GCSE Computer Science

Classroom Best Practice and Methodology Network

Pearson Edexcel

Introduction

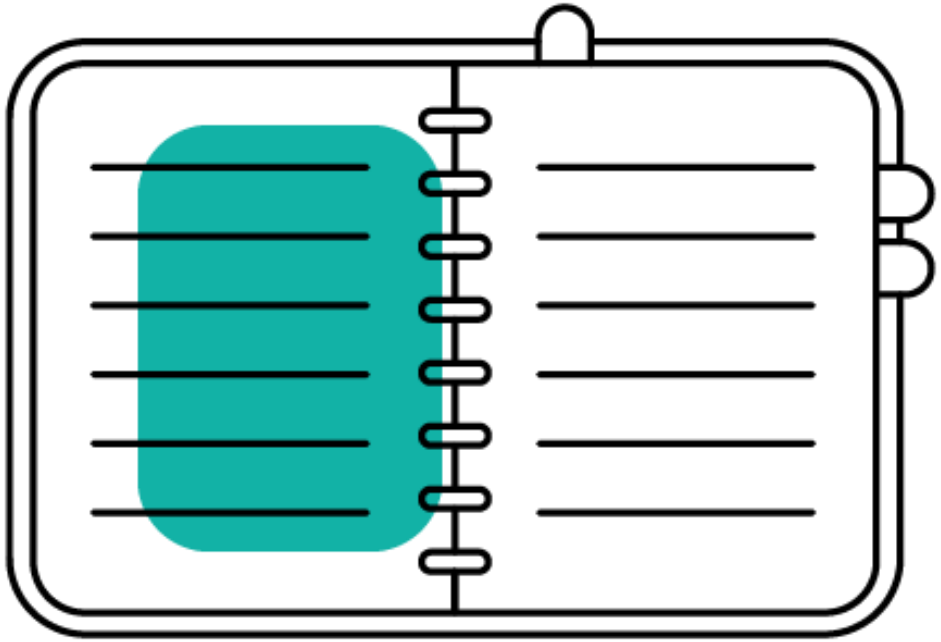
Welcome

Poll

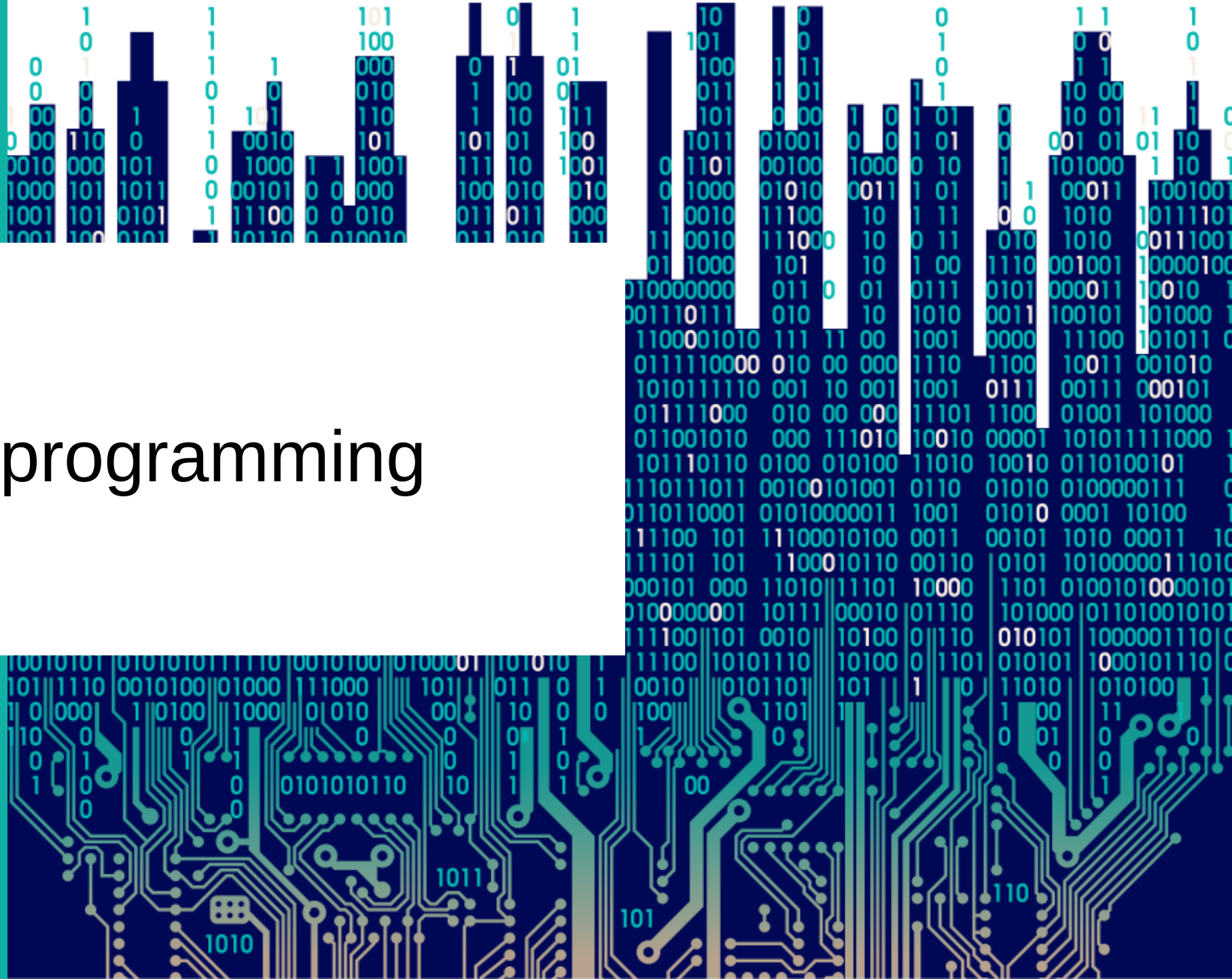
How long have you been delivering this course?

Agenda

- Introduction
- Teaching programming
- Discussion
- Teaching theory
- Discussion
- Support and resources



Teaching programming



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Integrated Development Environments

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Which IDE do you use?

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Do you offer your students a choice of IDE?

Practical hints for running the programming exam

- Choose an IDE carefully.
- Have your students practise in advance with the exam setup.
- Make sure students can turn on autocomplete, line numbers and other IDE settings that they're used to, as well as showing file extensions in the file manager.
- Check with exams team they are prepared; Train an invigilator or two specifically; Arrange for an IT technician to be available.
- On the day:
  - give students two copies of the code files
  - PLS paper copy is in secure QP package; pdf to be given with code files.
- After the exam:
  - get your IT technician to zip *everything* when uploading students' work.

