

Definitions and Concepts for AQA Computer Science AS-level

Topic 9: Fundamentals of Communication and Networking

9.1 Communication

9.1.1 Communication Methods

Asynchronous Transmission: The transmission of data intermittently between devices without the use of an external clock signal.

Parallel Transmission: The transmission of data through multiple channels allowing for several bits to be transmitted at a time.

Serial Transmission: The transmission of data through a single channel a single bit at a time.

Start Bit: The bit used to indicate the beginning of a unit of data in asynchronous transmission.

Stop Bit: The bit used to indicate the end of a unit of data in asynchronous transmission.

Synchronous Transmission: The transmission of data as a continuous between devices whose time signals are synchronised via a common clock.

9.1.2 Communication Basics

Bandwidth: The range of frequencies at which data can be transmitted through a channel, measured in Hertz.

Baud Rate: The number of symbol changes, waveform changes, or signaling events across a channel per unit time.

Bit Rate: The number of bits transmitted per unit time.

Latency: The time delay between the transmitter sending the data and the recipient receiving the data.

Protocol: A common set of rules followed during data transmission over a network to minimise inconsistencies.

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9.2 Networking

9.2.1 Network Topology

Logical Bus Topology: A network arrangement where every host computer is connected to a single main data cable.

Physical Star Topology: A network arrangement where every host computer has a dedicated connection to a central hub computer or switch.

9.2.2 Types of Networking between Hosts

Client-Server Network: A type of network organisation where networked computers (clients) connect to one or more powerful central computers (servers) that handles service requests and has resources.

Peer-to-Peer Network: A type of network organisation where networked computers are connected to each other with equal status and share resources and workloads without any central server.

9.2.3 Wireless Networking

Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA): A wireless protocol where computers attempt to avoid interference or collision in the channel by transmitting data only after the channel is sensed to be idle.

Media Access Control Address (MAC): A hardware identification number assigned to network interface cards used to uniquely identify a device on a network for communication purposes.

Request to Send/ Clear to Send (RTS/CTS): A protocol to prevent data collision during transmission on a wireless network, involving the transmitter sending a RTS to the receiver, and the receiver sending a CTS back to confirm it is idle.

Service Set Identifier (SSID): A local 32 character identifier for a group of wireless network devices, used to identify the network as a whole.

Wi-Fi: A wireless local area network that is based on international standards. †

Wi-Fi Protected Access (WPA/WPA2): A security certification program that secures wireless networks by encrypting transmitted data.

Wireless Network Adapter: A physical device that allows a computer system to connect to a wireless network.

Wireless Network Adapter: A physical device that creates a wireless local area network that



allows multiple devices to connect to a wired network.

Definitions with a '+ ' taken from [AQA AS and A-level Computer Science specification version 1.5](#)

