

Switching Guide

International GCSE

Computer Science (9210)

**Switching from Pearson Edexcel or
Cambridge International to
OxfordAQA International Qualifications**

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Switching to OxfordAQA International GCSE Computer Science (9210)

The **OxfordAQA International GCSE Computer Science** specification is both motivating and hands-on. Students will learn the highly sought-after skills of programming, problem-solving and critical thinking. It is the perfect platform to prepare for study at A-level.

Key features:

- Covers the knowledge and skills in high demand by employers, such as programming, cyber security and web page design.
- Programming skills make up 50% of the course marks and are assessed via an on-screen programming task that requires students to make improvements to a skeleton program made available to centres in advance.
- Flexibility in the choice of programming language: students can learn to design, write and test computer programs using a choice of Python, Visual Basic or C#.



Specification comparison

OxfordAQA specification (9210)	Pearson Edexcel International specification	Cambridge International specification
Overall structure		
<p>Split into eight topics:</p> <ul style="list-style-type: none"> • Algorithms • Programming • Data representation • Computer systems • Computer networks • Cyber security • Relational databases and SQL • Web page design <p>There are two exams.</p> <p>Each of two hours duration and worth 50% of the marks for the course.</p> <p>The first exam is completed on a computer and assesses practical programming skills. Exercises on the exam paper will be based on a program that is released to centres ahead of the exam for students to use, study and modify (known as the Skeleton program). Students will be expected to be able to explain how the program works and to modify and improve it. It is available for Python, C# and Visual Basic languages.</p> <p>The second exam, completed on paper, assesses knowledge of the theoretical aspects of the course together with SQL and web page design.</p>	<p>Split into six topics:</p> <ul style="list-style-type: none"> • Problem solving • Programming • Data • Computers • Communication and the internet • The bigger picture <p>There are two exams.</p> <p>One of which is of two hours duration and the second of which is three hours in duration.</p> <p>The first exam covers the theoretical aspects of the course and is worth 50% of the course marks.</p> <p>The second exam is a three hour practical programming exam which is completed using a computer. It is available for Python, C# and Java languages. There is no pre-release for students to use to prepare for the exam.</p>	<p>Split into eight topics:</p> <ul style="list-style-type: none"> • Data representation • Communication and internet technologies • Hardware and software • Security • Ethics • Algorithm design and problem solving • Programming • Databases <p>There are two exams.</p> <p>Each of 1 hour 45 minutes duration.</p> <p>The first exam covers the theoretical aspects of the course content and is worth 60% of the marks for the course.</p> <p>The second exam assesses the practical aspects of the course, which are algorithms, programming and databases. This exam is worth 40% of the marks for the course and is marked out of 50 marks. Of these 50 marks, 20 relate to a pre-released programming task that students need to complete before the exam takes place.</p> <p>Whilst the Cambridge International specification states that learning should take place in a mainly practical way, there is less focus on practical content and application of skills in it, compared to the OxfordAQA specification, both in the subject content and the assessment methods.</p>

OxfordAQA specification (9210)	Pearson Edexcel International specification	Cambridge International specification
Topic by topic		
Content	Coverage	Coverage
3.1 Algorithms		
3.1.1 Representing algorithms	This content is covered in sections 1.1 and 1.2 of the Pearson Edexcel specification.	This content is covered in section 2.1.1 of the Cambridge International specification. Cambridge International do not use the terms abstraction and decomposition, but an understanding of these concepts is nevertheless required. Students studying the OxfordAQA specification do not need to cover structure diagrams which are required by Cambridge International.
3.1.2 Efficiency of algorithms	This content is covered in section 1.1.9 of the Pearson Edexcel specification.	This topic is not explicitly required by Cambridge International, although it might be relevant to commenting on the effectiveness of a given solution, which is covered in section 2.1.1 of the Cambridge International specification.
3.1.3 Searching algorithms	This content is covered in section 1.1.8 of the Pearson Edexcel specification.	These are not covered by the Cambridge International specification.
3.1.4 Sorting algorithms	This content is covered in section 2.3.1 of the Pearson Edexcel specification.	This is covered in the Cambridge International specification in Section 2.2.1.
3.2 Programming		
3.2.1 Data types	The distribution and features of coastal ecosystems are covered in Section A, Topic 2 Coastal environments. The distribution and characteristics of ecosystems are also covered in Section A, Topic 5 Rural environments. The impact of climate change on ecosystems is covered in Section C, Topic 7 Fragile environments and climate change.	This overview of distribution and components is not covered.

