# COMPUTER SCIENCE

Our two-year A-Level covers both Computer Systems; the internal workings of the CPU, data exchange and software development and Algorithms and Programming; developing code and programs with computational thinking to solve problems

Scan for Specification

## BEFORE YOU START

- Key textbook to purchase: OCR AS and A Level Computer Science Textbook ISBN: 9781910523056
- Key software: download and install Microsoft Visual Studio and become familiar with the IDE
- Key Website: Create an account and explore the topics for the OCR A-Level on www. https://isaaccomputerscience.org/

Algorithms can be measured by their time complexity, this is called Big O Notation

Research the following key terms:
- Constant
- Linear
- Polynormal
- Exponential
- Logarithmic

Draw your own Big O graph that shows those terms, adding the description next to each representation on the graph

Computers use binary numbers to help determine and represent everything from numbers to text, images and sound.

You need to know how to convert between the different number systems used within computer science.

Create a presentation/guide that explains how to (step-by-step) convert between each of the following number systems
- Binary to Denary
- Denary to Binary
- Binary to Hexadecimal
- Hexadecimal to Binary
- Denary to Hexadecimal

To show your understanding of the conversions you will need to use the numbers in the table to the right as worked examples in your presentation/guide. You may use research to support this, but all step-by-step instructions need to be in your own words and link to the worked example.

| Conversion | Number |
|---|---|
| Binary to Denary | 10111001 |
| Denary to Binary | 97 |
| Binary to Hexadecimal | 10011101 |
| Hexadecimal to Binary | E8 |
| Denary to Hexadecimal | 115 |

Programming is an essential part of computer science, and we will be using the programming language Python within MV16 to learn and extend our abilities.

You will need to be able to do the following programming challenge using Python code; write a program that meets the following requirements and show evidence that you have tested it with screenshots and annotations:
a) Ask the user to input
- Their first name
- Their surname
- A date, in the format DD/MM/YYYY
b) The program should then output a customer ID as follows:
- The date in the format YYYYMMDD, then the first three letters of the surname, then the first initial, then the length of their first name. All letters should be in capitals
- For example, John Smith, 27/05/2017 would give 20170527SMITHJ4
c) The program should validate any inputs and keep asking for inputs until the user enters correct details or types "quit" at any point

Research and list 10 computer science-based careers

Choose three from the list and outline the role and expectations in more detail

Review those three to show why you would be interested or suitable for that career