Soldiers on duty

1. Learning Objectives

In this course, we mainly learn how to use Python programming to achieve that when the micro:bit A button is pressed, the dot matrix displays the direction of the door movement (left), the buzzer beeps shortly, and the security automatic door closes; when the micro:bit B button is pressed, the dot matrix displays the direction of the door movement (right), the buzzer beeps shortly, and the security automatic door opens.

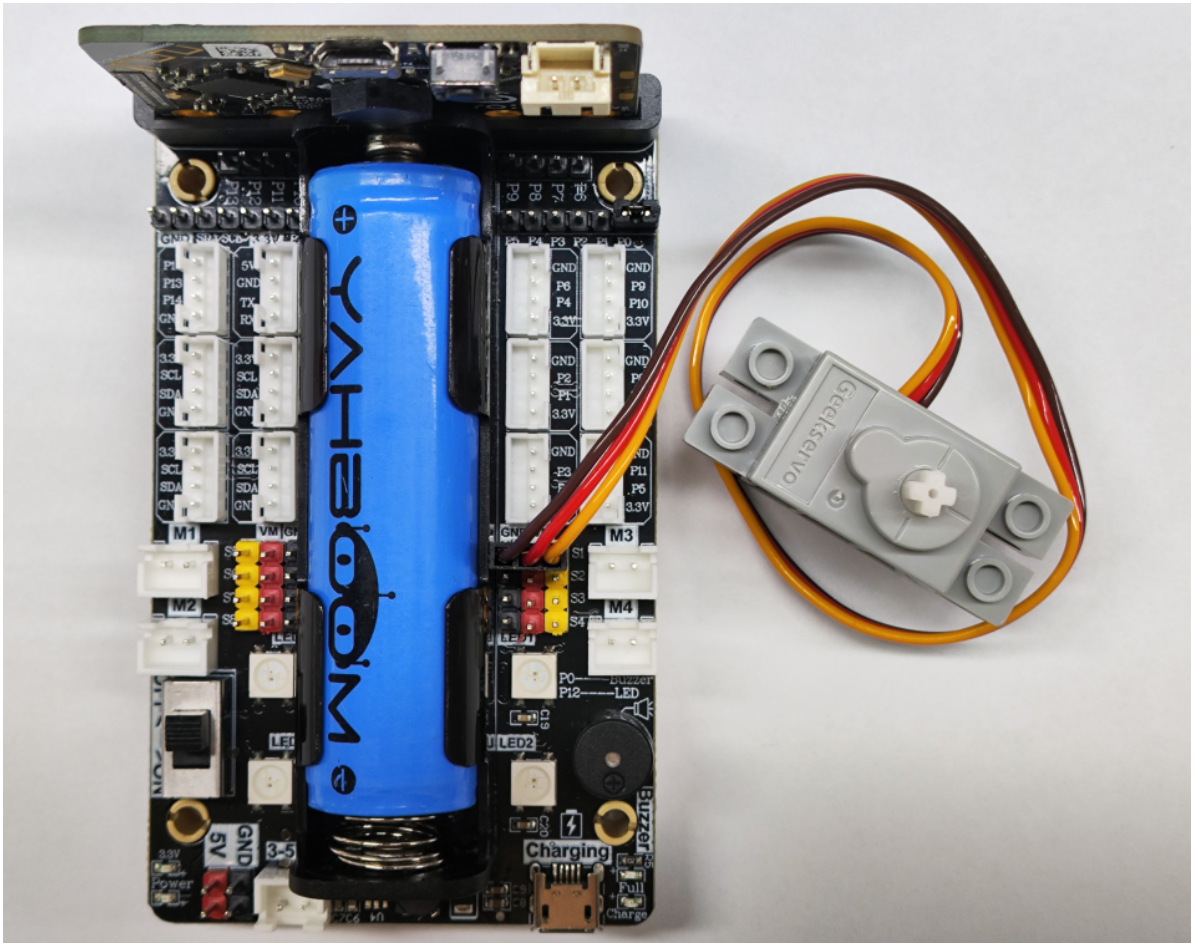
2. Building Blocks

For detailed steps of building blocks, please refer to the installation drawings of [Assembly course]-[Auto-door] in the materials or the building block installation album.

