

LROB RUYA

Micro bit starter kit master

A collection of various electronic components and modules, including a breadboard, integrated circuits, resistors, capacitors, LEDs, a motor, a fan, a USB cable, and a power supply unit.



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Preface

Company Profile

Founded in 2014, Shenzhen Lonten Technology Co., Ltd. focuses on the design, research production of Electronics Module for robotics related products. Consisting of professional researchers and skilled engineers, our R&D team constantly strives for creative function and excellent user experience. The company's R&D investments on arduino kits raspberry pi kits, as well as 3D printer and robots that back up STEAM education.

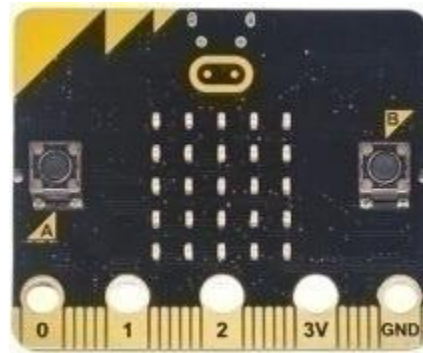
Customer Service

Our self-owned factory is certificated with BSCI and SO, covering an area of 5,000 square meters, and achieving an annual production capacity of over 10,000 units. Our products are all certified to CE, FCC, and ROHS standards, have exported to more than 100 countries including, but not limited to France, the United States of America, Australia, Russia, the United Kingdom, Germany, Singapore, Egypt, and India, bringing technological innovation to all walks of life.

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Micro:bit

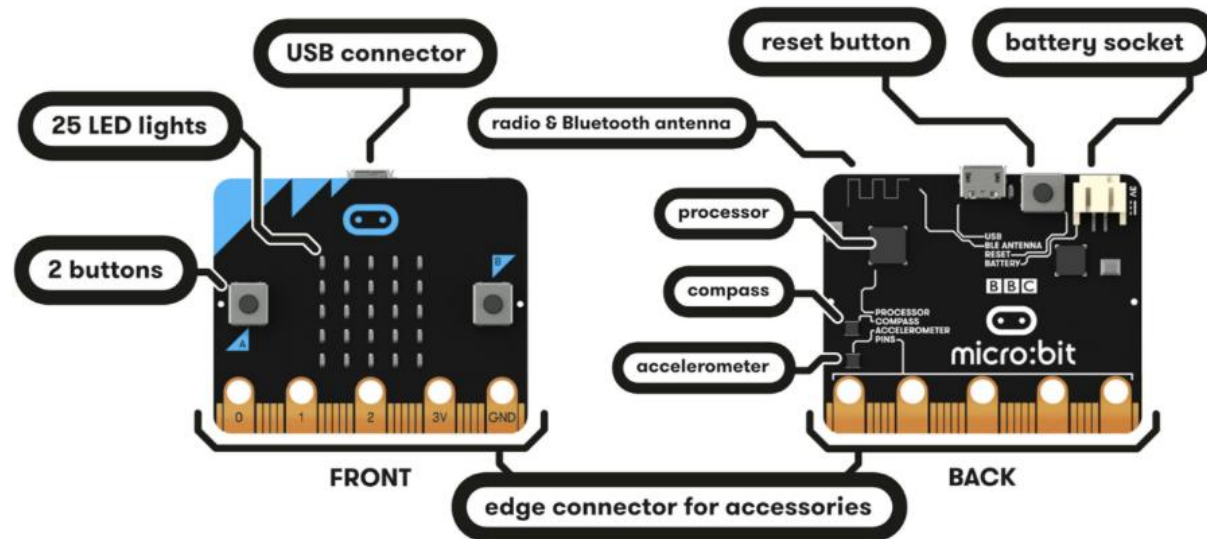
This chapter is the Start Point in the journey to build and explore Micro:bit electronic projects.



The BBC micro:bit is a pocket-size, programmable micro-computer that can be used for all sorts of cool creations, from robots to musical instruments the possibilities are infinite.

For more contents, please refer to: <https://microbit.org/guide/>

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Your micro:bit has the following physical features:

- 25 individual programmable LEDs
- 2 programmable buttons
- Physical connection pins
- Light and temperature sensors



-
- Motion sensors (accelerometer and compass)
 - Wireless Communication, via Radio and Bluetooth
 - USB interface

For more details, please refer to: <https://microbit.org/guide/features/>

It is not required for beginners to master this section, but a brief understanding is necessary. However, if you want to be a developer, hardware information will be very helpful. Detailed hardware information about micro:bit can be found here:

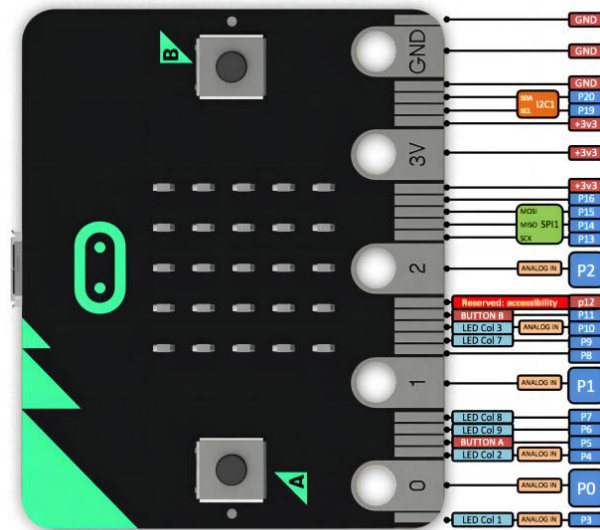
<https://tech.microbit.org/hardware/>

First, get to know the micro:bit GPIO.



GPIO

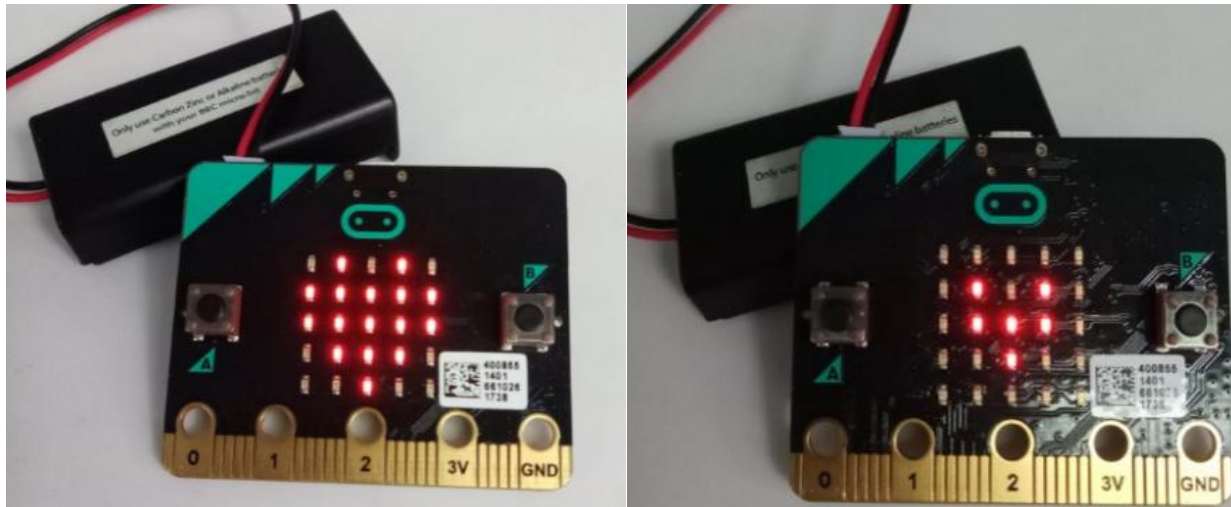
GPIO, namely General Purpose Input/output Pins, is an important part of micro:bit for connecting external devices. All sensors and devices on Rover communicate with each other through micro:bit GPIO. The following is the GPIO serial number and function diagram of micro:bit:



Lesson 1 Heart beat

Learning goals

Showing a big heart sharp on LED matrix firstly, and showing small heart later, this cycle looks like heart beat.



Preparation

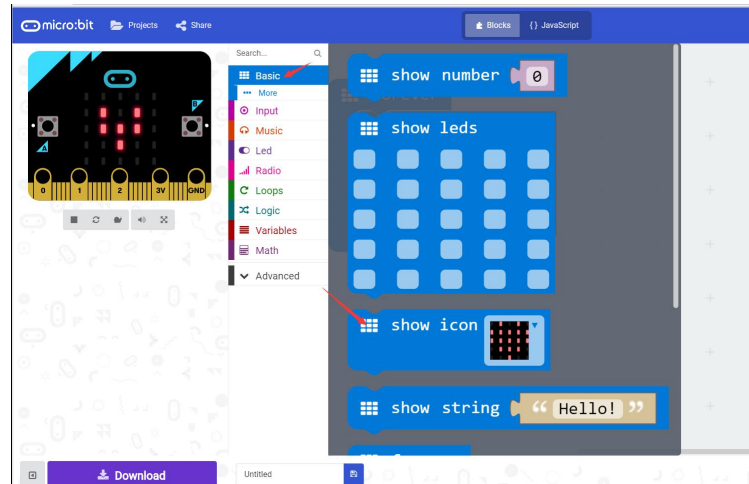
Hardware:

LROBRUYA

- 1 X Micro: bit Board
- 1 X Micro USB Cable
- 2 X AAA batteries

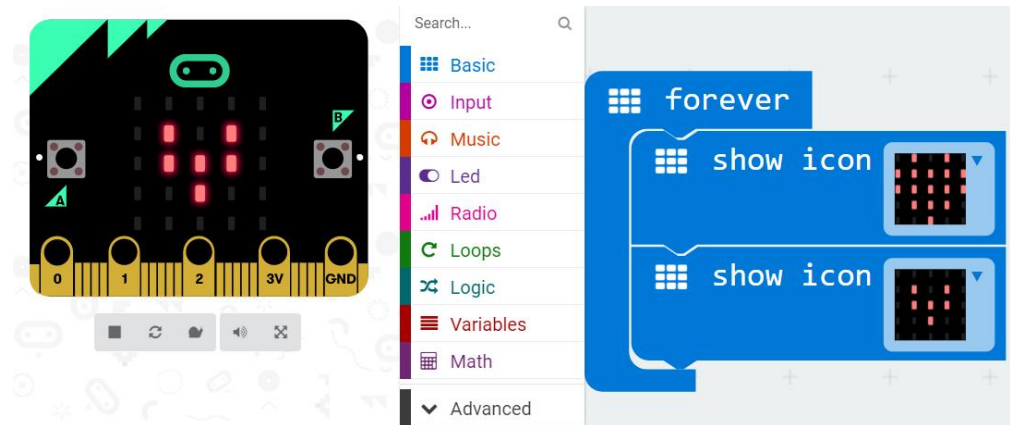
Then the micro:bit is connected to the computer through USB, and the computer will pop up a U disk and click the URL in the U disk to enter the programming interface.

Search for blocks



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Combine blocks



Have a try

Do you learn the course today?

If you learn to do it, give yourself a top quack.

Now give you a homework assignment.

On the micro:bit LED lattice that we just finished the heart beat, we light a circle, a triangle, a rectangle.

Start your little brain. Try it.

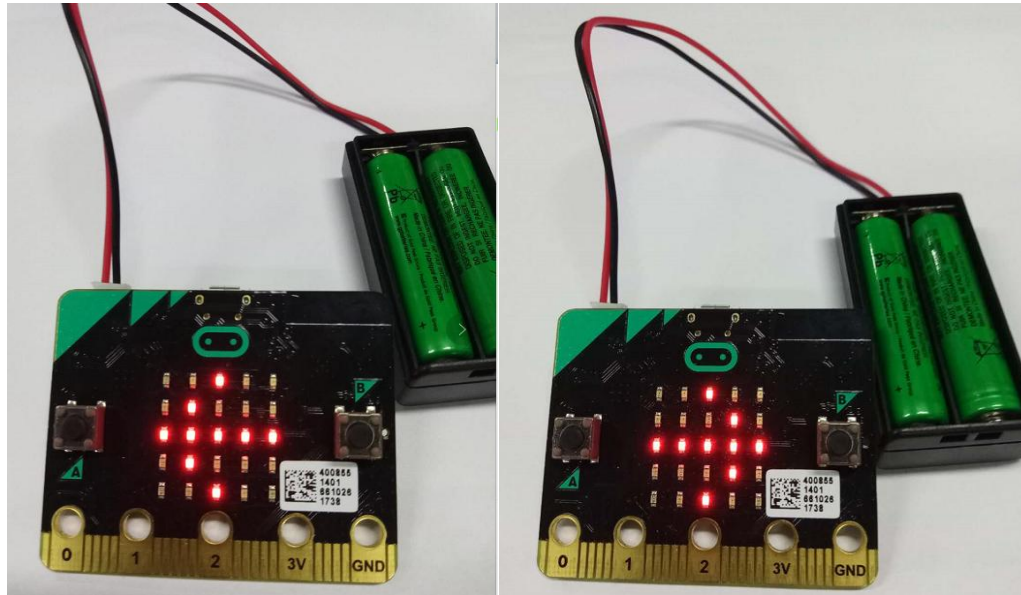


Lesson 2 See who is pressing fast

Learning goals

When you download a good program, call your little partner to play. One is standing on the A key, and the other is standing on the B button. And then you count down 3,2,1 and press the button together. If the A button is pressed first, there will be an arrow pointing to the A button on the dot matrix. If the B button is pressed first, there will be an arrow pointing to the B button on the dot matrix. If it is pressed at the same time, it will show a love on the dot matrix.

