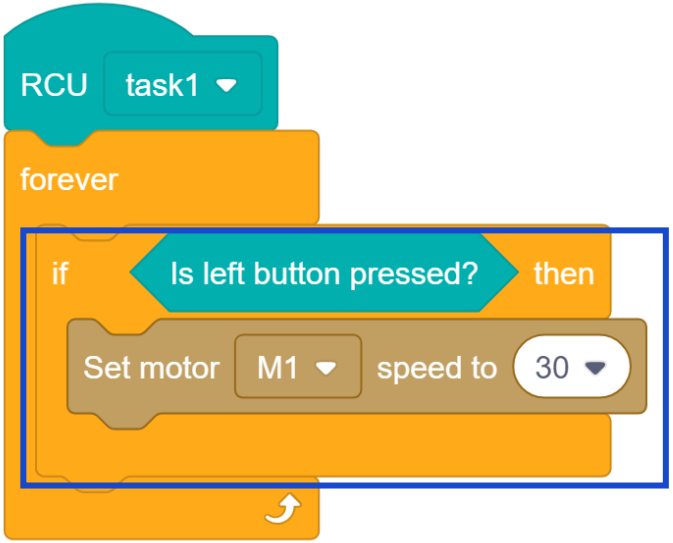




Flowchart of a parallel branch structure

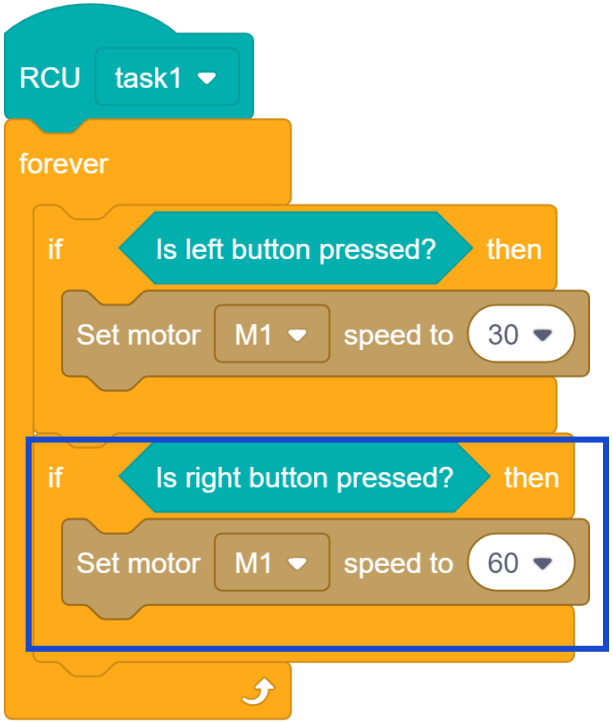
Put two or more branch structures in parallel to form a parallel branch structure, which can execute different commands according to different conditions. However, the judgment and execution of the conditions have a sequence, and they are not judged and executed at the same time.

1. Press the left button to make the fan run at low speed



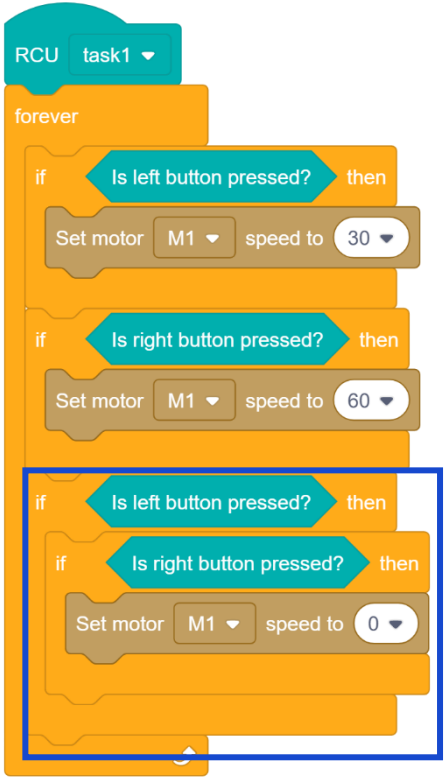
If the left button is pressed, the motor M1 will run at speed 30.

