

A-level Choices

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COLLEGE

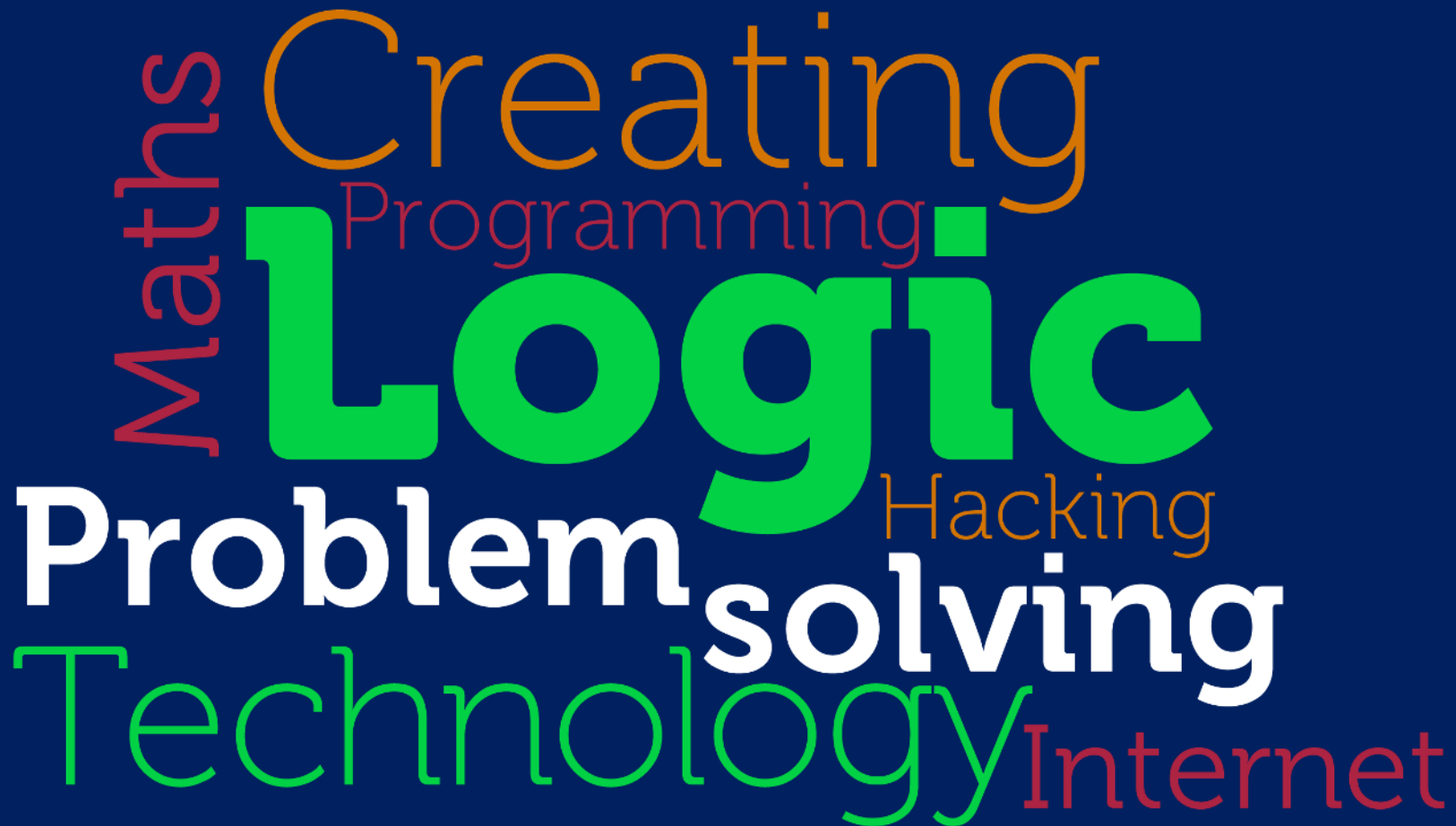


Computer Science
(AQA 7517)

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Do you like...?