3. Servo Wiring

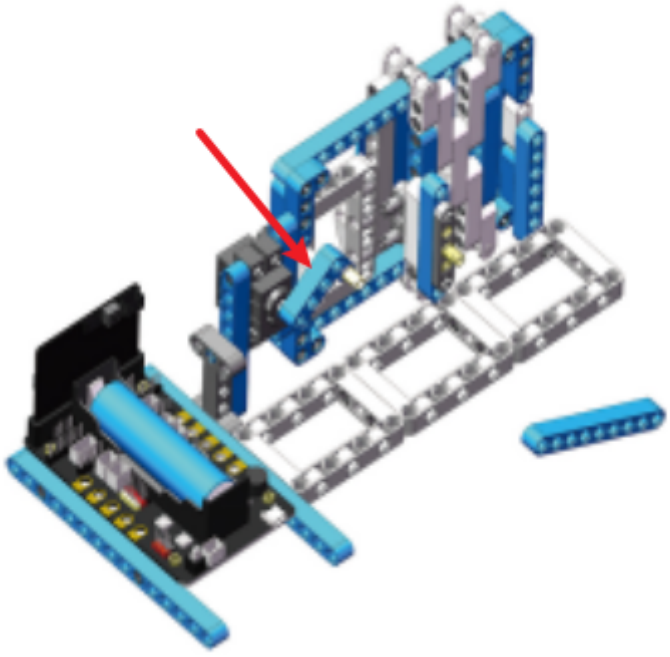
The building block servo wiring is inserted into the Super:bit expansion board S1 interface, and the servo orange wiring is inserted into the yellow pin of S1.

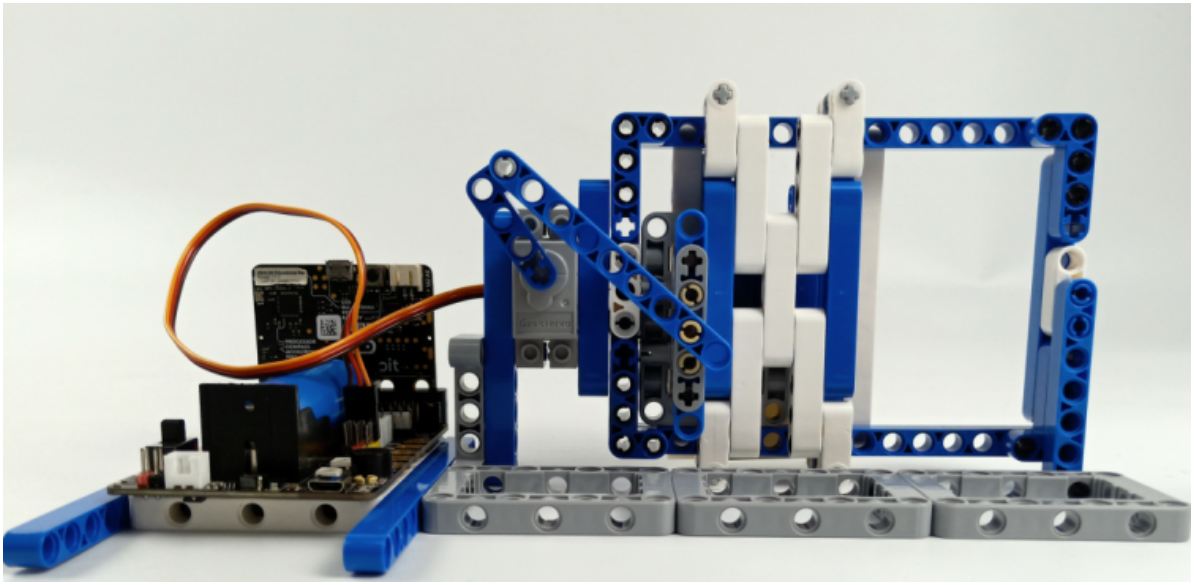
As shown in the figure below:



! Notes:

When taking the course related to the building block servo for the first time, we need to remove the blue building block installed on the servo and upload the program of this course to the micro:bit; then turn on the power switch of the Super:bit expansion board and wait for the building block servo to turn to the initial position; then, we can turn off the power, adjust the security automatic door to the open state, as shown in the figure below, and then install the blue building block. (If you have used the security automatic door and servo related program before, you can skip this step)





4. Code analysis

For the program of this course, please see the **Soldiers on duty.py** file.

```
from microbit import *
import superbit
import music
```

First, import the libraries needed for this lesson from microbit: the superbit library is dedicated to the superbit expansion board; the music library is used to play tones.

```
superbit.servo270(superbit.S1, 90)
```

superbit.servo270(superbit.S1, 90): Initialize the building block servo to rotate to about 90°. That is, open the door;

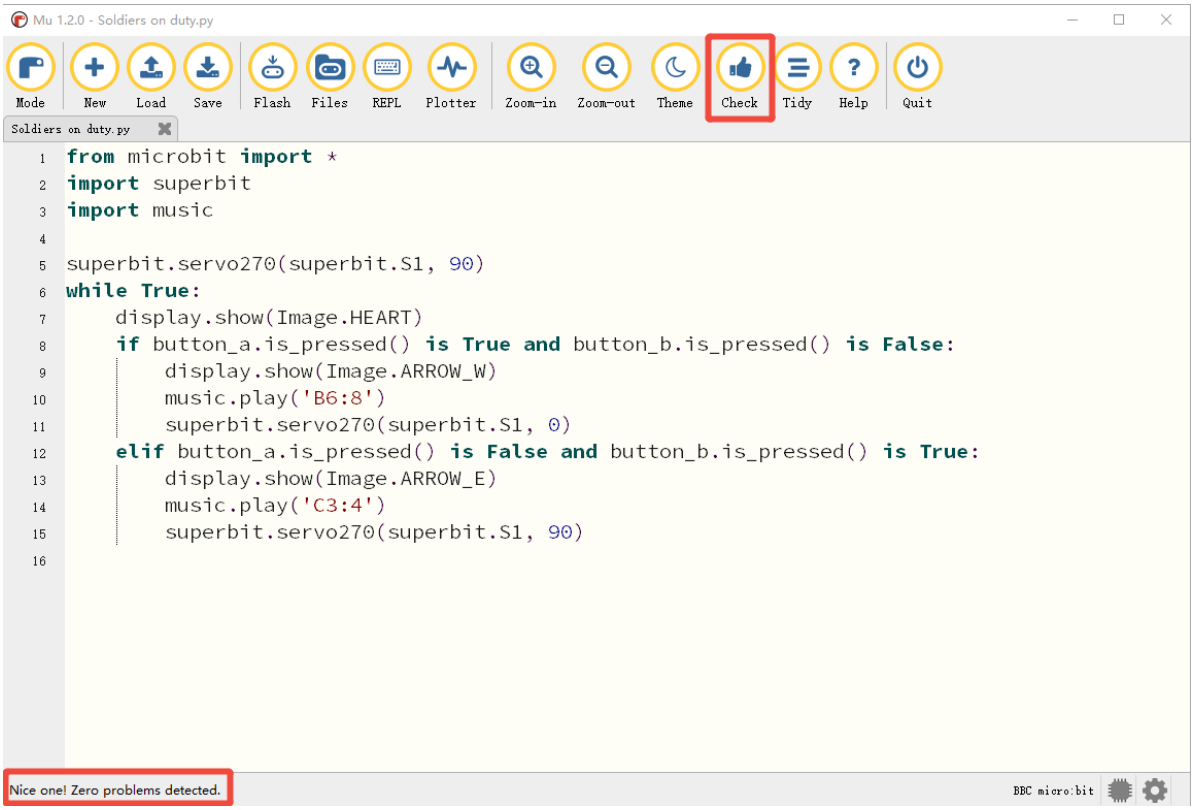
```
while True:
display.show(Image.HEART)
if button_a.is_pressed() is True and button_b.is_pressed() is False:
display.show(Image.ARROW_W)
music.play('B6:8')
superbit.servo270(superbit.S1, 0)
elif button_a.is_pressed() is False and button_b.is_pressed() is True:
display.show(Image.ARROW_E)
music.play('C3:4')
superbit.servo270(superbit.S1, 90)
```

