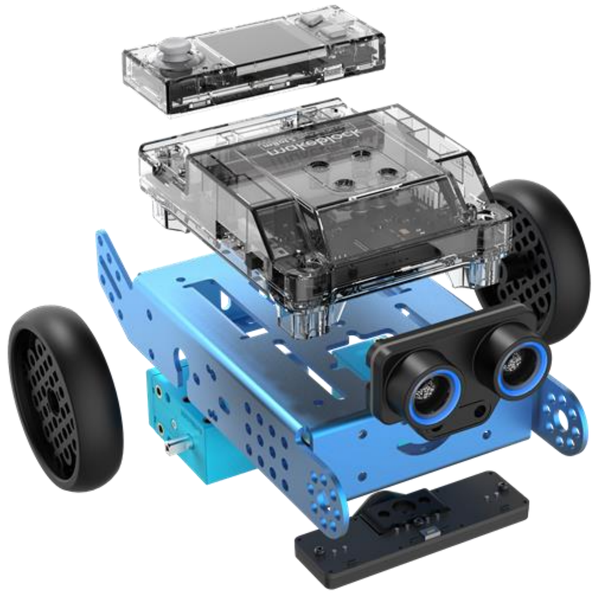
mBot 2.0

A new generation educational robot



More about the device

OURFRIEND MRROBOT

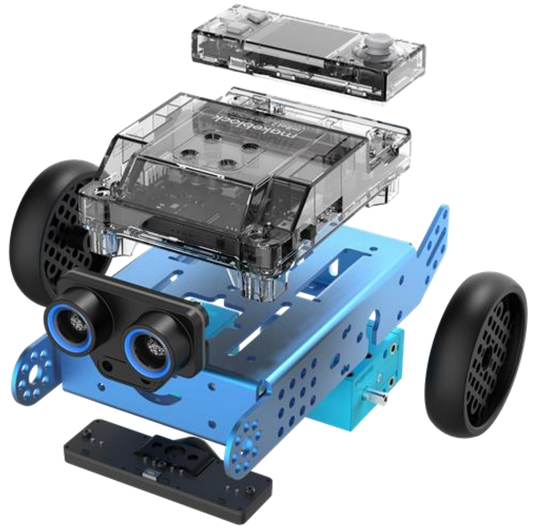
mBot 2.0

mBot2 is designed for children attending:

- higher grades of elementary school
- secondary school

Using **mBot.20** you learn about:

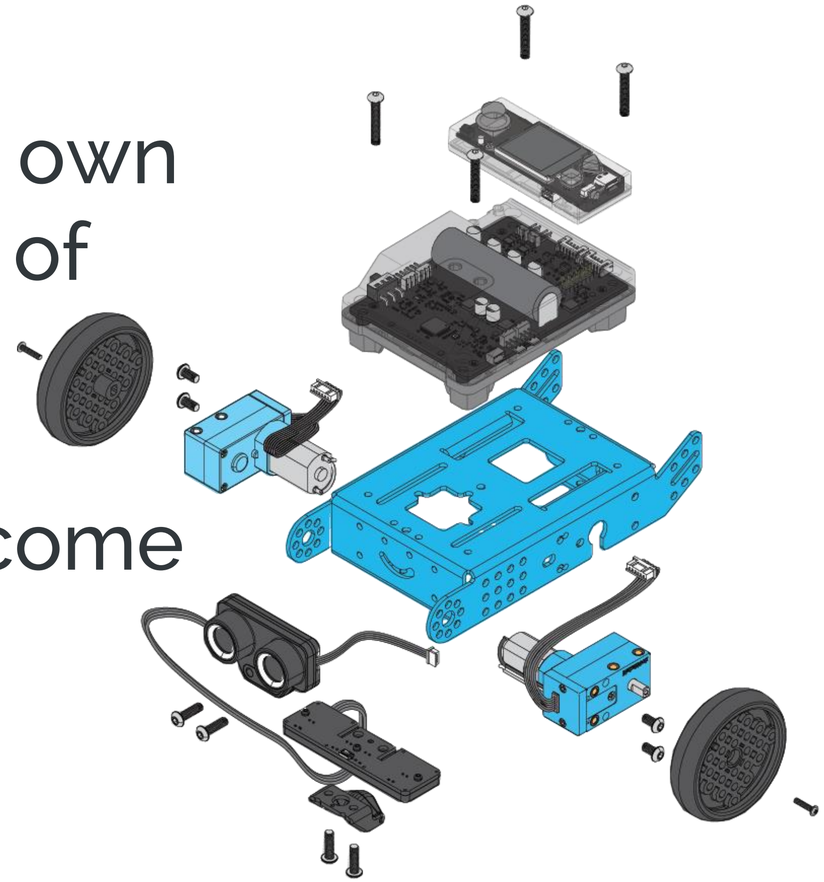
- coding
- learn
- technology and
- roboticists



mBot 2.0

With a simple tool and step-by-step instructions, you'll learn to build your own robot from scratch and enjoy the fun of hands-on creation.

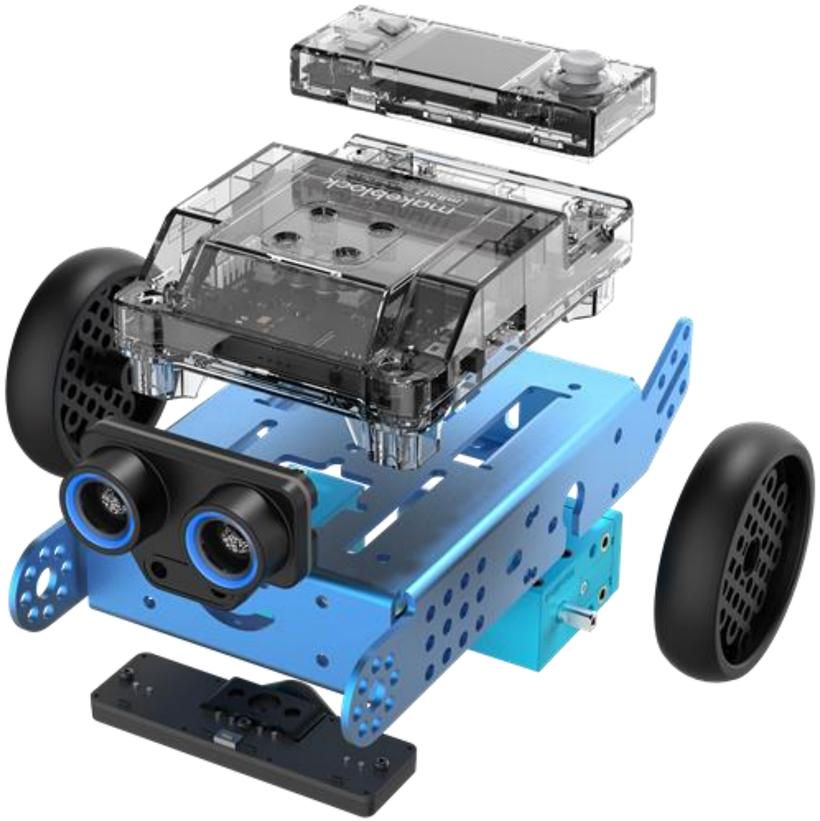
By building your own robots, you become familiar with the basics of robotic machinery and electronic parts.



mBot 2.0

The model we will use has the following electronic modules:

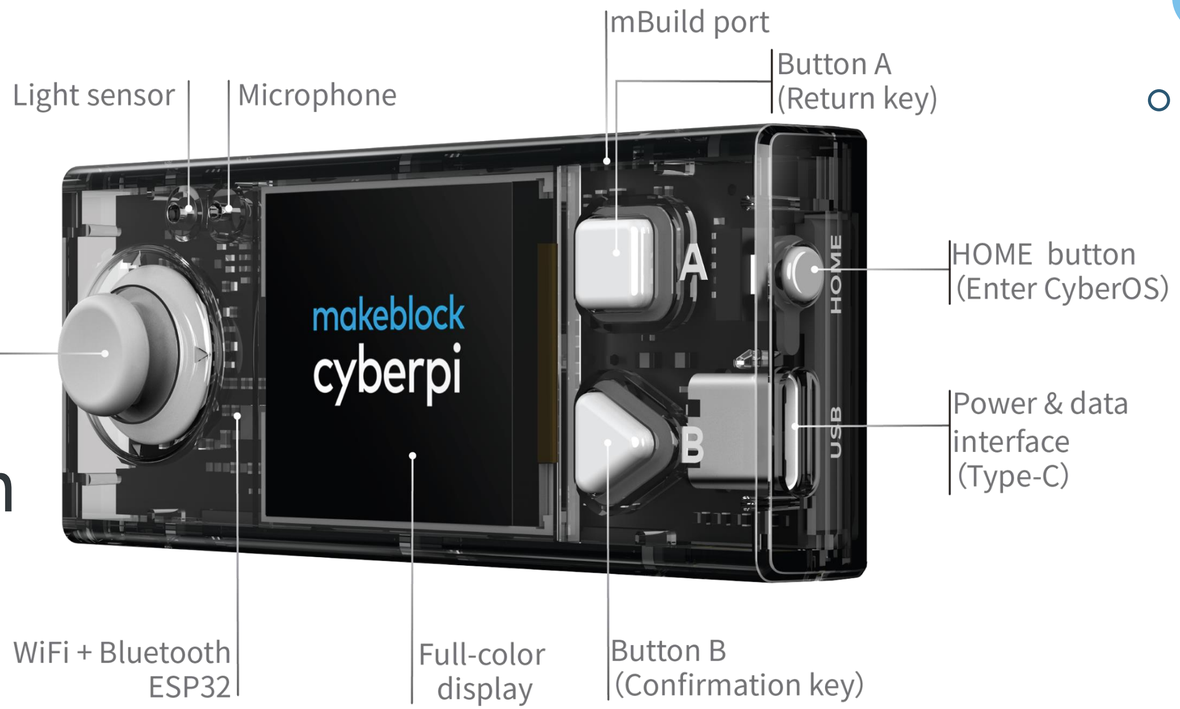
- CyberPi
- mBot Neo Shield
- Ultrasonic sensor 2
- Quad RGB sensor
- Encoder motor

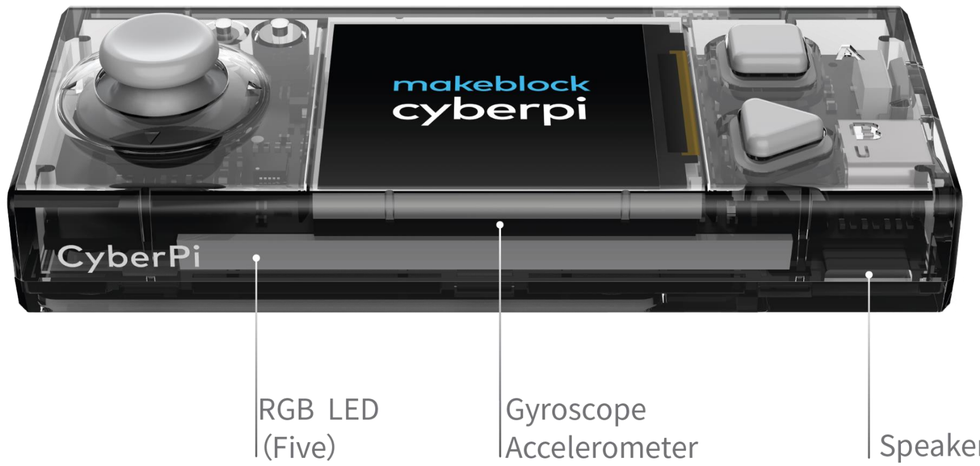


CyberPi

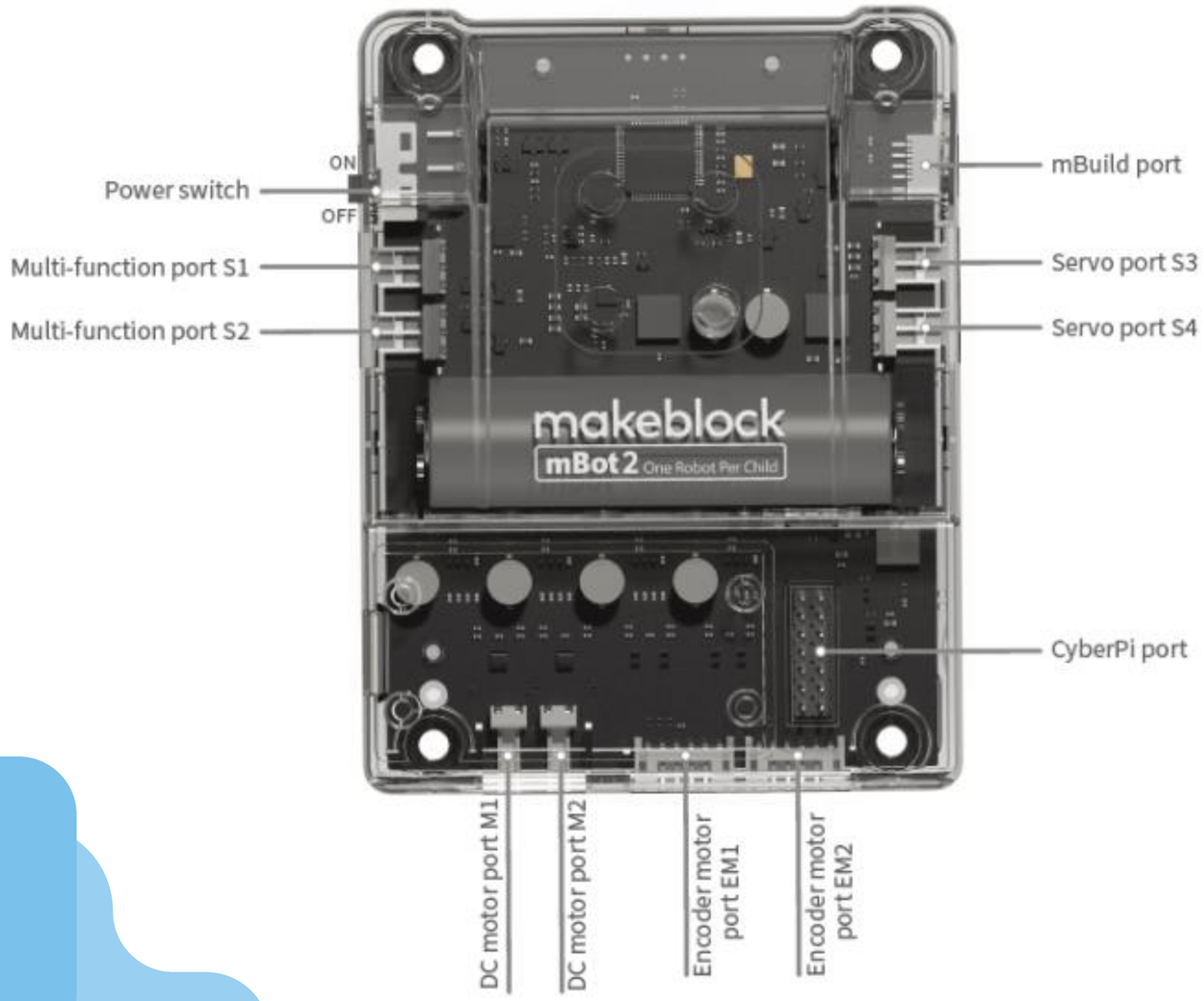
CyberPi is a main control board independently developed by Makeblock. With a compact structure and built-in ports, it can be easily expanded to meet a variety of educational needs:

- AI (Artificial intelligence)
- IoT (Internet of Things)
- data science
- user interface design





mBot2 Shield



The mBot2 Shield is equipped with a built-in rechargeable lithium-ion battery that can power the CyberPi.

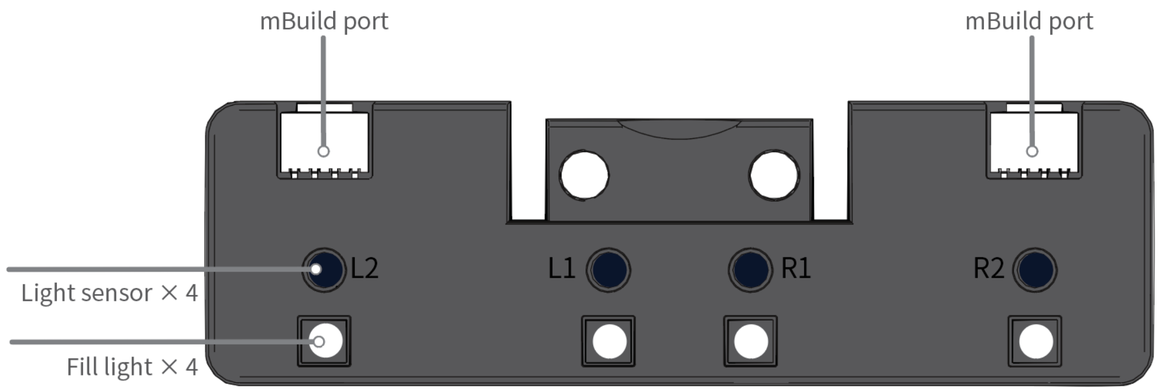
With multi-function, servo and motor ports, it can drive motors, servo motors and LED strips.

Ultrasonic Sensor 2

An ultrasonic sensor can be used to detect the distance between an obstacle and it.

The transmitter on the left emits ultrasound waves and the receiver on the right receives the reflected ultrasound waves.

Quad RGB Sensor



The quad RGB sensor uses visible light as supplemental lights, which significantly reduce ambient light interference. In addition, it provides a color recognition function.

With four light sensors, it can support multiple programming scenarios.

