1. Nezha Inventor Kit

1.1. Introduction

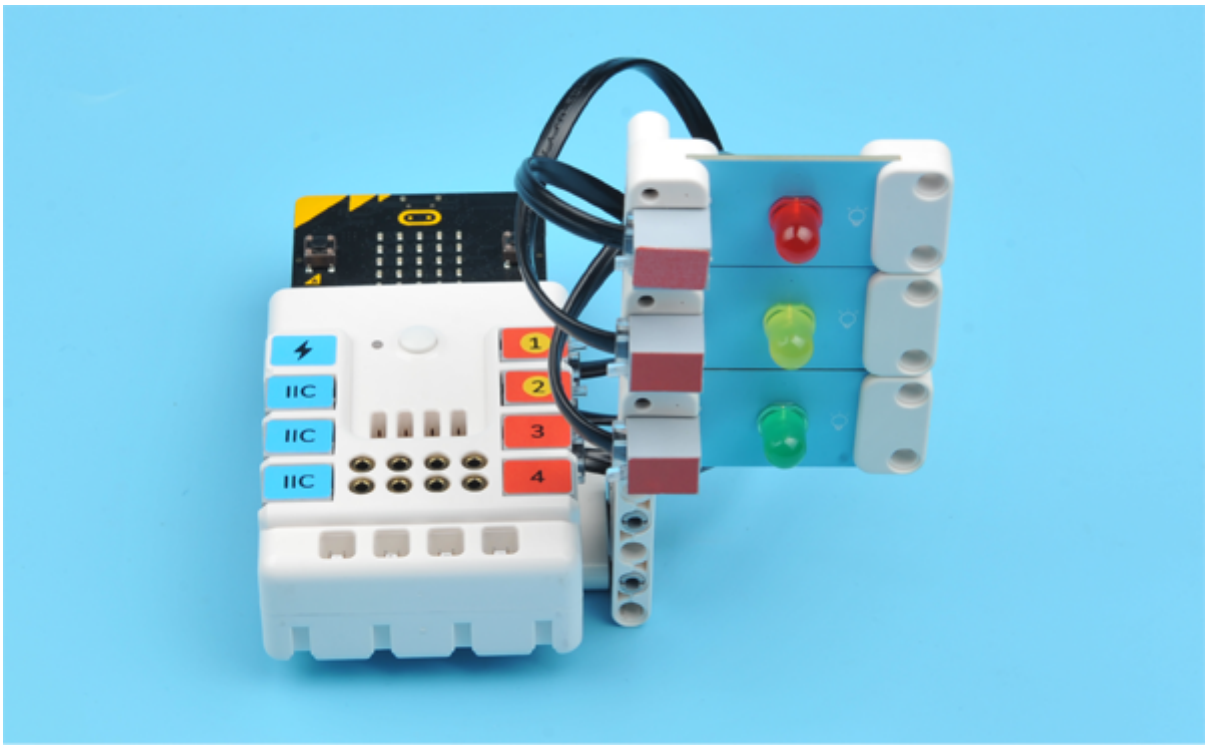
Based on Planet X sensors, Nezha Inventor's Kit is designed for BBC micro:bit. It contains multiple sensors and modules including LED, trimpot, soil moisture sensor, ultrasonic sensor, crash sensor, line-tracking sensor, etc., and also with over 400 pieces of bricks. We've built over 36 cases with this kit aiming to cultivate and inspire kids' creativity and imagination.

Make each kid be an inventor from Nezha Inventor's Kit!

2. Case 01: Traffic Lights

2.1. Introduction

To make a traffic lights system controlled by the micro:bit.



2.2. Quick Start

Materials Required

Nezha expansion board × 1

micro:bit × 1

LED-red × 1

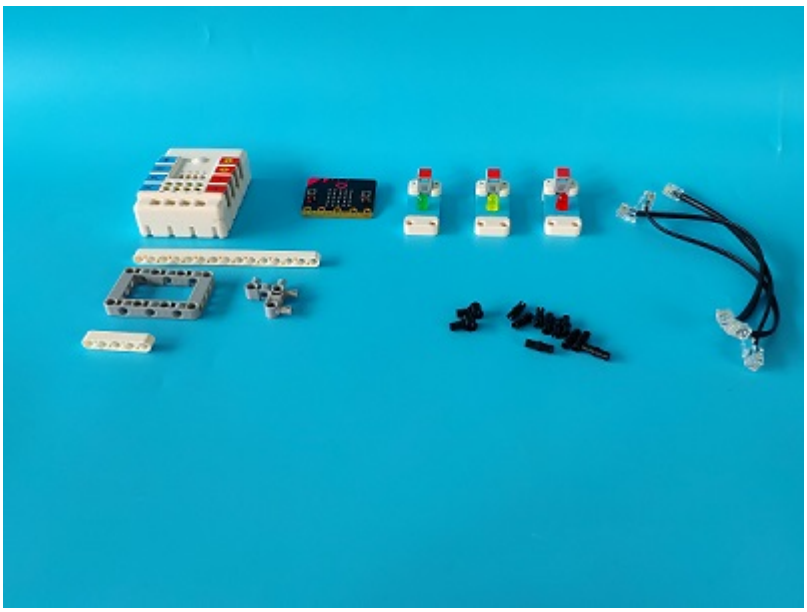
LED-green × 1

LED-yellow × 1

RJ11 wires × 3

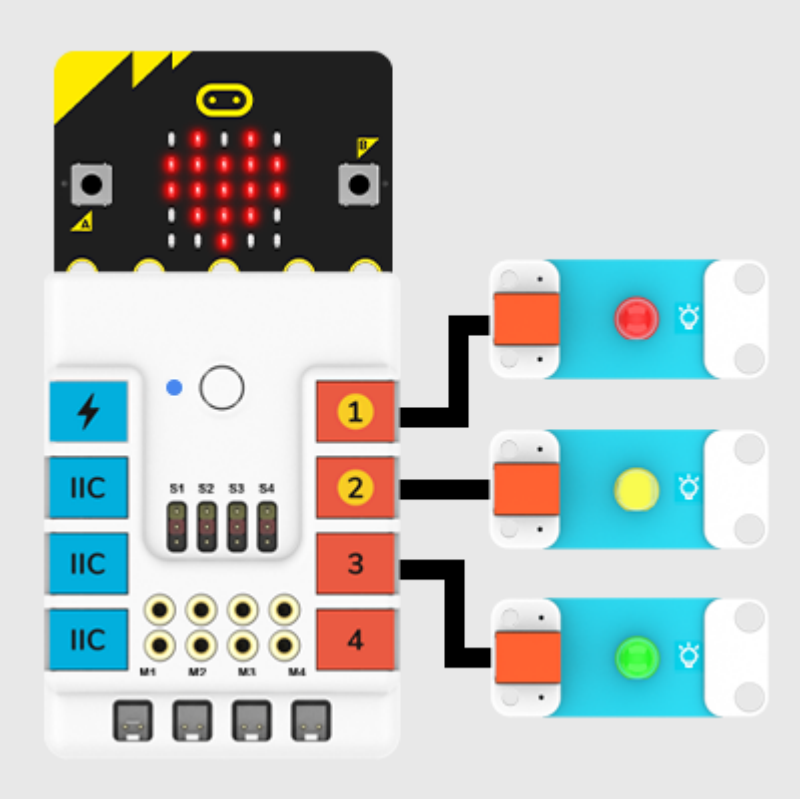
Bricks details

Bricks	qty
TECHNIC 5M BEAM	1
TECHNIC 15M BEAM	1
CONNECTOR PEG W. FRICTION	10
SINGLE BUSH 2M Ø4,9	2
Angular beam 90degr. w.4 snaps	1
BEAM FRAME 5X7 Ø 4.85	1

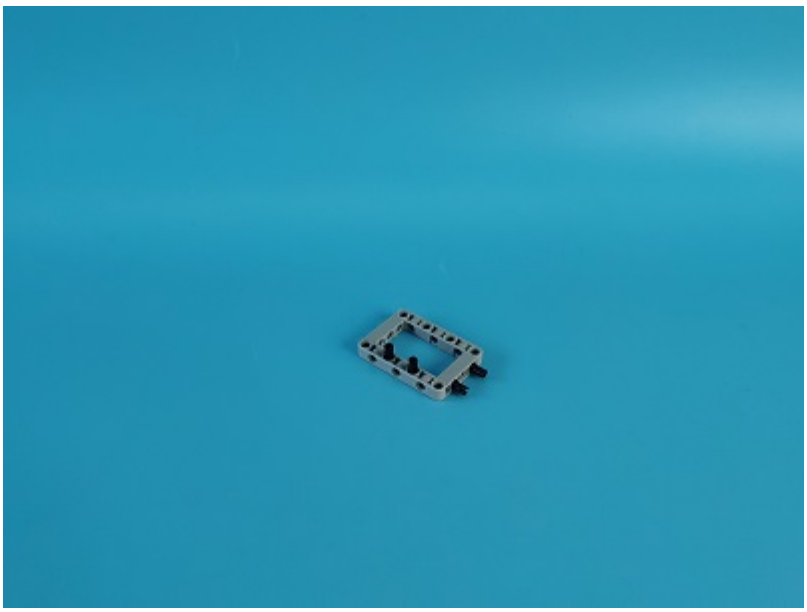


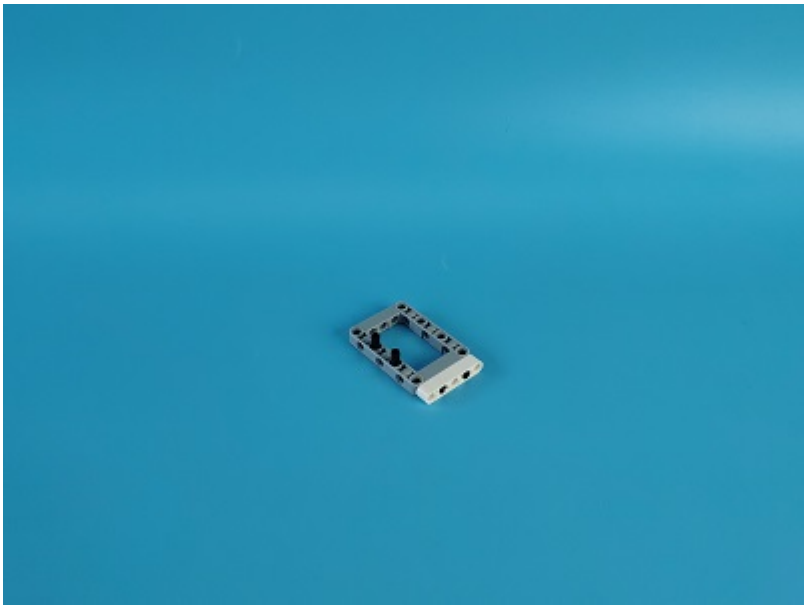
Connection Diagram

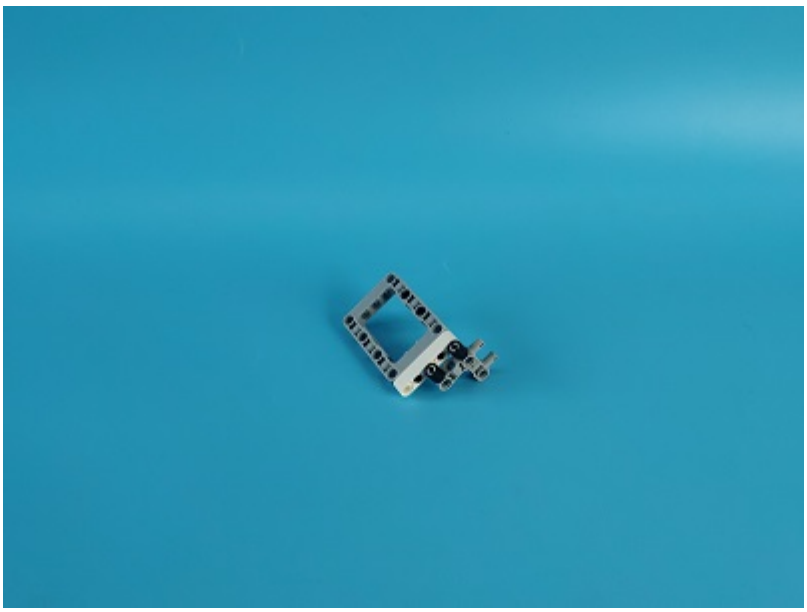
- Connect the red LED to J1, yellow LED to J2 and green LED to J3 on the Nezha expansion board as the picture shows.

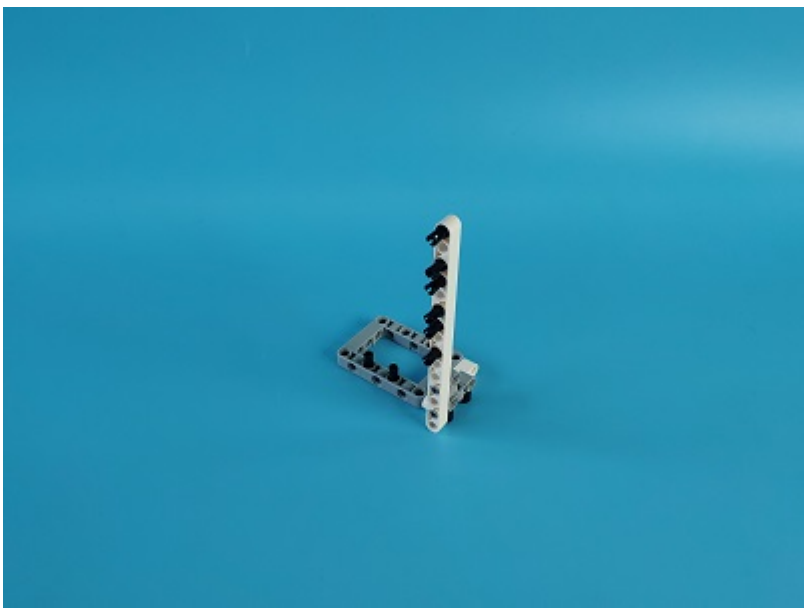


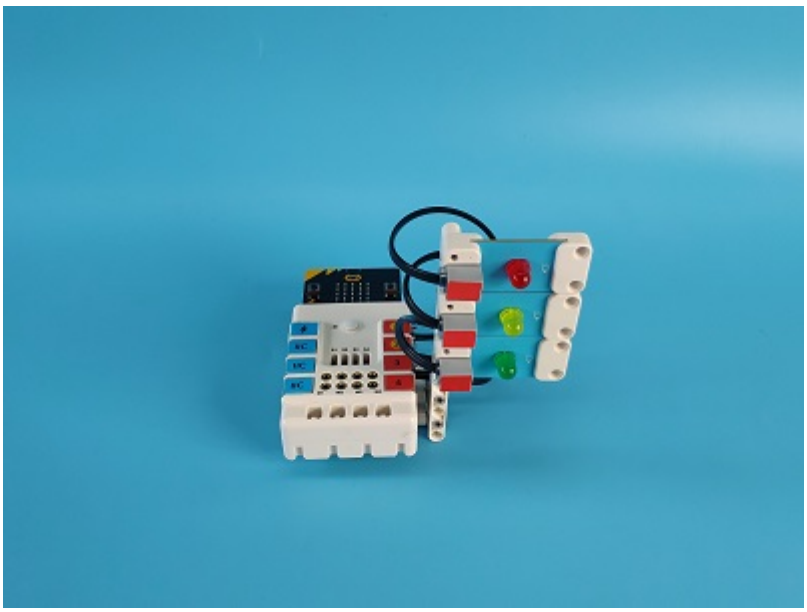
Assembly











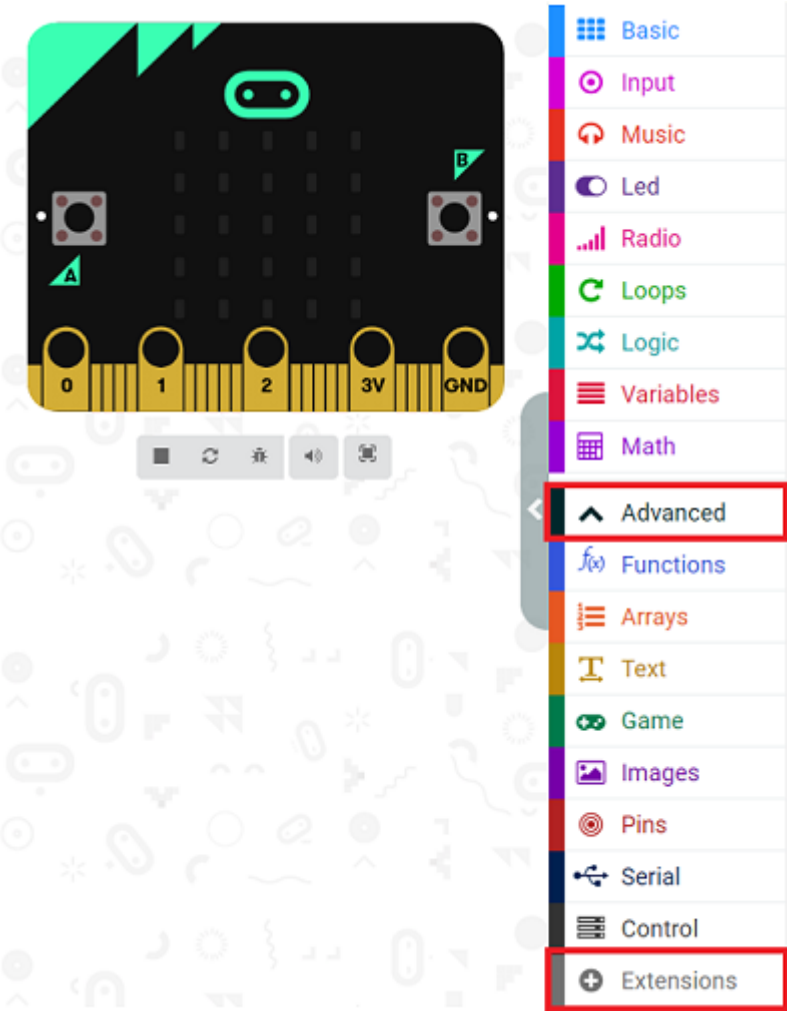
Video reference:https://youtu.be/TmsDDWLcgcs

Nezha Inventor's kit for microbit case 01 Traffic Lights

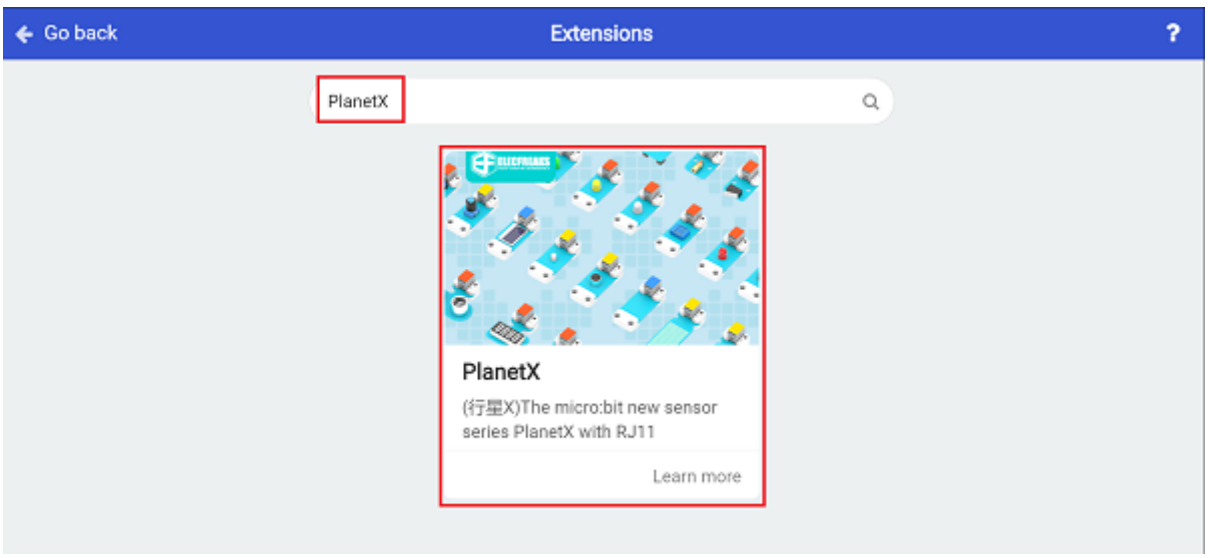
2.3. Makecode Programming

Step 1

Click “Advanced” in the MakeCode to see more choices.



For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “PlanetX” in the dialogue box to download it.



Notice: If you met a tip indicating that some codebases would be deleted due to incompatibility, you may continue as the tips say or create a new project in the menu.

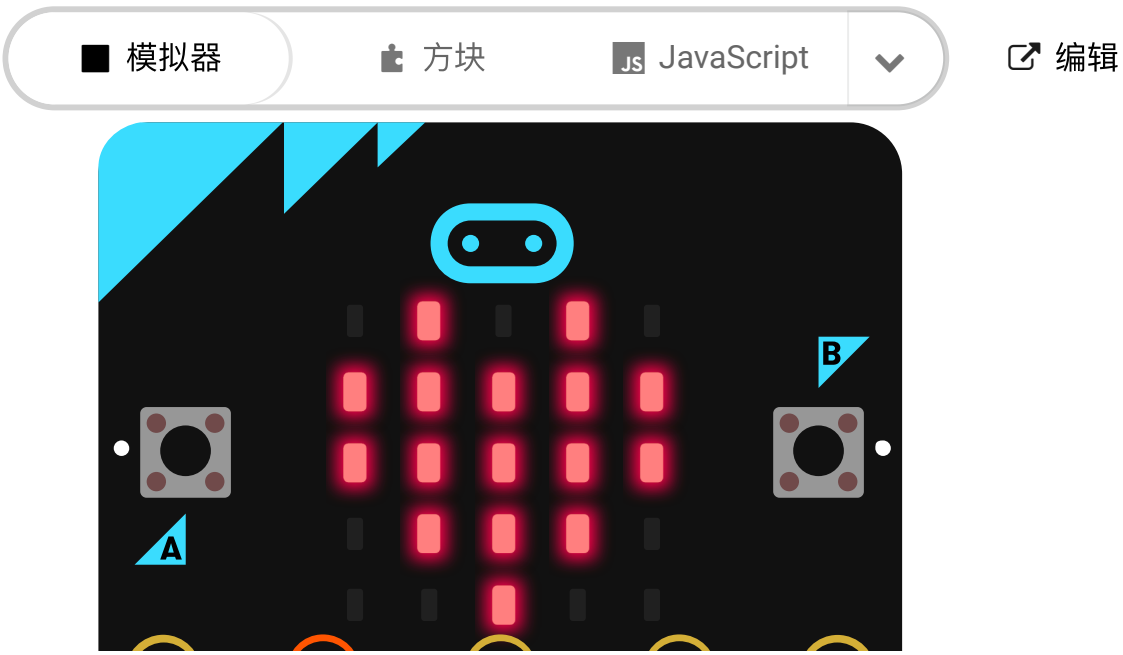
Step 2

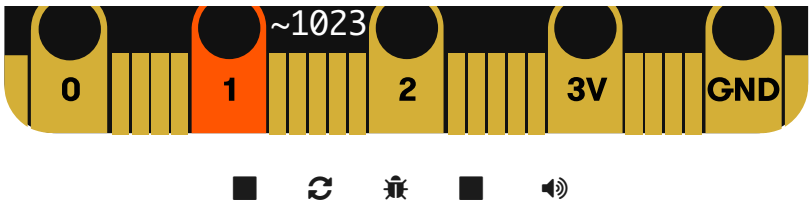
Code as below:

Reference

Link：https://makecode.microbit.org/_M6RiKA642WPP

You may also download it directly below:





Result

- The red LED lights on for 5 seconds and then lights off; the yellow LED lights on for 2 seconds and off then; the green LED lights on for 5 seconds and off then.

3. Case 02: Flower-watering Prompter

3.1. Introduction

To make a flower-watering prompter with a micro:bit.

3.2. Quick Start

Materials Required

Nezha expansion board × 1

micro:bit × 1

LED-red × 1

LED-green × 1

Soil moisture sensor × 1

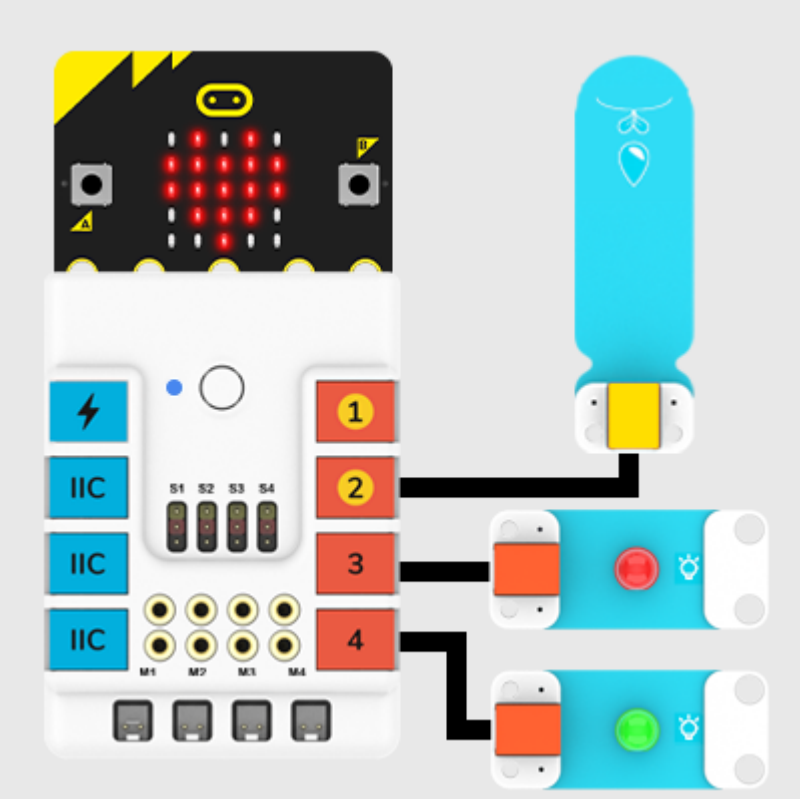
RJ11 wires × 3

Bricks details

Bricks	qty
TECHNIC 5M BEAM	1
TECHNIC 7M BEAM	4
TECHNIC 9M BEAM	1
CONNECTOR PEG W. FRICTION	14
SINGLE BUSH 2M Ø4,9	2
Angular beam 90degr. w.4 snaps	2
BEAM FRAME 5X7 Ø 4.85	1

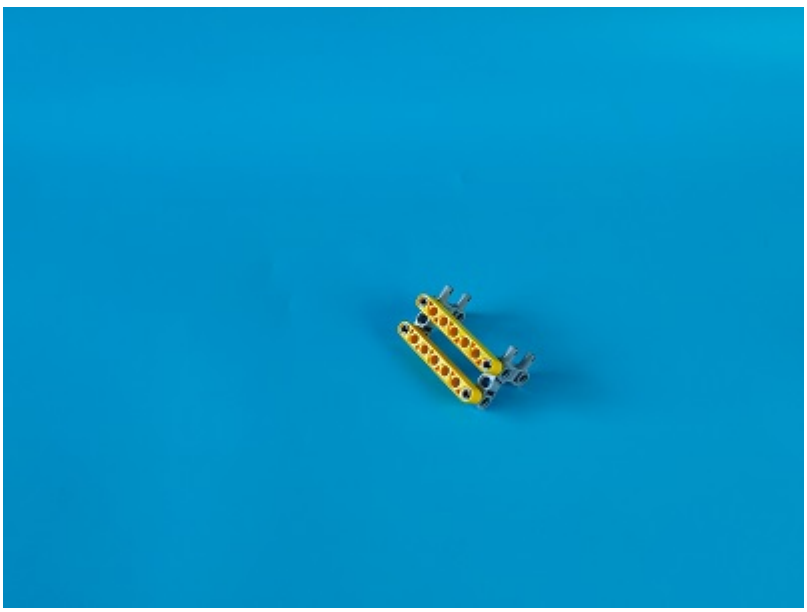
Connection Diagram

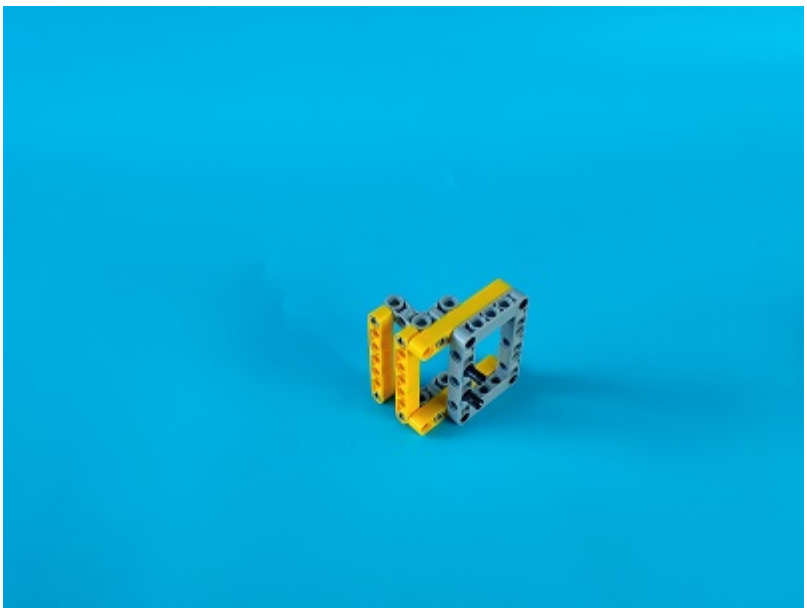
- Connect the green LED to J4, red LED to J3 and soil moisture sensor to J2 on the Nezha expansion board as the picture shows.

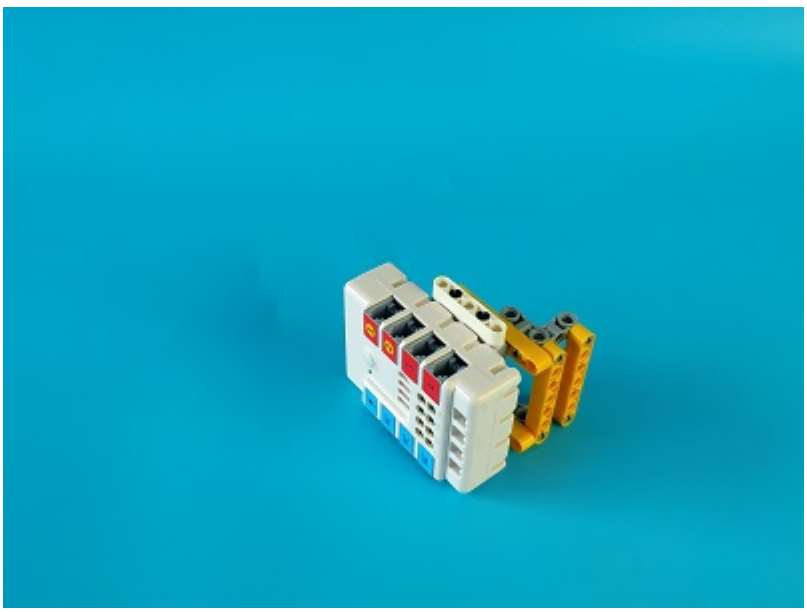


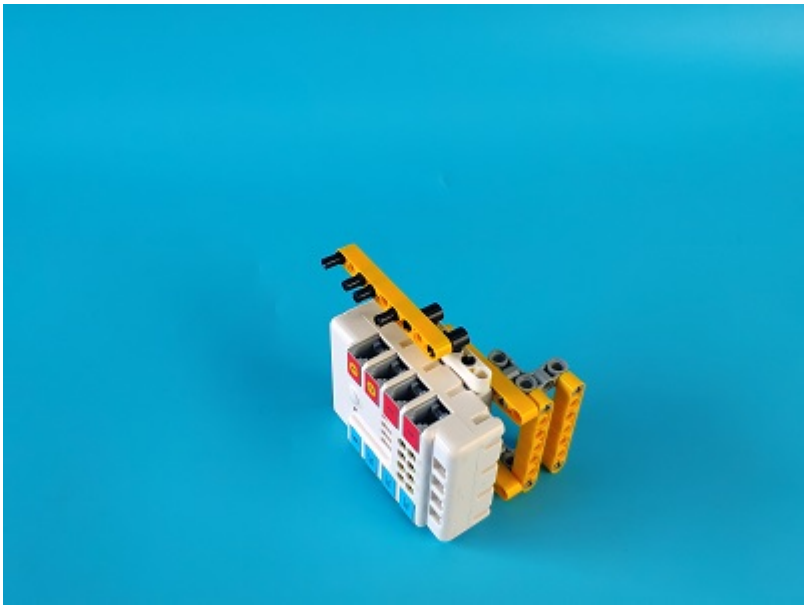
Assembly

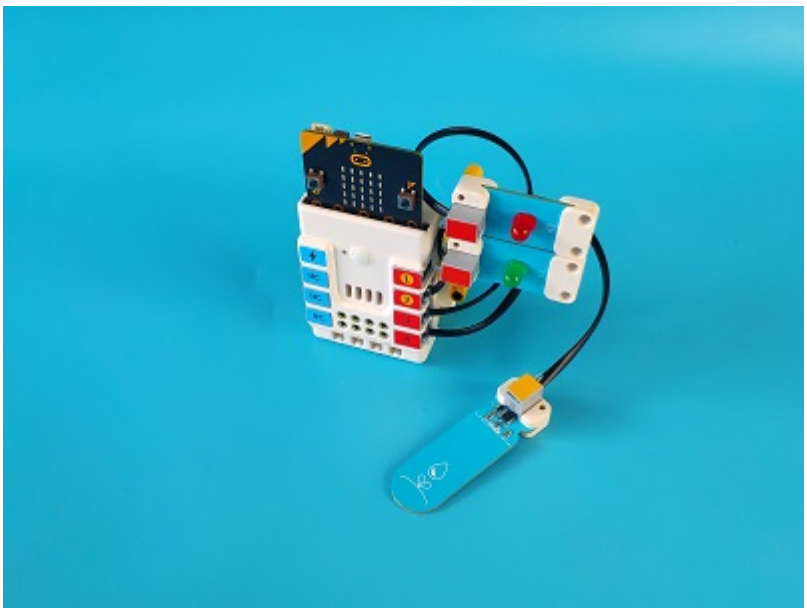
Build a device as the picture shows:









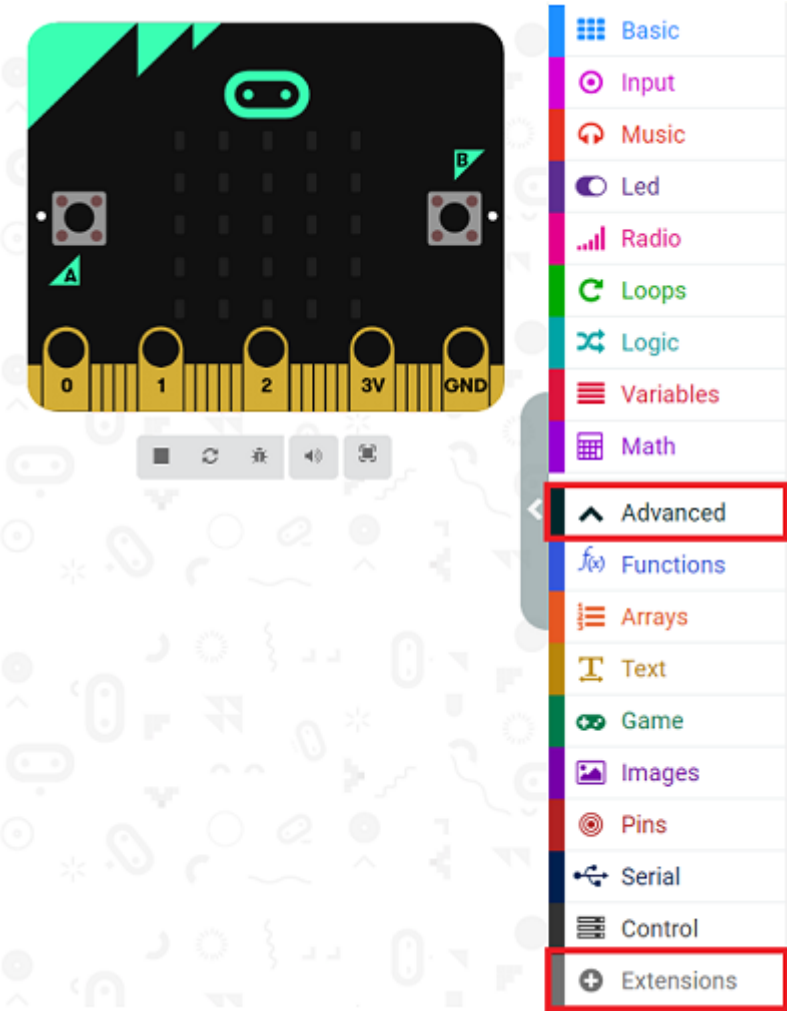


Video reference:https://youtu.be/YxEKEoDB6FQ

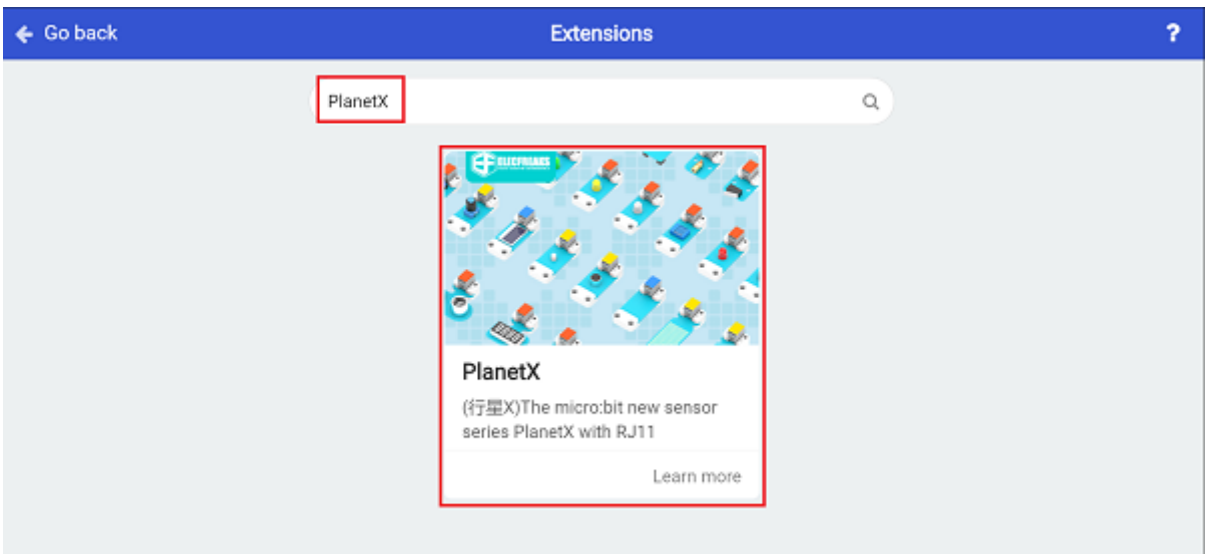
3.3. MakeCode Programming

Step 1

Click “Advanced” in the MakeCode to see more choices.



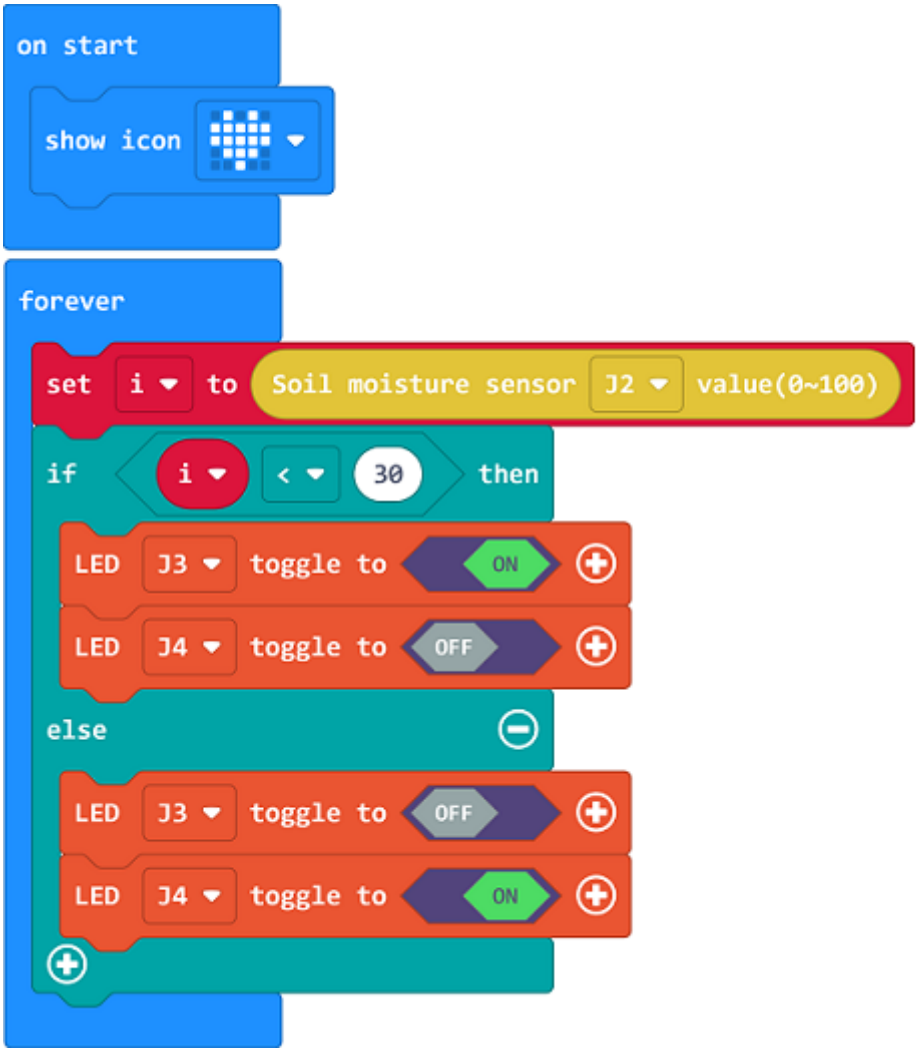
For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “PlanetX” in the dialogue box to download it.



Notice: If you met a tip indicating that some codebases would be deleted due to incompatibility, you may continue as the tips say or create a new project in the menu.

Step 2

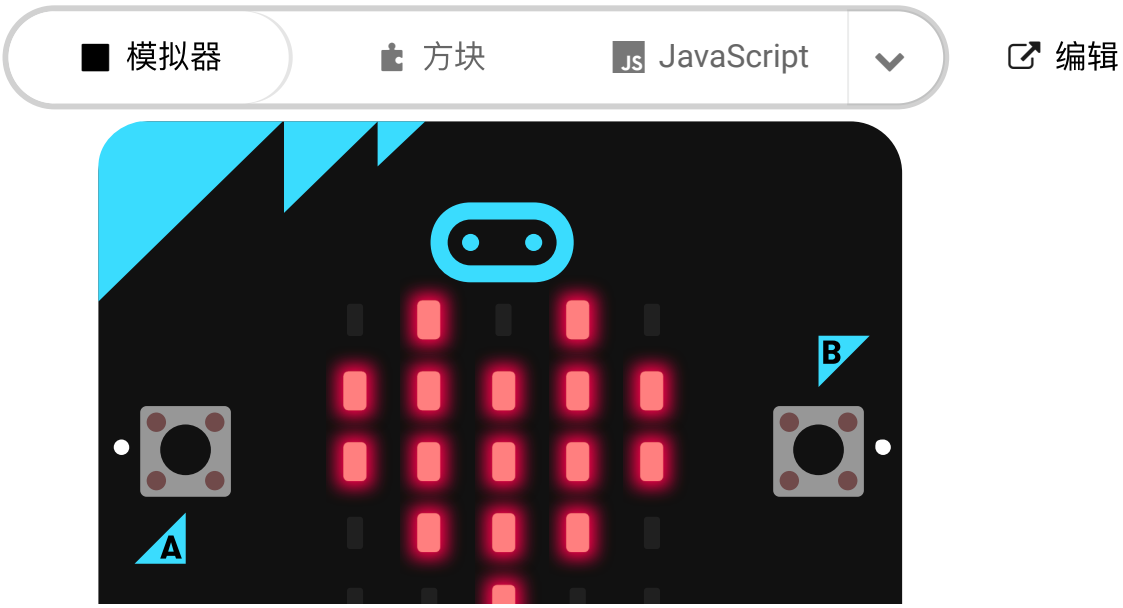
Code as below:

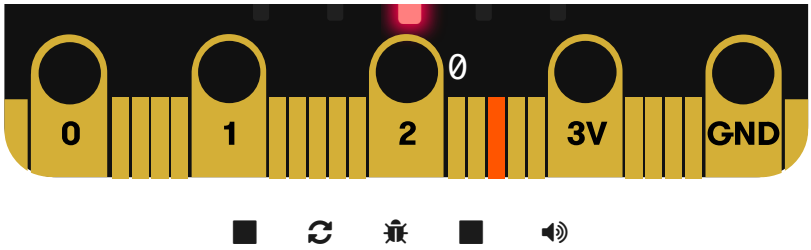


Reference

Link：https://makecode.microbit.org/_2FgMYuLiUeE8

You may also download it directly below:





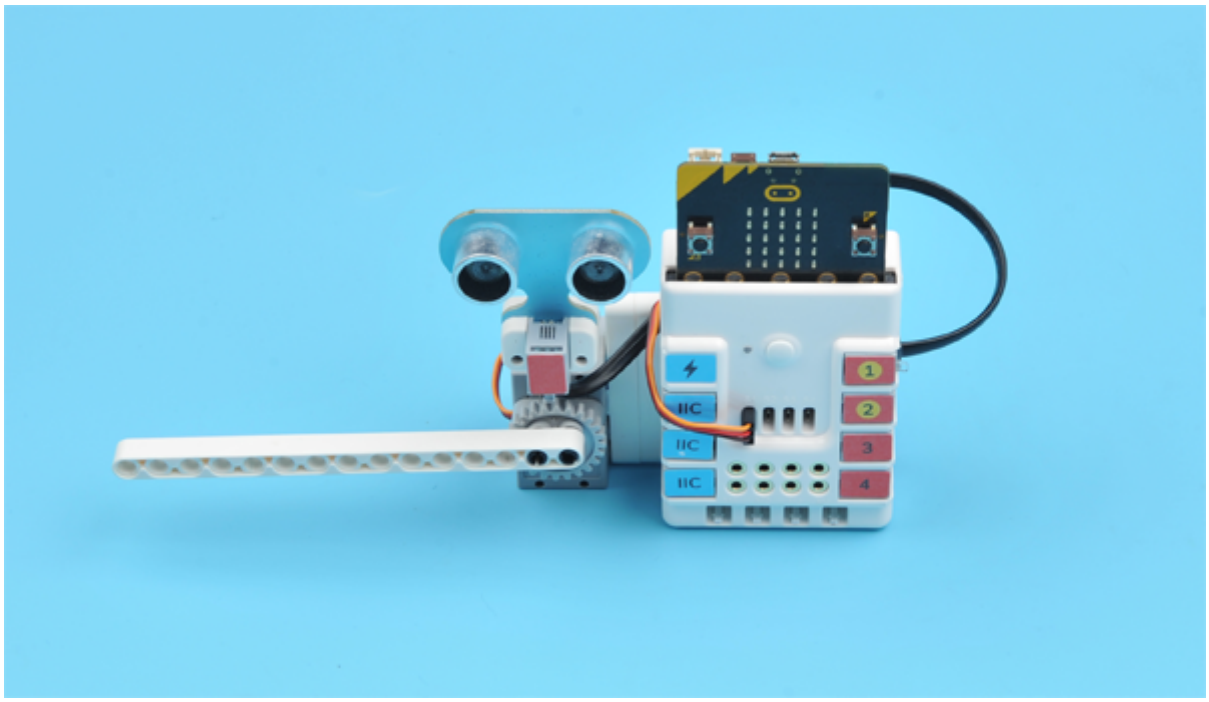
Result

- The red LED lights on for reminding of watering if the soil moisture sensors gets a low value from the earth, or the green LED lights on.

4. Case 03: Automatic Gate

4.1. Introduction

To make an automatic gate with the ultrasonic sound sensor controlled by the micro:bit.



4.2. Quick Start

Materials Required

Nezha expansion board × 1

micro:bit × 1

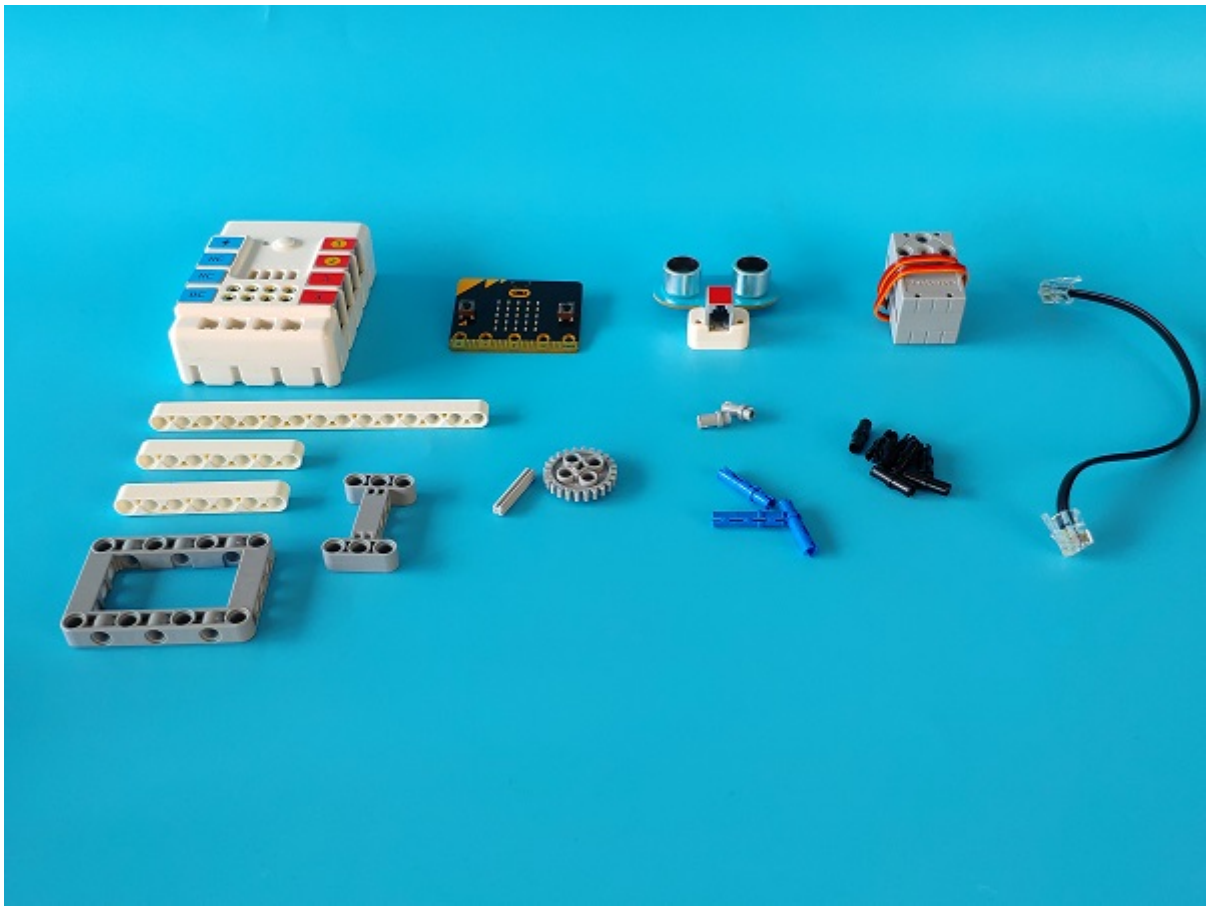
360° servo × 1

Sonar:bit × 1

RJ11 wire × 1

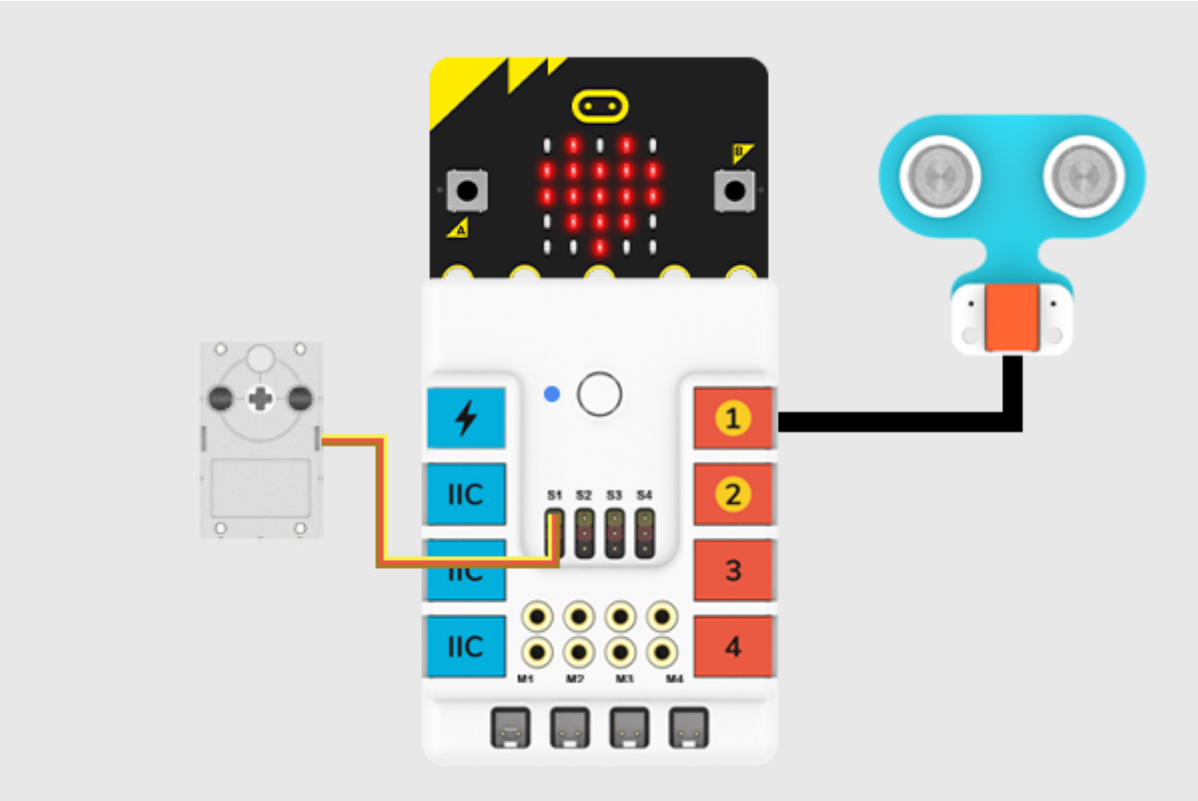
Bricks details

Bricks	qty
TECHNIC 7M BEAM	2
TECHNIC 15M BEAM	1
1 1/2 M CONNECTING BUSH	2
CONNECTOR PEG W. FRICTION	7
CROSS AXLE 3M	1
CONNECTOR PEG W. FRICTION 3M	3
BEAM FRAME 5X7 Ø 4.85	1
GEAR WHEEL Z24	1
BEAM I -FRAME 3X5 90 DEGR. HOLE Ø4.85	1



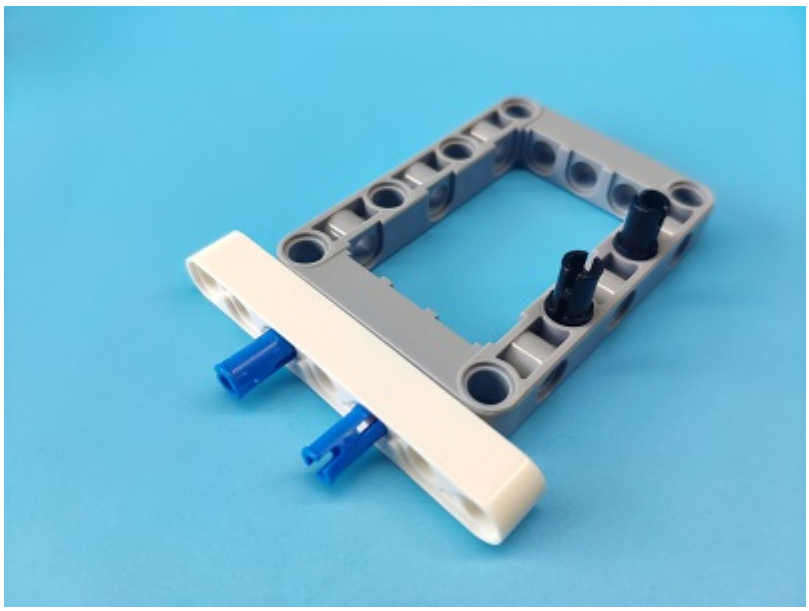
Connection Diagram

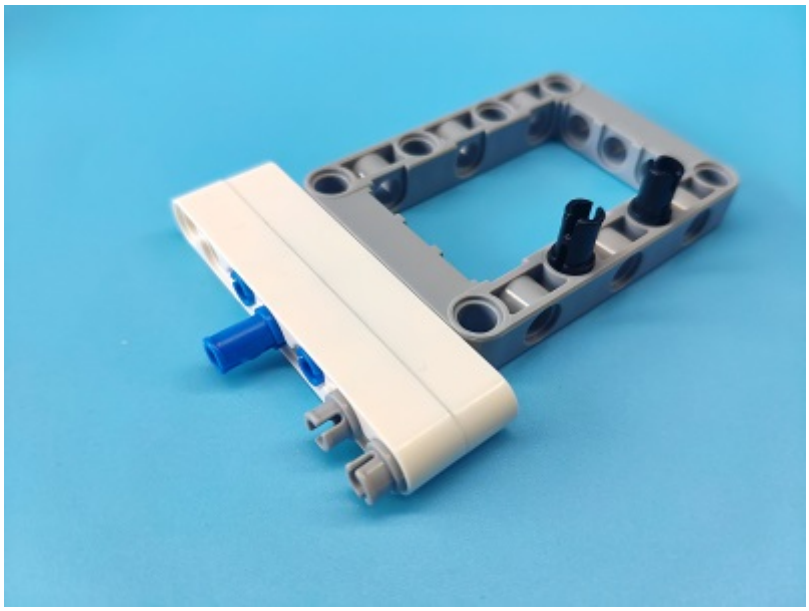
- Connect the 360° servo to S1 and the ultrasonic sound sensor to J1 on the Nezha expansion board as the picture shows.

