GCSE Computer Science – Topic Checklist

Key: Need to revise A close up of a face

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| **Topic 1.1 Architecture of the CPU** | Need to Revise | Revised Once | Got it! |
| the purpose of the CPU |  |  |  |
| o the fetch-execute cycle |  |  |  |
| common CPU components and their function: |  |  |  |
| o ALU (Arithmetic Logic Unit) |  |  |  |
| o CU (Control Unit) |  |  |  |
| o Cache |  |  |  |
| o Registers |  |  |  |
| Von Neumann architecture: |  |  |  |
| o MAR (Memory Address Register) |  |  |  |
| o MDR (Memory Data Register) |  |  |  |
| o Program Counter |  |  |  |
| o Accumulator |  |  |  |
| how common characteristics of CPUs affect their performance: |  |  |  |
| o Clock speed |  |  |  |
| o Cache size |  |  |  |
| o Number of Cores |  |  |  |
| The purpose and characteristics of embedded systems |  |  |  |
| Examples of embedded systems |  |  |  |

Study link: <https://www.youtube.com/watch?v=7Up7DIPkTzo&list=PLCiOXwirraUCvYFmgaS_gQ4eKe1GJqIJa>

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| **Topic 1.2 Memory and Storage** | Need to Revise | Revised Once | Got it! |
| The need for primary storage |  |  |  |
| The difference between RAM and ROM |  |  |  |
| The purpose of ROM in a computer system |  |  |  |
| The purpose of RAM in a computer system |  |  |  |
| Virtual memory |  |  |  |
| The need for secondary storage |  |  |  |
| Common types of storage: |  |  |  |
| o    Optical |  |  |  |
| o    Magnetic |  |  |  |
| o    Solid state |  |  |  |
| Suitable storage devices and storage media for a given application |  |  |  |
| The advantages and disadvantages of different storage devices and storage media relating to these characteristics: |  |  |  |
| o    Capacity |  |  |  |
| o    Speed |  |  |  |
| o    Portability |  |  |  |
| o    Durability |  |  |  |
| o    Reliability |  |  |  |
| o    Cost |  |  |  |
| The units of data storage: |  |  |  |
| o   Bit |  |  |  |
| o   Nibble (4 bits) |  |  |  |
| o   Byte (8 bits) |  |  |  |
| o   Kilobyte (1000 bytes or 1 KB) |  |  |  |
| o   Megabyte (1,000 KB) |  |  |  |
| o   Gigabyte (1,000 MB) |  |  |  |
| o   Terabyte (1,000 GB) |  |  |  |
| o   Petabyte (1,000 TB) |  |  |  |
| How data needs to be converted into a binary format to be processed by a computer. |  |  |  |
| Data capacity and calculation of data capacity requirements |  |  |  |

Study link: <https://www.youtube.com/watch?v=dhQOkkZXu5w&list=PLCiOXwirraUCaJP5LxCsFXWgX1_S-liGM>

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| **Topic 1.2 Data Storage and Compression** | Need to Revise | Revised Once | Got it! |
| Numbers |  |  |  |
| How to convert positive denary whole numbers to binary numbers (up to and including 8 bits) and vice versa |  |  |  |
| How to add two binary integers together (up to and including 8 bits) and explain overflow errors which may occur |  |  |  |
| How to convert positive denary whole numbers into 2-digit hexadecimal numbers and vice versa |  |  |  |
| How to convert from binary to hexadecimal equivalents and vice versa |  |  |  |
| Binary shifts |  |  |  |
| Characters |  |  |  |
| The use of binary codes to represent characters |  |  |  |
| The term ‘character-set’ |  |  |  |
| The relationship between the number of bits per character in a character set, and the number of characters which can be represented, e.g.: |  |  |  |
| o    ASCII |  |  |  |
| o    Unicode |  |  |  |
| Images |  |  |  |
| How an image is represented as a series of pixels, represented in binary |  |  |  |
| Metadata |  |  |  |
| The effect of colour depth and resolution on: |  |  |  |
| o    The quality of the image |  |  |  |
| o    The size of an image file |  |  |  |
| Sound |  |  |  |
| How sound can be sampled and stored in digital form |  |  |  |
| The effect of sample rate, duration and bit depth on: |  |  |  |
| o    The playback quality |  |  |  |
| o    The size of a sound file |  |  |  |
| The need for compression |  |  |  |
| Types of compression: |  |  |  |
| o    Lossy |  |  |  |
| o    Lossless |  |  |  |

Study link: <https://www.youtube.com/watch?v=dhQOkkZXu5w&list=PLCiOXwirraUCaJP5LxCsFXWgX1_S-liGM>

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| **Topic 1.3 Networks** | Need to Revise | Revised Once | Got it! |
| Types of networks: |  |  |  |
| o    LAN (Local Area Network) |  |  |  |
| o    WAN (Wide Area Network) |  |  |  |
| Factors that affect the performance of networks |  |  |  |
| The different roles of computers in a client-server and a peer-to-peer network |  |  |  |
| The hardware needed to connect stand-alone computers into a Local Area Network: |  |  |  |
| o    Wireless access points |  |  |  |
| o    Routers |  |  |  |
| o    Switches |  |  |  |
| o    NIC (Network Interface Controller/Card) |  |  |  |
| o    Transmission media |  |  |  |
| The Internet as a worldwide collection of computer networks: |  |  |  |
| o    DNS (Domain Name Server) |  |  |  |
| o    Hosting |  |  |  |
| o    The Cloud |  |  |  |
| o    Webservers and Clients |  |  |  |
| Star and Mesh network topologies |  |  |  |
| Modes of connection: |  |  |  |
| o    Wired |  |  |  |
| •          Ethernet |  |  |  |
| o    Wireless |  |  |  |
| •          Wi-Fi |  |  |  |
| •          Bluetooth |  |  |  |
| Encryption |  |  |  |
| IP addressing and MAC addressing |  |  |  |
| Standards |  |  |  |
| Common protocols including: |  |  |  |
| o   TCP/IP (Transmission Control Protocol/Internet Protocol) |  |  |  |
| o   HTTP (Hyper Text Transfer Protocol) |  |  |  |
| o   HTTPS (Hyper Text Transfer Protocol Secure) |  |  |  |
| o   FTP (File Transfer Protocol) |  |  |  |
| o   POP (Post Office Protocol) |  |  |  |
| o   IMAP (Internet Message Access Protocol) |  |  |  |
| o   SMTP (Simple Mail Transfer Protocol) |  |  |  |
| The concept of layers |  |  |  |

Study link: <https://www.youtube.com/watch?v=KeN3H8_Jhbc&list=PLCiOXwirraUBnOLZCIxrLTSuIfgvYeWj->

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| **Topic 1.4 Networks** | Need to Revise | Revised Once | Got it! |
| Forms of attack |  |  |  |
| o Malware |  |  |  |
| o Social engineering, e.g. phishing, people as the ‘weak point’ |  |  |  |
| o Brute-force attacks |  |  |  |
| o Denial of service attacks |  |  |  |
| o Data interception and theft |  |  |  |
| o The concept of SQL injection |  |  |  |
| Common prevention methods: |  |  |  |
| o Penetration Testing |  |  |  |
| o Anti-malware software |  |  |  |
| o Firewalls |  |  |  |
| o User access levels |  |  |  |
| o Passwords |  |  |  |
| o Encryption |  |  |  |
| o Physical Security |  |  |  |