Mission: Environment Detective - Exploring Our World with micro:bit

Overview

Ever wondered how we can use technology to understand the world around us? In this exciting project, you will become an environmental detective using your micro:bit's built-in superpowers!

Just like our five senses help us explore the world, your micro:bit has special sensors that can tell you:

- How warm or cold it is using its temperature sensor
- How bright or dark it is using its light sensor
- Which direction you're facing using its compass

What you will Learn

- [ ] Display temperature readings
- [ ] Create a light meter that reacts to brightness
- [ ] Build a digital compass to find your way

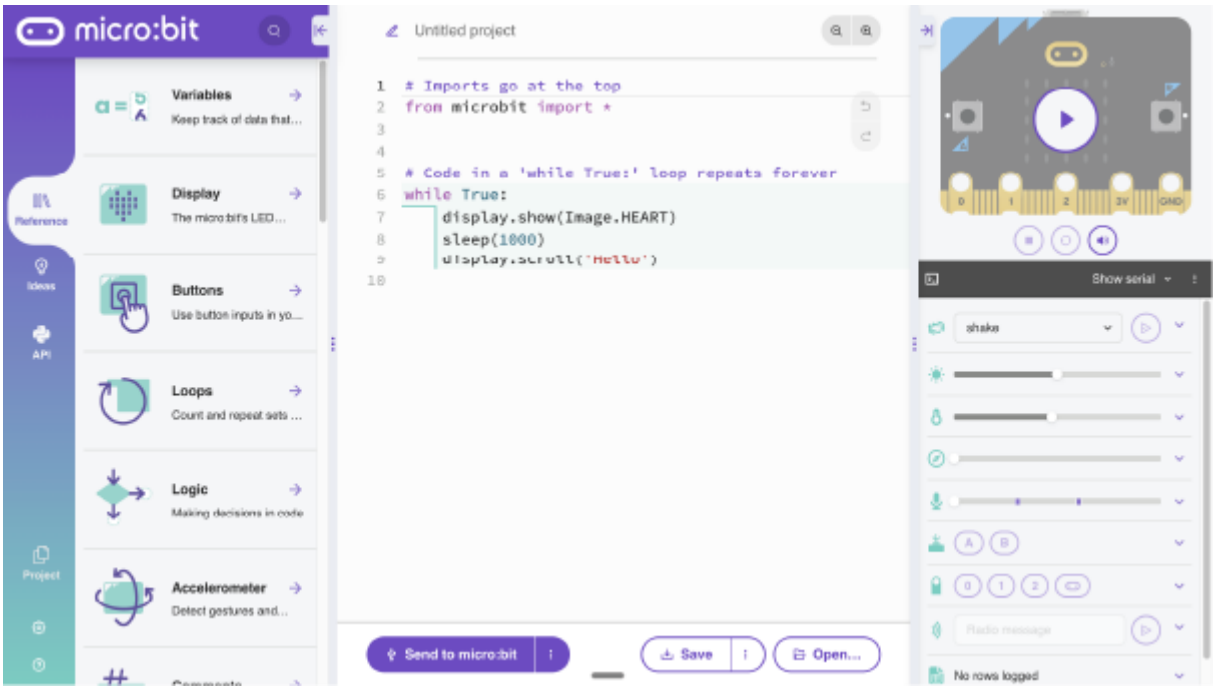
What you will Need

- 1 x micro:bit
- 1 x micro USB cable
- 1 x battery pack for the micro:bit (optional)

