Button control shovel

1. Learning objectives

In this course, we mainly learn how to use Python programming to achieve that when the A button on the micro:bit motherboard is pressed, the shovel is placed flat; when the B button on the micro:bit motherboard is pressed, the shovel is unloaded; when the AB buttons on the micro:bit motherboard are pressed at the same time, the shovel is lifted.

2. Building blocks

For the building blocks steps, please refer to the installation drawings of [Assembly course]-[Proficient carrier] in the materials or the building blocks installation album.

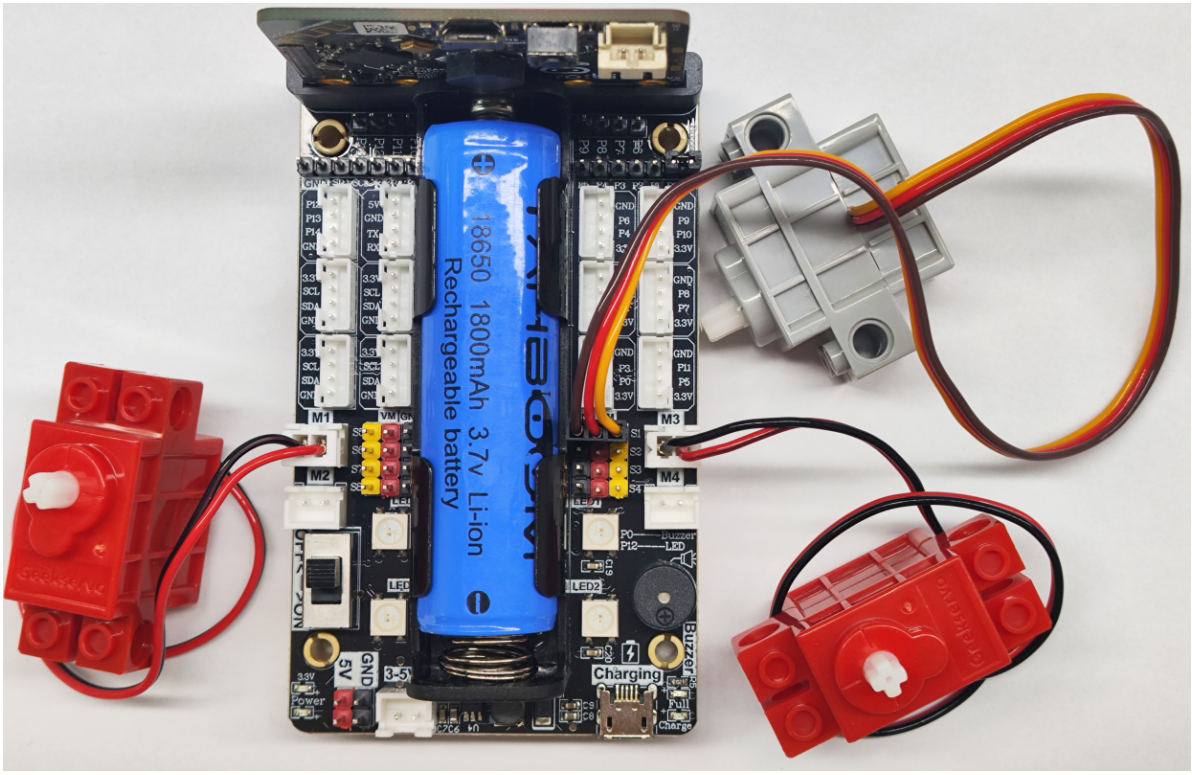
3. Motor wiring

The motor wiring on the left side of the car is inserted into the M1 interface of the Super:bit expansion board, and the black wire is close to the battery side;

The motor wiring on the right side of the car is inserted into the M3 interface of the Super:bit expansion board, and the black wire is close to the battery side;