Preparing students for the programming paper

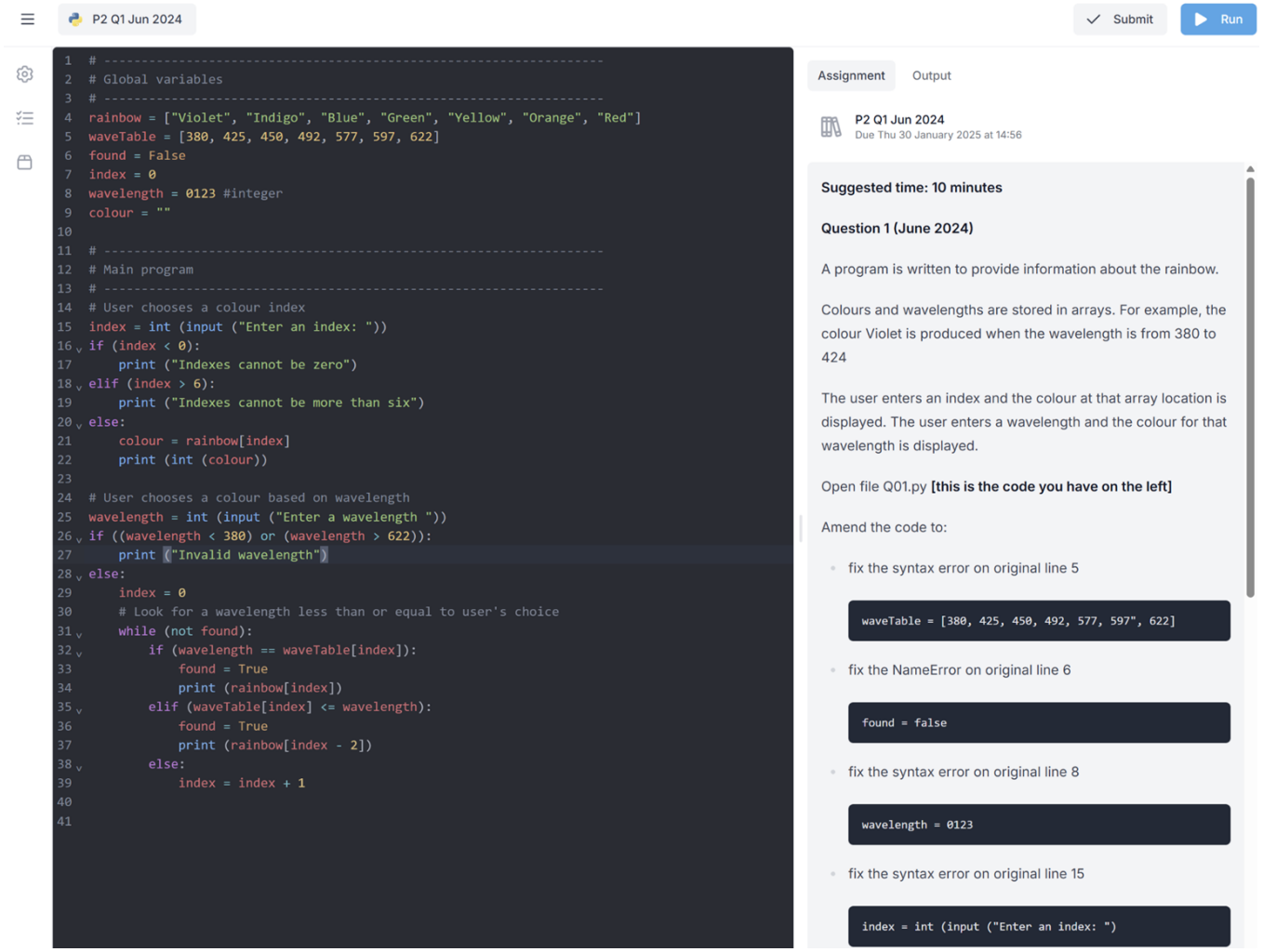
- Use the PLS in class… make using it the “normal way of working”
- Student: “What happens if..?”
- Use the sample questions (e.g. Edublocks)
- Shed Loads of Practice (SLOP)
- Actual papers vs Sample papers

Edublocks

- Not just blocks!
- 100% free and accessible
- 24 / 7 / 365
- Safe and suitable
- Easy to use
- Responsive to feedback / feature requests
- Import libraries
- Exam mode in development
- Engaging environment

Live demo: projects, assignments, starter projects, scaffolding with GPT

Please note: *Edublocks is among various available EDIs, and its usage is not mandatory for delivering the Pearson Edexcel qualification.*



PLS Quizzes

How about a pop quiz to get students used to using the PLS? It helps reinforce key terminology, familiarises them with what's covered in the PLS and gets them used to the <notation> for arguments. E.g.

