KS4 – Big Picture (GCSE Computing)

Y10 Autumn 01 *Weeks 1 – 7 (7 weeks)*	*Y10 Autumn 02* *Weeks 8 – 15 (8 weeks)*	*Y10 Spring 01* *Weeks …-… (6 weeks*
Component 1 – Computer Systems **1.1 – Systems architecture** 1.1.1 Architecture of the CPU - Purpose of CPU & fetch-execute cycle 1.1.1 Architecture of the CPU - Common CPU components and their functions: ALU CU cache registers 1.1.1 Architecture of the CPU - Von Neumann Architecture, MAR, MDR, Program Counter and Accumulator 1.1.2 **CPU performance** - How common characteristics of CPUs affect their performance: clock speed, cache size and number of cores 1.1.3 **Embedded Systems** - The purpose and characteristics of embedded systems **1.2 Memory and Storage** 1.2.1 Primary Memory (storage) – The need for primary storage 1.2.1 Primary Memory – The difference of RAM and ROM 1.2.1 Primary Memory – The purpose of ROM and RAM. 1.2.1 Primary Memory – The virtual memory 1.2.2 **Secondary Storage** – The need for secondary storage 1.2.2 Secondary Storage - Common types of storage: optical, magnetic and solid state 1.2.2 Secondary Storage - advantages and disadvantages of different storage media relating to these characteristics: capacity, speed, portability, durability, reliability, cost.	1.2.3 Units of data storage - Data representation Units Bit Byte KB to TB 1.2.4 Data storage - How to convert positive denary whole numbers and vice versa & Why Binary Binary representation of ASCII in the exam will use 8 bits Binary Addition & Shifts Hexadecimal & Check Digits Character sets Images Sound Data Calculations 1.2.5 Compression - The need for compression 1.2.5 Compression - Types of compression: Lossy and lossless.	**Computer networks, connections and protocols** 1.3.1 **Networks and Topologies** - the LAN and WAN 1.3.1 Factors that affect the performance of networks 1.3.1 Different roles of computers in a client-server and a peer-to- peer network. 1.3.1 Hardware needed to connect stand-alone computers into a LAN, includes: wireless access points, routers, switches, NIC and Transmedia media. 1.3.1 Internet as a worldwide collection of computer networks: DNS, Hosting, the cloud and web server and clients 1.3.1 Star and Mesh network technologies 1.3.2 Wired and wireless networks, protocols and layers. 1.3.2 Modes of connections: wired ethernet, wireless wi-fi and Bluetooth ; Encryption 1.3.2 IP Addressing and MAC addressing; (IPv4 and IPv6) 1.3.2 Network Standards 1.3.2 Common protocols including: TCP/IP, HTTP.HTTPS, FTP, POP, IMAP, SMTP. 1.3.2 Concept of layers; How and Benefits

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Assessment Objectives This is the knowledge, application and skills assessed by the Big Test: Mini Test on 1.1.1 -1.2.2 Paper 1	**Assessment Objectives** This is the knowledge, application and skills assessed by the Big Test: BIG TEST WK 8: 1.1-1.2 Mini Test on 1.2.3 – 1.2.5 Paper 1	**Assessment Objectives** This is the knowledge, application and skills assessed by the Big Test: Mini Test 1.3.

