Introduction

The change from ICT to computing made the subject much more technical and has moved the emphasis from how to use popular software applications to how computers actually work and how to develop logical thought processes.

One classic analogy is that ICT is like learning to drive a car, whereas computer science is learning how to design a car, maintain it and ultimately to be able to drive it better.

There has been much publicity recently about the need for greater technical knowledge of computers and a massive demand for computing skills. There has traditionally been a significant gender imbalance in the subject, something that we have been working hard to address.

Camp Hill had been offering an AS Level Computer Science qualification in Year 10 and 11 for many years, but now there is an established GCSE course in place we have returned to offering a more conventional GCSE option.

The Course

A significant part of the total lesson time will be spent developing programming skills in different ways including:

- a high level language (Python)

- a low level language (using the Little Man Computer

simulator)

Regular practice of programming through set tasks will be essential and will enable you to get computers to do what you want as well as developing structured approaches to problem solving. It is important to develop these skills throughout the course.

The theory topics studied include:

- Computer architecture (how the insides of a computer work) – covering both hardware and system software (i.e. what do Windows/iOS/Android actually do?)

- The laws that surround the use of computers (for example the downloading of songs over the Internet)

- How networks work, and how can we help them to work better?

- Cybersecurity threats and how they can be avoided

- Some maths work (Binary, Boolean algebra, etc.)

- The impact computers have had, and may have in the

future

- How some common problems have actually been solved using computers

We are keen to encourage extra-curricular computing work, so support various competitions and other opportunities throughout the course. Success requires a genuine interest in the subject, and you will be expected to actively contribute in lessons, bringing your own ideas and experiences and not just reading from text books. As a rough guide, those who are likely to be suited to computer science often have skills that also make them good at maths, physics or languages and you may enjoy problem solving or have an interest in how things work.

Assessment

Originally all GCSE Computer Science courses included 20% NEA (‘Non Examined Assessment’ = coursework). The revised J277 qualification introduced in September 2020 removes this component. Assessment is therefore based on two 90 minute exams, each 50% of the total GCSE grade:

- Component 01: Computer systems

Introduces students to the central processing unit (CPU), computer memory and storage, data representation wired and wireless networks, network topologies, system security and system software. It also looks at ethical, legal, cultural and environmental concerns associated with computer science.

- Component 02: Computational thinking, algorithms and programming

Students apply knowledge and understanding gained in component 01. They develop skills and understanding in computational thinking: algorithms, programming techniques, producing robust programs, computational logic and translators

Careers and Higher Education

There is the possibility for you to continue on to A Level Computer Science in the Sixth Form. A level also includes an independent programming project, which is another reason why it is important for you to develop these skills in practical settings.

If you want to increase your knowledge in the subject further you may consider computer science as a degree choice.

Ultimately there is a wide range of careers available in computer science, many of them commanding very high salaries. Unlike many other career directions this situation is unlikely to change. Degree level study is available in an ever increasing number of areas such as Software Engineering, Artificial Intelligence or Robotics, as well as overlapping with other fields such as Languages, Philosophy, Medicine, Sports Science, Psychology, etc. By studying computer science you will develop logical thinking skills and a systematic approach to problem solving. By having a better understanding of how computers and programs work, you will be in an excellent position to adopt and adapt to the latest technology in whatever field you work.

Mr N. Frost

Subject Leader G