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| **Term** | **Topic / Theme** | **Software** | **Outcome** |
| Christmas – 1 | Data representation  Binary systems | PowerPoint  Word Processing  Internet Explorer | recognise the use of binary numbers in computer systems  convert positive denary integers into binary and positive binary integers into denary  show understanding of the concept of a byte and how the byte is used to measure memory size |
| Christmas – 2 | Hexadecimal | PowerPoint  Word Processing  Internet Explorer | represent positive numbers in hexadecimal notation  show understanding of the reasons for choosing hexadecimal notation to represent numbers  convert positive hexadecimal integers to and from denary (a maximum of four hexadecimal digits will be required) convert positive hexadecimal integers to and from binary (a maximum of 16 bit binary numbers will be required) |
| Christmas – 3 | Data transmission |  | show understanding of what is meant by transmission of data distinguish between serial and parallel data transmission distinguish between simplex, duplex and half-duplex data transmission |
| Christmas – 4 | Parallel and serial transmission | PowerPoint  Word Processing  Internet Explorer | show understanding of the reasons for choosing serial or parallel data transmission |
| Christmas – 5 | Error checking |  | show understanding of the need to check for errors  explain how parity bits are used for error detection |
| Christmas – 6 | Data storage | PowerPoint  Word Processing  Internet Explorer | show understanding that sound, pictures, video, text and numbers are stored in different formats  identify and describe methods of error detection and correction, such as parity checks, check digits, checksums and Automatic Repeat reQuests (ARQ)  show understanding of the concept of Musical Instrument Digital Interface (MIDI) files, JPEG files, MP3 and MP4 files show understanding of the principles of data compression (lossless and lossy) applied to music/ video, photos and text files |
| Christmas – 7 | Input devices |  | describe the principles of operation (how each device works) of these input devices: 2D and 3D scanners, barcode readers, Quick Response (QR) code readers, digital cameras, keyboards, mice, touch screens, interactive whiteboards, microphones  describe how these principles are applied to real-life scenarios, for example: scanning of passports at airports, barcode readers at supermarket checkouts, and touch screens on mobile devices |
| HALF TERM |  |  |  |
| Christmas – 8/9 | Logic gates | Logisim 2.7 | use logic gates to create electronic circuits  understand and define the functions of NOT, AND, OR, NAND, NOR and XOR (EOR) gates, including the binary output produced from all the possible binary inputs (all gates, except the NOT gate, will have 2 inputs only)  draw truth tables and recognise a logic gate from its truth table  recognise and use the following standard symbols used to represent logic gates:  produce truth tables for given logic circuits, for example:  produce truth tables for given logic circuits, for example: |
| Christmas – 10 | Sensors |  | describe how a range of sensors can be used to input data into a computer system, including light, temperature, magnetic field, gas, pressure, moisture, humidity, pH and motion  describe how these sensors are used in real-life scenarios, for example: street lights, security devices, pollution control, games, and household and industrial applications |
| Christmas – 11 | Output devices |  | describe the principles of operation of the following output devices: inkjet, laser and 3D printers; 2D and 3D cutters; speakers and headphones; actuators; flat-panel display screens, such as Liquid Crystal Display (LCD) and Light-Emitting Diodes (LED) display; LCD projectors and Digital Light Projectors (DLP)  describe how these principles are applied to real-life scenarios, for example: printing single items on demand or in large volumes; use of small screens on mobile devices |
| Christmas – 12 | Security aspects |  | show understanding of the security aspects of using the Internet and understand what methods are available to help minimise the risks  show understanding of the Internet risks associated with malware, including viruses, spyware and hacking  explain how anti-virus and other protection software helps to protect the user from security risks |
| Christmas – 13 | Von Neumann computer system |  | show understanding of the basic Von Neumann model for a computer system and the stored program concept (program instructions and data are stored in main memory and instructions are fetched and executed one after another)  describe the stages of the fetch-execute cycle, including the use of registers and buses |
| Christmas – 14 | Assessment Week |  |  |

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| **Term** | **Topic / Theme** | **Content** | **Software** | **Outcome** |
| Easter – 1 | Input devices |  |  | describe the principles of operation (how each device works) of these input devices: 2D and 3D scanners, barcode readers, Quick Response (QR) code readers, digital cameras, keyboards, mice, touch screens, interactive whiteboards, microphones  describe how these principles are applied to real-life scenarios, for example: scanning of passports at airports, barcode readers at supermarket checkouts, and touch screens on mobile devices  describe how a range of sensors can be used to input data into a computer system, including light, temperature, magnetic field, gas, pressure, moisture, humidity, pH and motion  describe how these sensors are used in real-life scenarios, for example: street lights, security devices, pollution control, games, and household and industrial applications |