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3.2.2 Programming concepts	This content is covered in sections 2.2, 2.3.4 and 2.6 of the Pearson Edexcel specification. The Pearson Edexcel specification does not reference nesting of selection and iteration structures but it is likely that this would be expected at this level.	This is covered in the Cambridge International specification in Section 2.2.1. The Cambridge International specification does not reference nesting of selection and iteration structures but it is likely that this would be expected at this level.
3.2.3 Arithmetic operations in a programming language	This content is covered in section 2.5.1 of the Pearson Edexcel specification.	These are not explicitly listed in the Cambridge International specification but they would almost certainly be required as general programming techniques.
3.2.4 Relational operations in a programming language	This content is covered in section 2.5.2 of the Pearson Edexcel specification.	These are not explicitly listed in the Cambridge International specification but they would almost certainly be required as general programming techniques.
3.2.5 Boolean operations in a programming language	This content is covered in section 2.5.3 of the Pearson Edexcel specification.	These are not explicitly listed in the Cambridge International specification but they would almost certainly be required as general programming techniques.
3.2.6 Data structures	This content is covered in section 2.3.2 of the Pearson Edexcel specification.	The Cambridge International specification only covers the use of one-dimensional arrays, in section 2.2.2. The OxfordAQA specification also requires students to understand two-dimensional arrays and records.
3.2.7 Input/output and file handling	This content is covered in sections 2.4.1 and 2.4.3 of the Pearson Edexcel specification.	Input and output are not specifically referenced in the programming section of the Cambridge International specification but they are so fundamental that they must be required. File handling is not covered by the Cambridge International specification.
3.2.8 String handling operations in a programming language	This content is covered in section 2.3.3 of the Pearson Edexcel specification but unlike in the OxfordAQA specification, the specific operations that are required are not stated.	These are not explicitly listed in the Cambridge International specification but they would almost certainly be required as general programming techniques.

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3.2.9 Random number generation in a programming language	Use of random numbers is not explicitly required for the Pearson Edexcel specification.	Use of random numbers is not explicitly required for the Cambridge International specification.
3.2.10 Subroutines (procedures and functions)	This content is covered in section 2.6 of the Pearson Edexcel specification.	This topic is covered in section 2.1.1 of the Cambridge International specification. The specification does not make clear if students will be required to pass data using parameters.
3.2.11 Structured programming	The term structured programming is not used in the Pearson Edexcel specification but the concepts of structured programming are covered throughout the programming sections.	Elements of this topic are covered in sections 2.1.1 and 2.2.1 of the Cambridge International specification. The OxfordAQA specification requires students to explain the advantages of the structured approach, in addition to being able to use it.
3.2.12 Robust and secure programming	Programming of validation routines is covered in section 2.4.2 of the Pearson Edexcel specification but exactly what validation techniques are required is not stated. There is no explicit requirement to program authentication routines. Selection of test data is covered in section 2.1.4.	For the OxfordAQA specification, students are required to be able to implement simple validation and authentication checks in programs. In contrast, the Cambridge International specification requires that students should understand the need for a wider range of both validation and verification checks in section 2.1.1 but does not state that students should be able to implement these. Like the OxfordAQA specification, the Cambridge International specification requires students to be able to select appropriate test data.
3.2.13 Classification of programming languages	Similar content is covered in section 4.5 of the Pearson Edexcel specification but the requirements of students are not set out in as much detail.	Broadly similar topics are covered in section 1.3.7 of the Cambridge International specification but less detail is given about what candidates will be required to know about these topics.

