



Coloma Sixth Form

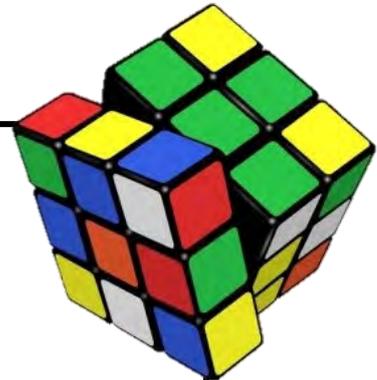
COMPUTER SCIENCE



“Any sufficiently advanced technology is indistinguishable from magic”



Why study Computer Science?



Computer Science is a special subject.

It is a discipline that offers rewarding and challenging possibilities for a wide range of people regardless of their range of interests.

At its heart, it requires you to solve problems. Not just mental puzzles like Sudoku, but big human problems too. Computer Science requires and develops capabilities in solving deep, multidimensional problems requiring imagination and sensitivity to a variety of concerns.

Computer Science drives innovation in the sciences (human genome project, AIDS vaccine research, environmental monitoring and protection just to mention a few), and also in engineering, business, entertainment and education.

"If you want to make a positive difference in the world, study Computer Science."

~ Association of Computing Machinery

An increasing number of universities and employers see successful completion of a Computer Science course as a sign of academic well-roundedness. In addition to its potential to evolve much further, Computer Science is also a career in which there are many high-paying jobs.



Specification

Qualification at a glance ([Full specification here](#))

Content and assessment overview

Component 1: Computer Systems (Component code: H446/01)
Written examination: 2 hours and 30 minutes (40% of total A Level) 140 marks
<p>Content Overview</p> <p>This component will be a traditionally marked and structured question paper with a mix of question types: short-answer, longer-answer, and levels of response mark-scheme-type questions. It will cover the characteristics of contemporary systems architecture and other areas including the following:</p> <ul style="list-style-type: none"> • The characteristics of contemporary processors, input, output and storage devices • Software and software development • Exchanging data • Data types, data structures and algorithms • Legal, moral, cultural and ethical issues

Component 2: Algorithms and programming (Component code: H446/02)	
Written examination: 2 hours and 30 minutes (40% of total A Level) 140 marks	
<p>Content Overview</p> <p>This component will be a traditionally marked and structured question paper with two sections, both of which include a mix of question types: short-answer, longer-answer, and levels of response mark-scheme-type questions.</p>	
SECTION A	SECTION B
<p>Traditional questions concerning computational thinking:</p> <ul style="list-style-type: none"> • Elements of computational thinking • Programming and problem solving • Pattern recognition, abstraction and decomposition • Algorithm design and efficiency • Standard algorithms 	<p>There will be a scenario/task contained in the paper, which could be an algorithm or a text page-based task, which will involve problem solving.</p>

Component 3: Non exam assessment Programming Project (Component code: H446/03)
Students select their own user-driven problem of an appropriate size and complexity to solve. This will enable them to demonstrate the skills and knowledge necessary to meet the Assessment Objectives. Students will need to analyse the problem, design a solution, implement the solution and give a thorough evaluation.



What could this qualification lead to?

Computer Science is a highly creative subject that calls on learners to be inventive. This qualification creates many opportunities for students to acquire valuable thinking and programming skills that are extremely attractive in the modern workplace. There are so many different careers that Computer Science could help students move towards. Here are some examples:



Relevant Links to Websites

- <https://www.thecompleteuniversityguide.co.uk/courses/computer-science/6-reasons-why-you-should-study-a-computer-science-degree/>
- <https://www.topuniversities.com/student-info/careers-advice/what-can-you-do-computer-science-degree>



Summer Work (Optional)

Component 03 of the specification will focus on your ability to solve a problem by applying computational methods. Your summer task is to start thinking about the coursework and what kind of project you wish to tackle. It can be almost anything – this is the opportunity not only for you to choose something you enjoy and but also to create a product that will add value to your future university or job applications!

Please read the following document for guidance:
<https://ocr.org.uk/Images/324587-project-setting-guidance.pdf>

Some things to remember:

- Choose a project you will enjoy (it does not necessarily have to come from the guidance document).
- Provide **at least 5** possible project ideas.
- A little bit of research is required to find out how similar projects have been implemented in the past (to give you some insight on the complexity of the task).
- There is no “best” programming language to use for the project, and it is fine if you are not familiar with it yet.

Fill in the table below, paste it to a word document and email this to Mrs Cheong at: lcheong@coloma.croydon.sch.uk.

	Title	Description	Programming language to be used	Any other resources required	Further comments
Project idea 1					
Project idea 2					
Project idea 3					
Project idea 4					
Project idea 5					



Online Courses

Here are some online lectures from CS50 – Harvard University, which will help you prepare for A-Level Computer Science:

- A taste of Python: <https://www.youtube.com/watch?v=fWsY-jRwIhU>
- Memory: https://www.youtube.com/watch?v=nvO1sq_b_zI
- A taste of Game Development: <https://youtu.be/gZXde3crVXI>

Sign up to edX for Computer Science courses:

<https://www.edx.org/search?q=computer+science>

Resources from 101Computing:

- HTML, CSS and Javascript Challenges:
<https://www.101computing.net/category/html-css-javascript/>
- Python Challenges: <https://www.101computing.net/category/python-challenges/>
- Computing Concepts:
<https://www.101computing.net/category/computing-concepts/>



Extra Suggestions for the Summer

Visits



- Visit The National Museum of Computing – booking details here: <http://www.tnmoc.org/>
- Participate in a Hackathon event and get the chance to win prizes and work placements at reputable Computing firms. Go to Acorn Aspirations to find out about the upcoming hackathon events: <http://acornaspirations.com/>
- Attend a talk at the Royal Institution. Find out more at: <http://www.rigb.org/whats-on>
- Attend “Tech” exhibitions. These will help you keep up with emerging technologies that are forming the future of organisations. Find out more at: <https://www.excel.london/whats-on>

Work Experience



- Apply for a summer internship. You can find out about apprenticeships and internships at:
 - <https://www.studentladder.co.uk/year-12/work-experience-opportunities/miscellaneous/>
 - Volunteering – you could look for opportunities to show people how to use computing skills. For example, you could find a volunteering job as a computer tutor for the elderly. More details at: <https://doit.life/discover>
 - Teach a friend or a relative to code. There are plenty of activities to try out at: <https://studio.code.org/home> (You will be required to create an account for this)
 - Create Vlogs to teach children about Computing. Read about Vlogging success stories here: <http://www.bbc.co.uk/newsbeat/article/24726895/meet-the-vloggers-self-employed-and-worth-a-fortune>

Courses



- Learn how to make mobile Apps for free - <https://code.org/educate/applab>
- Sign up to futurelearn.com and join tech and coding courses for free - https://www.futurelearn.com/courses?filter_category=17&filter_course_type=open&filter_availability=started&all_courses=1
- Learn to program for free at codecademy.com: <https://www.codecademy.com/>
- Watch videos and read articles about Computing Technology. For example, you could subscribe to Computer Weekly: <http://www.computerweekly.com/>
- Sign up to edX for virtual Computer Science courses offered by top universities like Harvard and Stanford: <https://www.edx.org/search?subject=Computer+Science&tab=course>