A word cloud of computer science related terms. The words are arranged in a cluster, with 'Logic' being the largest and most prominent. Other words include 'Creating', 'Programming', 'Maths', 'Problem solving', 'Hacking', 'Technology', and 'Internet'. The colors of the words vary, including orange, red, green, and white.

Maths
Creating
Programming
Logic
Problem solving
Hacking
Technology
Internet

Why choose CS?

- Computers are changing every part of our lives at an ever increasing rate – why not drive the future?
- In this A-level:
 - Develop your programming at an advanced level – procedural, object oriented, functional programming
 - Learn how computers work, in a lot more complex detail than the GCSE
 - Solve logical problems
 - Be creative – choose a programming project that you are interested in coding, for your coursework



Data science and healthcare

Old, current, new diseases – scientists work very hard, hand in hand with programmers and system designers to find cures, better medication and vaccines – now more than ever



Robotics

- We already have a variety of uses for robots in every day life
 - Robotic vacuums in the home
 - Car assembly
 - Clearing mines in a war zone
- To make a robot you need to have a good understanding of how computers work and how to program them



Entrepreneurs & start-ups

- It took just three people to create Snapchat
 - Bobby Murphy was the programmer who coded the app
- Within four years the software was sending six billion videos per day
 - Most entrepreneurs can't imagine having made it without a knowledge of programming and Computer Science



A strong games industry

- The UK is well known for its games development.
- The following were all made in the UK:
 - Grand Theft Auto (Edinburgh)
 - Elite Dangerous (Cambridge)
 - Candy Crush (London)
 - Batman: Arkham (London)
 - Sonic Forces (Leamington Spa)
 - Burnout Paradise (Guildford)



Careers in...

Systems engineer
Design **Robotics**
Future careers electronics
Games Web Cyber-Security
Data Entrepreneur App
analysis UX/UI Programming
Consultant



Computing Department Exam Results 2022



Time + Effort = Success

2022 is first public examinations year after a challenging Covid and lockdown experience for us all.

We are VERY pleased with these results, and they are credit that hard work pays.

A-level Computer Science (%)

	A*	A	B	C	D
2017	13	63	75	88	100
2018	30	80	80	90	100
2019	23	46	70	85	100
2022	33	67	89	100	100

IGCSE Computer Science (%)

	9	8	7	6
2017	42	89	100	100
2018	78	100	100	100
2019	24	80	100	100
2022	74	96	100	100



Course details

- **Exam board** – **AQA**
- **Entry requirements** - If a **GCSE in Computer Science** has been completed, we require **minimum grade 7** (equivalent A); it is not compulsory, but it helps.
- Due to the **logical** nature of the course content, including **10% Mathematics concepts**, we require **minimum grade 7 (equivalent A) in Maths GCSE**
- For the same reason we require that you study at least **CORE Maths** – but **A-level Maths / Further Maths** will be far more helpful

The Department

- Miss Bilechi, Miss Austin, Mr Muwonge
- Strong and supportive Computer Science practitioners (at a time of high demand for Computing specialists, after the transition from ICT which started a few years ago). SB is an AQA A-level examiner, with 8+ years experience of marking A-level scripts
- Regular Outstanding Exam Results and value added
- Variety of competitions opportunities
- Modern technology, supported by a highly efficient IT Services team, housed in recently refurbished, modern classroom learning environment

The world needs **YOU**
to help develop the future.

Are you in?

Is A-level Computer Science for me?

If you have.....

- Tried to **write code beyond your prep / exam preparation...**
- Made an effort to **participate** in any **optional** competitions (eg Braben Cup, British Algorithmic Olympiad)...
- Undertaken **additional reading** on a CS topic...
- **Did not give** up if a program didn't work, and you have a **real passion for programming...**

...then the answer is **YES!**

Otherwise – you may find yourselves struggling with the complexity of the course content, and the 2 years commitment for this A-level.

Do I need a GCSE in Computer science?

No.

But **it helps**.

