

LONG-TERM OVERVIEW

YEAR 10			YEAR 11		
Term	Topics	Assessment	Term	Topics	Assessment
1	<ul style="list-style-type: none"> • Introduction to the course • SLR 1 Systems architecture <ul style="list-style-type: none"> ◦ 6 lessons • SLR 2 Memory and storage <ul style="list-style-type: none"> ◦ 6 lessons • SLR 3 Computer networks, protocols and layers <ul style="list-style-type: none"> ◦ 3 lessons • Plus 5 dedicated programming lessons 	SLR 1 Student workbook SLR 1 End-of-topic test SLR 2 Student workbook SLR 2 End-of-topic test	1	<ul style="list-style-type: none"> • SLR 7 Algorithms <ul style="list-style-type: none"> ◦ 14 lessons 	
2	<ul style="list-style-type: none"> • SLR 3 Computer networks, protocols and layers <ul style="list-style-type: none"> ◦ 5 lessons • SLR 4 Cybersecurity <ul style="list-style-type: none"> ◦ 9 lessons • SLR 5 Hardware and software <ul style="list-style-type: none"> ◦ 5 lessons • Plus 5 dedicated programming lessons 	SLR 3 Student workbook SLR 3 End-of-topic test SLR 4 Student workbook SLR 4 End-of-topic test	2	<ul style="list-style-type: none"> • SLR 7 Algorithms <ul style="list-style-type: none"> ◦ 6 lesson • SLR 11 Boolean logic <ul style="list-style-type: none"> ◦ 5 lessons • Plus 5 paper 1 exam revision lessons 	SLR 7 Student workbook SLR 7 End-of-topic test SLR 11 Student workbook SLR 11 End-of-topic test
3	<ul style="list-style-type: none"> • SLR 5 Hardware and software <ul style="list-style-type: none"> ◦ 2 lessons • SLR 6 Ethical, legal and environmental impacts <ul style="list-style-type: none"> ◦ 8 lessons • Plus 8 dedicated programming lessons 	SLR 5 Student workbook SLR 5 End-of-topic test	3	<ul style="list-style-type: none"> • SLR 12 Classification of programming languages <ul style="list-style-type: none"> ◦ 5 lessons • Plus 7 paper 1 exam revision lessons 	SLR 12 Student workbook SLR 12 End-of-topic test
4	<ul style="list-style-type: none"> • SLR 13 Data representation <ul style="list-style-type: none"> ◦ 14 lessons • Plus 4 dedicated programming lessons 	SLR 13 Student workbook SLR 13 End-of-topic test	4	<ul style="list-style-type: none"> • SLR 14 Relational databases and SQL <ul style="list-style-type: none"> ◦ 6 lessons • Plus 6 paper 1 exam revision lessons 	SLR 14 Student workbook SLR 14 End-of-topic test
5	<ul style="list-style-type: none"> • SLR 8 Basic programming concepts <ul style="list-style-type: none"> ◦ 6 lessons • SLR 9 Advanced programming concepts <ul style="list-style-type: none"> ◦ 6 lessons • Plus 3 dedicated programming lessons 	SLR 8 Student workbook SLR 8 End-of-topic test	5	This final term before Easter has been set aside for you to use as you see fit. Refer to the SoL for suggestions.	Past papers Smart Revise
6	<ul style="list-style-type: none"> • SLR 9 Advanced programming concepts <ul style="list-style-type: none"> ◦ 2 lessons • SLR 10 Robust and secure programming <ul style="list-style-type: none"> ◦ 6 lessons • Plus 13 text-based adventure game lessons 	SLR 9 Student workbook SLR 9 End-of-topic test SLR 10 Student workbook SLR 10 End-of-topic test	Along with full, dedicated programming lessons in year 10, many of the theory lessons are half-lessons and allow for the second half to be used for programming. See the delivery calendar “1.2 OCR GCSE J277 - 1-week model (delivery calendar).xlsx”		



SHORT-TERM SCHEME OF LEARNING

1. This lesson-by-lesson breakdown is based on the one-week calendar. You will need to adapt it slightly to fit your school's delivery model.
2. Along with the whole dedicated programming lessons in year 10, many of the theory lessons have allotted the second half to be used for programming. Opportunities for independent programming during lesson time are shown in **green**. This should of course be reinforced by regular practice in the student's own time.
3. Dedicated lesson time for assessment and students responding to feedback/making improvements are shown in **blue**.
4. For a detailed breakdown of which lessons to deliver week by week, see our Excel delivery calendars which accompany this SoL.
5. All the resources you need for the theory lessons are contained within their own topic folders – e.g., "SLR1 Systems architecture."
6. All the resources you need for the dedicated **programming lessons** in year 10 are downloadable from the "Programming" section of your premium subscription.
7. All resources you need for the **dedicated paper 2 exam revision lesson** are contained in the folder named "Paper 1 exam **revision unit**."
8. **Along** with each lesson's learning outcomes, we also supply a key question that each lesson attempts to address. **These key questions appear in red.**
9. Each topic in this SoL is presented as part of a workbook, each workbook and all of its associated resources can be download from your premium account as a single zip file. When extracted they contain the following folders:



Lesson overview PowerPoints

One for each lesson to be displayed at the front of the classroom to provide structure to the lesson.



End of topic test

Written using exam style questions.

All tests are out of 20 so easy comparisons can be made between different topics.

Full answers provided.



Student workbook

This is the main file students complete as they progress through a topic.

Includes an opportunity for assessment and feedback.

Includes a RAG rating self-assessment page.



Student workbook (answers)

A grade 9 model answer version of the blank student workbook.

Doubles up as an excellent knowledge organiser to hand out to students when needed.



[Assessment with Craig 'n' Dave - \(GCSE\)](#)



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YEAR 10 – TERM 1						
	Focus for lesson	Learning outcomes	Starter	Activities	HW for the next lesson	Key terms
1	1.0 Introduction lesson – About the course	<ul style="list-style-type: none"> Understand the course structure and appreciate how you will be taught and assessed in this subject. Understand the important of the flipped classroom approach. 	What is a computer?	Introductory activities (Slides 8 – 11)	SLR1 Common CPU components and their function SLR1 Von Neumann architecture	
SLR 1 Systems architecture						
2	1.1 Lesson 1 – The von Neumann architecture	<ul style="list-style-type: none"> Understand what the CPU of a computer does. Know what major components of the CPU are. Begin learning to program in Python. <p>KEY QUESTION: What is the “architecture” of a CPU?</p>	Who was John von Neumann? What are the characteristics of the von Neumann computer architecture?	SLR 1 Workbook Complete slide 2 1.1 Lesson 1 - Programming introduction.docx	SLR1 The fetch-execute cycle	Slides 1-11 CPU, Von Neumann architecture, Fetch-Decode-Execute cycle, ALU, Control unit, Clock speed, Processor cores, Cache, Register, Bus, Embedded system
3	1.2 Lesson 2 – The von Neumann architecture	<ul style="list-style-type: none"> Understand what the CPU of a computer does. Know what major components of the CPU are. Know the stages of the fetch, execute cycle. Begin learning to program in Python. <p>KEY QUESTION: What is the “architecture” of a CPU?</p>	A train on a child’s toy railway takes 1 second to travel on each segment of track. How long does it take the train to travel around the inside track? How long does it take the train to travel around the outside track? What is the relevance of this illustration to caching? To what extent is this illustration of caching accurate?	SLR 1 Workbook Complete slides 3-6 Programming world cloud	SLR1 The performance of CPUs	
4	1.3 Lesson 3 – The performance of CPUs	<ul style="list-style-type: none"> Know what factors affect the speed of a CPU. Know what major components of the CPU are. Begin learning to program in Python. <p>KEY QUESTION: What factors affect the CPU performance?</p>	What factors affect the speed of a computer? Put these processors in order, slowest first:	SLR 1 Workbook Complete slide 7 Programming	SLR1 Embedded systems	
5	1.4 Lesson 4 – Embedded systems	<ul style="list-style-type: none"> Know what is meant by the term: ‘embedded system’. 	In what ways is this washing machine a computer?	SLR 1 Workbook Complete slide 8	Revise what you have learned in this topic.	

