

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

LONG-TERM OVERVIEW

YEAR 12			YEAR 13		
Term	Topics	Assessment	Term	Topics	Assessment
1	<ul style="list-style-type: none"> Introduction to the course SLR 1 Structure and function of the processor (7 lessons) SLR 2 Types of processor (3 lessons) Plus 26 dedicated programming lessons 	<ul style="list-style-type: none"> Completed SLRs 1 and 2 form the basis for assessment. SLR 1 and 2 exam questions 	1	<ul style="list-style-type: none"> SLR 1 (1 lesson + 1 AS recap lesson) SLR 2 (1 lesson + 1 AS recap lesson) SLR 3 and 4 (2 AS recap lessons) SLR 5 (2 lessons + 1 AS recap lesson) SLR 6 (1 AS recap lesson) SLR 7 Types of programming languages (5 lessons) SLR 9 Compression, encryption and hashing (4 lessons) SLR 10 (3 lessons + AS recap lesson) Plus 7 dedicated project lessons 	<ul style="list-style-type: none"> Completed or updated SLRs 1, 2, 5, 7, 9 and 10 form the basis for assessment. SLR 1, 2, 5, 7, 9 and 10 exam questions
2	<ul style="list-style-type: none"> SLR 3 Input, output and storage (5 lessons) SLR 13 Data types (8 lessons) SLR 15 Boolean algebra (5 lessons) SLR 4 Systems software (8 lessons) Plus 16 dedicated programming lessons 	<ul style="list-style-type: none"> Completed SLRs 3, 4, 13 and 15 form the basis for assessment. SLR 3, 4, 13 and 15 exam questions 	2	<ul style="list-style-type: none"> SLR 11 (2 lessons + 1 AS recap lesson) SLR 12 (2 lessons + 1 AS recap lesson) SLR 13 (6 lessons + 1 AS recap lesson) SLR 14 (5 lessons + 1 AS recap lesson) Plus 17 dedicated project lessons 	<ul style="list-style-type: none"> Completed or updated SLRs 11, 12, 13 and 14 form the basis for assessment. SLR 11, 12, 13 and 14 exam questions
3	<ul style="list-style-type: none"> SLR 16 Computer-related legislation (3 lessons) SLR 5 Application generation (4 lessons) SLR 6 Software development (7 lessons) SLR 18 Thinking abstractly (3 lessons) SLR 10 Databases (4 lessons) Plus 15 dedicated programming lessons 	<ul style="list-style-type: none"> Completed SLRs 5, 6, 10, 15, 16 and 18 form the basis for assessment. SLR 5, 6, 10, 15, 16 and 18 exam questions 	3	<ul style="list-style-type: none"> SLR 15 (3 lessons + 1 AS recap lesson) SLR 16,17and18 (3 AS recap lessons) SLR 19 (1 lesson + 1 AS recap lesson) SLR 20 and 21 (2 AS recap lessons) SLR 22 Thinking concurrently (2 lessons) SLR 23 (1 lesson + 1 AS recap lesson) Plus 18 dedicated project lessons 	<ul style="list-style-type: none"> Completed or updated SLRs 15, 19, 22 and 23 form the basis for assessment. SLR 15, 19, 22 and 23 exam questions
4	<ul style="list-style-type: none"> SLR 11 Networks (6 lessons) SLR 12 Web technologies (8 lessons) SLR 17 Ethical, moral and cultural issues (4 lessons) SLR 14 Data structures (4 lessons) SLR 8 Introducing to programming (7 lessons) 	<ul style="list-style-type: none"> Completed SLRs 8, 11, 12, 14 and 17 form the basis for assessment. SLR 8, 11, 12, 14 and 17 exam questions 	4	<ul style="list-style-type: none"> SLR 24 Computational methods (7 lessons) Plus 23 dedicated project lessons 	<ul style="list-style-type: none"> Completed SLR 24 form the basis for assessment. SLR 24 exam questions
5	<ul style="list-style-type: none"> SLR 23 Programming techniques (4 lessons) SLR19 Thinking ahead (3 lessons) SLR 20 Thinking procedurally (3 lessons) SLR 21 Thinking logically (3 lessons) SLR 25 Algorithms (9 lessons) 8 revision lessons 	<ul style="list-style-type: none"> Completed SLRs 19, 20, 21, 23 and 25 form the basis for assessment. SLR 19, 20, 21, 23 and 25 exam questions 	5	<ul style="list-style-type: none"> SLR 26 Algorithms (10 lessons + 1 AS recap lesson) Plus 5 dedicated project lessons 9 revision lessons 	<ul style="list-style-type: none"> Completed SLR 26 form the basis for assessment.
6	<ul style="list-style-type: none"> AS Level Exam Period Preparation for Year 13 course 		The dedicated programming lessons are for students to engage in self-directed programming. See our Excel delivery calendar OCR AS and A-Level – 1-week model (delivery calendar).xlsx		

SHORT-TERM SCHEME OF LEARNING

1. This lesson-by-lesson breakdown is based on a one-week calendar where a school delivers all the AS content in Year 12 and then delivers all the remaining content to make up the full A Level in Year 13. You will need to adapt it slightly to fit your school's delivery model.
2. The delivery method is flipped classroom, and homework is presented *before* the next lesson with a link to our YouTube videos hosted on student.craigndave.org.
3. A description of how a typical Craig 'n' Dave flipped classroom lessons can be structured is available here: craigndave.org/our-pedagogy/alevel-lesson/.
4. Along with the dedicated programming lessons in Year 12, students should reinforce their programming skills through regular practice in their own time. Opportunities for independent programming during lesson time are shown in **green**.
5. Dedicated lesson time for end-of-topic tests and student self-assessment are shown in **blue**.
6. Dedicated lesson time set aside for the A Level project is shown in **purple**.
7. Each topic in this SoL is presented as part of a Structured Learning Record, each structured learning record can be download from your premium account as a single zip file. When extracted they contain the following folders:



Activities

Contains all the activities for you to share with your students.

We often provide **more** activities than your students could reasonably complete in the time provided.

We constantly improve and add to our bank of activities for each SLR, so please check each year for the latest updates!

Pick and choose the most appropriate activities for your students as required.



Answers

Contains all the activities **plus** model answers.

For you to use as you see fit.



Assessment

Contains the Structure Learning Records for your students to fill out as they carry out the activities above.

