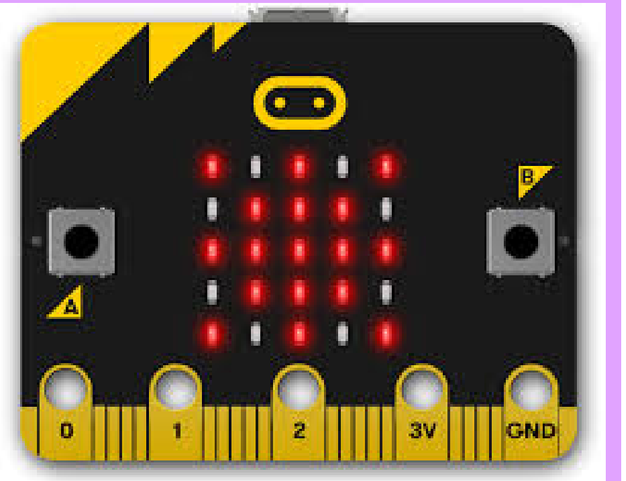
Code and simulate micro:bits in Tinkercad



Lesson Objectives

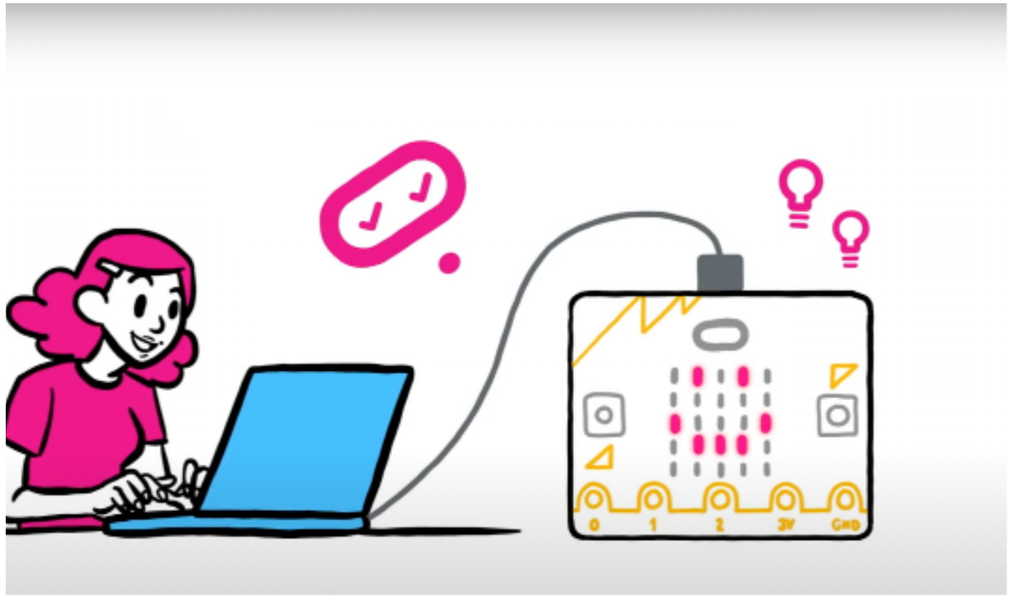
- Use Python coding to display simple shapes (e.g., heart, smiley face) on the Micro:bit LED screen so that students you creatively express ideas and reinforce coding logic through visual feedback

Keywords

program	sequence of instructions that can be used to control electrical components
sensor	a device that can detect and monitor changes
simulate	to imitate a product or process to test it

What is a micro:bit?

