The dancing spider

1. Learning Objectives

In this course, we mainly learn how to use Python programming to make the building block spider "sing" and "dance" at the same time.

2. Building Blocks

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

3. Motor Wiring

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

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

As shown below:
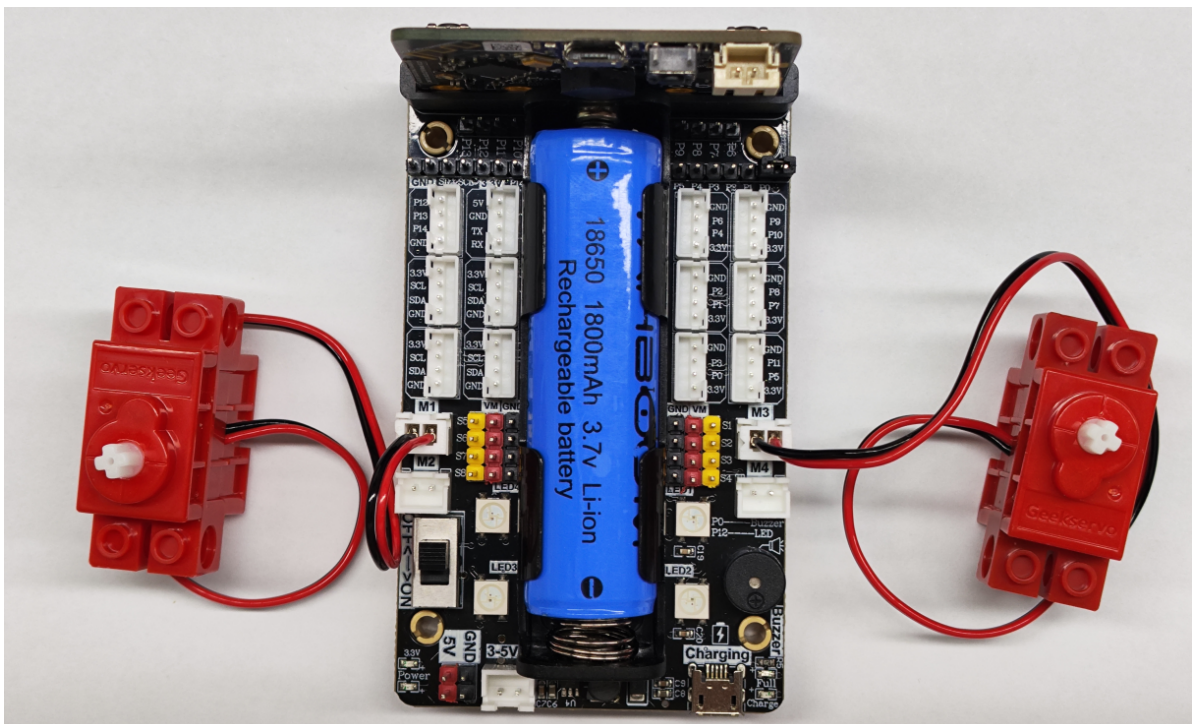
4. Code Analysis

For the program of this course, please see the **The dancing spider.py** file.

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

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 music.

```python
display.show(Image.HAPPY)
```

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

```python
while True:
    music.play('E4:4')
    superbit.motor_control(superbit.M1, 255, 0)
    superbit.motor_control(superbit.M3, 255, 0)
    ...
```

while True: infinite loop

music.play('E4:4'): The buzzer plays a tone. Parameter 1 E4 represents the tone, and parameter 2 4 represents the beat.

superbit.motor_control(superbit.M1, 255, 0): The motor connected to the M1 interface rotates forward at a speed of 255;

superbit.motor_control(superbit.M3, 255, 0): The motor connected to the M3 interface rotates forward at a speed of 255;

.....

This cycle repeats.

