COMPUTER SCIENCE KS5

KEY

- Data structures and algorithms
- Theory of computation
- Computer Systems
- Ethical, Legal and environmental impacts
- Programming

Data Representation – numbers, text, images and sound

Can I convert between different number systems and perform binary arithmetic?

Can I explain how images and sound are represented in binary?
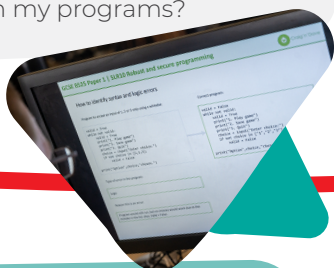
How do compression and encryption work?

Fundamentals of Programming

How can I solve simple problems involving sequence, selection and iteration?

Can I use nested selection and iteration statements to solve more complicated problems?

How can I use data structures when writing algorithms?

How can I use files and handle errors in my programs?

Problem solving and the theory of computation

Can I trace a complex algorithm to say what it does?

How can I design algorithms to solve complex problems? How can I test my algorithms work as I expect?

Can I draw a finite state system from a description of the problem?

YR12

Communication: Technology and consequences

Can I draw diagrams of different network topologies and explain their key differences?

Can I give examples of where peer-to-peer and client-server networking might be used?

Can I discuss how developments in computer science affect society?

expression?

Computer organisation and architecture

How do I write simple assembly code programs?

Can I describe the concept of addressable memory and the stored program concept?

Can I explain the difference between von Neumann and Harvard architectures?

expression?

Hardware and Software

What is meant by system software and application software?

What is the difference between high- and low-level languages?

How do I draw a logic gate circuit from a given Boolean expression?

Algorithms

What makes an algorithm recursive?

What makes an algorithm more efficient than another?

What is the travelling salesman problem?

What is meant by a tractable or intractable problem?

YR13

Data structures

How can I describe the concept and uses of a common data structures like queues, stacks, graphs and trees?

Can I perform vector addition and scalar multiplication?

The Internet

Do I understand how the internet works and how packets of data arrive at the right destination?

Can I explain the four layers of TPC/IP networking?

Regular Languages

What makes a language regular?

Can I interpret finite state machines?

Can I use set operations such as union and intersection?

How can I write regular expressions?

Can I define the grammar of a language?

Can I convert between prefix, infix and postfix notation?

Can I explain what a Turing machine is and its importance to the computer science?

Database and Software Development

Can I produce an entity relationship diagram and write entity descriptions?

What are different kinds of database keys?

Can I use SQL to retrieve, update, insert and delete data from a database table?

Object-Oriented and Functional Programming

Can I explain why the object-oriented paradigm is used?

Can I explain what is meant by inheritance and polymorphism?

Can I interpret and correct a simple object-oriented program?

Do I understand the key ideas behind functional programming?

Exam preparation

How can I make sure I am revising effectively for this subject?

How do I memorise and recall knowledge I need for the exam?

How do I maximise marks in this subject's exam?

What are the gaps in my knowledge and how can I address them?

How do I approach exam questions in this subject to ensure I reach the highest grade?

What do I need to do to prepare myself for university courses?

What do I need to do to prepare myself for employment?