



# **Computational thinking, problem-solving and programming: Introduction to programming**

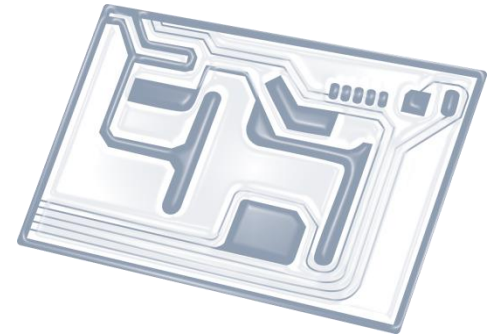
**IB Computer Science**



*Content developed by  
Dartford Grammar School  
Computer Science Department*



# HL Topics 1-7, D1-4



1: System design



2: Computer Organisation



3: Networks



4: Computational thinking



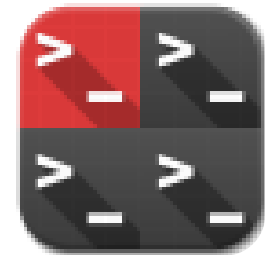
5: Abstract data structures



6: Resource management



7: Control



D: OOP

# HL & SL 4.3 Overview

## Nature of programming languages

- 4.3.1 State the fundamental operations of a computer
- 4.3.2 Distinguish between fundamental and compound operations of a computer
- 4.3.3 Explain the essential features of a computer language
- 4.3.4 Explain the need for higher level languages
- 4.3.5 Outline the need for a translation process from a higher level language to machine executable code

## Use of programming languages

- 4.3.6 Define the terms: variable, constant, operator, object
- 4.3.7 Define the operators =, .., <, <=, >, >=, mod, div
- 4.3.8 Analyse the use of variables, constants and operators in algorithms
- 4.3.9 Construct algorithms using loops, branching
- 4.3.10 Describe the characteristics and applications of a collection
- 4.3.11 Construct algorithms using the access methods of a collection
- 4.3.12 Discuss the need for sub-programmes and collections within programmed solutions
- 4.3.13 Construct algorithms using predefined sub-programmes, one-dimensional arrays and/or collections



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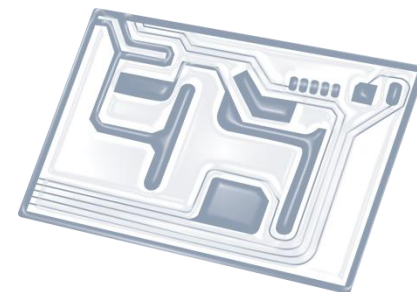


7: Control

D: OOP



# Topic 4.3.11



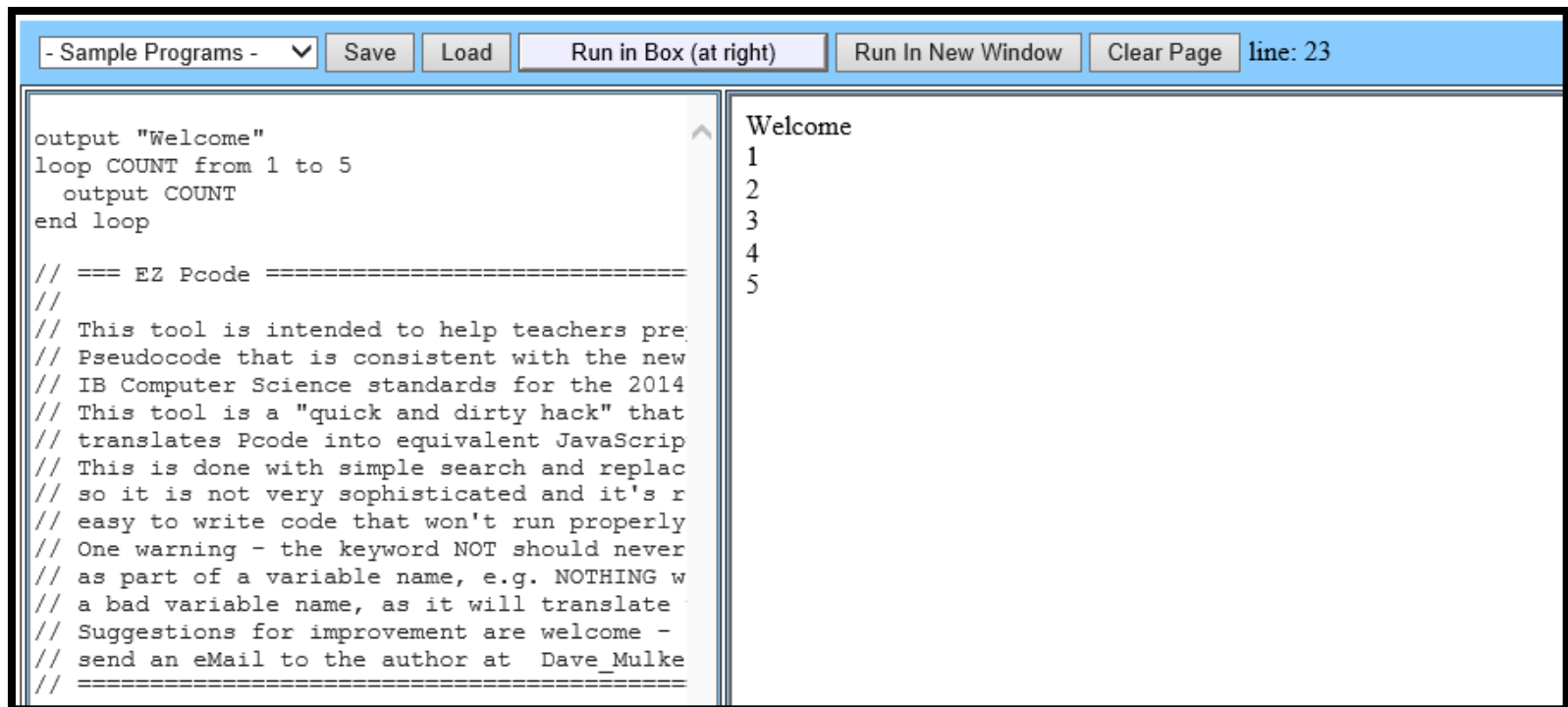
Construct algorithms using the **access methods** of a **collection**



# Best method: **PRACTICE THIS!**

Use the *D. Mulkey's* **ONLINE PSEUDO CODE GENERATOR:**

<https://dl.dropboxusercontent.com/u/275979/ibcomp/pseudocode/pcode.html>

A screenshot of a web-based pseudocode generator. The interface has a light blue header with a dropdown menu set to '- Sample Programs -', and buttons for 'Save', 'Load', 'Run in Box (at right)', 'Run In New Window', and 'Clear Page'. A 'line: 23' indicator is on the right. The main area is split into two panes. The left pane contains pseudocode: 'output "Welcome"', 'loop COUNT from 1 to 5', ' output COUNT', 'end loop', followed by a large block of comments starting with '// === EZ Pcode ==='. The right pane shows the output: 'Welcome' followed by a vertical list of numbers '1', '2', '3', '4', '5'.

# Important: **only use the methods below**

A collection is like a linked-list, but the order of elements is not guaranteed so you can't use `.get(x)` or `.size()` etc.

Collection methods in **Pseudocode** are:

- `.addItem( new data item )`
- `.resetNext( )` start at beginning of list
- `.hasNext( )` checks whether there are still more items in the list
- `.getNext( )` retrieve the next item in the list
- `.isEmpty( )` check whether the list is empty