

# **Getting Ready to Teach the Pearson Edexcel International GCSE Computer Science (9-1)**

Event Code:16IBAN01



## Aims and Objectives

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To equip you with the information you need to successfully plan and deliver international GCSE Computer Science, including:

- XX** the structure and content of the qualification
- XX** how it is assessed, including requirements for the practical examination
- XX** support available from Pearson and others
- XX** teaching and delivery strategies

And to give you an opportunity to share ideas and pool your expertise.



## Agenda

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

# What is computer science?

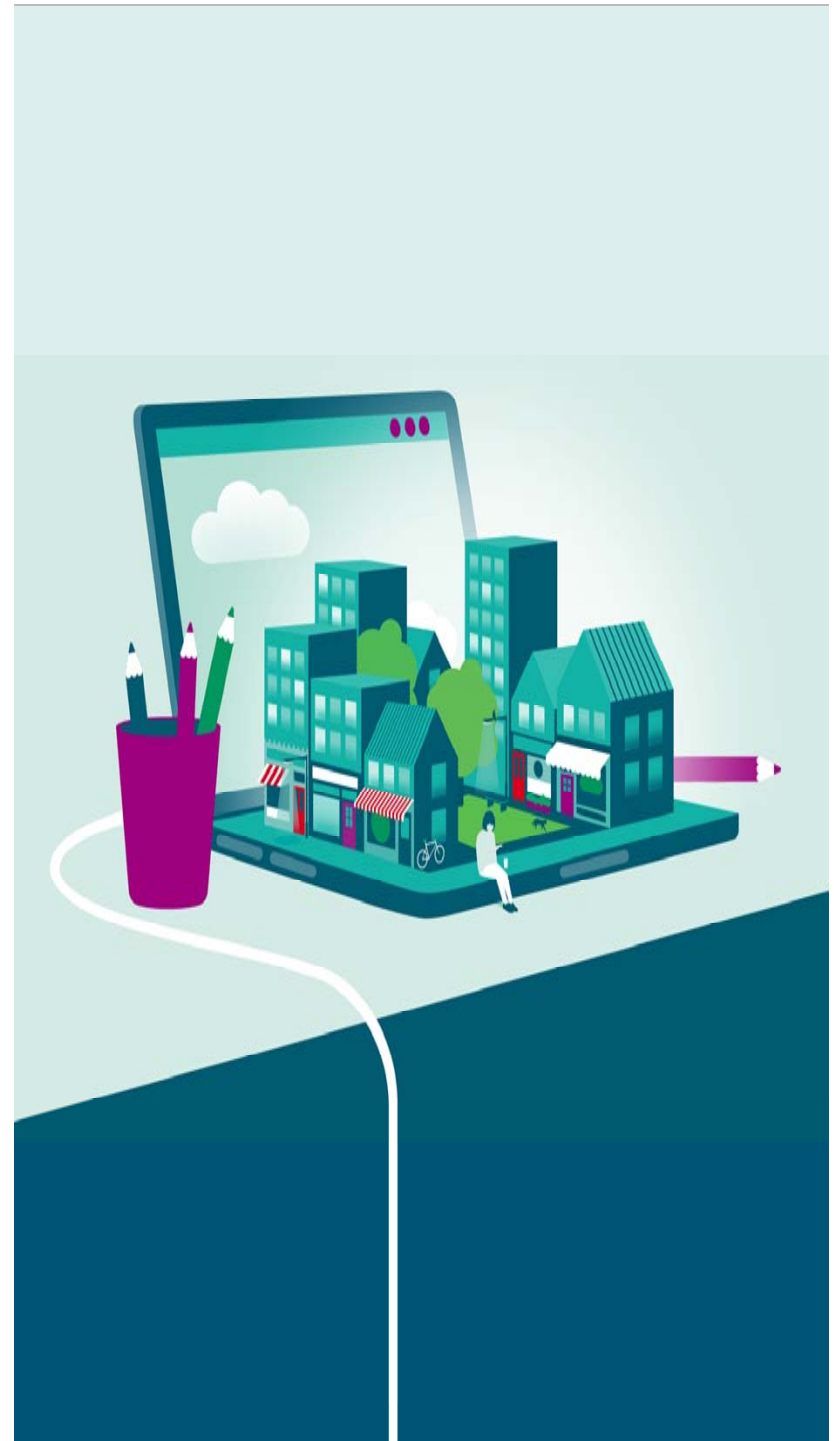
- ❑ Students who study computer science learn how specific computers and applications work and how to fix them when they break.
- ❑ Although computer science is an academic discipline with a well-defined body of knowledge, it also has a significant practical problem solving element.
- ❑ Computer science 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?

