

# Computing



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Information for  
students and parents

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# COMPUTING

Computer Science is a practical subject allowing students to apply the academic principles learned in the classroom to real-world systems. It is a creative subject that combines invention with excitement and looks at the natural world through a digital prism. The aims of this qualification are to enable learners to develop:

- An understanding and ability to apply the fundamental principles and concepts of computer science, including: abstraction, decomposition, logic, algorithms and data representation.
- The ability to analyse problems in computational terms through practical experience of solving such problems, including writing programs to do so.
- The capacity to think creatively, innovatively, analytically, logically and critically.
- The capacity to see relationships between different aspects of computer science.
- Mathematical skills.

“At its heart lies the notion of computational thinking: a mode of thought that goes well beyond software and hardware, and that provides a framework within which to reason about systems and problems.” (CAS-Computer Science a Curriculum for Schools).

A-level Computer Science will, above all else, be relevant to the modern and changing world of computing. There is very little in our world that does not have an aspect of computer science. The subject enables teachers to tailor the qualification to meet the needs of their learners and has an open source ethos allowing any programming language (that meets the needs of the course) to be used.

An A-level in Computer Science will value computational thinking, helping learners to develop the skills to solve problems, design systems and understand the power and limits of human and machine intelligence. Learners will develop an ability to analyse, critically evaluate and make decisions. The project approach is a vital component of ‘post-school’ life and is of particular relevance to Further Education, Higher Education and the workplace. Each learner is able to tailor their project to fit their individual needs, choices and aspirations.

## HIGHER EDUCATION AND CAREER OPPORTUNITIES

Computer Science, Software Engineering, Computer Games Production, Information Systems, Forensic Computing, Computer Technology, Networking and Electronics.

Computer Science offers Maynard students an unparalleled employment opportunity:

- The technology industries will continue to grow using AI and robotics.
- Traditional industries are being replaced by automation and online services.
- There is a drive to employ more women into the sector, with the hi-tech industries currently having a female workforce of just 7%.

## COURSE CONTENT

**Exam Board: OCR**

### Computer Systems

This component will introduce learners to the internal workings of the Central Processing Unit (CPU) and the exchange of data. It will also look at software development, data types and legal and ethical issues. It is expected that learners will draw on this underpinning content when studying computational thinking, developing programming techniques and devising their own programming approach in the Programming Project component (O3 or O4). Learners will be expected to apply the criteria below in different contexts including current and future uses of the technologies

### Algorithms and Programming

This component will incorporate and build on the knowledge and understanding gained in the Computer systems component (O1). In addition, learners should:

- Understand what is meant by computational thinking
- Understand the benefits of applying computational thinking to solving a wide variety of problems
- Understand the principles of solving problems by computational methods
- Be able to use algorithms to describe problems
- Be able to analyse a problem by identifying its component parts.

### Programming Project

Students will be expected to analyse, design, develop, test, evaluate and document a program written in a suitable programming language. The underlying approach to the project is to apply the principles of computational thinking to a practical coding problem. Students are expected to apply appropriate principles from an agile development approach to the project development.

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