

## Music door

### 1.Learning goals

In this course, we mainly learn how to use Python programming to realize following function.

Function: The automatic door is gradually opened and gradually closed, the buzzer plays the song "Ode", and the RGB lights switch different colors.

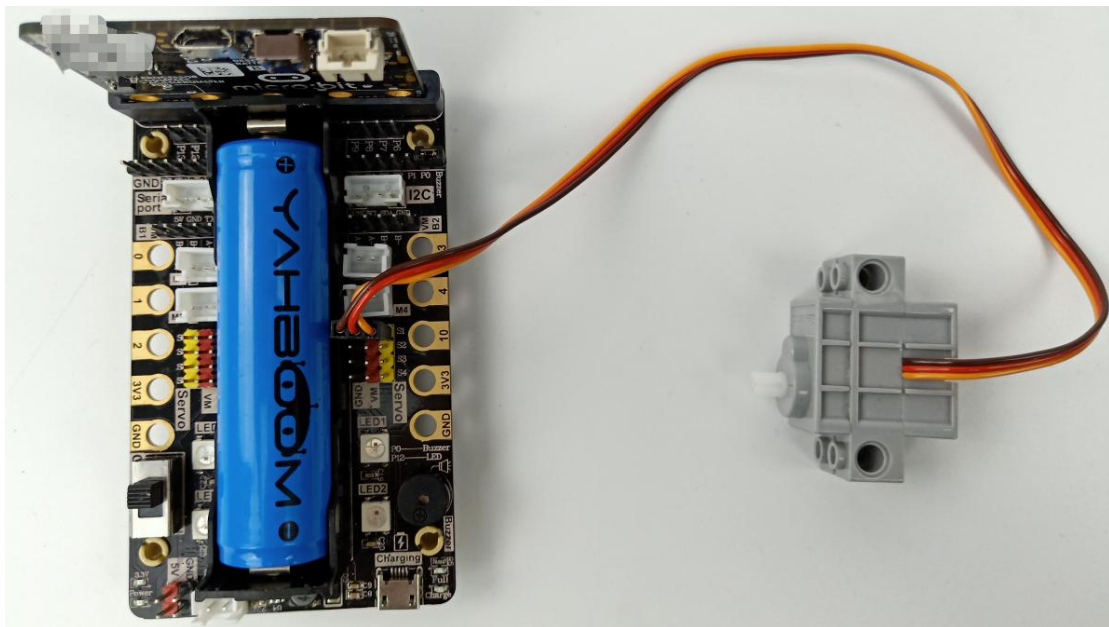
### 2.Building block assembly steps

For the building block construction steps, please refer to the installation manual or building block installation picture of [Assembly course]-[Auto-door].

### 3.Wiring of servo

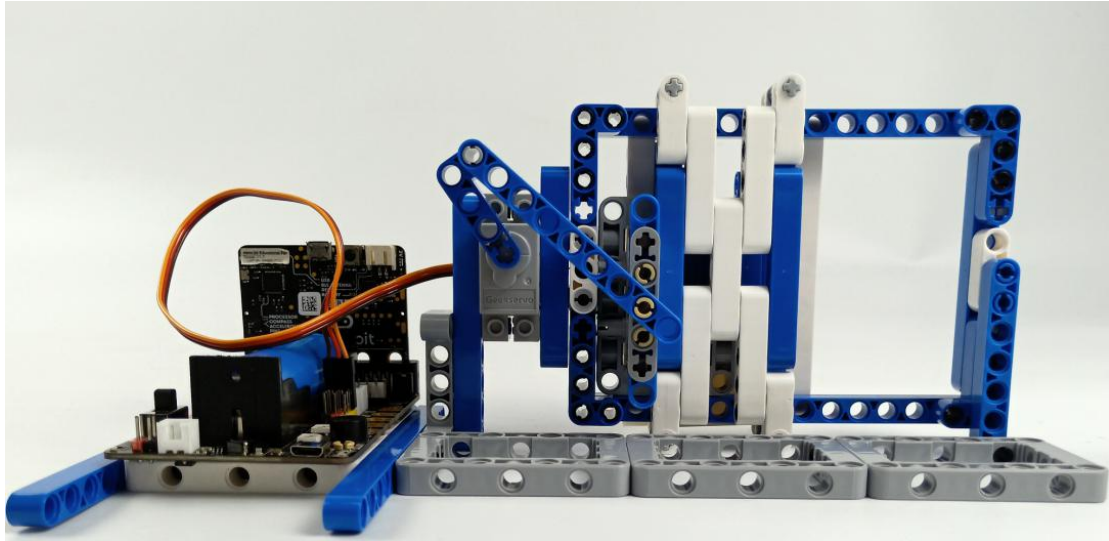
Building block servo insert into the Super: bit expansion board S1 interface, and the orange wiring connect the yellow pin of S1.

