

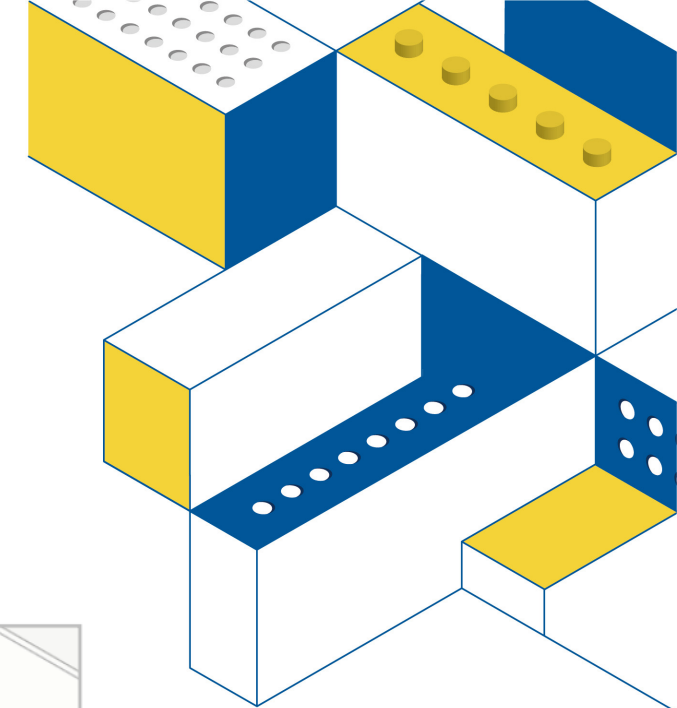
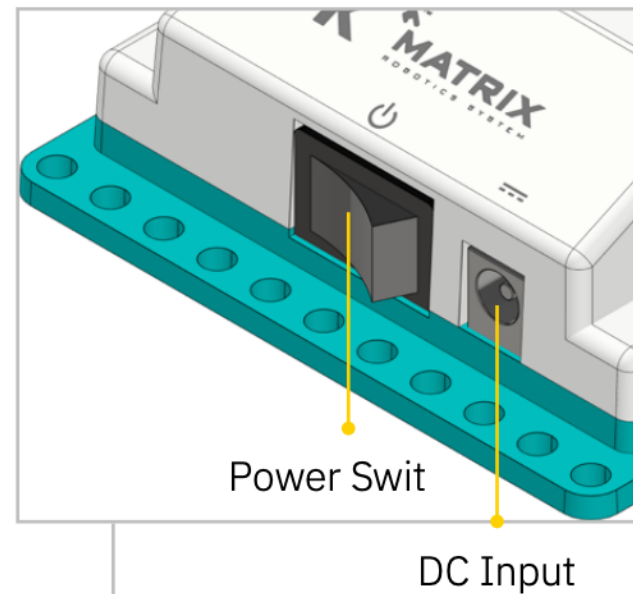
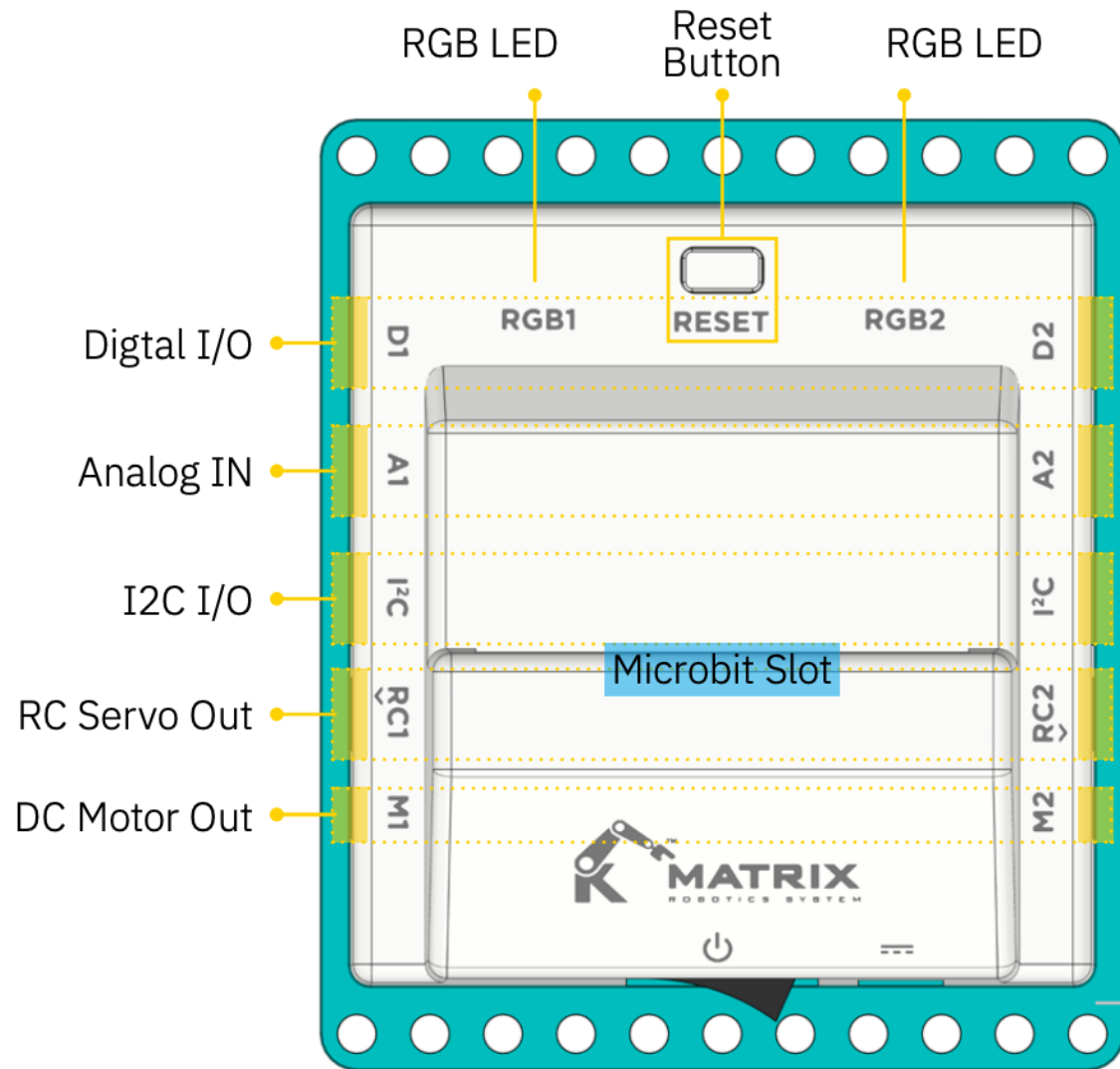
Code:bit Car User Manual



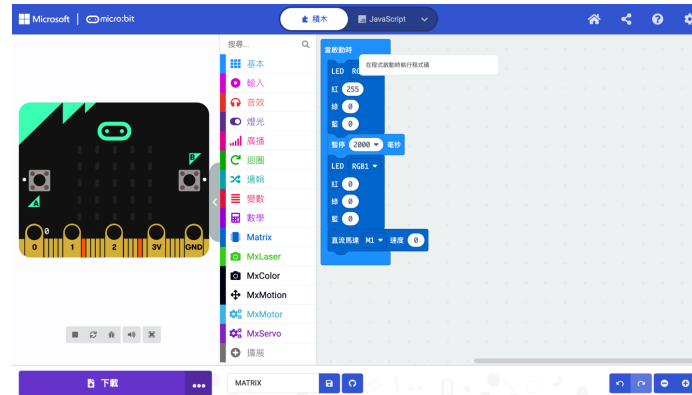
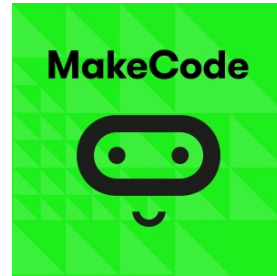
Outline

- MATRIX Micro introduction
- Programming tour
- Connect and download
- Build the Car
- Control motors and sensors

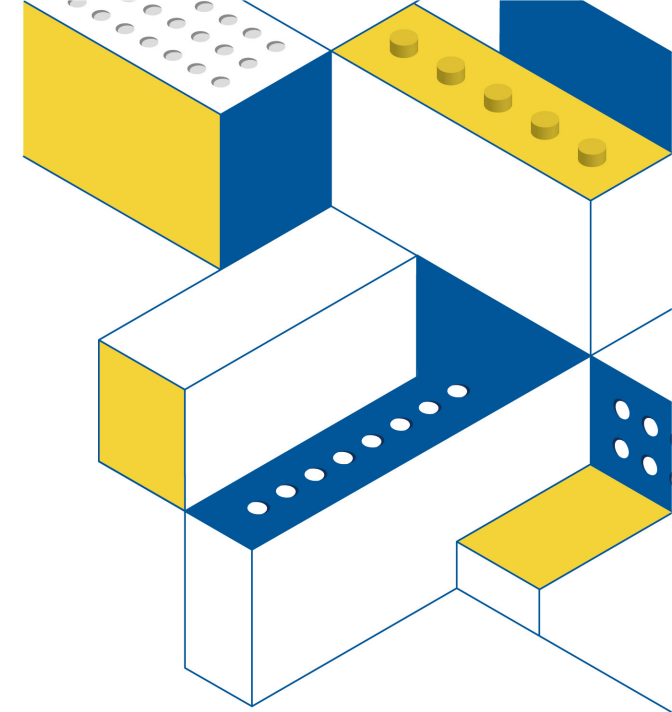
MATRIX Micro



Programing

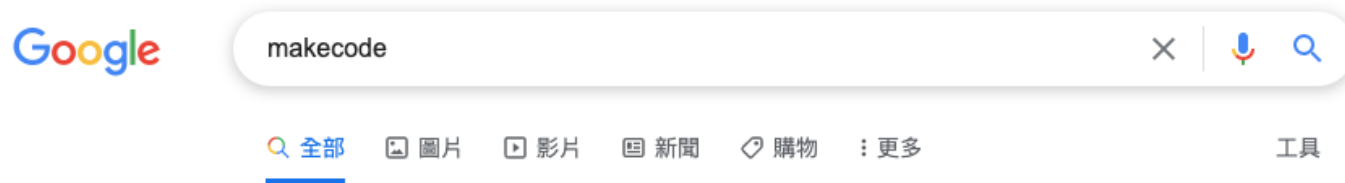


MakeCode



Online MakeCode

1 Open your web browser and type "MakeCode" in the search bar



2 Click →

Microsoft MakeCode for micro:bit

A Blocks / JavaScript code editor for the micro:bit powered by Microsoft **MakeCode**.

MakeCode Offline App

MICROSOFT SOFTWARE
LICENSE TERMS. MICROSOFT
MAKECODE SOFTWARE FOR
micro:bit.

USB

Connect your micro:bit to your
computer with a USB cable ...

Support

What is a micro:bit? - Login - Reset
the micro:bit - ...

[microbit.org 的其他相關資訊 »](#)

Firmware

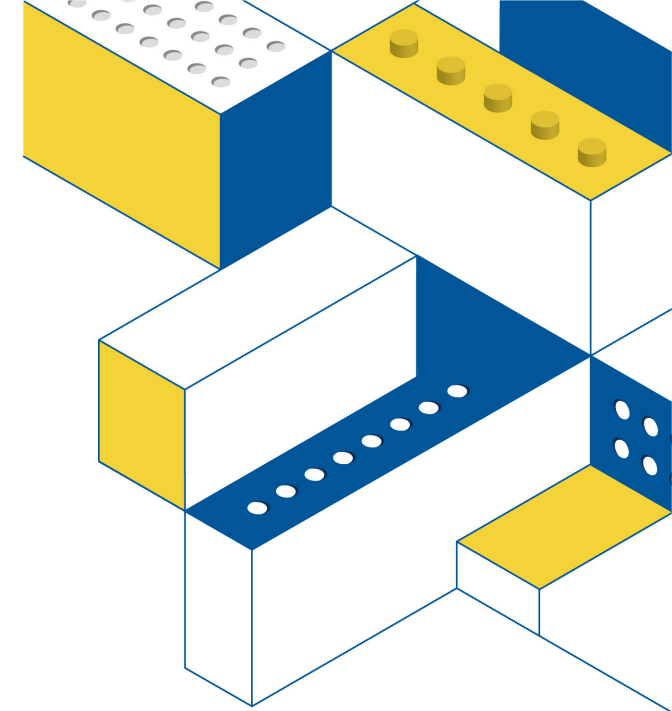
Plug it in to a computer using the
USB cable · Open the DETAILS ...

Extensions

Extension Gallery · Display ·
Electronics · Gaming ...

Reference

Basic - Documentation - Music -
Radio - Led - Game - Light Level



Download MakeCode App

1 Open your web browser and type "MakeCode offline app" in the search bar



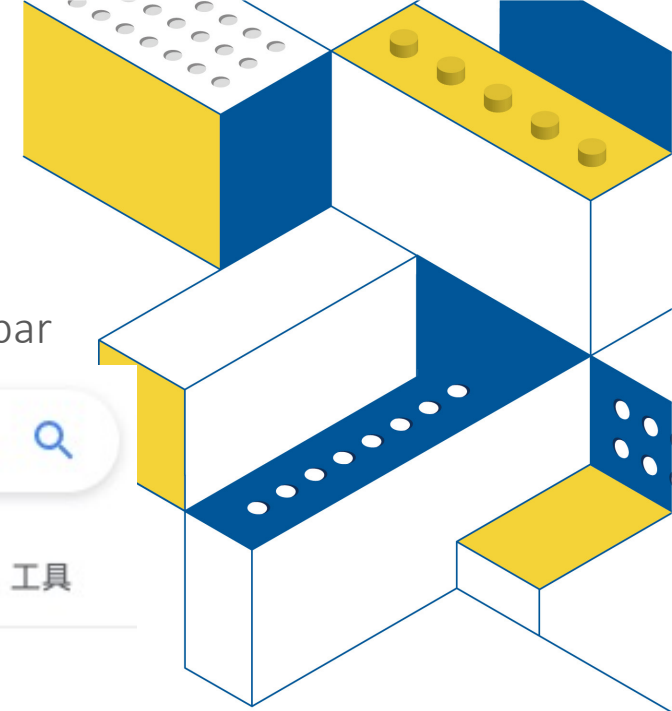
2 Click  **Microsoft MakeCode Offline App**

A Microsoft **MakeCode offline app**. ... any number of copies of the software to develop and test your software applications for use with micro:bit hardware.

<https://makecode.microbit.org > offline> [翻譯這個網頁](#)

Using MakeCode offline

The MakeCode editor is available as app which you can install on a computer with Windows or Mac OS. Once installed, the **MakeCode Offline App** lets you create ...



Download App

MakeCode Offline App

Please read and accept the following terms to download the app.

MICROSOFT SOFTWARE LICENSE TERMS

MICROSOFT MAKECODE SOFTWARE FOR MICRO:BIT

These license terms are an agreement between Microsoft Corporation (or based on where you live, one of its affiliates) and you. They apply to the software named above. The terms also apply to any Microsoft services or updates for the software, except to the extent those have additional terms.

IF YOU COMPLY WITH THESE LICENSE TERMS, YOU HAVE THE RIGHTS BELOW.

- 1. INSTALLATION AND USE RIGHTS.** You may install and use any number of copies of the software to develop and test your software applications for use with micro:bit hardware.
- 2. ASSOCIATED ONLINE SERVICES.** Some features of the software provide access to, or

I agree to these Microsoft Software License Terms and to the [Microsoft Privacy Statement](#).

Windows	Mac OS
makecode-microbit-setup-win64.exe	makecode-microbit-mac64.zip

3 Tick agree

4 Download the version for your computer system

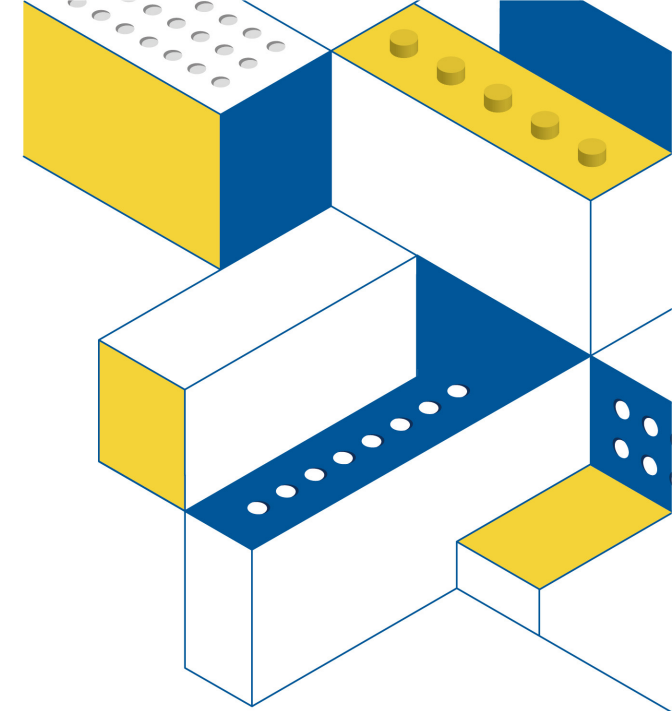


Programing Tour

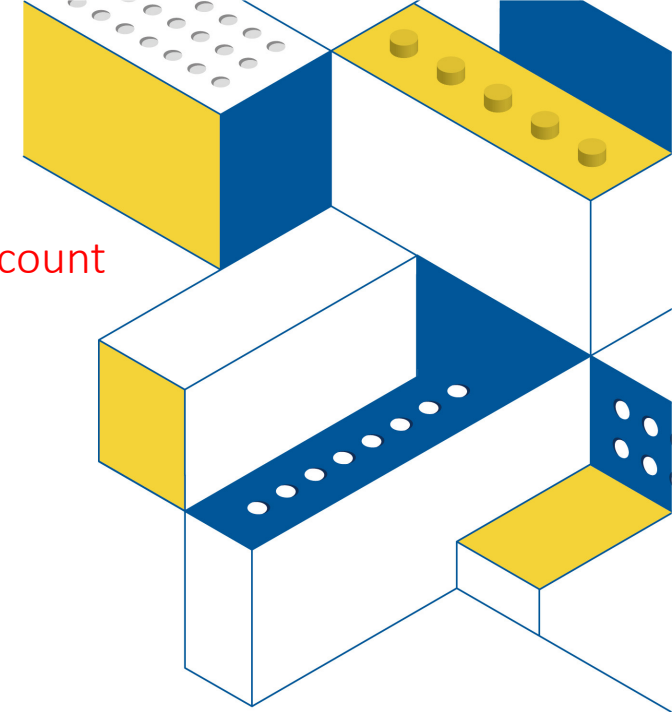
New Project

The screenshot shows the Microsoft MakeCode website interface. At the top, there is a blue header with the Microsoft logo, the text "micro:bit", a settings gear icon, and a "Sign In" button. Below the header is a large banner with a dark background. On the left, it says "Send messages with your micro:bit" and has a "Start Tutorial" button. The banner features two cartoon characters, a man and a woman, both holding micro:bit devices. The background of the banner is filled with colorful, floating Scratch-style code blocks, including "radio send string", "radio set group", "on button A pressed", and "radio send string".

