

# 1. Introduction to Smart Coding Kit

## 1.1. Introduction

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Elecbreaks Smart Coding Kit is a wearable device based on micro:bit button cell extension board Pro, a DIY micro:bit watch can be easily made with a simple installing method.

Smart Coding Kit is the updated version for the first generation Power Bit Watch Kit, the breakthroughs are:

Simplify the installation without using the acrylic back shroud.

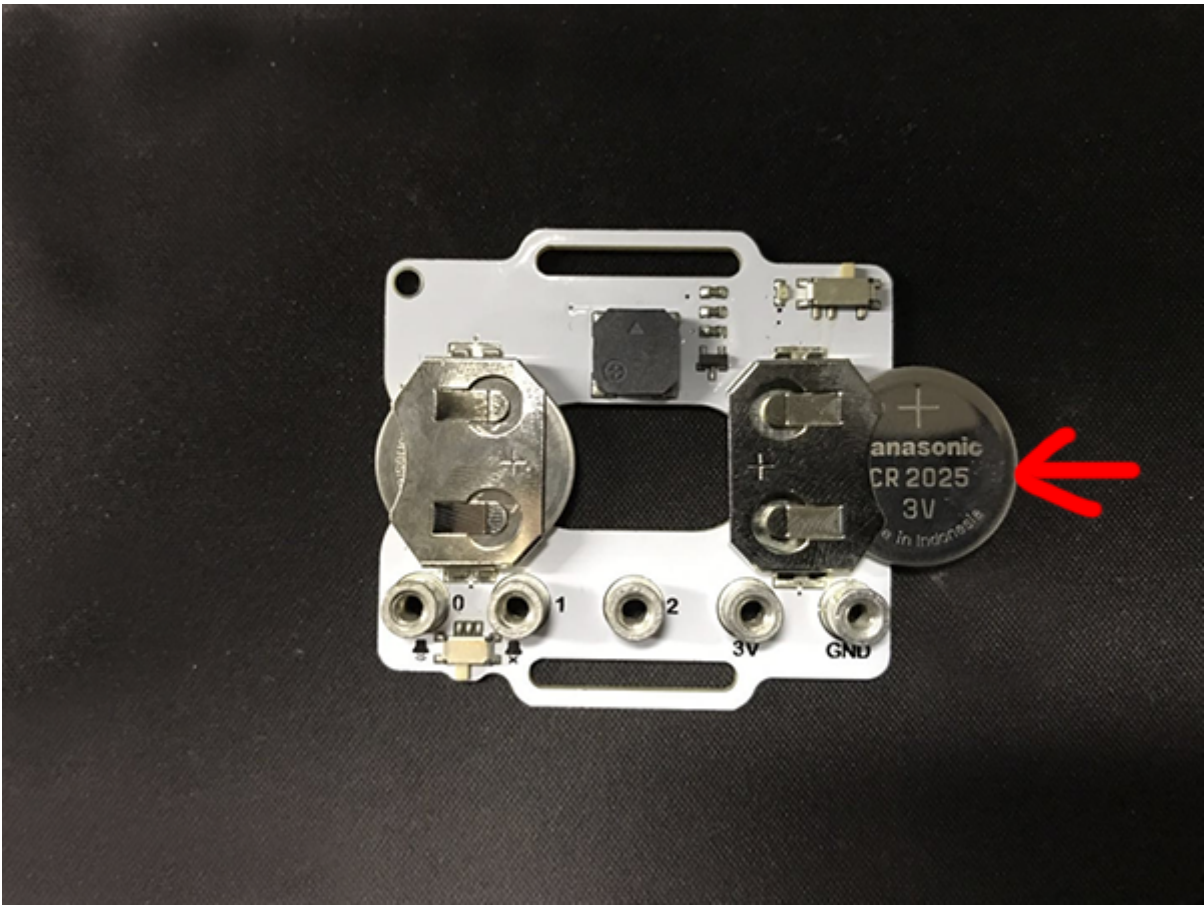
Maintain a simple style with 3-pin ports canceled.

Upgrade the function by adding a switch for the buzzer.

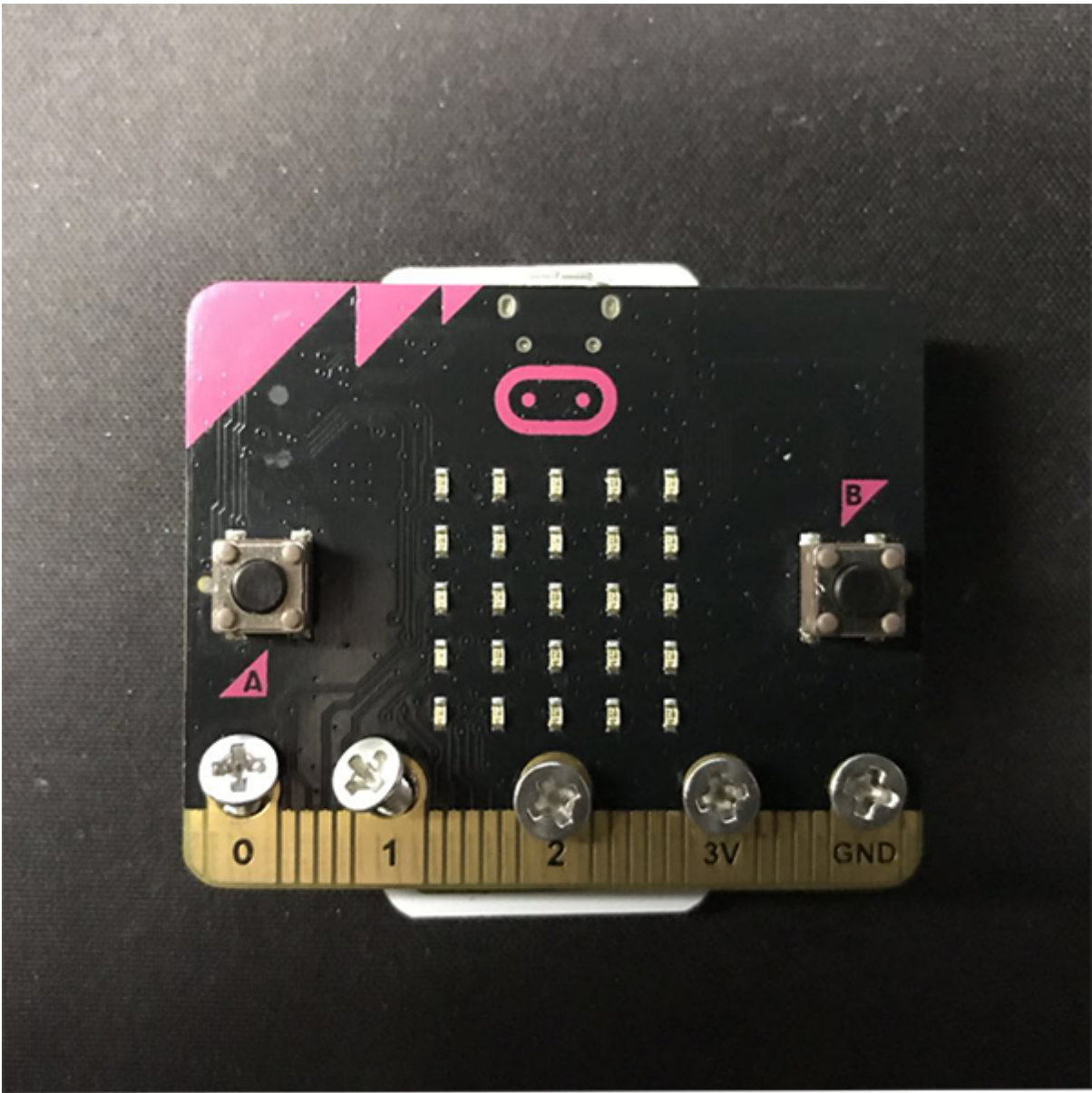
## 1.2. Assembling Diagram

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Install two 3V 2025 cells to the battery holder.

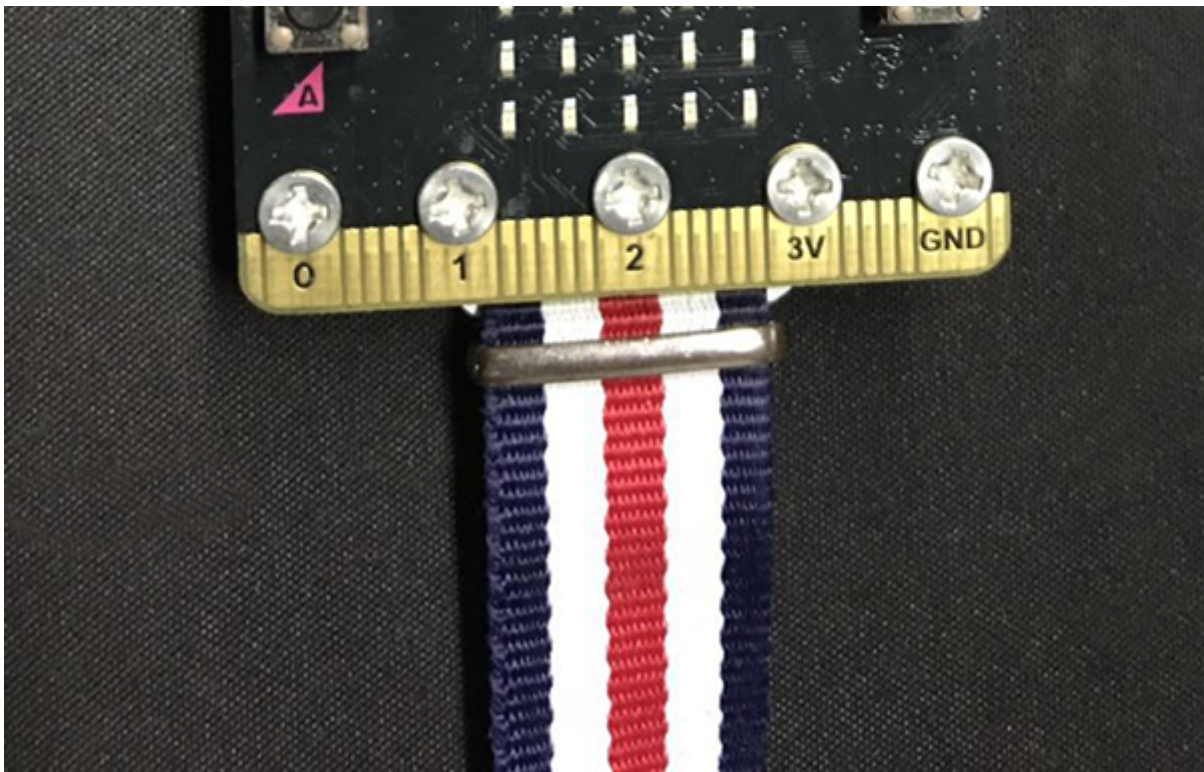


Fix the micro:bit to the button cell extension board Pro with screws.



Pass the longer watch strap through the hole in the button panel Pro to install the watch strap.