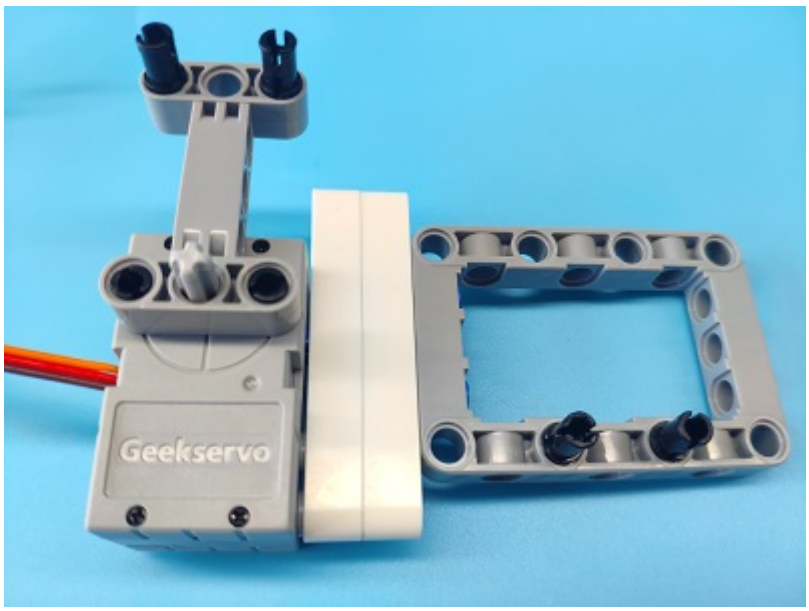


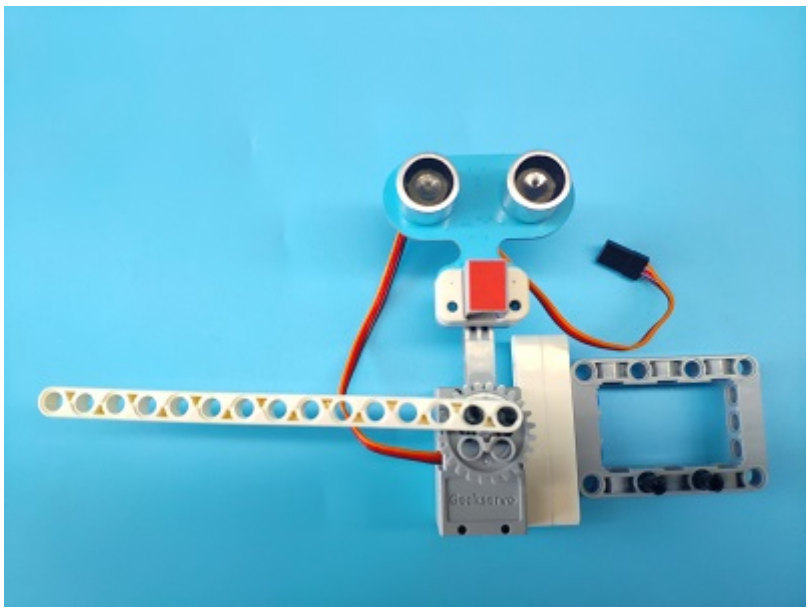
Assembly

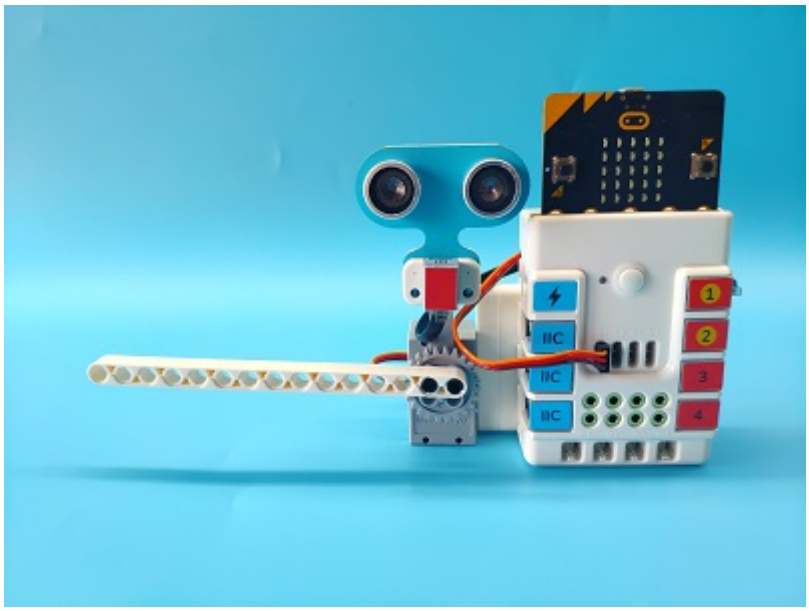
Build a device as the picture shows:






Geekservo



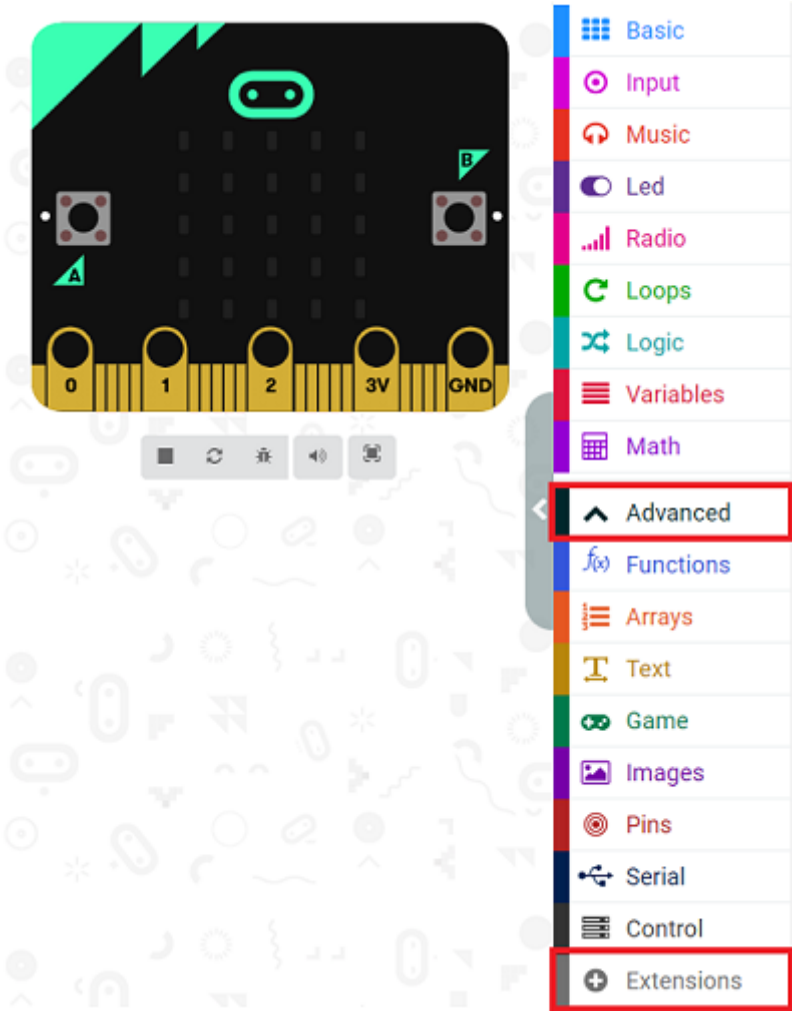


Video reference: https://youtu.be/nOh7YCmcotA

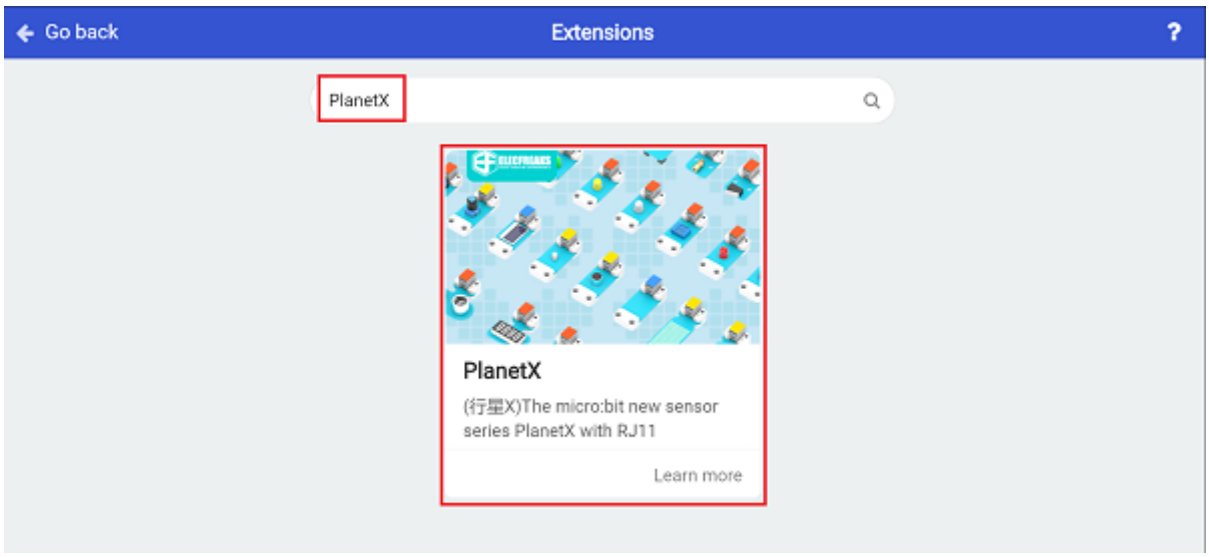
4.3. MakeCode Programming

Step 1

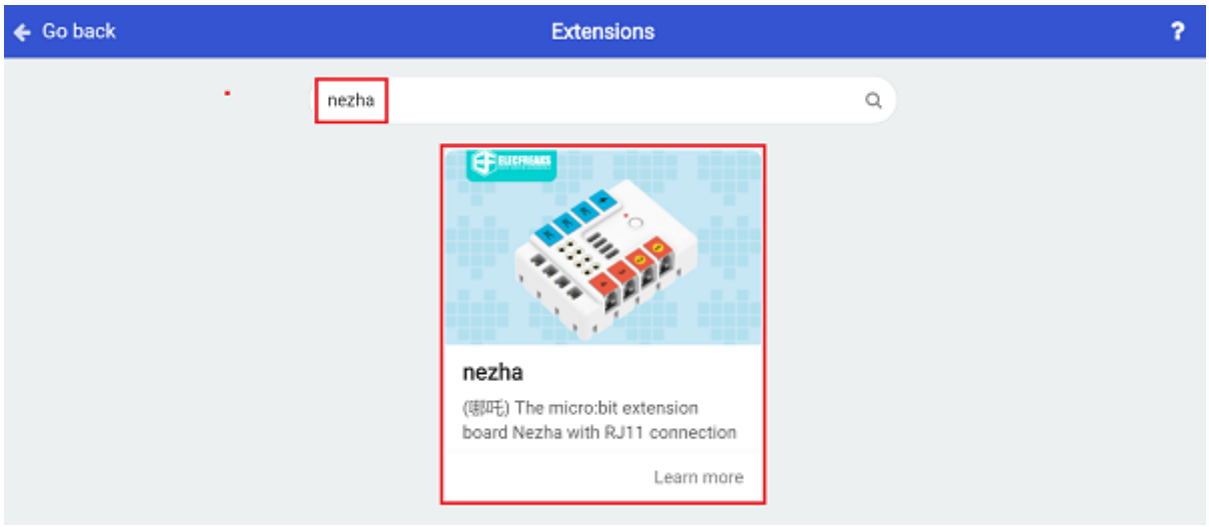
Click “Advanced” in the MakeCode to see more choices.



For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “PlanetX” in the dialogue box to download it.



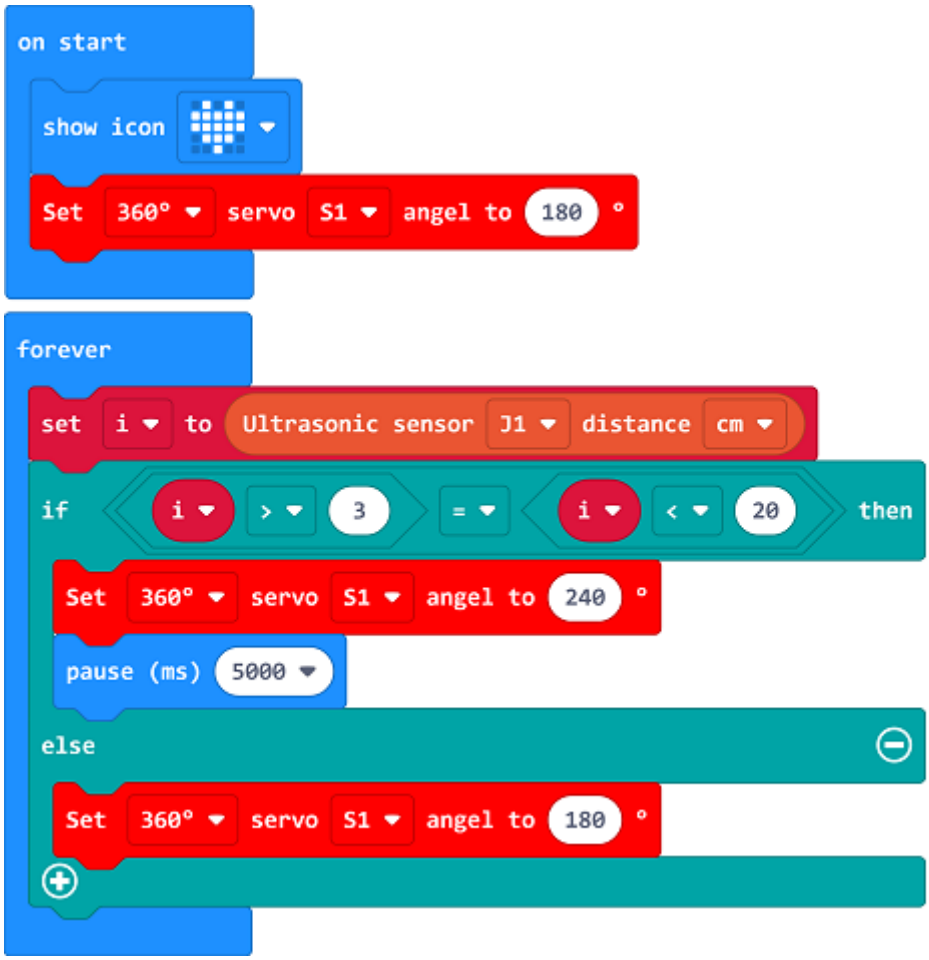
For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “nezha” in the dialogue box to download it.



Notice: If you met a tip indicating that some codebases would be deleted due to incompatibility, you may continue as the tips say or create a new project in the menu.

Step 2

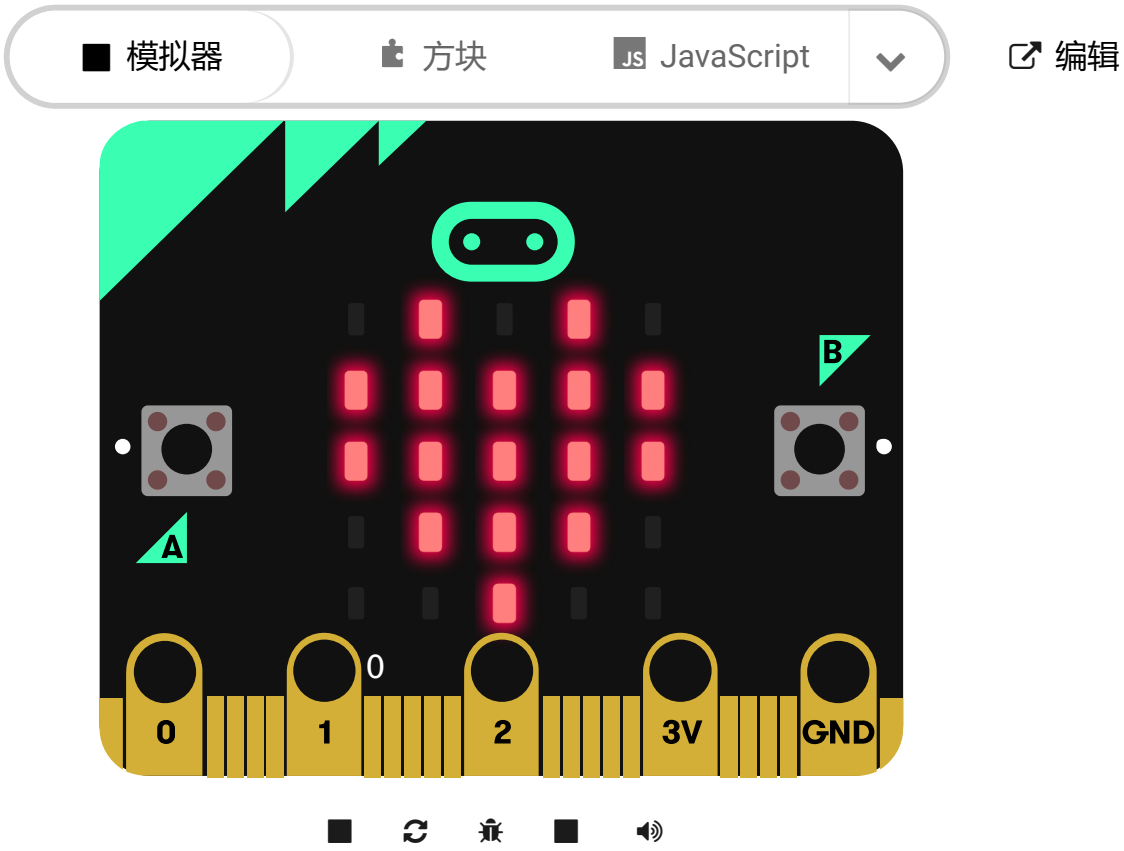
Code as below:



Reference

Link: https://makecode.microbit.org/_VqieaTVyeUXx

You may also download it directly below:



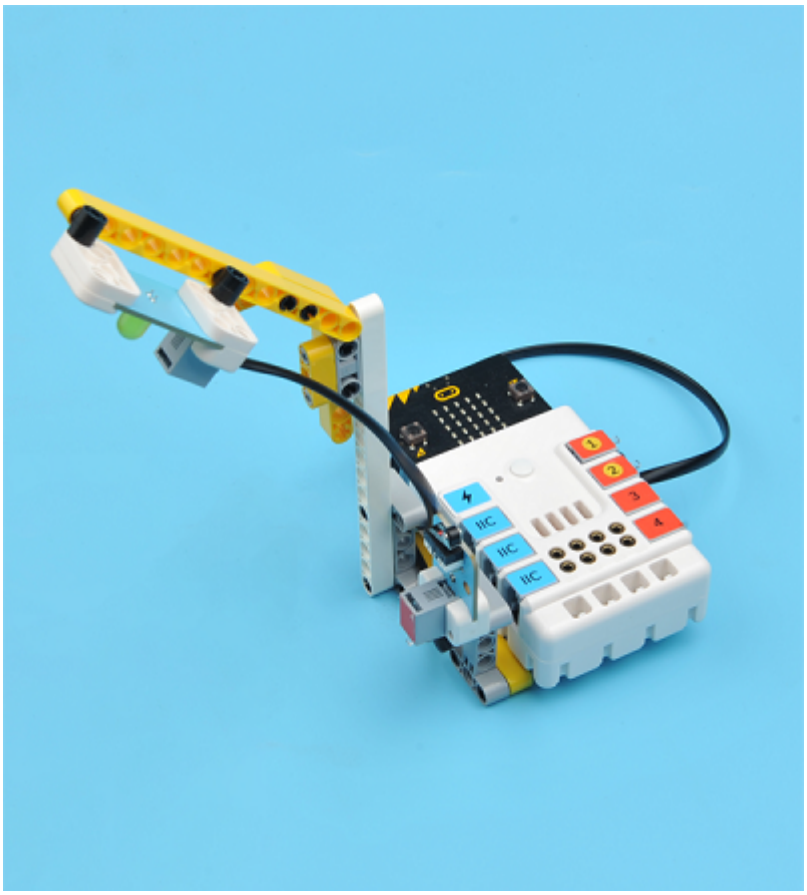
Result

- While the ultrasonic sound sensor detects any object, the gate opens automatically.

5. Case 04: Mini Table Lamps

5.1. Introduction

To make a mini table lamp with a micro:bit.



5.2. Quick Start

Materials Reuqired

Nezha expansion board × 1

micro:bit × 1

LED-yellow × 1

Crash sensor × 1

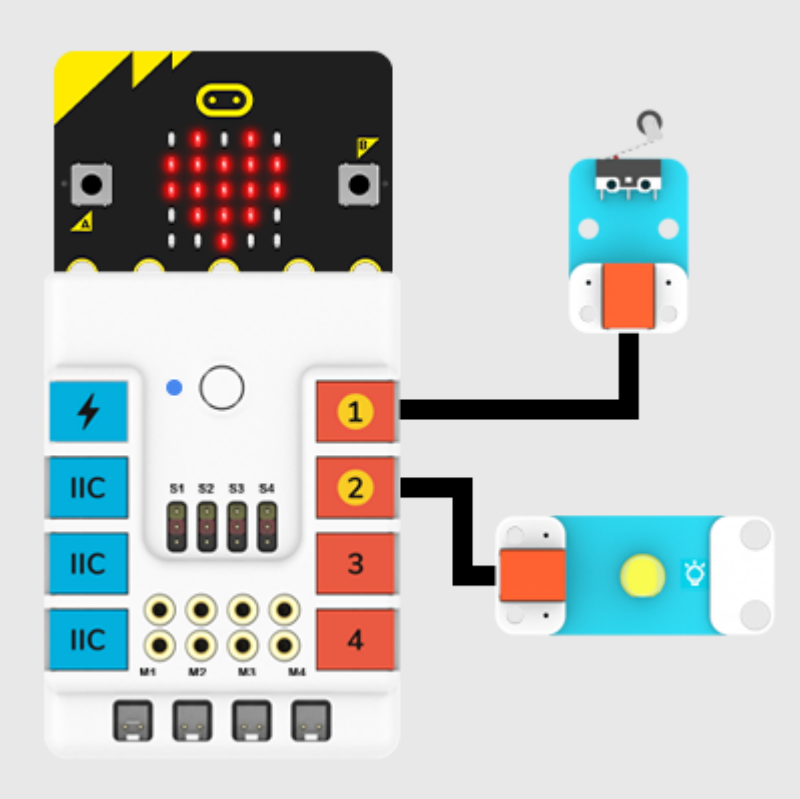
RJ11 wires × 2

Bricks details

Bricks	qty
TECHNIC 3M BEAM	1
TECHNIC 9M BEAM	1
TECHNIC 13M BEAM	1
TECHNIC 15M BEAM	1
DOUBLE ANGULAR BEAM 3X7 45°	1
CONNECTOR PEG W. FRICTION	18
BEAM 3 M. W/4 SNAPS	1
BEAM FRAME 5X7 Ø 4.85	1
SINGLE BUSH 2M Ø4,9	2
BEAM I -FRAME 3X5 90 DEGR. HOLE Ø4.85	1

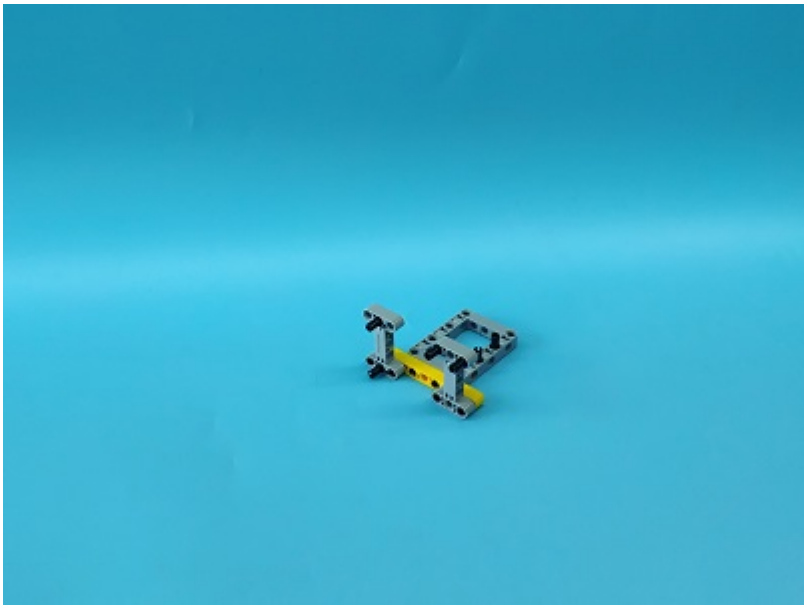
Connection Diagram

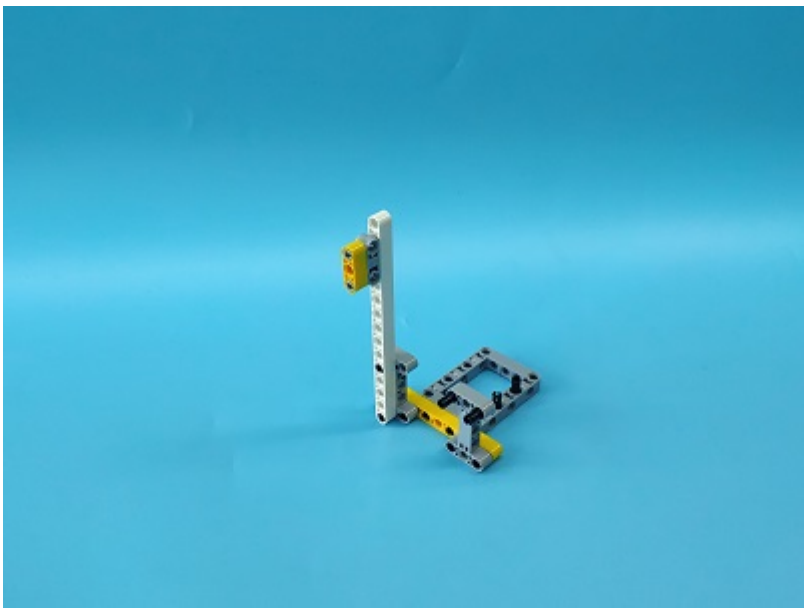
- Connect the crash sensor to J1 and the yellow LED to J2 on the Nezha expansion board as the picture shows.

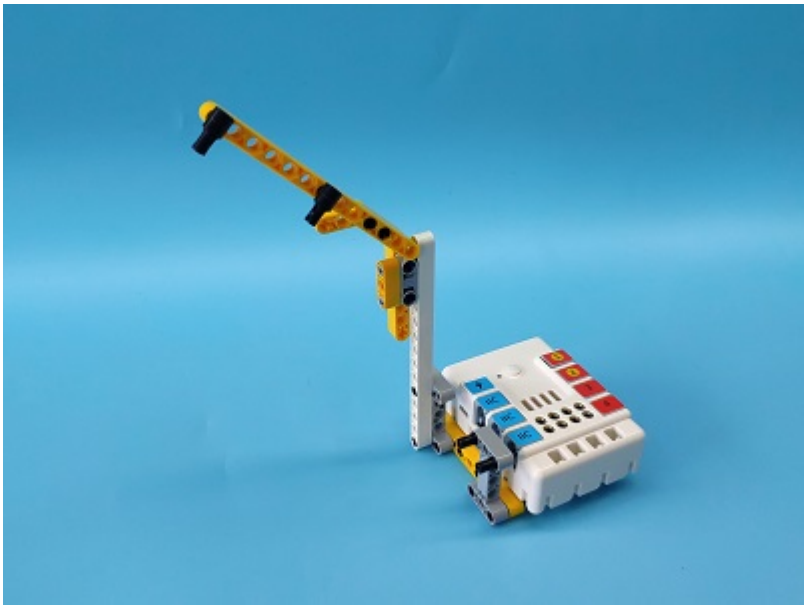


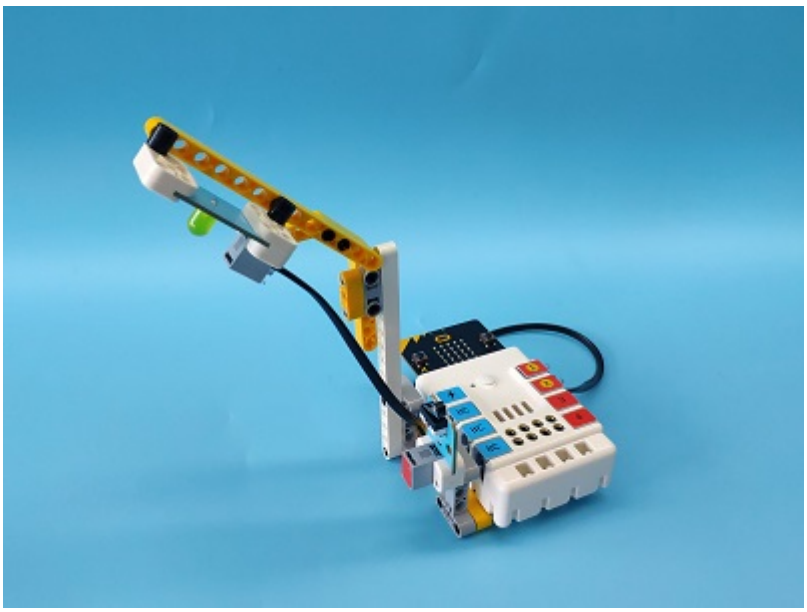
Assembly

Build a device as the picture shows:







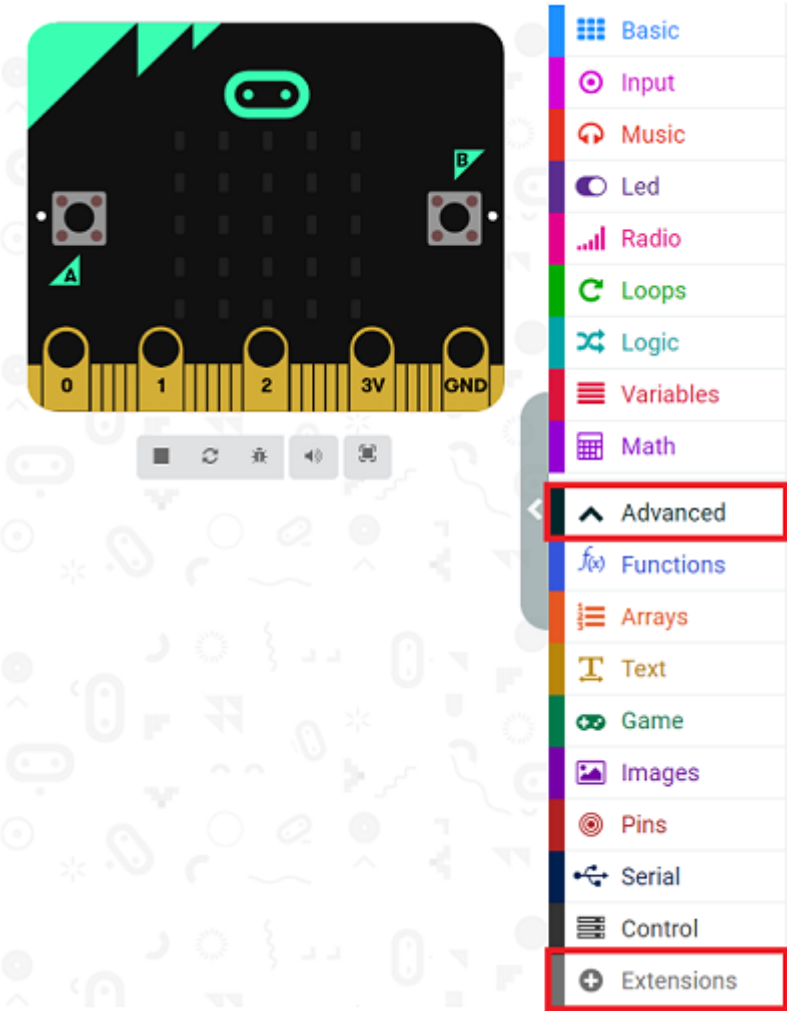


Video reference:https://youtu.be/BBP1Nx6t090

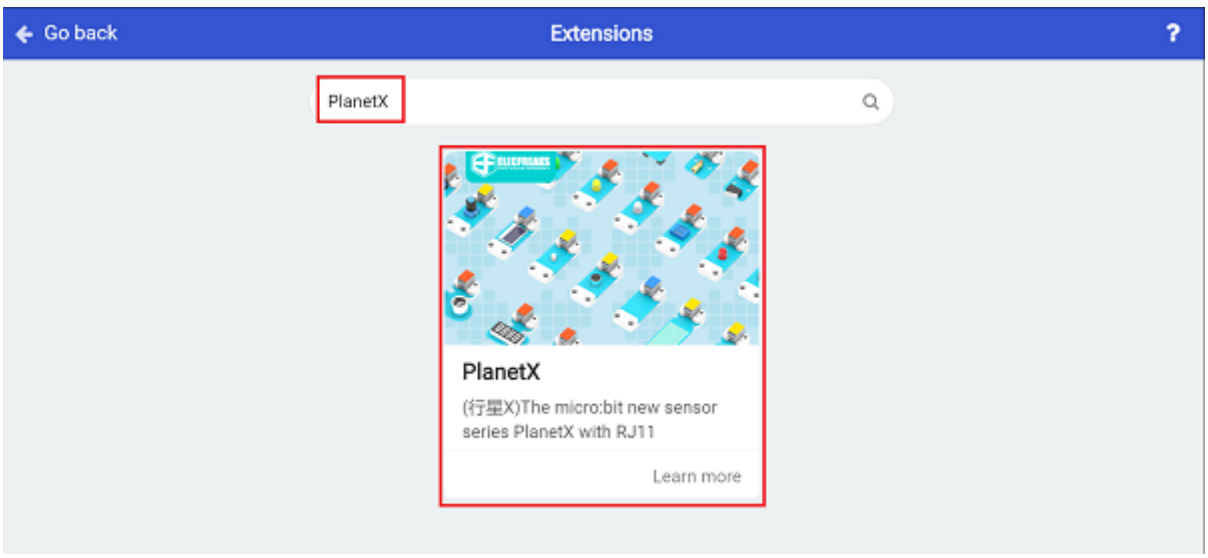
5.3. MakeCode Programming

Step 1

Click “Advanced” in the MakeCode to see more choices.



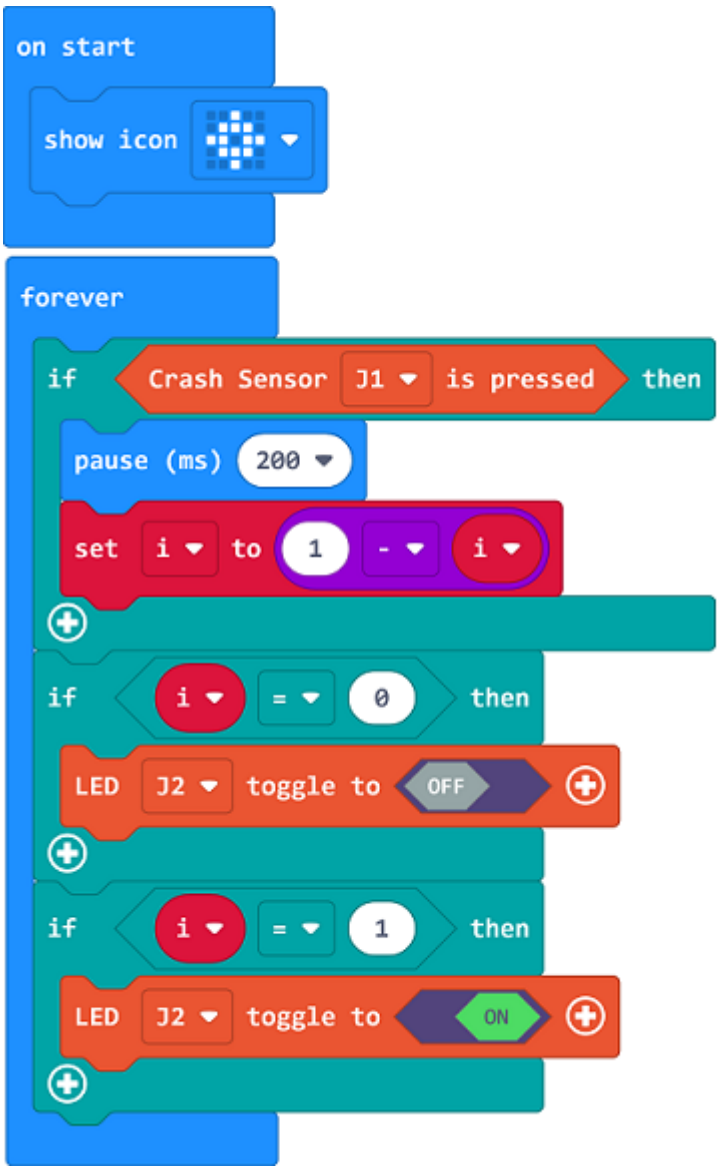
For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “PlanetX” in the dialogue box to download it.



Notice: If you met a tip indicating that some codebases would be deleted due to incompatibility, you may continue as the tips say or create a new project in the menu.

Step 2

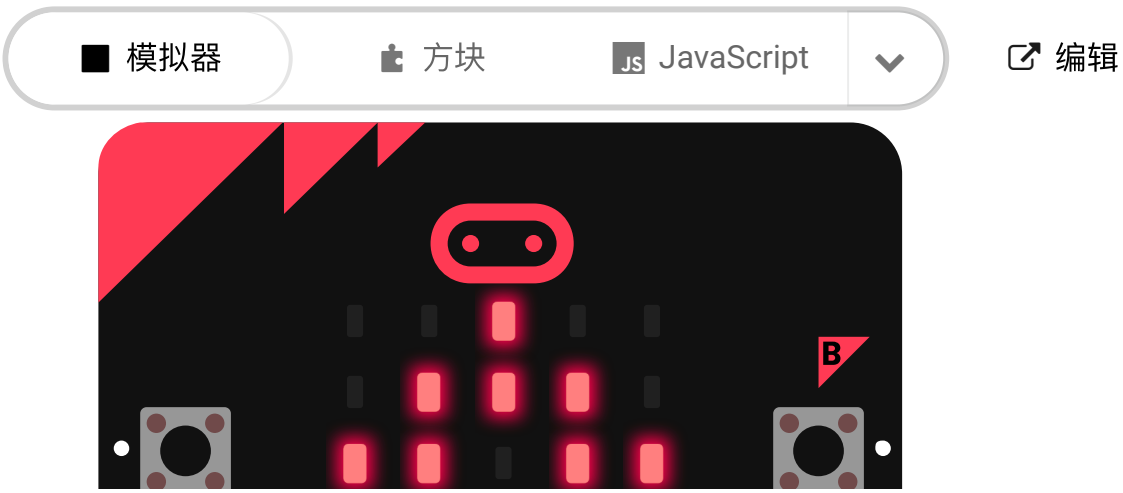
Code as below:

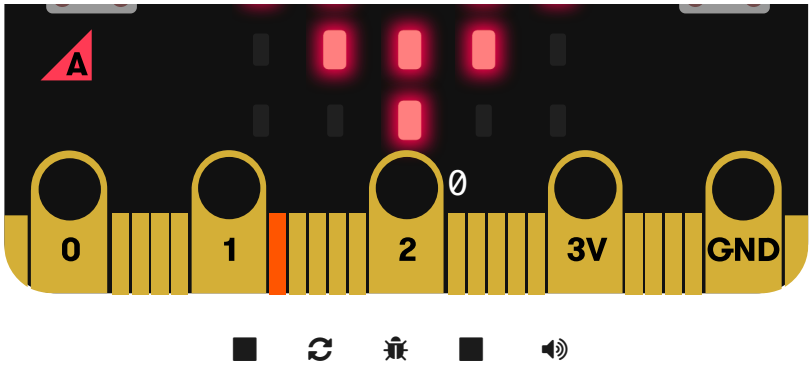


Reference

Link：https://makecode.microbit.org/_J9Lc271kpHiD

You may also download it directly below:





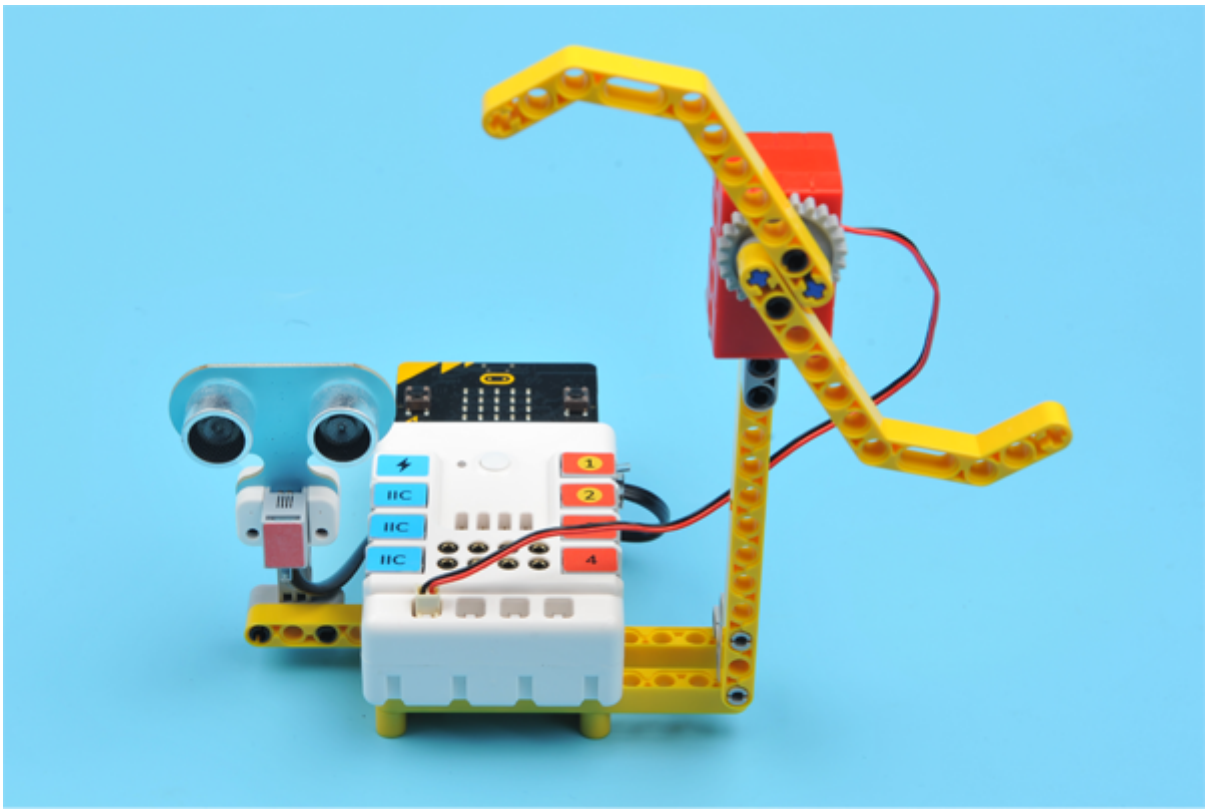
Result

- The crash sensor controlls the on/off of the LED.

6. Case 05: Automatic Dryer

6.1. Introduction

To make an automatic dryer with a micro:bit.



6.2. Quick Start

Materials Required

Nezha expansion board × 1

micro:bit × 1

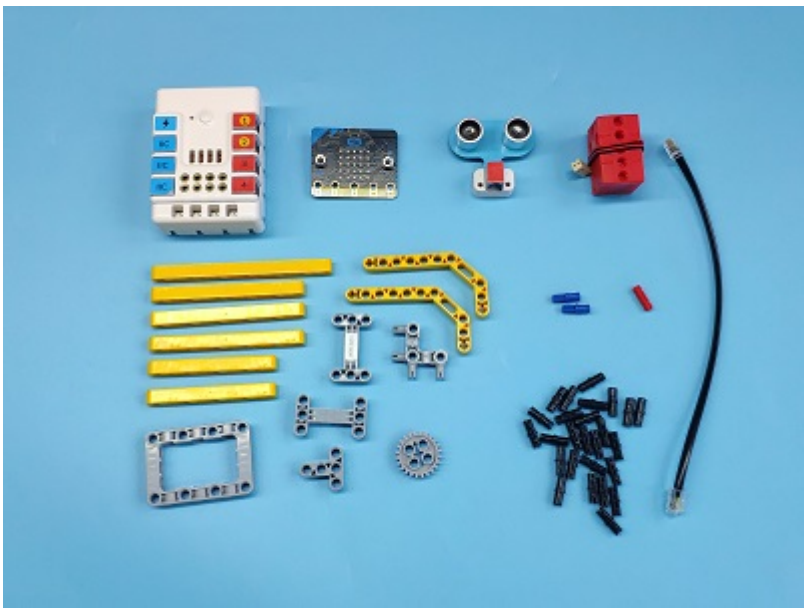
Sonar:bit × 1

Motor × 1

RJ11 wires × 1

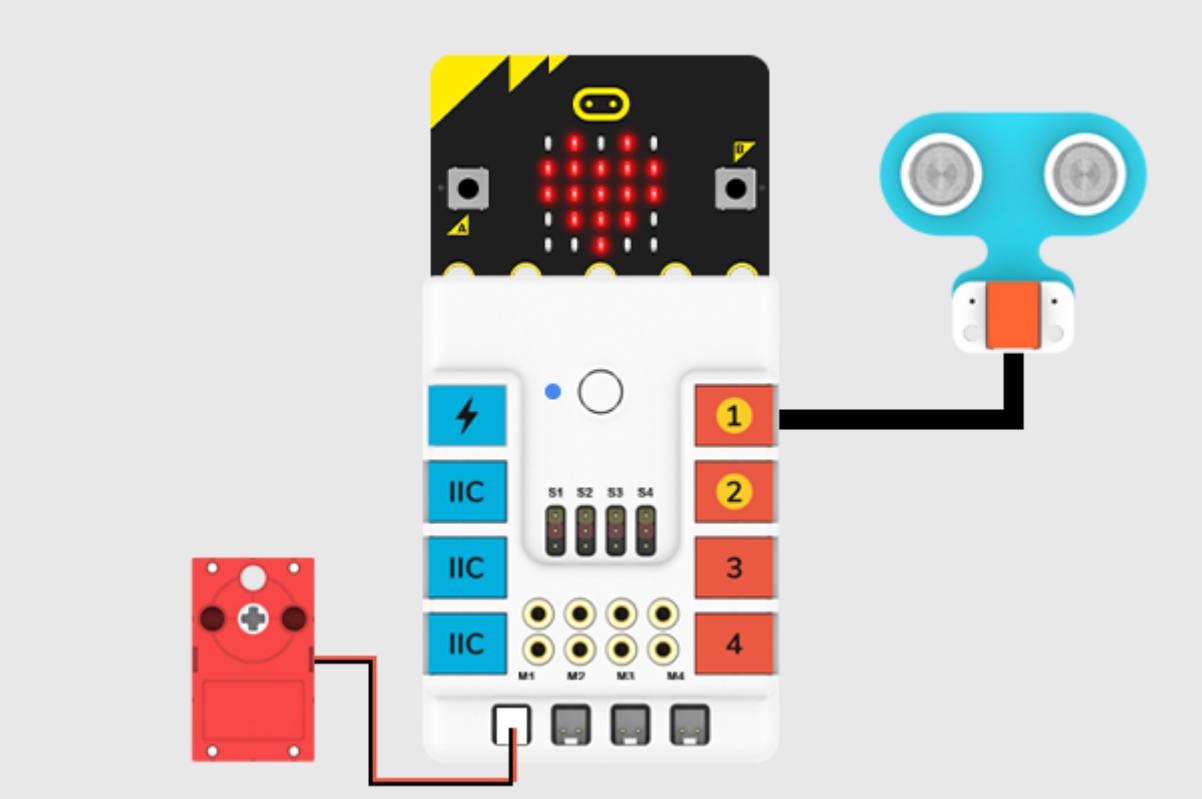
Bricks details

Bricks	qty
TECHNIC 9M BEAM	2
T-BEAM 3X3 W/HOLE Ø4.8	1
TECHNIC 11M BEAM	3
TECHNIC 13M BEAM	1
DOUBLE ANGULAR BEAM 3X7 45°	2
2M CROSS AXLE W. GROOVE	1
CONNECTOR PEG W. FRICTION	26
CONN.BUSH W.FRIC./CROSSALE	2
Angular beam 90degr. w.4 snaps	1
BEAM FRAME 5X7 Ø 4.85	1
GEAR WHEEL Z24	1
BEAM I -FRAME 3X5 90 DEGR. HOLE Ø4.85	2



Connection Diagram

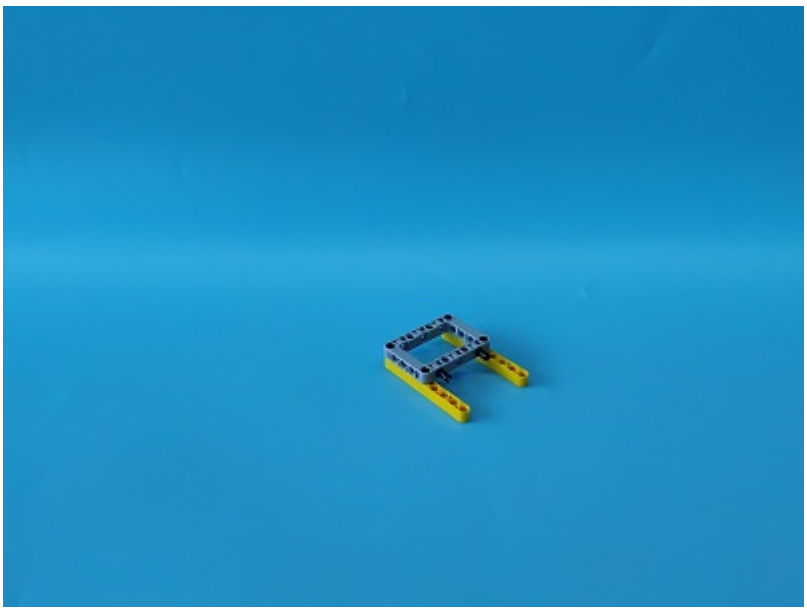
- Connect the sonar:bit to J1 and the motor to M1 on the Nezha expansion board as the picture shows.

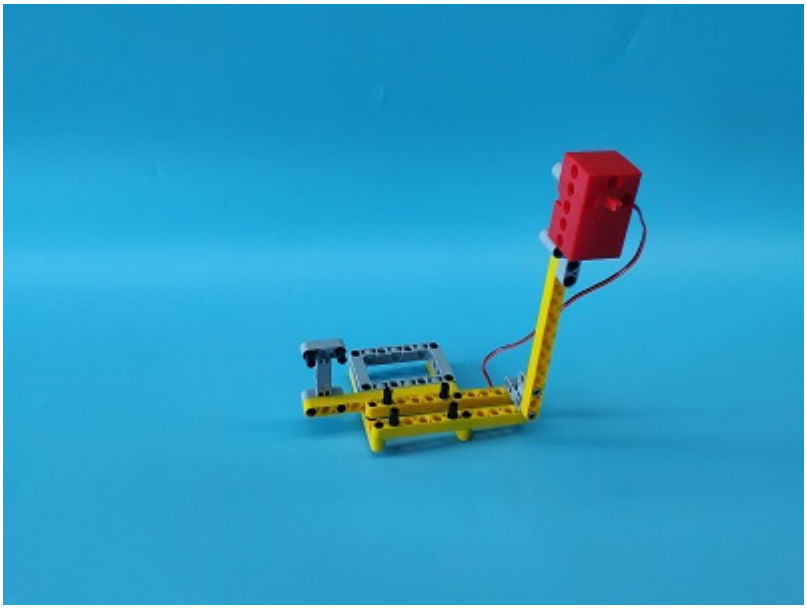


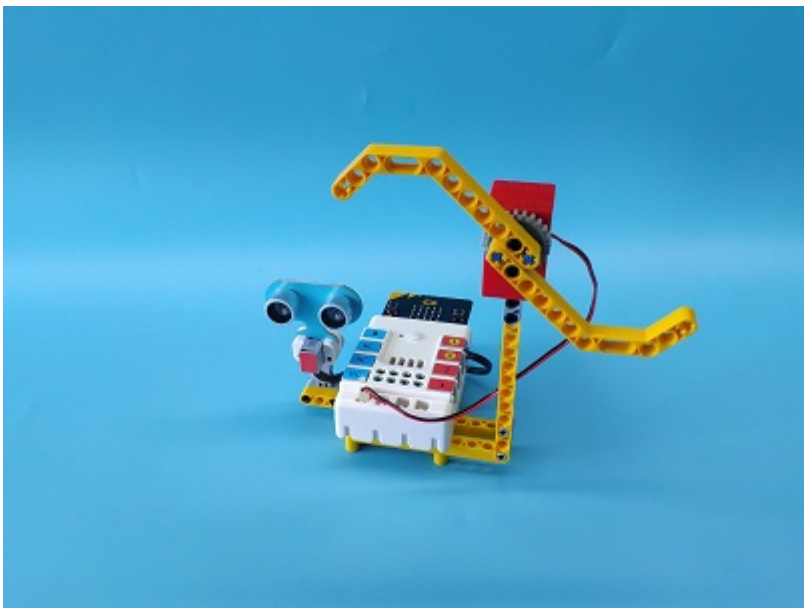
-

Assembly

Build a device as the picture shows:





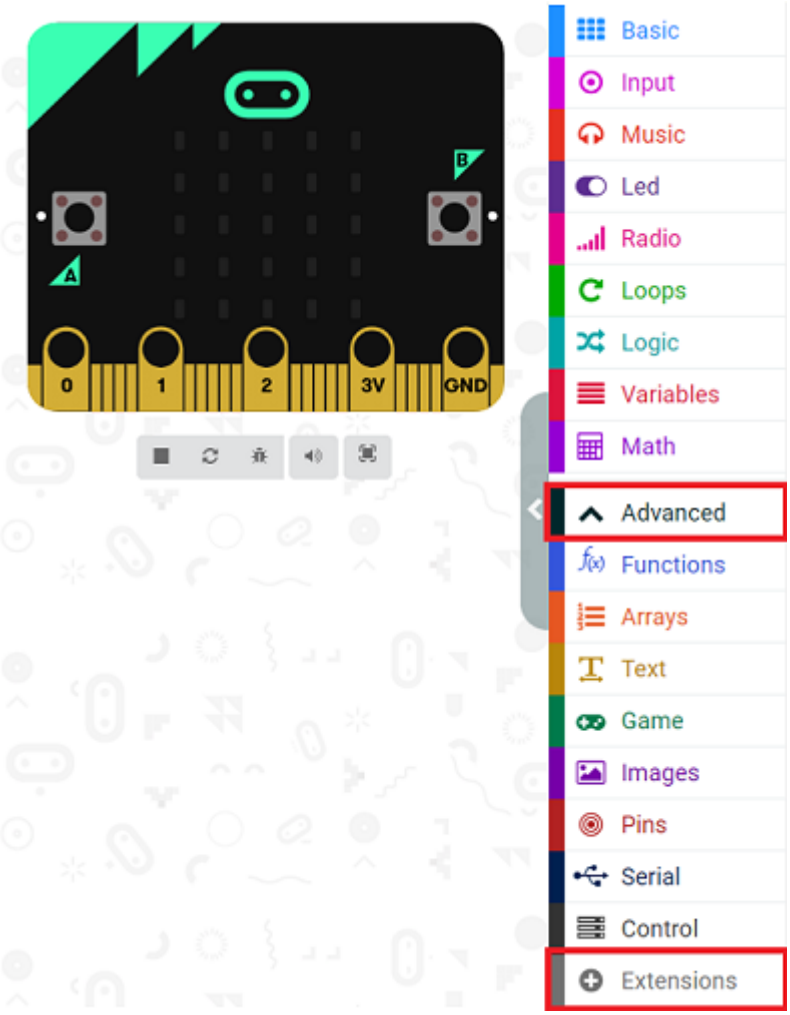


Video reference: https://youtu.be/5kB0bYEsJ1c

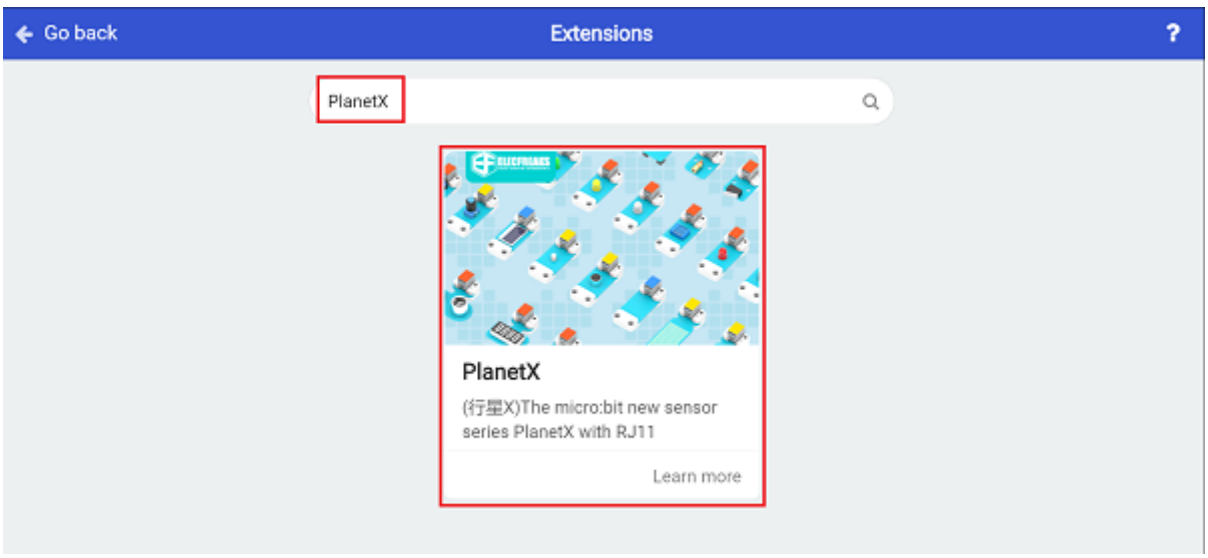
6.3. MakeCode Programming

Step 1

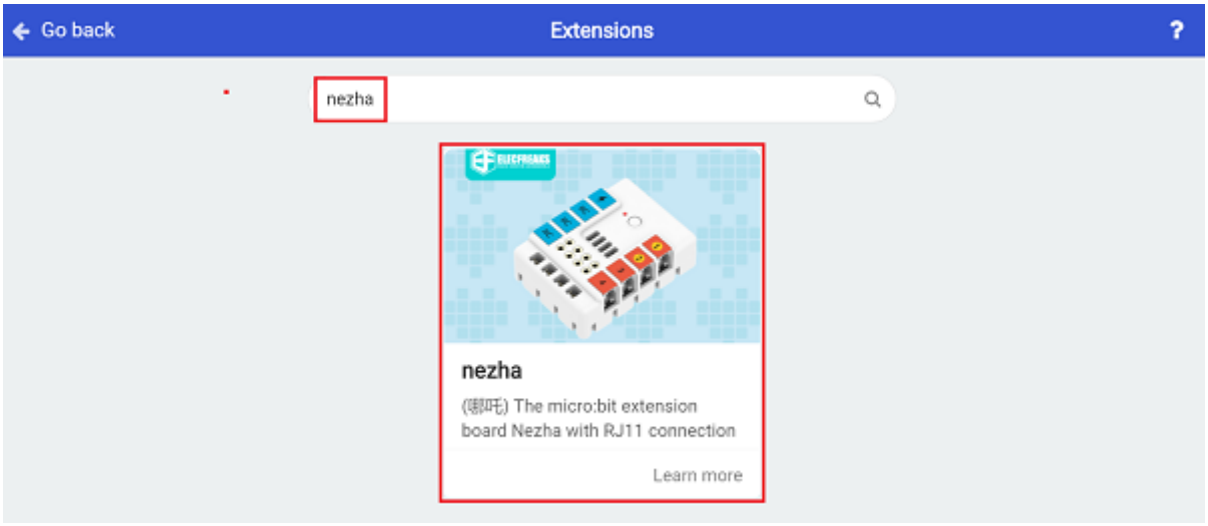
Click “Advanced” in the MakeCode to see more choices.



For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “PlanetX” in the dialogue box to download it.



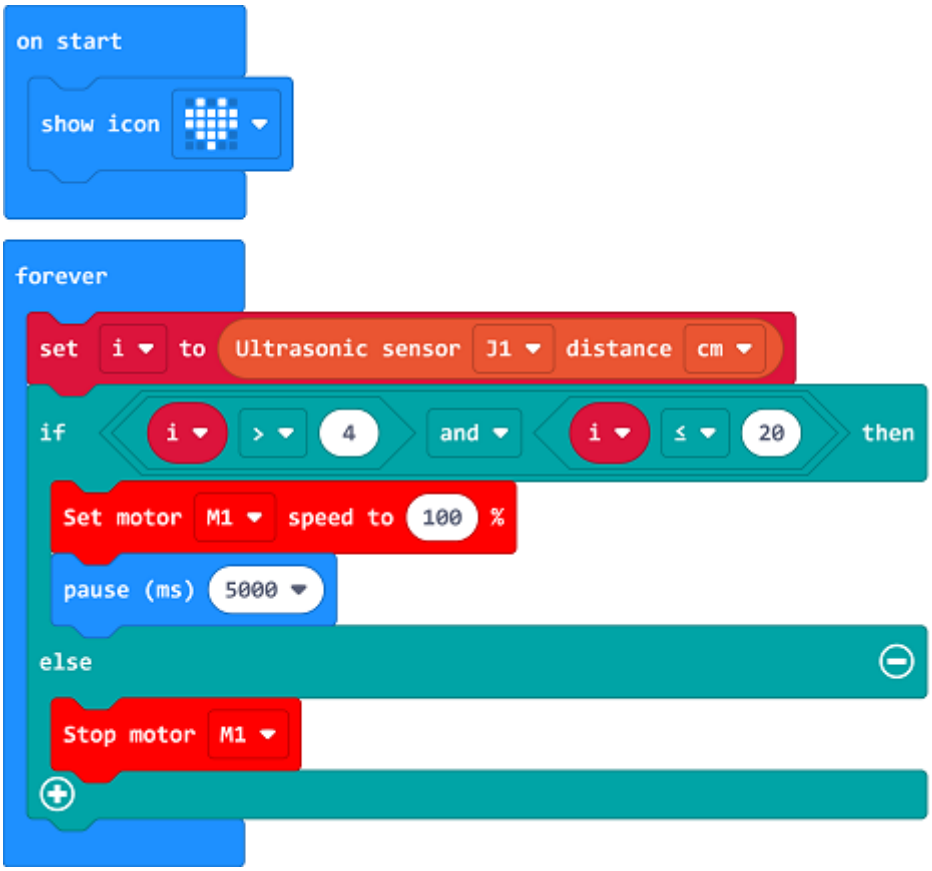
For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “nezha” in the dialogue box to download it.



Notice: If you met a tip indicating that some codebases would be deleted due to incompatibility, you may continue as the tips say or create a new project in the menu.

Step 2

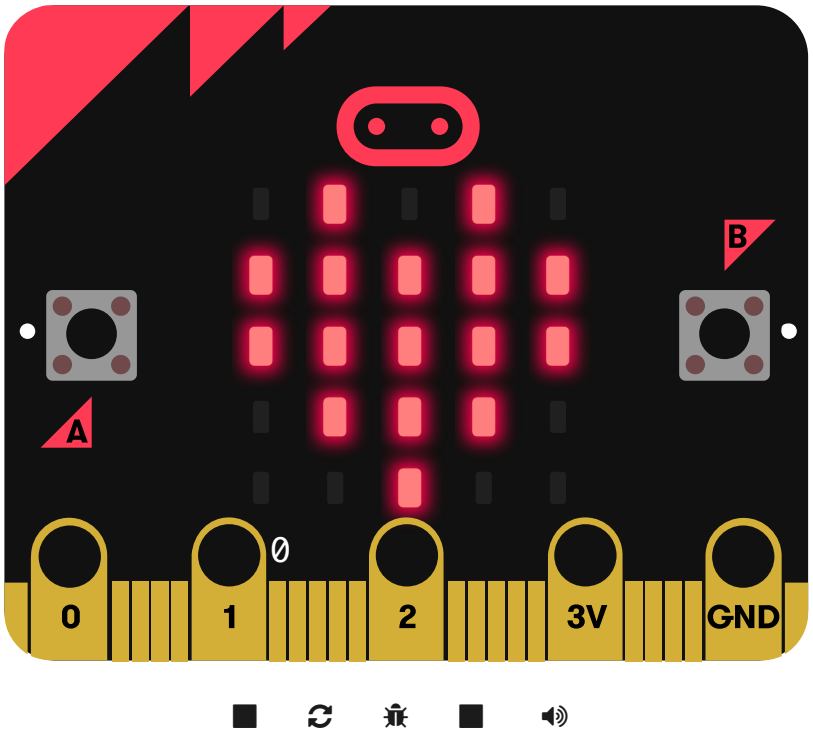
Code as below:



Reference

Link：https://makecode.microbit.org/_LTA1RLL1ddfM

You may also download it directly below:



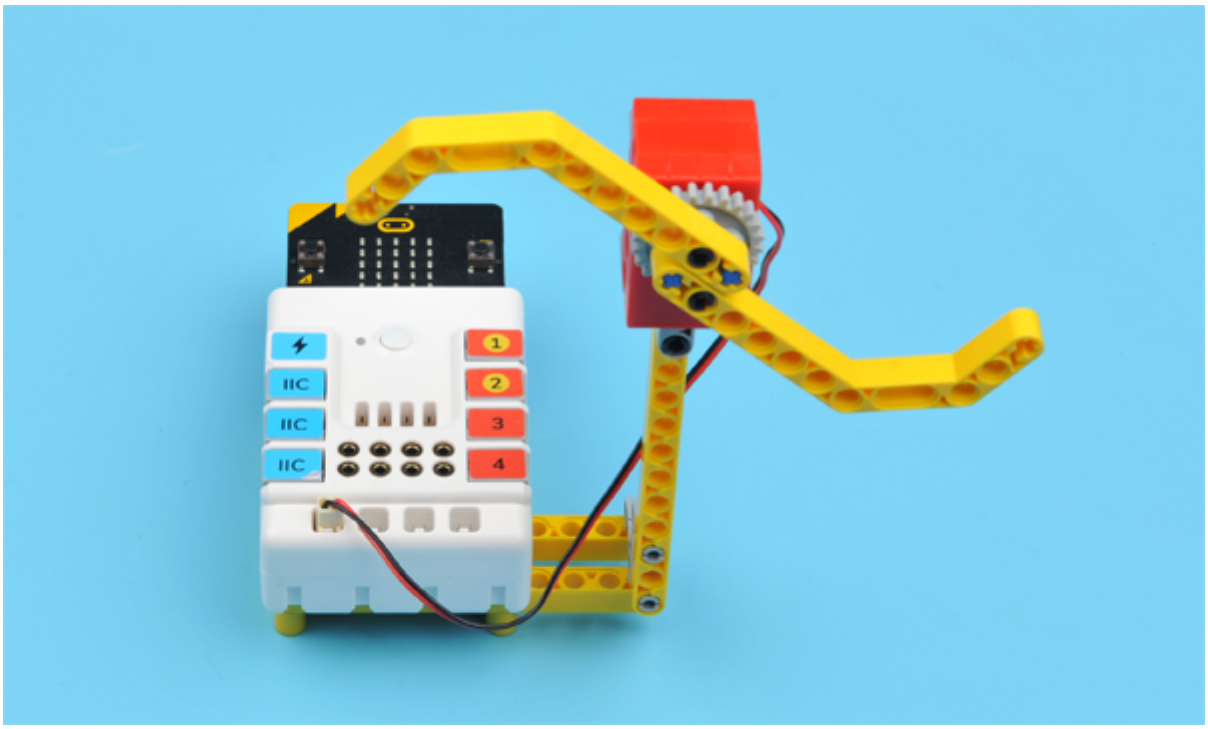
Result

- While there is any object detected by the Sonar:bit, the fan moves automatically.