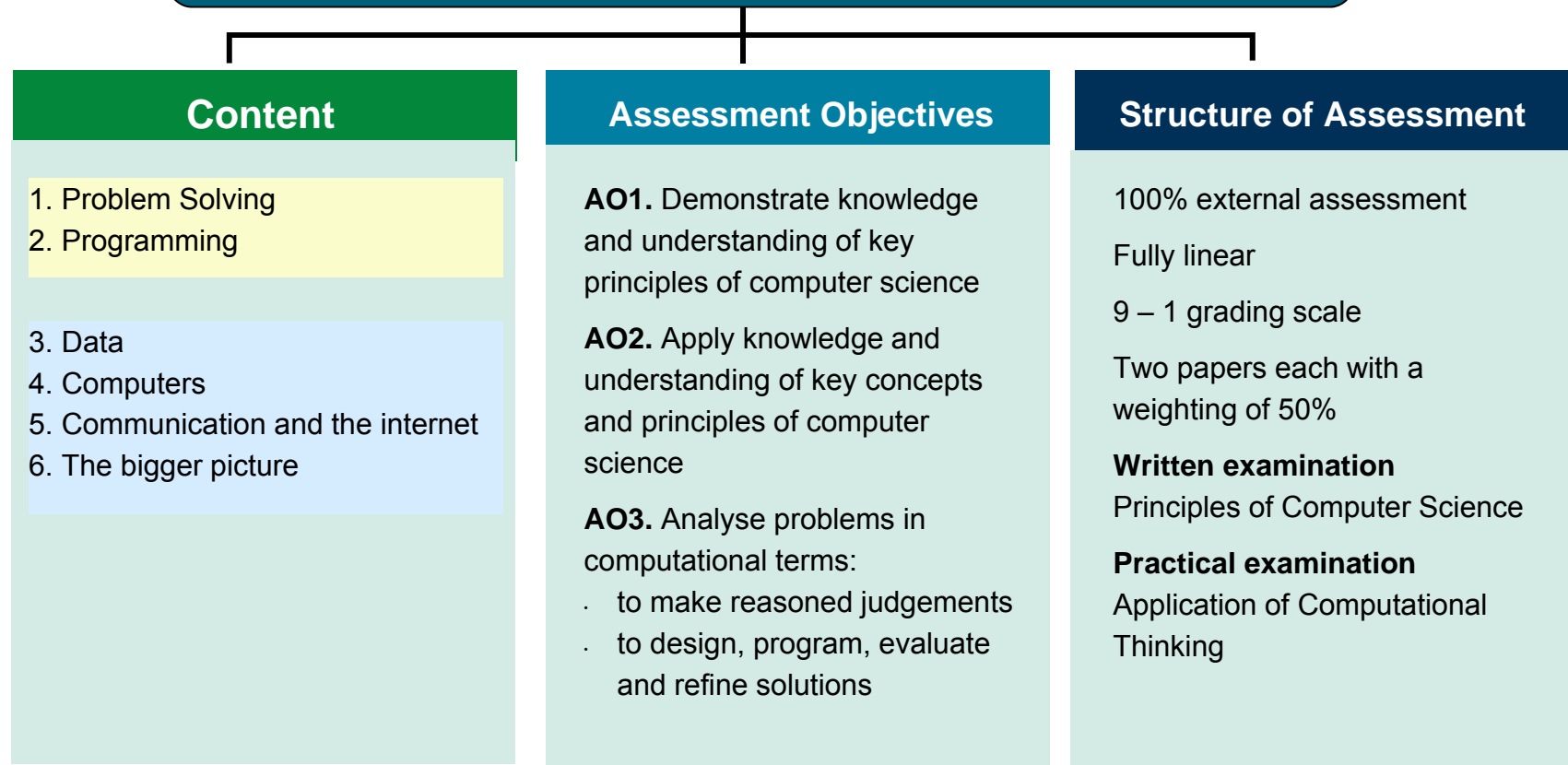
- ☐ Coding a solution to a problem
- ☐ Logical thinking challenges
- ☐ Learning how a computer works
- ☐ Discussing ethical issues arising from the use of computing technology
- ☐ All of the above

## 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



**What students must  
understand and be  
able to do**



# Problem solving and programming

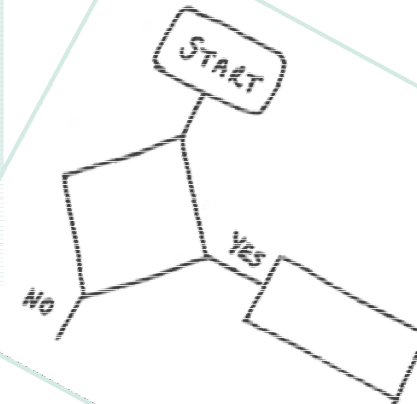
```
FUNCTION calc_averages(data)
# calculates average temp and wind speed for selected data
BEGIN FUNCTION
SET totalTemp TO 0
SET totalWindSpeed TO 0
SET numReadings TO LENGTH(data)
FOR EACH item FROM data
SET totalTemp TO totalTemp + data[3]
SET totalWindSpeed TO totalWindSpeed + data[4]
ENDFOR
SET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