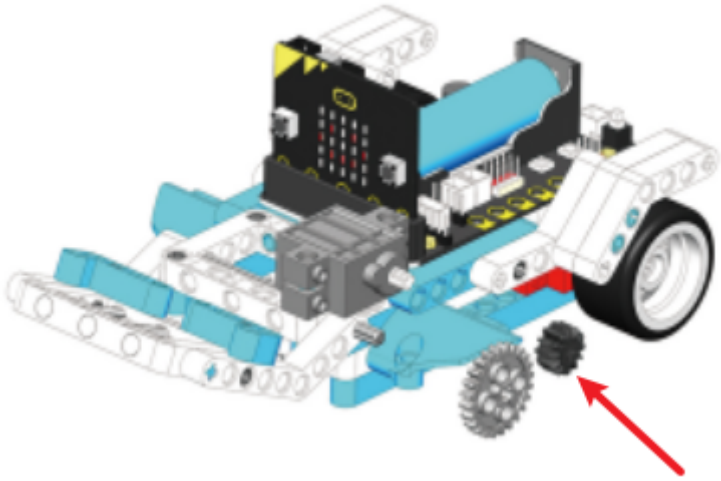
The building blocks servo wiring is inserted into the S1 interface of the Super:bit expansion board, and the orange servo wiring is inserted into the yellow pin of S1.

As shown below:



! Notes:

When taking a course related to the building block servo for the first time, we need to remove the gear on the servo first 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 angle of the shovel of the car to be parallel to the ground, and then install the servo gear. (If you have used the transport expert and servo-related programs before, you can skip this step)



4. Code analysis

For the program of this course, please see the **Button control shovel.py** file.

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

First, import the libraries needed for this lesson from microbit: the superbit library is compatible with the superbit expansion board;

```
display.show(Image.HAPPY)
superbit.servo270(superbit.S1, 120)
```

display.show(Image.HAPPY): Display a smiley face pattern on the microbit dot matrix;

superbit.servo270(superbit.S1, 120): Initialize the building block servo to rotate to about 120°;

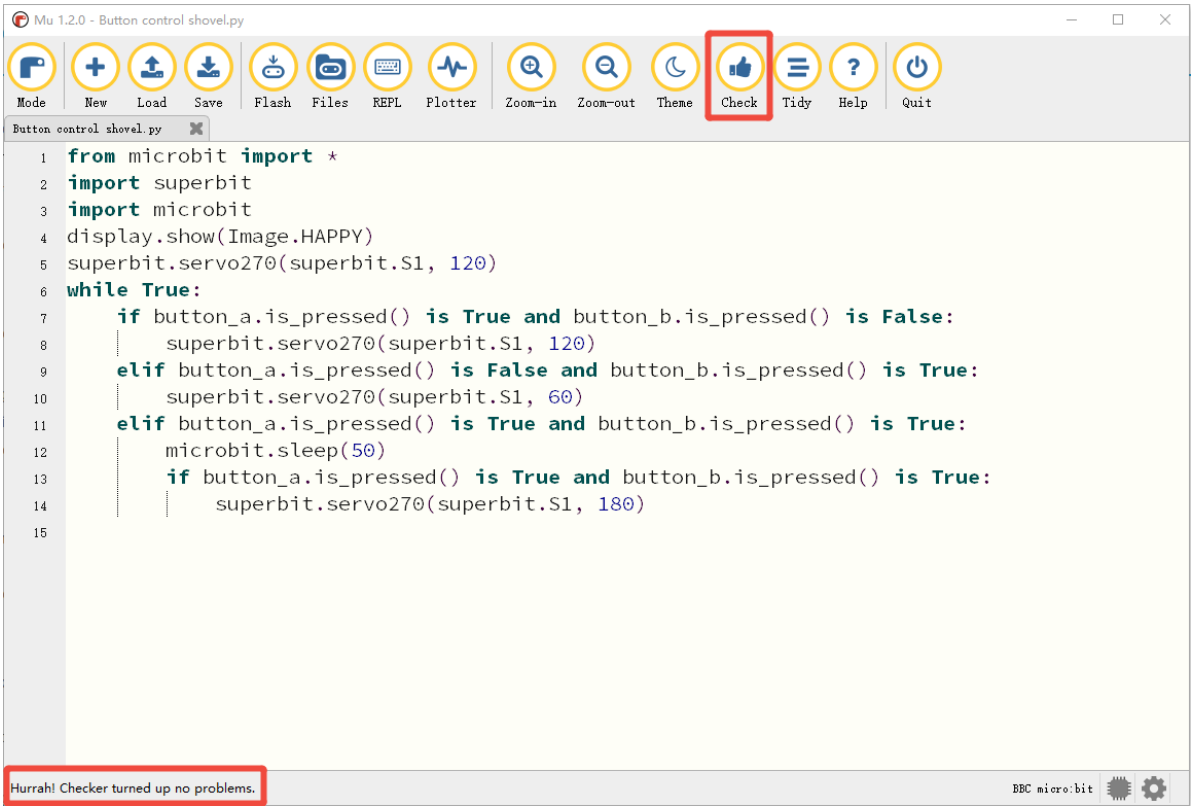
```
while True:
if button_a.is_pressed() is True and button_b.is_pressed() is False:
superbit.servo270(superbit.S1, 120)
elif button_a.is_pressed() is False and button_b.is_pressed() is True:
superbit.servo270(superbit.S1, 60)
elif button_a.is_pressed() is True and button_b.is_pressed() is True:
microbit.sleep(50)
if button_a.is_pressed() is True and button_b.is_pressed() is True:
superbit.servo270(superbit.S1, 180)
```