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Preparation

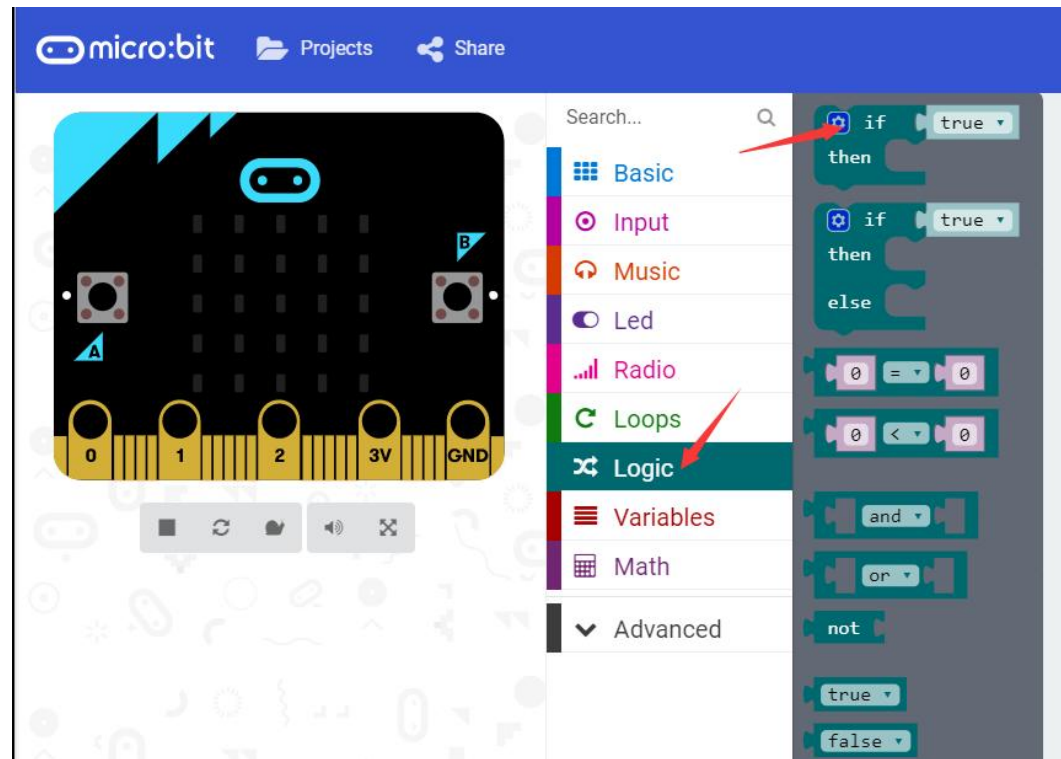
Hardware:

- 1 X Micro: bit Board
- 1 X Micro USB Cable
- 2 X AAA batteries

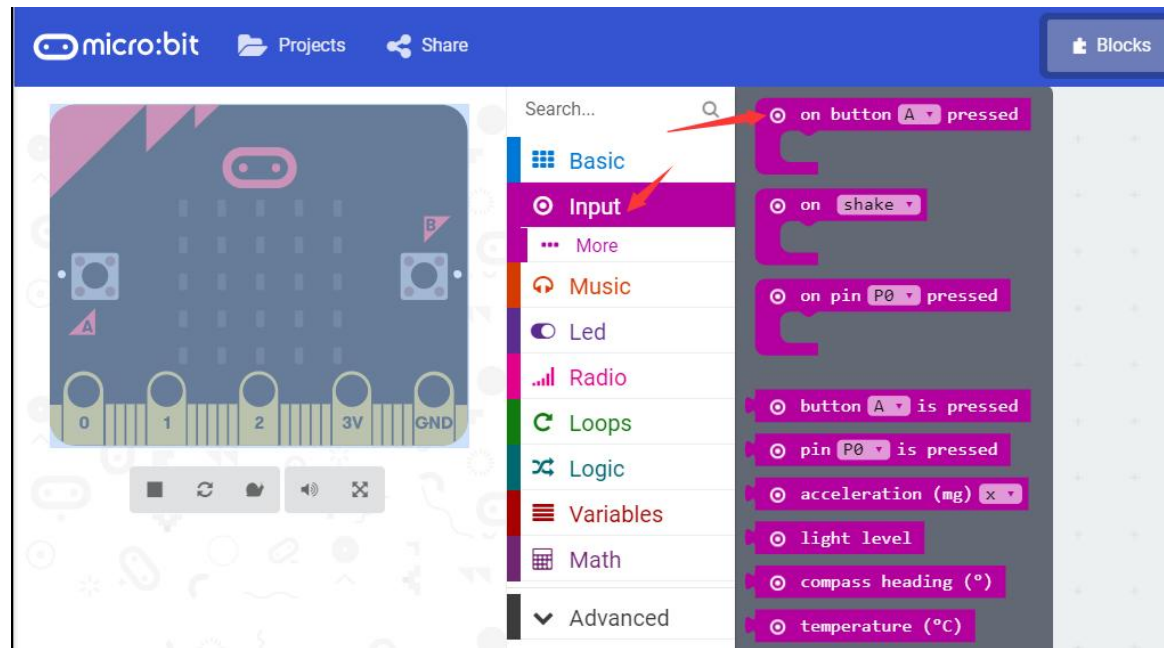
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Then the micro:bit is connected to the computer through USB, and the computer will pop up a U disk and click the URL in the U disk to enter the programming interface.

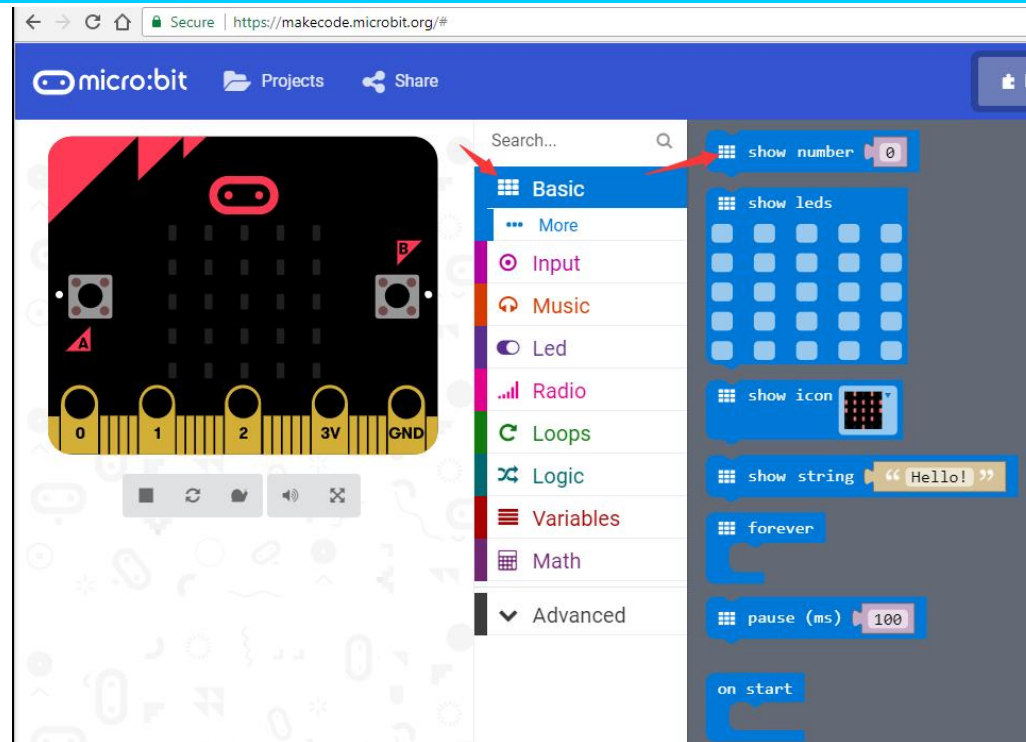
Search for blocks



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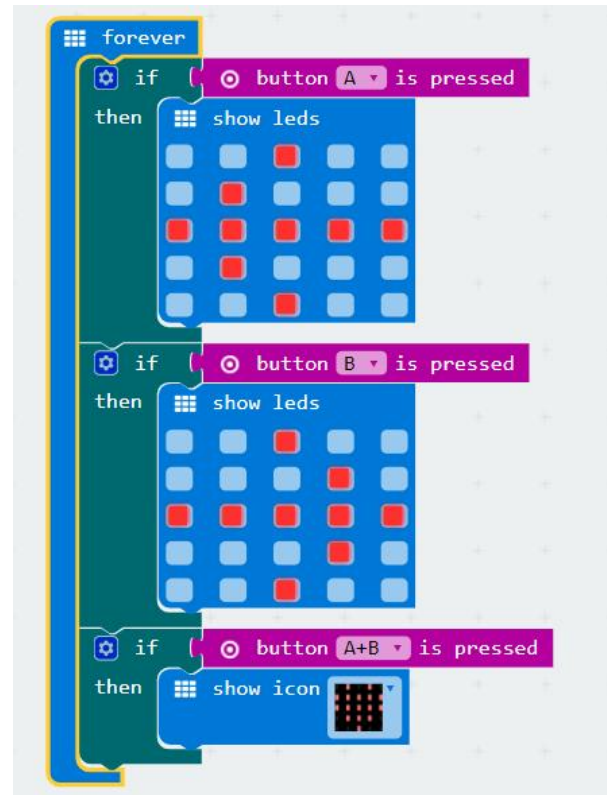


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Combine blocks





Have a try

Do you learn the course today?

If you learn to do it, give yourself a top quack.

Now give you a homework assignment.

On the micro:bit dot matrix, press the A button, the heart starts to beat, press the B button, and the heart stops beating. You can relate the content of this lesson to the first lesson.

Start your little brain. Try it.

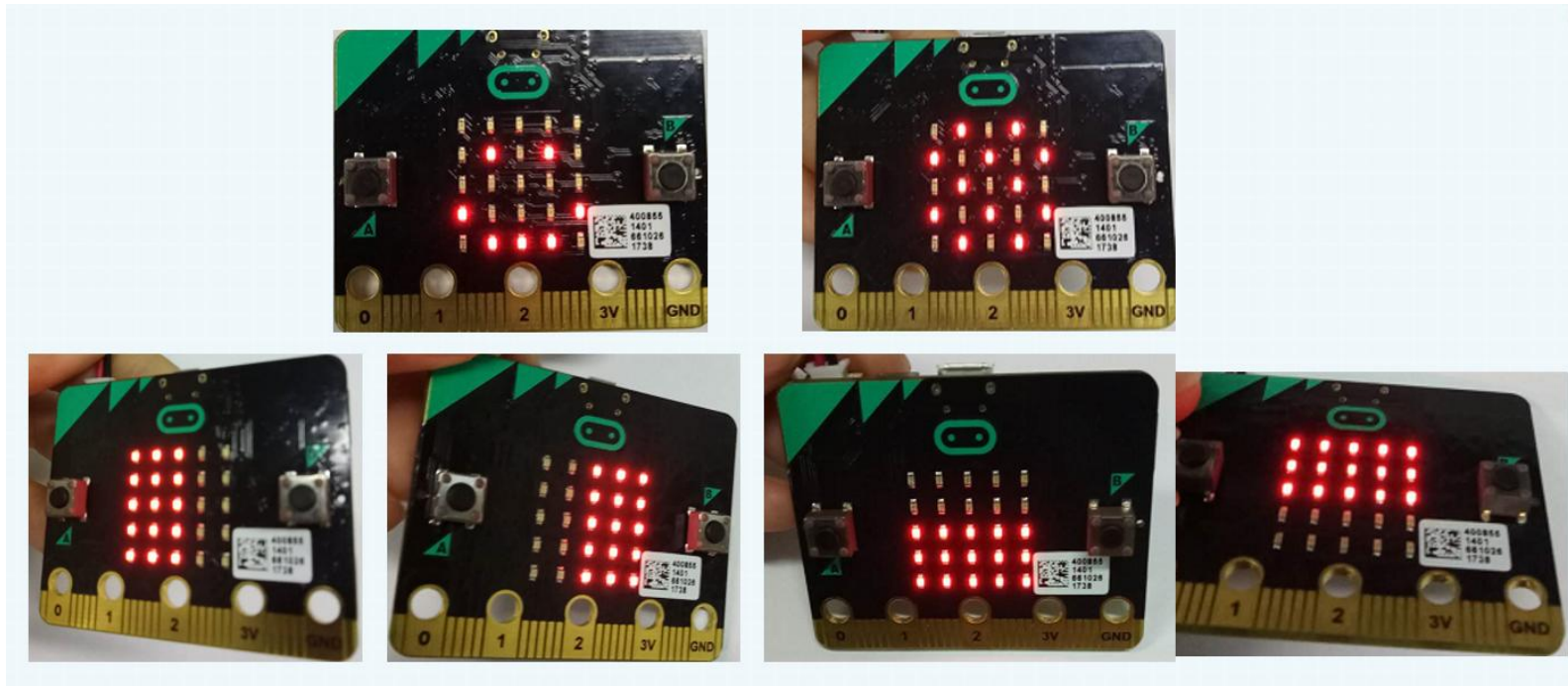
Lesson 3 Flowing sand

Learning goals

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When you download the program, the micro:bit board will show a smile first when it is put up (the dot matrix is facing up).

