GCSE Computer Science – Topic Checklist

Key: Need to revise  Revised Once  Got it! 

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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 |   |   |   |