7. Case 06: Temperature-controlled Fan

7.1. Introduction

To make a fan that can be controlled by the temperature with a micro:bit.



7.2. Quick Start

Materials Required

Nezha expansion board × 1

micro:bit × 1

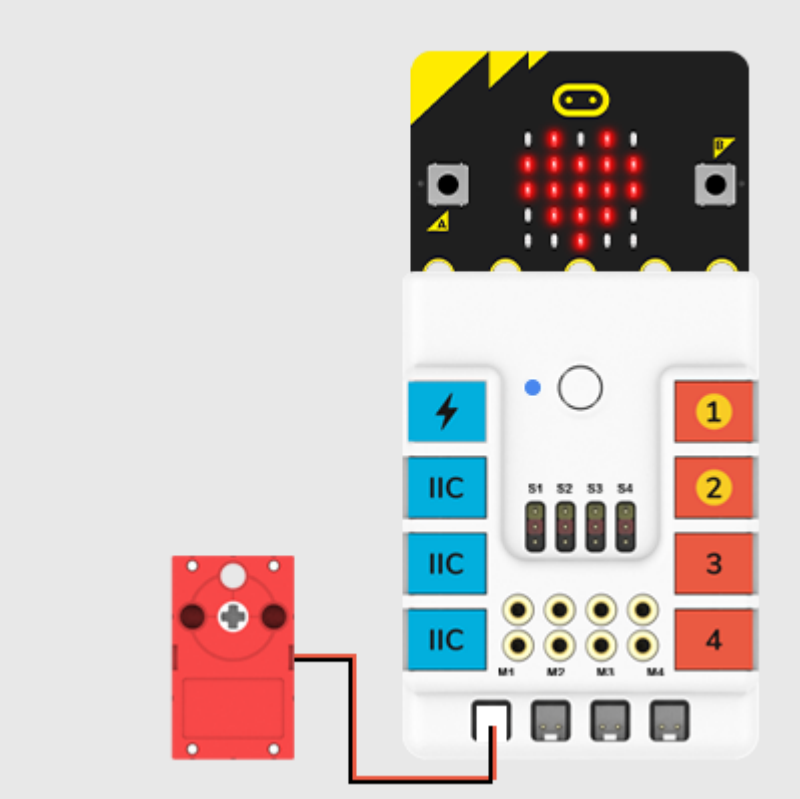
Motor × 1

Bricks details

Bricks	qty
TECHNIC 9M BEAM	2
T-BEAM 3X3 W/HOLE Ø4.8	1
TECHNIC 11M BEAM	2
TECHNIC 13M BEAM	1
DOUBLE ANGULAR BEAM 3X7 45°	2
2M CROSS AXLE W. GROOVE	1
CONNECTOR PEG W. FRICTION	20
CONN.BUSH W.FRIC./CROSSALE	2
Angular beam 90degr. w.4 snaps	1
BEAM FRAME 5X7 Ø 4.85	1
GEAR WHEEL Z24	1
BEAM I -FRAME 3X5 90 DEGR. HOLE Ø4.85	1

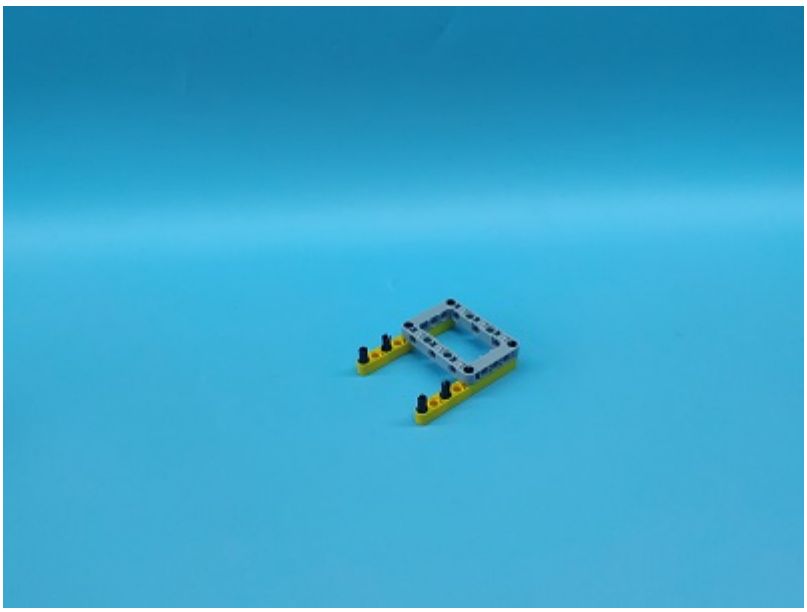
Connection Diagram

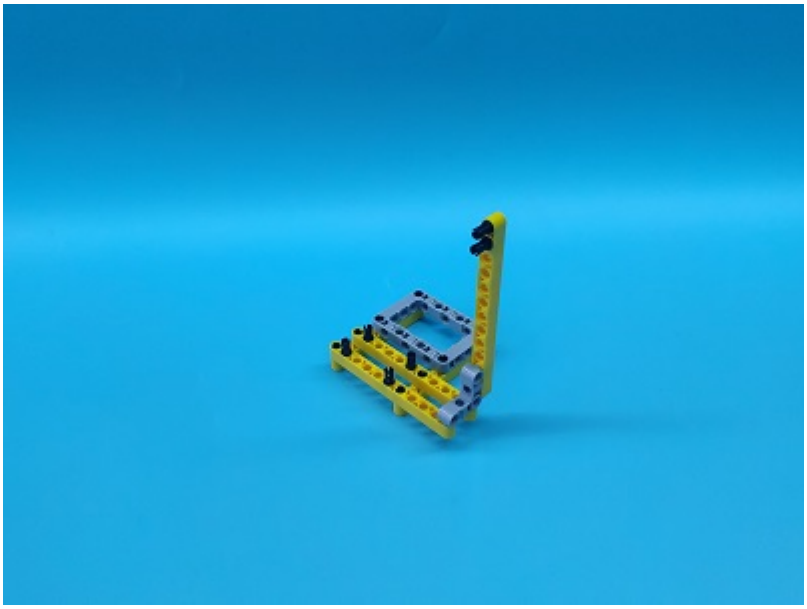
- Connect the motor to M1 on the Nezha expansion board as the picture shows.

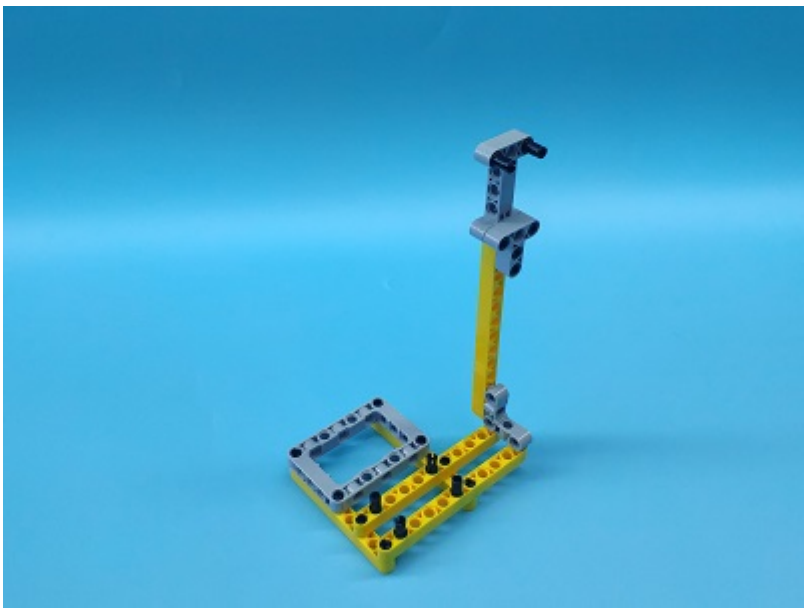


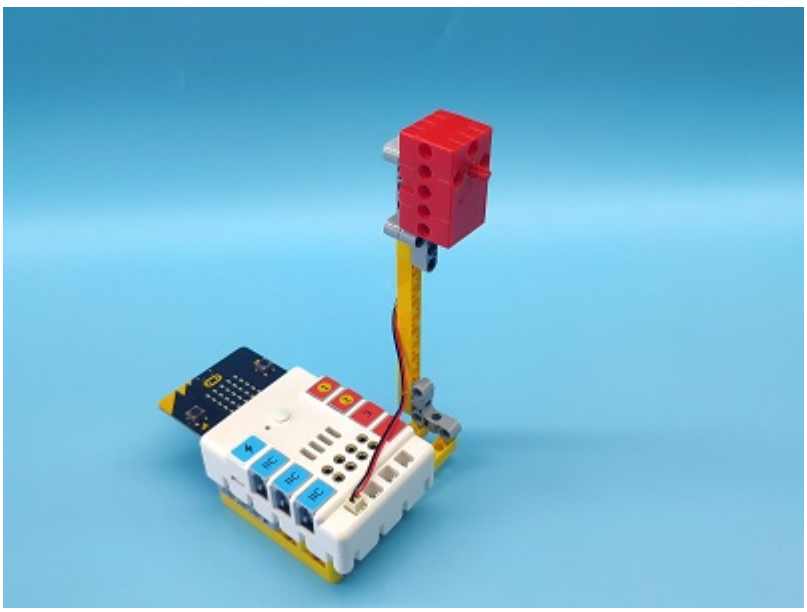
Assembly

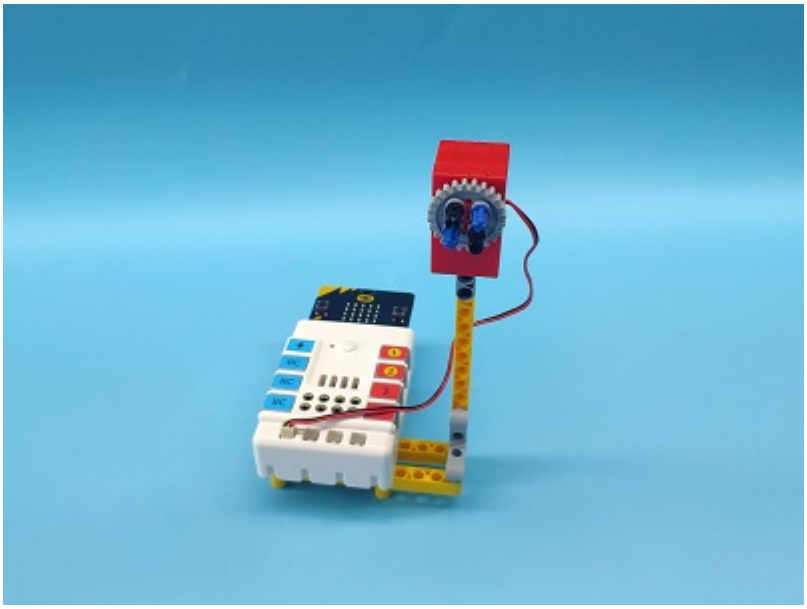
- Build a device as the picture shows:









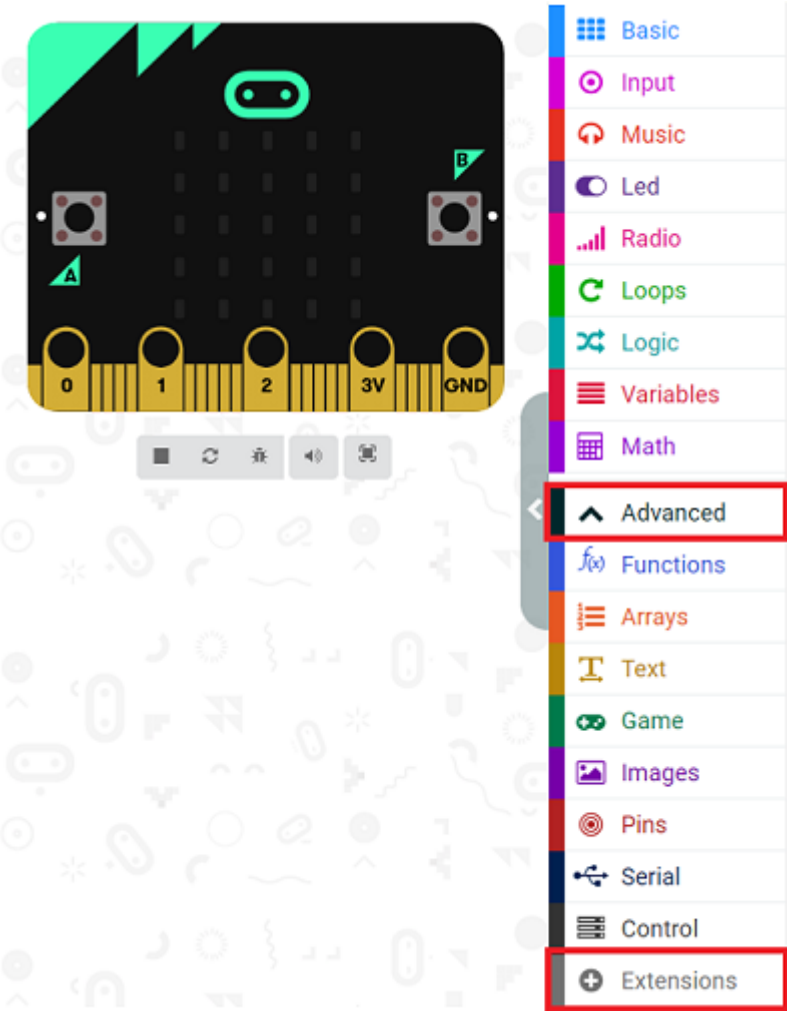


Video reference: https://youtu.be/shI_D7j6M7o

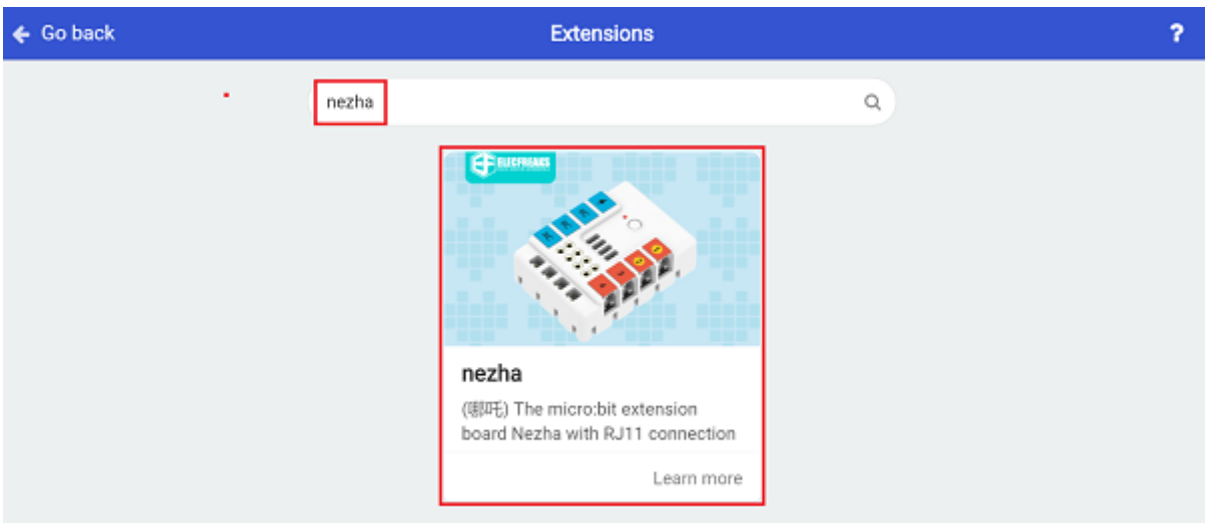
7.3. MakeCode Programming

Step 1

Click “Advanced” in the MakeCode to see more choices.



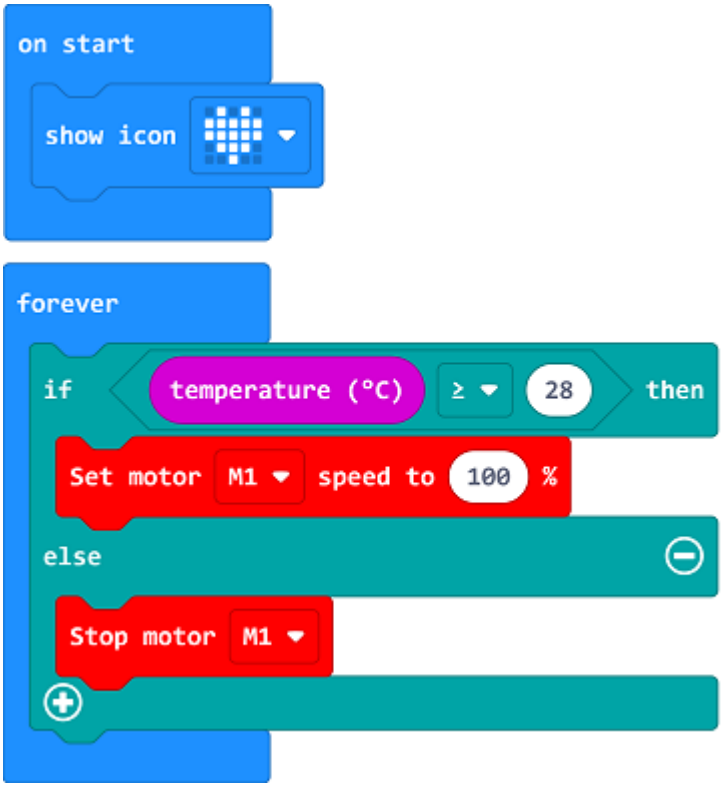
For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “nezha” in the dialogue box to download it.



Notice: If you met a tip indicating that some codebases would be deleted due to incompatibility, you may continue as the tips say or create a new project in the menu.

Step 2

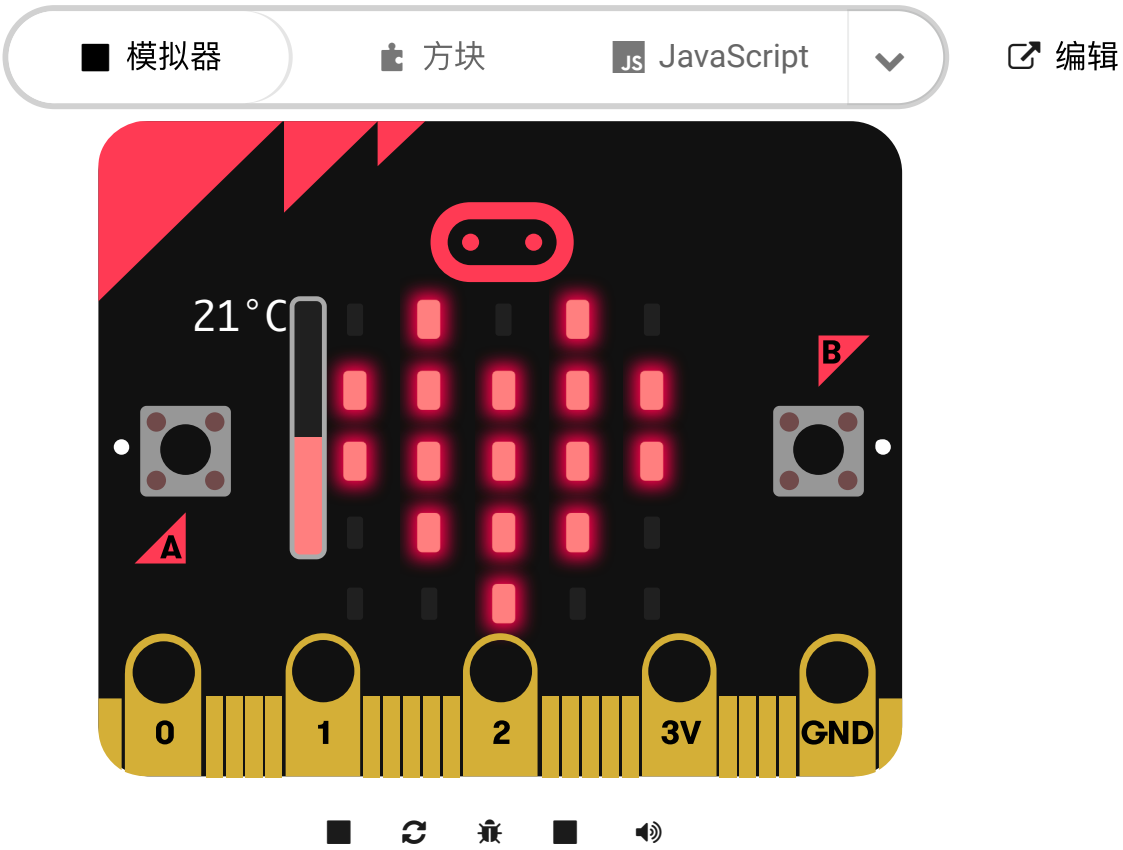
Code as below:



Reference

Link：https://makecode.microbit.org/_3gkW8U8Vk55v

You may also download it directly below:



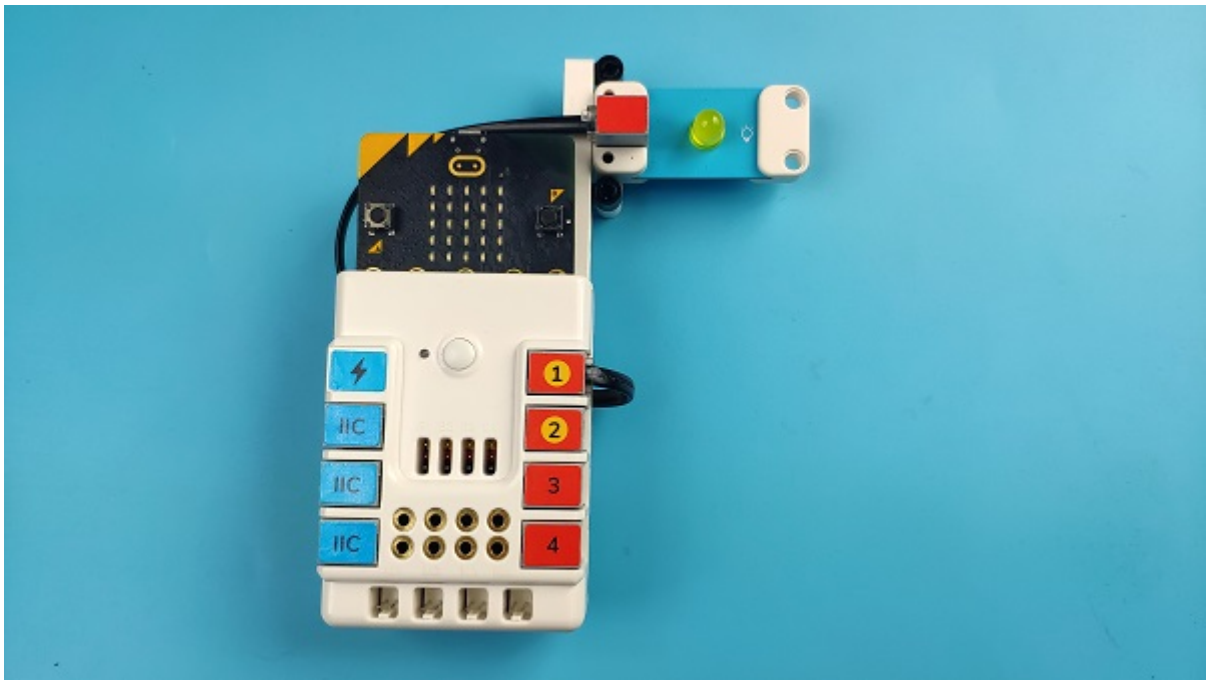
Result

- The fan turns on/off automatically according to the temperature.

8. Case 07: Smart Lamps

8.1. Introduction

To make a smart lamp with the micro:bit.

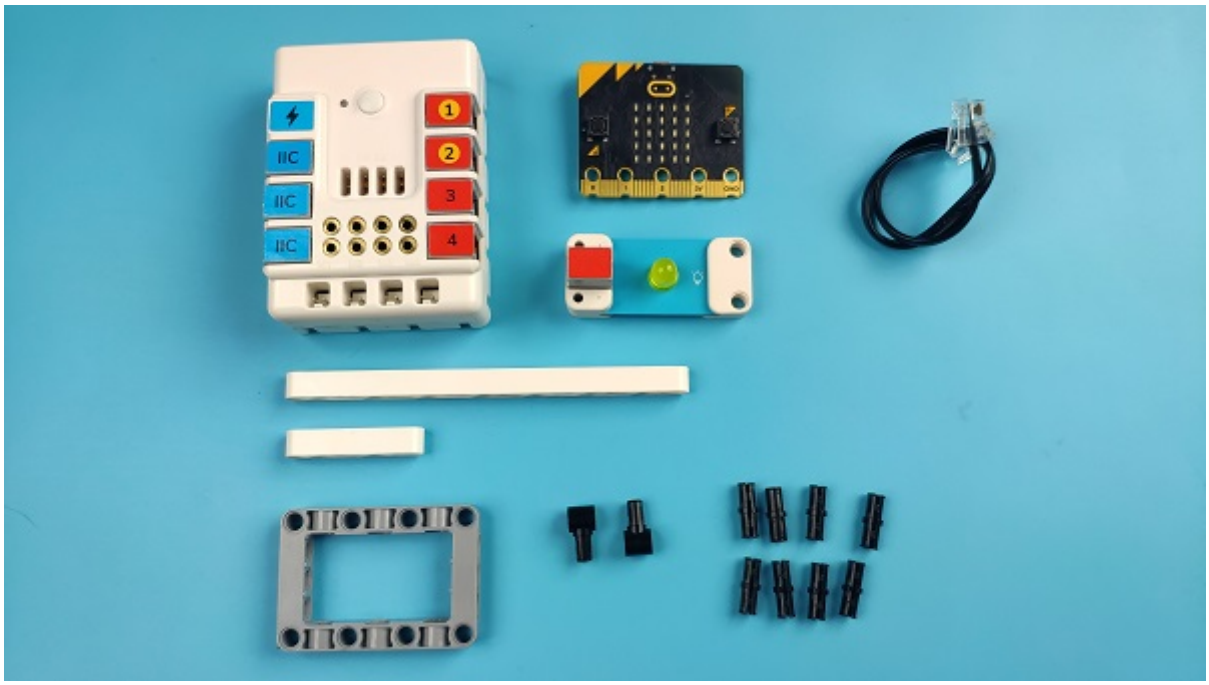


8.2. Quick Start

Materials Required

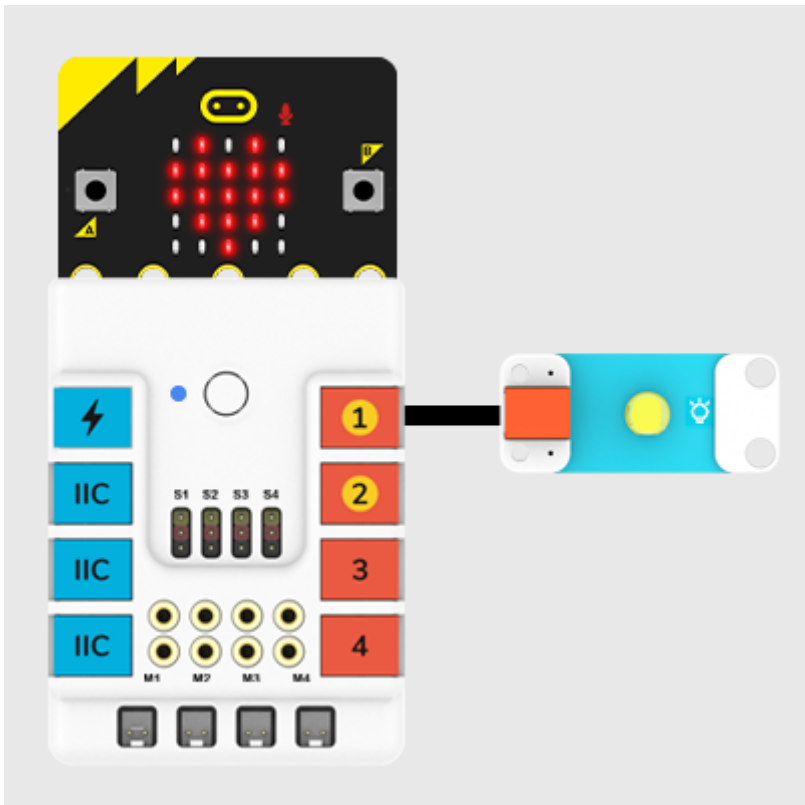
Nezha expansion board × 1 micro:bit × 1 LED-yellow × 1 RJ11 wires × 1

Bricks	qty
TECHNIC 5M BEAM	1
TECHNIC 15M BEAM	1
CONNECTOR PEG W. FRICTION	8
BEAM FRAME 5X7 Ø 4.85	1
SINGLE BUSH 2M Ø 4.9	2



Connection Diagram

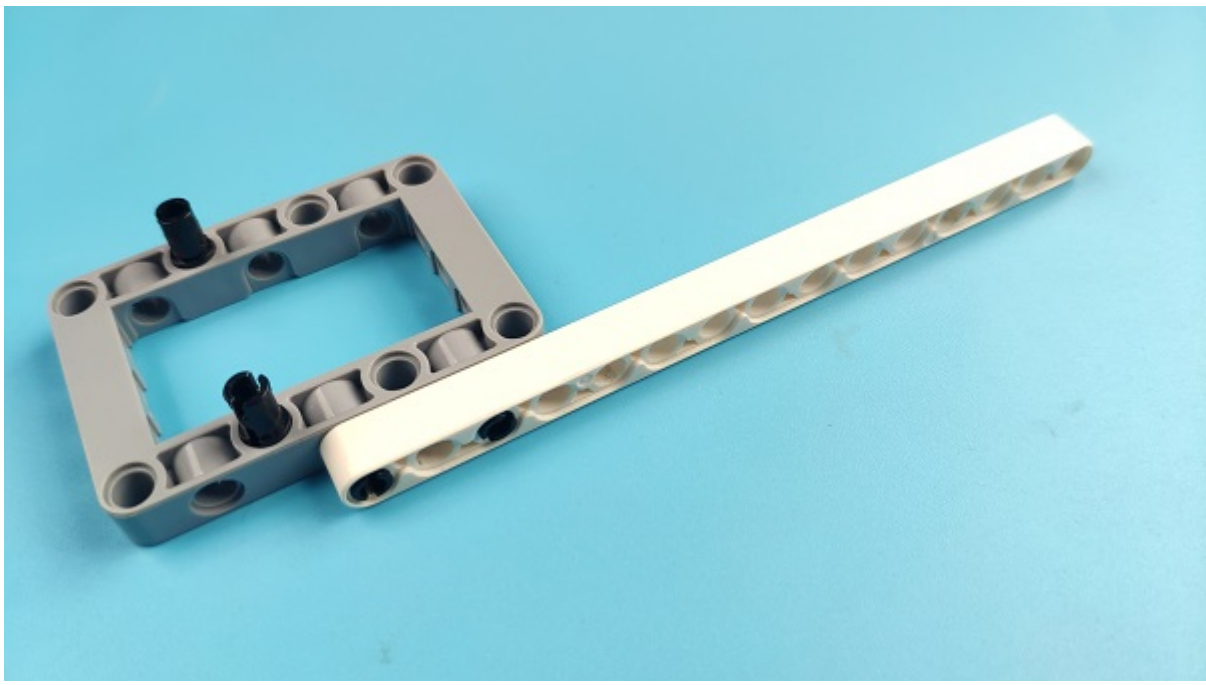
- Connect the yellow LED on the Nezha expansion board as the picture shows.

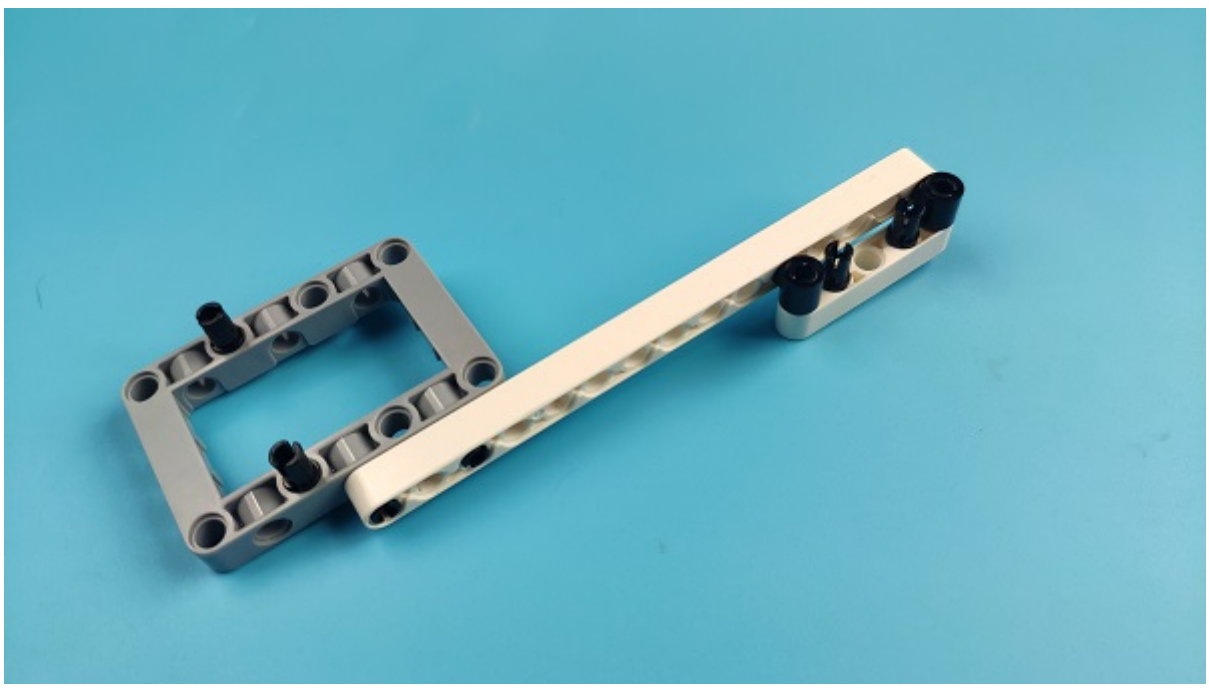


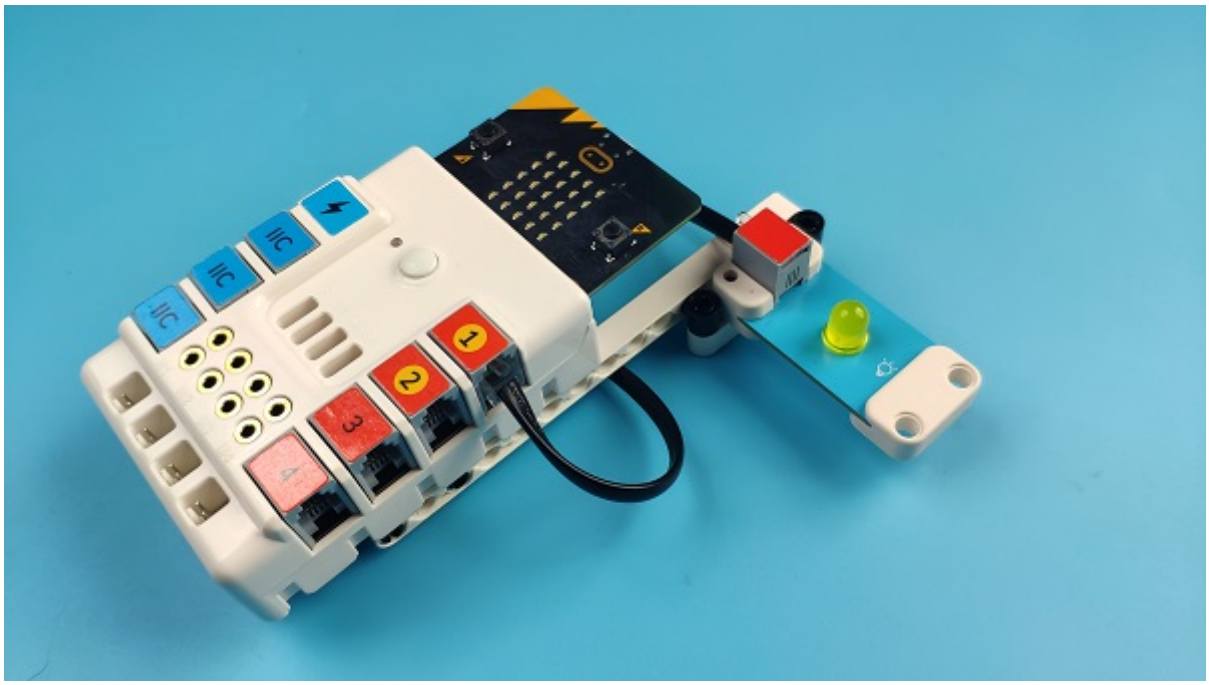
-

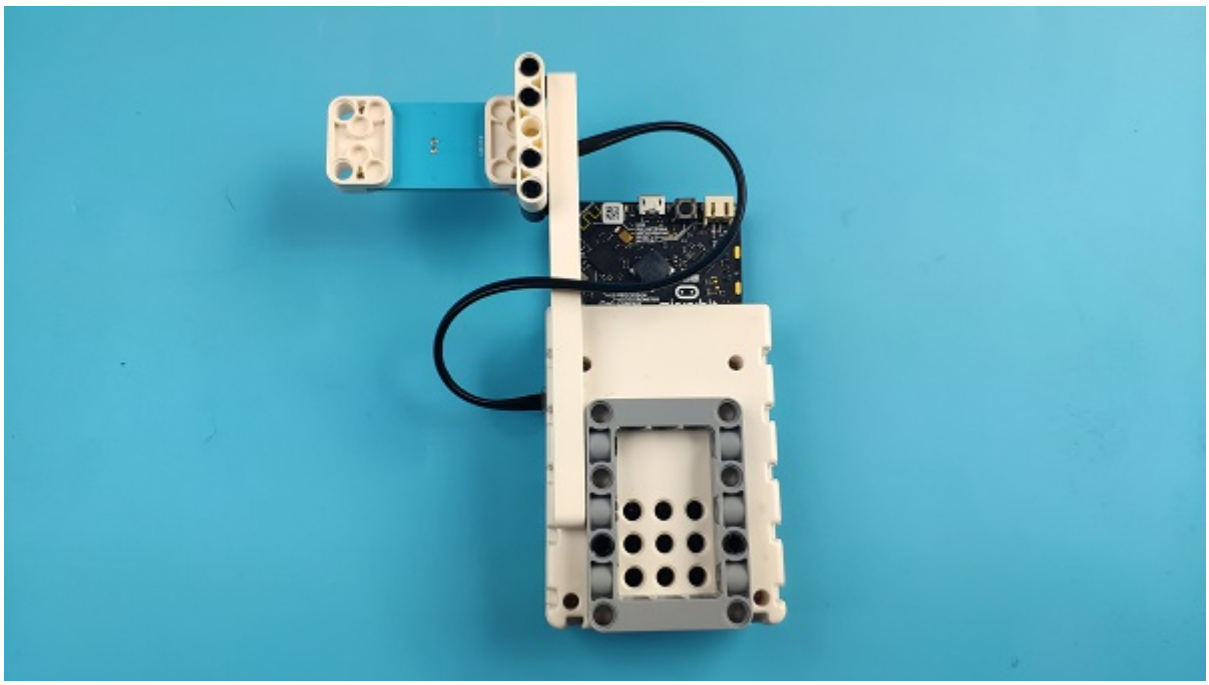
Assembly

Build the device as the picture shows:

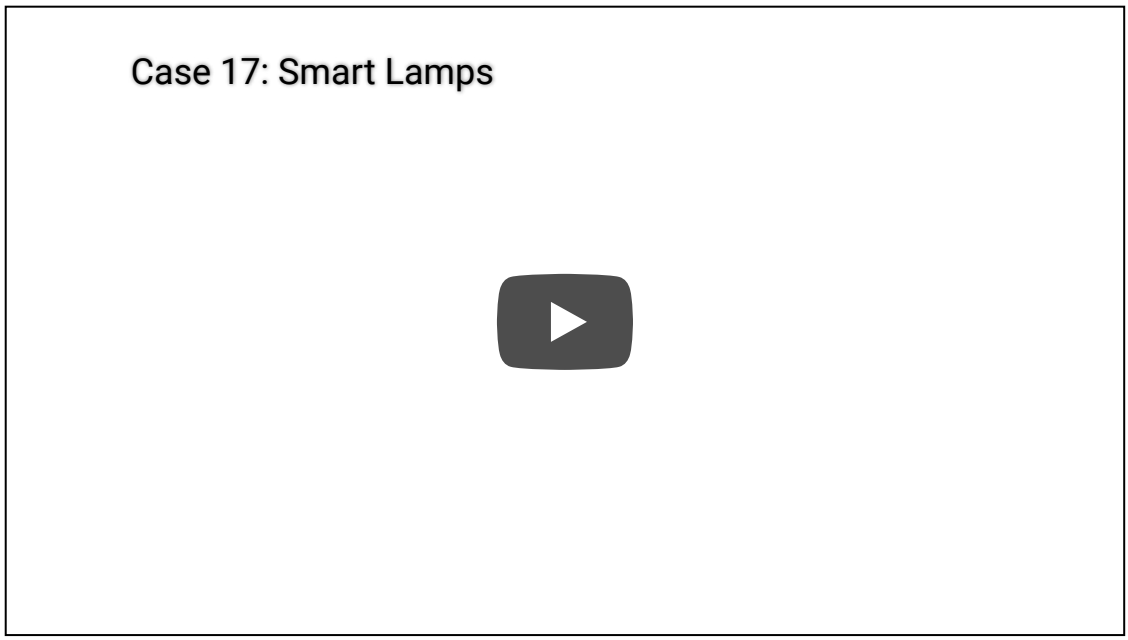








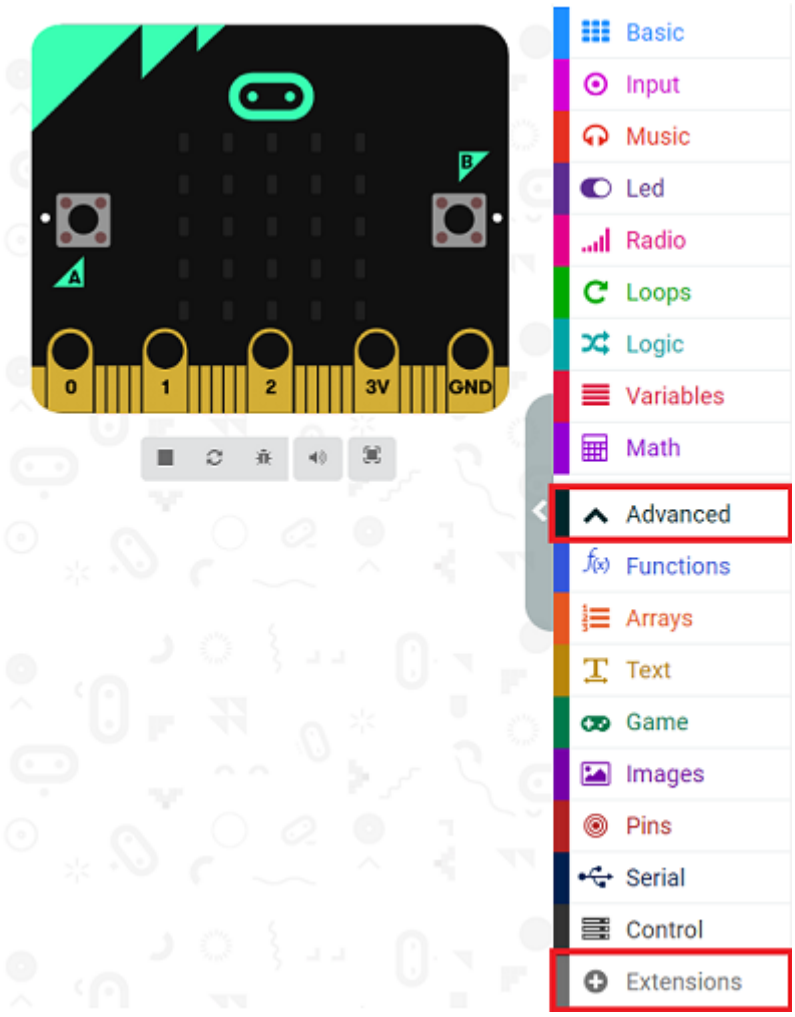
Video reference: https://youtu.be/oDzSJMKisO8



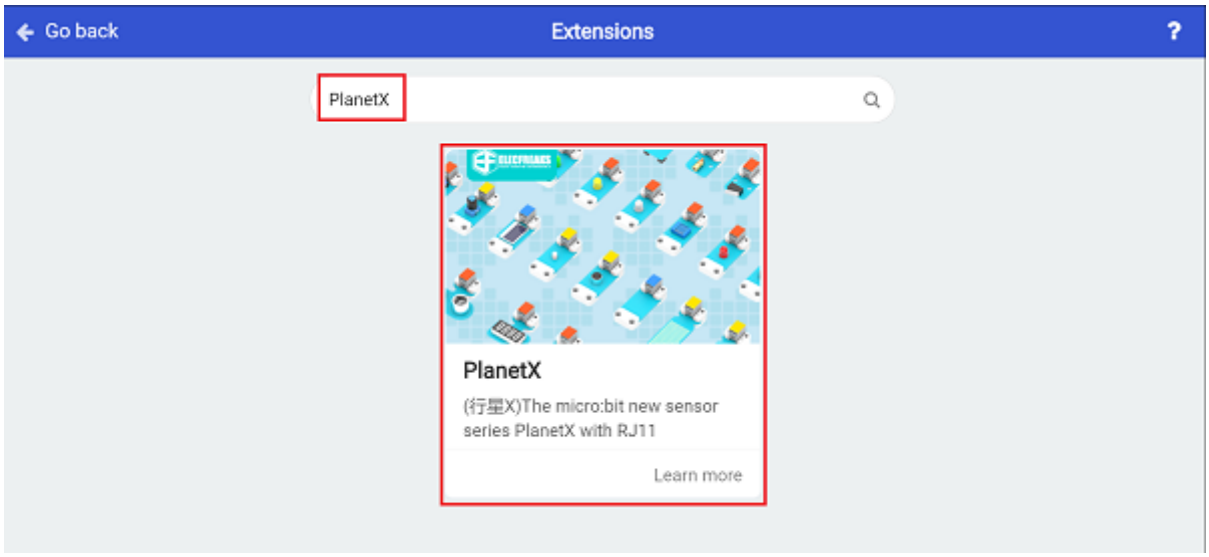
8.3. MakeCode Programming

Step 1

Click “Advanced” in the MakeCode to see more choices.



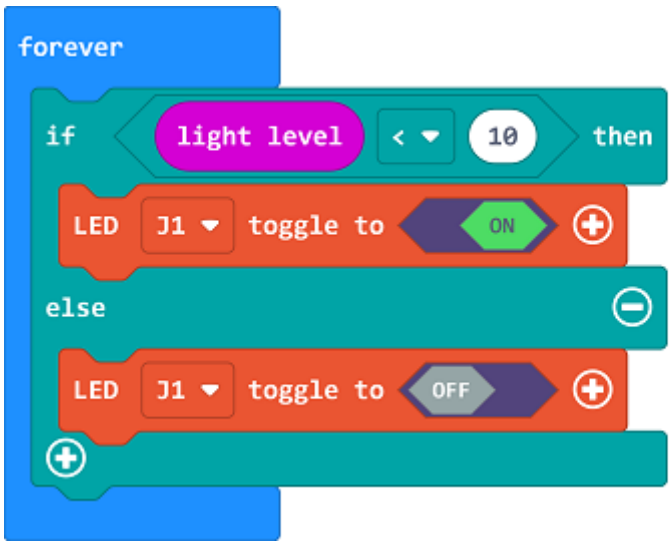
For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “PlanetX” in the dialogue box to download it.



Notice: If you met a tip indicating that some codebases would be deleted due to incompatibility, you may continue as the tips say or create a new project in the menu.

Step 2

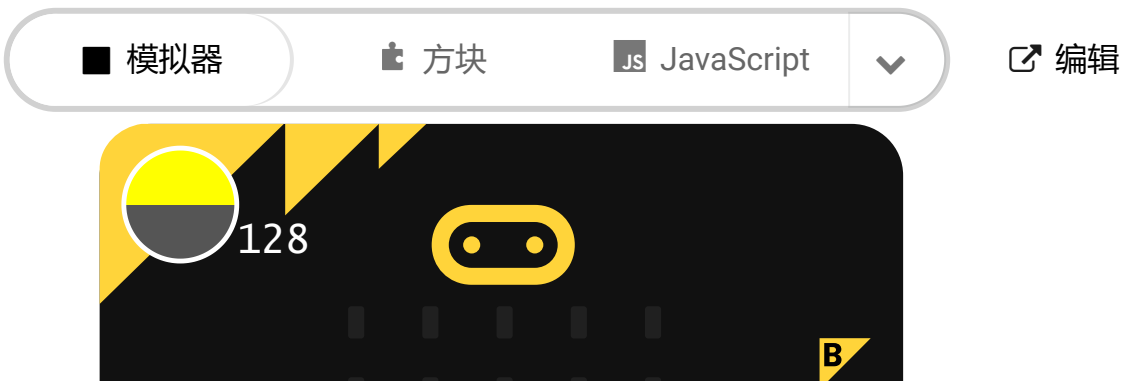
Code as below:

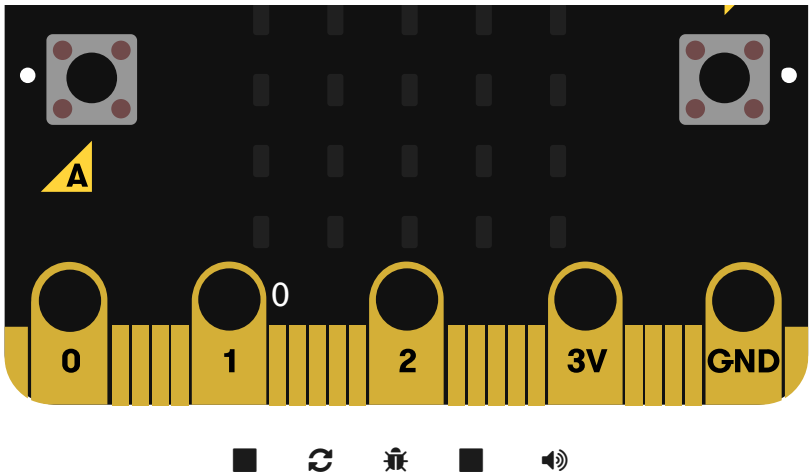


Reference

Link：https://makecode.microbit.org/_haMDD2EftPLV

You may also download it directly below:





Result

- The LED lamps light on/off according to the light intensity.

9. Case 08: Speed Adjustable Fans

9.1. Introduction

To make a speed adjustable fan with the micro:bit.

9.2. Quick Start

Materials Required

Nezha expansion board × 1

micro:bit × 1

Potentiometer × 1

Motor × 1

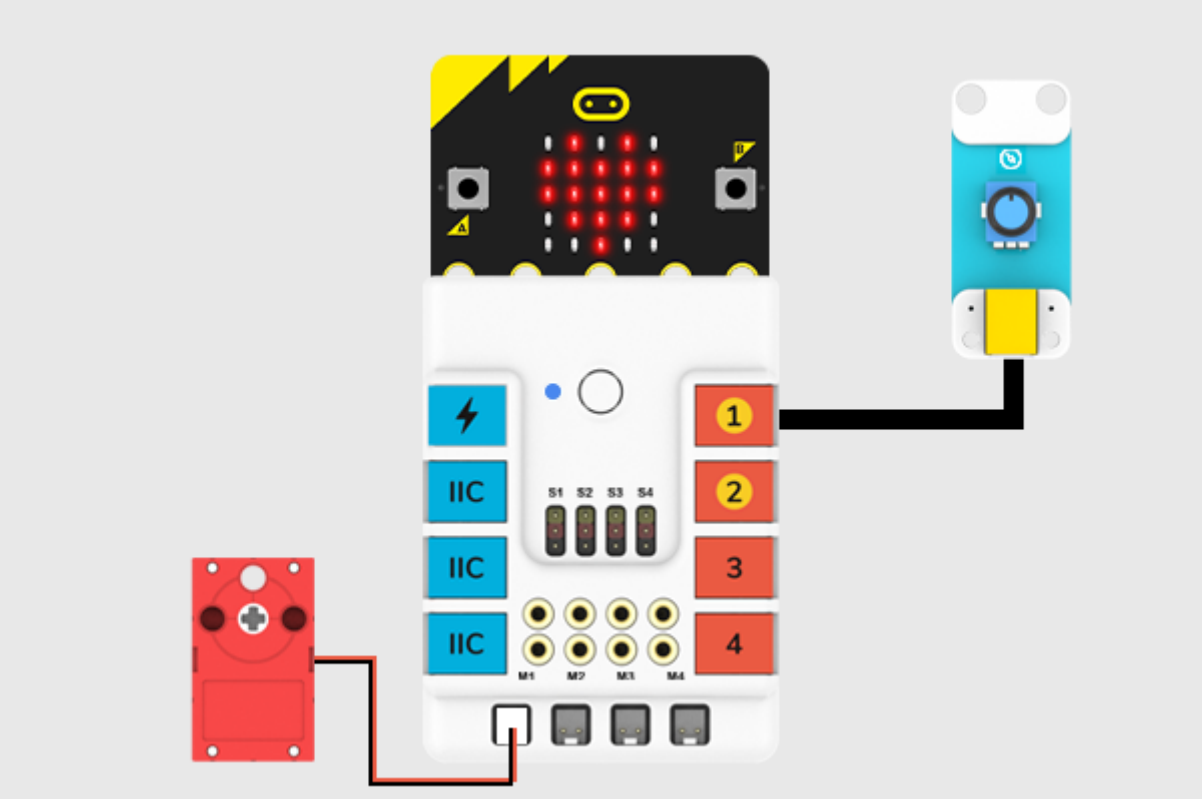
RJ11 wire × 1

Bricks details

Bricks	qty
TECHNIC 3M BEAM	4
TECHNIC 9M BEAM	2
T-BEAM 3X3 W/HOLE Ø4.8	1
TECHNIC 15M BEAM	3
DOUBLE ANGULAR BEAM 3X7 45°	2
2M CROSS AXLE W. GROOVE	1
CONNECTOR PEG W. FRICTION	26
CONN.BUSH W.FRIC./CROSSALE	2
CONNECTOR PEG W. FRICTION 3M	2
Angular beam 90degr. w.4 snaps	1
BEAM FRAME 5X7 Ø 4.85	1
GEAR WHEEL Z24	1
BEAM I -FRAME 3X5 90 DEGR. HOLE Ø4.85	1

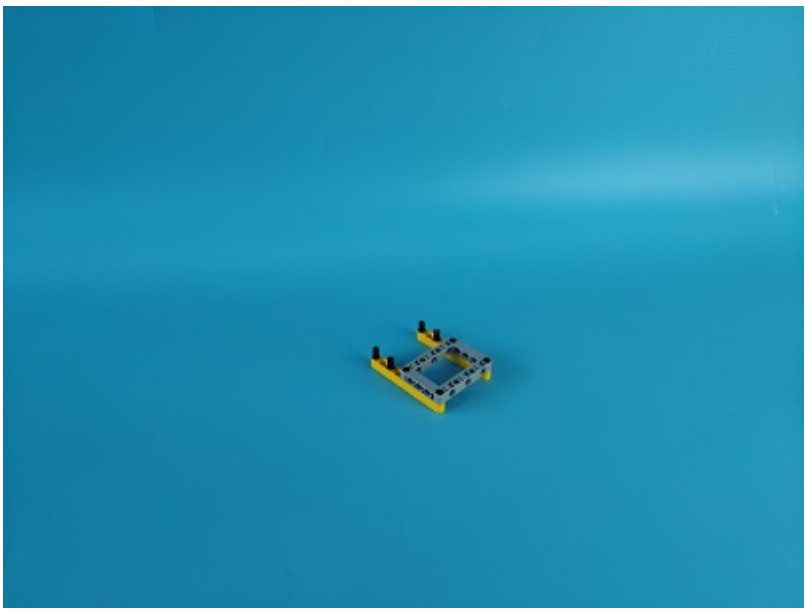
Connection Diagram

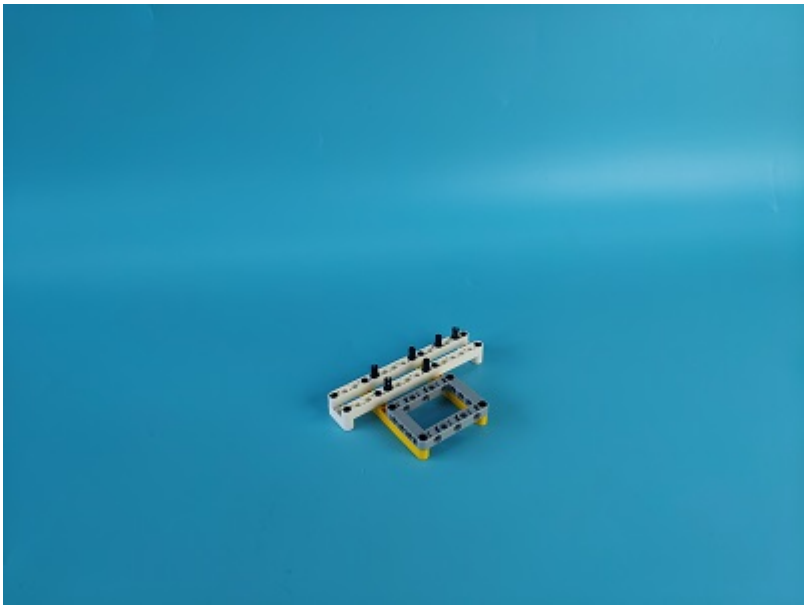
- Connect the potentiometer to J1 and motor to M1 on the Nezha expansion board as the picture shows.