## 1.3. List

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- 1 x micro:bit
- 1 xPower:bit
- 1 x Nylon watch strap
- 1 x micro USB wire
- 5 x M3x5 Inner cross screws
- 1 x MINI Screwdriver
- 1 x micro:bit guidebook

## 1.4. FAQ

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## 2. Wear:bit

### 2.1. Introduction

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Wear:bit button panel Pro is a mini extension board in small size.

It can give power to the micro:bit and is loaded with buzzer which can be used with our watch strap and the micro:bit. The breakthroughs are:

Simplify the installation without using the acrylic back shroud.

Maintain a simple style with 3-pin ports canceled.

Upgrade the function by adding a switch for the buzzer.

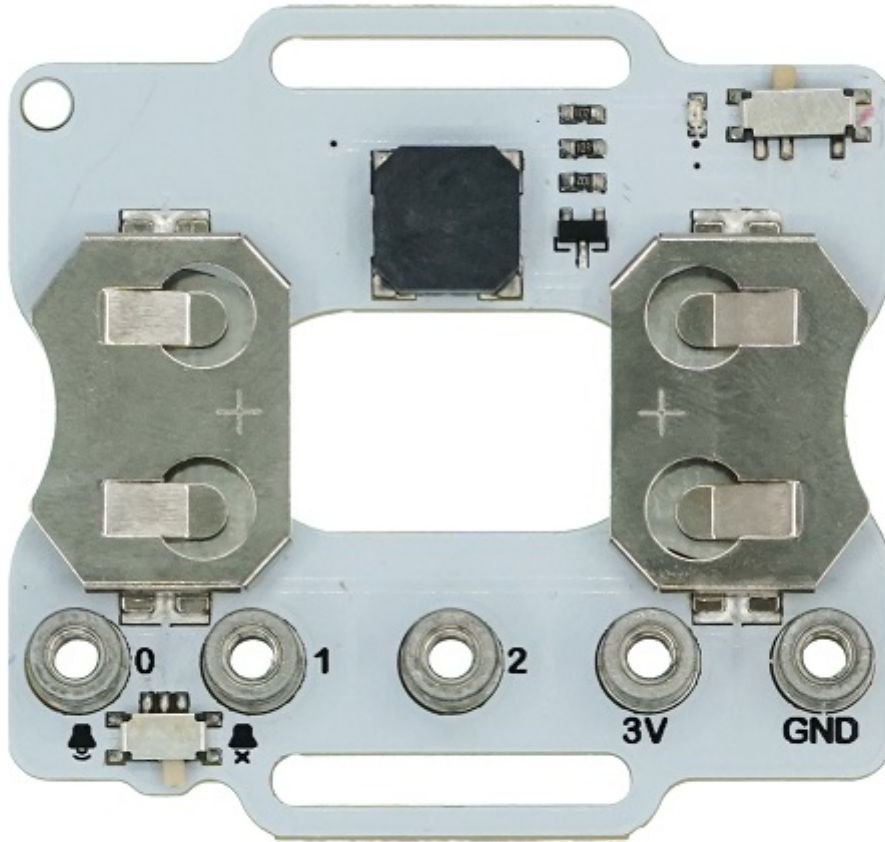
### 2.2. Characteristic

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- Powered by two 3V CR2025 lithium batteries.
- Loaded with a buzzer that is controlled through P0 port.
- Loaded with a buzzer switch.
- It can be used with the watch strap and the micro:bit.

### 2.3. Outlook and Dimension

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## 2.4. Parameter

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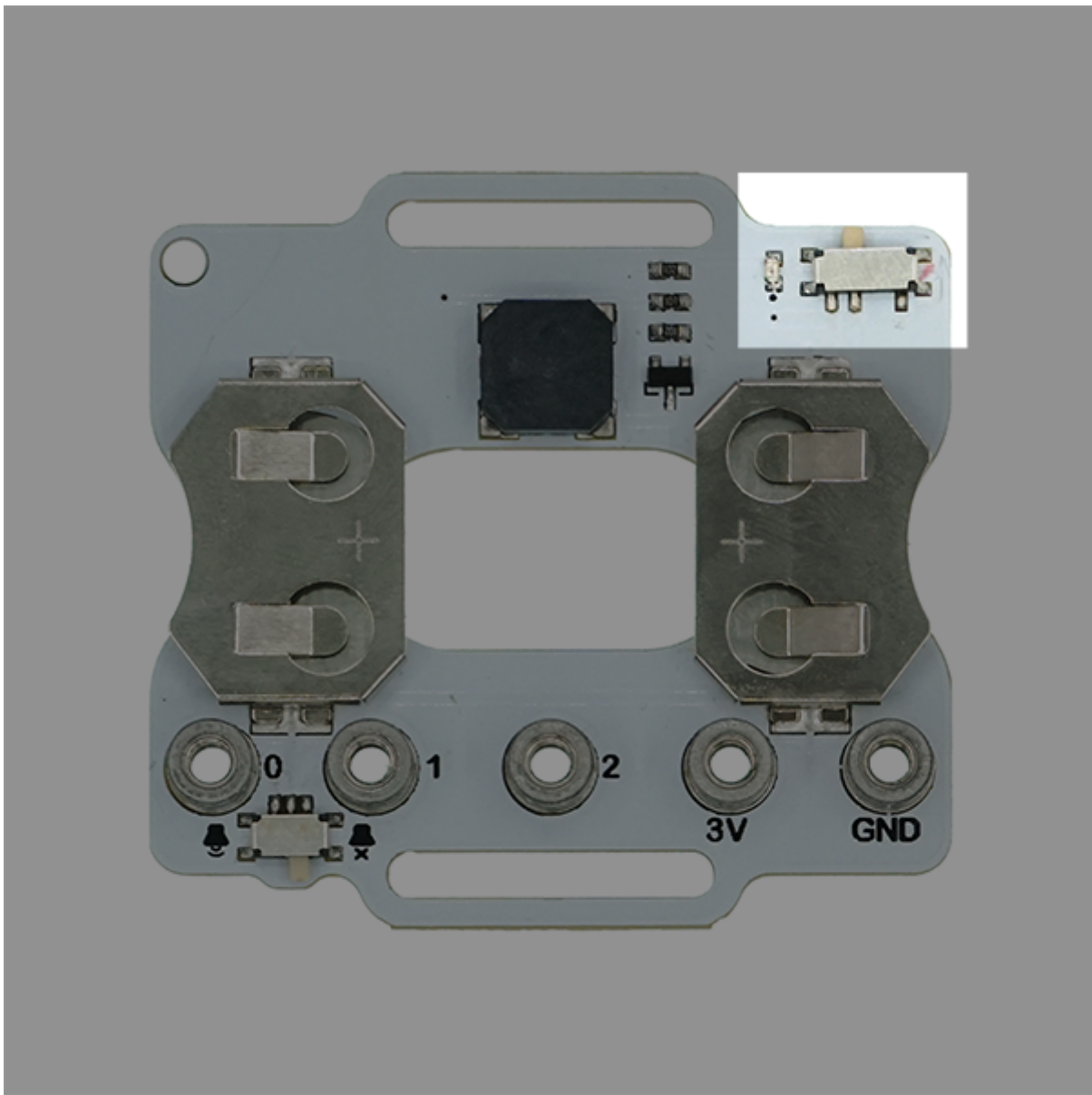
- Name: Wear:bit
- Version: V1.0
- Working Voltage: 2.7~3.3V
- Buzzer: Support
- Size: 49.1x51.6mm
- Net Weight:12.7g

## 2.5. Introduction to Main Modules

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### Power Switch

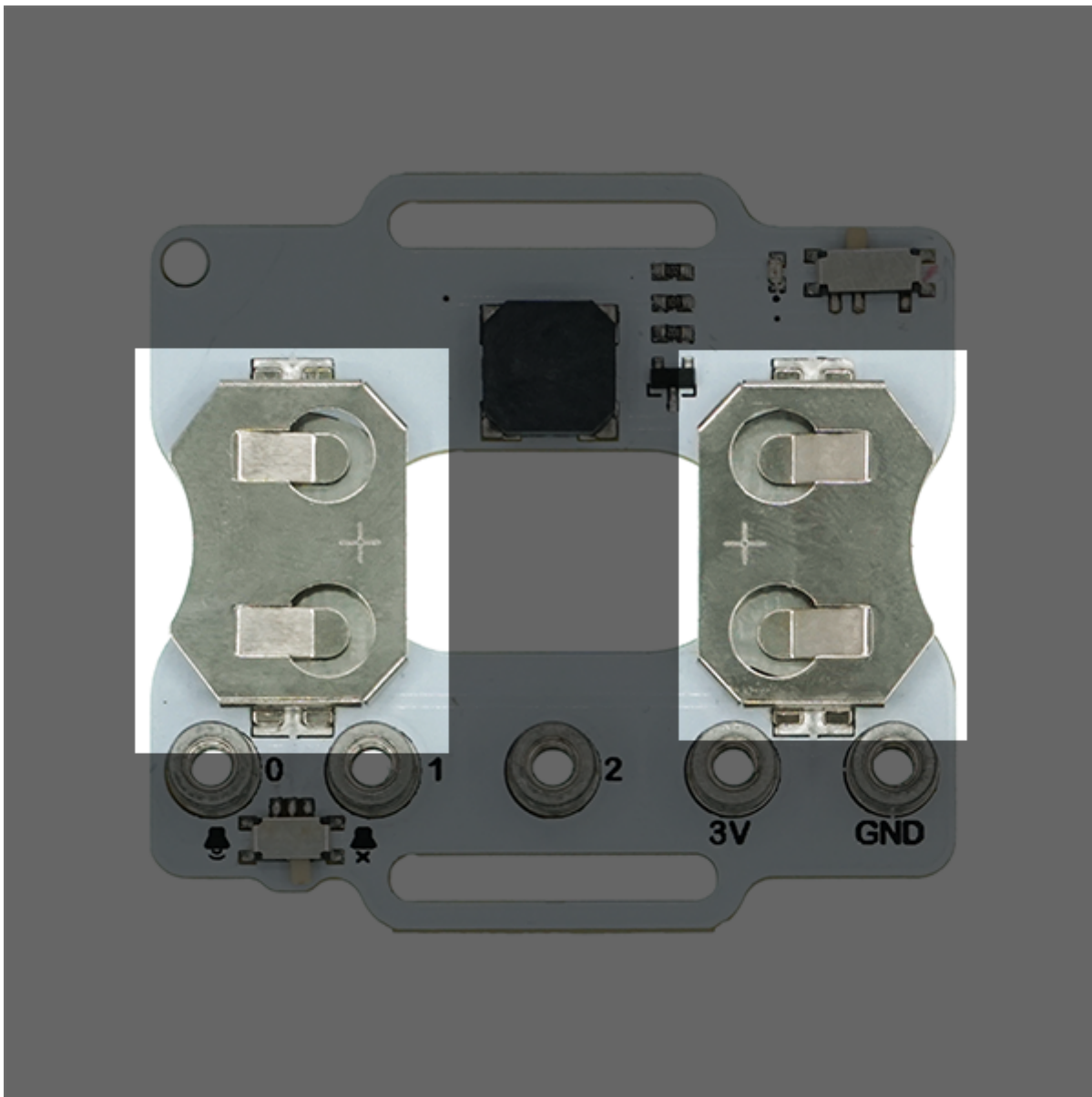
“I” to switch on, “O” to switch off.