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Y10 Spring 02 *Weeks …- …(5 weeks)*	*Y10 Summer 01* *Weeks … – …(5 weeks)*	*Y10 Summer 02* *Weeks … – …(7 weeks)*
1.4 Network security 1.4.1 Threats to computer systems and networks – forms of attacks: malware, social engineering, brute-force attacks, denial of service attacks, data interception and theft, SQL injection. 1.4.2 Identifying and preventing vulnerabilities – common prevention methods: penetration testing, anti-malware software, firewalls, user access levels and passwords, encryption and physical security. **1.5 Systems Software** 1.5.1 Operating systems – purpose and functionality of operating systems: user interface, memory, peripheral, user and file management. 1.5.2 Utility Software – purpose and functionality of utility software: encryption software, defragmentation and data operations	**1.6 Ethical, legal, cultural and environmental impacts of digital technology** 1.61 Impacts of digital technology on wider society including: Ethical & legal issues Cultural, Environmental and privacy issues Legislations relevant to Computer Science: The Data Protection Act 2018, Computer Misuse Act 1990, Copyright Designs and Patents Act 1988 Software licences (i.e. open source and proprietary software) REVISION of 1.1 -1.6	**EXAM Technique** **2.2 Programming Fundamentals** 2.2.1 Programming fundamentals – The use of variables, constants, operators, inputs, outputs and assignments. 2.2.1 The use of the three basic programming constructs: sequence, selection and iteration. 2.2.1 The common arithmetic operators, comparison and Boolean operators AND, OR and NOT. 2.2.2 Data types – include: integer, real, casting, character and string. 2.2.3 Additional programming techniques 2.2.3 The use of basic string manipulation 2.2.3 The use of basic file handling operation: open, read, write and close. and characteristics of a compiler and an interpreter.
Assessment Objectives This is the knowledge, application and skills assessed by the Big Test: Mini Test 1.4 Mini Test 1.5 Big Test 2: 1.1-1.5	**Assessment Objectives** This is the knowledge, application and skills assessed by the Big Test: Mini Test: 1.6	**Assessment Objectives** This is the knowledge, application and skills assessed by the Big Test: Dates to be decided Big Test: Mock Exam Paper 1 and Paper 2 (2.2)

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Y11 Autumn 01 *Weeks 1 – 7 (7 weeks)*	*Y11 Autumn 02* *Weeks 8 – 15 (8 weeks)*	*Y11 Spring 01* *Weeks …-… (6 weeks)*
2.1 Algorithms **2.1.1 Computational Thinking** Principles of computational thinking: ○ Abstraction ○ Decomposition ○ 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: ○ Pseudocode ○ Flowcharts ○ Reference language/high-level programming language Identify common errors Trace tables **2.1.3 Searching and sorting algorithms** Standard searching algorithms: ○ Binary search ○ Linear search Standard sorting algorithms: ○ Bubble sort ○ Merge sort ○ Insertion sort	**2.3 Producing Robust Programs** 2.3.1 Defensive Design Considerations, anticipating misuse and authentication. 2.3.1 Defensive Design - Input validation and maintainability include: use of sub programs, naming conventions, indentation and commenting. 2.3.2 Testing - the purpose of testing: final, iterative & terminal 2.3.2 Testing – identifying syntax and logic error 2.3.2 Selecting and using suitable test data: Normal, boundary and invalid and erroneous. **2.4 Boolean Logic** 2.4.1 Simple logic diagrams using AND, OR and NOT 2.4.1 Truth tables and combining Boolean operators using AND, OR and NOT. 2.4.1 Applying logical operators in the truth to solve problems • Understanding of how to create, complete or edit logic diagrams and truth tables for given scenarios • Knowledge of the truth tables for each logic gate	**2.5 Programming languages and Integrated Development Environments** 2.5.1 Languages – characteristics and purpose of different level of programming language: High-level & low-level languages. 2.5.1 The purpose of translators and characteristics of a compiler and an interpreter. 2.5.2 The Integrated Development Environment (IDE) - common tools and facilities available in an IDE: editors, error diagnostics2.5.1 Languages – characteristics and purpose of different level of programming language: High-level & low-level languages. 2.5.1 The purpose of translators and characteristics of a compiler and an interpreter. 2.5.2 The Integrated Development Environment (IDE) - common tools and facilities available in an IDE: editors, error diagnostics, run-time environment and translators., run-time environment and translators

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Assessment Objectives This is the knowledge, application and skills assessed by the Big Test: Y11 Progress Mini Test: 2.1-2.2	**Assessment Objectives** This is the knowledge, application and skills assessed by the Big Test: Nov PPE Mini Test 2.3-2.4	**Assessment Objectives** This is the knowledge, application and skills assessed by the Big Test:

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Y11 Spring 2	*Y11 Summer 1*	
Exam Revision **Common Misconceptions** **Tricky Topics**	**Exam Revision** **Exam technique**	
Assessment Objectives	**Assessment Objectives**	**Assessment Objectives**