




YEAR 12 A LEVEL COMPUTER SCIENCE SUMMER TERM 3 – PAPER 1

'An ambitious curriculum that meets the needs of all'

Medium Term Planning – Exchange Data

Curriculum Intent	Pupils will be taught the following National Curriculum guidelines this term:
Skills/Assessment Objective Links	<p>At the end of this Unit all students should be able to:</p> <ul style="list-style-type: none">▪ explain the difference between lossy and lossless compression and list advantages and disadvantages of each▪ use basic encryption to create ciphertext▪ encrypt and decrypt a message using the Caesar cipher▪ explain the weaknesses of the Caesar cipher▪ define the terms flat file, primary key, indexing▪ define the terms relational database, foreign key, secondary key, entity▪ draw a simple entity relationship diagram involving three or four entities▪ state the properties of a database in Third Normal Form▪ interpret a simple SQL statement▪ list methods of capturing data for input to a database▪ list problems that can arise with a multi-user database <p>Most students will be able to:</p> <ul style="list-style-type: none">▪ explain run length encoding and dictionary based compression▪ use lossy compression methods to reduce file size▪ explain the differences between asymmetric and symmetric encryption▪ explain the use of hashing to encrypt data▪ draw a complex entity relationship diagram involving several entities▪ normalise a database to third normal form▪ list the advantages of a normalised database▪ use SQL to select data from related tables in a database▪ describe methods of capturing, selecting, managing and exchanging data▪ describe what is meant by record locking and why it is necessary in a multi-user database▪ Describe what is meant by redundancy <p>Some students will be able to:</p> <ul style="list-style-type: none">▪ explain what is meant by referential integrity▪ use SQL to modify a database▪ describe what is meant by transaction processing and ACID
Numeracy	
Literacy	<p>Vocabulary Tier 3: lossy, lossless, compression, run length encoding, dictionary coding, hashing, relational database, flat file, primary key, foreign key, secondary key, entity relationship, modelling, normalisation, indexing, 3NF, SQL, referential integrity, transaction processing, ACID (Atomicity, Consistency, Isolation, Durability), record locking, deadlock, redundancy</p> <p>Vocabulary Tier 2: record, primary, secondary, relationships, model</p> <p>Reading: Worksheets, presentations, answer sheets, exam questions, mark scheme, further reading for homework</p> <p>Writing: Answer on the worksheet via word</p> <p>Oracy: listening and using tier 3 words</p>
Becoming future ready	<p>Careers/Employability:</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">▪ Software Architect.▪ Data Scientist.▪ Machine Learning Engineer.▪ Blockchain Developer

	<ul style="list-style-type: none"> ▪ Cybersecurity Engineer. ▪ Cloud Solutions Architect. ▪ AI Research Scientist. ▪ Full-Stack Developer.
Adaptation	Throughout this topic, quality first teaching will provide differentiation:
QFT/SEND Provision	<p>By product: Learners are asked to present outcomes in a different way via pieces of writing, targeted questioning, models and drawings and speaking.</p> <p>By resource: 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>By Intervention: By providing different levels of supervision and support</p> <p>By Progressive Questioning: Exploring pupils' understanding through interactive dialogue using Blooms Taxonomy.</p> <p>By Grouping: According to prior attainment, gender, social preference, preferred learning style.</p> <p>By Task: Pupils identify targets which are meaningful to them via feedback sheets</p> <p>By Offering Optional Activities: 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>
Implementation Curriculum Delivery	To be able to:
Learning Outcomes (Knowledge)	<p>Topic 1 Compression, encryption and hashing Understand the difference between lossless and lossy compression Explain run length encoding and dictionary based compression Define symmetric and asymmetric encryption Understand how and why hashing may be used to encrypt data</p> <p>Topic 2 Database concepts Explain the concept of a relational database Define the terms <ul style="list-style-type: none"> ○ flat file ○ entity ○ attribute ○ primary key ○ foreign key ○ secondary key ○ entity relationship modelling ○ referential integrity Produce an entity relationship model for a simple scenario involving multiple entities</p> <p>Topic 3 Relational databases and normalisation Describe the use of secondary keys and indexing Describe the use of a hash table for index organisation Normalise relations to third normal form Understand why databases are normalized</p> <p>Topic 4 Introduction to SQL Be able to use SQL to retrieve data from multiple tables of a relational database Be able to interpret and modify SQL</p> <p>Topic 5 Defining and updating tables using SQL Be able to use SQL to define a database table Be able to use SQL to update, insert and delete data from multiple tables of a relational database</p> <p>Topic 6 Transaction processing Describe methods of capturing, selecting, managing and exchanging data Describe what is meant by transaction processing and ACID (Atomicity, Consistency, Isolation, Durability) Describe what is meant by record locking and why it is necessary in a multi-user database</p>

	Describe what is meant by redundancy End of unit assessment	
Current learning to be developed in the future within:		
Assessment	See assessment maps for formative and summative assessment opportunities.	
Impact	<p>Review assessment results and target pupils that require further support via:-</p> <ul style="list-style-type: none"> • Learning conversation • Changing seating plan • Plan lessons to address areas of concern in assessment • Targeted homework based on low performance areas identified in the assessment and marked pieces • Stretch and challenge high ability pupils by identifying ambitious next steps to expand knowledge <p>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</p>	