



Year 11 Computer Science – Social, Ethical and Legal Factors in Computing

Learning about this topic is important because:

With the current growth in the use of computing/digital technology, it is important to consider the wider impacts the growth has on society, especially as often the laws and regulations do not advance as rapidly as the technology itself.

This builds on:

Computing Project 3 (Year 9) – Along with Y7/Y8 Computing projects which examine the wider impacts of technology.

This leads to:

A Level (Y13) social, ethical and cultural topic where the impacts are examined in further depth,

We will learn:

- Discuss the impacts of digital technology on the wider society including ethical issues, cultural issues and environmental issues
- Discuss the impact of manufacture, disposal, upgrading and replacing digital technology
- Discuss the impact of e-waste
- Discuss the impact of digital technology regarding legal issues and privacy issues
- Describe legislation relevant to Computer Science including
 - The Data Protection Act 2018
 - Computer Misuse Act 1990
 - Copyright Designs and Patents Act 1988
- Describe the features of open source and proprietary software licences.

We will develop/practise skills including:

- Research
- Analysis
- Presentation skills
- Answering extended response essay style questions

Some of the vocabulary that we will use includes:

Ethical, cultural, environmental, legislation, manufacture, disposal, upgrade, replace, e-waste, privacy, legal, data protection, computer misuse, copyright, copyright designs and patents act, open source, proprietary, software licence

You could learn more about this topic by:

Ethical, legal and cultural concerns (Bitesize) – Click [here](#)
Craig n Dave videos (Ethical, Legal and Cultural) – Click [here](#)
Video – What's in a smartphone? – Click [here](#)
Video – Amazon warehouse robots – Click [here](#)
Video – Copyright (Ed Sheeran v Matt Cardle) – Click [here](#)





Year 11 Computer Science – Social, Ethical and Legal Factors in Computing



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Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are:

End of Topic Assessment.

Social Ethical Cultural Workbook



Year 11 Computer Science – Algorithms



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Learning about this topic is important because:

Computational thinking techniques are important as they can be applied to problem solving in general, not just in terms of computing problems. They are also skills which are generic to all programming languages (not just Python)

This builds on:

Sorting Algorithms (Y9) / Searching Algorithms (Y8) / Computational Thinking (Y7)

This leads to:

Computational Thinking / Computational Methods (Y12)

We will learn:

Understand the principles of computational thinking including

- **Abstraction**
- **Decomposition**
- **Algorithmic thinking**

Be able to produce structure diagrams to show:

- **The structure of a problem**
- **Subsections and their links to other subsections**

Understand and use different types of search

- **Binary search**
- **Linear search**

Understand the standard sort algorithms:

- **Bubble sort**
- **Insertion sort**
- **Merge sort**

Be able to apply each algorithm to a data set

Understand flowchart symbols

Create, interpret, correct, complete and refine algorithms using flowcharts.

Write algorithms in pseudocode involving sequence, selection and iteration

Understand the purpose of a given algorithm and how an algorithm works

Understand how to identify and correct errors in algorithms

Create and use of trace tables to follow an algorithm

We will develop/practise skills including:

Problem solving

Decomposing problems

Algorithmic thinking

Logical reasoning

Drawing flowchart diagrams



Year 11 Computer Science – Algorithms



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Some of the vocabulary that we will use includes: Computational thinking, abstraction, decomposition, algorithmic thinking, inputs, processes, outputs, structure diagrams, pseudocode, flowcharts, reference language, trace tables, syntax error, logical error, algorithm, decision, terminal, sub program, process, binary search, linear search, bubble sort, merge sort, insertion sort,	You could learn more about this topic by: Craig n Dave Algorithms Videos – Click here BBC Bitesize – Algorithmic Thinking – Click here VisualGo – Visualise the different search/sort algorithms – Click here 
Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are: Algorithms Workbook End of Unit Assessment	



Year 11 Computer Science – Network Security



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Learning about this topic is important because:

We have learnt about computer networks and the benefits of connecting devices. The widespread use of computer networks comes with various risks. Ensuring the security of computer systems and the security of the users' data is a vital element of modern computing. Here we will learn about the various forms of attack and also defensive measures put in place by organisations to minimise the risk of such attacks taking place.