Shake can show a plate of sand. Tilt to the left and the sand sink to the left, tilt right and to right, tilt down and to the bottom, tilt to up and to above. Look at it, it's not like a flow of sand?





Preparation

Hardware:

- 1 X Micro: bit Board
- 1 X Micro USB Cable
- 2 X AAA batteries

Then the micro:bit is connected to the computer through USB, and the computer will pop up a U disk and click the URL in the U disk to enter the programming interface.

Search for blocks

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The image displays two side-by-side panels of the LROBRUYA interface, which is a Scratch-like environment for programming microcontrollers. Each panel features a left sidebar with a search bar and a categorized list of blocks: Basic, Input, More, Music, Led, Radio, Loops, Logic, Variables, Math, and Advanced. The main workspace on the right contains a sequence of code blocks.

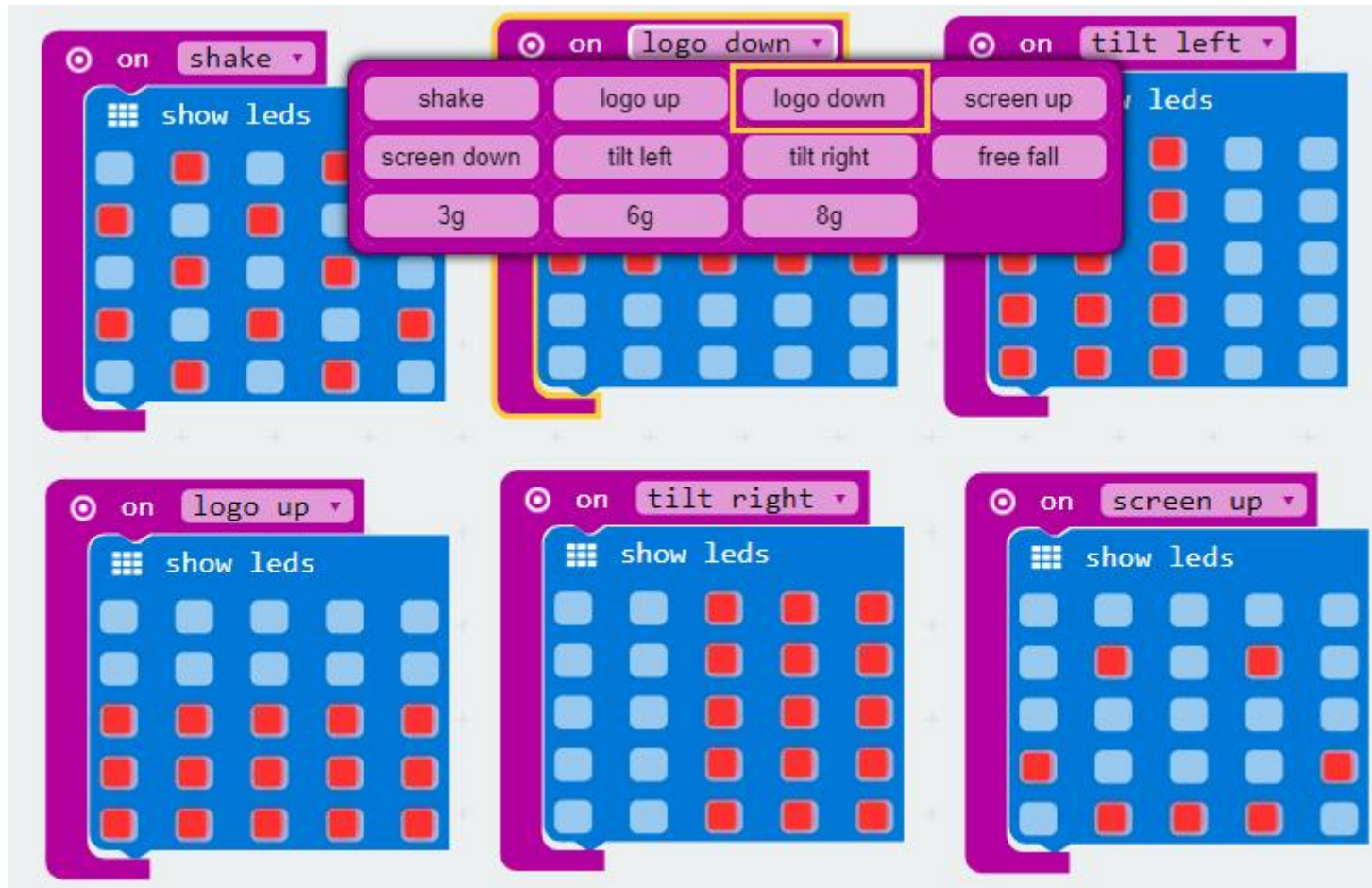
Left Panel:

- Input:** The 'Input' category is selected. The 'on button A pressed' block is highlighted with a red arrow.
- Logic:** The 'on shake' block is highlighted with a red arrow.
- Input:** The 'on pin P0 pressed' block is visible.
- Logic:** A series of 'when X happens' blocks are visible: 'button A is pressed', 'pin P0 is pressed', 'acceleration (mg) x', 'light level', 'compass heading (°)', and 'temperature (°C)'.

Right Panel:

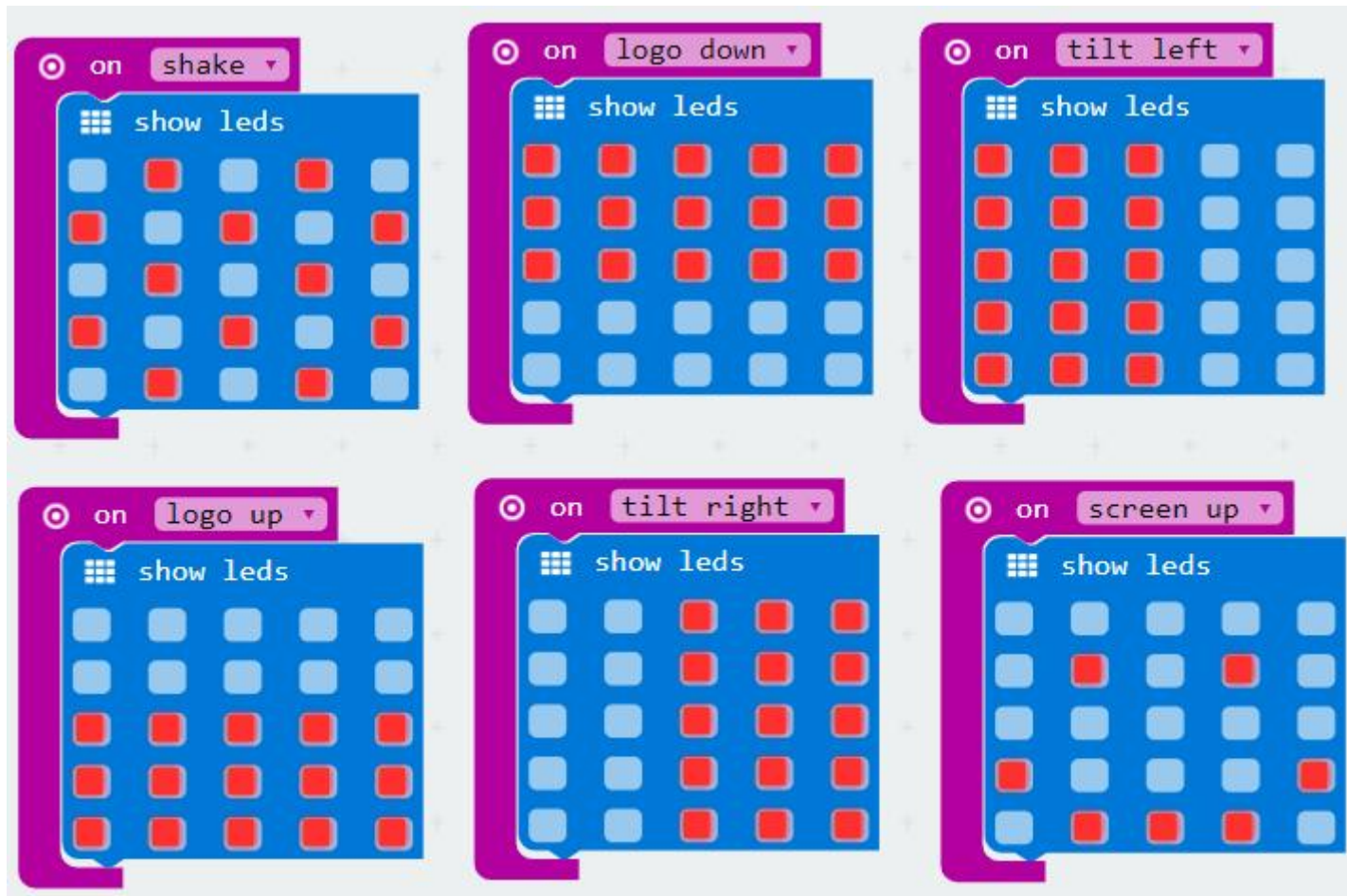
- Basic:** The 'Basic' category is selected.
- Basic:** The 'show number' block is visible with the value '0'.
- Basic:** The 'show leds' block is visible, showing a 5x5 grid of LEDs.
- Basic:** The 'show icon' block is visible, showing a 5x5 grid of icons.
- Basic:** The 'show string' block is visible with the text 'Hello!'.
- Logic:** The 'forever' loop block is visible.
- Basic:** The 'pause (ms)' block is visible with the value '100'.

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Combine blocks





Have a try

Do you learn the course today?

If you learn to do it, give yourself a top quack.

Now you have learned how to use the accelerometer in micro:bit.

Do you know how the content of this lesson is actually achieved?

Accelerometer is used to measure the deflection of physical quantities, such as tilt inversion and other azimuth deflection. It can accurately determine the actual actions of users, and send some instructions to micro:bit through these actions he collected. There are many places involved in accelerometer. For example, we can make some small games with accelerometer. For example, dice game, snake game is achieved through micro:bit accelerometer.