while True: Infinite loop

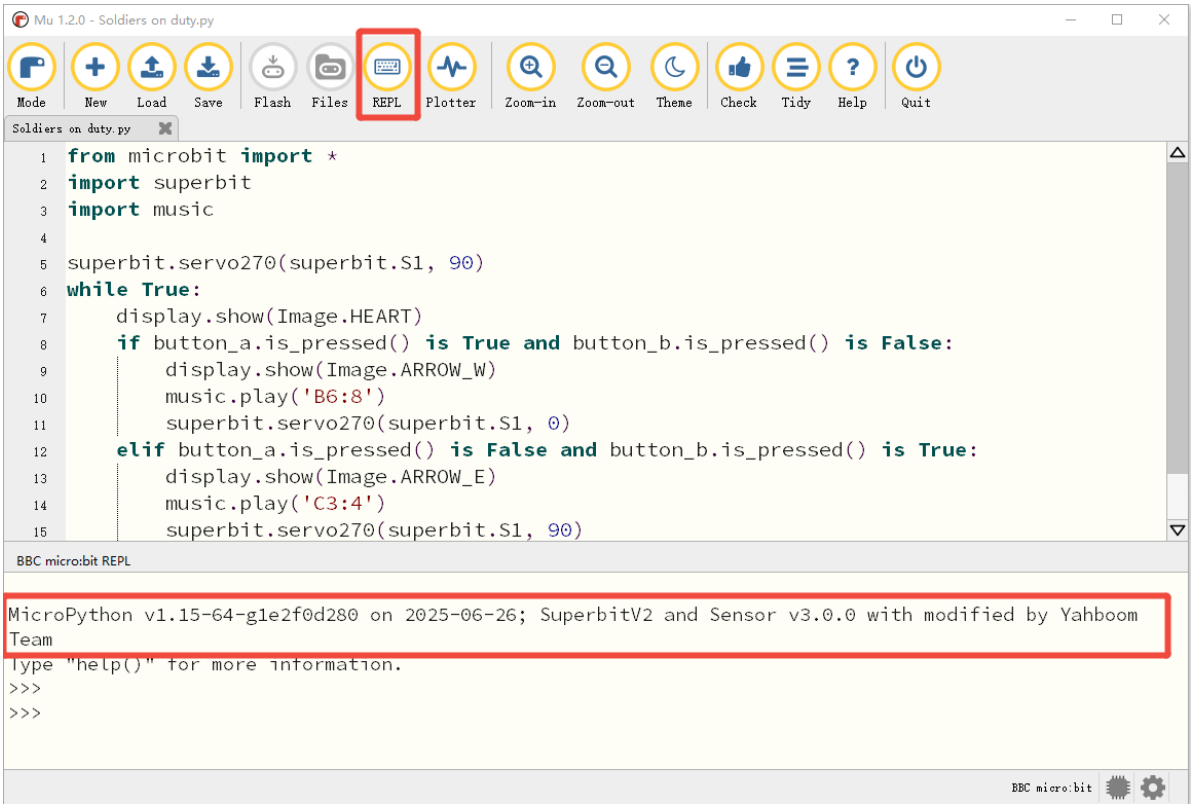
In the infinite loop, determine whether the A and B buttons on the microbit mainboard are pressed. When the micro:bit A button is pressed, the dot matrix displays the direction of the door movement (left), the buzzer beeps shortly, and the security automatic door closes; when the micro:bit B button is pressed, the dot matrix displays the direction of the door movement (right), the buzzer beeps shortly, and the security automatic door opens.

5. Write and download the program

1. Open the Mu software and enter the code in the editing window. **Note! All English and symbols should be entered in English mode, use the Tab key for indentation, and the last line ends with a blank program.**
2. Click the thumb 'Check' button to check if there are any errors in our code. If a cursor or underline appears in a line, it means a syntax error. Please check and modify it. If there is no error, the lower left corner will prompt that there is no problem with the detection.