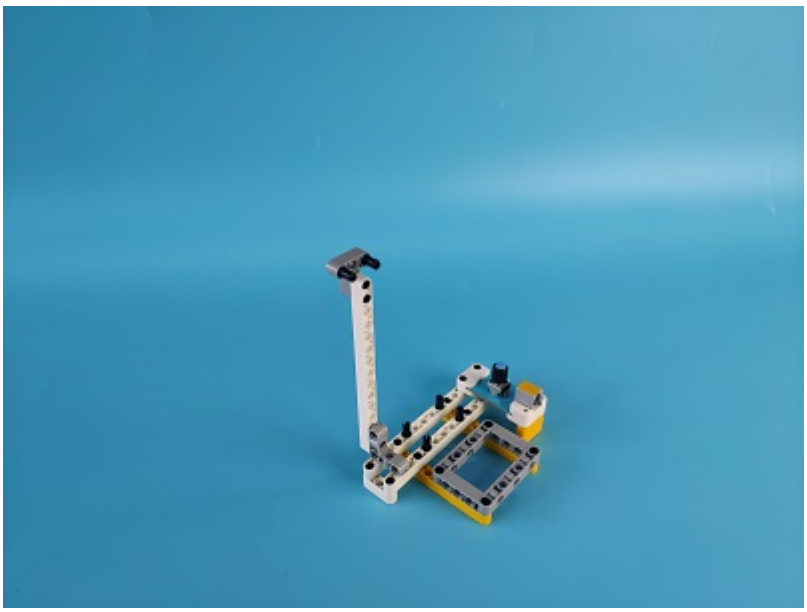


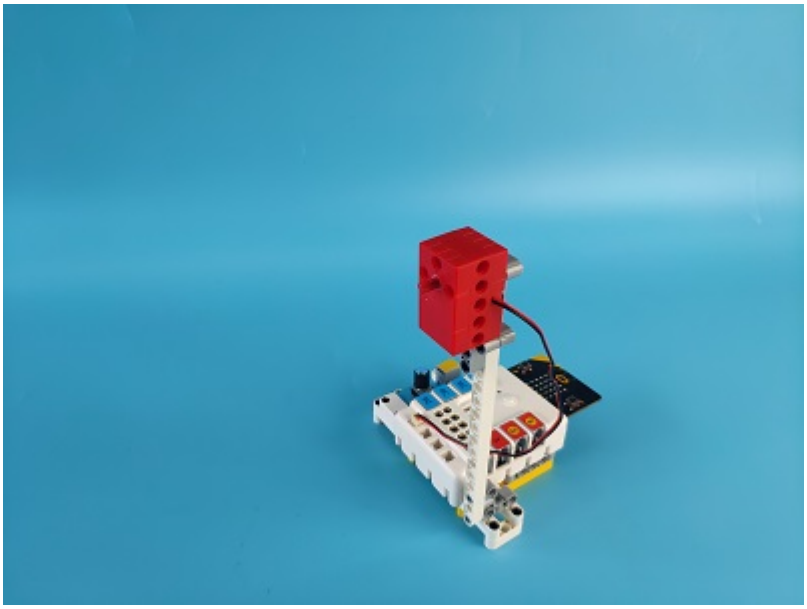
Assembly

- Build a device as the picture shows:







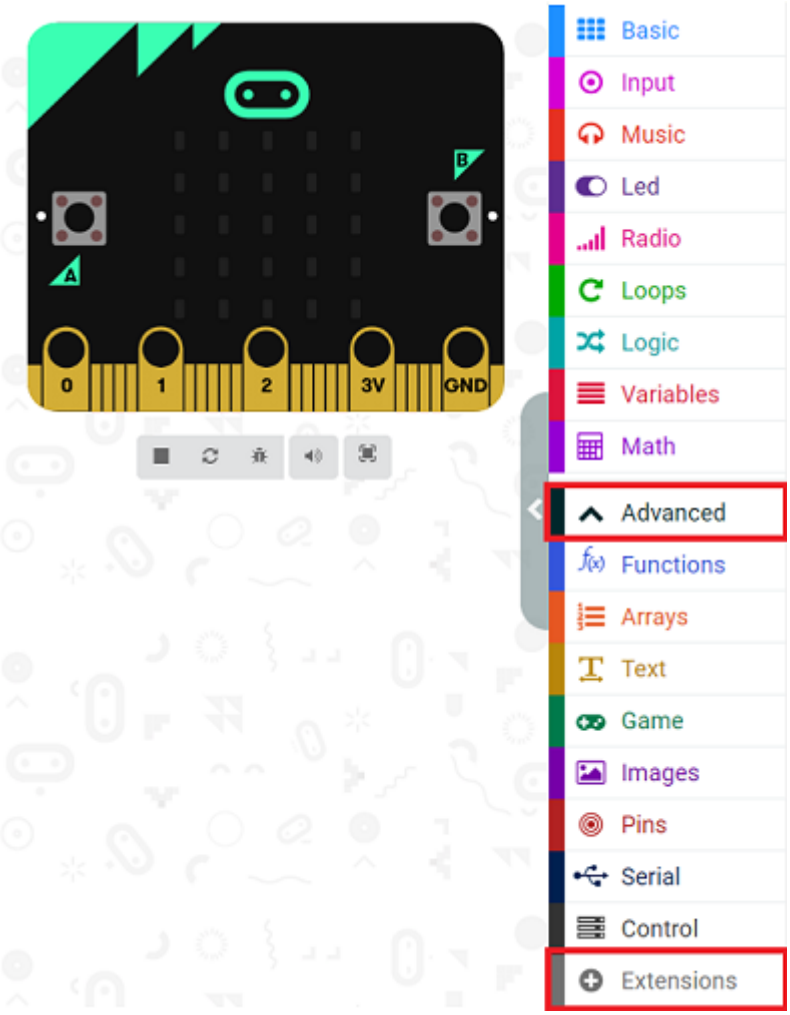


Video reference: https://youtu.be/1-FaQU7Yj0k

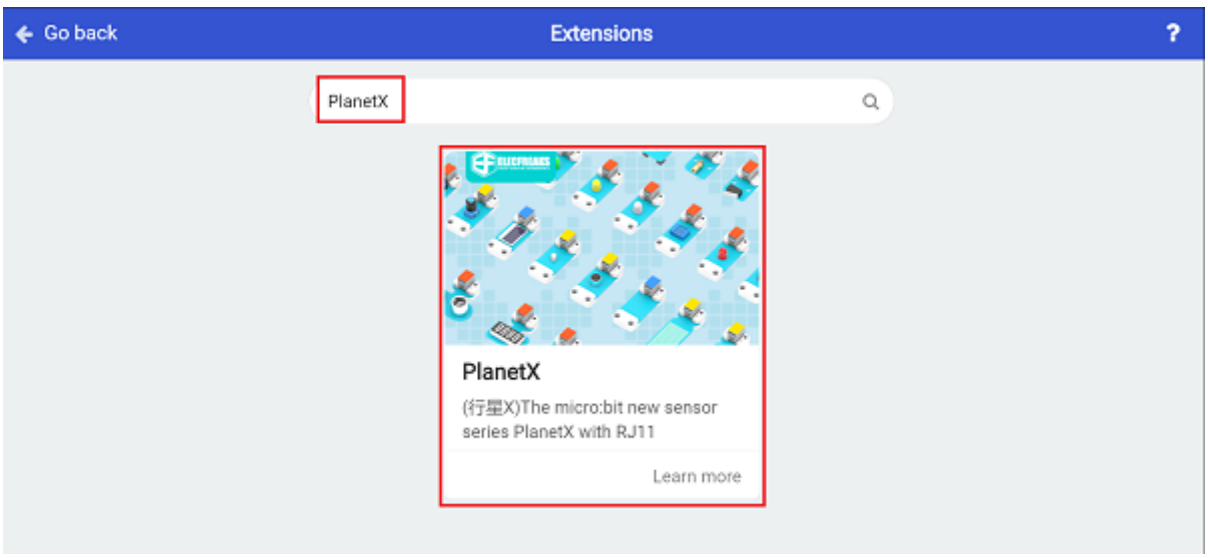
9.3. MakeCode Programming

Step 1

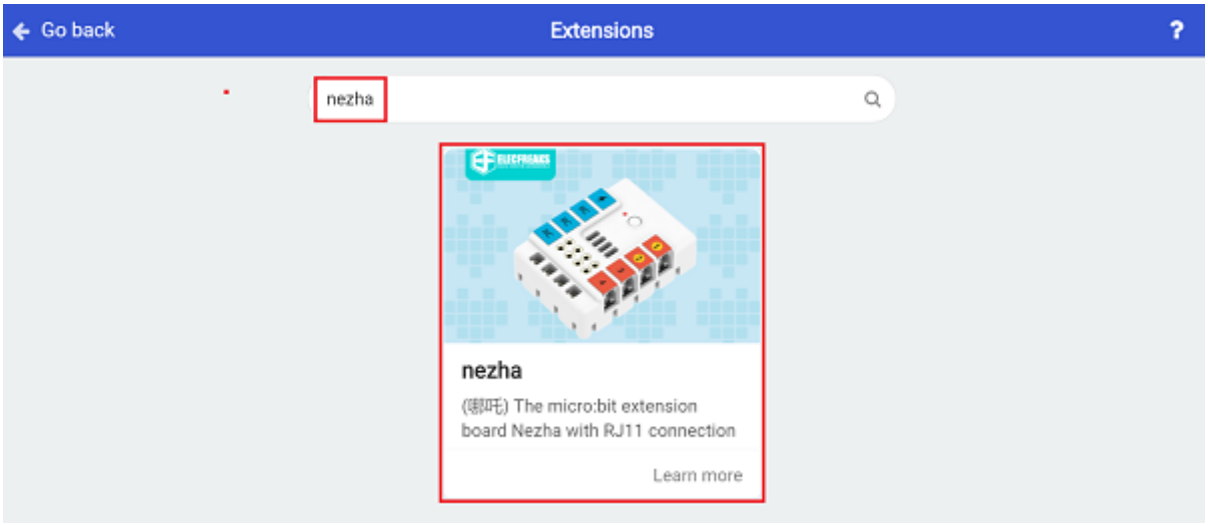
Click “Advanced” in the MakeCode to see more choices.



For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “PlanetX” in the dialogue box to download it.



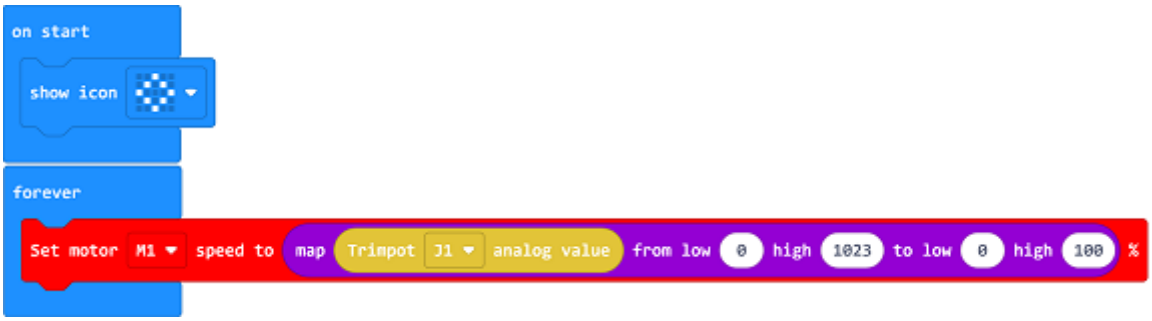
For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “nezha” in the dialogue box to download it.



Notice: If you met a tip indicating that some codebases would be deleted due to incompatibility, you may continue as the tips say or create a new project in the menu.

Step 2

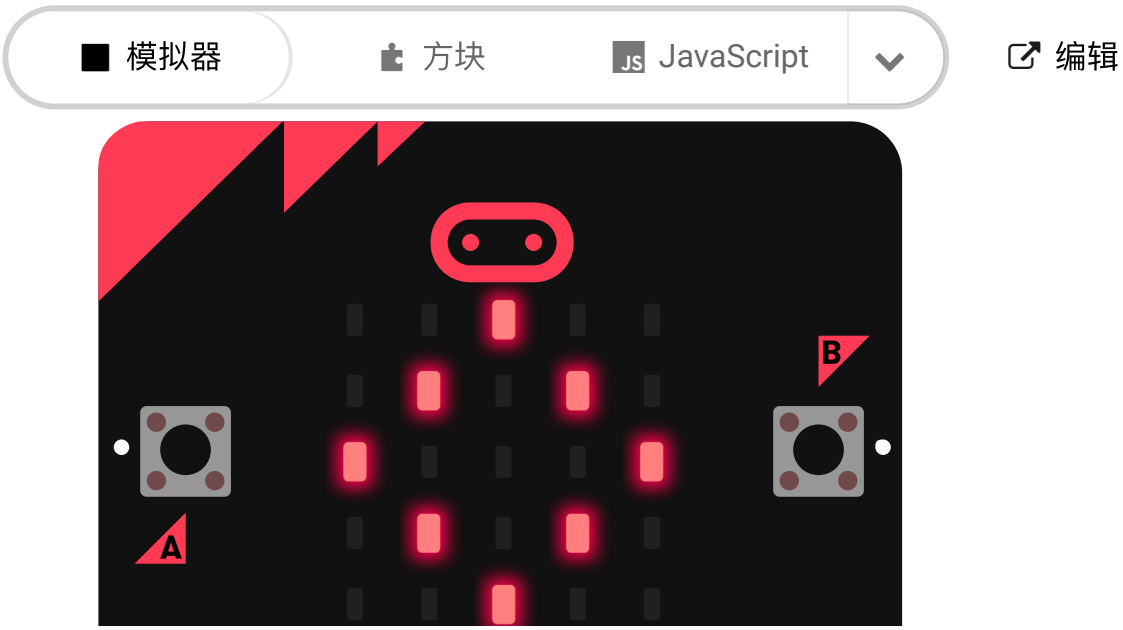
Code as below:

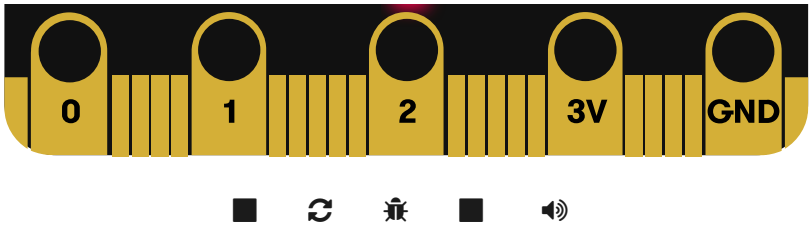


Reference

Link：https://makecode.microbit.org/_RK1WTKEMyfit

You may also download it directly below:





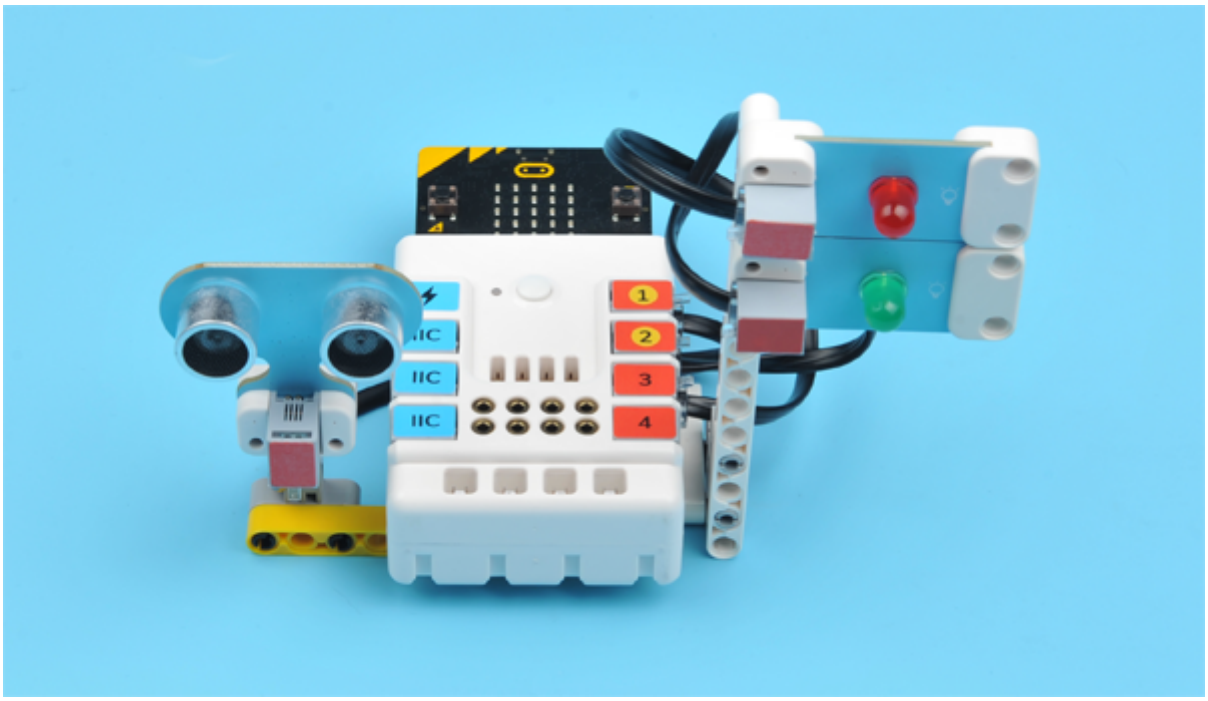
Result

- Adjust the speed of the fan via the potentiometer.

10. Case 09: Invading Detection Device

10.1. Introduction

To make an invading detection device with the micro:bit.



10.2. Quick Start

Materials Required

Nezha expansion board × 1

micro:bit × 1

LED-green × 1

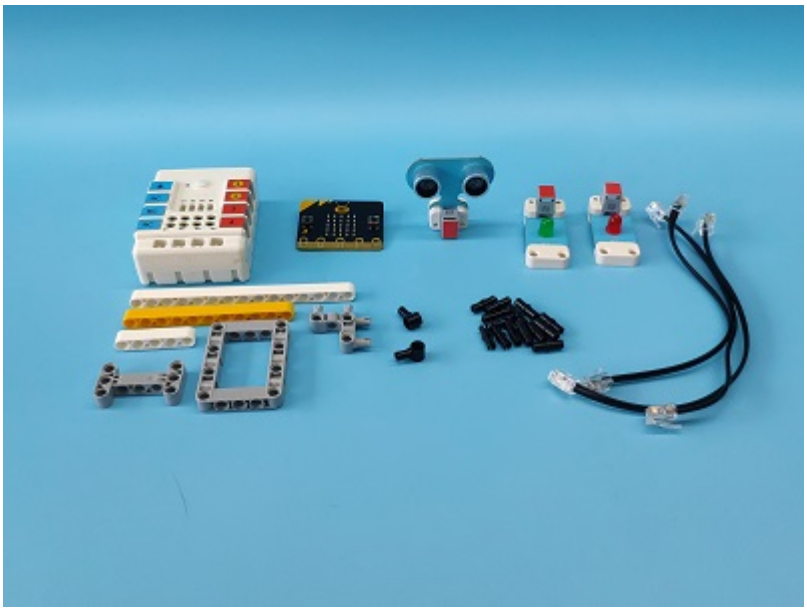
LED-red × 1

Sonar:bit × 1

RJ11 wires × 3

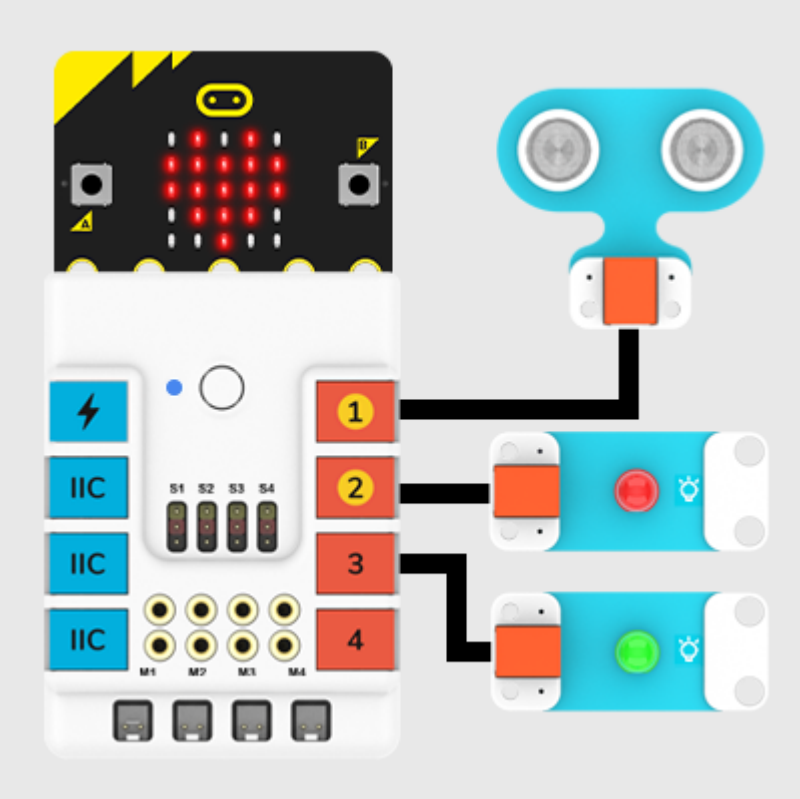
Bricks details

Bricks	qty
TECHNIC 5M BEAM	1
TECHNIC 11M BEAM	1
TECHNIC 15M BEAM	1
CONNECTOR PEG W. FRICTION	13
Angular beam 90degr. w.4 snaps	1
BEAM FRAME 5X7 Ø 4.85	1
SINGLE BUSH 2M Ø4,9	2
BEAM I -FRAME 3X5 90 DEGR. HOLE Ø4.85	1



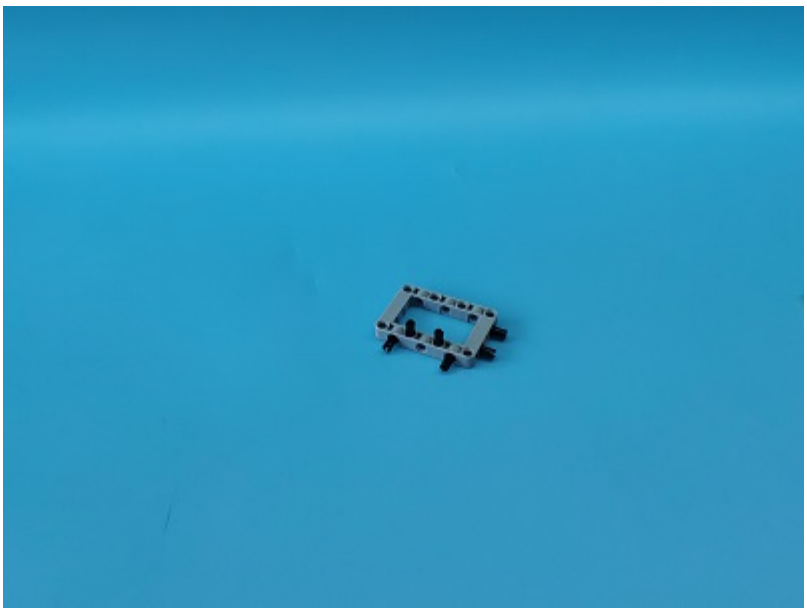
Connection Diagram

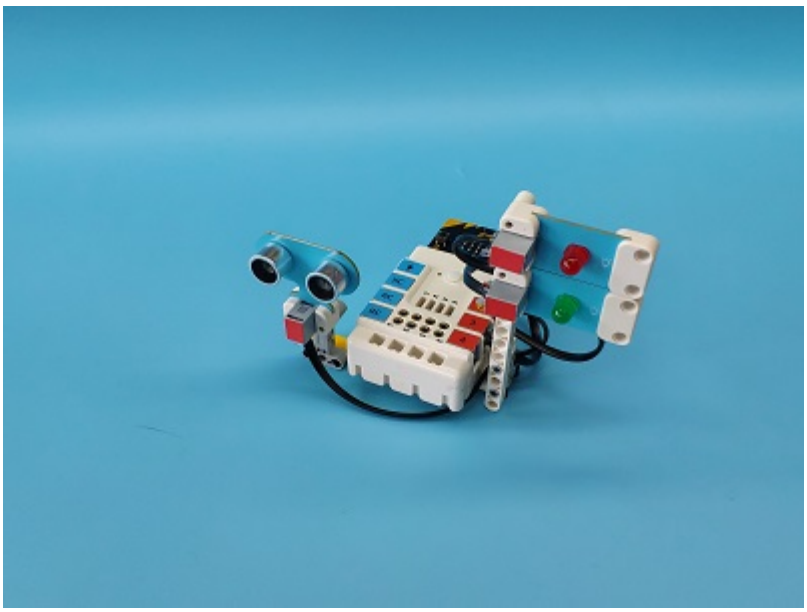
- Connect the sonar:bit to J1, red LED to J2 and green LED to J3 on the Nezha expansion board as the picture shows.



Assembly

- Build a device as the picture shows:



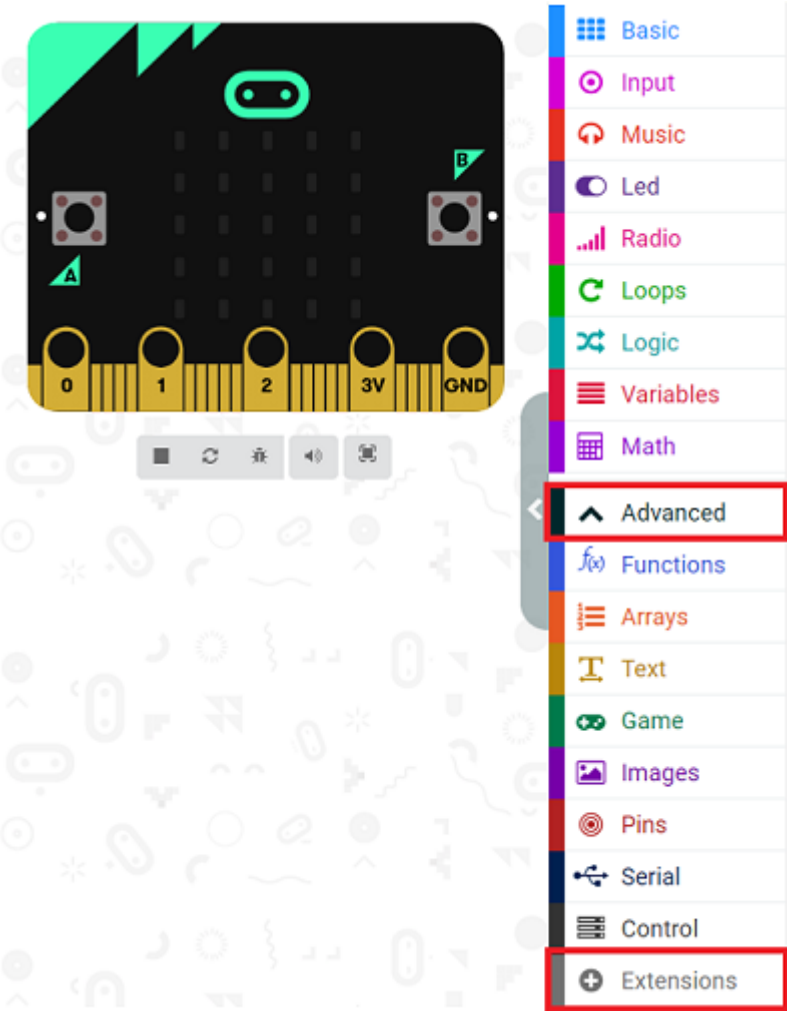


Video Reference: https://youtu.be/jw9_wlNIiHw

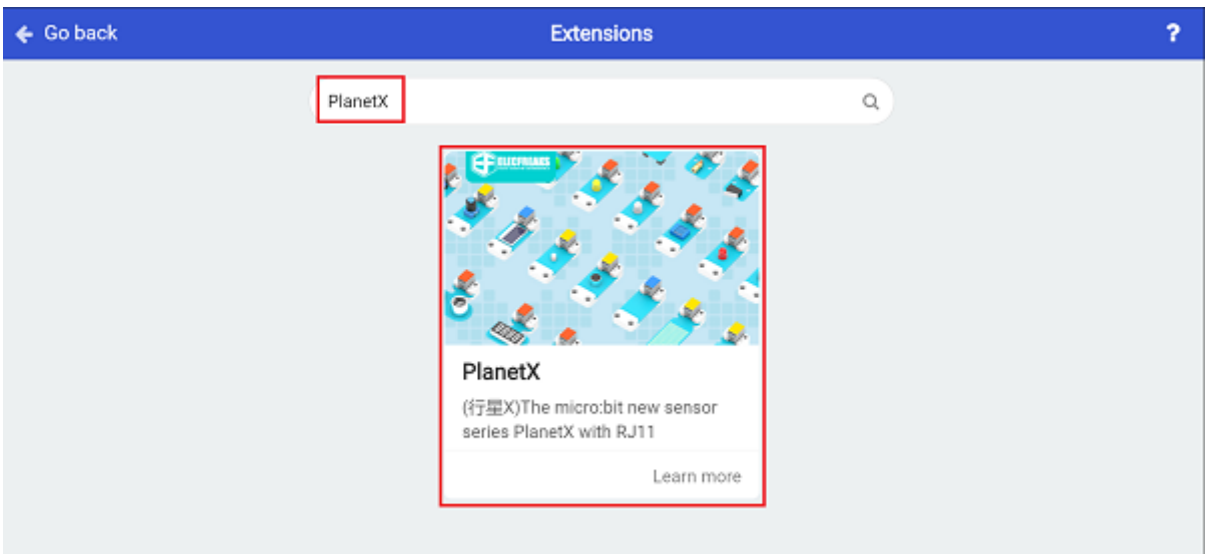
10.3. MakeCode Programming

Step 1

Click “Advanced” in the MakeCode to see more choices.



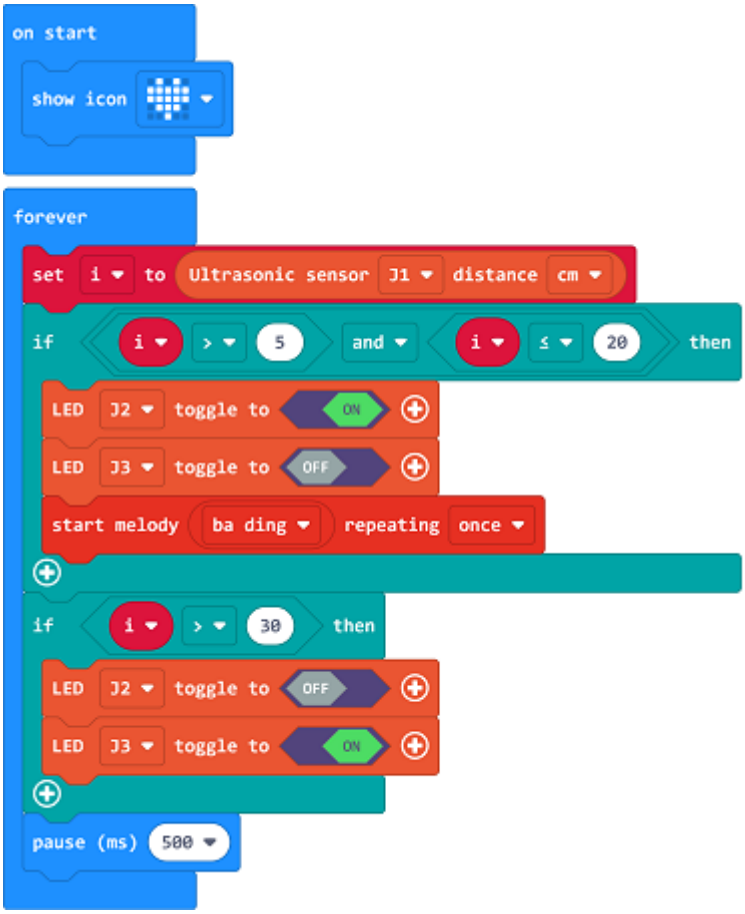
For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “PlanetX” in the dialogue box to download it.



Notice: If you met a tip indicating that some codebases would be deleted due to incompatibility, you may continue as the tips say or create a new project in the menu.

Step 2

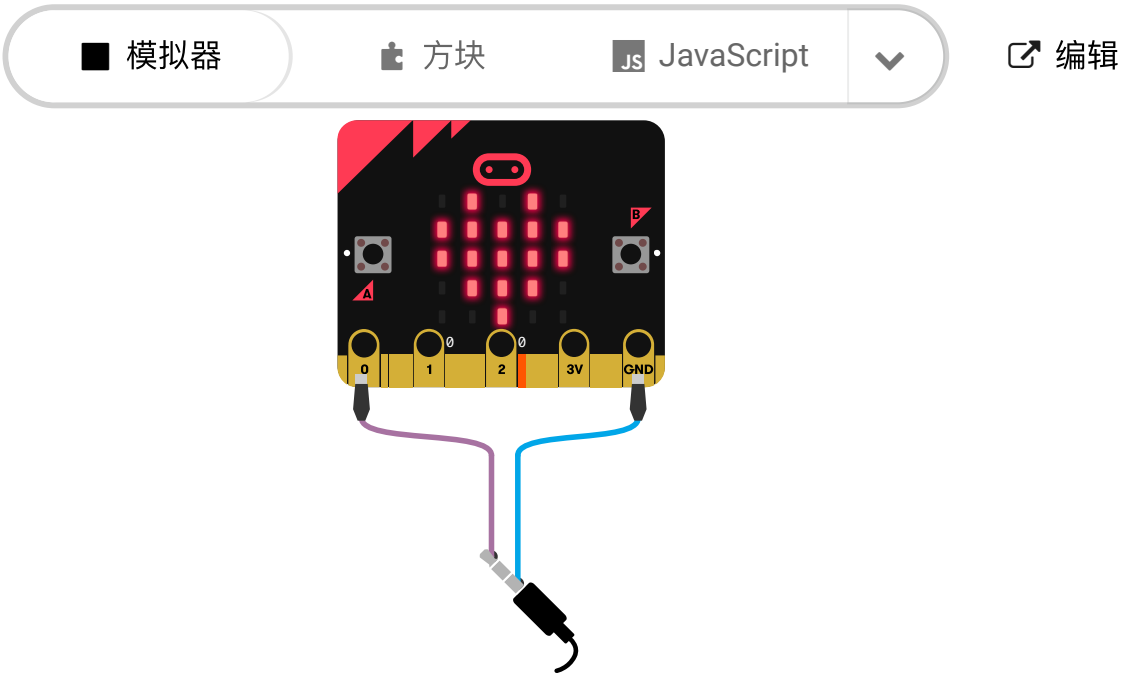
Code as below:



Reference

Link：https://makecode.microbit.org/_2zrE6AKRHbqW

You may also download it directly below:



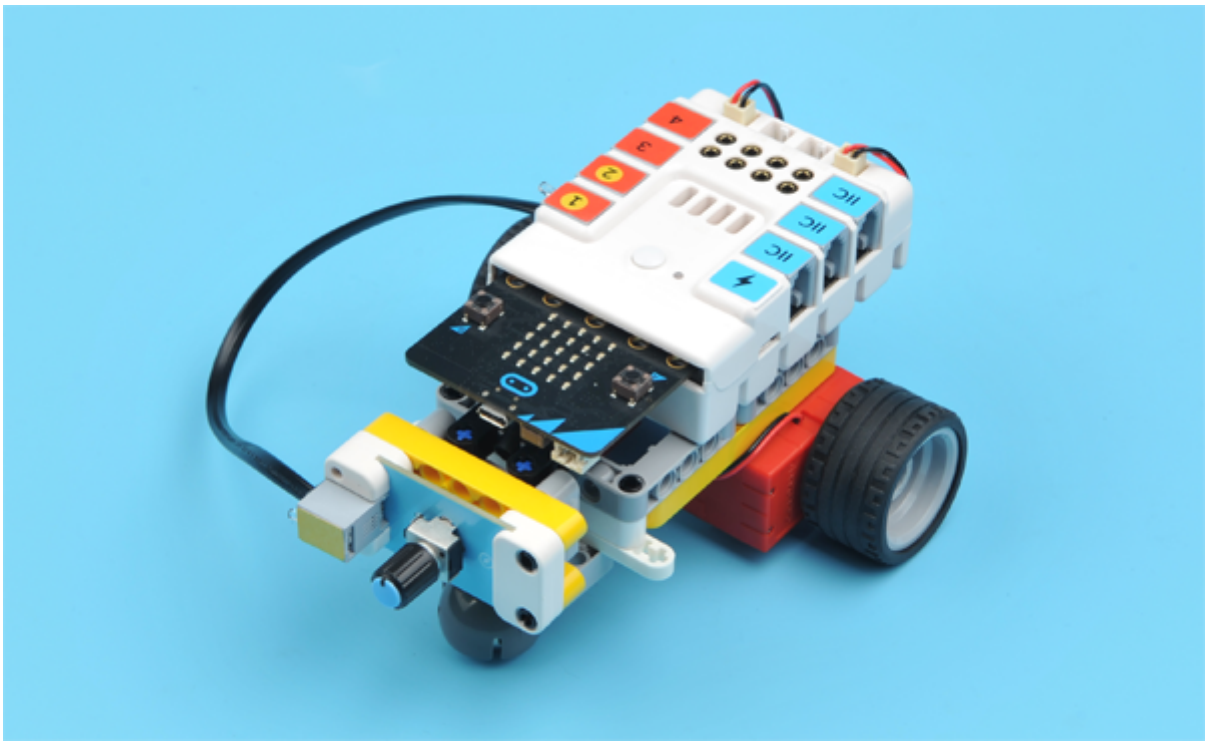
Result

- While the sonar:bit detects the object, the red LED lights up and the buzzer alarms.

11. Case 10: Speed Adjustable Car

11.1. Introduction

To make a speed adjustable car with a micro:bit.



11.2. Quick Start

Materials Required

Nezha expansion board × 1

micro:bit × 1

Potentiometer × 1

Motors × 2

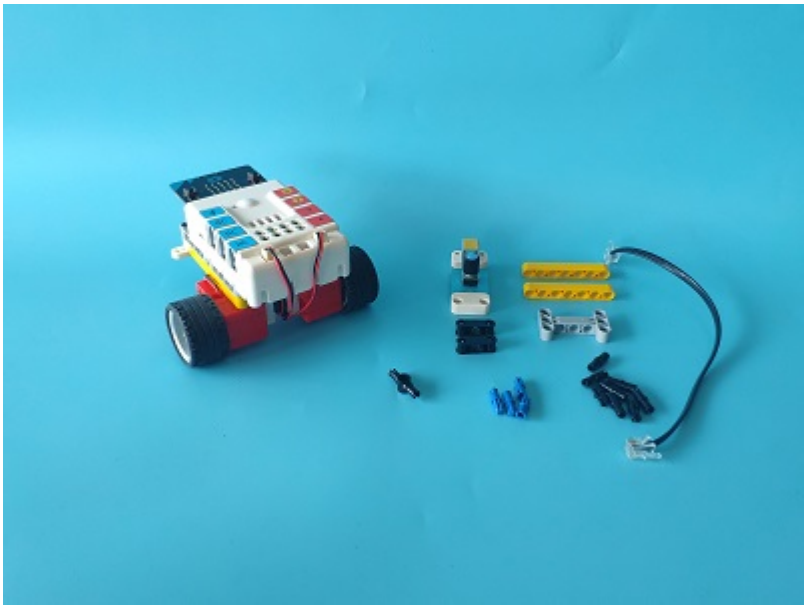
RJ11 wires × 1

Bricks details

Bricks	qty
RIM WIDE W.CROSS 30x20	2
TYRE LOW WIDE Ø37 X 22	2
TECHNIC 3M BEAM	2
TECHNIC 7M BEAM	3
TECHNIC 9M BEAM	2
LEVER 1X4, WITHOUT NOTCH	2
1/2 BUSH	2
1 1/2 M CONNECTING BUSH	4
CONNECTOR PEG W. FRICTION	25
CROSS AXLE 3M	2
CONN.BUSH W.FRIC./CROSSALE	6
DOUBLE CROSS BLOCK	2
DOUBLE BUSH 3M Ø4.9	2
BEAM FRAME 5X7 Ø 4.85	2
BEAM I -FRAME 3X5 90 DEGR. HOLE Ø4.85	2
POWER JOINT	1
STEEL BALL	1

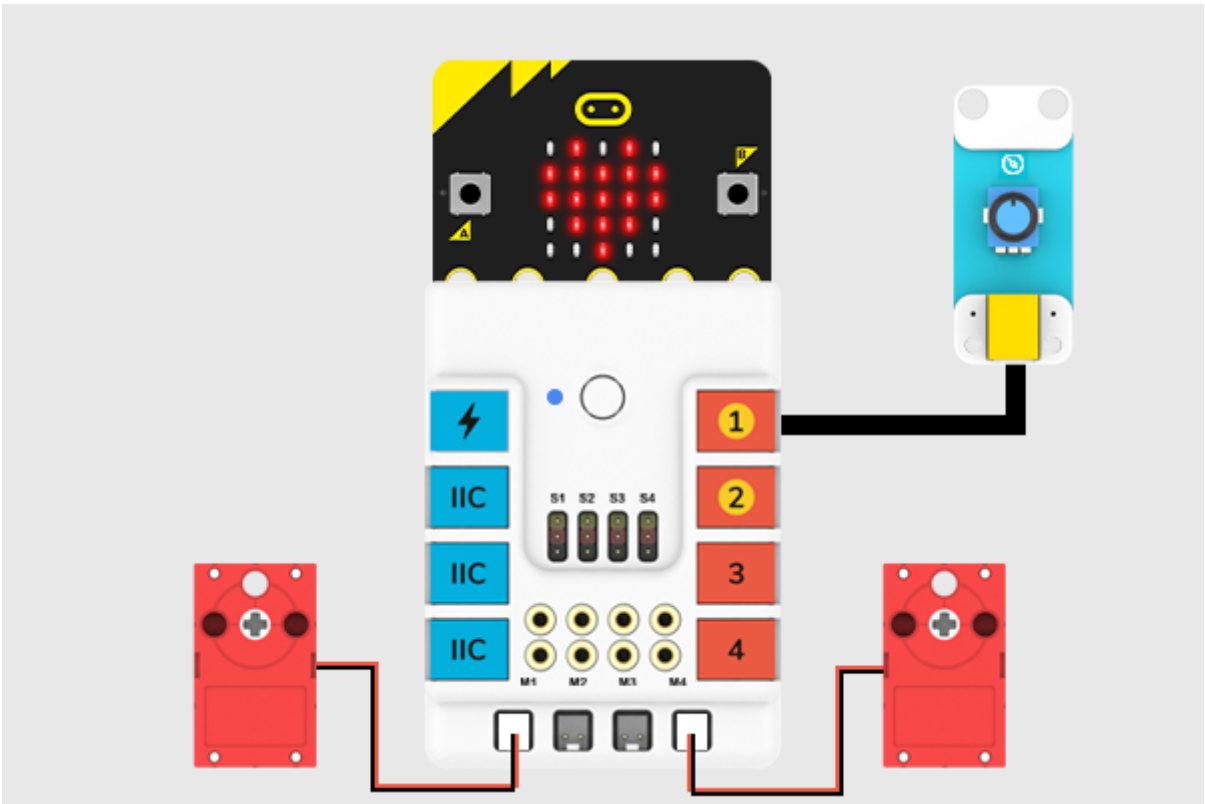
Build the body parts of the car:

Speed controller build-up



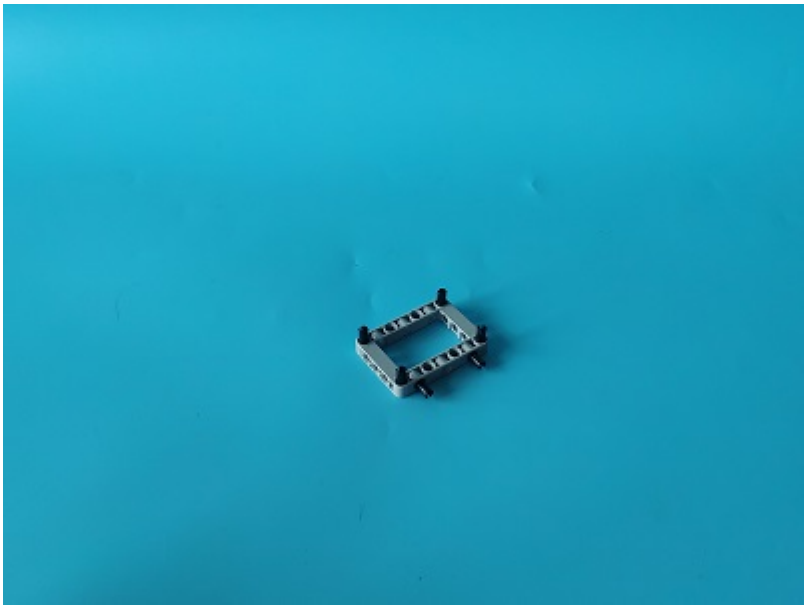
Connection Diagram

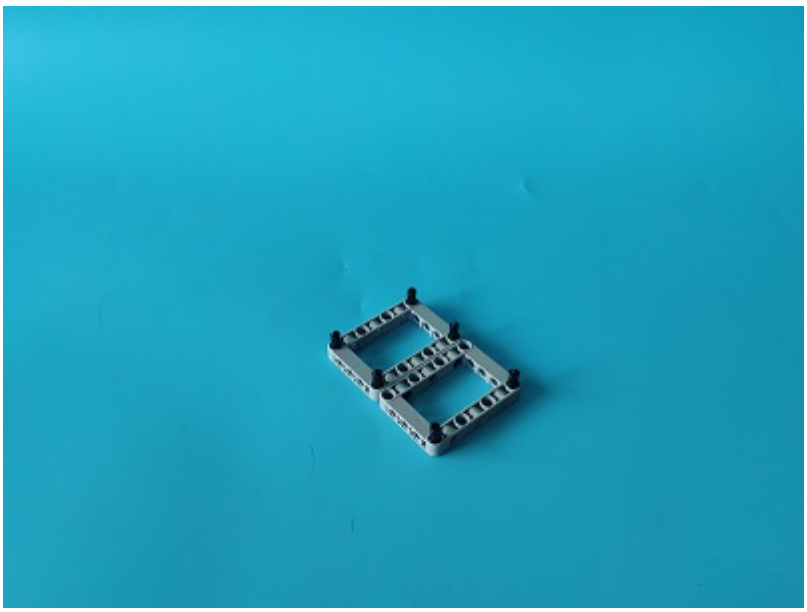
- Connect the potentiometer to J1, the two motors to M1&M4 on the Nezha expansion board as the picture shows.

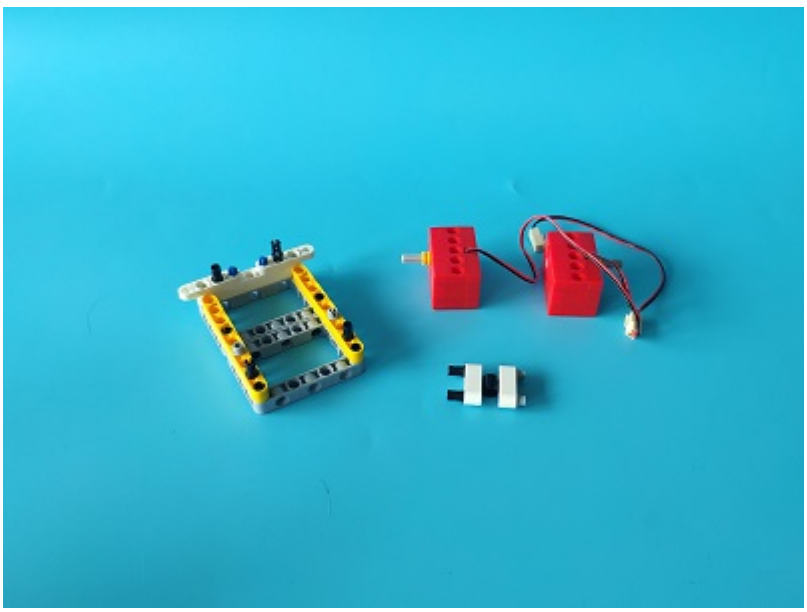


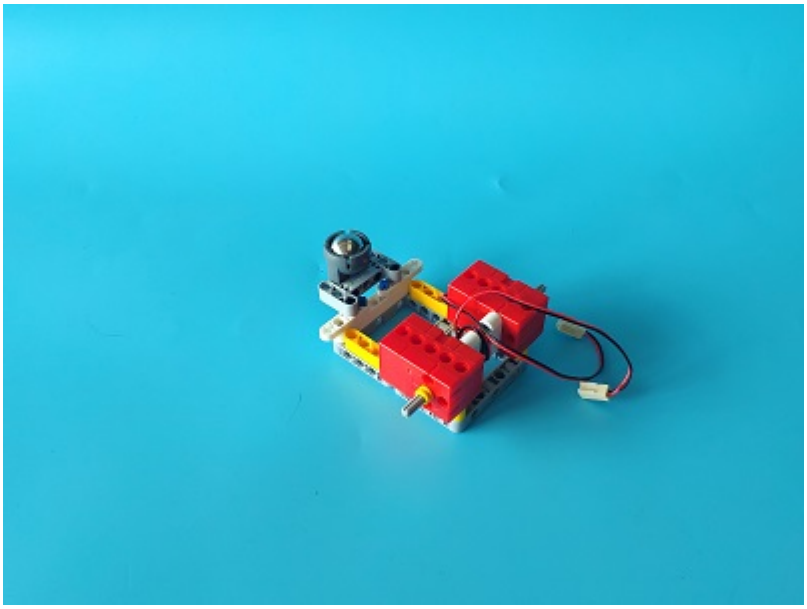
Assembly

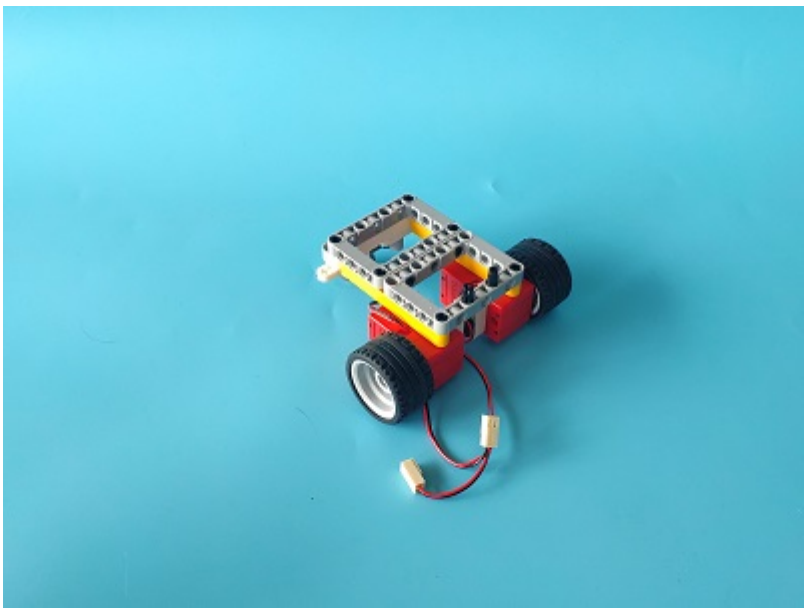
- Build a device as the picture shows:

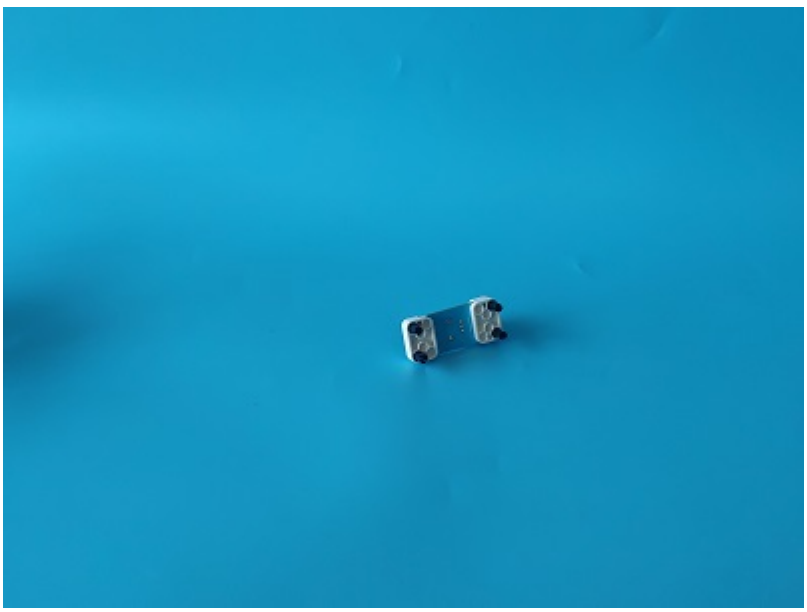


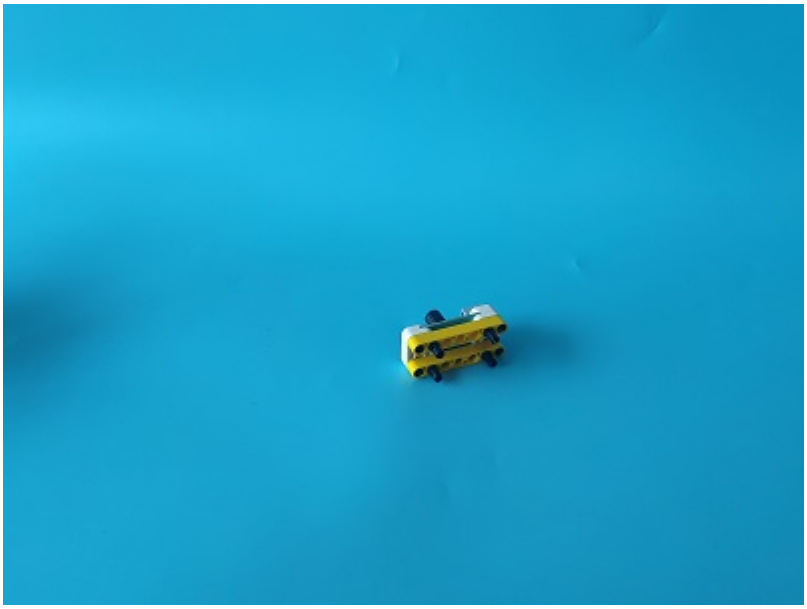


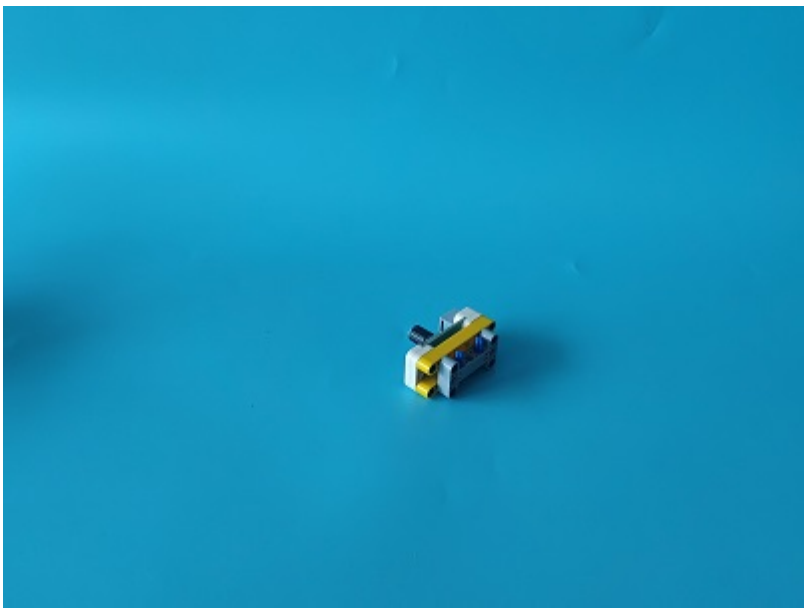


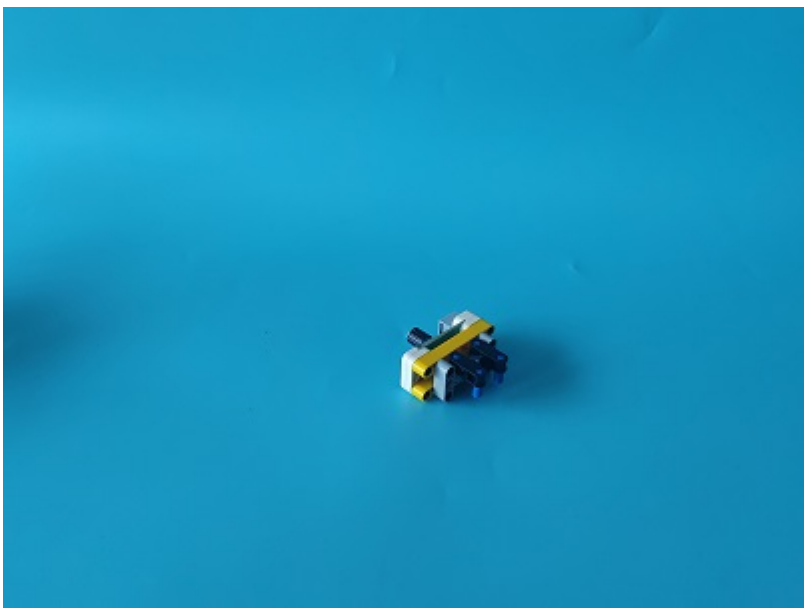










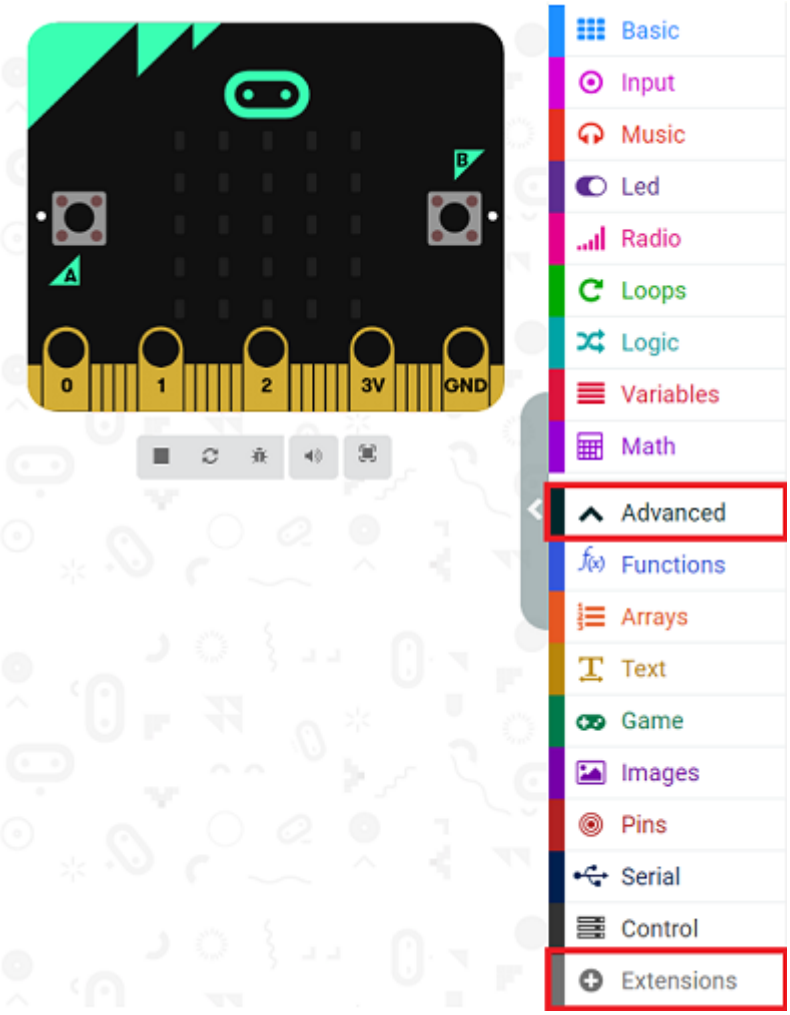


Video reference: https://youtu.be/bVa5-wrcoeA

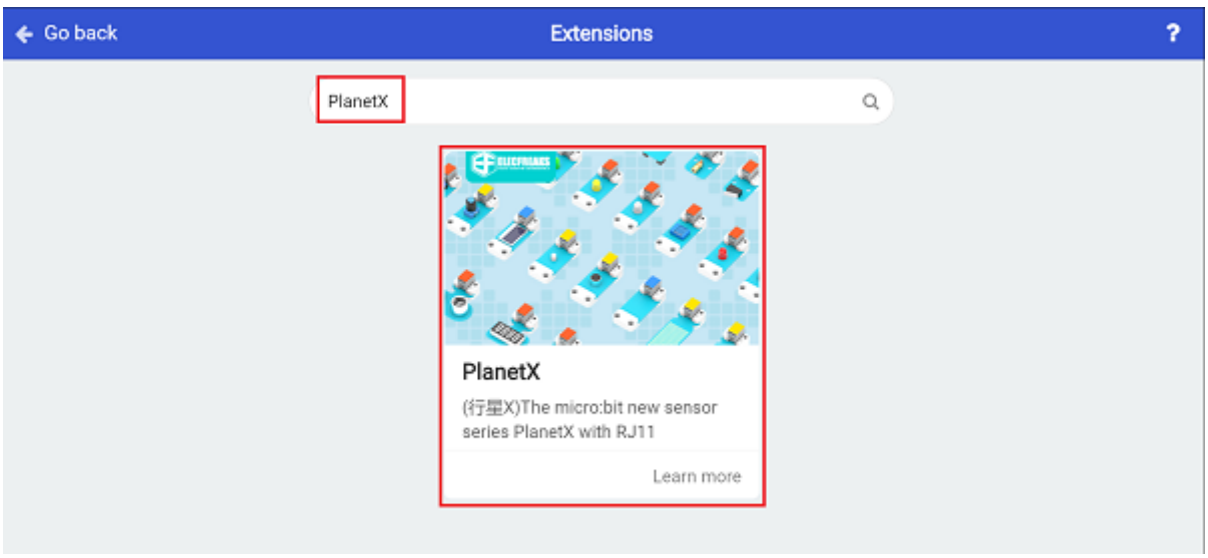
11.3. MakeCode Programming

Step 1

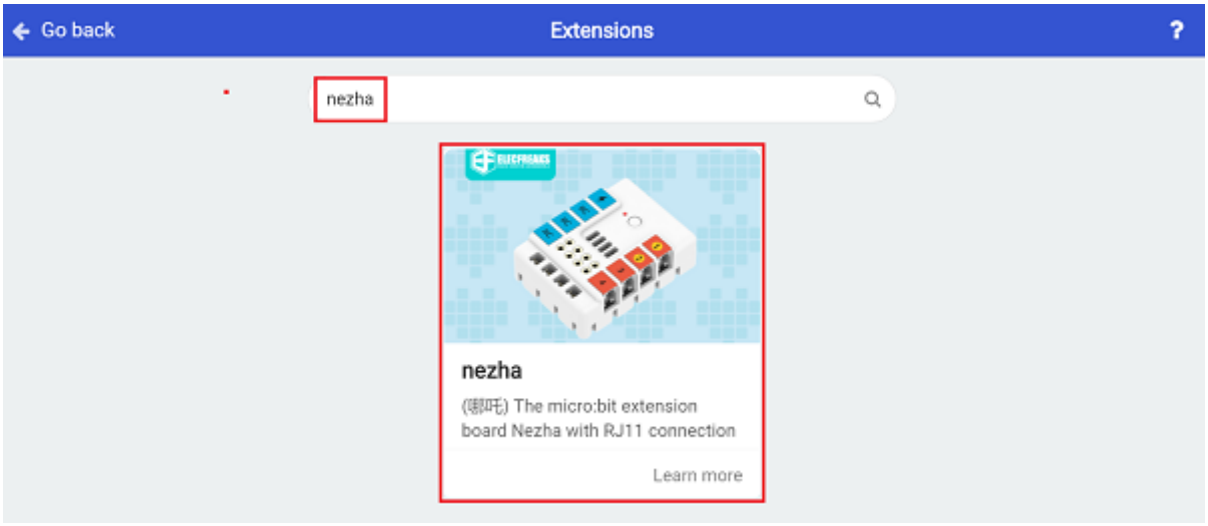
Click “Advanced” in the MakeCode to see more choices.



For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “PlanetX” in the dialogue box to download it.



