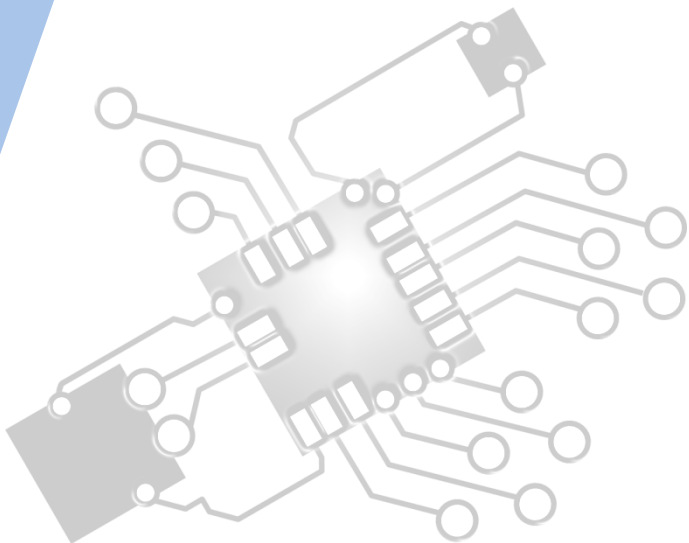




Planning & system installation

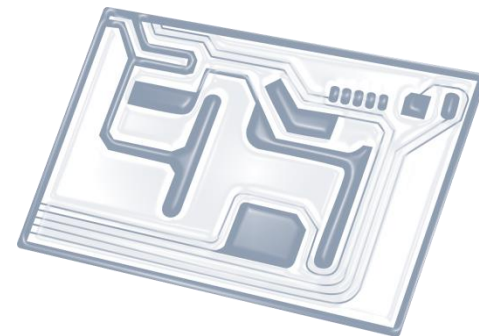
IB Computer Science



*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 *only* 5 Overview

Thinking recursively

- 5.1.1 Identify a situation that requires the use of recursive thinking
- 5.1.2 Identify recursive thinking in a specified problem solution
- 5.1.3 Trace a recursive algorithm to express a solution to a problem

Abstract data structures

- 5.1.4 Describe the characteristics of a two-dimensional array
- 5.1.5 Construct algorithms using two-dimensional arrays
- 5.1.6 Describe the characteristics and applications of a stack
- 5.1.7 Construct algorithms using the access methods of a stack
- 5.1.8 Describe the characteristics and applications of a queue
- 5.1.9 Construct algorithms using the access methods of a queue
- 5.1.10 Explain the use of arrays as static stacks and queues

Linked lists

- 5.1.11 Describe the features and characteristics of a dynamic data structure
- 5.1.12 Describe how linked lists operate logically
- 5.1.13 Sketch linked lists (single, double and circular)

Trees

- 5.1.14 Describe how trees operate logically (both binary and non-binary)
- 5.1.15 Define the terms: parent, left-child, right-child, subtree, root and leaf
- 5.1.16 State the result of inorder, postorder and preorder tree traversal
- 5.1.17 Sketch binary trees

Applications

- 5.1.18 Define the term dynamic data structure
- 5.1.19 Compare the use of static and dynamic data structures
- 5.1.20 Suggest a suitable structure for a given situation