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		<ul style="list-style-type: none"> Know several examples of embedded systems. Understand how to program in Python. <p>KEY QUESTION: What are embedded systems, and what are their characteristics?</p>		Programming		
6 to 9	Independent programming	<p>Gain experience in practical programming</p> <p>Use our T.I.M.E workbooks, Programming challenges and Defold games tutorials.</p>		Various		
10	SLR 1 – End-of-topic test	End-of-topic test		SLR 1 Test.docx SLR 1 Test Answers.docx		
11	SLR 1 – Action	Action/response lessons		Chance for students to respond to feedback, improve workbooks, correct misunderstandings	SLR2 Different types of memory SLR2 RAM and ROM	
SLR 2 Memory and storage						
12	2.1 Lesson 1 – Different types of memory	<ul style="list-style-type: none"> Understand the different types of memory within a computer: RAM, ROM, Cache, Registers. Know the difference between RAM and ROM. Know the purpose of ROM in a computer system. Know the purpose of RAM in a computer system. Understand how to program in Python. <p>KEY QUESTION: What are the different types of memory used for?</p>	<p>Find out where this old type of memory was used.</p> <p>What is a core dump?</p>	SLR 2 Workbook Complete slides 2 - 6 Programming	SLR2 The need for secondary storage SLR2 Common types of storage	Slides 12-20 Main memory, RAM, ROM, Secondary storage, Solid state storage, Optical storage, Magnetic storage, Cloud storage, Local storage
13	2.2 Lesson 2 – Common types of storage	<ul style="list-style-type: none"> Understand the need for secondary storage. Know the common types of storage. Know the characteristics of storage devices. Understand how to program in Python. <p>KEY QUESTION:</p>	<p>A digital camera uses an SD card to store images. How much would it cost me to upgrade my memory card from 32GB?</p> <p>A friend has a Nintendo Switch console. They need a memory card</p>	SLR 2 Workbook Complete slides 7 – 10 Programming	SLR2 Advantages and disadvantages of storage devices for a given scenario	

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		What are the differences between secondary storage devices?	to store more games. What card would you recommend and how much would it cost?			
14	2.3 Lesson 3 – Applications of storage	<ul style="list-style-type: none">Understand the suitability of storage devices for given applications.Understand the advantages and disadvantages of devices based on their characteristics.Understand how to program in Python. <p>KEY QUESTION: What features of secondary storage make devices suitable for different situations?</p>	What storage media would you choose for:	SLR 2 Workbook Complete slides 11-13 Programming	 SLR2 Cloud storage	
15	2.4 Lesson 4 – Cloud storage	<ul style="list-style-type: none">Know what is meant by cloud storage.Understand the advantages and disadvantages of cloud storage.Know the characteristics of storage devices.Understand how to program in Python. <p>KEY QUESTION: What is meant by cloud storage?</p>	A cloud-based server farm is considering replacing all its hard disks for solid state storage drives. Why would it want to do this, and what are the implications to consider?	SLR 2 Workbook Complete slide 14 Programming	Revise what you have learned in this topic.	
16	Independent programming	Gain experience in practical programming Use our T.I.M.E workbooks, Programming challenges and Defold games tutorials.		Various		
17	SLR 2 – End-of-topic test	End-of-topic test		SLR 2 Test.docx SLR 2 Test.docx		
18	SLR 2 – Action	Action/response lessons		Chance for students to respond to feedback, improve workbooks, correct misunderstandings	 SLR3 Types of networks	
SLR 3 Computer networks, protocols and layers						
19	3.1 Lesson 1 – Types of networks	<ul style="list-style-type: none">Know what is meant by a ‘computer network’.Know the different types of networks: LAN, WAN and PAN.Understand the advantages of networking.Understand the disadvantages of networking.	Wide area networks have enabled email and social networking to become a major part of our society today. To what extent have these tools changed our society for the better?	SLR 3 Workbook Complete slides 2 – 4 Programming	 SLR3 Modes of connection, wired and wireless	Slides 21-48 Network topology, PAN, LAN, WAN, Wired connections, Wireless

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		<ul style="list-style-type: none"> Understand how to program in Python. <p>KEY QUESTION: What are the characteristics of PANs, LANs and WANs?</p>				
20	3.2 Lesson 2 - Advantages and disadvantages of wireless networks	<ul style="list-style-type: none"> Understand that networks can be wired or wireless. Understand that wired networks typically use copper or fibre optic cables. Understand the advantages of wireless networks. Understand the disadvantages of wireless networks. <p>KEY QUESTION: In which situations would you suggest a wireless over a wired network and vice versa?</p>	How does the internet connect across oceans? What media would be best to use?	SLR 3 Workbook Complete slides 5 and 6	SLR3 Star and mesh network topologies	connections, Star network, Bus network, Protocol, Ethernet, Wi-Fi, TCP, UDP, IP, HTTP, HTTPS, FTP, SMTP, IMAP, Network security, Authentication, Encryption, Firewall, MAC address filtering, Application layer, Transport layer, Internet layer, Link layer
21	3.3 Lesson 3 – Star and bus network topologies	<ul style="list-style-type: none"> Know what a star network is. Know what a bus network is. Know the advantages and disadvantages of star and bus networks. Understand how to program in Python. <p>KEY QUESTION: Why is a star network better than a bus network?</p>	A small business is moving into a new premises. They are going to have a small local area network with computers connected to a central server and the internet. Parts of the network will have wired connections and other parts will be connected wirelessly. List six items of hardware they will need.	SLR 3 Workbook Complete slides 7 – 10 Programming	SLR3 Common network protocols	



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YEAR 10 – TERM 2						
	Focus for lesson	Learning outcomes	Starter	Activities	HW for the next lesson	Key terms
22	3.4 Lesson 4 – Common network protocols	<ul style="list-style-type: none"> Know what is meant by the term “network protocol”. Explain what the Ethernet protocol family is. Describe the use of a range of common network protocols, including TCP, UDP, IP, HTTP, HTTPS, FTP, SMTP and IMAP. Understand how to program in Python. <p>KEY QUESTION: What are protocols?</p>	<p>Research: 802.11b, 802.11g, 802.11n and 802.11ac</p> <ul style="list-style-type: none"> When were these protocols adopted? What is the maximum data transfer speed? Which band do they operate in? Are there any other advances in technology from previous protocols? 	<p>SLR 3 Workbook Complete slides 10 – 12</p> <p>Programming</p>	<p> SLR3 The four-layer TCP/IP protocol model</p>	<p>Slides 21-48</p> <p>Network topology, PAN, LAN, WAN, Wired connections, Wireless connections, Star network, Bus network, Protocol, Ethernet, Wi-Fi, TCP, UDP, IP, HTTP, HTTPS, FTP, SMTP, IMAP, Network security, Authentication, Encryption, Firewall, MAC address filtering, Application layer, Transport layer, Internet layer, Link layer</p>
23	3.5 Lesson 5 – The four-layer TCP/IP protocol model	<ul style="list-style-type: none"> Know why protocols are layered. Understand the four layers which make up the TCP/IP protocol model. Understand which common network protocols from last lesson operate at each layer. Understand how to program in Python. <p>KEY QUESTION: What are the benefits of layering protocols?</p>	<p>Using the fillings below, create two different burgers using one item from each category:</p> <p>Category 1: sesame seed bun, plain bun, ciabatta bun</p> <p>Category 2: beef, vegetarian beef, chicken</p> <p>Category 3: Cheddar cheese, red Leicester, Roquefort</p> <p>Category 4: Bacon, egg, chorizo, tomato</p> <p>Category 5: Lettuce, onions</p> <p>Category 6: Tomato sauce, mayonnaise, BBQ sauce</p>	<p>SLR 3 Workbook Complete slide 13</p> <p>Programming</p>	<p> SLR3 The need for and methods of network security</p>	
24	3.6 Lesson 6 – Network security methods	<ul style="list-style-type: none"> Understand the need for, and importance of, network security. Explain various methods of network security. Understand how to program in Python. <p>KEY QUESTION: What common methods are used to enhance network security?</p>	<p>What is CryptoLocker? What was Operation Tovar? Who was Evgeniy Bogachev? What was the reward for capturing Bogachev? How much money did CryptoLocker make?</p>	<p>SLR 3 Workbook Complete slides 14 and 15</p> <p>Programming</p>	<p>Revise what you have learned in this topic</p>	