## Two CR2025 Battery Holders

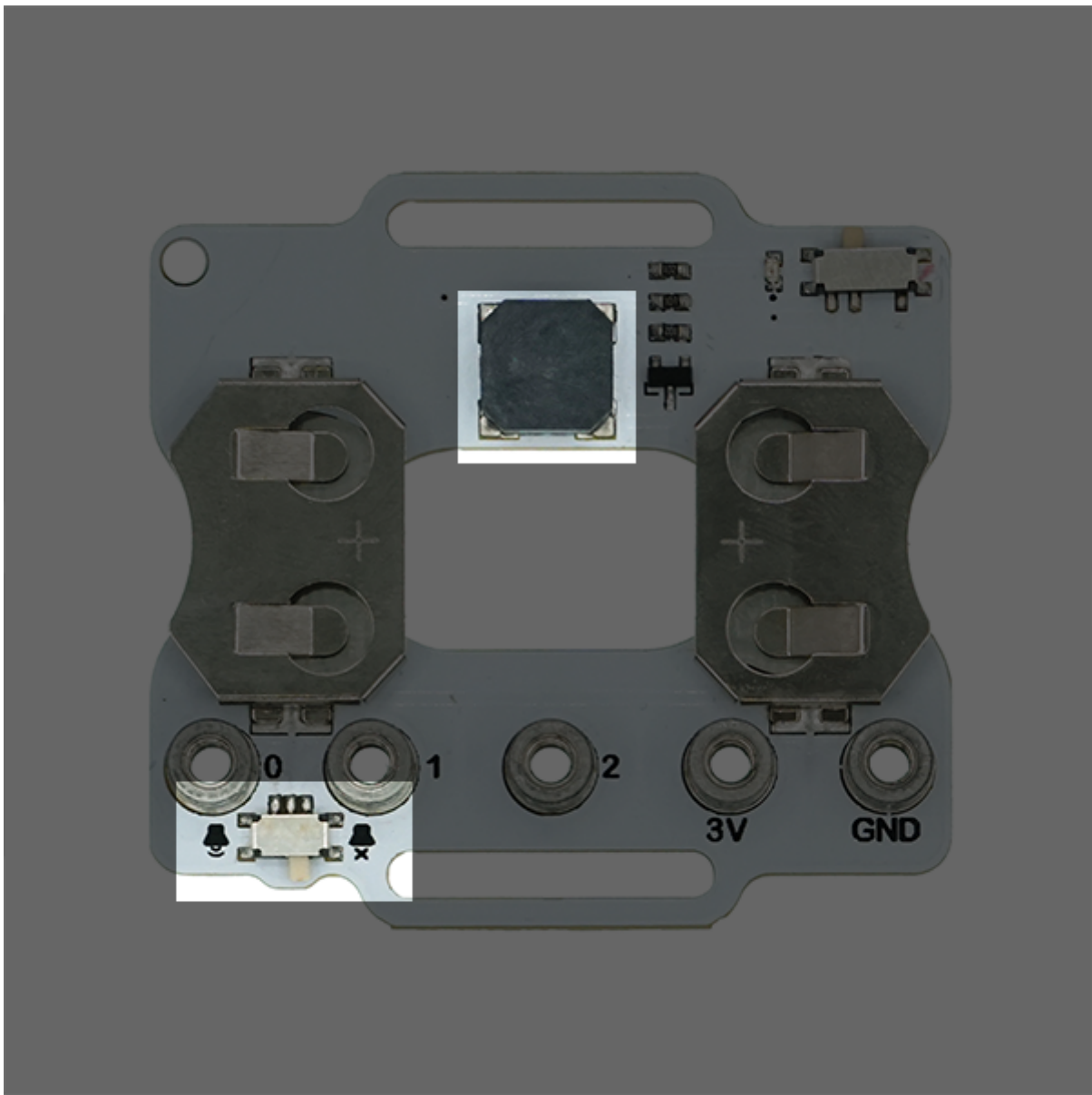
It is powered by 2025 button cells(3V Li-Mn button cells) with a simple installation method.





## Buzzer and Switch

The buzzer is controlled through P0 port that can play music. The switch powers the buzzer on or off.

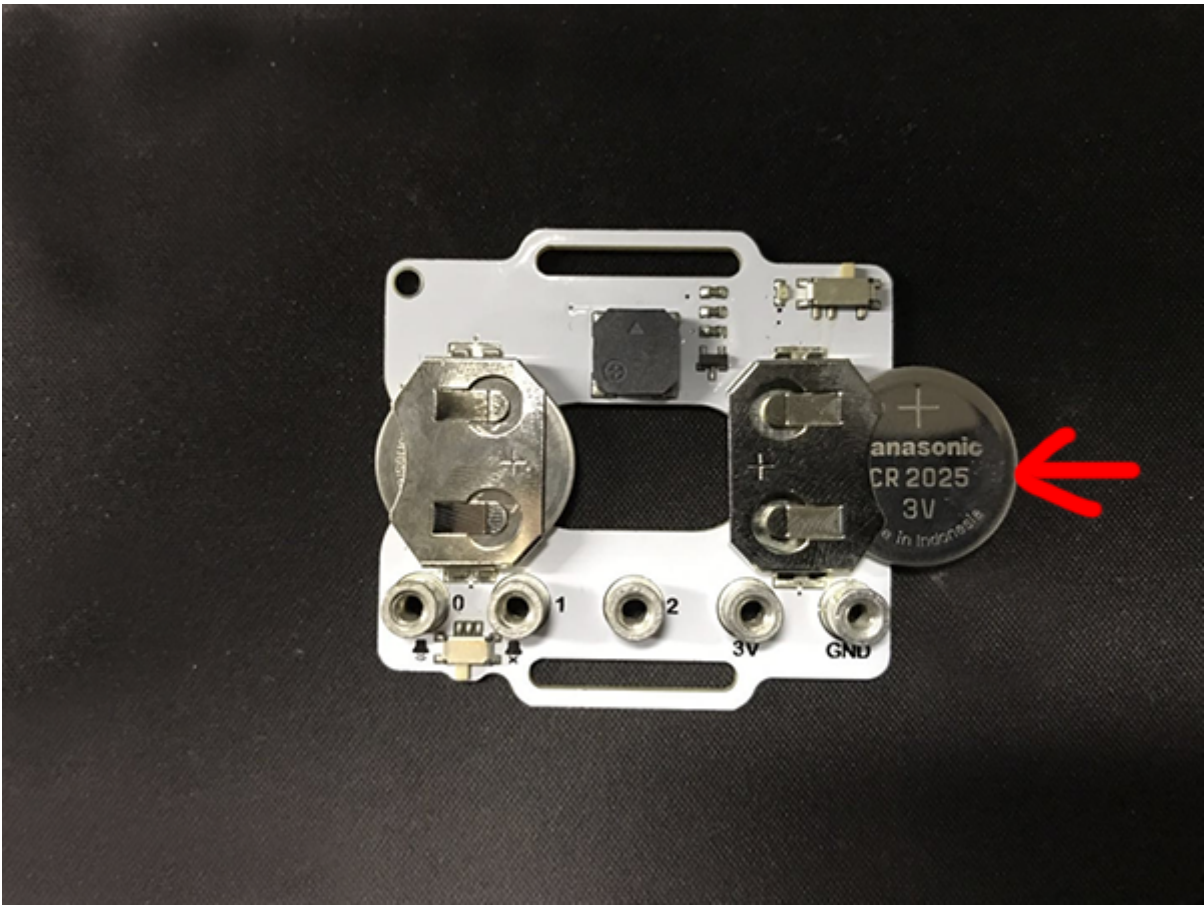


## 2.6. Quick to Start

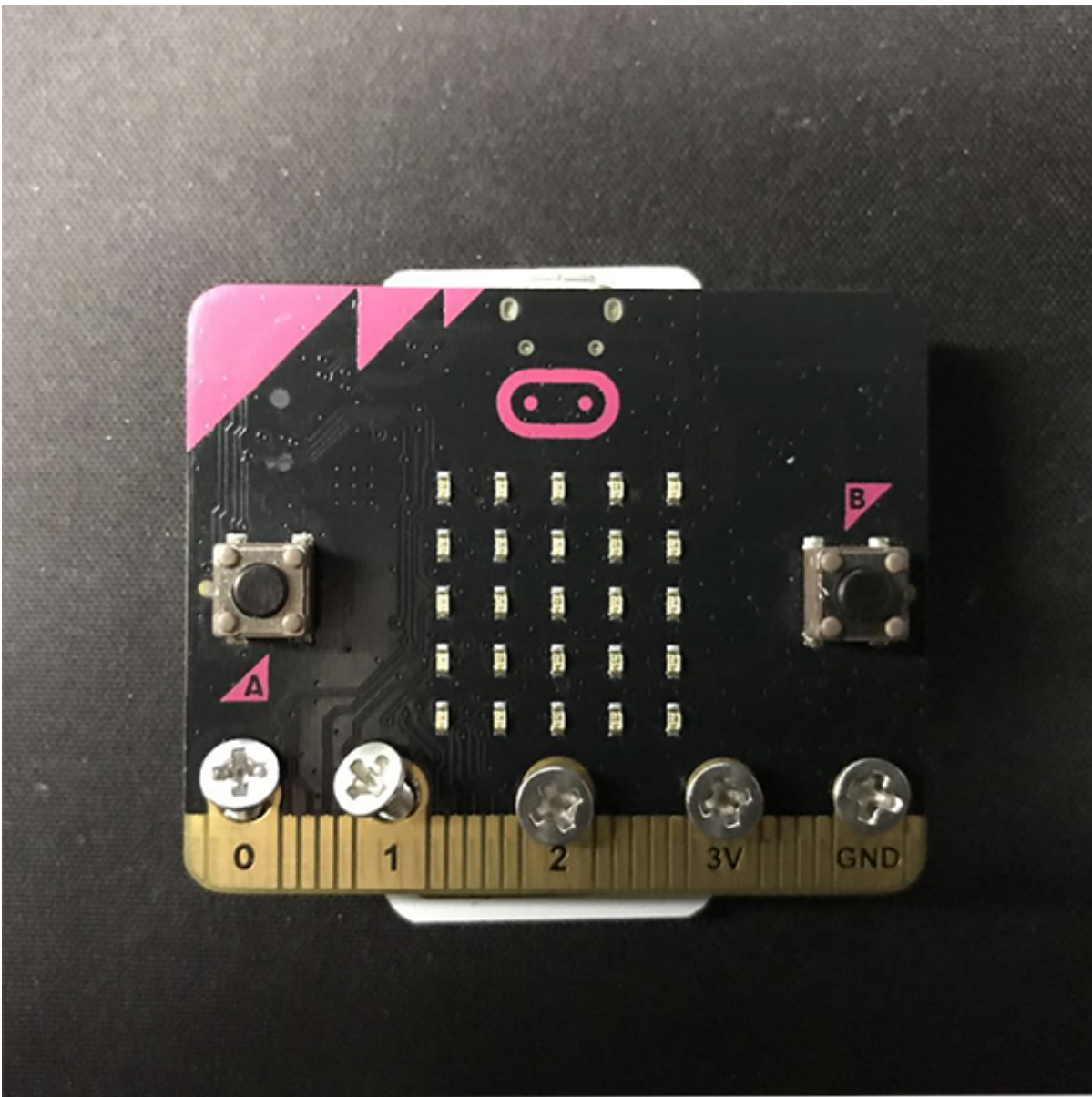
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### Hardware Connection

Install two 3V 2025 button cells to the battery holder of the Wear:bit extension board.



