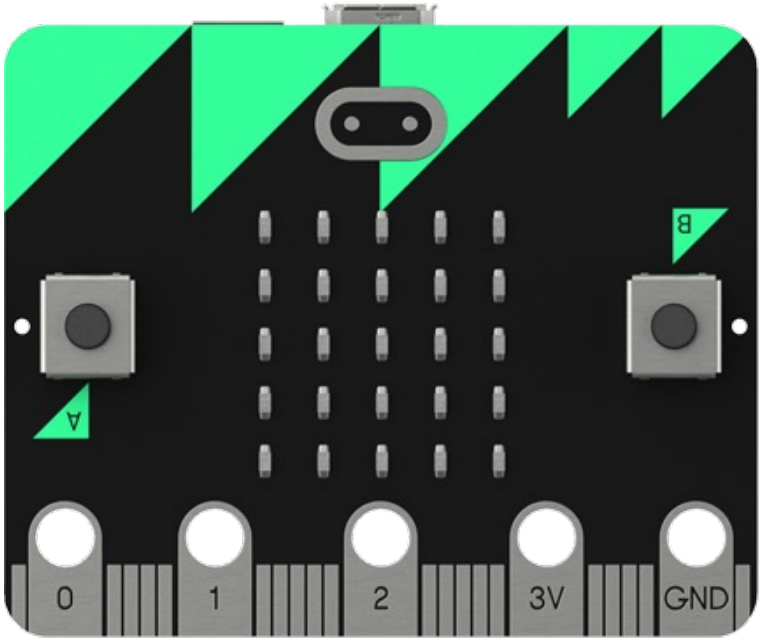
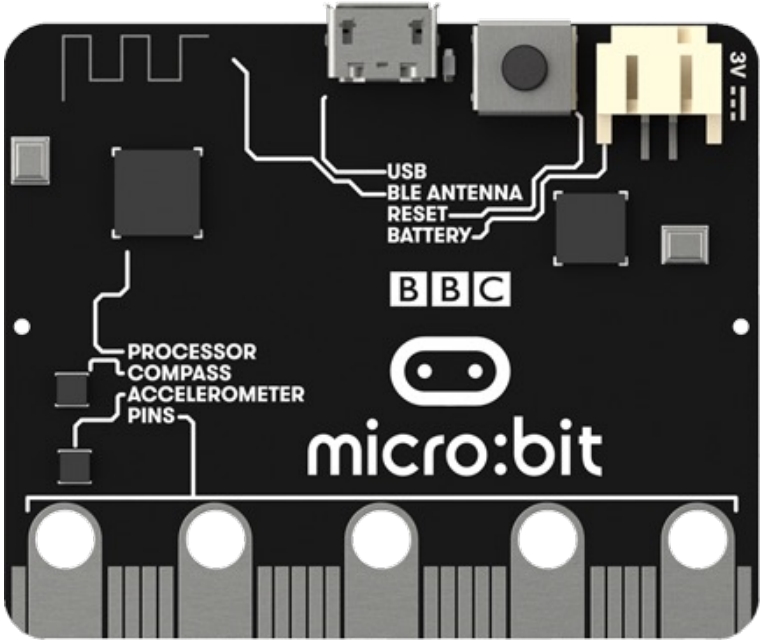
BBC Micro:bit





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Lesson 2

Variables and Lists

Variables

When programming it is often necessary to store a value for use later on in the program.

A variable is a label given to a location in memory containing a value that can be accessed or changed.

Think of a variable as a box with a label that you can store information in.

Drawing Your Own Images

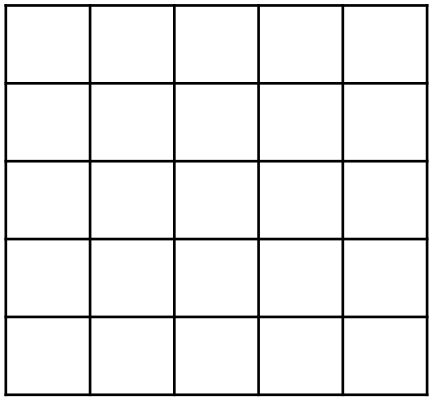
Each LED pixel on the micro:bit display can to set to one of ten values (0 to 9). 0 is off and 9 is the brightest setting.

```
from microbit import *

pattern = Image("05050:50505:05050:50505:05050")

display.show(pattern)
```