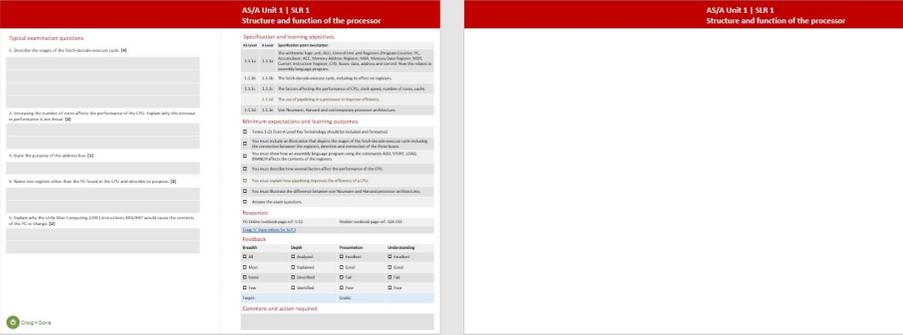
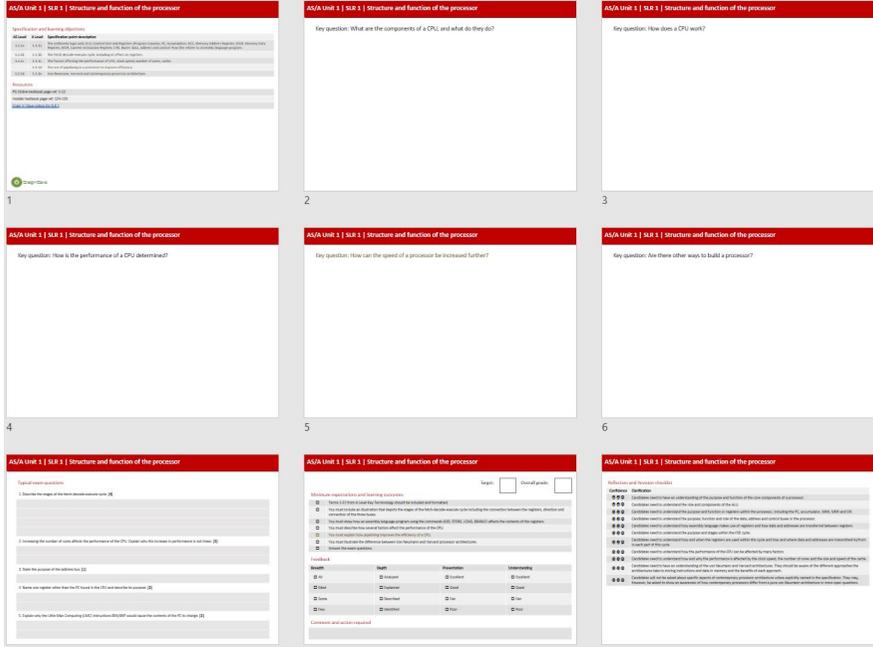
These provide your method of assessment. There is a video in this folder explaining how to get the most out of our SLRs.

Contains answers to the exam questions set in the SLRs.

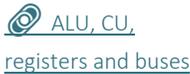
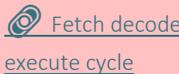


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- 8. Out structured learning records come in two formats. We would not expect a student to complete both formats, choose the one which is most appropriate for each of your students.

A3 Unscaffolded format	A4 Scaffolded format
	
<ul style="list-style-type: none"> • An unscaffolded format to allow students more freedom in how to demonstrate their knowledge and understanding in any way they see fit. • Provides minimal support on the cover page in terms of minimum expectations. • Provides an area for exam questions, assessment and feedback. 	<ul style="list-style-type: none"> • A scaffolded format providing students with prompts in the form of questions which they need to answer in order to demonstrate their knowledge and understanding. • The question slides are referenced in the “Key question” column in the SoL. • Provides an area for exam questions, assessment and feedback. • Provides a reflection and revision checklist.
<p> Assessment with Craig'n'Dave – (AS/A Level)</p>	

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YEAR 12 - TERM 1							
Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms	
0 Introduction to the course	N/A	<ul style="list-style-type: none"> Understand the course structure and appreciate how you will be taught and assessed in this subject. Understand the importance of the flipped classroom approach. 	What is computer science?	None			
1 to 12 Independent programming	N/A	<p>Gain experience in practical programming</p> <p>Use our <i>T.I.M.E</i> workbooks, <i>Programming challenges</i> and <i>Defold games tutorials</i>.</p>		Various	 ALU, CU, registers and buses		
13 SLR1 - Structure and function of the processor	1.1.1a	<ul style="list-style-type: none"> The arithmetic logic unit; ALU, Control Unit and Registers (Program Counter; PC, Accumulator; ACC, Memory Address Register; MAR, Memory Data Register; MDR, Current Instruction Register; CIR). Busses: data, address and control: How this relates to assembly language program. 	What are the components of a CPU, and what do they do? (SLR1 slide 2)	SLR1 Activities folder SLR1 Answers folder (Files starting 01)		ALU, Control unit, Register, PC, ACC, MAR, MDR, CIR, Busses, Data bus, Address bus, Control bus, Fetch-decode-execute, CPU, Clock speed, Cores, Cache, Von Neumann architecture, Harvard architecture, Contemporary architecture	
14 SLR1 - Structure and function of the processor	1.1.1a	<ul style="list-style-type: none"> The arithmetic logic unit; ALU, Control Unit and Registers (Program Counter; PC, Accumulator; ACC, Memory Address Register; MAR, Memory Data Register; MDR, Current Instruction Register; CIR). Busses: data, address and control: How this relates to assembly language program. 	What are the components of a CPU, and what do they do? (SLR1 slide 2)	SLR1 Activities folder SLR1 Answers folder (Files starting 01)			
15 SLR1 - Structure and function of the processor	1.1.1a	<ul style="list-style-type: none"> The arithmetic logic unit; ALU, Control Unit and Registers (Program Counter; PC, Accumulator; ACC, Memory Address Register; MAR, Memory Data Register; MDR, Current Instruction Register; CIR). Busses: data, address and control: How this relates to assembly language program. 	What are the components of a CPU, and what do they do? (SLR1 slide 2)	SLR1 Activities folder SLR1 Answers folder (Files starting 01)	 Fetch decode execute cycle		
16 SLR1 - Structure and function of the processor	1.1.1b	<ul style="list-style-type: none"> The fetch-decode-execute cycle, including its effect on registers. 	How does a CPU work? (SLR1 slide 3)	SLR1 Activities folder SLR1 Answers folder (Files starting 02)	 Performance of the CPU		

