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# Interview for the PGCE in Computing

Congratulations on having been offered an interview for a place on the PCGE course for September 2024. As you will have read from the pre-interview information online, the interview process provides an insight into the course and an opportunity for you to ask questions. The day will comprise of several different activities that enable you to demonstrate a variety of attributes and skills that successful teachers draw upon to enable learning to happen in the classroom and therefore is fair and rigorous.

This document provides an overview of the subject element of the interview day and should be read in conjunction with the main webpage. There are two key processes that make up the subject element of the selection process.

## The Subject Interview

In the afternoon, you will have a specialist subject interview in which you will explore a range of topics; these are likely to include:

* Your view of how computing could/should be taught in the classroom and how that could link to the current UK Computing curriculum.
* Your proficiency in at least one programming language.
* Be able to verbally explain the technical journey of how typing a URL into a browser becomes a functional webpage that user can interact with.
* A discussion about your creative lesson planning task from the morning’s Group interview – remember this should not be based on your specialist subject. See notes about the Group interview
* Examples of working-with or understanding of working-with young people.

## Initial Subject Knowledge Audit in Computer Science

Below you will find a copy of the Initial Subject Knowledge Audit in Computing, which you should complete and bring a copy with you to the interview day to discuss.

We look forward to meeting you.

Best wishes,

Allan Callaghan

Subject Lead for Secondary Computing in Initial Teacher Education

Canterbury Christ Church University

## Initial Subject **Knowledge** Audit

This audit aims to help you:

* Understand what “subject knowledge” means for your subject.
* Perform a gap analysis of your own skills.
* Guide you with building subject knowledge before you start the course.

No teacher knows everything about their subject.

There are no defined list of topics or other information that must be known by subject practitioners.

It is important that you have a map of the wider concepts.

## What the PGCE “is” and “isn’t”

* The one-year PGCE course will be focused on developing your “Subject Pedagogy” e.g. How do you effectively teach XYZ.
* The course will not be focused on developing “Subject Knowledge” e.g. Your skills or knowledge about XYZ

You will be taking responsibility for learning new material and raising your level of subject knowledge. This is an aspect of the course in which you need to develop independent strategies for learning.

## Subject Knowledge Level Descriptors

What do your levels of competence look like in different Computing topic areas?

For each area listed, indicate where you assess your level of competence to be currently. Please use the descriptions provided and be frank and honest in your self-assessment. Do not spend more than 30min on this task.

The level descriptions should be used as a guide rather than a check list, to aid you. We are not expecting you to be able to demonstrate many areas at level 3 or 4 at this stage, therefore do not worry about ticking any of the boxes as this audit is used as a tool to help support and develop your subject knowledge rather than a judgement tool.

1. **Some/None:** No idea or unsure, insecure knowledge. Need to look it up or refresh knowledge Know the rules but need to refresh knowledge/skills
2. **I know and can do:** Quickly recall, answer exam style questions without a prompt. Know the key information, meanings and have the knowledge
3. **I understand and can explain:** Focus on teaching: Can explain how and why to someone else. Can use analogies, models or similar. Can link prior knowledge and next development stages. Understands the progression in a topic
4. **I can help others to learn:** Focus on individual learning and understanding: Can interconnect and link to other topics. Use relevance and everyday applications to motivate. Anticipate problems and difficulties through use of common misconceptions and other strategies. Understand conceptual structure. Deconstruct learning into manageable chunks. Enable meta-cognition