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25 to 27	Independent programming	Gain experience in practical programming Use our T.I.M.E workbooks, Programming challenges and Defold games tutorials.	Various		
28	SLR 3 – End-of-topic test	End-of-topic test	SLR 3 – Test		
29	SLR 3 – Action	Action/response lessons	SLR 3 Test - Part 1 SLR 3 Test - Part 1 Answers.docx SLR 3 Test - Part 2 SLR 3 Test - Part 2 Answers.docx	 SLR4 Cyber Security and cybersecurity threats	
SLR 4 Cybersecurity					
30	4.1 Lesson 1 – Cybersecurity and cybersecurity threats	<ul style="list-style-type: none"> Define the term cybersecurity and describe the main purpose of cybersecurity. Understand and be able to explain a range of cybersecurity threats. Understand how to program in Python. <p>KEY QUESTION: List the potential cybersecurity threats to computers and computing devices.</p>	ILOVEYOU was the most damaging malware event of all time gaining an entry into the Guinness World Records in 2000. What was it? What did it do? How are people a 'weak point' in this example?	SLR 4 Workbook Complete slides 2 – 4 Programming	 SLR4 Social engineering threats
31	4.2 Lesson 2 – Social engineering (blagging and phishing)	<ul style="list-style-type: none"> Define the term social engineering. Describe what social engineering is and how it can be protected against. Explain the following form of social engineering: blagging (pretexting). Explain the following form of social engineering: phishing. Understand how to program in Python. <p>KEY QUESTION: How is a phishing and blagging attack carried out?</p>	How can you tell this email is phishing?	SLR 4 Workbook Complete slides 5 and 6 Programming	
32	4.3 Lesson 3 – Social engineering (shouldering)	<ul style="list-style-type: none"> Define the term social engineering. Describe what social engineering is and how it can be protected against. 	Imagine you bank with TrustedBank. What should you do if you receive this email?	SLR 4 Workbook Complete slides 7 and 8 Programming	 SLR4 Malware



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		<ul style="list-style-type: none"> Explain the following form of social engineering: shouldering (or shoulder surfing). Explain the following cybersecurity threat: pharming. Understand how to program in Python. <p>KEY QUESTION: What is meant by shouldering or “shoulder surfing”?</p>				Automatic software updates
33	4.4 Lesson 4 – Malware (malware and viruses)	<ul style="list-style-type: none"> Define the term malware. Describe what malware is and how it can be protected against. Describe the following form of malware: computer virus. Understand how to program in Python. <p>KEY QUESTION: What effect do different malware attacks have on your computer?</p>	Identify all the potential threats to system security in this image. Consider ‘people as a weak point’.	SLR 4 Workbook Complete slides 9 and 10 Programming		
34	4.5 Lesson 5 – Malware (trojans and spyware)	<ul style="list-style-type: none"> Define the term malware. Describe what malware is and how it can be protected against. Describe the following form of malware: trojan Describe the following form of malware: spyware Understand how to program in Python. <p>KEY QUESTION: What effect do different malware attacks have on your computer?</p>	Much of America’s internet was brought down on 21 st October 2016. This included Netflix, Twitter, Spotify, Reddit, CNN, PayPal, Pinterest, Fox News, The Guardian, The New York Times and the Wall Street Journal. What happened?	SLR 4 Workbook Complete slides 11 – 13 Programming	 SLR4 Penetration testing	
35	4.6 Lesson 6 – Penetration testing	<ul style="list-style-type: none"> Explain what penetration testing is and what it is used for. Explain the difference between black-box and white-box penetration testing. Understand the common mistakes people make as the weak points in a system. Understand how to program in Python. 	Use the internet to find out what the difference between a white-hat, grey-hat and black-hat hacker is.	SLR 4 Workbook Complete slides 14 and 15 Programming	 SLR4 Security measures	



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		KEY QUESTION: What is the difference between white box and black box testing?				
36	4.7 Lesson 7 – Security measures	<ul style="list-style-type: none">Understand and be able to explain a range of security measures, including:<ul style="list-style-type: none">BiometricsPassword systemsCAPTCHAEmail conformationAutomatic software updatesUnderstand how to program in Python. KEY QUESTION: What are some of the security measures which can be used to protect against hackers?	How long would it take a computer to brute force crack your password? Check it at: howsecureismypassword.net How could you improve your password strength?	SLR 4 Workbook Complete slide 16 Complete any other areas of your hacker’s handbook you have not had a chance to finish. Programming	Revise what you have learned in this topic	
37 & 38	Independent programming	Gain experience in practical programming Use our T.I.M.E workbooks, Programming challenges and Defold games tutorials.		Various		
39	SLR 4 – End-of-topic test	End-of-topic test		SLR 4 Test.docx SLR 4 Test Answers.docx		
40	SLR 4 – Action	Action/response lessons		Chance for students to respond to feedback, improve workbooks, correct misunderstandings	 SLR5 Hardware and software – an introduction	
SLR 5 Hardware and software						
41	5.1 Lesson 1 – Introduction to hardware and software	<ul style="list-style-type: none">Define the term hardware and software.Understand the relationship between hardware and software.Explain what is meant by system software and application software.Understand how to program in Python. KEY QUESTION: What is the difference between hardware and software?	Name as many different categories of application software as you can think of.	SLR 5 Workbook Complete slides 2 and 3 Programming	 SLR2 The purpose and functionality of operating systems	Slides 65-70 Hardware, Software, System software, Application software, Operating system, Utility software
42	5.2 Lesson 2 – The purpose and	<ul style="list-style-type: none">Understand the need for operating systems.	How many operating systems can you name?	SLR 5 Workbook Complete slide 4	 SLR5 Operating systems part 1	

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	functionality of system software	<ul style="list-style-type: none"> Understand the functions of operating systems. Understand how to program in Python. <p>KEY QUESTION: Why does your computer need an operating system?</p>		Programming		
43	5.3 Lesson 3 – Operating systems part 1	<ul style="list-style-type: none"> Understand how the operating system handles the management of the processor(s). Understand how the operating system handles the management of the memory. Understand how to program in Python. <p>KEY QUESTION: How does a computer manage having lots of programs open and running at the same time?</p>	<p>Below is an illustration of the RAM of a computer.</p> <p>Each square is a page of memory that can hold a fragment of a program. The memory always fills up left to right, but fragments are never moved.</p> <p>Show the state of the memory after this sequence of processes:</p>	SLR 5 Workbook Complete slides 5 and 6 Programming	 SLR5 Operating systems part 2	
44	5.4 Lesson 4 – Operating systems part 2	<ul style="list-style-type: none"> Understand how the operating system handles the management of the I/O devices. Understand how the operating system handles the management of the applications. Understand how the operating system handles the management of user security. Understand how to program in Python. <p>KEY QUESTION: What features does an operating system give users?</p>	<p>Find out what is meant by the term, 'roaming profile' in the context of an operating system.</p> <p>What are the advantages and disadvantages of roaming profiles?</p>	SLR 5 Workbook Complete slides 7 - 9 Programming	 SLR5 Utility system software	
45	5.5 Lesson 5 – Utility system software	<ul style="list-style-type: none"> Understand encryption utilities. Understand defragmentation utilities. Understand data compression utilities. Understand backup utilities. <p>KEY QUESTION: What is the purpose of utility software?</p>	Identify these common computing catchphrases.	SLR 5 Workbook Complete slide 10	Revise what you have learned in this topic	



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YEAR 10 – TERM 3						
	Focus for lesson	Learning outcomes	Starter	Activities	HW for the next lesson	Key terms
46	SLR 5 – End-of-topic test	End-of-topic test		SLR 5 Test.docx SLR 5 Test Answers.docx		
47	SLR 5 – Action	Action/response lessons		Chance for students to respond to feedback, improve workbooks, correct misunderstandings		
48 to 51	Independent programming	Gain experience in practical programming Use our T.I.M.E workbooks, Programming challenges and Defold games tutorials.		Various	 SLR6 Ethical, legal and environmental concerns	
SLR 6 Ethical, legal and environmental impacts						
52	6.1 Lesson 1 – ethical issues	<ul style="list-style-type: none">Know a range of things to consider beyond development when implementing new computer systems.Understand at least one ethical issue of digital technology. <p>KEY QUESTION: What are the ethical issues of computing?</p>	To what extent is copying software, music and motion picture files really a form of stealing? Make your own mind up, and then look at the comments in this online debate: www.debate.org/opinions/should-piracy-be-legal What are the arguments for and against piracy?	SLR 6 Workbook Complete slides 2 – 5 Spend 10-15 minutes playing REVISE-IT	 SLR6 Privacy issues	Slides 71-75 Ethical issues, Legal issues, Environmental issues, Privacy issues, Data Protection Act 2018
53	6.2 Lesson 2 – Privacy issues	<ul style="list-style-type: none">Understand at least one issue related to privacy and digital technologies. <p>KEY QUESTION: What privacy issues does computing give rise to in our society?</p>	To what extent can you maintain your privacy on social networking? What are the potential problems of public profiles?	SLR 6 Workbook Complete slides 6 – 8 Spend 10-15 minutes playing REVISE-IT	 SLR6 Legislation relevant to computer science	
54	6.3 Lesson 3 – Legal issues	<ul style="list-style-type: none">Know the principles of the Acts of Parliament:<ul style="list-style-type: none">Data Protection Act 2018Computer Misuse Act 1990Copyright Designs and Patents Act 1988Freedom of Information Act 2000	1. I know a teacher username and password. I use this to access the school information system to change the grades on my report. Am I breaking the law? 2. I copy a picture from the internet to use in my new book	SLR 6 Workbook Complete slides 9 and 10 Spend 10-15 minutes playing REVISE-IT	 SLR6 Environmental impact of computer science	