Q1: Give four examples of relational operators. (4)

Q2: Which kind of loop is used for iteration? (1)

Q3: What is the (official) name of the % operator in Python? (1)

Q4: What is the difference between a procedure and a function? (1)

Q5: What two parameters are needed to open a file for appending? (2)

Q6: What does ord(<char>) do? (1)

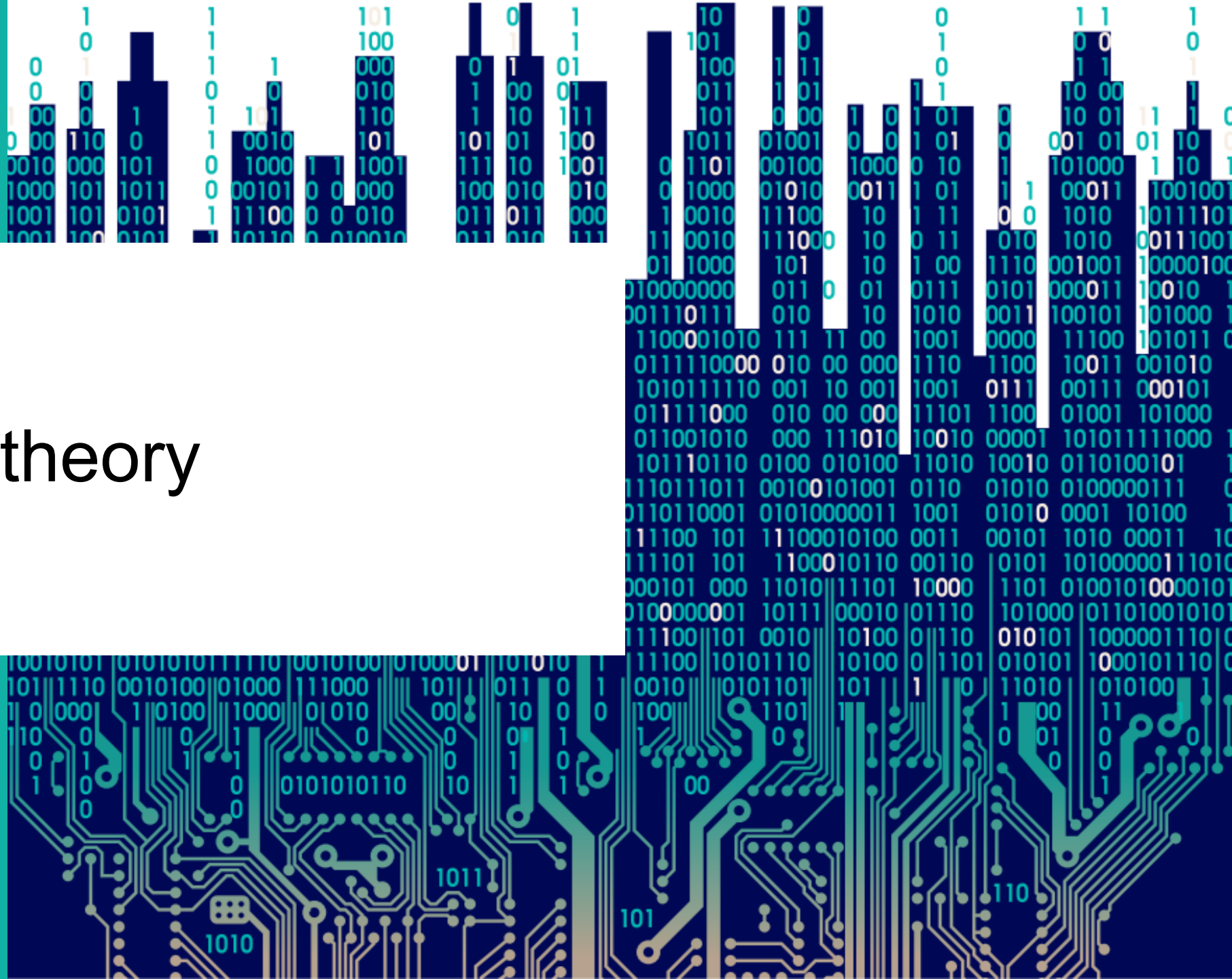
Discussion

Paper 2: Programming (Application of Computational Thinking)

