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 3 Overview

### Network fundamentals
- 3.1.1 Identify different types of networks
- 3.1.2 Outline the importance of standards in the construction of networks
- 3.1.3 Describe how communication over networks is broken down into different layers
- 3.1.4 Identify the technologies required to provide a VPN
- 3.1.5 Evaluate the use of a VPN

### Data transmission
- 3.1.6 Define the terms: protocol, data packet
- 3.1.7 Explain why protocols are necessary
- 3.1.8 Explain why the speed of data transmission across a network can vary
- 3.1.9 Explain why compression of data is often necessary when transmitting across a network
- 3.1.10 Outline the characteristics of different transmission media
- 3.1.11 Explain how data is transmitted by packet switching

### Wireless networking
- 3.1.12 Outline the advantages and disadvantages of wireless networks
- 3.1.13 Describe the hardware and software components of a wireless network
- 3.1.14 Describe the characteristics of wireless networks
- 3.1.15 Describe the different methods of network security
- 3.1.16 Evaluate the advantages and disadvantages of each method of network security
Topic 3.1.3

Describe how communication over networks is broken down into different layers
Exam note!

This curriculum point requires you to have an awareness of the seven-layer OSI-model, but an understanding of the functioning of each layer is not required.
## OSI Model

<table>
<thead>
<tr>
<th>Layer</th>
<th>Description</th>
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| APPLICATION   | Interface for end point service  
Examples are web browsing and email |
| PRESENTATION  | Formats application data for delivery  
Examples are compression and encryption |
| SESSION       | Manages sessions between application process                                |
| TRANSPORT     | Host to host communications  
Segments and Diagrams                                                          |
| NETWORK       | Source and destination IP addresses  
[www.google.com](http://www.google.com) = IP address  
Packets                                                                  |
| DATA LINK     | Source and destination MAC addresses  
Ethernet Frames                                                                |
| PHYSICAL      | Physical media  
Layer 1                                                                       |
Simplified TCP/IP Model

**Application**
- Program that sends out the data (HTML/SMTP)

**Transmission**
- Data is broken into packets (TCP)

**Network**
- Packets are addressed with destination and sender’s address

**Link**
- Packets are converted into binary and sent