3. Flowing sand

1. Learning goals

In this lesson, we will learn to use micro:bit to realize the effect of flowing sand.

2.Code and analysis

```
from microbit import *
import microbit

up = Image("00000:"
           "00000:"
           "99999:"
           "99999:"
           "99999")

down = Image("99999:"
             "99999:"
             "99999:"
             "00000:"
             "00000")

left = Image("99900:"
             "99900:"
             "99900:"
             "99900:"
             "99900")

right = Image("00999:"
              "00999:"
              "00999:"
              "00999:"
              "00999")

while True:
    gesture = accelerometer.current_gesture()
    if gesture == "face up":
        display.show(Image.HAPPY)
    elif gesture == "shake":
        display.show(Image.CHESSBOARD)
    elif gesture == "up":
        display.show(up)
    elif gesture == "down":
        display.show(down)
    elif gesture == "left":
        display.show(left)
    elif gesture == "right":
        display.show(right)
```

from microbit import *

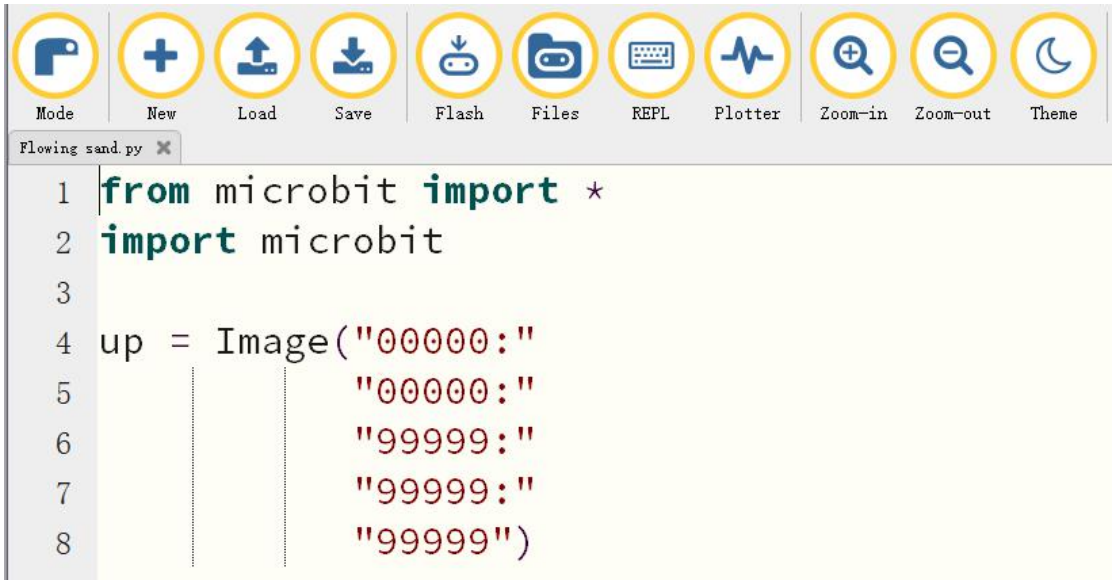
This code is to import everything from the microbit library, and any program need to uses import this library.

Micro:bit has a dot matrix of 5*5 LEDs, and the brightness of each LED on the dot matrix can be set to a value from 0 to 9.
If the brightness of an LED is set to 0, then it goes out.
If its brightness is set to 9, then it is at the brightest level.
We can display a custom image on the micro:bit dot matrix. Based on the pattern required this time, we define four custom patterns and display this pattern.