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		<ul style="list-style-type: none"> Understand some of the legal impacts of computer science and its related technologies. <p>KEY QUESTION: What does the legislation for computing prohibit?</p>	<p>that I intend to sell online. Am I breaking the law?</p> <p>3. I want to know what the latest traffic improvement scheme in town cost to put in place. Can I find out?</p>			
55	6.4 Lesson 4 – Environmental issues	<ul style="list-style-type: none"> Understand the environmental impact of digital technology in terms of: <ul style="list-style-type: none"> Manufacturing Use Disposal <p>KEY QUESTION: What is the environmental impact of computing?</p>	<p>Which 20 elements are used in the manufacturing of computers? How many can you guess correctly? Highlight the ones most hazardous to humans for double points.</p>	<p>SLR 6 Workbook Complete slide 11</p> <p>Spend 10-15 minutes playing REVISE-IT</p>	 SLR6 Impacts and risks of digital technology on society	
56	6.5 Lesson 5 – Impacts and risks of digital technology on society	<ul style="list-style-type: none"> Understand a range of impacts and risks of digital technology Understand how to consider a scenario from the perspective of different groups. Understand at least one scenario of the impact and risks of digital technology. <p>KEY QUESTION: How can digital technology have an impact on society at a local, national and international level?</p>	<p>To prepare for a school parents evening, students take a blank appointment sheet to each teacher, and book a time slot for their parent/carer to see a teacher. Once complete, they give this sheet to their parent/carer.</p> <p>The school is going to introduce an online booking system instead, where parents can book their own appointments.</p> <p>Identify 3 impacts for each of the 3 stakeholders: students, parents and teachers.</p>	<p>SLR 6 Workbook Complete slides 12 and 13</p> <p>Spend 10-15 minutes playing REVISE-IT</p>		
57	6.6 Lesson 6 – Additional lesson	<ul style="list-style-type: none"> Reinforce and consolidate your understanding of the ethical, legal and environmental impacts and risks of digital technology on society. <p>KEY QUESTION: What are some of the moral and legal considerations behind autonomous self-drive cars?</p>	<p>An electricity supplier is changing their practice of reading customer usage meters.</p> <p>Instead of estimating bills and sending someone to read the meter at houses once a year, the company are investing in “smart meters”. These meters send the usage data via</p>	<p>SLR 6 Workbook Complete slides 14 – 16</p> <p>Spend 10-15 minutes playing REVISE-IT</p>	<p>Revise what you have learned in this topic</p>	



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			the internet to the electricity supplier automatically once a month. Identify the key stakeholders and state the impact on them.			
58 to 61	Independent programming	Gain experience in practical programming Use our T.I.M.E workbooks, Programming challenges and Defold games tutorials.		Various		
62	SLR 6 – End-of-topic test	End-of-topic test		SLR 6 – Test		
63	SLR 6 – Action	Action/response lessons		SLR 6 Test.docx SLR 6 Test Answers.docx	 SLR13 Bit patterns	



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YEAR 10 – TERM 4						
	Focus for lesson	Learning outcomes	Starter	Activities	HW for the next lesson	Key terms
64	13.1 Lesson 1 – How binary represents all data and instructions	<ul style="list-style-type: none"> Understand why computers systems use binary to store data. Understand that computers use binary to represent many different types of data and instructions. <p>KEY QUESTION: Why is it impossible to say what '100101101' represents without more information?</p>	Hard drives are considered old technology today as people replace their HDD with SSD, but could they instead actually be the future technology for mass storage of data? Research: "single atom magnets" What is your conclusion?	SLR 13 Workbook – Part 1 Complete slides 2 and 3 Programming	SLR13 Number bases SLR13 Why hexadecimal is used in computer science	Slides 151-178 Decimal (base 10), Binary (base 2), Hexadecimal (base 16), Bit, Nibble, Byte, kB, MB, GB, TB, Binary shift, Character set, 7-bit ASCII, Unicode, Encoding table, Pixel, Image size, Colour depth, Bitmap, Image file size, Analogue sound, Digital sound, Sampling rate, Sample resolution, Sound file size, Compression, Huffman Trees, RLE
65	13.2 Lesson 2 – Number bases	<ul style="list-style-type: none"> Understand the number bases: <ul style="list-style-type: none"> Decimal (base 10) Binary (base 2) Hexadecimal (base 16) Explain why hexadecimal is often used in computer science. Understand how binary can be used to represent whole numbers. Under how hexadecimal can be used to represent whole numbers. <p>KEY QUESTION: What is meant by the term 'number-base'?</p>	Throughout history civilisations have used all sorts of different base number systems. Using the internet see what you can find.	SLR 13 Workbook – Part 1 Complete slides 4 – 6 Programming	SLR13 Converting between decimal and 8-bit binary SLR13 Converting between decimal and 2-digit hexadecimal	
66	13.3 Lesson 3 – Base number conversions	<ul style="list-style-type: none"> Know how to convert positive decimal whole numbers (0–255) into 8-bit binary numbers and vice versa. Know how to convert positive binary whole numbers (0-255) into hexadecimal. Know how to convert positive decimal whole numbers (0-255) into hexadecimal. <p>KEY QUESTION: Why do we use hexadecimal to represent information?</p>	Why do you think our number system is base-10?	SLR 13 Workbook – Part 1 Complete slides 7 – 10 Programming	SLR13 Binary shifts SLR13 Adding three 8-bit binary integers	
67	13.4 Lesson 4 – Binary addition and shifts	<ul style="list-style-type: none"> Know how to add together up to three 8-bit binary numbers. 	Use the internet to research three different uses of hexadecimal in computer science.	SLR 13 Workbook – Part 1 Complete slides 11 – 13		

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		<ul style="list-style-type: none"> Know how to perform a left and right binary shift. Understand what binary shift achieves. <p>KEY QUESTION: What can happen to the most significant bit when you add two binary numbers together?</p>		Programming		
68	13.5 Lesson 5 – Catch-up lesson	<ul style="list-style-type: none"> Complete any outstanding work to this point. <p>KEY QUESTION: What is the relationship between denary, binary and hexadecimal?</p>	<p>We are all familiar with terms like: Thousands Millions Billions Trillions But are you aware there are official terms for much bigger numbers? See what you can find!</p>	<p>SLR 13 Workbook – Part 1 Complete slides 2 – 13</p> <p>Programming</p>	 SLR13 The units of data storage	
69	13.6 Lesson 6 – Units	<ul style="list-style-type: none"> Understand what is meant by the terms bit, nibble, byte, kilobyte, megabyte, gigabyte and terabyte. Know how to represent the capacity of data storage using these units and be able to convert between them. <p>KEY QUESTION: Why is data stored in binary?</p>	<p>A Blu-Ray of 1 minute at HDTV quality requires 540 megabytes of storage. How many gigabytes would be required to store a 2-hour film?</p>	<p>SLR 13 Workbook – Part 1 Complete slides 14 – 17</p> <p>Programming</p>	 SLR13 Representing characters and character sets	
70	13.7 Lesson 7 – Character sets	<ul style="list-style-type: none"> Understand that all data must be represented in binary numbers, including text. Know what is meant by the term “character set”. Understand the relationship between the number of bits in the character set and the number of characters that can be represented. Know two common character sets: ASCII and Unicode. <p>KEY QUESTION: How does a computer store character and what are the implications for the number of bits used?</p>	<p>How many binary combinations are there with: 2 bits? 4 bits? 8 bits?</p>	<p>SLR 13 Workbook – Part 2 Complete slides 2 – 4</p> <p>Programming</p>	 SLR13 Representing images	



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71	13.8 Lesson 8 – Bitmaps	<ul style="list-style-type: none"> Understand how an image is represented as a series of pixels represented in binary. Explain what the terms “size of pixels” and “colour depth” mean. Explain how to calculate the physical size of a bitmap image. Understand the effect of colour depth and pixel dimensions on the size of an image file. Be able to covert binary data into a simple image and vice versa. <p>KEY QUESTION: How does a computer store graphics and what are the implications for image size and resolution?</p>	Find out what colours these hexadecimal numbers represent: FF0000 00FF00 0000FF What does that tell you about what all colours on a computer are made up of?	SLR 13 Workbook – Part 2 Complete slides 5 – 9 Programming	
72	13.9 Lesson 9 – Catch-up lesson	<ul style="list-style-type: none"> Complete any outstanding work to this point. <p>KEY QUESTION: How do you calculate the size of a bitmap image?</p>	Televisions are made up of pixels just like bitmap images. 4K TV’s are now quite common with 8K already available. How many pixels are there in a 4K and 8K TV image?	SLR 13 Workbook – Part 1 Complete slides 2 – 17 SLR 13 Workbook – Part 2 Complete slides 2 – 9 Programming	 SLR13 Representing sound
73	13.10 Lesson 10 – Sound	<ul style="list-style-type: none"> Understand how sound can be sampled and stored in digital form. Understand the difference between analogue and digital sound. Understand how sampling rate and sample resolution affect the size of a sound file and the quality of its playback. <p>KEY QUESTION: How do computers store sound and what are the implications for sample rate, duration and bit depth?</p>	Describe what is happening in this illustration:	SLR 13 Workbook – Part 2 Complete slides 10 – 13 Programming	 SLR13 Compression introduction  SLR13 Compression – Huffman coding
74	13.11 Lesson 11 – Compression	<ul style="list-style-type: none"> Know why data is often compressed for transfer and storage. 	Using the metadata and data below, what is the paragraph of text?	SLR 13 Workbook – Part 2 Complete slides 14 – 17	 SLR13 Compression – Run-length encoding