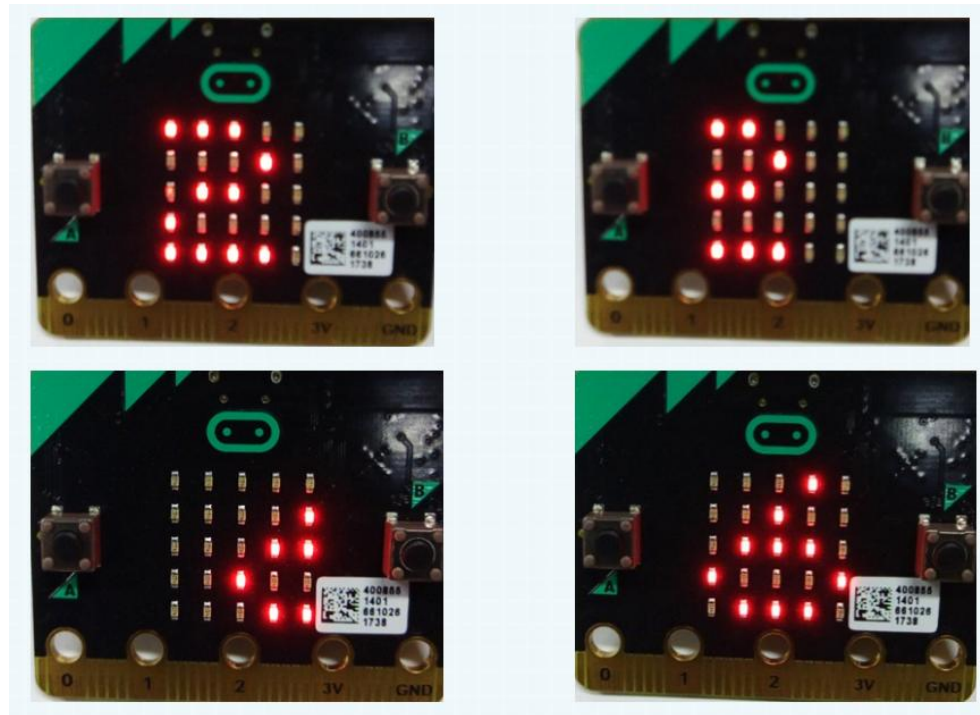
Lesson 4 DIY thermometer

Learning goals

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After you have downloaded the program, you can see the value of the temperature on the micro:bit's dot matrix to the left.

At present, the teacher has measured the temperature of 26 degrees Celsius. The students can try to see how much the temperature is around you.





Preparation

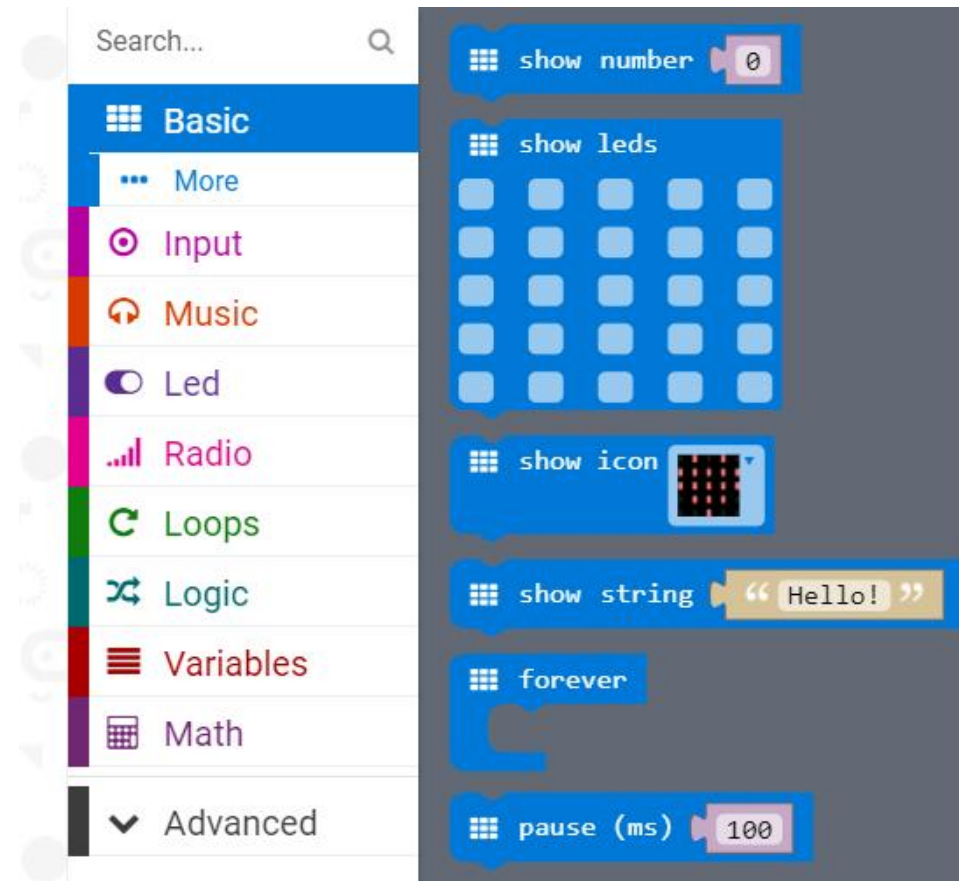
Hardware:

- 1 X Micro: bit Board
- 1 X Micro USB Cable
- 2 X AAA batteries

Then the micro:bit is connected to the computer through USB, and the computer will pop up a U disk and click the URL in the U disk to enter the programming interface.

Search for blocks

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The image shows a screenshot of the LROBRUYA programming environment. On the left is a category menu with a search bar at the top. The categories listed are: Basic, Input (highlighted in purple), More (indicated by three dots), Music, Led, Radio, Loops, Logic, Variables, Math, and Advanced (indicated by a downward arrow). On the right is a workspace containing a list of input blocks, each with a circular icon and a dropdown menu. The blocks are: 'on button A pressed', 'on shake', 'on pin P0 pressed', 'button A is pressed', 'pin P0 is pressed', 'acceleration (mg) x', 'light level', 'compass heading (°)', and 'temperature (°C)'.

Search...

- Basic
- Input**
- More
- Music
- Led
- Radio
- Loops
- Logic
- Variables
- Math
- Advanced

on button A pressed

on shake

on pin P0 pressed

button A is pressed

pin P0 is pressed

acceleration (mg) x

light level

compass heading (°)

temperature (°C)

LROBRUYA

Combine blocks



Have a try

Do you learn the course today?

If you learn to do it, give yourself a top quack.

Now you have learned how to use the thermometer in micro:bit.

But do you know what the temperature means?

Temperature is the physical quantity that represents the degree of cold and heat of a body. Microscopically speaking, it is the intensity of the thermal movement of an object molecule. In this experiment, we measured the Celsius temperature. The

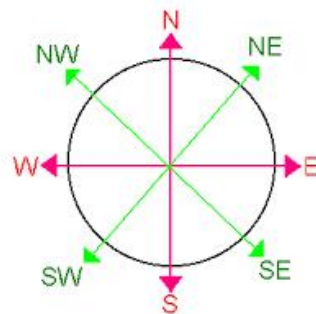
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inventor was Anders Celsius, the freezing point was 0 degrees, and the boiling point was 99.974 degrees. So what are your temperature now, children?

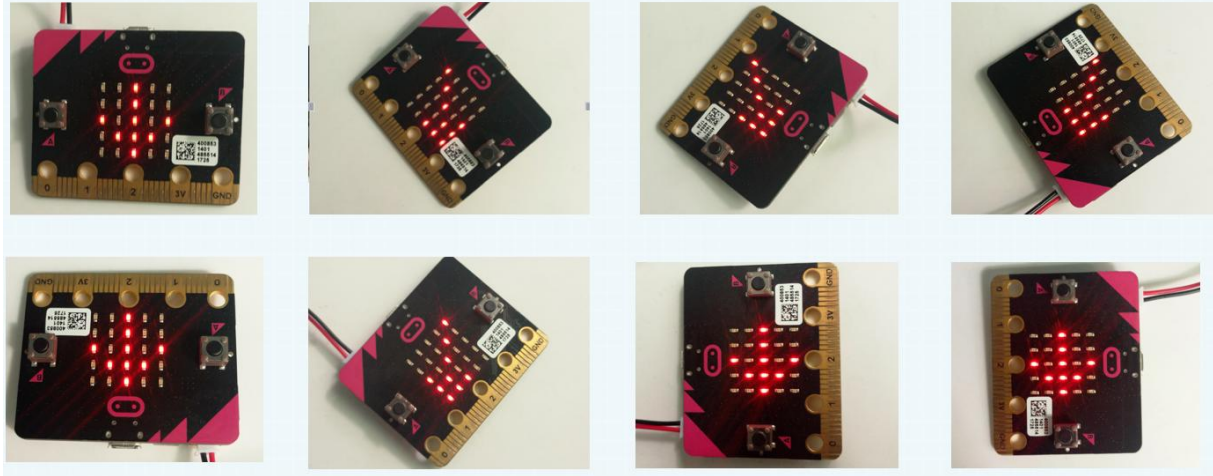
Lesson 5 Direction follower

Learning goals

After downloading the program, the bit development board can be swung to the east, west, south, north, northeast, northwest, southeast, southwest eight different directions. You can see that no matter which direction the micro:bit swings, the pointer on the dot will point to this direction.



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Preparation

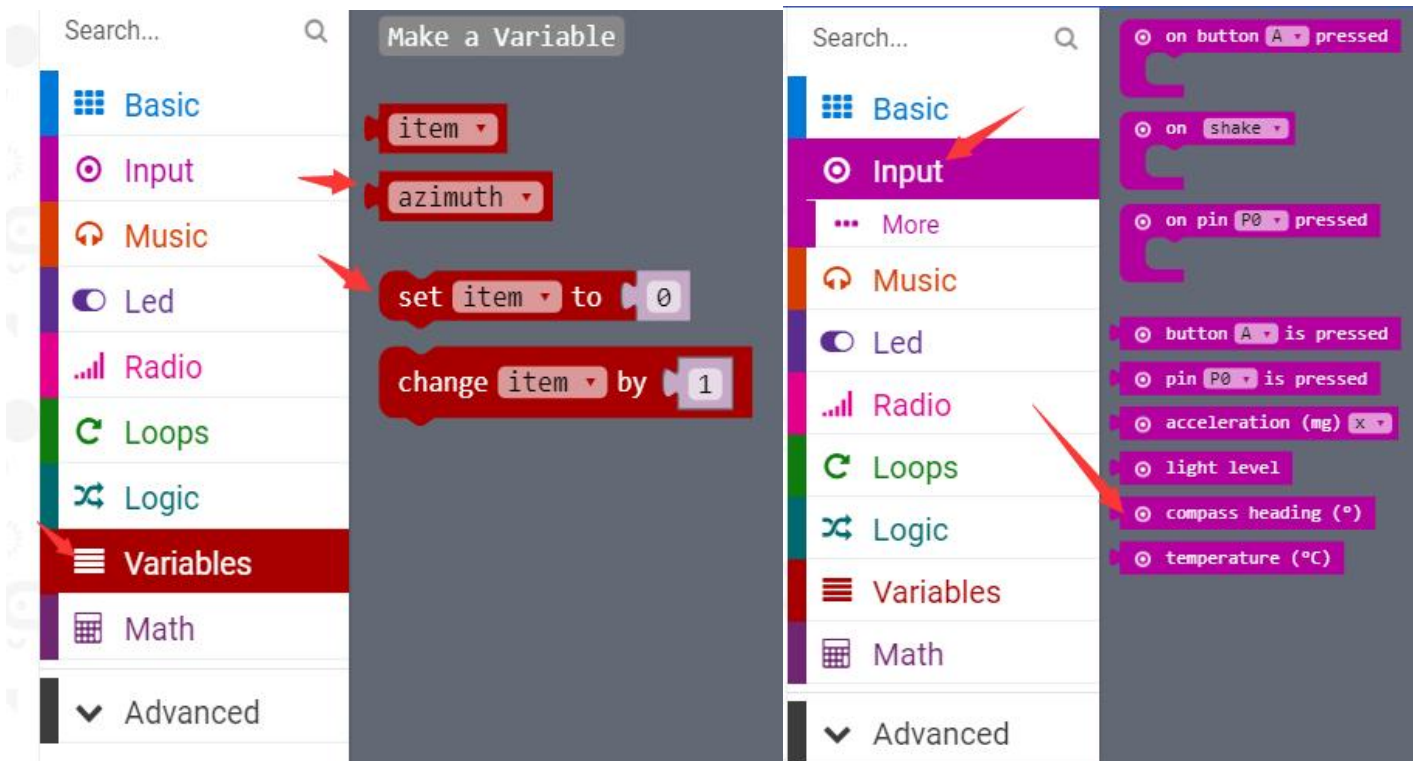
Hardware:

- 1 X Micro: bit Board
- 1 X Micro USB Cable
- 2 X AAA batteries

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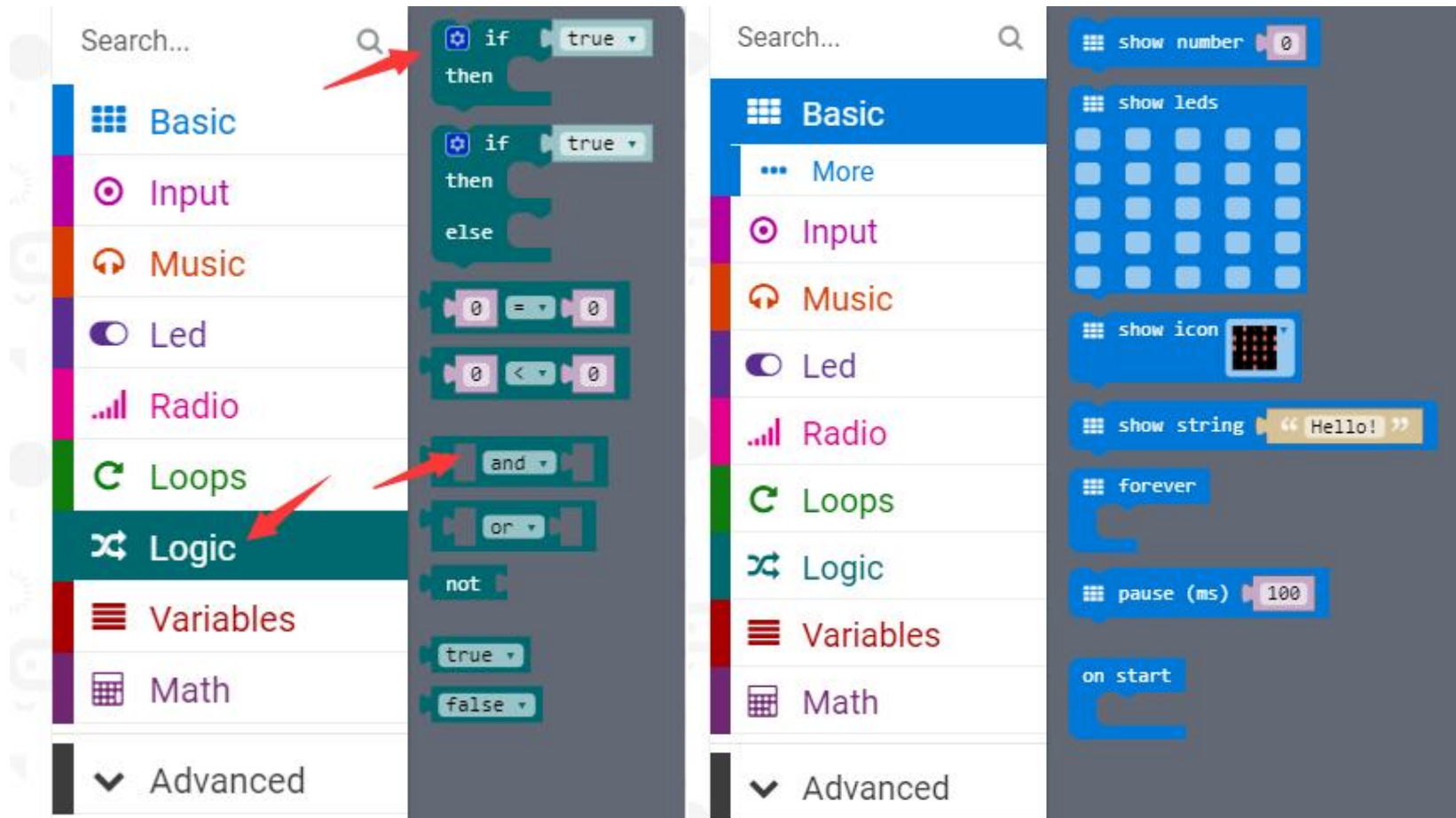
Then the micro:bit is connected to the computer through USB, and the computer will pop up a U disk and click the URL in the U disk to enter the programming interface.

Search for blocks

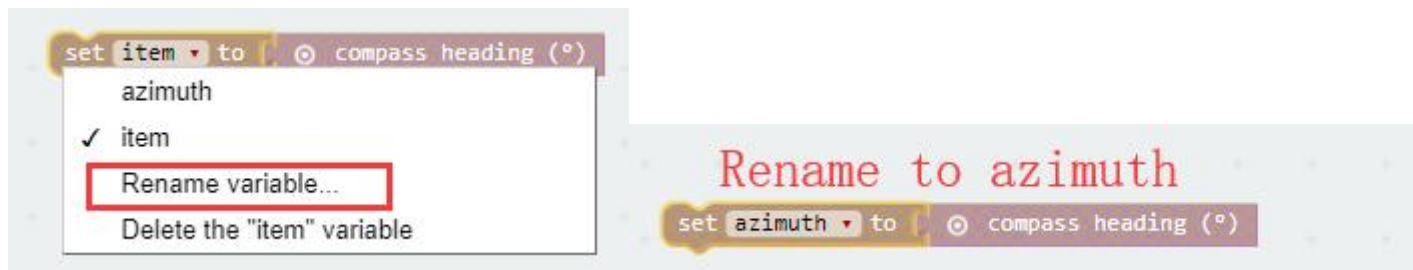


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compass heading "the direction of the compass", In micro:bit, we use the degree to indicate its direction by default.



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The image shows a Scratch code editor. On the left, a dropdown menu for the 'set' block is open, showing options: 'azimuth', '✓ item', 'Rename variable...' (highlighted with a red box), and 'Delete the "item" variable'. On the right, a 'Rename to azimuth' dialog box is displayed, showing the code 'set azimuth to compass heading (°)'.

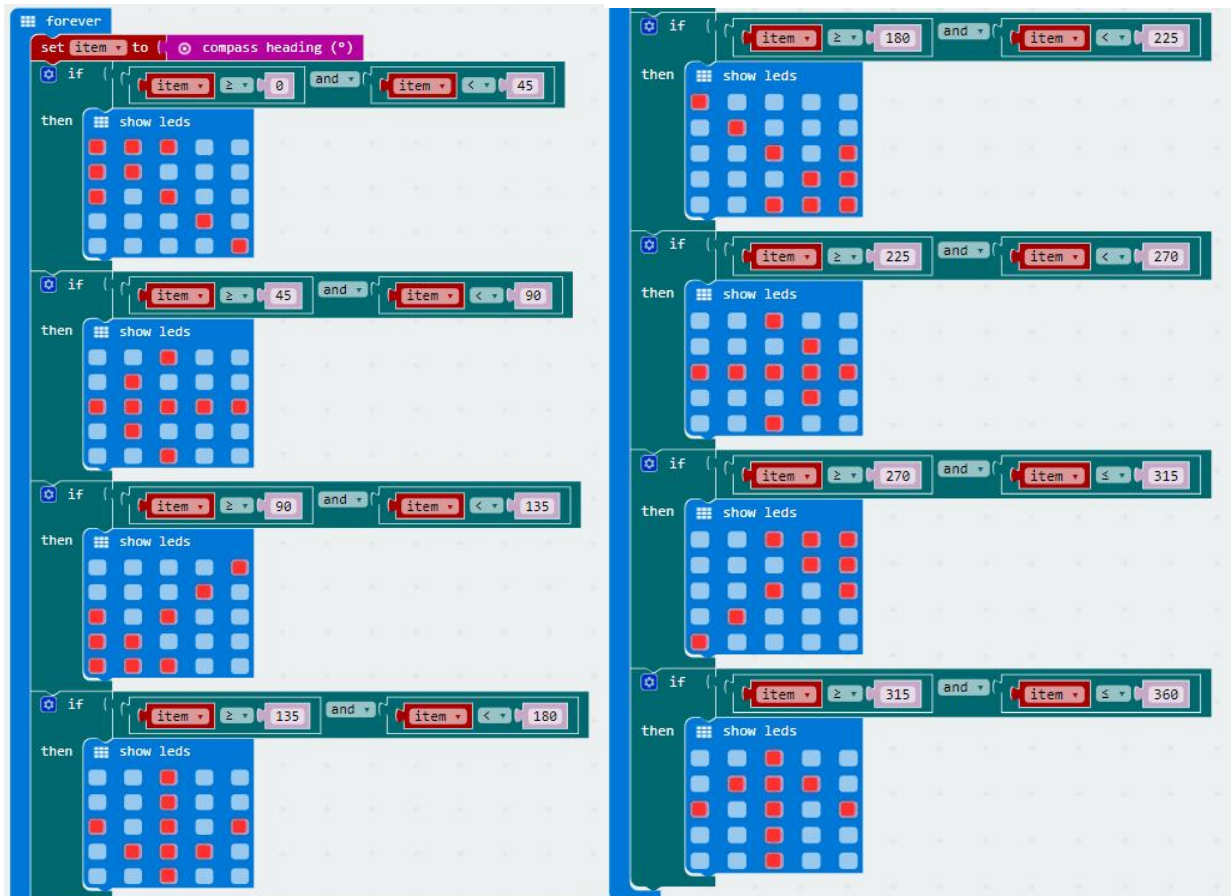
Rename all 'item' variables to:

azimuth |

Ok ✓ Cancel x

LROBRUYA

Combine blocks





Note: After downloading the program, we need to calibrate the compass for normal use.

The calibration method is:

We need to bias the micro:bit in different directions, illuminate all the LED lights on the LED dot matrix, and a smile appears, indicating that the calibration is successful. We can use the micro:bit compass normally.

Have a try

Do you learn the course today?

If you learn to do it, give yourself a top quack.

Now give you a homework assignment.

Today, our content is a simple compass, the compass is one of the four great inventions of ancient China. Let's go and find out what the other three of the four great inventions of ancient China are.

Start your little brain. Try it.



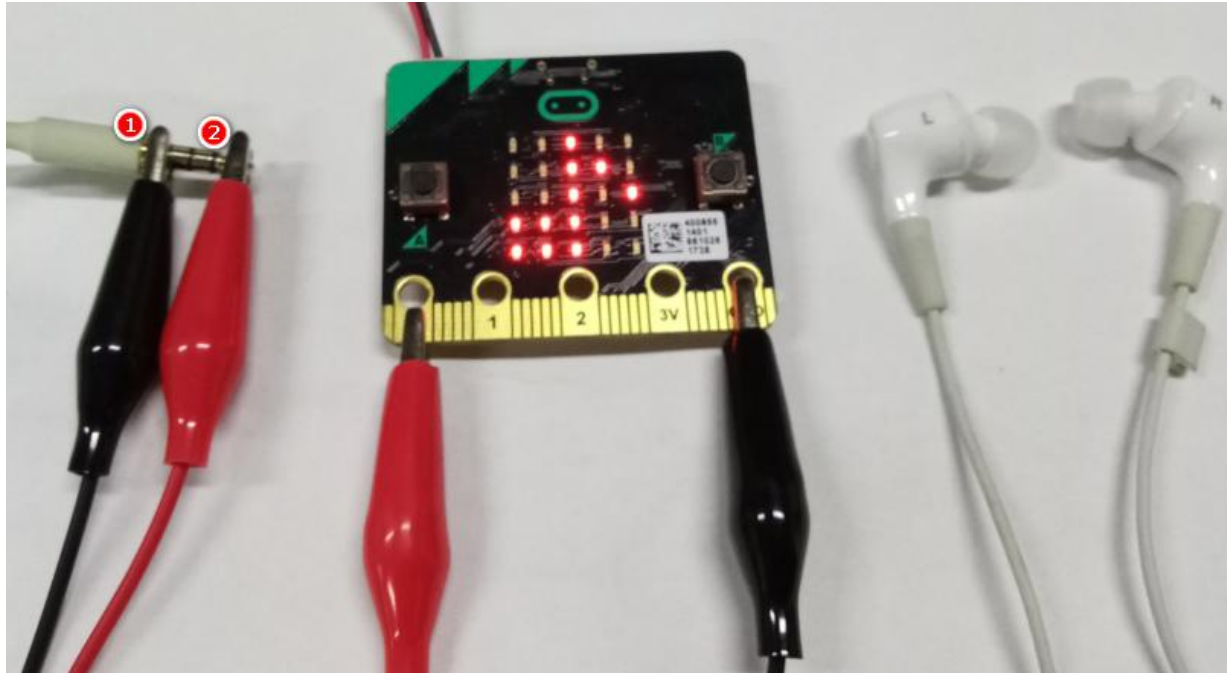
Lesson 6 Listen to music

Learning goals

You need two crocodile clips and a pair of headphones for this experiment. First, the black crocodile clip is used to clamp the GND of micro:bit, and the black crocodile clip on the other side clamps the interface of the earphone.

Then use the red crocodile clip to clamp P0, and the other end clamps the interface of the earphone 2. After downloading the program, you can play music from the earphone.