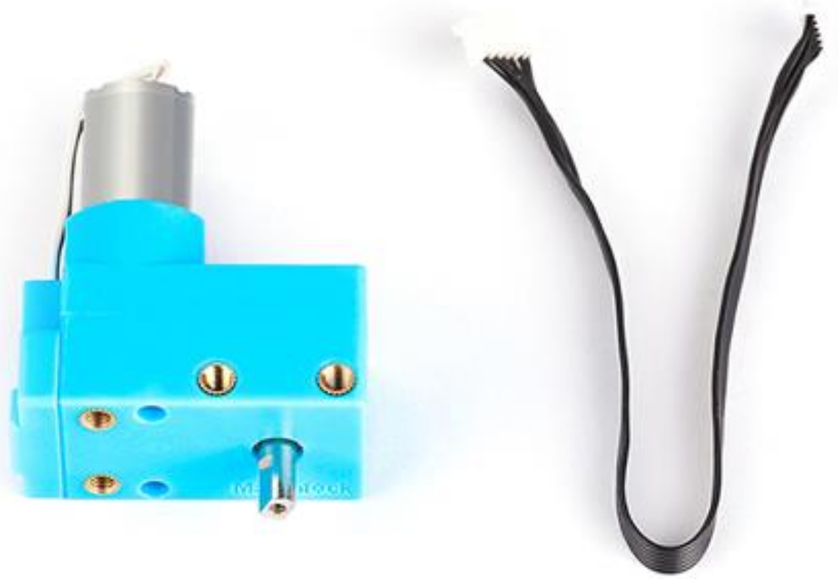
Detection range: 5-15 mm from the object to be detected

Photoelectric Encoder Motor 180 RPM

It is equipped with an optical encoder that enables high-precision control.

It is easily connected to Makeblock mechanical parts and thus can be flexibly used in combination with various other parts.

The custom material it uses reduces noise and promises high torque output



mBot 2.0

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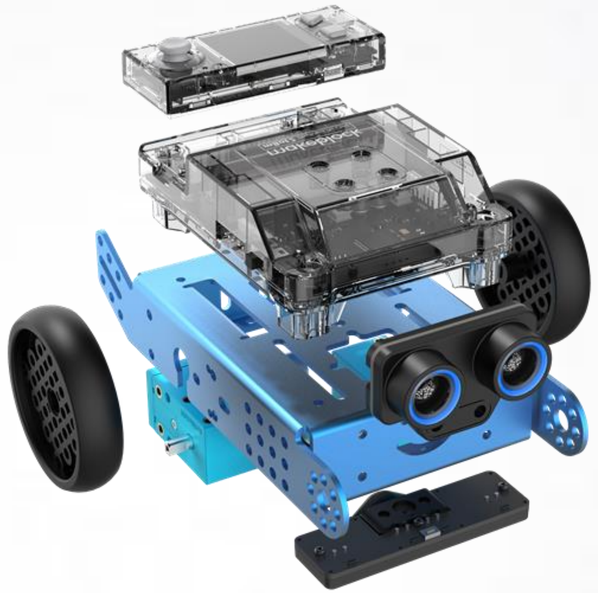

Assembly instructions

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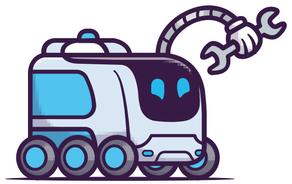
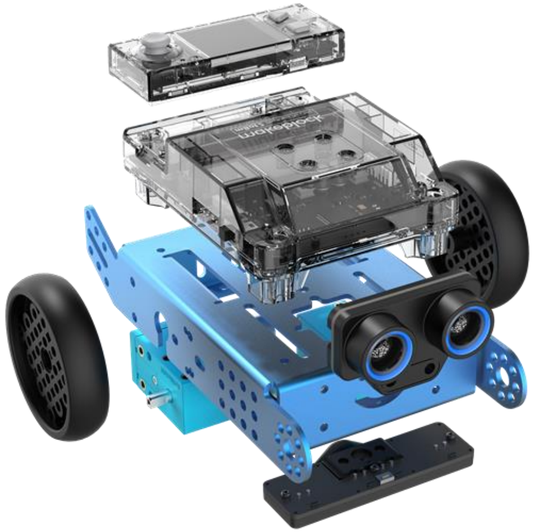
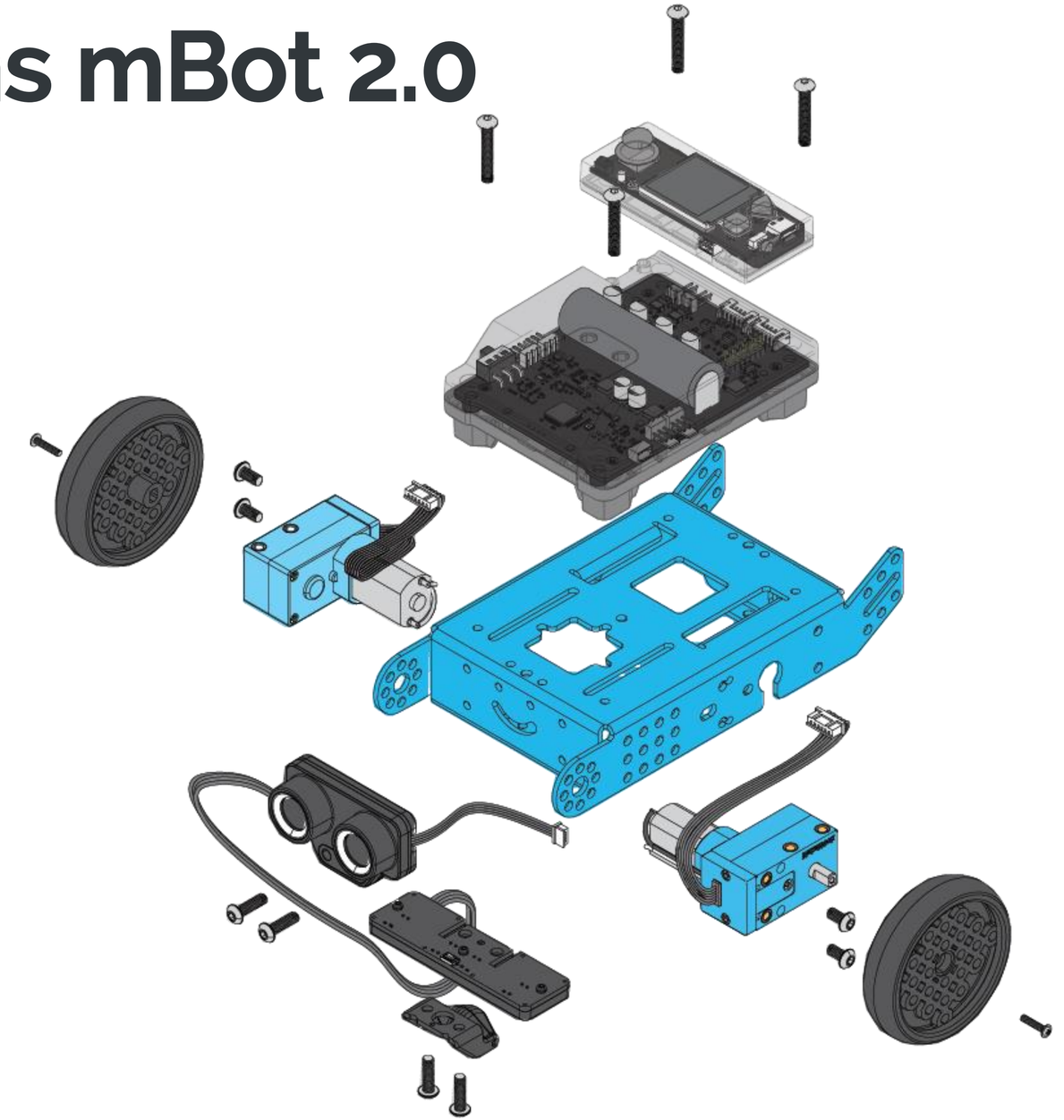
Assembly instructions mBot 2.0



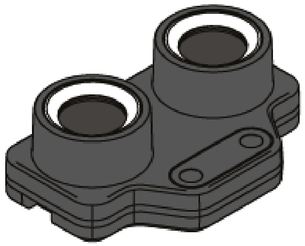
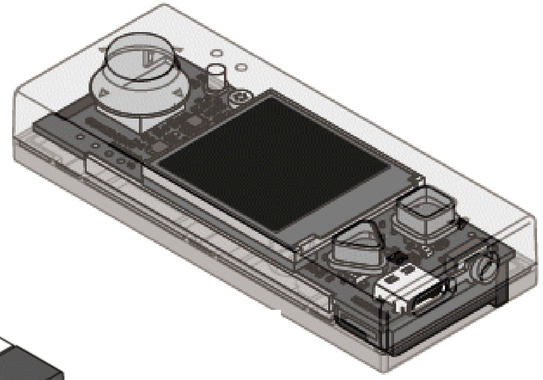
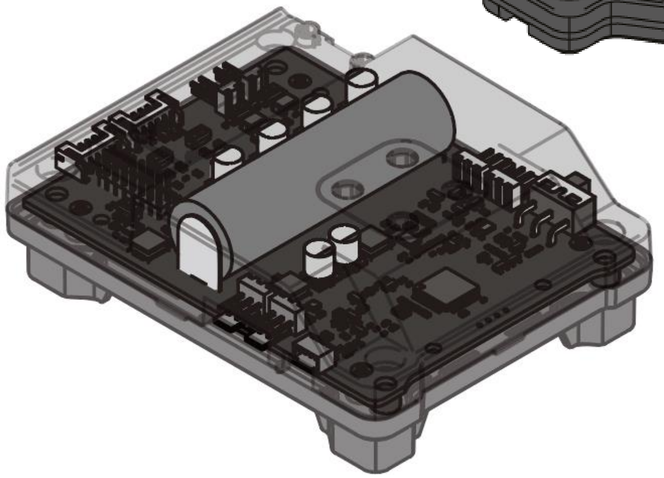
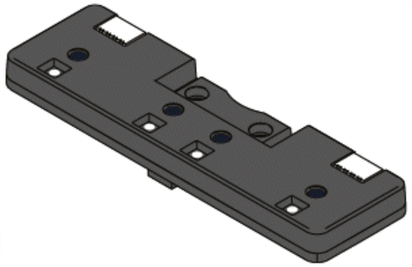


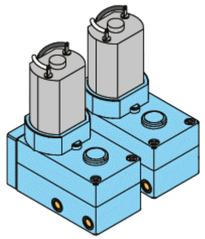
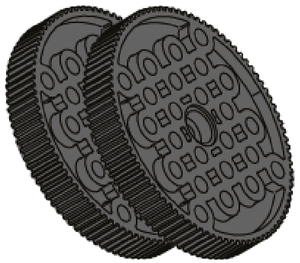
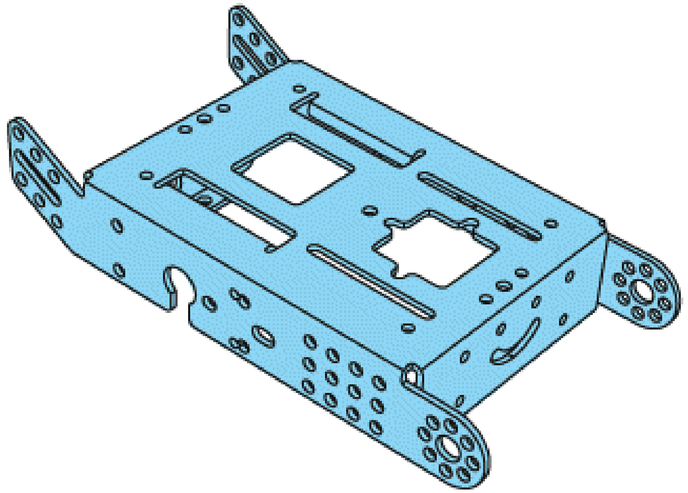


Assembly instructions mBot 2.0

List of parts:

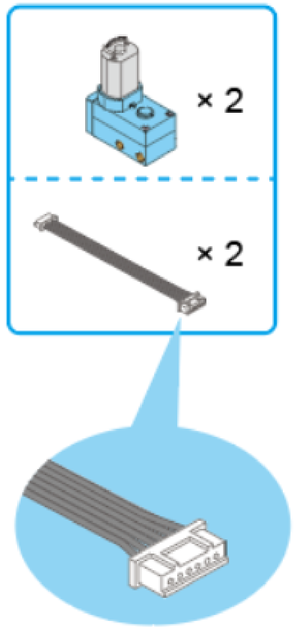
- CyberPi
- mBot2 Shield
- Ultrasonic sensor 2
- Quad RGB sensor
- Encoder motor
- Wheel hub
- Slick tyre
- Mini whell
- Chassis
- USB cable
- Motor cable
- mBuild cable (10 cm)
- mBuild calbe (20 cm)

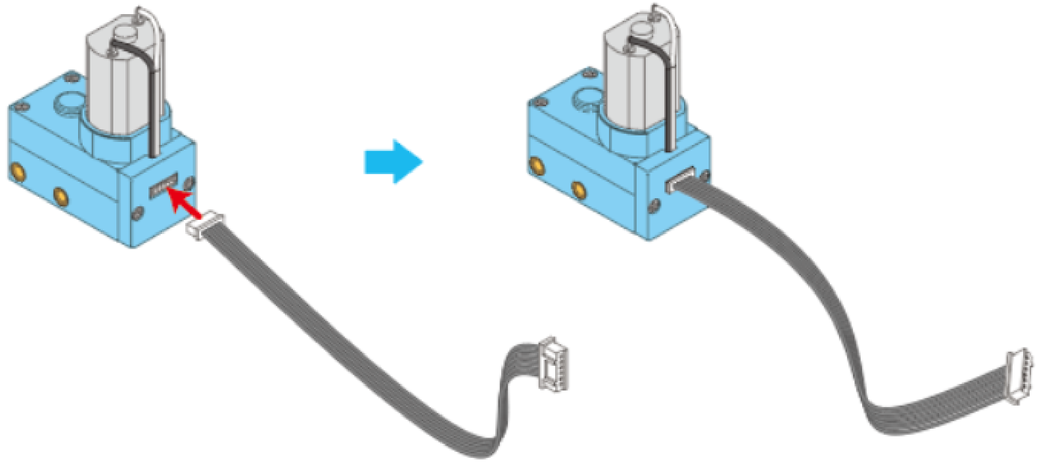





Assembly instructions mBot 2.0

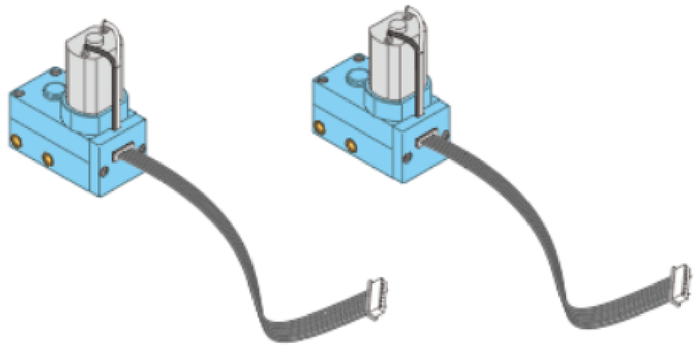
Step 1.





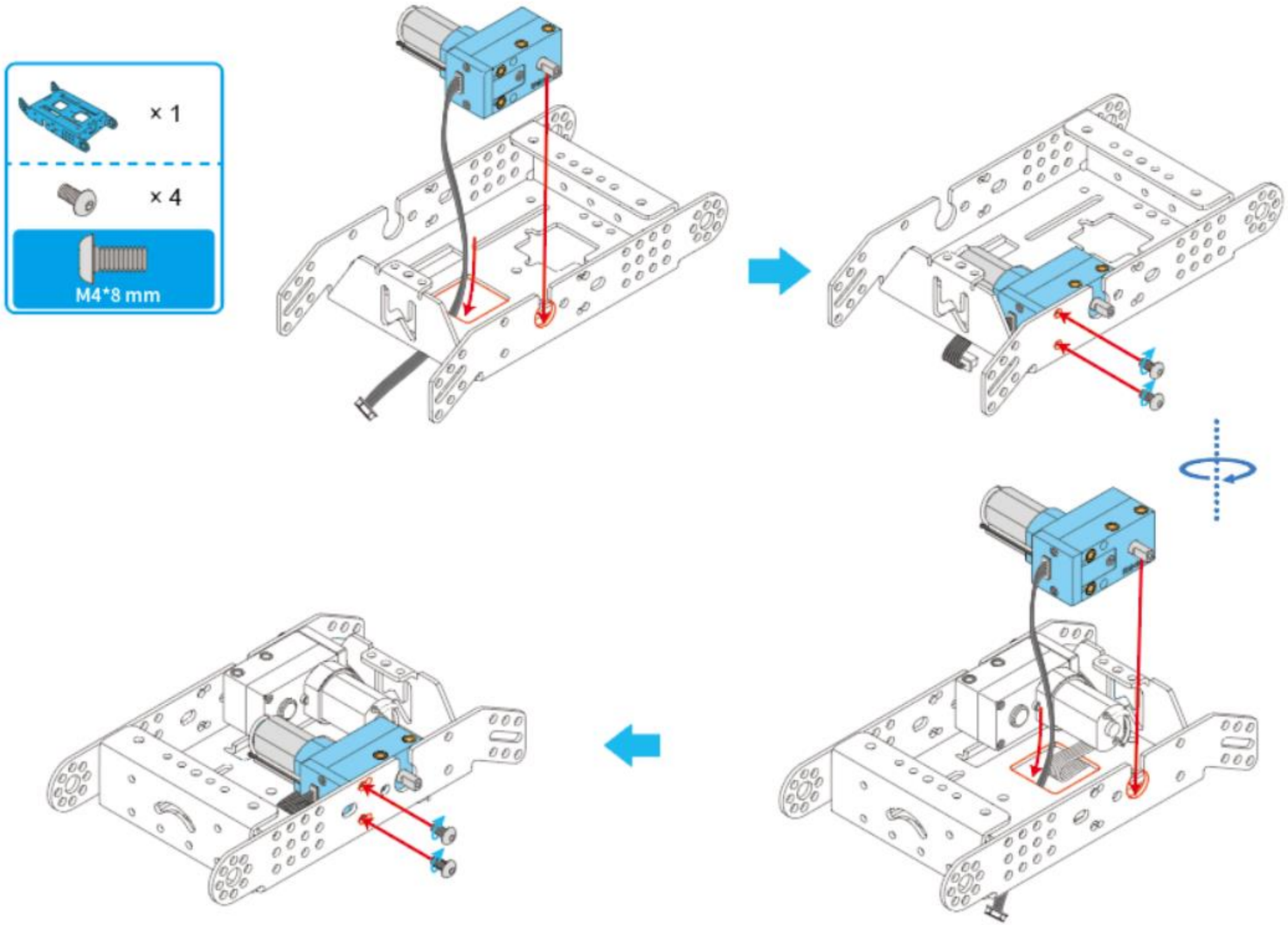
Tips:

Insert the other motor cable to the other encoder motor.



