



SUBJECT - Computer Science - 0984 CIE

<p>Units 0984 CIE</p>	<ol style="list-style-type: none"> 1. Data representation 2. Data transmission 3. Hardware 4. Software 5. The internet and its uses 6. Automated and emerging technologies 7. Algorithm design and problem solving 8. Programming 9. Databases 10. Boolean logic 	<p><i>The 5Cs and their application in Computer Science:</i></p> <p>Computer science can serve as a powerful tool for cultivating and promoting important values such as community, compassion, creativity, confidence, and challenge. Through computer science education, students can engage in collaborative projects that foster a sense of community, encouraging them to work together, share ideas, and learn from one another. The use of technology can also provide opportunities for demonstrating compassion by developing applications that address societal issues and empower marginalised communities. Additionally, computer science nurtures creativity by encouraging students to think outside the box, explore innovative solutions, and express their ideas through coding and programming. As students tackle complex problems and overcome coding challenges, they develop confidence in their abilities, learning to persevere, problem-solve, and adapt in the face of adversity. Ultimately, computer science education provides a platform for instilling these values, equipping students with the skills and mindset necessary to positively impact the world around them.</p> <p>Computer science is essential to education because it equips students with critical thinking, problem-solving, and digital literacy skills necessary for navigating an increasingly technology-driven world.</p>	
<p>Exam 0984 CIE</p>	<p>Topics 1–6 address elements that will be tested in Paper 1. Topics 7–10 address elements that will be tested in Paper 2.</p>	<p>Past Papers 0984 CIE</p>	<p>Past/specimen papers and mark schemes are available to download at www.cambridgeinternational.org/support</p>
<p>Assessment</p>	<p>Assessment in Computing is ongoing throughout the year and will focus on the ability and command of the Domains, Concepts and objectives of the 0984 CIE iGCSE Computer Science Course. Past Paper questions should be used prior to each reporting point to ensure accurate data.</p>		
<p>Domains of Knowledge & Application to Key Concepts</p>	<p>Computational Thinking supports learners to create and present solutions to problems using algorithms, logic and precision. Programming helps learners to understand the common constructs of programming languages and to appreciate the contribution that Computer Scientists make to our lives. Managing Data encourages learners to reflect on how computers store and analyse data on an ever-increasing scale. Networks and Digital Communication shows how computers and other machines communicate with each other across networks and how the networks are</p>		

created through a combination of hardware and data transmission protocols.

***Computer Systems** helps learners to understand that computers follow precise sets of instruction to process inputs that are given by humans, to make decisions and produce outputs.*

	Year 10	Year 11
Term 1		
Topic and Content	Data representation 1.1 Number systems 1.2 Text, Sound and Images 1.3 Data storage and compression Data transmission 2.1 Types and methods of data transmission 2.2 Methods of error detection 2.3 Encryption	Databases Boolean logic Programming 8.1 Programming concepts
Skills	Data representation <ol style="list-style-type: none">1. Understand how and why computers use binary to represent all forms of data.2. Understand denary, binary and hexadecimal number systems.3. Convert positive integers between these number systems.4. Understand how and why hexadecimal is used as a beneficial method of data representation.5. Add two positive 8-bit binary integers.6. Understand the concept of overflow and why it occurs in binary addition.7. Perform logical binary shifts on positive 8-bit binary integers and understand the effect this has on the positive binary integer.8. Use two's complement to represent positive and negative 8-bit binary integers9. Understand how and why a computer represents text and the use of character sets, including ASCII and Unicode.	Databases <ol style="list-style-type: none">1 Define a single-table database from given data storage requirements.2 Suggest suitable basic data types.3 Understand the purpose of a primary key and identify a suitable primary key for a given database table.4 Read, understand and complete structured query language (SQL) scripts to query data stored in a single database table. Boolean logic <ol style="list-style-type: none">1 Identify and use standard symbols for logic gates.2 Define and understand the functions of the logic gates.

