# Keyestudio

## Project 6: Compass

## 1. Description

This project mainly introduces the use of the Micro:bit' s compass. It can be used to determine the direction. We need to calibrate the Micro:bit board when magnetic sensor works. The correct calibration method is to rotate the Micro:bit board.

In addition, the objects nearby may affect the accuracy of readings and calibration.

(Compass)

## 2. Components Needed

| | | |
|---|---|---|
|  |  | |
| Micro:bit * 1 | USB Cable * 1 | |

## 3. Test Code

You can upload the code directly from the tutorial (read the "Development Environment Configuration" file if in doubt).

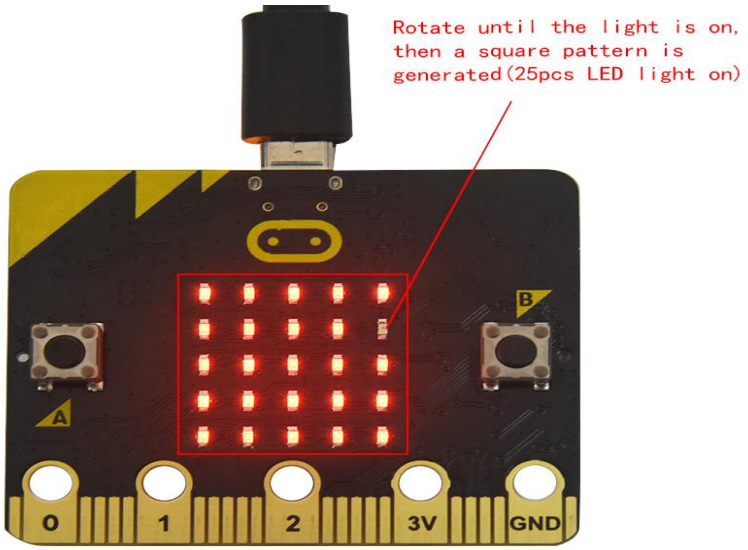
Code1:

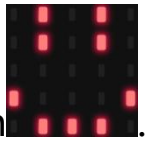
```
from microbit import *


compass.calibrate()


while True:


    if button_a.is_pressed():
        display.scroll(compass.heading())
```

**Code Explanation:** We need to calibrate micro：bit due to different magnetic field in different areas. Micro:bit will prompt you to calibrate when you use it first time.

Transfer code 1 to micro:bit, plug in micro:bit via USB cable and press button A. “TILT TO FILL SCREEN” appears on micro:bit. Then enter the calibration interface, the calibration method is to rotate the micro:bit board and display a full square pattern(25 LEDs are on), as shown in the following figure:

# Keyestudio




The calibration is finished until you view the smile pattern  .

The serial monitor will show 0°, 90°, 180°and 270°  when pressing A.

Code2:

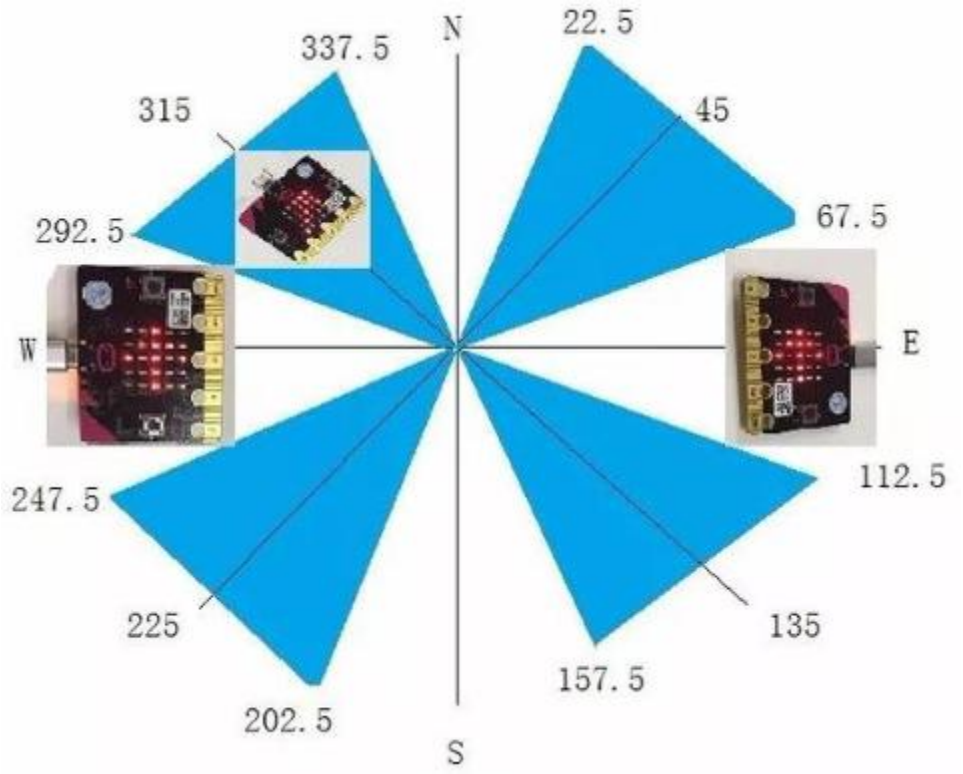
```
from microbit import *
compass.calibrate()
x = 0
while True:
    x = compass.heading()
    if x >= 293 and x < 338:

display.show(Image("00999:""00099:""00909:""09000:""90000"))
```

```
        elif x >= 23 and x < 68:

display.show(Image("99900:""99000:""90900:""00090:""00009"))
        elif x >= 68 and x < 113:

display.show(Image("00900:""09000:""99999:""09000:""00900"))
        elif x >= 113 and x < 158:

display.show(Image("00009:""00090:""90900:""99000:""99900"))
        elif x >= 158 and x < 203:

display.show(Image("00900:""00900:""90909:""09990:""00900"))
        elif x >= 203 and x < 248:

display.show(Image("90000:""09000:""00909:""00099:""00999"))
        elif x >= 248 and x < 293:

display.show(Image("00900:""00090:""99999:""00090:""00900"))
        else:

display.show(Image("00900:""09990:""90909:""00900:""00900"))
```

# Keyestudio

Make micro: bit board point to the north, south, east and west horizontally , LED dot matrix displays the corresponding direction patterns.

As shown below, the arrow pointing to the upper right when the value ranges from 292.5 to 337.5. 0.5 can’ t be input in the code, thereby, the values we get are 293 and 338




Upload code 2 onto micro:bit board and don’ t plug off USB cable. After calibration, tilt Micro:bit board, the LED dot matrix displays the direction signs.

## 4. Code Explanation

| | |
|---|---|
| **from** microbit **import** * | Import the library file of micro:bit |
| compass.calibrate() | Compass calibration |
| **while True:** | This is a permanent loop, which makes micro:bit execute the code of it. |
| **if** button_a.is_pressed():<br>display.scroll(compass.heading()) | When the button A is pressed<br>Micro:bit scrolls to show the value of compass |
| x = 0 | Set variable x=0 |
| x = compass.heading() | Set the value of compass to variable x |
| **if...elif...else** | Set the value of compass to variable x |
| display.show(Image("00999:""00099:""00909:""09000:""90000"))<br>display.show(Image("99900:""99000:""90900:""00090:""00009"))<br>display.show(Image("00900:""09000:""99999:""09000:""00900"))<br>display.show(Image("00009:""00090:""90900:""99000:""99900"))<br>display.show(Image("00900:""0090 | Micro:bit shows the Northeast arrow sign<br>Micro:bit shows the Northwest arrow sign<br>Micro:bit shows the west arrow sign<br>Micro:bit shows the Southwest arrow sign<br>Micro:bit shows the Southeast arrow sign |

| | |
|---|---|
| 0:""90909:""09990:""00900"))<br>display.show(Image("90000:""0900<br>0:""00909:""00099:""00999"))<br>display.show(Image("00900:""0009<br>0:""99999:""00090:""00900"))<br>display.show(Image("00900:""0999<br>0:""90909:""00900:""00900")) | Micro:bit shows the South arrow sign<br>Micro:bit shows the East arrow sign<br>Micro:bit shows the North arrow sign |