Fix the micro:bit to the button cell extension board Pro with screws.



When switching on, the cells give power to the micro:bit and the Wear:bit, or the cells do not give power.

microbitKit\smart\_coding\_kit\./images/wear\_bit\_06.png

If slide the buzzer switch to the left side, the buzzer begins working; while to the right side, the buzzer stops working.

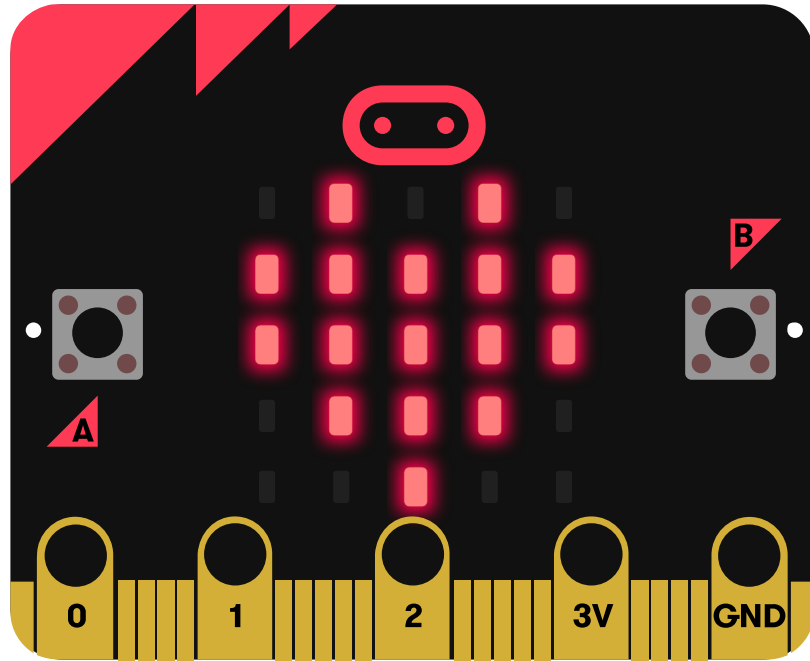
microbitKit\smart\_coding\_kit\./images/wear\_bit\_07.png

## Software Programming

Open Makecode, programme to make micro:bit show heart in a flash way.

Link: [https://makecode.microbit.org/\\_MP28fbDmUMfz](https://makecode.microbit.org/_MP28fbDmUMfz)

You can also download it below:



## Result

A flash heart pattern is showing on the micro:bit.

## 2.7. FAQ

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## 3. Case 01: Connect Scratch-Windows

### 3.1. Goal

- Connect Scratch with Smart Coding Kit.

### 3.2. Materials

- 1 x Smart Coding kit
- 1 x computer(support Bluetooth)


System Version (Windows 10 version 1709+) (macOS 10.13+)

Bluetooth Version (Bluetooth 4.0)

### 3.3. Background

#### What is Scratch ?

- [Scratch](#) is a graphical programming tool developed by Lifelong Kindergarten Group from MIT, it suits for teenagers.

 [https://gss1.bdstatic.com/-vo3dSag\\_xl4khGkpoWK1HF6hhy/baike/c0%3Dbaike80%2C5%2C5%2C80%2C26/sign=df7338639f8fa0ec6bca6c5f47fe328b](https://gss1.bdstatic.com/-vo3dSag_xl4khGkpoWK1HF6hhy/baike/c0%3Dbaike80%2C5%2C5%2C80%2C26/sign=df7338639f8fa0ec6bca6c5f47fe328b)

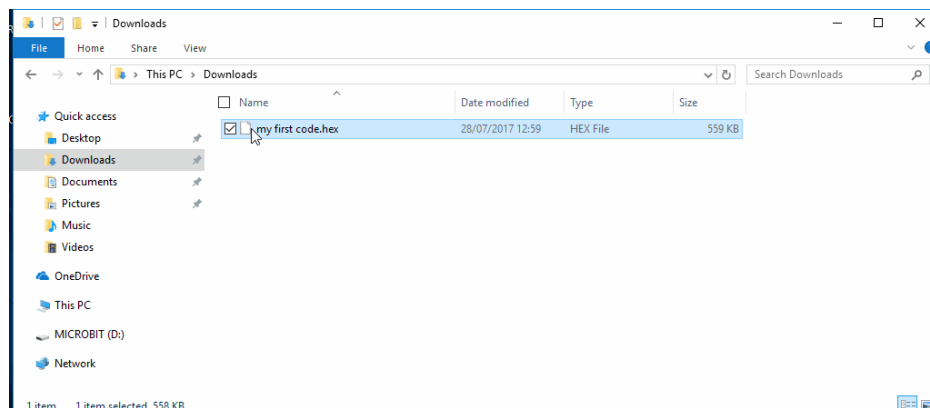
### 3.4. Software

- Scratch online programming link: <https://scratch.mit.edu/projects/editor>
- Scratch software download: <https://scratch.mit.edu/download>]  
(<https://scratch.mit.edu/download>)
- Both the software and the online version are acceptable, you can choose one.
- Scratch Link (Windows): <https://downloads.scratch.mit.edu/link/windows.zip>
- Scratch Link (macOS): <https://downloads.scratch.mit.edu/link/mac.zip>
- micro:bit firmware: <https://downloads.scratch.mit.edu/microbit/scratch-microbit-1.1.0.hex.zip>

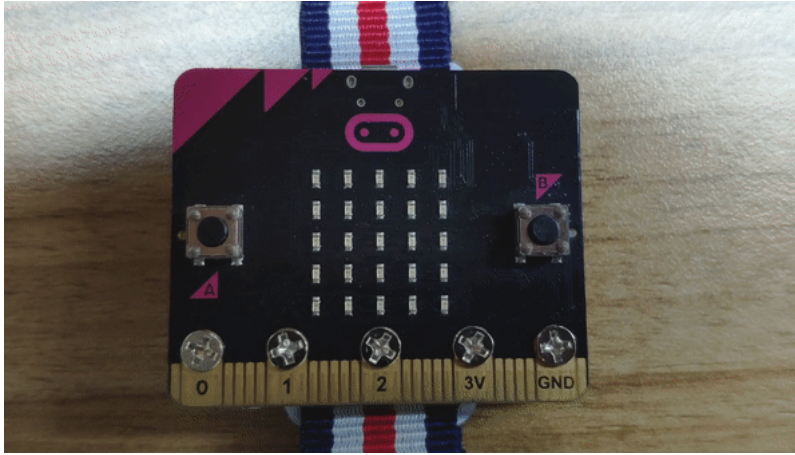
### 3.5. Connection Steps

#### Step 1

- Connect the micro:bit to your computer and send the prepared micro:bit firmware to the micro:bit.

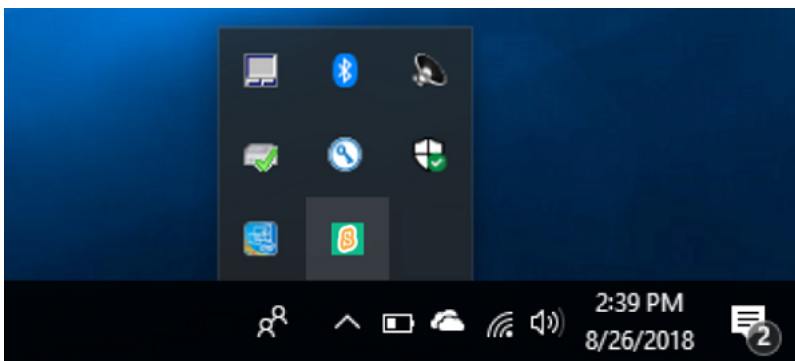



- Give power to micro:bit solely and the displaying characters on the micro:bit is the identification code for Bluetooth.

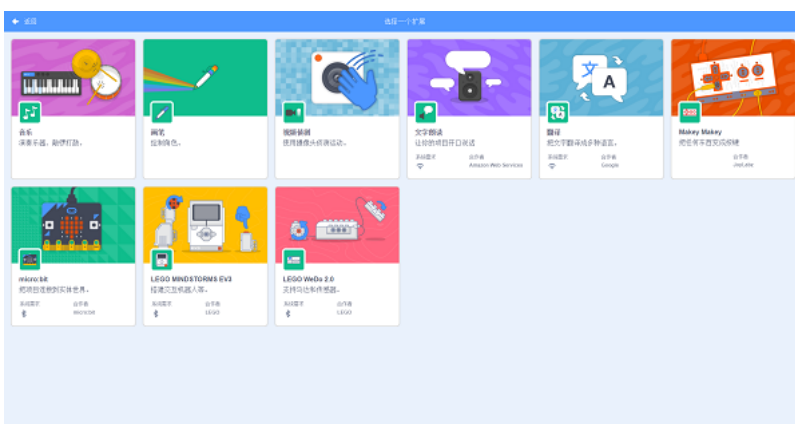
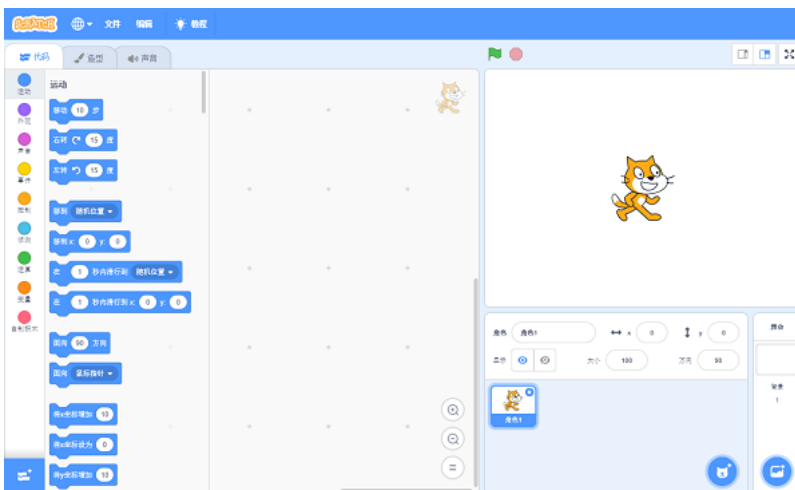


## Step 2

- Open Scratch Link and you will see an icon of it on the status bar.



- Open the Scratch coding software, choose micro:bit expansion after clicking  on the left bottom.



- Choose your micro:bit in the pop-up dialogue box.



### 3.6. Complete

- If connection is completed, the yellow exclamation mark changes to a green check mark.
- Now you can code the micro:bit with Scratch!



### 3.7. FAQ

#### Fail to connect Scratch

1. The lowest operation system version is listed at the top of this page.
2. Only one copy of the scratch can be connected to the micro:bit. If you have open the Scratch in other browsers, please close all of them and re-try.
3. If there is another computer connecting to your micro:bit, please cut off the connection with another computer or yours, and re-try.
4. You might press the “reset” button between the USB connector and power supply connector on the back of the micro:bit while operating it, make sure your hands or feet be away from it!