```
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]))
```



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

**Pearson**

43

- 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

# **Question types and command words**

# 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

**Discussion point**  
**What's the best way to teach  
problem-solving and  
programming?**

# Free learning to program resources

Codecademy: <https://www.codecademy.com>

Grok Learning: <https://groklearning.com>

Sentdex Youtube channel: <https://www.youtube.com/user/sentdex/videos>

Khan Academy: <https://www.khanacademy.org>

Interactive tutorials: <https://learnpython.org>, <https://learnjavaonline.org>,  
<https://www.learncs.org>

CodingBat: <http://codingbat.com>

Code.org hour of code: <https://code.org>

Invent your own computer games with Python: <http://inventwithpython.com/chapters/>

Hacking secret ciphers with Python: <http://inventwithpython.com/hacking/>

# Concepts and principles of Computer Science

Data	<ul style="list-style-type: none"><li>• Binary</li><li>• Data representation</li><li>• Data storage and compression</li><li>• Encryption</li></ul>
Computers	<ul style="list-style-type: none"><li>• Machines and computational models</li><li>• Hardware</li><li>• Logic</li><li>• Software</li><li>• Programming languages</li></ul>
Communication and the internet	<ul style="list-style-type: none"><li>• Networks</li><li>• Network security</li><li>• The internet and the world wide web</li></ul>
The bigger picture	<ul style="list-style-type: none"><li>• Emerging trends, issues and impact</li></ul>

# 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



Write your name here	
Surname	Other names
<b>Pearson Edexcel</b>	Centre Number
<b>Level 1/Level 2</b>	Candidate Number
<b>International GCSE (9–1)</b>	
<h1>Computer Science</h1> <h2>Paper 1: Principles of Computer Science</h2>	
Sample assessment material for first teaching September 2017 <b>Time: 2 hours</b>	Paper Reference <b>4CP0/01</b>
<b>You must have:</b> 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

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

- 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

# Planning the course

# 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



# 9-1 grading scale (1)

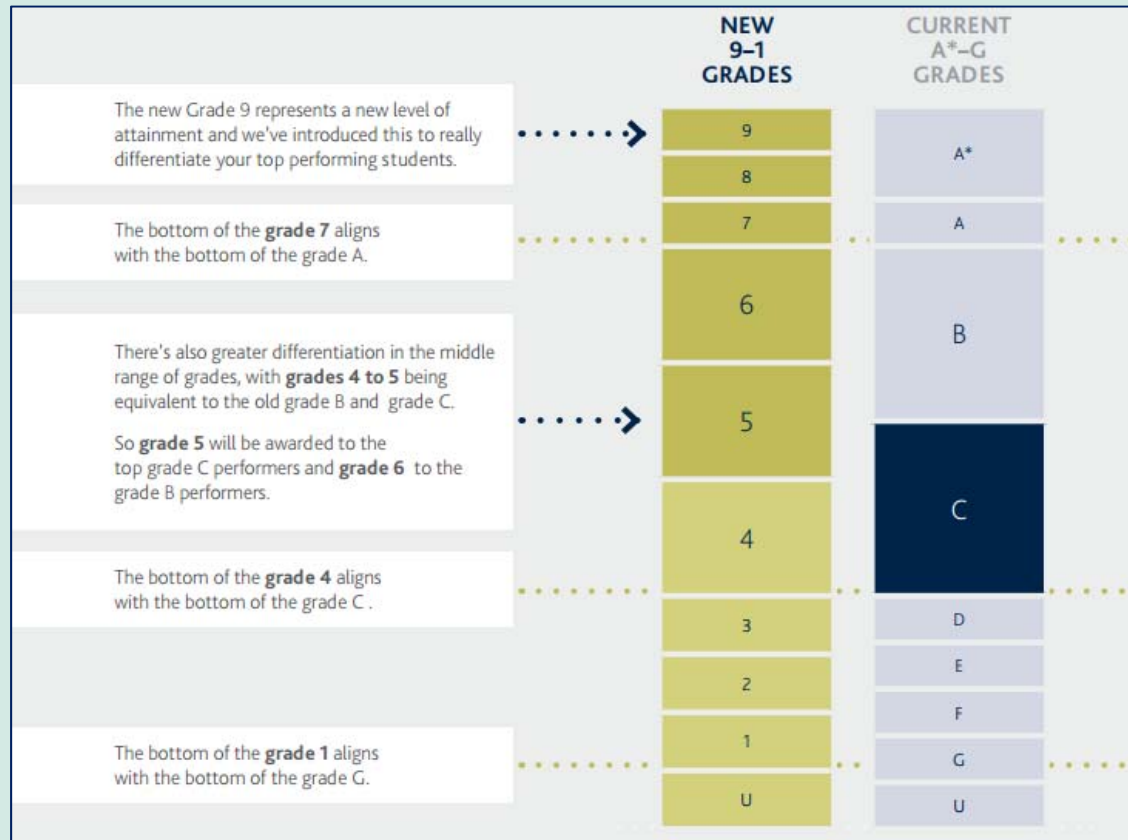
## **Awarding**

- The grading system is changing but our commitment to awarding grades that accurately reflect learner exam performance remains the same.
- We set new grade boundaries (minimum number of marks needed to achieve each grade) for each assessment of each qualification.

## **Benefits**

- Greater differentiation across levels of attainment e.g. 2 grades where the current C grade is
- Rewards truly outstanding achievement with the grade 9
- Provides more information about student attainment to help progression to A Level
- Same scale for Pearson Edexcel GCSE and International GCSE allows clear comparison with English standards, unlike old A\* to G grading

# 9-1 grading scale (2)

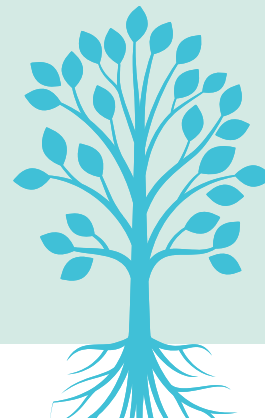






# Resources

We offer a range of free and paid for resources for International GCSEs. These have been designed to support teachers to improve learner outcomes





# Support overview

Support for all  
