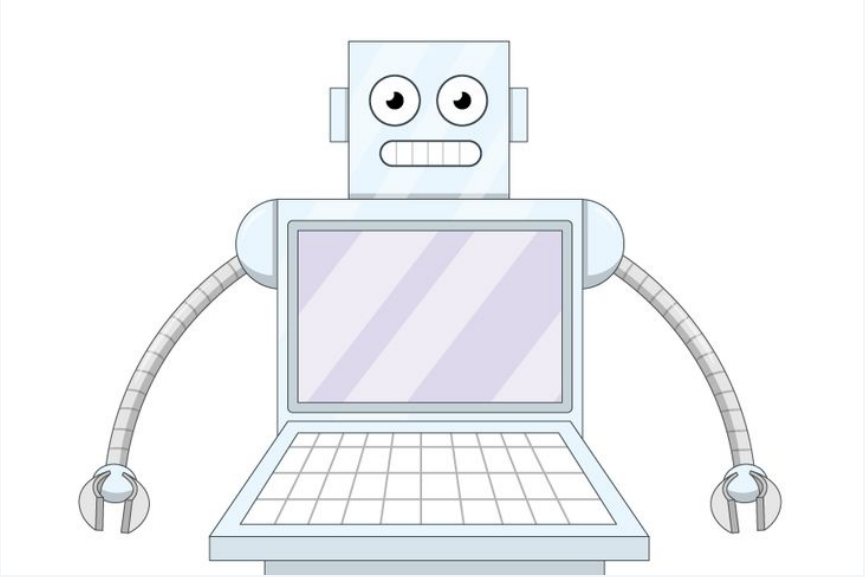
L1: Sequence

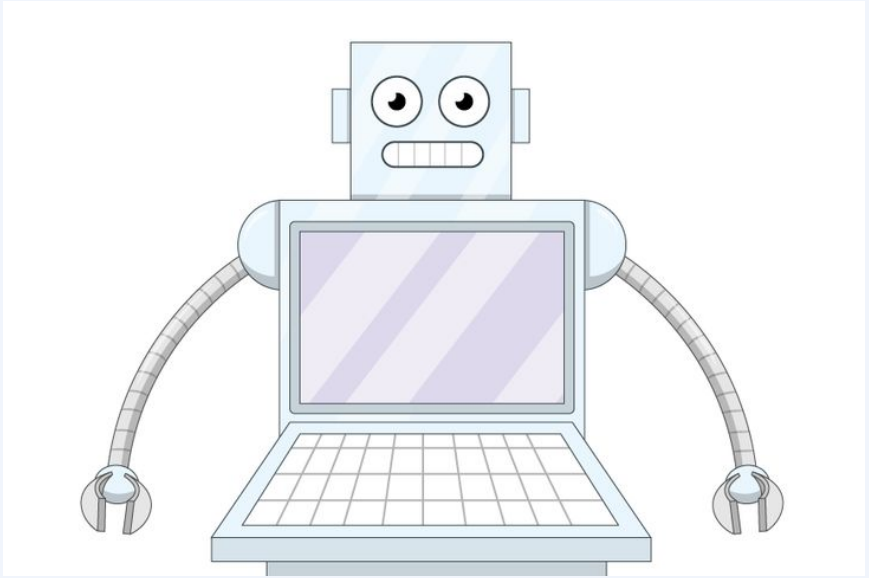
Think, write, pair, share

Why do we need **translators** in programming?



Think, write, pair, share

Computers can only **execute machine code**, so **translators** are required for executing the programs that programmers write in **high-level languages**.



Lesson 2: Sequence

In this lesson, you will:

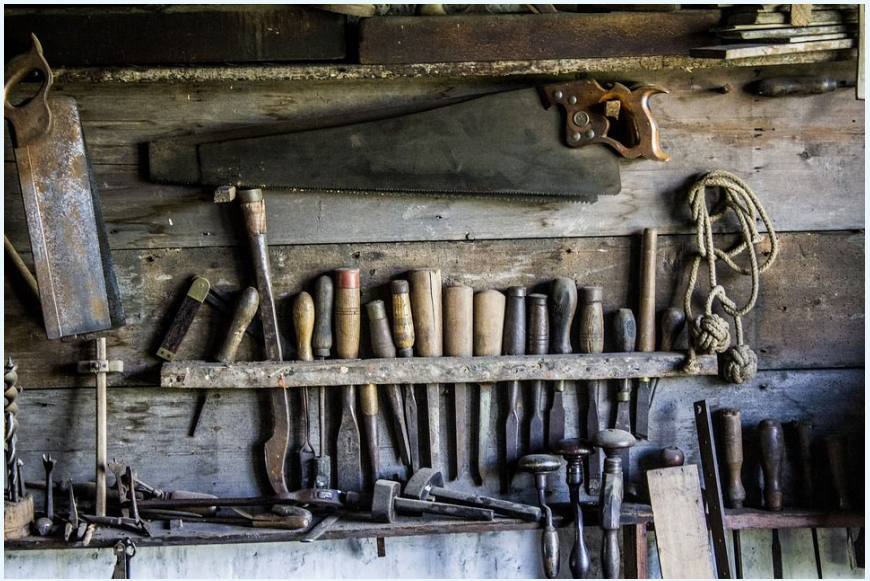
- Describe the tools an IDE provides (editors, error diagnostics, runtime environment, translators)
- Use subroutines in programs
- Define a sequence as instructions performed in order, with each executed in turn
- Predict the outcome of a sequence and modify it
- Interpret error messages and define error types and identify them in programs (logic, syntax)

Integrated development environments (IDEs)

IDEs were created to give programmers all the tools they needed to write programs in **one place**.

They allow you to **write**, **run,** and **debug** code without having to switch programs.

They were designed to make programming easier!



Integrated development environments (IDEs)

IDEs make it easier to write code because they provide useful tools, like syntax **colour coding**.

Basic text editor

```
if today_is_cold:
    print("Wear a coat")
```

IDE example

```
if today_is_cold:
    print("Wear a coat")
```

Integrated development environments (IDEs)

IDEs can also **highlight** important syntax structures to remind you to include them.

Basic text editor

```
if today_is_cold:
    print("Wear a coat")
```

IDE example

```
if today_is_cold:
    print("Wear a coat")
```

Integrated development environments (IDEs)

They will often **automatically indent code** for you.

Python is very particular about indents. The IDE will remind you if it thinks an indent is required by putting one in for you.

Basic text editor

```
if today_is_cold:
print("Wear a coat")
```

IDE example

```
if today_is_cold:
    print("Wear a coat")
```

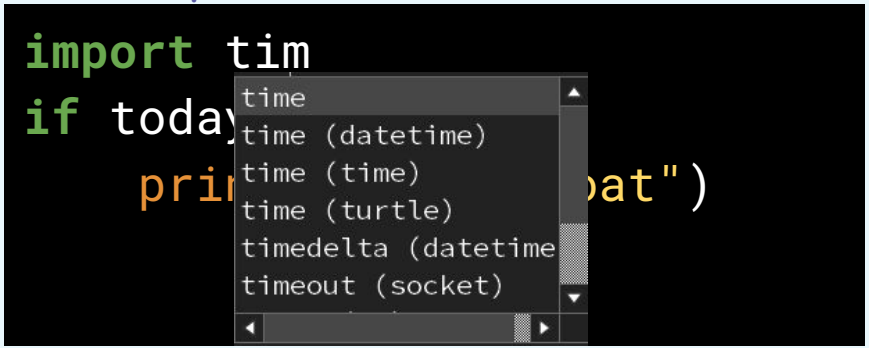
Integrated development environments (IDEs)

And they can **autocomplete** lines of code that are typically used.

Basic text editor

```
if today_is_cold:
    print("Wear a coat")
```

IDE example



Integrated development environments (IDEs)

In programming, the language specific code that you write in has its own **syntax**. The syntax is unique to that programming language.

An **IDE** can point out any **syntax errors** that you have made. This means that you can then check and fix them.

IDE example

```
if today_is_cold:
    print"Wear a coat")
```

Error message

```
line 2
print"Wear a coat")
                  ^
SyntaxError: invalid syntax
>>>
```

Integrated development environments (IDEs)

In Python, the **IDE** will call the **interpreter** to **translate** the code and allow you to **run** and test your program.

This means that you can **test** your code as you write your program.

IDE example

```
print("What is your name?")
name = input()
print("Hello", name)
```

Runtime output

```
What is your name?
Becky
Hello Becky
>>>
```

Integrated development environments (IDEs)

Without an **IDE,** you would have to write all of your programs in a **basic text editor.**

You would then need to switch programs to **translate** the code and **test** it. An **IDE** helps programmers because it bundles together these processes.