This builds on:

Year 10 – Networks, protocols and layers

This leads to:

Year 12 – Computer Networks and Web Technologies (Spring 1)

We will learn:

- **Forms of attack:** Malware, Social engineering (e.g. phishing, people as the 'weak point'), Brute-force attacks, Denial of service attacks, Data interception and theft, The concept of SQL injection.
- **Common prevention methods:** Penetration testing, anti-malware software, Firewalls, User access levels, Passwords, Encryption, Physical security

We will develop/practise skills including:

- **Research and investigation of real case study examples in the news**

Some of the vocabulary that we will use includes:

Social engineering, Phishing, Brute-force attack, Denial-of-service attack, Data interception and theft, SQL injection, Penetration testing, Anti-malware software, Firewall, User access level, Password, Physical security

You could learn more about this topic by:

Craig n Dave – Network security videos – [Click Here](#)
BBC Bitesize – Network Security – [Click Here](#)
Isaac Computing – Network Security – [Click Here](#)
Isaac Computing – Malicious Software – [Click Here](#)
Isaac Computing – Social Engineering – [Click Here](#)



Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are:

Topic test, key homework, 1.4 Workbook



Year 11 Computer Science – Network Security



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Year 11 Computer Science – Producing Robust Programs



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Learning about this topic is important because:

It is not just important that algorithms / computer programs work as intended, they should also be as secure and efficient as possible. This topic builds on what we have learnt about writing code to now consider code efficiency and security (designed to prevent misuse).

This builds on:

Year 10 – Programming Techniques

This leads to:

Year 12 – Programming Techniques and Paradigms (Autumn 1)

We will learn:

- **Defensive design considerations: Anticipating misuse, Authentication.**
- **Input validation**
- **Maintainability: Use of sub programs, Naming conventions, Indentation, Commenting**
- **The purpose of testing**
- **Types of testing: Iterative, Final/terminal**
- **Identify syntax and logic errors**
- **Selecting and using suitable test data: Normal, Boundary, Invalid, Erroneous**
- **Refining algorithms**

We will develop/practise skills including:

- **Creating test plans for code.**
- **Identifying errors and inefficiencies in code.**
- **Correcting and refining code.**

Some of the vocabulary that we will use includes:

Defensive design, Anticipating misuse, Authentication, Input validation, Maintainability, Naming conventions, Indentation, Commenting, Testing, Iterative testing, Final/terminal testing, Syntax error, Logical error, Test data, Normal, Boundary, Invalid, Erroneous

You could learn more about this topic by:

Isaac Computing – Testing – [Click Here](#)
BBC Bitesize – Producing Robust Programs – [Click Here](#)
Craig n Dave – Producing Robust Programs Videos – [Click Here](#)



Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are: Topic test, key homework, 2.3 Workbook



Year 11 Computer Science – Boolean Logic



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Learning about this topic is important because:

At the simplest level, computers are little more than a collection of transistors and circuits. They connect together to form logic gates, which in turn are used to form logic circuits. We will be learning about how these circuits can be designed to perform some of the logical operations required of computers.

This builds on:

Year 10 Data Representation

This leads to:

Year 13 – Data Types and Boolean Logic (Autumn 1)

We will learn:

- Simple logic diagrams using the operations AND, OR and NOT.
- Truth tables.
- Combining Boolean operators using AND, OR and NOT to two levels.
- Applying logical operators in appropriate truth tables to solve problems.

We will develop/practise skills including:

Logical Reasoning.
Drawing and annotating logic circuit diagrams.
Creating Boolean logic circuits from Boolean expressions and vice versa.

Some of the vocabulary that we will use includes:

Logic gate, AND, OR, NOT, Truth table

You could learn more about this topic by:

Craig n Dave Boolean Logic – [Click Here](#)
BBC Bitesize Boolean Logic – [Click Here](#)
Isaac Computing Boolean Logic – [Click Here](#)



Your teacher will assess your knowledge & understanding throughout the topic by looking at your work, questioning, discussion and giving you feedback in lots of different ways. The key pieces of work in this topic are: Topic test, key homework, 2.4 Workbook