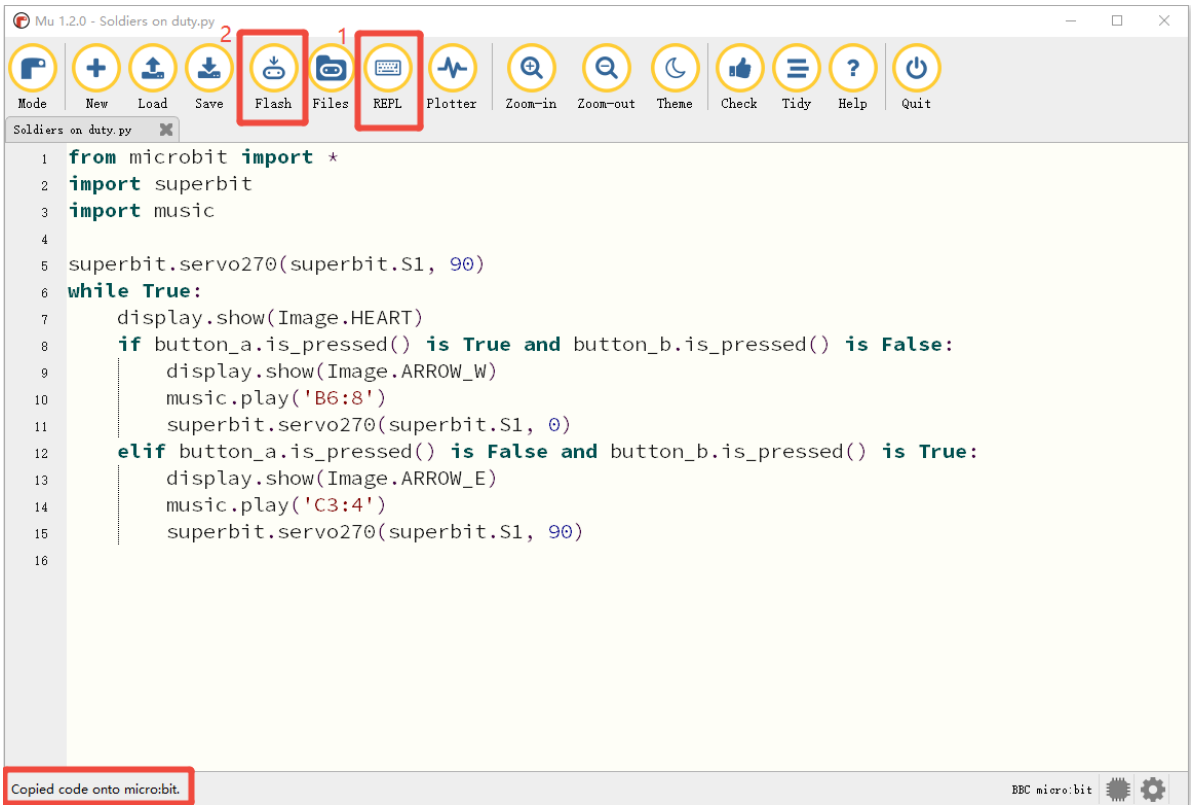


3. Click the 'REPL' button to check whether the Superbit library has been downloaded. If not, please refer to [Preparation before class] --> [2.4 Python Programming Guide].



4. After the program is written, connect the computer and the microbit mainboard with a microUSB data cable, and click the 'Flash' button to download the program to the micro:bit

mainboard. **(You need to click the 'REPL' button again to turn off the import library file function before you can download the program normally).**



5. If the download fails, please confirm whether the microbit is properly connected to the computer via the microUSB data cable and the Superbit Python library has been imported.

6. Experimental phenomenon

After the program is successfully downloaded, the micro:bit dot matrix will display a smiley face. Turn on the power switch. When the micro:bit A button is pressed, the dot matrix displays the direction of the door movement (left), the buzzer beeps shortly, and the security automatic door closes; when the micro:bit B button is pressed, the dot matrix displays the direction of the door movement (right), the buzzer beeps shortly, and the security automatic door opens.

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