## Initial Skills Audit

|  |  | **Tags** | **Links** | **Working Level (optional a few words describing evidence of why you think are at this level)** |
| --- | --- | --- | --- | --- |
| 0 | Representing algorithms  Trace algorithm and determine purpose. Decompose problem. Pseudocode. Flowcharts | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Representing_algorithms)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=17) |  |
| 1 | Efficiency of algorithms  O(n) | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Efficiency_of_algorithms)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=) |  |
| 2 | Searching algorithms  linear, binary | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Searching_algorithms)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=18) |  |
| 3 | Sorting algorithms  bubble, merge, insertion | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Sorting_algorithms)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=18) |  |
| 4 | Data types  convert between data types | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Data_types)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=20) |  |
| 5 | Programming concepts  nested iteration | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Programming_concepts)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=20) |  |
| 6 | Arithmetic operations in a programming language  modulo | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Arithmetic_operations_in_a_programming_language)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=19) |  |
| 7 | Relational operations in a programming language | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Relational_operations_in_a_programming_language)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=19) |  |
| 8 | Boolean operations in a programming language | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Boolean_operations_in_a_programming_language)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=19) |  |
| 9 | Data structures  2d array, object/record/struct/dictionary/data-class | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Data_structures)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=20) |  |
| 10 | Input output | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Input_output)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=) |  |
| 11 | String handling operations in a programming language  substring, ascii | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=20) |  |
| 12 | Random number generation in a programming language | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Random_number_generation_in_a_programming_language)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=20) |  |
| 13 | Structured programming and subroutines procedures and functions  functions with multiple parameters, local variable scope | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Structured_programming_and_subroutines_procedures_and_functions)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=20) |  |
| 14 | Robust and secure programming  validation, test-data, syntax-vs-logic error | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Robust_and_secure_programming)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=21) |  |
| 15 | Number bases | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=) |  |
| 16 | Converting between number bases  convert between binary, hex, dec | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Converting_between_number_bases)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=10) |  |
| 17 | Units of information  byte, kilobyte, kibi | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=10) |  |
| 18 | Binary arithmetic  add 3 numbers, shift | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Binary_arithmetic)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=) |  |
| 19 | Character encoding  ascii, utf8 | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Character_encoding)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=11) |  |
| 20 | Representing images  calculate bitmap size in bytes | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Representing_images)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=11)  [nc](https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study/national-curriculum-in-england-computing-programmes-of-study#key-stage-3) |  |
| 21 | Representing sound  calculate wav size in bytes | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Representing_sound)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=11) |  |
| 22 | Data compression  rle, huffman tree, lossy/lossless | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=11) |  |
| 23 | Hardware and software | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Hardware_and_software)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=) |  |
| 24 | Boolean logic  logic gates to algebra, xor | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Boolean_logic)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=22)  [nc](https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study/national-curriculum-in-england-computing-programmes-of-study#key-stage-3) |  |