2. Press the right button to make the fan run at high speed



If the right button is pressed, the motor M1 rotates at a speed of 60.

3. Press the left and right buttons simultaneously to turn off the fan.

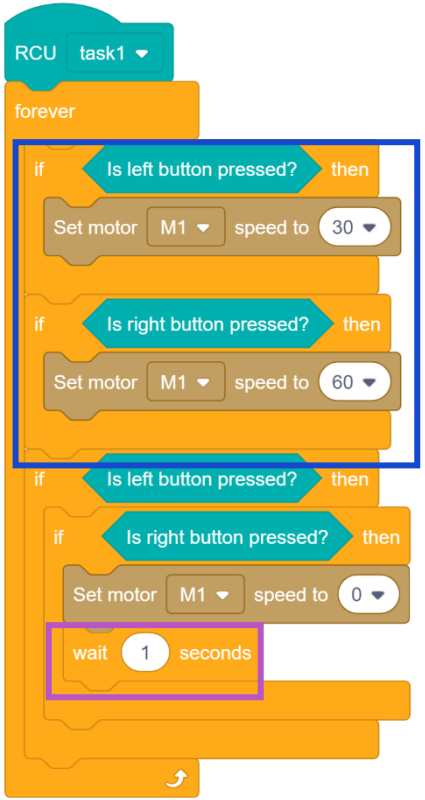


If the left button is pressed, the program will continue to determine whether the right button is pressed. If the condition is met, the speed of motor M1 is set to 0.

Will this program achieve the results we desire?



4.Increase the waiting time



Press the left button to start the fan.

Leave time to release the button

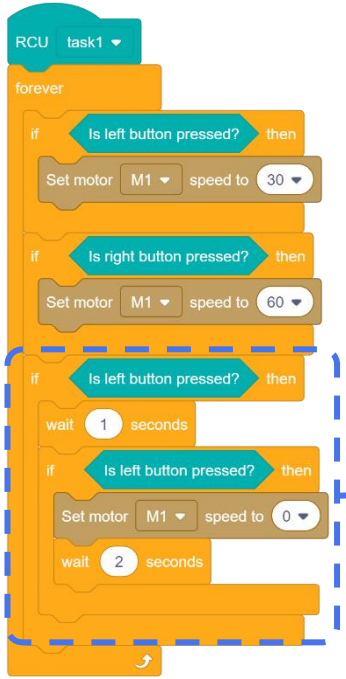
Because the program runs very fast, after pressing the left and right buttons at the same time to turn off the fan, the program immediately runs to the "Press the left button to make the fan turn" part. So we need to add a waiting time, such as 1 second, so that after the fan is turned off, we have time to release the button.

Expansion Tasks

Modify the program to long press the left button to turn off the fan



Expansion Program



Press and hold the left button for about 1 second to turn off the fan.

Quiz

Single-choice question

The following description is incorrect ( )

A. The motor connection port can select "M1-M4"

B. The motor speed value range is: -100~100

C. The larger the motor speed value, the slower the speed

D. There are two modes for controlling the motor in "Test"

Answer: C

Further Reading



Mechanical fans originated in 1830. An American named James Byron was inspired by the structure of clocks and invented a mechanical fan that can be fixed on the ceiling and driven by a spring. The cool breeze brought by the rotating blades of this fan makes people feel cool.

In 1872, a Frenchman named Joseph developed a mechanical fan that was started by a spring turbine and driven by a gear chain device. This fan was much more sophisticated and easier to use than the mechanical fan invented by Byron.

Further Reading



In 1880, American Schuler first installed the blades directly on the motor, and then connected the power supply. The blades rotated rapidly, and gusts of cool breeze blew on the face. This was the world's first electric fan.

Thanks!