Data transmission

IB Computer Science
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 3.1.9

Explain **why** compression of data is often necessary when transmitting across a network.
Definition: Compression

Data compression involves encoding information to use fewer bits than the original data entity.
Key concept: **Time**!

- The **smaller** we can compress data, the **more** data we can send in the same amount of time.
- The consequence of this is that data can be **disseminated more rapidly**.
Why bother to compress?

- Backups/archiving
- File transfer
- Encryption/protection
- Media file transfer over the web
Lossless vs Lossy Compression

http://www.youtube.com/watch?v=2Qo5prktYNQ
Video: Compression

Link (YouTube): https://youtu.be/OtDxDvCpPL4