### 3.8. Relevant Files



Scratch official connection files: <https://scratch.mit.edu/microbit>](<https://scratch.mit.edu/microbit>)

Scratch official website: <https://scratch.mit.edu>

## 4. Case 02: Dice

### 4.1. Purpose

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- Use the Smart Coding Kit to make a wearable dice.

### 4.2. Materials

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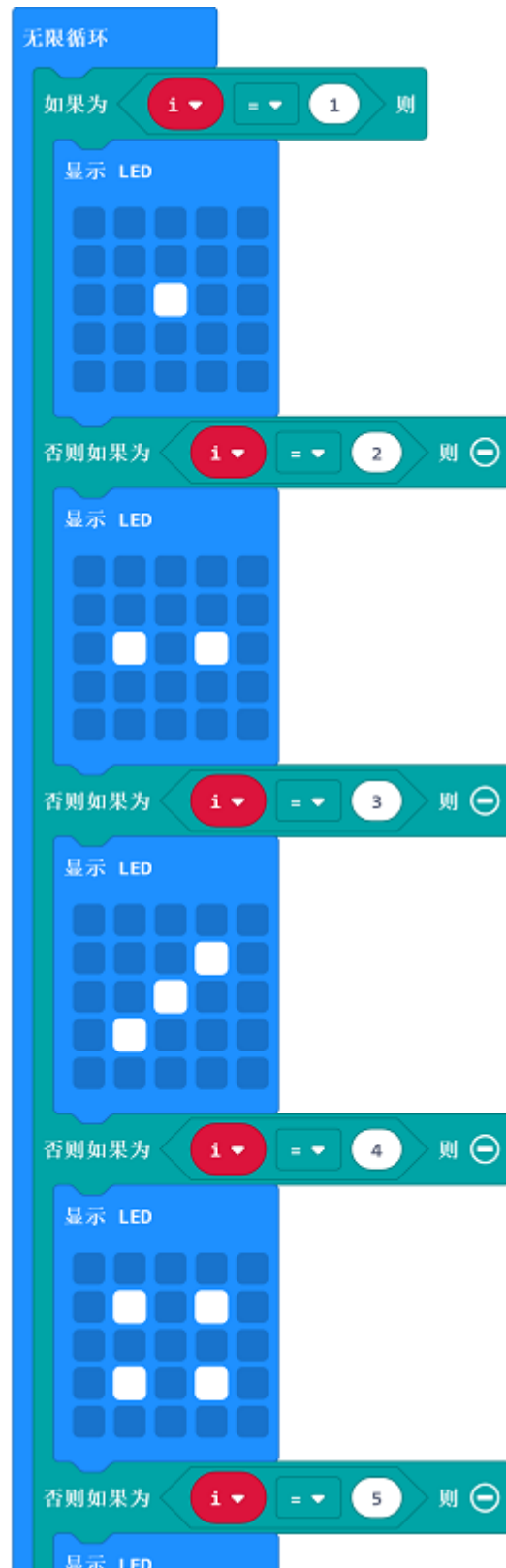
- 1 x smart coding kit

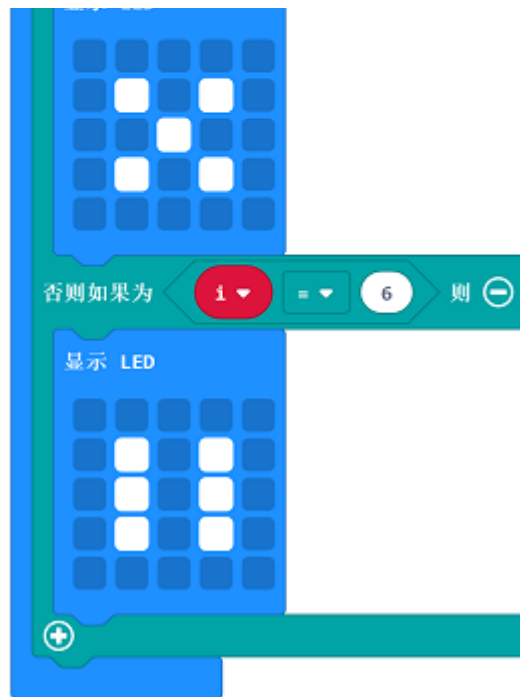


### 4.3. Software

## 4.4. Programming

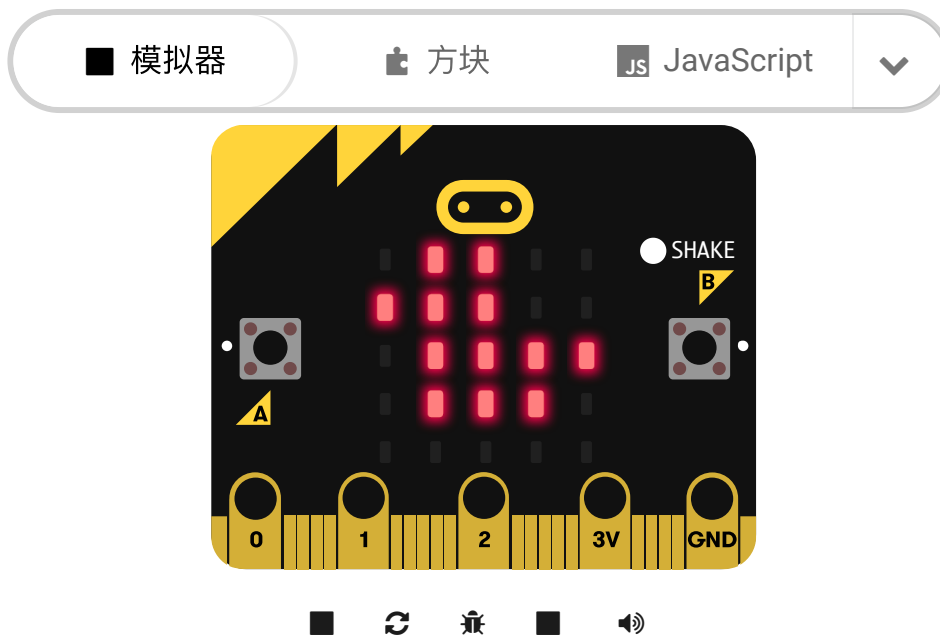
- Drag out an `on shake` block from `input`. Create a variable `num` and assign value to this variable with a random number among 1-6.
- Insert a `if` block. If the picked random number is 0, then display one point. If the random number is 2, then display two points. And so on.





## Link

- Link: [https://makecode.microbit.org/\\_hiRiC6PPT4Pd](https://makecode.microbit.org/_hiRiC6PPT4Pd)
- You can also download it directly below:



## 4.5. Result

- A random number will be created each time when we shake our micro:bit.

## **4.6. Exploration**

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## **4.7. FAQ**

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## **4.8. Relevant File**

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## 5. Case 03: Thermometer

### 5.1. Purpose

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- Use the Smart Coding Kit to create a wearable thermometer.

### 5.2. Materials

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- 1 x smart coding kit



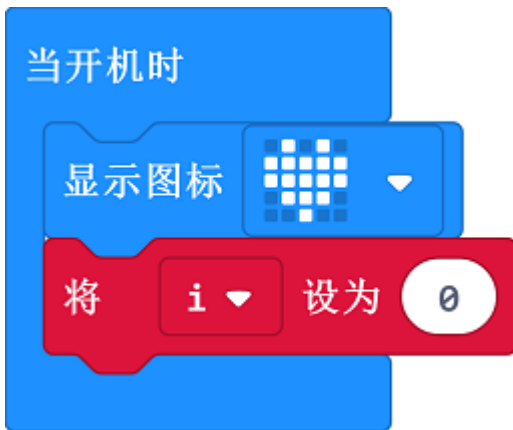
### 5.3. Software

## 5.4. Programming

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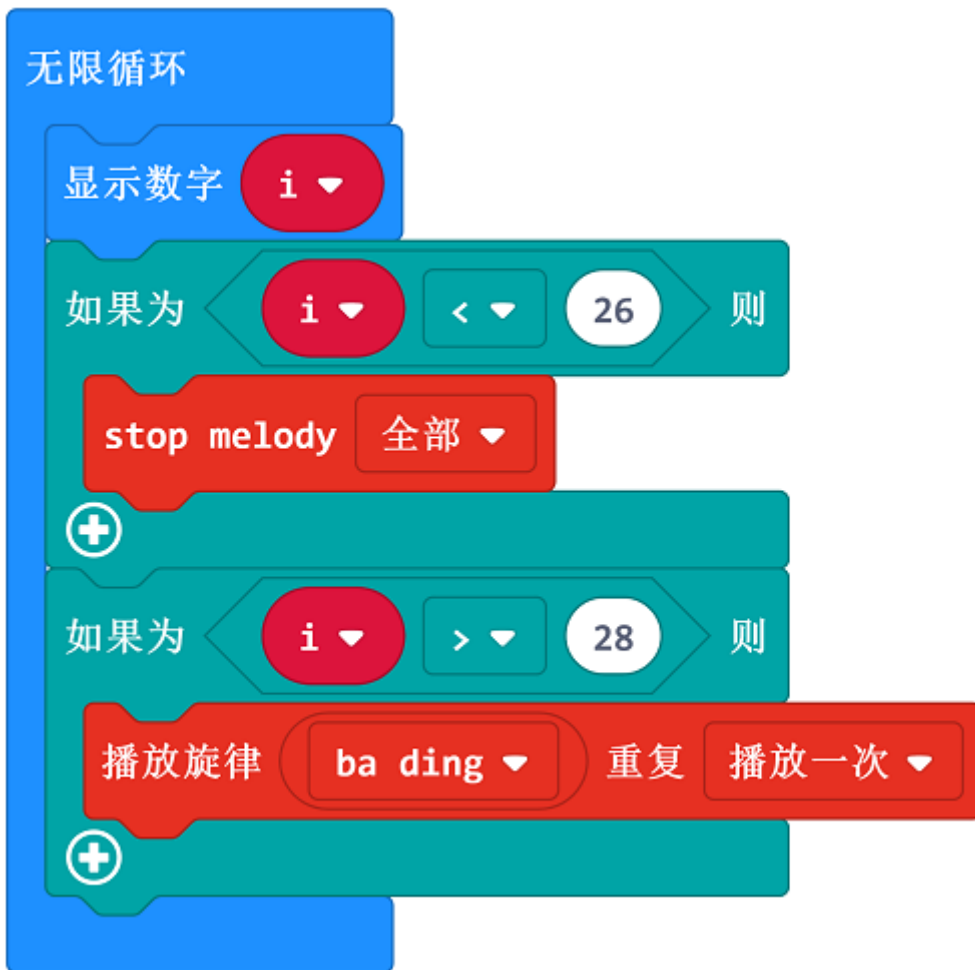
### Step 1

- Create a variable `flag`. Initialize this variable to 0 when we startup our micro:bit.



### Step 2

- Create a `forever` loop to show the variable `i`. If it is over the default value, it alarms; Or it does not alarm.



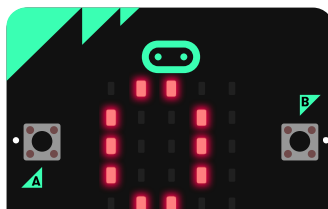
### Step 3

- When button A being pressed, set the returned value as `i` displaying on the micro:bit.

