

## Autumn Term 1 – Binary and Data Representation

|                  | Knowledge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Skills                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| <b>Strong</b>    | <ul style="list-style-type: none"> <li>Clearly and accurately communicates how binary enables computers to represent and process data using transistors.</li> <li>Clearly communicates the relationships between bits, bytes and larger units of data storage using appropriate technical terminology.</li> <li>Clearly communicates how conversions between denary, binary and hexadecimal number systems are performed.</li> <li>Clearly communicates the purpose of hexadecimal notation and its relationship to binary representation.</li> <li>Clearly communicates the process of binary addition and how carries are generated.</li> <li>Clearly communicates how images are digitally represented through pixels, colour channels and binary or hexadecimal colour values.</li> <li>Clearly communicates how sound is converted into digital form through sampling, frequency and amplitude.</li> <li>Clearly communicates how character encoding systems such as ASCII represent text using binary values.</li> </ul> | <ul style="list-style-type: none"> <li>Can accurately and efficiently convert between denary, binary and hexadecimal number systems.</li> <li>Can apply knowledge of binary addition to increasingly complex calculations.</li> <li>Can interpret and explain binary and hexadecimal representations in a variety of contexts.</li> <li>Can use technical terminology accurately when describing the representation of numbers, images, sound and text.</li> <li>Can independently analyse examples of digital media and explain how they are represented within a computer system.</li> <li>Can maintain comprehensive, well-organised notes demonstrating a detailed understanding of the topics covered.</li> <li>Can produce an accurate, detailed and well-structured written report that effectively communicates understanding of data representation concepts.</li> </ul> |
| <b>Confident</b> | <ul style="list-style-type: none"> <li>Communicates how transistors use binary states to process and store data.</li> <li>Communicates the relationships between bits, nibbles, bytes and larger storage units up to terabytes.</li> <li>Communicates how denary and binary numbers represent values and how numbers can be converted between the two systems.</li> <li>Communicates why hexadecimal is used within computing and how it relates to binary.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Can accurately convert denary numbers between 0 and 255 into binary and vice versa.</li> <li>Can convert denary values into hexadecimal through binary conversion.</li> <li>Can perform binary addition independently.</li> <li>Can interpret binary and hexadecimal colour values in simple examples.</li> <li>Can explain the representation of images, sound and text using appropriate technical terminology.</li> <li>Can maintain organised notes that accurately record learning throughout the unit.</li> </ul>                                                                                                                                                                                                                                                                                                                    |

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|            | <ul style="list-style-type: none"> <li>Communicates how binary addition can be used to calculate values.</li> <li>Communicates how colour is represented using combinations of red, green and blue values and how these can be expressed in binary and hexadecimal.</li> <li>Communicates how sound is sampled using amplitude measurements at regular intervals.</li> <li>Communicates how ASCII represents characters using binary values.</li> </ul>                                                                                                                                                                           | <ul style="list-style-type: none"> <li>Can produce a clear written report about a data representation topic.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Developing | <ul style="list-style-type: none"> <li>Describes how transistors use on and off states to represent binary values.</li> <li>Explains the meaning of bits, bytes and larger storage units such as kilobytes and megabytes.</li> <li>Explains the difference between denary and binary number systems.</li> <li>Explains that hexadecimal is used as a shorter and more readable representation of binary.</li> <li>Describes how images are represented using pixels and colour values.</li> <li>Describes how sound is sampled and stored digitally.</li> <li>Explains that ASCII assigns binary values to characters.</li> </ul> | <ul style="list-style-type: none"> <li>Can calculate and compare common data storage units.</li> <li>Can convert simple binary numbers into denary values and vice versa with support.</li> <li>Can identify hexadecimal values and their equivalent binary groupings.</li> <li>Can perform simple binary addition calculations.</li> <li>Can identify how pixels and colour values contribute to digital images.</li> <li>Can use key terminology when describing digital sound and character representation.</li> <li>Can complete structured written tasks about data representation.</li> </ul> |
| Emerging   | <ul style="list-style-type: none"> <li>Recognises that computers store data using 1s and 0s.</li> <li>Recognises that transistors can be in an on or off state.</li> <li>Recognises that a bit is a single binary digit.</li> <li>Recognises that computers use binary to represent numbers.</li> <li>Recognises that computers can store images, sound and text as data.</li> <li>Recognises that ASCII is used to represent characters.</li> </ul>                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Can identify binary digits as 1s and 0s.</li> <li>Can identify bits, bytes and common storage units with support.</li> <li>Can recognise binary, denary and hexadecimal numbers from examples.</li> <li>Can identify basic features of digital images and sound.</li> <li>Can complete simple note-taking activities.</li> </ul>                                                                                                                                                                                                                             |