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Topic focus		Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
17	SLR1 - Structure and function of the processor	1.1.1c	<ul style="list-style-type: none"> The factors affecting the performance of CPU, clock speed, number of cores, cache. 	How is the performance of a CPU determined? (SLR1 slide 4)	SLR1 Activities folder SLR1 Answers folder (Files starting 03)	 Von Neumann and Harvard	
18	SLR1 - Structure and function of the processor	1.1.1d	<ul style="list-style-type: none"> Von Neumann, Harvard and contemporary processor architecture. 	Are there other ways to build a processor? (SLR1 slide 6)	SLR1 Activities folder SLR1 Answers folder (Files starting 04)		
19	SLR1 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR1 (slide 7) Self-assess (slide 9)		
20 to 24	Independent programming	N/A	Gain experience in practical programming Use our <i>T.I.M.E</i> workbooks, <i>Programming challenges</i> and <i>Defold games tutorials</i> .		Various	 CISC vs RISC	
25	SLR2 - Types of processor	1.1.2a	<ul style="list-style-type: none"> The differences between and uses of CISC and RISC processors 	What are the differences between the RISC and CISC architectures? (SLR2 slide 2)	SLR2 Activities folder SLR2 Answers folder (Files starting 01)	 Multicore and parallel systems	CISC, RISC, Multicore system, Parallel processor system
26	SLR2 - Types of processor	1.1.2b	<ul style="list-style-type: none"> Multicore and parallel systems 	How does having multiple cores affect the speed of processing? (SLR2 slide 3)	SLR2 Activities folder SLR2 Answers folder (Files starting 02)		
27	SLR2 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR2 (slide 5) Self-assess (slide 7)		
28 to 36	Independent programming	N/A	Gain experience in practical programming Use our <i>T.I.M.E</i> workbooks, <i>Programming challenges</i> and <i>Defold games tutorials</i> .		Various	 Input, Output and Storage devices	

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YEAR 12 - TERM 2							
Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms	
37	SLR3 - Input, output and storage	1.1.3a	<ul style="list-style-type: none"> How different input, output and storage devices can be applied as a solution to different problems 	How are input, output and storage devices used in typical applications of Computer Science? (SLR3 slide 2)	SLR3 Activities folder SLR3 Answers folder (Files starting 01)	Magnetic, Flash and Optical storage	Input device, Output device, Storage device, Magnetic storage, Flash storage, Optical storage, RAM, ROM, Virtual storage
38	SLR3 - Input, output and storage	1.1.3b	<ul style="list-style-type: none"> The uses of magnetic, flash and optical storage devices 	How do different storage devices compare in terms of cost, capacity and speed? (SLR3 slide 3)	SLR3 Activities folder SLR3 Answers folder (Files starting 02)		
39	SLR3 - Input, output and storage	1.1.3b	<ul style="list-style-type: none"> The uses of magnetic, flash and optical storage devices 	How do different storage devices compare in terms of cost, capacity and speed? (SLR3 slide 3)	SLR3 Activities folder SLR3 Answers folder (Files starting 02)	RAM and ROM Virtual storage	
40	SLR3 - Input, output and storage	1.1.3c&d	<ul style="list-style-type: none"> RAM and ROM Virtual storage 	What are the characteristics of ROM and RAM? (SLR3 slide 4) What are the benefits and drawbacks of virtual storage? (SLR3 slide 5)	SLR3 Activities folder SLR3 Answers folder (Files starting 03)		
41	SLR3 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR3 (slide 6) Self-assess (slide 8)	Primitive Data Types	
42	SLR13 – Data types	1.4.1a	<ul style="list-style-type: none"> Primitive data types, integer, real/floating-point, character, string and Boolean 	What is meant by the term, 'data type'? (SLR13 slide 2)	SLR13 Activities folder SLR13 Answers folder (Files starting 01)	Binary Positive Integers Sign and Magnitude Two's Complement	Primitive data types, Integer, Real, Floating point, Character, String, Boolean, Binary, Sign and magnitude, Two's complement, Hexadecimal, Denary, Character sets, ASCII, UNICODE, Array
43	SLR13 – Data types	1.4.1b&c	<ul style="list-style-type: none"> Represent positive integers in binary Use of sign and magnitude and two's complement to represent negative numbers in binary 	How are numbers stored in memory? (SLR13 slide 3)	SLR13 Activities folder SLR13 Answers folder (Files starting 02 & 03)	Binary Addition and Subtraction	
44	SLR13 – Data types	1.4.1d	<ul style="list-style-type: none"> Addition and subtraction of binary integers 	How does an arithmetic logic unit (ALU) perform arithmetic? (SLR13 slide 4)	SLR13 Activities folder SLR13 Answers folder (Files starting 04)	Hexadecimal Representation	

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					Converting between Binary, Hex and Denary	
45	SLR13 – Data types	1.4.1e&f	<ul style="list-style-type: none"> Represent positive integers in hexadecimal Convert positive integers between binary hexadecimal and denary 	Provide an example of a situation where working with large binary numbers is a problem. What is the solution? (SLR13 slide 5)	SLR13 Activities folder SLR13 Answers folder (Files starting 05 & 06)	Floating-point binary – Part 1 Floating-point binary – part 2 (normalisation)
46	SLR13 – Data types	1.4.1g	<ul style="list-style-type: none"> Positive and negative real numbers using normalised floating-point representation 	How does a computer store fractions (real numbers)? (SLR13 slide 6)	SLR13 Activities folder SLR13 Answers folder (Files starting 07)	Floating point binary – Part 3 (further examples)
47	SLR13 – Data types	1.4.1g	<ul style="list-style-type: none"> Positive and negative real numbers using normalised floating-point representation 	How does a computer store a larger range of numbers in a fixed number of bits in memory? (SLR13 slide 7)	SLR13 Activities folder SLR13 Answers folder (Files starting 07)	Character Sets
48	SLR13 – Data types	1.4.1h	<ul style="list-style-type: none"> How character sets (ASCII and UNICODE) are used to represent text 	How does a computer store text in memory? (SLR13 slide 9)	SLR13 Activities folder SLR13 Answers folder (Files starting 08)	
49	SLR13 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity		Test – SLR13 (slide 11) Self-assess (slide 13-14)		
50 to 54	Independent programming	N/A	Gain experience in practical programming Use our <i>T.I.M.E</i> workbooks, <i>Programming challenges</i> and <i>Defold games tutorials</i> .	Various	Define problems using Boolean logic	
55	SLR15 – Boolean algebra	1.4.3a	<ul style="list-style-type: none"> Define problems using Boolean logic 	What are the Boolean operators and their associated logic gate symbols? (SLR15 slide 2)	SLR15 Activities folder SLR15 Answers folder (Files starting 01)	Boolean logic, Karnaugh maps, Logic gate diagram, Truth table, AND, OR, NOT, XOR
56	SLR15 – Boolean algebra	1.4.3a	<ul style="list-style-type: none"> Define problems using Boolean logic 	What are the Boolean operators and their associated logic gate symbols? (SLR15 slide 2)	SLR15 Activities folder SLR15 Answers folder (Files starting 01)	