If you haven't completed the GCSE course, then **some programming experience is required** – be it in Python or another programming language.

It doesn't have to be a course or a qualification, but you should have spent **some time coding in the past**, to give you an initial **basic understanding of basic programming concepts**, and an initial experience in coding a simple program from a given task.

You will find it much easier to follow a given code to understand what it does and how it works.

Perhaps do this after your GCSE exams....

What is the course about?

- **advanced** and complex **programming** (a LOT more than the GCSE course), as a means to demonstrate the systematic approach to **solving problems** and **computational thinking**
- complex and **advanced theory** (full paper 2, and many aspects of paper 1) – which builds on the foundation studied at GCSE

This, together with a firm basis of **facts** about computer systems, provides a course that is recognised for its **academic worth** alongside the more traditional subjects.

How will I be assessed?

Paper 1

40% of A-level grade

- 2.5 hours **on-screen examination** based on a pre-released skeleton program (roughly 600-700 lines of code to start with);
 - **Topics assessed:** 1 to 4 on the handout
 - programming language available: Python3, C#, VB.Net
-

Paper 2

40% of A-level grade

- 2.5 hours **written** examination (exam paper containing a collection of compulsory short- and long-answer questions)
 - **Topics assessed:** 5 to 12 in the handout
-

Non-exam assessment (NEA)

20% of A-level grade

- **coursework**, internally assessed – report documenting a **programmed** solution to a **real problem of your choice and interest**

Programming

You will learn **PROGRAMMING CONCEPTS**, starting from the basics (some of which will be familiar from your IGCSE / GCSE course)

I will use **C# to demonstrate** and you will practise these concepts (part of Visual Studio package). You may choose to continue with Python, or use the easier language VB.Net.

You are expected to install the relevant programming language on your **personal device** (desktop / laptop, not iPad!) within the first 2 weeks of study – as you are expected to undertake **A LOT** of **independent programming** to develop your skills and build upon your confidence.

Your personal device must have a 'decent' spec (eg Core i5 or i7, minimum 8GB RAM, minimum 256GB storage – SSD recommended) – to NOT be used for gaming.

- C# and VB.Net work best on a Windows platform, so will install with no issues on Windows machines
- Mac devices will need customised – IT Services, or older CS students will be able to help

Programming

You **can** learn another programming language in parallel (such as Java), as extension, to stretch and challenge yourselves – or with the view to complete your coursework in.

BUT C# / Python / VB.Net will be used in the **Paper 1 programming exam**, so it is compulsory

Focus:

First year

- **Procedural** programming
- **OOP** is started mid-Michaelmas term of L6, to enable you to start your coursework early (Lent term of L6)
- **start NEA**
- **Recursiveness and other complex algorithms**
- **Complex data structures**

Second year:

- **Intense NEA work – code AND project report**
- **Remainder of advanced concepts, such as Dijkstra Algorithm and Functional Programming**

Non-exam assessment (NEA)

Programming project, solving a '*realistic problem*'.

The **main assessed skill**: ability to create a **complex programmed** solution **independently**. **42** programming marks out of the **75** total.

You can **choose a problem** that interests **you**; though you must be aware and confident of the required programming skills needed to solve it. **Programming language**: ANY high level language that you are proficient and sufficiently confident in, to an advanced standard.

Examples:

- Games (very popular!) – either educational, or implementing a creative idea...
- Simulation of a real life situation (eg scheduling, Conway Game of Life)
- data processing for an organisation
- AI / machine learning investigation

Subjects CS goes well with

Maths / Further Maths

Physics

Music!

Other sciences

University destinations / Subjects read (past graduates)

University	Subject read
Imperial College	CS (pure / software engineering / cyber security / AI)
Southampton	Art / digital animation
KCL	Engineering – electrical / design / aerospace
Durham	Architecture
Warwick	History
Bath	Medicine / Biomed / Medical sciences
UCL	
Birmingham	
Newcastle	
US based	
Apprenticeships! (currently, two past candidates) eg KPMG, studying cyber security	



Any questions?