Below the banner, there is a section titled "My Projects" with a "View All" link and an "Import" button. A prominent purple square button with a white plus sign and the text "New Project" is highlighted with a red border. Below this, there is a "Tutorials" section with a row of five colorful icons. The first icon is a strawberry with a speech bubble that says "New? Start Here!". The other icons include a house with "MICRO" written below it, a yellow smiley face, a micro:bit device, and a hand holding a pen.



Programing Tour



Sign In Account

A screenshot of the Microsoft MakeCode micro:bit IDE interface. The interface is divided into several sections: a top navigation bar with 'Microsoft | micro:bit', 'Blocks', and 'JavaScript' tabs; a left sidebar with a 'Simulator' window showing a virtual micro:bit board; a central 'Blocks area' with a search bar and a list of categories (Basic, Input, Music, Led, Radio, Loops, Logic, Variables, Math, Extensions, Advanced); and a right 'Scripts area' with a grid for assembling code blocks. A 'Sign In' button is located in the top right corner. The interface is framed by a red border.

Microsoft | micro:bit

Blocks JavaScript

Search...

Basic

Basic

Input

Music

Led

Radio

Loops

Logic

Variables

Math

Extensions

Advanced

show number 0

show leds

show icon

show string "Hello!"

clear screen

forever

on start

Scripts area

Simulator

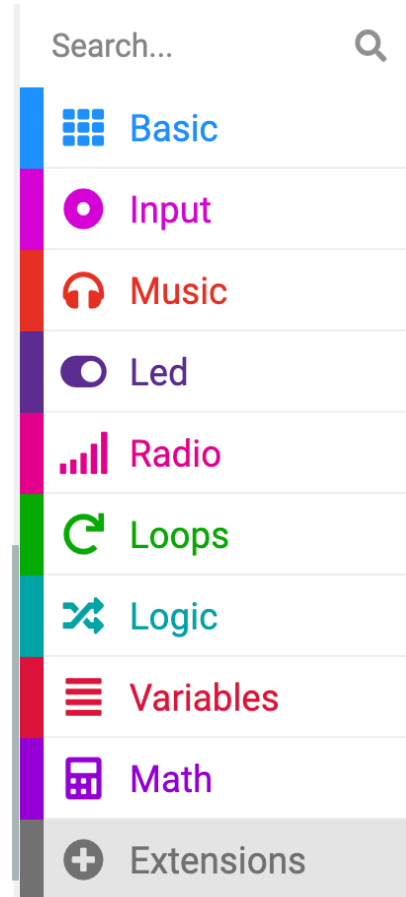
Blocks area

Sign In

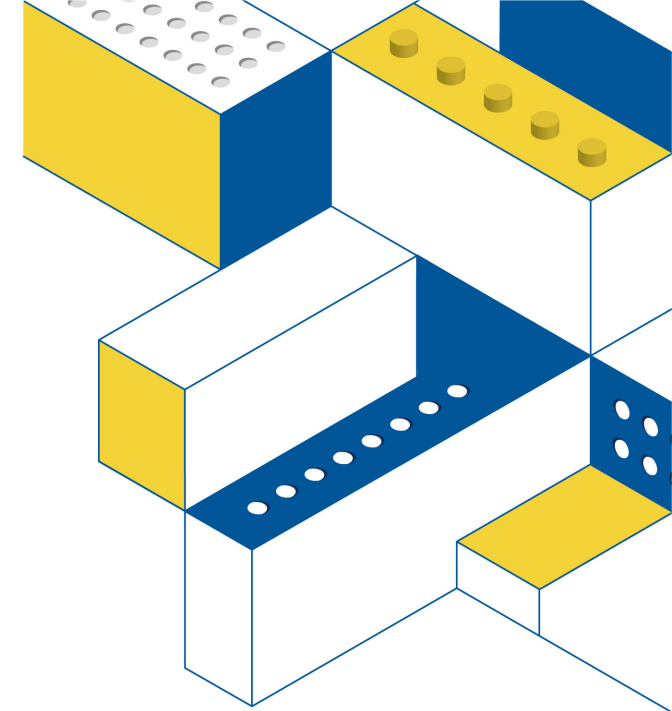
Download

sample

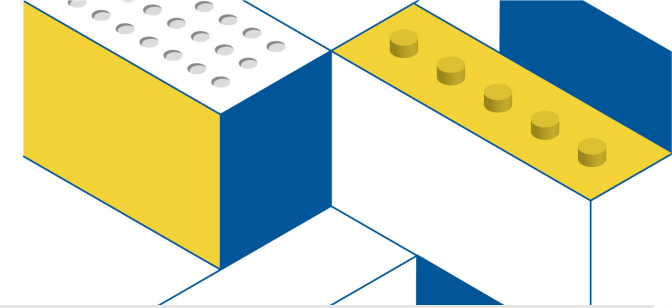
Extension Blocks



1 Click the Extensions →



Extension Blocks

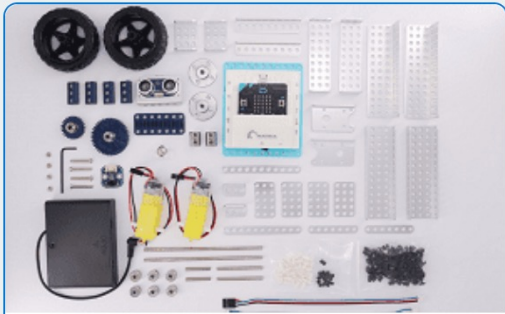


matrix 2 Search "matrix"

- Lights and Display
- Software
- Science
- Robotics
- Gaming
- Networking

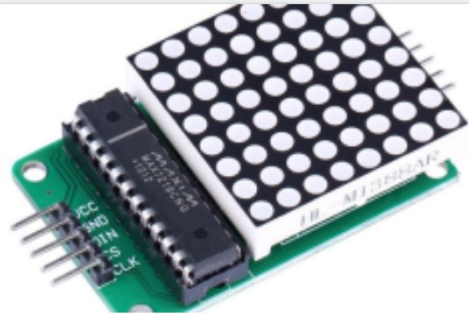
Home

Import File



MatrixMicro
Exclusive extension for MATRIX Micro programmable robot controllers.

[Learn More](#)



MAX7219_8x8
BBC micro:bit MakeCode extension for MAX7219 8x8 matrix LED modules

[Learn More](#)



ColorBit
ColorBit : 5x5 WS2812B LED matrix makecode extension for micro:bit

[Learn More](#)

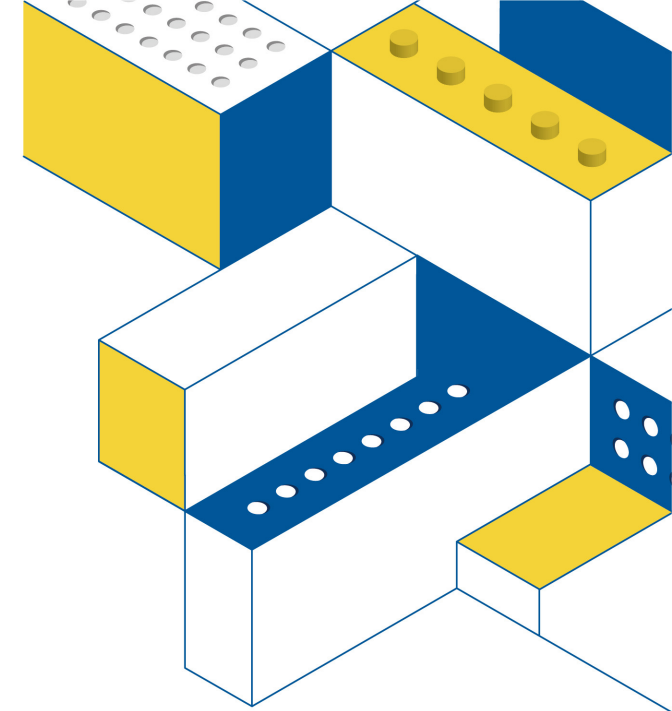
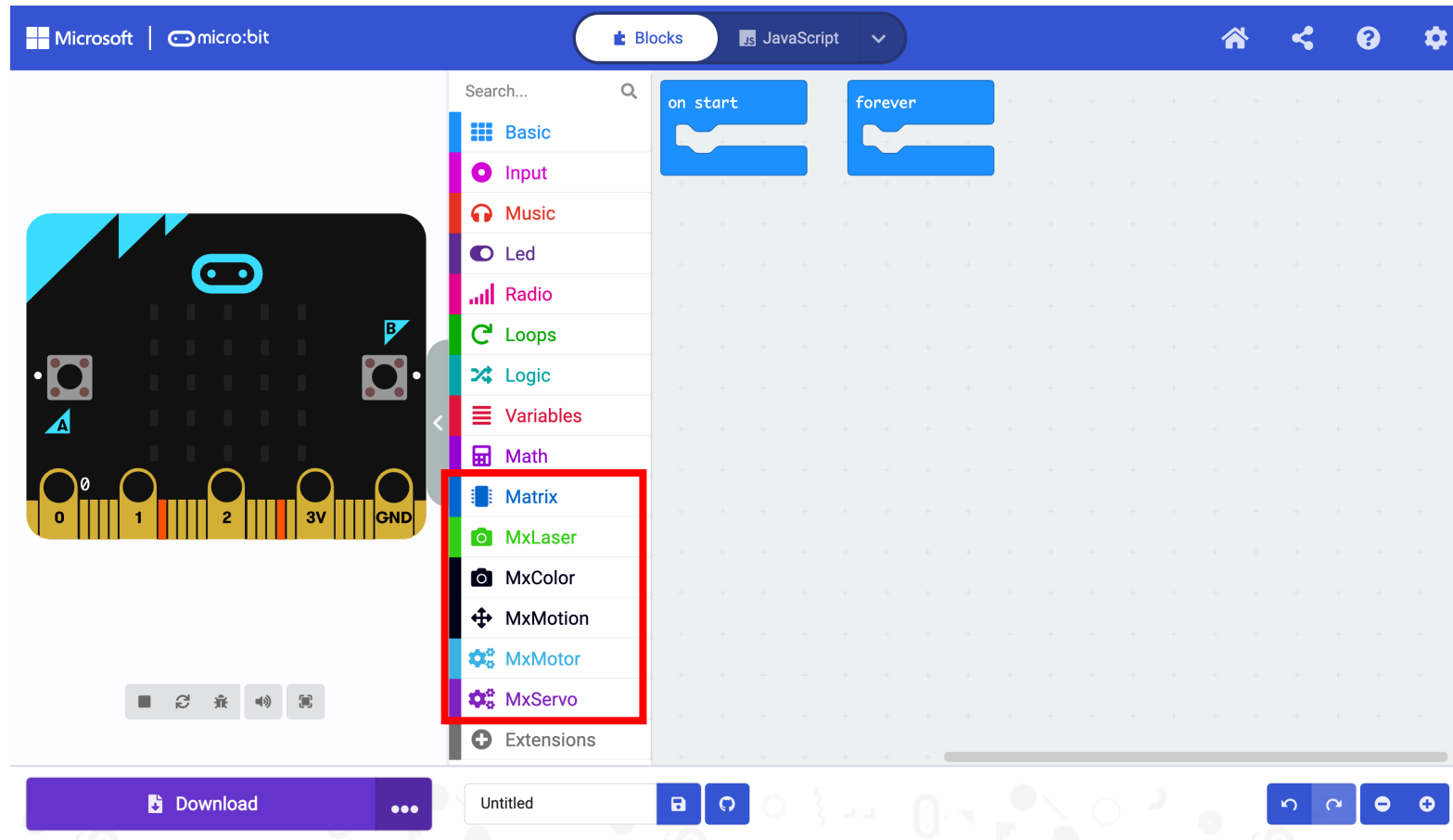


weather-bit
MakeCode package for the SparkFun weather:bit board - beta

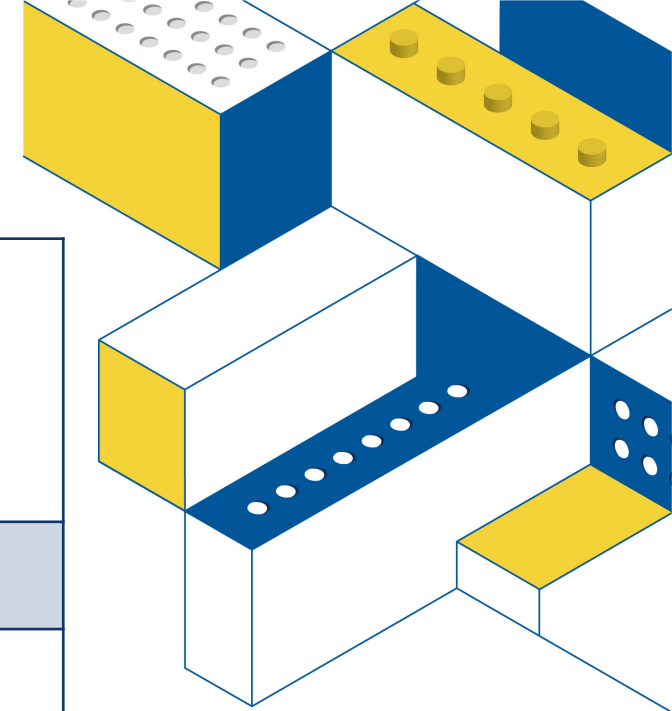
[Learn More](#)

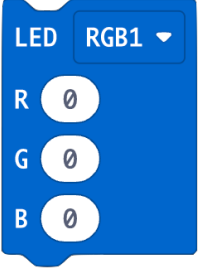


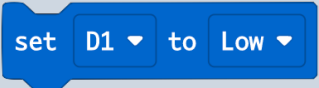

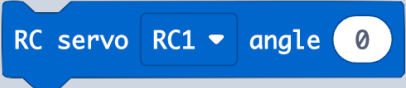


Click "Matrix Micro"

Import Extension Blocks



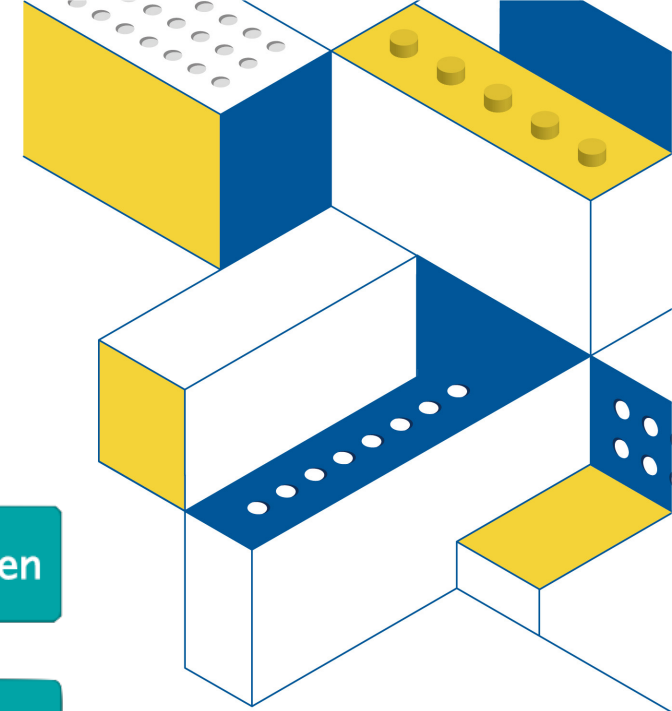
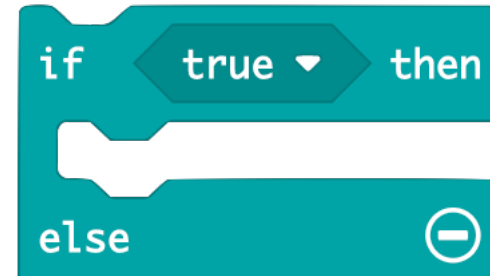
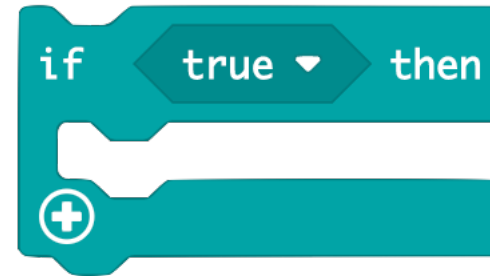
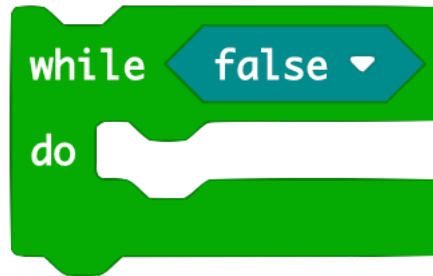
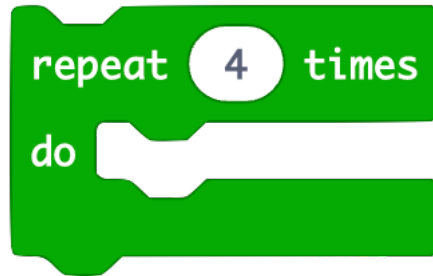
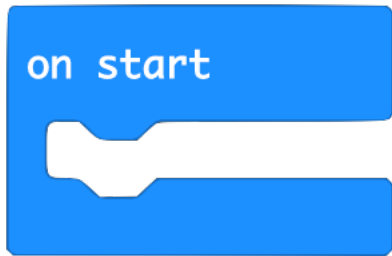
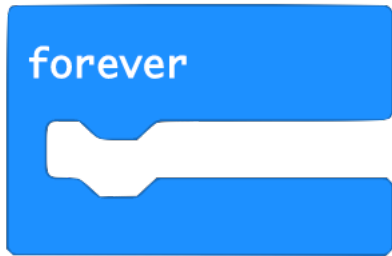
Matrix Micro Blocks



	Set RGB LED
	Read digital signal
	Read distance from ultrasonic sensor (cm)
	Set output voltage
	Read analog port
	Set RC servo angle
	Release all servo motor
	Set speed of DC motor