Basic text editor

```
if today_is_cold:
    print("Wear a coat")
```

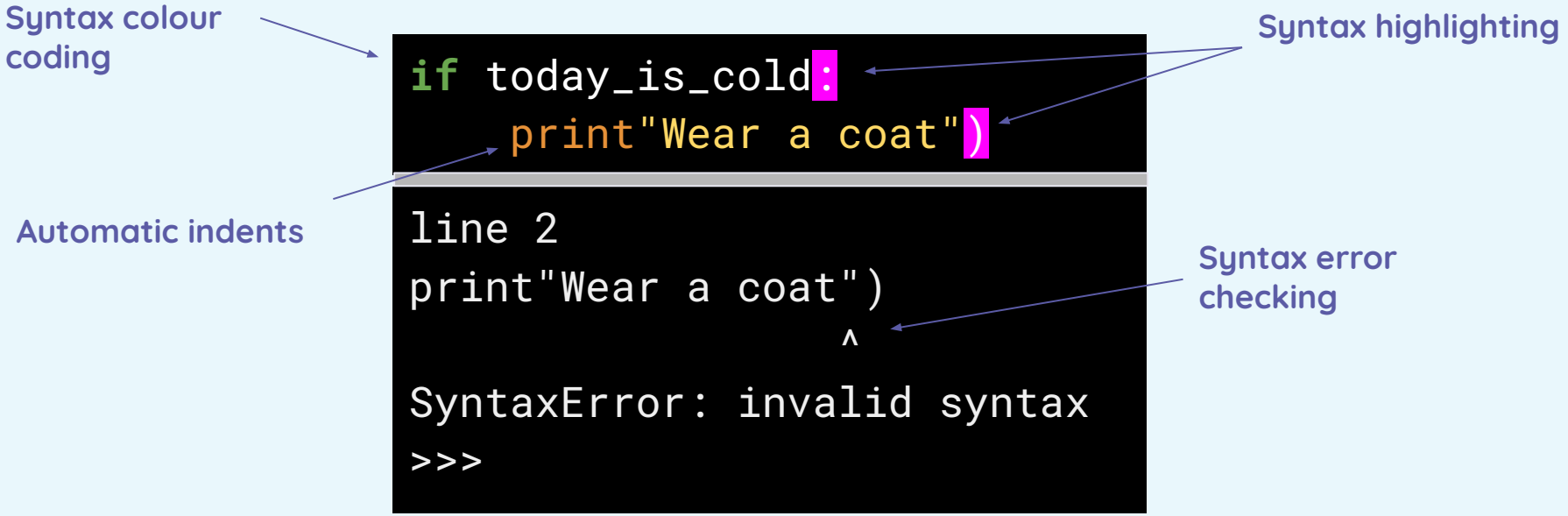
Question

How many features of an IDE can you spot in this diagram?

```
if today_is_cold:
    print"Wear a coat")
```

```
line 2
print"Wear a coat")
                  ^
SyntaxError: invalid syntax
>>>
```

Question


Syntax colour coding
Syntax highlighting
if today_is_cold:
print"Wear a coat")
Automatic indents
line 2
print"Wear a coat")
^
SyntaxError: invalid syntax
>>>
Syntax error checking

Introducing your IDE

Here is a demonstration of the IDE
that you will be using for this course.

Your first Python code

```
1  def welcome():
2      print("Hello world")
3  welcome()
```

Use the worksheet to help you write your first piece of Python code.

National Centre for Computing Education

KS4 - Programming
Lesson 2 - A developer's playground

Learner Activity sheet

Save a copy

Task

Step 1

Type the code from the demonstration into Python and see if you can get it to **run.**

```
1  def welcome():
2      print("Hello world")
3  welcome()
4
5
6
```

Step 2

If you were faced with an **error message,** read it and try to fix the problem.

Here are some common errors that can occur. Use the checklist to help you fix the problem:

- ❑ Missing brackets **()**
- ❑ Missed the speech marks around **"Hello world"**
- ❑ Upper case **P** used for **p**rint
- ❑ Missing a colon **:**
- ❑ Missing the indent on line 2

Twinkle, twinkle, little sequence

Precise instructions are very important when programming. You also need to make sure that your code is written in the correct **sequence**.

A **sequence** of instructions will be read from top to bottom, performing each instruction in turn.