Discussion Focus: Delivering Programming Confidently

- What approach do you take to introduce programming: PRIMM, TIME, Use-Modify-Create, or something else? Why?
- How do you scaffold programming tasks for mixed-ability learners?
- Which concepts (e.g. iteration, logic, subroutines) do students find most difficult? What helps?
- How do you prepare students for the on-paper code questions, especially those who struggle with syntax?
- How do you assess and give feedback on programming skills?
- What’s your favourite coding task or project that builds strong skills while keeping students engaged?

Teaching theory



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Background in theory

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Which theory topic do you find hardest to deliver?

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How well do you feel KS3 prepares students for this course?

Practical ideas for teaching theory topics

- Analogies
- SLOP
- Exam Questions: Topic booklets
- Reinforce knowledge
  - Ebbinghaus’ forgetting curve
  - Low stakes, retrieval
  - Interleaving
- 'What’s in the bag?’
- Binary bingo
- CPU activity

Practical ideas for teaching theory topics

🔐 Cybersecurity

Analogy: Home Security

- **Firewall** = Security guard checking who can enter
- **Antivirus** = Pest controller checking for infestations
- **Phishing** = Scam phone call pretending to be your bank
- **Passwords** = Keys – strong keys (long passwords) make break-ins harder

💾 Memory & Storage

Analogy: Desk and Filing Cabinet

- **RAM** = Desk space – fast, temporary access while working
- **Hard Drive/SSD** = Filing cabinet – permanent but slower
- **Cache** = Sticky note on your monitor – very fast and small
- **Virtual Memory** = Borrowing space on the floor when your desk is full

Practical activity for teaching scheduling algorithms

🛒 **FIFO (First-In, First-Out)**

Analogy: Supermarket Checkout Queue

Customers are served in the exact order they arrive. No skipping!

✅ *Simple and fair, but slow if someone has a large basket.*

✂️ **Shortest Job First (SJF)**

Analogy: Quick Haircuts at the Barber

The barber picks the person with the **shortest haircut time** first.

✅ *Efficient overall, but longer jobs may have to wait (unfair!).*

🕹️ **Round Robin**

Analogy: Friends Taking Turns on an Arcade Machine

Everyone gets **2 minutes to play**, then swaps out and rejoins the queue.