- A tiny computer
- You tell it what to do by writing instructions in code
- The code is an algorithm, a sequence
- of instructions.
- The micro:bit can show words on its LED display output.
- You can unplug your micro:bit, attach a battery pack and the code still works



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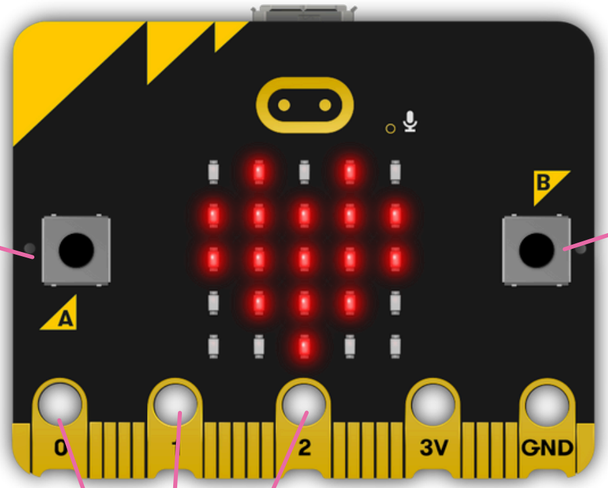
Code a light sequence

The micro:bit has several inputs and sensors which are built in.



button A

button B

three connector pins
(input or output)

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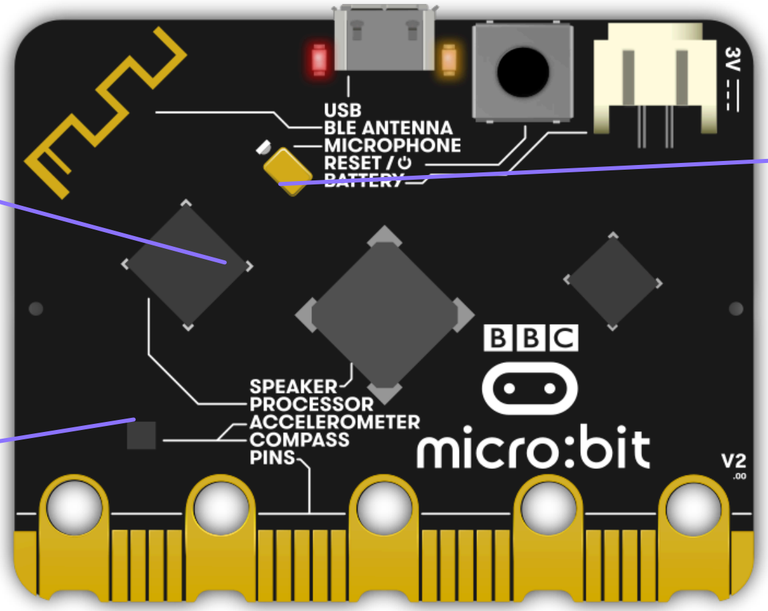
Code a light sequence

We can see more inputs and sensors on the reverse of the micro:bit.

processor and temperature sensor

accelerometer



microphone

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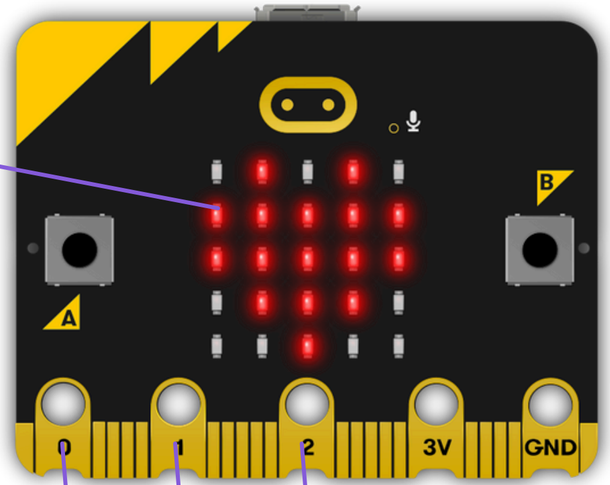
Code a light sequence

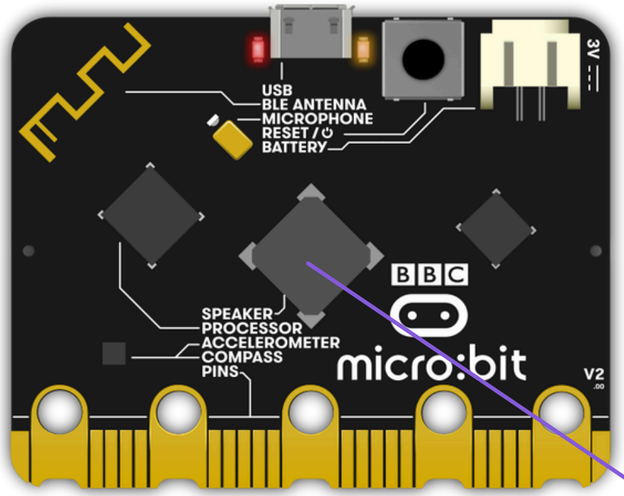
It also has several output devices built in.