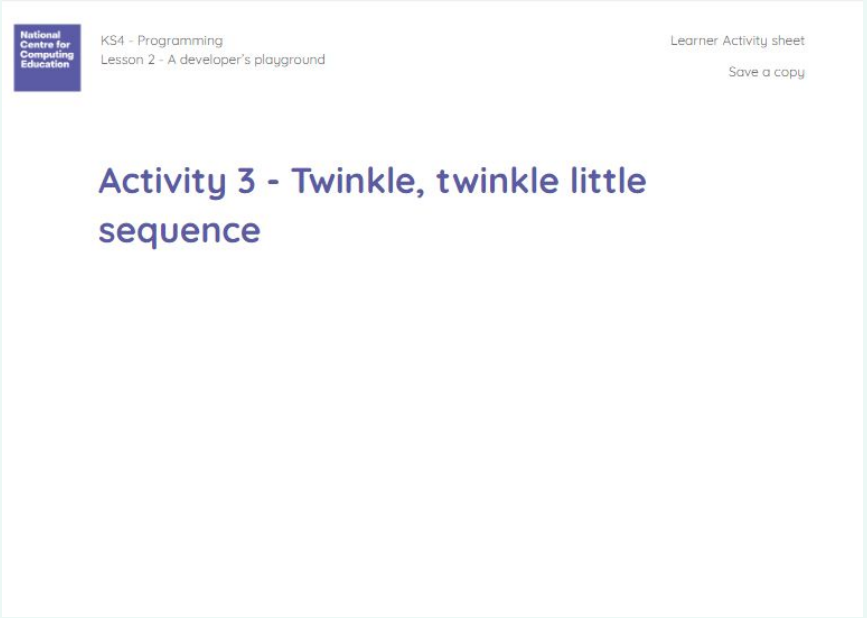
Twinkle, twinkle, little sequence

A karaoke program has been created to help a class of nursery children remember the words to *Twinkle, Twinkle, Little Star.*

You will need to **investigate** the code to see how it works, and then **modify** it so that it is finished.

Twinkle, twinkle, little sequence

Use the **Activity 3** worksheet to help you do this.



Sequences

```
1  def welcome():
2      print("Hello world")
3
```

Question

You have made a welcome screen for a game. What will appear on screen when this code executes?

- A Hello world will appear
- B “Hello world” will appear
- C Nothing
- D Welcome will appear

The subroutine has not been called, which means that nothing will be displayed on the screen

Sequences

```
1  def letterb():
2      print("b")
3  def lettera():
4      print(“a”)
5
6  lettera()
7  letterb()
```

Question

What will appear on screen when this code executes?

A. b followed by a
B. a followed by b
C. Nothing
D. lettera, letterb

The subroutines have been written in b, a order, but they have been called in a, b order, so this is when they will be run

Syntax

```
1  def welcome():
2      Print("Hello world")
3  welcome()
```

Question

What will happen when this code is executed?

- A Syntax error on line 2
- B Syntax error on line 3
- C Nothing
- D Hello world will appear

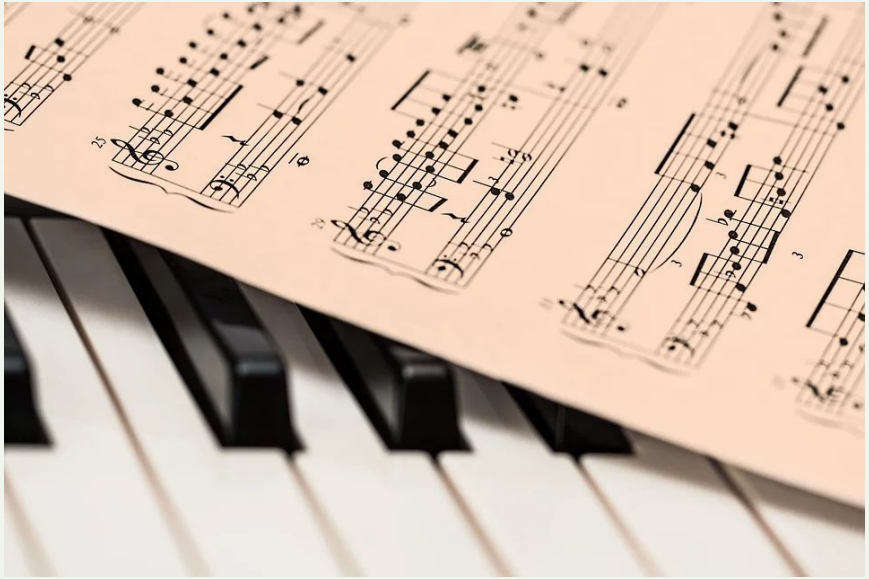
A capital P has been used for the print statement. This would cause a syntax error.

Complete your make task

For Activity 3, you were given a **make** task to **create** a karaoke program for your favourite song.

Complete this for homework.

Due next lesson



Next lesson

In this lesson, you…

Learnt about the IDE

Wrote your first Python programs

Learnt about sequencing

Next lesson, you will…

Learn how to use variables within your programs.