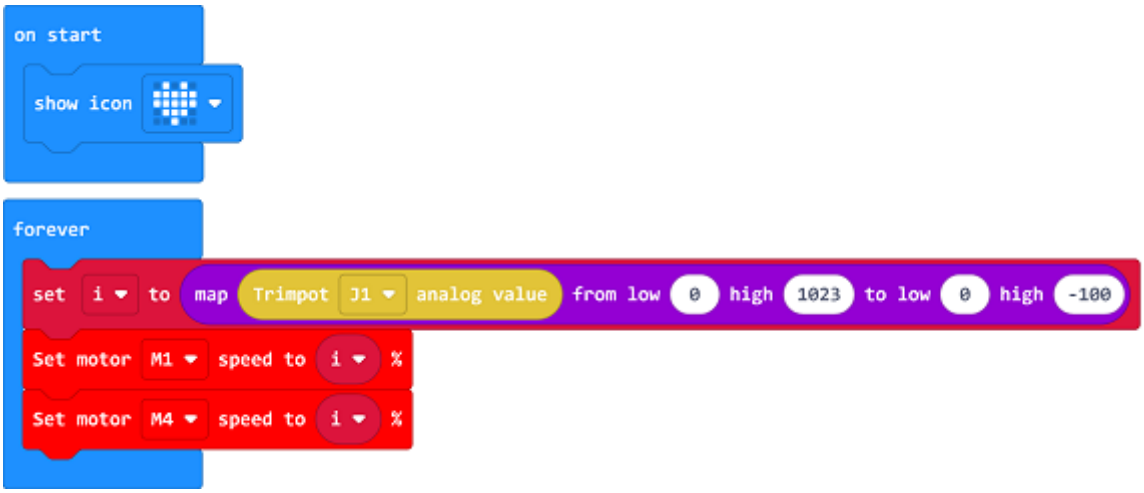
For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “nezha” in the dialogue box to download it.



Notice: If you met a tip indicating that some codebases would be deleted due to incompatibility, you may continue as the tips say or create a new project in the menu.

Step 2

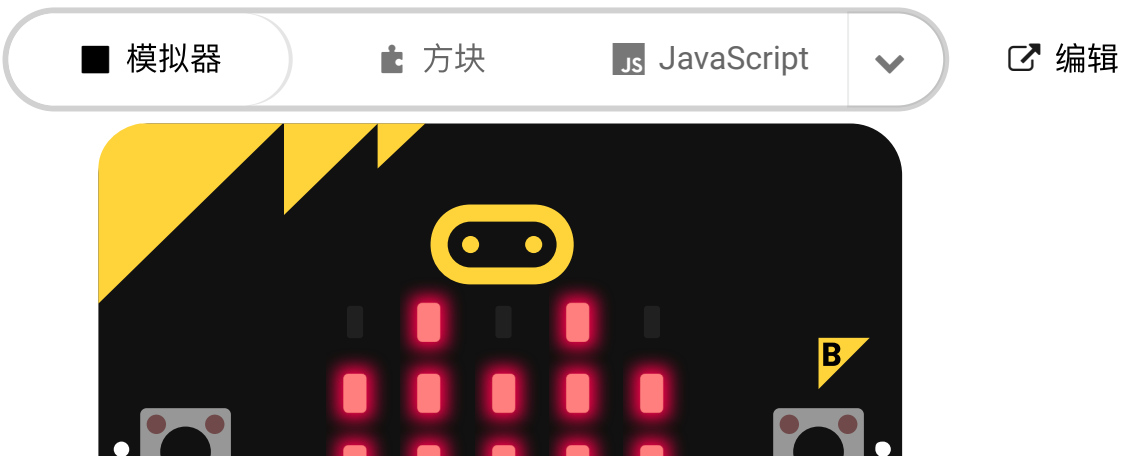
Code as below:

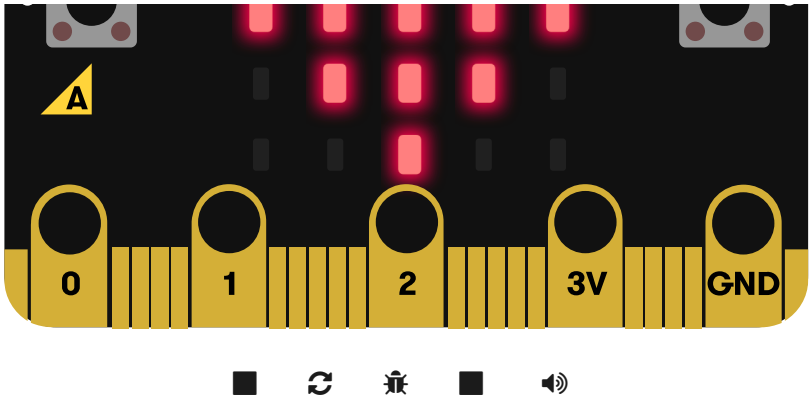


Reference

Link：https://makecode.microbit.org/_cTDgmegXA5ip

You may also download it directly below:





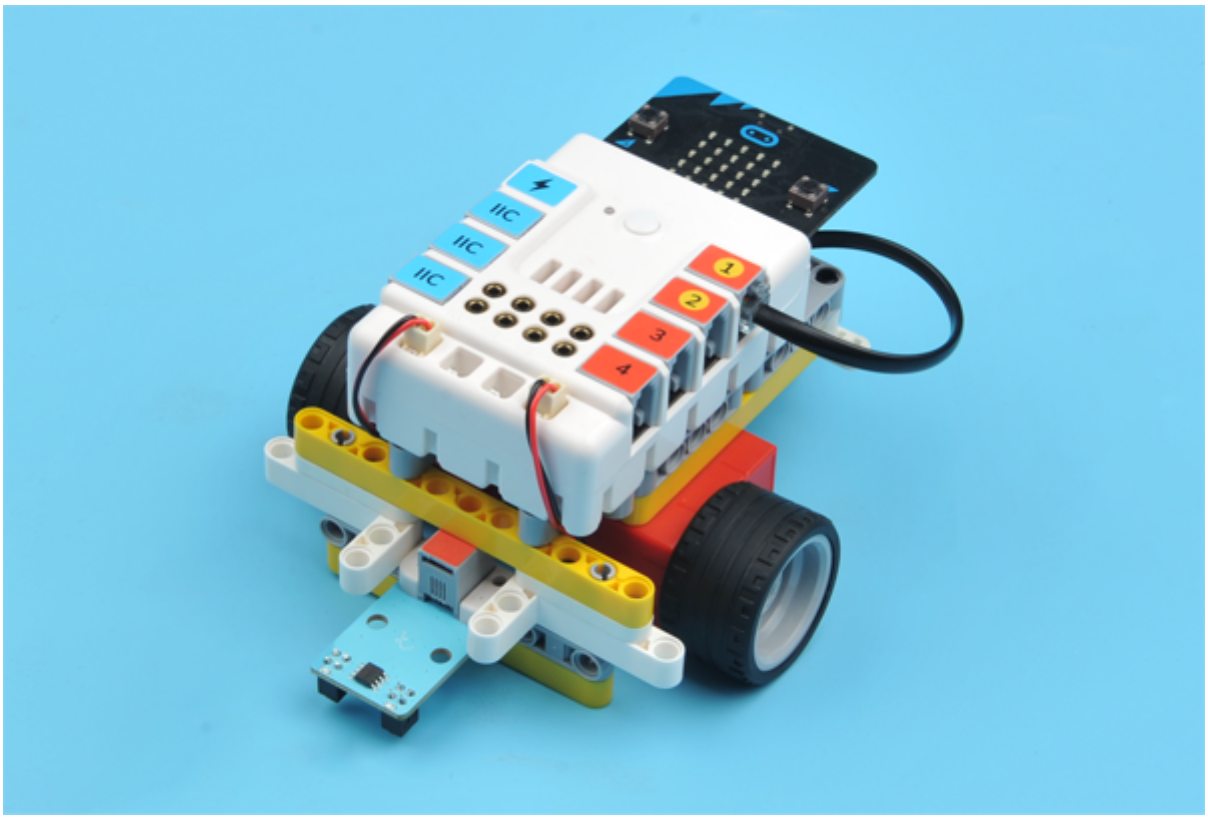
Result

- The speed of the car could be adjusted by the potentiometer.

12. Case 11: Line-tracking Car

12.1. Introduction

To build a car that could drive along with the black line with a micro:bit.



12.2. Quick Start

Materials Required

Nezha expansion board × 1

micro:bit × 1

Line-tracking sensor × 1

Motors × 2

RJ11 wires × 1

Bricks details

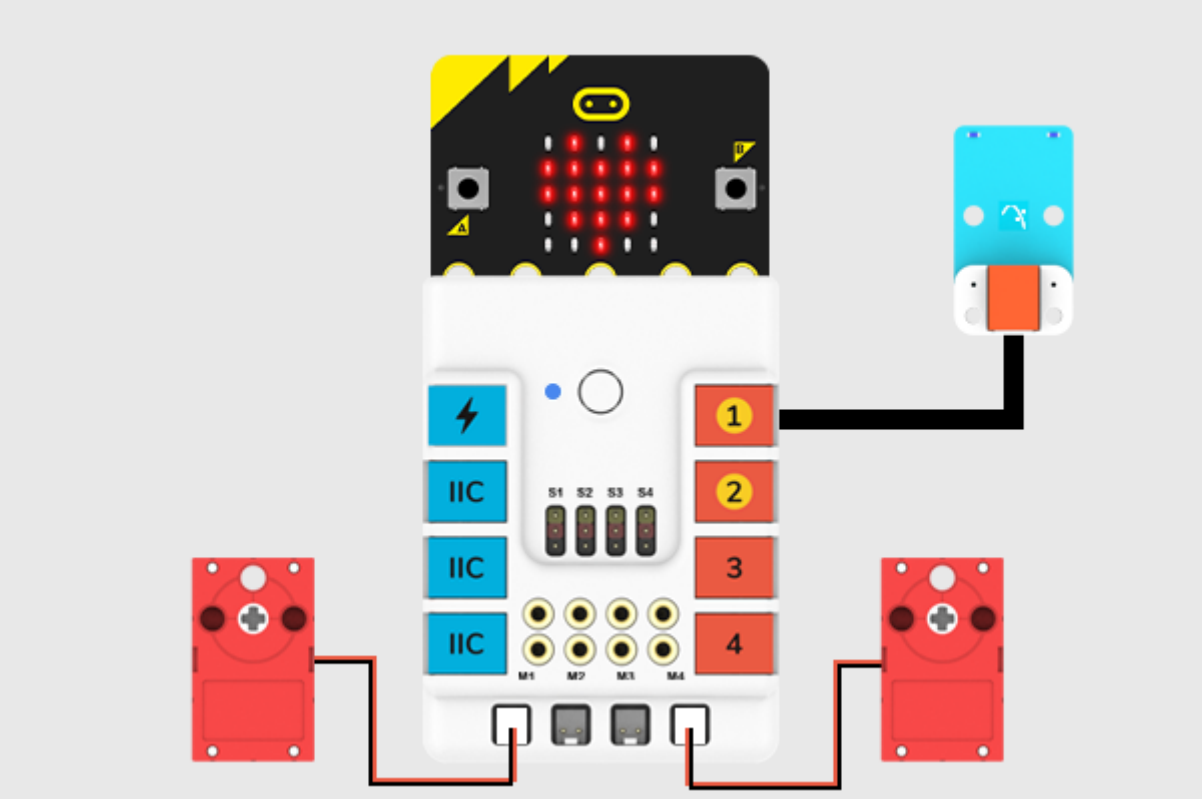
Bricks	qty
RIM WIDE W.CROSS 30x20	2
TYRE LOW WIDE Ø37 X 22	2
TECHNIC 3M BEAM	2
TECHNIC 7M BEAM	1
TECHNIC 9M BEAM	3
T-BEAM 3X3 W/HOLE Ø4.8	2
TECHNIC 11M BEAM	1
TECHNIC ANG. BEAM 3X5 90 DEG.	2
LEVER 1X4, WITHOUT NOTCH	2
LEVER 1X4, WITHOUT NOTCH	2
1/2 BUSH	2
1 1/2 M CONNECTING BUSH	6
CONNECTOR PEG W. FRICTION	29
CROSS AXLE 3M	2
CONN.BUSH W.FRIC./CROSSALE	4
DOUBLE BUSH 3M Ø4.9	1
BEAM 3 M. W/4 SNAPS	2
BEAM FRAME 5X7 Ø 4.85	2
BEAM I -FRAME 3X5 90 DEGR. HOLE Ø4.85	1
POWER JOINT	1
STEEL BALL	1

Build the body parts of the car

Line-tracking module build-up

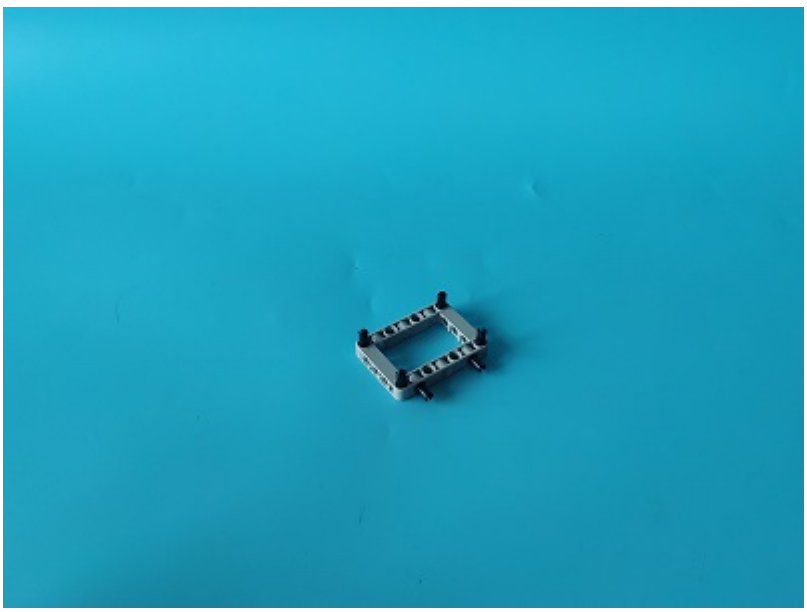
Connection Diagram

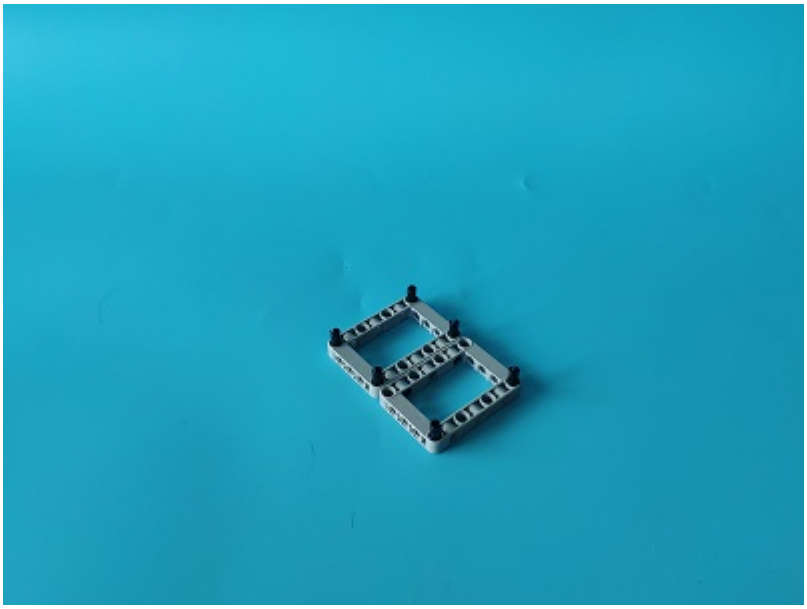
- Connect the line-tracking sensor to J1, the two motors to M1&M4 on the Nezha expansion board as the picture shows.

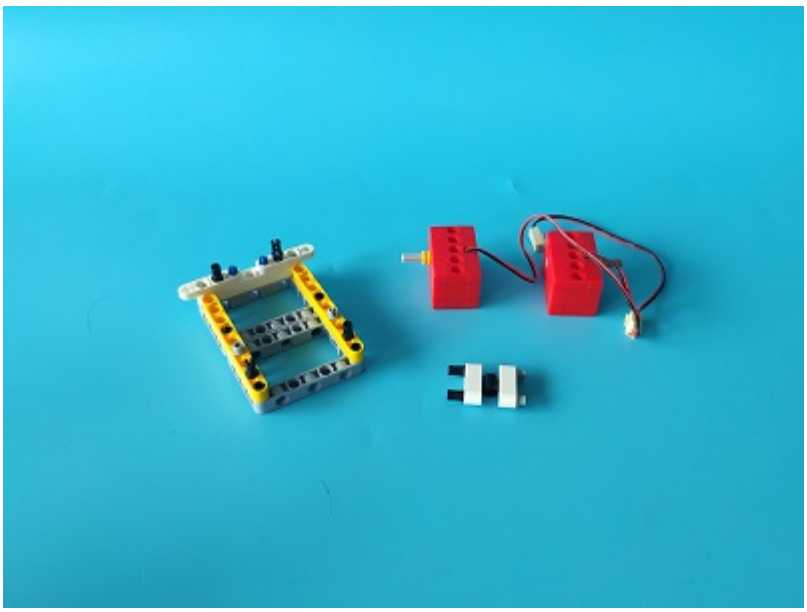


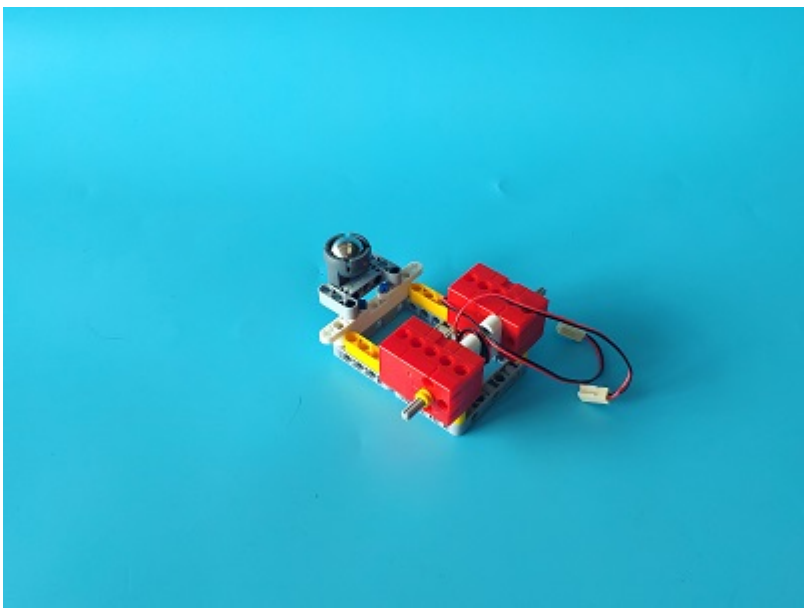
Assembly

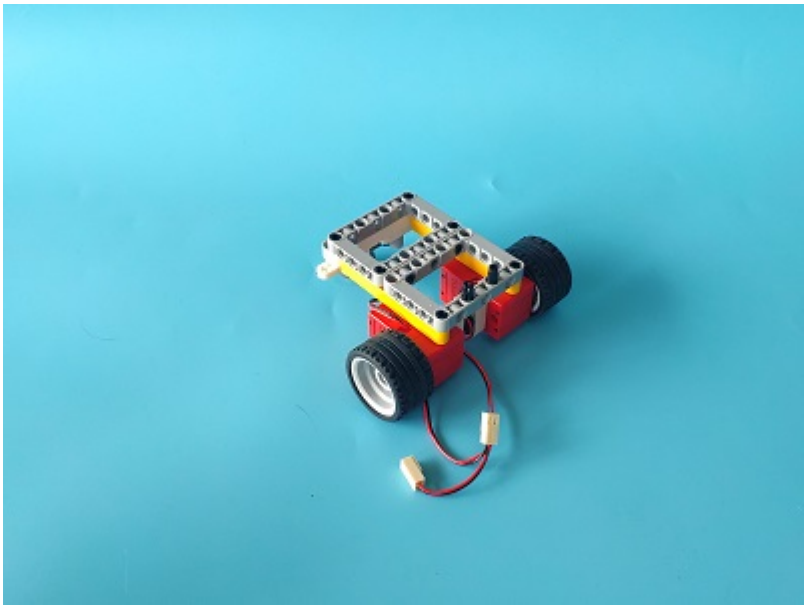
- Build a device as the picture shows:

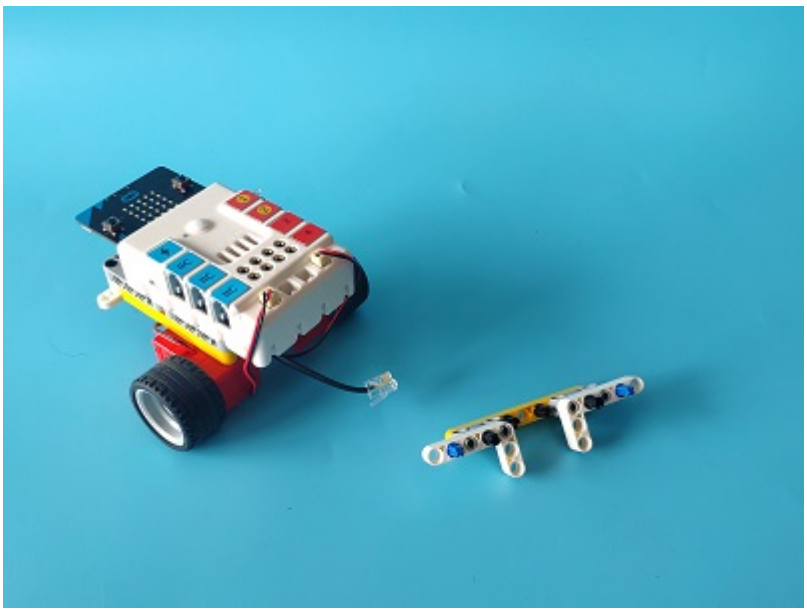


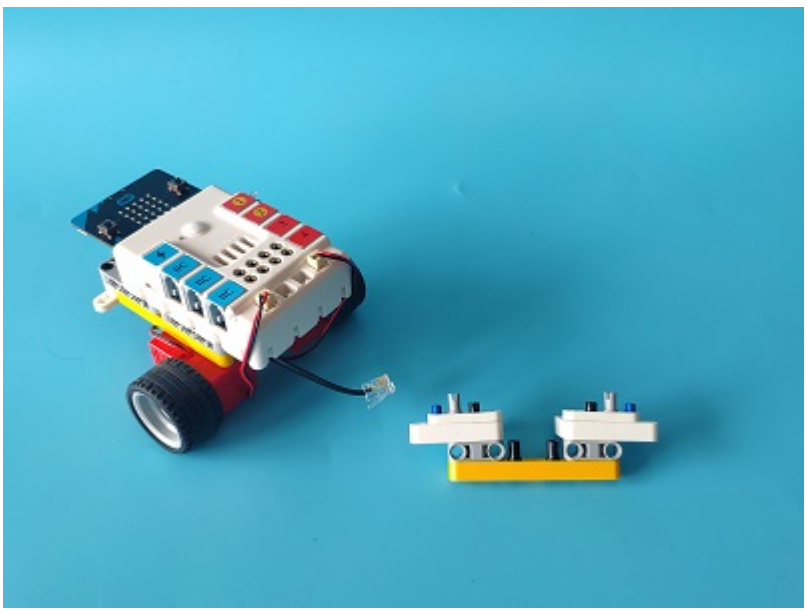


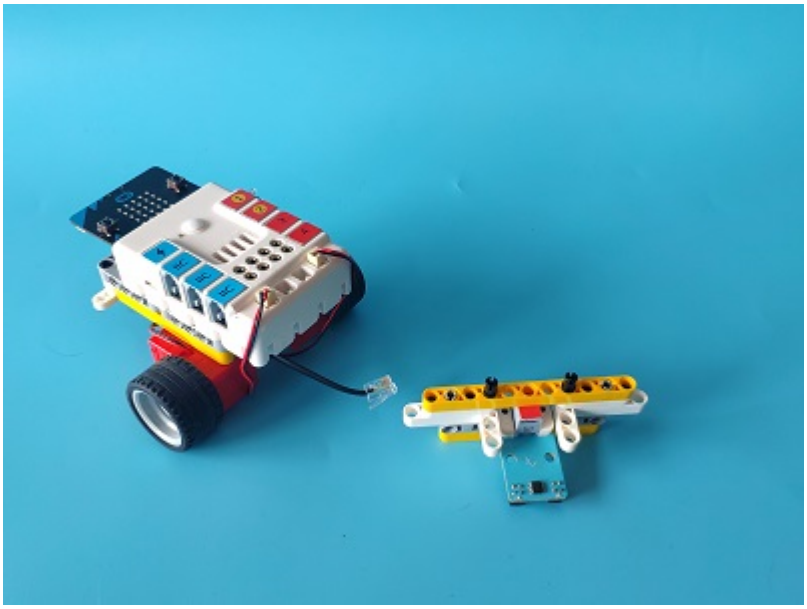


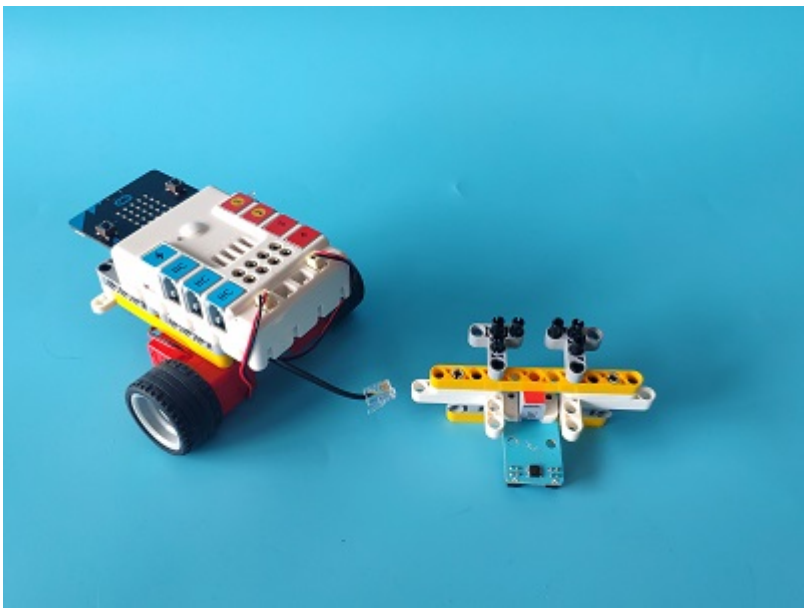


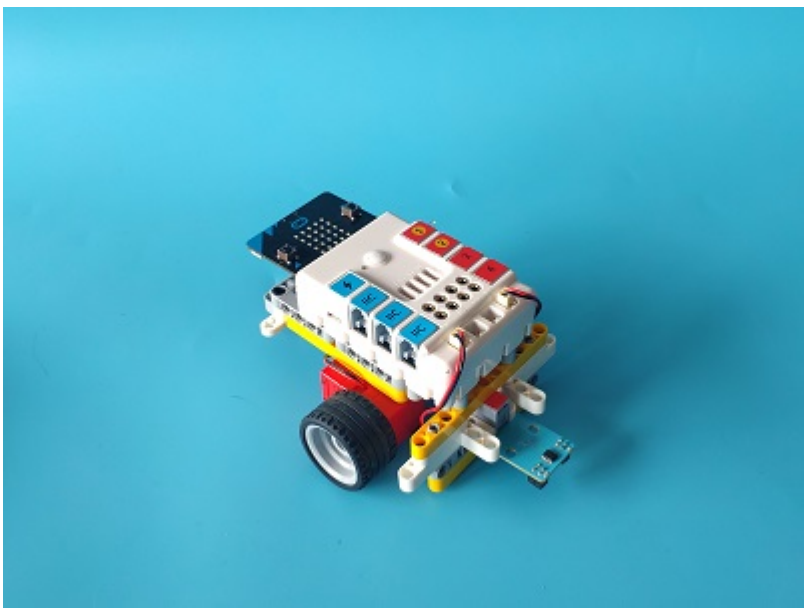










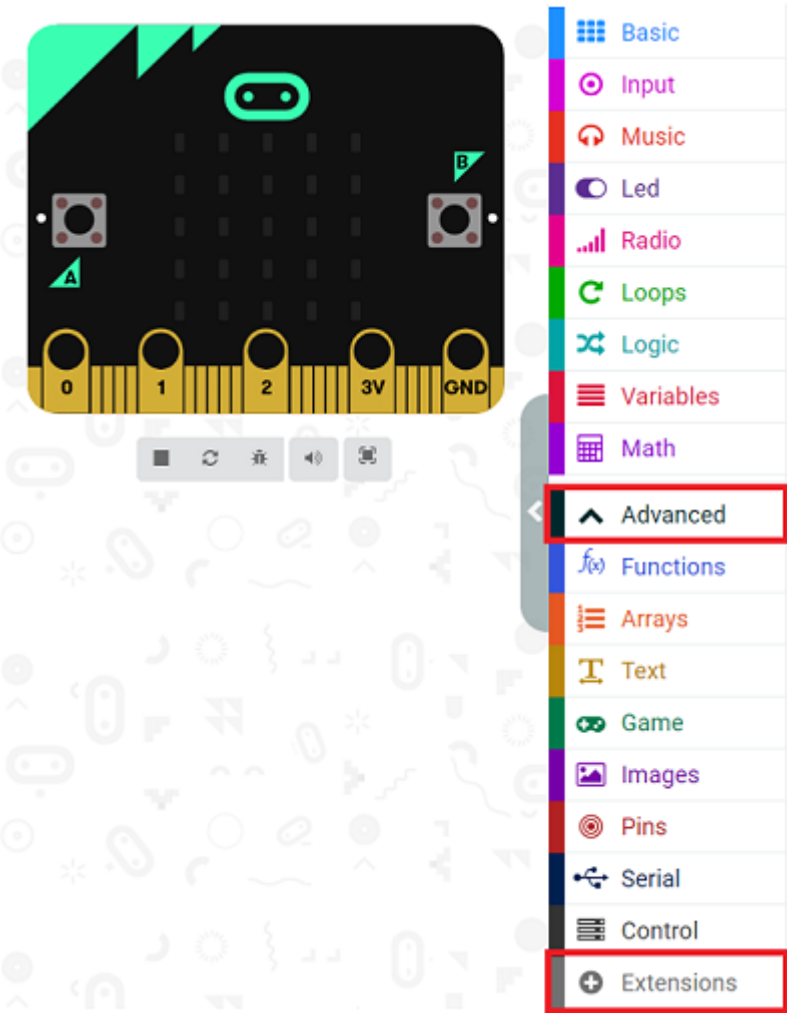


Video reference: https://youtu.be/N2w01pGaj30

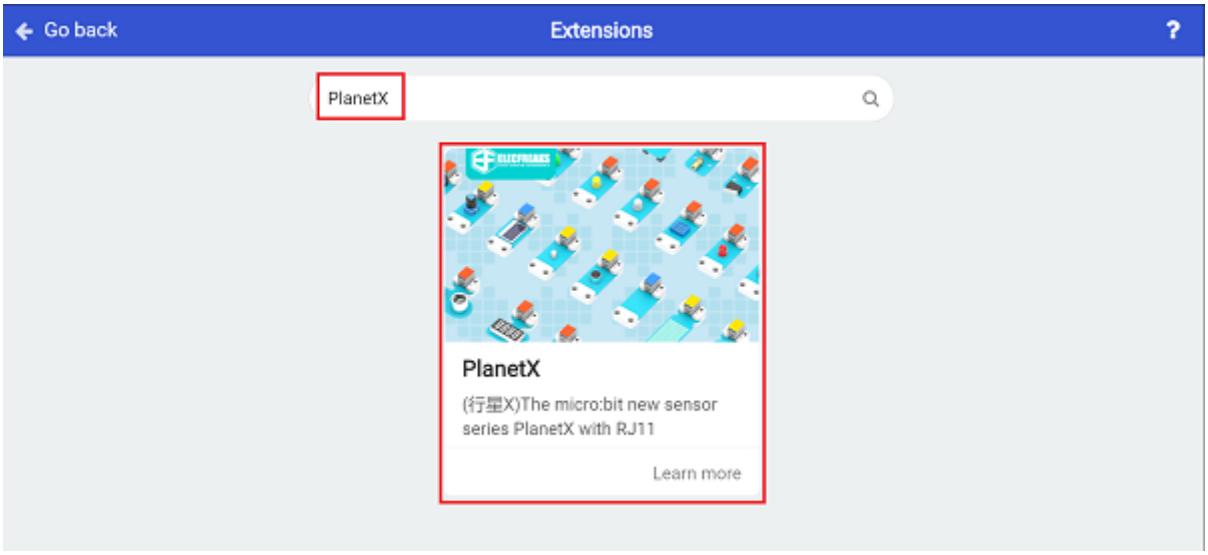
12.3. MakeCode Programming

Step 1

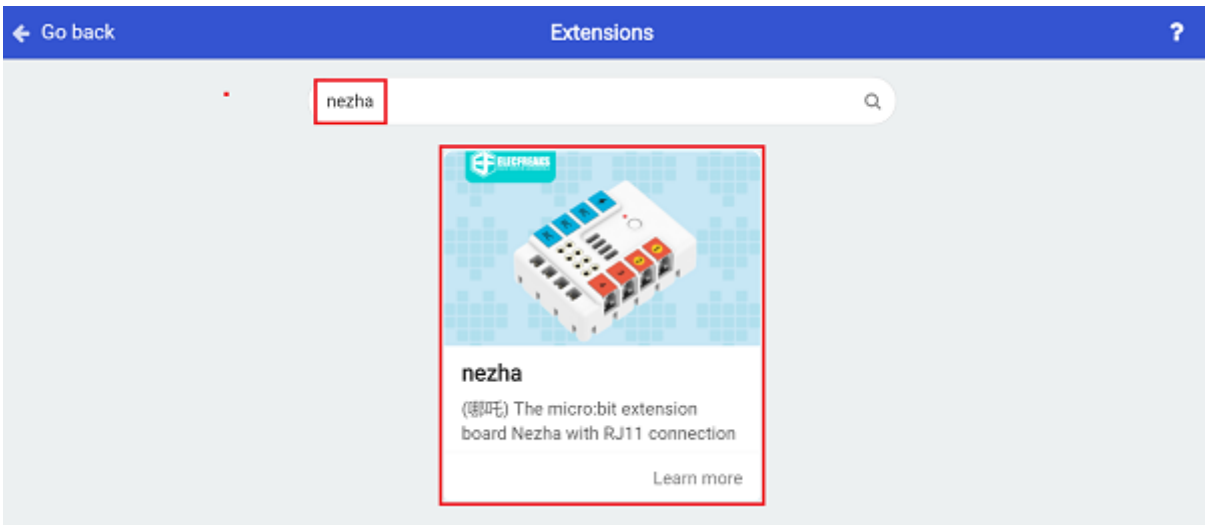
Click “Advanced” in the MakeCode to see more choices.



For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “PlanetX” in the dialogue box to download it.



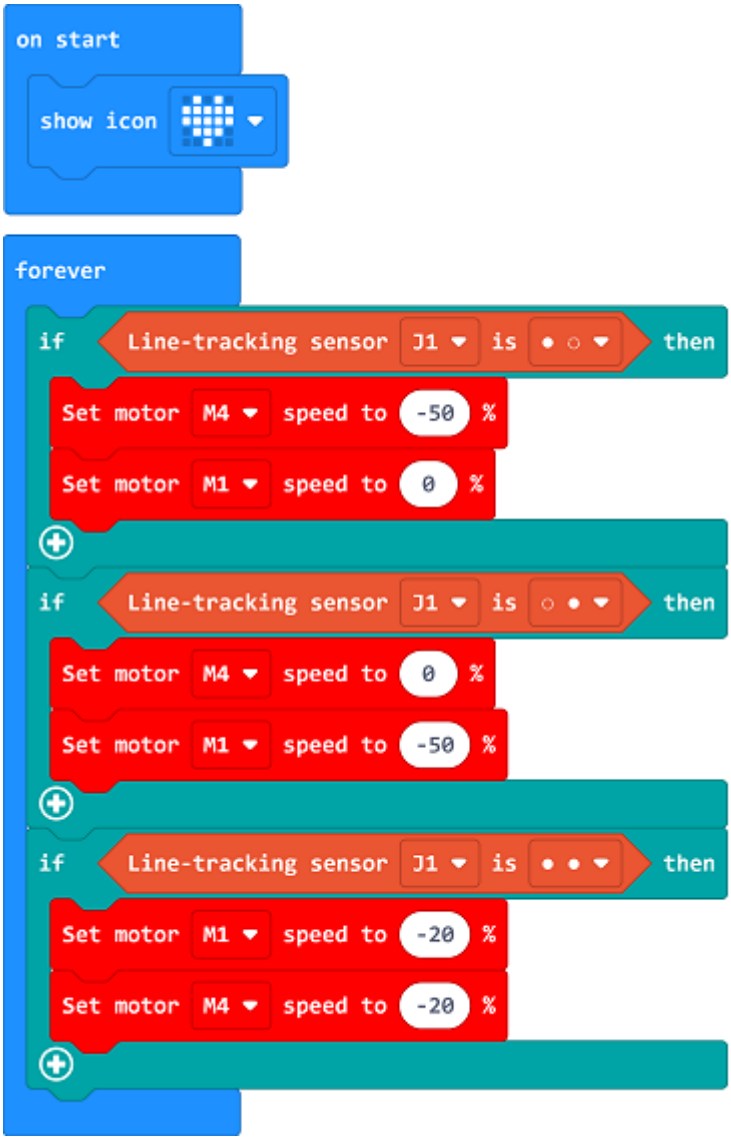
For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “nezha” in the dialogue box to download it.



Notice: If you met a tip indicating that some codebases would be deleted due to incompatibility, you may continue as the tips say or create a new project in the menu.

Step 2

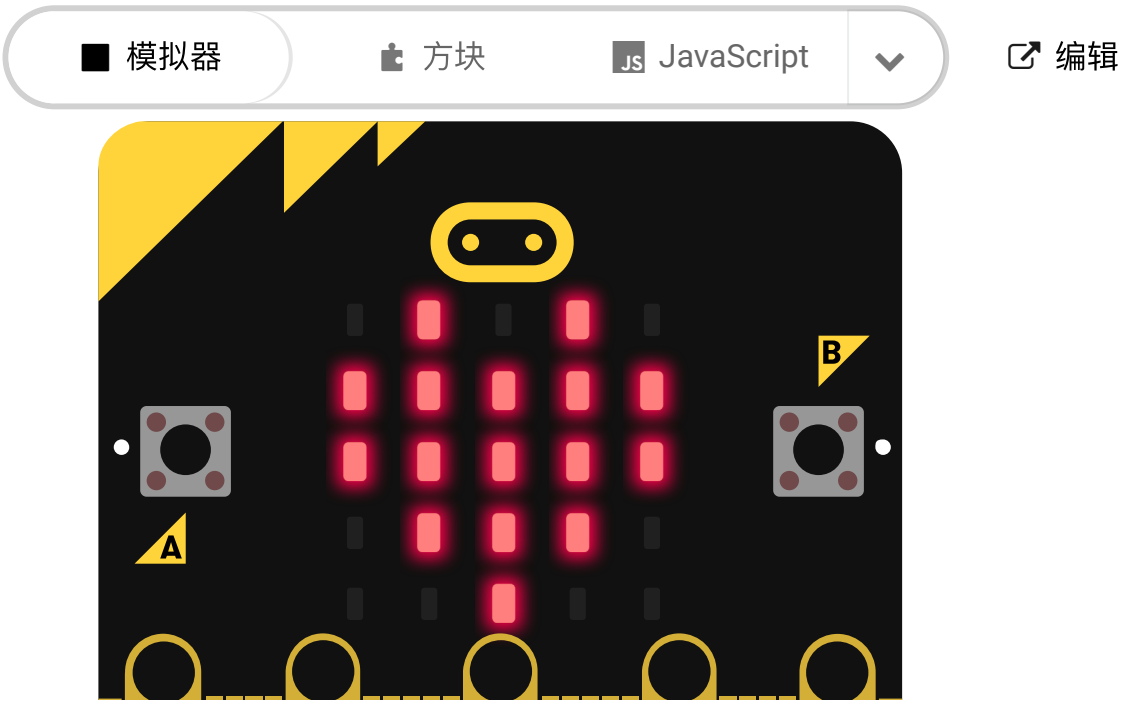
Code as below:



Reference

Link：https://makecode.microbit.org/_MbaX4mTEmHmf

You may also download it directly below:



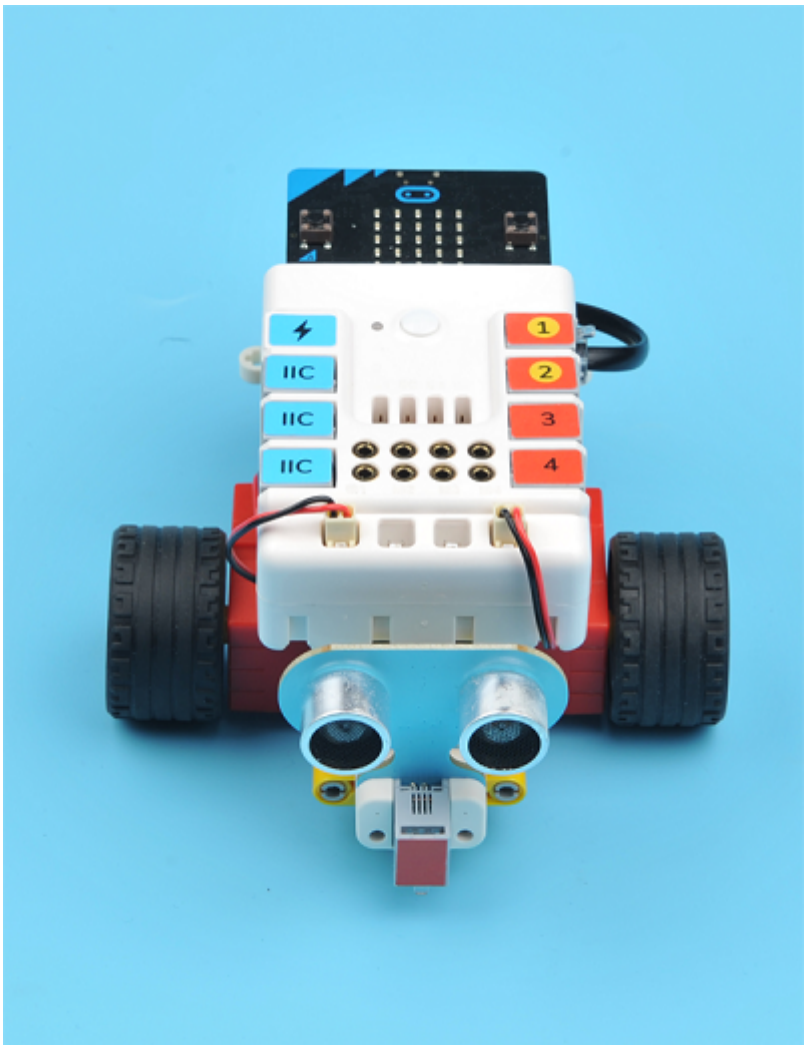
Result

- The car drives along with the black line.

13. Case 12: Obstacles Avoidance Car

13.1. Introduction

To build a car that can avoid the obstacles automatically with a micro:bit.



13.2. Quick Start

Materials Required

Nezha expansion board × 1

micro:bit × 1

Sonar:bit × 1

Motors × 2

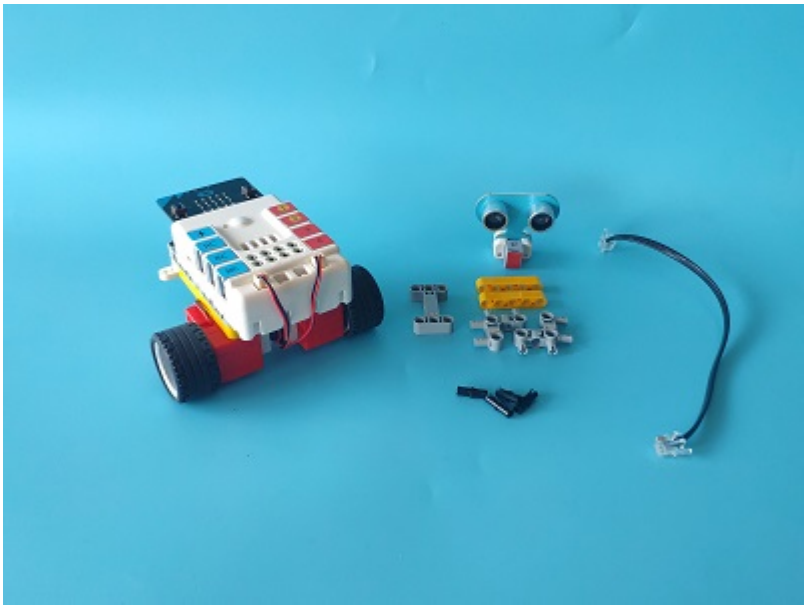
RJ11 wires × 1

Bricks details

Bricks	qty
RIM WIDE W.CROSS 30x20	2
TYRE LOW WIDE Ø37 X 22	2
TECHNIC 3M BEAM	2
TECHNIC 5M BEAM	2
TECHNIC 7M BEAM	1
TECHNIC 9M BEAM	2
LEVER 1X4, WITHOUT NOTCH	2
1/2 BUSH	2
1 1/2 M CONNECTING BUSH	4
CONNECTOR PEG W. FRICTION	21
CROSS AXLE 3M	2
CONN.BUSH W.FRIC./CROSSALE	2
DOUBLE BUSH 3M Ø4.9	1
Angular beam 90degr. w.4 snaps	2
BEAM FRAME 5X7 Ø 4.85	2
BEAM I -FRAME 3X5 90 DEGR. HOLE Ø4.85	2
POWER JOINT	1
STEEL BALL	1

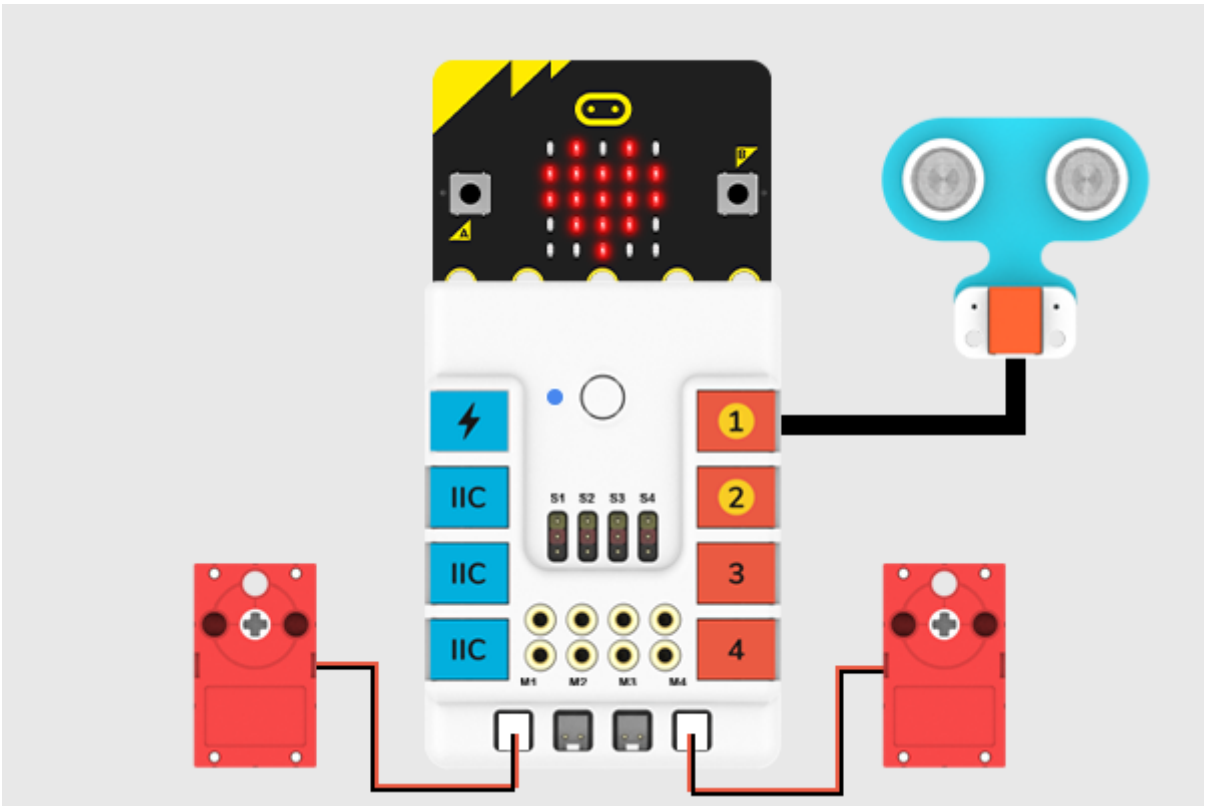
Build the body parts of the car

Sonar:bit module build-up



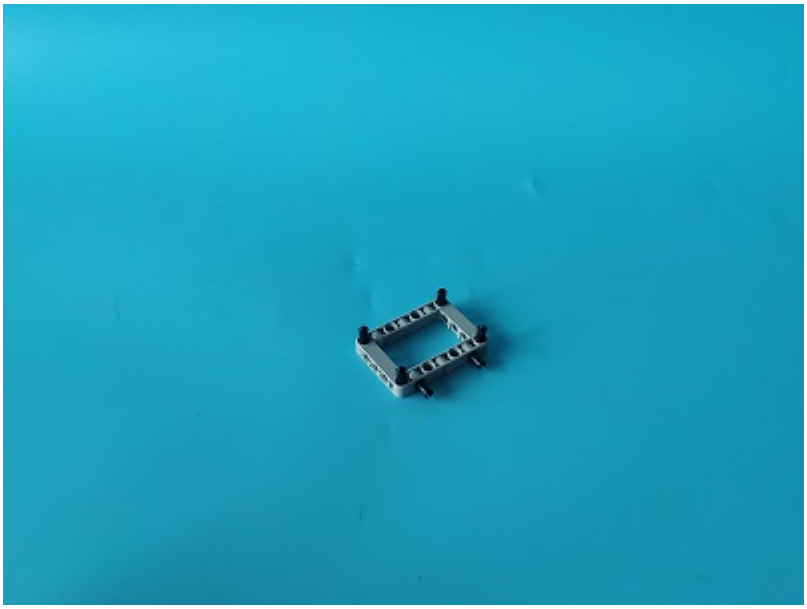
Connection Diagram

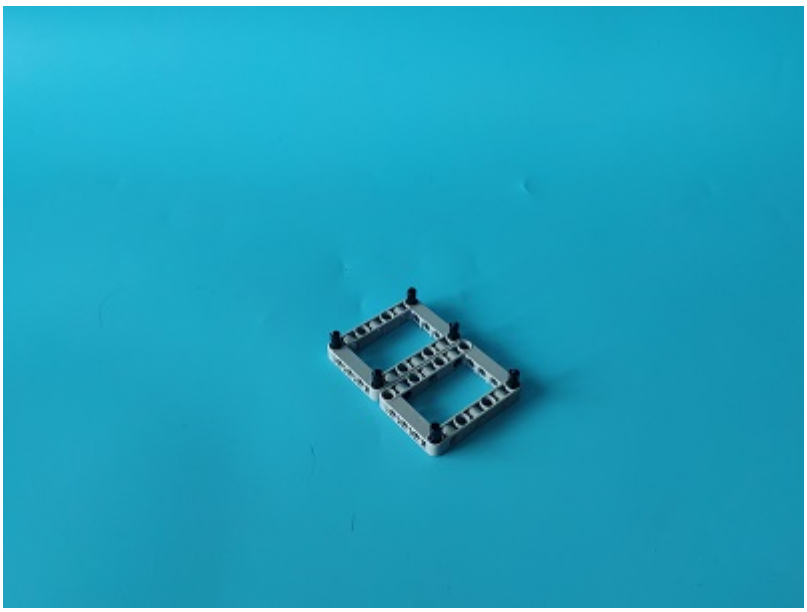
- Connect the sonar:bit to J1, the two motors to M1&M4 on the Nezha expansion board as the picture shows.

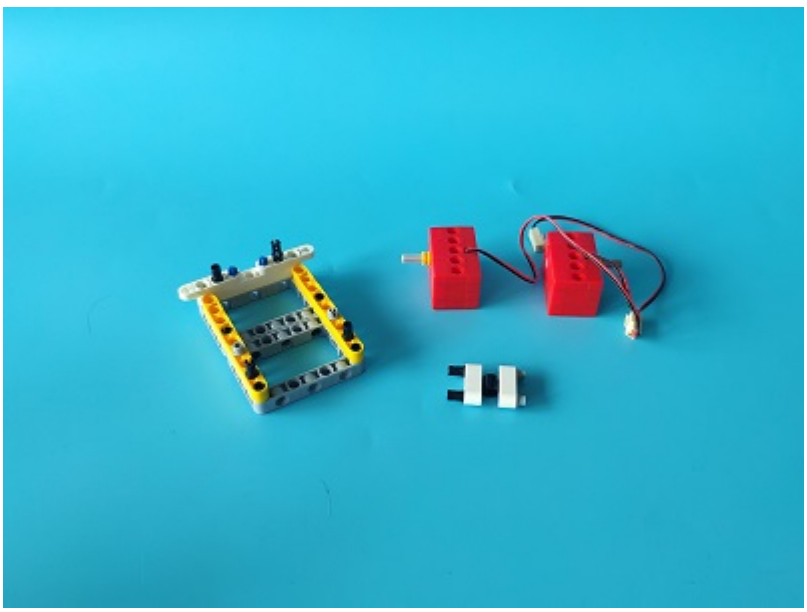


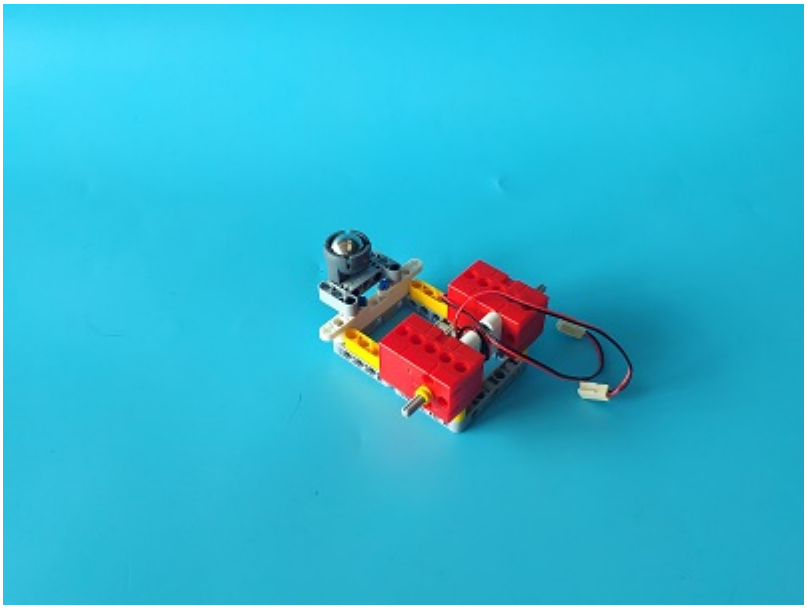
Assembly

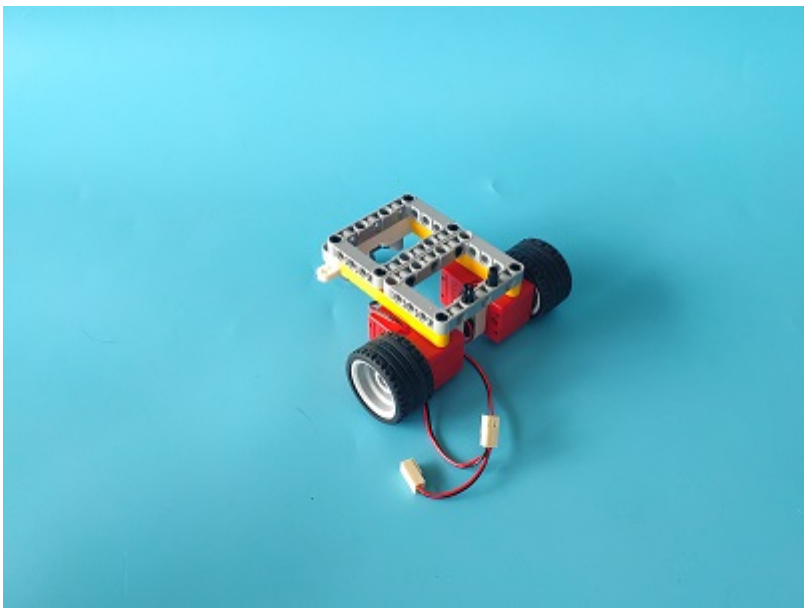
- Build a device as the picture shows:

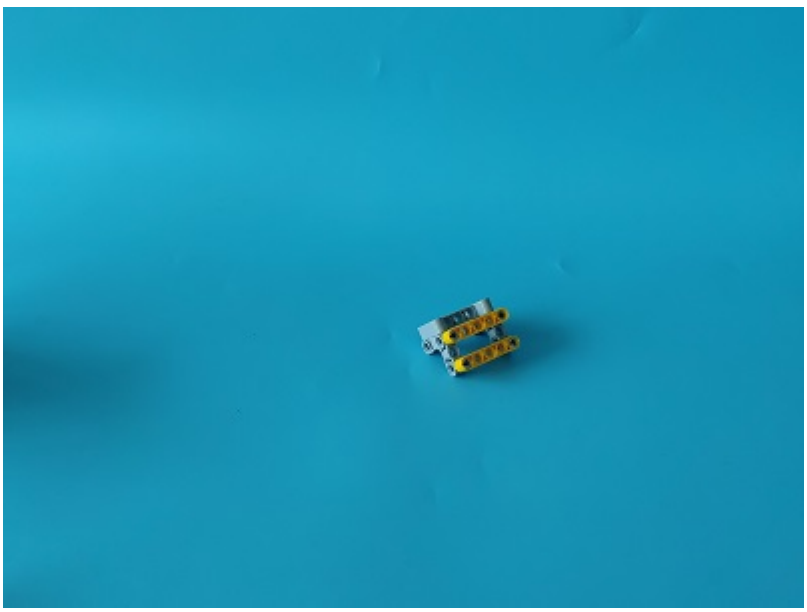


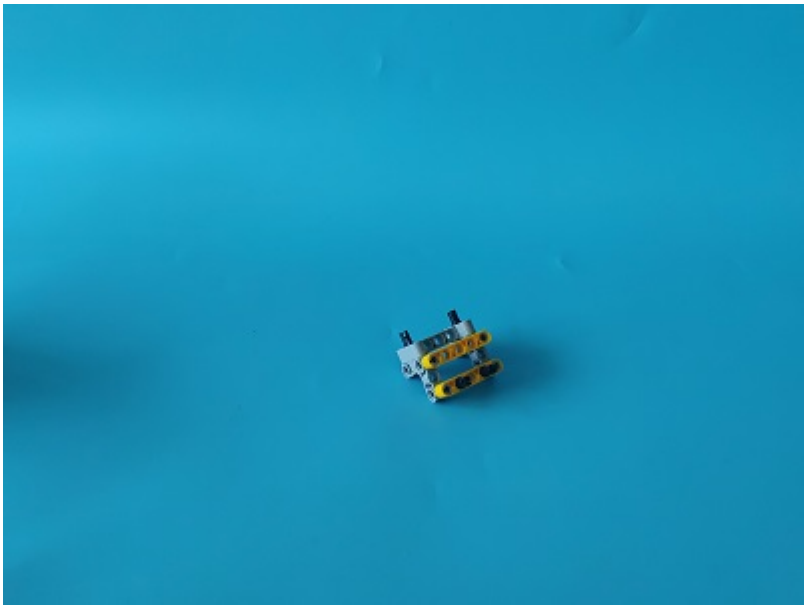


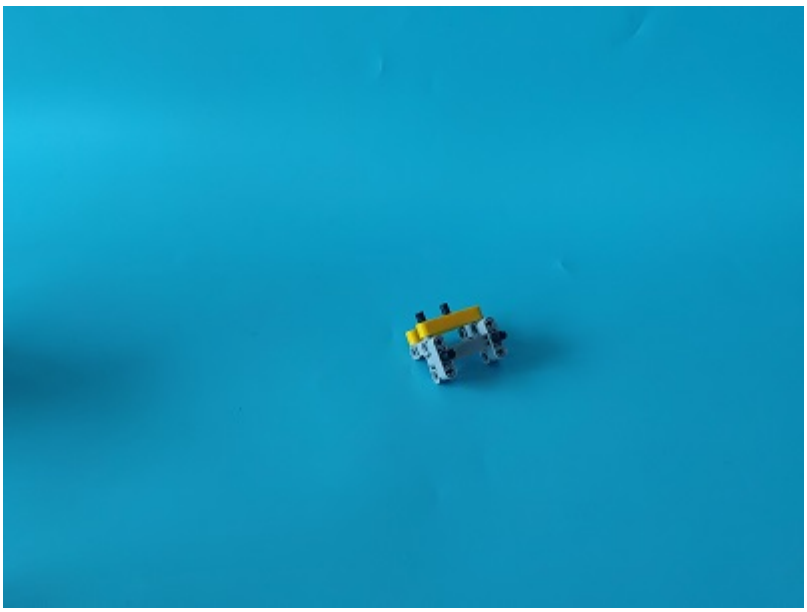


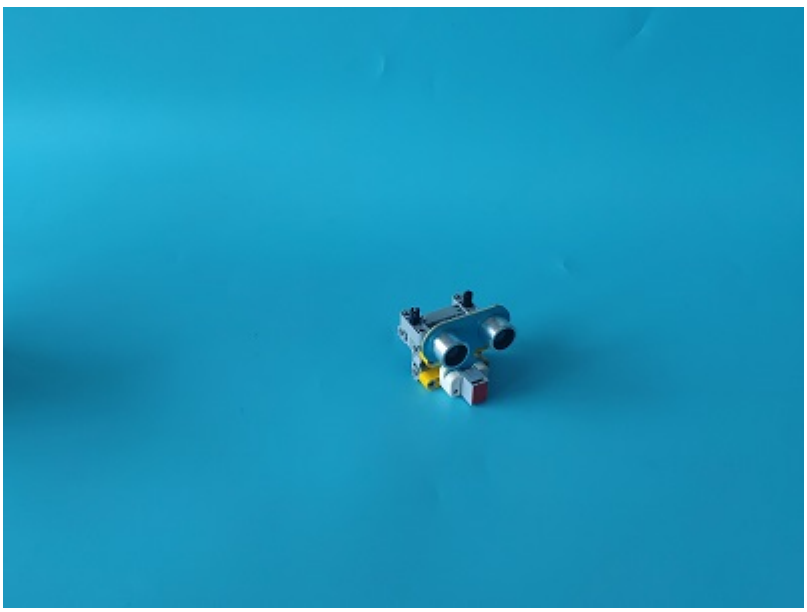










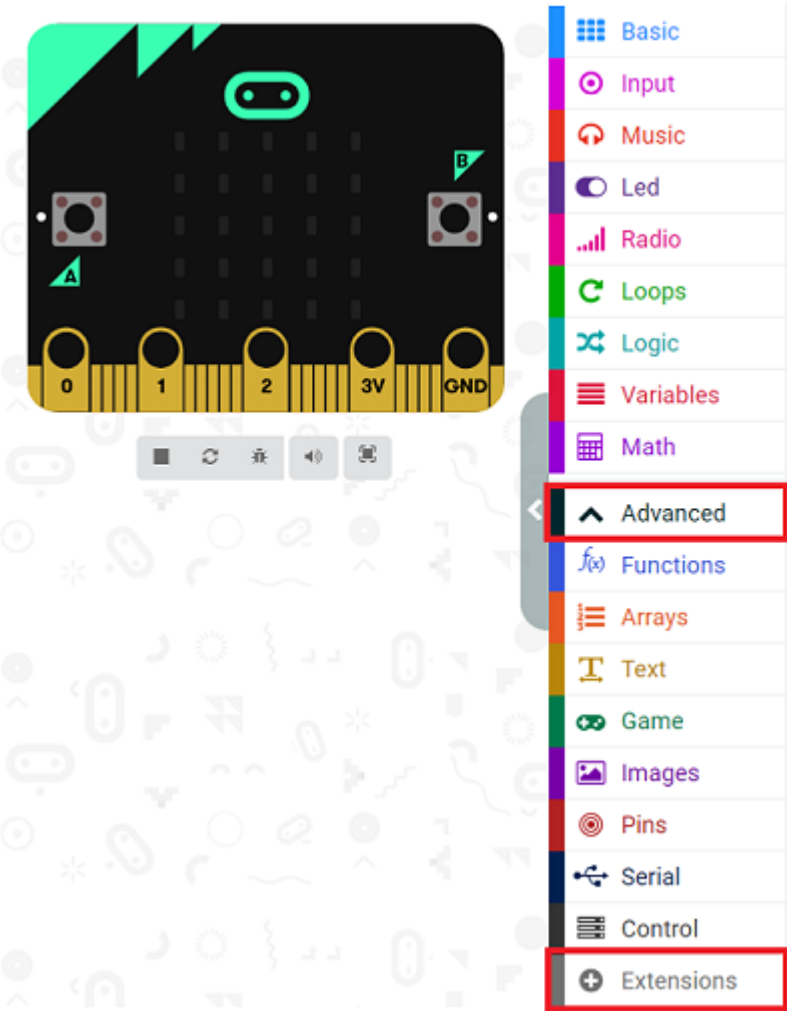


Video reference: https://youtu.be/k8eaTQSVsfk

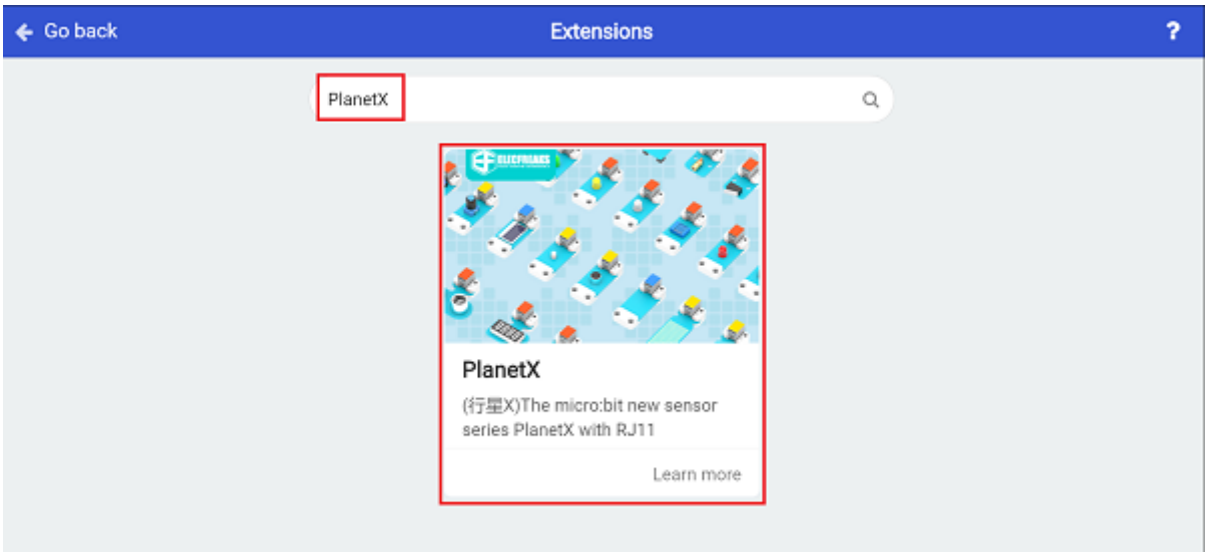
13.3. MakeCode Programming

Step 1

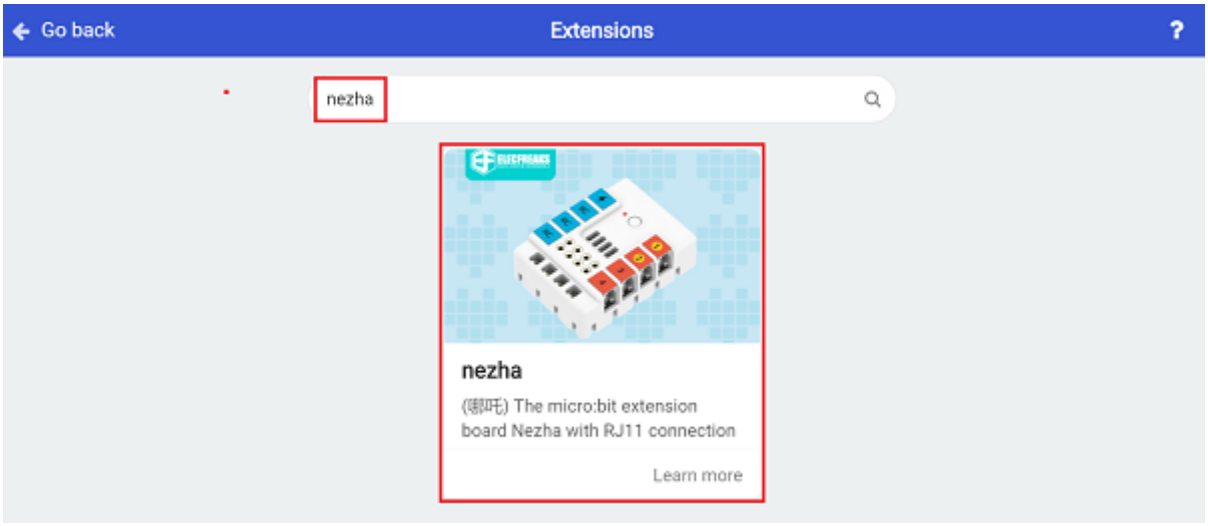
Click “Advanced” in the MakeCode to see more choices.