## Autumn Term 2 – Python

|                  | Knowledge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Skills                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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| <b>Strong</b>    | <ul style="list-style-type: none"> <li>Clearly and accurately communicates how condition-based programming enables programs to respond to different inputs and outcomes.</li> <li>Clearly communicates how inputs, variables, casting and outputs work together within a program.</li> <li>Clearly communicates the purpose and advantages of using fStrings when presenting information to a user.</li> <li>Clearly communicates how flowcharts represent algorithms and support program development.</li> <li>Clearly communicates how multiple and nested conditions can be combined to create sophisticated decision-making processes.</li> <li>Clearly communicates how algorithms can be planned and refined to solve a range of programming problems efficiently.</li> </ul> | <ul style="list-style-type: none"> <li>Can independently design, develop and refine programs that use multiple and nested conditional statements.</li> <li>Can select and apply inputs, variables, outputs, casting and fStrings effectively to create robust solutions.</li> <li>Can create detailed flowcharts that accurately represent complex program logic.</li> <li>Can systematically test, debug and improve programs.</li> <li>Can analyse a problem and develop an efficient algorithmic solution before coding.</li> <li>Can apply programming knowledge to create solutions for unfamiliar challenges where only the required outcome is provided.</li> <li>Can maintain comprehensive and well-organised notes that accurately document learning, solutions and programming techniques.</li> </ul> |
| <b>Confident</b> | <ul style="list-style-type: none"> <li>Communicates how IF, ELSE and ELIF statements can be used to create condition-based programs.</li> <li>Communicates how inputs, variables and outputs work together to process data.</li> <li>Communicates the purpose of casting and how it enables programs to perform calculations and comparisons.</li> <li>Communicates how fStrings improve the readability and presentation of program output.</li> <li>Communicates how flowcharts can be used to design and plan algorithms before coding.</li> <li>Communicates how multiple and nested conditions can be used to solve increasingly complex problems.</li> </ul>                                                                                                                  | <ul style="list-style-type: none"> <li>Can independently create programs using IF, ELSE and ELIF statements.</li> <li>Can use inputs, outputs, variables and casting appropriately within a solution.</li> <li>Can create programs containing multiple conditions.</li> <li>Can use fStrings to produce clear and informative program output.</li> <li>Can design algorithms using flowcharts before coding.</li> <li>Can test and debug programs to ensure they function correctly.</li> <li>Can develop solutions to programming problems based on specified requirements.</li> </ul>                                                                                                                                                                                                                          |

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| Developing | <ul style="list-style-type: none"> <li>• Describes how IF, ELSE and ELIF statements allow programs to make decisions.</li> <li>• Explains the purpose of inputs, variables and outputs within a program.</li> <li>• Explains why casting is needed when working with user input and numerical values.</li> <li>• Explains how fStrings can be used to display output clearly.</li> <li>• Explains how flowcharts can be used to plan program logic.</li> <li>• Explains that programs may contain multiple conditions to solve more complex problems.</li> </ul> | <ul style="list-style-type: none"> <li>• Can create programs that use IF and ELSE statements.</li> <li>• Can use inputs, variables and outputs to solve straightforward problems.</li> <li>• Can use basic casting to convert user input into numerical values.</li> <li>• Can create output using fStrings.</li> <li>• Can create simple flowcharts to plan solutions.</li> <li>• Can complete structured programming challenges with some support.</li> </ul> |
| Emerging   | <ul style="list-style-type: none"> <li>• Recognises that programs can make decisions.</li> <li>• Recognises that input, variables and output are components of a program.</li> <li>• Recognises that conditions can be used to control what a program does.</li> <li>• Recognises that flowcharts can be used to plan a solution.</li> <li>• Recognises that casting can be used when working with different types of data.</li> </ul>                                                                                                                           | <ul style="list-style-type: none"> <li>• Can write and run simple Python programs with support.</li> <li>• Can use input and output statements in basic programs.</li> <li>• Can create and use simple variables.</li> <li>• Can follow a provided flowchart to create a simple program.</li> <li>• Can identify simple errors when guided.</li> </ul>                                                                                                          |

## Spring Term 1 – Computer Networks

|                  | Knowledge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Skills                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| <b>Strong</b>    | <ul style="list-style-type: none"> <li>Clearly and accurately communicates how computer networks enable communication and resource sharing.</li> <li>Clearly communicates the differences, purposes and typical uses of LANs and WANs.</li> <li>Clearly communicates the role and function of networking hardware within a network.</li> <li>Clearly communicates the characteristics, advantages and limitations of common network topologies.</li> <li>Clearly communicates how data is transferred across the internet using packets, routers and IP addressing.</li> <li>Clearly communicates the relationship between the internet, the World Wide Web and DNS systems.</li> <li>Clearly communicates how DNS servers translate domain names into IP addresses to support web access.</li> <li>Clearly communicates the purpose and applications of different wireless networking technologies.</li> </ul> | <ul style="list-style-type: none"> <li>Can accurately analyse network diagrams and identify the role of each component.</li> <li>Can apply networking knowledge to explain how different types of networks operate in real-world situations.</li> <li>Can create detailed network diagrams using appropriate symbols and terminology.</li> <li>Can explain and justify the selection of networking hardware for specific scenarios.</li> <li>Can accurately describe the process of accessing a website from entering a URL through to receiving web content.</li> <li>Can use technical networking terminology consistently and accurately in extended written responses.</li> <li>Can maintain comprehensive, well-organised notes demonstrating a detailed understanding of networking concepts.</li> </ul> |
| <b>Confident</b> | <ul style="list-style-type: none"> <li>Communicates the purpose of computer networks and the benefits of sharing resources.</li> <li>Communicates the differences between LANs and WANs and provides relevant examples of each.</li> <li>Communicates the role of networking hardware, including switches, routers, servers, cables and access points.</li> <li>Communicates the characteristics of different network topologies.</li> <li>Communicates how data is transmitted across the internet using IP addresses, packets, routers, senders and recipients.</li> </ul>                                                                                                                                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Can accurately classify networks, hardware and topologies.</li> <li>Can explain how devices communicate across a network using appropriate terminology.</li> <li>Can interpret and create network diagrams showing common hardware components.</li> <li>Can explain the journey of data across the internet using terms such as packet, router, sender, recipient and IP address.</li> <li>Can distinguish between internet-based services and web-based services.</li> <li>Can use networking terminology accurately in written and verbal responses.</li> </ul>                                                                                                                                                                                                       |