| Easter – 2 |
| Easter – 3 | Mock Examination Week |  |  | Set Paper 1 |
| Easter – 4 | Output devices |  |  | describe the principles of operation of the following output devices: inkjet, laser and 3D printers; 2D and 3D cutters; speakers and headphones; actuators; flat-panel display screens, such as Liquid Crystal Display (LCD) and Light-Emitting Diodes (LED) display; LCD projectors and Digital Light Projectors (DLP)  describe how these principles are applied to real-life scenarios, for example: printing single items on demand or in large volumes; use of small screens on mobile devices |
| Easter – 5 |
| Easter – 6 | Memory, storage devices and media |  |  | show understanding of the difference between: primary, secondary and off-line storage and provide examples of each, such as: primary: Read Only Memory (ROM), and Random Access Memory (RAM) secondary: hard disk drive (HDD) and Solid State Drive (SSD); off-line: Digital Versatile Disc (DVD), Compact Disc (CD), Blu-ray disc, USB flash memory and removable HDD |
| HALF TERM |  |  |  |  |
| Easter – 7 | Memory, storage devices and media |  |  | describe the principles of operation of a range of types of storage device and media including magnetic, optical and solid state  describe how these principles are applied to currently available storage solutions, such as SSDs, HDDs, USB flash memory, DVDs, CDs and Blu-ray discs  calculate the storage requirement of a file |
| Easter – 8 | Operating systems |  |  | Describe the purpose of an operating system (Candidates will be required to understand the purpose and function of an operating system and why it is needed.  show understanding of the need for interrupts |
| Easter – 9 | High- and low-level languages and their translators |  |  | show understanding of the need for both high-level and low-level languages  show understanding of the need for compilers when translating programs written in a high-level language  show understanding of the use of interpreters with high-level language programs  show understanding of the need for assemblers when translating programs written in assembly language |
| Easter – 10 | Security |  |  | show understanding of the need to keep data safe from accidental damage, including corruption and human errors  show understanding of how data are kept safe when stored and transmitted  use of symmetric encryption (plain text, cypher text and use of a key) showing understanding that increasing the length of a key increases the strength of the encryption |
| Easter – 11 | Ethics |  |  | show understanding of computer ethics, including copyright issues and plagiarism distinguish between free software, freeware and shareware  show understanding of the ethical issues raised by the spread of electronic communication and computer systems, including hacking, cracking and production of malware |

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| Summer – 1 | Algorithm design and problem-solving  Problem-solving and design |  |  | show understanding that every computer system is made up of sub-systems, which in turn are made up of further sub-systems  use top-down design, structure diagrams, flowcharts, pseudocode, library routines and subroutines  work out the purpose of a given algorithm  explain standard methods of solution suggest and apply suitable test data understand the need for validation and verification checks to be made on input data (validation could include range checks, length checks, type checks and check digits)  use trace tables to find the value of variables at each step in an algorithm identify errors in given algorithms and suggest ways of removing these errors  produce an algorithm for a given problem  comment on the effectiveness of a given solution |
| Summer – 2 |  |
| Summer – 3 |  |
| Summer – 4 |  |
| Summer – 5 |
| Summer – 6 |
| HALF TERM |  |  |  |  |
| Summer – 7 | Pseudocode and flowcharts |  |  | understand and use pseudocode for assignment, using  understand and use pseudocode, using the following conditional statements: IF … THEN … ELSE … ENDIF CASE … OF … OTHERWISE … ENDCASE  understand and use pseudocode, using the following loop structures: FOR … TO … NEXT REPEAT … UNTIL WHILE … DO … ENDWHILE understand and use pseudocode, using the following commands and statements: INPUT and OUTPUT (e.g. READ and PRINT) totalling (e.g. Sum ← Sum + Number) counting (e.g. Count ← Count + 1)  understand and use standard flowchart symbols to represent the above statements, commands and structures |
| Summer – 8 | Programming  Programming concepts  Data structures; arrays |  | Programming language of scholars choice | declare and use variables and constants  understand and use basic data types: Integer, Real, Char, String and Boolean  understand and use the concepts of sequence, selection, repetition, totalling and counting  use predefined procedures/functions  declare and use one-dimensional arrays  show understanding of the use of one-dimensional arrays, including the use of a variable as an index in an array  read or write values in an array using a FOR … TO … NEXT loop |
| Summer – 9 |
| Summer – 10 | Databases |  | Database – Access | define a single-table database from given data storage requirements choose and specify suitable data types  choose a suitable primary key for a database table  perform a query-by-example from given search criteria. |
| Summer – 11 |  |  |  |  |