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		<ul style="list-style-type: none"> Understand the difference between lossy and lossless compression. Explain how data can be compressed using Huffman coding. Be able to interpret and create Huffman trees. Be able to calculate the rate of compression using Huffman trees. <p>KEY QUESTION: Where is compression used and why?</p>		Programming		
75	13.12 Lesson 12 – Compression	<ul style="list-style-type: none"> Know why data is often compressed for transfer and storage. Understand the difference between lossy and lossless compression. Explain how data can be compressed using run-length encoding (RLE). Be able to represent data in RLE frequency/data pairs. <p>KEY QUESTION: What type of data would be better compressed using Huffman coding compared to run-length encoding and vice versa?</p>	Using the metadata and data below, explain why the compression is ineffective.	SLR 13 Workbook – Part 2 Complete slides 18 and 19 Programming	Revise what you have learned in this topic	
76 to 79	Independent programming	<p>Gain experience in practical programming Use our T.I.M.E workbooks, Programming challenges and Defold games tutorials.</p>		Various		
80	SLR 13 – End-of-topic test	End-of-topic test		SLR 13 Test - Part 1.docx SLR 13 Test - Part 1 Answers.docx SLR 13 Test - Part 2.docx SLR 13 Test - Part 2 Answers.docx		
81	SLR 13 – Action	Action/response lessons		Chance for students to respond to feedback, improve workbooks, correct misunderstandings	SLR8 The use of data types and casting SLR8 The common arithmetic and comparison operators	



				 SLR8 The common Boolean operators	
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YEAR 10 – TERM 5					
Focus for lesson	Learning outcomes	Starter	Activities	HW for the next lesson	Key terms
SLR 8 Basic programming concepts					
82 8.1 Lesson 1 – Data types and operators	<ul style="list-style-type: none"> Know the different variable data types. Know the arithmetic operators. Know the Boolean operators. Know the comparison operators. <p>KEY QUESTION: Why are numbers sometimes stored as strings?</p>	<p>Solve the logic puzzle presented to you on paper: University of Greenwich is sending out several expeditions to study different bat species around the world. Each expedition will include a chiroptologist (bat expert) and a speleologist (cave expert), and each will take place in a different country. Which person is leaving in each month? Average time to solve this puzzle: 2 minutes.</p>	<p>SLR 8 Workbook Complete slides 2 and 3</p> <p>Continue working on any programs you have yet to get working.</p> <p>Or improve/extend any of your previous programs.</p>	<p> SLR8 The use of variables, constants and assignments</p>	<p>Slides 89-120 Data type, Integer, Real/Float, Boolean, Character, String, Variable, Constant, Assignment, Iteration, Selection, Sequence, Subroutine, Procedure, Function, Count controlled loop, Condition controlled loop, +, -, *, /, DIV, MOD, ==, ≠, <, >, ≤, ≥, AND, OR, NOT</p>
83 8.2 Lesson 2 – Variables, constants, inputs, outputs and assignments	<ul style="list-style-type: none"> Understand what a variable is and when to use one. Understand what a constant is and when to use one. Understand how to get input from the keyboard. Understand how to output data to the screen. Understand why it is important to use meaningful identifier names. <p>KEY QUESTION: What terms are associated with programming?</p>	<p>Use the internet to look up some of the first programming languages ever written. How far back can you go?</p>	<p>SLR 8 Workbook Complete slides 4 – 6</p> <p>Continue working on any programs you have yet to get working.</p> <p>Or improve/extend any of your previous programs.</p>	<p> SLR8 The use of the three basic programming constructs</p>	
84 8.3 Lesson 3 – Basic programming constructs	<ul style="list-style-type: none"> Know the three programming constructs: <ul style="list-style-type: none"> Sequence Selection Iteration Understand the use of nested selection and iteration structures. <p>KEY QUESTION:</p>	<p>Constants and variables both store data for a program. The concepts are very similar. Why should a programmer use a constant in their code instead of a variable?</p>	<p>SLR 8 Workbook Complete slides 7 – 9</p> <p>Continue working on any programs you have yet to get working.</p>	<p> SLR8 Introduction to subroutines</p>	

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		What are the three basic programming constructs and how do they differ?		Or improve/extend any of your previous programs.		
85	8.4 Lesson 4 – Introduction to subroutines	<ul style="list-style-type: none">Understand that programs can be structured using procedures and functions. KEY QUESTION: Why are subroutines used?	Find the error in this python program.	SLR 8 Workbook Complete slide 10 Complete the username program from slide 7 of the lesson overview PP	Revise what you have learned in this topic	
86 to 87	Independent programming	Gain experience in practical programming Use our T.I.M.E workbooks, Programming challenges and Defold games tutorials.		Various		
88	SLR 8 – End-of-topic test	End-of-topic test		SLR 8 – Test		
89	SLR 8– Action	Action/response lessons		SLR 8 Test.docx SLR 8 Test Answers.docx		
90	Independent programming	Gain experience in practical programming Use our T.I.M.E workbooks, Programming challenges and Defold games tutorials.		Various	 SLR9 Data structures and arrays  SLR9 The use of records to store data	
SLR 9 Advanced programming concepts						
91	9.1 Lesson 1 – Data structures, arrays and records	<ul style="list-style-type: none">Understand the concept of a data structure.Understand how an array or list can be used to store data.Understand that arrays can be one or two dimensional.Understand how to use records to help solve simple problems. KEY QUESTION: What does a two-dimensional array or list mean?	Using the internet, you have 5 minutes to list as many computing data structures as you can. Are you able to find any obscure ones which no one else in the class can find?	SLR 9 Workbook Complete slides 2 and 3 Practice any programming tasks you have yet to complete or would like to improve.	 SLR9 The use of basic string manipulation	Slides 121-127 String manipulation, Random number generation, Parameter, Parameter passing, Return value, Local variable, Structured programming
92	9.2 Lesson 2 – String manipulation	<ul style="list-style-type: none">Understand and be able to use a range of string manipulation functions.Understand how to convert strings into other data types and vice versa.	Below is some code presented in both Python and Visual Basic. What ends up being assigned to the variable x?	SLR 9 Workbook Complete slides 4 and 5	 SLR9 Random number generation	





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		<p>KEY QUESTION: What are some of the ways we can manipulate string variables?</p>		Continue working on your programming tasks from last lesson.	
93	9.3 Lesson 3 – Random number generation	<ul style="list-style-type: none"> Understand how to use random number generation. <p>KEY QUESTION: In what sort of problems might we need to generate a random number or sequence of random numbers?</p>	<p>“Can computers produce truly random numbers?”</p> <p>What can you find out about this question in the next few minutes?</p>	<p>SLR 9 Workbook Complete slide 6</p> <p>Write the dice roll program that you pseudo-coded on slide 6 of your workbook in Python.</p>	<p> SLR9 How to use subroutines</p> <p> SLR9 The importance of local variables</p>
94	9.4 Lesson 4 – Subroutines and structured programming	<ul style="list-style-type: none"> Understand how to use subroutines. Explain the advantages of using subroutines. Describe the user of parameters to pass data within programs. Understand that subroutines can return values to the calling routine. <p>KEY QUESTION: What is meant by ‘parameter passing’ when talking about subroutines?</p>	What does this program output if A=6?	<p>SLR 9 Workbook Complete slides 7 and 8</p> <p>Write a program to output a random bingo ticket. These objectives get progressively more difficult. See how far you can get (See slide 7 of lesson PP)</p>	<p> SLR9 The structured approach to programming</p>
95	9.5 Lesson 5 – Subroutines and structured programming	<ul style="list-style-type: none"> Understand how to use subroutines. Understand how to use local variables. Explain the importance of using local variables. Describe the structured approach to programming Explain the advantages of the structured approach to programming. <p>KEY QUESTION: What are local variables and why should you use them whenever possible?</p>	<p>Using a hierarchy Smart Art object break down the main steps to draw this image of a house:</p> <ul style="list-style-type: none"> Start with a box titled: Draw House Think about how this could be broken down into subroutines Don't add extra information which is not presented in the diagram 	<p>SLR 9 Workbook Complete slide 9</p> <p>Write a program to output a random bingo ticket. These objectives get progressively more difficult. See how far you can get (See slide 7 of the lesson PP)</p>	
96	9.6 Lesson 6 – Catch-up lesson	<ul style="list-style-type: none"> Complete various programming tasks and challenges you have been presented with during the programming workbooks. 	Where in this program are ‘parameters’ being passed and where are they being returned?	SLR 9 Workbook	Revise what you have learned in this topic




