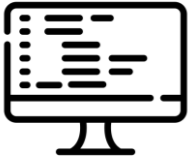





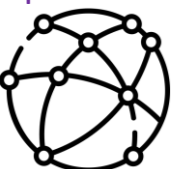
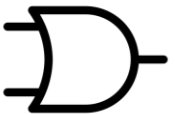
OCL Computing Curriculum: Progression Map

Core concept	Year 7	Year 8	Year 9	Year 10	Year 11	Relevant end point
<p style="color: #002060; font-weight: bold;">Programming</p> 	<p>HT4 - Block Based programming using Scratch.</p> <ul style="list-style-type: none"> → A variable is a named piece of data. → Programs execute in sequence one line after another. → Programs can use selection (if) statements to make decisions. → Operators such as =, < and > can be used to make comparisons. → Programs can repeat code using iteration (while). → A subroutine is a smaller program inside the main program. 	<p>HT1 – Block based programming using Scratch.</p> <ul style="list-style-type: none"> → Operators such as AND, OR and NOT can be used to make more complex decisions. → Count controlled iteration can cause a part of a program to repeat a set number of times. → Parts of a program can send instructions to another part of a program. <p>HT4 – Text based programming with Python.</p> <ul style="list-style-type: none"> → An IDE can be used to create computer programs. → Text based programs can have syntax errors. → Error reporting can help us to debug a program. + Variable names should be sensible and describe the data that they hold. 	<p>HT2 – Text based programming with Python</p> <ul style="list-style-type: none"> → All data in variables is categorised into types of integer, float, string and Boolean. → Importing allows us to include code from a module. + Syntax errors cause your program to stop executing logic errors do not but may lead to an incorrect output. + Data in variables can be categorised into types such as integer, float, String and Boolean + Previous code can be refactored to make it more efficient 	<p>GCSE Computer Science (Python) All prior programming knowledge underpins what students will learn in KS4 but all the basics will be covered again.</p> <p>HT1</p> <ul style="list-style-type: none"> → Programs are translated by compilers and interpreters. → Flowcharts can be used to represent an algorithm. + The time module gives access to methods that measure time. + The data in variables can be cast to different types. <p>HT2</p> <ul style="list-style-type: none"> → Decisions can be made using selection (if, elif and else) → Inputs, outputs and changes to data can be tracked with a trace table. → Inputted data can be validated with try and except + Selection and iteration can be nested inside other selection and iteration statements. + The random module gives access to methods that generate random numbers. 		<ul style="list-style-type: none"> • Students will be able to develop a solution to a problem using computational thinking. • Students will be able to create computer programs in Scratch and in Python. • Students will be able to debug errors in Python code. • Students will be able to create programs that use sequence, selection and iteration to solve a variety of problems. • Students will be able to import and use code from modules in their programs.

				<p>HT3</p> <ul style="list-style-type: none"> → Pseudocode is a way of representing code without following specific syntax rules. → Larger programs should be created using a structured approach. + + Functions are subroutines that return a value. + + Data can only be accessed when it is in scope. <p>HT4</p> <ul style="list-style-type: none"> → Data can be stored in lists. → Lists can also be stored inside other lists. + ++ Characters in a string can be manipulated the same way data in a list can be. <p>HT5</p> <ul style="list-style-type: none"> → Python can read from and write to text and csv files. → Comments can be used to make code more maintainable. + +++ Data in variables can be saved to and loaded from external files. <p>HT6</p> <ul style="list-style-type: none"> → Testing should be done at regular intervals in program creation. 		
<p>Media Editing and creation</p>	<p>HT1 Using technology safely</p> <ul style="list-style-type: none"> → Presentation software can be used to help to give information to others. → Information on slides should be readable and clear. 	<p>HT5 Multimedia 2</p> <ul style="list-style-type: none"> → Bitmap graphics are made of pixels, vector graphics are not. → Animations are a series of moving images. → Examples of animation types. → Examples of animation techniques. 	<p>HT5 Mobile App Development</p> <ul style="list-style-type: none"> → Users navigate mobile applications using touch controls. → There are conventions of applications that users expect to see. + + Multimedia content can be added to apps just like it can be added to web pages. 			<ul style="list-style-type: none"> • Students will be able to create documents that are fit for purpose using a variety of software packages. • Students will be able to create and edit bitmap images. • Students will be able to create digital animations