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					Karnaugh maps part 3 Karnaugh maps part 4		
57	SLR15 – Boolean algebra	1.4.3b	<ul style="list-style-type: none"> Manipulate Boolean expressions, including the use of Karnaugh maps to simplify Boolean expressions 	How can Karnaugh maps be used to simplify Boolean expressions? (SLR15 slide 4)	SLR15 Activities folder SLR15 Answers folder (Files starting 03)	Logic gates and truth tables	
58	SLR15 – Boolean algebra	1.4.3c	<ul style="list-style-type: none"> Using logic gate diagrams and truth tables 	How do you translate a logic gate diagram into its associated truth table and Boolean expression and vice versa? (SLR15 slide 3)	SLR15 Activities folder SLR15 Answers folder (Files starting 02)		
59	SLR15 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity		Test – SLR15 (slide 8) Self-assess (slide 10)			
60	Independent programming	N/A	Gain experience in practical programming Use our <i>T.I.M.E</i> workbooks, <i>Programming challenges</i> and <i>Defold games tutorials</i> .	Various	Need for operating systems Paging, segmentation and virtual memory		
61	SLR4 – Operating systems	1.2.1a&b	<ul style="list-style-type: none"> The need for, function and purposes of operating systems Memory management (paging, segmentation and virtual memory) 	Why do computers need an operating system like Windows/Linux/macOS? (SLR4 slide 2) How does a computer handle running out of memory and why does it slow down? (SLR4 slide 3)	SLR4 Activities folder SLR4 Answers folder (Files starting 01 & 02)	Interrupts	Operating system, Memory management, Paging, Segmentation, Virtual memory,
62	SLR4 – Operating systems	1.2.1c	<ul style="list-style-type: none"> Interrupts, the role of interrupts and Interrupt Service Routines (ISR), role within the fetch decode execute cycle 	What causes an interrupt to the CPU and how is it handled? (SLR4 slide 4)	SLR4 Activities folder SLR4 Answers folder (Files starting 03)	Scheduling	Interrupt, ISR, Scheduling, RR, FCFS, MLFQ, SJF, SRT, Distributed OS, Embedded OS, Multi-tasking OS, Multi-user
63	SLR4 – Operating systems	1.2.1d	<ul style="list-style-type: none"> Scheduling: round robin, first come first served, multi-level feedback queues, shortest job first and shortest remaining time 	From all the open programs in memory, how does the CPU decide which process to execute? (SLR4 slide 5)	SLR4 Activities folder SLR4 Answers folder (Files starting 04)		

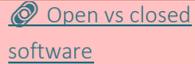
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Topic focus		Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
64	SLR4 – Operating systems	1.2.1d	<ul style="list-style-type: none"> Scheduling: round robin, first come first served, multi-level feedback queues, shortest job first and shortest remaining time 	From all the open programs in memory, how does the CPU decide which process to execute? (SLR4 slide 5)	SLR4 Activities folder SLR4 Answers folder (Files starting 04)	 Types of operating system	OS, Real-time OS, BIOS, Device drivers, Virtual machine, Intermediate code
65	SLR4 – Operating systems	1.2.1e	<ul style="list-style-type: none"> Distributed, embedded, multi-tasking, multi-user and real-time operating systems 	What are the features of different types of operating system? (SLR4 slide 6)	SLR4 Activities folder SLR4 Answers folder (Files starting 05)	 BIOS  Device drivers	
66	SLR4 – Operating systems	1.2.1f&g	<ul style="list-style-type: none"> BIOS Device drivers 	What is the relationship between these terms: BIOS, ROM, CMOS, POST, bootstrap and kernel? (SLR4 slide 7) What is the purpose of a device driver? (SLR4 slide 8)	SLR4 Activities folder SLR4 Answers folder (Files starting 06 & 07)	 Virtual machines	
67	SLR4 – Operating systems	1.2.1h	<ul style="list-style-type: none"> Virtual machines, any instance where software is used to take on the function of a machine including executing intermediate code or running an operating system within another 	What is a virtual machine? (SLR4 slide 9)	SLR4 Activities folder SLR4 Answers folder (Files starting 09)		
68	SLR4 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR4 (slide 10) Self-assess (slide 12)		
69 to 79	Independent programming	N/A	Gain experience in practical programming Use our <i>T.I.M.E</i> workbooks, <i>Programming challenges</i> and <i>Defold games tutorials</i> .		Various		
80 to 84	This is the last week before Christmas. It has been left free in our delivery calendar as a buffer week.						

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YEAR 12 - TERM 3							
Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms	
					Data Protection Act (superseded by GDPR) Computer Misuse Act		
85	SLR16 – Computer-related legislation	1.5.1a&b	<ul style="list-style-type: none"> The Data Protection Act 2018 (GDPR) The Computer Misuse Act 1990 	What are the principles of the Data Protection laws? (SLR16 slide 2) How does the DPA affect what organisations can and cannot do with stored data? (SLR16 slide 3) What is the purpose of the Computer Misuse Act and what does it prohibit? (SLR16 slide 4)	SLR16 Activities folder SLR16 Answers folder (Files starting 02 & 03)	Copyright Design and Patents Act Investigatory Powers Act	DPA, GDPR, CMD, CDPA, RIPA
86	SLR16 – Computer-related legislation	1.5.1c&d	<ul style="list-style-type: none"> The Copyright Design and Patents Act 1988 The Regulation of Investigatory Powers Act 2000 	What is the purpose of the Copyright Design and Patents Act and what does it prohibit? (SLR16 slide 5) What is the purpose of the Regulation of Investigatory Powers Act and what does it enable? (SLR16 slide 6)	SLR16 Activities folder SLR16 Answers folder (Files starting 04, 05 & 06)		
87	SLR16 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity		Test – SLR16 (slide 7) Self-assess (slide 9)			
88 to 96	Independent programming	N/A	Gain experience in practical programming Use our <i>T.I.M.E</i> workbooks, <i>Programming challenges</i> and <i>Defold games tutorials</i> .	Various	The nature of applications		
97	SLR5 – Application generation	1.2.2a	<ul style="list-style-type: none"> The nature of applications, justifying suitable applications for a specific purpose 	In what ways do typical businesses use applications software?	SLR5 Activities folder SLR5 Answers folder	Utilities	Application, Utilities, Open

