Pearson Edexcel

iLowerSecondary COMPUTING SPECIFICATION

Pearson Edexcel International Award in Lower Secondary Computing (LCP11)
For first teaching September 2019
First examination June 2020
Issue 1

Contents

1 Introduction

Why choose the Pearson Edexcel International Award in Lower Secondary Computing?

We have listened to feedback from all parts of the International School subject community, including a large number of teachers. We have made changes that will engage students and give them skills that will support progression to further study in computing and a range of other subjects. Our content and assessment approach to lower secondary computing has been developed alongside primary English, primary mathematics and primary science to ensure a consistent approach across the whole Pearson Edexcel iLowerSecondary programme.

The content and assessment approach for lower secondary computing has been designed to meet students' needs in the following ways:

- content is interesting and engaging and is designed to ensure good preparation for further study of the Pearson Edexcel International Award in Lower Secondary Computing
- opportunities are provided to 'localise' the content to make it more relevant for students
- achievement tests are clear and straightforward – they are accessible for students of all ability ranges and for all learning styles; our mark schemes are straightforward, so that the assessment requirements are clear
- students' skills are broadly developed – the skills developed will be assessed through questions in written examinations; applying understanding of computing concepts and principles to a range of situations improves analytical and logic skills.

Progression to International GCSE and beyond

The Pearson Edexcel iLowerSecondary programme provides the ideal preparation for progression to the Pearson Edexcel International GCSEs – laying the foundations for success at ICT or Computing.

Through our World Class Qualification development process, we have consulted with International GCSE teachers and examiners to validate the appropriateness of the qualification, including its content, skills development and assessment structure.

More information on all our qualifications can be found on our Pearson Edexcel iPrimary and iLowerSecondary pages at qualifications.pearson.com

Supporting you in planning and implementing this qualification

The Pearson Edexcel iLowerSecondary programme is more than just a curriculum and specification – it is a complete toolkit for teachers, comprising the following elements to improve student outcomes.

Planning

- Full, editable Schemes of Work are supplied for all three years of the iLowerSecondary curriculum.

Teaching and learning

- Subject-specific teacher guides at each level support specialist- and non-specialist teachers; the guides cover teaching techniques, pedagogy and short-, medium- and long-term planning.
- Full example units of work are provided for each and every topic.

Training and professional development

- Face-to-face teacher professional development is included as part of your iLowerSecondary subscription.
- Additional, ongoing online and interactive webinar support is also included as part of the programme.

Preparing for assessments

Exam support

We will give you resources to help you prepare your students for their assessments, for example examiner commentaries following each examination series.

ResultsPlus

ResultsPlus provides the most detailed analysis available of your students' exam performance. It can help you to identify the topics and skills where further learning would benefit your students.

Get help and support

Get support from both Pearson and the wider iLowerSecondary community via our dedicated online forum

https://community.pearsoninternationalschools.com/clubs/view/iprimary-pilot-schools

Qualification at a glance

Content and assessment overview

The Pearson Edexcel International Award in Lower Secondary Computing consists of one externally-set achievement test.

Achievement test	***(LCP11/01)**
Externally assessed Written examination: 1 hour 20 minutes Availability: June First assessment: June 2020 80 marks	
Content overview The content is split into two sections as follows: **Section A – Computer Science** Topic 1. Problem solving: algorithms, decomposition and abstraction Topic 2. Programming and development Topic 3. Data representation Topic 4. Computers: hardware, processing and software Topic 5. Communications and networks Topic 6. Safe and responsible practice **Section B – Digital Technology** Topic 7. Information technology Topic 8. Software skills: word processing Topic 9. Software skills: database management Topic 10. Software skills: spreadsheets Topic 11. Software skills: web authoring Topic 12. Software skills: presentation Topic 13. Software skills: graphics and digital photo-editing Topic 14. Software skills: file handling	
Assessment overview • The test has two sections: o Section A consists of 50 marks, it covers the content from Computer Science. o Section B consists of 30 marks, it covers the content from Digital Technology. • Students must answer all questions. • The test consists of multiple-choice, closed-response questions and short-open response questions.	

*The subject code is used by centres to enter students for a qualification. Centres will need to use the entry codes only when claiming students' qualifications.

2 Subject content and assessment information

Qualification aims and objectives

The International Award in Lower Secondary Computing aims to ensure that all students:

- can understand and apply the fundamental principles and concepts of computer science, including abstraction, logic, algorithms and data representation
- can analyse problems in computational terms and that they have repeated practical experience of writing computer programs in order to solve such problems
- can evaluate and apply information technology, including new or unfamiliar technologies, analytically to solve problems
- are responsible, competent, confident and creative users of information and communication technology.

Content

Overview

The Pearson Edexcel International Award in Lower Secondary Computing requires students to demonstrate knowledge, understanding and application of the following learning objectives drawn from the Pearson Edexcel iLower Secondary Curriculum in Computing.

Content detail

Section A – Computer Science

Topic 1 – Problem solving: algorithms, decomposition and abstraction

Students should:		**Curriculum reference**
1.1	Know how to code algorithms visually using flow charts and in text using pseudocode language	PS7.1A PS8.1A PS9.1A PS9.2B
1.2	Know how bubble sort and linear search work	PS9.1B PS9.2D
1.3	Be able to look for the most efficient solution when comparing alternative algorithms for the same problem	PS7.1B PS8.2B PS9.2E
1.4	Design, use and evaluate computational thinking that model the state and behaviour of real-world problems and physical systems	PS7.2A PS8.2B PS9.2A, E
1.5	Be able to consider the principles of abstraction and decomposition when considering real-world examples	PS7.2A PS8.2B PS9.1C PS9.2E

Topic 2 – Programming and development

Students should:		Curriculum reference
2.1	Be able to write programs in a high-level programming language	PD7.1A PD9.1A
2.2	Understand the use of sequence, selection and iteration when writing programs	PD7.6B PD8.1B
2.3	Understand the structural components of a program (variables, data structures, subprograms)	PD7.1B PD7.7A PD8.2A, B PD9.2A, B
2.4	Understand the need for data structures (records, one-dimensional arrays)	PD8.2A
2.5	Understand the need for, and how to manipulate, strings	PD7.3A, B, C, D, E, F, G
2.6	Know how to implement subprograms, including local and global variables, parameters, and return values	PD7.7A PD8.2B PD9.2A
2.7	Understand the purpose of, and how to use, arithmetic operators (add, subtract, divide, multiply, modulus, integer division)	PD7.4A, B
2.8	Understand the purpose of, and how to use, relational operators: a. equal to b. less than c. greater than d. not equal to e. less than or equal to f. greater than or equal to	PD7.5A
2.9	Understand the purpose of, and how to use, logic operators (AND, OR, NOT)	PD8.3A
2.10	Understand the use of pre-existing (built-in, library) subprograms in high level programming languages	PD7.7A PD9.2A, B
2.11	Be able to locate and fix errors in a program	PD7.2A, B PD9.3A PD8.4A

Topic 3 – Data representation

Students should:		Curriculum reference
3.1	Be able to convert between binary and denary positive integers (0–255)	DR7.1A, D
3.2	Be able to perform simple binary arithmetic (addition)	DR8.1A
3.3	Understand that computers use binary to represent data (numbers, text, sound, graphics) and program instructions	DR7.1A DR8.1B, C, D DR9.1A
3.4	Know how computers encode characters using ASCII and Unicode	DR7.1E
3.5	Know how bitmap images are represented in binary (pixels, resolution, colour depth: 2-bit max)	DR8.1B, C, D
3.6	Know how sound, an analogue signal, is represented in binary (sample rate, amplitude, bit-depth)	DR9.1A, B
3.7	Understand the terms describing capacity of storage, including bit, byte, kibi, mebi, gibi	CN7.1E DR8.1F, G
3.8	Be able to convert storage capacities into different units of measurement	DR8.1F, G
3.9	Know that file storage is measured in bytes and be able to calculate storage requirements based on the needs of the user	DR8.1F, G

Topic 4 – Computers: hardware, processing and software

Students should:		Curriculum reference
4.1	Be able to represent a computer system using an input, process, output, feedback diagram	CO9.1A, B
4.2	Understand the function of the hardware components of a computer system: a. central processing unit (CPU) b. main memory c. secondary storage d. input and output devices	CO9.1A, B
4.3	Know how data and instructions are stored in main memory and instructions are executed in the CPU	CO9.1B
4.4	Understand the function of random-access memory (RAM) and read-only memory (ROM)	CO9.1C

Topic 4 (*continued*)

Students should:		Curriculum reference
4.5	Know that an operating system provides an interface between the machine and the user	CO8.1A
4.6	Understand the purposes of different software types, including: a. application software to carry out particular tasks, including office-productivity tools and presentation software, web authoring, image and sound editing (2 hours) b. utility software which allows a user to manage and maintain a computer, including managing files; compression; backing up; anti-malware (antivirus, anti-spyware)	IT7.1A CO8.1B, C
4.7	Be able to differentiate between storage devices and the media used to store data	CO9.1D
4.8	Understand why storage device (hard-disk drives (HDD), solid-state drives (SSD), optical discs, flash) are used for a particular task	CO9.1D, E
4.9	Know about software licensing types (free/open source and proprietary software)	CO9.2A

Topic 5 – Communications and networks

Students should:		Curriculum reference
5.1	Understand why computers are connected in a network, including the Internet, and the opportunities they offer for communication and collaboration	CN9.1A, B
5.2	Understand the different types of networks (local area network (LAN), wide area network (WAN), personal area network (PAN))	CN8.1A CN9.1A
5.3	Understand benefits and drawbacks of the use of wired and wireless connectivity	CN7.1A, D CN8.3A CN9.1B
5.4	Know that network data speeds are measured in bits per second (Mbps, Gbps)	CN7.1E
5.5	Know how data can be transmitted wirelessly using both Wi-Fi and mobile phone networks	CN7.1B CN8.3A
5.6	Know how data can be transmitted in packets	CN7.4B

Topic 5 (*continued*)

Students should:		Curriculum reference
5.7	Understand why data is vulnerable to: a. missing software security updates b. malicious software c. malicious USB or digital devices designed to intercept data d. eavesdropping messages and emails	CN8.4A CN8.5A SR9.1A
5.8	Know what is meant by the 'Internet'	CN7.3A
5.9	Know what is meant by the 'World Wide Web'	CN7.2A CN8.1A
5.10	Understand the components of the WWW (web server URLs, ISP, HTTP, HTTPS, HTML)	CN7.3A CN8.1A
5.11	Understand the role of components used to access the Internet (modem, router, switch, wireless access point (WAP)) and how these are combined	CN8.2A
5.12	Know the role of web browsers, search engines and filter software	CN7.3B, C, D
5.13	Know the range of ways that digital devices can receive information, including satellite, cable, broadcast (TV, radio)	CN7.1C CN8.2A
5.14	Understand why appropriate wireless communication protocols, including Wi-Fi, Bluetooth® and Near-field Communication (NFC), should be used for a particular task	CN8.3A
5.15	Know how technology enables individuals' movements and communications to be monitored, including CCTV, ID cards, social media posts, GPS location data, eavesdropping	SR7.1A CN8.4A CN8.5A

Topic 6 – Safe and responsible practice

Students should:		Curriculum reference
6.1	Understand why technology is used respectfully to stay safe online, including protecting online identity and privacy, recognising inappropriate content, contact and conduct, and knowing how to report concerns	SR7.1A SR7.2A CN8.5A SR9.1A
6.2	Understand the environmental impact of the manufacture, use, and disposal of technology	SR8.2A
6.3	Understand the ethical impact of using technology (privacy, inclusion) on society	CN8.5A SR9.1A
6.4	Understand the legal impact of using technology (digital piracy, plagiarism, copyright)	SR7.2A