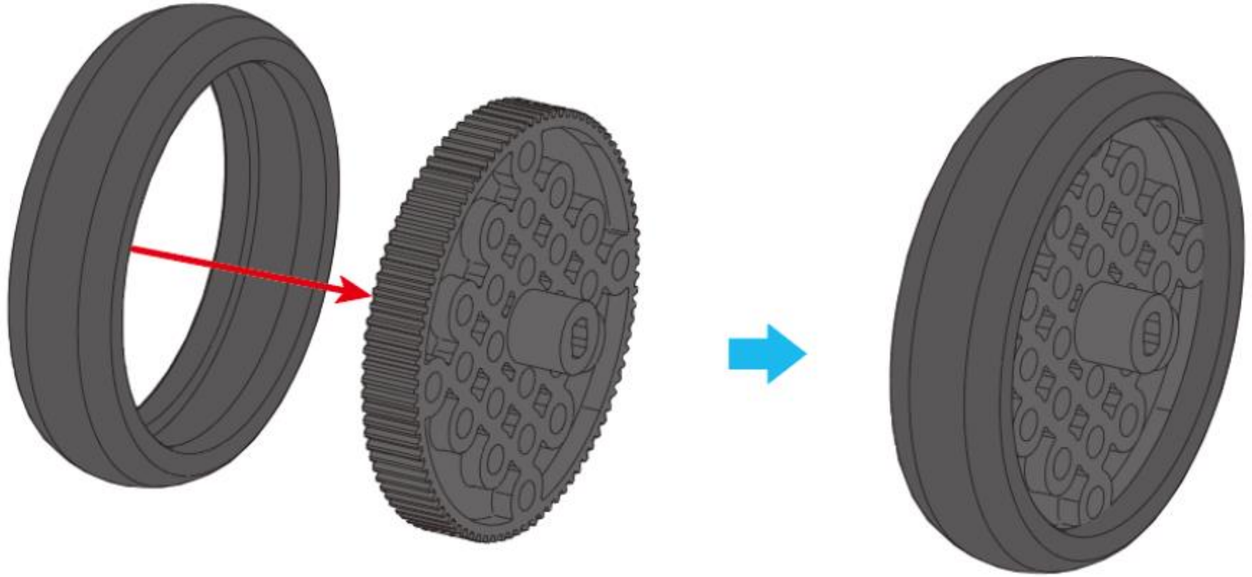
Assembly instructions mBot 2.0

Step 2.



Assembly instructions mBot 2.0

Step 3.

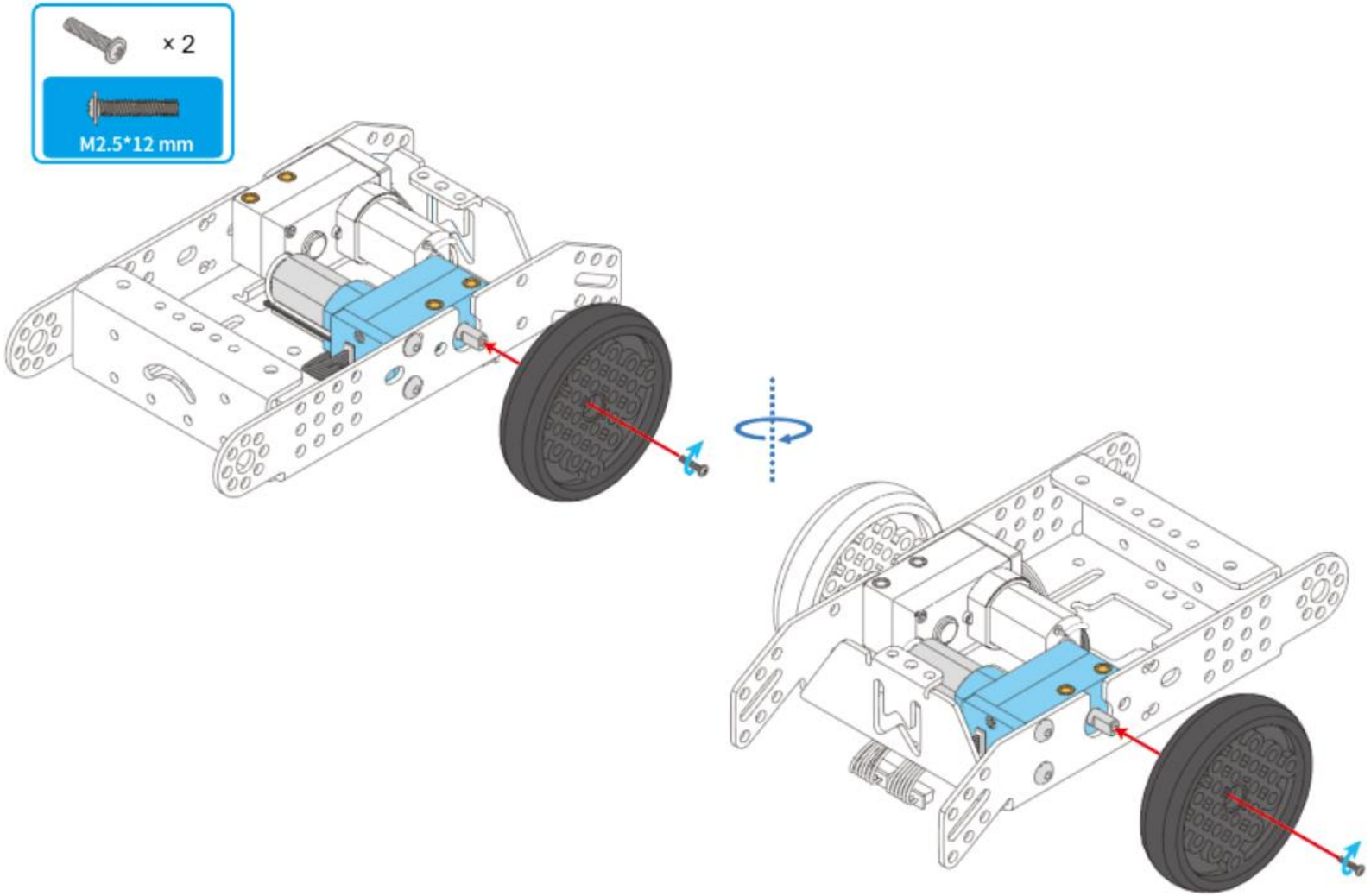


Tips:

Assemble two wheels in the same way.

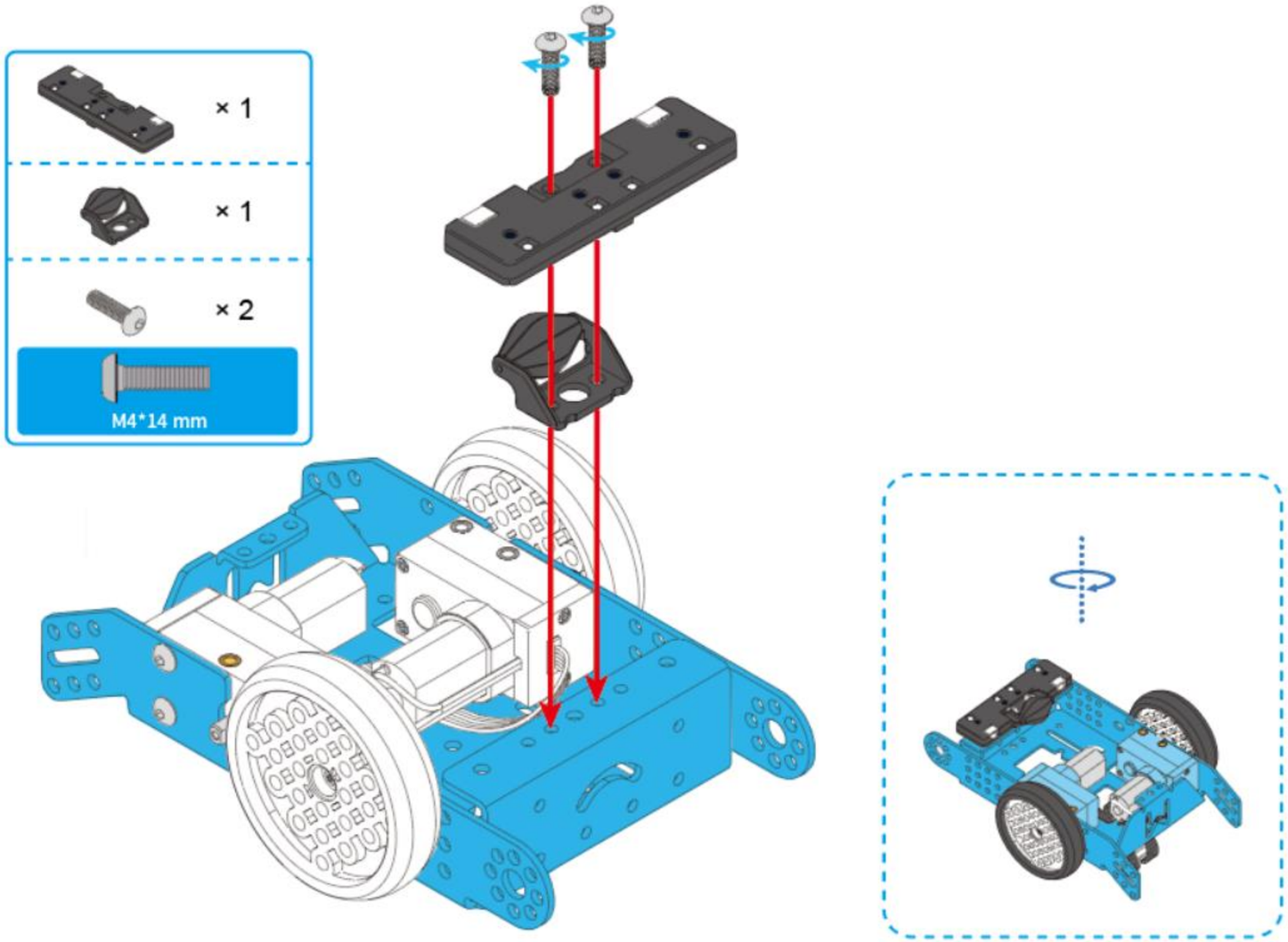
Assembly instructions mBot 2.0

Step 4.



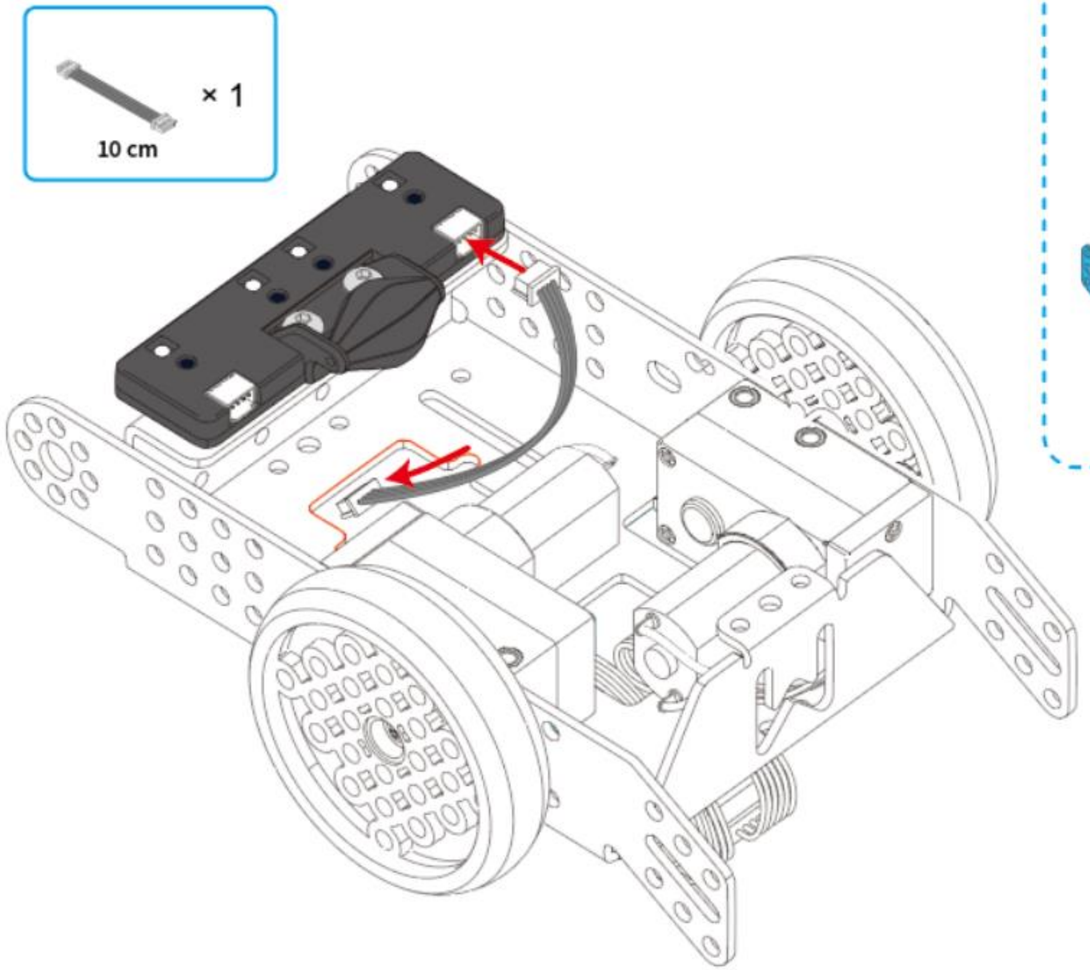
Assembly instructions mBot 2.0

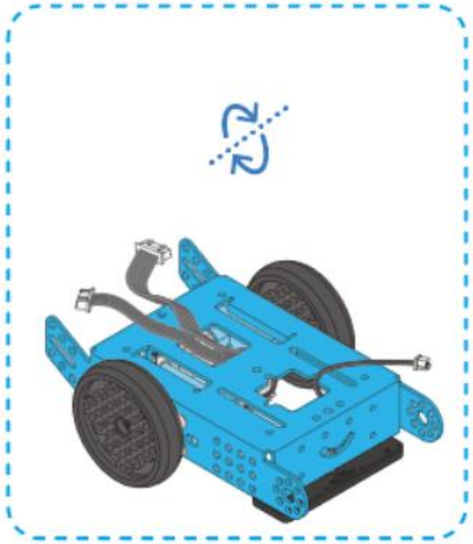
Step 5.



Assembly instructions mBot 2.0

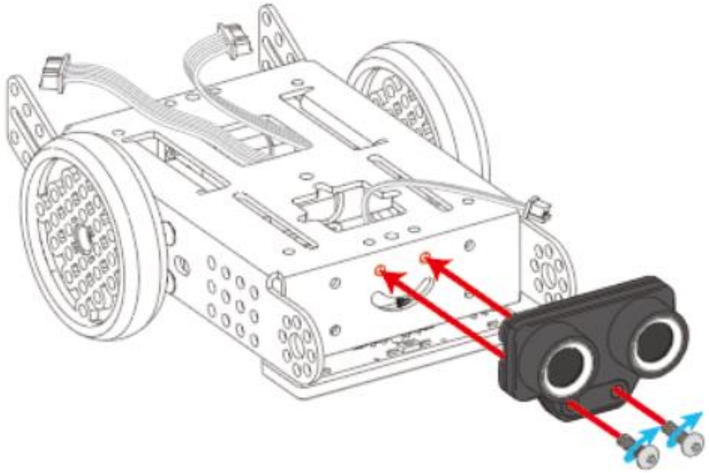
Step 6.