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Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms	
			(SLR5 slide 2)	(Files starting 01)	 Open vs closed software	source, Closed source, Source code, Translator, Interpreter, Compiler, Assembler	
98	SLR5 – Application generation	1.2.2b&c	<ul style="list-style-type: none"> Utilities Open source vs Closed source 	How do utilities help to keep your computer safe and in working order? (SLR5 slide 3) What are the considerations for a school between choosing an open or closed learning platform? (SLR5 slide 4)	SLR5 Activities folder SLR5 Answers folder (Files starting 02 & 03)	 Translators	
99	SLR5 – Application generation	1.2.2d	<ul style="list-style-type: none"> Translators: interpreters, compilers and assemblers 	How does a program become the binary code that a computer can execute? (SLR5 slide 5)	SLR5 Activities folder SLR5 Answers folder (Files starting 04)		
100	SLR5 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity		Test – SLR5 (slide 8) Self-assess (slide 10)			
101 to 106	Independent programming	N/A	Gain experience in practical programming Use our <i>T.I.M.E</i> workbooks, <i>Programming challenges</i> and <i>Defold games tutorials</i> .	Various	 Development Methodologies Part 1  Development Methodologies Part 2		
107	SLR6 – Software development	2.2.2a&b	<ul style="list-style-type: none"> Understand the waterfall lifecycle, agile methodologies, extreme programming, the spiral model and rapid application The relative merits and drawbacks of different methodologies and when they might be used 	How are large scale programming projects undertaken? (SLR6 slide 2)	SLR6 Activities folder SLR6 Answers folder (Files starting 01 & 02)		SDLC, Waterfall model, Agile methodologies, Extreme programming, Spiral model, RAD
108	SLR6 – Software development	2.2.2a&b	<ul style="list-style-type: none"> Understand the waterfall lifecycle, agile methodologies, extreme programming, the spiral model and rapid application The relative merits and drawbacks of different methodologies and when they might be used 	What are the advantages and disadvantages of each development methodology? (SLR6 slide 3)	SLR6 Activities folder SLR6 Answers folder (Files starting 01 & 02)	 Algorithms	

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109	SLR6 – Software development	2.2.2c	<ul style="list-style-type: none"> Writing and following algorithms 	What techniques, skills and tools can we use to help us write and follow algorithms? (SLR6 slide 4)	SLR6 Activities folder SLR6 Answers folder (Files starting 03)	Test Strategies	
110	SLR6 – Software development	2.2.2d	<ul style="list-style-type: none"> Different test strategies, including black and white box testing and alpha and beta testing 	What are the features of the different ways a program can be tested? (SLR6 slide 5)	SLR6 Activities folder SLR6 Answers folder (Files starting 04)		
111	SLR6 – Software development	2.2.2d	<ul style="list-style-type: none"> Different test strategies, including black and white box testing and alpha and beta testing 	What are the features of the different ways a program can be tested? (SLR6 slide 5)	SLR6 Activities folder SLR6 Answers folder (Files starting 04)	Test Data and User Feedback	
112	SLR6 – Software development	2.2.2e	<ul style="list-style-type: none"> Test programs that solve problems using suitable test data and end-user feedback, justify a test strategy for a given situation 	What are the features of the different ways a program can be tested? (SLR6 slide 5)	SLR6 Activities folder SLR6 Answers folder (Files starting 05)		
113	SLR6 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR6 (slide 6) Self-assess (slide 8)	Nature of abstraction Need for abstraction Abstraction and reality	
114	SLR18 – Thinking abstractly	2.2.1a, b & c	<ul style="list-style-type: none"> The nature of abstraction The need for abstraction The differences between abstraction and reality 	What is abstraction and why is it needed? (SLR18 slide 2) How is abstraction used in every-day life? (SLR18 slide 3) What are some examples of abstraction in computer science? (SLR18 slide 4)	SLR18 Activities folder SLR18 Answers folder (Files starting 01, 02 & 03)	Devise an abstract model	Abstraction, Abstract model, Thinking abstractly
115	SLR18 – Thinking abstractly	2.1.1d	<ul style="list-style-type: none"> Devise an abstract model for a variety of situations 	What is meant by an abstract model? Provide some examples. (SLR18 slide 5)	SLR18 Activities folder SLR18 Answers folder (Files starting 04)		
116	SLR18 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR18 (slide 6) Self-assess (slide 8)	Introduction to data concepts	

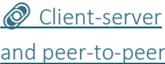
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Topic focus		Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
117	SLR10 – Databases	1.3.1a	<ul style="list-style-type: none"> Relational database, flat file, primary key, foreign key, secondary key, entity-relationship modelling, normalisation and indexing 	What are the key terms associated with databases? (SLR10 slide 2)	SLR10 Activities folder SLR10 Answers folder (Files starting 01)		Relational database, Flat file, Primary key, Foreign key, Concatenated primary key, Secondary key,
118	SLR10 – Databases	1.3.1a	<ul style="list-style-type: none"> Relational database, flat file, primary key, foreign key, secondary key, entity-relationship modelling, normalisation and indexing 	What are the key terms associated with databases? (SLR10 slide 2)	SLR10 Activities folder SLR10 Answers folder (Files starting 01)	 Methods of capturing data	
119	SLR10 – Databases	1.3.1b	<ul style="list-style-type: none"> Methods of capturing, selecting, managing and exchanging data 	How can data be captured and exchanged for databases? (SLR10 slide 3)	SLR10 Activities folder SLR10 Answers folder (Files starting 02)		
120	SLR10 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR10 (slide 7) Self-assess (slide 9-10)		

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YEAR 12 - TERM 4							
Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms	
122-126	Term 1-3 assessment opportunity	The lessons in this first week back have been set aside to carry out a mock exam and marking with the students on the material covered in terms 1-3.					
					Network characteristics and protocols		
127	SLR11 – Networks	1.3.2a	<ul style="list-style-type: none"> Characteristics of networks and the importance of protocols and standards 	What is a network and why are they more useful than stand-alone computers? (SLR11 slide 2) What are the definitions of standards and protocols, and why are they needed? (SLR11 slide 3) What are the typical standards and protocols used in networking today? (SLR11 slide 4)	SLR11 Activities folder SLR11 Answers folder (Files starting 01)	TCP IP, DNS and Protocol layers	Protocol, TCP/IP stack, DNS, Protocol layering, LAN, WAN, Packet switching, Circuit switching, Client-server, Peer to peer
128	SLR11 – Networks	1.3.2a&b	<ul style="list-style-type: none"> Characteristics of networks and the importance of protocols and standards Internet structure: -The TCP/IP Stack -DNS -Protocol layering -LANs and WANs -Packet and circuit switching 	What does protocol layering mean and why is it needed? (SLR11 slide 5) How does the internet work using TCP/IP? (SLR11 slide 6) How does the domain name system work using recursive domain name servers? (SLR 11 slide 7)	SLR11 Activities folder SLR11 Answers folder (Files starting 01, 02 & 03)	LANs & WANs Packet and circuit switching	
129	SLR11 – Networks	1.3.2b	<ul style="list-style-type: none"> Internet structure: -The TCP/IP Stack -DNS -Protocol layering -LANs and WANs -Packet and circuit switching 	How does circuit switching work? (SLR11 slide 8) How does packet switching work? (SLR11 slide 9) What are the differences between local and wide area networks? (SLR11 slide 10)	SLR11 Activities folder SLR11 Answers folder (Files starting 01, 02 & 03)		