while True: infinite loop

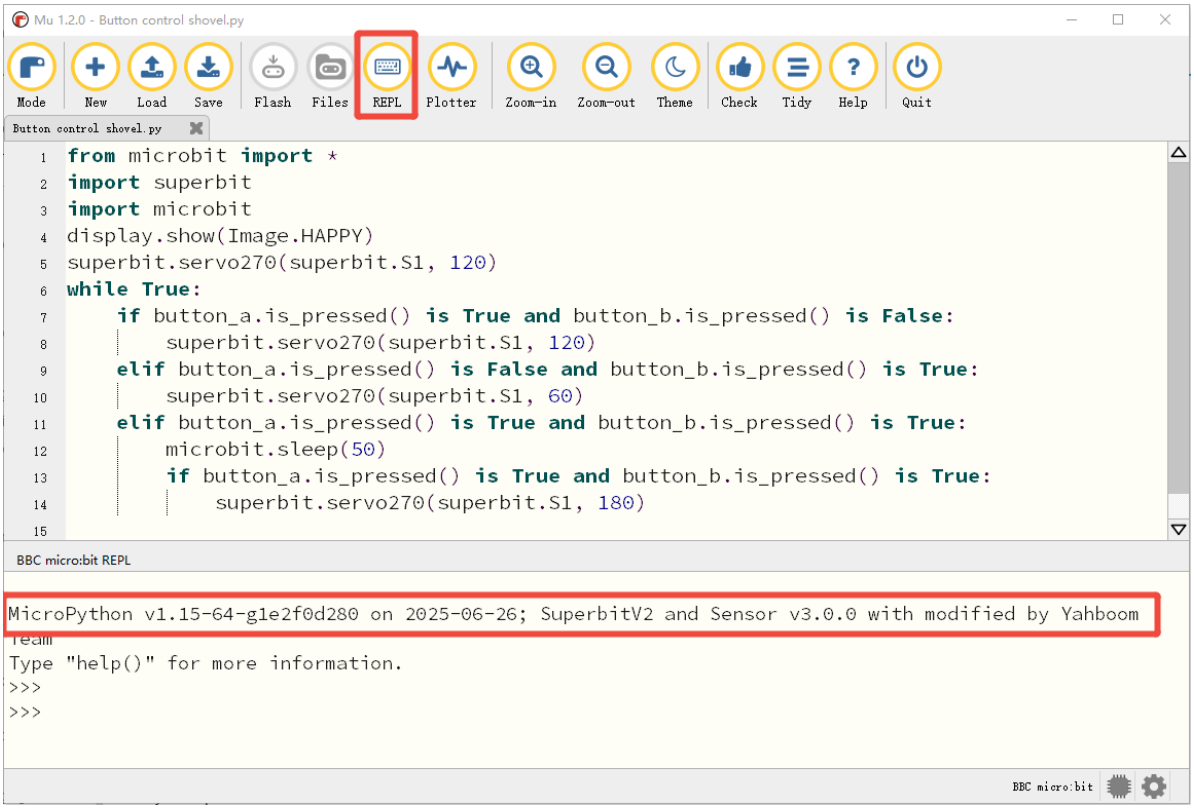
In the infinite loop, determine whether the A and B buttons on the microbit mainboard are pressed. If the A button is pressed, the servo rotates to 120° (the shovel is placed flat); if the B button is pressed, the servo rotates to 60° (the shovel is unloading); if both the AB buttons are pressed, the servo rotates to 180° (the shovel is raised).