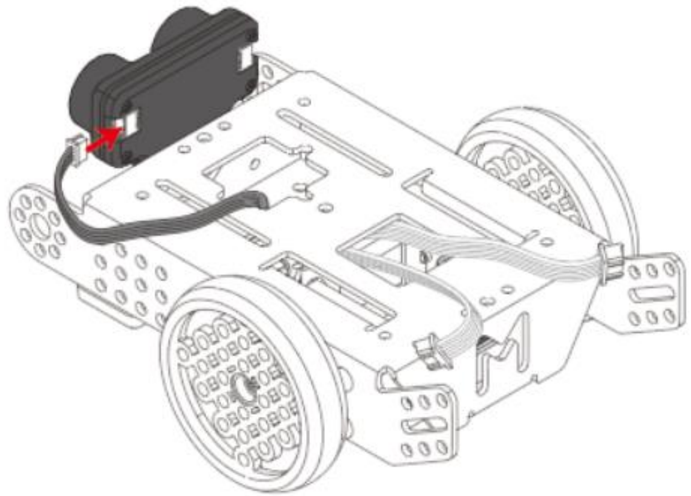




Assembly instructions mBot 2.0

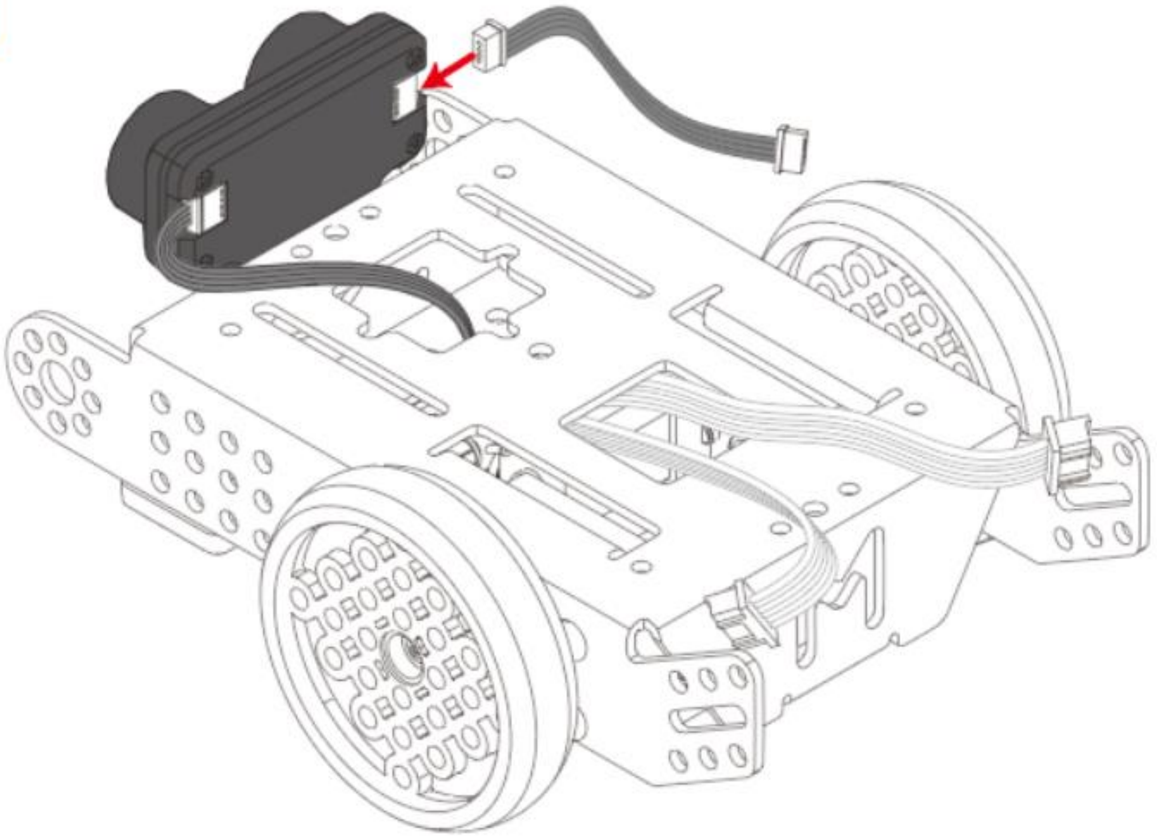
Step 7.





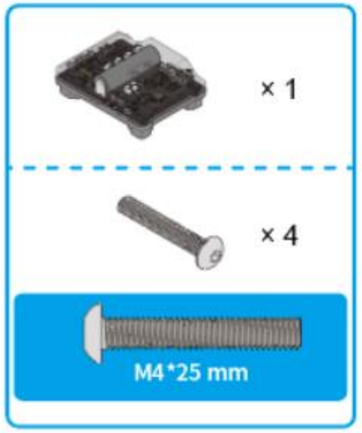
Assembly instructions mBot 2.0

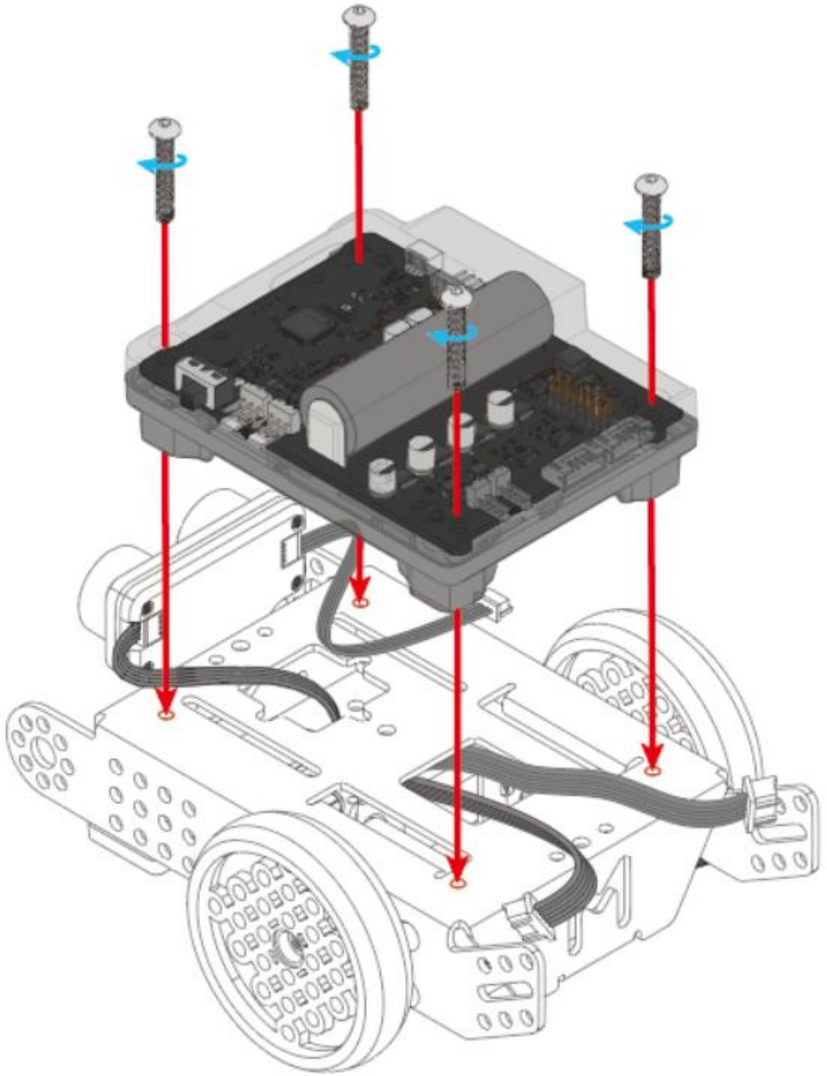
Step 8.



Assembly instructions mBot 2.0

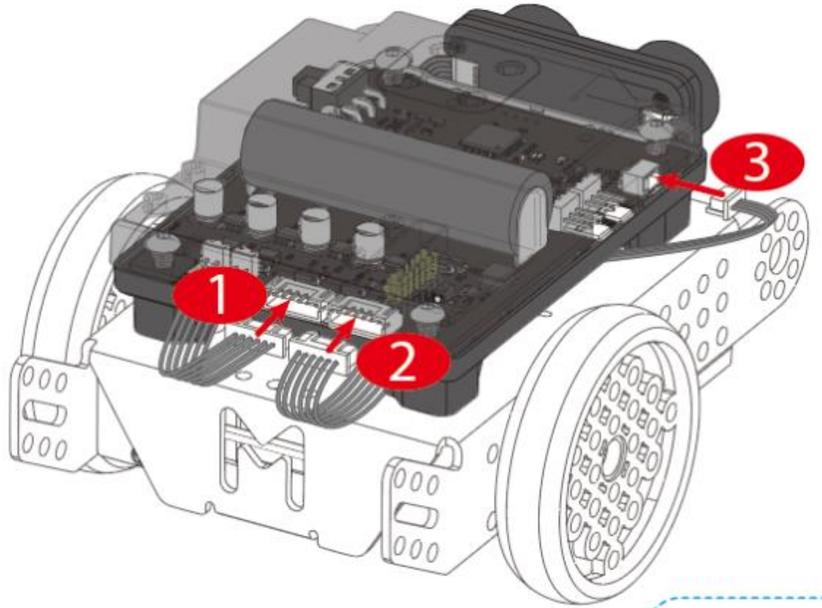
Step 9.

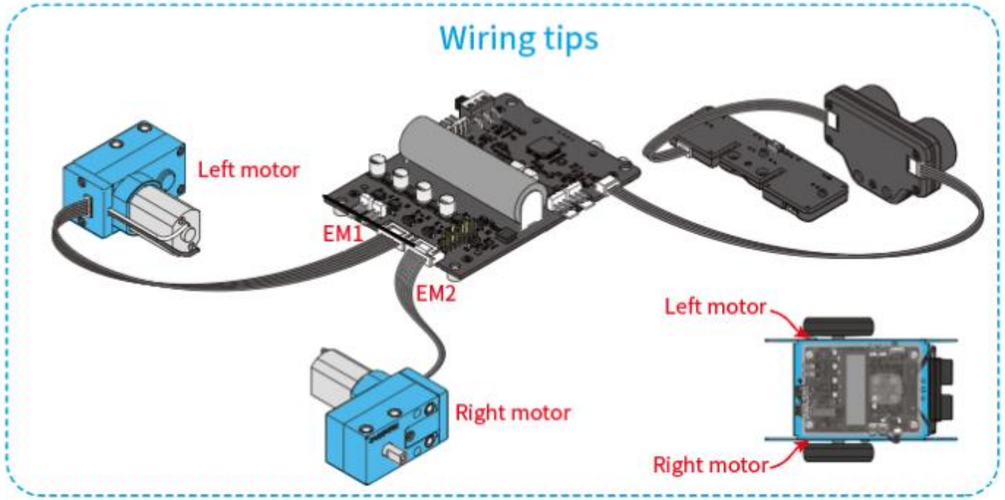




Assembly instructions mBot 2.0

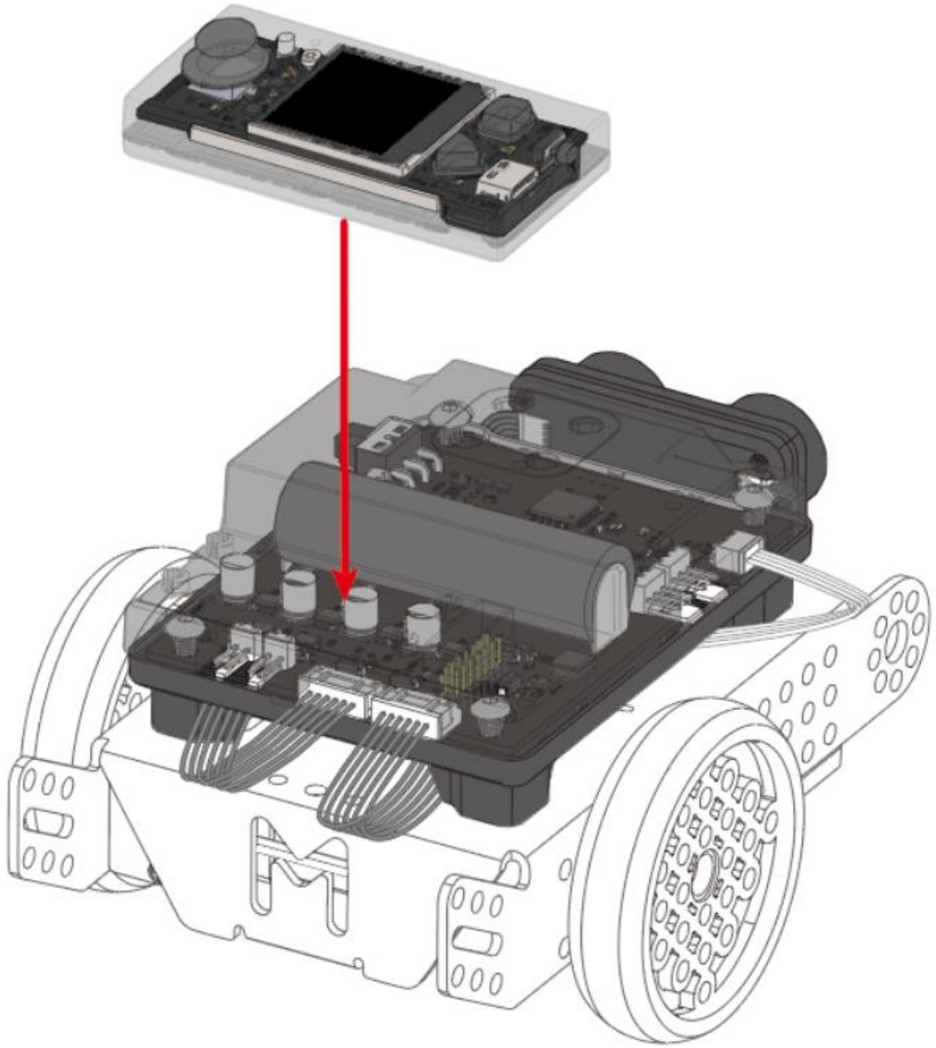
Step 10.





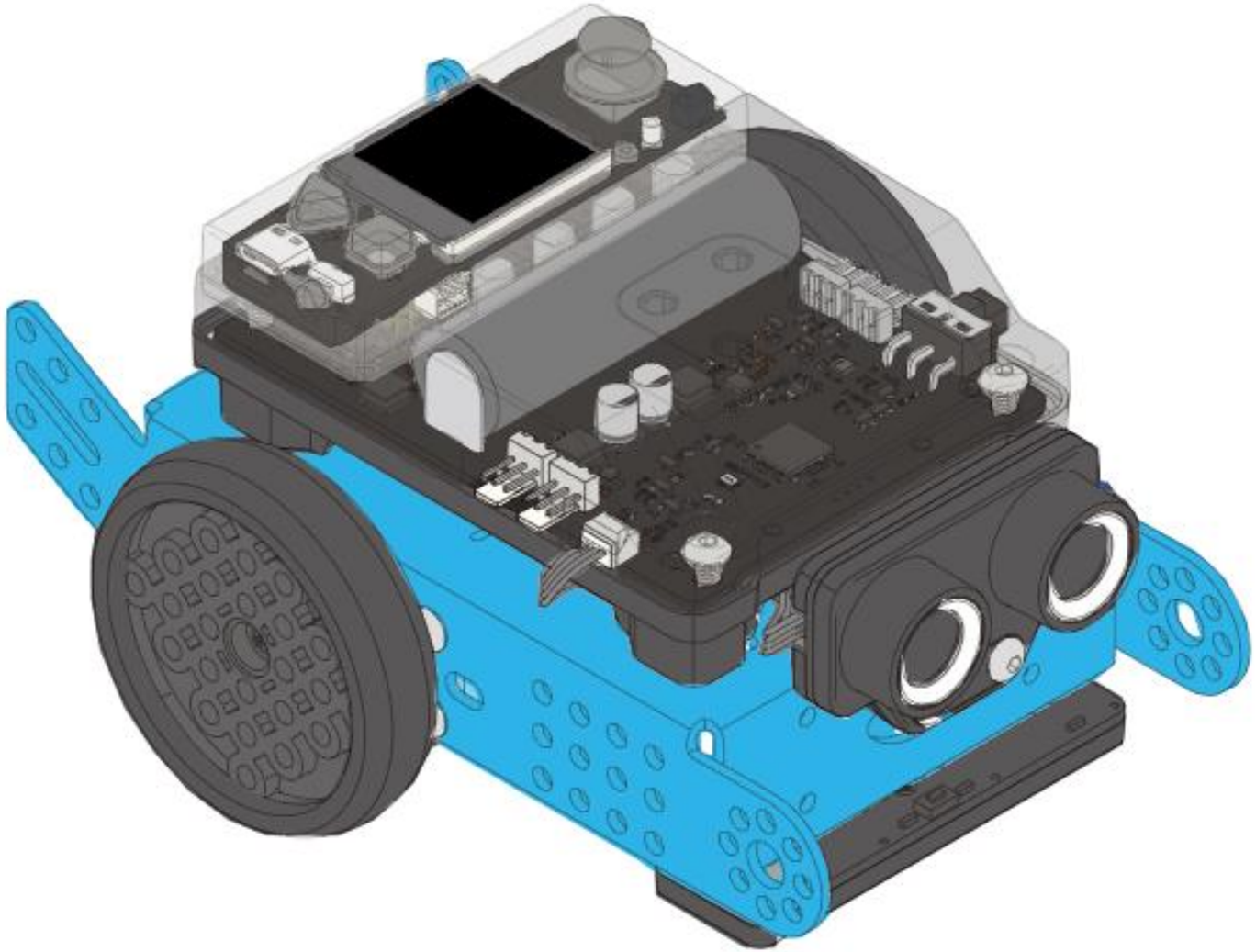
Assembly instructions mBot 2.0

Step 12.



