

Curriculum Map 2019-2022

School: Bohunt Educational Trust

Subject: Computer Science

Year Group: 9

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Unit(s)	Introduction to Computer Hardware & Storage	Introduction to Algorithms & Python Programming	Introduction to Networks	How Computers Represent Data	Introduction to Boolean Logic	Computational Thinking Searching & Sorting Algorithms
Key knowledge	- Systems Architecture - Memory - Storage - Cloud Storage	- Programming Techniques - Key Terms - Debugging - Data Types - Flowcharts & Pseudocode	- Wired and wireless networks - Topologies - WiFi & Ethernet	- Images - Sound - Characters - Compression Binary/Hex	- Logic gates - Boolean operators - Computing-related mathematics - Use of IDEs in programming	- Computational Thinking - Algorithms (searching, & sorting)
Key skills	Understanding of how computers work	Programming	Understanding of how computer networks function	Understanding of how computers represent data	How computational logic is used in computers and programming	Thinking computationally and describing and interpreting algorithms
Link to Exam Board AOs	• the purpose of the CPU • common CPU components ◦ ALU (Arithmetic Logic Unit), CU (Control Unit), Cache • the function of the CPU as fetch and execute instructions stored in memory • how common characteristics of CPUs affect performance: ◦ clock speed, cache size, number of cores • memory (RAM and ROM) • the need for virtual memory • flash memory • secondary storage (optical, magnetic, solid state) • storage characteristics (capacity, speed, portability, durability, reliability, cost) • Cloud storage	• 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: ◦ sequence ◦ selection ◦ iteration (count and condition controlled loops) • the use of basic string manipulation • the use of data types: ◦ integer ◦ real ◦ Boolean ◦ character and string ◦ casting • the common arithmetic operators • Common Boolean operators. • how to produce algorithms using: • pseudocode • using flow diagrams • interpret, correct or complete algorithms	• types of networks: ◦ LAN and WAN • 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 a Local Area Network: ◦ wireless access points ◦ routers/switches ◦ NIC (Network Interface Controller/Card) ◦ transmission media • star and mesh network topologies	• Units ◦ bit, nibble, byte, etc • Numbers ◦ binary conversion ◦ binary addition ◦ binary shifts ◦ hex conversions ◦ check digits. • Characters ◦ ASCII, extended ASCII and Unicode • Images ◦ pixels and metadata ◦ the effect of colour depth and resolution on the size of an image file. • Sound ◦ how sound can be sampled ◦ how sample size, bit rate, sampling frequency affect file size and quality • Compression ◦ Lossy and lossless.	• why data is represented in computer systems in binary form • simple logic diagrams using the operations AND, OR and NOT • truth tables • combining Boolean operators using AND, OR and NOT to two levels • applying logical operators in appropriate truth tables to solve problems • applying computing-related mathematics: ◦ + ◦ - ◦ / ◦ * ◦ Exponentiation (^) ◦ MOD ◦ DIV	• computational thinking: ◦ abstraction ◦ decomposition ◦ algorithmic thinking • standard searching algorithms: ◦ binary search ◦ linear search • standard sorting algorithms: ◦ bubble sort ◦ merge sort ◦ insertion sort
Assessment	End of topic test	End of topic test	BET Assessment w/c 27 th January	End of topic test	End of topic test	BET Assessment w/c 8 th June