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|            | <ul style="list-style-type: none"> <li>Communicates the difference between the internet and the World Wide Web.</li> <li>Communicates how DNS servers enable users to access websites using domain names rather than IP addresses.</li> <li>Communicates the purpose of a range of wireless networking technologies.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Can maintain clear and well-organised notes throughout the unit.</li> </ul>                                                                                                                                                                                                                                                                                                     |
| Developing | <ul style="list-style-type: none"> <li>Describes what a computer network is and why networks are used.</li> <li>Explains the difference between a Local Area Network (LAN) and a Wide Area Network (WAN).</li> <li>Explains the purpose of common networking hardware, including switches, routers, servers, cables and wireless access points.</li> <li>Describes different network topologies.</li> <li>Explains that data travels across the internet in packets.</li> <li>Explains the difference between the internet and the World Wide Web.</li> <li>Explains that DNS servers help convert website names into IP addresses.</li> <li>Identifies common wireless technologies used for networking.</li> </ul> | <ul style="list-style-type: none"> <li>Can classify networks as LANs or WANs.</li> <li>Can identify the purpose of common networking hardware.</li> <li>Can label simple network diagrams.</li> <li>Can identify different network topologies from examples.</li> <li>Can explain simple examples of how data travels across a network.</li> <li>Can organise notes and research about networking concepts.</li> </ul> |
| Emerging   | <ul style="list-style-type: none"> <li>Recognises that a network consists of two or more computers connected together.</li> <li>Recognises that networks allow devices to share resources.</li> <li>Recognises that networks use different pieces of hardware.</li> <li>Recognises that the internet allows computers to communicate.</li> <li>Recognises that wireless technologies can be used to connect devices.</li> </ul>                                                                                                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Can identify common networking devices from images or descriptions.</li> <li>Can identify examples of networks in everyday life.</li> <li>Can use key networking vocabulary with support.</li> <li>Can complete basic note-taking activities about networks.</li> </ul>                                                                                                         |

## Spring Term 2 – Spreadsheets

|                  | Knowledge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Skills                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
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| <b>Strong</b>    | <ul style="list-style-type: none"> <li>Clearly and accurately communicates how spreadsheets can be used to process, analyse and present data.</li> <li>Clearly communicates how formulae, operators and brackets are used to perform calculations.</li> <li>Clearly communicates the advantages of using cell references within formulae.</li> <li>Clearly communicates the purpose and application of a range of spreadsheet functions, including conditional and statistical functions.</li> <li>Clearly communicates how formatting contributes to the usability and professionalism of a spreadsheet.</li> <li>Clearly communicates how spreadsheets can be used to model scenarios, make predictions and support decision-making.</li> <li>Clearly communicates how charts can be used to visualise data and identify trends or patterns.</li> </ul> | <ul style="list-style-type: none"> <li>Can independently design, develop and refine a spreadsheet that meets the requirements of a specified scenario.</li> <li>Can create accurate and efficient formulae using a range of operators, functions and cell references.</li> <li>Can apply conditional and nested formulae to solve complex problems.</li> <li>Can use Goal Seek and modelling techniques to investigate and predict outcomes.</li> <li>Can select and create the most appropriate charts to communicate data effectively.</li> <li>Can apply professional formatting techniques to improve usability and presentation.</li> <li>Can test, evaluate and improve spreadsheet solutions to ensure accuracy and effectiveness.</li> <li>Can produce a comprehensive spreadsheet solution that demonstrates effective data management, analysis and presentation skills.</li> </ul> |
| <b>Confident</b> | <ul style="list-style-type: none"> <li>Communicates how rows, columns, cells and cell references are used to organise and process data.</li> <li>Communicates how formulae are constructed using operators and brackets.</li> <li>Communicates the difference between formulae and values.</li> <li>Communicates how cell references allow dynamic calculations and why this benefits users.</li> <li>Communicates the purpose and use of functions including SUM, AVERAGE, MAX, MIN, MODE.SNGL, IF, Nested IF and COUNTIF.</li> <li>Communicates how formatting improves readability and usability.</li> </ul>                                                                                                                                                                                                                                           | <ul style="list-style-type: none"> <li>Can independently create formulae using operators, brackets and cell references.</li> <li>Can use a range of functions including SUM, AVERAGE, MAX, MIN, MODE.SNGL, IF and COUNTIF.</li> <li>Can create nested IF statements for more complex situations.</li> <li>Can format spreadsheets to improve usability and presentation.</li> <li>Can use spreadsheets to model scenarios and predict outcomes.</li> <li>Can use Goal Seek to determine values required to meet a specified outcome.</li> <li>Can create appropriate charts to represent data effectively.</li> <li>Can develop a spreadsheet solution for a given scenario.</li> </ul>                                                                                                                                                                                                       |