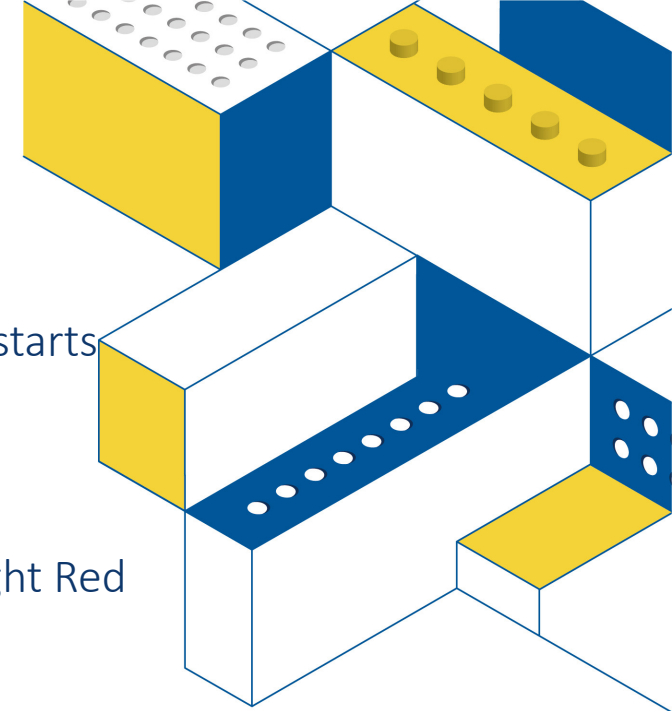
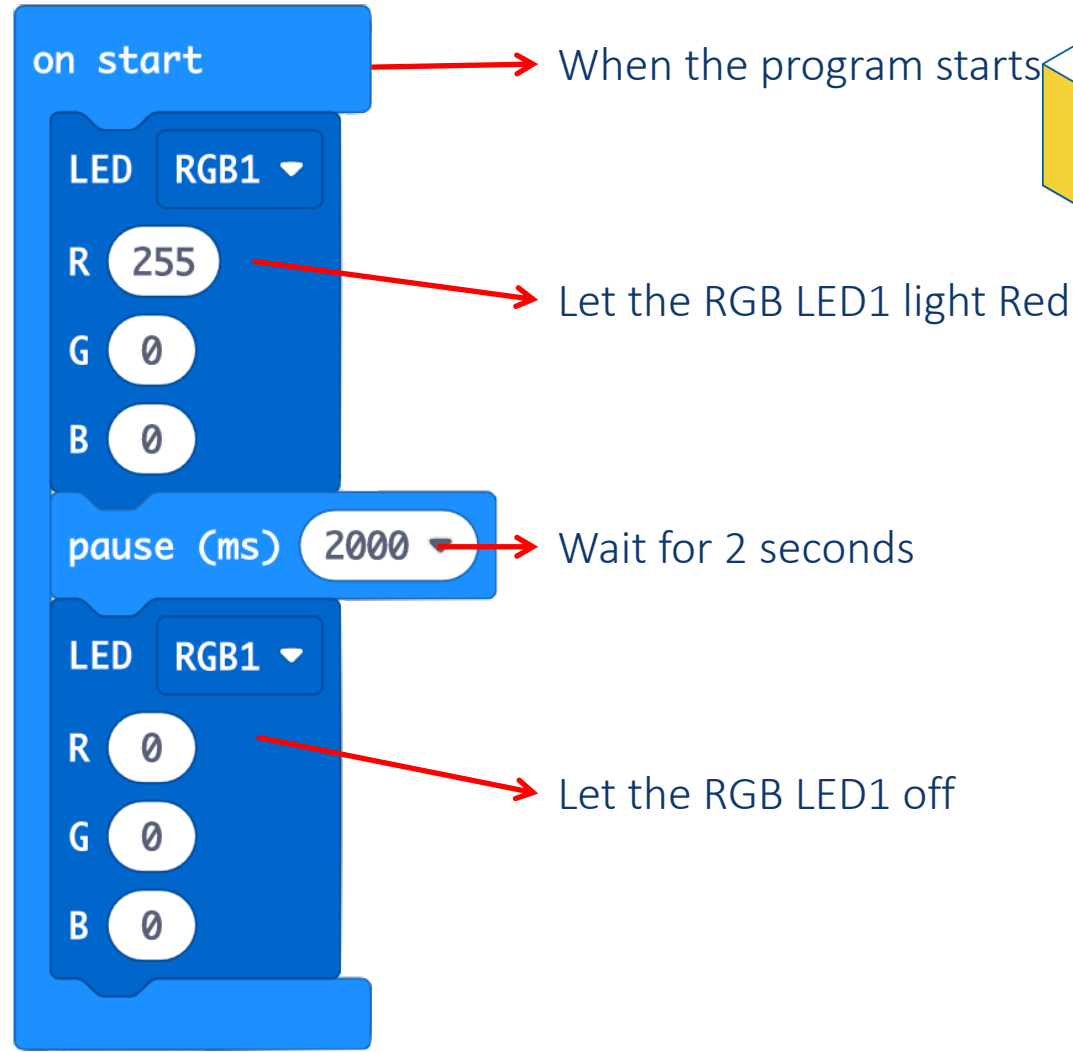
Flow Control

Delay, loops, Conditionals



Test – Light Switch

- Pause block
- Test the Reset button

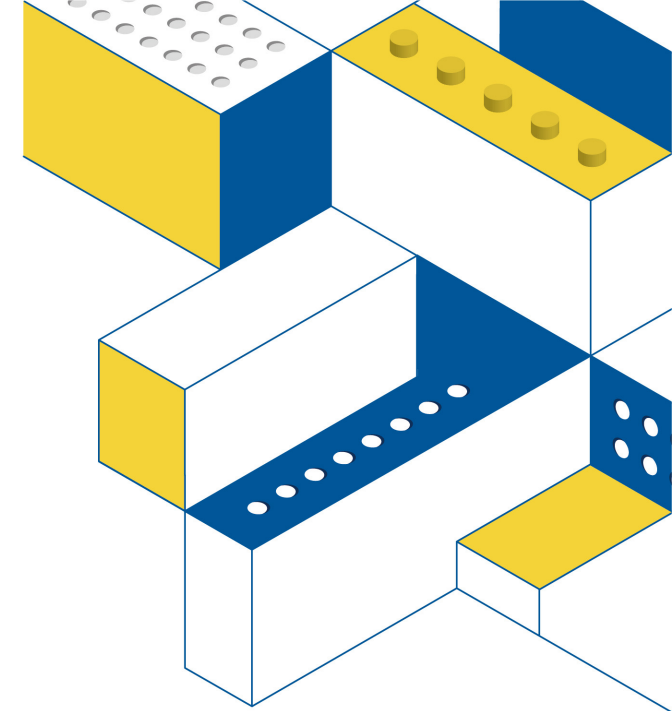
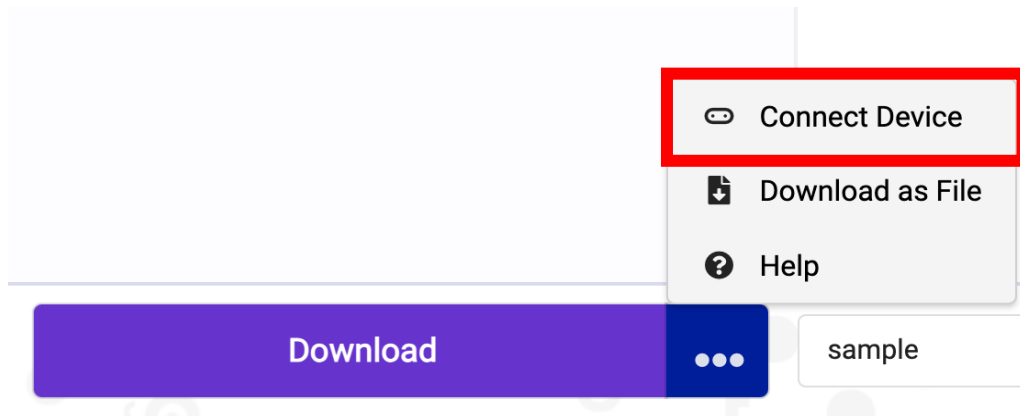




Connect and Download

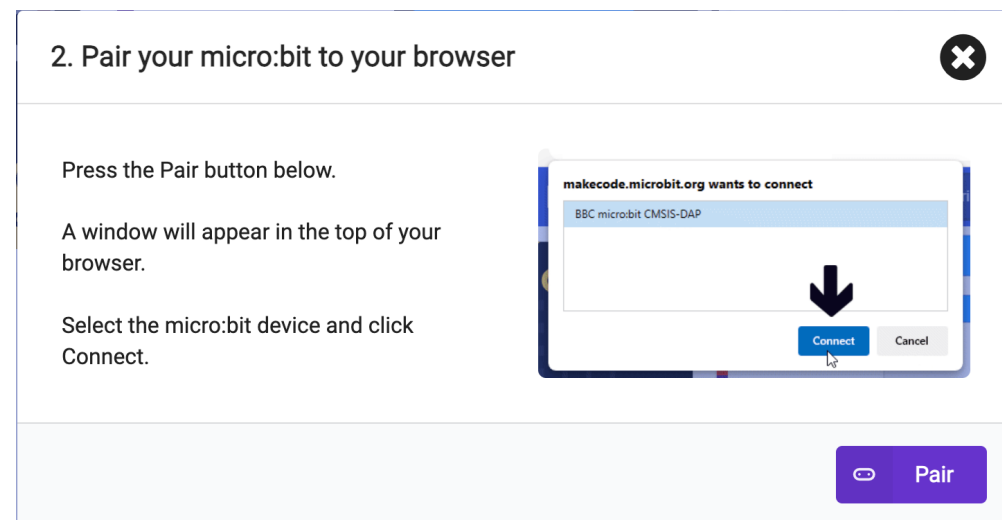
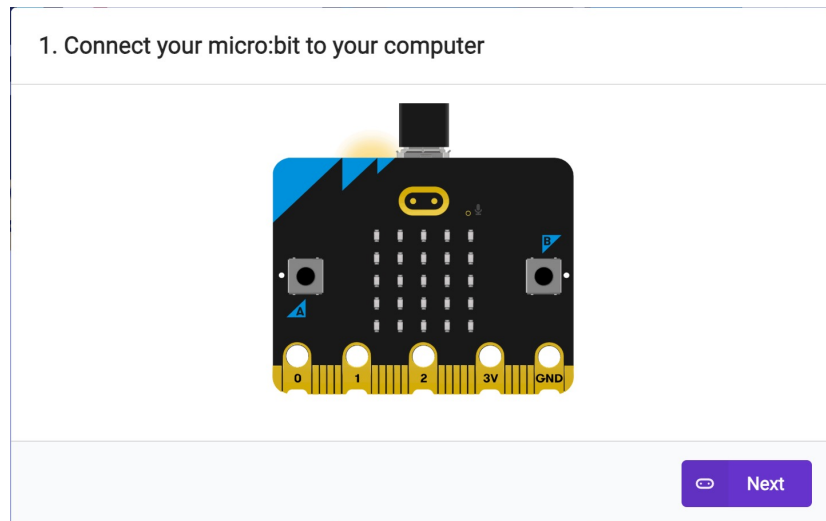
Connect Device

- 1 Click the "..." beside Download, select "Connect device"



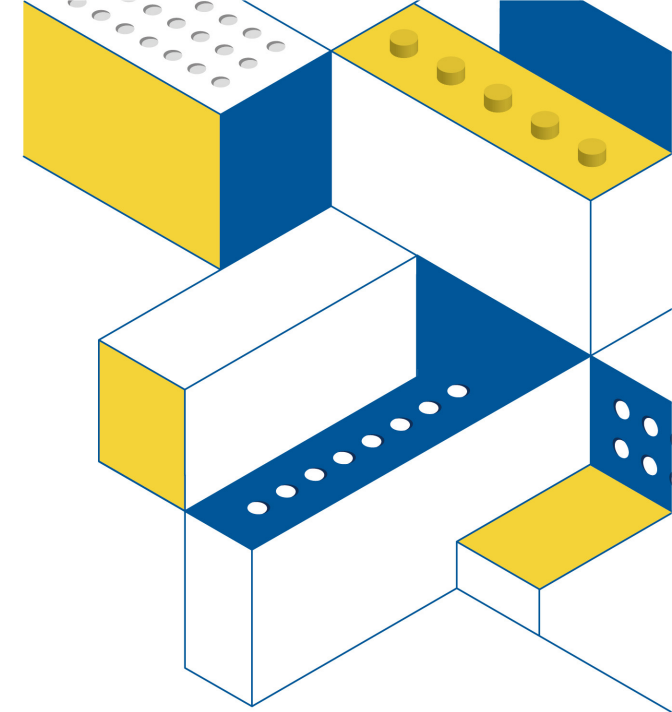
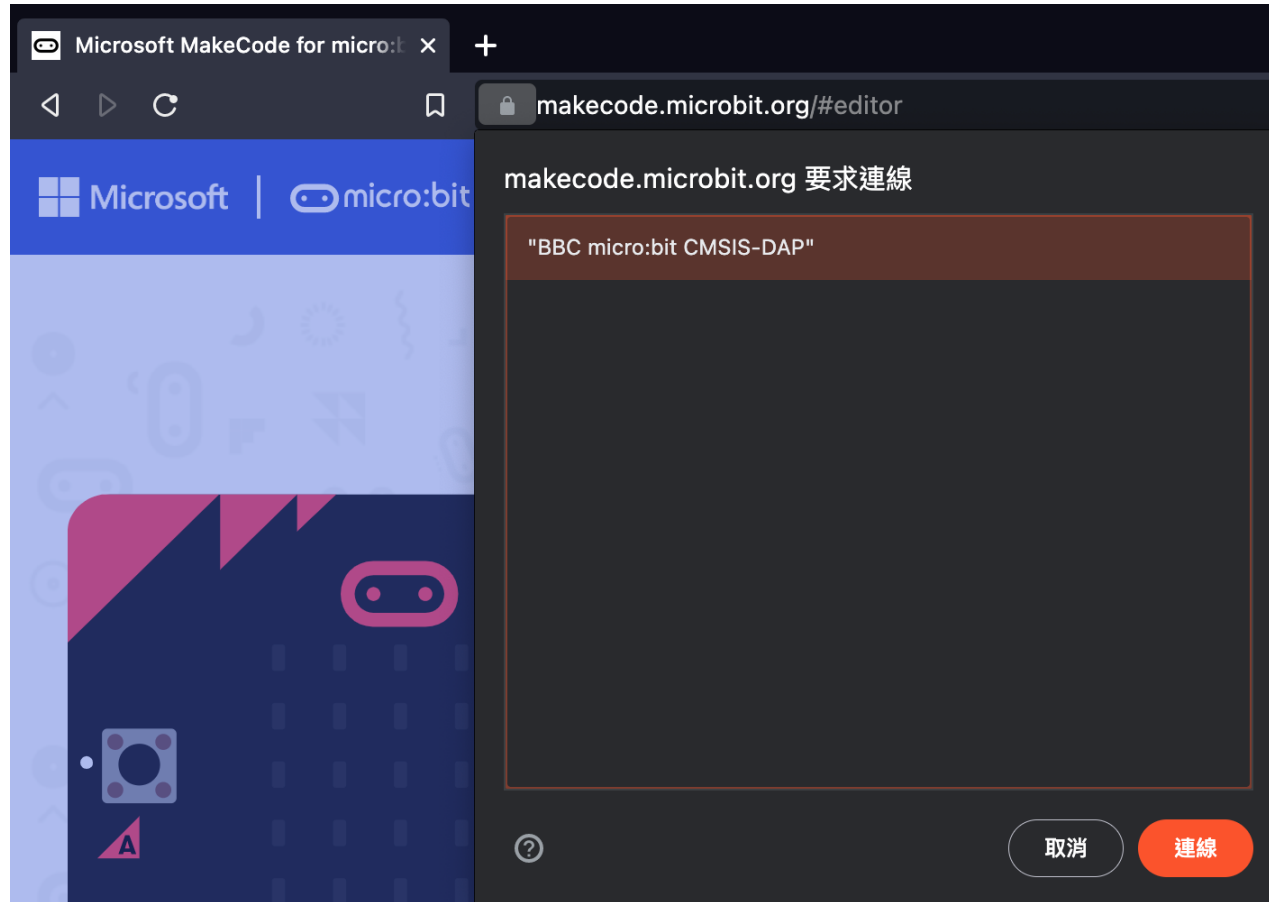
Connect Device

- 2 Make sure your micro:bit is connected to computer with a USB cable, then click "Next" and "Pair".

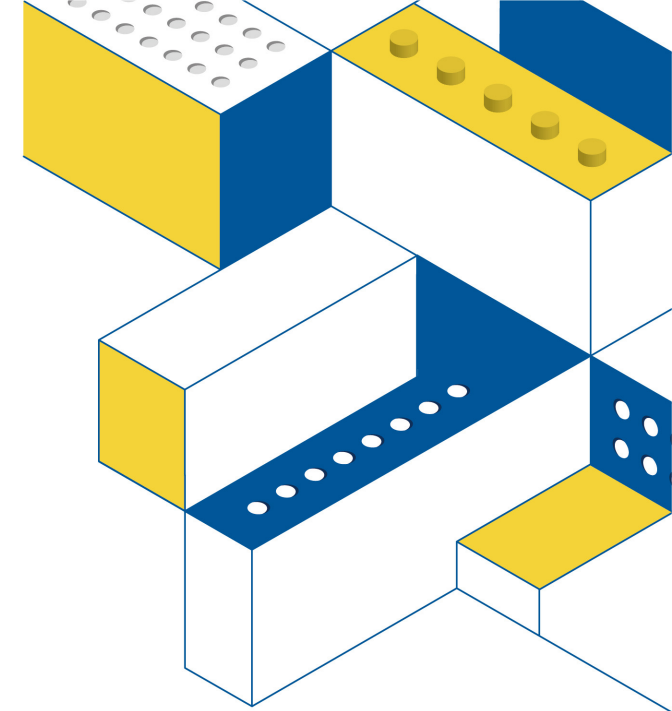
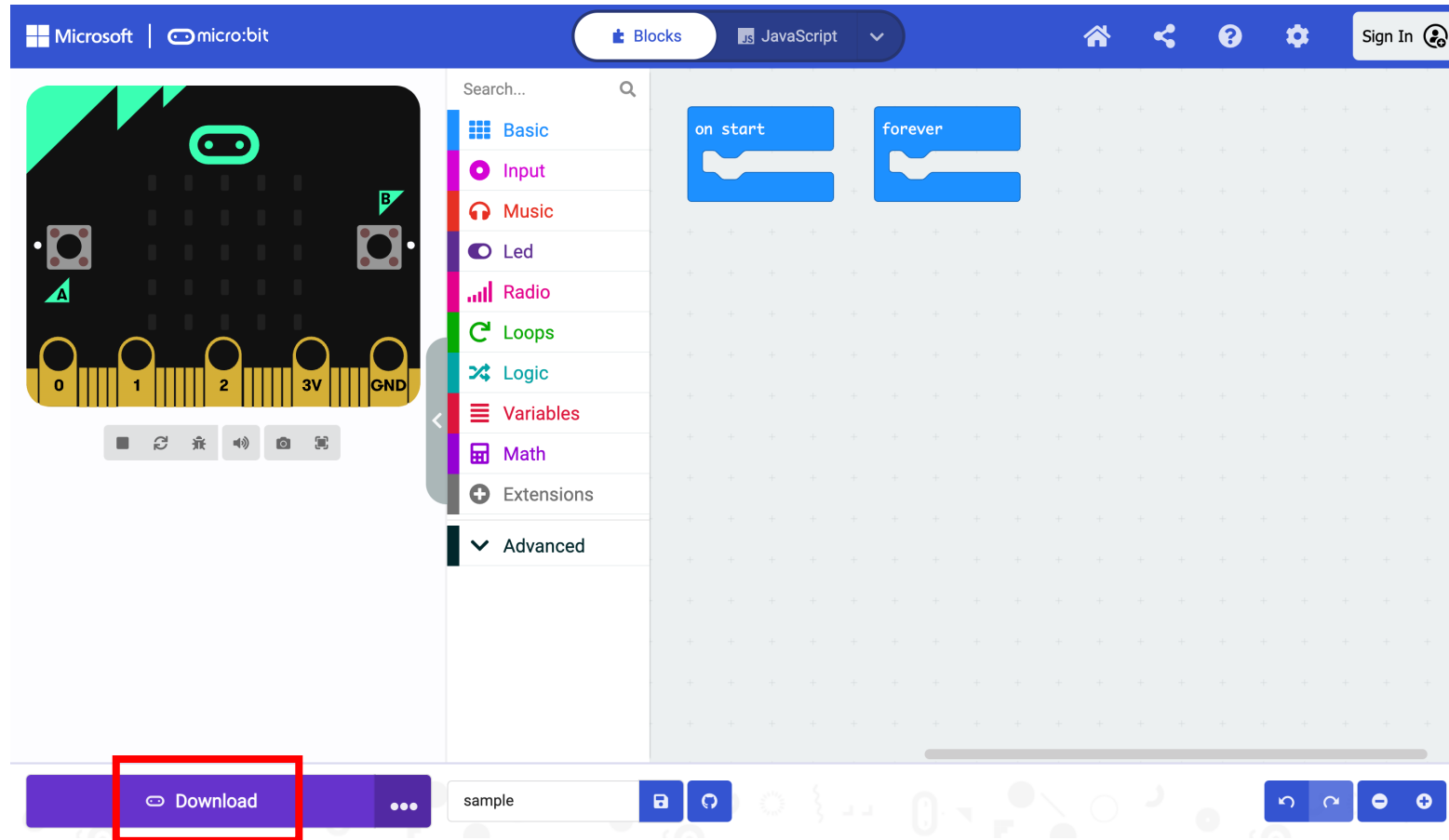


Connect Device

- 3 Select your micro:bit from the popup, then click "Connect"

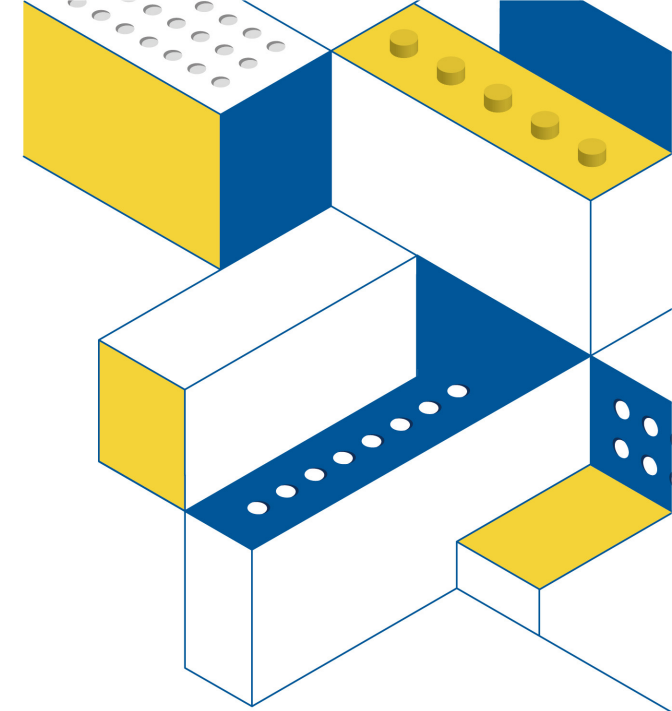


Connection succeeded



Checklist before download

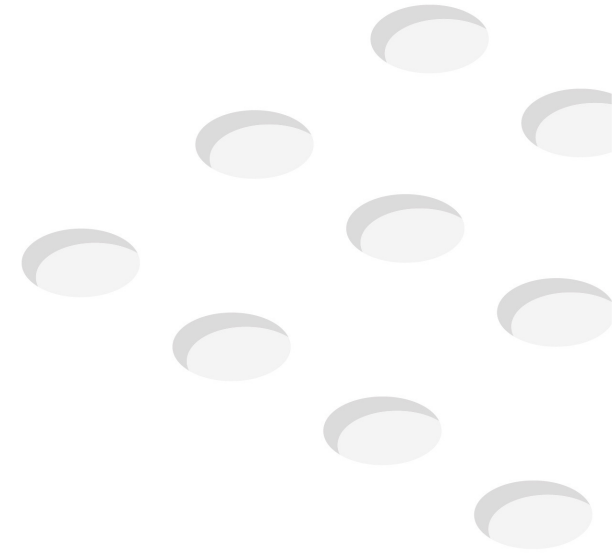
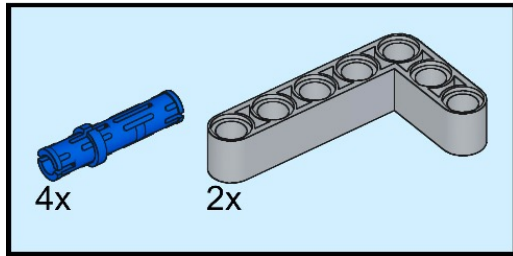
1. USB Connection
2. Keeping robots safe





Build the Car

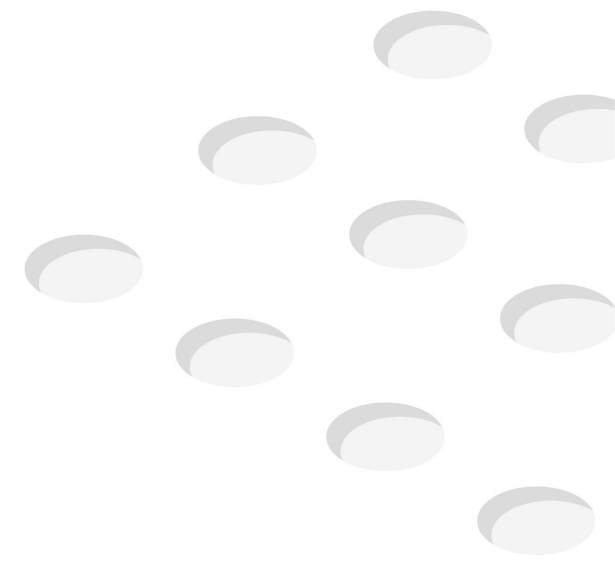
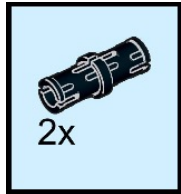
Step 1.



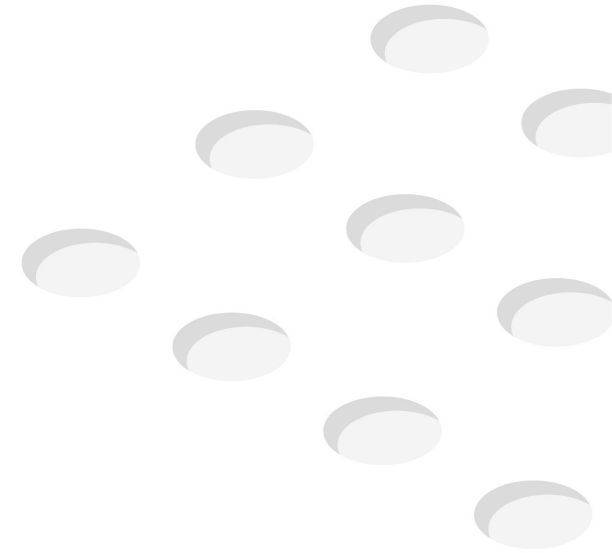
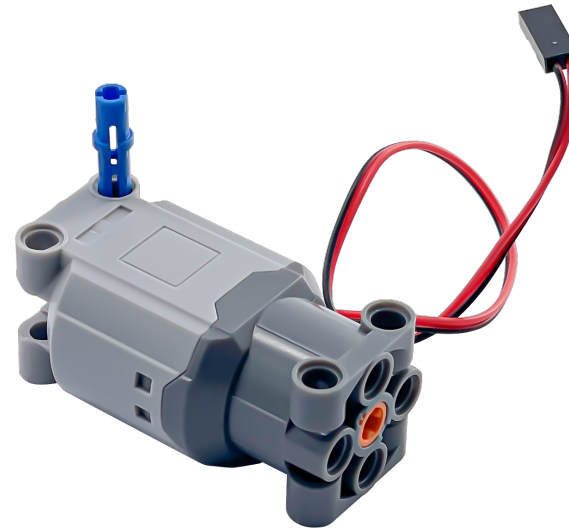
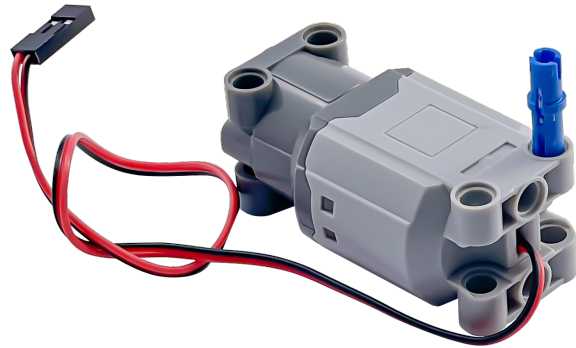
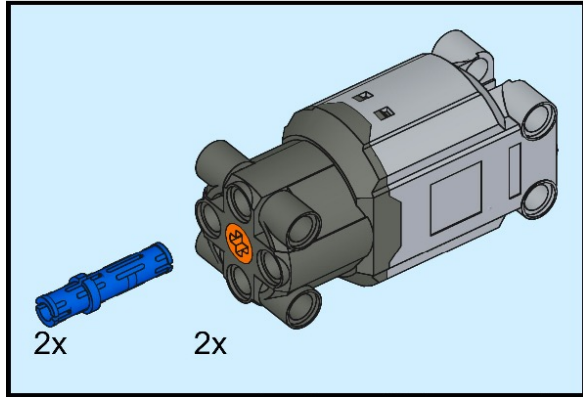
Step2.



Step3.



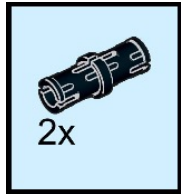
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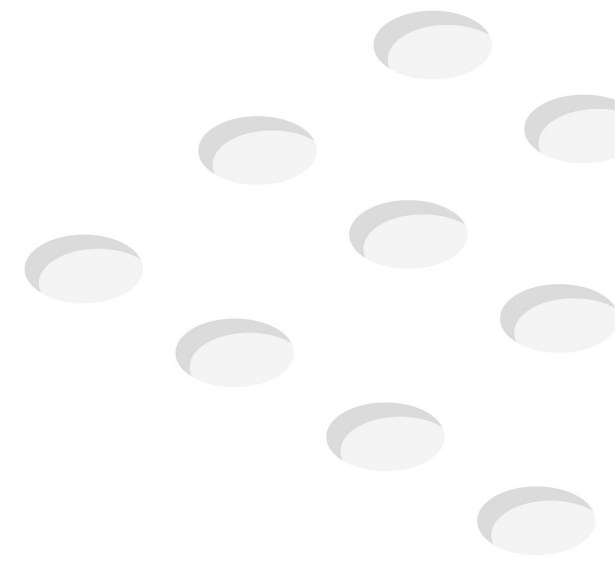
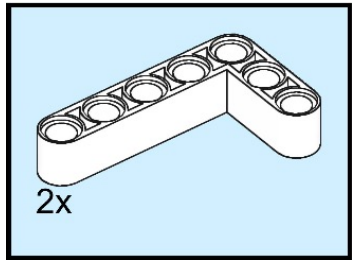
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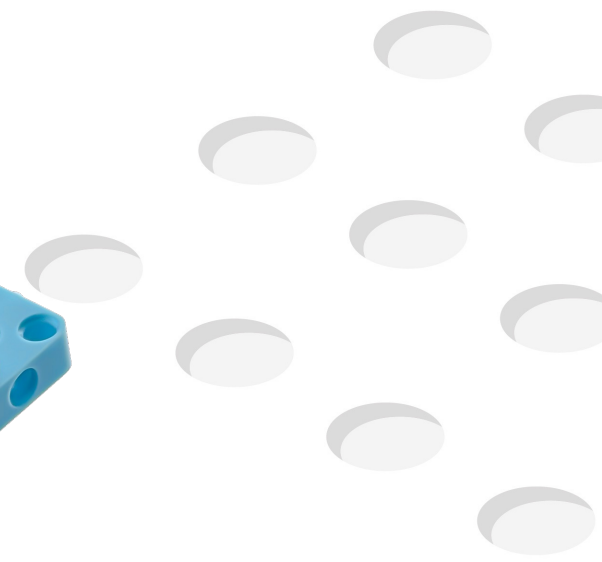
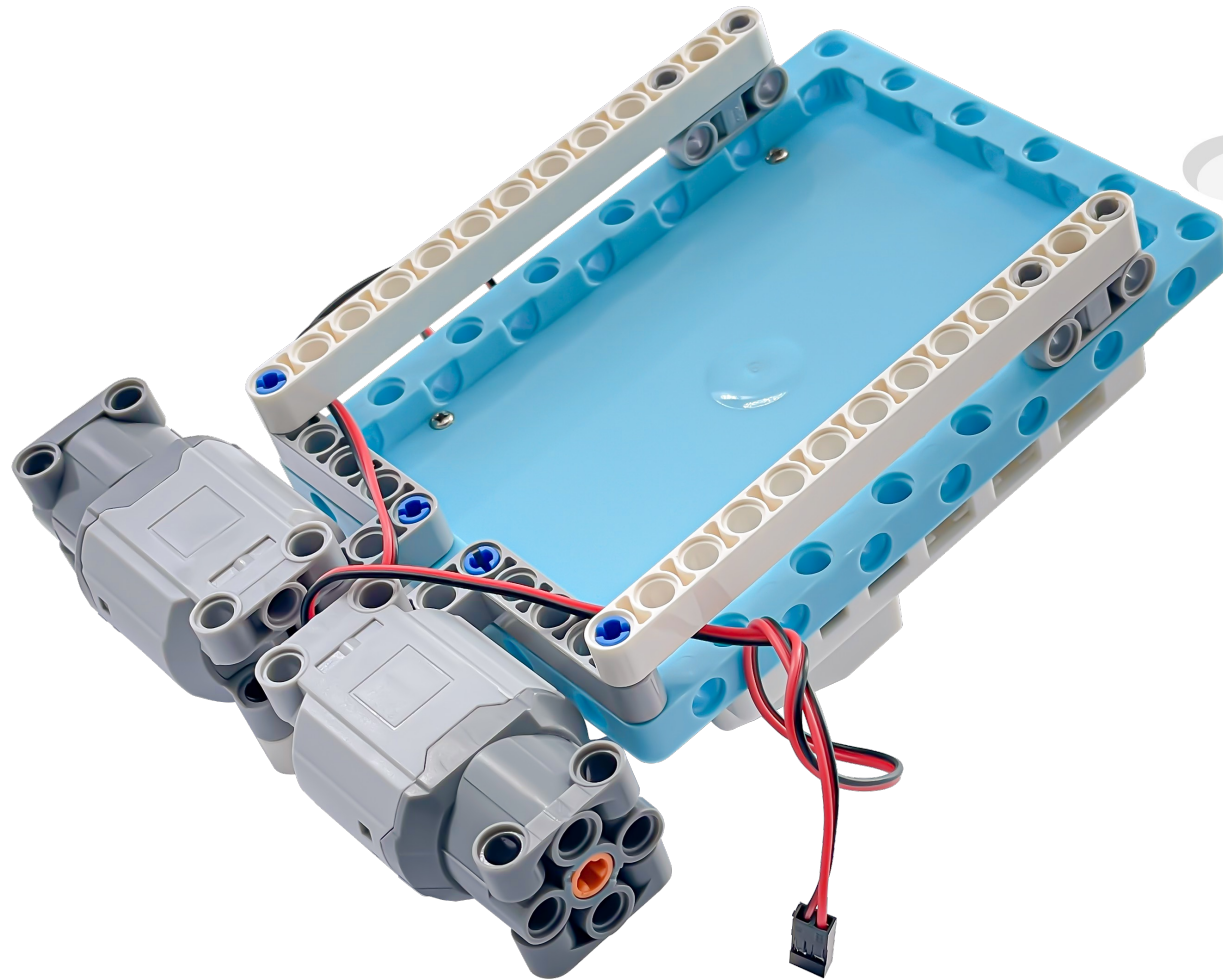
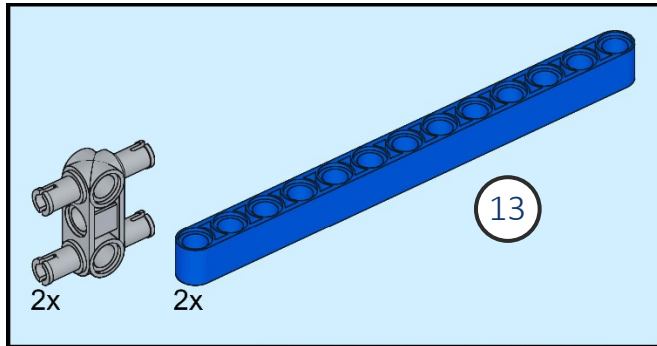
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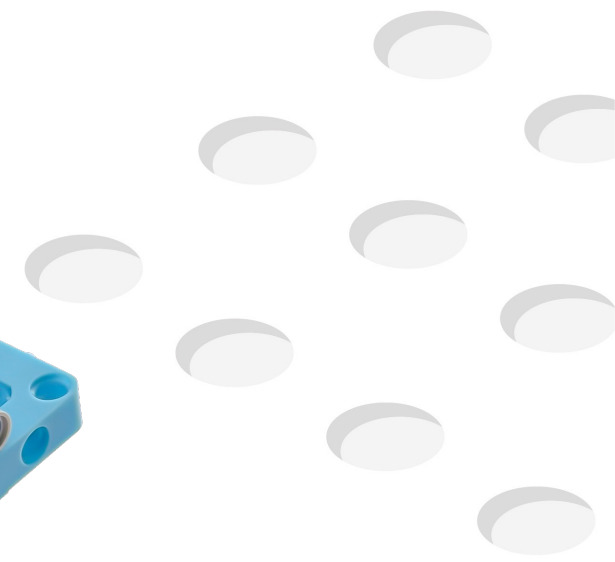
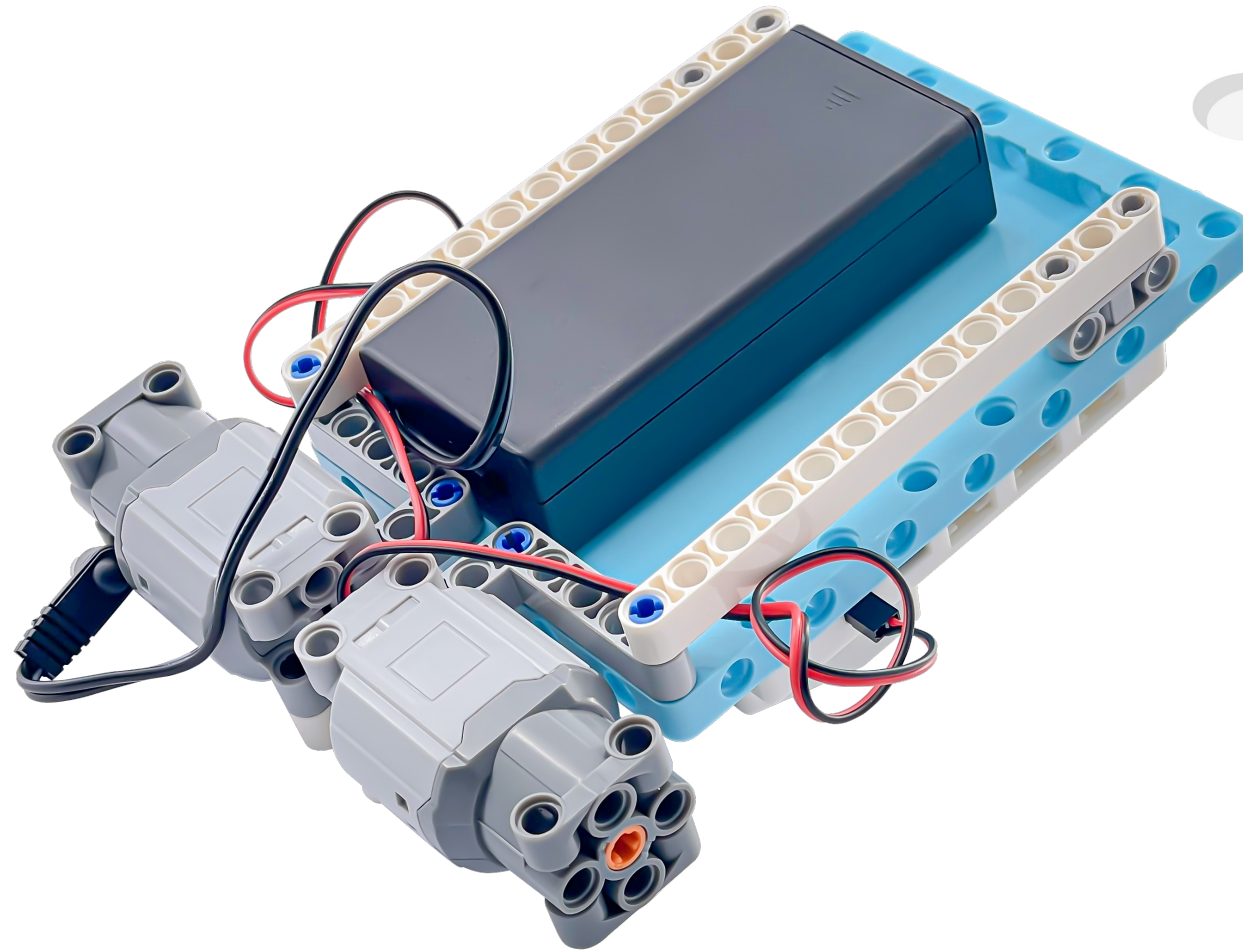
Step 7.



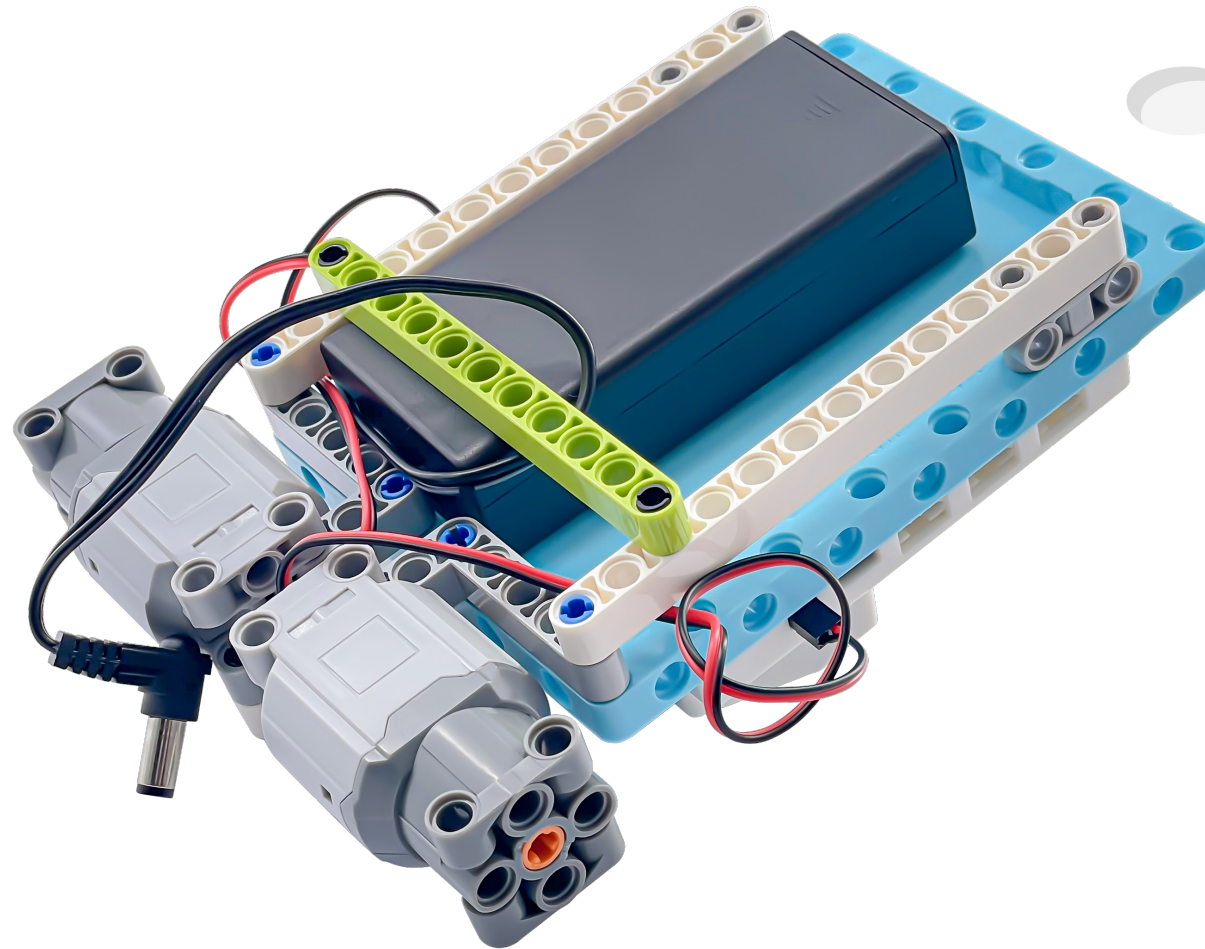
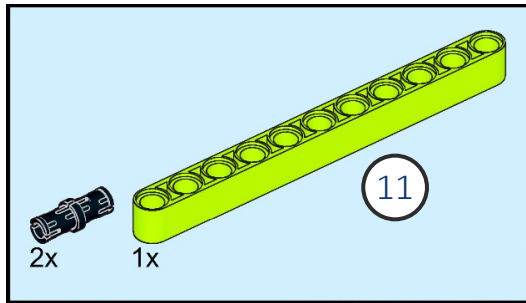
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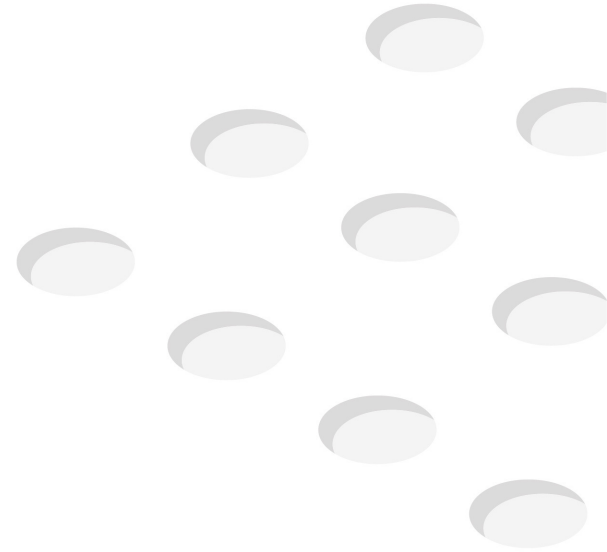
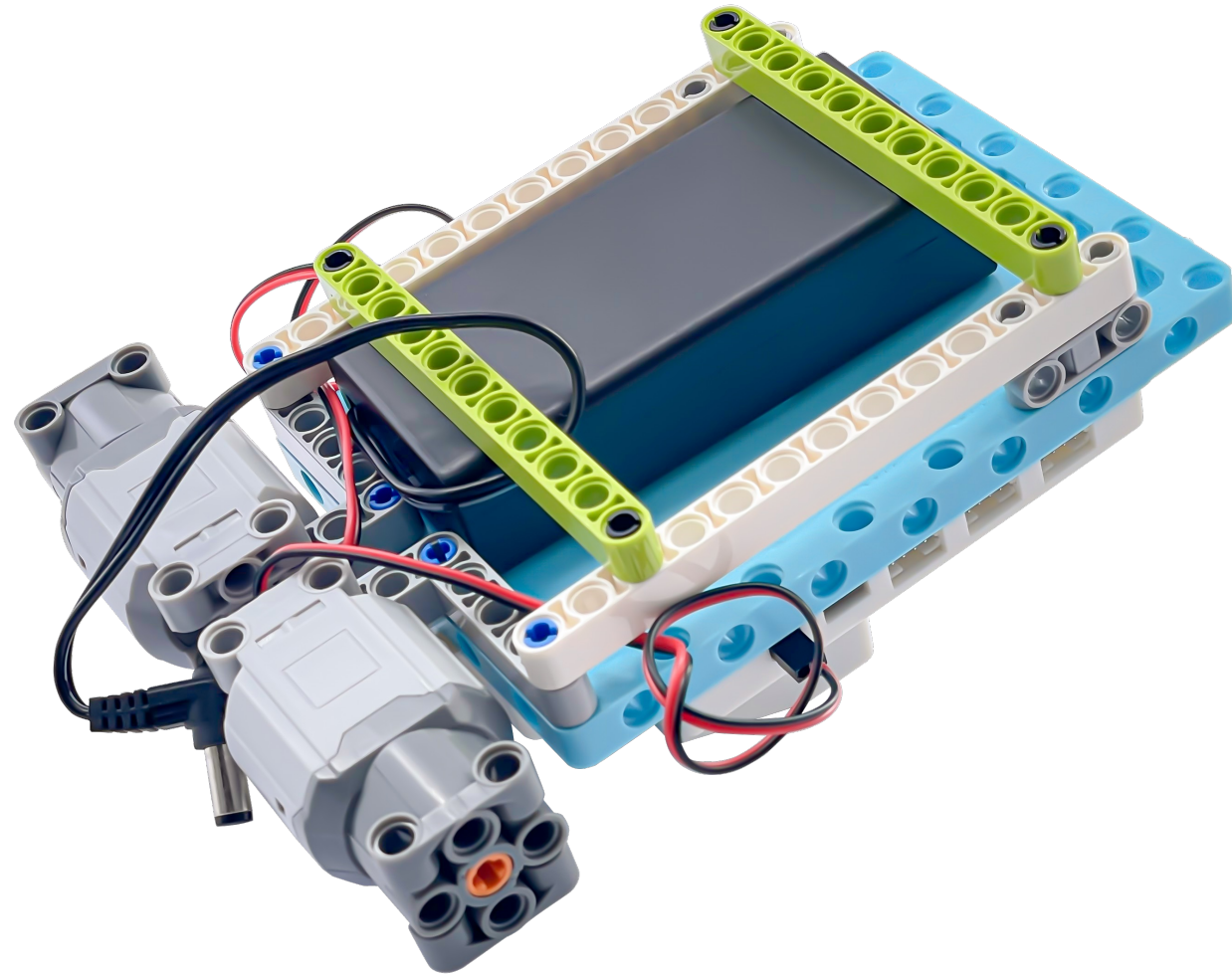
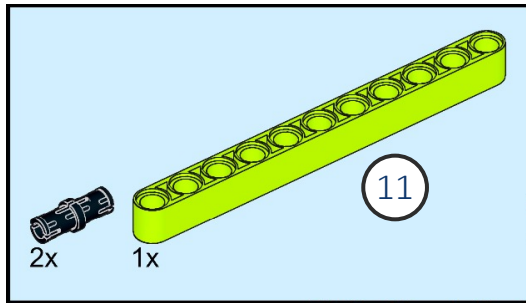
Step9.



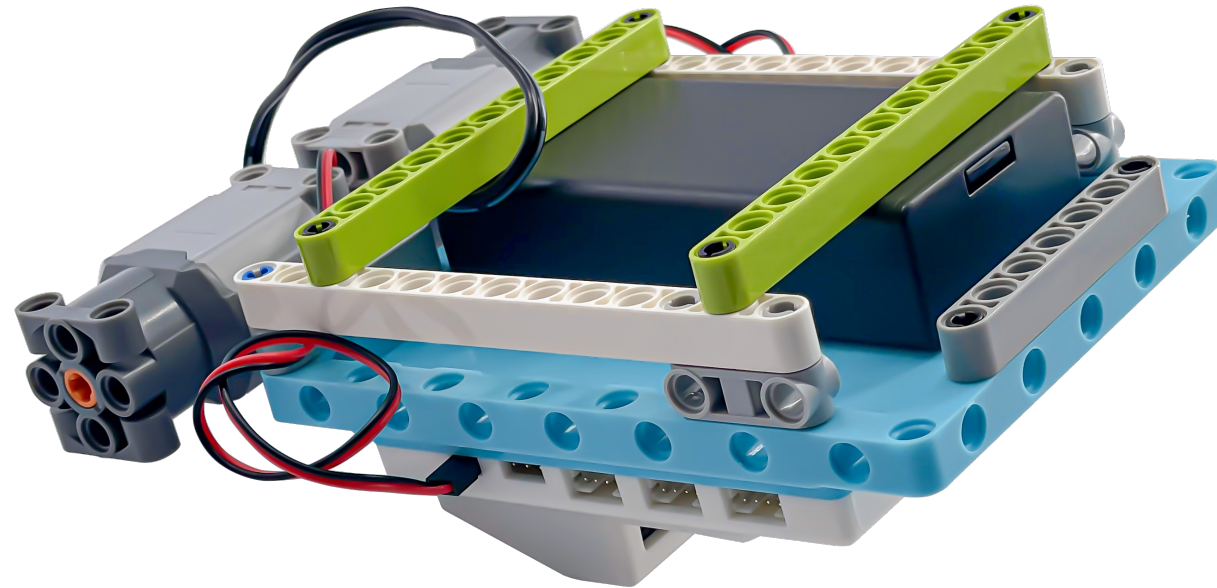
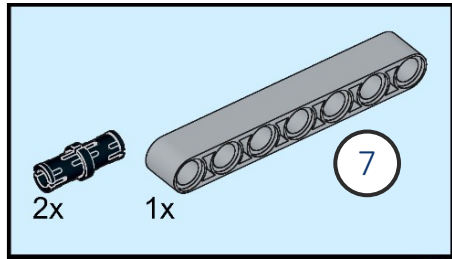
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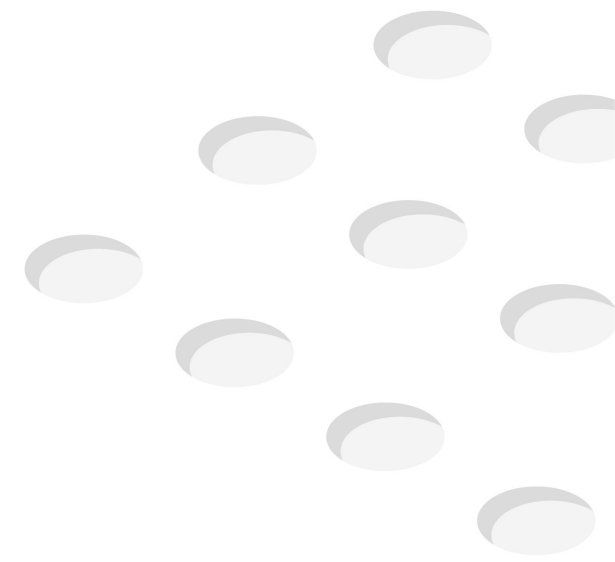
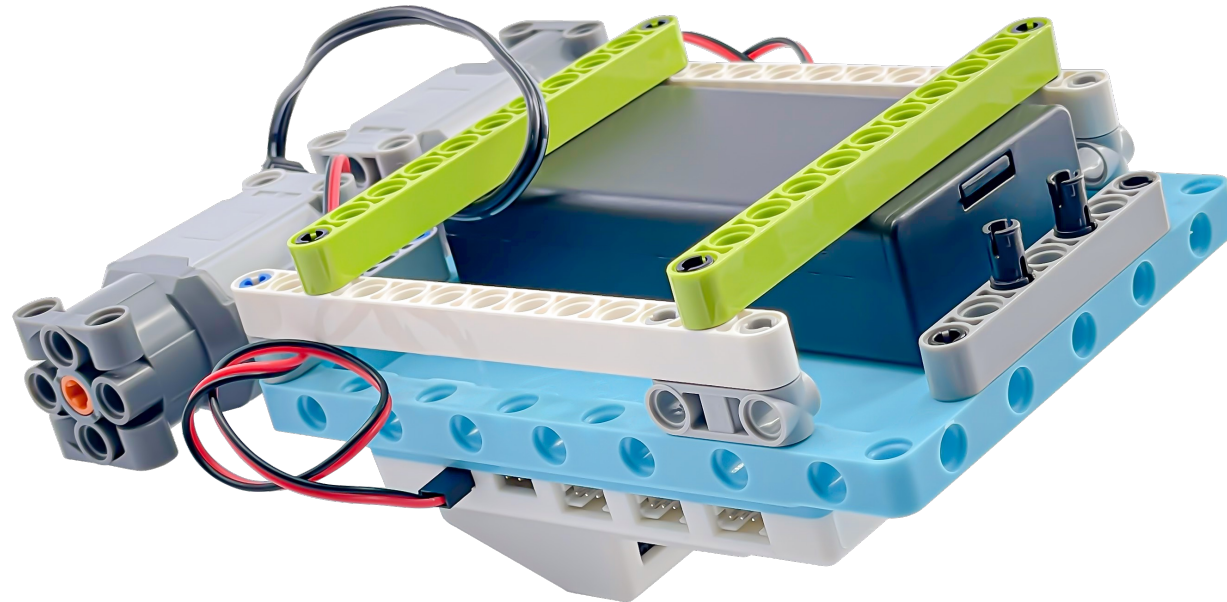
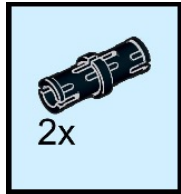
Step 11.



