

PEARSON EDEXCEL INTERNATIONAL GCSE (9-1)

Computer Science

GETTING READY TO TEACH

Event code: **18IBAN01**

First teaching in 2017, first assessment in 2019.



Session agenda

- 10:00 Welcome and introductions
- 10:10 Overview of Pearson and International GCSE
- 10:20 Overview of the qualification
- 10:30 Topics 1 & 2
- 11:05 Paper 02 – Application of Computational Thinking
- 11:45 Topics 3 – 6
- 12:30 Lunch
- 13:30 Paper 01 – Principles of Computer Science
- 14:05 Planning and Delivery
- 15:05 Help and Support from Pearson
- 15:30 Finish

Aims and Objectives

Delegates will:

- Understand the subject and structure of specification
- Understand changes in the specification
- Consider approaches to teaching and learning
- Understand assessment aims and objectives
- Understand the new 9-1 grading scale
- Understand question papers and marking
- Review resources and services that are available to support teaching.

Welcome to Pearson Edexcel

Welcome to Pearson Edexcel,
the world's leading learning company
and the UK's largest awarding body.

We set the standard for worldwide
recognised qualifications, built on the
UK educational system and accepted
by universities worldwide.

We have a simple mission:
**to help make a measurable impact on improving
people's lives through learning.**

*“We judge
ourselves – and
invite others to
judge us – not by
the products that
we make but by the
impact on
learners.”*

John Fallon,
Chief Executive Officer, Pearson

About Pearson Edexcel?

- As the UK's largest awarding organisation, we are best placed to provide qualifications that are most closely aligned to the British educational system.
- We are the most reliable awarding organisation in the UK, recognised and trusted by educators, learners and employers to provide high quality qualifications.
- By helping you to realise student potential, you can prepare and empower all your students to progress to further education, university and employment.
- Our technology capability allows us to provide you with more advanced support services, tools and resources to make life easier for school leaders, teachers and students.
- Pearson Edexcel are leading the way, challenging thinking and creating new ideas so you can be confident our qualifications will always be world-class

World-class features

All Edexcel qualifications are developed to meet Pearson's **World Class Qualification design principles**

Developed using an understanding and benchmarking of **all educational systems**



Endorsement of educational **thought-leaders and assessment experts** from across the globe

Qualifications that support young people to **develop the capabilities** they need to **progress** and prosper in their lives

The global transferable skills framework

COGNITIVE

Core skills brain uses to think, learn and reason – used to carry out any task.

Critical Thinking, Problem Solving, Analysis, Decision-making, Creativity

INTRAPERSONAL

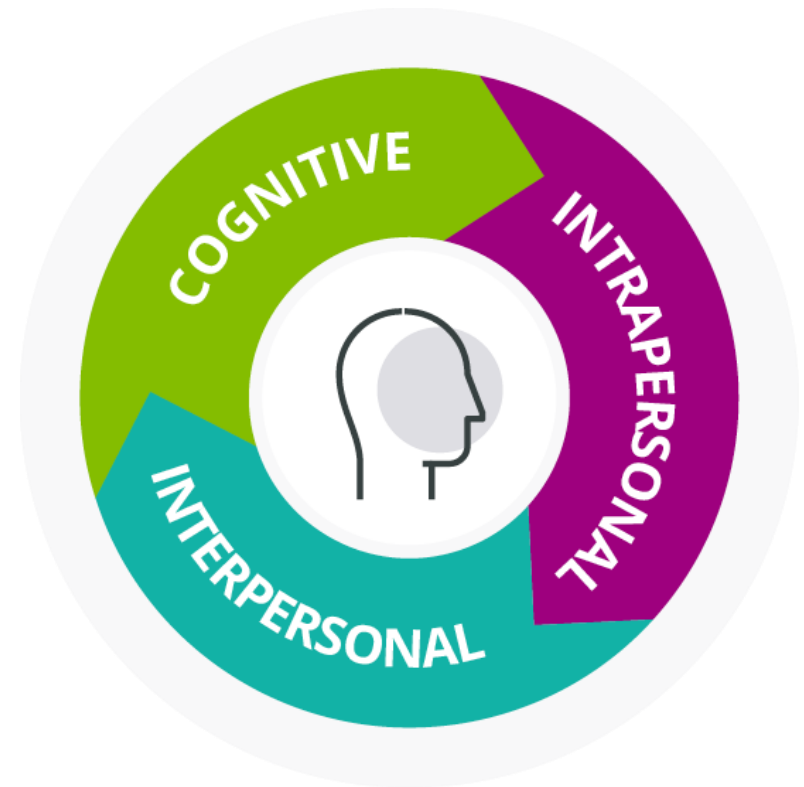
Emotional intelligence, ability to know, understand and manage own emotions and learning.