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Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms	
130	SLR11 – Networks	1.3.2b	<ul style="list-style-type: none"> Internet structure: -The TCP/IP Stack -DNS -Protocol layering -LANs and WANs -Packet and circuit switching 	All previous questions.	SLR11 Activities folder SLR11 Answers folder (Files starting 07)		
131	SLR11 – Networks	1.3.2c	<ul style="list-style-type: none"> Client-server and Peer to Peer 	What are the differences between a client-server and peer-to-peer network topology? (SLR11 slide 13)	SLR11 Activities folder SLR11 Answers folder (Files starting 06)		
132	SLR11 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity		Test – SLR11 (slide 14) Self-assess (slide 16)			
133	SLR12 – Web technologies	1.3.3a	<ul style="list-style-type: none"> HTML, CSS and JavaScript 	How does a browser display a web page using HTML and CSS? (SLR12 slide 2) Provide an example of JavaScript. (SLR12 slide 3)	SLR12 Activities folder SLR12 Answers folder (Files starting 01)		HTML, CSS, JavaScript
134	SLR12 – Web technologies	1.3.3a	<ul style="list-style-type: none"> HTML, CSS and JavaScript 	How does a browser display a web page using HTML and CSS? (SLR12 slide 2) Provide an example of JavaScript. (SLR12 slide 3)	SLR12 Activities folder SLR12 Answers folder (Files starting 01)		
135	SLR12 – Web technologies	1.3.3a	<ul style="list-style-type: none"> HTML, CSS and JavaScript 	How does a browser display a web page using HTML and CSS? (SLR12 slide 2) Provide an example of JavaScript. (SLR12 slide 3)	SLR12 Activities folder SLR12 Answers folder (Files starting 01)		
136	SLR12 – Web technologies	1.3.3a	<ul style="list-style-type: none"> HTML, CSS and JavaScript 	How does a browser display a web page using HTML and CSS? (SLR12 slide 2) Provide an example of JavaScript. (SLR12 slide 3)	SLR12 Activities folder SLR12 Answers folder (Files starting 01)		
137	SLR12 – Web technologies	1.3.3a	<ul style="list-style-type: none"> HTML, CSS and JavaScript 	How does a browser display a web page using HTML and CSS? (SLR12 slide 2)	SLR12 Activities folder SLR12 Answers folder (Files starting 01)		
137	SLR12 – Web technologies	1.3.3a	<ul style="list-style-type: none"> HTML, CSS and JavaScript 	How does a browser display a web page using HTML and CSS? (SLR12 slide 2)	SLR12 Activities folder SLR12 Answers folder (Files starting 01)		

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Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms	
			Provide an example of JavaScript. (SLR12 slide 3)				
138	SLR12 – Web technologies	1.3.3a	<ul style="list-style-type: none"> HTML, CSS and JavaScript 	<p>How does a browser display a web page using HTML and CSS? (SLR12 slide 2)</p> <p>Provide an example of JavaScript. (SLR12 slide 3)</p>	SLR12 Activities folder SLR12 Answers folder (Files starting 01)	 Lossy vs Lossless	
139	SLR12 – Web technologies	1.3.3b	<ul style="list-style-type: none"> Lossy v lossless compression 	<p>What is the difference between lossy and lossless compression, and what are the limitations of each? (SLR12 slide 6)</p>	SLR12 Activities folder SLR12 Answers folder (Files starting 02)		
140	SLR12 – End-of-topic test	<p>End-of-topic test</p> <p>Student self-assessment RAG rating opportunity</p>		<p>Test – SLR12 (slide 7)</p> <p>Self-assess (slide 9)</p>	 Moral, social and ethical issues Part 1		
141	SLR17 – Ethical, moral and cultural issues	1.5.2a	<ul style="list-style-type: none"> The individual (moral), social (ethical) and cultural opportunities and risks of digital technology: <ul style="list-style-type: none"> Computers in the workforce Automated decision making Artificial intelligence 	<p>Topic for consideration: Computers in the workforce: moral, ethical and social issues.</p> <p>Topic for consideration: Automated decision making: moral, ethical and social issues.</p> <p>Topic for consideration: Artificial intelligence: moral, ethical and social issues. (SLR17 slide 2-4)</p>	SLR17 Activities folder SLR17 Answers folder (Files starting 01)	 Moral, social and ethical issues Part 2  Moral, social and ethical issues Part 3	Ethical issues, Moral issues, Cultural issues, Environmental issues
142	SLR17 – Ethical, moral and cultural issues	1.5.2a	<ul style="list-style-type: none"> The individual (moral), social (ethical) and cultural opportunities and risks of digital technology: <ul style="list-style-type: none"> Environmental effects Censorship and the Internet Monitor behaviour 	<p>Topic for consideration: Environmental effects of computer science: moral, ethical and social issues.</p> <p>Topic for consideration: Censorship and the Internet: moral, ethical and social issues.</p> <p>Topic for consideration: Monitoring behaviour: moral, ethical and social issues. (SLR17 slide 5-7)</p>	SLR17 Activities folder SLR17 Answers folder (Files starting 01)	 Moral, social and ethical issues Part 4  Moral, social and ethical issues Part 5	

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
143 SLR17 – Ethical, moral and cultural issues	1.5.2a	<ul style="list-style-type: none"> The individual (moral), social (ethical) and cultural opportunities and risks of digital technology: <ul style="list-style-type: none"> Analyse personal information Piracy and offensive communications Layout, colour paradigms and character sets 	<p>Topic for consideration: Analysing personal information: moral, ethical and social issues.</p> <p>Topic for consideration: Piracy and offensive communications: moral, ethical and social issues.</p> <p>Topic for consideration: Interface layout, colour paradigms and character sets (SLR17 slide 8-10)</p>	SLR17 Activities folder SLR17 Answers folder (Files starting 01)		
144 SLR17 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR17 (slide 11) Self-assess (slide 13)	Arrays, records, lists and tuples Tuples, static or dynamic	
145 SLR14 – Data structures	1.4.2a	<ul style="list-style-type: none"> Arrays (of up to 3 dimensions), records, lists, tuples 	What are the differences between arrays, lists and tuples? (SLR14 slide 2)	SLR14 Activities folder SLR14 Answers folder (Files starting 01)	Stacks and queues	Array, Records, Lists, Tuple, Stack, Queue
146 SLR14 – Data structures	1.4.2b	<ul style="list-style-type: none"> The properties of stacks and queues 	<p>How do the operations push and pop work with a stack stored as an array? (SLR14 slide 3)</p> <p>How do the operations enqueue and dequeue work with a queue stored as an array? (SLR14 slide 4)</p> <p>What are the uses of stacks and queues in computer science? (SLR14 slide 5)</p>	SLR14 Activities folder SLR14 Answers folder (Files starting 02 & 03)		
147 SLR14 – Data structures	1.4.2b	<ul style="list-style-type: none"> The properties of stacks and queues 	<p>How do the operations push and pop work with a stack stored as an array? (SLR14 slide 3)</p> <p>How do the operations enqueue and dequeue work with a queue stored as an array?</p>	SLR14 Activities folder SLR14 Answers folder (Files starting 02 & 03)		

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Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
			(SLR14 slide 4) What are the uses of stacks and queues in computer science? (SLR14 slide 5)			
148	SLR14 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity		Test – SLR14 (slide 13) Self-assess (slide 15)	Intro to programming – Part 1, program flow Intro to programming – Part 2, variables and constants Intro to programming – Part 3, procedures and functions	
149	SLR8 – Introduction to programming	1.2.3a <ul style="list-style-type: none"> Procedural programming language techniques: program flow, variables and constants, procedures and functions, arithmetic, Boolean and assignment operators, string handling, file handling 	What are the three primary programming constructs? (SLR8 slide 2) What is the difference between variables and constants and how can they be used? (SLR8 slide 3) What is the difference between a procedure and a function and how do we pass parameters to them? (SLR8 slide 4)	SLR8 Activities folder SLR8 Answers folder (Files starting 01)	Intro to programming – Part 4, mathematical operators Intro to programming – Part 5, string handling Intro to programming – Part 6, file handling	Sequence, Selection, Iteration, Variables, Constants, Procedures, Functions, Arithmetic operators, Boolean operators, Assignment operators, String handling, File handling, LMC
150	SLR8 – Introduction to programming	1.2.3a <ul style="list-style-type: none"> Procedural programming language techniques: program flow, variables and constants, procedures and functions, arithmetic, Boolean and assignment operators, string handling, file handling 	What are the common arithmetic / logical and Boolean operators used in procedural programming? (SLR8 slide 5) What is string handling in programming and what are some of the most common string handling operations?	SLR8 Activities folder SLR8 Answers folder (Files starting 01)	Assembly language and LMC language	Assignment operators, String handling, File handling, LMC

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
				(SLR8 slide 6) How do you read from and write to a simple text file? (SLR8 slide 7)			
151	SLR8 – Introduction to programming	1.2.3b	<ul style="list-style-type: none"> Assembly language (including following and writing programs with Little Man Computer) 	What are assembly code and the Little Man Computer language? (SLR8 slide 8)	SLR8 Activities folder SLR8 Answers folder (Files starting 02)		
152	SLR8 – Introduction to programming	1.2.3b	<ul style="list-style-type: none"> Assembly language (including following and writing programs with Little Man Computer) 	What are assembly code and the Little Man Computer language? (SLR8 slide 8)	SLR8 Activities folder SLR8 Answers folder (Files starting 02)		
153	SLR8 – Introduction to programming	1.2.3b	<ul style="list-style-type: none"> Assembly language (including following and writing programs with Little Man Computer) 	What are assembly code and the Little Man Computer language? (SLR8 slide 8)	SLR8 Activities folder SLR8 Answers folder (Files starting 02)		
154	SLR8 – Introduction to programming	1.2.3b	<ul style="list-style-type: none"> Assembly language (including following and writing programs with Little Man Computer) 	What are assembly code and the Little Man Computer language? (SLR8 slide 8)	SLR8 Activities folder SLR8 Answers folder (Files starting 02)		
155	SLR8 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR8 (slide 9) Self-assess (slide 11)		
156	Buffer lesson	Use this extra lesson as you see fit					

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

YEAR 12 - TERM 5

Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms	
					Programming constructs Global and local variables		
157	SLR23 – Programming techniques	3.3.2a&b	<ul style="list-style-type: none"> Programming constructs: sequence, iteration, branching Global and local variables 	What are the 3 basic programming constructs? (SLR23 slide 2) What is the difference between local and global variables and when should they be used? (SLR23 slide 3)	SLR23 Activities folder SLR23 Answers folder (Files starting 01 & 02)	Functions and procedures	Sequence, Selection, Iteration, Global variable, Local variables, Modularity, Procedure, Function, Parameters, Parameter passing, Parameter passing by value, Parameter passing by reference, IDE, Debugging
158	SLR23 – Programming techniques	3.3.2c	<ul style="list-style-type: none"> Modularity, functions and procedures, parameter passing by value and reference 	What is the difference between procedures and functions, and what is the difference between passing parameters by value and by reference? (SLR23 slide 4)	SLR23 Activities folder SLR23 Answers folder (Files starting 03 & 04)	IDEs	
159	SLR23 – Programming techniques	3.3.2d	<ul style="list-style-type: none"> Use of an IDE to develop/debug a program 	What are the features of an IDE? (SLR23 slide 5)	SLR23 Activities folder SLR23 Answers folder (Files starting 05)		
160	SLR23 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity		Test – SLR23 (slide 8) Self-assess (slide 11)	Identify inputs and outputs Determining preconditions		
161	SLR19 – Thinking ahead	2.1.2a&b	<ul style="list-style-type: none"> Identify the inputs and outputs for a given situation Determine the preconditions for devising a solution to a problem 	What are the inputs and outputs of a real-world system? (SLR19 slide 2) What are preconditions for devising a solution to a problem? (SLR19 slide 3)	SLR19 Activities folder SLR19 Answers folder (Files starting 01 & 02)	Reusable program components	Thinking ahead, System inputs, System outputs, Solution preconditions