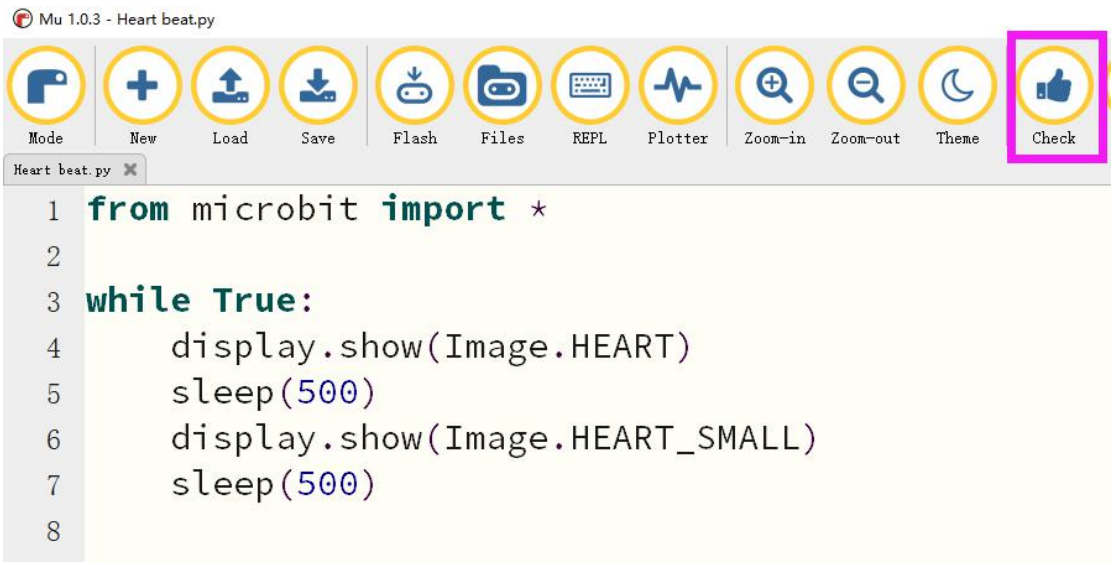
accelerometer.current_gesture()
According to the direction of the microbit position. Get the gesture direction of the current microbit, and return the strings "up", "down", "left", "right", "face up", "face down", etc.

Note:
1 - The capital letter/lowercase letters must be distinguished !
2 - Correct spelling!
3 - Keywords such as # need a space between the content.
4 - You can only use the Tab key (tabulation key) for indentation.

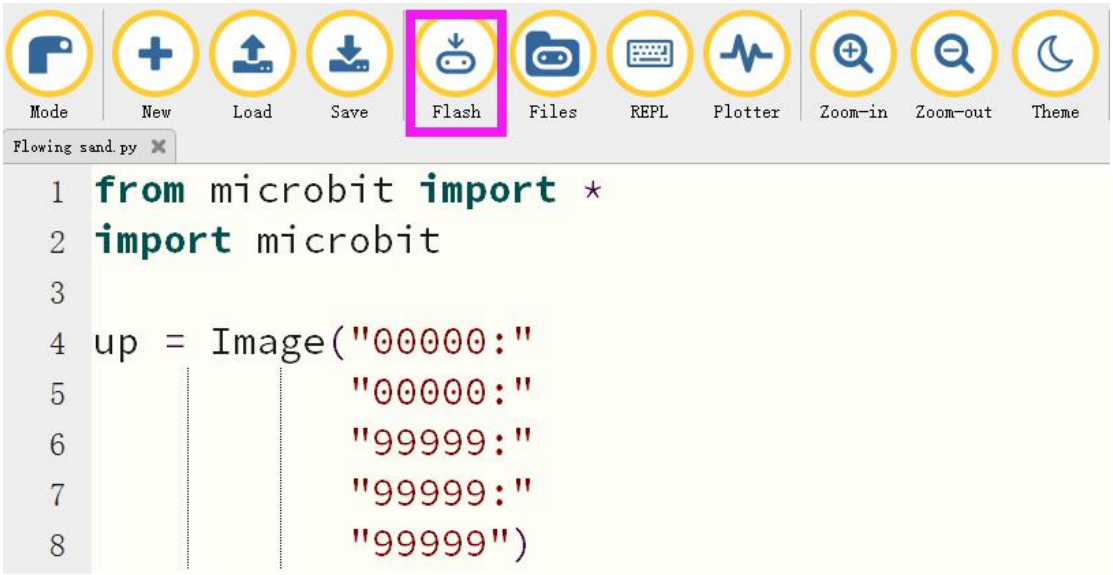
3.Programming and downloading
3.1 You should open the Mu software, and enter the code in the edit window, , as shown in Figure .
Note! All English and symbols should be entered in English, and the last line must be a space.



3.2 As shown in Figure, you need to click the Check button to check if our code has an error. If a line appears with a cursor or an underscore, the program indicating this line is wrong.



3.3 You need to connect the micro data cable to micro:bit and the computer, then click the Flash button to download the program to micro:bit as shown in Figure 2-3.



4. Experimental phenomena

After downloading the program, the micro:bit board will show a smile when you put it upright (dot matrix facing up).

When you shake it to show a plate of loose sand.

When the micro:bit tilts in different directions, the state of the LED on the dot matrix will change, and a plate of flowing sand will sound.