Assembly instructions mBot 2.0

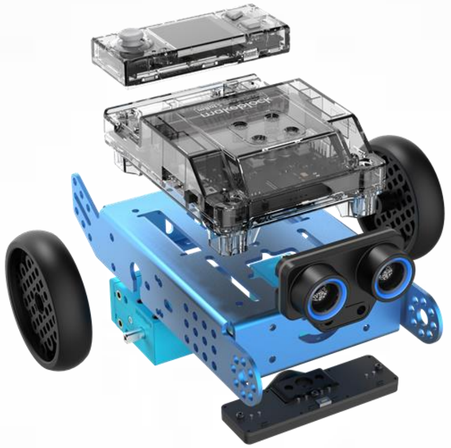
Completed



mBot 2.0

A new generation educational robot

Manual control - Makeblock app



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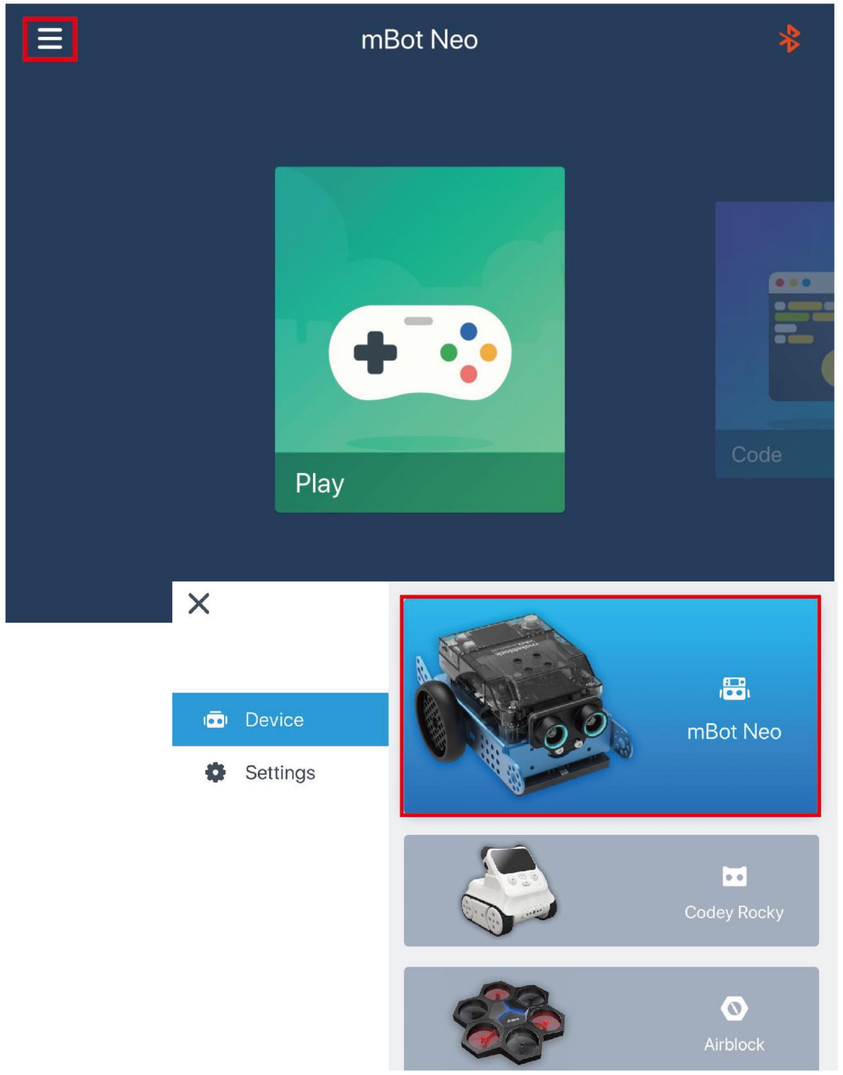
Makeblock app

Use your mobile device to scan the following QR code to download or update the Makeblock app.

Alternatively, search for Makeblock in the app stores to download or update your Makeblock app.

Connecting the device to the application

1. Turn on Bluetooth on your device
2. Turn on mBot 2.0
3. Open the Makeblock app, click on  and select the mBot 2.0 device
4. Click on the Bluetooth icon to the device connects to the Makeblock app
5. Place your smart device nearby Mbot 2.0



Makeblock app

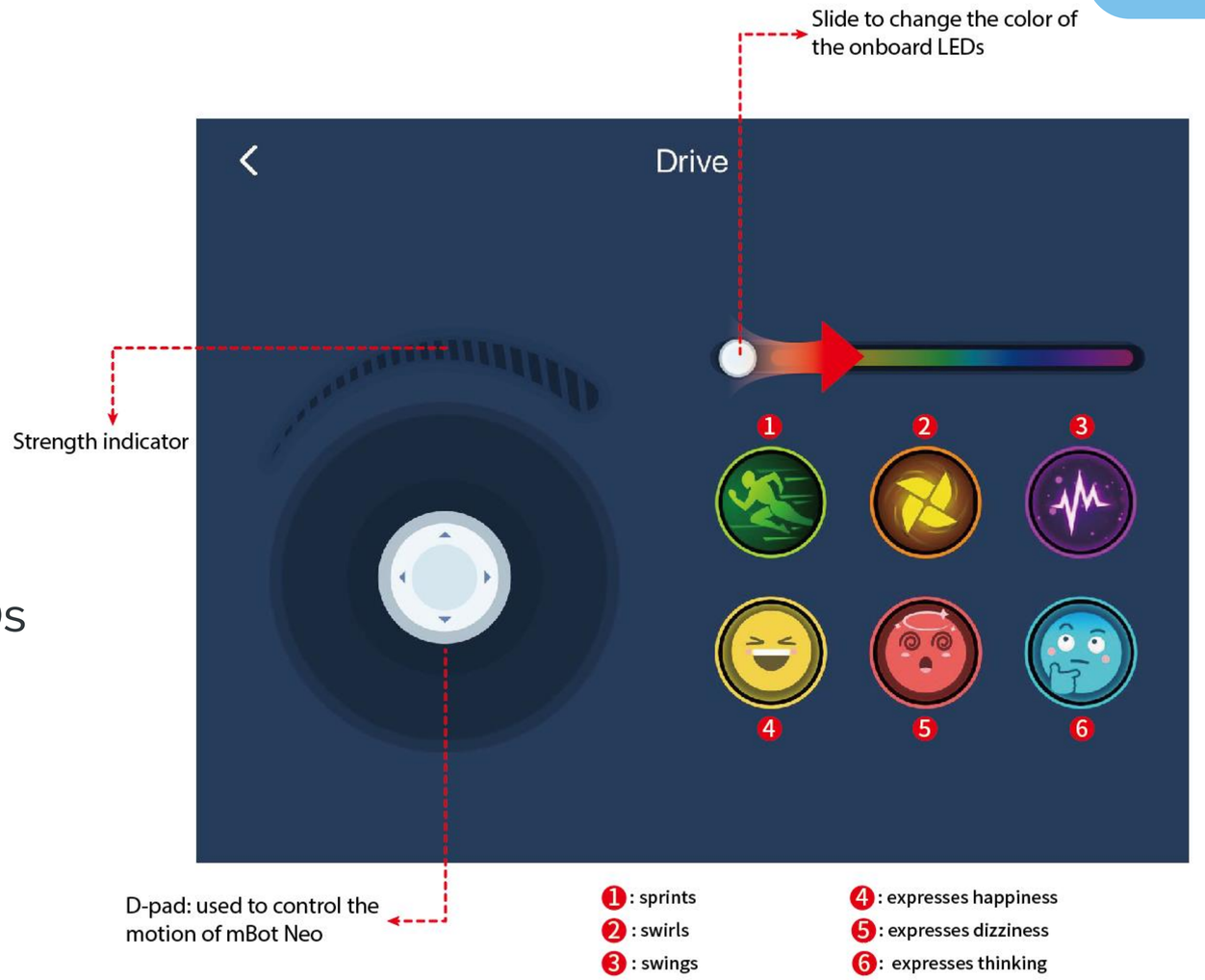
Makeblock provides three control functions

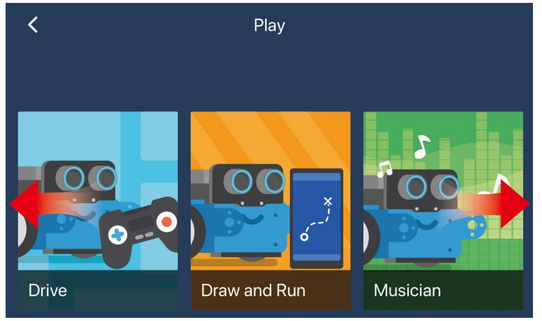
1. **Play**: allows controlling mBot 2.0 in four modes
2. **Code**: opens mBlock 5 for writing code
3. **Wi-Fi Guide**: Wi-Fi connection guide

Play mode

Play mode provides four control modes, and you can swipe left or right to select one.

- **Drive**: motion control and display LEDs
- **Draw and Run**: movement of the device along the drawn path
- **Musician**: plays preset music and provides a keyboard
- **Voice Control**: executes the commands you speak

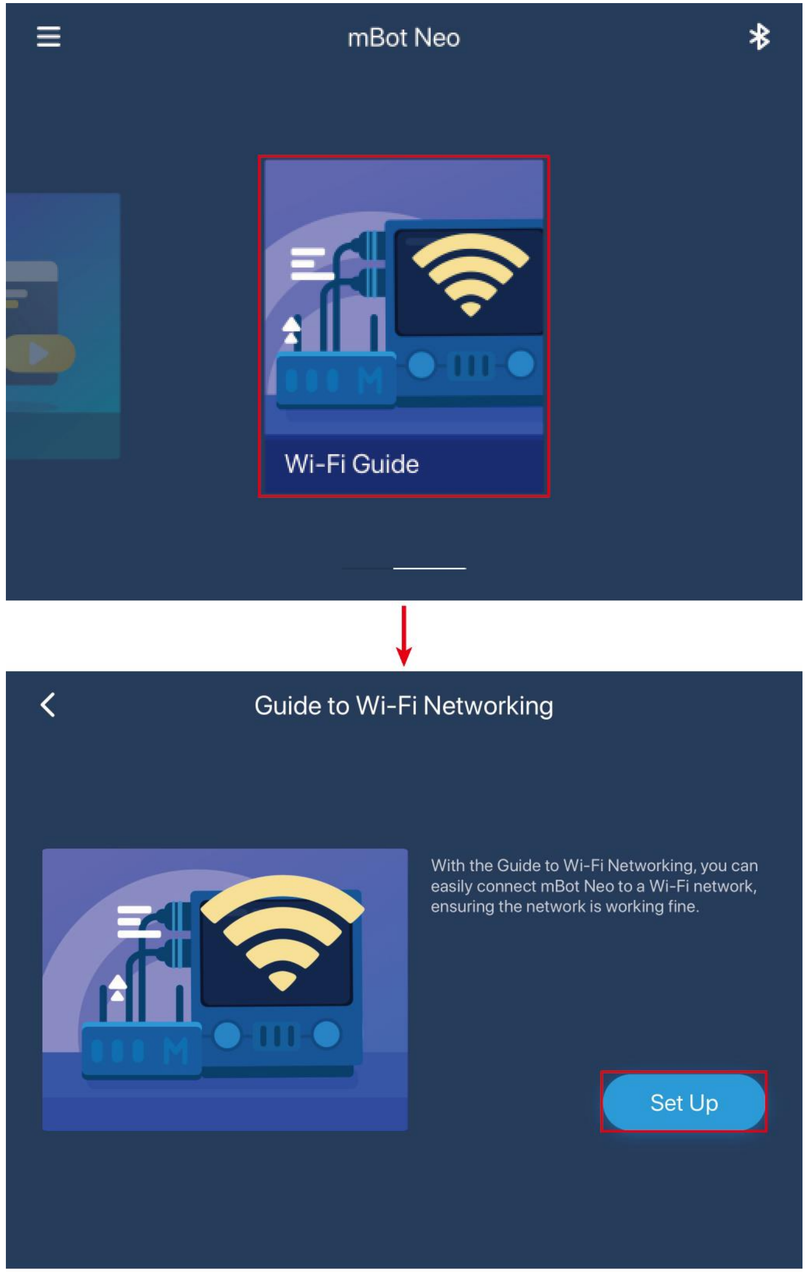




Wi-Fi Guide

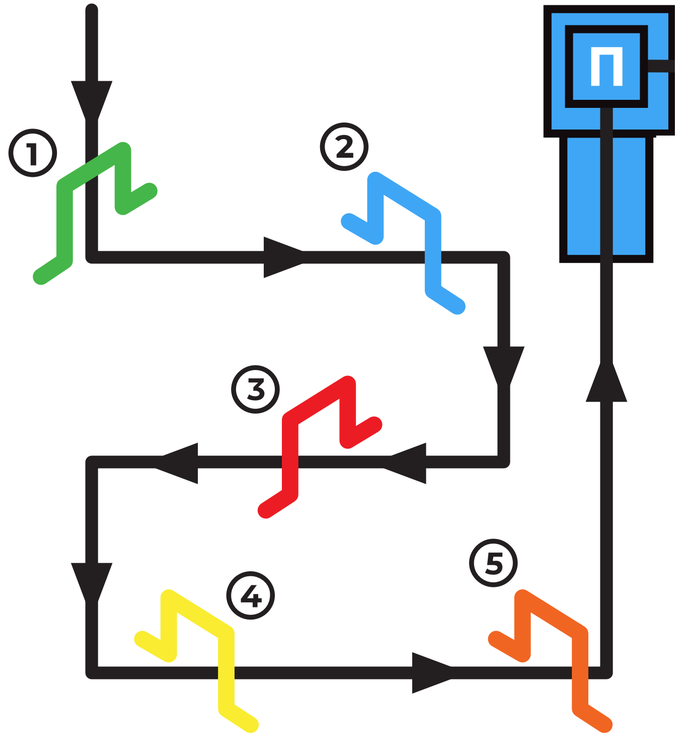
With the Wi-Fi Guide feature, you can set up a Wi-Fi connection for mBot 2.0.

1. Click on **Wi-Fi Guide**, then on **Set Up**
2. Enter the Wi-Fi account and password that are available



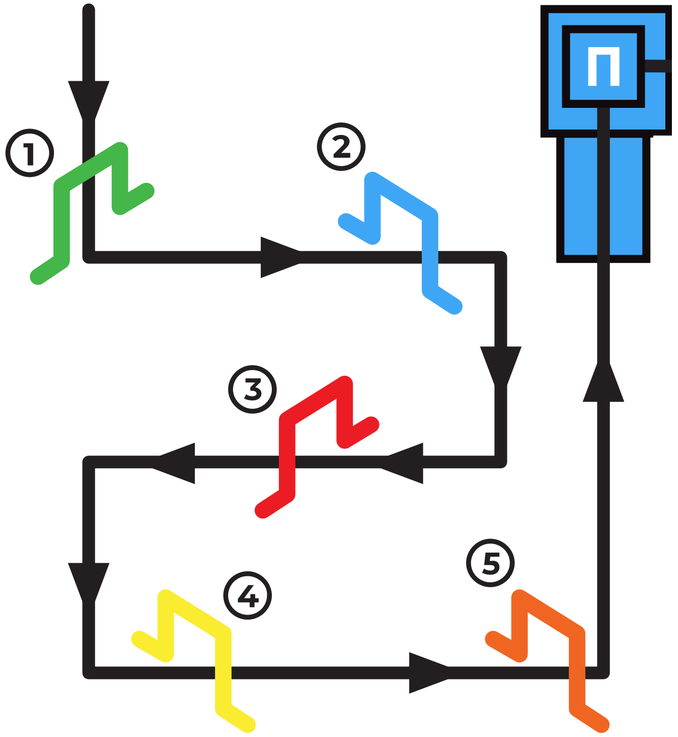
Mission 1.

Control the robot using the “Makeblock app”, go through the given obstacles and climb the ramp.



Mission 1.

Scoring: each obstacle is worth 5 points (if one of the obstacles falls over - the competitor continues on, and for a given obstacle he gets 0 points), when crossing the obstacle the **color of the LED display** should match the gate through which he passes - 5 points per obstacle.
Time to cross the entire polygon: first place 30 points, second place 20 points, third place 10 points.



mBlock V5

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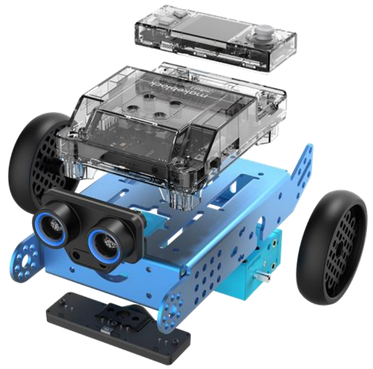
mBlock 5 app

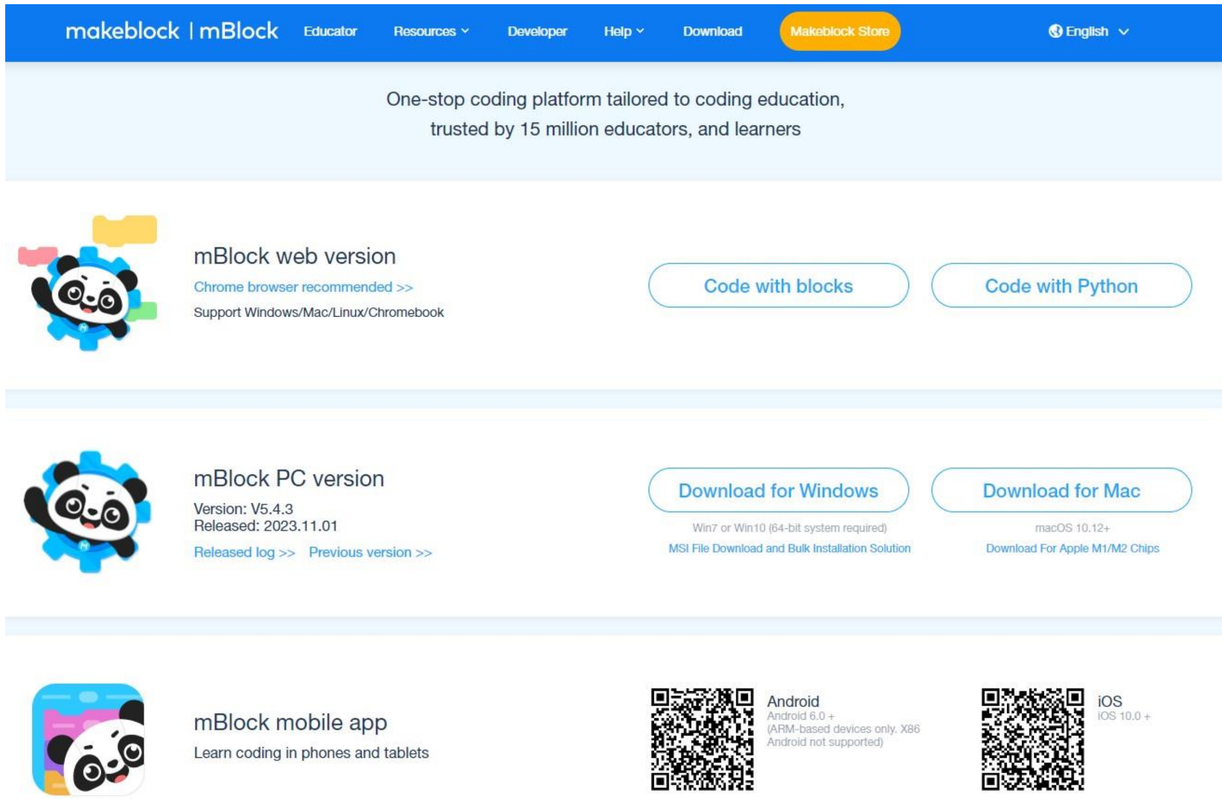
mBlock is a coding platform designed to provide an enhanced educational experience for every student. They can start with block-based programming and build their skills until they are able to master the Python language, all within the same platform.