Section B – Digital Technology

Topic 7 – Information technology

Students should:		Curriculum reference
7.1	Understand the purpose of software applications (word processing, database management, spreadsheet, web authoring, presentation (multimedia), graphics)	IT7.1A, B, O IT8.1A, B IT9.1A
7.2	Understand the importance of data analysis from primary and secondary sources	IT7.1C, D IT8.1C, D IT9.1B
7.3	Understand why digital products should be fit for purpose and suitable for the intended audience	IT7.1E, F, G, H, I, J, K, L, M IT8.1E, F, G IT9.1C, D
7.4	Understand the need for a consistent and professional style	IT7.1J IT7.1N

Topic 8 – Software skills: word processing

Students should:		Curriculum reference
8.1	Know the purpose of different document types, including letter, report, newsletter and memo	SS7.1C
8.2	Understand the importance of, and reasons for using, page layout options such as headings, sub-headings, lists, templates, header, footer, page orientation, page breaks, page numbering	SS7.1A
8.3	Understand the use of formatting options, including (but not limited to) font styles, types and enhancements, alignment, grouping, layering and resizing	IT7.1K
8.4	Know that a single document can contain the following: charts and diagrams, tables, images, callouts/autoshapes, text from different files, text boxes, values and charts from spreadsheets	SS7.1B IT7.1L

Topic 9 – Software skills: database management

Students should:		Curriculum reference
9.1	Know the difference between a flat file and relational database	SS9.1B
9.2	Understand the structure of a given database, including tables (records and fields), primary key/field, foreign key/field and the relationships between them	SS9.1B
9.3	Understand field data types, including text, number, date/time and logical/Boolean	SS9.1A
9.4	Know how to search/query an existing database using a single criterion, multiple criteria, relational and logical operators	SS9.1C
9.5	Understand why data output reports are produced for a specific purpose	IT7.1N SS9.1D

Topic 10 – Software skills: spreadsheets

Students should:		Guidance *iLower Secondary Curriculum reference*
10.1	Know the different data types in a worksheet, including currency, percentage, decimal places, date/time	SS8.1A
10.2	Know how to use basic formulae, including plus, minus, multiply and divide	SS8.1B
10.3	Understand the purpose of spreadsheet functions, including SUM, AVERAGE, MAXIMUM, MINIMUM, COUNT, LENGTH, and IF	SS8.1C
10.4	Understand the reason for using multiple worksheets, sorting and filtering	SS8.1D, E, F
10.5	Understand the purpose of graphs and charts, including pie chart, line chart, bar/column chart and scattergraph	SS8.1G
10.6	Understand the purpose of formatting graphs/charts, including title, axis labels, colour and legends	SS8.1H

Topic 11 – Software skills: web authoring

Students should:		Curriculum reference
11.1	Know how a web page is structured, including titles, body, text, images, sound, animation and video	SS9.2A
11.2	Understand web design terminology, including hyperlinks, bookmarks, anchors, heading and paragraph styles, colour, tables, simple and bulleted lists, metadata and comments	SS9.2A
11.3	Be able to use HTML to create a web page that includes text, images, hyperlinks, body, header, information	SS9.2A
11.4	Know the role of WYSIWYG (what you see is what you get) software and the use of HTML to create a web page	SS9.2A

Topic 12 – Software skills: presentation

Students should:		Curriculum reference
12.1	Understand the importance of formatting a presentation to meet the needs of the audience, using text and image formatting, inserting buttons, hyperlinks to internal and external content, animation effects, transition effects, embedding multimedia content, including videos	IT7.1M SS7.2A
12.2	Understand the importance of the selection of appropriate images and content	IT7.1I, M

Topic 13 – Software skills: graphics and digital photo-editing

Students should:		Curriculum reference
13.1	Understand the difference between bitmap and vector graphics	SS8.2A
13.2	Understand graphics design technology, including image adjustment and enhancement, crop, colour adjustment, resizing, painting and erasing	IT7.1H IT8.1E
13.3	Understand the use of appropriate file type and compression options to save an image to meet the needs of the audience	SS8.2B

Topic 14 – Software skills: file handling

Students should:		Curriculum reference
14.1	Understand the use of cloud-based services, including hosted applications and storage	SS7.3A
14.2	Understand the use of permission-based file sharing	SS7.3A
14.3	Understand the reason for using file compression tools	SS7.3A SS8.2B
14.4	Understand the importance of effective file naming and structure	SS7.3A

Assessment information

The Pearson Edexcel International Award in Lower Secondary Computing consists of an externally-examined achievement test.

- The test is 1 hour and 20 minutes and is out of 80 marks.
- The test has two sections:
  - Section A consists of 50 marks and covers the content from Computer Science.
  - Section B consists of 30 marks and covers the content from Digital Technology.
- Students must answer all questions.
- The test consists of multiple-choice, closed-response questions and short open-response questions.

Please see the *Qualification at a glance* section for more information.

Sample assessment materials

A sample achievement test and mark scheme can be found in the *Pearson Edexcel International Award in Lower Secondary Computing Sample Assessment Materials (SAMs)* document.

A full list of command words that will be used in the assessment can be found in *Appendix 1: Command word taxonomy*.

Assessment Objectives

Students must:		% in qualification
AO1	Demonstrate knowledge of computing ideas, computing techniques and procedures	24–26
AO2	Demonstrate understanding of computing ideas, computing techniques and procedures	36–38
AO3	Apply knowledge and understanding of computing ideas, computing, techniques and procedures	19–21
AO4	Analyse and interpret information, including computing data	5–8
AO5	Evaluate, make judgements and draw conclusions	5–8
AO6	Use computing information to construct an artefact for a real-world situation	5
	Total	**100%**

3 Administration and general information

Entries

Details of how to enter students for the examinations for this qualification can be found in our *International Information Manual*. A copy is made available to all examinations officers and is also available on our website: qualifications.pearson.com

Access arrangements, reasonable adjustments, special consideration and malpractice

Equality and fairness are central to our work. Our equality policy requires all students to have equal opportunity to access our qualifications and assessments, and our qualifications to be awarded in a way that is fair to every student.

We are committed to making sure that:

- students with a protected characteristic (as defined by the UK Equality Act 2010) are not, when they are undertaking one of our qualifications, disadvantaged in comparison to students who do not share that characteristic
- all students achieve the recognition they deserve for undertaking a qualification and that this achievement can be compared fairly to the achievement of their peers.

Language of assessment

Assessment of this qualification will be available in English only. All student work must be in English.

Access arrangements

Access arrangements are agreed before an assessment. They allow students with special educational needs, disabilities or temporary injuries to:

- access the assessment
- show what they know and can do without changing the demands of the assessment.

The intention behind an access arrangement is to meet the particular needs of an individual student with a disability without affecting the integrity of the assessment. Access arrangements are the principal way in which awarding bodies comply with the duty under the Equality Act 2010 to make 'reasonable adjustments'.

Access arrangements should always be processed at the start of the course. Students will then know what is available and have the access arrangement(s) in place for assessment.

Reasonable adjustments

The Equality Act 2010 requires an awarding organisation to make reasonable adjustments where a student with a disability would be at a substantial disadvantage in undertaking an assessment. The awarding organisation is required to take reasonable steps to overcome that disadvantage.

A reasonable adjustment for a particular student may be unique to that individual and therefore might not be in the list of available access arrangements.

Whether an adjustment will be considered reasonable will depend on a number of factors, including:

- the needs of the student with the disability
- the effectiveness of the adjustment
- the cost of the adjustment; and
- the likely impact of the adjustment on the student with the disability and other students.

An adjustment will not be approved if it involves unreasonable costs to the awarding organisation, timeframes or affects the security or integrity of the assessment. This is because the adjustment is not 'reasonable'.

Special consideration

Special consideration is a post-examination adjustment to a student's mark or grade to reflect temporary injury, illness or other indisposition at the time of the examination/assessment, which has had, or is reasonably likely to have had, a material effect on a candidate's ability to take an assessment or demonstrate their level of attainment in an assessment.

Further information

Please see our website for further information about how to apply for access arrangements and special consideration.

For further information about access arrangements, reasonable adjustments and special consideration please refer to the JCQ website: www.jcq.org.uk

Candidate malpractice

Candidate malpractice refers to any act by a candidate that compromises or seeks to compromise the process of assessment or which undermines the integrity of the qualifications or the validity of results/certificates.

Candidate malpractice in examinations **must** be reported to Pearson using a *JCQ Form M1* (available at www.jcq.org.uk/exams-office/malpractice). The form should be emailed to candidatemalpractice@pearson.com. Please provide as much information and supporting documentation as possible. Note that the final decision regarding appropriate sanctions lies with Pearson.

Failure to report malpractice constitutes staff or centre malpractice.

Staff/centre malpractice

Staff and centre malpractice includes both deliberate malpractice and maladministration of our qualifications. As with candidate malpractice, staff and centre malpractice is any act that compromises or seeks to compromise the process of assessment or which undermines the integrity of the qualifications or the validity of results/certificates.

All cases of suspected staff malpractice and maladministration **must** be reported immediately, before any investigation is undertaken by the centre, to Pearson on a *JCQ Form M2(a)* (available at www.jcq.org.uk/exams-office/malpractice).

The form, supporting documentation and as much information as possible should be emailed to pqsmalpractice@pearson.com. Note that the final decision regarding appropriate sanctions lies with Pearson.

Failure to report malpractice itself constitutes malpractice.

More-detailed guidance on malpractice can be found in the latest version of the document *JCQ General and vocational qualifications Suspected Malpractice in Examinations and Assessments,* available at www.jcq.org.uk/exams-office/malpractice.

Awarding and reporting

The Pearson Edexcel International Award in Lower Secondary Computing will be graded on a four-level scale from S1 to S4.

A pass in the Pearson Edexcel International Award in Lower Secondary Computing is indicated by one of the four levels S1, S2, S3 and S4, of which level S4 is the highest and level S1 the lowest. Students whose level of achievement is below the minimum judged by Pearson to be of sufficient standard to be recorded on a certificate will receive an unclassified U result.

The first certification opportunity for the Pearson Edexcel International Award in Lower Secondary Computing will be in August 2020.

Student recruitment and progression

Pearson follows the JCQ policy concerning recruitment to our qualifications in that:

- they must be available to anyone who is capable of reaching the required standard
- they must be free from barriers that restrict access and progression
- equal opportunities exist for all students.

Prior learning and other requirements

There are no prior learning or other requirements for this qualification.

Progression

Students can progress from this qualification to the Pearson Edexcel International GCSE in Computer Science.

Appendices

Appendix 1: Command word taxonomy

The following table lists the command words that will be used in the externally-examined achievement test.

Command word	Definition
Add/label	Requires the addition of something, or labelling of, a stimulus material given in the question, for example labelling a diagram.
Circle	Used for indicating a point on a diagram where the answer is shown by a circle.
Compare	Looking for similarities and/or differences of two or more things. Should not require the drawing of a conclusion.
Complete	Requires the completion of a table, diagram, algorithm, flow chart or picture.
Create	Requires the creation of an artefact, e.g. an algorithm, flow chart, diagram.
Draw	Produce/complete a diagram using a ruler or freehand.
Describe	To give an account of something. Statements in the response need to be developed as they are often linked but do not need to include a justification or reason.
Explain	An explanation requires an identification of a point linked with justification/reasoning.
Give/State/Name	These command words are really synonyms. They generally require recall of one or more pieces of information. They are used only when there is more than one possible answer and where the words 'What' or 'Which' cannot be used.
Identify	Usually requires some key information to be selected from a given stimulus/resource.
Tick	Used for completion of a table where the answer is given by a tick in the table.
Write	Construct a program command that meets a specified problem or required function. This could be to meet a need or solve an error in a program.

Edexcel, BTEC and LCCI qualifications

Edexcel, BTEC and LCCI qualifications are awarded by Pearson, the UK's largest awarding body offering academic and vocational qualifications that are globally recognised and benchmarked. For further information, please visit our qualification website at qualifications.pearson.com. Alternatively, you can get in touch with us using the details on our contact us page at qualifications.pearson.com/contactus

About Pearson

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