THE BARLOW RC HIGH SCHOOL

Rise up, take courage, and do it.

Year 10

Subject:	**GCSE Business**
Exam Board:	**Edexcel**
Papers:	**Paper 1:** Computer Systems **Paper 2:** Computational thinking, algorithms and programming

Revision Topics	Revised
1.1 – Systems architecture	
The purpose of the CPU: o The fetch-execute cycle ¨ Common CPU components and their function: o ALU (Arithmetic Logic Unit) o CU (Control Unit) o Cache o Registers ¨ Von Neumann architecture: o MAR (Memory Address Register) o MDR (Memory Data Register) o Program Counter o Accumulator	
1.1.2 CPU performance ¨ How common characteristics of CPUs affect their performance: o Clock speed o Cache size o Number of cores	
1.1.3 Embedded systems ¨ The purpose and characteristics of embedded systems ¨ Examples of embedded systems	

Revision Topics	Revised
1.2 – Memory and storage	
1.2.1 Primary storage (memory) The need for primary storage The difference between RAM and ROM The purpose of ROM in a computer system The purpose of RAM in a computer system Virtual memory Cache	
1.2.2 Secondary storage ¨ The need for secondary storage ¨ Common types of storage: o Optical o Magnetic o Solid state ¨ Suitable storage devices and storage media for a given application	

¨ The advantages and disadvantages of different storage devices and storage media relating to these characteristics: o Capacity o Speed o Portability o Durability o Reliability o Cost	
1.2.3 Units ¨ The units of data storage: o Bit o Nibble (4 bits) o Byte (8 bits) o Kilobyte (1,000 bytes or 1 KB) o Megabyte (1,000 KB) o Gigabyte (1,000 MB) o Terabyte (1,000 GB) o Petabyte (1,000 TB) ¨ How data needs to be converted into a binary format to be processed by a computer ¨ Data capacity and calculation of data capacity requirements	
1.2.4 Data storage Numbers ¨ How to convert positive denary whole numbers to binary numbers (up to and including 8 bits) and vice versa ¨ How to add two binary integers together (up to and including 8 bits) and explain overflow errors which may occur ¨ How to convert positive denary whole numbers into 2-digit hexadecimal numbers and vice versa ¨ How to convert binary integers to their hexadecimal equivalents and vice versa ¨ Binary shifts Characters ¨ The use of binary codes to represent characters ¨ The term 'character set' ¨ The relationship between the number of bits per character in a character set, and the number of characters which can be represented, e.g.: o ASCII o Unicode Images ¨ How an image is represented as a series of pixels, represented in binary ¨ Metadata ¨ The effect of colour depth and resolution on: o The quality of the image o The size of an image file Sound ¨ How sound can be sampled and stored in digital form ¨ The effect of sample rate, duration and bit depth on: o The playback quality o The size of a sound file	
1.2.5 Compression ¨ The need for compression ¨ Types of compression: o Lossy o Lossless	

Revision Topics	Revised
1.3 – Computer networks, connections and protocols	
1.3.1 Networks and topologies Types of network: o LAN (Local Area Network) o WAN (Wide Area Network) ¨ Factors that affect the performance of networks ¨ The different roles of computers in a client-server and a peer-topeer network ¨ The hardware needed to connect stand-alone computers into a Local Area Network: o Wireless access points o Routers o Switches o NIC (Network Interface Controller/Card) o Transmission media ¨ The Internet as a worldwide collection of computer networks: o DNS (Domain Name Server) o Hosting o The Cloud o Web servers and clients ¨ Star and Mesh network topologies	
1.3.2 Wired and wireless networks, protocols and layers ¨ Modes of connection: o Wired • Ethernet o Wireless • Wi-Fi • Bluetooth ¨ Encryption ¨ IP addressing and MAC addressing ¨ Standards ¨ Common protocols including: o TCP/IP (Transmission Control Protocol/Internet Protocol) o HTTP (Hyper Text Transfer Protocol) o HTTPS (Hyper Text Transfer Protocol Secure) o FTP (File Transfer Protocol) o POP (Post Office Protocol) o IMAP (Internet Message Access Protocol) o SMTP (Simple Mail Transfer Protocol) ¨ The concept of layers	

Revision Topics	Revised
2.1 Algorithms	
2.1.1 Computational thinking ¨ Principles of computational thinking: o Abstraction o Decomposition o Algorithmic thinking	
2.1.2 Designing, creating and refining algorithms ¨ Identify the inputs, processes, and outputs for a problem ¨ Structure diagrams ¨ Create, interpret, correct, complete, and refine algorithms using: o Pseudocode	

o Flowcharts o Reference language/high-level programming language ¨ Identify common errors ¨ Trace tables	
2.1.3 Searching and sorting algorithms ¨ Standard searching algorithms: o Binary search o Linear search ¨ Standard sorting algorithms: o Bubble sort o Merge sort o Insertion sort	

Revision Topics	Revised
2.2 Programming fundamentals	
2.2.1 Programming fundamentals ¨ The use of variables, constants, operators, inputs, outputs and assignments ¨ The use of the three basic programming constructs used to control the flow of a program: o Sequence o Selection o Iteration (count- and condition-controlled loops) ¨ The common arithmetic operators ¨ The common Boolean operators AND, OR and NOT	
2.2.2 Data types ¨ The use of data types: o Integer o Real o Boolean o Character and string o Casting	
2.2.3 Additional programming techniques ¨ The use of basic string manipulation ¨ The use of basic file handling operations: o Open o Read o Write o Close ¨ The use of records to store data ¨ The use of SQL to search for data ¨ The use of arrays (or equivalent) when solving problems, including both one-dimensional (1D) and two-dimensional arrays (2D) ¨ How to use sub programs (functions and procedures) to produce structured code ¨ Random number generation	