Available for both tablet and PC, mBlock makes STEAM education more meaningful and engaging.



mBlock 5 app download

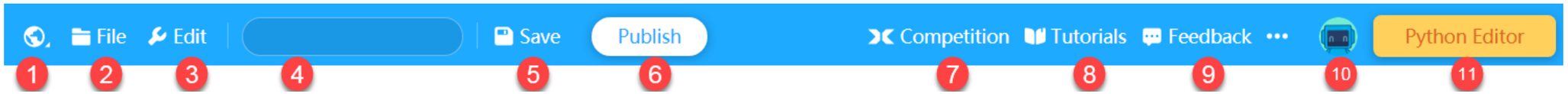
You can download the application from the official website makeblock



There are three options when downloading software:

- mBlock web version
- mBlock version for PC
- mBlock app for phone

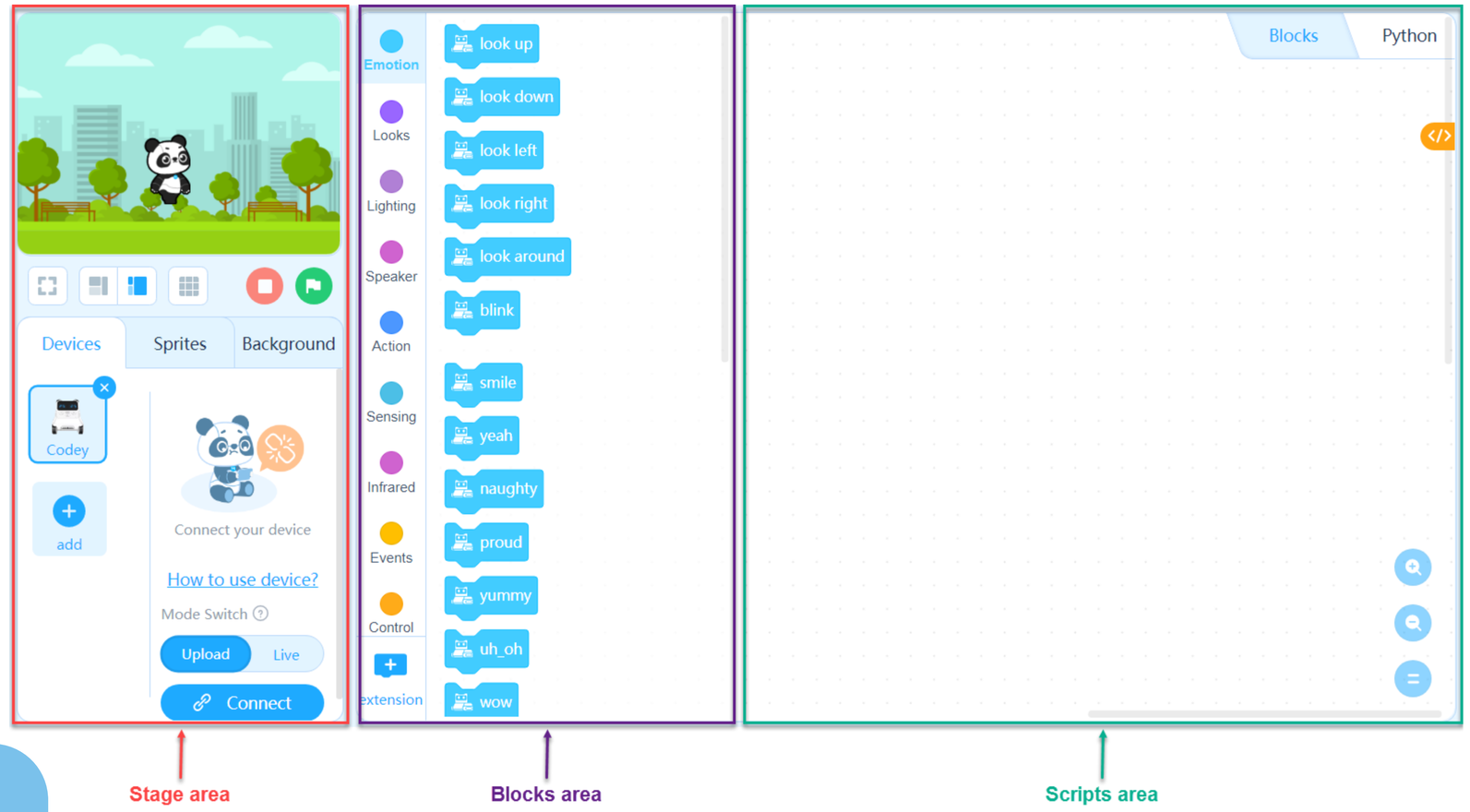
mBlock 5 app interface



On the working line of the program there are the following options:

1. Language selection
2. File: create, open, save project, import/export project
3. Edit:
4. Setting the project title
5. Saving the project
6. Publish: posting the project to the mBlock community
7. Competition
8. Tutorials and Help option
9. Feedback: possibility to post your feedback
10. Sign up/Sign in - when you log in you can see your projects
11. Python Editor: the ability to write/view code in the Python programming language

mBlock 5 app interface



Stage area: Here you can present your work, connect devices and set your avatar and background images.

Block area: Here you can find the blocks you need by category and color

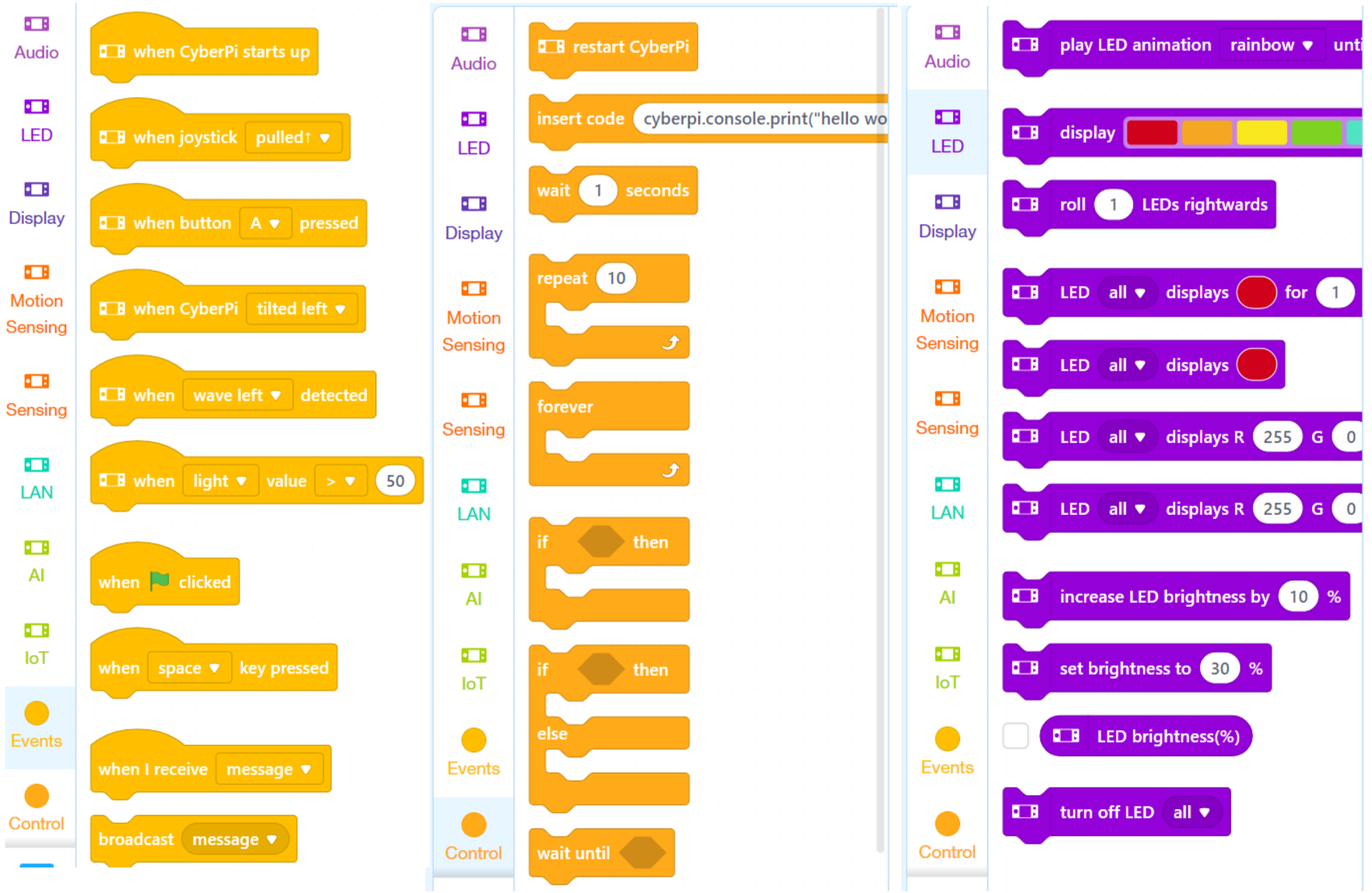
Script area: You can compile your program by dragging blocks into this area

mBlock 5 app interface - Blocks

Each group of cards has special blocks with the help of which you can control your robot in a specific way.

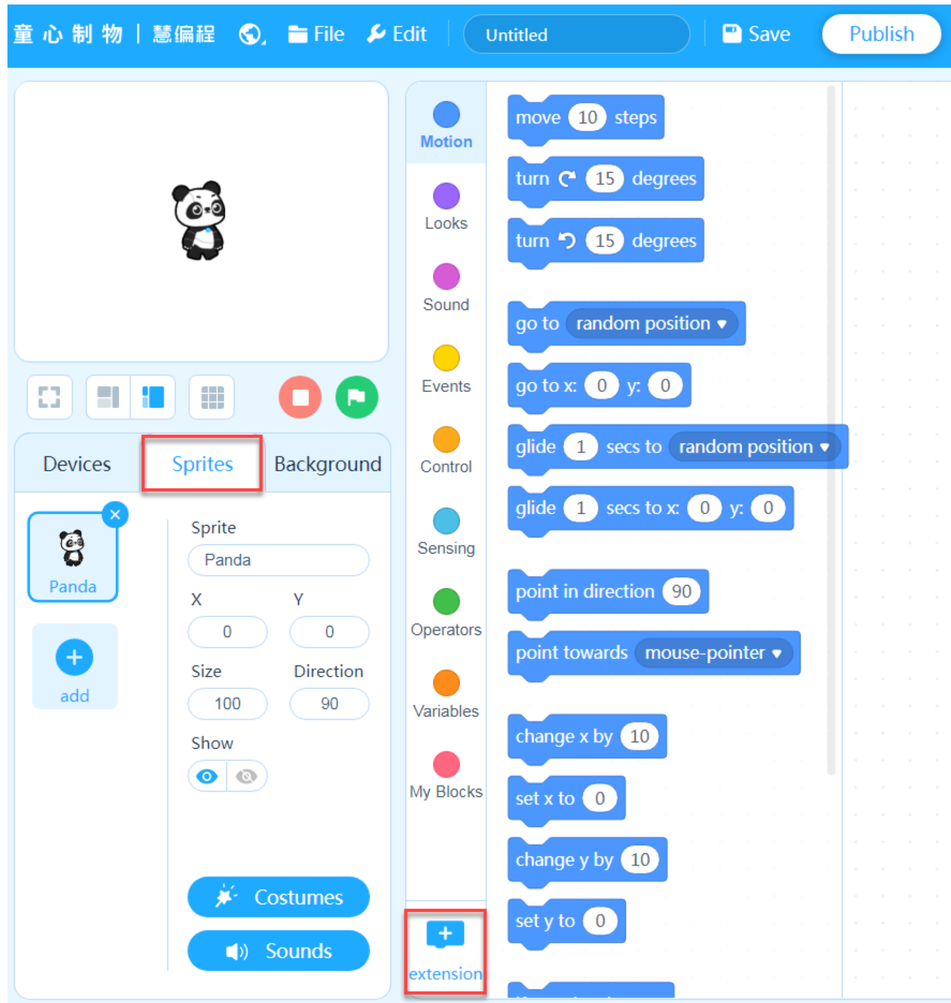
The picture shows only some of the most commonly used card groups.

Each group of blocks is defined by a specific color.



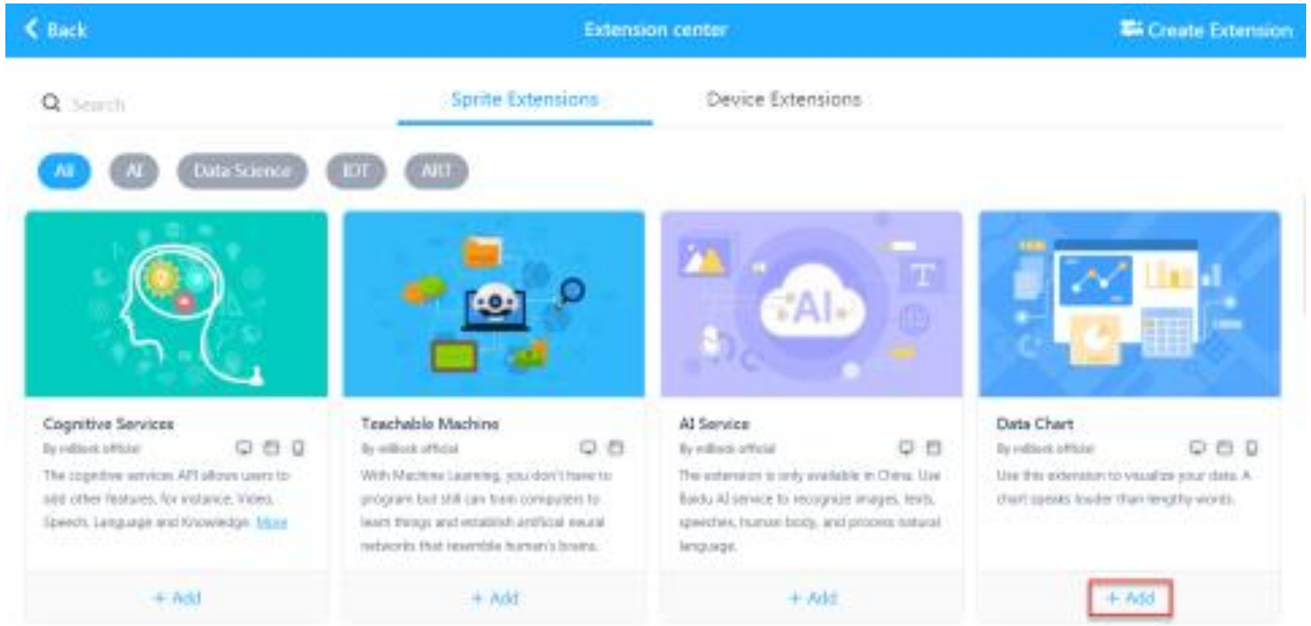
mBlock 5 app extensions

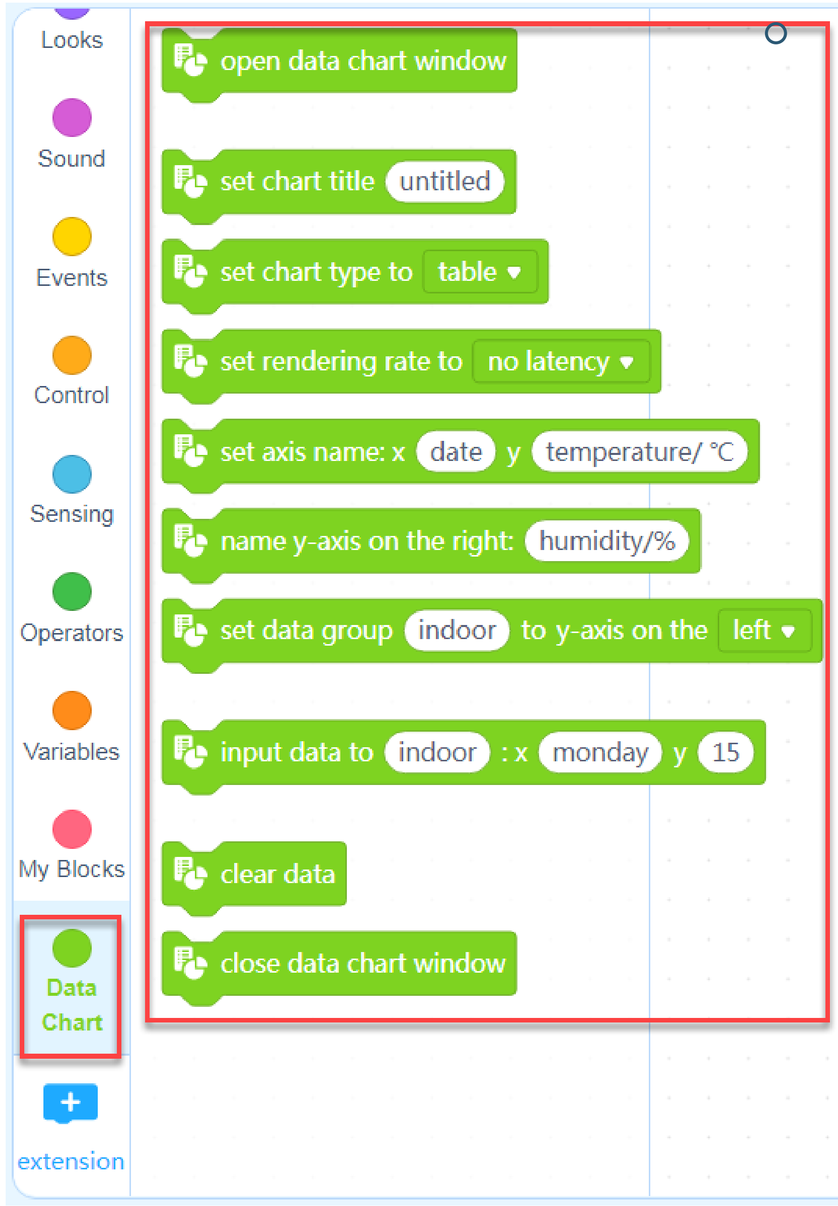
You activate the extensions by the Extension center window opens click on the avatar tab, then on the +extension button.



mBlock 5 app extensions

After adding the extension, you get the possibility to use the blocks found in the selected extension.

