



| Topic Name | Term | Skills Developed | Next link in curriculum | Other Notes |
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| <i>Computer Architecture: Structure / function of processor and processor types & Input / output and storage devices</i> | <i>Autumn 1</i> | <ul style="list-style-type: none">• CPU function/components/cycle.• Von Neumann vs Harvard architecture.• Processor cycle – Assembly language overview.• CPU performance factors – pipelining, multicore etc.• Parallel processing (SIMD/MIMD)• RISC vs CISC processors.• Categorising devices and selecting use for specific purposes.• Flash/Optical/Magnetic storage media comparison. | | Links to Prior Learning: Y10 System Architecture Y10 Memory and Storage |
| <i>System Software: Operating Systems and utility software. Nature of applications</i> | <i>Autumn 2</i> | <ul style="list-style-type: none">• Operating system purpose.• Operating system functions – processor scheduling algorithms, memory management etc.• Operating system types.• Application generation – stages of compilation. | | Links to Prior Learning: Y11 – System Software |



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| <p><i>Programming techniques/paradigms</i></p> | <p><i>Autumn 1 / Autumn 2</i></p> | <ul style="list-style-type: none"> ● <i>Basic procedural language concepts (loops/lists/strings/files)</i> ● <i>Procedures/functions/program flow</i> ● <i>Variables/constants/scope</i> ● <i>File handling / Use of IDE</i> ● <i>OOP concepts, classes, methods, attributes</i> ● <i>OOP - Inheritance and Polymorphism</i> ● <i>Assembly language</i> ● <i>Assembly addressing modes.</i> ● <i>Declarative / functional programming.</i> | <ul style="list-style-type: none"> ● <i>NEA Programming Project (Year 12 – Summer 2)</i> ● <i>Data structures and Algorithms – Spring 1/2</i> | <p>Links to Prior Learning:</p> <p>Y10 Programming Techniques Y11 Creating Robust Programs</p> |
| <p><i>Networks and Web technologies</i></p> | <p><i>Spring 1 / Spring 2</i></p> | <ul style="list-style-type: none"> ● <i>LAN / WAN / Hardware</i> ● <i>CS/P2P/Ethernet/Wifi</i> ● <i>Internet Structure and Protocols</i> ● <i>Web Forms / JavaScript / php</i> ● <i>Search Engine Indexing</i> | | <p>Links to Prior Learning:</p> <p>Year 10 Network Communications and Protocols Year 11 Network Security</p> |
| <p><i>Data Structures and Algorithms / Algorithm analysis and design</i></p> | <p><i>Spring 1/2</i></p> | <ul style="list-style-type: none"> ● <i>Tuples and records</i> ● <i>Linear, Circular and priority queues</i> ● <i>Stacks vs Queues</i> ● <i>Bubble / Insert / Merge / Quick Sorts</i> | <ul style="list-style-type: none"> ● <i>NEA Programming Project (Year 12)</i> | <p>Links to Prior Learning:</p> <p>Y11 Algorithms Y10 Programming Fundamentals</p> |



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| | | <ul style="list-style-type: none">• <i>Linear Search vs Binary Search (recursion)</i>• <i>Linked Lists</i>• <i>Hash Tables</i>• <i>Graphs - Implementation / Traversal</i>• <i>Trees - Implementation / Traversal</i>• <i>Trees - Binary Search Tree</i>• <i>Binary Search Tree using recursion</i>• <i>Breadth first vs Depth first graph traversal</i> | | |
| Algorithms | Summer 1 | <ul style="list-style-type: none">• <i>Searching Algorithms (Binary/Linear)</i>• <i>Sorting Algorithms (Bubble/Insert/Merge/Quick)</i>• <i>Optimisation Algorithms - Dijkstra's / A*</i>• <i>Big O Notation</i> | | Links to Prior Learning: Y11 Algorithms Y10 Programming Fundamentals |
| <i>System Lifecycle / Testing Methods</i> | Summer 2 | <ul style="list-style-type: none">• <i>Waterfall / Spiral / Agile etc methods of software development.</i> <i>Testing strategies / test data / test plans.</i> | NEA Programming Project (Year 12) | Links to Prior Learning: Y11 – Creating Robust Programs (elements of testing) |



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| <i>Computational Thinking</i> | <i>Summer 1</i> | <ul style="list-style-type: none">● <i>Abstraction</i>● <i>Thinking Ahead</i>● <i>Thinking Procedurally</i>● <i>Thinking concurrently/Computational Methods</i> | <ul style="list-style-type: none">● <i>NEA Programming Project (Year 12)</i> | Links to Prior Learning: Y10 - Algorithms |
| <i>NEA Programming Project</i> | <i>Summer 2</i> | <ul style="list-style-type: none">● <i>Independent NEA project.</i>● <i>Analyse, design, implement, test and evaluate a system developed for a real end user to fulfil a specific need.</i> | | Links to Prior Learning: Y10 Algorithms Y12 Programming Techniques Y11 Creating Robust Programs Y12 Computational Thinking Y12 Data Structures and Algorithms |