Year 11

Programming skills and challenges to be completed as Homework and evidenced for OCR

2.2 – Programming fundamentals

2.2.1 Programming fundamentals
2.2.2 Data types
2.2.3 Additional programming techniques

2.3 – Producing robust programs:

2.3.1 Defensive design

Defensive design considerations:

- Anticipating misuse
- Authentication

Input validation

Maintainability:

- Use of sub programs
- Naming conventions
- Indentation
- Commenting

2.3.2 Testing

The purpose of testing

Types of testing:

- Iterative
- Final/terminal

Identify syntax and logic errors

Selecting and using suitable test data:

- Normal
- Boundary
- Invalid/Erroneous

Refining algorithms

Computer Science: Curriculum for Sept 2021

HT 1 | HT 2 | HT 3 | HT 4 | HT 5 | HT 6

Key Stage 4: Year 11 2021/2022

Term	Topic	Covered in lessons	Intent	NC Focus 1	NC Focus 2	Assessment
HT 1	**1.2 Memory and Storage:** **1.1.2 – Primary storage**	• Recap on Primary Storage	Learn where different types of data can be stored understand the hardware and software	understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems	understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits	End of Topic Test and Exam questions
	1.2.2 - Secondary memory	• Need for Secondary storage • Common types of Secondary storage • Suitable devices and media • Characteristics of storage	Learn about external storage	understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems	understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits	End of Topic Test and Exam questions
	1.2.3 Units **1.2.4 – Data Storage** **1.2.5 - Compression**	• Units of data • Data storage • Character sets • Images • (Sound) • Compression	Learn how computers understand and make use of data	understand how instructions are stored and executed within a computer system; understand how data of various types (including text, sounds and pictures) can be represented and manipulated digitally, in the form of binary digits		End of Topic Test and Exam questions
	1.3 Computer Networks, Connections and Protocols: **1.3.1 Networks and Topologies**	• Types of network • Factors that affect the performance of networks • The different roles of computers in a client-server and a peer-to-peer network • The hardware needed to connect stand-alone computers into LAN • The Internet as a worldwide collection of computer networks: • Star and Mesh network topologies	Understand how different networks are made up and how they work and understand the networks around them	understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems	design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems	End of Topic Test and Exam questions
	1.3.2 - Wired and Wireless Networks, protocols and Layers	Modes of connection –Wired/wireless • IP addressing and MAC addressing • Standards • Common protocols • The concept of layers	Understand how different networks are made up and how they work and understand the networks around them	understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems	design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems	End of Topic Test and Exam questions

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Key Stage 4: Year 11 2021/2022

Term	Topic	Covered in lessons	Intent	NC Focus 1	NC Focus 2	Assessment
HT 2	**1.4 Network Security:** **1.4.1 – Threats to computer systems and networks**	Forms of attack: • Malware • Social engineering • Brute-force attacks • Denial of service attacks • Data interception and theft • The concept of SQL injection	Learn about the set of rules and configurations designed to protect the integrity, confidentiality and accessibility of computer networks and data using both software and hardware technologies.	understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems	design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems	End of Topic Test and Exam questions
	1.4.2 - Identifying and preventing vulnerabilities	Identifying and prevention vulnerabilities: • Pen testing • Anti malware • Firewalls • User access levels • Passwords • Encryption • Physical security	Learn about the set of rules and configurations designed to protect the integrity, confidentiality and accessibility of computer networks and data using both software and hardware technologies.	understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems	design, use and evaluate computational abstractions that model the state and behaviour of real-world problems and physical systems	
	MOCK EXAM REVISION					

Computer Science: Curriculum for Sept 2021

HT 1 | HT 2 | HT 3 | HT 4 | HT 5 | HT 6

Key Stage 4: Year 11 2021/2022

Term	Topic	Covered in lessons	Intent	NC Focus 1	NC Focus 2	Assessment
HT3	**1.5 Systems Software:** **1.5.1 - Operating Systems**	Purpose and functionality of OS: • User interface • Memory management • Peripheral management and drivers • User management • File management	Learn about the software that manages computer hardware and software and supplies an interface for the user and important utilities for managing the computer.	understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems	understand how instructions are stored and executed within a computer system	End of Topic Test and Exam questions
	1.5.2 - Utility Software	Purpose and functionality of utility software: • Encryption software • Defragmentation • Data compression	Learn about software that configures, analyses, optimises and maintains a computer.	understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems	understand how instructions are stored and executed within a computer system;	
	1.6 Ethical, legal, cultural and environmental impacts of digital technology 1.6.1 – Ethical, legal and environmental impact	Impacts of digital technology on wider society including: • Ethical issues • Legal issues • Cultural issues • Environmental issues • Privacy issues Legislation 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)	Learn about the legal and ethical side of technology and new innovations and the laws related to IT	understand a range of ways to use technology safely, respectfully, responsibly and securely, including protecting their online identity and privacy; recognise inappropriate content, contact and conduct and know how to report concerns.		End of Topic Test and Exam questions

Computer Science: Curriculum for Sept 2021

HT 1 | HT 2 | HT 3 | HT 4 | HT 5 | HT 6

Key Stage 4: Year 11 2021/2022

Term	Topic	Covered in lessons	Intent	NC Focus 1	NC Focus 2	Assessment
HT4	**FINAL EXAM REVISION**	• Paper 1 and Paper 2 revision				
HT5	**SUMMER EXAMS 2022**					
HT6						