



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

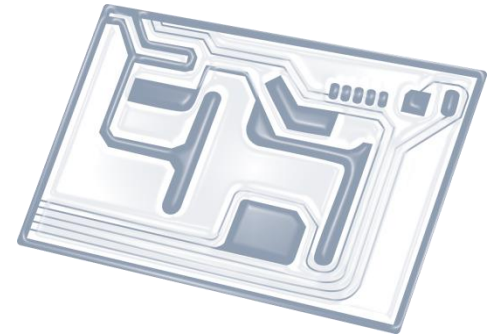
IB Computer Science



*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



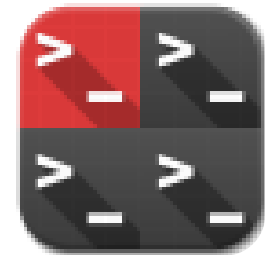
5: Abstract data structures



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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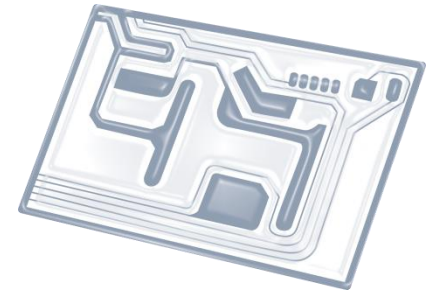


7: Control

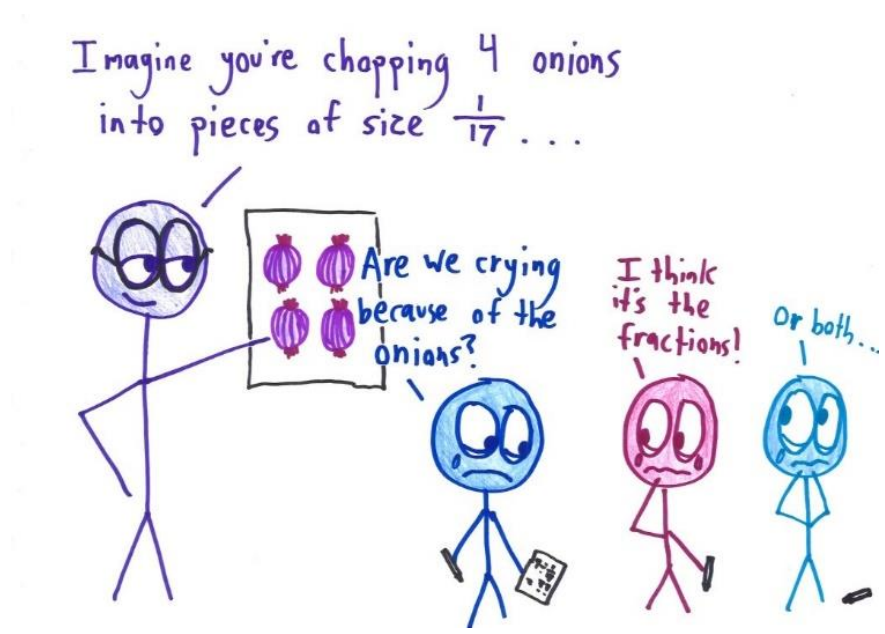
D: OOP



Topic 4.3.8



Analyse the use of **variables**, **constants** and **operators** in algorithms



Teacher's notes:

For example, identify and justify the use of a constant as opposed to a variable in a given situation.

These will depend on the algorithm presented in the exam and are impossible to predict.



Example type questions:

```
QUANTITY = input("How many hamburgers do you want?")
```

```
if QUANTITY >= 10 then
    PRICE = 2.59
else if QUANTITY <= 9 AND QUANTITY >= 5 then
    PRICE = 2.89
else if QUANTITY < 5 then
    PRICE = 3.25
end if
```

- ✓ *Why should QUANTITY always be a variable?*
- ✓ *Is PRICE a variable or a constant?*
- ✓ *What is 3.25?*