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PIN	Description
1	Ground
2	Microphone
3	Right Side Earpiece
4	Left Side Earpiece

Preparation

Hardware:

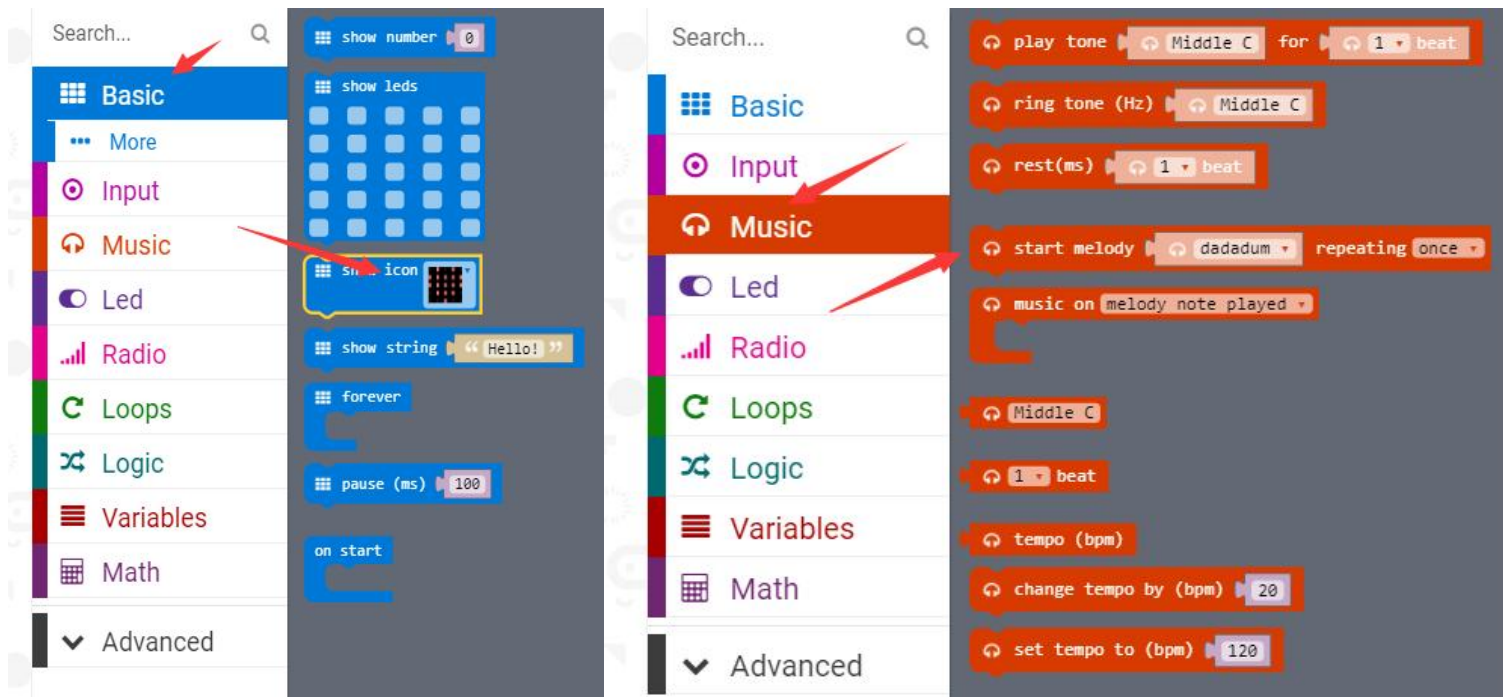
- 1 X Micro: bit Board
- 1 X Micro USB Cable

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- 2 X AAA batteries

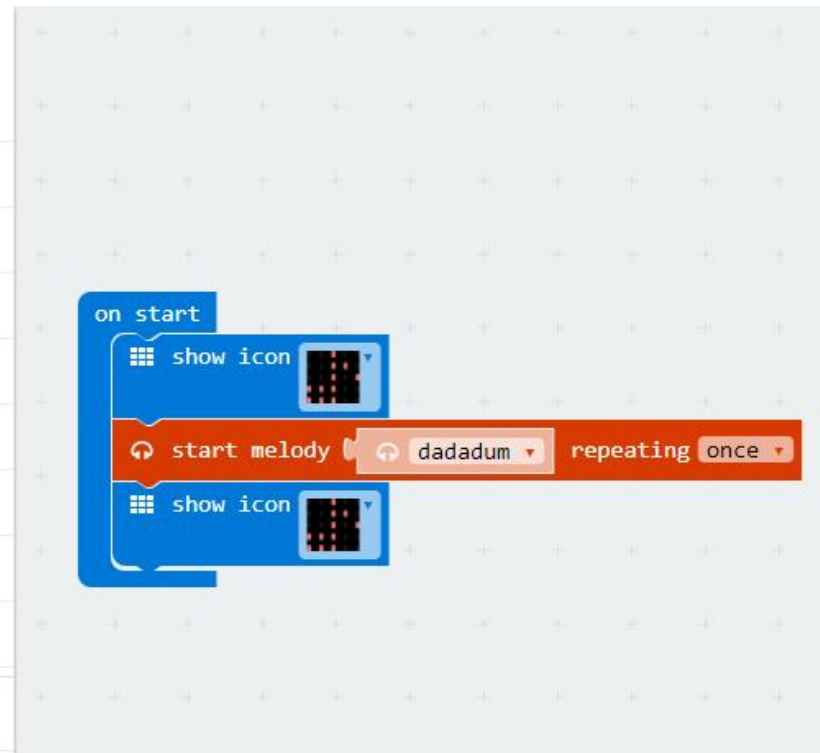
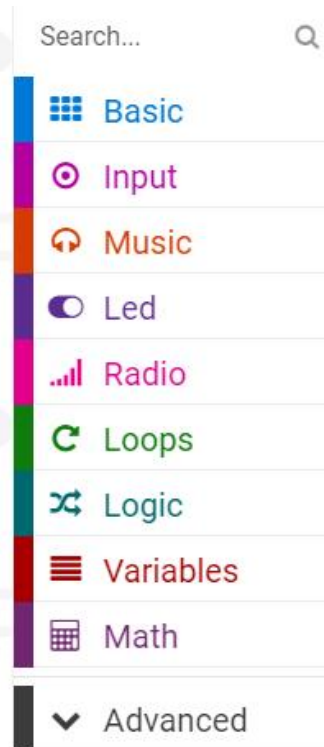
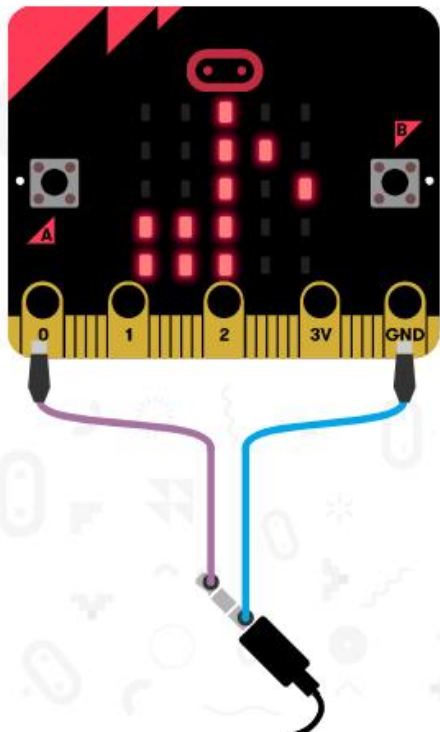
Then the micro:bit is connected to the computer through USB, and the computer will pop up a U disk and click the URL in the U disk to enter the programming interface.

Search for blocks



LROBRUYA

Combine blocks



Have a try

Do you learn the course today?



If you learn to do it, give yourself a top quack.

Now give you a homework assignment.

On the basis of the playing music we just realized, plus the function of the key, we play the song after pressing the key, and the name of the song is displayed on the dot matrix.

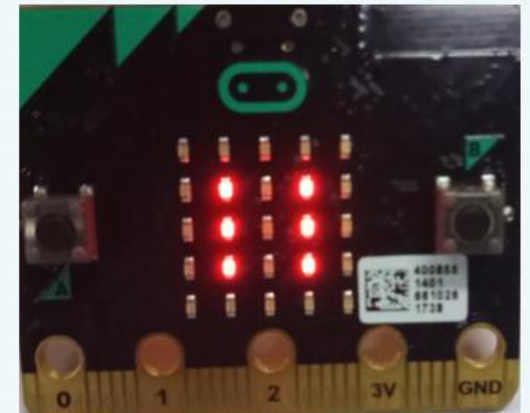
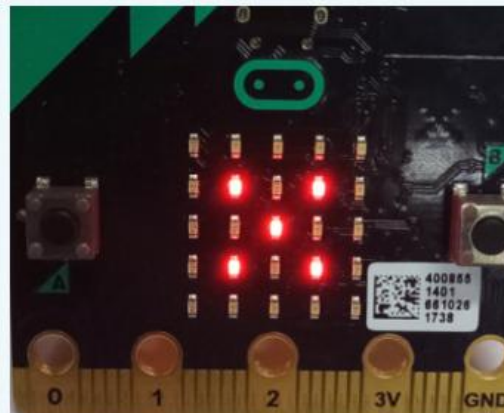
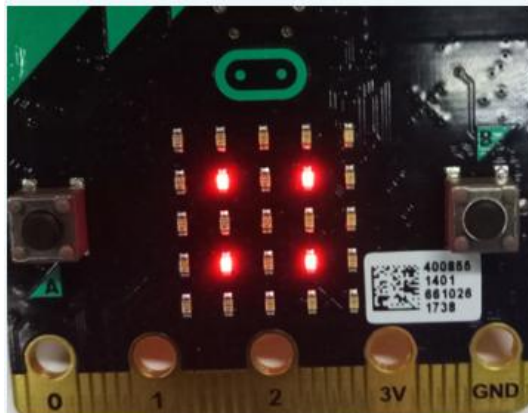
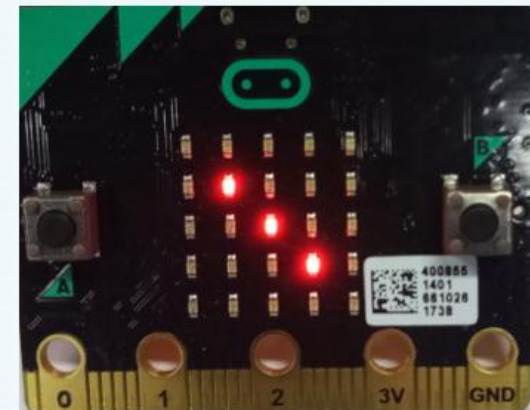
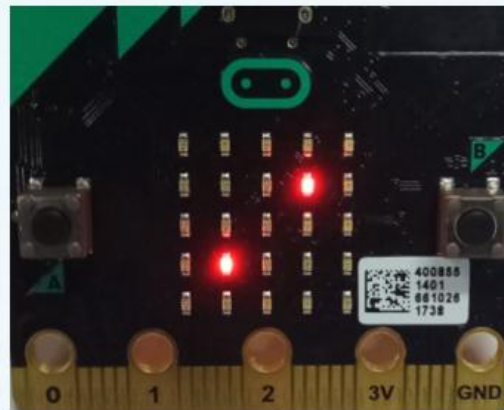
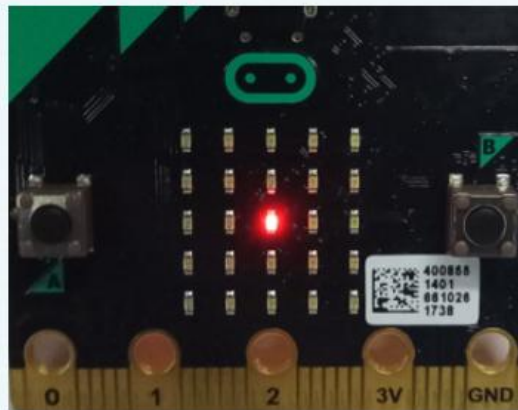
Start your little brain. Try it.

Lesson 7 Dice game

Learning goals

After downloading the program, shake a roll of micro:bit. There are 1-6 points randomly appearing on the dot matrix, which is exactly the same as playing the dice. You can call your buddy to play this game, see who points out relatively large.