	<ol style="list-style-type: none"> 10. Understand how and why a computer represents sound, including the effects of the sample rate and sample resolution. 11. Understand how and why a computer represents an image, including the effects of the resolution and colour depth. 12. Understand how data storage is measured. 13. Calculate file sizes for image and sound files. 14. Understand the purpose of and need for data compression. 15. Understand how files are compressed using lossy and lossless file compression methods. <p>Data transmission</p> <ol style="list-style-type: none"> 1. Understand that data is broken down into packets for transmitted; describe the structure of a packet; describe the process of packet switching. 2. Describe how data is transmitted from one device to another using different methods of data transmission. Explain the suitability of the method of data transmission for a given scenario. 3. Understand the universal serial bus (USB) interface and how it is used to transmit data. 4. Understand the need to check for errors after data transmission and how these errors can occur. 5. Describe the processes involved in error detection methods. 6. Describe how a check digit is used to detect errors in data entry including ISBN numbers and bar codes. 7. Describe how an automatic repeat request (ARQ) can be used to establish that data is received without error. 8. Understand the need for and purpose of encryption when transmitting data. 9. Understand how data is encrypted using symmetric and asymmetric encryption. 	<p>3 Use of logic gates to create given logic circuits. Complete a truth table and write a logic expression.</p>
<p>Methods of Assessment</p>	<p>1.1 Number systems 1.2 Text, Sound and Images 1.3 Data storage and compression March 2019 Paper 12, question 3(a) June 2019 Paper 11, question 1 June 2019 Paper 13, question 1(a) Nov 2019 Paper 11, question 2</p>	<p>Databases June 2019 Paper 21 Question 5(a) and 5(b) June 2019 Paper 22 Question 5(a) June 2019 Paper 23 Question 6(a) Nov 2019 Paper 21 Question 5(a) and 5(b) Nov 2019 Paper 22 Question 7(a) Nov 2019 Paper 23 Question 7(a) and 7(b)</p>

Nov 2019 Paper 12, question 4
 Nov 2019 Paper 13, question 1(c)(i)
 March 2020 Paper 12, question 5
 June 2020 Paper 11, question 9(d)
 June 2020 Paper 12, question 7
 June 2020 Paper 13, question 1
 2023 Specimen Paper 1, question 1
 1.2 and 1.3
 March 2019 Paper 12, question 1
 June 2019 Paper 12, question 4(b)
 Nov 2019 Paper 11, question 6(d)
 Nov 2019 Paper 12, question 5(a) and 5(b)
 Nov 2019 Paper 13, question 1(c)(ii)
 March 2020 Paper 12, question 3(d)
 June 2020 Paper 11, question 3(c)

2.1 Types and methods of data transmission
2.2 Methods of error detection
2.3 Encryption

March 2019 Paper 12, question 4(d) and question 6(a)
 June 2019 Paper 12, question 9
 June 2019 Paper 13, question 3(b) and question 5
 Nov 2019 Paper 11, question 5
 Nov 2019 Paper 12, question 5(c)(ii), question 9 and question 10(a)
 Nov 2019 Paper 13, question 1(b) question 3 and question 5
 March 2020 Paper 12, question 2
 June 2020 Paper 11, question 3(a), 3(b) and question 4
 June 2020 Paper 12, question 3
 June 2020 Paper 13, question 9
 2023 Specimen Paper 1, question 2(a), 2(b) and question 9

Past Paper questions will be used prior to each reporting point to ensure accurate data.

March 2020 Paper 22 Question 5(a)
 June 2020 Paper 21 Question 6(a)
 June 2020 Paper 22 Question 6(a)
 June 2020 Paper 23 Question 7(a)
 2023 Specimen Paper 2 Question 11

Note: learners do not need to use QBE grids, so these parts of the past questions have been omitted. Teachers can rewrite the QBE parts of the questions to use SQL to provide extra example questions.

Boolean logic

March 2019 Paper 12, question 5
 June 2019 Paper 11, question 2
 June 2019 Paper 12, question 8
 June 2019 Paper 13, question 4
 Nov 2019 Paper 11, question 2
 Nov 2019 Paper 12, question 4
 Nov 2019 Paper 13, question 6
 March 2020 Paper 12, question 6
 June 2020 Paper 11, question 2
 June 2020 Paper 12, question 4
 June 2020 Paper 13, question 6
 2023 Specimen Paper 2, question 6

Note: from 2023 Boolean logic questions will be set in paper 2.

Past Paper questions will be used prior to each reporting point to ensure accurate data.

Term 2

<p>Topic and Content</p>	<p>Hardware 3.1 Computer architecture 3.2 Input and output devices 3.3 Data storage 3.4 Network hardware</p> <p>Software 4.1 Types of software and interrupts 4.2 Types of programming language, translators and integrated development environments (IDEs)</p>	<p>Programming 8.1 Programming concepts</p>
<p>Skills</p>	<p>Hardware</p> <ol style="list-style-type: none"> 1 Understand the role of the central processing unit (CPU) in a computer. Understand what is meant by a microprocessor. 2 Understand the purpose of the components in a CPU, in a computer that has a Von Neumann architecture. Describe the role of each component in the process of the fetch–decode–execute cycle. 3 Understand what is meant by CPU core, cache and clock how they can affect the performance of a CPU. 4 Understand the purpose and use of a CPU instruction set. 5 Describe the purpose and characteristics of an embedded system and identify devices in which they are commonly used. 6 Understand what is meant by an input device and why it is required. 7 Understand what is meant by an output device and why it is required. 8 Understand what is meant by a sensor and the purpose of sensors. Identify the type of data captured by each sensor, and when each sensor would be used, including selecting the most suitable sensor for a given context. 9 Understand what is meant by primary storage. 10 Understand what is meant by secondary storage. 11 Describe the operation of magnetic, optical and solid-state storage and give examples of each. 12 Describe what is meant by virtual memory, how it is created, used and why it is necessary. 	<p>Programming</p> <ol style="list-style-type: none"> 1 Declare and use variables and constants. 2 Understand and use basic data types. 3 Understand and use input and output. 4 Understand and use the concepts of sequence; selection; iteration, totalling; counting; string handling; and arithmetic, logical and Boolean operators. 5 Understand and use nested statements. 6 Understand what is meant by procedures, functions and parameters; Define and use procedures and functions, with or without parameters; Understand and use local and global variables. 7 Understand and use library routines. 8 Understand how to create a maintainable program. 9 Declare and use one-dimensional (1D) and two-dimensional (2D) arrays. 10 Understand the use of arrays. 11 Write values into and read values from an array using iteration. 12 Understand the purpose of storing data in files. 13 Open, close and use a file for reading and writing.

	<p>13 Understand what is meant by cloud storage.</p> <p>14 Explain the advantages and disadvantages of storing data on the cloud in comparison to storing it locally.</p> <p>15 Understand that a computer needs a network interface card (NIC) to access a network.</p> <p>16 Understand what is meant by the purpose and structure of a media access control (MAC) address, including its structure.</p> <p>17 Understand what is meant by the purpose of an internet protocol (IP) address. Understand that there are different types IP address.</p> <p>18 Describe the role of a router in a network.</p> <p>Software</p> <p>1 Describe the difference between system software and application software and provide examples of each.</p> <p>2 Describe the role and basic functions of an operating system.</p> <p>3 Understand how hardware, firmware and an operating system are required to run applications software.</p> <p>4 Describe the role and operation of interrupts.</p> <p>5 Explain what is meant by a high-level language, and low-level language, including the advantages and disadvantages of each.</p> <p>6 Understand that assembly language is a form of low-level language that uses mnemonics, and that an assembler is needed to translate an assembly language program into machine code.</p> <p>7 Describe the operation of a compiler and an interpreter, including how a high-level language is translated by each and how errors are reported.</p> <p>8 Explain the advantages and disadvantages of a compiler and an interpreter.</p> <p>9 Explain the role of an IDE and the common functions it provides.</p>	
Methods of Assessment	<p>Hardware</p> <p>June 2019 Paper 13, question 2(b)</p> <p>Nov 2019 Paper 11, question 8</p> <p>Nov 2019 Paper 12, question 2</p> <p>Nov 2019 Paper 13, question 7(a)</p>	<p>Programming</p> <p>March 2019 Paper 22, question 1 and question 4</p> <p>June 2019 Paper 21, question 1, question 2 and question 3</p> <p>June 2019 Paper 22, question 1 and question 4</p> <p>June 2019 Paper 23, question 1 and question 5</p>

March 2020 Paper 12, question 1
June 2020 Paper 11, question 5
June 2020 Paper 12, question 1
June 2020 Paper 13, question 5(b)(ii)
2023 Specimen Paper 1, question 4

3.2 and 3.3

March 2019 Paper 12, question 3(b), and question 6
June 2019 Paper 11, question 3 and question 6(b)
June 2019 Paper 12, question 4, question 7(b) and question 10
June 2019 Paper 13, question 6
Nov 2019 Paper 11, question 1 and question 4
Nov 2019 Paper 12, question 6, question 7(a) and question 11
Nov 2019 Paper 13, question 1(a) and 1(d)
March 2020 Paper 12, question 3(a), 3(b) and 3(c)
June 2020 Paper 11, question 1(a), 1(b), 1(d) question 6 and question 8
June 2020 Paper 12, question 6, question 8(b) and question 9
June 2020 Paper 13, question 2, question 5(b)(i) and question 8

3.4

June 2019 Paper 13, question 2(a)
June 2020 Paper 11, question 1(c)
2023 Specimen Paper 1, question 1(b), question 2 and question 3(a)

Software

March 2019 Paper 12, question 4(a) and 4(b)
June 2019 Paper 11, question 7
Nov 2019 Paper 11, question 6(a)
Nov 2019 Paper 12, question 7(a)
Nov 2019 Paper 13, question 2 and question 7(b)
March 2020 Paper 12, question 4
June 2020 Paper 11, question 8(a), question 9(a), 9(b) and 9(c)
June 2020 Paper 12, question 2 and question 8(c)
June 2020 Paper 13
2023 Specimen Paper 1, question 4(d) and question 5

Past Paper questions will be used prior to each reporting point to ensure accurate data.

Nov 2019 Paper 21, question 1
Nov 2019 Paper 22, question 1, question 5 and question 6
Nov 2019 Paper 23, question 1 and question 4
March 2020 Paper 22, question 1
June 2020 Paper 21, question 1 and question 4
June 2020 Paper 22, question 1, question 2 and question 5
June 2020 Paper 23, question 1, question 2, question 3 and question 4
2023 Specimen Paper 2, question 1, question 3, question 8, question 9, question 10, question 12 and question 13

Past Paper questions will be used prior to each reporting point to ensure accurate data.

Term 3

Topic and Content	5.1 The internet and the world wide web 5.2 Digital currency 5.3 Cyber security 6.1 Automated systems 6.2 Robotics 6.3 Artificial intelligence	Programming 8.2 Arrays 8.3 File handling
Skills	The internet and its uses 1 Understand the difference between the internet and the world wide web. 2 Understand what is meant by a uniform resource locator (URL). 3 Describe the purpose and operation of hypertext transfer protocol (HTTP) and hypertext transfer protocol secure (HTTPS). 4 Explain the purpose and functions of a web browser. 5 Describe how web pages are located, retrieved and displayed of on a device when a user enters a URL. 6 Explain what is meant by cookies and how they are used, including session cookies and persistent cookies. 7 Understand the concept and use of digital currency. 8 Understand the process of blockchain and how it is used to track digital currency. 9 Describe the processes involved in, and the aim of carrying out a range of cyber security threats. 10 Explain how a range of solutions are used to help keep data safe from security threats. Automated and emerging technologies 1 Describe how sensors, microprocessors and actuators can be used to create automated systems.	Programming 14 Declare and use variables and constants. 15 Understand and use basic data types. 16 Understand and use input and output. 17 Understand and use the concepts of sequence; selection; iteration, totalling; counting; string handling; and arithmetic, logical and Boolean operators. 18 Understand and use nested statements. 19 Understand what is meant by procedures, functions and parameters; Define and use procedures and functions, with or without parameters; Understand and use local and global variables. 20 Understand and use library routines. 21 Understand how to create a maintainable program. 22 Declare and use one-dimensional (1D) and two-dimensional (2D) arrays. 23 Understand the use of arrays. 24 Write values into and read values from an array using iteration. 25 Understand the purpose of storing data in files. 26 Open, close and use a file for reading and writing.

	<p>2 Describe the advantages and disadvantages of automated systems used for a given scenario.</p> <p>3 robotics.</p> <p>4 Describe the characteristics of a robot.</p> <p>5 Understand the roles that robots can perform and the advantages and disadvantages of their use</p> <p>6 Understand what is meant by artificial intelligence (AI).</p> <p>7 Describe the main characteristics of AI.</p> <p>8 Explain the basic operation and components of AI systems to simulate intelligent behaviour.</p>	
<p>Methods of Assessment</p>	<p>The internet and its uses March 2019 Paper 12, question 7 June 2019 Paper 11, question 4 and question 6(a) June 2019 Paper 12, question 5, question 6(a), 6(b), 6(d) and 6(e) June 2019 Paper 13, question 1(d), 1(e) and question 3 Nov 2019 Paper 11, question 3 and question 6(b) Nov 2019 Paper 12, question 7 and question 10 Nov 2019 Paper 13, question 8 March 2020 Paper 12, question 8 June 2020 Paper 11, question 1(e), question 7 and question 9(b) June 2020 Paper 12, question 5 and question 10 June 2020 Paper 13, question 3, question 7 and question 10 2023 Specimen Paper 1, question 2(c) and question 10</p> <p>Automated and emerging technologies March 2019 Paper 12, question 3(b) June 2019 Paper 12, question 7(a) Nov 2019 Paper 11, question 2 Nov 2019 Paper 12, question 4 Nov 2019 Paper 13, question 6 March 2020 Paper 12, question 7 June 2020 Paper 11, question 6 2023 Specimen Paper 1 Question 6</p> <p>Past Paper questions will be used prior to each reporting point to ensure accurate data.</p>	<p>Programming March 2019 Paper 22, question 1 and question 4 June 2019 Paper 21, question 1, question 2 and question 3 June 2019 Paper 22, question 1 and question 4 June 2019 Paper 23, question 1 and question 5 Nov 2019 Paper 21, question 1 Nov 2019 Paper 22, question 1, question 5 and question 6 Nov 2019 Paper 23, question 1 and question 4 March 2020 Paper 22, question 1 June 2020 Paper 21, question 1 and question 4 June 2020 Paper 22, question 1, question 2 and question 5 June 2020 Paper 23, question 1, question 2, question 3 and question 4 2023 Specimen Paper 2, question 1, question 3, question 8, question 9, question 10, question 12 and question 13</p> <p>Past Paper questions will be used prior to each reporting point to ensure accurate data.</p>

Term 4		Term 4 - Exam & Revision
Topic and Content	7 Algorithm design and problem solving	
Skills	<ol style="list-style-type: none"> 1 Understand the program development life cycle: analysis, design, coding and testing. 2 Understand that every computer system is made up of sub-systems, which are made up of further sub-systems. Understand how a problem can be decomposed into its component parts. Use different methods to design and construct a solution to a problem. 3 Explain the purpose of a given algorithm. 4 Understand standard methods of solution. 5 Understand the need for validation checks to be made on input data and the different types of validation check. Understand the need for verification checks to be made on input data and the different types of verification check. 6 Suggest and apply suitable test data. 7 Complete a trace table to document a dry-run of an algorithms. 8 Identify and suggest ways of correcting of errors in algorithms. 9 Write and amend algorithms for given problems or scenarios using, pseudocode, program code and flowcharts. 	
Methods of Assessment	Algorithm design and problem solving March 2019 Paper 22, question 2, question 3 and question 5 June 2019 Paper 21, question 4 June 2019 Paper 22, question 2, question 3 and question 5 June 2019 Paper 23, question 2, question 3 and question 4 Nov 2019 Paper 21, question 1(e), question 2 and question 4 Nov 2019 Paper 22, question 2, question 3 and question 4 Nov 2019 Paper 23, question 5 and question 6 March 2020 Paper 22 question 2, question 3 and question 4 June 2020 Paper 21, question 2, question 3, question 4 and question 5	

June 2020 Paper 22, question 1(b), question 3 and question 4

June 2020 Paper 23, question 3, question 4, question 5 and question 6

2023 Specimen Paper 2, question 2, question 4, question 5 and question 7

Past Paper questions will be used prior to each reporting point to ensure accurate data.