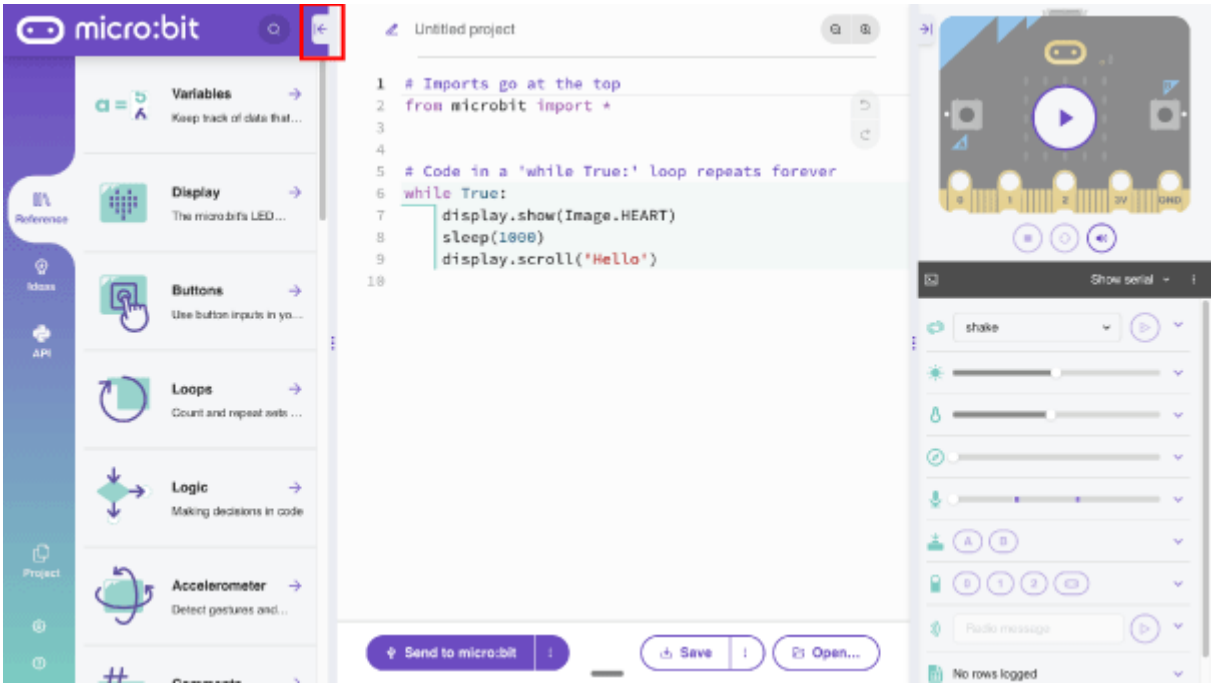
Are you ready to start exploring? Let's begin our environmental adventure!

Navigating to the Python

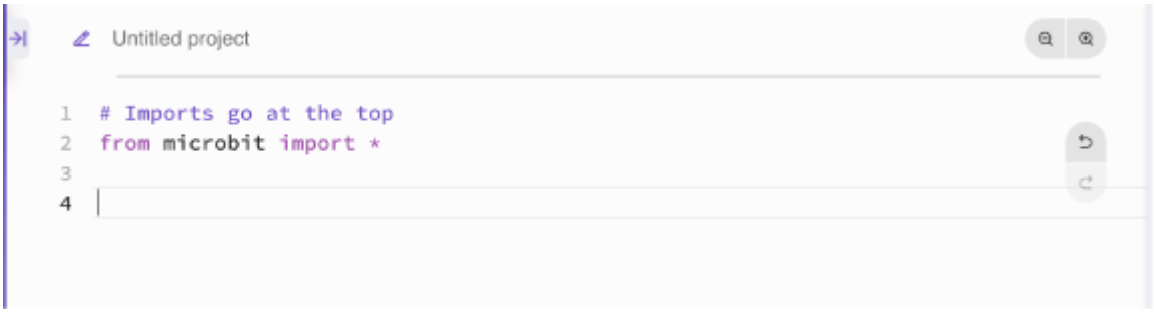
1. Open your favourite browser (we recommend Google Chrome).
2. Within the address bar of the browser type python.microbit.org or on a tablet or phone press create code.



3. Close the left hand panel by selecting the arrow pointing to the left. See the image below.



4. Delete the code from line 5 -9 on the main code area.



We are now ready to start coding!

Coding

Creating the while True loop

Type the following line of code under `from microbit import *`

```
while True:
```

Once you press enter your cursor will automatically indent. Start typing the rest of your code from here.