subjects

Getting Started  
Guide & Scheme of  
Work

Getting Ready to  
Teach Events

Subject interpretation  
of transferable skills

Subject Advisor

Results Plus

Regional Support  
Manager

Exemplar Marked  
Responses

# Free support

**Getting Started Guide** *includes mapping of changes, content and assessment guidance, course planner and resource list*

**Editable Scheme of Work** *includes activities to support transferable skills development*

**Results Plus** *free online service giving instant and detailed analysis of your students' exam and mock performance*

**Regional support manager** *access to a regionally based support manager for any query*

**Subject Advisor** *For any subject related query you have. Sign up to mailing list*

**Exemplar** *Marked student responses to SAMs questions*

## 2-year course planner for Pearson International GCSE Computer Science (9 - 1)

Weeks 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

### Year 1, Term 1 (15 weeks)

Lesson 1	Intro	Problem solving & programming	Computers	Representation of numbers	Programming languages	Hardware	OS
Lesson 2	Problem solving & programming						OS

Weeks 1 2 3 4 5 6 7 8 9 10 11 12

### Year 1, Term 2 (12 weeks)

Lesson 1	Networks		Boolean logic		Data rep: text	
Lesson 2	Problem solving & programming		The bigger picture	Problem solving & programming	The bigger picture	Networks

Weeks 1 2 3 4 5 6 7 8 9 10 11 12 13 14

### Year 1, Term 3 (14 weeks)

Lesson 1	Data rep: images	Data rep: sound	Hardware: internal components	Comput. models	Network security
Lesson 2	Problem solving & programming				Network security

Weeks 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

### Year 2, Term 1 (15 weeks)

Lesson 1	Prob solv & prog	Data storage and compression	Hardware: secondary storage	Internet & WWW	Encryption	Embedded systems
Lesson 2	Problem solving & programming				Encryption	Big.Pict

Weeks 1 2 3 4

### Year 2, Term 2 (4 weeks)

Lesson 1	Bigger picture: Emerging trends
Lesson 2	Problem solving & programming

Topic 1: Problem solving	Topic 4: Computers
Topic 2: Programming	Topic 5: Communication and the Internet
Topic 3: Data	Topic 6: The bigger picture

## 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

# INTERNATIONAL GCSE

## Computer Science (9-1)

### GETTING STARTED GUIDE

Pearson Edexcel International GCSE in Computer Science (4CP0)

For first teaching in September 2017

First examination June 2019



# Support

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Facebook:

<https://www.facebook.com/groups/140885586105397/>

[Click here to go to  
"Contact Us" Webpage](#)

# 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 Edexcel examinations.

## 3. [Results Plus](#)

- Edexcel's free online service giving instant and detailed analysis of your students' exam and mock performance.
- See your students' scores for every exam question.
- Understand how your students' performance compares with Edexcel national averages.

**Any questions?**

**Thank you for  
attending this event.**

*How did we do?*

*Please fill in the evaluation form that you'll  
receive via e-mail in a few minutes.*

# **There's so much more to learn**

Find out more about our range of events at  
<http://qualifications.pearson.com/training>



**ALWAYS LEARNING**