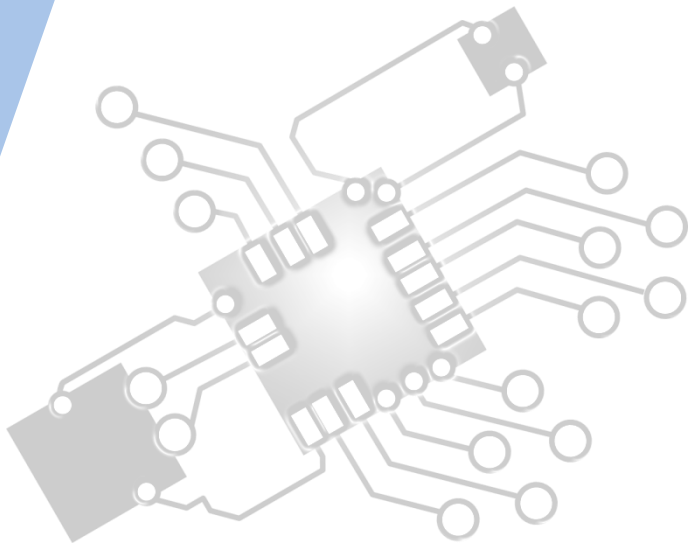
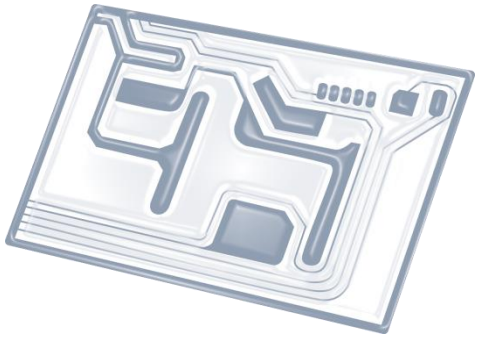
Computational thinking, problem-solving and programming: Introduction to programming

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


1: System design

2: Computer Organisation



3: Networks

4: Computational thinking

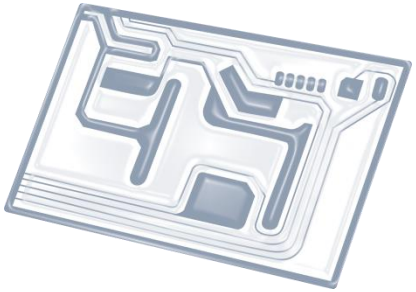

5: Abstract data structures

6: Resource management



7: Control

D: OOP

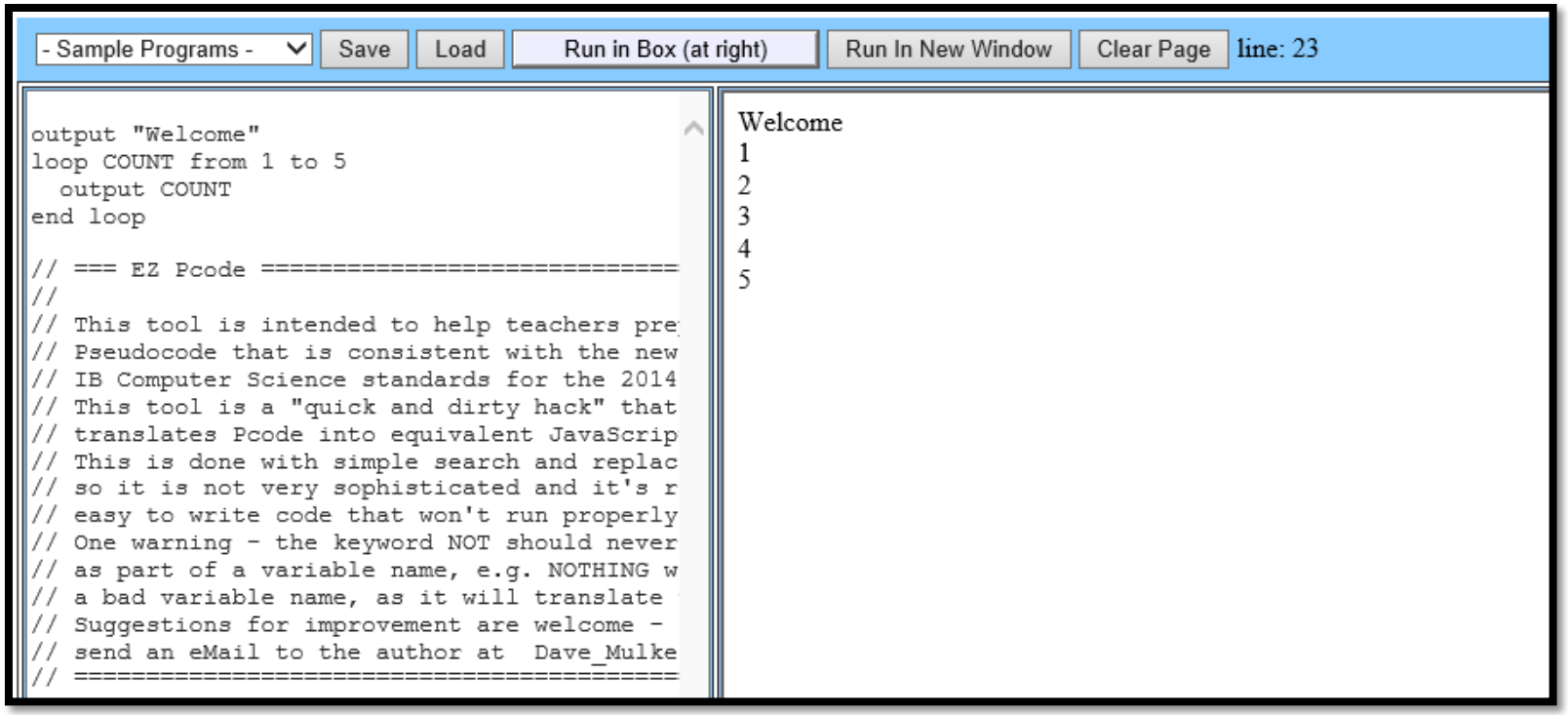
Topic 4.3.11

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/pseduocode/pcode.html



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