For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “PlanetX” in the dialogue box to download it.



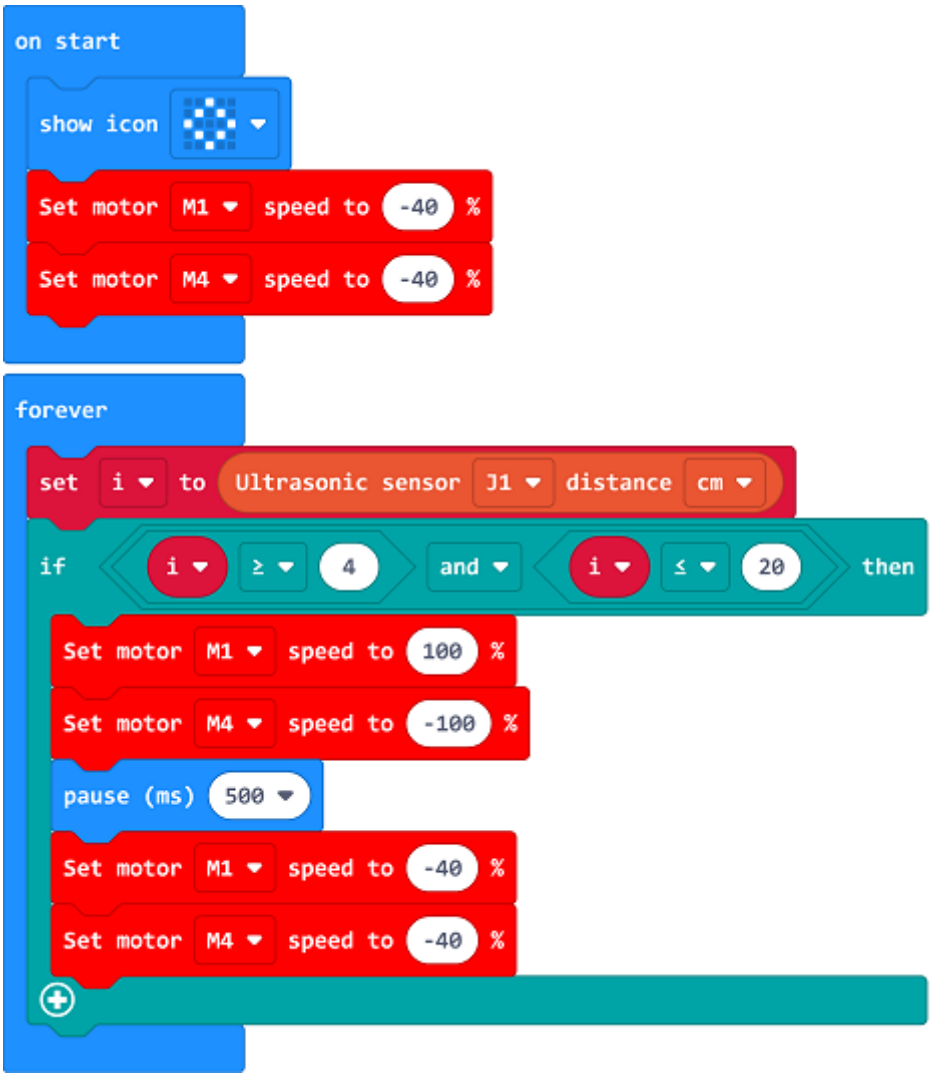
For programming, we need to add a package: click “Extensions” at the bottom of the MakeCode drawer and search with “nezha” in the dialogue box to download it.



Notice: If you met a tip indicating that some codebases would be deleted due to incompatibility, you may continue as the tips say or create a new project in the menu.

Step 2

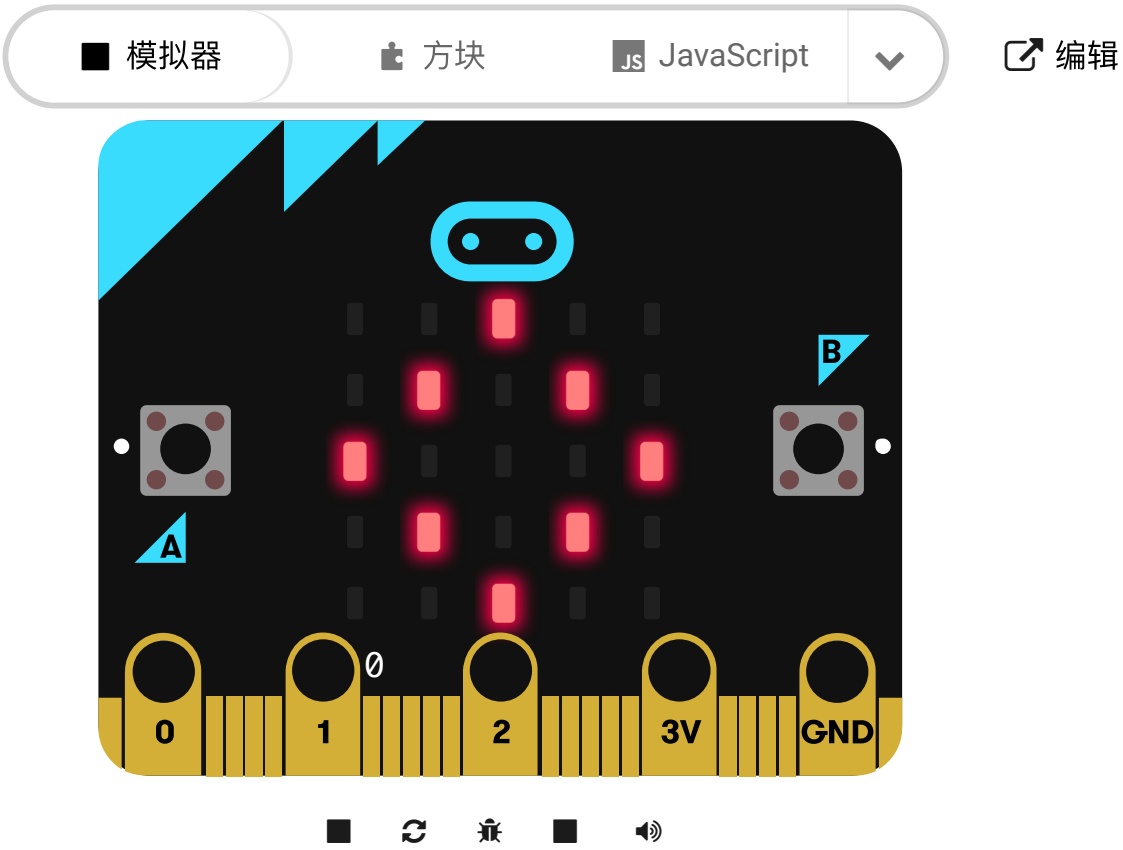
Code as below:



Reference

Link：https://makecode.microbit.org/_MyUJpP6L9YPo

You may also download it directly below:



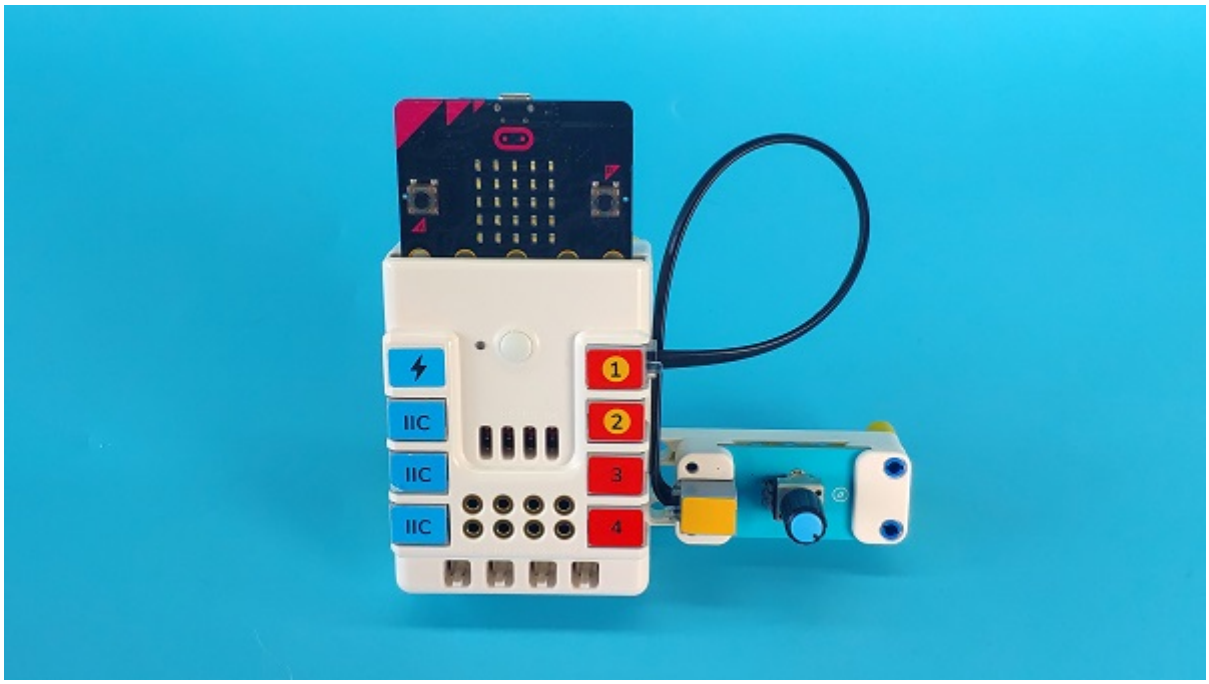
Result

- The car drives and avoids the obstacles automatically.

14. Case 13: Lively Music

14.1. Introduction

Make an electronic piano through micro:bit with the trimpot module.



14.2. Quick to Start

Mterials

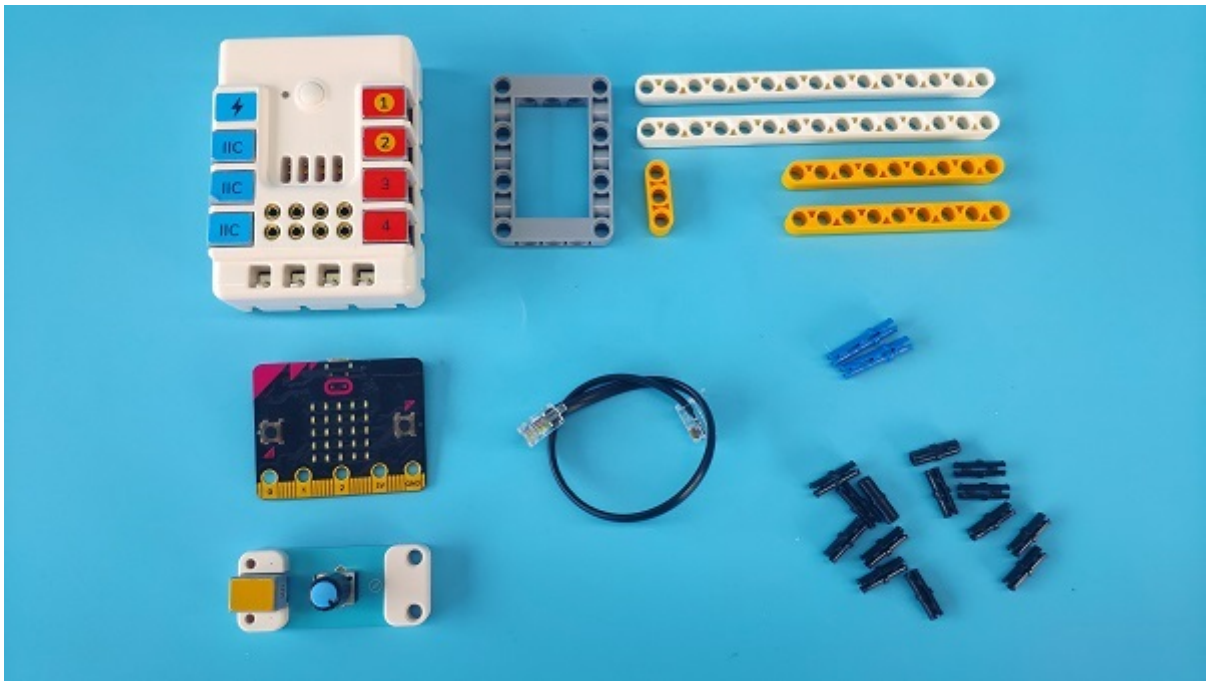
Nezha expansion board × 1

micro:bit × 1

Trimpot × 1

RJ11 wires × 1

Bricks × n

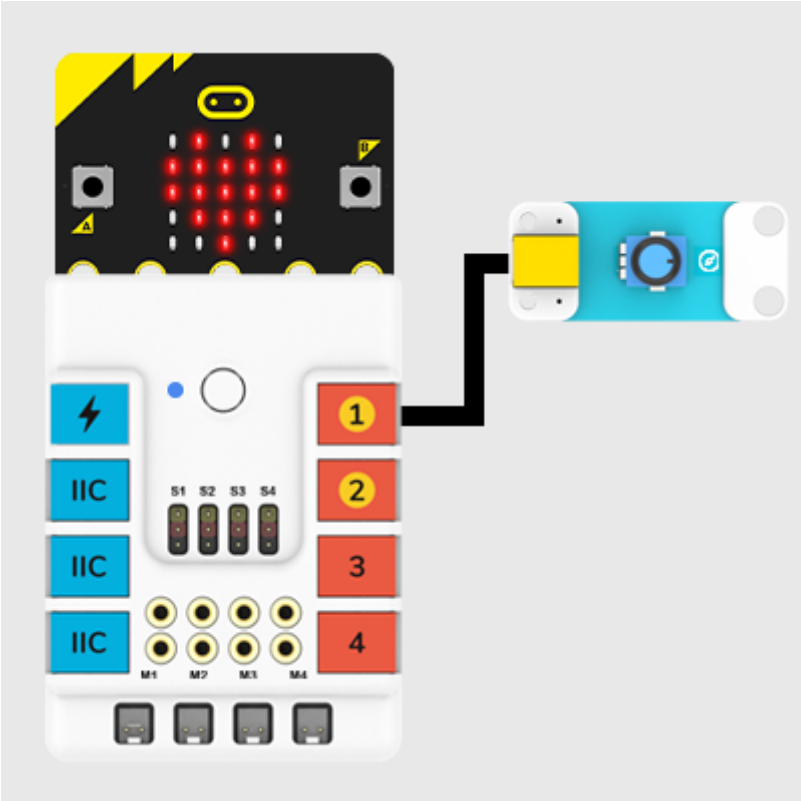


Bricks Details

Bricks	qty
TECHNIC 3M BEAM	1
TECHNIC 9M BEAM	2
TECHNIC 15M BEAM	2
CONNECTOR PEG W. FRICTION	14
CONNECTOR PEG W. FRICTION 3M	2
BEAM FRAME 5X7 Ø 4.85	1

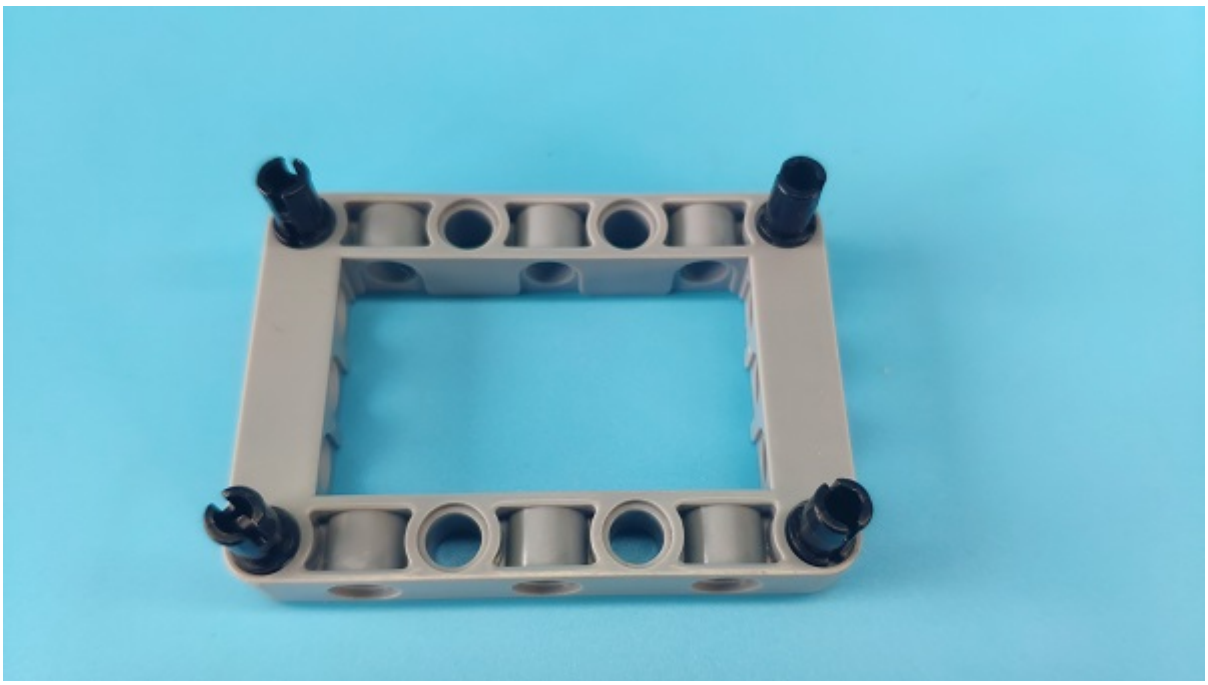
Connection Diagram

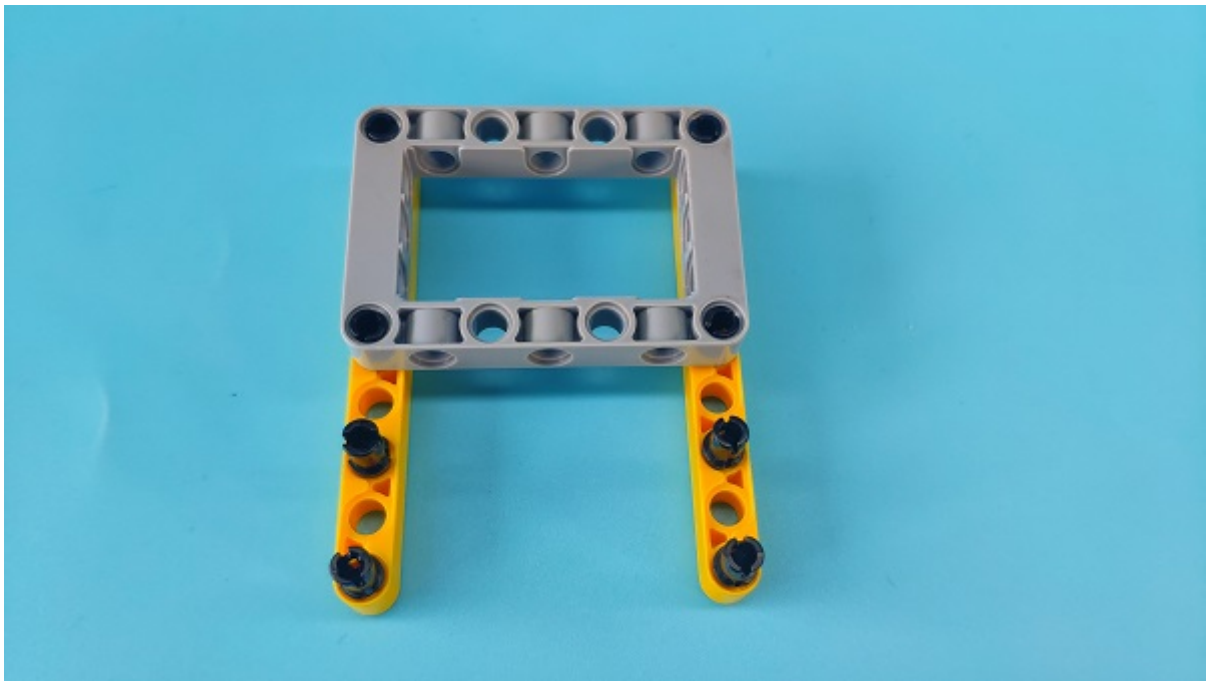
- Connect the trimpot to J1 port on the Nezha expansion board.

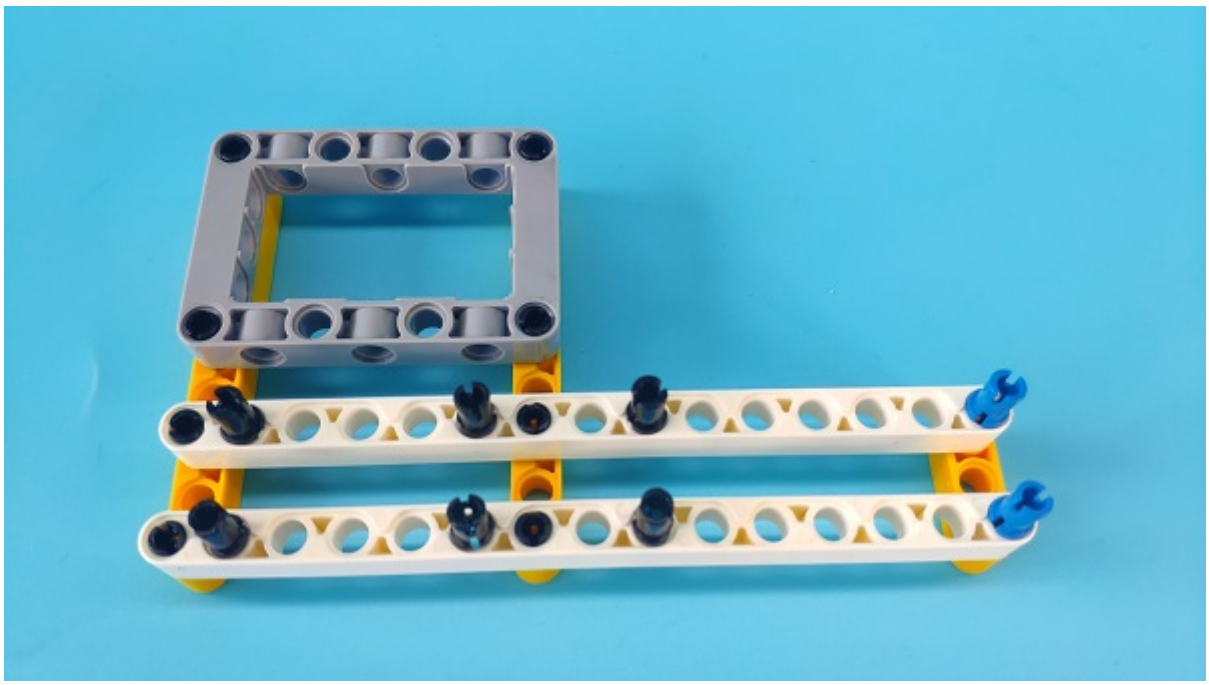


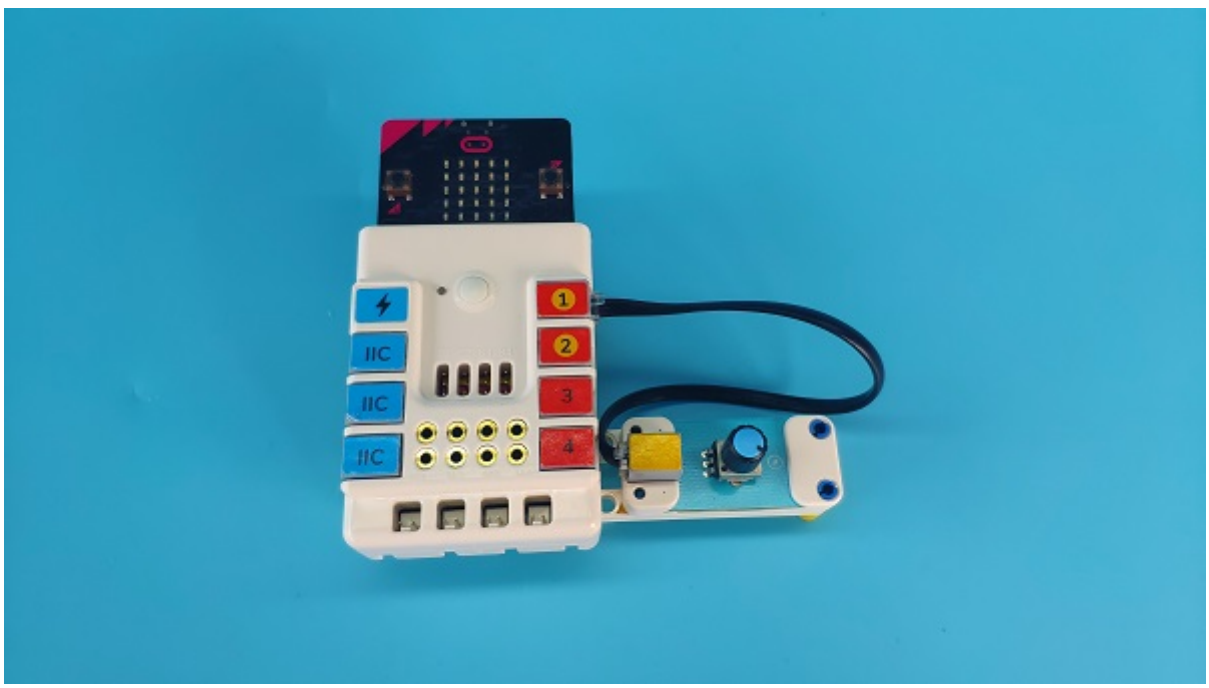
Build the Device

- Build a device as the below picture shows.







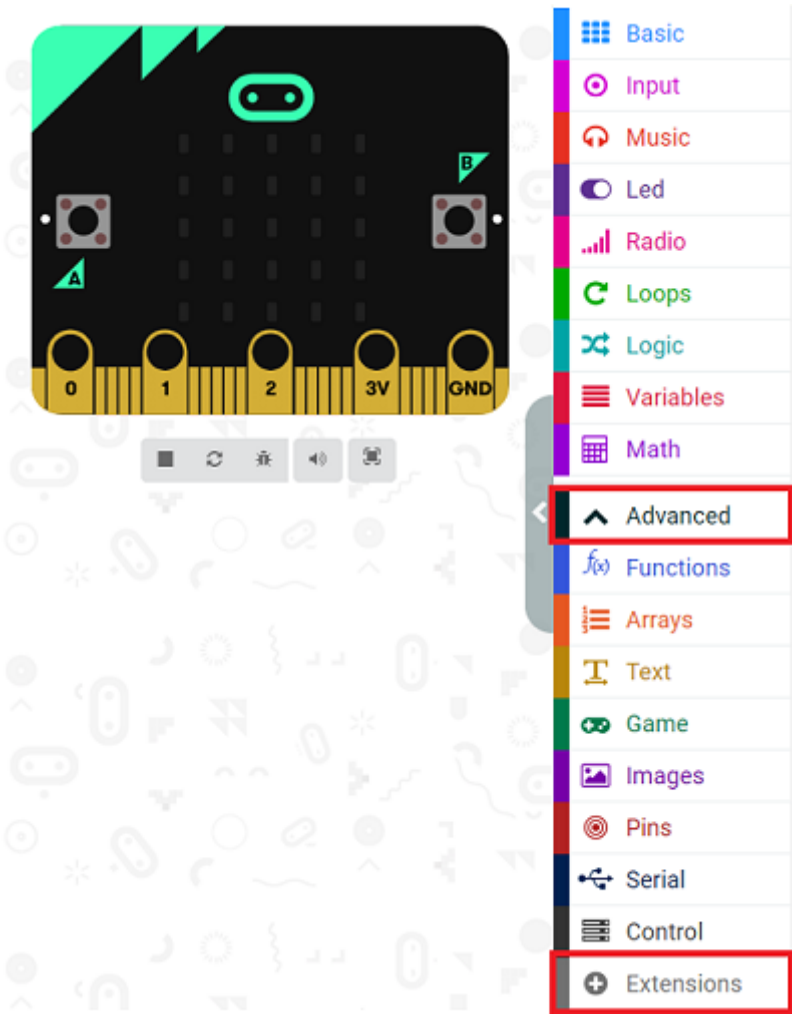

IIC
IIC
IIC
1
2
3
4

Video reference for building:https://youtu.be/G0hycQ2rxCk

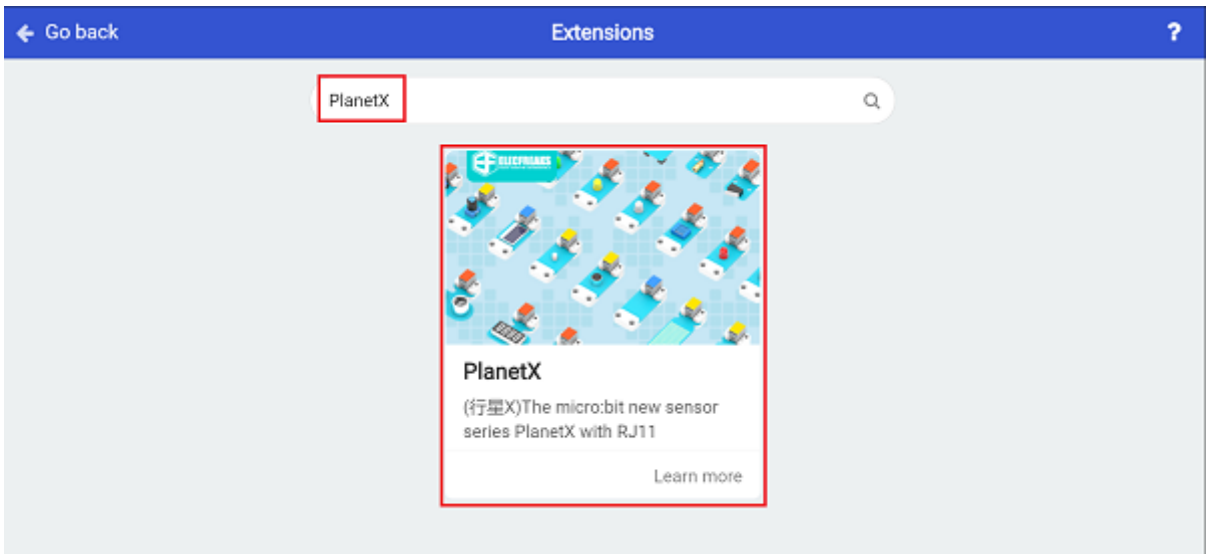
14.3. MakeCode Programming.

Step 1

Click “Advanced” in the makecode drawer to see more choices.



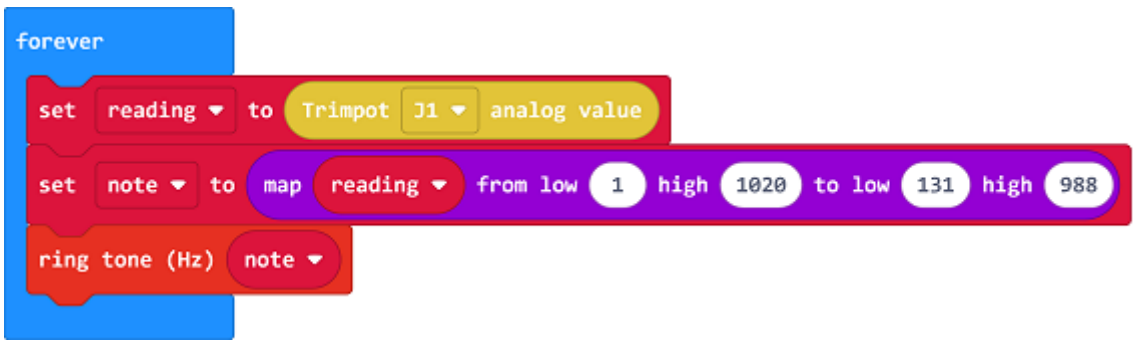
We need add a package for programming. Click “Extensions” in the bottom of the makecode drawer and search with “Planet X” to have the package downloaded.



Note: If you met a tip indicating it might be deleted due to incompatibility, you may continue as it indicates or create a new project in the menu.

Step 2

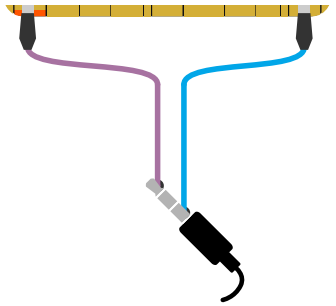
Programme



Link

Link: https://makecode.microbit.org/_Fp5c7g7XjRMg

You may download it directly below:



Result

- The tones could be adjusted via the trimpot.

15. Case 14: Guess the tones

15.1. Introduction

Make a micro:bit device that is able to recognize the tones.

15.2. Quick to Start

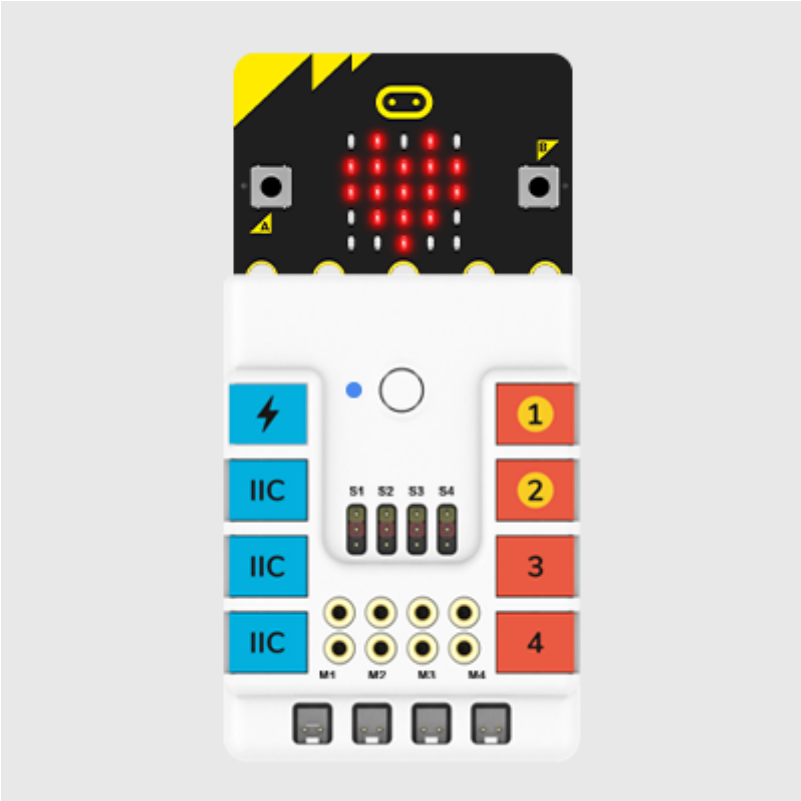
Materials

Nezha expansion board × 1

micro:bit × 1

Connection Diagram

- Connect the micro:bit to Nezha expansion board as the picture shows.

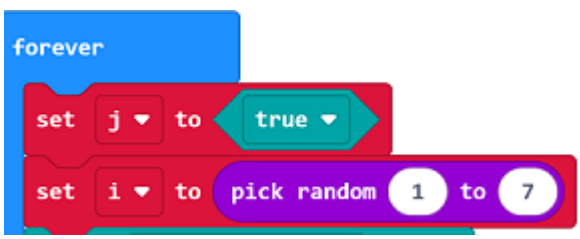


15.3. MakeCode Programming

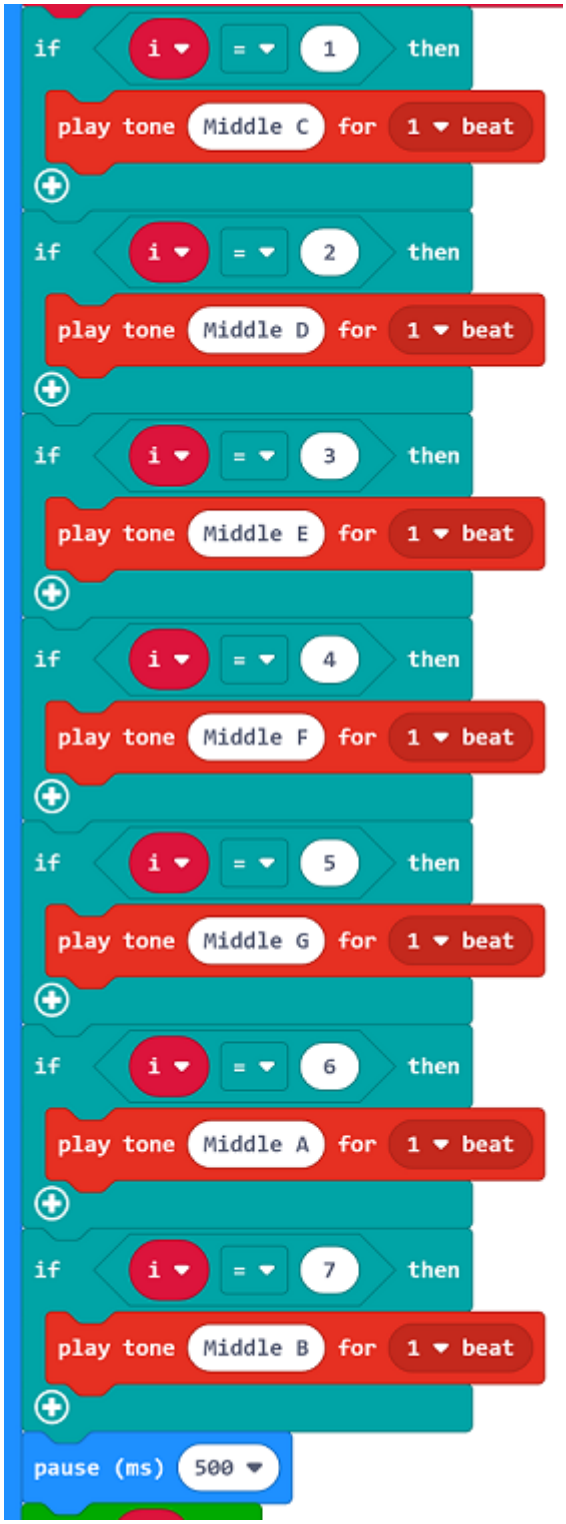
Step 1

Program to show icon in the on start brick and set the variable K as 0.

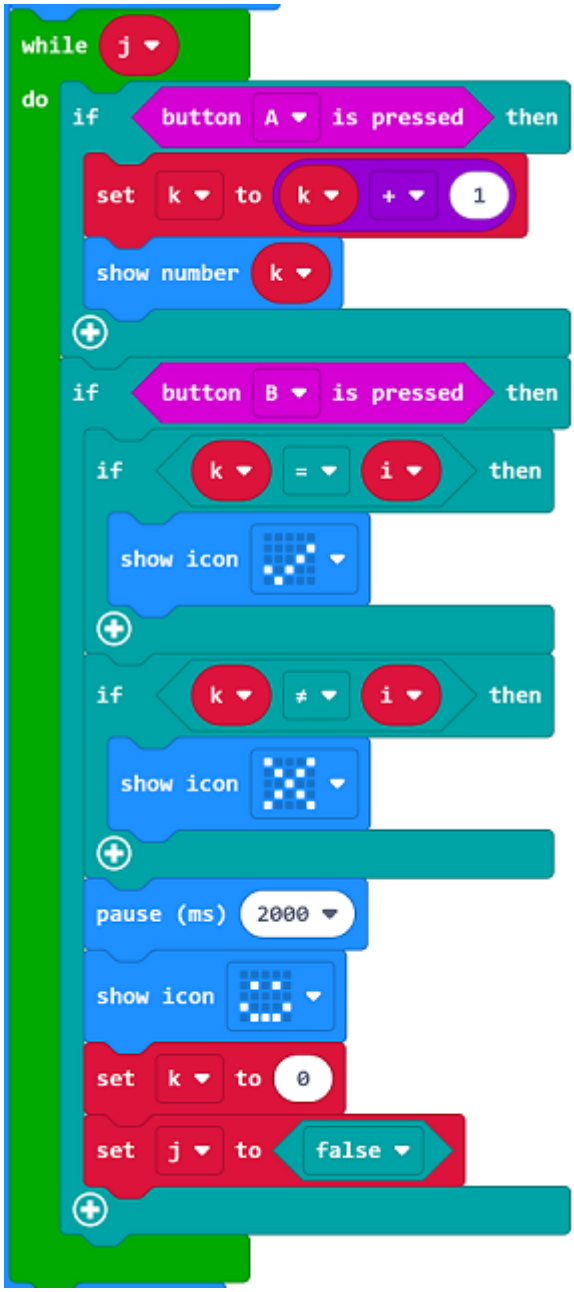
In forever brick, set the variable j as true and the value of i as a random number among 1~7.



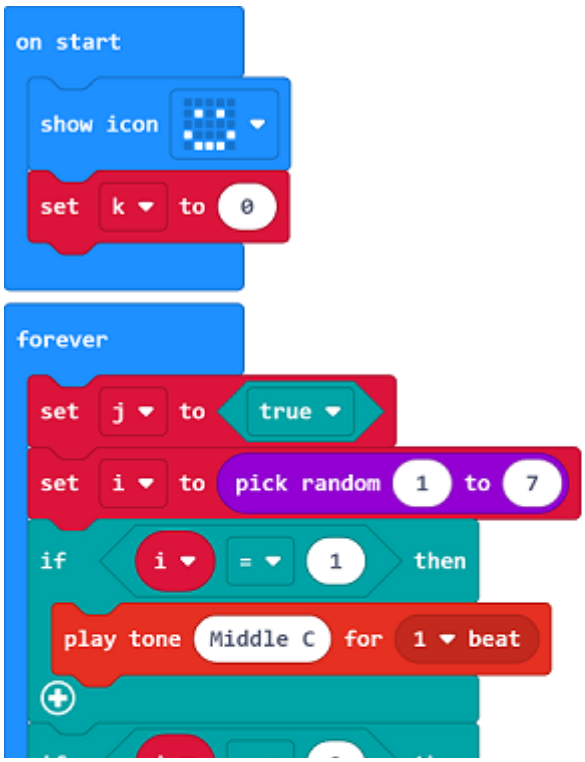
If i=1, programme to play the tone of C; if i=2, set to play the tone of D, and set the following 5 tones accordingly in the same way.



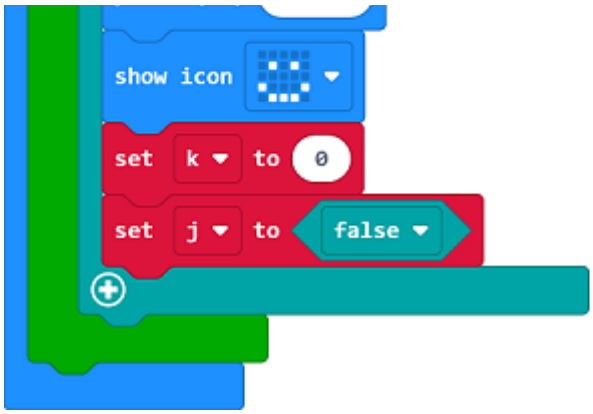
While the variable j is true, set k=k+1 after button A being pressed and display the value of K; while button B being pressed, if k=1, set to display √; if k≠i, set to display ×, and pause for 2000ms, then display the smile face; if k=0, set the variable of j as false.


while j
do
if button A is pressed then
set k to k + 1
show number k
if button B is pressed then
if k = i then
show icon
if k ≠ i then
show icon
pause (ms) 2000
show icon
set k to 0
set j to false

Full Code:


on start
show icon
set k to 0
forever
set j to true
set i to pick random 1 to 7
if i = 1 then
play tone Middle C for 1 beat


if i = 2 then
play tone Middle D for 1 beat
if i = 3 then
play tone Middle E for 1 beat
if i = 4 then
play tone Middle F for 1 beat
if i = 5 then
play tone Middle G for 1 beat
if i = 6 then
play tone Middle A for 1 beat
if i = 7 then
play tone Middle B for 1 beat
pause (ms) 500
while j
do
if button A is pressed then
set k to k + 1
show number k
if button B is pressed then
if k = i then
show icon
if k ≠ i then
show icon
pause (ms) 2000



Link

link: https://makecode.microbit.org/_DK41ckRkTb4o

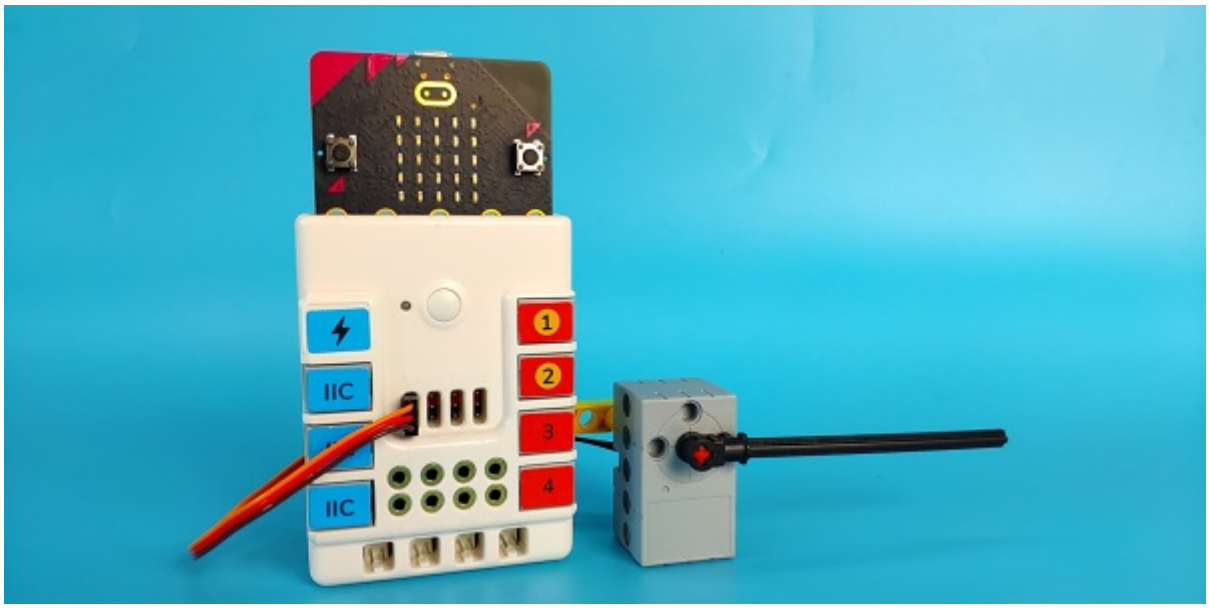
You may also download it directly below:

Result - After powering on, it displays a smile face and plays a tone. Choose the equivalent numbers by pressing button A and confirm it by pressing button B. If the confirmed number and the tone are the same one, the micro:bit displays √; if not, it displays ×.

16. Case 15: Volume Reminder

16.1. Introduction

Make a volume reminder with micro:bit.



16.2. Quick to Start

Materials

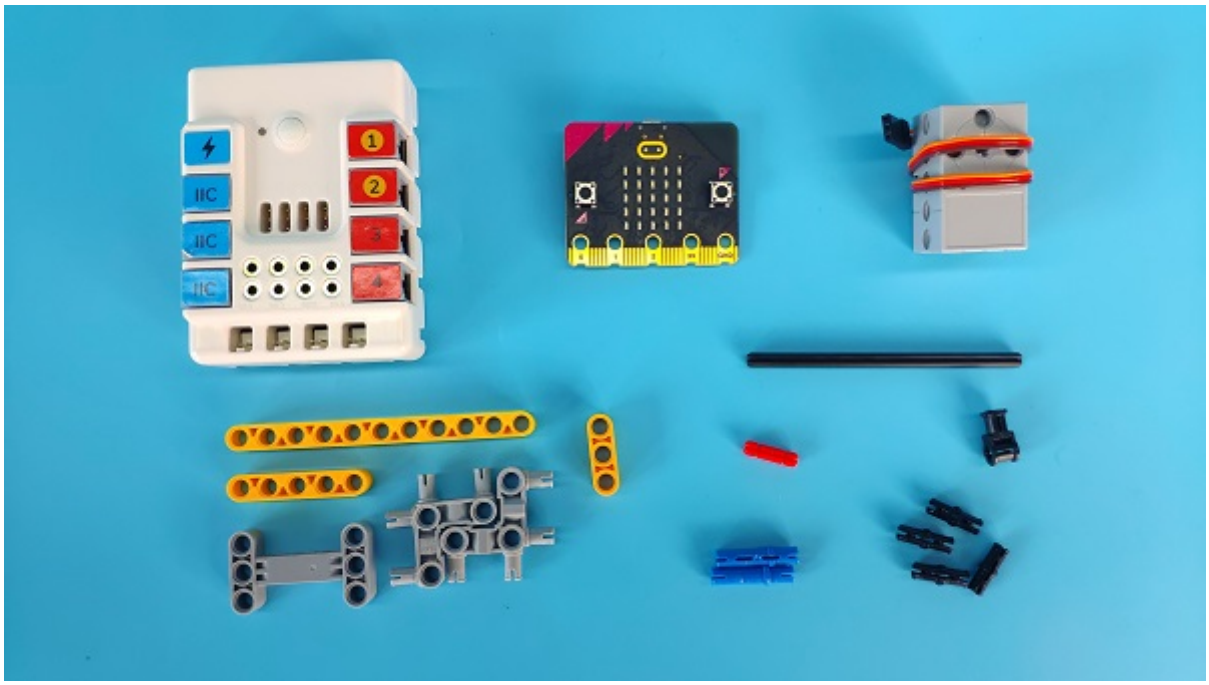
Nezha expansion board × 1

micro:bit × 1

servo × 1

RJ11 wires × 1

Bricks × n

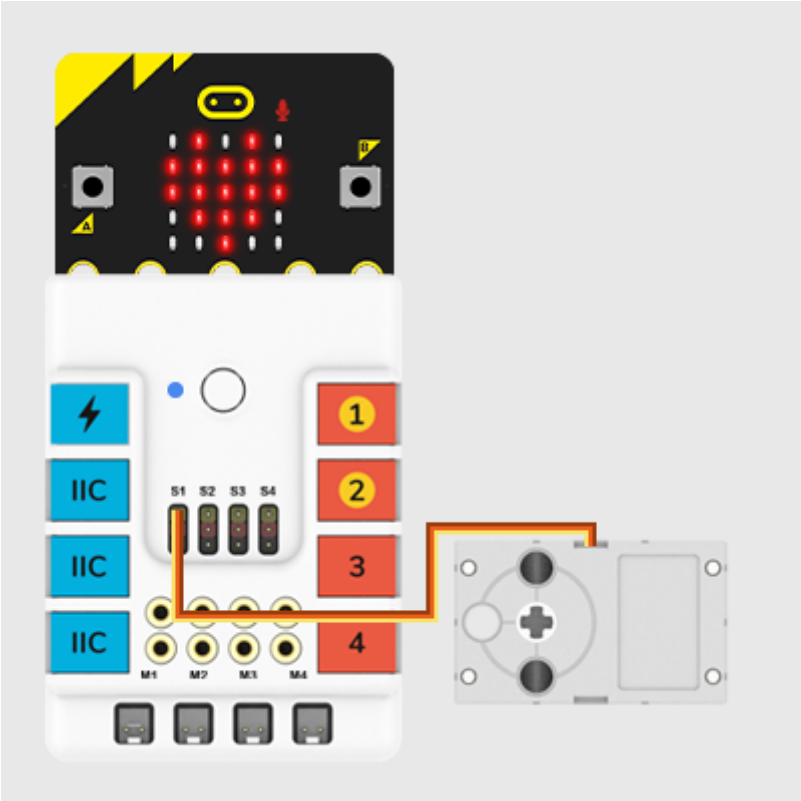


Bricks Details

Bricks	qty
TECHNIC 3M BEAM	1
TECHNIC 5M BEAM	1
TECHNIC 11M BEAM	1
2M CROSS AXLE W. GROOVE	1
CONNECTOR PEG W. FRICTION	4
CONNECTOR PEG W. FRICTION 3M	2
CATCH W. CROSS HOLE	1
CROSS AXLE 10M	1
Angular beam 90degr. w.4 snaps	2
BEAM I -FRAME 3X5 90 DEGR. HOLE Ø4.85	1

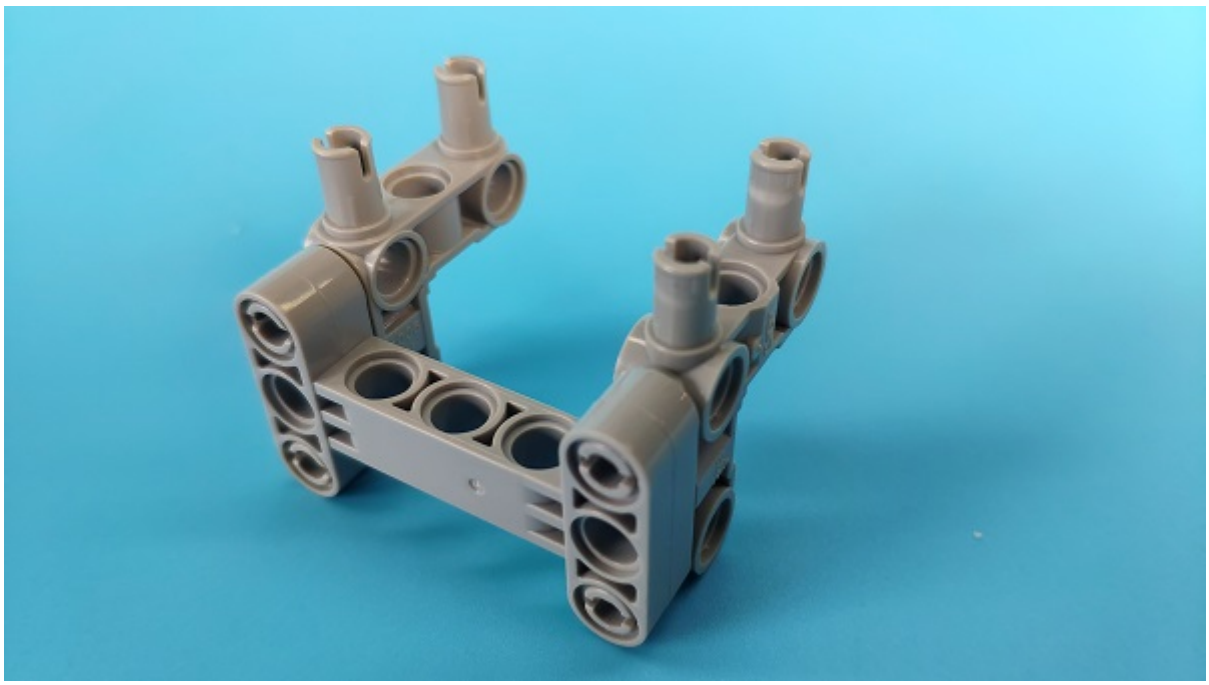
Connection Diagram

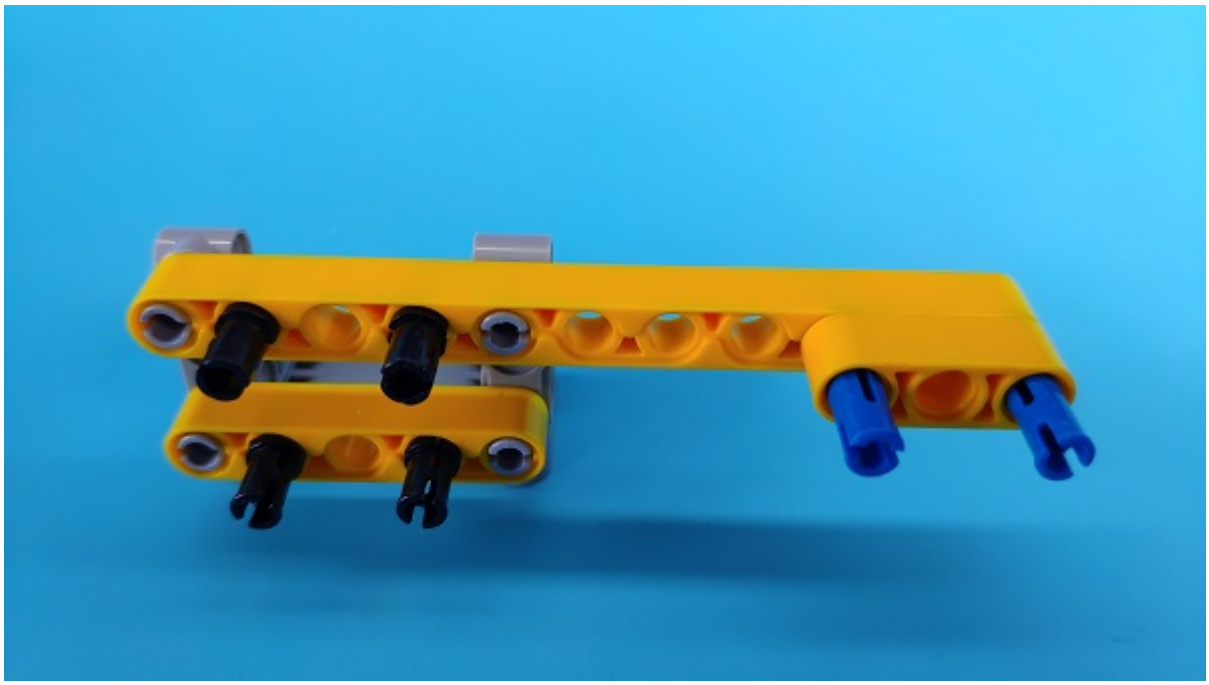
- Connect the 360 degrees servo to S1 port on the Nezha expansion board.