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|            | <ul style="list-style-type: none"> <li>Communicates how spreadsheets can be used for modelling, prediction and decision-making.</li> <li>Communicates how charts can be used to represent data effectively.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Developing | <ul style="list-style-type: none"> <li>Describes the purpose of rows, columns, cells and cell references.</li> <li>Explains how formulae can be created using mathematical operators.</li> <li>Explains the difference between a formula and a value.</li> <li>Explains that cell references allow formulae to update automatically when data changes.</li> <li>Explains the purpose of some common functions such as SUM, AVERAGE, MAX and MIN.</li> <li>Explains why formatting is important in making spreadsheets easier to use.</li> <li>Explains that spreadsheets can be used for modelling, prediction and chart creation.</li> </ul> | <ul style="list-style-type: none"> <li>Can create formulae using the four main mathematical operators.</li> <li>Can use cell references within simple calculations.</li> <li>Can use common functions such as SUM, AVERAGE, MAX and MIN.</li> <li>Can apply basic formatting to improve the appearance of a spreadsheet.</li> <li>Can create and label simple charts.</li> <li>Can use spreadsheets to investigate straightforward scenarios.</li> <li>Can complete spreadsheet tasks with occasional support.</li> </ul> |
| Emerging   | <ul style="list-style-type: none"> <li>Recognises that spreadsheets are used to organise, calculate and present data.</li> <li>Recognises rows, columns and cells within a spreadsheet.</li> <li>Recognises that formulae can be used to perform calculations.</li> <li>Recognises that functions are built-in formulae.</li> <li>Recognises that spreadsheets can be used to create charts.</li> <li>Recognises that spreadsheets can be used to model different scenarios.</li> </ul>                                                                                                                                                       | <ul style="list-style-type: none"> <li>Can enter data into a spreadsheet with support.</li> <li>Can identify rows, columns, cells and cell references.</li> <li>Can create simple formulae using guidance.</li> <li>Can use basic formatting tools.</li> <li>Can create simple charts with support.</li> <li>Can complete structured spreadsheet activities.</li> </ul>                                                                                                                                                   |

## Summer Term 1 – Threats and Security

|                  | Knowledge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Skills                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
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| <b>Strong</b>    | <ul style="list-style-type: none"> <li>Clearly and accurately communicates the characteristics and impact of different forms of malware, including viruses, worms, trojans and ransomware.</li> <li>Clearly communicates how social engineering techniques exploit human vulnerabilities to compromise security.</li> <li>Clearly communicates how a range of hacking techniques, including keylogging, man-in-the-middle attacks, DNS spoofing and brute force attacks, threaten systems and data.</li> <li>Clearly communicates the differences between DoS and DDoS attacks and how they disrupt digital services.</li> <li>Clearly communicates how anti-malware software and firewalls work together to prevent, detect and mitigate security threats.</li> <li>Clearly communicates the security challenges posed by AI technologies, including prompt injection attacks.</li> <li>Clearly communicates how a range of security measures can be used to reduce risks and protect data, devices and systems.</li> </ul> | <ul style="list-style-type: none"> <li>Can accurately analyse cybersecurity scenarios and identify multiple threats and vulnerabilities.</li> <li>Can recommend appropriate preventative measures to reduce the risk of malware, hacking and social engineering attacks.</li> <li>Can evaluate the effectiveness of different security measures for a given context.</li> <li>Can explain how security software and practices work together to provide layered protection.</li> <li>Can assess emerging cybersecurity risks associated with AI technologies and suggest appropriate safeguards.</li> <li>Can use technical cybersecurity terminology confidently and accurately in extended written responses.</li> <li>Can produce comprehensive, well-organised notes and written work that demonstrate a detailed understanding of cybersecurity concepts.</li> </ul> |
| <b>Confident</b> | <ul style="list-style-type: none"> <li>Communicates how different types of malware infect systems and affect users.</li> <li>Communicates how social engineering attacks exploit human behaviour to gain access to information.</li> <li>Communicates how hacking techniques such as keylogging, man-in-the-middle attacks, DNS spoofing and brute force attacks operate.</li> <li>Communicates the difference between DoS and DDoS attacks and their impact on networks and services.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <ul style="list-style-type: none"> <li>Can accurately distinguish between different forms of malware, cyberattacks and security risks.</li> <li>Can analyse scenarios and identify the cybersecurity threats involved.</li> <li>Can explain appropriate security measures for a given situation.</li> <li>Can explain how anti-malware software and firewalls contribute to system security.</li> <li>Can assess the strength of passwords and recommend improvements.</li> <li>Can apply cybersecurity terminology accurately in written reports and discussions.</li> </ul>                                                                                                                                                                                                                                                                                            |

