Testing

Testing

Testing is the process of making sure that the program works as intended – does the program match the design?

There are two areas we consider when testing software:
- Test data
- Types of errors

Test tables

Programs are tested to make sure they work as we expect.

This is achieved by creating test tables which contain different test data. The test table contains the expected output for each type of test data. As the program is tested, the actual output is recorded in the table.

If the expected output matches the actual output then the program works as expected.

Test data

There are 3 types of test data:

Normal: data which the program should accept and which is within the expected range for the program.

Extreme: data that is on the boundaries of what should be acceptable, or on the boundaries of conditions within the program.

Exceptional: data that would not be accepted by the program, and should be rejected. Designed to test whether or not the program can cope with unexpected data.

Test table example

Here is a testing table we would use to test a program which asks a school pupil to enter their age and displays if they should be in primary or secondary.

Test Type	Test Data	Expected Output	Actual Output
Normal	7	Primary	
Extreme	18	Secondary	
Exceptional	21	Error message	

During testing, the actual output column would be filled out. If the actual output matches the expected output then the program works as expected.

Types of errors
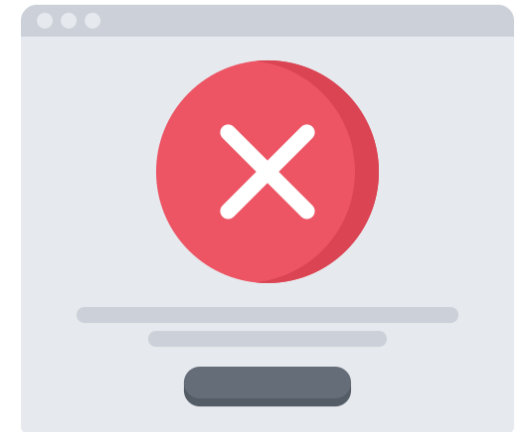
There are 3 types of errors:
- Syntax errors
- Logic errors
- Run-time errors (or execution errors)

You need to be able to identify and fix each type of error.

Syntax errors

Syntax errors are usually typing or spelling mistakes in the program.

- Misspelling a reserved word
- Misspelling a variable name
- Missing brackets or colons

A reserved word is one that would turn purple or orange in Python e.g. print or while

Finding syntax errors

Syntax errors are found before the program executes – the development environment will not allow the program to run and will display an error.
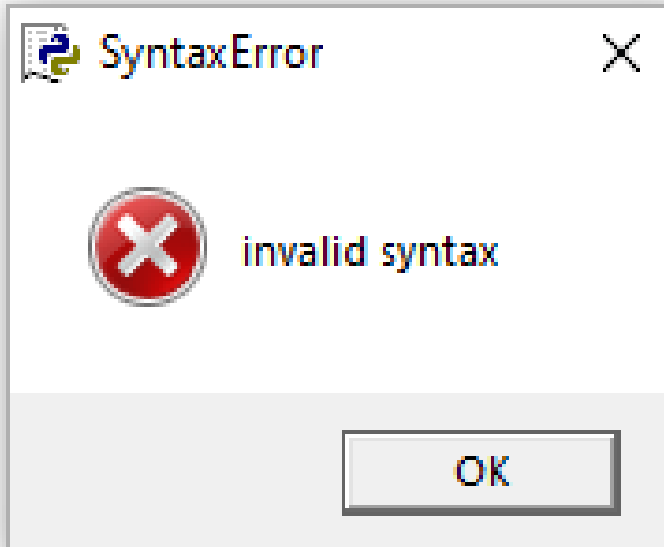
Logic errors

A logic error happens when the program is syntactically correct, but there is a mistake in the way a calculation or condition has been written.

- Using < instead of >
- Using and instead of or
- Forgetting to use brackets in calculations

Finding logic errors

Logic errors are found during the testing process. A test table is written with the expected output, but when the program is actually run it produces a different result.