AQA Computer Science GCSE
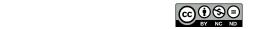# 3.5 Fundamentals of Computer Networks

Flashcards

What is a computer network?

What is a computer network?

A group of connected devices that can share data and resources.

What is a PAN?

What is a PAN?

Personal Area Network - uses a technology such as Bluetooth to connect personal devices like smartphones, headphones and wearables.

What is a LAN?

What is a LAN?

Local Area Network - covers a relatively small geographical area like a school or office.

What is a WAN?

What is a WAN?

Wide Area Network - covers a large geographical area, usually made up of several LANs connected together and under collective ownership.

Give one difference between a LAN and a WAN.

Give one difference between a LAN and a WAN.

LANs cover a small geographical area and are privately owned; WANs cover larger geographical areas and are often under collective ownership.

What is the main difference between wired and wireless networks?

What is the main difference between wired and wireless networks?

Wired uses cables; wireless uses radio signals.

State three advantages of a wired network.

State three advantages of a wired network.

Faster, more secure, doesn't suffer interference.

State two advantages of a wireless network.

State two advantages of a wireless network.

More convenient, as users can move freely with their devices.

Modern devices are more likely to be designed to connect wirelessly.

State two types of cable.

State two types of cable.

Copper cable, fibre cable.

What are the characteristics of copper cables?

What are the characteristics of copper cables?

Generally cheaper than fibre cables. Can only reliably transmit data over short distances, more susceptible to interference, slower than fibre cables.

What are the characteristics of fibre cables?

What are the characteristics of fibre cables?

More expensive than copper cables and they use light to transmit data. Faster, less susceptible to interference, able to transmit data over longer distances.

Name two LAN topologies.

Name two LAN topologies.

Star and bus.

Describe the star topology.

Describe the star topology.

All devices connect to a central switch or hub.

Name one advantage of the star topology.

Name one advantage of the star topology.

Easy to add or remove devices.

Name two disadvantages of the star topology.

Name two disadvantages of the star topology.

Should the central hub/switch fail, all communication over the network is stopped. Expensive to install due to the amount of cable required.

What is the difference between a switch and a hub?

What is the difference between a switch and a hub?

Whilst a switch sends data packets only to the intended device, a hub sends data to all connected devices.

Describe the bus topology.

Describe the bus topology.

Devices are connected to a single cable called a backbone.

Name two advantages of the bus topology.

Name two advantages of the bus topology.

No central hub, reducing the chances of a network failure and decreasing the cost. Inexpensive to install as a minimum length of cable is required.

Name two disadvantages of the bus topology.

Name two disadvantages of the bus topology.

The backbone is used by multiple clients, introducing the risk of collisions. Should the backbone fail, the entire network becomes unusable.

What is a network protocol?

What is a network protocol?

A set of rules that allow devices to communicate.

Describe TCP (Transmission Control Protocol).

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TCP ensures that data sent over a network arrives completely and in the correct order. It breaks data into packets and checks that all packets are received properly, requesting any missing ones to be resent.

Describe UDP (User Datagram Protocol).

Describe UDP (User Datagram Protocol).

UDP is a fast, lightweight protocol for sending data over a network without checking if it arrives correctly. Unlike TCP, it doesn't confirm delivery or order of data packets.

Describe IP (Internet Protocol).

Describe IP (Internet Protocol).

IP is responsible for addressing and routing data packets across networks. It ensures that data packets can find their way from the sender to the correct destination computer using IP addresses.

Describe HTTP (Hypertext Transfer Protocol).

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HTTP is the protocol used for transferring web pages and other content between web servers and browsers. It defines how web browsers request pages and how web servers respond with the requested content.

Describe HTTPS (Hypertext Transfer Protocol Secure).

Describe HTTPS (Hypertext Transfer Protocol Secure).

HTTPS is the secure version of HTTP that encrypts data being transferred between web browsers and servers. It protects sensitive information like passwords and credit card details from being intercepted by hackers.

Describe SMTP (Simple Mail Transfer Protocol).

Describe SMTP (Simple Mail Transfer Protocol).

SMTP is used for sending emails from one email server to another across the internet. It handles the delivery of outgoing emails from your email client to the recipient's email server.

Describe IMAP (Internet Message Access Protocol).

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IMAP allows users to access and manage their emails stored on a remote email server. It enables emails to be read and organised from multiple devices whilst keeping them synchronised on the server.

Explain the importance of network security.

Explain the importance of network security.

Many organisations rely on networks to store and transfer sensitive information. Without proper security, this data could be stolen, deleted or altered by hackers.

State four methods of network security.

State four methods of network security.

Authentication, encryption, firewalls, MAC address filtering.

What is authentication?

What is authentication?

The process of verifying the identity of a user or device before allowing access to a system or network.

What is encryption?

What is encryption?

A method of converting data into a coded format so that only authorised users with the correct decryption key can understand it.

What is a firewall?

What is a firewall?

A network security device that monitors incoming and outgoing traffic and blocks or allows data based on a set of security rules.

What is a MAC address?

What is a MAC address?

Every device has a unique MAC (Media Access Control) address built into its physical network adaptor.

How does MAC address filtering work?

How does MAC address filtering work?

Only devices with MAC addresses that are on the allow list are permitted to access a network.

Name the 4 layers of the TCP/IP model in order.

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1. Application layer
2. Transport layer
3. Internet layer
4. Link layer

Describe the application layer.

Describe the application layer.

This is where the network applications, such as web browsers or email programs, operate.

Describe the transport layer.

Describe the transport layer.

This layer sets up the communication between the two hosts and they agree settings such as the size of packets.

Describe the internet layer.

Describe the internet layer.

Addresses and packages data for transmission. Routes the packets across the network.

Describe the link layer.

Describe the link layer.

This is where the network hardware such as the NIC (network interface card) is located. OS device drivers are also located here.

Which layer do the HTTP, HTTPS, SMTP, IMAP and FTP protocols operate at?

Which layer do the HTTP, HTTPS, SMTP, IMAP and FTP protocols operate at?

Application layer.

Which protocol(s) operate at the transport layer?

Which protocol(s) operate at the transport layer?

The TCP and UDP protocols.

Which protocol(s) operate at the internet layer?

Which protocol(s) operate at the internet layer?

The IP protocol.