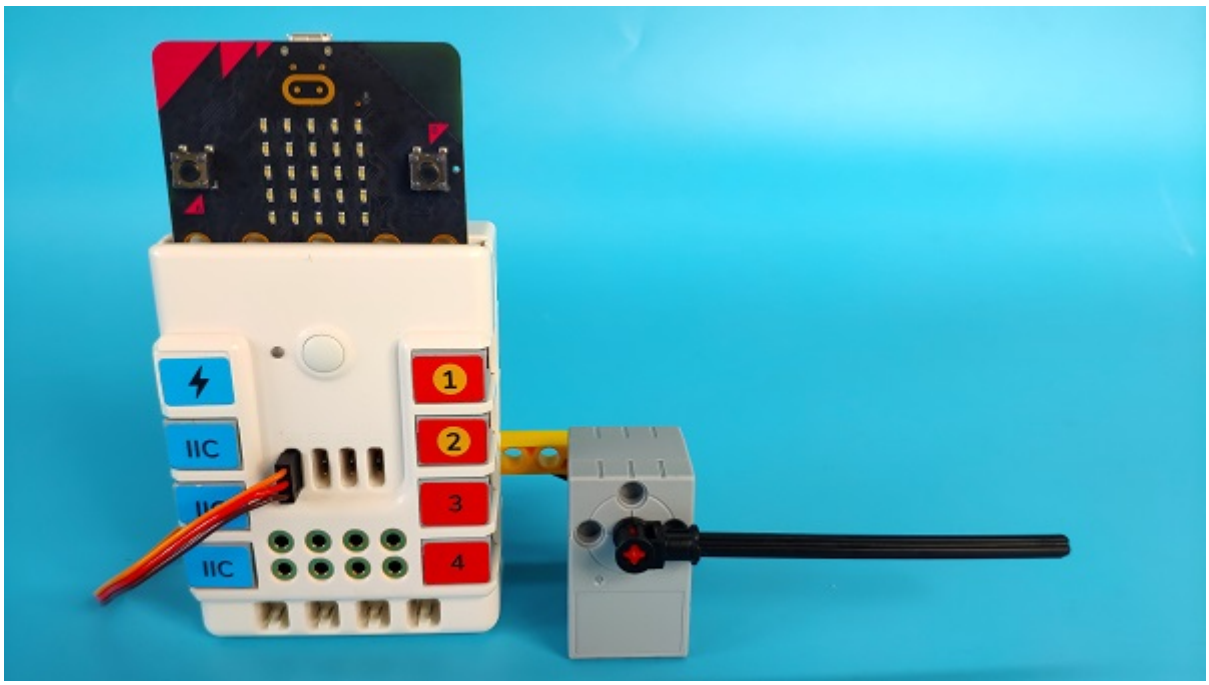


Bricks Build-up

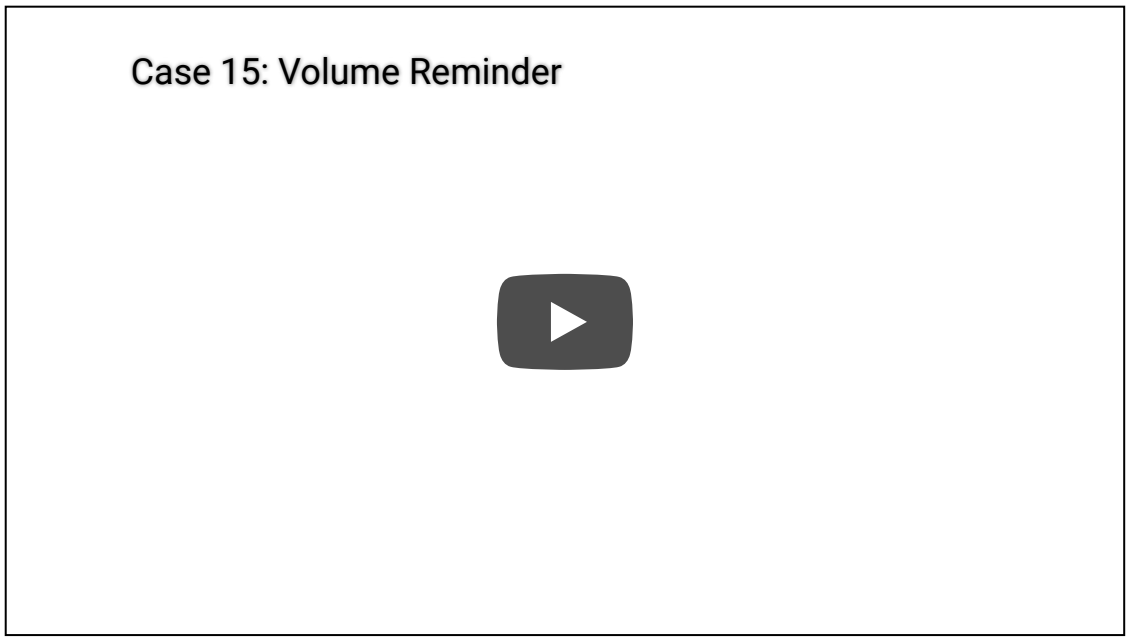
- Build a device as the pictures indicate:







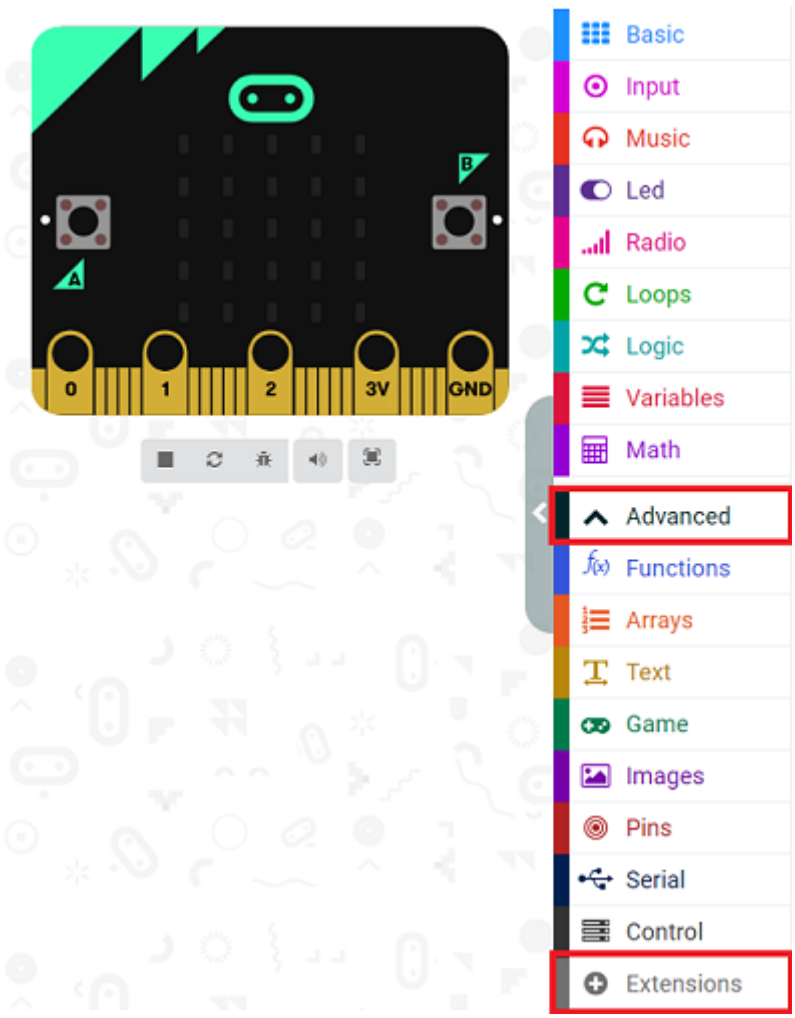
Video link:https://youtu.be/sq4fq4W51Ck



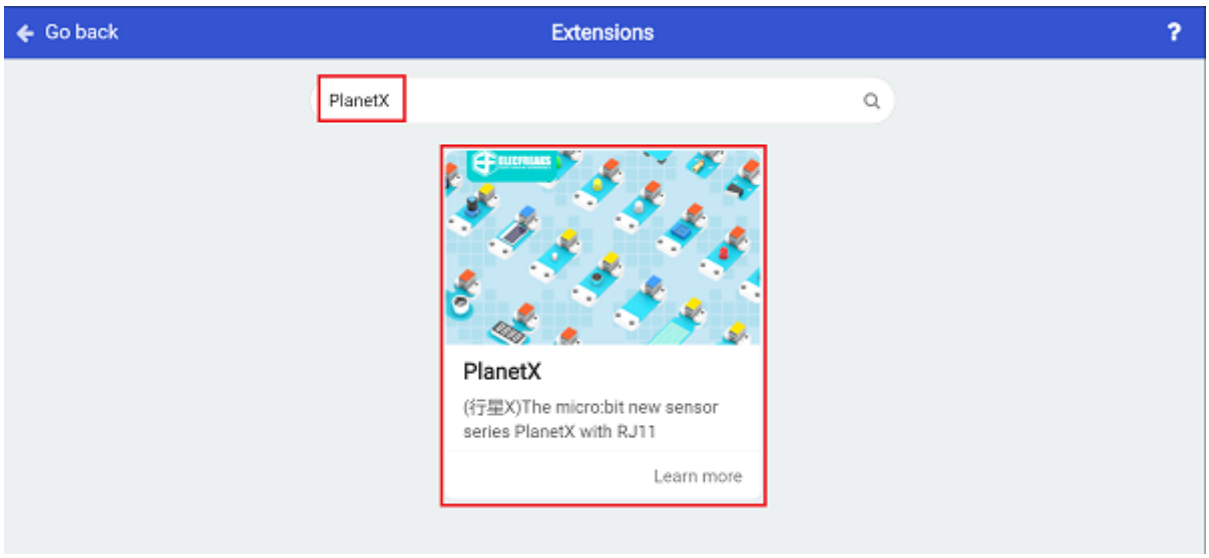
16.3. MakeCode Programming

Step 1

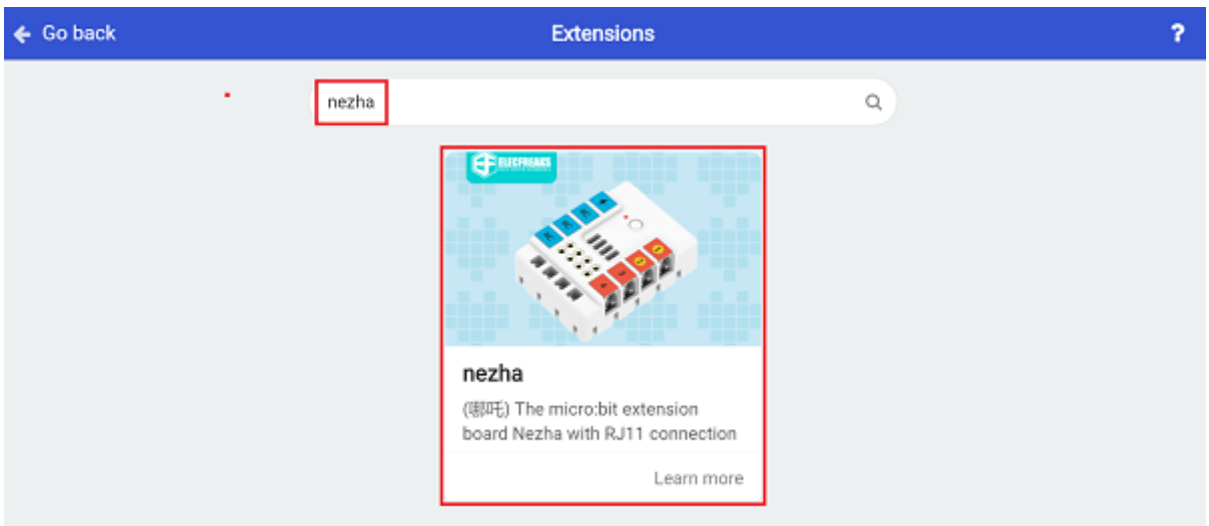
Click “Advanced” in the MakeCode drawer to see more choices.



We need to add a package for programming. Click “Extensions” in the bottom of the drawer and search with “PlanetX” to download it.



We need to add a package for programming. Click “Extensions” in the bottom of the drawer and search with “Nezha” to download it.



Note: If you met a tip indicating the codebase might be deleted due to incompatibility, you may continue as the tips say or create a new project in the menu.

Step 2

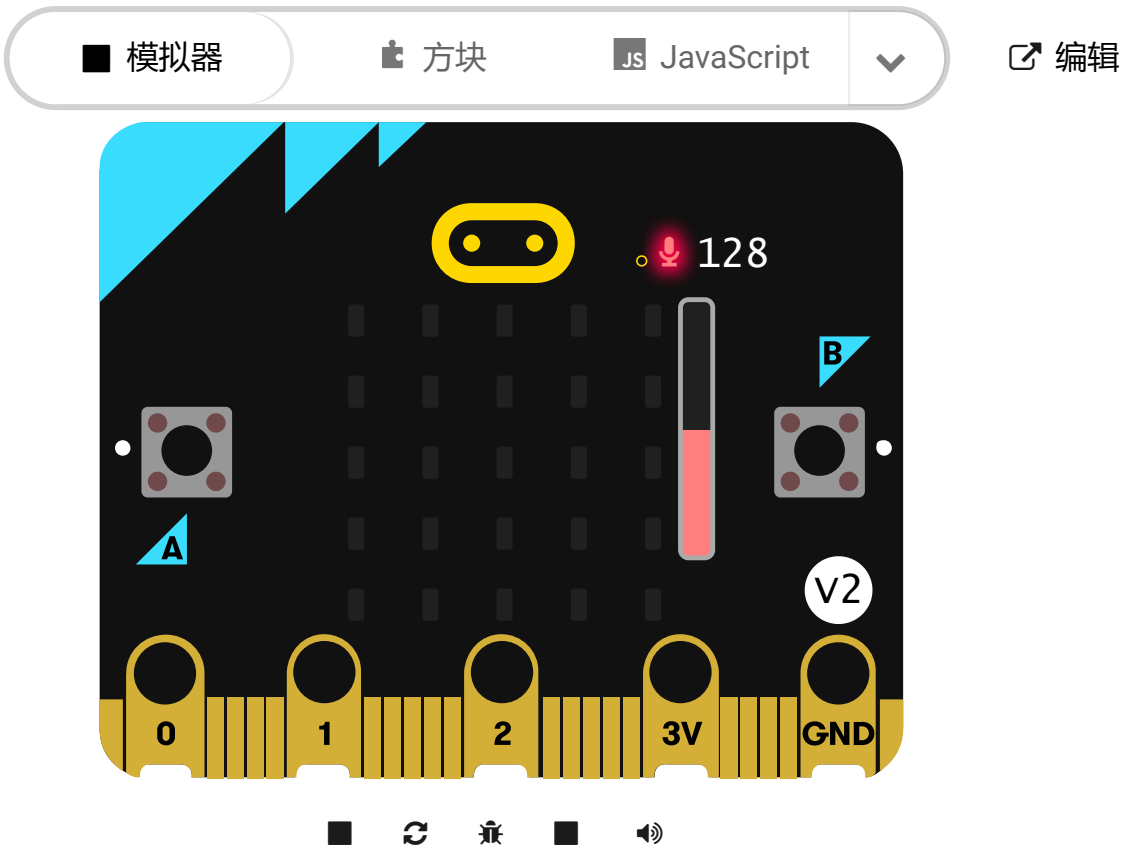
Programme as the pictures indicate

../../_images/

Link

Link: https://makecode.microbit.org/_JfDgxzJkc72X

You may download it directly below:



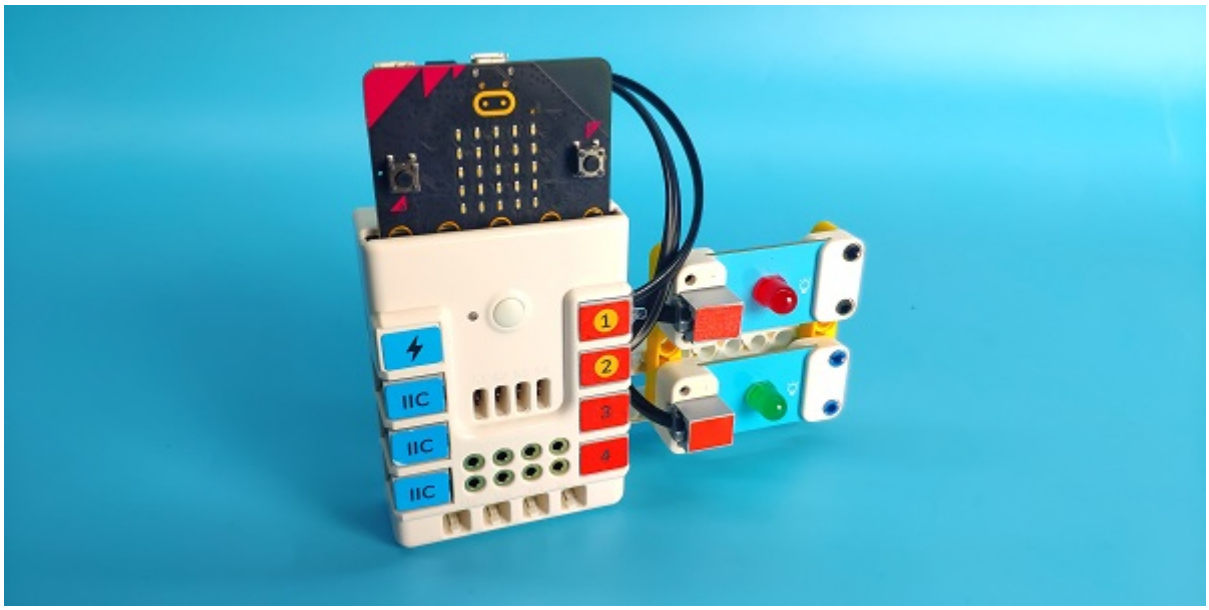
Result

- The servos drive in accordance with the change of the volume.

17. Case 16: Light Show

17.1. Introduction

Build a light show device with the micro:bit.



17.2. Quick to Start

Materials

Nezha expansion board × 1

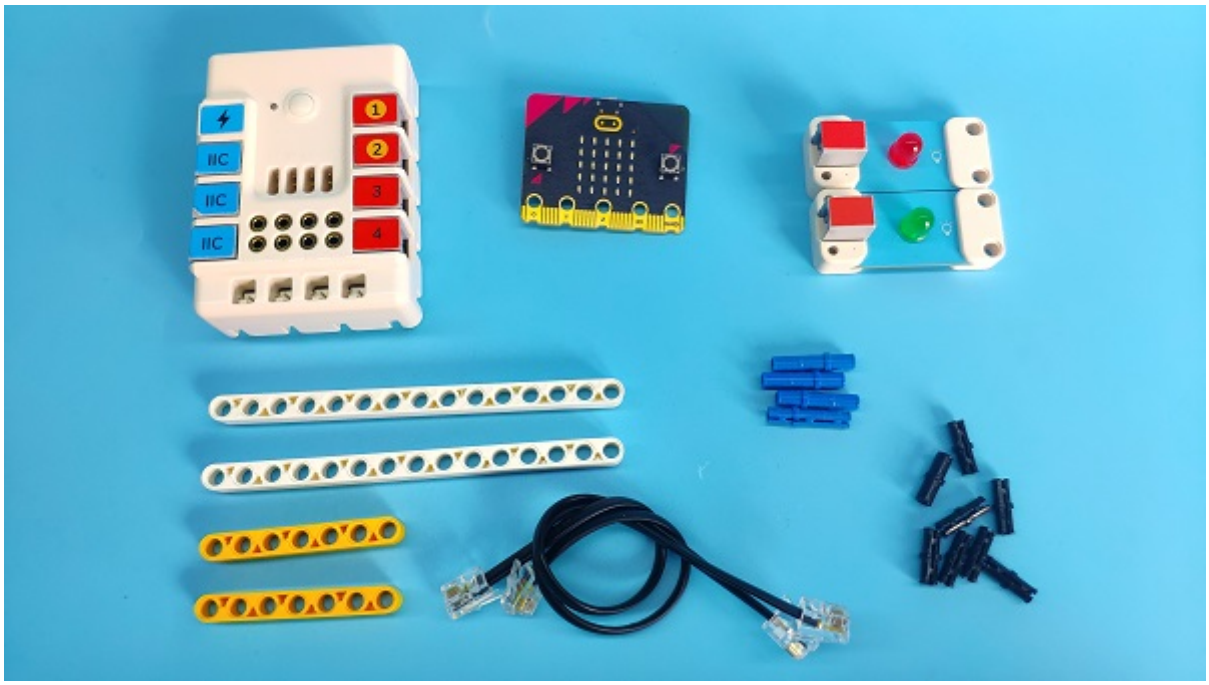
micro:bit × 1

LED-red × 1

LED-green × 1

RJ11 wires × 2

Bricks × n

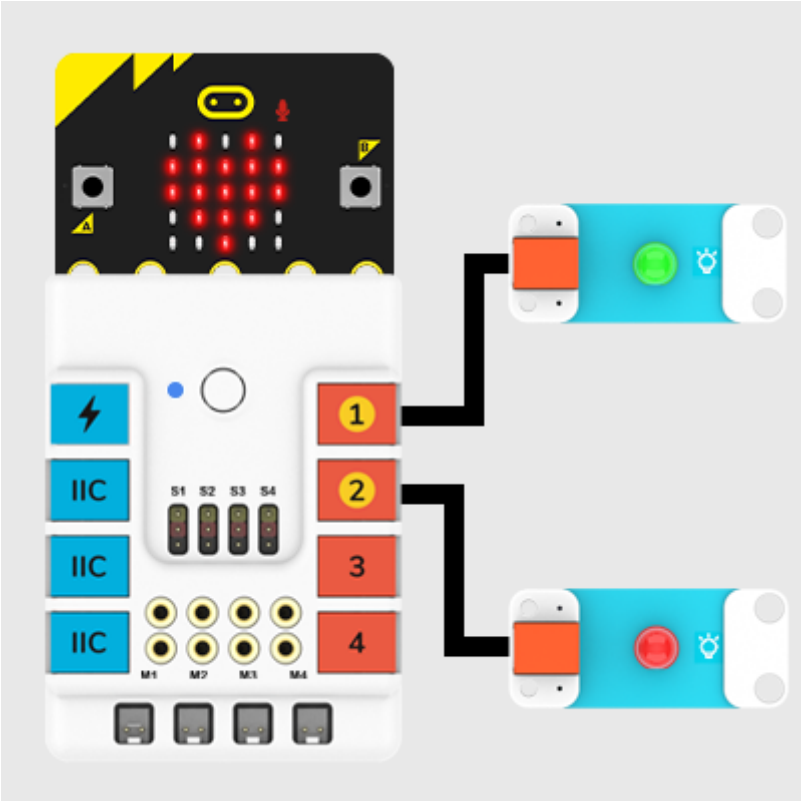


Bricks details

Bricks	qty
TECHNIC 7M BEAM	2
TECHNIC 15M BEAM	2
CONNECTOR PEG W. FRICTION	8
CONNECTOR PEG W. FRICTION 3M	4

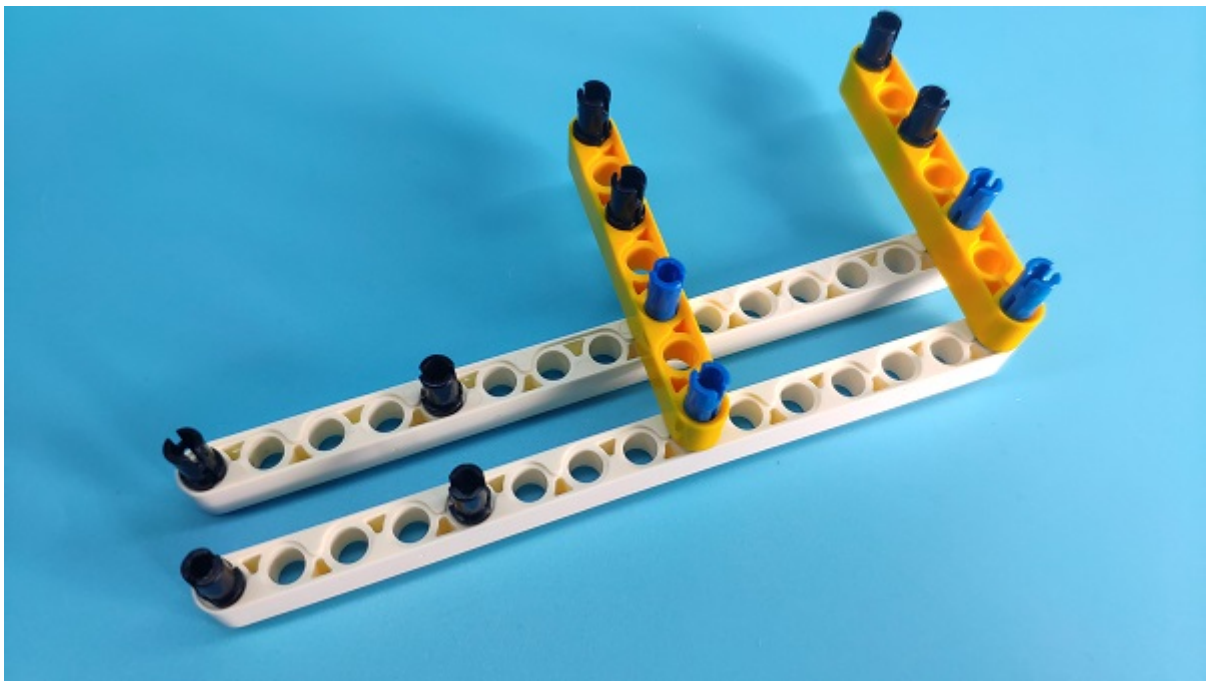
Connection Diagram

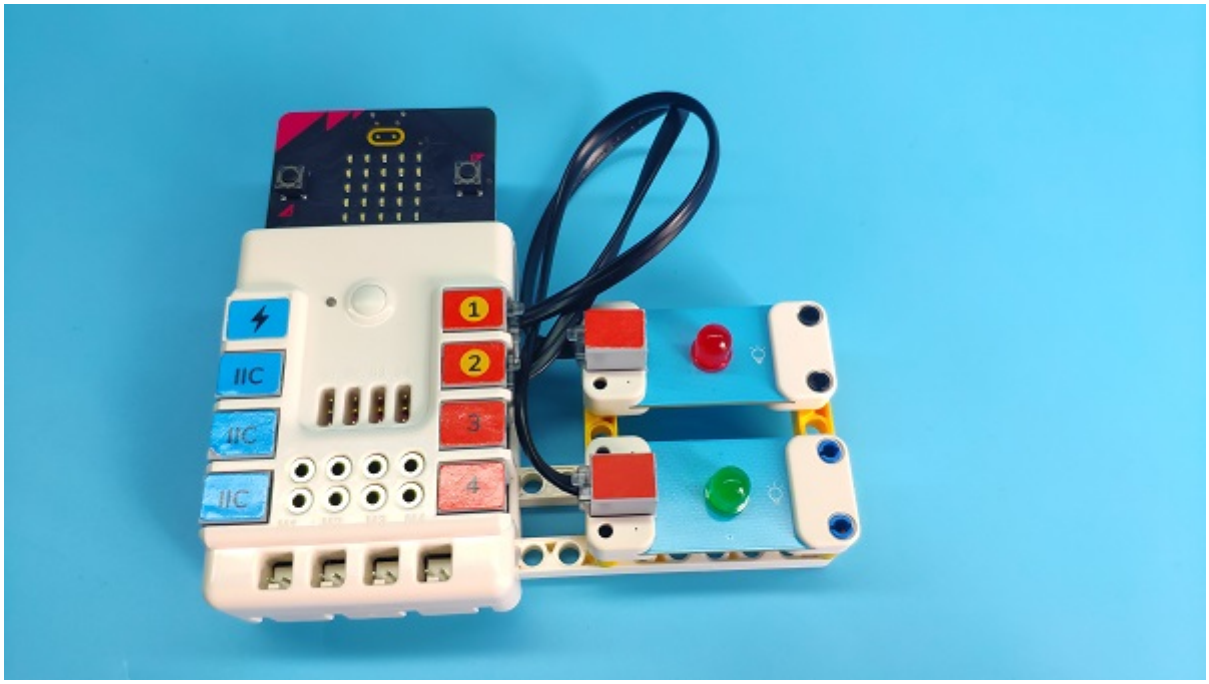
- Connect the green LED to J1 port and red LED to J2 port on the Nezha expansion board as the picture shows.



Bricks Build-up

- Build a device as the pictures indicate:



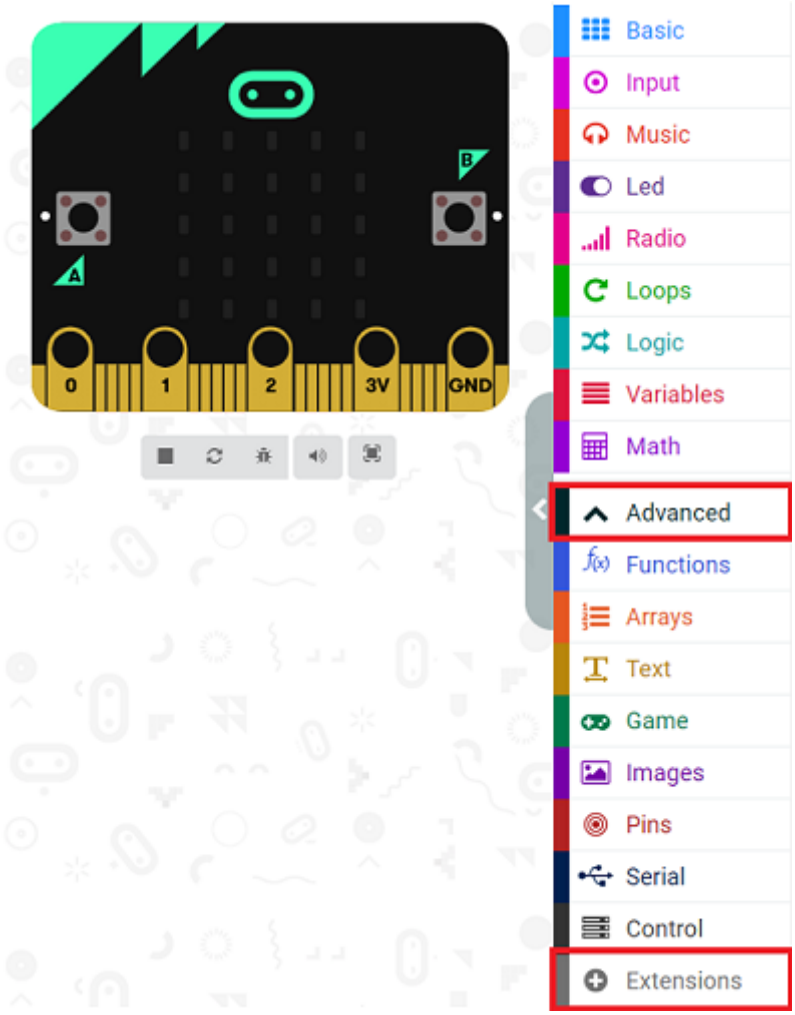


Video link:https://youtu.be/ie4sO5qNvfM

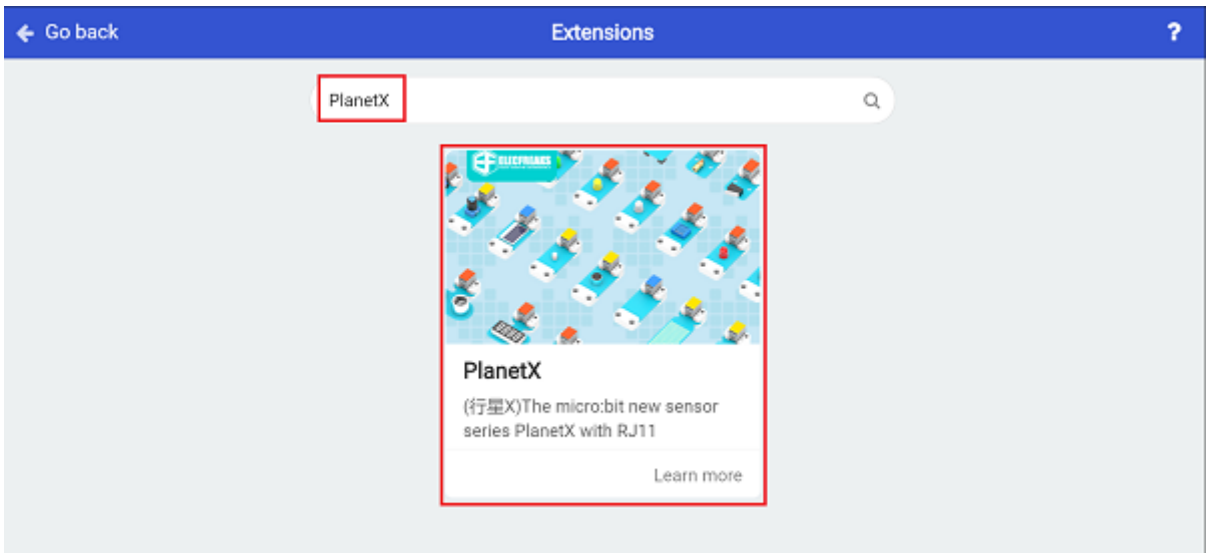
17.3. MakeCode Programming

Step 1

Click “Advanced” in the MakeCode drawer to see more choices.



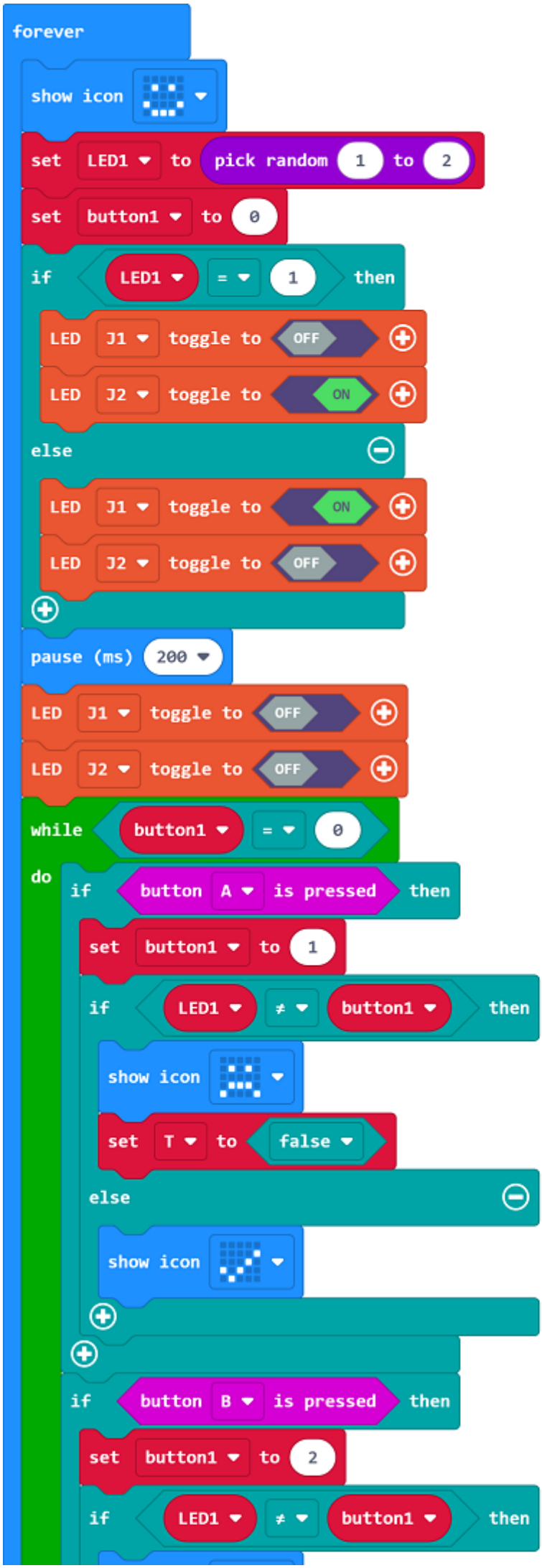
We need to add a package for programming. Click “Extensions” in the bottom of the drawer and search with “PlanetX” in the dialogue box to download it.

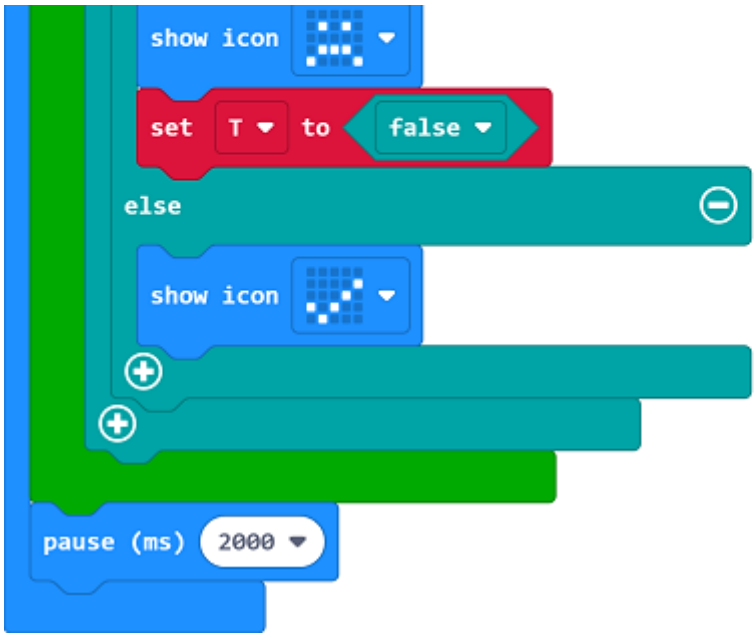


Note: If you met a tip indicating that the codebase will be deleted due to incompatibility, you may continue as the tips say or build a new project in the menu.

Step 2

Programme as the picture shows:

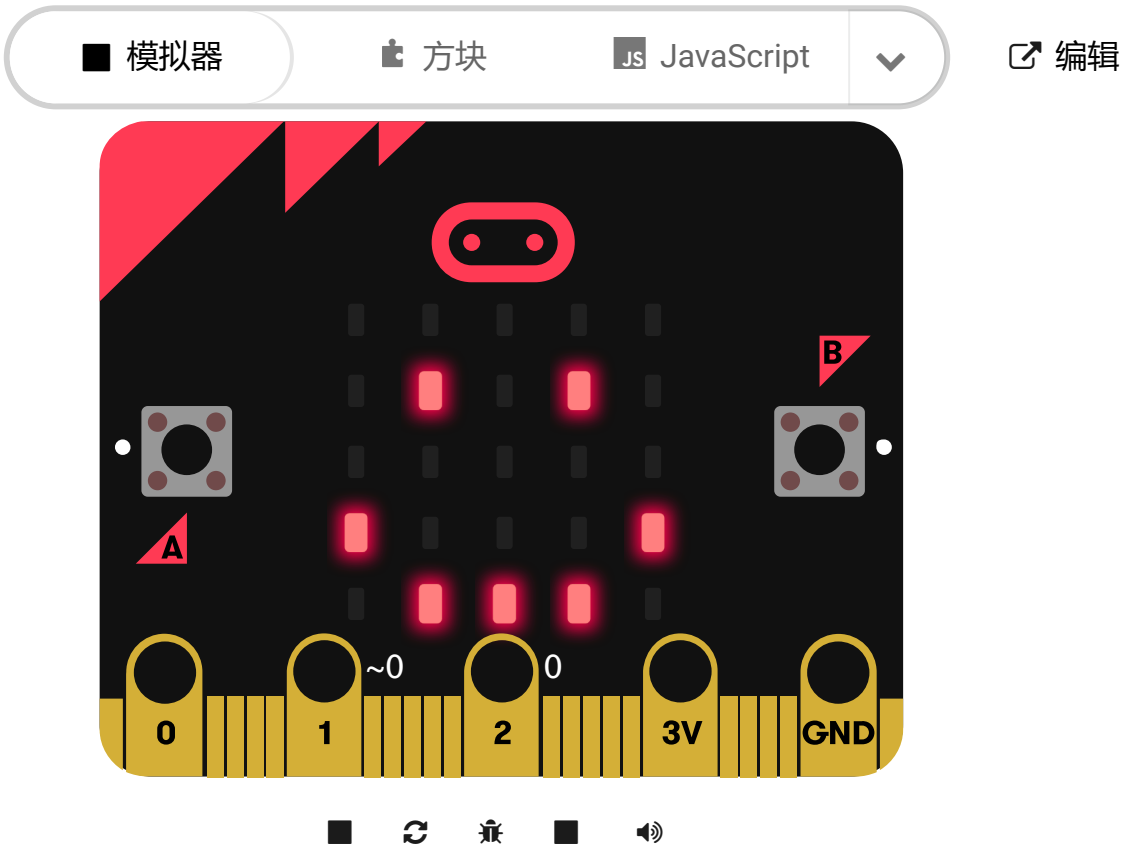

forever
show icon
set LED1 to pick random 1 to 2
set button1 to 0
if LED1 = 1 then
LED J1 toggle to OFF
LED J2 toggle to ON
else
LED J1 toggle to ON
LED J2 toggle to OFF
pause (ms) 200
LED J1 toggle to OFF
LED J2 toggle to OFF
while button1 = 0
do
if button A is pressed then
set button1 to 1
if LED1 ≠ button1 then
show icon
set T to false
else
show icon
if button B is pressed then
set button1 to 2
if LED1 ≠ button1 then



Link

Link: https://makecode.microbit.org/_RXyWcdDkYWm3

You may also downoad it directly below:



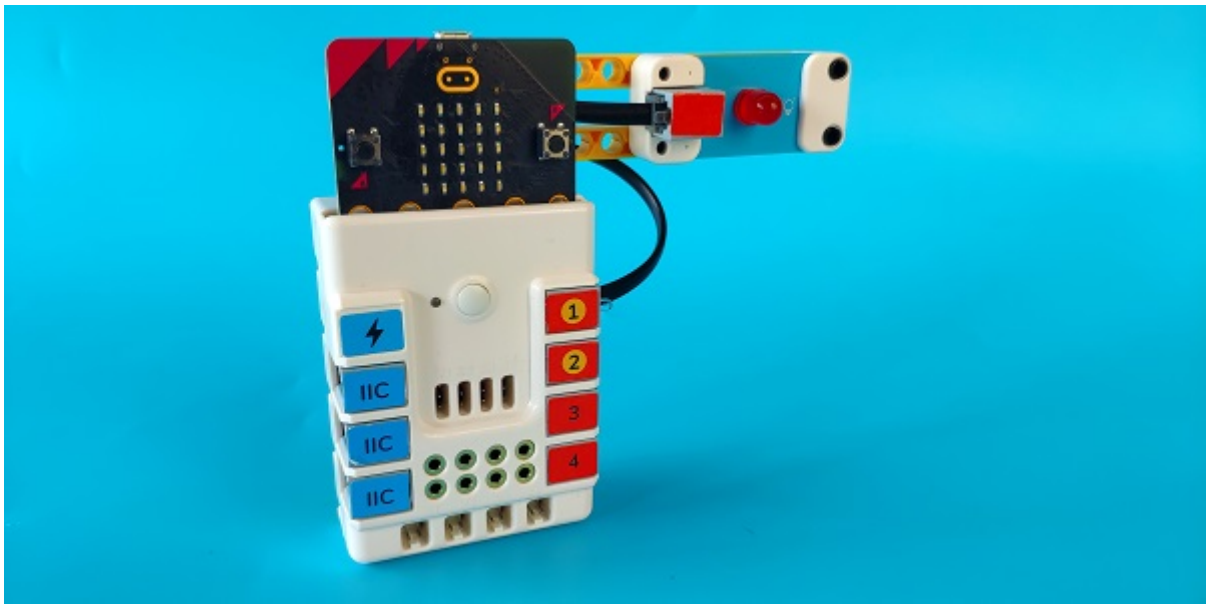
Result

- The red and green LEDs light on at random, press button A while the red lights on; press button B while the green lights on, if you press them at the right sequence(A for red and B for green), the micro:bit display a “√” or it displays a sad face.

18. Case 17: Alarm Device

18.1. Introduction

Build an alarm device with the micro:bit.



18.2. Quick to Start

Materials

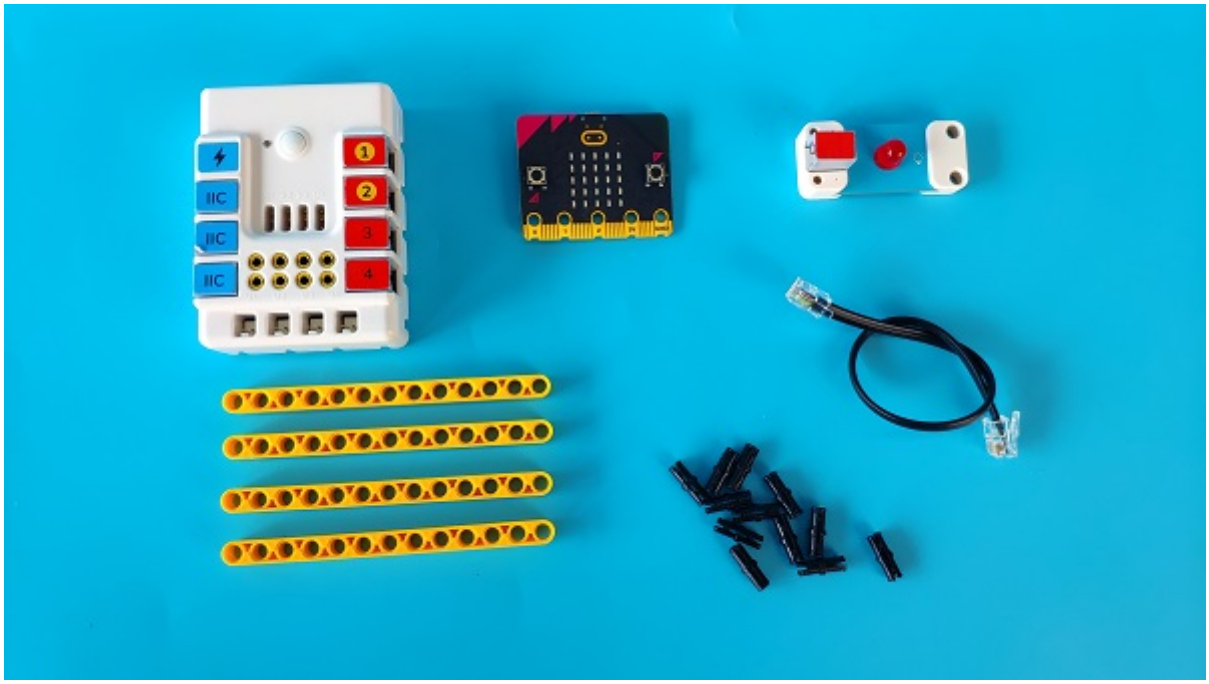
Nezha expansion board × 1

micro:bit × 1

LED-red × 1

RJ11 wires × 1

Bricks × n



Bricks details

Bricks	qty
TECHNIC 13M BEAM	4
CONNECTOR PEG W. FRICTION	12

Connection Diagram

- Connect the red LED to the J1 port on Nezha expansion board.

../../_images/

Bricks Build-up

- Build a device as the pictures indicate:

../../_images/

../../_images/

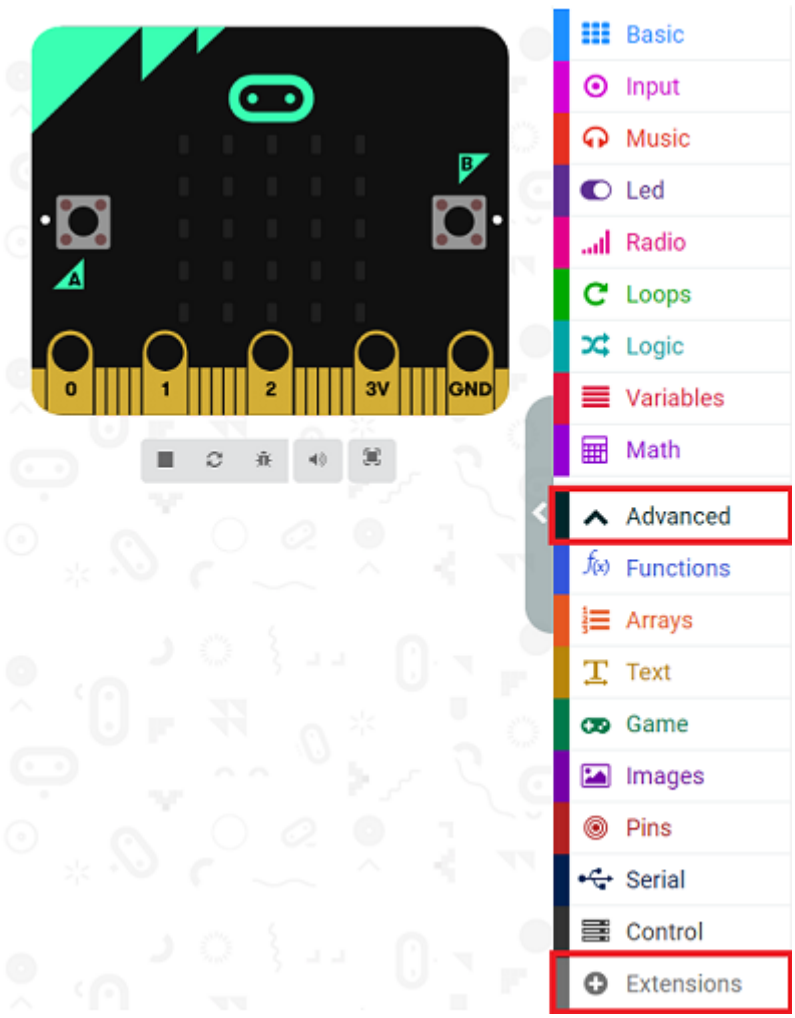
../../_images/

Video link:https://youtu.be/bYN6-6PskHQ

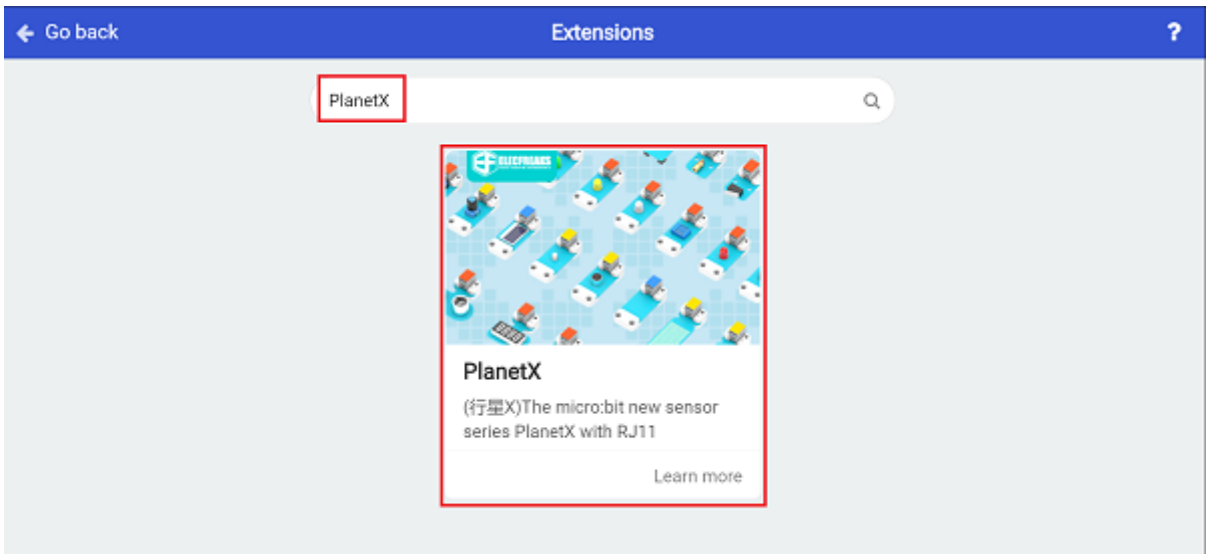
18.3. MakeCode Programming

Step 1

Click “Advanced” in the MakeCode drawer to see more choices.



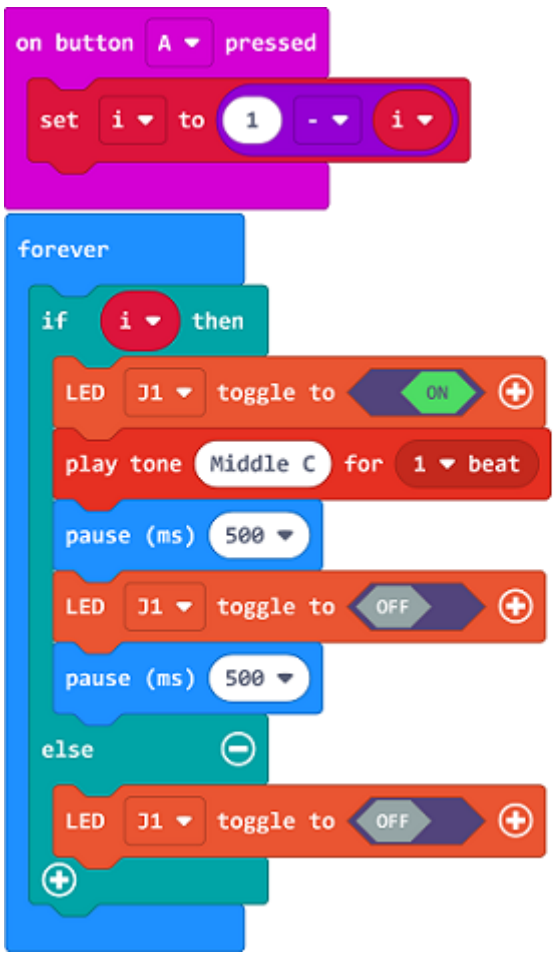
We need to add a package for programming. Click “Extensions” in the bottom of the drawer and search with “PlanetX” in the dialogue box to download it.



Note: If you met a tip indicating that the codebase will be deleted due to incompatibility, you may continue as the tips say or build a new project in the menu.

Step 2

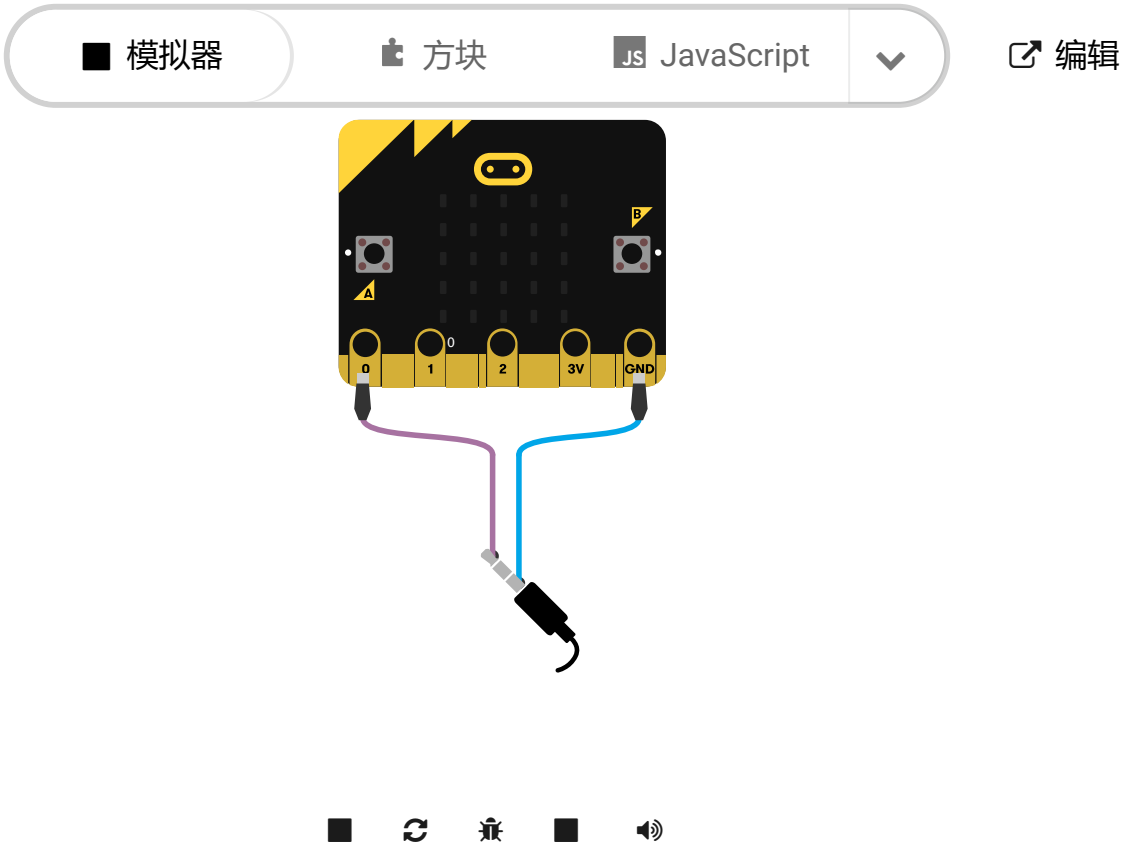
Programme as the picture shows:



Link

Link: https://makecode.microbit.org/_A4CaHvTuJ7br

You may also downoad it directly below:



Result

- Press button A to alarm and the red LED flashes; press it again to stop the alarming and the LED turns off.

19. Case 18: Music Box

19.1. Introduction

Build a music box with the micro:bit.