✅ *Fair for everyone, but lots of switching between players.*

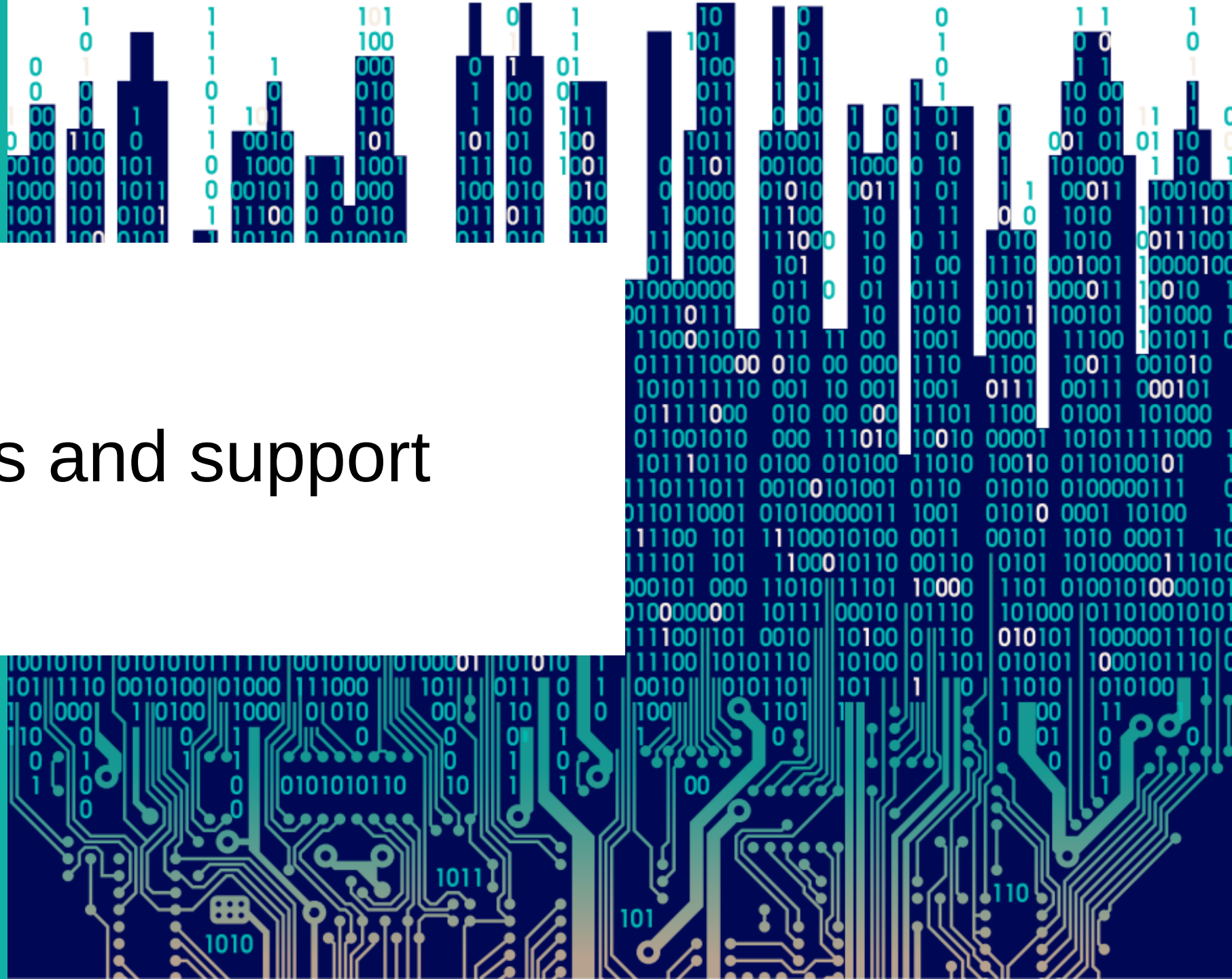
Discussion

Paper 1: Theory (Principles of Computer Science)

Discussion Focus: Understanding and Teaching Theory Concepts

- Which topics do your students find the hardest to understand? Why?
- What analogies or practical examples have helped your students 'get' abstract theory topics?
- Which theory areas lend themselves best to ‘use-modify-create’ or 'misconception spotting' activities
- How confident are students in applying theoretical knowledge to exam scenarios?
- Do you relate programming tasks to the theory topics?

