Year 7: Computer Science

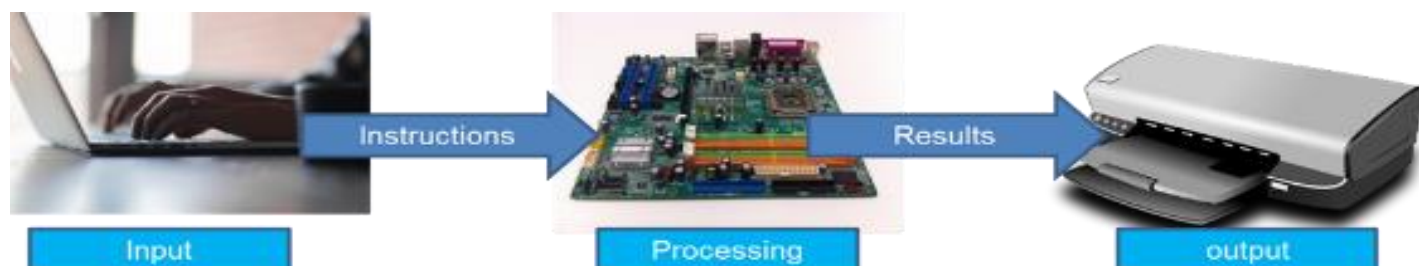|	
Michaelmas 1	• **Understanding Computers & E-SAFETY** • Understand what is meant by Esafety and how to be safe and responsible while using different technologies. • The impact of the internet and being connected to our wellbeing. Explore different forms of bullying that affect young people: • Computer Systems: Elements of a computer system
Michaelmas 2	• **Data Representation (binary)** • Describe the function of the hardware components of a computer system (CPU, main memory, secondary storage) and how they work together. Data Representation (binary) • Explain why computers use binary to represent data and program instructions. • Convert between binary and denary
Lent 1	• **HTML and website development: Scripts programming** • HTML (Website creation) Scripts programming • Learn HTML and CSS. • Develop a basic website with at 3 web pages
Lent 2	• **Spreadsheet:** • Spreadsheet be formatted, use formulas in spreadsheets, spreadsheet model,
Trinity 1	• **Algorithm: Control system with Flowol** • Computational thinking: Principles of computational thinking: Decomposition, Algorithmic thinking, Abstraction • Representing Algorithms using Flowcharts. Control system with Flowol. Flow Chart Symbol. Algorithms with Flowol. Zebra Crossing. What is a flowchart? Flowchart symbols • Introduction to Flowol. Sequences. Decision table, Use Flowol to make the first traffic lights work. Traffic Light Sequences • Flowol – Controlling a light house and Ferris Wheel, Sensors. Create your own flowcharts • Flowol – Controlling a baby mobile. Controlling a Lighthouse. Control Systems usually work because of a cause • Create Control Systems using Flowol
Trinity 2	• **Python Programming:** • How to create algorithms in a flowchart & Pseudocode. Use selection, sequence and iteration on python. Uses more than two (if, elif and else) conditions to make decisions within a python program

Year 8: Computer Science

Michaelmas 1	• **Understanding Computers & E-SAFETY** • Understand what is meant by eSafety and how to be safe and responsible while using different technologies. • The impact of the internet and being connected to our wellbeing. Explore different forms of bullying that affect young people: • **Computer Systems**: Architecture of the CPU
Michaelmas 2	• **Data Representation (Hexadecimal & binary) Advance** • Describe the function of the hardware components of a computer system (CPU, main memory, secondary storage) and how they work together. **Advance Data Representation (binary)** • Explain why computers use binary to represent data and program instructions. • Convert between binary and denary
Lent 1	• **Scripting programming with HTML** • **Advance HTML** (Website creation) Scripts programming • Learn HTML and CSS. • Develop a basic website with at 3 web pages
Lent 2	• **Advance Spreadsheet:** • Spreadsheet be formatted, use formulas in spreadsheets, spreadsheet model,
Trinity 1	• **Algorithm: Control system with Flowol** • Computational thinking: Principles of computational thinking: Decomposition, Algorithmic thinking, Abstraction • Representing Algorithms using Flowcharts. Control system with Flowol. Flow Chart Symbol. Algorithms with Flowol. Zebra Crossing. What is a flowchart? Flowchart symbols • Introduction to Flowol. Sequences. Decision table, Use Flowol to make the first traffic lights work. Traffic Light Sequences • Flowol – Controlling a light house and Ferris Wheel, Sensors. Create your own flowcharts • Flowol – Controlling a baby mobile. Controlling a Lighthouse. Control Systems usually work because of a cause • Create Control Systems using Flowol
Trinity 2	• **Python Programming:** • How to create algorithms in a flowchart & Pseudocode. Use selection, sequence and iteration on python. Uses more than two (if, elif and else) conditions to make decisions within a python program