		<p>KEY QUESTION: What is a 'return value'?</p>		<p>Complete any outstanding workbook pages.</p> <p>Complete any outstanding programs:</p> <ul style="list-style-type: none">• Input and output• Random dice• Bingo ticket		
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YEAR 10 – TERM 6					
	Focus for lesson	Learning outcomes	Starter	Activities	HW for the next lesson
97	SLR 9 – End-of-topic test	End-of-topic test		SLR 9 – Test	
98	SLR 9– Action	Action/response lessons		SLR 9 Test.docx SLR 9 Test Answers.docx	
99 & 100	Independent programming	Introduce the “Telium” text based adventure game		See lessons 109 – 117	 SLR10 Data validation
SLR 10 Robust and secure programming					
101	10.1 Lesson 1 – Data validation	<ul style="list-style-type: none"> Understand why data validation is necessary. Know a range of validation techniques that can be used to write simple data validation routines. <p>KEY QUESTION: What issues should a programmer consider to ensure a program caters for all likely input values?</p>	What input validation could be performed on this sign-up form?	SLR 10 Workbook Complete slide 2 Write a program that asks the user to enter a date in the format DD/MM/YYYY (More details on slide 9 of lesson PP)	 SLR10 Simple authentication routines
102	10.2 Lesson 2 – Authentication routines	<ul style="list-style-type: none"> Understand some authentication techniques a programmer may choose to use to protect their program from misuse. Be able to write simple authentication routines. <p>KEY QUESTION: What issues should a programmer consider to ensure a program caters for all likely input values?</p>	Why do online forms often have this prompt? What else is ReCAPTCHA used for?	SLR 10 Workbook Complete slide 3 Write a simple authentication routine that uses a username and password. SUPER CHALLENGE: Research what makes a strong password. Create a program to validate a secure password.	 SLR10 Suitable test data
103	10.3 Lesson 3 – Suitable test data	<ul style="list-style-type: none"> Understand that because a program works, it doesn't mean it works for all inputs. Understand that suitable test data for a program needs to include: 	The following program outputs the factorial of a number input – e.g., 5! = 5*4*3*2*1 = 120.	SLR 10 Workbook Complete slides 4 and 5	 SLR10 Different types of errors



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		<ul style="list-style-type: none"> ○ Normal (typical) data ○ Boundary (extreme) data ○ Erroneous data <p>KEY QUESTION: What are the features of good testing strategy?</p>	Suggest a range of test data that could be used with this program and why that data should be used.	<p>Write a program to simulate an input tweet of up to 280 characters. It should allow the user to enter text and output the number of characters that were remaining after the input. Inputs of more than 280 characters are rejected with the number of characters over shown as a negative number.</p> <p>SUPER CHALLENGE: Can you allow the user to enter a multi-line tweet using a list to store each line input, terminating when the line contains no characters? Extend the program so it only stops when a tweet of 0 characters is entered.</p>	 SLR10 How to identify syntax and logic errors	
104	10.4 Lesson 4 – Syntax and logic errors	<ul style="list-style-type: none"> • Be able to state four reasons why a program should be tested. • Know what a syntax error is. • Know what a logic error is. • Understand how to identify and fix syntax and logic errors. <p>KEY QUESTION: What are the different types of errors that can occur in a program?</p>	The following program should output the factorial of a number input – e.g., $5! = 5*4*3*2*1 = 120$, but it contains syntax and logic errors. Where are they?	<p>SLR 10 Workbook Complete slides 6 – 10</p> <p>Create the program shown in the starter to output the factorial of a number. Include suitable input validation for the program.</p>	Revise what you have learned in this topic	







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105 to 106	Independent programming	Carry on with the “Telium” text based adventure game	See lessons 109 – 117		
107	SLR 10 – End-of-topic test	End-of-topic test	SLR 10 – Test		
108	SLR 10– Action	Action/response lessons	SLR 10 Test.docx SLR 10 Test Answers.docx		
109	<p style="text-align: center;">Text adventure game</p> <p style="text-align: center;">All the resources needed for this section are in the folder “Text-based adventure game (Telium)”</p> <p style="text-align: center;">These resources can be used in many ways. If you are following our delivery plan, we have set aside these dedicated lessons in the final term of year 10 for your students to attempt an extended text-based space adventure game.</p> <p style="text-align: center;">By this point, students should have a fair amount of experience in programming – this is a nice exercise to bring all the concepts together in an extended exercise. There is a detailed teacher notes file in the folder above named “+ Telium – Teacher notes (README)”.</p> <p style="text-align: center;">We have also provided a PDF workbook for students to use throughout this section.</p> <p style="text-align: center;">All the coded solutions are also provided for your reference.</p>				
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YEAR 11 – TERM 1						
	Focus for lesson	Learning outcomes	Starter	Activities	HW for the next lesson	Key terms
SLR 7 Algorithms						
					 SLR7 What's an algorithm  SLR7 Abstraction	
1	7.1 Lesson 1 – Algorithms and abstraction	<ul style="list-style-type: none"> Be able to define the term algorithm. Understand what is meant by abstraction. Be able to provide examples of abstraction. <p>KEY QUESTION: What is an algorithm?</p>	The picture below shows Perrygrove railway. In what ways is this an example of abstraction?	SLR 7 Workbook Complete slides 2 and 3 Start slide 4. Can you extend your icon set to include more animals? What features have you included in your icons so they are recognisable as part of the same icon set?		Slides 76-88 Algorithm, Decomposition, Abstraction, Pseudo-code, Flow-chart, Program inputs, Program outputs, Program processes, Algorithm efficiency, Linear search, Binary search, Merge sort, Bubble sort
2	7.2 Lesson 2 – Abstraction	<ul style="list-style-type: none"> Know what is meant by the term 'abstraction'. Be able to provide examples of abstraction. <p>KEY QUESTION: What is abstraction?</p>	Consider the interface of a sat-nav device. What are the necessary details for the input? What are the necessary details for the output?	SLR 7 Workbook Complete slide 4 Complete the program on slide 5	 SLR7 Decomposition	
3	7.3 Lesson 3 – Decomposition	<ul style="list-style-type: none"> Know what is meant by problem decomposition. Know the advantages of decomposition when applied to programming. Be able to provide an example of problem decomposition. <p>KEY QUESTION: What is the purpose of decomposition and how can producing structure diagrams help with this process?</p>	You and a friend decide to go to the cinema on Saturday. How would you apply problem decomposition to this task?	SLR 7 Workbook Complete slides 6 and 7 Complete the programming challenge on slide 7.	 SLR7 Systematic approach to problem-solving	
4	7.4 Lesson 4 – Systematic	Understand how to solve computational problems by a systematic approach to problem solving.	A storage unit is in the shape of a hemisphere on top of a cylinder. The	SLR 7 Workbook Complete slide 8		

