Computer Science Department - Year 9

Shirley High Curriculum Map	The Skilled Computer Scientists will become competent in performing binary mathematical computations, apply appropriate computational thinking, improve their programming skills and use them to program in AI through the Drag'n'Drop interface of Game Maker and further develop their understanding on the relationship between hardware components and System Software.		
	Autumn 1 - Autumn 2	**Spring 1 - Spring 2**	**Summer 1 - Summer 2**
	Theme/Topic/Skill:	Theme/Topic/Skill:	Theme/Topic/Skill:
	Binary representation of data & Logic Gate	Computational Thinking	Programming
Why now?	Learners will use diagrams to express solutions and logical reasoning to predict outputs, showing an awareness of the way inputs can affect outputs. Building upon the binary introduction unit in Y8 and the data representation unit in Y7. The learners will have a solid foundation and the opportunity to explain how data of various types can be represented and manipulated in the form of binary digits including numbers, text, sounds and pictures, and be able to carry out some manipulations by hand. The learners will apply the appropriate arithmetic concept when adding together two binary numbers.	The learners will learn how design solutions (algorithms) use repetition and two-way selections i.e. if, then, else. Consideration will be paid on all 4 elements of the Computational Thinking learnt in Y8 and understanding the importance of coding efficiency by exploring a range of algorithmic solutions.	This unit builds upon the Introduction to the Python program in Y8. The learners will learn how to define a function to perform a specific task using various data types and variables to ensure the source code is efficient. They will improve programs by using the If/Else statement to add more functionality to the code and 'While' and 'For' loops to repeat statements, import functions that are not built in, and annotating the code. This unit will be a sound foundation for KS4 Computer Science GCSE.
Fundamental Concepts	o Logic Gates o skills, addition, subtraction, multiplication o Measuring Units o Types of images (Bitmap, Vector)	o The use of all 4 Computational Thinking elements o The breakdown of a large instruction in simple small one (Decomposition) o Abstraction o Pattern Recognition o Algorithm	o Write a simple program in Python o Output a program by using 'print' o User input o Assign variables and data types o all types of data types (String, Boolean, Integer, Character etc.)
Students will learn	o Logic Gates o The main types of Logic Gates and their truth table. o Data Representation types o Explain why data is represented in computer systems in binary form o Define the terms bit, nibble, byte, kilobyte, megabyte, gigabyte, terabyte o Understand that data needs to be converted into a binary format to be processed by a computer. o The Binary Number System o Binary Addition o Convert positive denary whole numbers (0-255) into 2-digit hexadecimal numbers and vice versa o Convert between binary and hexadecimal equivalents of the same number o Binary Representation of Text o Binary Representation of Images o Binary Representation of Sound	o Logical Thinking o Algorithm o Flowchart o Understand algorithms (written in pseudocode or flow diagram), explain what they do, and correct or complete them. o Produce algorithms in pseudocode or flow diagrams to solve problems	o How to use the IDLE editor to save programs. o Expressions and variables and their use. o Types of data types and variables. o The if/Else statement and indentation o The use of "If/Else statements" to make a decision. o The benefits of a function. o Write and call a function. o The random function in programs o How to use a looping statement (while). o How and why we should use comments in our code.
Language for Life (Key terms /Vocabulary)	o Binary Code o Recalling Information o Networks o Problem Solving o Units o Hexadecimal o Logic Gates	o Pseudocode o Flowchart	o Problem Solving o Programming o Sequencing o Loops o If Statements o Debugging
Extended writing Opportunities	The learners will be able to explain why file size, resolution affects storage use and how it can be resolved.	The learners will describe the 4 elements of Computational Thinking and how they can be used as part of a problem solving process that includes a number of characteristics and dispositions in questions.	The learned will be able to evaluate their program by explain changes can be made.
Maths Across the Curriculum	Number Bases	Flowchart Symbols Boolean Algebra	Problem solving
Links to careers/ aspirations	CAD technician Hardware Designer Machine learning engineer	Game designer Systems analyst	Programmer
Cultural Capital	Understand that computers use a different numbering system, and everything is represented in binary in the computer world. Considerations on ethical and legal aspects when representing data in binary.	Apply appropriate techniques to break down complicated functions so that programs can be developed. Consideration of ethical aspects when applying computational thinking.	Use appropriate thinking techniques to write programs in Python. Applying diversity of skills and ethical considerations.
Practical Application of Skills	A written assessment made up of exam style questions covering all aspects of the unit.	A written assessment made up of exam style questions covering all aspects of the unit. This will be carried out at the end of the unit.	Students will complete various tasks on Python challenge projects.