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|            | <ul style="list-style-type: none"> <li>Communicates how anti-malware software and firewalls help prevent and detect security threats.</li> <li>Communicates how prompt injection attacks can influence AI systems and create security risks.</li> <li>Communicates the importance of adopting good security practices to protect personal and organisational data.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Can maintain clear and detailed notes throughout the unit.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Developing | <ul style="list-style-type: none"> <li>Describes some common types of malware; from viruses, worms, trojans and ransomware.</li> <li>Explains that social engineering attacks attempt to manipulate users into revealing information or taking actions.</li> <li>Explains common hacking techniques such as keylogging, brute force attacks and DNS spoofing.</li> <li>Describes the difference between DoS and DDoS attacks.</li> <li>Explains the purpose of anti-malware software and firewalls.</li> <li>Explains that AI technologies can introduce new security risks, including prompt injection attacks.</li> <li>Explains basic methods that can be used to improve security, such as strong passwords and device locking.</li> </ul> | <ul style="list-style-type: none"> <li>Can classify different types of malware according to their characteristics.</li> <li>Can identify examples of social engineering attacks from scenarios.</li> <li>Can identify common hacking techniques and the risks they pose.</li> <li>Can suggest simple security measures to protect devices and accounts.</li> <li>Can use appropriate cybersecurity terminology in written and verbal responses.</li> <li>Can organise notes and research on cybersecurity topics.</li> </ul> |
| Emerging   | <ul style="list-style-type: none"> <li>Recognises that computers and networks can be affected by security threats.</li> <li>Recognises that malware can cause problems for computer systems.</li> <li>Recognises that hackers attempt to gain unauthorised access to data and systems.</li> <li>Recognises that software can be used to protect devices.</li> <li>Recognises that users can take steps to keep their data secure.</li> </ul>                                                                                                                                                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Can identify common examples of security threats with support.</li> <li>Can identify examples of malware from descriptions or scenarios.</li> <li>Can recognise secure and insecure online behaviours.</li> <li>Can complete basic note-taking activities about cybersecurity.</li> <li>Can participate in discussions about online safety.</li> </ul>                                                                                                                                |