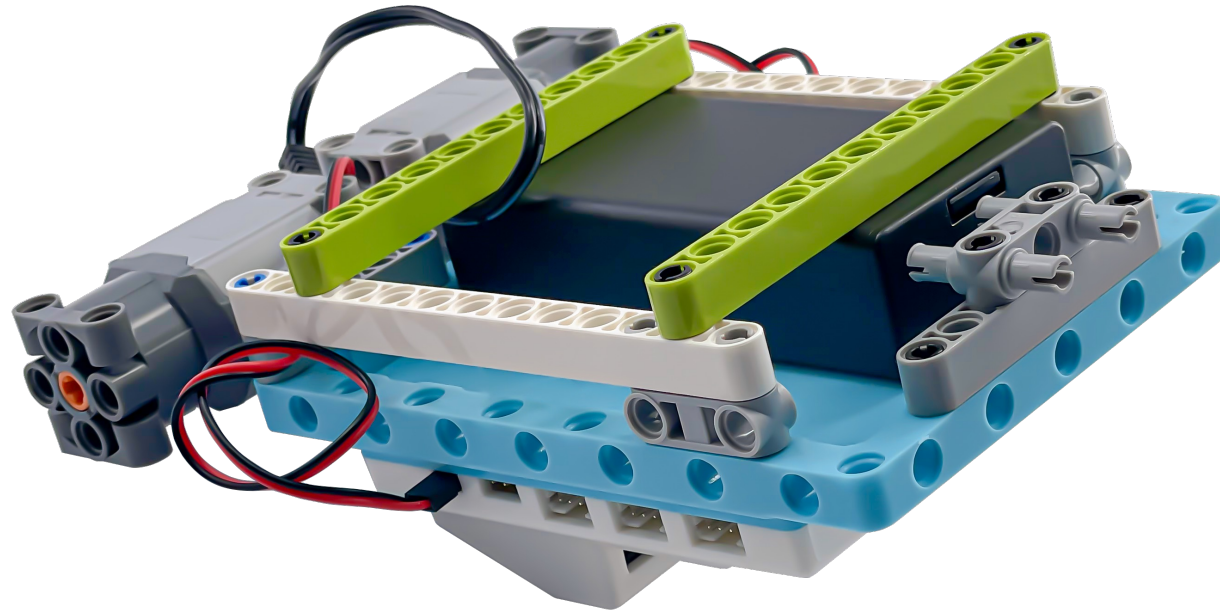
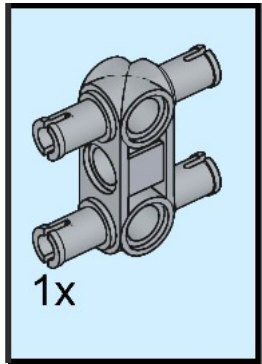
Step 12.



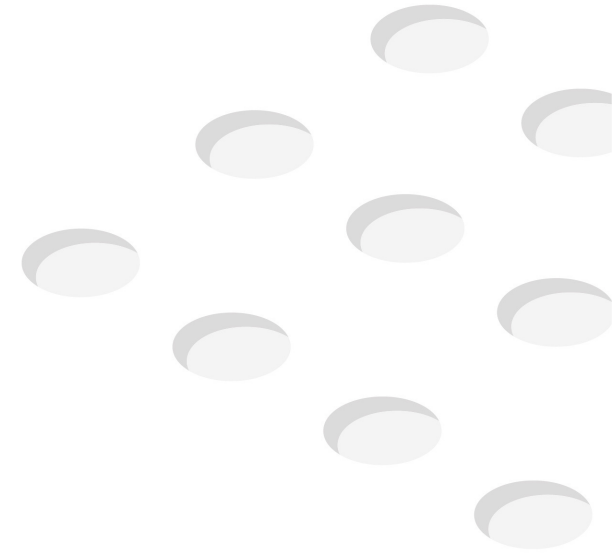
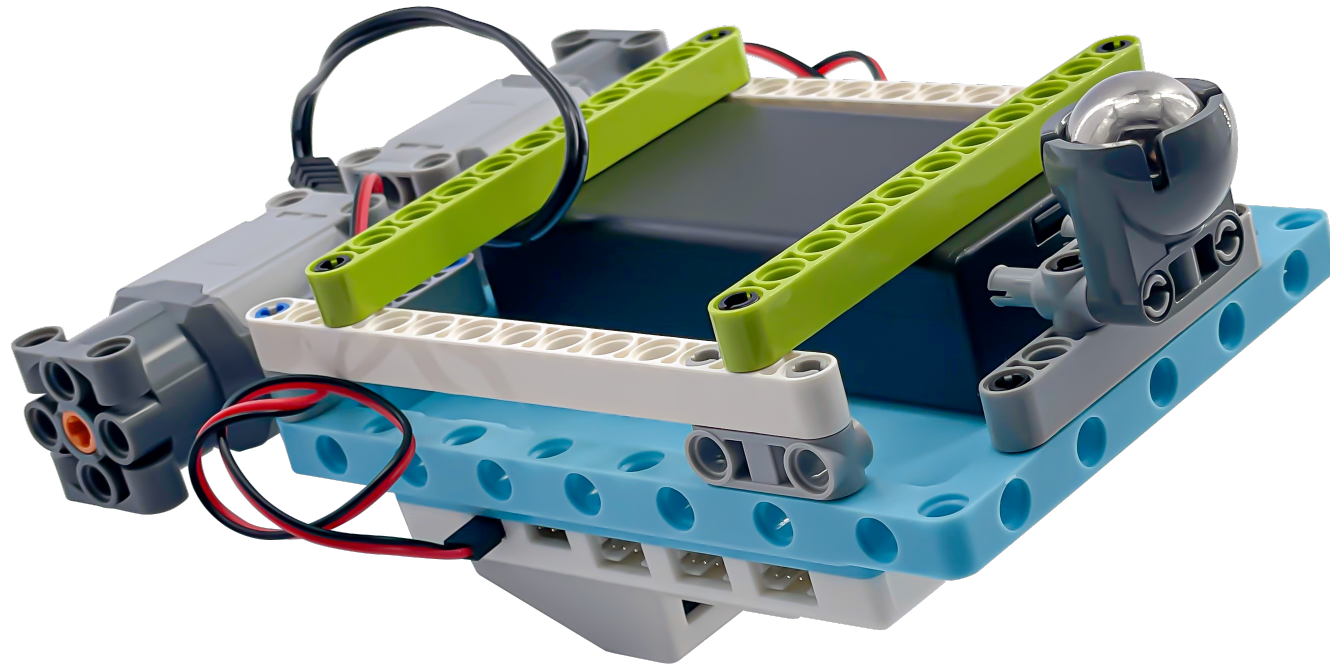
Step13.



Step 14.

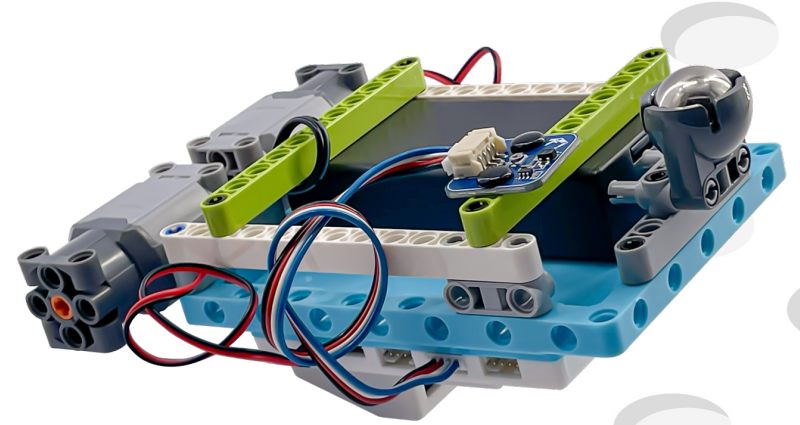
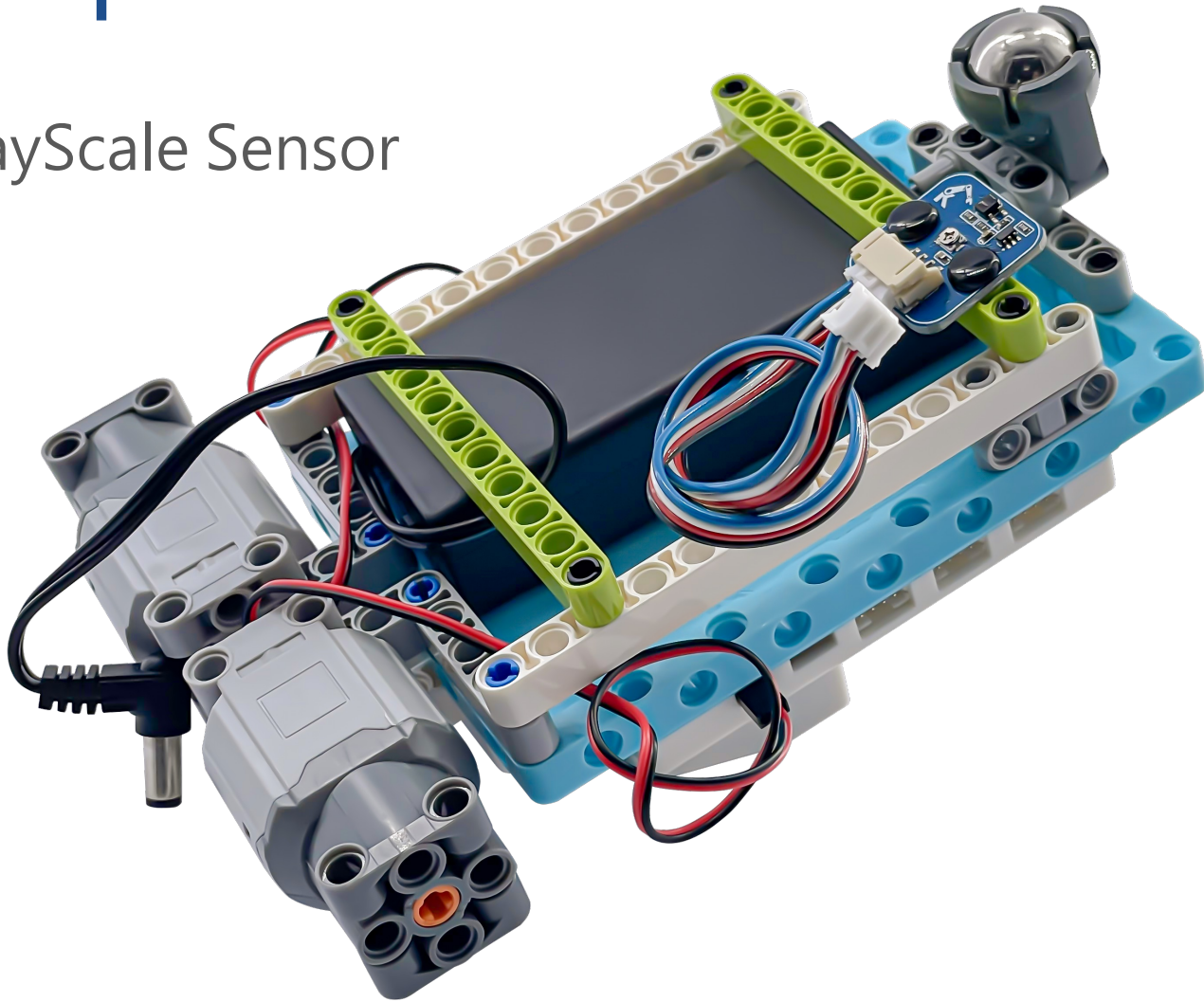


Step15.



Step16.

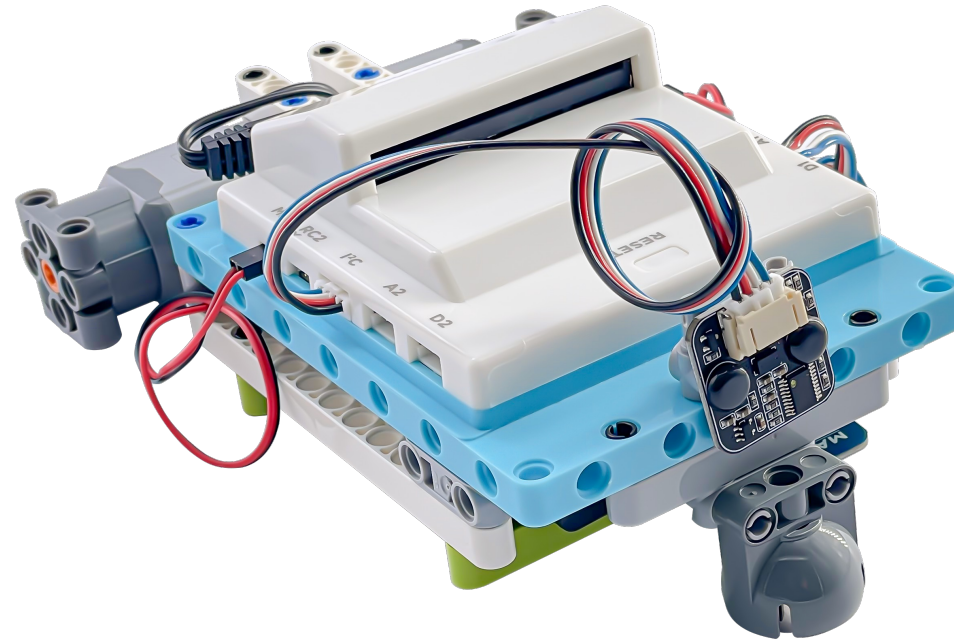
GrayScale Sensor



Plug into port A1

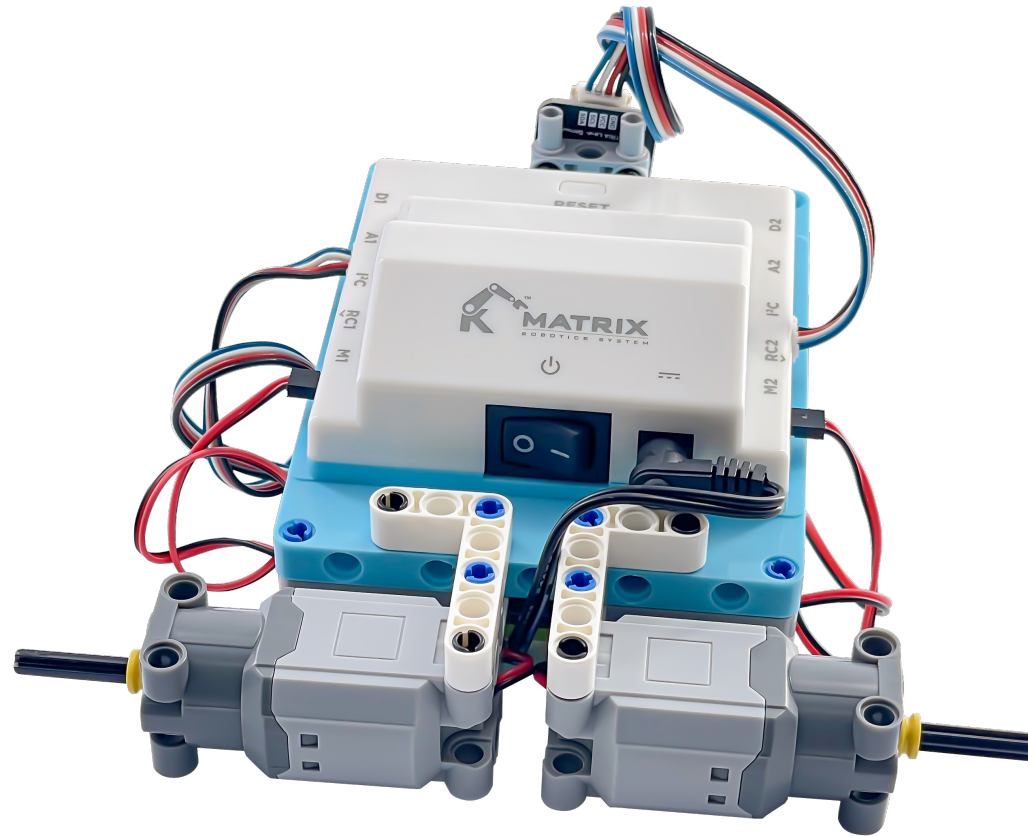
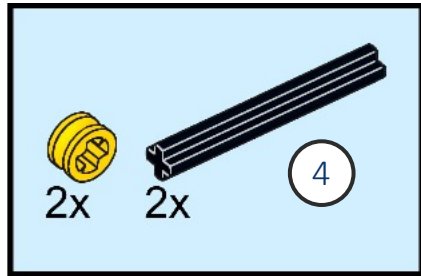
Step17.

