GCSE Computer Science Revision Checklist

Unit 1.1 System Architecture

Confidence			Clarification
			I can explain the purpose and function of the CPU.
			I can describe the fetch-execute cycle.
			I can explain what the Arithmetic Logic Unit is.
			I can explain what the Control Unit is.
			I can explain what the cache is.
			I can explain what is meant by the term register.
			I can explain what the Memory Address Register is in the context of the von Neumann architecture.
			I can explain what the Memory Data Register is in the context of the von Neumann architecture.
			I can explain what the program counter is used for.
			I can explain what the accumulator is used for.
			I can explain how the clock speed affects CPU performance.
			I can explain how the cache size affects CPU performance.
			I can explain how the number of cores affects CPU performance.
			I can explain the purpose of embedded systems.
			I can give examples of embedded systems.

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Unit 1.2 Memory and Storage

Primary and secondary Storage

Confidence			Clarification
🟢	🟡	🔴	
			I can explain the need for primary storage.
			I can explain the difference between RAM and ROM.
			I can explain the purpose of RAM in a computer system.
			I can explain the purpose of ROM in a computer system.
			I can explain the need for virtual memory.
			I can explain who virtual memory works.
			I can explain the need for secondary storage.
			I can explain common types of storage including: Optical, magnetic, solid-state.
			I can suggest suitable storage devices and media for a specific application.
			I can explain the advantages and disadvantages of different storage devices/media in relation to the following characteristic: capacity.
			I can explain the advantages and disadvantages of different storage devices/media in relation to the following characteristic: speed.
			I can explain the advantages and disadvantages of different storage devices/media in relation to the following characteristic: portability.
			I can explain the advantages and disadvantages of different storage devices/media in relation to the following characteristic: durability.
			I can explain the advantages and disadvantages of different storage devices/media in relation to the following characteristic: reliability.
			I can explain the advantages and disadvantages of different storage devices/media in relation to the following characteristic: cost.

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Binary conversions, Hexadecimal and Data Representation

Confidence			Clarification
🟩	🟧	🟥	
			I can explain the following units of storage: bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte, petabyte.
			I can explain why data needs to be converted into a binary format to be processed by a computer.
			I can explain how to calculate data capacity requirements.
			I can explain how to convert positive denary whole numbers (0 – 255) into 8-bit binary numbers and vice versa.
			I can explain how to add two 8-bit binary integers.
			I can explain what overflow is and why it might occur when performing binary addition.
			I can explain how to convert positive denary whole numbers (0 – 255) into 2-digit hexadecimal numbers and vice versa.
			I can explain how to convert binary integers into their hexadecimal equivalents and vice versa.
			I can describe the terms Most Significant Bit (MSB) and Least Significant Bit (LSB).
			I can explain what a binary shift is and what it can be used for.
			I can explain the effect of both a binary left and right shift on a number.
			I can explain how binary codes are used to represented characters.
			I can explain what a character set is.
			I can explain the relationship between the number of bits per character and the number of characters that can be represented in a character set.
			I can explain the difference between the ASCII and UNICODE character sets.

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Confidence			Clarification
🟩	🟨	🟥	
			I can explain how an image is a series of pixels represented in binary.
			I can explain what metadata is and provide examples.
			I can explain the effect of colour depth and resolution on the size of an image file.
			I can explain how sound can be sampled and stored in a digital form.
			I can explain how sample rate can affect the size and quality of an audio file.
			I can explain how sample duration can affect the size and quality of an audio file.
			I can explain how bit depth can affect the size and quality of an audio file.
			I can explain the need for compression.
			I can explain what lossy compression is.
			I can explain what lossless compression is.
			I can explain the advantages and disadvantages of lossy vs lossless compression.

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Unit 1.3 Computer Networks Connections and Protocols

Confidence			Clarification
🟩	🟧	🟥	
			I can explain what a LAN is.
			I can explain what a WAN is.
			I can explain factors that can affect network performance.
			I can explain the difference roles of computers in a client-server and peer-to-peer network.
			I can explain the hardware required to connect to standalone computers in a LAN.
			I can explain what a wireless access point is.
			I can explain what a router and switch is.
			I can explain what a network interface card is.
			I can explain what transmission media is.
			I can explain what the internet is.
			I can explain what DNS is.
			I can explain what hosting is.
			I can explain what the cloud is.
			I can explain what web servers and clients are.
			I can explain what a star network is.
			I can explain what a mesh network is.

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Confidence			Clarification
🟩	🟨	🟥	
			I can explain what is meant by a wired and wireless network.
			I can explain various modes of connection such as Ethernet, Wi-Fi and Bluetooth.
			I can compare the benefits and drawbacks of a wired connection versus a wireless connection.
			I can recommend one or more connections for a specified scenario.
			I can explain what network encryption is.
			I can explain what IP addressing is and the IP address formats IPv4 and IPv6.
			I can explain what a MAC address is.
			I can explain the principle of a standard to provide rules for areas of computing.
			I can explain what the TCP/IP protocol.
			I can explain what the HTTP and HTTPS protocols are.
			I can explain what the FTP protocol is.
			I can explain what the POP protocol is.
			I can explain what the SMTP and IMAP protocols are.
			I can explain the concept of layers.