front

back

LED matrix





Speaker

three connector pins
(input or output)

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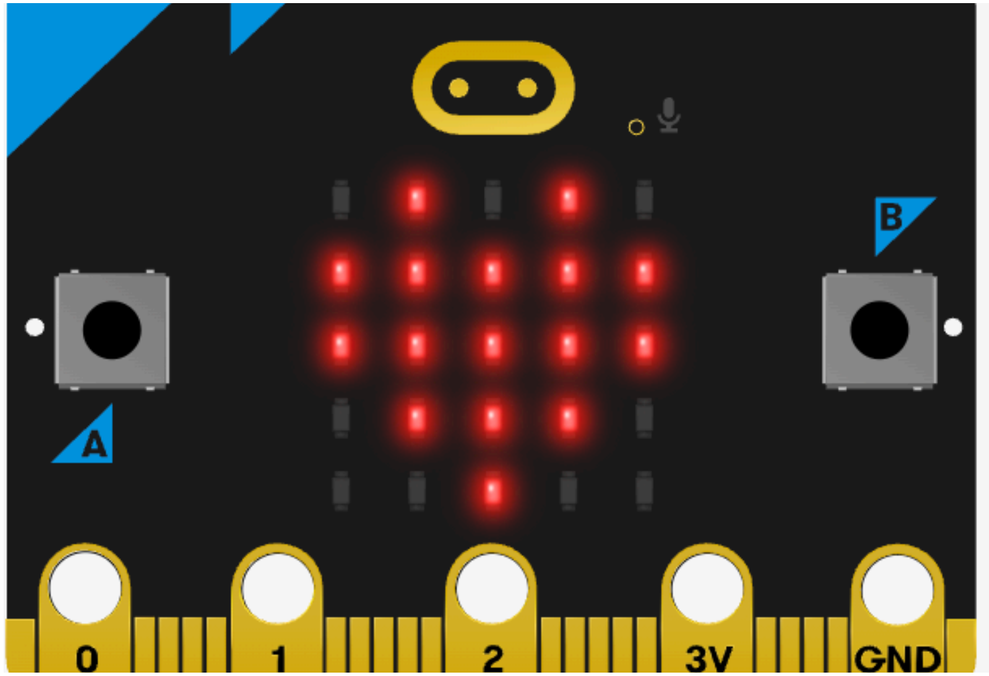
Code a light sequence

When designing a control system using a micro:bit, a decision has to be made about whether to use the onboard and built in inputs and outputs or the connector pins to connect components.

Code a light sequence

To program the inbuilt LEDs to flash an X on and off, the code would look like this.

```
1  # Imports go at the top
2  from microbit import *
3
4  while True:
5          display.show(Image.HEART)
6          sleep(1000)
7
8
9
0
```