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	approach to problem-solving	KEY QUESTION: What do we mean by the “systematic approach to problem solving”?	surface of the storage unit is to be painted. Calculate the area to be painted.	Write the programs on slide 8.	
5	7.5 Lesson 5 – Systematic approach to problem-solving	<ul style="list-style-type: none"> Understand how to solve computational problems by applying a systematic approach to problem solving. KEY QUESTION: What do we mean by the “systematic approach to problem solving”?	What does this algorithm output for each of the following values of a and b? $a = 3$ $b = 4$ What does this algorithm do?	SLR 7 Workbook Complete slide 9 Continue working on problems on slide 8 or 9.	 SLR7 How to produce algorithms
6	7.6 Lesson 6 – How to produce algorithms	<ul style="list-style-type: none"> Know the flow diagram symbols. Know that flow diagrams are also called flowcharts. Know how to make a flow diagram. Understand how to construct a program from a flow diagram. Know what is meant by the term pseudocode. Understand how to write pseudocode. KEY QUESTION: How can algorithms be described without ambiguity?	Can you write a program for this algorithm?	SLR 7 Workbook Complete slides 10 – 12 Create the program on slide 12.	
7	7.7 Lesson 7 – How to produce algorithms	<ul style="list-style-type: none"> Know how to make a flow diagram. Understand how to write pseudocode. Understand how to write a program from a flow diagram and pseudocode. KEY QUESTION: How can algorithms be described without ambiguity?	A role-playing game (RPG) often requires dice with a different number of sides to be rolled. This Python program should ask the user how many sides the dice has, and how many rolls to perform, before outputting the result of the dice rolls, but it does not work. Where is the bug?	SLR 7 Workbook Complete slides 13 and 14 Write the program described on slide 14.	
8	7.8 Lesson 8 – How to produce algorithms	<ul style="list-style-type: none"> Know how to make a flow diagram. Understand how to write pseudocode. Understand how to write a program from a flow diagram and pseudocode. KEY QUESTION: How can you represent algorithms using flow charts?	A role-playing game (RPG) often requires dice with a different number of sides to be rolled. This Python program should ask the user how many sides the dice has, and how many rolls to perform, before outputting the result of the	SLR 7 Workbook Complete slide 15 Start slide 4. Can you extend your icon set to include more animals?	 SLR7 Inputs, processes and outputs



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			dice rolls, but it does not work. Where is the bug?	What features have you included in your icons so they are recognisable as part of the same icon set?	
9	7.9 Lesson 9 – Identifying inputs, processing and outputs	<ul style="list-style-type: none"> Understand how to interpret algorithms. Understand how to correct algorithms. Be able to identify inputs, processing and outputs from an algorithm. <p>KEY QUESTION: What do we mean when we talk about a problem's inputs, processes and outputs?</p>	<p>A role-playing game (RPG) often requires dice with a different number of sides to be rolled.</p> <p>This Python program should ask the user how many sides the dice has, and how many rolls to perform, before outputting the result of the dice rolls, but it does not work. Where is the bug?</p>	<p>SLR 7 Workbook Complete slides 16 – 18</p> <p>Write the program described on slide 16 or 18.</p>	 SLR7 Using trace tables to determine the purpose of algorithms
10	7.10 Lesson 10 – Visual inspection and trace tables	<ul style="list-style-type: none"> Understand how to use visual inspection to determine how simple algorithms work and what their purpose is. Understand how to use trace tables to determine how simple algorithms work and what their purpose is. <p>KEY QUESTION: How and why do programmers use a trace table?</p>	<p>What does this algorithm output for each of the following values of n?</p> <p>n = 2 n = 3 n = 4</p> <p>What does this algorithm do?</p>	<p>SLR 7 Workbook Complete slides 19 – 21</p> <p>Continue working on problems from either slide 16 or slide 18.</p>	 SLR7 Linear search
11	7.11 Lesson 11 – Linear search	<ul style="list-style-type: none"> Understand the linear search algorithm. Understand it is not an efficient algorithm, but it is easier to program than alternatives and does not require the items to be in any order. <p>KEY QUESTION: How does a linear search work?</p>	<p>Consider this list of mountains.</p> <p>With a linear search, how many conditions will be executed to find each of the mountains below?</p> <p>Manaslu Annapurna Broad Peak</p>	<p>SLR 7 Workbook Complete slide 22</p> <p>Write a program to perform a linear search to output the latitude and longitude of a given capital city.</p>	 SLR7 Binary search
12	7.12 Lesson 12 – Binary search	<ul style="list-style-type: none"> Understand the binary search algorithm. Understand the required condition of the list of items in order for the binary search to work. Understand which searching algorithm is quicker. 	<p>Given this list of numbers, can you illustrate the binary search as a picture of a tree?</p> <p>2, 4, 6, 8, 10, 12, 14</p>	<p>SLR 7 Workbook Complete slides 23 and 24</p>	 SLR7 Merge sort

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		KEY QUESTION: How does linear search work?		Write a program to perform a binary search on a list of items.		
13	7.13 Lesson 13 – Merge sort	<ul style="list-style-type: none"> Understand the merge sort algorithm. <p>KEY QUESTION: How does a merge sort work?</p>	<p>Class is divided into two groups. Group 1 are demonstrating a merge sort. Group 2 are demonstrating an insertion sort. To demonstrate this, each person in the team lines up and holds an A4 sheet with a number in front of them. According to the algorithm one student physically moves at a time to show how the sort works.</p>	<p>SLR 7 Workbook Complete slides 25 and 26</p> <p>Continue working on programs you have already started in this unit.</p> <p>There is no need to learn how to program the merge sort as it requires some A level knowledge.</p>	 SLR7 Bubble sort	
14	7.14 Lesson 14 – Bubble sort	<ul style="list-style-type: none"> Understand the bubble sort algorithm. <p>KEY QUESTION: How does a bubble sort work?</p>	<p>What is the value of n after running this code? What does this code do?</p>	<p>SLR 7 Workbook Complete slide 27</p> <p>Write a program to perform a bubble sort on a list of items.</p>	 SLR7 Algorithm efficiency	



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YEAR 11 – TERM 2						
	Focus for lesson	Learning outcomes	Starter	Activities	HW for the next lesson	Key terms
15	7.15 Lesson 15 – Choosing the right algorithm	<ul style="list-style-type: none">Understand that more than one algorithm can be used to solve the same problem.Understand that certain algorithms can be more efficient (quicker) at solving a problem than another. <p>KEY QUESTION: What do we mean by an algorithm’s efficiency?</p>	Use the internet to find out what a “link analysis” algorithm is and how it is used.	SLR 7 Workbook Complete slide 28 Continue working on programs you have already started in this unit.	Revise what you have learned in this topic	
16	Extra padding	This lesson is provided as extra padding for this unit. Use it as you see if during of delivery of this unit.				
17	Extra padding	This lesson is provided as extra padding for this unit. Use it as you see if during of delivery of this unit.				
18	Extra padding	This lesson is provided as extra padding for this unit. Use it as you see if during of delivery of this unit.				
19	SLR 7 – End-of-topic test	End-of-topic test		SLR 7 Test.docx SLR 7 Test Answers.docx		
20	SLR 7 – Action	Action/response lessons		Chance for students to respond to feedback, improve workbooks, correct misunderstandings	 SLR11 Introduction to logic gates and logic circuits  SLR11 Truth tables	
SLR11 Boolean logic						
21	11.1 Lesson 1 – Truth tables for simple logic gates and diagrams	<ul style="list-style-type: none">Understand how to construct truth tables from logic gates NOT AND OR XOR.Understand how to construct truth tables for simple logic circuits.Be able to interpret the results of simple truth tables. <p>KEY QUESTION: What are the symbols used in logic diagrams?</p>	Use http://logic.ly/demo/ to make this circuit: What internal component do you think it could be part of in a computer system?	SLR 11 Workbook Complete slides 2 – 9 Just for fun – this circuit is part of the arithmetic logic unit in the CPU. It adds two binary digits: 0+0=0, 0+1=1, 1+0=1, 1+1=0 carry 1. Give it a go at logic.ly/demo .	 SLR11 Combining Boolean operators to create Boolean expressions	Slides 136-142 AND, NOT, OR, XOR, Logic circuit, Truth table, Boolean expression
22	11.2 Lesson 2 – Boolean expressions and logic circuits	<ul style="list-style-type: none">Know how to make simple logic circuit diagrams from Boolean expressions using AND, OR, NOT, XOR and vice versa.Know how to modify and interpret simple logic circuit diagrams.	Study the electric circuit below. Which logic gate is it? Can you create a circuit for an alternative logic gate?	SLR 11 Workbook Complete slides 10 – 17 Mark your truth tables by drawing the logic diagrams on slides 3-9	 SLR11 Applying logical operators in truth tables to solve problems	

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		KEY QUESTION: How do you complete a truth table?		using http://logic.ly/demo/ Use toggle switches for inputs and a light bulb for the output. Check that the output matches the inputs given for each of your truth tables.		
23	11.3 Lesson 3 – Applying logic operators in truth tables to solve problems	<ul style="list-style-type: none"> Understand how to create, complete or edit logic diagrams and truth tables for given scenarios. KEY QUESTION: How do you create logic diagrams from truth tables?	In the last video, we presented a simple way of remembering which of the following logic gates represents AND, OR and NOT. What was this method? Describe it to the person sitting next to you.	SLR 11 Workbook Complete slides 18 – 20 Mark your truth tables by drawing the logic diagrams on slides 3-9 using logic.ly/demo . Use toggle switches for inputs and a light bulb for the output. Check that the output matches the inputs given for each of your truth tables.	Revise what you have learned in this topic	
24 to 26	Dedicated paper 1 exam revision lesson	Gain experience in answering computational thinking, algorithms and programming questions for component 8525 – Paper 1 using our dedicated exam Revision unit.			Progress with activities in the “Exam revision unit” folder	
27	SLR 11 – End-of-topic test	End-of-topic test			SLR 11 Test.docx SLR 11 Test Answers.docx	
28	SLR 11 – Action	Action/response lessons			Chance for students to respond to feedback, improve workbooks, correct misunderstandings	