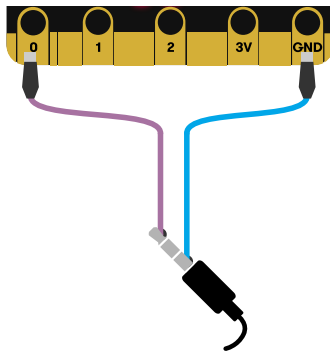


### Link

- Link: [https://makecode.microbit.org/\\_hR9djPETmd38](https://makecode.microbit.org/_hR9djPETmd38)
- You can also download it below:







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## 5.5. Result

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- The current value will be detected and displayed on the micro:bit when button A being pressed.

## 5.6. Exploration

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## 5.7. FAQ

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Q: Sometimes the temperature is below 20 degrees, but the value detected is even higher?

A: The temperature detected is the micro:bit chips but not the environment, the chips will get hot obviously when powering on for a long time.

## 5.8. Relevant File

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## 6. Case 04: Counter

### 6.1. Purpose

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- Use the Smart Coding Kit to create a wearable counter.

### 6.2. Materials

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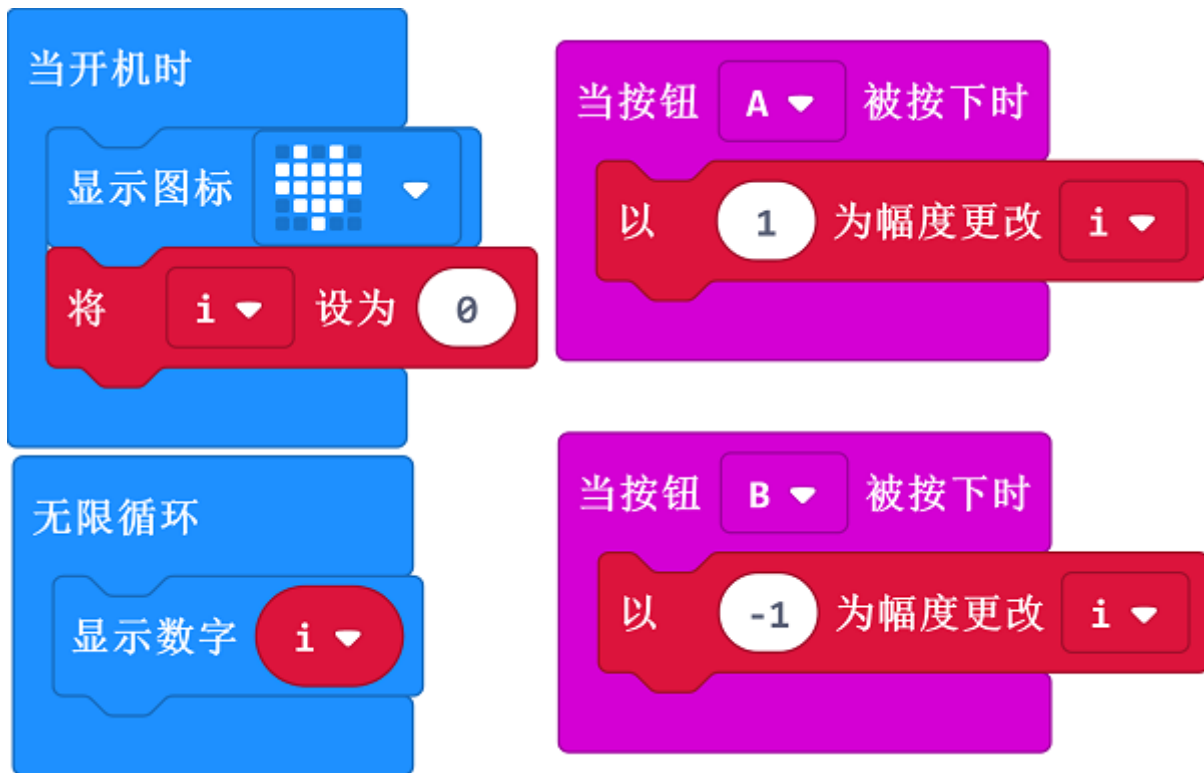
- 1 x smart coding kit



### 6.3. Software

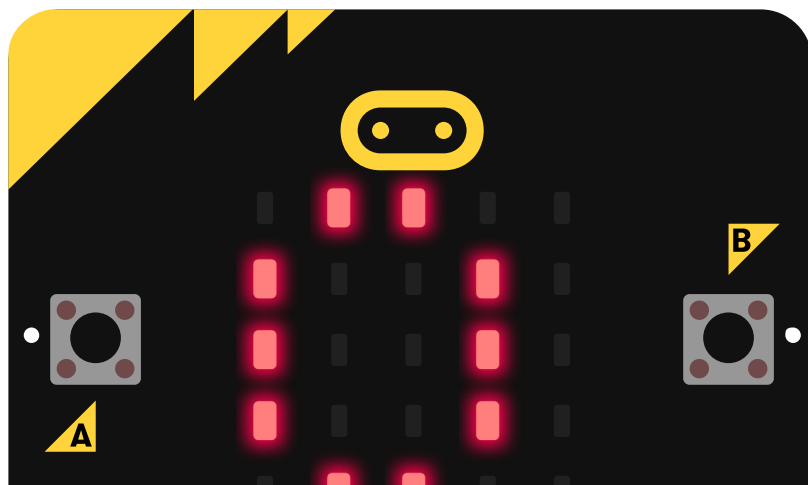
## 6.4. Programming

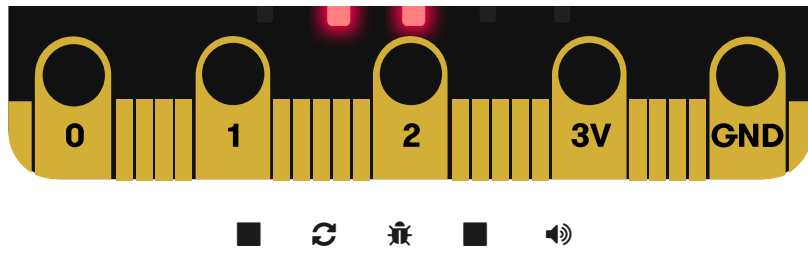
- Programme to show icon while on start and set the variable `i` as 0; Set  $i=i+1$  while button A being pressed, Set  $i=i-1$  while button B being pressed. Drag the show digital block to the Forever block and choose to display `i` of the value of the variable.



### Link

- Link: [https://makecode.microbit.org/\\_foxcuohURfzb](https://makecode.microbit.org/_foxcuohURfzb)
- You may also download it directly below:





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## 6.5. Result

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- Start counting and displaying the results through button A or B.

## 6.6. Exploration

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## 6.7. FAQ

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## 6.8. Relevant File

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## 7. Case 05: Pedometer

### 7.1. Purpose

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- Use the Smart Coding Kit to create a wearable pedometer.

### 7.2. Materials

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- 1 x smart coding kit



### 7.3. Software

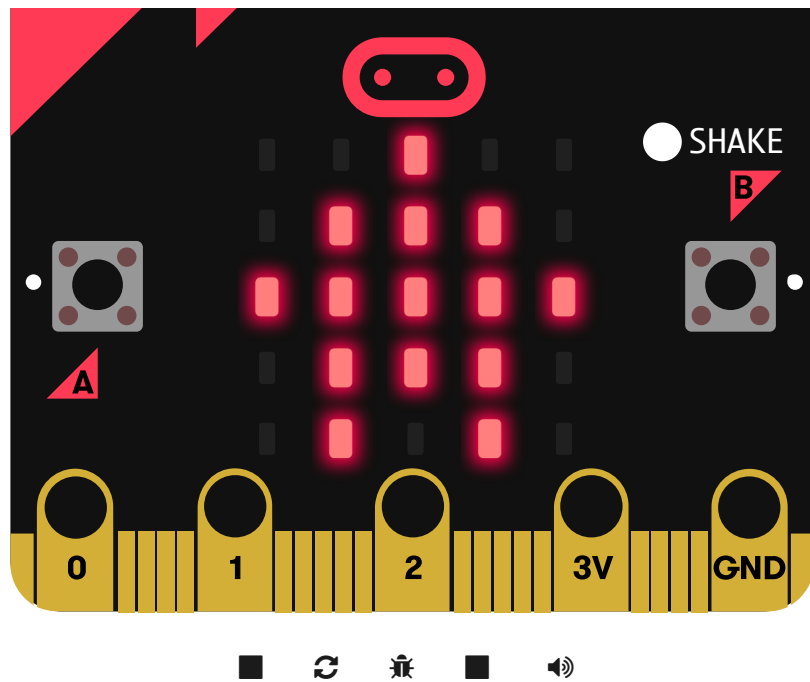
## 7.4. Programming

- Show the preset icon while on start; Set  $i=i+1$  while on shake and display the value of the variable `i`; set `i` as 0 while button A being pressed and display the value of `i` at the same time.



### Link

- Link: [https://makecode.microbit.org/\\_LKJM7kAaw58M](https://makecode.microbit.org/_LKJM7kAaw58M)
- You can also download it directly below:



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## 7.5. Result

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While detecting the shake, the displaying number will add up 1 automatically for each time being detected, and the value will be back to 0 once button A being pressed.

## 7.6. Exploration

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## 7.7. FAQ

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## 7.8. Relevant File

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## 8. Case 06: Compass

### 8.1. Purpose

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- Use the Smart Coding Kit to create a wearable compass.
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### 8.2. Materials

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- 1 x smart coding kit

### 8.3. Software

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MakeCodemakecode

### 8.4. Programming

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- Save the returned value of the compass direction as variable `i` and judge it, if `i < 45` or `i > 315`, display "N"; if `i < 135`, display "E"; if `i < 225`, display "S", or display "W".

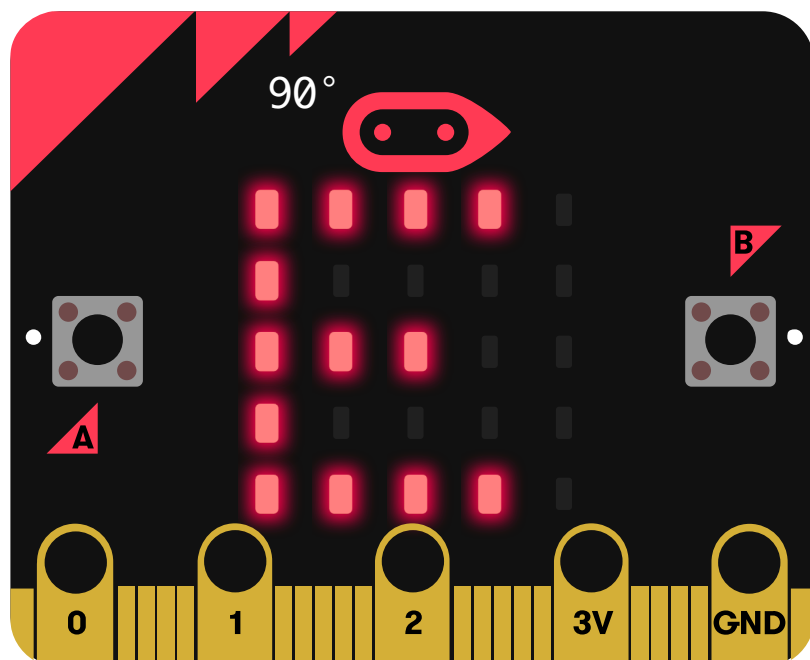


```
无限循环
  将 i 设为 指南针朝向 (°)
  如果为 i < 45 或 i > 315 则
    显示字符串 "N"
  否则如果为 i < 135 则
    显示字符串 "E"
  否则如果为 i < 225 则
    显示字符串 "S"
  否则
    显示字符串 "W"
```

## Link

- Link: [https://makecode.microbit.org/\\_H0DEUV74dKg0](https://makecode.microbit.org/_H0DEUV74dKg0)
- You can also download it directly below:

■ 模拟器    方块    JS JavaScript    编辑



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## 8.5. Result

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The current direction displays on the micro:bit.