| 25 | Software classification  system, application, operating system (user management, file systems) | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Software_classification)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=15) |  |
| 26 | Classification of programming languages and translators  interpreter, compiler, assembler, machine code, IDE's | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Classification_of_programming_languages_and_translators)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=23) |  |
| 27 | Systems architecture  fetch execute cycle, volatile/non-volatile storage | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Systems_architecture)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=8)  [ocr\_more](http://localhost:8000/9) |  |
| 28 | Fundamentals of computer networks  network topologies, tcp, udp, http(s), smtp, mac-address (link layer), dns | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=12)  [ocr\_more](http://localhost:8000/13) |  |
| 29 | Fundamentals of cyber security | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Fundamentals of cyber security)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=) |  |
| 30 | Cyber security threats  DOS, pen-test, Social\_engineering, phishing, Malicious\_code\_malware | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Cyber_security_threats)  [aqa\_more](http://localhost:8000/Social_engineering,%20Malicious_code_malware)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=14) |  |
| 31 | Methods to detect and prevent cyber security threats  biometric, 2 factor | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Methods_to_detect_and_prevent_cyber_security_threats)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=) |  |
| 32 | Relational databases  table, record, primary-key, SELECT, FROM, WHERE, ORDER BY, INSERT INTO, UPDATE | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Relational_databases)  [aqa\_more](http://localhost:8000/Structured_query_language_SQL)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=20) |  |
| 33 | Ethical, legal, social, privacy  cloud, wearables, cookies, data protection, copyright, open source | gcse | [aqa](https://www.aqa.org.uk/subjects/computer-science-and-it/gcse/computer-science-8525/subject-content#Ethical_legal_and_environmental_impacts_of_digital_technology_on_wider_society_including_issues_of_privacy)  [ocr](https://www.ocr.org.uk/Images/558027-specification-gcse-computer-science-j277.pdf#page=16) |  |
| 34 | Spreadsheet  VLOOKUP, Conditional Formatting, Absolute cell referencing | ict |  |  |
| 35 | Animation  Tween, Keyframe | iMedia | [ocr\_imedia](https://www.ocr.org.uk/Images/115888-specification.pdf#page=26) |  |
| 36 | Creating a digital video sequence  Record and instructional video for a class | iMedia | [ocr\_imedia](https://www.ocr.org.uk/Images/115888-specification.pdf#page=34) |  |
| 37 | Styles/Master/Template  Slide Master, Document Styles, TOC | ict |  |  |
| 38 | Web/HTML  h1, table, ul, a, css | iMedia | [ocr\_imedia](https://www.ocr.org.uk/Images/115888-specification.pdf#page=23) |  |
| 39 | Physical  Microbit, Arduino, LegoMindstorms, other. Use of sensors and upload to physical device | physical | [Microbit](https://microbit.org/) |  |
| 40 | Train an AI Image classifier | digital-literacy | [google](https://teachablemachine.withgoogle.com)  [raspberrypi](https://www.raspberrypi.org/blog/ai-education-resources-what-to-teach-seame-framework/) |  |
| 41 | AI Prompt engineering | digital-literacy |  |  |
| 42 | Pair Programming  Co-ordinate, guide, scaffold, a pair programming as part of teaching a topic | pedagogy  computing | [teacherEducation](https://github.com/calaldees/teacherEducation/blob/main/teacherEducation/pairProgramming.md) |  |
| 43 | Debugger  breakpoint, step-over, step-into, watch variables | computing |  |  |
| 44 | Automated Tests  Tests give students feedback on progress. Student constructing their own assertions and verifying these | pedagogy  computing | [teacherEducation](https://github.com/calaldees/teacherEducation/blob/main/teacherEducation/automated_tests.md) |  |
| 45 | EU Digital Competence Framework  Consider how your students skills map to external competency frameworks | digital-literacy  framework | [eu](https://joint-research-centre.ec.europa.eu/digcomp/digcomp-framework_en) |  |
| 46 | NCCE: Computing Quality Framework  Framework for inspecting and grading a schools computing provision | framework | [NCCE](https://computingqualityframework.org/overview/pdf-version/) |  |
| 47 | HCI design principles | digital-literacy | [iDEA](https://idea.org.uk/badge/ux) |  |
| 48 | gov.uk Education for a connected world  eSafety, Cyber awareness, Digital Citizenship. Age appropriate benchmark statements | digital-literacy  framework | [gov.uk](https://www.gov.uk/government/publications/education-for-a-connected-world)  [projectevolve](https://projectevolve.co.uk/) |  |
| 49 | File Organisation  Naming your documents. Use of folders. Backing up and restoring your data. Where is your data? (in memory?, on ssd? on usb? on the cloud? which country?) | ict  digital-literacy |  |  |
