Holy Family Catholic High School

Subject	Year	Term
Computer Science	12	Autumn

Topic

Programming, data structures, data types, Boolean algebra and system architecture

Content - Intent

Prior Learning (Topic)	Key Stage 4 National Curriculum

System architecture. The structure and function of the processor, types of processor and different processor architectures. Input, output and storage devices and how these can be applied to the solution of different problems. The concepts of CISC and RISC, as well as the comparison of GPUs and CPUs are explained Data types. Five topics in this unit cover data representation of numbers and text, binary arithmetic using both fixed point and normalised floating-point numbers, bitwise manipulation and masks. Data structures. The unit gives practical and worked examples of each of the different abstract data structures including linked lists, graphs, stacks, queues, trees, binary search trees and hash tables. The function and practical application of each data type is discussed, with pseudocode. Boolean algebra. Logic gates and Boolean algebra, Karnaugh maps, D-type flip-flops, half and full adders. Programming. The use of an IDE to develop/debug a program, and the fundamentals of programming including recursion and the concepts of OOP, while recognising that some students may have had little previous experience of programming and others will already be seasoned programmers

Future Learning	Programming, system software, computational thinking, software development

What Knowledge and Skills will be Taught (Implementation)	How will your understanding be assessed and recorded (Impact)
Computational maths, including logic and binary truth tables, combinations of logic gates to produce circuits, Boolean algebra and K maps. Floppy circuits, half and full adder. How and when to use stacks, queues, linked lists, binary trees and graphs. Manipulation of binary data, including masks, normalisation of fractions, bitwise manipulation	A series of questions and worksheets that accompany each section. Advice and help will be given to perfect programming solutions and suggestions for how to better solve the problem Practice creating K maps and using principles of Boolean algebra to simplify equations and thereby simplify circuits. These will be marked in class, with feedback provided. Regular assessment to test previous learning through the use of past papers
How the processor uses registers and buses to execute instructions using LMC. Classification of the different architectures, the various OS. Understand how high-level language routines are translated into low level processor instructions, and what those low-level instruction look like	Worksheets and practice questions to demonstrate the depth that students need to attain in their learning.

How can parents help at home?

Ensure homework is completed on time.
Class notes are being finished and summarised at home.

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Reading	Vocabulary Lists
Reading Theory textbook – *ISBN 978-1910523056* OCR AS and A Level Computer Science, by Heathcote and Heathcote Programming Textbooks- *ISBN - 978-1910523193* Tackling A Level Projects in Computer Science for OCR H446 *ISBN - 978-1484260463* Modern C++ for Absolute Beginners *ISBN - 978-1838648572* Beginning C++ Game Programming	**Vocabulary Lists** Local & global variables Stack Queue Abstract data type Linked list karnaugh maps Boolean Functions Procedures Program Counter Accumulator Memory Address Register Memory Data Register Current Instruction Register And Or