Michaelmas 1	**1.1 -Systems architecture & 2.1 – Algorithms** • Architecture of the CPU • ¨ The purpose of the CPU: • The fetch-execute cycle • ¨ Common CPU components and their function: • ALU (Arithmetic Logic Unit) • CU (Control Unit), Cache, Registers, ¨ Von Neumann architecture: • MAR (Memory Address Register), MDR (Memory Data Register) • Program Counter, o Accumulator • Designing, creating and refining algorithms
Michaelmas 2	**1.1 Systems architecture & 2.1 – Algorithms** • **1.2.1 Primary storage (memory)** • Searching and sorting algorithms • Standard sorting algorithms: Bubble sort, Merge sort, Insertion sort • Sequence, Selection, Iteration (count- and condition-controlled loops) • Create, interpret, correct, complete, and refine algorithms using: • Pseudocode, Flowcharts, o Reference language/high-level programming language
Lent 1	• **– Memory and storage & 2.2 – Programming fundamentals** • 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 • Optical, Magnetic, Solid state • The common arithmetic operators • The common Boolean operators AND, OR and NOT
Lent 2	**1.2– Memory and storage & 2.2 – Programming fundamentals** • The use of data types: • The advantages and disadvantages of different storage devices and storage media relating to these characteristics: Capacity, Speed, Portability, Durability, Reliability, Cost • The units of data storage: Bit, Nibble (4 bits), Byte (8 bits), Kilobyte (1,000 bytes or 1 KB)
Trinity 1	**1.3 – Computer networks, connections and protocols & 2.2.2 Data types - 2.2.3 Additional programming techniques** • Networks and topologies • The Internet as a worldwide collection of computer networks • Wired and wireless networks, protocols and layers • Open, Read, Write, Close
Trinity 2	**1.3 – Computer networks, connections and protocols & 2.2.2 Data types** • Modes of connection: Wired, Ethernet, Wireless, Wi-Fi, Bluetooth • Common protocols including: • TCP/IP (Transmission Control Protocol/Internet Protocol) • HTTP (Hyper Text Transfer Protocol) • o HTTPS (Hyper Text Transfer Protocol Secure)

Input — Instructions — Processing — Results — output

Year 10: Computer Science

Michaelmas 1	**1.4 -Network security & 2.3 – Producing robust programs** • Threats to computer systems and networks • Identifying and preventing vulnerabilities • Utility software • Defensive design
Michaelmas 2	**1.4-Network security & 2.3 – Producing robust programs** • Defensive design & Testing • Identify common errors • Trace tables
Lent 1	**1.5 – Systems software & 2.4 – Boolean logic** • Operating systems, The purpose and functionality of operating systems: • User interface, Memory management and multitasking • Peripheral management and drivers • User management, File management • Simple logic diagrams using the operators AND, OR and NOT
Lent 2	**1.5 – Systems software & 2.4 – Boolean logic** • Simple logic diagrams using the operators AND, OR and NOT • The purpose and functionality of utility software • Utility system software: • Encryption software • Defragmentation • Data compression
Trinity 1	**1.6 – Ethical, legal, cultural and environmental impacts of digital technology** **2.5 – Programming languages and Integrated Development Environments** • Ethical, legal, cultural and environmental impact • Legislation relevant to Computer Science: • Characteristics and purpose of different levels of programming language: High-level languages, Low-level languages
Trinity 2	**1.6 – Ethical, legal, cultural and environmental impacts of digital technology** **2.5 – Programming languages and Integrated Development Environments** • The Data Protection Act 2018 • Computer Misuse Act 1990 • Copyright Designs and Patents Act 1988 • Software licences (i.e. open source and proprietary)

Year 11: Revision -Computer Science

Michaelmas 1	**1.1 -Systems architecture & 2.1 – Algorithms** • Architecture of the CPU • ¨ The purpose of the CPU: • The fetch-execute cycle • ¨ Common CPU components and their function: **1.2.1 Primary storage (memory)** • Searching and sorting algorithms • Standard sorting algorithms: Bubble sort, Merge sort, Insertion sort • Sequence, Selection, Iteration (count- and condition-controlled loops) • Create, interpret, correct, complete, and refine algorithms using: • Pseudocode, Flowcharts, o Reference language/high-level programming language **1.2– Memory and storage & 2.2 – Programming fundamentals** • The use of data types: • The advantages and disadvantages of different storage devices and storage media relating to these characteristics: Capacity, Speed, Portability, Durability, Reliability, Cost
Michaelmas 2	**1.3 – Computer networks, connections and protocols & 2.2.2 Data types -** **2.2.3** Additional programming techniques • Networks and topologies • The Internet as a worldwide collection of computer networks **1.4 -Network security & 2.3 – Producing robust programs** • Threats to computer systems and networks • Identifying and preventing vulnerabilities
Lent 1	**1.5 – Systems software & 2.4 – Boolean logic** • Operating systems, The purpose and functionality of operating systems: • User interface, Memory management and multitasking **1.6 – Ethical, legal, cultural and environmental impacts of digital technology** **2.5 – Programming languages and Integrated Development Environments** • Ethical, legal, cultural and environmental impact
Lent 2	Exam Practice
Trinity 1	Exam Practice
Trinity 2	Exam practice