1: System design

2: Computer Organisation



3: Networks

4: Computational thinking



5: Abstract data structures

6: Resource management

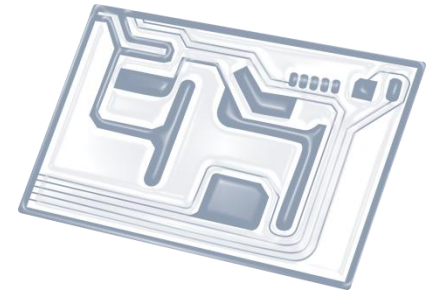


7: Control

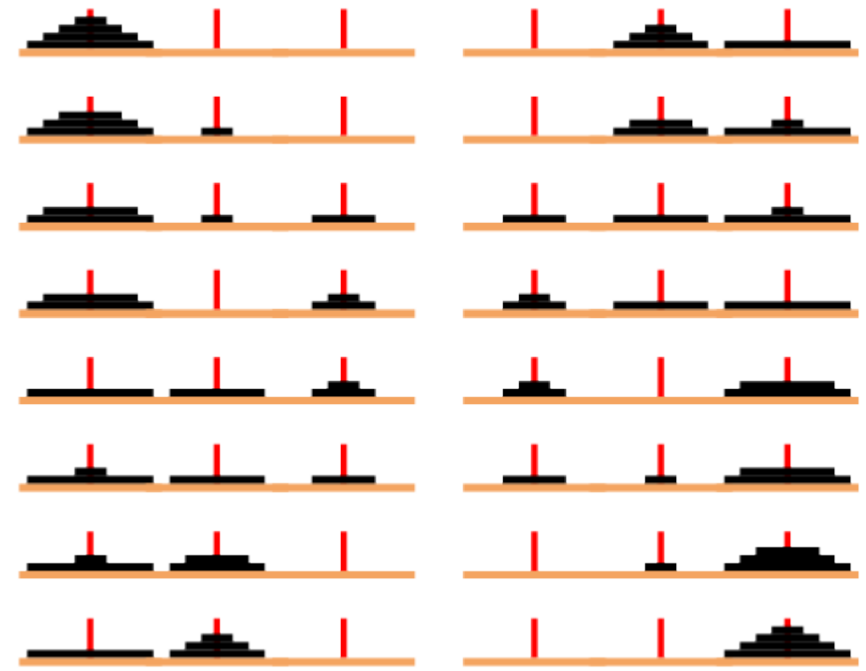
D: OOP



Topic 5.1.2

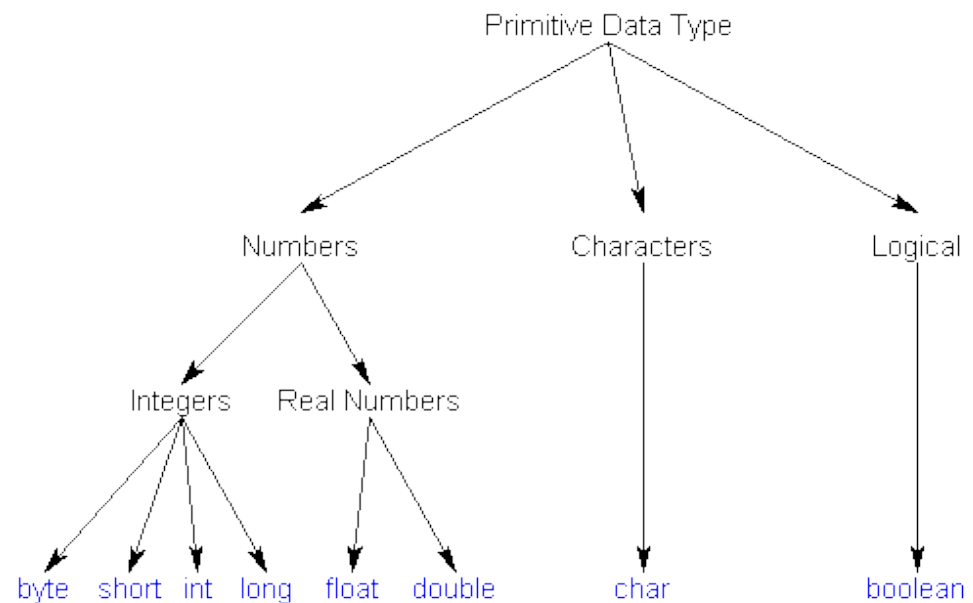


Identify **recursive thinking** in a specified problem solution



Abstract Data Structures (ADTs)

- 2D array
- Stack
- Queue
- Linked List
- (Binary) Tree
- **Recursion**



Video (YouTube)



https://www.youtube.com/watch?v=neuDuf_i8Sg

Video (YouTube)

← Prev
Next →

Find height of a binary tree

```

graph TD
    1((1)) --> 2((2))
    1 --> 3((3))
    2 --> 4((4))
    2 --> 5((5))
    3 --> 6((6))
    3 --> 7((7))
    5 --> 8((8))
    5 --> 9((9))
    
```

```

FindHeight(root)
{
  if (root is NULL)
    return

  leftHeight ← FindHeight(root→left)
  rightHeight ← FindHeight(root→right)
  return max(leftHeight, rightHeight)+1
}
    
```

<https://www.youtube.com/watch?v= pnqMz5nrRs>