About the tone:

I am playing the song "Ode to Joy" here. You can check the simple score of the song on the Internet and then write the corresponding program according to the simple score. For example: music.play('E4:4'), music.play('F4:8') ...
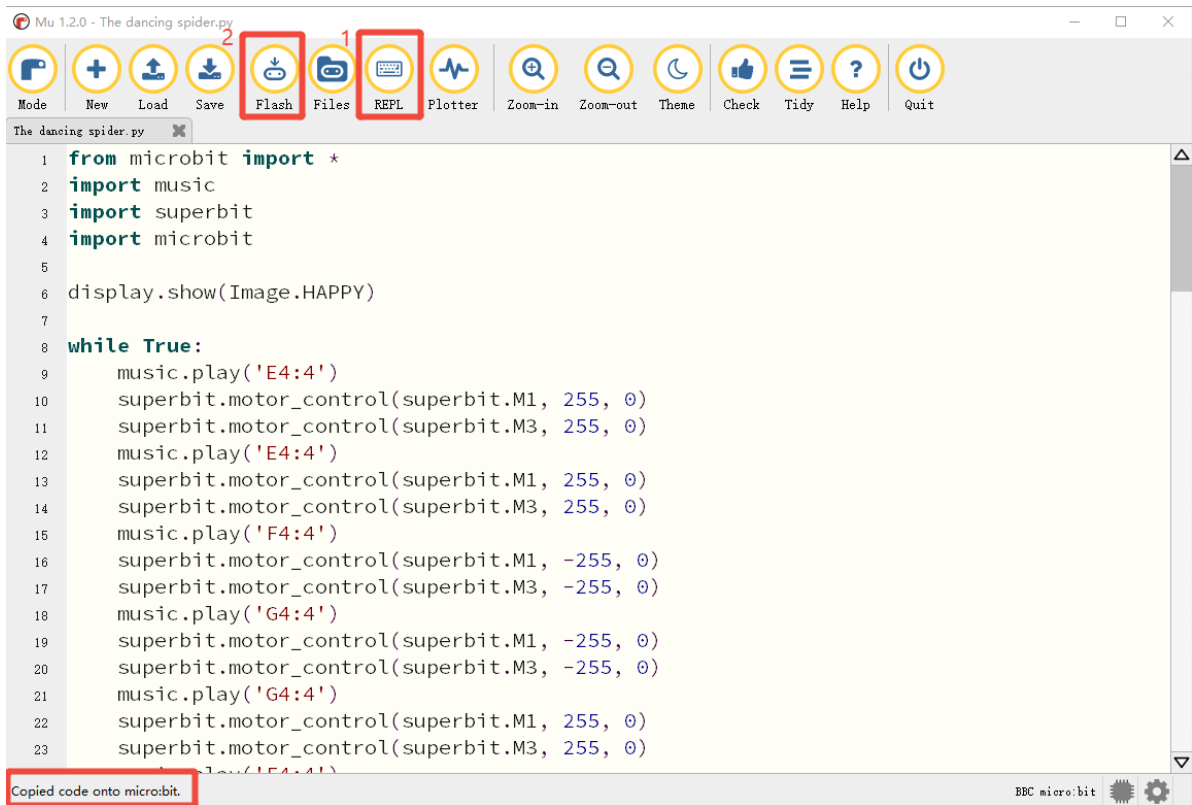
5. Write and download the program