Laser Sensor

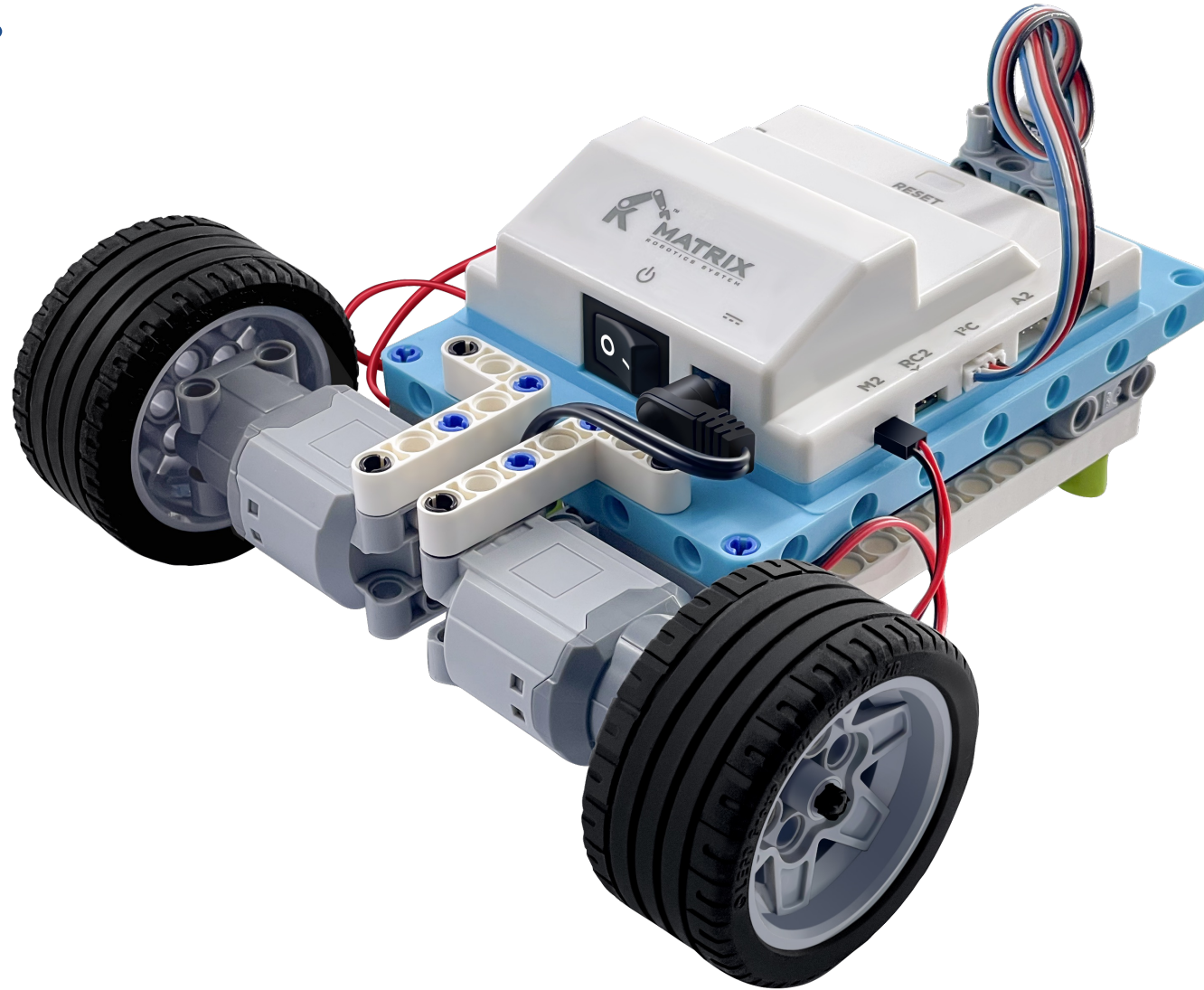


Plug into port I²C

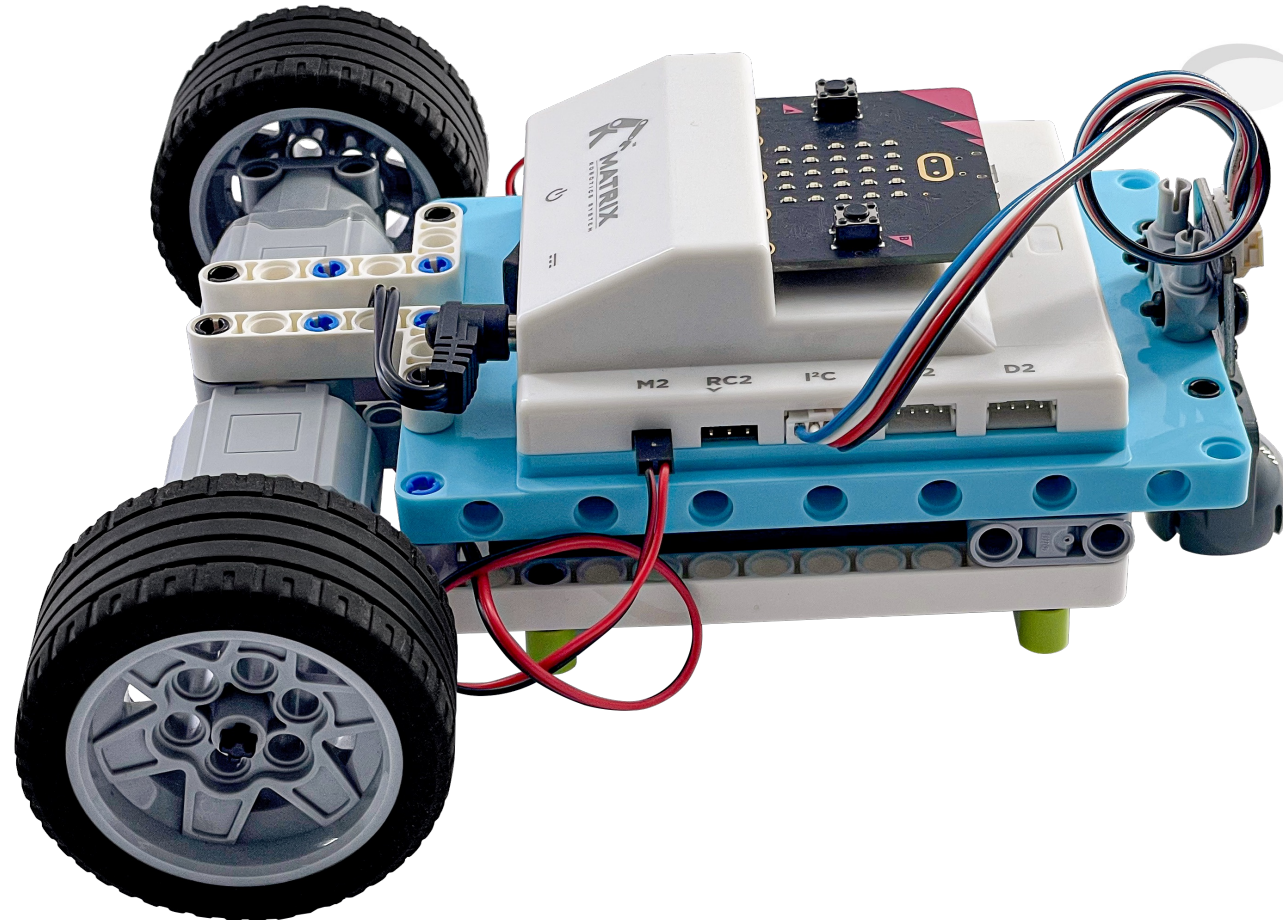
Step18.



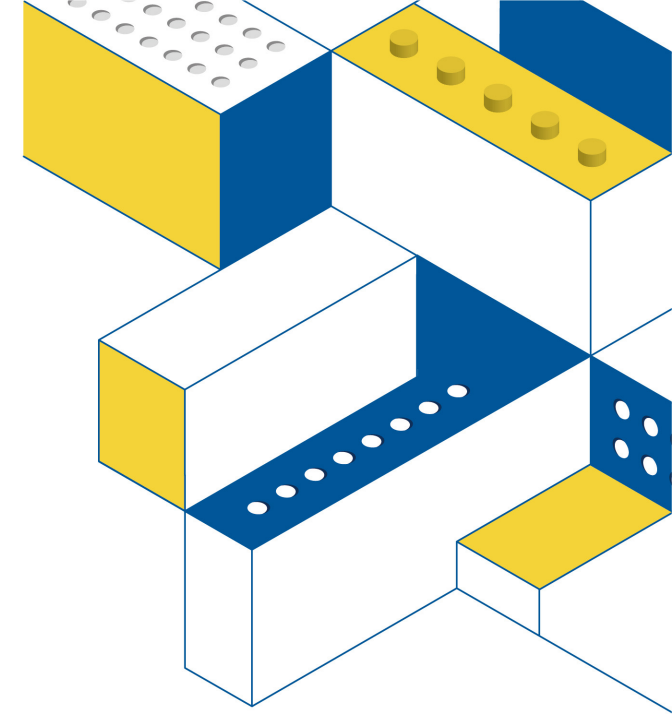
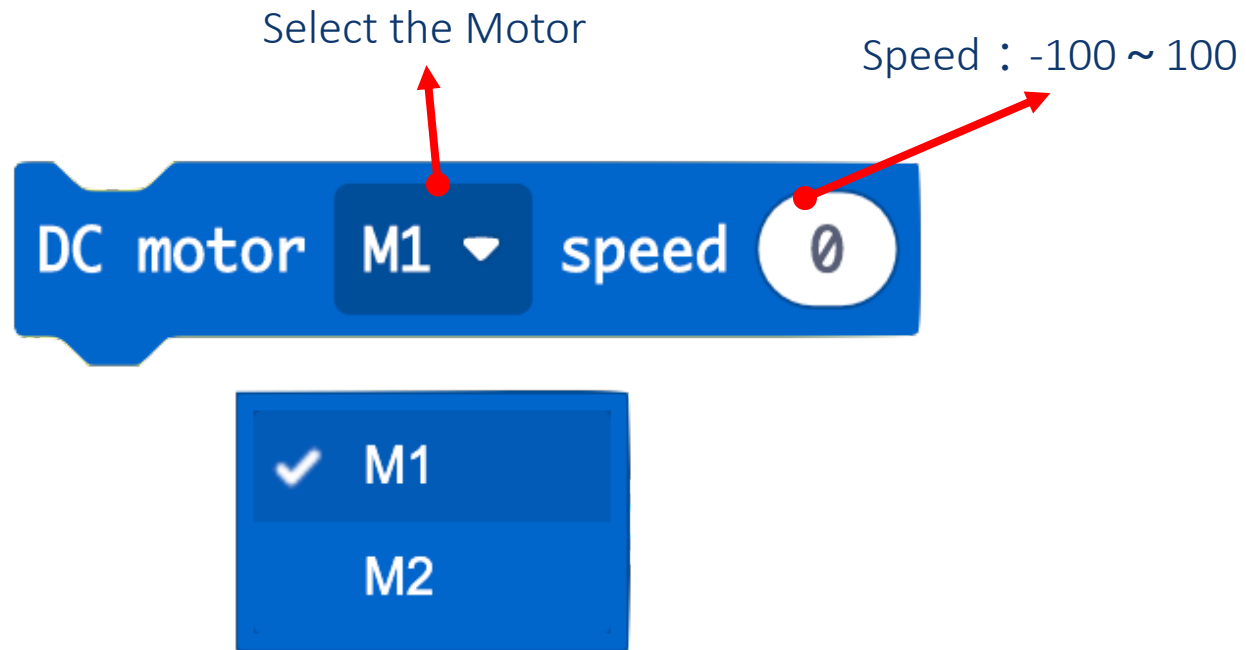
Step19.



Step20.



DC motors



Let's Go Forward

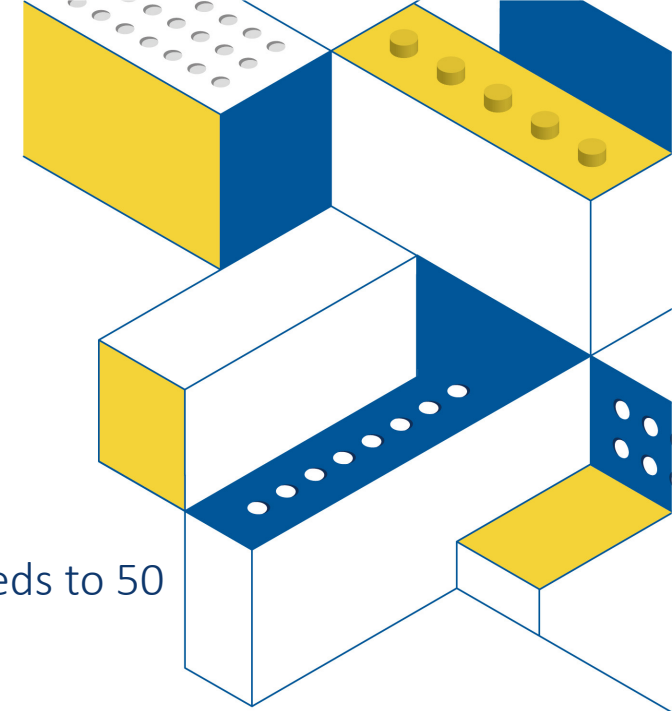
```
on start
  DC motor M1 speed 50
  DC motor M2 speed 50
  pause (ms) 500
  DC motor M1 speed 0
  DC motor M2 speed 0
```

Set the both motor Speeds to 50

Keep the speeds at 50 for 0.5 second

Set the both motor Speeds to 0

✘ If the Car does not move forward, please check the wired of the reverse motor.



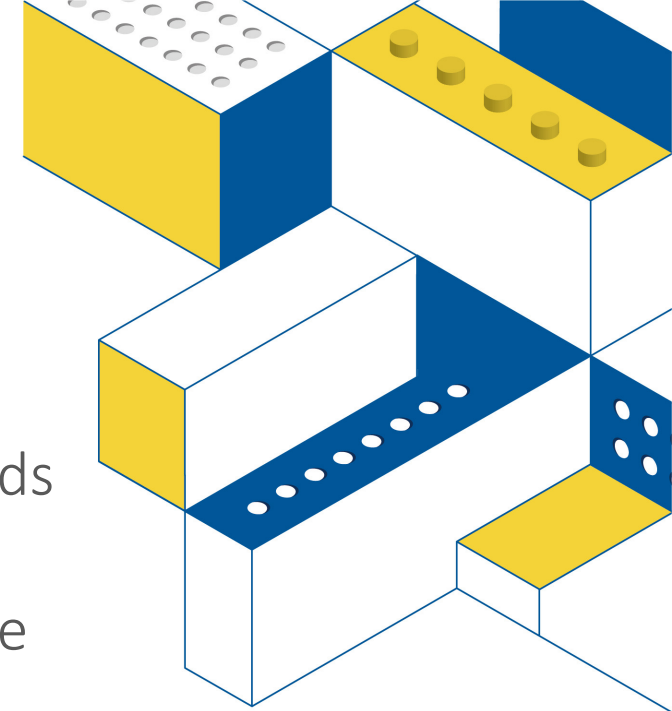
Block introduction

MakeCode provides several start syntaxes in the basic and input command block lists, which are shown below. The application methods are differentiated as follows:

on start : An event that is executed when the program starts, only one per project.



forever : You can "continuously run" the specified program in the background, and you can put multiple programs in a project.

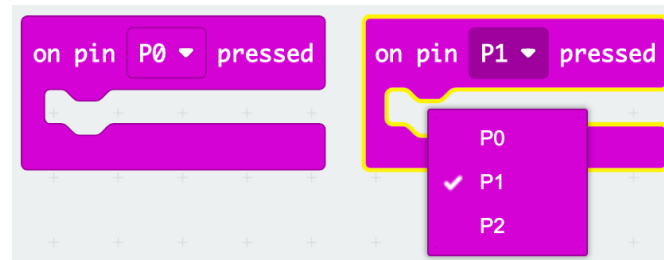


Input

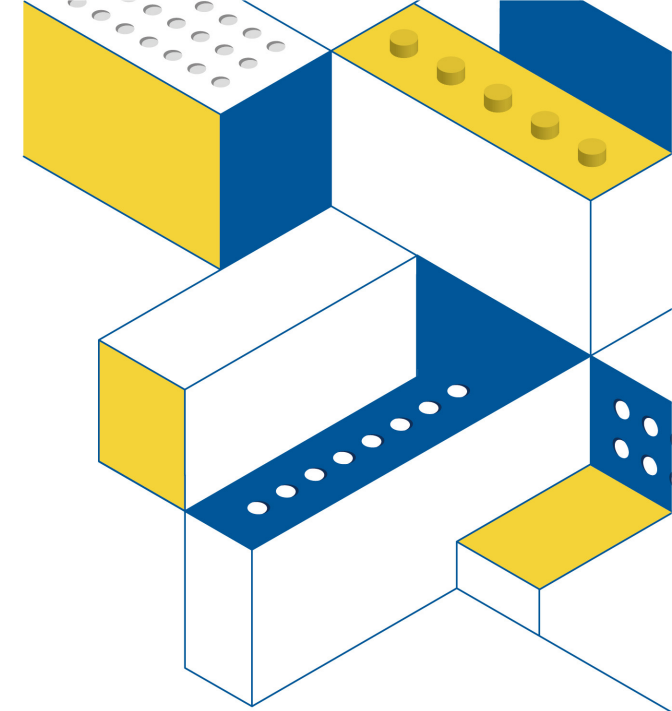
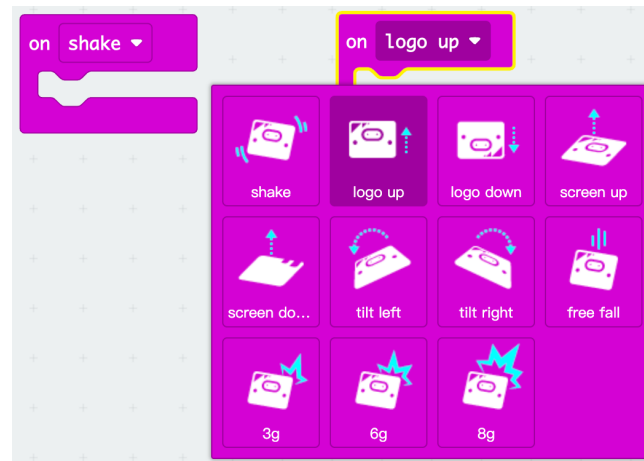
On button pressed