OxfordAQA specification (9210)	Pearson Edexcel International specification	Cambridge International specification
3.3 Data representation		
3.3.1 Number bases	This content is covered in section 3.1 of the Pearson Edexcel specification.	This is covered in the Cambridge International specification in sections 1.1.1 and 1.1.2.
3.3.2 Converting between number bases	This content is covered in sections 3.1.3 and 3.1.5 of the Pearson Edexcel specification. The Pearson Edexcel specification requires students to be able to use sign and magnitude and two's complement notation for signed integers whilst the OxfordAQA specification only covers unsigned integers	This is covered in the Cambridge International specification in sections 1.1.1 and 1.1.2. For the OxfordAQA specification students only need to work with numbers up to 8 bits in length, for Cambridge International they need to work with numbers up to 16 bits in length.
3.3.3 Units of information	This content is covered in section 3.3.1 of the Pearson Edexcel specification. The Pearson Edexcel specification requires students to cover kibibytes, mebibytes, gibibytes and tebibytes which are not required by OxfordAQA.	This topic is not explicitly referred to in the Cambridge International specification (other than the byte in section 1.1.1) but as students have to cover data storage as a topic, they will need to have covered this.
3.3.4 Binary arithmetic	This content is covered in section 3.1.4 of the Pearson Edexcel specification. The Pearson Edexcel specification requires students to be able to use arithmetic shifts and to understand overflow which is not required for the OxfordAQA specification.	This is not required for the Cambridge International specification.
3.3.5 Character encoding	Character encoding is covered in section 3.2.1 of the Pearson Edexcel specification. Pearson Edexcel do not state explicitly that student should be aware of the advantages of Unicode over ASCII which is required by OxfordAQA.	This topic is covered by the Cambridge International specification in section 1.1.3 but the description is somewhat vague, stating only that students should understand how text can be stored.

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3.3.6 Representing images	Representing images is covered in section 3.2.2 of the Pearson Edexcel specification, but the requirements are not set out in as much detail as in the OxfordAQA specification. The OxfordAQA specification explicitly states that students must be able to calculate image file sizes and must be able to convert between binary data and an image. These are not explicitly required by Pearson Edexcel but might be covered by the general description in the specification.	This topic is covered in section 1.1.3 of the Cambridge International specification but less detail is included about what students need to know. The Cambridge International specification requires students to cover JPEG files which are not required for the OxfordAQA specification. It also covers MP4 video files, which are not required for OxfordAQA.
3.3.7 Representing sound	This content is covered in sections 3.2.3 and 3.2.4 of the Pearson Edexcel specification. The OxfordAQA specification explicitly states that students must be able to calculate sound sample sizes. This is not explicitly required by Pearson Edexcel but might be covered by the general description in the specification.	This topic is covered in section 1.1.3 of the Cambridge International specification but less detail is included about what students need to know. The Cambridge International specification requires students to cover MIDI and MP3 files which are not required for the OxfordAQA specification.
3.3.8 Data compression	Data compression is covered in sections 3.3.2 and 3.3.3 of the Pearson Edexcel specification but the requirements are not identical to those of the OxfordAQA specification. For Pearson Edexcel, lossy and lossless techniques, together with run length encoding and examples such as JPEG and MP3 are covered. For OxfordAQA, students do not need to distinguish between lossy and lossless compression but do need to understand Huffman coding in addition to run length encoding.	The Cambridge International specification covers compression in section 1.1.3 but at a more abstract level, requiring students to understand how lossy and lossless compression can be used in a range of contexts. The OxfordAQA specification instead focuses on the application of two specific methods of compression: run length encoding and Huffman coding.
3.4 Computer systems		
3.4.1 Hardware and software	The Pearson Edexcel specification covers both hardware and software in section 4 but unlike the OxfordAQA specification it does not explicitly state that students should be able to explain the difference between the two.	The Cambridge International specification covers both hardware and software in section 1.3 but unlike the OxfordAQA specification it does not explicitly state that students should be able to explain the difference between the two.

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3.4.2 Boolean logic	Some of this content is covered in section 4.3 of the Pearson Edexcel specification. However, the Pearson Edexcel specification only requires students to be able to construct and interpret truth tables and to produce logic statements. In addition to this, the OxfordAQA specification requires students to be able to draw and interpret logic circuits and also states that students should be able to write a Boolean expression for a logic circuit and vice-versa.	This is covered in section 1.3.1 of the Cambridge International specification. The Cambridge International specification requires that students can use NOT, AND, OR, NAND, NOR and XOR gates whereas the OxfordAQA specification only covers NOT, AND and OR gates. For the OxfordAQA specification students need to be able to write a Boolean expression for a simple logic circuit, and vice-versa, which is not required by Cambridge International.
3.4.3 Software classification	This content is covered in section 4.4 of the Pearson Edexcel specification.	The OxfordAQA specification requires students to differentiate between application and system software which the Cambridge International specification does not. Both specifications cover operating systems (section 1.3.6) but the OxfordAQA specification contains more details about what is required. Cambridge International require students to understand the need for interrupts which is not on the OxfordAQA specification.
3.4.4 Systems architecture	<p>The Pearson Edexcel and OxfordAQA specifications both cover the Von Neumann architecture. This is covered in section 4.2 of the Pearson Edexcel specification.</p> <p>Topics common to both specifications include factors that affect processor performance (4.2.4), the fetch-execute cycle (4.2.3), main memory (4.2.2) and secondary storage (4.2.5), cloud storage (4.2.6) and embedded systems (4.2.7). The Pearson Edexcel specification covers some additional content in relation to the components of the CPU and requires students to distinguish between the different buses. It also covers additional content about virtual memory, types of cache memory and the stored program concept that is not required for the OxfordAQA specification.</p>	<p>The content that is common to the Cambridge International and OxfordAQA specifications is covered in sections 1.3.2, 1.3.3 and 1.3.5.</p> <p>Both specifications cover the Von Neumann architecture and the fetch-execute cycle. The Cambridge International specification covers the stored program concept and the use of registers which are not required by OxfordAQA. The OxfordAQA specification requires that students can explain how clock speed, number of processor cores and cache size can affect performance, which Cambridge International do not require.</p>

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		<p>With regard to storage, the Cambridge International specification covers off-line storage which the OxfordAQA specification does not. However, the OxfordAQA specification covers Cloud Storage which Cambridge International do not. The Cambridge International specification requires that students can calculate file sizes, which is only required for the specific context of bitmap and sound files for OxfordAQA.</p> <p>The OxfordAQA specification covers embedded systems which is not covered by Cambridge International although some components which might be used by embedded systems are covered in section 1.3.3 of the Cambridge International specification.</p>
3.5 Computer networks		
3.5 Computer networks	<p>This topic is mostly covered in section 5.1 of the Pearson Edexcel specification.</p> <p>The Pearson Edexcel specification requires some additional topics that are not required by OxfordAQA. These include: Personal area networks, client server vs peer-to-peer, measurements of data speeds, ring and mesh topologies and mobile communication standards. The OxfordAQA specification requires that the UDP protocol is covered, which is not required by Pearson Edexcel.</p> <p>Some of the network security aspects of the topic are covered in sections 5.2.1 and 5.2.5 of the Pearson Edexcel specification but it is not stated explicitly what security measures students will need to have covered.</p>	<p>The Cambridge International specification covers a range of data transmission topics in section 1.2.1, such as serial and parallel, simplex and duplex and parity bits that are not required for the OxfordAQA specification.</p> <p>The OxfordAQA specification covers what a computer network is, LANs and WANs, wired and wireless communication and topologies which are not required by Cambridge International.</p> <p>Both the Cambridge International specification (in section 1.2.3) and the OxfordAQA specification cover the Internet, but some of the content is different. The Cambridge International specification focuses on topics such as browsers, ISPs and addressing systems such as MAC addresses and URLs whilst the OxfordAQA specification focuses on the protocols used by the internet eg TCP, IP, SMTP and the TCP/IP stack.</p>

OxfordAQA specification (9210)	Pearson Edexcel International specification	Cambridge International specification
3.6 Cyber security		
3.6 Cyber security	The OxfordAQA specification requires students to define the term cyber security, which the Pearson Edexcel specification does not although much of the detailed content about security threats and measures is similar.	The OxfordAQA specification requires students to define the term cyber security, which the Cambridge International specification does not although much of the detailed content about security threats and measures is similar.
3.6.1 Cyber security threats	<p>This topic is covered in section 5.2 of the Pearson Edexcel specification.</p> <p>The threats listed are not exactly the same in the two specifications. OxfordAQA include malicious code, weak passwords, misconfigured access rights and blagging as threats which are not required by Pearson Edexcel. Pearson Edexcel include digital devices and eavesdropping which are not covered by OxfordAQA.</p>	Some of these are covered in section 1.2.2 and 1.4.3 of the Cambridge International specification. The Cambridge International specification does not cover weak and default passwords, misconfigured access rights, removable media, unpatched/outdated software, penetration testing, blagging, shouldering, Trojans or adware. Some of these might be relevant under more general topic headings in the Cambridge International specification.
3.6.2 Methods to detect and prevent cyber security threats	<p>This topic is covered in section 5.2 of the Pearson Edexcel specification.</p> <p>The Pearson Edexcel specification has a considerable amount of additional content on this topic that is not covered by OxfordAQA. The additional topics include: physical security, ethical hacking, commercial analysis tools, network and user policies, software design, audit trails, secure coding, code reviews and modular testing.</p> <p>The OxfordAQA specification covers passwords, biometrics, CAPTCHAs, email confirmations and automatic software updates that are not covered by Pearson Edexcel.</p>	<p>This topic is covered in sections 1.2.2 and 1.4 of the Cambridge International specification.</p> <p>The use of passwords, biometrics and firewalls are common to both specifications. The OxfordAQA specification covers CAPTCHA, email confirmations and automatic software updates which are not required for the Cambridge International specification. The Cambridge International specification covers proxy servers, SSL, TLS and symmetric encryption which are not required by OxfordAQA.</p>

OxfordAQA specification (9210)	Pearson Edexcel International specification	Cambridge International specification
3.7 Relational databases and structured query language (SQL)		
3.7.1 Relational databases	This topic is not covered by the Pearson Edexcel specification.	The Cambridge International specification covers databases in section 2.3, but only single table databases not relational databases.
3.7.2 Database design	This topic is not covered by the Pearson Edexcel specification.	In section 2.3 the Cambridge International specification requires that suitable data types and primary keys can be selected, for a single table database. The OxfordAQA specification has similar requirements, but for a relational database consisting of up to three tables.
3.7.3 Structured Query Language (SQL)	This topic is not covered by the Pearson Edexcel specification.	The use of SQL is not required by Cambridge International. In section 2.3 the Cambridge International specification requires students to be able to specify the structure of a table and to be able to perform queries-by-example.
3.8 Web page design		
3.8.1 Web design concepts	This topic is not covered by the Pearson Edexcel specification.	The Cambridge International specification refers to distinguishing between HTML structure and presentation in section 1.2.3 but does not refer explicitly to CSS or server-side scripting.
3.8.2 Hypertext Markup Language (HTML) and Cascading Style Sheets (CSS)	This topic is not covered by the Pearson Edexcel specification, although HTML is mentioned in section 5.3.2.	HTML is referenced in section 1.2.3 of the Cambridge International specification but there is no requirement for students to have made practical use of HTML or CSS, which is required by OxfordAQA.

Content covered by the Pearson Edexcel that is not required for OxfordAQA	Content covered by Cambridge International that is not required for OxfordAQA
<ul style="list-style-type: none"> • 2.1.3: Be able to differentiate between types of errors in programs: logic, syntax, runtime. • 3.3.4: Be able to calculate file sizes. • 3.4: Understand the need for data encryption and explain how the pigpen, Caesar, Vignere and rail fence cipher methods work. • 4.1.2: Understand that there are a range of computational models (sequential, parallel, multi-agent). • 5.3.1: Understand what is meant by the Internet and IP addressing and DNS. • 5.3.2: Understand what is meant by the World Wide Web and its components (URLs, ISP, HTML). • 5.3.3: Understand IP addresses including IPv4 and IPv6 formats. • 5.3.4: Understand the role of components used to access the internet including: modems, routers, switches and wireless access points. • 6.1.1: Understand the environmental impact of technology: health, energy use, resources. • 6.1.2: Understand the ethical impact of technology: privacy, inclusion, professionalism. • 6.1.3: Understand the legal impacts of technology: intellectual property, patents, licensing. • 6.1.4: Be aware of current and emerging trends: quantum computing, DNA computing, artificial intelligence. 	<ul style="list-style-type: none"> • 1.1.3: Identify and describe four methods of error detection and correction (parity checks, check digits, checksums, ARQs). • 1.3.3: Describe the principles of operation of an extensive list of ten different input devices (2D scanner, 3D scanner, barcode reader, QR code reader, digital camera, keyboard, mouse, touch screen, interactive whiteboard, microphone) and how these are used in real life scenarios. • 1.3.3: Describe how a wide range of sensors (light, temperature, magnetic field, gas, pressure, moisture, humidity, pH, motion) are used in a range of real life scenarios. • 1.3.4: Describe the principles of operation of an extensive list of nine different output devices (inkjet printer, laser printer, 3D printer, 2D/3D cutters, speakers and headphones, actuators, displays (including LCD and LED), LCD projectors, Digital Light Projectors) and how these are used in real life scenarios. • 1.5: Show understanding of computer ethics, including copyright, plagiarism, freeware, shareware, hacking and cracking and production of malwar.

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Get in touch

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