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 (tab key) for indentation, and the last line ends with a blank program.**
2. Click the thumb 'Check' button to check whether our code has any errors. If a cursor or underline appears on 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.
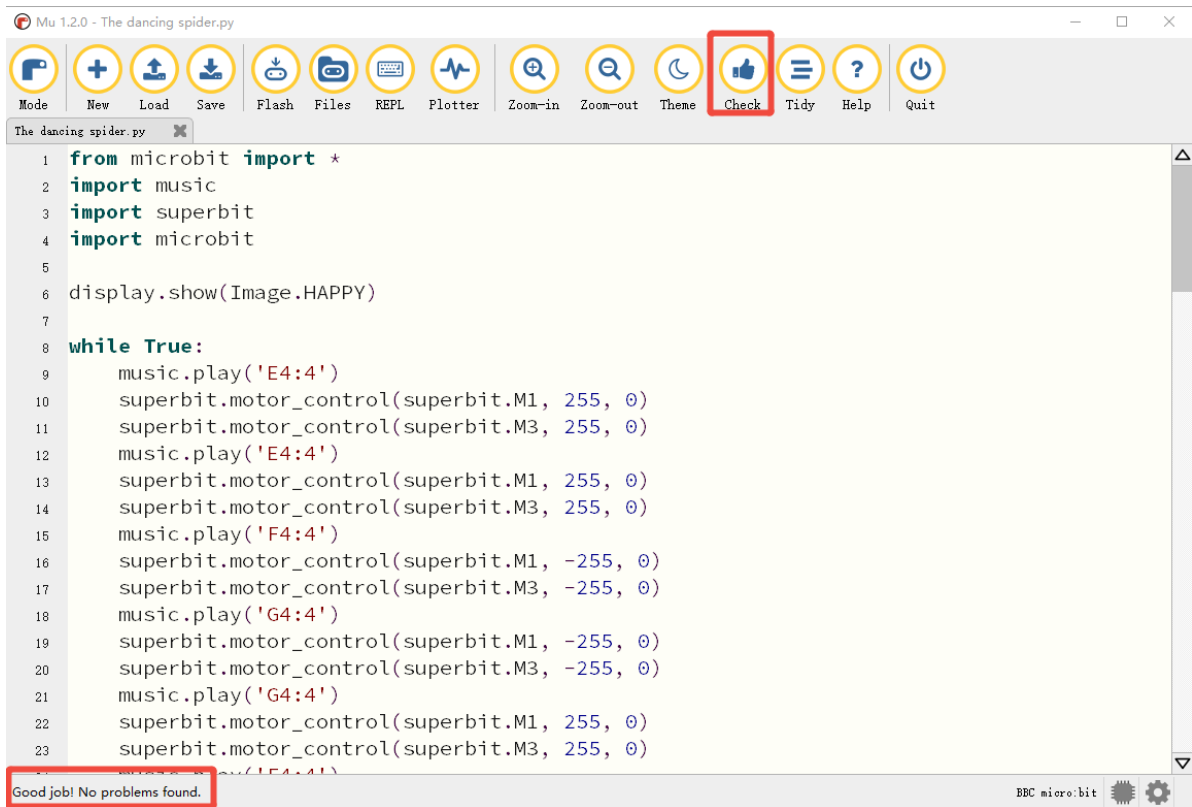
3. Click the 'REPL' button to check whether the Superbit library has been downloaded. If not, please refer to [Preparation before class] --> [2.4 Python Programming Guide].
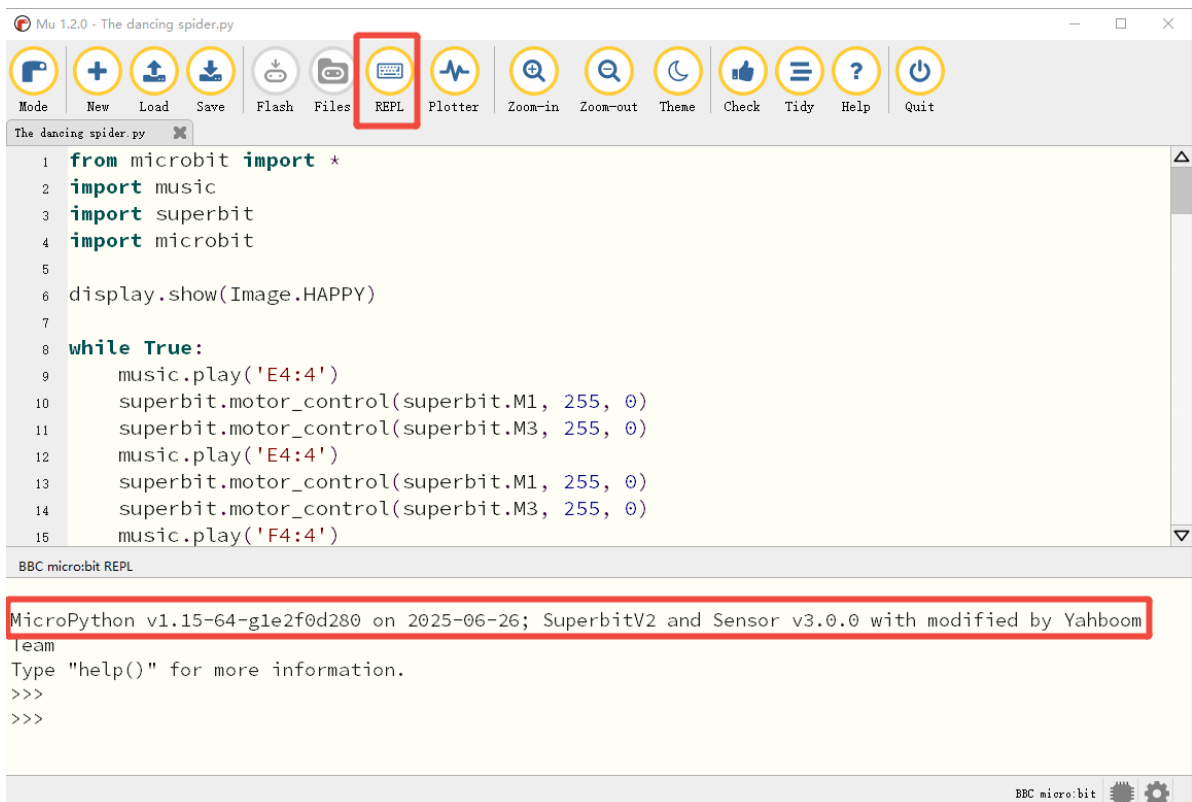