As shown below:



#### Note:

For the first course related to building block servo, we need to remove the gear on the servo and upload the program of this course to micro: bit. Then, turn on the power switch of the Super:bit expansion board and wait for the building block servo turn to the initial position. Next, we can turn off the power, and adjust the automatic door is opened. Finally, install the servo. (If you have used programs related to clip robot before, you can skip this step)



#### 4.Code and analysis

The program for this course, please view .py file.

```
1 from microbit import *
2 import music
3 import superbitt
4 import microbit
5 import neopixel
```

First, we need to import the library needed for this lesson from micro:bit, superbitt library is dedicated to super:bit expansion board; music library is used to play music; neopixel is used to control RGB lights.

```
7 display.show(Image.HAPPY)
8 np = neopixel.NeoPixel(pin12, 4)
9 superbitt.servo270(superbitt.S1, 90)
```

**display.show(Image.HAPPY):** Display smile pattern on micro:bit matrix.

**np = neopixel.NeoPixel(pin12, 4):** RGB lamp initialization settings, a total of 4 RGB lamps, connected to the P12 pin of the micro:bit board (you can check the hardware interface manual);

**superbitt.servo270(superbitt.S1, 90):** Initialization makes the servo rotates to 90°, that is open the door;

```

11 while True:
12     music.play('E4:4')
13     superbitt.servo270(superbitt.S1, 70)
14     superbitt.motor_control(superbitt.M1, 255, 0)
15     superbitt.motor_control(superbitt.M3, 255, 0)
16     np[0] = (255, 0, 0)
17     np.show()

```

while True:

music.play('E4:4') The buzzer plays the tone. Parameter1 E4 represents the pitch, parameter2 4 represents the beat.

superbitt.servo270(superbitt.S1, 70) The servo of S1 interface rotates to 90°;

superbitt.motor\_control(superbitt.M1, 255, 0) The motor connected to the M3 interface rotates forward with speed 255;

np[0] = (255, 0, 0)

np.show() control first RGB to red

....