Temperature Sensing

Type the following code, which will enable us to detect the temperature when we shake the micro:bit.

```
if accelerometer.is_gesture('shake'):
    display.scroll(temperature())
```

Light Sensing

Type the following code, which will enable us to detect the light level of our environment. Make sure that the cursor is lined up with the `if`.

```
if button_a.is_pressed():
    if display.read_light_level() < 100:
      display.show(Image.HAPPY)
    else:
      display.clear()
    sleep(2000)
```

Compass Sensing

Type the following code, which will allow us to detect the direction we are facing. Make sure the cursor is lined up with `if button_a.is_pressed():`.

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

Completed Code

```
# Imports go at the top
from microbit import *

while True:
  if accelerometer.is_gesture('shake'):
    display.scroll(temperature())
  if button_a.is_pressed():
    if display.read_light_level() < 100:
```

```
        display.show(Image.HAPPY)
      else:
        display.clear()
      sleep(2000)
    if button_b.is_pressed():
      display.scroll(compass.heading())
```

We are now ready to download the code to our micro:bit so we can go out and sense our environment.

Downloading the code

Pairing the micro:bit to your computer

1. Take the micro USB cable and connect the micro:bit to the computer.
2. Select the **3 little dots** next to **send to micro:bit**.

3. Select **Connect** and follow the on screen prompts.

Downloading code to the micro:bit

Select **Send to micro:bit** to download the code to your micro:bit.

Lets move on to see how to play.

How to Play

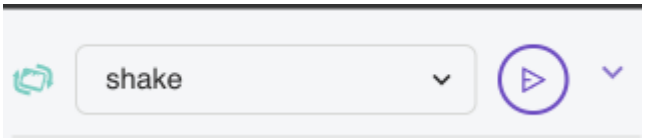
Well done you have created your very own environment sensing micro:bit.

Web Browser

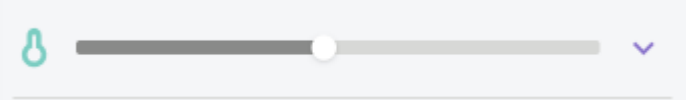
The Python Editor has a built-in micro:bit simulator so you can use this if you don't have a micro:bit handy.

Temperature Sensing

Under the micro:bit simulator you will see that the shake function is selected and if you click on the play button next to it this will simulate the micro:bit being shaken and display the temperature on screen.

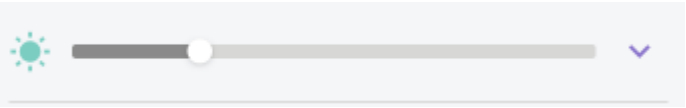


We can also edit the temperature reading by moving the slider next to the little thermometer.



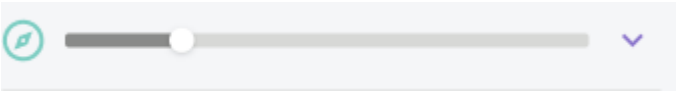
Light Sensing

Below the micro:bit simulator you will see a **sun** icon. We can move this slider to simulate light levels. When the slider is below 100 we will get a smiley face displayed on the LED matrix when we press the A button. If the slider is above 100 the LED matrix will remain blank.



Compass Sensing

Below the micro:bit simulator you will see a **compass** icon. We can move this slider to simulate the compass reading then we can display the reading on the LED matrix when we press the B button.



Using the micro:bit

Temperature Sensing

Shake the micro:bit to get a temperature reading on the LED matrix.

Light Sensing

When the light level is below 100 we will get a smiley face displayed on the LED matrix when we press the A button. If the Light Level is above 100 the LED matrix will remain blank.

Compass Sensing

Press the B button to detect which direction we are facing.

> NOTE
> If you are using the compass for the first time, you will get a message to move the micro:bit around to light every LED up on the LED matrix. This is to calibrate the micro:bit to get an accurate as possible compass reading.

Now go around different room/outdoors to see the difference in temperature and light level.