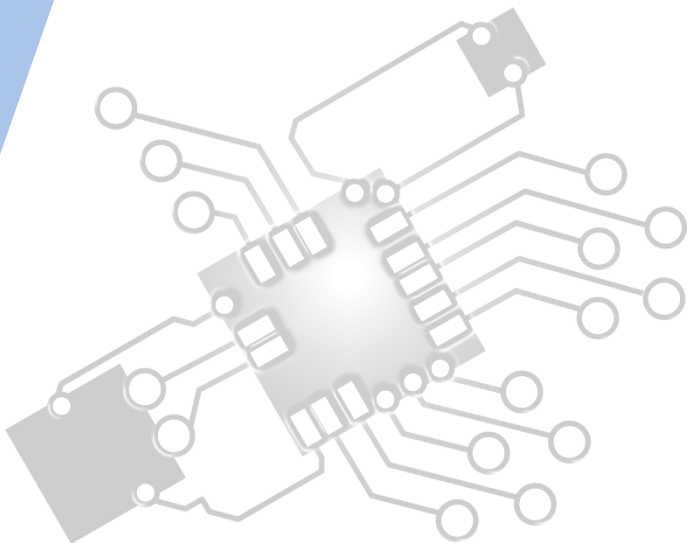




Computational thinking, problem-solving and programming:

General Principals

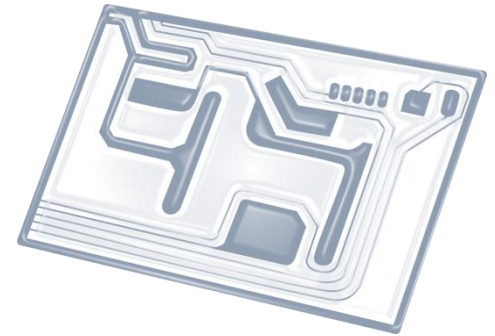
IB Computer Science



*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 4.1 Overview

Thinking procedurally

4.1.1 Identify the procedure appropriate to solving a problem

4.1.2 Evaluate whether the order in which activities are undertaken will result in the required outcome

4.1.3 Explain the role of sub-procedures in solving a problem

Thinking logically

4.1.4 Identify when decision-making is required in a specified situation

4.1.5 Identify the decisions required for the solution to a specified problem

4.1.6 Identify the condition associated with a given decision in a specified problem

4.1.7 Explain the relationship between the decisions and conditions of a system

4.1.8 Deduce logical rules for real-world situations

Thinking ahead

4.1.9 Identify the inputs and outputs required in a solution

4.1.10 Identify pre-planning in a suggested problem and solution

4.1.11 Explain the need for pre-conditions when executing an algorithm

4.1.12 Outline the pre- and post-conditions to a specified problem

4.1.13 Identify exceptions that need to be considered in a specified problem solution

Thinking concurrently

4.1.14 Identify the parts of a solution that could be implemented concurrently

4.1.15 Describe how concurrent processing can be used to solve a problem

4.1.16 Evaluate the decision to use concurrent processing in solving a problem

Thinking abstractly

4.1.17 Identify examples of abstraction

4.1.18 Explain why abstraction is required in the derivation of computational solutions for a specified situation

4.1.19 Construct an abstraction from a specified situation

4.1.20 Distinguish between a real-world entity and its abstraction



1: System design

2: Computer Organisation



3: Networks

4: Computational thinking



5: Abstract data structures

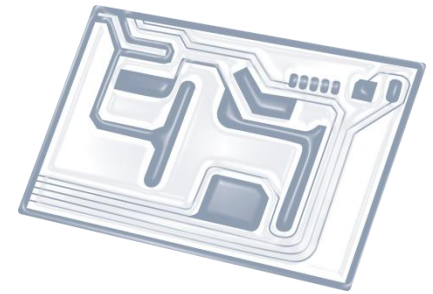
6: Resource management



7: Control

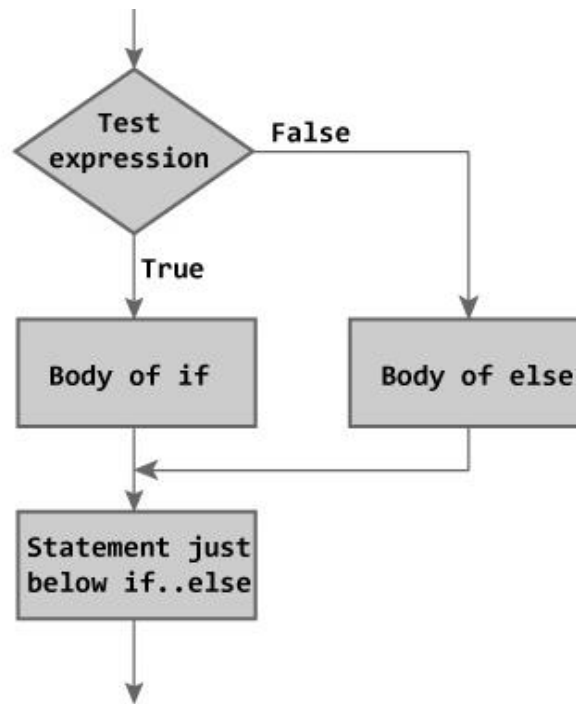
D: OOP





Topic 4.1.7

Explain the **relationship** between the **decisions** and **conditions** of a system



```
if ( condition_1 )  
{  
    //statements to execute when condition_1 is true  
}  
else if ( condition_2 )  
{  
    //statements to execute when condition_2 is true  
}
```

```
//more else if blocks as necessary
```

```
else if ( last_condition )  
{  
    //statements to execute when last_condition is true  
}  
else  
{  
    //statements to execute when all conditions are false  
}
```

**else if
is two words**

**The else branch
is optional**

```
public static void main(String[] args) {  
  
    int user = 21;  
  
    if (user <= 18) {  
        System.out.println("User is 18 or younger");  
    }  
    else if (user > 18 && user < 40) {  
        System.out.println("User is between 19 and 39");  
    }  
  
    else {  
        System.out.println("User is older than 40");  
    }  
}
```