



# Coded algorithms

We have chosen to provide coded solutions in Python 3 because it is the most popular language taught at GCSE, and in Visual Basic Console (2015 onwards) because it is a language that most closely resembles the pseudocode and coded examples students will need to work with in examinations.

For those students studying other languages such as C++/C# or Java, it would be a great exercise to translate the code presented in this book.

Each chapter has been carefully considered to ensure it matches the needs of students and the requirements of examining bodies without being unnecessarily complex. Where possible we have taken a consistent approach so that it is easy to see how algorithms expressed in English and pseudocode relate to real coded solutions. Therefore, we have adopted some conventions such as:

- ++ += -= for incrementing and decrementing variables has been avoided. Instead favouring `x = x + 1`.
- Swapping of variables using approaches such as `a, b = b, a` which students find confusing. Instead using a three-way swap with a temporary variable which is favoured in examinations.
- The fewest functions/methods as possible to achieve a solution.

The result is not necessarily the most efficient code, but an implementation that is most suitable for the level of study.

Readers should consider that there are many ways to code these algorithms. Taking the depth first search as an example, this can be coded using iteration or recursion, with a dictionary, objects or arrays. That is six different implementations but even these are not exhaustive! When combined with a programmer's own approach and the available commands in the language, the number of possibilities for coding these algorithms is huge. What is important is that students recognise the underlying data structures, understand the way an algorithm works, and can determine the output from a piece of code. **Therefore, the approaches and solutions presented in this download are a solution, not THE solution.**

## Our pedagogy

Read more about our pedagogy of teaching programming here:

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