| 50 | Hotkeys  Windows accessibility, window arrangement, undo, select-all, copy/paste, triple click, move tabs, screenshot | digital-literacy |  |  |
| 51 | Touch Typing  Typing Speed + fluent use of keyboard. Students can't trial ideas and be creative with a device if they spend 7 minuets typing in one line of text using a single finger and looking for each letter on the keyboard individually. (some school have 10min of this as a starter of every year 7 and 8 lesson). | digital-literacy |  |  |
| 52 | IDE  autoformatter, auto-complete, run/debug cycle, hotkeys, find-uses, ctrl+click goto definition | digital-literacy  computing |  |  |
| 53 | Multiple Desktop Operating System user paradigms  Linux, Windows, Mac (cultural capital). differences Hotkeys, privacy, storage, drivers | digital-literacy |  |  |
| 54 | Command Line  do an operation in gui and commandline. Download youtube downloaded? encode a video? compress a folder? flags | digital-literacy  computing |  |  |
| 55 | File format extensions/mime-types  pdf? doc? jpg? csv? | digital-literacy |  |  |
| 56 | Document format conversion  convert a document to other file format. What is lost/damaged? (docx,odt) (xlsx,csv) pandoc? | digital-literacy  ict  computing |  |  |
| 57 | Version Control  git?, diff(+,-,context), history, branch, merge | computing |  |  |
| 58 | Document History  See a documents version history. see previous versions of a document. who changed them? compare changes? | digital-literacy |  |  |
| 59 | Interesting hardware peripherals  keylogger, magnetic strip reader, smartcard reader, mini thermal printer, ultraleap, barcode reader, rf reader | digital-literacy  physical |  |  |
| 60 | markdown  headings, bullets, code blocks, tables, images, see mermaid and `Remark` |  |  |  |
| 61 | mermaid  diagram notation |  | [mermaid.js.org](https://mermaid.js.org/intro/n00b-gettingStarted.html) |  |
| 62 | wiki/knowlege-base  non linear web of linked concepts. hashtags, backreferences, search plain text (maybe with commandline grep?) | digital-literacy |  |  |
| 63 | API  Use an api to get/post data. Understand json data structures. | digital-literacy  computing |  |  |
| 64 | Task Automation  Automate a task. macros? commandline-script? no-code? (IDEA course example send text when leave house). Think of more | computing  ict  digital-literacy | [iDEA](https://idea.org.uk/badge/automation) |  |
| 65 | GDPR  Terminology, rights as a data subject | digital-literacy | [iDEA](https://idea.org.uk/badge/gdpr) |  |
| 66 | email  Setup rules and forwarding, signatures, cc and bcc, replying inline `>` | ict  digital-literacy |  |  |
| 67 | Printer  preview, duplex, 2 to a page, margins, headers/footers, printing tables | ict  digital-literacy  physical |  |  |
| 68 | 3D Printer + 3D Model  Print a 3D model. Simple creation and modification of a 3D model | physical  ict |  |  |
| 69 | UnrealEngine: Blueprints  A practical alternate paradigm for writing logic. 2d linked components | computing | [UnrealEngine](https://dev.epicgames.com/community/learning/courses/QGD/unreal-engine-blueprint-essential-concepts/P7L/unreal-engine-introduction-to-blueprint-essential-concepts) |  |
| 70 | Network Simulator  Use a network simulator to make networking more practical than theoretical | pedagogy  computing | [cs4g](https://netsim.erinn.io/)  [code.org](https://studio.code.org/s/netsim/)  [ncce](https://teachcomputing.org/curriculum/key-stage-4/networks)  [HelloWorld](https://helloworld.raspberrypi.org/articles/HW8-make-networks-interesting-with-filius) |  |
| 71 | Domain name  Understand the process of registering a domain name and hosting a service. DNS Record A, AAAA, MX. Mail forwarding? | computing  digital-literacy |  |  |
| 72 | Judging Quality of Information  FakeNews, DeepFakes, Quality/Credibility of information | digital-literacy | [iDEA](https://idea.org.uk/badge/fake-news)  [iDEA2](https://idea.org.uk/badge/fake-news-detector)  [nc](https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study/national-curriculum-in-england-computing-programmes-of-study#key-stage-3) |  |
| 73 | Careers  Breath of digital careers. Bioinformatics, Social media co-ordination, AI Prompt Engineer, Dev-Ops, Embedded systems, VR, IoT, Data Science, Data Visualisation, more! | digital-literacy | [iDEA](https://idea.org.uk/badge/digital-careers) |  |
| 74 | Draw a graph/visualisation from a dataset | ict  computing | [iDEA](https://idea.org.uk/badge/data-visualisation)  [nc](https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study/national-curriculum-in-england-computing-programmes-of-study#key-stage-3) |  |
| 75 | Draw geometric shapes with recursion  Recursive tree | computing |  |  |
| 76 | Advanced Web Search: AND, OR, NOT, Date, Location | ict | [nc](https://www.gov.uk/government/publications/national-curriculum-in-england-computing-programmes-of-study/national-curriculum-in-england-computing-programmes-of-study#key-stage-3) |  |

## Additional Subject Skills

Describe any additional experience/understanding you have related to the discipline of computing: