

8. Morning and night

1. Learning goals

In this lesson, we will learn to how to make micro:bit display different patterns according to external light.

2. Code and analysis

```
Morning and night.py x
1 from microbit import *
2 sun = Image("90909:"
3             "09990:"
4             "99999:"
5             "09990:"
6             "90909")
7
8 moon = Image("00990:"
9              "09900:"
10             "09900:"
11             "09900:"
12             "00990")
13
14
15 while True:
16     value = display.read_light_level()
17     if value < 20:
18         display.show(moon)
19     else:
20         display.show(sun)
21     value = 0
22
```

from microbit import *

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

display.read_light_level()

In reverse bias mode, use the LED light of microbit dot matrix to sense the brightness falling on the dot matrix. Returns an integer between 0 and 255.

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.

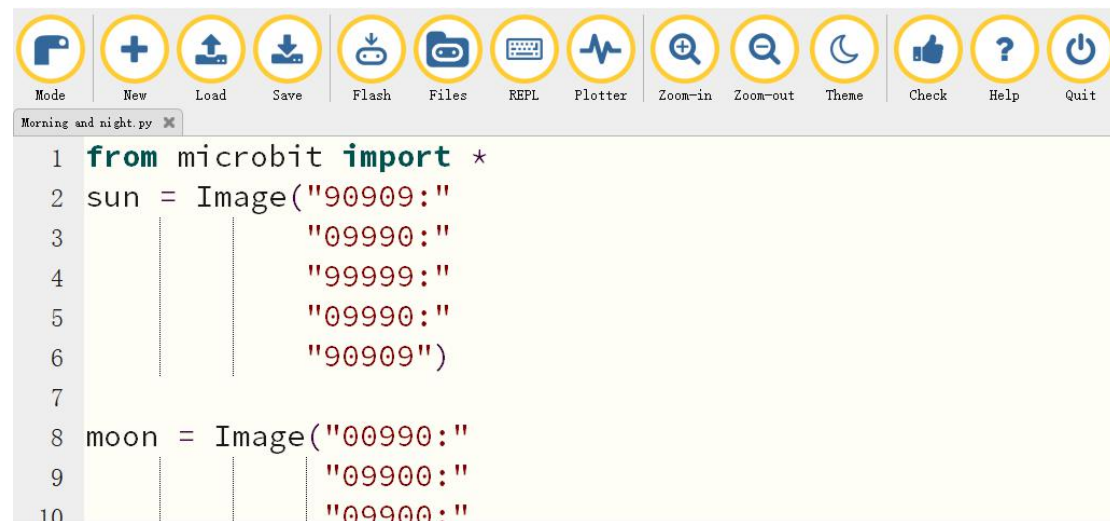
Note:

- 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.

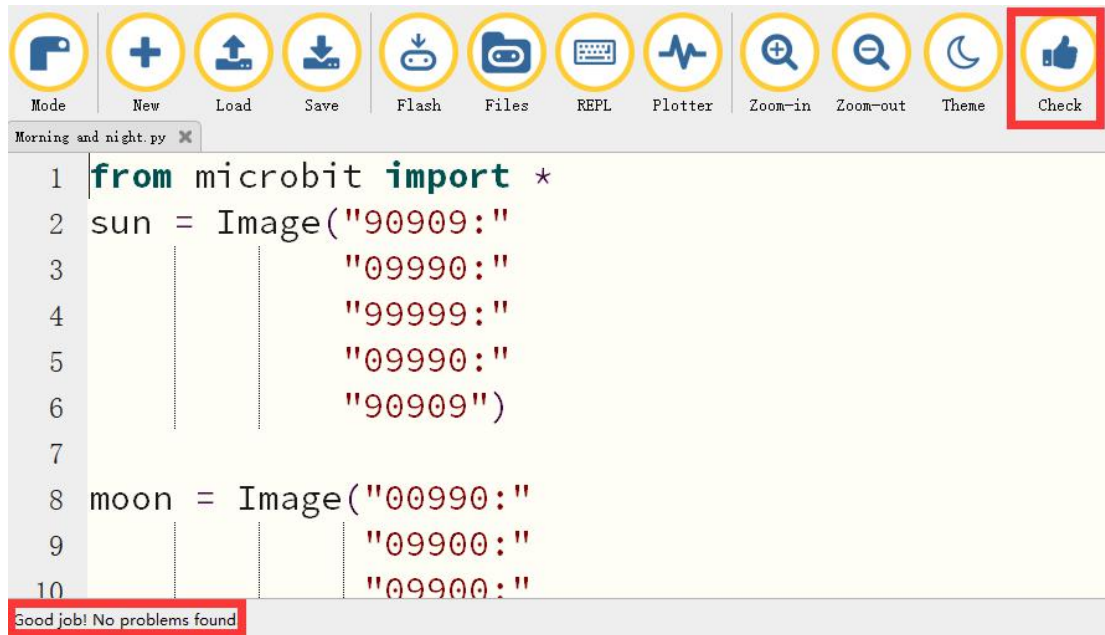
3. Programming and downloading

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

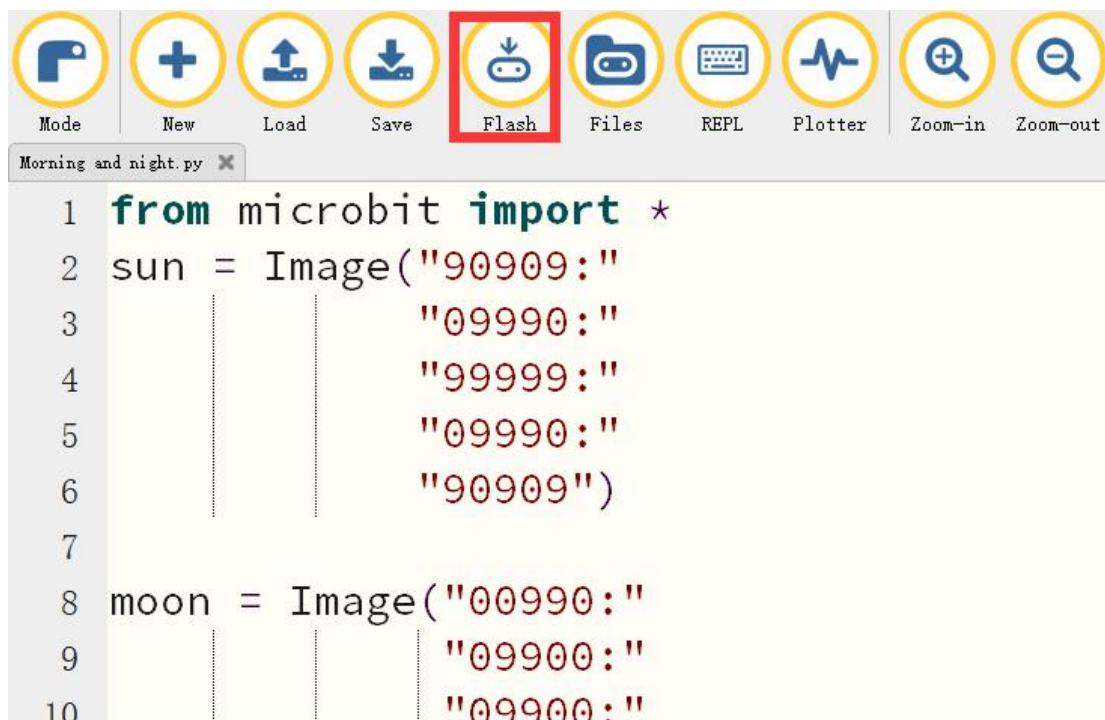
Note! All English and symbols should be entered in English, and the last line must be a space.



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.



4. Experimental phenomena

After the program is successfully downloaded.

When the micro:bit board is in a relatively bright environment, a sun pattern will be displayed on the dot matrix, which means to say "Good morning" to everyone.

When the micro:bit board is in a relatively dark environment, a moon pattern will appear on the dot matrix, which means to say "Good night" to everyone.