# Teacher guidance: Exploring Python: Lesson 2

## Python syntax

### Python syntax

- Python follows strict rules called syntax, which tell the computer how to read code.
- Symbols such as colons, brackets and commas organise the code and show structure.
- Indentation is essential because Python uses it to show which lines belong inside a loop or block.
- Python is case-sensitive so capital and lowercase letters are treated differently.
- Small errors in syntax, such as missing colons, extra spaces, misspelt commands, stop the program from running or cause unexpected behaviour.
- The children may not realise how precise Python is compared to block coding, where many syntax details are hidden.

### Recap and recall:

Presentation: Mind map

### Children may recall:

- Both block code and Python give instructions for the computer to follow.
- MakeCode and Python can control the micro:bit to show text or patterns.
- Block code uses visual blocks, while Python uses typed commands.
- Loops in MakeCode (repeat) match 'for i in range()' in Python.
- Both use pauses or timing to control when things happen.
- Python needs correct spelling, symbols and indentation to work properly.

### Main event:

Download: Syntax project. hex file

This code lights up a line across the centre of the display, with one LED lighting up at a time. It uses a for loop to move the lit LED from left to right across the row.

for x in range(5): runs the loop five times, with x changing from 0 to 4.
display.set_pixel(x, 2, 9) lights the LED at column x on row 2 at maximum brightness, so the light moves from left to right.
sleep(200) adds a short pause between each LED lighting so the movement can be seen clearly.

### Main event:

Activity: Syntax error log

For a completed example of the Activity: Syntax error log, please see the Resource: Syntax error log example.

### Code one: missing colon

- This code is missing a colon (:) after while True, which tells Python to start a new block of code. Without it, the program will not run and will show a SyntaxError. Once the colon is added, the micro:bit will repeatedly display a heart image for half a second before refreshing.

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**Code two: wrong indentation**

- The code has incorrect indentation - the lines inside the loop (display.show and sleep) need to be indented so Python knows they belong to the while True: block. Without proper indentation, the program produces an IndentationError. When indented correctly, the micro:bit displays a heart image that flashes every half second in a continuous loop.

**Code three: missing line break**

- This code has two commands, sleep(50) and display.show(Image.SAD), written on the same line with no line break between them. Python attempts to read them as a single instruction so the program still runs but does not behave as intended; the micro:bit quickly flashes the images or skips one altogether. Adding a new line before display.show(Image.SAD) separates the commands, allowing the heart and sad face to appear one after the other with a short pause in between.

**Wrapping up:**

Presentation: Syntax showdown

**Syntax error one: misspelt command**

- Demonstrates how a small spelling mistake can stop code from running.
- The word dispaly is typed incorrectly, instead of display, so Python shows a NameError because it does not recognise the command.
- This highlights that Python is very precise and it only understands keywords spelt correctly and will not try to guess what you meant.

**Syntax error two: capital letter in keyword**

- Shows that Python is case-sensitive, so capital and lowercase letters mean different things.
- Writing While instead of while causes a SyntaxError because Python does not see it as the same command.
- This reinforces the need for accuracy and attention to detail when typing code.

**Syntax error three: extra space/indentation error**

- Explains that indentation shows which lines of code belong together inside a loop or block.
- Uneven spaces before lines cause an IndentationError, stopping the program from running.
- Helps children see that indentation is not just about neatness; it tells Python which instructions to repeat or group.