## 8.6. Exploration

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## 8.7. FAQ

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## 8.8. Relevant File

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## 9. Case 07: Wireless Communication

### 9.1. Purpose

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- Use the Smart Coding Kit to send signals.

### 9.2. Materials

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- 2 x smart coding kits



### 9.3. Software

## 9.4. Programming

### Step 1

- Sending end
- Show icon
- Set the wireless group
- Send number 1 when button A being pressed
- Send number 2 when button B being pressed



### Step 2

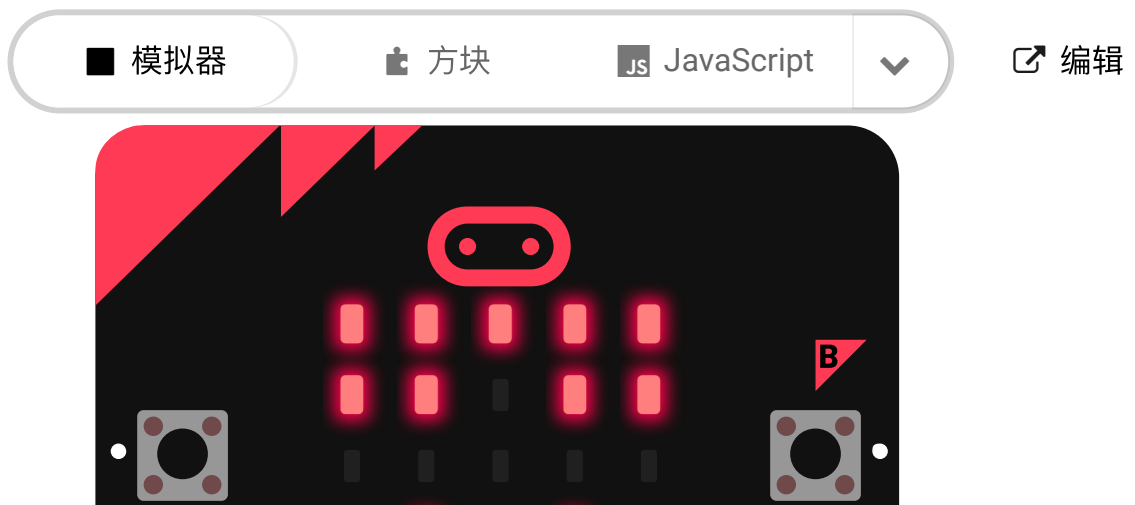
- Receiving end
- Show icon
- Set the wireless group

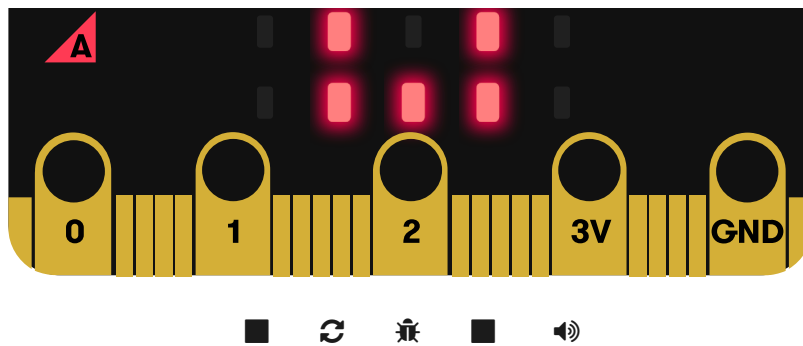
- Save the received number as variable i
- Judge the received number and display the icon accordingly.



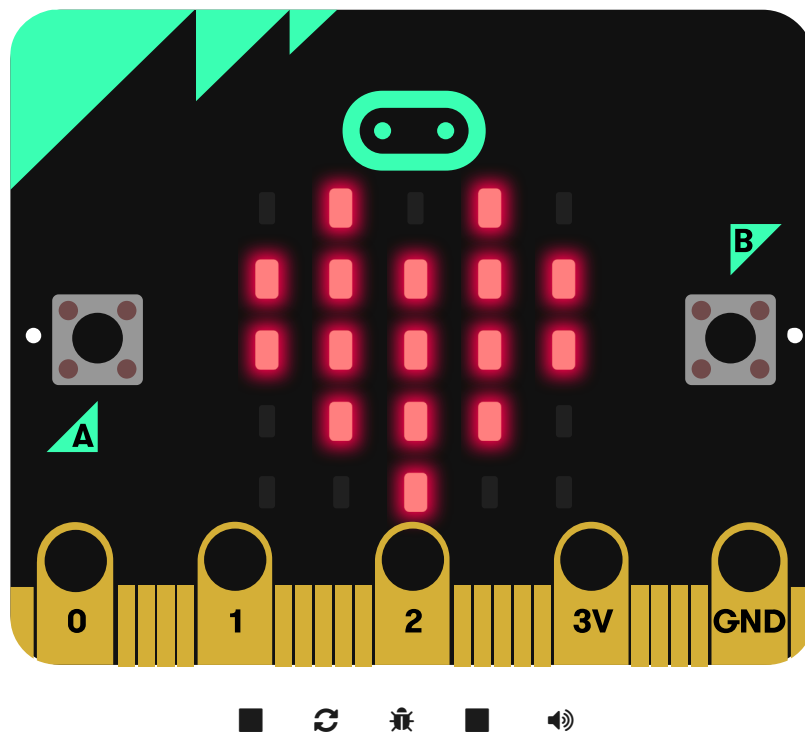
## Link

- Sending end
- Link: [https://makecode.microbit.org/\\_ix81uXcAULqW](https://makecode.microbit.org/_ix81uXcAULqW)
- You can also download it directly below:





- Receiving end - Link: [[https://makecode.microbit.org/\\_WpqdARYUXWMj](https://makecode.microbit.org/_WpqdARYUXWMj)]  
([https://makecode.microbit.org/\\_WpqdARYUXWMj](https://makecode.microbit.org/_WpqdARYUXWMj)) - You can also download it directly below:



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## 9.5. Result

- While button A or B in the sending end being pressed, an icon of  or  displays on the receiving end.

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## 9.6. Exploration

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## 9.7. FAQ

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## 9.8. Relevant File





## 10. Case 08: Play the Music

### 10.1. Purpose

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- Use the Smart Coding Kit to play a music.

### 10.2. Material

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- 1 x smart coding kit



### 10.3. Software

## 10.4. Programming

- Show the icon when on start
- While button A being pressed, it plays the music of “Happy Birthday”.
- While button B being pressed, it plays the music that you set.



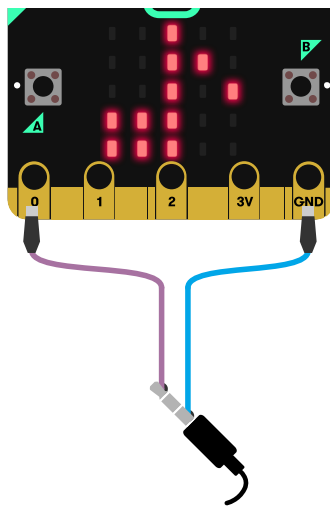
### Link

- Link: [https://makecode.microbit.org/\\_D2JPv158u5o8](https://makecode.microbit.org/_D2JPv158u5o8)
- You can also download it directly below:

■ 模拟器    方块    JS JavaScript    ▼

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## 10.5. Result

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- Show the icon when on start
- While button A being pressed, it plays the music of “Happy Birthday”.
- While button B being pressed, it plays the music that you set.

## 10.6. Exploration

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## 10.7. FAQ

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## 10.8. Relevant File

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## 11. SCase 09: Countdown

### 11.1. Purpose

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- Use the Smart Coding Kit to create a countdown machine.

### 11.2. Material

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- 1 x smart coding kit



### 11.3. Software

## 11.4. Programming

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- Show the icon while on start and set the variable `i` as 9.
- While button A being pressed, set the variable `i` as 9.
- While button B being pressed, start the countdown and display the icon when it comes to 0.

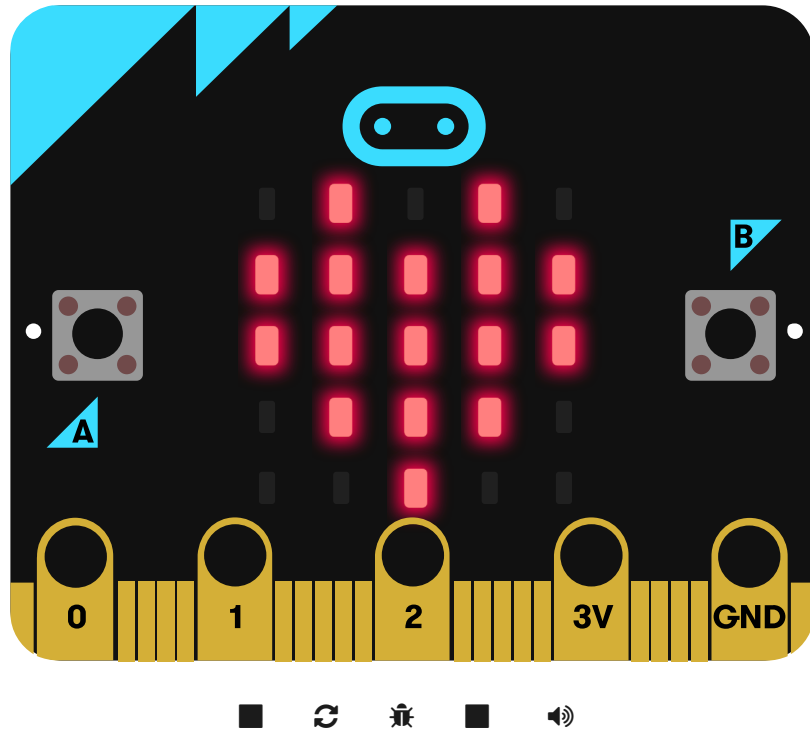
```
当开机时
  显示图标 [ 图标 ]
  将 i 设为 9

当按钮 A 被按下时
  将 i 设为 9
  显示数字 i

当按钮 B 被按下时
  当条件为 i > 0
    执行
      以 -1 为幅度更改 i
      暂停 (ms) 1000
      显示数字 i
  显示图标 [ 图标 ]
```