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29 to 30	Dedicated paper 1 exam revision lesson	Gain experience in answering computational thinking, algorithms and programming questions for component 8525 – Paper 1 using our dedicated exam Revision unit.	Progress with activities in the “Exam revision unit” folder	 SLR12 <u>Characteristics and purpose of different levels of programming language</u>	
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YEAR 11 – TERM 3						
Focus for lesson		Learning outcomes	Starter	Activities	HW for the next lesson	Key terms
SLR12 Classification of programming languages						
31	12.1 Lesson 1 – Characteristics of languages	<ul style="list-style-type: none"> Know the characteristics of low-level and high-level programming languages. Explain the main differences between low-level and high-level languages. Understand the advantages and disadvantages of low-level language programming compared with high-level language programming. <p>KEY QUESTION: What are the differences between low-level and high-level programming languages?</p>	Translate these alphabet hieroglyphics:	SLR 12 Classification of programming languages workbook Complete slides 2 and 3 Complete any outstanding programming challenges or improve any existing programs	 SLR12 The purpose of translators	Slides 143-150 Low-level languages, High-level languages, Machine code, Assembly language, Translator, Interpreter, Compiler, Assembler
32	12.2 Lesson 2 – Relationship between machine code and assembly	<ul style="list-style-type: none"> Understand the relationship between machine code and low-level languages. Explain the difference between machine code and low-level languages. <p>KEY QUESTION: What is the relationship between machine code and assembly?</p>	What should this program do? What is the problem with it?	SLR 12 Classification of programming languages workbook Complete slides 4 and 5 Complete any outstanding programming challenges or improve any existing programs	 SLR12 Assemblers, compilers and interpreters	
33	12.3 Lesson 3 – Assemblers, compilers and interpreters for translation	<ul style="list-style-type: none"> Know what a translator does. Understand the differences between assemblers, compilers and interpreters. Understand when it would be appropriate to use each type of translator. <p>KEY QUESTION: How does code written by a programmer become binary that a computer can execute?</p>	Research the family tree of programming languages and put these languages in historical order.	SLR 12 Classification of programming languages workbook Complete slides 6 and 7 Activity using BBC Micro emulator https://bbc.godbolt.org/	Revise what you have learned in this topic	
34 to 36	Dedicated paper 1 exam revision lesson	Gain experience in answering computational thinking, algorithms and programming questions for component 8525 – Paper 1 using our dedicated exam Revision unit.		Progress with activities in the “Exam revision unit” folder		

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37	SLR 12 – End-of-topic test	End-of-topic test	SLR 12 Test.docx SLR 12 Test Answers.docx		
38	SLR 12 – Action	Action/response lessons	Chance for students to respond to feedback, improve workbooks, correct misunderstandings		
39 to 42	Dedicated paper 1 exam revision lesson	Gain experience in answering computational thinking, algorithms and programming questions for component 8525 – Paper 1 using our dedicated exam Revision unit.	Progress with activities in the “Exam revision unit” folder		



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YEAR 11 – TERM 4						
	Focus for lesson	Learning outcomes	Starter	Activities	HW for the next lesson	Key terms
SLR14 Relational databases and SQL						
					 SLR14 Relational databases – introduction	
43	14.1 Lesson 1 – Introduction to databases	<ul style="list-style-type: none"> Understand what a database is. Understand what a relational database is. Understand the difference between the two. <p>KEY QUESTION: What makes a 'database' and 'relational database'?</p>	Databases are a vital and integral part of our modern age, storing a vast amount of data. Using the internet see how many database management systems you can list.	SLR 14 Relational databases and SQL Complete slides 2 and 3 "Human database" activity on slides 7-15	 SLR14 Relational database concepts	Slides 179-193 Database, Relational database, Table, Record, Field, Primary key, Foreign key, SQL, SELECT, FROM, WHERE, ORDER BY, INSERT, UPDATE, DELETE
44	14.2 Lesson 2 – Relational database concepts	<ul style="list-style-type: none"> Understand the following database concepts: <ul style="list-style-type: none"> Table Record Field Primary key Foreign key Understand that the use of a relational database facilitates the elimination of data inconsistency and data redundancy. <p>KEY QUESTION: How are separate tables in a 'relational database' linked together?</p>	A new online streaming company is setting up a database of films. 1. Suggest a sensible name for a table it could use to store details of the films. 2. Suggest a list of fields and their data types. Think of fields including strings, integers and real numbers. 3. Suggest which field could be a primary key.	SLR 14 Relational databases and SQL Complete slides 4 and 5 Exploring a relational database activity on slide 7	 SLR14 The use of SQL to search for data from a relational database	
45	14.3 Lesson 3 – SQL: How to query a database	<ul style="list-style-type: none"> Understand how to retrieve data from a relational database by using the SQL command SELECT. Understand how to order the data retrieved from a SQL SELECT command. <p>KEY QUESTION: How do you query a relational database?</p>	How many records would be returned?	SLR 14 Relational databases and SQL Complete slide 6 Complete a range of SQL activities from the following website: sqlzoo.net/wiki/SQL_Tutorial	 SLR14 The use of SQL to insert data into a relational database	



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				<p>Focus on exercises with the keywords:</p> <ul style="list-style-type: none"> • SELECT • FROM • WHERE • ORDER BY 		
46	14.4 Lesson 4 – SQL: How to insert, update and delete	<ul style="list-style-type: none"> • Understand how to insert data into a relational database by using the SQL INSERT command. • Understand how to update data in a relational database by using the SQL UPDATE command. • Understand how to delete data from a relational database by using the SQL DELETE command. <p>KEY QUESTION: When using a relational database, how do you insert, update and delete data?</p>	<p>Which students would be deleted if we executed the following SQL statement:</p> <p>DELETE FROM Students WHERE Tutor Group = 'FMC' AND Gender = 'F'</p>	<p>SLR 14 Relational databases and SQL</p> <p>Complete slides 7 – 9</p> <p>Complete a range of SQL activities from the following website: sqlzoo.net/wiki/SQL_Tutorial</p> <p>Focus on exercises with the keywords:</p> <ul style="list-style-type: none"> • INSERT • UPDATE • DELETE 	Revise what you have learned in this topic	
47 & 48	Dedicated paper 1 exam revision lesson	Gain experience in answering computational thinking, algorithms and programming questions for component 8525 – Paper 1 using our dedicated exam Revision unit.			Progress with activities in the “Exam revision unit” folder	
49	SLR 14 – End-of-topic test	End-of-topic test			SLR 14 Test.docx SLR 14 Test Answers.docx	
50	SLR 14 – Action	Action/response lessons			Chance for students to respond to feedback, improve workbooks, correct misunderstandings	
51 to 54	Dedicated paper 1 exam revision lesson	Gain experience in answering computational thinking, algorithms and programming questions for component 8525 – Paper 1 using our dedicated exam Revision unit.			Progress with activities in the “Exam revision unit” folder	



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YEAR 11 – TERM 5					
Focus for lesson	Learning outcomes and Key Question	Starter	Activities	HW for the next lesson	Key terms
55	Exam revision	<p>This final term before Easter has been set aside for you to use as you see fit for your students. We have many resources to help with revision:</p> <ul style="list-style-type: none"> • Further programming experience with the exam revision unit. • Additional time to complete the many programming challenges and super challenges presented throughout the SLR theory units and from the dedicated programming resources. • Our free, dedicated for students with all our videos and other helpful resources: student.craigndave.org • Our series of videos on exam technique, including how to understand command words and answer extended questions: student.craigndave.org/videos/exam-technique 			
56	Exam revision				
57	Exam revision				
58	Exam revision				
59	Exam revision				
60	Exam revision				
61	Exam revision	<p>We also have a dedicated revision tool and course companion called Smart Revise, which has a bank of over 600 questions for the GCSE 8525 course. It is <i>not</i> simply another MCQ tool – we based the entire design and philosophy of Smart Revise around proven research on how students learn and remember over time. Regular usage of Smart Revise has proven to have marked results on students' ability to recall key information and facts under exam conditions. Smart Revise has a pin-sharp focus on the specification, and every single bullet point is covered.</p>			
62	Exam revision				
63	Exam revision				
64	Exam revision				
65	Exam revision	<p>To find out more about Smart Revise, visit smartrevise.craigndave.org</p> <p>To get started with a free trial, visit www.smartrevise.online.</p>			
66	Exam revision				
67	Exam revision				