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Preparation

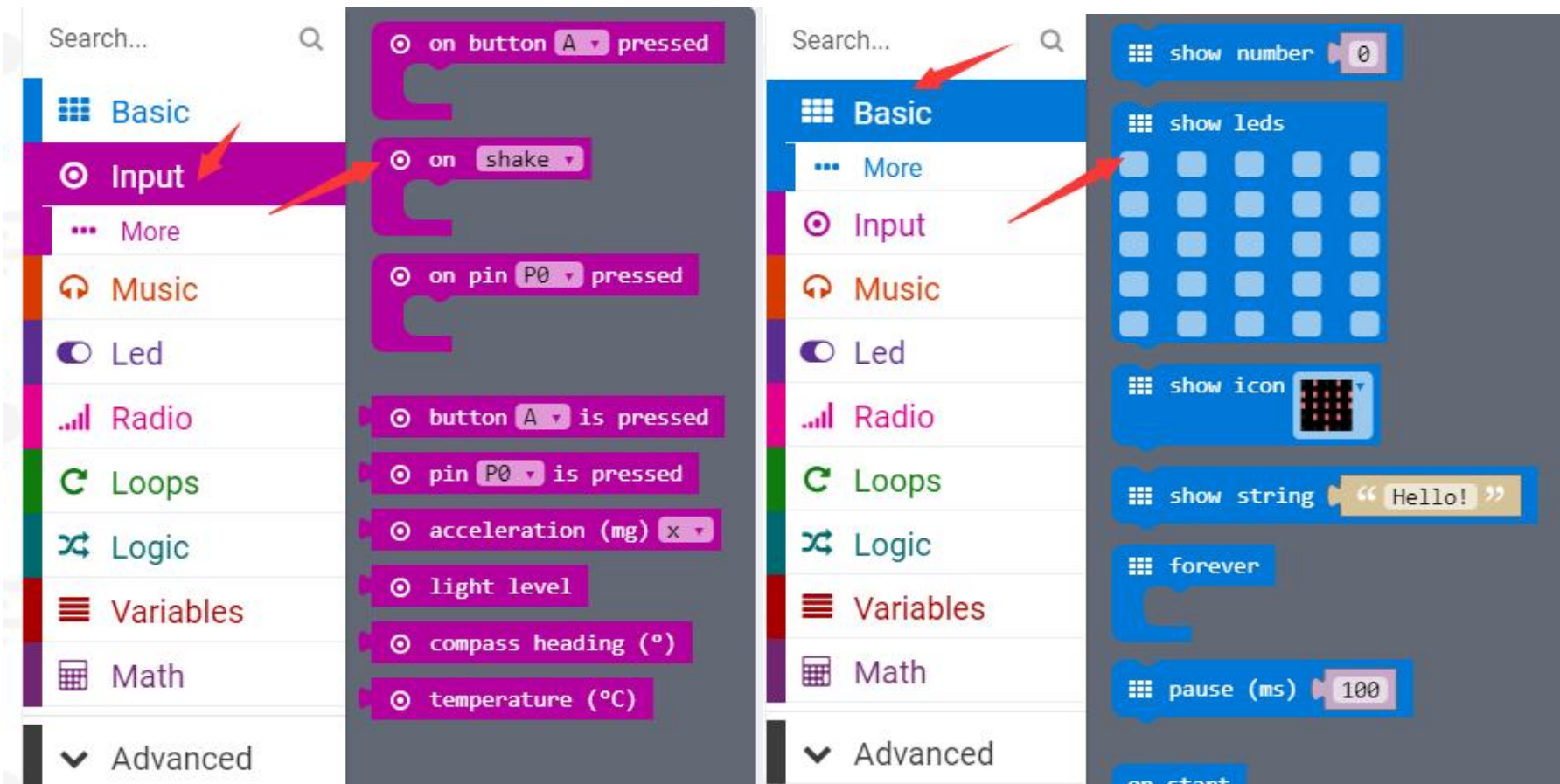
Hardware:

- 1 X Micro: bit Board
- 1 X Micro USB Cable
- 2 X AAA batteries

Then the micro:bit is connected to the computer through USB, and the computer will pop up a U disk and click the URL in the U disk to enter the programming interface.

Search for blocks

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The image displays two side-by-side screenshots of the LROBRUYA Scratch-like interface, illustrating the Logic and Variables categories. Red arrows highlight specific elements in both panels.

Left Panel (Logic Category):

- Search...** (with a magnifying glass icon)
- Basic** (grid icon)
- Input** (target icon)
- Music** (headphones icon)
- Led** (lightbulb icon)
- Radio** (signal waves icon)
- Loops** (refresh icon)
- Logic** (crossed wrench and screwdriver icon) - **Highlighted with a red arrow.**
- Variables** (three horizontal lines icon)
- Math** (calculator icon)
- Advanced** (dropdown arrow icon)

Logic Blocks:

- if** (true) **then**
- if** (true) **then** **else**
- 0** **=** **0**
- 0** **<** **0**
- and**
- or**
- not**
- true**

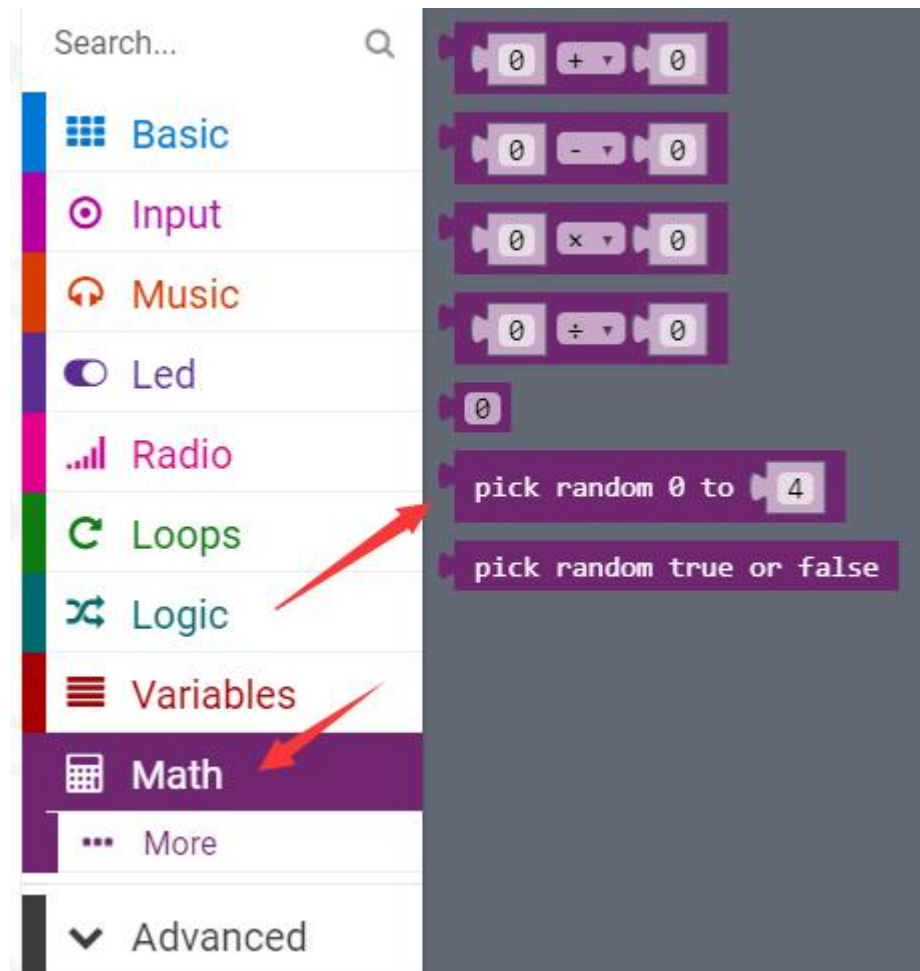
Right Panel (Variables Category):

- Search...** (with a magnifying glass icon)
- Basic** (grid icon)
- Input** (target icon)
- Music** (headphones icon)
- Led** (lightbulb icon)
- Radio** (signal waves icon)
- Loops** (refresh icon)
- Logic** (crossed wrench and screwdriver icon)
- Variables** (three horizontal lines icon) - **Highlighted with a red arrow.**
- Math** (calculator icon)
- Advanced** (dropdown arrow icon)

Variable Blocks:

- Make a Variable**
- item**
- stochastic**
- set item** **to** **0**
- change item** **by** **1**

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Rename all 'item' variables to:

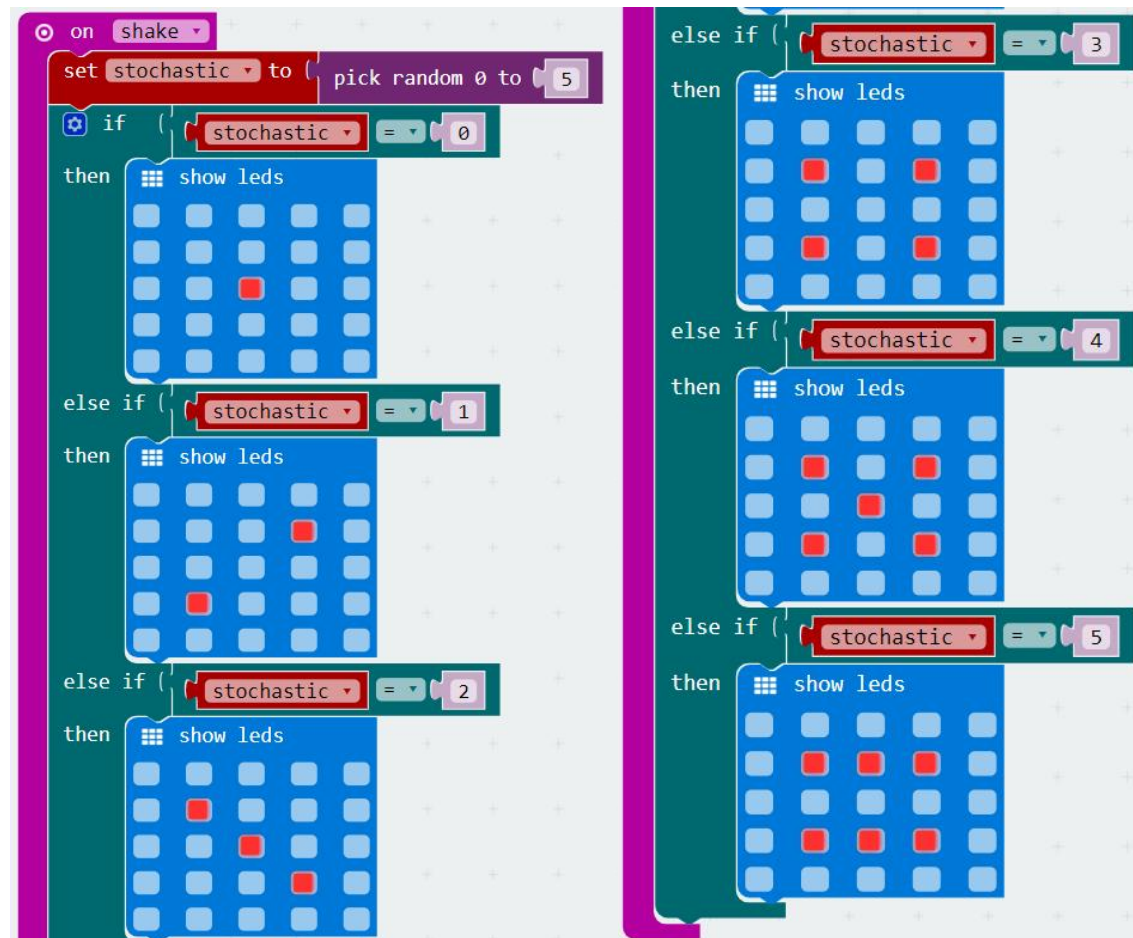
stochastic

Ok ✓

Cancel ✕

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Combine blocks





Have a try

Do you learn the course today?

If you learn to do it, give yourself a top quack.

Now give you a homework assignment.

On micro:bit, we can play a melody when we shake it.

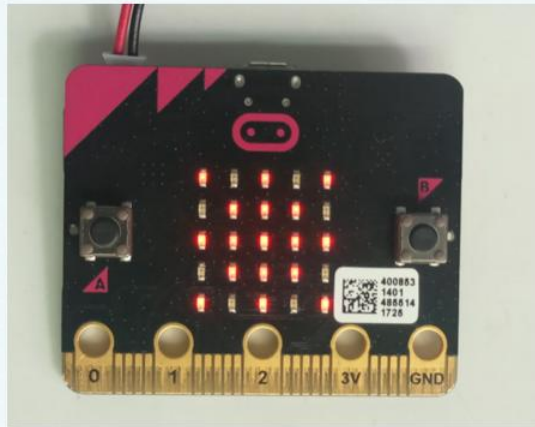
Start your little brain. Try it.

Lesson 8 Good morning, good night

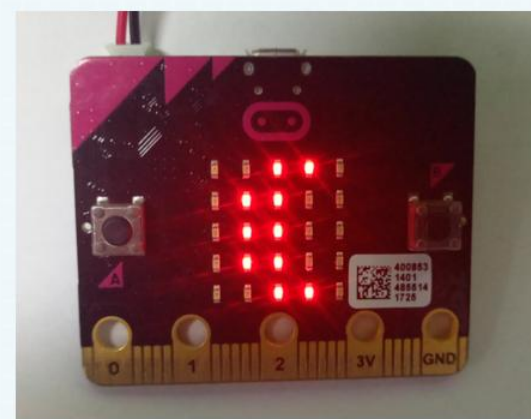
Learning goals

After downloading the program, When the micro:bit development board is in the brighter environment, a pattern of the sun will be displayed on the dot matrix, which means to say "good morning" to everyone. similarly, when in a dark environment, the moon pattern will be displayed on the dot matrix, which means to say "good night" to everyone.