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Unit 1.4 Network Security

Confidence			Clarification
🟩	🟨	🟥	
			I can explain the various forms of cyberattacks.
			I can explain the following network threat: Malware
			I can explain the following network threat: Phishing
			I can explain the following network threat: People as a weak point
			I can explain the following network threat: Brute-force attacks
			I can explain the following network threat: Denial-of-service attacks
			I can explain the following network threat: Data interception/theft
			I can explain the following network threat: SQL injections
			I can explain how to identify and prevent vulnerabilities using: Penetration testing
			I can explain how to identify and prevent vulnerabilities using: Firewalls
			I can explain how to identify and prevent vulnerabilities using: User access levels
			I can explain how to identify and prevent vulnerabilities using: Anti-malware software
			I can explain how to identify and prevent vulnerabilities using: Usernames/passwords
			I can explain how to identify and prevent vulnerabilities using: Encryption
			I can explain how to identify and prevent vulnerabilities using: Physical security

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Unit 1.5 Systems Software

Confidence			Clarification
			I can explain the purpose and functionality of on operating system.
			I can explain the following aspect of an operating system: user interface
			I can explain the following aspect of an operating system: memory management
			I can explain the following aspect of an operating system: peripheral management and drivers
			I can explain the following aspect of an operating system: user management
			I can explain the following aspect of an operating system: file management
			I can explain what utility system software is.
			I can explain what encryption software is.
			I can explain what defragmentation is.
			I can explain what data compression is.

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Unit 1.6 Ethical Legal and Cultural Issues

Confidence			Clarification
			I can explain various ethical issues surrounding computer science technologies.
			I can explain various legal issues surrounding computer science technologies.
			I can explain various cultural issues surrounding computer science technologies.
			I can explain various environmental issues surrounding computer science technologies.
			I can explain various privacy issues surrounding computer science technologies.
			I can explain how digital technology impacts our society.
			I can explain the following piece of legislation in relation to computer science: Data Protection Act 2018.
			I can explain the following piece of legislation in relation to computer science: Computer Misuse Act 1990.
			I can explain the following piece of legislation in relation to computer science: Copyright Designs and Patents Act 1988.
			I can explain what is meant by software licences.
			I can explain what is meant by open-source software.
			I can explain what is meant by proprietary software.

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Unit 2.1 Algorithms

Confidence			Clarification
🟩	🟨	🟥	
			I can explain what is meant by the term abstraction.
			I can explain why abstraction is helpful when designing a solution to a problem.
			I can explain what decomposition is and how it is useful.
			I can explain what is meant by algorithmic thinking.
			I can identify the inputs, processes and outputs of a problem.
			I can use structure diagrams to help design a solution to a problem.
			I can identify common errors.
			I can explain what trace tables are and how to use them.
			I can explain how a binary search works.
			I can explain how a linear search works.
			I can explain how a bubble sort works.
			I can explain how a merge sort works.
			I can explain how an insertion sort works.
			I can explain how to produce pseudocode to describe an algorithm and why it is needed.
			I can explain how to produce a flowchart to describe an algorithm.
			I can interpret, correct, refine and complete a range of algorithms using algorithms, flowcharts and the OCR reference language.

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Unit 2.2 Programming Fundamentals

Confidence			Clarification
🟩	🟧	🟥	
			I can explain variables and constants and why I would use them.
			I can explain what the various operators are.
			I can explain how to input data to a program and write it out again.
			I can explain the three basic programming constructs: sequence, selection, iteration (count- and condition-controlled).
			I can carry out various basic string manipulation techniques.
			I can use basic file handling operations in a program: open, read, write, close.
			I can use records to store data.
			I can use basic SQL commands to search for data in a database.
			I can use one-dimensional arrays (or their equivalent – e.g., lists in Python) when solving problems.
			I can use two-dimensional arrays (or their equivalent – e.g., lists in Python) when solving problems.
			I can explain the difference between a procedure and a function.
			I can explain why using sub-programs is useful when producing a structured program.
			I can explain the use of the following data types: integer, real, Boolean, character, string.
			I can explain what casting is.
			I can explain the common arithmetic operators.
			I can explain the common Boolean operators.

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Unit 2.3 Producing Robust Programs

Confidence			Clarification
			I can explain the following defensive design consideration: input validation.
			I can explain the following defensive design consideration: anticipating misuse.
			I can explain the following defensive design consideration: authentication.
			I can explain how adding comments improves the maintainability of code.
			I can explain how indentation and white space improves the maintainability of code.
			I can explain how the use of sub-programs improves the maintainability of code.
			I can explain how adopting naming conventions improves the maintainability of code.
			I can explain the purpose of testing.
			I can explain what is meant by iterative testing.
			I can explain what is meant by final/terminal testing.
			I can identify both syntax and logic errors in code.
			I can select and use suitable test data for a program.
			I can explain what is meant by normal test data.
			I can explain what is meant by boundary test data.
			I can explain what is meant by invalid test data.
			I can explain what is meant by erroneous test data.
			I can refine algorithms to make them more robust.

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Unit 2.4 Boolean Logic

Confidence			Clarification
			I can construct simple logic diagrams using the operators AND, OR and NOT.
			I can construct truth tables for the operators AND, OR and NOT.
			I can construct a truth table for a given logic diagram.
			I can apply logical operators in appropriate truth tables to solve problems.

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Unit 2.5 Programming Languages and IDE's

Confidence			Clarification
🟥	🟨	🟩	
			I can explain what a low-level language is.
			I can explain the characteristics and purpose of low-level languages.
			I can explain what a high-level language is.
			I can explain the characteristics and purpose of high-level languages.
			I can explain what the purpose of a translator is.
			I can explain what an interpreter is used for and how it differs from a compiler.
			I can explain what a compiler is used for and how it differs from an interpreter.
			I can explain the following feature of an integrated development environment (IDE): Editor
			I can explain the following feature of an integrated development environment (IDE): Error diagnostics
			I can explain the following feature of an integrated development environment (IDE): Run-time environment
			I can explain the following feature of an integrated development environment (IDE): Translator