Resources and support



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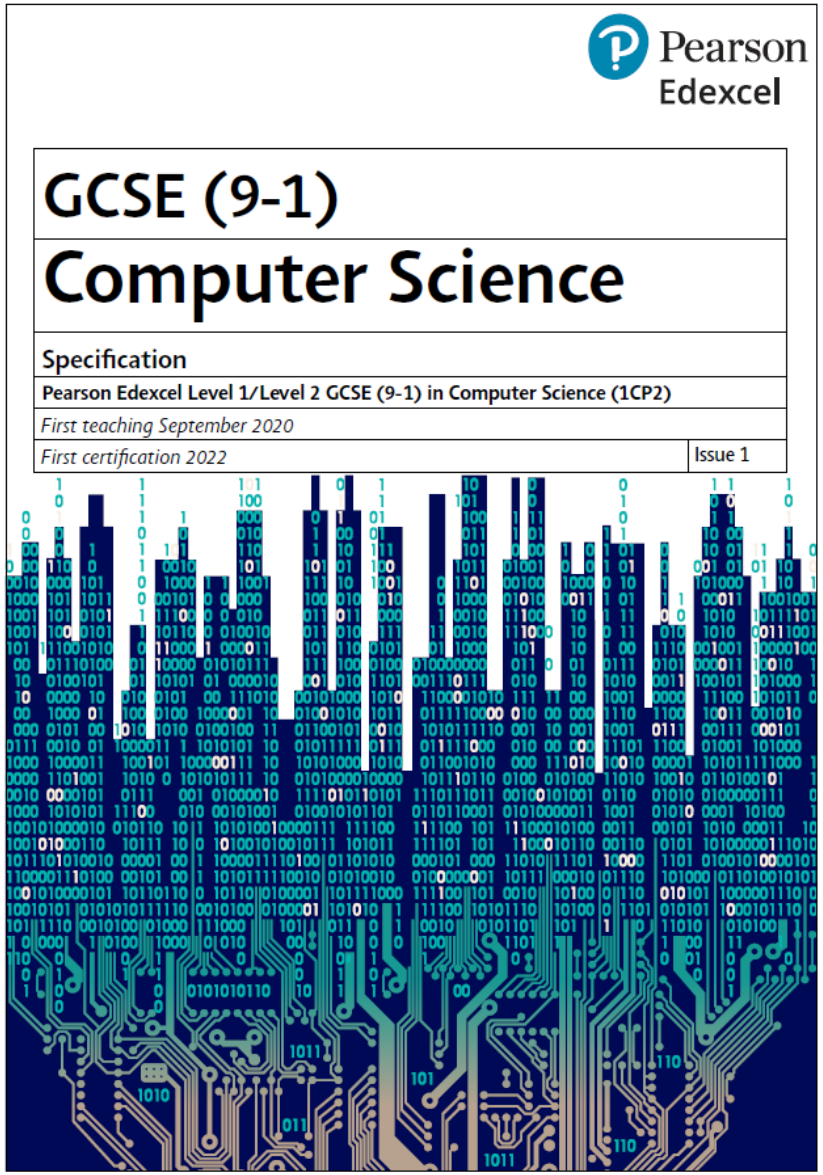
Resources for teaching programming

Tailored to this particular course:

- Pearson Edexcel's scheme of work
  (fully-resourced lesson plans provided)



Resources for teaching programming

The following links are examples of cloud-hosting IDEs:

- Edublocks (including coding resources to go with above)
- Trinket.io (including coding resources to go with above)

Resources for further programming practice

Online courses:

- W3schools
- Raspberry Pi Foundation
- Coddy.tech
- Sololearn
- Mimo
- Snakify
- Time2Code (free from Craig'n'Dave)
- PythonSponge (free from the team behind PCTC)

An actual textbook:

- "Python by example" (book by Nichola Lacey ISB 978-1-108-71683-3)

Resources for further programming practice

A competitive element:

- Bebras Coding Challenge (competition)
- Perse Coding Team Challenge (competition)
- CodinGame (practice and also competitions)

Resources for teaching theory

- Pearson Edexcel's fully-resourced scheme of work
- BBC Bitesize
- Isaac Computer Science
- Smart Revise, videos and other resources (Paid-for, from Craig'nDave)
- Ultimate GCSE Computer Science (Paid-for, from Paul Long)

General:

- Ada Computer Science
- TryHackMe
- Eedi / diagnostic questions

Resources for professional development

- Pearson Edexcel's free online webinars and meetings
- Isaac Computer Science offers free events for students that are also good for teachers
- Digit<all> Charity offers free events and CPD (as well as resources)
- Computing at School (Community and events)
- NCCE (CPD, curriculum, CQF)

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