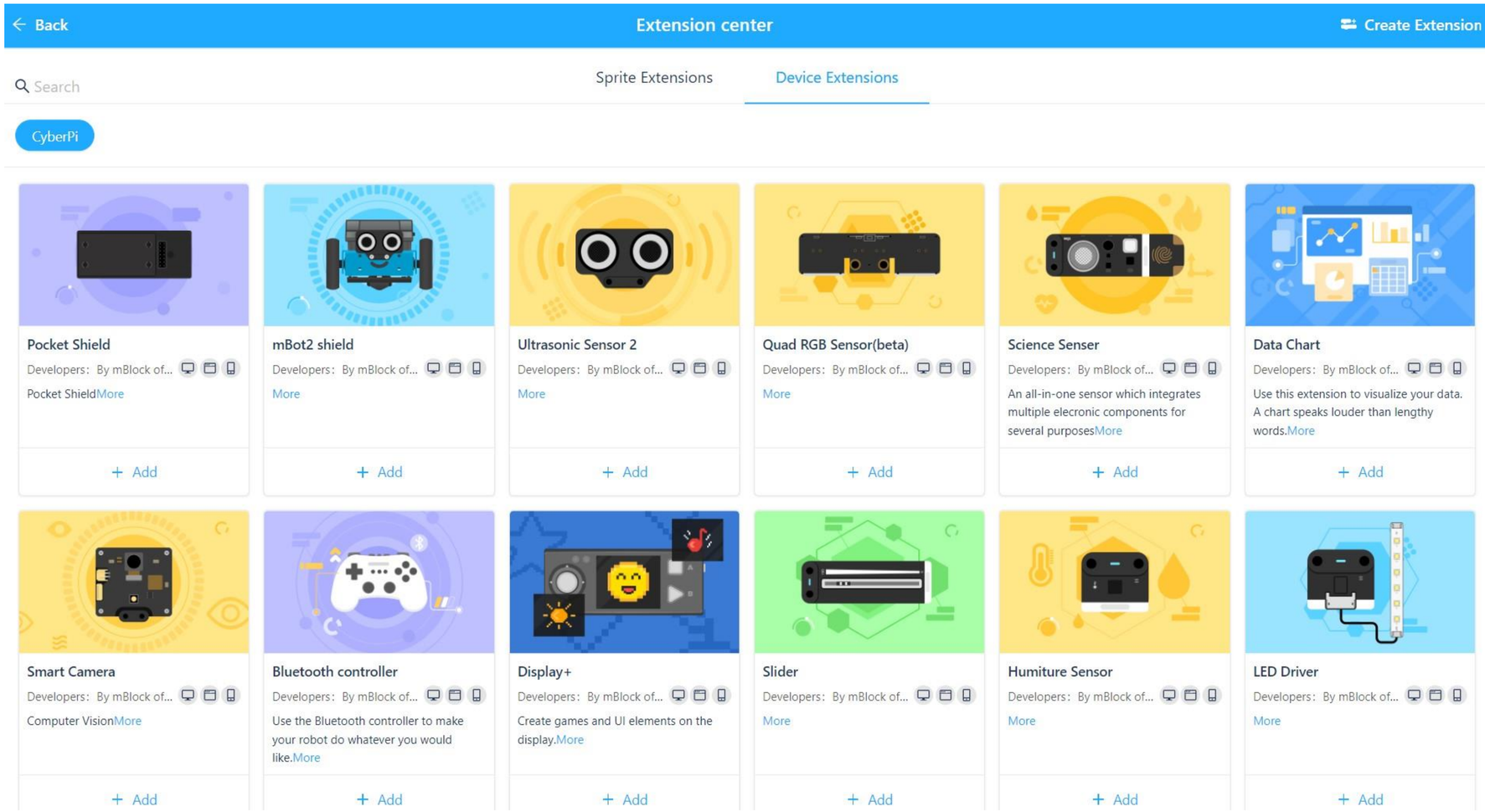




mBlock 5 app extensions

To get started, we'll add the following extensions:

- mBot2 shield
- Ultrasonic Sensor 2
- Quad RGB Sensor

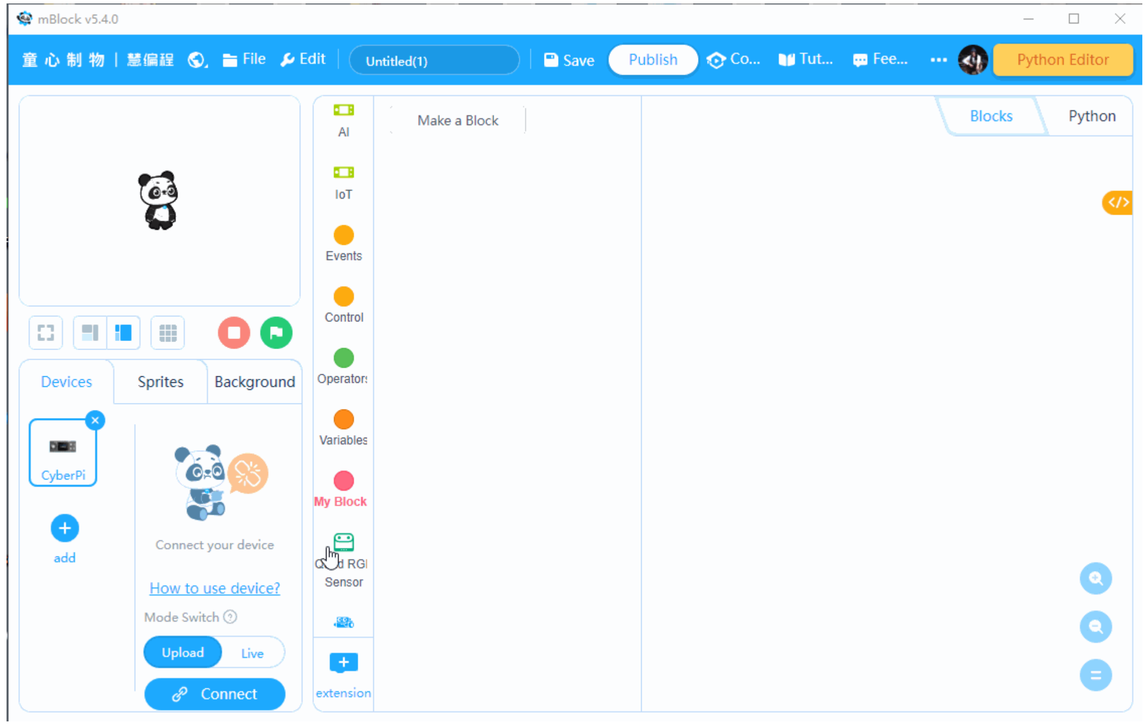


mBlock V5 - tasks

1. Hello world

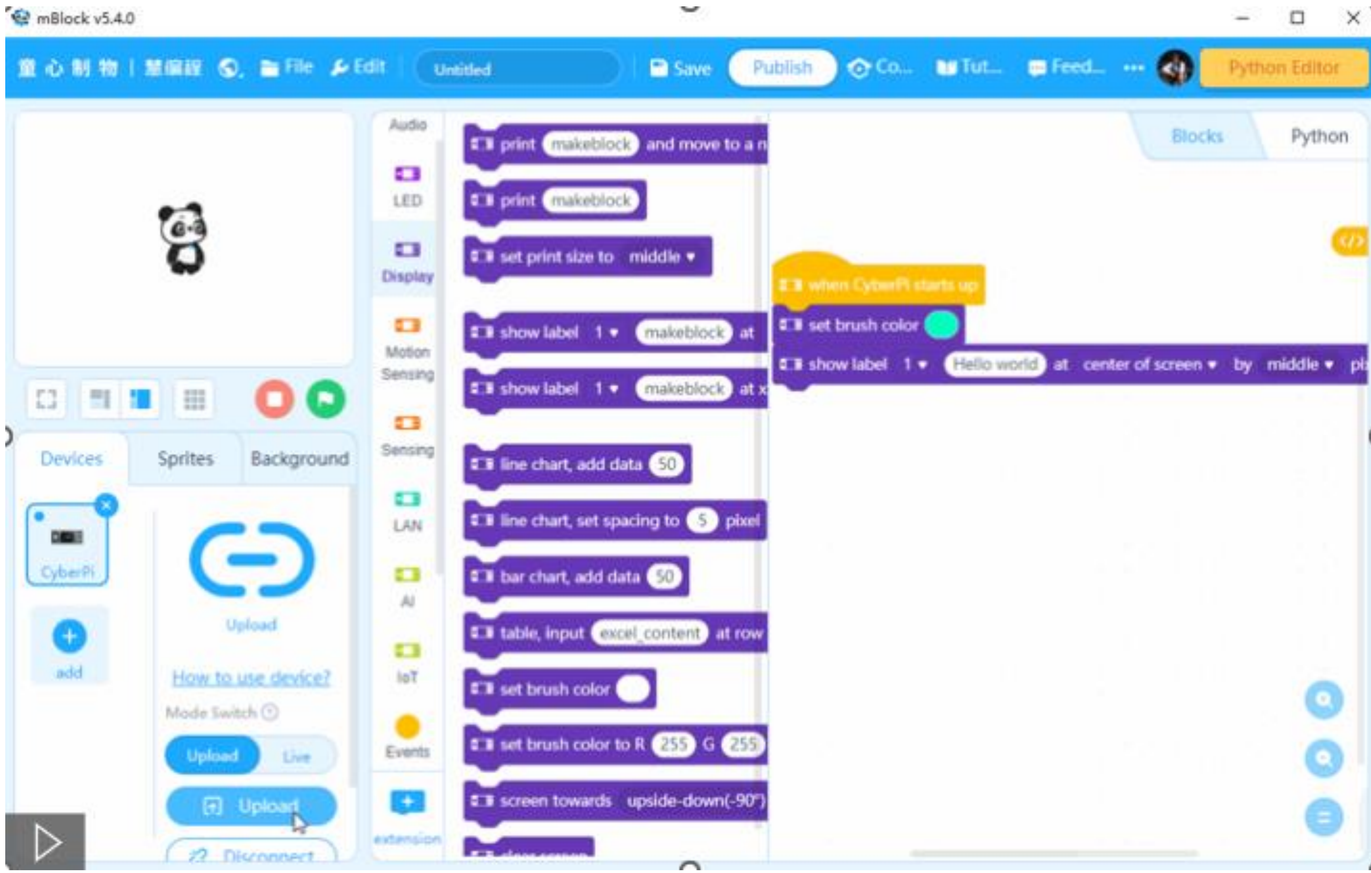
The task of the program is to print the message "Hello World" on the CyberPi display.

Connect the CyberPi to the computer with a cable, open mBlock 5, connect the CyberPi and select Upload mode.



1. Hello world

Write a program like the one in the picture that will display the text "Hello World".



Exercise

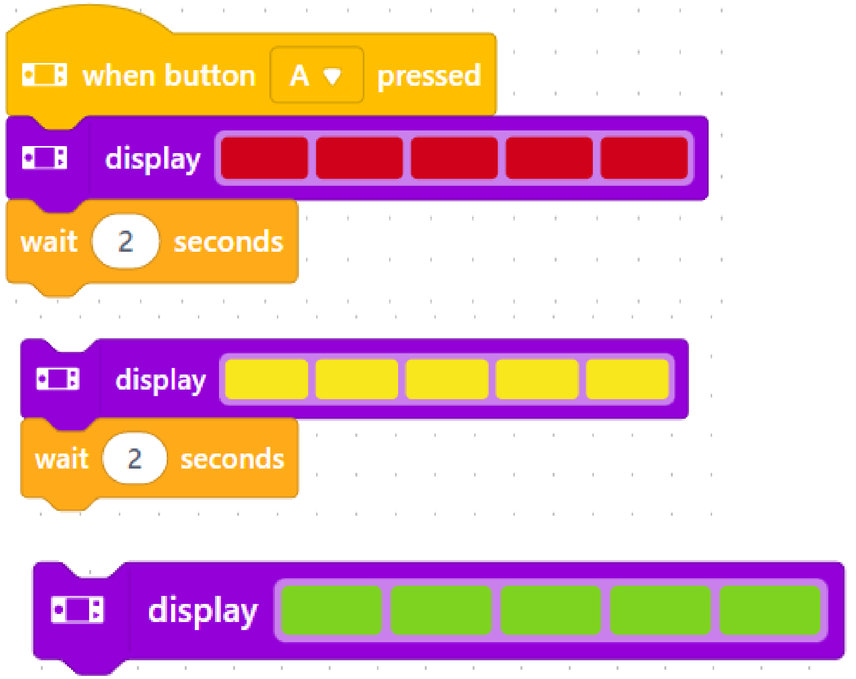
Try changing the color and size of the text.

Try Show label blocks. Can you find the differences between them?

Try line graphs, bar graphs, and tables.

2. Led display control - traffic light

After you upload the program, the RGB LEDs should first flash green for two seconds, then yellow and finally red.



What is the wait block for?
What if we didn't have that block?

2.1 LED display control

After you upload the program, the RGB LEDs blink and light up one by one, changing their order.

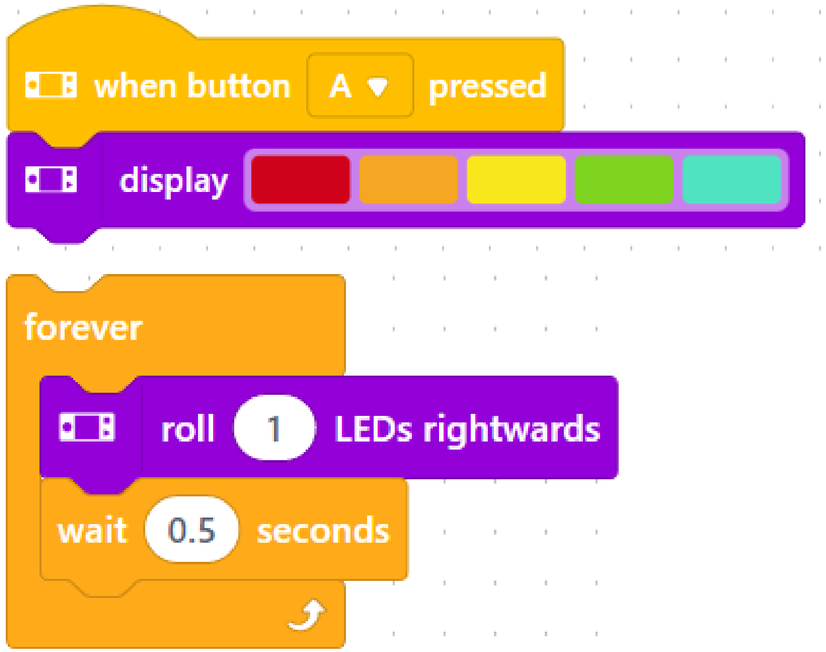
Connect the CyberPi to the computer with a cable, open mBlock 5, connect the CyberPi and select Upload mode.

2.1 LED display control

Exercise :

Try changing the color of the LEDs.

Try changing the blinking frequency of the LEDs.