Curriculum Map 2019-2022

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Year Group: 10

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Unit(s)	Network Communication	Advanced Python Programming	Systems Security & Software	Computer Hardware, Systems & Software	Robust Programs & IDEs	Ethical & Legal Issues
Key knowledge	- Internet - Virtual Networks - Protocols / Layering - Packet Switching	- Arrays - File handling - SQL - Functions	- Forms of attack and threats to networks and how to prevent them - Utility software	- Von Neumann Architecture - Embedded Systems - Translators and facilities of languages	- Strong and robust programs - How to test programs - How to identify errors in programs using IDEs	- Ethical, Cultural, Legal and Environmental issues - Open source v proprietary software
Key skills	Understanding of how the internet works	Using advanced features of Python to create more complex programs	Identify and preventing threats to computer networks		Design, test and debugging of programs	Understanding the effects of computers on society.
Link to Exam Board AOs	• WiFi ○ Frequency and channels ○ encryption • ethernet • the internet as a worldwide collection of computer networks: ○ DNS (Domain Name Server) ○ Hosting ○ the cloud • the concept of virtual networks. • the uses of IP addressing, MAC addressing, and protocols including: ○ TCP/IP ○ HTTP ○ HTTPS ○ FTP ○ POP ○ SMTP • the concept of layers ○ packet switching.	• the use of basic file handling operations: ○ open ○ read ○ write ○ 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 and two dimensional arrays • how to use sub programs (functions and procedures) to produce structured code	• forms of attack • threats posed to networks: • malware / phishing • social engineering • brute force attacks • denial of service attacks • data interception/theft • SQL injection • poor network policy • identifying and preventing vulnerabilities: • penetration testing • network forensics • network policies • anti-malware software • firewalls • user access levels • passwords • encryption. • utility system software: • encryption software • defragmentation • data compression • backup: full and incremental. • operating systems • user interface • memory management • peripheral management and drivers • user & file management	• Von Neumann architecture: ○ MAR (Memory Address Register) ○ MDR (Memory Data Register) ○ Program Counter ○ Accumulator • embedded systems: ○ purpose of embedded systems ○ examples of embedded systems. • characteristics and purpose of different levels of programming language, including low level languages • the purpose of translators • the characteristics of an assembler, a compiler and an interpreter	• defensive design considerations: ○ input sanitisation/validation ○ planning for contingencies ○ anticipating misuse ○ authentication • maintainability: ○ comments ○ indentation • the purpose of testing • types of testing: ○ iterative ○ final/terminal • how to identify syntax and logic errors • selecting and using suitable test data. • integrated development environment (IDE): • editors • error diagnostics • run-time environment	• how to investigate and discuss Computer Science technologies while considering: ○ ethical issues ○ legal issues ○ cultural issues ○ environmental issues. ○ privacy issues. • how key stakeholders are affected by technologies • environmental impact of Computer Science • cultural implications of Computer Science • open source vs proprietary software • legislation relevant to Computer Science: ○ The Data Protection Act 1998 ○ Computer Misuse Act 1990 ○ Copyright Designs and Patents Act 1988 ○ Creative Commons Licensing ○ Freedom of Information Act 2000.
Assessment	BET Assessment	End of topic test	End of topic test	End of topic test	BET Assessment	End of topic test

Curriculum Map 2019-2022

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Subject: Computer Science

Year Group: 11

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Unit(s)	Revision	Revision	Revision	Revision		
Key knowledge	- Adapt to class and student needs	- Adapt to class and student needs	- Adapt to class and student needs	- Adapt to class and student needs	-	
Key skills	Exam Technique	Exam Technique	Exam Technique	Exam Technique		
Link to Exam Board AOs						
Assessment	Exam Questions	BET MOCKS	Exam Questions	BET MOCKS 2	GCSE Exams	GCSE Exams

Year 9 Assessments 2019-2022

Year 9 BET 1	Year 9 BET 2
• 2 Papers (each 40 marks and 35 minutes) • Content to be assessed will be: Paper 1 • 1.1 Systems Architecture (just the following) • the purpose of the CPU • common CPU components ▪ ALU (Arithmetic Logic Unit) ▪ CU (Control Unit) ▪ Cache • the function of the CPU as fetch and execute instructions stored in memory • how common characteristics of CPUs affect performance: ▪ clock speed ▪ cache size ▪ number of cores • 1.2 Memory • 1.3 Storage (including Cloud Storage) Paper 2 • 2.1 Algorithms • How to produce algorithms using pseudocode and flow diagrams • Interpret, correct or complete algorithms. • 2.2 Programming Techniques (just the following) • 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: ▪ sequence ▪ selection (<, >) ▪ iteration (count and condition controlled loops) • the use of basic string manipulation • the use of data types: ▪ integer ▪ real ▪ Boolean ▪ character and string ▪ casting • the common arithmetic operators (+, -, *, /) • the common Boolean operators (AND, OR, NOT)	• 2 Papers (each 40 marks and 35 minutes) • All of Year 9 BET 1 plus the following: • 1.4 Wired and wireless networks • 2.4 Computational Logic • 2.6 Data Representation