19.2. Quick to Start

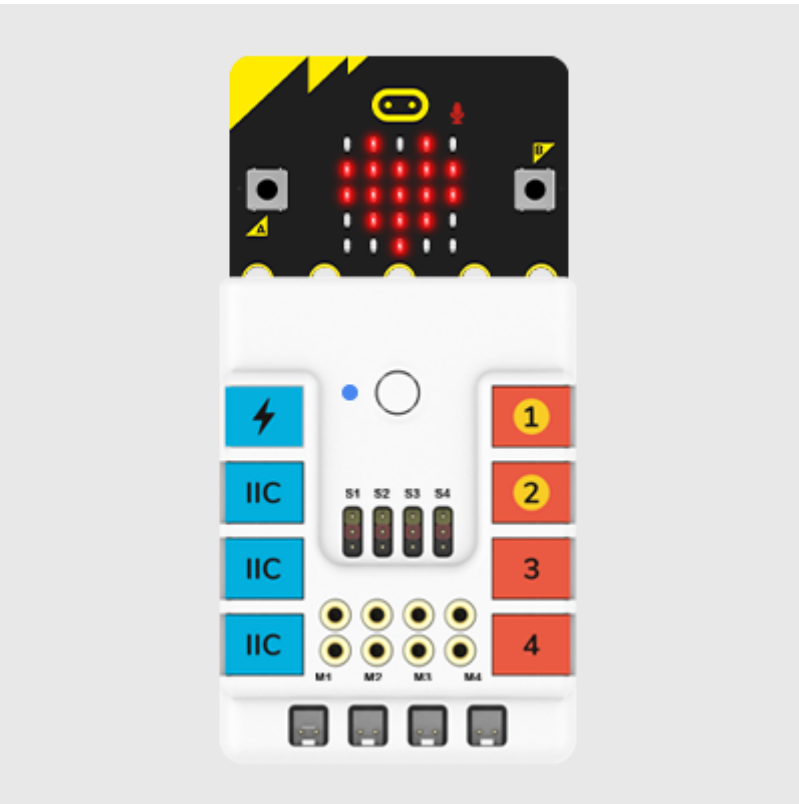
Materials

Nezha expansion board × 1

micro:bit × 1

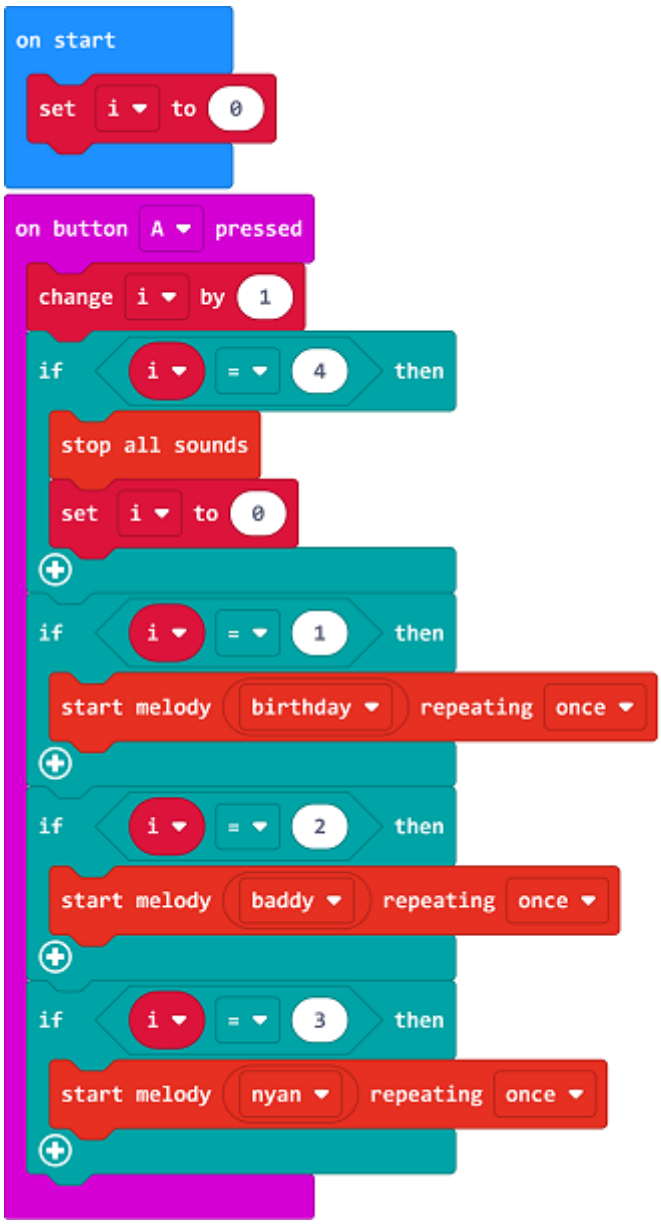
Connection Diagram

- Insert the micro:bit to Nezha expansion board.



19.3. MakeCode Programming

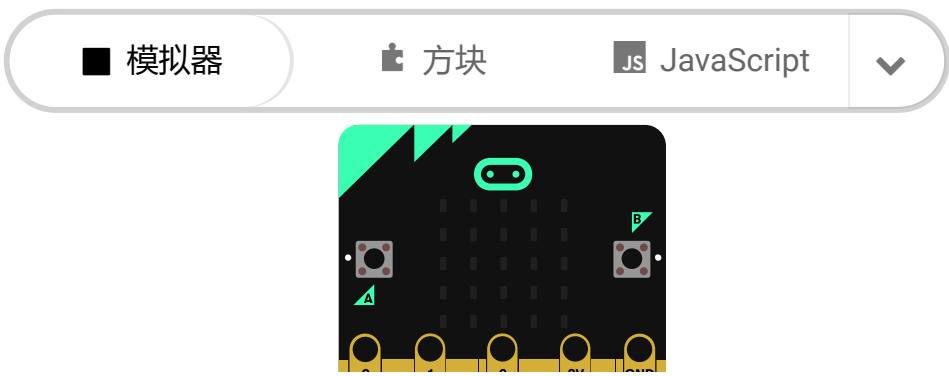
Programme as the picture shows:

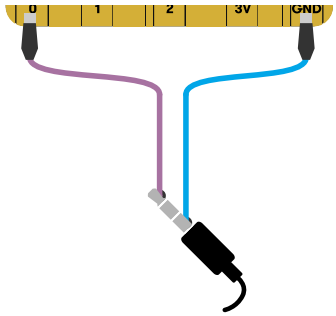


Link

Link: https://makecode.microbit.org/_gRoDU7R96LTf

You may also downoad it directly below:





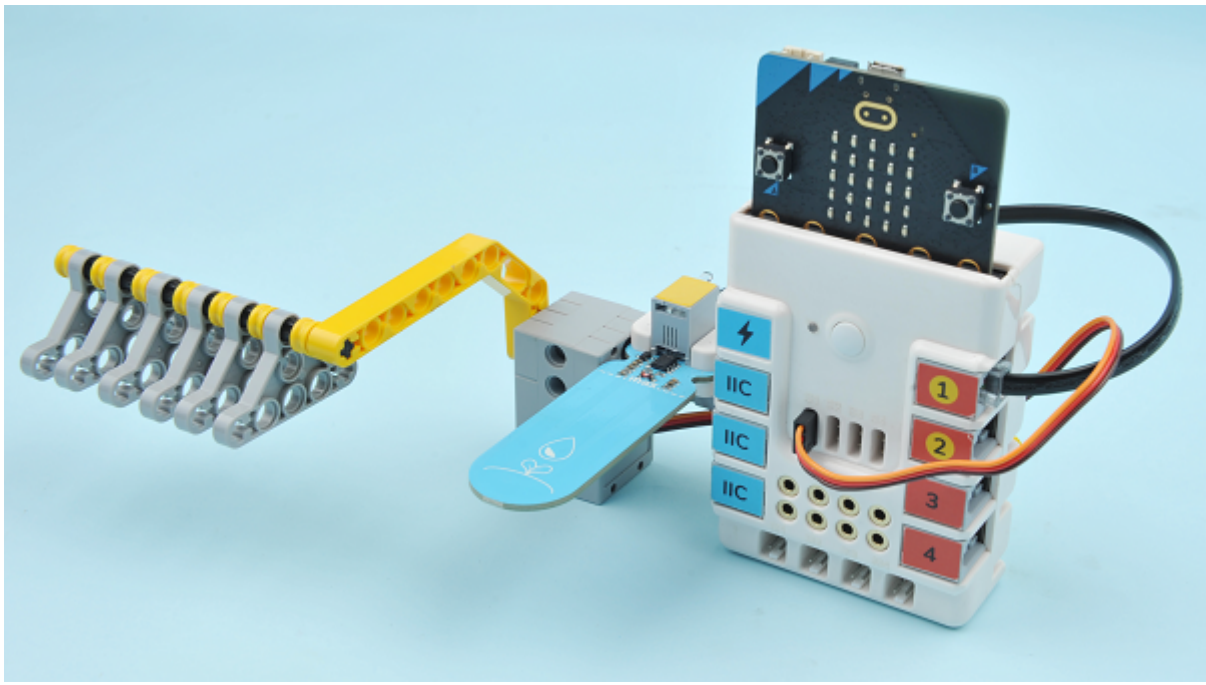
Result

- Press button A to switch the music.

20. case 19： The Automatic Laundry Rack

20.1. Introduction

Build an automatic laundry rack with a micro:bit.



20.2. Quick to Start

Materials

Nezha expansion board × 1

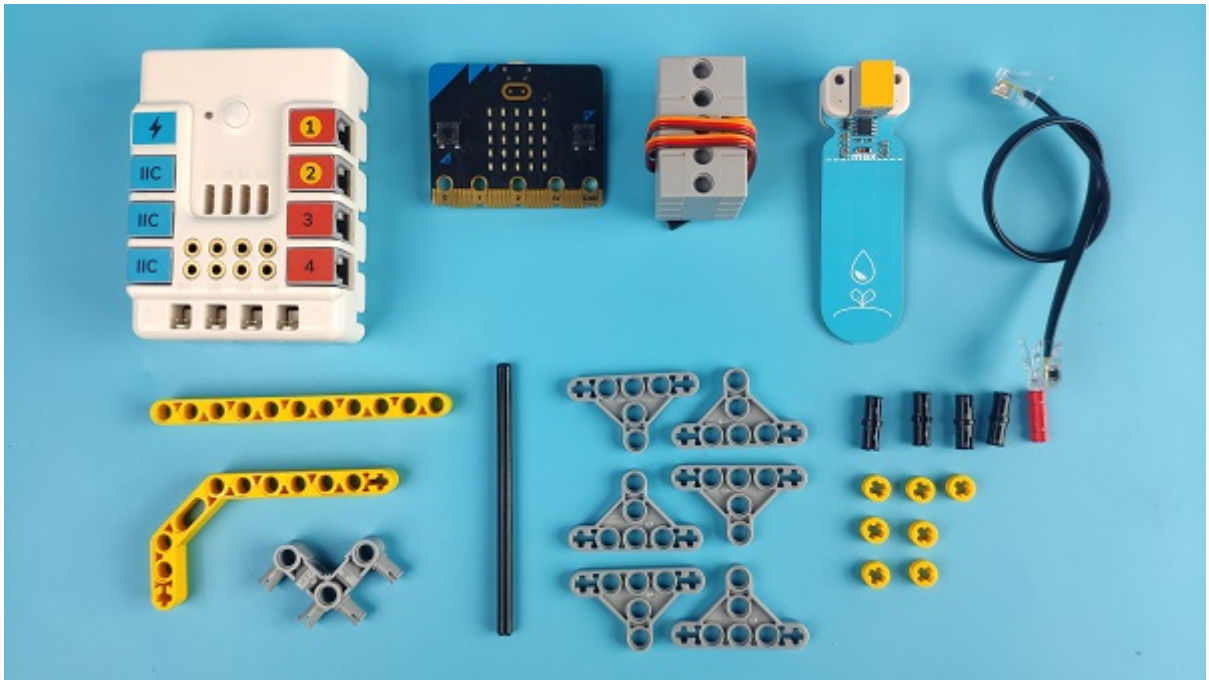
micro:bit × 1

360°servo × 1

Bricks × n

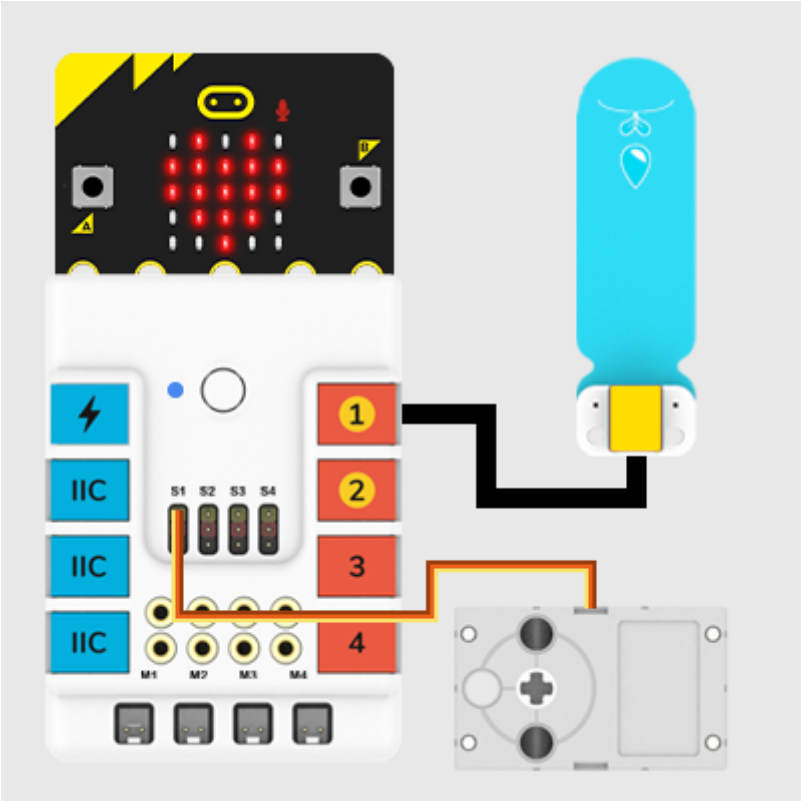
Bricks details

Bricks	qty
TECHNIC 11M BEAM	1
DOUBLE ANGULAR BEAM 3X7 45°	1
TRIANGLE	6
1/2 BUSH	7
2M CROSS AXLE W. GROOVE	1
CONNECTOR PEG W. FRICTION	4
CROSS AXLE 10M	1
Angular beam 90degr. w.4 snaps	1



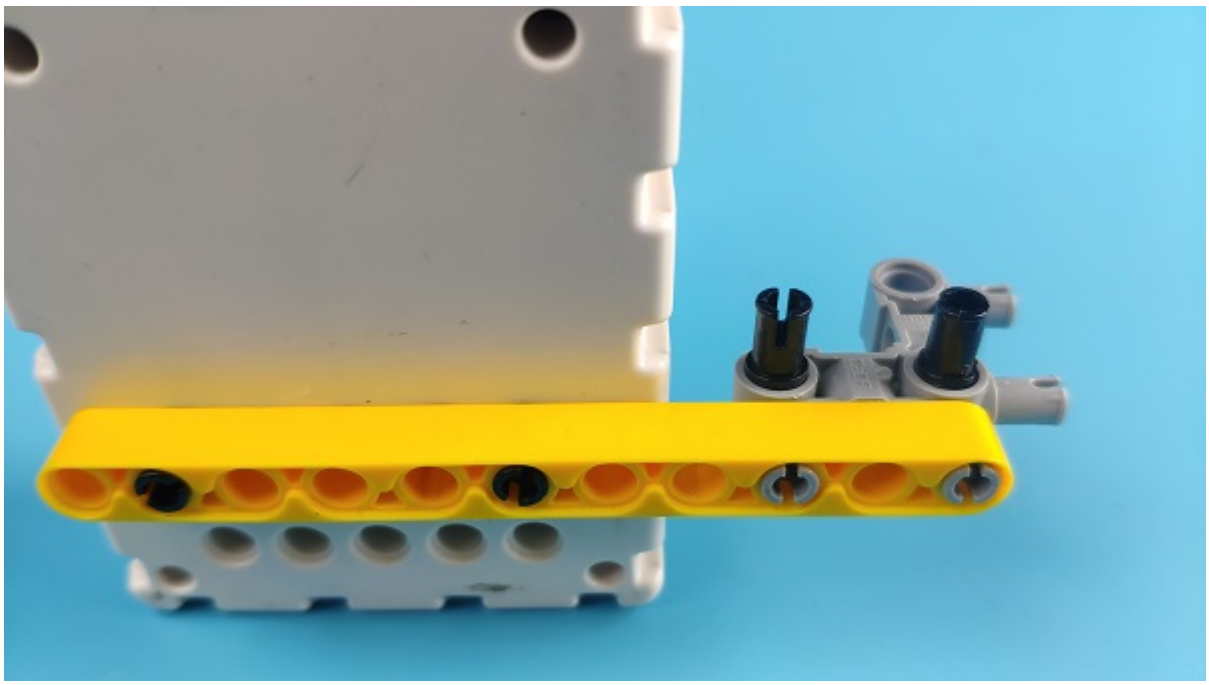
Connections Diagram

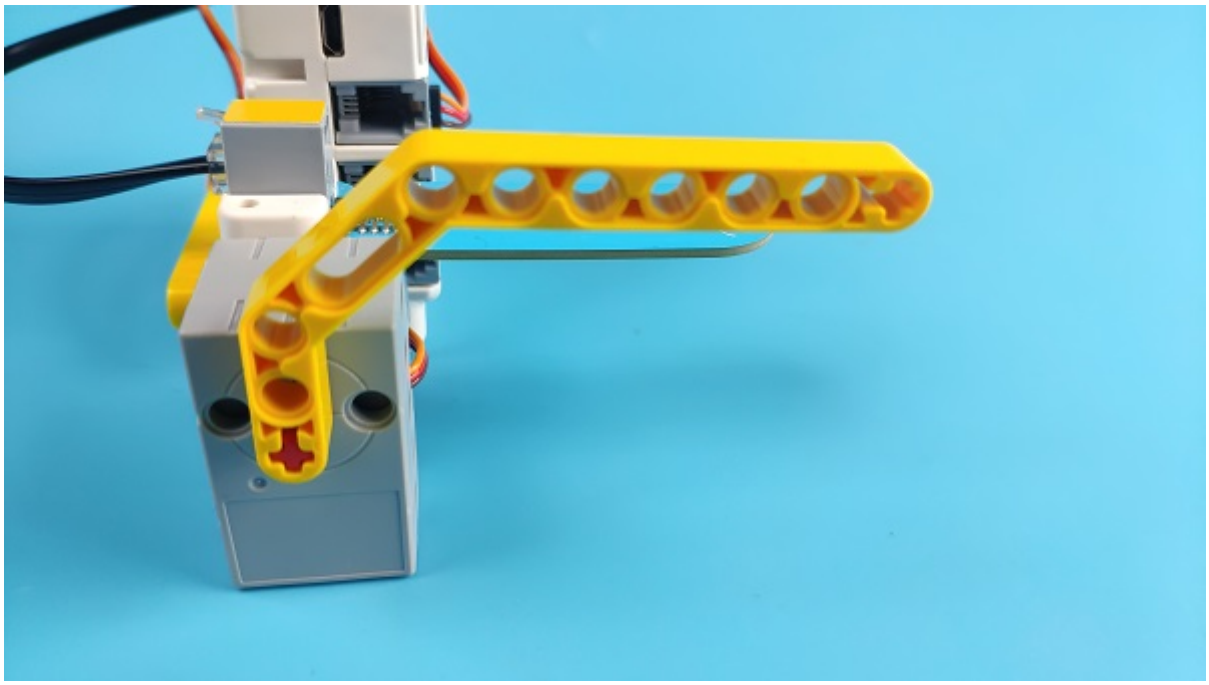
- Connect the micro:bit with the Nezha expansion board, connect the servo to S1 port and the soil moisture sensor to J1 port on Nezha expansion board.

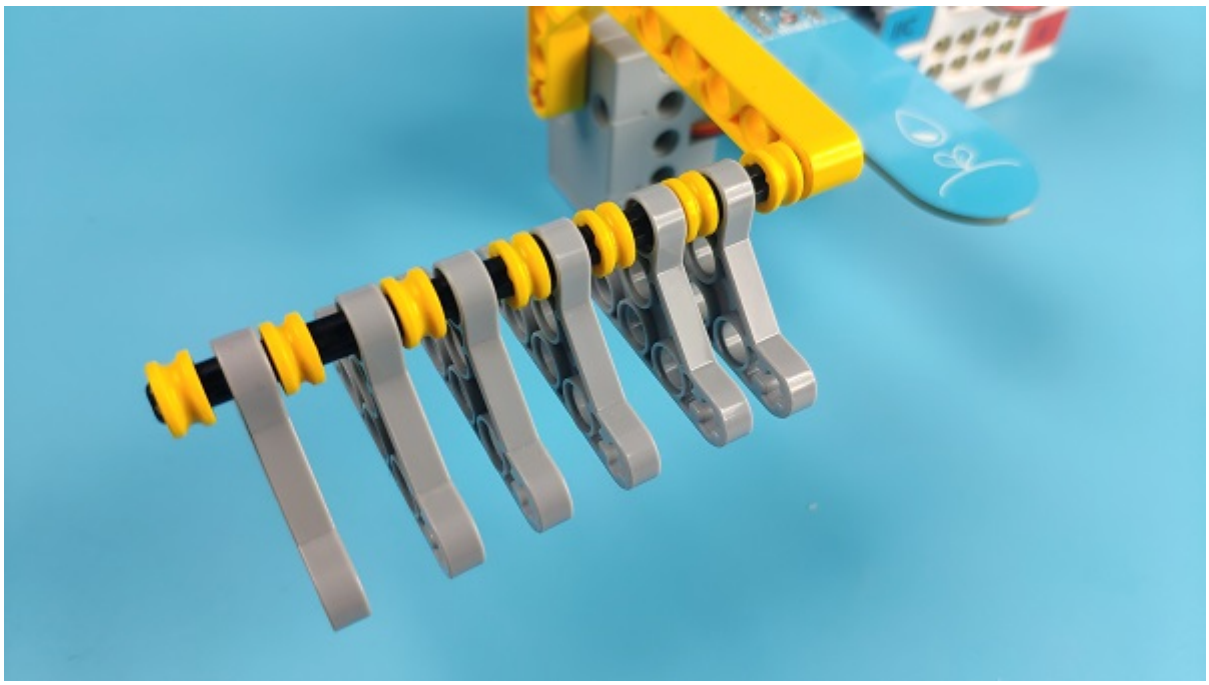


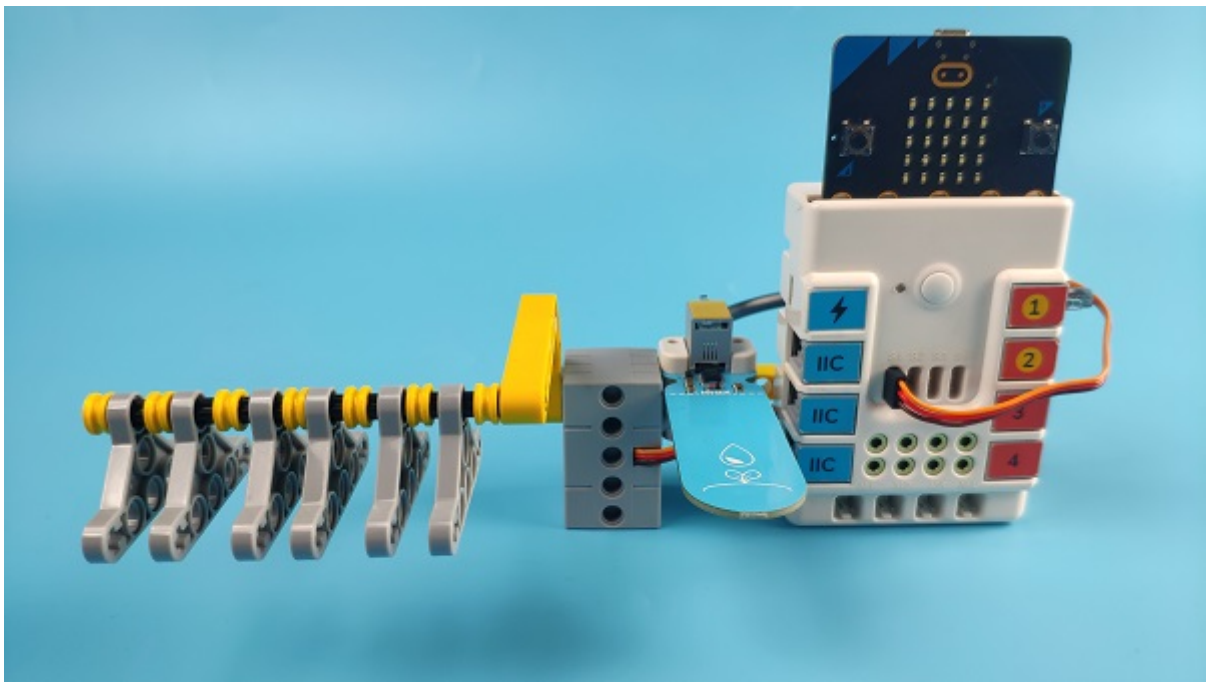
Assembly

- Assemble it as the pictures suggest:

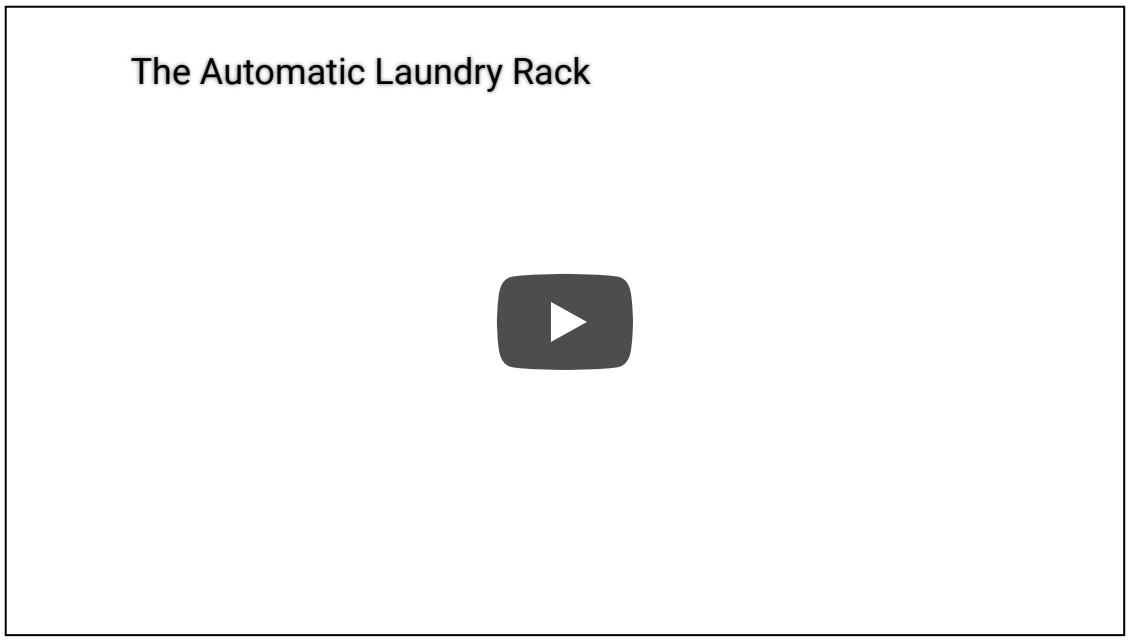







IIC
IIC
IIC
1
2
3
4

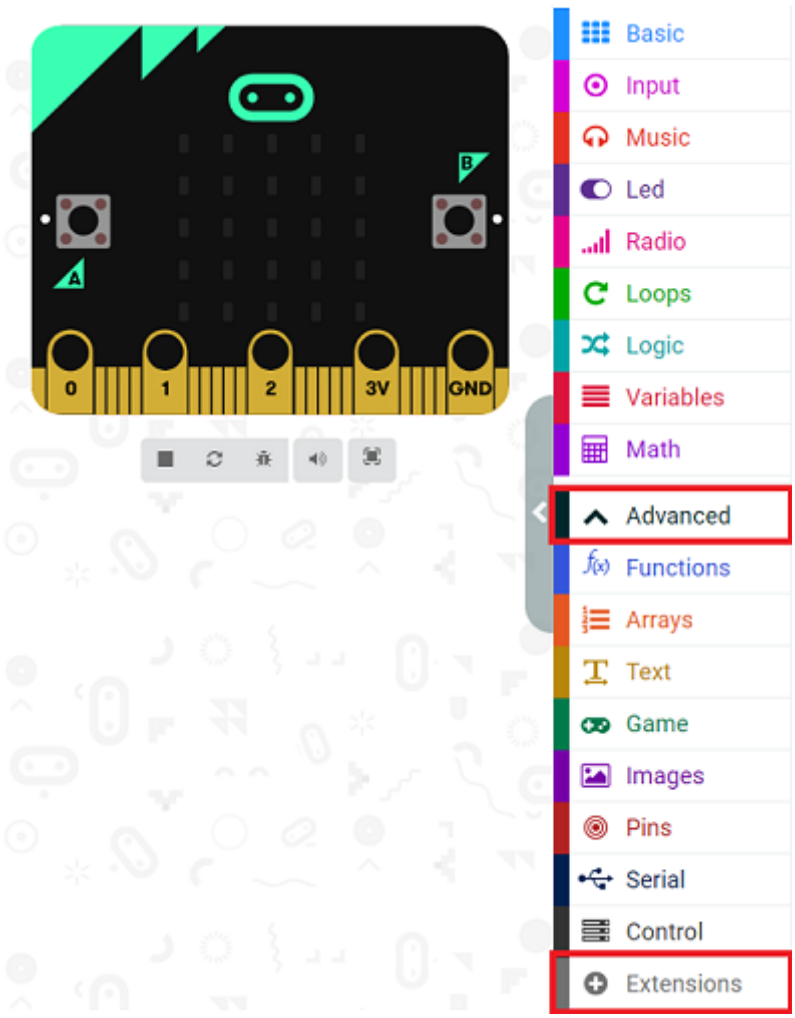
Video reference: https://youtu.be/t2mYccra8Vw



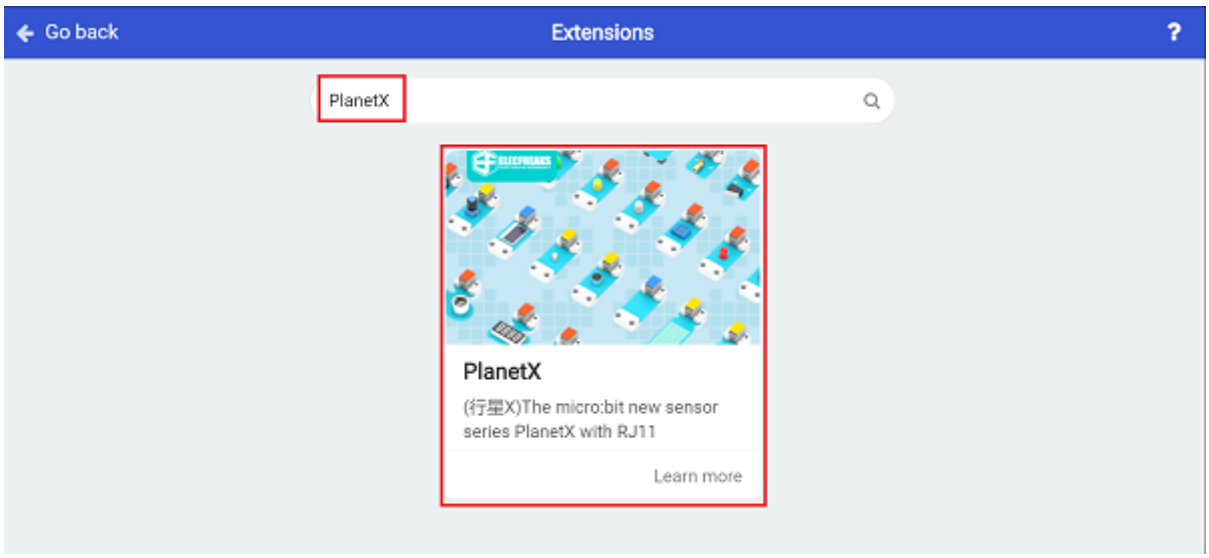
20.3. MakeCode Programming

Step 1

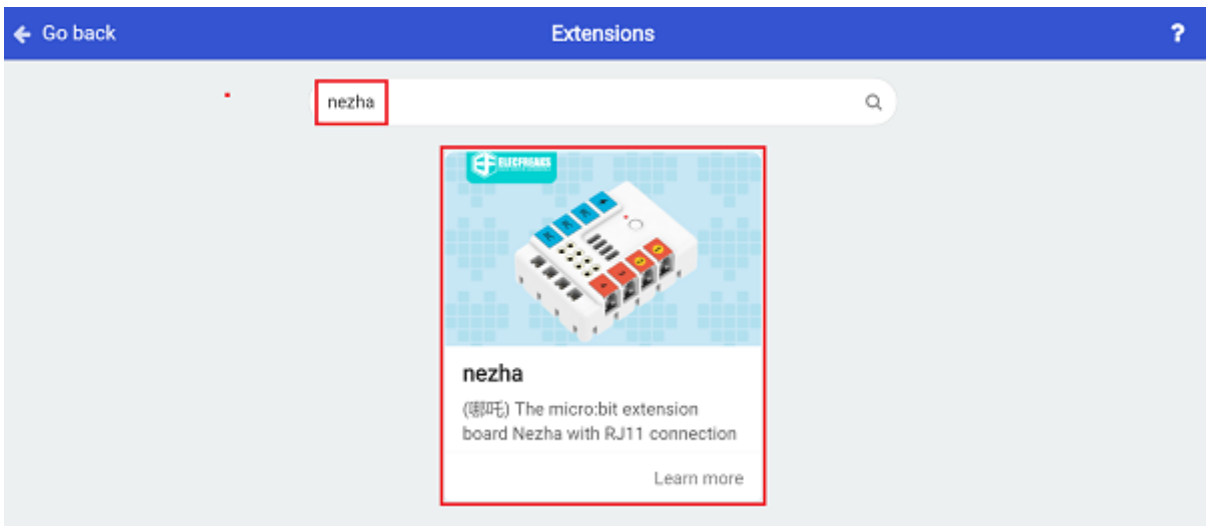
Click “Advanced” in the MakeCode drawer to see more choices.



We need to add a package for programming. Click “Extensions” in the bottom of the drawer and search with “PlanetX” in the dialogue box to download it.



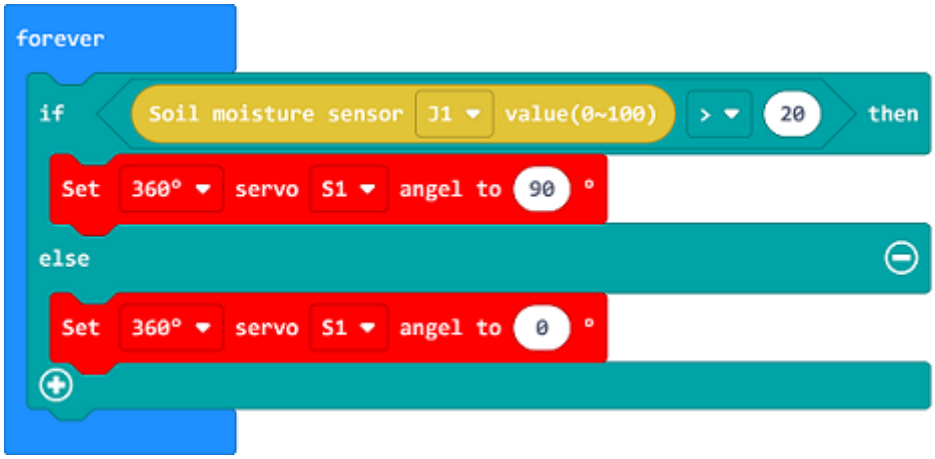
We need to add a package for programming. Click “Extensions” in the bottom of the drawer and search with “Nezha” in the dialogue box to download it.



Note: If you met a tip indicating that the codebase will be deleted due to incompatibility, you may continue as the tips say or build a new project in the menu.

Step 2

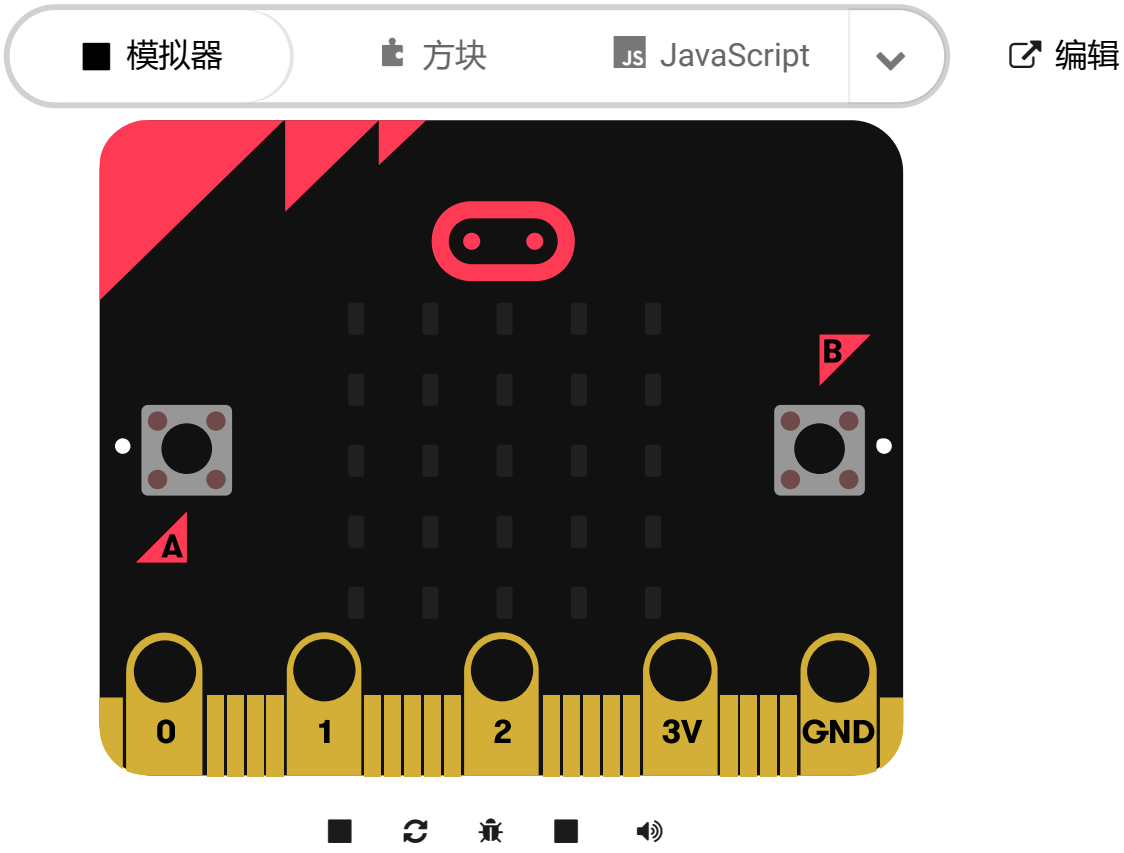
Programme as the picture shows:



Link

Link：https://makecode.microbit.org/_2Ub6zkdT8RbY

You may also downoad it directly below:



Result

- While rainning, the detected value from the soil moisture sensor is over the setting point, the laundry rack folds back in case of the clothes getting wet; while the sun comes out, the the detected value from the soil moisture sensor is below the setting point, and the the laundry rack stretches out to dry the clothes.

21. case 20： Micro:bit Avoiding Bricks

21.1. Introduction

Let's use micro:bit to make a game of avoiding bricks. It can control the spots by gravity to avoid the falling bricks. Once it touches the bricks, the game ends. Let's see how it works。

21.2. Quick to Start

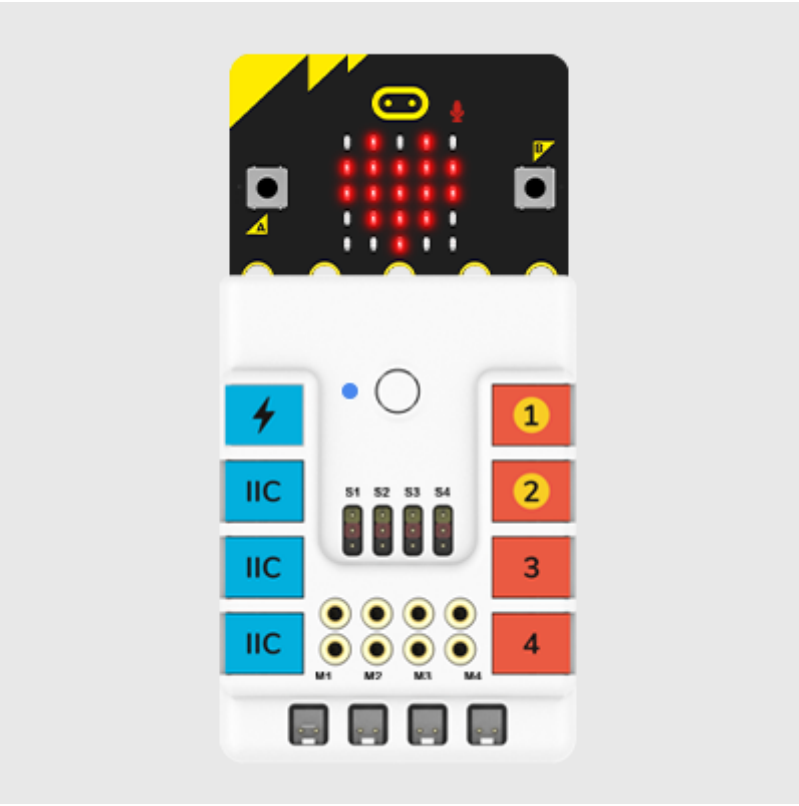
Materials

Nezha expansion board × 1

micro:bit × 1

Connections Diagram

- Connect the micro:bit to Nezha expansion board.



21.3. MakeCode Programming

21.4. Principle:

The implementation logic is roughly divided into two parts, the small highlight part controlled by the player and the randomly generated obstacle part. For simplicity, here we set:

1.The small bright spot can only move left and right at the bottom of the screen

2.The length of the obstacle is fixed as three

3.The descending speed of obstacles remains unchanged

4.The game ends when the small bright spot hits an obstacle

5.Due to the small size of the screen, only one obstacle will appear at the same time. When one obstacle drops to the bottom, another obstacle will be generated again.

21.5. Implementation

Next is the implementation part. We need to use two infinite loops to implement the logic of the small bright spot and the logic of the obstacle respectively. 4 sprites (actually a variable representing the sprite) will be generated, one for the small bright spot, and 3 Obstacle sprites also need 2 variables, x and sudu, x is used to accept the generated random number and set the abscissas of 3 obstacle sprites, sudu is used to control the descending speed of obstacles, open the micro:bit online programming website (https://makecode.microbit.org/)

21.6. Start programming.

On start

1.Under the variable classification, use the variable module to set 6 variables, namely x, sudu, spirt (representing small bright spots), zhangai1 (representing the leftmost obstacle wizard), zhangai2 (representing the middle obstacle wizard), zhangai3 (representing the rightmost obstacle) Elf)

2.Set the value of x to the random number module to generate a random number from 0 to 2

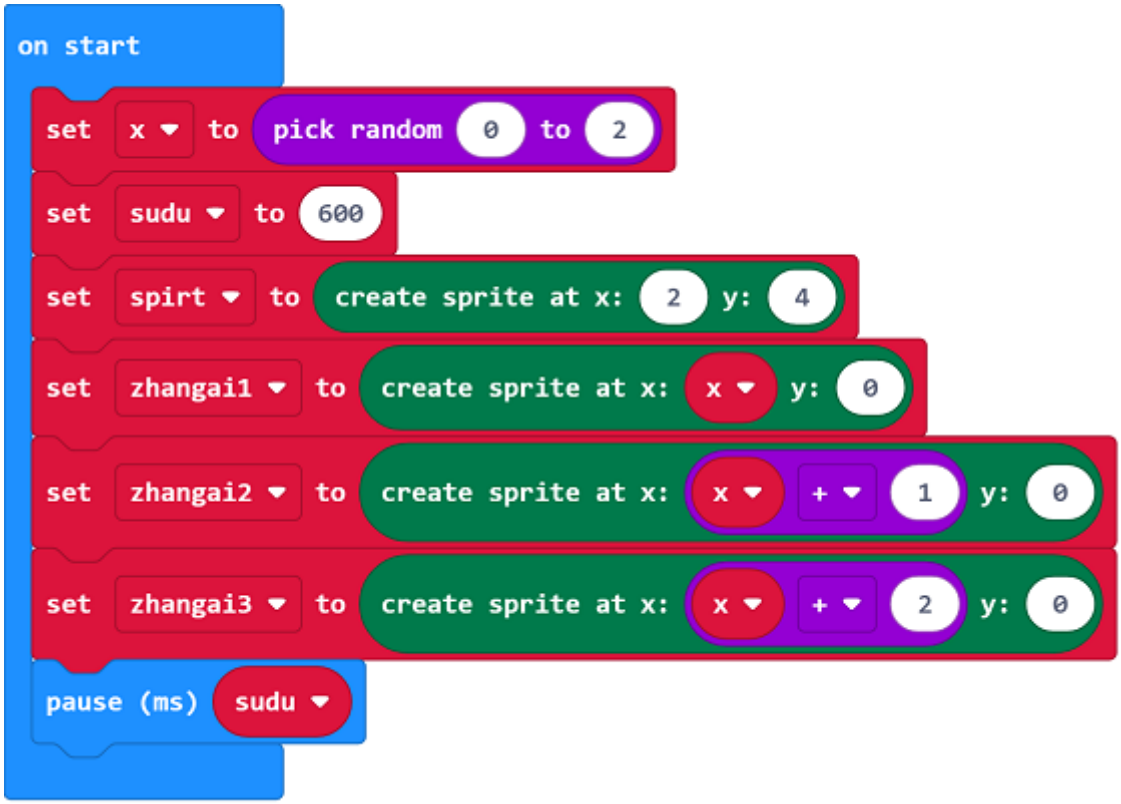
3.Set the value of sudu to 600

4.Set spirt to the Create Wizard module under the game category, fill in the variable 2 for the x coordinate and 4 for the y coordinate to ensure that the initial state of the small bright spot is in the bottom middle of the screen

5.Set zhangai1 to create a wizard module, fill the x coordinate with the variable x, and fill the y coordinate with 0

6.Set zhangai2 to create a wizard module, fill the x coordinate with the variable x + 1, and fill the y coordinate with 0

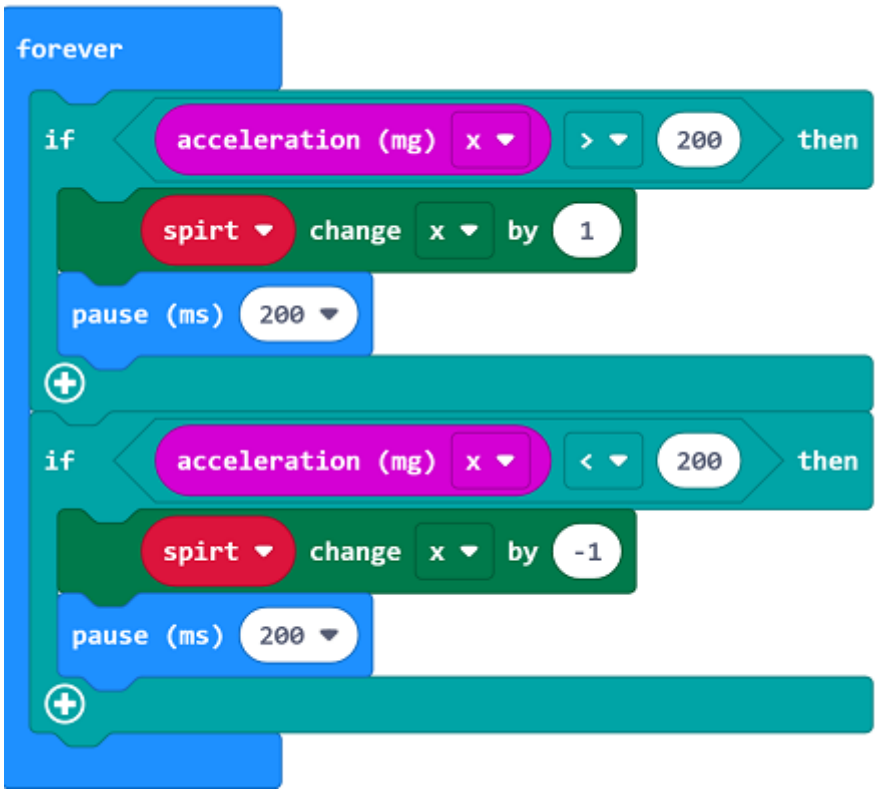
7.Set zhangai3 to create a wizard module, fill the x coordinate with the variable x + 2, and fill the y coordinate with 0



21.7. The bright spot part

1.Judge the acceleration in the x direction, if it is over 200, add 1 to the spirt x coordinate and pause for 200ms

2.Judge the acceleration in the x direction, if it is less than -200, subtract 1 from the spirt x coordinate, and pause for 200ms



21.8. Obstacles part

1.The 3 obstacle sprites y coordinate minus 1 each time

2.Judge If spirt touches zhangai1 or spirt touches zhangai2 or spirt touches zhangai3, the game is over when it touches any one among them.

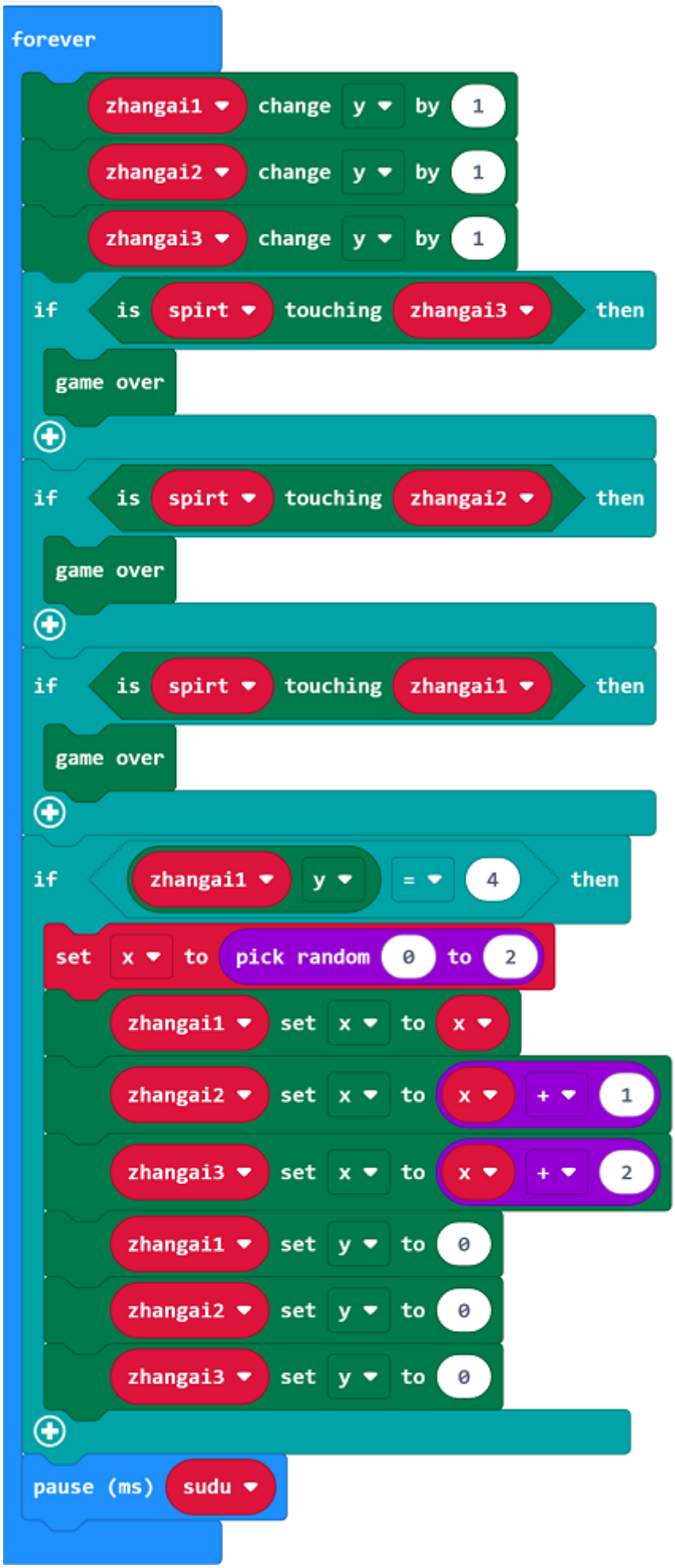
3.If the y coordinate of zhangai1 (or zhangai2 or zhangai3) is 4, regenerate a random number from 0 to 2 and set it to the variable x

4.Use the variable x to set the coordinate x of zhangai1 to the variable x and the y coordinate to 0

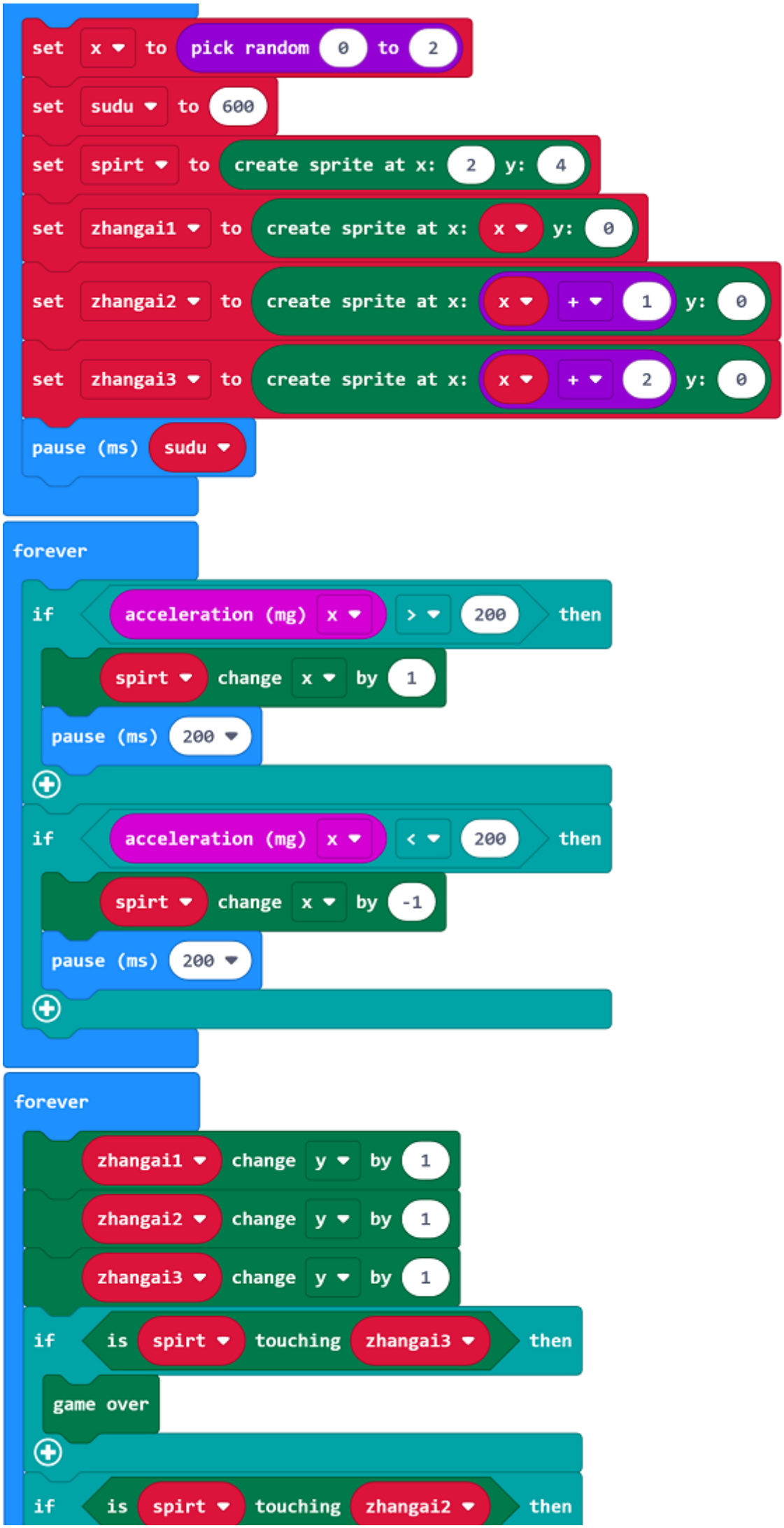
5.Set the coordinate of zhangai2 with variable x. The x coordinate is variable x + 1, and the y coordinate is 0

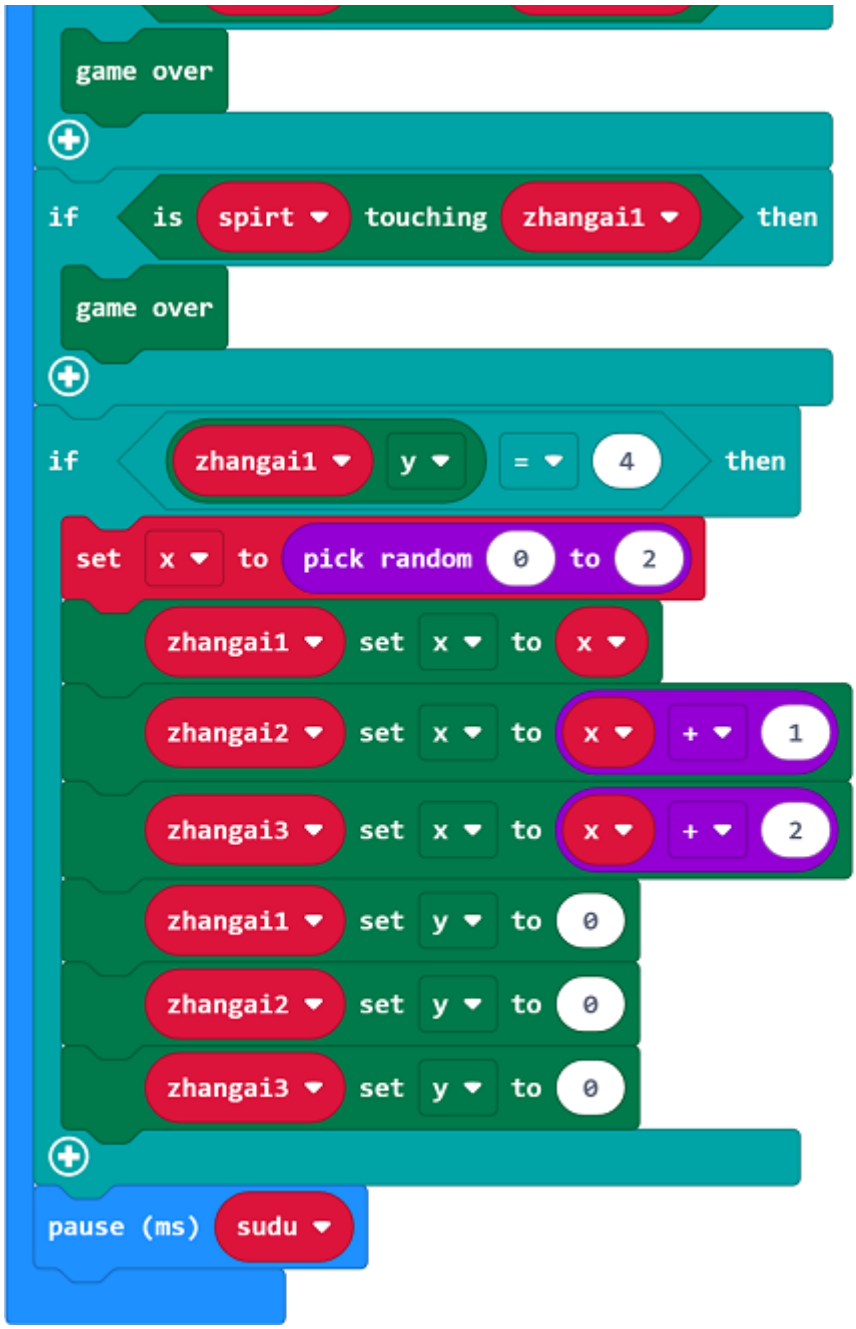
6.Set the coordinate of zhangai3 with variable x. The x coordinate is variable x + 2, and the y coordinate is 0

7.Pause variable sudu time



Programme as the picture shows:

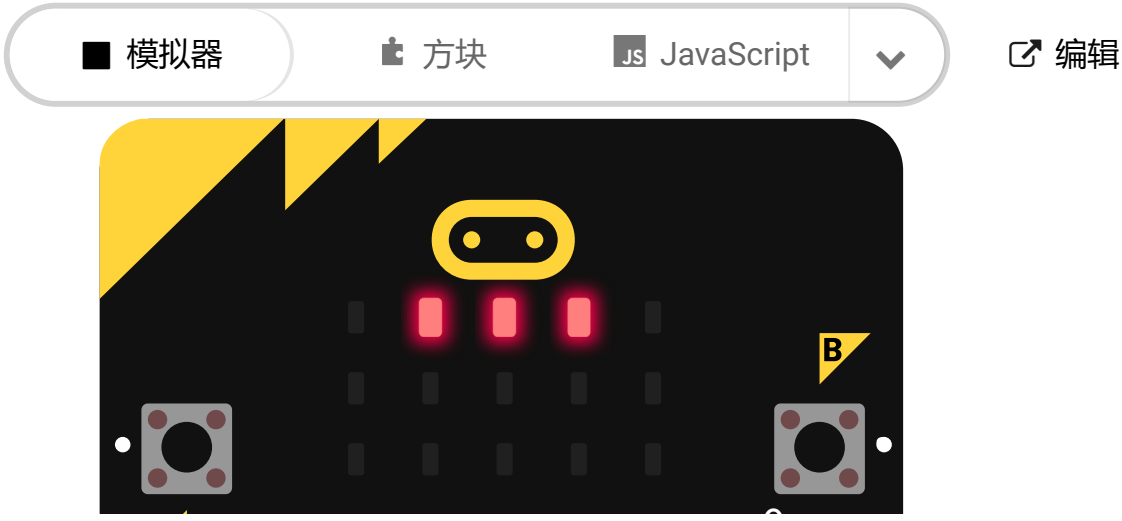

set x to pick random 0 to 2
set sudu to 600
set spirt to create sprite at x: 2 y: 4
set zhangai1 to create sprite at x: x y: 0
set zhangai2 to create sprite at x: x + 1 y: 0
set zhangai3 to create sprite at x: x + 2 y: 0
pause (ms) sudu
forever
if acceleration (mg) x > 200 then
spirt change x by 1
pause (ms) 200
if acceleration (mg) x < 200 then
spirt change x by -1
pause (ms) 200
forever
zhangai1 change y by 1
zhangai2 change y by 1
zhangai3 change y by 1
if is spirt touching zhangai3 then
game over
if is spirt touching zhangai2 then

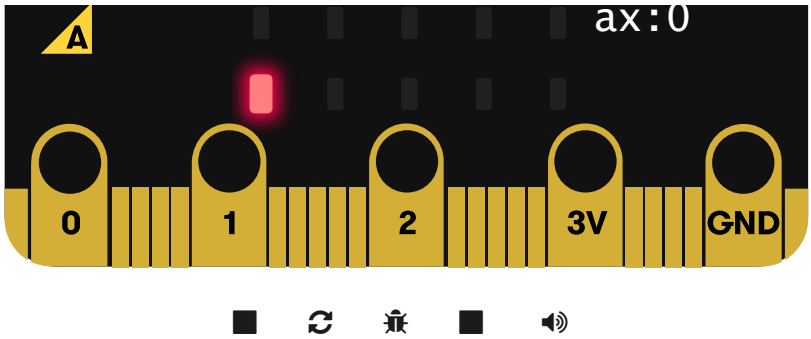


Link

Link: https : //makecode.microbit.org/_AF1g8HYYeTjH

You may download it directly here:





Result

- It can control the spots by gravity to avoid the falling bricks. Once it touches the bricks, the game ends.