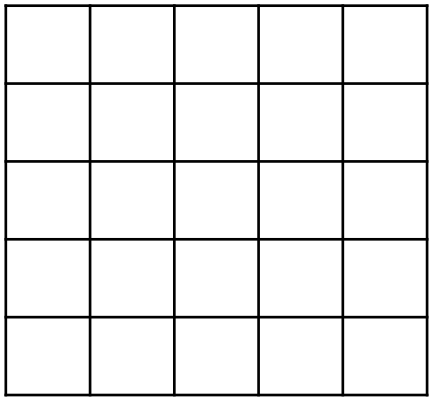
This program creates a checkerboard image and stores it in a variable called pattern. It then displays the image on the LED display. Try it for yourself.

Activity 2.1

Design your own image that you could display on the micro:bit by shading in the cells in the grid.



Turn your design into a form the micro:bit will understand by placing a number between 0 and 9 in each cell.



Activity 2.2

Create a program that will display the image you designed in Activity 2.1. Use the code shown below as a starting point:

```
from microbit import *

pattern = Image("05050:50505:05050:50505:05050")

display.show(pattern)
```

Place a screenshot of your code here.

Activity 2.3

Define two more custom images and display them with a pause between each one. Use this code as a starting point:

```
from microbit import *

pattern1 = Image("05050:50505:05050:50505:05050")
pattern2 = Image("50505:05050:50505:05050:50505")

display.show(pattern1)
sleep(1000)
display.show(pattern2)
```

Place a screenshot of your code here.

Lists

Lists in Python allow you to store multiple items, for example images. If you store a set of images in a list you can tell Micro Python to animate the list.

This example program uses a list to store the happy, sad and angry images. It them animates them with a delay of 0.1 seconds between each image. Try it yourself.

```
from microbit import *
faces = [Image.HAPPY,Image.SAD,Image.ANGRY]
display.show(faces, loop=True, delay=100)
```

Built In Images

Here is a list of the built in images in Micro Python:

```
Image.HEART
Image.HEART_SMALL
Image.HAPPY
Image.SMILE
Image.SAD
Image.CONFUSED
Image.ANGRY
Image.ASLEEP
Image.SURPRISED
Image.SILLY
Image.FABULOUS
Image.MEH
Image.YES
Image.NO
Image.TRIANGLE
```

```
Image.TRIANGLE_LEFT
Image.CHESSBOARD
Image.DIAMOND
Image.DIAMOND_SMALL
Image.SQUARE
Image.SQUARE_SMALL
Image.RABBIT
Image.COW
Image.MUSIC_CROTCHET
Image.MUSIC_QUAVER
Image.MUSIC_QUAVERS
Image.PITCHFORK
Image.XMAS
Image.PACMAN
```

```
Image.TARGET
Image.TSHIRT
Image.ROLLERSKATE
Image.DUCK
Image.HOUSE
Image.TORTOISE
Image.BUTTERFLY
Image.STICKFIGURE
Image.GHOST
Image.SWORD
Image.GIRAFFE
Image.SKULL
Image.UMBRELLA
Image.SNAKE
```

`Image.CLOCK12` (clock at 12 o' clock, others from 1–11)
`Image.ARROW_N` (arrow pointing north, others replace N with NE, E, SE, S, SW, W, NW)

Activity 2.4

Create an animation using the different built in images. Use a list to store the images you want to use.

```
from microbit import *
faces = [Image.HAPPY,Image.SAD,Image.ANGRY]
display.show(faces, loop=True, delay=100)
```

Place a screenshot of your code here.

Activity 2.5

Define three new custom images and store them in a list. Create an animation using the list. Use this code as a starting point:

```
from microbit import *

pattern1 = Image("05050:50505:05050:50505:05050")
pattern2 = Image("50505:05050:50505:05050:50505")
patterns = [pattern1, pattern2]

display.show(patterns, loop=True, delay=100)
```

Place a screenshot of your code here.