In a loop

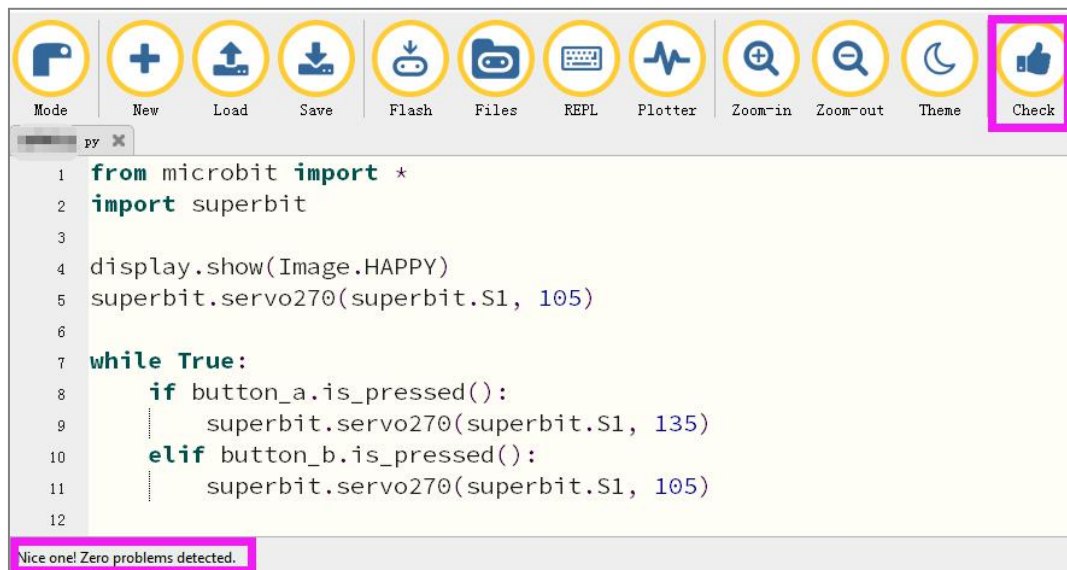
## 5. Writing and download code

1. You should open the Mu software, and enter the code in the edit window, as shown below.

**Note! All English and symbols should be entered in English, use the Tab key (tab key) to indent and the last line must be a space.**

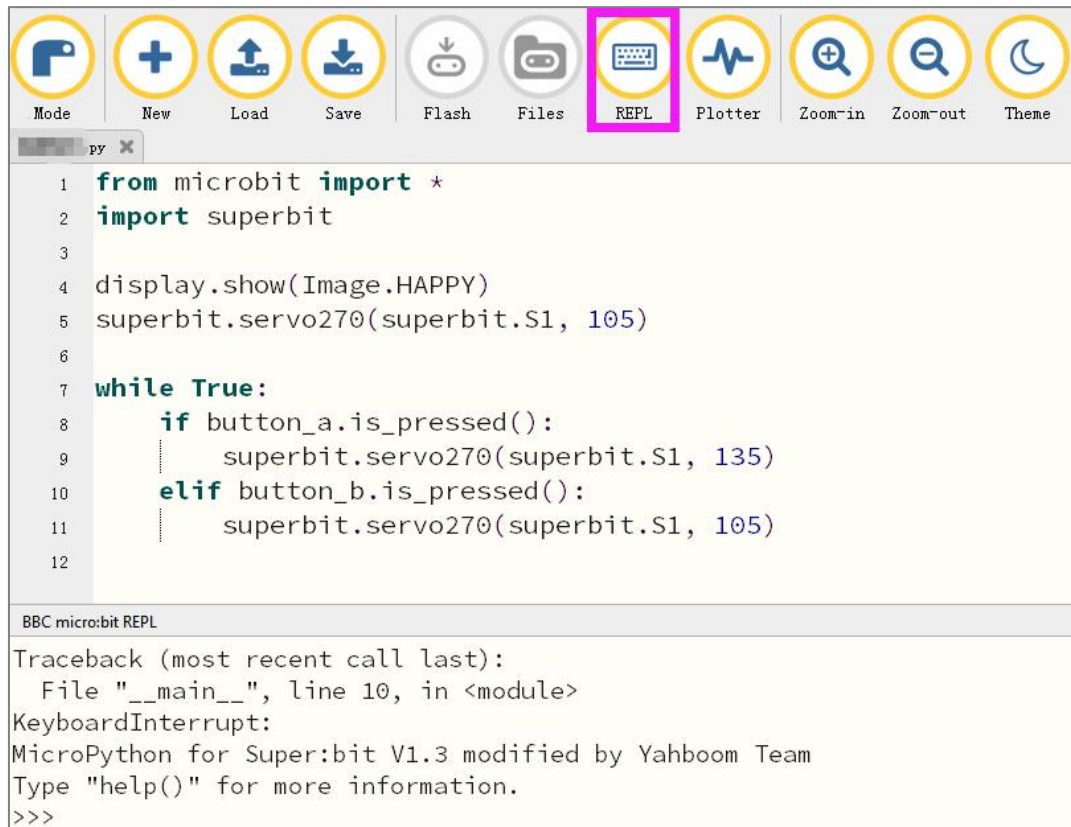
2. You can click the “Check” button to check if our code has an error.

If a cursor or underline appears on a line, it indicates a syntax error, please check and modify. If there is no error in the program, the bottom left of the interface will prompt that there is no problem in detection.

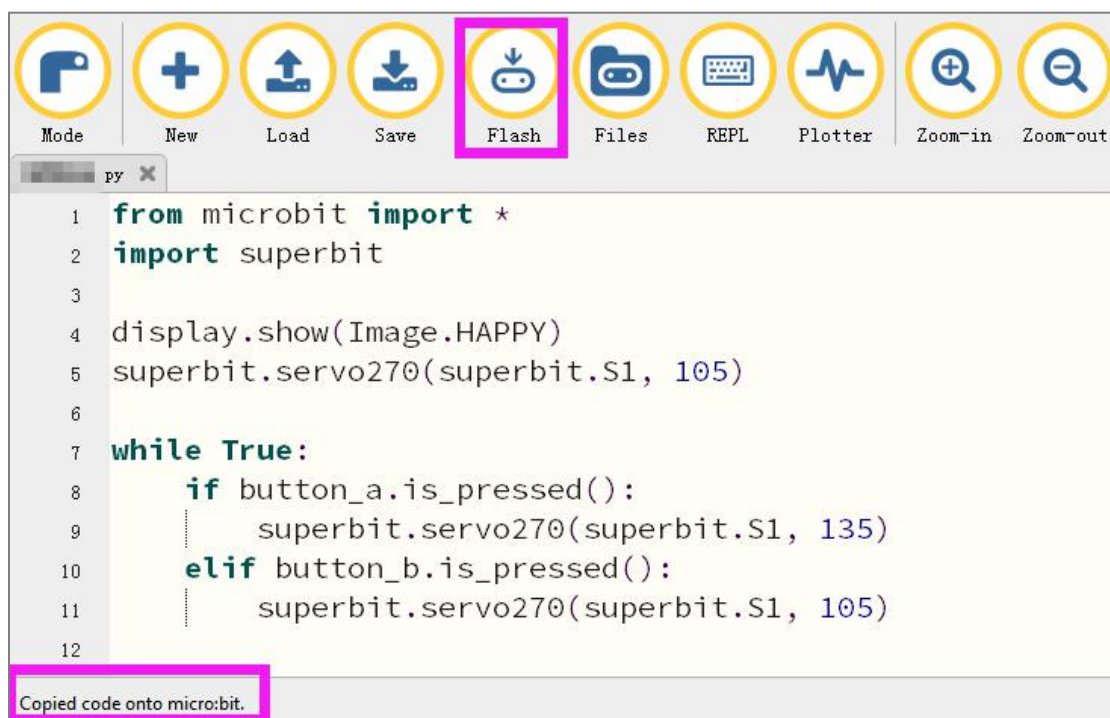


3. Click the ‘REPL’ button to check whether the Superbit library has been downloaded.

If not, please refer to [Preparation before class] --> [2.4 Python Programming Guide] .



4. After the program is written, use a micro USB cable to connect the computer and the micro:bit board. Please click the 'Flash' button to download the program to the micro:bit motherboard (You need to click the 'REPL' button again to close the function of importing library files before you download the program).



5.If the download failed, please confirm whether the micro:bit is connected to the computer through the micro USB data cable, and confirm whether the Super:bit Python library has been imported.

### **6.Experimental phenomena**

After the program is successfully downloaded, the micro:bit dot matrix will show a smile pattern.

Open the power switch, the automatic door is gradually opened and gradually closed, the buzzer plays the song "Ode", and the RGB lights switch different colors.

**If you need to restart, press the reset button on the back of the micro:bit board.**