Activity 1 Code a light sequence

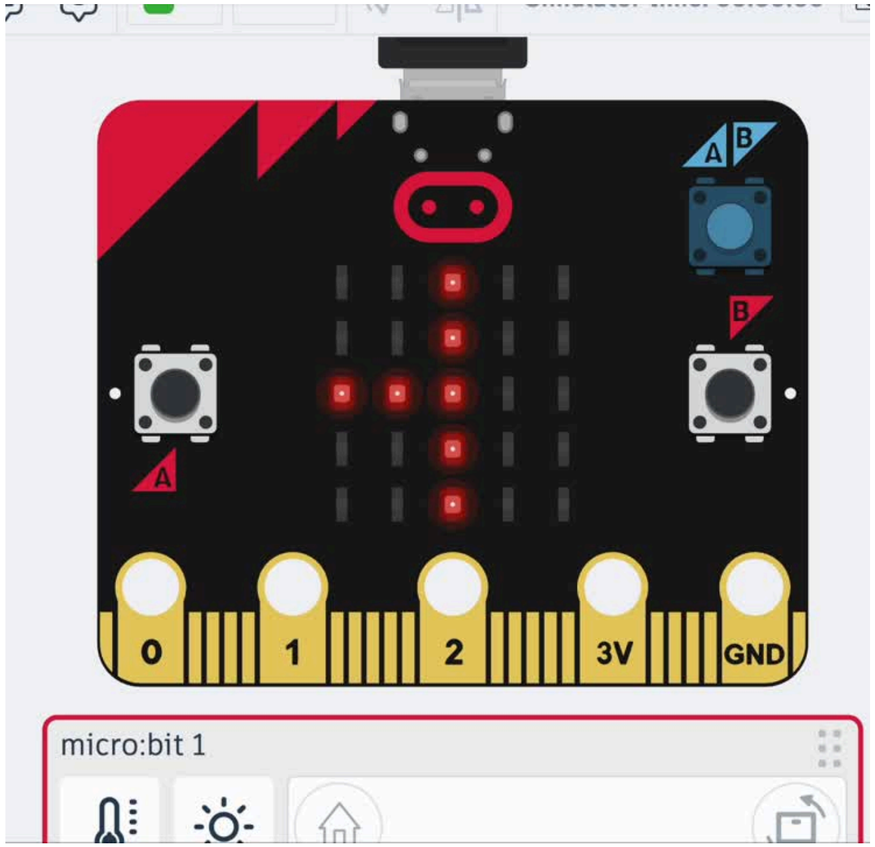
```
# Imports go at the top
from microbit import *

while True:
    display.show(Image.HEART)
    sleep(1000)
```

1. Amend the program to show a different LED shape as the output and change this to be off when it is light and on when it is dark, explain how you did this.
2. simulate your code by clicking start simulation button at the top

Code a light sequence

You can also light up the in built LED’s and show a word for example: Hello!

```
1  # Imports go at the top
2  from microbit import *
3
4  while True:
5      display.scroll('Hello')
6      sleep(1000)
7
8
9
10
```



Activity 2 Code a light sequence

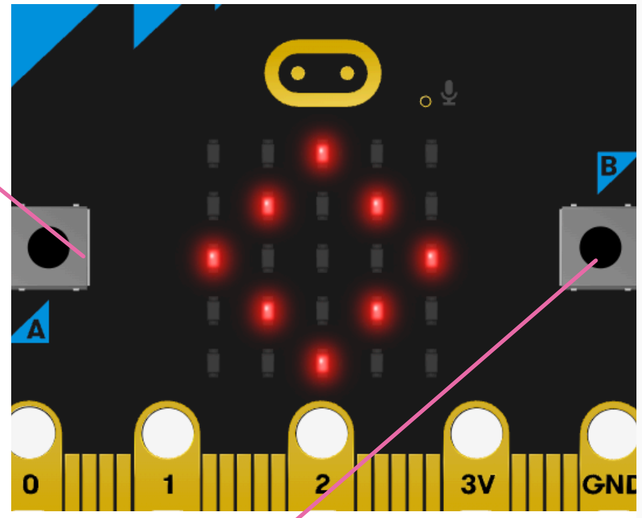
```
1  # Imports go at the top
2  from microbit import *
3
4  while True:
5      display.scroll('Hello')
6      sleep(1000)
7
8
9
10
```

1. Amend the program to show a different LED word
2. simulate your code by clicking start simulation button at the top

Code a light sequence

You can also program your microbit so it can take input in this case the button a and button b.

button a



button b

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

while True:
    if button_a.is_pressed():
        display.show(Image.DIAMOND)
        sleep(1000)
    elif button_b.is_pressed():
        display.scroll('nice')
        sleep(1000)

```

Activity 3 Code a light sequence

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

while True:
    if button_a.is_pressed():
        display.show(Image.DIAMOND)
        sleep(1000)
    elif button_b.is_pressed():
        display.scroll('nice')
        sleep(1000)

```

1. Amend the program to show a different LED word and image
2. simulate your code by clicking start simulation button at the top

Extension: apart from buttons you can also add pin