On pin pressed

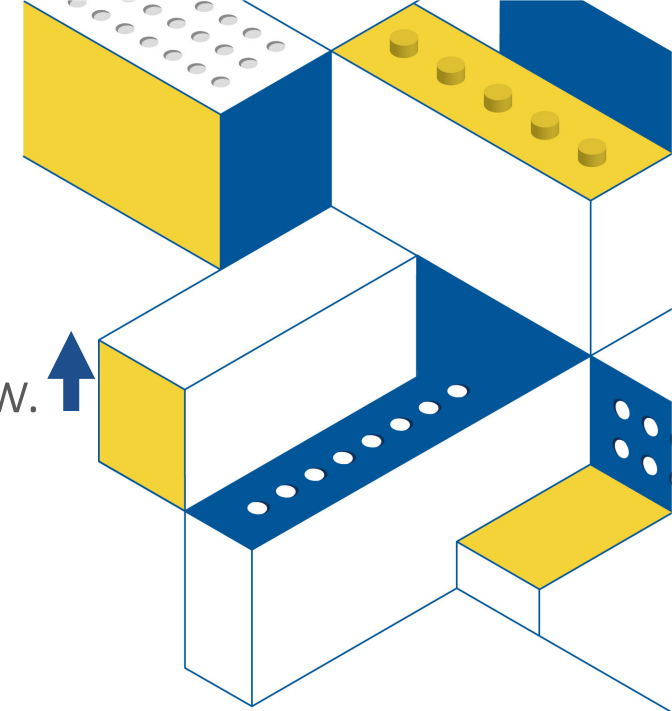


On motion occurred

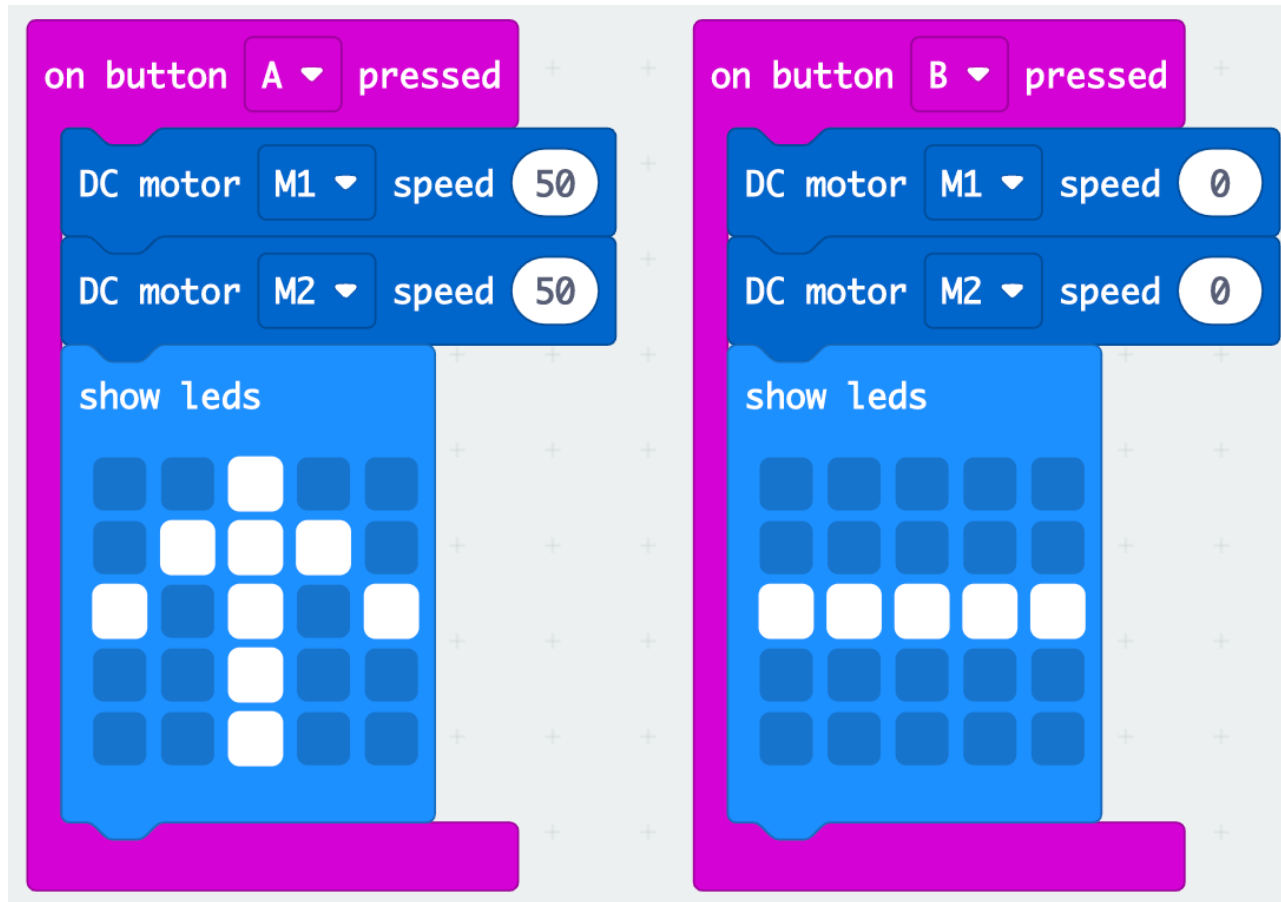


Challenge 1

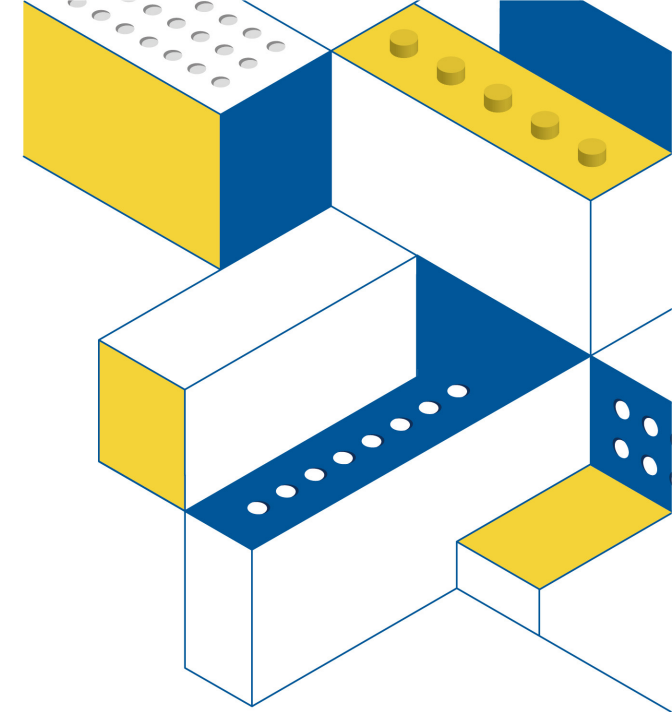
After pressing button A, the car moves forward and displays the arrow.  Stop the car and display  when button B is pressed.



Challenge 1 Solution



The image shows two Scratch code blocks side-by-side, each representing a different button press event. The left block is triggered by 'on button A pressed' and contains two 'DC motor' blocks: 'M1 speed 50' and 'M2 speed 50'. Below these is a 'show leds' block with a 5x5 grid where the top row has the 3rd and 4th LEDs lit, the 2nd row has the 2nd, 3rd, and 4th LEDs lit, the 3rd row has the 1st, 3rd, and 5th LEDs lit, the 4th row has the 3rd LED lit, and the 5th row has the 3rd LED lit. The right block is triggered by 'on button B pressed' and contains two 'DC motor' blocks: 'M1 speed 0' and 'M2 speed 0'. Below these is a 'show leds' block with a 5x5 grid where the 3rd, 4th, and 5th LEDs of the 1st row are lit, the 1st, 2nd, 3rd, and 4th LEDs of the 2nd row are lit, the 1st, 2nd, 3rd, 4th, and 5th LEDs of the 3rd row are lit, and the 1st, 2nd, 3rd, 4th, and 5th LEDs of the 4th row are lit.



⌘ Not the only solution

Grayscale Sensor

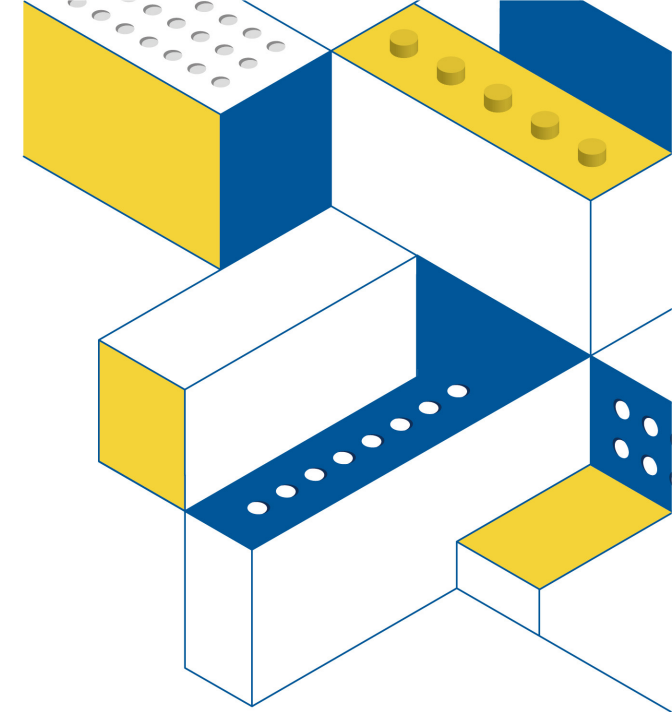
Return value : 0 ~ 1023

The return value of black is larger

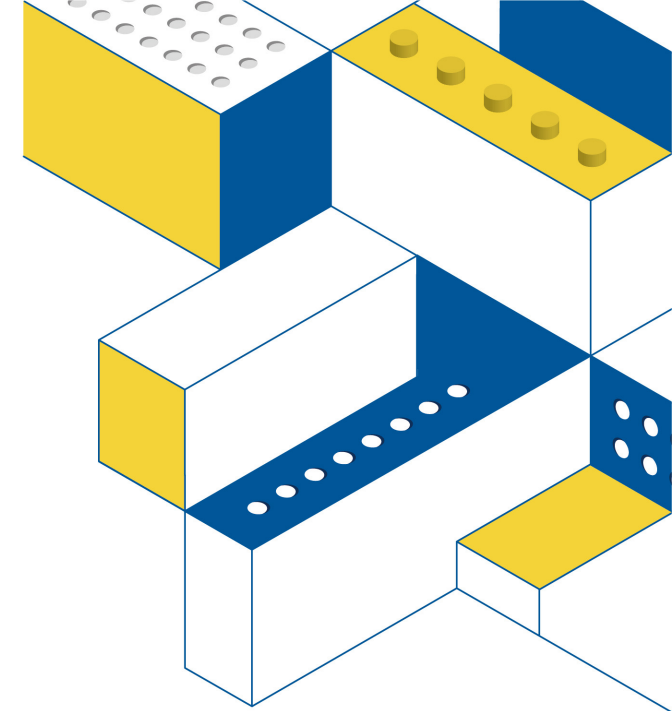
The return value of white is smaller

Analog ports: A1, A2

read data from **A1** ▼



Display sensor value on LED

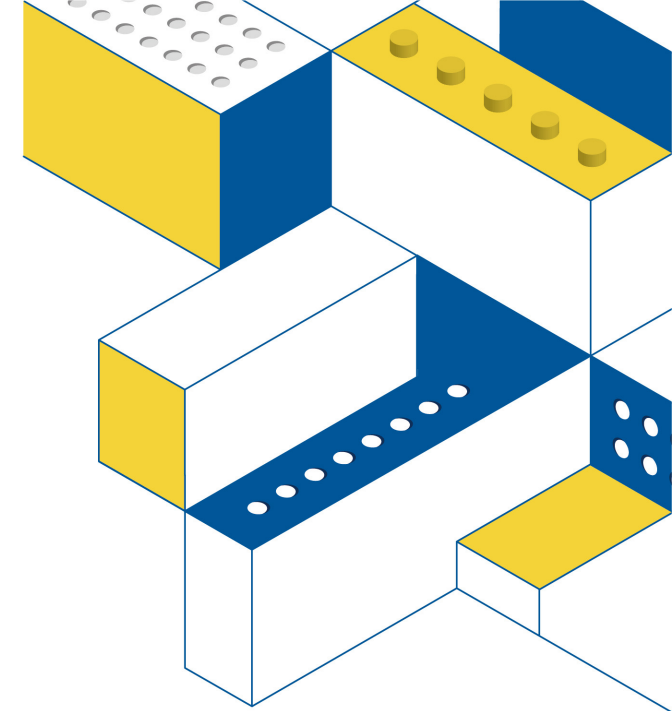


```
forever
  show number read data from A1
```

Challenge 2

Use the grayscale sensor as a condition to stop the car:

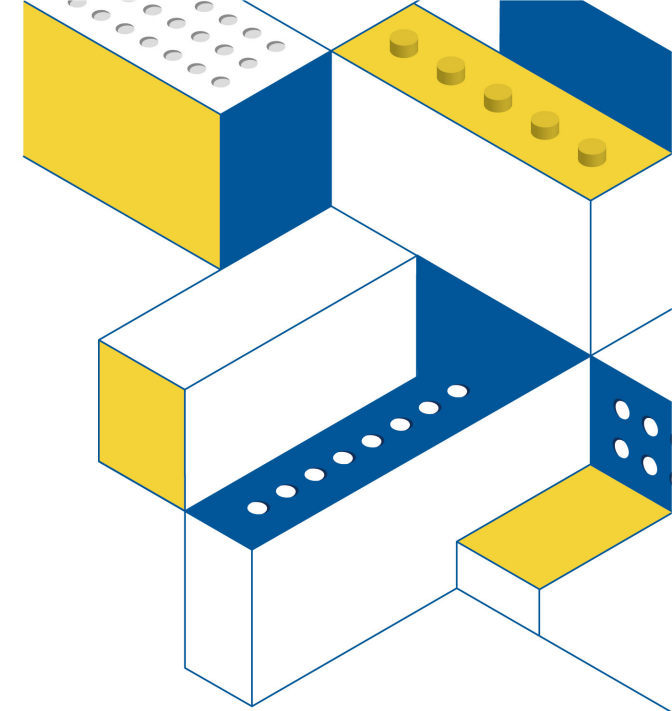
Press button A to move the car forward until the sensor detects the black line and stops the car.



Challenge 2 Solution

```
on button A pressed
while read data from A1 < 500
do
  DC motor M1 speed 60
  DC motor M2 speed 60
DC motor M1 speed 0
DC motor M2 speed 0
```

※Not the only solution



Laser Sensor

Return value : 21 ~ 1999mm

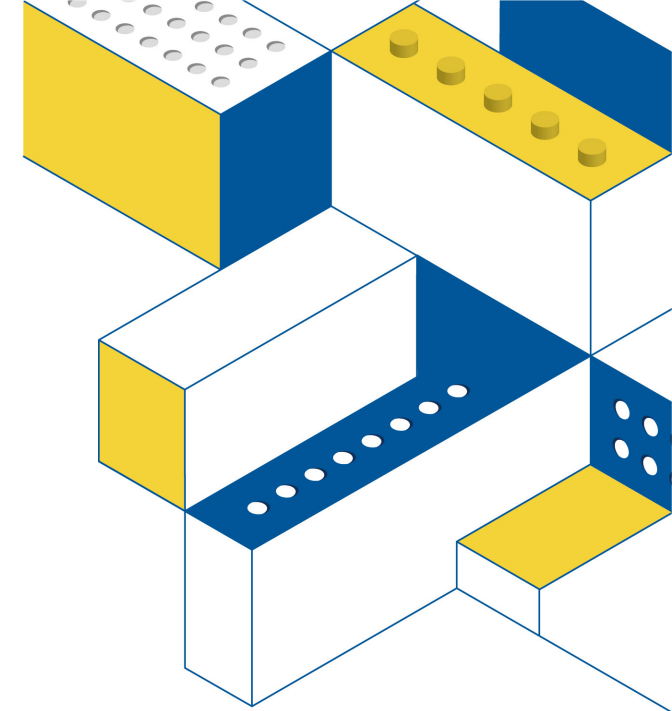
I2C ports

start up the Laser sensor

Must be placed in the “on start”

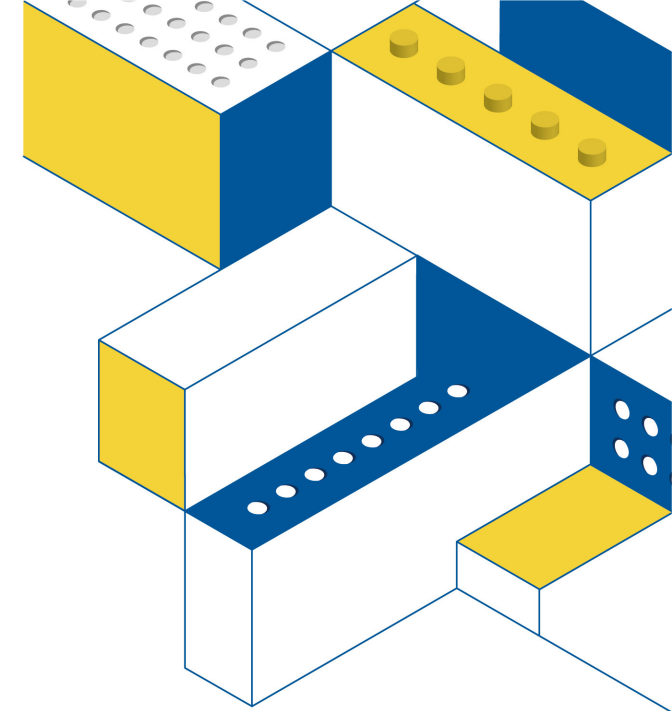
read distance from sensor

Read the value from laser sensor.

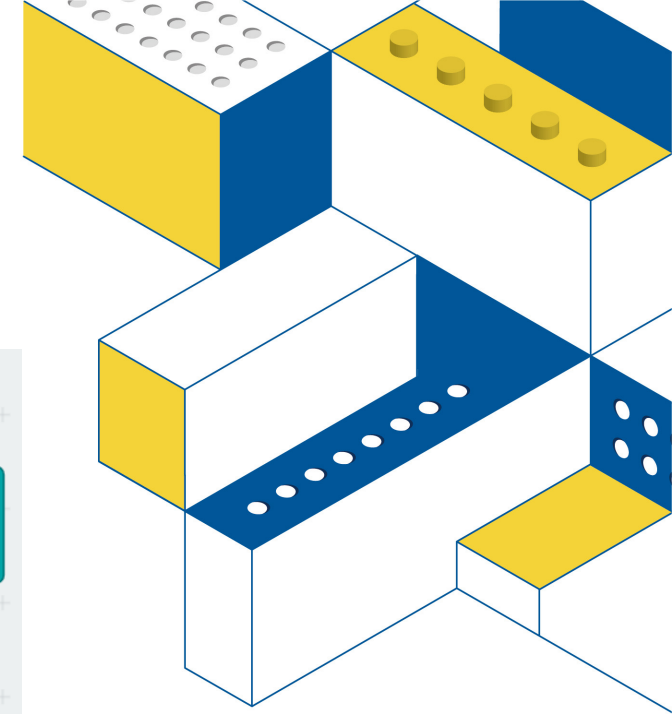


Challenge 3

Stop the car in front of the obstacle 15cm.



Challenge 3 Solution



```
on start
  start up the Laser sensor

forever
  if read distance from sensor >= 150 then
    DC motor M1 speed 50
    DC motor M2 speed 50
  else
    DC motor M1 speed 0
    DC motor M2 speed 0
```