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Sunlight
(Good morning)



Moon
(Good evening)

Preparation

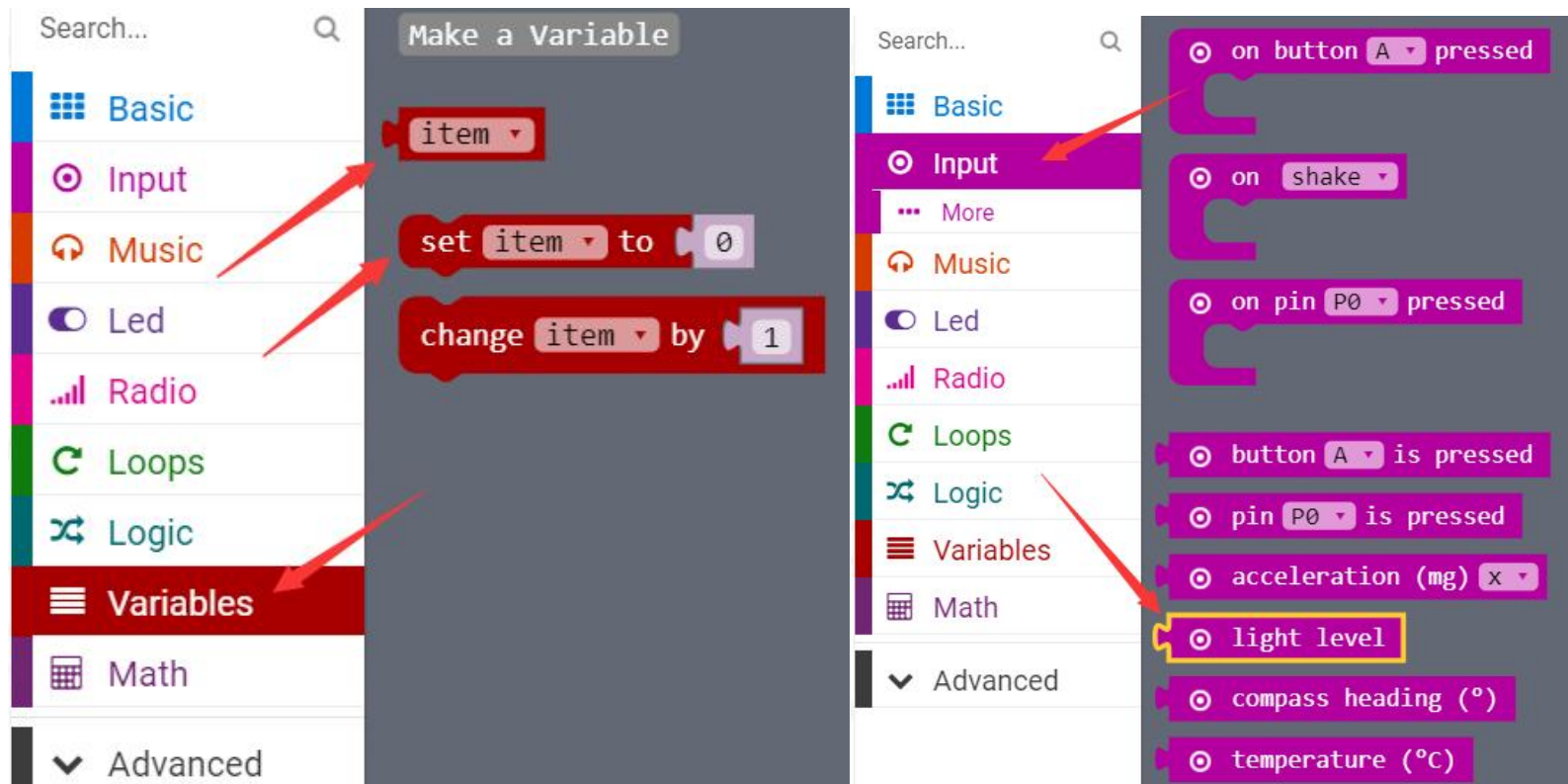
Hardware:

- 1 X Micro: bit Board
- 1 X Micro USB Cable
- 2 X AAA batteries

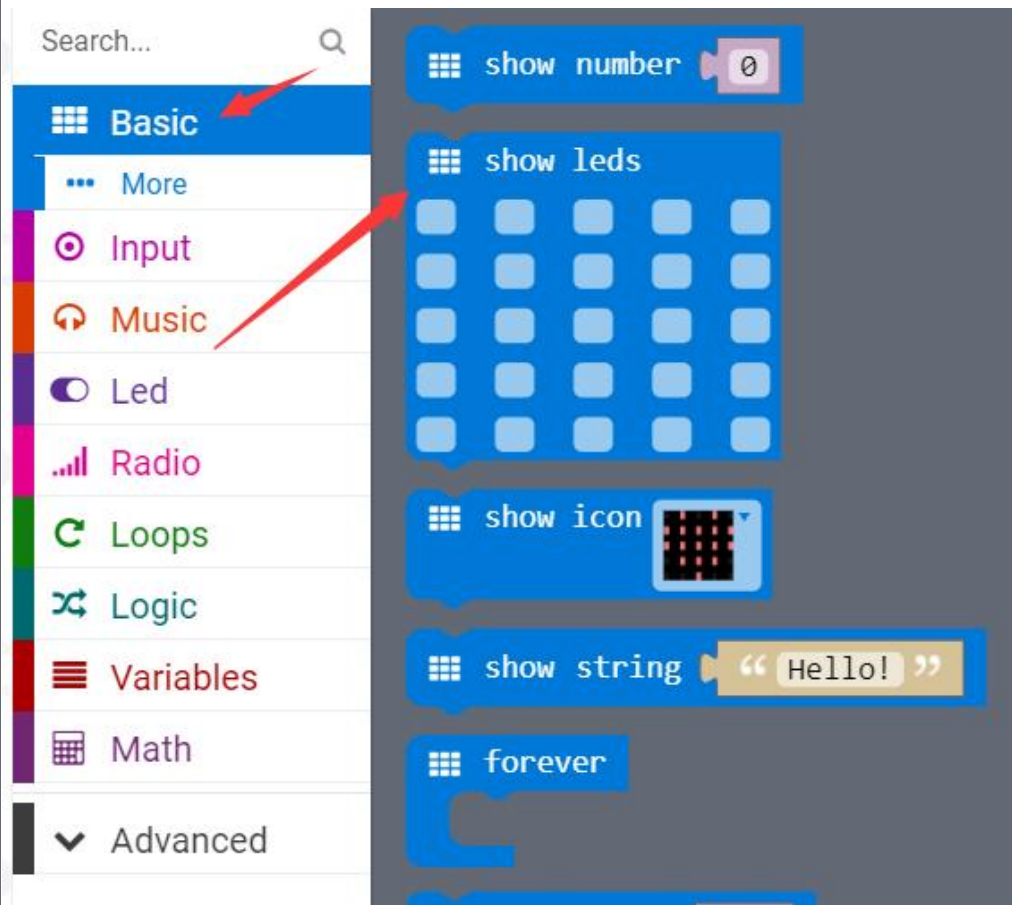
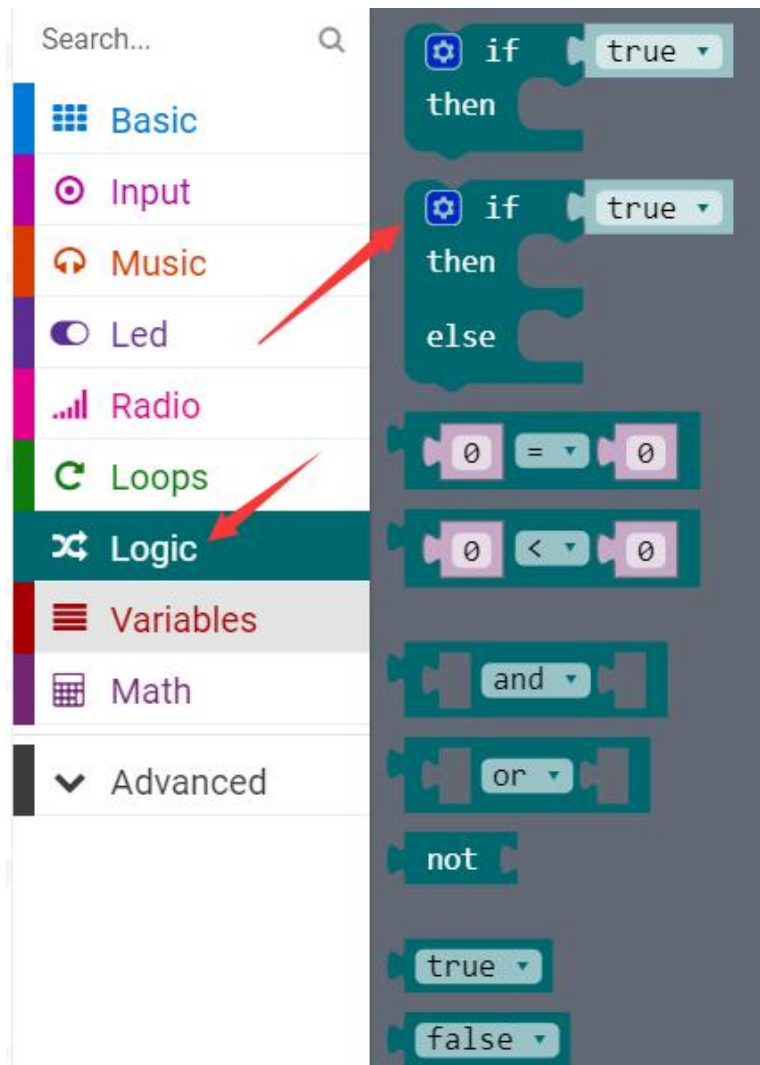
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Then the micro:bit is connected to the computer through USB, and the computer will pop up a U disk and click the URL in the U disk to enter the programming interface.

Search for blocks

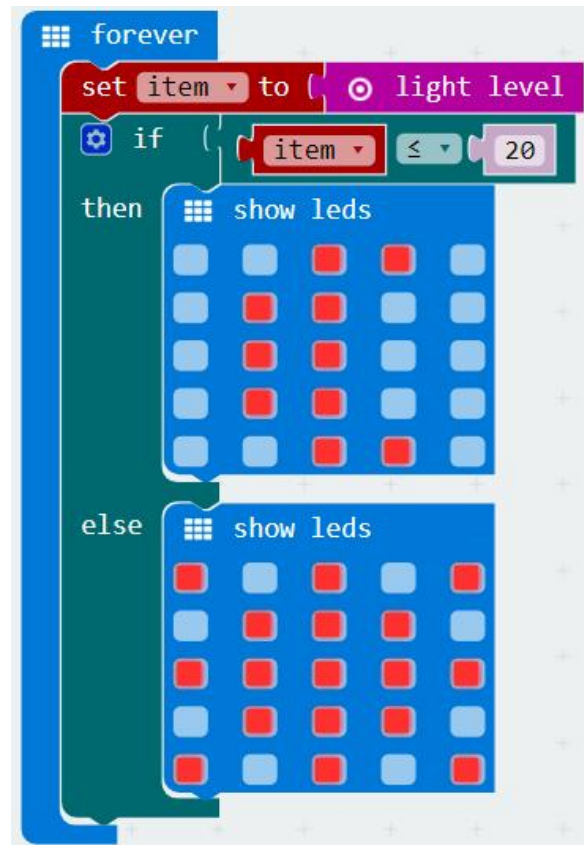


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Combine blocks





20 here is an intermediate value set freely, The meaning of building blocks is that: If the current light intensity is less than 20, the moon will appear on the dot matrix. If greater than 20, the sun will appear.

Median value: Put all the numbers in numerical order. If there is an odd number of results, the median is the middle number.

If there is an even number of results, the median will be the mean of the two central numbers.

(in this course, you can set the middle value on your own).

Have a try

Do you learn the course today?

If you learn to do it, give yourself a top quack.

Now give you a homework assignment.

The value of the current luminance is displayed on the micro:bit dot matrix.

Children can use the mobile phone lights or turn off the lights at home to change the current brightness.

Start your little brain. Try it.