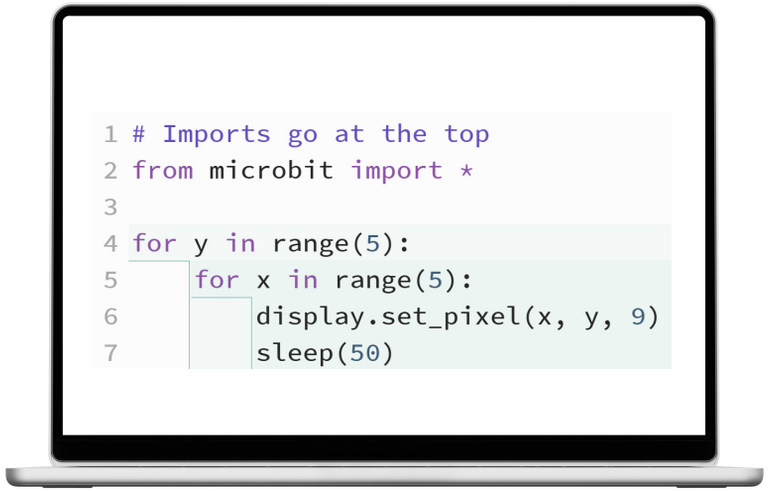
What is Python?

- Python is a text-based programming language.
- It uses typed code instead of blocks.
- Python tells computers exactly what to do.
- Syntax is the set of rules for how Python code must be written.



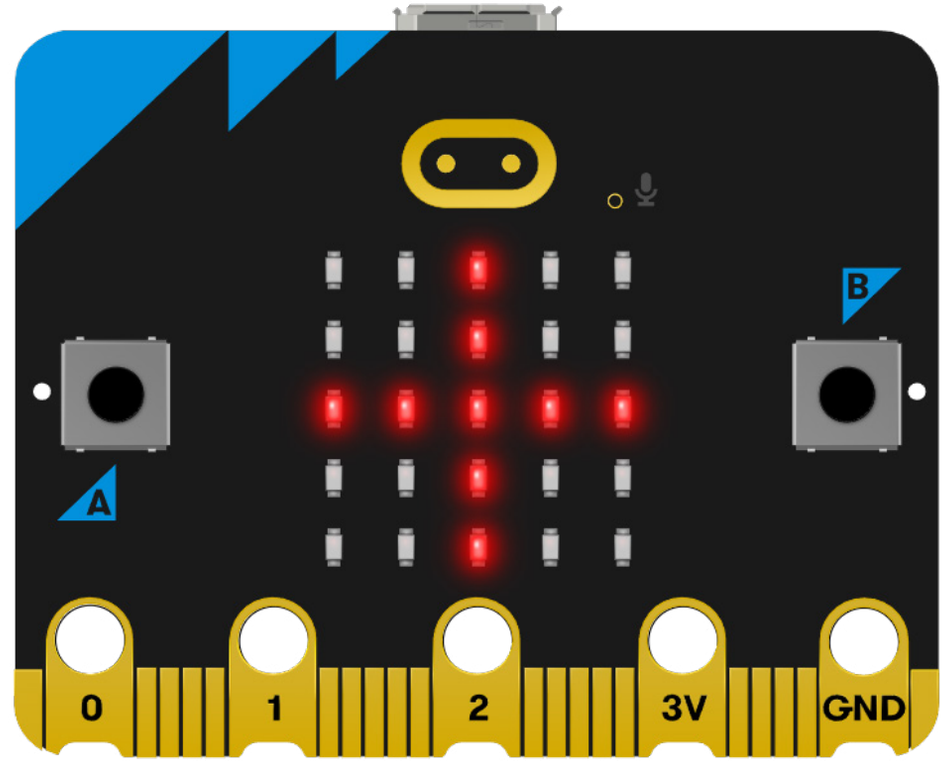
```
# Imports go at the top
from microbit import *

for y in range(5):
    for x in range(5):
        display.set_pixel(x, y, 9)
        sleep(50)
```

Python syntax includes:

- Correct spelling of words.
- Colons at the end of some lines.
- Correct indentation (spacing).
- Brackets used properly.

The micro:bit LED grid



The micro:bit has a 5 x 5 LED grid.

- Each LED has a position using x and y values.
- X moves across the grid (left to right).
- Y moves down the grid (top to bottom).
- Both values range from 0 to 4.
- Python uses x and y to control which LED lights up.

Nested loops in Python

```
1 # Imports go at the top
2 from microbit import *
3
4 for y in range(5):
5     for x in range(5):
6         display.set_pixel(x, y, 9)
7         sleep(50)
```

The outer loop controls the rows (y values).

The inner loop controls the columns (x values).

How it works:

- The **inner loop** runs first and fills one row.
- The **outer loop** then moves to the next row.
- Together they create a full grid pattern.

Python is used in the real world by programmers, scientists and businesses to build apps, websites, games and analyse data.

Errors in Python

```
1 from microbit import *
2
3 for x in range(5)
4     for y in range(6):
5         display.set_pixel(0, 0, 9)
```

A syntax error is when the code breaks the rules of Python and will not run.

- A colon, bracket or keyword is missing.
- Indentation is incorrect.

A loop error happens when a loop repeats incorrectly.

- Runs too many or too few times.
- Uses values outside the 0 to 4 grid.

A logic error is when the code runs but does the wrong thing.

- X and y are not used so LEDs appear in the wrong place, such as (0, 0).
- The pattern moves the wrong direction or does not change.
- The screen stays blank or only one LED lights up.