	<p>→ Chosen images should be appropriate to the topic.</p> <p>HT5 Multimedia 1</p> <ul style="list-style-type: none"> → Formatting is changing the appearance of a document. → Usage of basic tools in MS word (font size, colour, alignment, using tables etc). 	<p>→ Usage of animation techniques in creating digital animations (frame by frame, onion skinning, key frames and tweening)</p> <p>HT6 Developing for the Web</p> <ul style="list-style-type: none"> → HTML is used to add content to a web page. → CSS is used to style a web page. → Multimedia content can be added to web pages. → There are various ways to make a website accessible. → Why should a website be accessible. → Hyperlinks allow movement with a website and to other websites. + + Formatting webpages for readability improves accessibility. 	<ul style="list-style-type: none"> + + Like websites apps can be made accessible. + + Hyperlinks and buttons can allow movement to different parts of an app. 			<p>using various animation techniques.</p> <ul style="list-style-type: none"> • Students will be able to create web pages which contain image and are styled with CSS.
<p>Moral, Legal, ethical and environmental concerns</p> 	<p>HT1 Using technology safely</p> <ul style="list-style-type: none"> → Messages and comments online can be misinterpreted. → We should be respectful when writing messages, comments and emails. → Cyberbullying is bullying using digital devices. → The effects of cyberbullying. → Reporting and stopping cyberbullying. <p>HT5 Multimedia 1</p> <ul style="list-style-type: none"> → The copyright, designs and patents act. → What does copyright protect? → What is plagiarism? → What is creative commons? 	<p>HT6 Developing for the web</p> <ul style="list-style-type: none"> → Websites must be accessible and make reasonable adjustments for users. + + Copyright also protects intellectual property. 	<p>HT4 Cybersecurity</p> <ul style="list-style-type: none"> → The data protection act. → What is GDPR. → The effect of loosing or leaking data. → Why do companies want to collect data. → What are the potential drawbacks of so much personal data being available. 		<p>HT3 GCSE Computer Science</p> <ul style="list-style-type: none"> → The impact of technology on society. → The computer misuse act. → Cultural considerations when using digital technology. → What is privacy and what rights do we have. → How digital technology affects the environments. → The ethical impacts of technology in different sectors. → The consequences of cybercrimes. + ++ Copyright and intellectual property includes ideas and concepts. + + What are the long term effects of so much personal data being available. 	<ul style="list-style-type: none"> • Students will be able to recognise and minimise common risks of being online. • Students will be able to recognise and report cyberbullying. • Students will understand the laws protecting digital creations and intellectual property. • Students will understand how websites and apps can be made accessible as well as why this is important. • Student will understand what data is any how it is used. • Students will understand the impact of the spread of digital technology on the environment. • Students will understand the cultural impacts of the spread of digital technology.

	<p>→ How do we know if information online is credible.</p>					
 <p>Cybersecurity</p>	<p>HT1 Using technology safely</p> <ul style="list-style-type: none"> → What makes a good password. → The issues of having weak passwords. → The issues with sharing passwords. 		<p>HT4 Cybersecurity</p> <ul style="list-style-type: none"> → Why do hackers want access to data. → How can data be protected. → Humans can be the weak link in the system. → How hacking can be ethical. → There are many types of malware (ransomware, virus, trojan etc). → Programs can be designed with security in mind. + + How are passwords and data encrypted. 	<p>HT 4 GCSE Computer Science</p> <ul style="list-style-type: none"> → What does a ransomware attack look like. → The motivations of hackers. → How computers and networks can be accessed without automation. → How computers and networks can be accessed with automation. → What are the effects of different malware and what is their purpose. → How does encryption protect data. → How can we design computer systems with defence in mind. + ++ What is the difference between symmetric and asymmetric encryption. + 	<p>HT3 GCSE Computer Science</p> <ul style="list-style-type: none"> → Which laws apply to cybercrimes. → The computer misuse act. → The consequences of cybercrimes. + ++How computers and networks can be accessed with automation. + What are the effects of different malware and what is their purpose. + +++ How does encryption protect data. + + What are the different types of protection we can use for our networks. + + How can we design networks with defence in mind. 	<ul style="list-style-type: none"> • Students will understand the importance of having a strong password. • Students will understand why hackers want to gain access to data and how they use it. • Students will recognise ethical and unethical hacking. • Students will recognise common automated and non-automated cyber-attacks. • Students will understand how systems and networks can be protected. • Students will understand how humans can be the weak link in the system.
 <p>Computer systems</p>	<p>HT 3 Computer networks</p> <ul style="list-style-type: none"> → Hardware is used in computer networks (Hub, Server, Network cable and router) <p>HT6 Computer systems</p> <ul style="list-style-type: none"> → Peripherals allow us to interact with computer systems. → The CPU carries out all of the calculations and processing for the computer. 		<p>HT3 Computer Systems 2</p> <ul style="list-style-type: none"> → The CPU is made up of a number of components working together. → Some storage devices are better for a given task. → The operating system has many functions. → Systems can be connected with hardware. + Hardware is used in computer networks (Hub, Server, Network cable and router) + + The ALU inside the CPU carries out all of the arithmetic and logical operations. 	<p>GCSE Computer Science HT1</p> <ul style="list-style-type: none"> → Each component of the CPU has a specific task. → CPUs are designed using Von Neumann architecture. → The CPU carries out the FDE cycle. → Memory stores the programs that are active now in RAM and start up instructions in ROM. → The strengths and weaknesses of 		<ul style="list-style-type: none"> • Students will recognise common hardware and be able to state their purpose. • Students will be able to recommend the correct device for a given situation. • Students will be able to break down the function of key components such as the CPU. • Students will be able to compare storage devices and recommend the best one for a given task. • Students will recognise the different types of software.