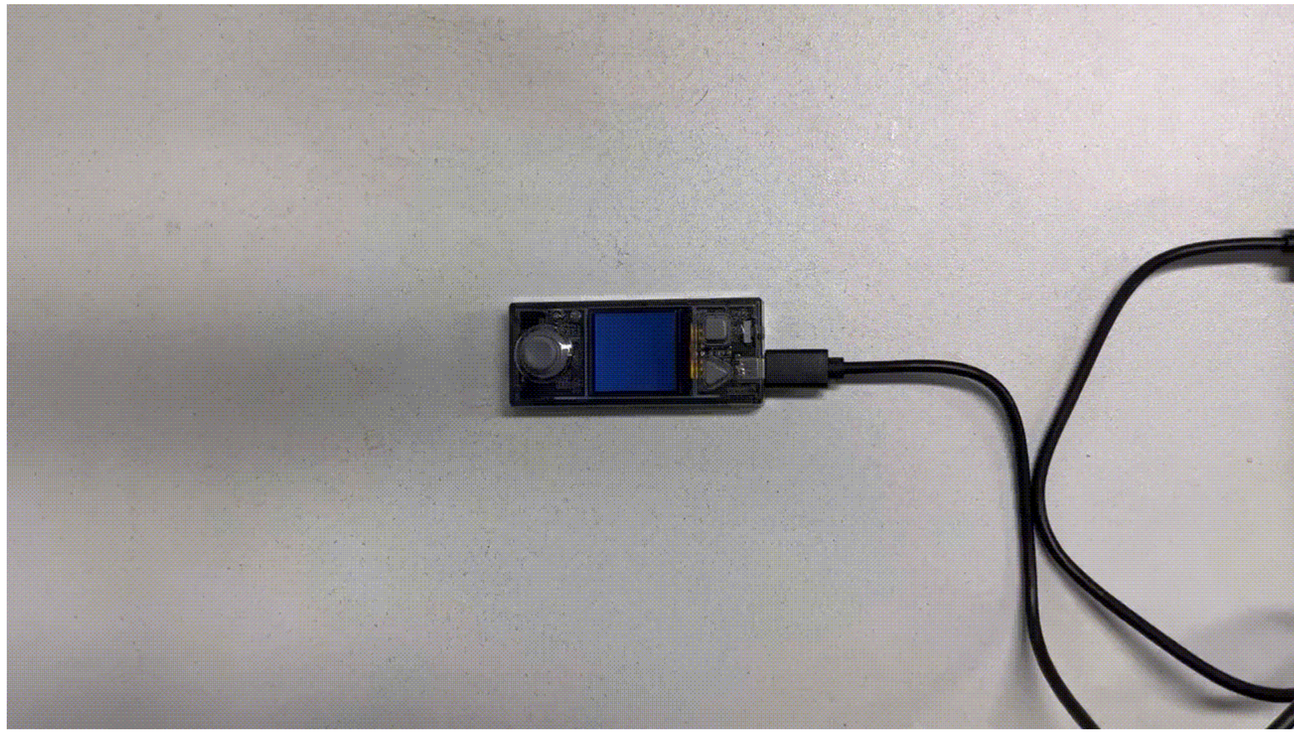
We're going to insert a loop here.

A loop is a list of pieces that need to be done until a certain condition is met.

There are different types of loops - here we use an infinite loop.

3. Button control

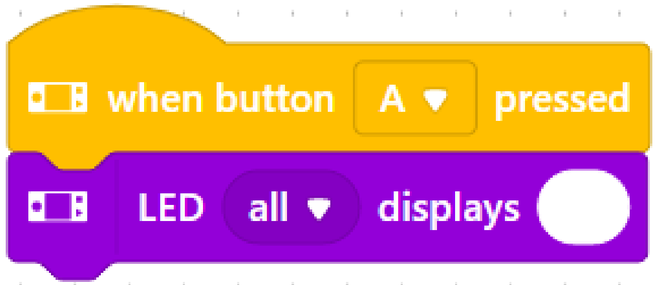
After you upload the program, you can press the A button and the B button to control the RGB LEDs on the CyberPi.

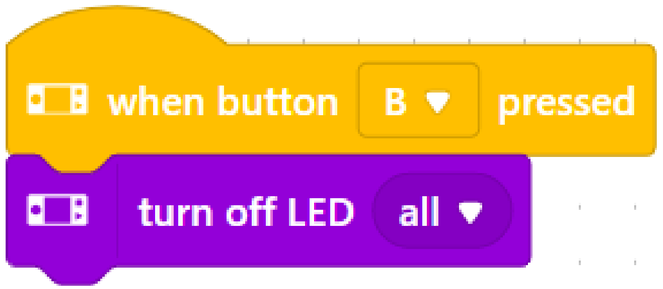


3. Button control

Exercise :

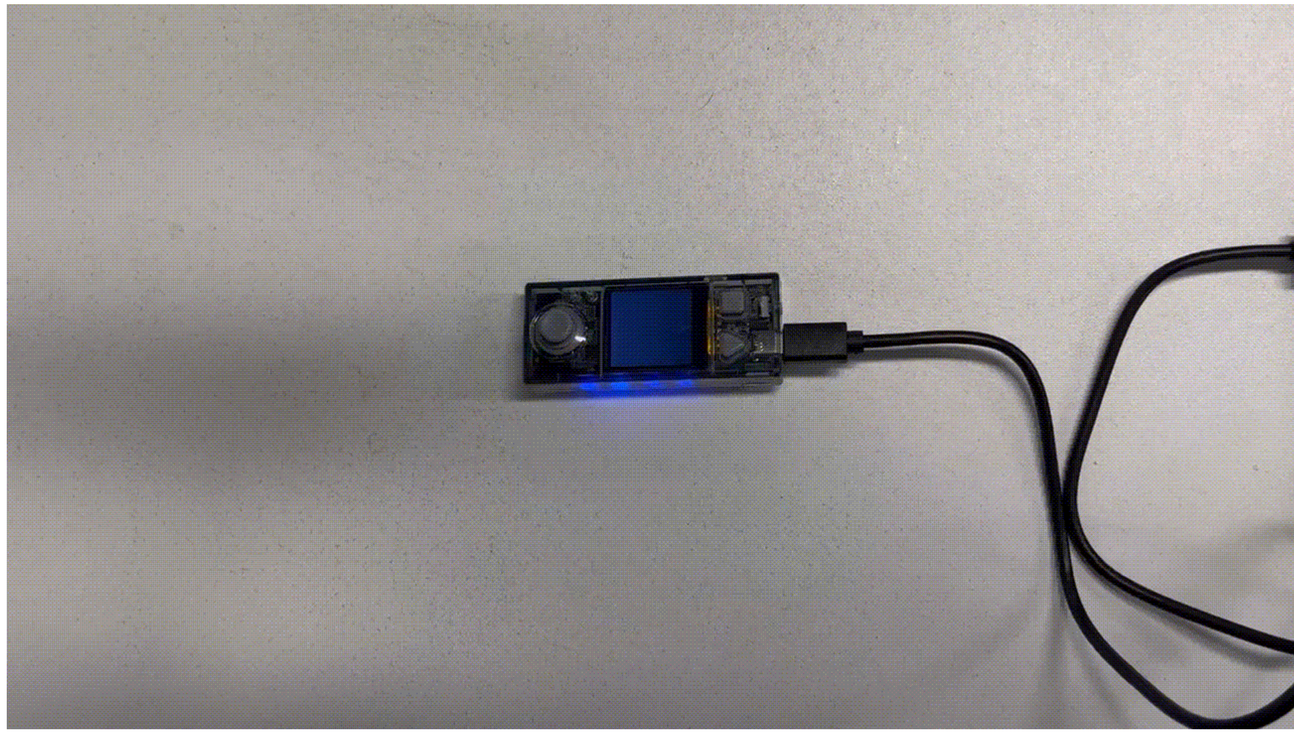
Besides RGB LEDs, what else can you control with buttons?





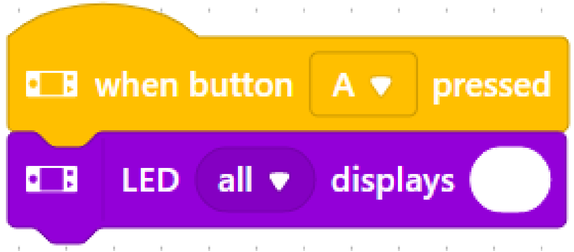
4. Control the joystick

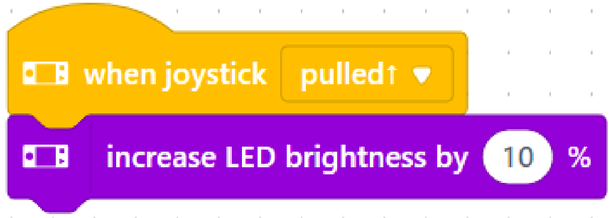
After uploading the program, you can control the brightness of the RGB LEDs using the joystick.



4. Control the joystick

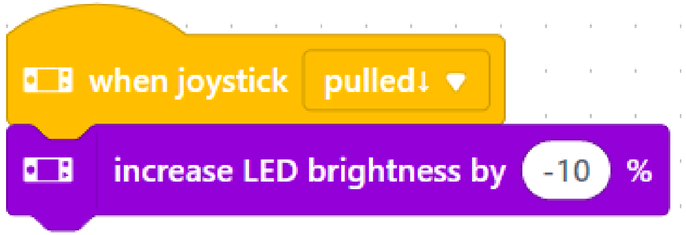
Move the joystick up and down to control the brightness of the RGB LEDs.





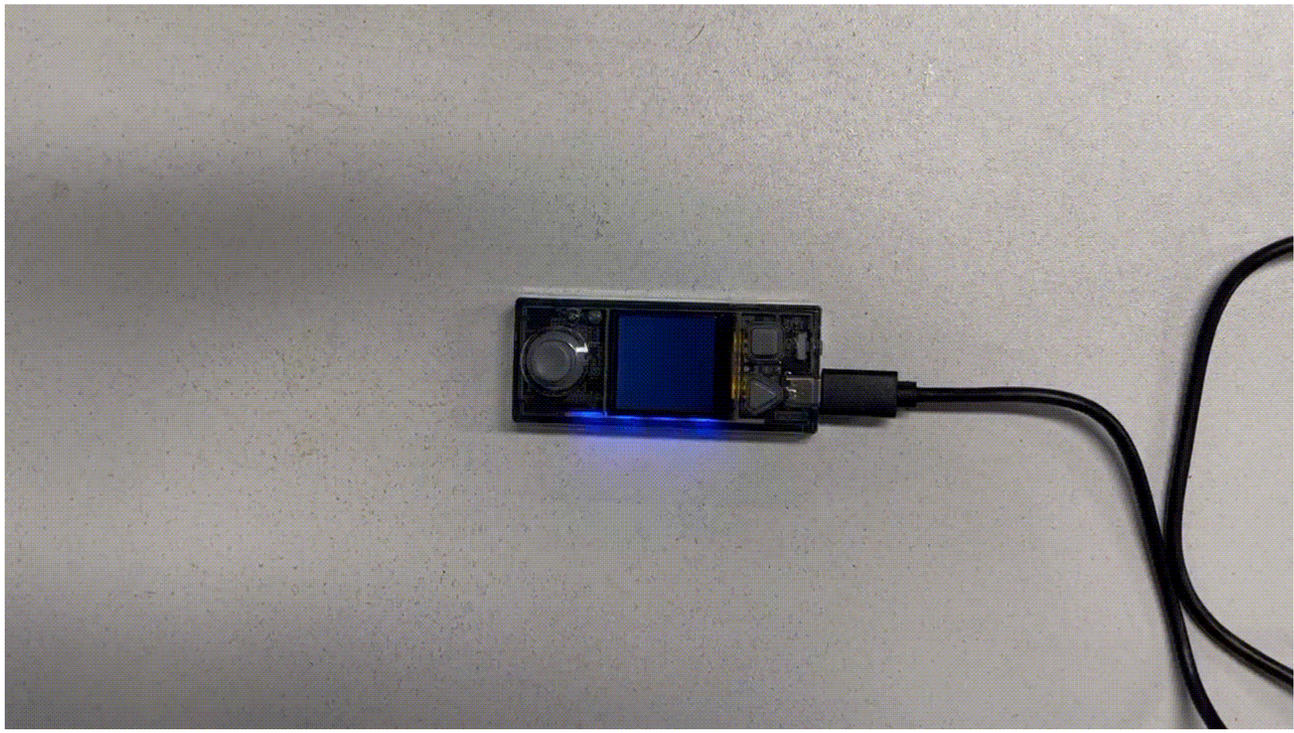
Exercise

Besides RGB LEDs, what else can you control with a joystick?



5. Change the color of the LEDs

After you upload the program, the color of the RGB LEDs on the CyberPi changes from red to green, from green to blue, then from blue to red, and this process repeats itself over and over.

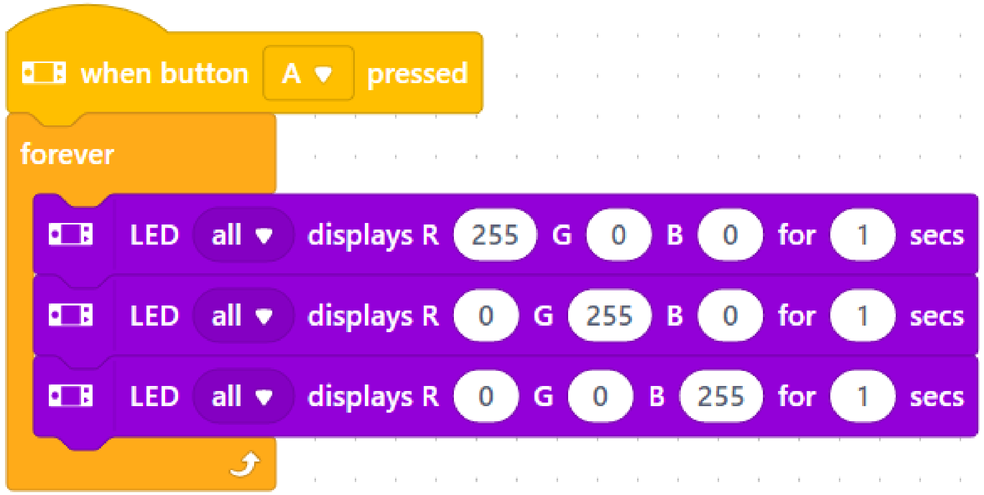


5. Change the color of the LEDs

Exercise

The color of the RGB LED light on the CyberPi changes from red to green and then from green to blue and then from blue to red, and this process is repeated over and over again at 1-second intervals.

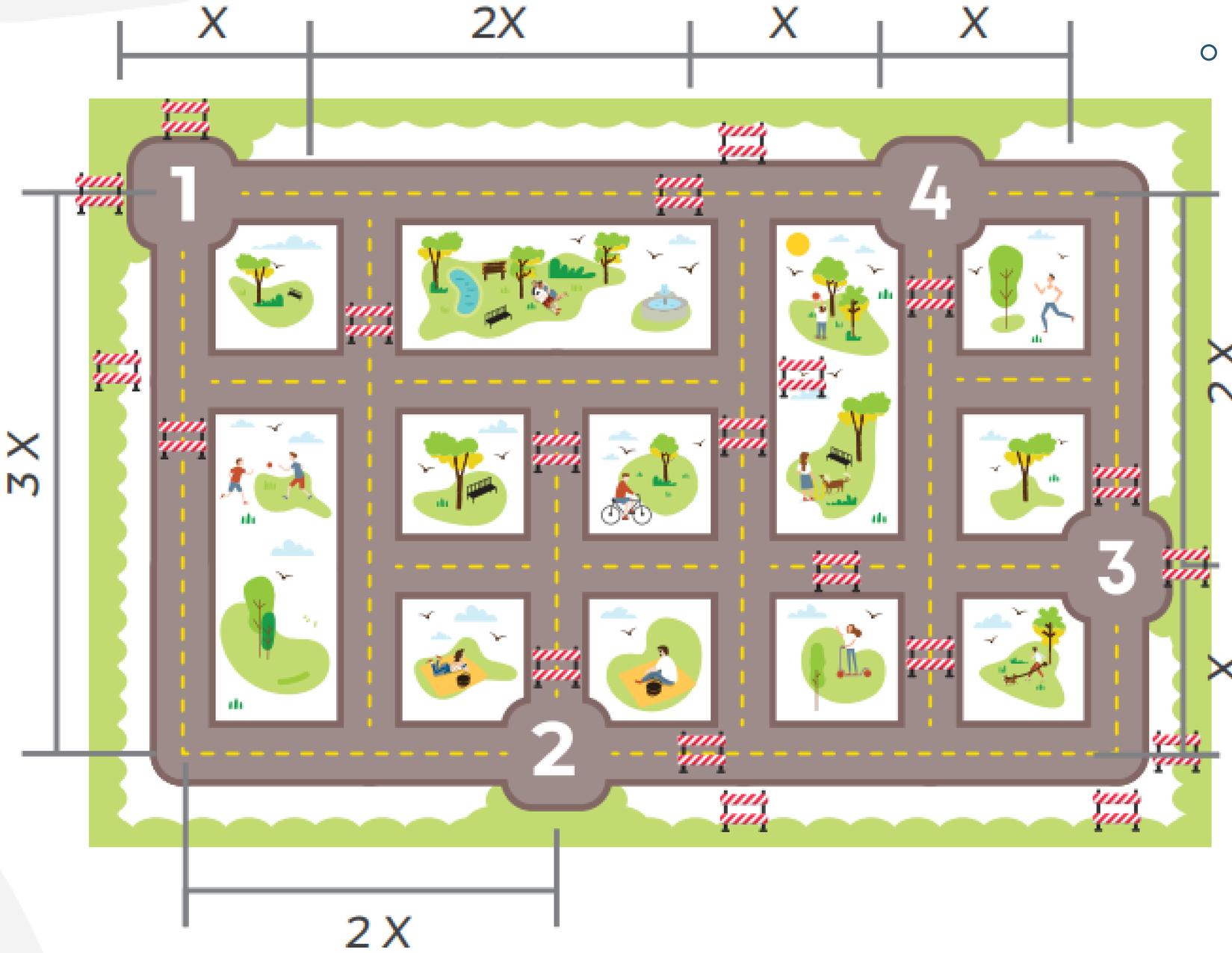
Try changing the RGB value and see what happens. Change the speed of the color change.



Mission 2.

Create a program using mBlock where the robot will follow the positions 2-1-4-3.

The area of a rectangle with sides 2X and 3X is 0.96m².



OURFRIEND
MRROBOT

MRROBOT.ORG.RS