## Summer Term 2 – Python Looping and Turtle

|                  | Knowledge                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Skills                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| <b>Strong</b>    | <ul style="list-style-type: none"> <li>Clearly and accurately communicates how while loops and for loops are used to solve different programming problems.</li> <li>Clearly communicates how validation can be achieved through the use of appropriately constructed while loops.</li> <li>Clearly communicates the differences, advantages and appropriate uses of conditional while loops and while True loops.</li> <li>Clearly communicates how the arguments of the range() function determine the behaviour of a for loop.</li> <li>Clearly communicates how loops can generate sequences and automate repetitive tasks efficiently.</li> <li>Clearly communicates how iteration can be used to simplify, optimise and improve Turtle graphics programs.</li> <li>Clearly communicates how algorithmic planning supports the development of efficient and maintainable programs.</li> </ul> | <ul style="list-style-type: none"> <li>Can independently design, develop and refine programs that use both while loops and for loops appropriately.</li> <li>Can create robust validation routines using conditional and while True loops.</li> <li>Can apply iteration techniques to solve unfamiliar programming challenges.</li> <li>Can accurately use all three arguments of the range() function to produce efficient solutions.</li> <li>Can analyse, test and optimise code to improve efficiency and readability.</li> <li>Can design and create complex Turtle graphics using loops and algorithmic planning.</li> <li>Can identify and remove unnecessary repetition through the effective use of iteration.</li> <li>Can maintain comprehensive notes that explain programming concepts, solutions and coding decisions.</li> </ul> |
| <b>Confident</b> | <ul style="list-style-type: none"> <li>Communicates how while loops can be used for input validation and repeated processing.</li> <li>Communicates the difference between conditional while loops and while True loops.</li> <li>Communicates how for loops iterate a specified number of times.</li> <li>Communicates how the arguments within the range() function control the start, stop and step values.</li> <li>Communicates that the stop value in a range is not included in the sequence.</li> <li>Communicates how loops can be used to generate mathematical and numerical sequences.</li> </ul>                                                                                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Can independently create programs that use while loops for validation.</li> <li>Can select appropriate conditions for repetition within a program.</li> <li>Can use for i in range() loops effectively, including start, stop and step values.</li> <li>Can predict and explain the output generated by different loop structures.</li> <li>Can create programs that generate a variety of numerical sequences.</li> <li>Can plan and develop Turtle graphics using loops to reduce repetition.</li> <li>Can test and debug programs to ensure they meet their intended purpose.</li> </ul>                                                                                                                                                                                                              |

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|            | <ul style="list-style-type: none"> <li>Communicates how Python Turtle programs can be made more efficient through the use of loops.</li> <li>Communicates the importance of planning algorithms before developing Turtle graphics.</li> </ul>                                                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Can maintain clear and organised programming notes.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Developing | <ul style="list-style-type: none"> <li>Describes the purpose of while loops and for loops.</li> <li>Explains that while loops continue to run while a condition remains true.</li> <li>Explains the difference between a conditional while loop and a while True loop.</li> <li>Explains how a for loop can repeat code a specific number of times.</li> <li>Explains the purpose of the range() function.</li> <li>Explains how for loops can be used to generate patterns and sequences.</li> <li>Explains that loops can be used within Turtle programs to reduce repetition.</li> </ul> | <ul style="list-style-type: none"> <li>Can create while loops that repeat instructions until a condition is met.</li> <li>Can create simple validation routines using while loops.</li> <li>Can create for loops using the range() function.</li> <li>Can identify the start and stop values within a range.</li> <li>Can generate simple numerical sequences using for loops.</li> <li>Can use Python Turtle to draw geometric shapes.</li> <li>Can complete structured programming challenges with some support.</li> </ul> |
| Emerging   | <ul style="list-style-type: none"> <li>Recognises that loops allow instructions to be repeated.</li> <li>Recognises that there are different types of loops in Python.</li> <li>Recognises that while loops can repeat instructions until a condition is met.</li> <li>Recognises that for loops repeat instructions a set number of times.</li> <li>Recognises that Python Turtle can be used to create drawings and shapes.</li> <li>Recognises that loops can make code shorter and more efficient.</li> </ul>                                                                           | <ul style="list-style-type: none"> <li>Can write and run simple Python programs with support.</li> <li>Can create loops (either while or for) with support.</li> <li>Can use Python Turtle commands to create some basic shapes e.g. squares and triangles.</li> <li>May follow step-by-step instructions to complete programming activities.</li> <li>May record basic notes about programming concepts and examples.</li> </ul>                                                                                             |