	<ul style="list-style-type: none"> → Memory can be volatile and non-volatile. → Storage has 3 types magnetic, optical and solid state. → Application software adds functionality to computers. → System software helps to run the computer. 		<ul style="list-style-type: none"> + + RAM is volatile and ROM is non-volatile. + + Each storage type has distinct strengths and weaknesses. + + Utility software helps the operating system run the computer. 	<p>secondary storage (optical and Magnetic)</p> <p>→</p> <p>HT2</p> <ul style="list-style-type: none"> → The strengths and weaknesses of secondary storage (Solid state) → How different computer specification affect performance. + + The CPU has very fast onboard memory. + ++ How utility software such as defragmentation helps the performance of the computer. 		<ul style="list-style-type: none"> • Students will understand how utility software such as defragmentation software operates. • Students will be able to list and explain the functions of an operating system.
<p>Computer networks</p> 	<p>HT3 Computer networks</p> <ul style="list-style-type: none"> → Computer networks have evolved rapidly over the last 70+ years. → Computer networks make communication easier. → Networks can be connected to using wired and wireless methods. → There are a number of factors that affect data transfer speed. → Data is transferred using packets. → There are lots of services that run on the internet including the World Wide Web 	<p>HT6 Developing for the Web</p> <ul style="list-style-type: none"> → Websites are accessed via the internet. + + We use hyperlinks to navigate between websites on the internet. 			<p>GCSE Computer Science HT2</p> <ul style="list-style-type: none"> → A LAN is a network with a small geographical area. → A WAN is a network with a large geographical area. → Data can be shared peer or peer or via the client server model. → There are lots of network protocols that computers must use. → The TCP/IP model is made up of layers each with its own purpose + + Packets can be lost in transmission. + + Understanding the factors that affect data transfer speed can help us to evaluate the performance of a network. + + The internet is a WAN. 	<ul style="list-style-type: none"> • Students will understand how computers communicate. • Students will be able to describe how data is sent across networks. • Students will be able to describe the different services of the internet. • Students will recognise and explain the function of LAN and WAN networks. • Students will understand the different ways data can be shared. • Students will be able to list and explain network protocols including IP and TCP/IP.
<p>Boolean Logic</p> 	<p>HT4 Scratch Programming 1</p> <ul style="list-style-type: none"> → The operators AND, OR and NOT can help us make decisions. 	<p>HT1 Scratch Programming 2 and HT4 Programming with Python 1</p> <ul style="list-style-type: none"> + + The operators AND, OR and NOT can allow programs to make complex decisions. <p>HT2 Binary and Boolean logic</p> <ul style="list-style-type: none"> → There are 3 logic gate AND, OR and NOT. 	<p>HT2 Programming with Python 2</p> <ul style="list-style-type: none"> + ++ The operators AND, OR and NOT can be used together to make more complex decisions. 	<p>GCSE Computer Science HT1-6 Python programming</p> <ul style="list-style-type: none"> + +++ Boolean operators AND, OR and NOT can be used in conjunction with arithmetic operators to further increase complexity of decision making. 		<ul style="list-style-type: none"> • Students will recognise the Boolean operators AND, OR and NOT. • Students will recognise the logic gates for AND, OR and NOT. • Students will be able to complete trace tables for

		<ul style="list-style-type: none">→ The outputs of logic gates and be shown with truth tables.→ Logic gates can be combined to make circuits.		HT2 <ul style="list-style-type: none">→ Logic circuits can be used represent how a computer understands a logic problem+ Truth tables can be expanded to show all of the possible outputs for a circuit.		<p>simple circuits using AND, OR and NOT.</p> <ul style="list-style-type: none">• Students will be able to use the operators AND, OR and NOT in Python programs to make complex decisions.
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