



# YEAR 13 A LEVEL COMPUTER SCIENCE SPRING 1<sup>st</sup> TERM 2 – PAPER 1

'An ambitious curriculum that meets the needs of all'

## Medium Term Planning – Data Types

Curriculum Intent	Pupils will be taught the following National Curriculum guidelines this term:
Skills/Assessment Objective Links	<p><b>At the end of this Unit all students should be able to:</b></p> <ul style="list-style-type: none"><li>▪ list primitive data types</li><li>▪ represent positive integers in binary</li><li>▪ use sign and magnitude and two's complement to represent negative numbers in binary</li><li>▪ add two unsigned binary numbers</li><li>▪ represent positive numbers in hexadecimal</li><li>▪ convert between denary, binary and hexadecimal number systems</li><li>▪ define bits and bytes, and use names, symbols and prefixes appropriately</li><li>▪ know how to use the ASCII table to represent text as binary</li><li>▪ explain why Unicode was introduced, and its advantages</li><li>▪ use arithmetic operations and Boolean operations AND, OR and XOR</li><li>▪ show the effect of a logical shift left and shift right of a number of bits</li></ul> <p><b>Most students will be able to:</b></p> <ul style="list-style-type: none"><li>▪ use fixed point binary to represent numbers with a fractional part</li><li>▪ convert a positive floating point number to denary and vice versa</li><li>▪ normalise a positive floating point number</li><li>▪ use arithmetic, logical and circular shifts</li><li>▪ differentiate between the character code for a digit and its pure binary representation</li></ul> <p><b>Some students will be able to:</b></p> <ul style="list-style-type: none"><li>▪ normalise negative floating point numbers</li><li>▪ add and subtract floating point numbers</li><li>▪ use shifts, bitwise manipulation and masks to solve problems</li><li>▪ </li></ul>
Numeracy	Integer, float, real, kilobyte, megabyte, gigabyte, binary, hexadecimal
Literacy	<p><b>Vocabulary Tier 3:</b> Primitive data types, integer, real/floating point, character, string, Boolean, denary, binary, signed and unsigned, sign and magnitude, fixed point, floating point, two's complement, kibi, mebi, gibi, hexadecimal, ASCII, Unicode, character set, bitwise manipulation, mask, arithmetic shift, logical shift and circular shift</p> <p><b>Vocabulary Tier 2:</b> logic, integer, real, character</p> <p><b>Reading:</b> Worksheets, presentations, answer sheets, exam questions, mark scheme, further reading for homework</p> <p><b>Writing:</b> Answer on the worksheet via word</p> <p><b>Oracy:</b> listening and using tier 3 words</p>
Becoming future ready	<p><b>Careers/Employability:</b></p> <p>Understand the grade requirements at universities and the topics that can be applied for. Explore apprenticeship opportunities with a range of industries.</p> <ul style="list-style-type: none"><li>▪ Software Architect.</li><li>▪ Data Scientist.</li><li>▪ Machine Learning Engineer.</li><li>▪ Blockchain Developer</li><li>▪ Cybersecurity Engineer.</li><li>▪ Cloud Solutions Architect.</li><li>▪ AI Research Scientist.</li><li>▪ Full-Stack Developer.</li></ul>
Adaptation	Throughout this topic, quality first teaching will provide differentiation:

<b>QFT/SEND Provision</b>	<p><b>By product:</b> Learners are asked to present outcomes in a different way via pieces of writing, targeted questioning, models and drawings and speaking.</p> <p><b>By resource:</b> Worksheets are well presented and accessible. Instructions are clearly outlined and separate from the information so that pupils know where to begin and end. Handouts are differentiated by outcome. Resources used will appeal to the range of preferred learning styles of pupils e.g. visual, auditory or kinesthetic learners. Scaffolding of tasks – word frames.</p> <p><b>By Intervention:</b> By providing different levels of supervision and support</p> <p><b>By Progressive Questioning:</b> Exploring pupils' understanding through interactive dialogue using Blooms Taxonomy.</p> <p><b>By Grouping:</b> According to prior attainment, gender, social preference, preferred learning style.</p> <p><b>By Task:</b> Pupils identify targets which are meaningful to them via feedback sheets</p> <p><b>By Offering Optional Activities:</b> In class or as homework, to extend learning.</p> <p>This QFT/SEND provision will be explicit within the lesson by lesson schemes of work.</p>
<b>Implementation Curriculum Delivery</b>	To be able to:
<b>Learning Outcomes (Knowledge)</b>	<p><b>Topic 1 Primitive data types, binary and hexadecimal</b>  List and define primitive data types  Represent positive integers in binary and hexadecimal  Convert between binary, hexadecimal and denary number systems</p> <p><b>Topic 2 Number Systems, ASCII and Unicorn</b>  Define a bit as a 1 or a 0, and a byte as a group of eight bits  Know that <math>2^n</math> different values can be represented with n bits  Use names, symbols and corresponding powers of 2 for binary prefixes e.g. Ki, Mi  Differentiate between the character code of a denary digit and its pure binary representation  Describe how character sets (ASCII and Unicode) are used to represent text</p> <p><b>Topic 3 Binary arithmetic</b>  Use sign and magnitude to represent negative numbers in binary  Use two's complement to represent negative numbers in binary  Add and subtract binary integers  Represent fractions in fixed point binary</p> <p><b>Topic 4 Floating point arithmetic</b>  Represent positive and negative numbers with a fractional part in floating point form  Normalise un-normalised floating point numbers with positive or negative mantissas  Add and subtract floating point numbers</p> <p><b>Topic 5 Bitwise manipulation and masks</b>  Perform logical, arithmetic and circular shifts on binary data  Perform bitwise operations AND, OR and XOR  Use masks to manipulate bits</p> <p>End of unit assessment</p>
<b>Current learning to be developed in the future within:</b>	
<b>Assessment</b>	See assessment maps for formative and summative assessment opportunities.
<b>Impact</b>	Review assessment results and target pupils that require further support via:- <ul style="list-style-type: none"> <li>• Learning conversation</li> <li>• Changing seating plan</li> <li>• Plan lessons to address areas of concern in assessment</li> <li>• Targeted homework based on low performance areas identified in the assessment and marked pieces</li> </ul>

- Stretch and challenge high ability pupils by identifying ambitious next steps to extend knowledge

Create a feedback sheet for each student

Each student identifies areas of Green, Amber and Red using Mark Assessment on their feedback sheet

Complete NOW task on areas identified as Amber and Red