Adaptability, Continuous Learning, Intellectual Curiosity, Work Ethics, Self-Evaluation

INTERPERSONAL

Life skills used every day to communicate and interact with others, individually and in groups.

Teamwork & Collaboration, Communication, Negotiation, Empathy, Leadership



Where does International GCSE fit in?



Key features of the new International GCSE

- Reviewed and updated in light of UK GCSE changes
- Consultation with teachers and higher education institutions
- Dedicated textbooks are currently in production
- New 9-1 grading scale
- Transferable Skills embedded
- Pearson World Class Qualifications design principles
- Examinations available in January and June
- Dedicated Subject Adviser

“Grade 9 is not the same as A*; it’s a new grade, designed to recognise the very highest performing students.”

Ofqual

The new 9–1 grading scale structure

The new grading scales gives teachers **more information about student's attainment** to help progression to A Level, and universities more information when looking at accepting students into HE.

The new **grade 9 represents a new level of attainment** and we've introduced this to really differentiate top performing students

There's **greater differentiation in the middle of the range of grades**, with three grades (4, 5 and 6) instead of two grades (grades B and C).

Using the same scale for Pearson Edexcel GCSE and International GCSE allows **clear comparison with English standards**, unlike the A*-G scale.

NEW GRADING STRUCTURE	CURRENT GRADING STRUCTURE
9	A*
8	
7	
6	B
5	
4	
3	D
2	
1	
U	U

Pearson Edexcel International GCSE (9-1)

Computer Science



What is computer science?

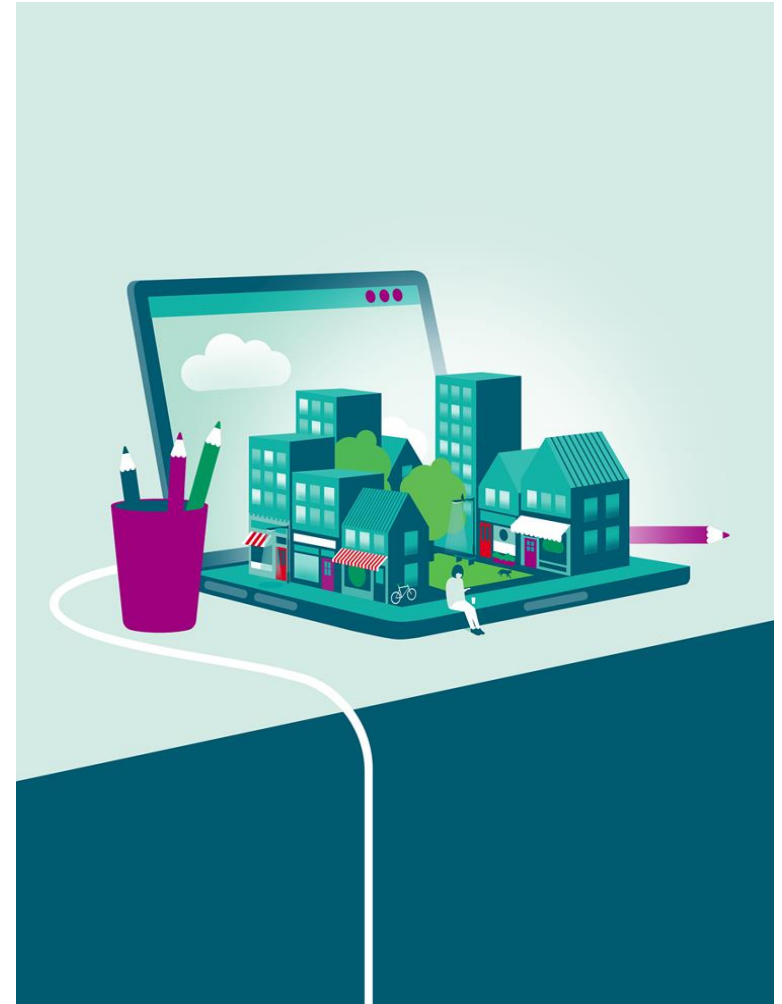
- Students who study computer science learn how specific computers and applications work and how to fix them when they break.
- Although computer science is an academic discipline with a well-defined body of knowledge, it also has a significant practical problem solving element.
- Computer science is primarily concerned with learning to program.
- Being good at maths is a prerequisite for studying computer science.
- Computer science is just a new name for ICT

Which of these will students enjoy most?

- Coding a solution to a problem
- Logical thinking challenges
- Learning how a computer works
- Discussing ethical issues arising from the use of computing technology
- All of the above

Key features

- Engaging, contemporary content
- Focus on computational thinking
- Examination-only assessment
- Clear and straight-forward question papers
- Choice of three programming languages
- Fosters progression



Overview of the qualification

Content

1. Problem Solving
2. Programming
3. Data
4. Computers
5. Communication and the internet
6. The bigger picture

Assessment Objectives

AO1. Demonstrate knowledge and understanding of key principles of computer science

AO2. Apply knowledge and understanding of key concepts and principles of computer science

AO3. Analyse problems in computational terms:

- to make reasoned judgements
- to design, program, evaluate and refine solutions

Structure of Assessment

100% external assessment

Fully linear

9 – 1 grading scale

Two papers each with a weighting of 50%

Written examination

Principles of Computer Science

Practical examination

Application of Computational Thinking

Problem solving and programming

What students must understand and be able to do

Problem solving and programming

```

theArtists = [
    ["Andy", "Warhol", 1928],
    ["Pablo", "Picasso", 1881],
    ["Salvador", "Dali", 1904],
    ["Lavinia", "Fontana", 1552],
    ["Jackson", "Pollock", 1912],
    ["Henri", "Matisse", 1869],
    ["Frida", "Kahlo", 1907],
    ["Georgia", "O'Keeffe", 1887],
    ["Kara", "Walker", 1969],
    ["Yayoi", "Kusama", 1929]
]

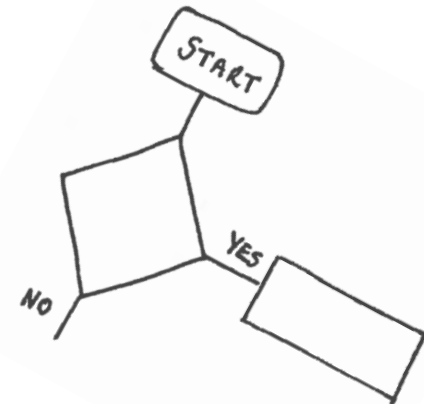
theLabels = [] # Put the new user labels into this structure

# Make the artist labels
for person in theArtists:
    newRecord = person[1][0] + person[0][0] + str(person[2])
    theLabels.append(newRecord)
print ("The new userIDs are: ", theLabels)

# Find and print the youngest person and their birthdate
maxDate = 0
for person in theArtists:
    if person[2] > maxDate:
        maxDate = person[2]
        maxPerson = person
print (maxPerson[0], maxPerson[1], "is youngest", str(maxPerson[2]))

```

FUNCTION calc_averages(data)
 # calculates average temp and wind speed for selected data
 BEGIN FUNCTION
 SET totalTemp TO 0
 SET totalWindSpeed TO 0
 SET numReadings TO LENGTH(data)
 FOR EACH item FROM data
 SET totalTemp TO totalTemp + data[3]
 SET totalWindSpeed TO totalWindSpeed + data[4]
 ENDFOR
 SET averageTemp TO totalTemp/numReadings
 SET averageWindSpeed TO averageWindSpeed/numReadings
 RETURN averageTemp, averageWindSpeed
 END FUNCTION



Write your name here

Surname	Other names
---------	-------------

Pearson Edexcel
Level 1/Level 2
International GCSE (9–1)

Centre Number	Candidate Number
---------------	------------------

Computer Science
Paper 2: Application of Computational Thinking

Sample assessment material for first teaching September 2017 Time: 3 hours	Paper Reference 4CP0/02
--	-----------------------------------

You must have: A computer workstation with appropriate programming language code editing software and tools, including a code interpreter/compiler, CODES folder containing code and data files, pseudocode reference	Total Marks
--	-------------

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions **requiring a written answer** in the spaces provided – *there may be more space than you need.*
- Only **one** programming language must be used throughout the test.
- Carry out practical tasks on the computer system and save new or amended code using the name given with the appropriate file extension.
- Do **not** overwrite the original code and data files provided to you.
- You must **not** use the Internet during the test.

Information

- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets
- This paper covers Python, C# and Java.
- The CODES folder in your user area includes all the code and data files you need.
- The invigilator will tell you where to store your work.

Advice

- Read each question carefully before you start to answer it.
- Save your work regularly.
- Check your answers and work if you have time at the end.

Turn over ►

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Paper 2

- 3 hour, untiered practical exam
- 5-day window
- Candidates must have:
 - a computer workstation with one of the approved programming language (Python, C# or Java),
 - editing software and tools, including a code translator
 - access to a CODES folder containing the supplied code and data files
 - a pseudocode reference sheet
- Some questions require a written response
- No Internet access
- No choice of questions.
- File naming conventions must be observed



Activity 1

Command words and questions



Activity 1 Task 1

Command words

Activity 1 Task 2 Question Qo1(c)(ii)

```
myNumbers = [10, 20, 30, 40 ,50, 60, 70, 80, 90,  
100]
```

```
total
```

```
for theNumber in myNumbers:
```

```
    total = total + theNumber
```

```
    if (theNumber % 2 == 0):
```

```
        print("Even")
```

```
    else:
```

```
        print("Odd")
```

```
print(total)
```

Conducting the practical exam

- Set up a separate secure user area with sufficient storage for each candidate
- Download the data files, check for compatibility and copy into each candidates' user area
- Check that the computer equipment and software to be used is suitable
- Ensure that at least one invigilator is able to deal with any technical issues that may arise
- Ensure that during the examination candidates :
 - ✓ can only access the files required for the examination
 - ✓ cannot access the internet or refer to textbooks
 - ✓ cannot save the files they produce in a central, unsecure location or on a portable storage device
 - ✓ cannot view each other's screens
 - ✓ can make use of offline help facilities /software-specific manuals
- Return paper scripts to Pearson and upload digital responses
- Refer to the ICE document for further, detailed instructions

Activity 2

Approaches to teaching problem-solving and programming



Free learning to program resources

Codecademy: [Web link](#)

Grok Learning: [Web link](#)

Sentdex Youtube channel: [Web link](#)

Khan Academy: [Web link](#)

Interactive tutorials: [Learnpython](#), [Learnjavaonline](#), [LearnCS](#)

CodingBat: [Web link](#)

Code.org hour of code: [Web link](#)

Invent your own computer games with Python: [Web link](#)

Hacking secret ciphers with Python: [Web link](#)

Introduction to Topics 3 - 6



Concepts and principles of Computer Science

3. Data

- Binary
- Data representation
- Data storage and compression
- Encryption

4. Computers

- Machines and computational models
- Hardware
- Logic
- Software
- Programming languages

5. Communication and the internet

- Networks
- Network security
- The internet and the world wide web

6. The bigger picture

- Emerging trends, issues and impact

Computer-related mathematics

Students must be able to:

- ✓ Convert between number bases
- ✓ Perform binary addition, division and multiplication (logical and arithmetic shifts)
- ✓ Construct and interpret expressions and logic statements
- ✓ Convert between units of measurement
- ✓ Calculate file sizes

Paper 1

- 2 hour, untiered written exam
- No choice of questions
- Variety of question types, including some multiple choice
- Consistent use of command words
- At least one extended-writing question worth 6 marks
- Some questions involve working with algorithms
- Use of a calculator is not allowed
- Space for drafting where appropriate

Write your name here	
Surname	Other names
Pearson Edexcel	Centre Number
Level 1/Level 2	Candidate Number
International GCSE (9–1)	
Computer Science	
Paper 1: Principles of Computer Science	
Sample assessment material for first teaching September 2017 Time: 2 hours	Paper Reference 4CP0/01
You must have: A pseudocode reference	Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*

Information


- The total mark for this paper is 80.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*
- You are not allowed to use a calculator.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.
- Marks will not be awarded for using product or trade names in answers without giving further explanation.


Turn over ►

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Pearson Edexcel International GCSE in Information and Communication Technology
Sample Assessment Materials – Issue 1 – October 2016 © Pearson Education Limited 2016


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Activity 3

In your booklet -

Course Structure



Assessment structure

Paper 01: Principles of Computer Science

2 hours

50%

Paper 02: Application of Computational Thinking

3 hours

50%

Subject topics by paper

Topics	Paper 01	Paper 02
1. Problem Solving	✓	✓
2. Programming	✓	✓
3. Data	✓	✓
4. Computers	✓	✓
5. Communication and the internet	✓	✓
6. The Bigger Picture	✓	✓

Considerations

- Designed to be delivered in 120 – 140 guided learning hours (approximately two 1 hour lessons a week over two years)
- Both the exams must be taken at the end of the course
- Problem solving and programming must be developed and practised throughout the course
- How much experience of programming students already have
- Students won't be using computers in every lesson
- There are opportunities to link theory and practical work



Activity 4

In your booklet -

Planning and Delivery – free support materials



Support overview

Getting Started Guide
& Scheme of Work

Getting Ready to
Teach Events

Subject interpretation
of transferable skills

Subject Advisor

Results Plus

Regional Support
Manager

Lesson Plans

ResultsPlus &
Examwizard

Access to Scripts

Other resources

- *Computing as School (CAS)*
- *CS4FN (Computer Science for Fun)*
- *Computer Science Unplugged*
- *Text books for the regulated GCSE in Computer Science*
- *The Cybersecurity Challenge Schools Programme*





ResultsPlus is the free online results analysis tool for teachers - it provides analysis features that other similar solutions don't

- Provides a detailed breakdown of student performance in Edexcel exams.
- Helps identify topics where the student can benefit from further learning and allows this knowledge to inform teaching strategies and approaches.
- Provides a comparison of student performance at regional level.
- Allows you to view your school's performance against other Pearson Edexcel schools in your country. You can also find student results analysis from their previous Pearson Edexcel school.
- Mock exams results can also be fed into the system to produce an analysis.
- [ResultsPlus Direct](#) gives your students access to their final grades and performance breakdown, wherever they are.
- Sign up for free ResultsPlus account in just a few quick and easy steps [here](#).
- Access additional video guides here:
 - [ResultPlus - Individual Student Analysis](#)
 - [ResultsPlus - Cohort Analysis](#)
 - [ResultsPlus - Mock Analysis](#)
 - [ResultsPlus - Global Analysis](#)

New Access to Script (ATS) Online Portal

Access to Scripts (ATS) is a free online portal which allows teachers to immediately access electronically marked exam papers

Provides enhanced transparency and

- Offers transparent approach to marking process
- Provides better understanding of marking before requests for enquiries about results are made
- Provides excellent aid for teaching and preparing other cohorts for examinations by helping you to evaluate a student's performance on particular questions in relation to what they have been taught.

Available instantly from results day for all our examination series, for a defined window, you can view and download scripts which have been marked online free of charge from our Self-Service Portal.

For more information on ATS, and the post results windows, visit our [post-results pages here](#).



Pearson International Schools Community

Connect with international teachers around the world

- Connect with other teachers working in international schools and join groups who have shared interests, subjects or location
- Read topical news and articles and share yours
- Advertise jobs at your school or find job opportunities
- Download free resources
- Sign up for events.

Sign up today at:
community.pearsoninternationalschools.com



Progression to university

- Our qualifications are accepted by universities all over the world including top institutions in the UK, United States, Australia, Canada and Singapore.
- Universities recognise and trust the quality of the Pearson Edexcel qualifications and accept them as being comparable to nationally recognised qualifications, offering excellence in learning and achievement.
- Students can equally pursue undergraduate study at a university closer to home as our qualifications are recognised for entry in their region of study.
- We provide a range of free support to help students progress, such as country study guides, case study blogs and interactive webinars.
- We have a proactive programme of student engagement activities such as advice from higher education experts, a specialised website page and social media communities.
- We are closely connected with higher education stakeholders.

Learn more about progression and recognition [here on our website](#).

Other useful links

1. Grade Boundaries

This page shows the minimum marks needed to achieve a certain grade for all UK and international examinations. Also refer to the examiners report which is available for download with other documents.

2. Examination Results Statistics

Results statistics summarise the overall grade outcomes of candidates sitting Pearson Edexcel examinations.

Subject Advisor

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Any final questions?

Please fill in your evaluation forms

**We value your
feedback!**





Thank you for your time

Find out more about us at:
<http://qualifications.pearson.com>