## Link

- Link: [https://makecode.microbit.org/\\_e5CWK5DbUaqY](https://makecode.microbit.org/_e5CWK5DbUaqY)
- You can also download it directly below:



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## 11.5. Result

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- Show the icon while on start
- While button A being pressed, the number 9 displays on the micro:bit
- While button B being pressed, the countdown starts and number 0 displays on the micro:bit

## 11.6. Exploration

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## 11.7. FAQ

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## 11.8. Relevant File

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## 12. Case 10: Finger-guessing game

### 12.1. Purpose

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- Use the Smart Coding Kit to create a finger-guessing game

### 12.2. Material

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- 1 x smart coding kit



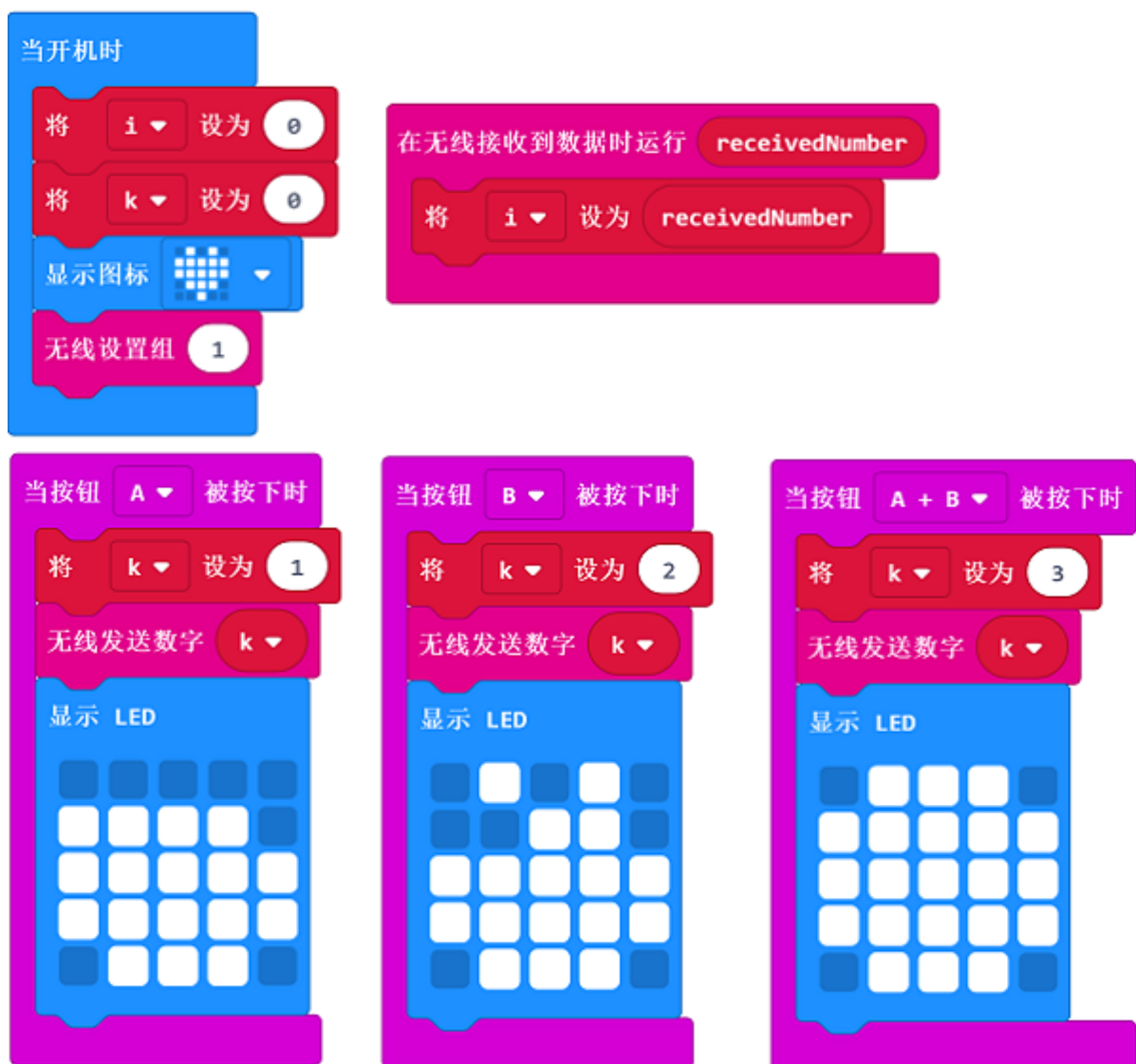
### 12.3. Software



## 12.4. Programming

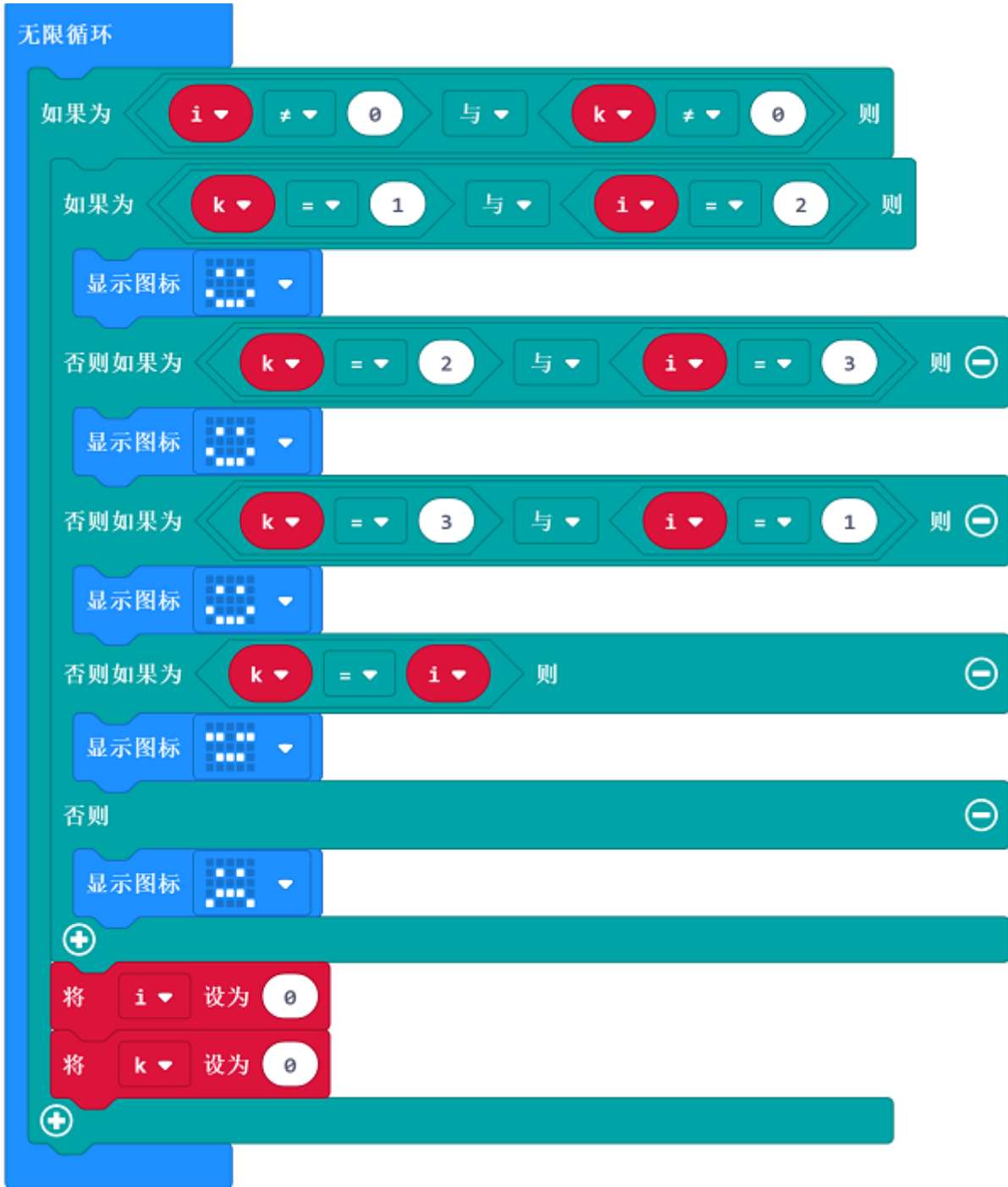
### Step 1

- Set both the variables “i” and “k” as 0 and show the on start icon
- Set the wireless group
- While pressing button A or/and B, set the variable “k” as the equivalent number and send it to show the icon accordingly
- After receiving the data, save the data as variable “i”



### Step 2

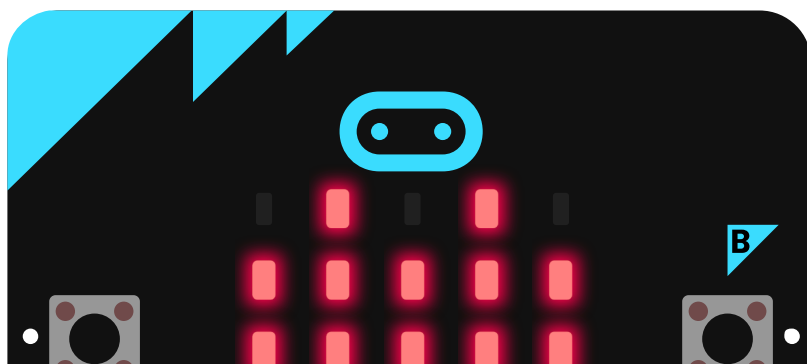
- In the Forever block, judge the value of “i” and “k”, if they are not 0, it means both the players give a “fist”
- The winner will be judged by the comparasion of “i” and “k”
- Set both the variables “i” and “k” as 0 and be prepared for the next round

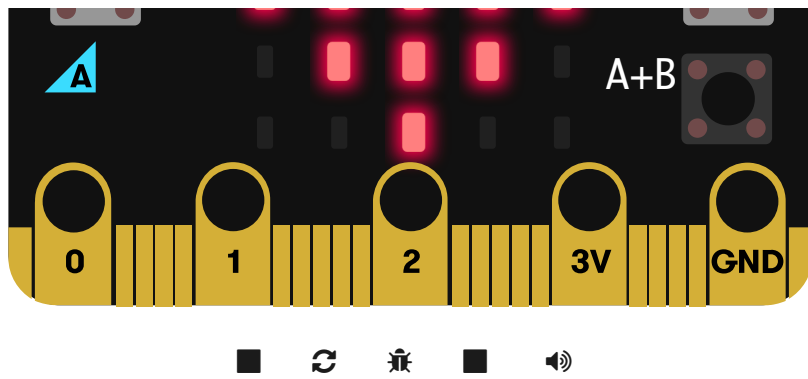


## Link

- Link: [https://makecode.microbit.org/\\_0HpEjy3Dj8vY](https://makecode.microbit.org/_0HpEjy3Dj8vY)
- You can also download it directly below:

■ 模拟器
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JS JavaScript
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## 12.5. Result

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Choose to give a “fist” through button A or/and B, the results will be given accordingly, the winner has a smile face and the loser has a cry face on the micro:bit.

## 12.6. Exploration

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## 12.7. FAQ

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## 12.8. Relevant File

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