4. After the program is written, connect the computer and the microbit mainboard with a microUSB data cable. Please click the 'Flash' button to download the program to the micro:bit mainboard. **(You need to click the 'REPL' button again to turn off the import library file function before you can download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

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

display.show(Image.HAPPY)

while True:
    music.play('E4:4')
    superbit.motor_control(superbit.M1, 255, 0)
    superbit.motor_control(superbit.M3, 255, 0)
    music.play('E4:4')
    superbit.motor_control(superbit.M1, 255, 0)
    superbit.motor_control(superbit.M3, 255, 0)
    music.play('F4:4')
    superbit.motor_control(superbit.M1, -255, 0)
    superbit.motor_control(superbit.M3, -255, 0)
    music.play('G4:4')
    superbit.motor_control(superbit.M1, -255, 0)
    superbit.motor_control(superbit.M3, -255, 0)
    music.play('G4:4')
    superbit.motor_control(superbit.M1, 255, 0)
    superbit.motor_control(superbit.M3, 255, 0)
```

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, as shown in the figure below. Turn on the power switch, the building block spider will play the music "Ode to Joy" and will move forward-->backward.
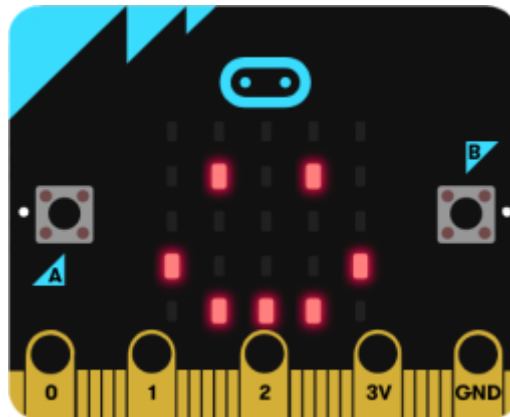
If you need to restart, press the reset button on the back of the micro:bit motherboard.