5. Write and download the program

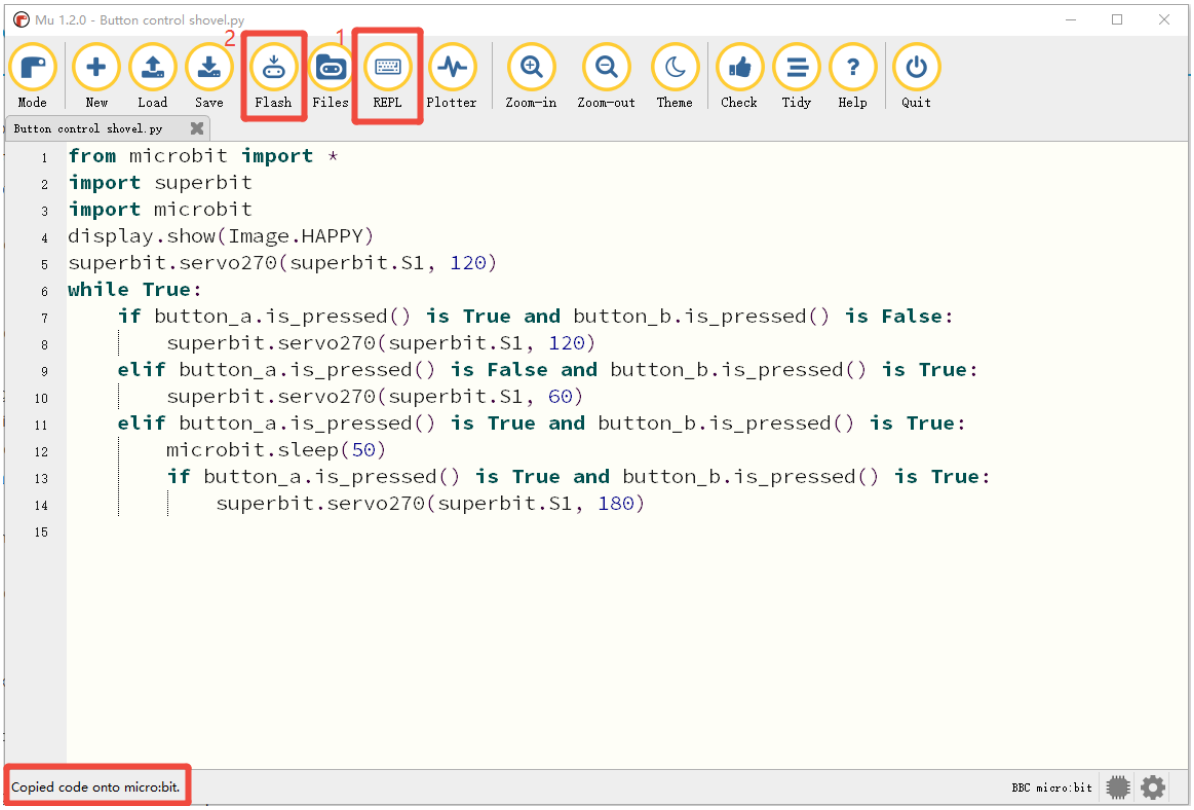
1. Open the Mu software and enter the code in the editing window. **Note! All English and symbols should be entered in English mode, use the Tab key for indentation, and the last line ends with a blank program.**
2. Click the thumb 'Check' button to check whether there are any errors in our code. If 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].



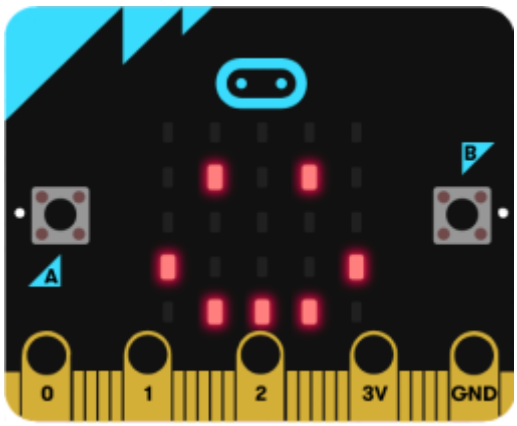
4. After the program is written, connect the computer and microbit mainboard with a microUSB data cable, click the 'Flash' button to download the program to the micro:bit mainboard. **(You need to click the 'REPL' button again to turn off the import library file function before you can download the program normally).**



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

6. Experimental phenomenon

After the program is downloaded successfully, the micro:bit dot matrix will display a smiley face, as shown in the figure below. Turn on the power switch, the catapult will play the music "Ode to Joy", and will move forward-->backward-->rotate left-->rotate right-->turn left-->turn right, the RGB light will switch to different colors, and the projection rod will constantly change position.



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