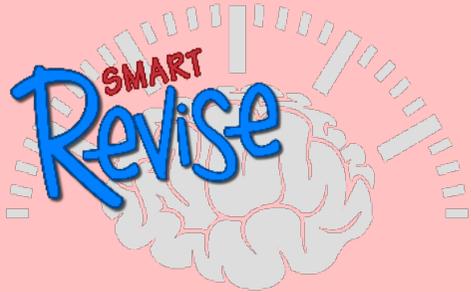
AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
162	SLR19 – Thinking ahead	2.1.2b&c	<ul style="list-style-type: none"> The need for reusable program components 	What are the benefits and drawbacks of reusable program components? (SLR19 slide 4)	SLR19 Activities folder SLR19 Answers folder (Files starting 03)		
163	SLR19 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR19 (slide 6) Self-assess (slide 8)	Identify components of a problem Identify components of a solution	
164	SLR20 – Thinking procedurally	2.1.3a&b	<ul style="list-style-type: none"> Identify the components of a problem Identify the components of a solution to a problem 	How can a system diagram be used to represent a computing problem? (SLR20 slide 2) How are flowcharts used to define algorithms? (SLR20 slide 3)	SLR20 Activities folder SLR20 Answers folder (Files starting 01 & 02)	Steps to solve a problem Identify subprocedures	Thinking procedurally
165	SLR20 – Thinking procedurally	2.1.3c&d	<ul style="list-style-type: none"> Determine the order of the steps needed to solve a problem Identify sub-procedures necessary to solve a problem 	How is pseudocode used as an alternative to flowcharts? (SLR20 slide 4) What are sub-procedures, and how do they help to construct a complete solution to a problem? (SLR20 slide 5)	SLR20 Activities folder SLR20 Answers folder (Files starting 03 & 04)		
166	SLR20 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR20 (slide 6) Self-assess (slide 8)	Decisions and program flow Determine logical conditions	
167	SLR21 – Thinking logically	2.1.4a&b	<ul style="list-style-type: none"> Identify the points in a solution where a decision has to be taken Determine the logical conditions that affect the outcome of a decision 	What is meant by the term “decision points” in a program? (SLR21 slide 2)	SLR21 Activities folder SLR21 Answers folder (Files starting 00, 01 & 02)	Decision points in a solution	Thinking logically
168	SLR21 – Thinking logically	2.1.4b&c	<ul style="list-style-type: none"> Determine the logical conditions that affect the outcome of a decision 	How do decisions affect the flow of a program?	SLR21 Activities folder SLR21 Answers folder		

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Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
		<ul style="list-style-type: none"> Determine how decisions affect flow through a program 	(SLR21 slide 3)	(Files starting 03)		
169	SLR21 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity		Test – SLR21 (slide 4) Self-assess (slide 6)	Analysis and design of algorithms	
170	SLR25 – Algorithms	2.3.1a <ul style="list-style-type: none"> Analysis and design of algorithms for a given situation 	None for this lesson	None for this lesson	Standard algorithms Implement bubble sort	Algorithm, Bubble sort, Insertion sort, Binary search, Linear search, Stacks, Queues
171	SLR25 – Algorithms	2.3.1b&c <ul style="list-style-type: none"> Standard algorithms (bubble sort, insertion sort, binary search and linear search) Implement bubble sort, insertion sort 	How does the bubble sort work? (SLR25 slide 2) How does the insertion sort work? (SLR25 slide 3)	SLR25 Activities folder SLR25 Answers folder (Files starting 01 & 02)	Implement insertion sort	
172	SLR25 – Algorithms	2.3.1b&c <ul style="list-style-type: none"> Standard algorithms (bubble sort, insertion sort, binary search and linear search) Implement bubble sort, insertion sort 	How does the bubble sort work? (SLR25 slide 2) How does the insertion sort work? (SLR25 slide 3)	SLR25 Activities folder SLR25 Answers folder (Files starting 01 & 02)	Implement linear search	
173	SLR25 – Algorithms	2.3.1b&d <ul style="list-style-type: none"> Standard algorithms (bubble sort, insertion sort, binary search and linear search) Implement binary and linear search 	How does the linear search work? (SLR25 slide 4) How does the binary search work? (SLR25 slide 5)	SLR25 Activities folder SLR25 Answers folder (Files starting 03)	Implement binary search	
174	SLR25 – Algorithms	2.3.1b&d <ul style="list-style-type: none"> Standard algorithms (bubble sort, insertion sort, binary search and linear search) Implement binary and linear search 	How does the linear search work? (SLR25 slide 4) How does the binary search work? (SLR25 slide 5)	SLR25 Activities folder SLR25 Answers folder (Files starting 03)	Representing, adding and removing from queues and stacks	
175	SLR25 – Algorithms	2.3.1e <ul style="list-style-type: none"> Representing, adding data to and removing data from queues and stacks 	How do stacks and queues work? (SLR25 slide 6)	SLR25 Activities folder SLR25 Answers folder (Files starting 05)		
176	SLR25 – Algorithms	2.3.1e <ul style="list-style-type: none"> Representing, adding data to and removing data from queues and stacks 	How do stacks and queues work? (SLR25 slide 6)	SLR25 Activities folder SLR25 Answers folder (Files starting 05)	Comparing suitability of algorithms	

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Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
177	SLR25 – Algorithms	2.3.1f	• Compare the suitability of different algorithms for a given task and data set	None for this lesson	SLR25 Activities folder SLR25 Answers folder (Files starting 04)	
178	SLR25 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity		Test – SLR25 (slide 7-8) Self-assess (slide 10)		
179	Revision	<p>This period is given over to revision. We have many resources to help with revision, including:</p> <ul style="list-style-type: none"> A dedicated FREE site for students with all our videos and downloadable cheat sheets: student.craigdave.org A series of videos on exam technique, including how to understand command words and answer extended questions: student.craigdave.org/videos/exam-technique 				
180	Revision					
181	Revision					
182	Revision					
183	Revision					
184	Revision					
185	Revision					
186	Revision	<p>We also have a dedicated revision app called Smart Revise with over a thousand questions. It has a pin-sharp focus on the specification and every single bullet point is covered.</p> <ul style="list-style-type: none"> For a summary and to share with your colleagues, visit smartrevise.craigdave.org To get started with a free trial, visit www.smartrevise.online To check out our overview videos, visit our YouTube channel https://youtu.be/YQDLfcy7xSM 				

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

YEAR 12 - TERM 6

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
187 to 198	AS Level Exam Period						
199 to 228	Year 13 introduction		<p>Many schools delivering AS Level exams have their Year 12s return for the final 4-5 weeks of Term 6 after the exams have finished to commence the Year 13 course.</p> <p>If you are in this situation, this is an ideal opportunity to introduce the Year 13 course and project.</p> <p>Activities can include:</p> <ul style="list-style-type: none"> • Coming up with project ideas • Group discussions on what makes a good project • Practising programming skills ready for the project • Working on prototypes and proof-of-concepts <p>Get students to watch our YouTube video playlist on <i>Unit 3 Project advice</i>: www.youtube.com/watch?v=ZUcjAoVFYWA&list=PLCiOXwirraUDinzjsVmpx7yof8AE-LVgd</p> <p>Overview the project and hand out copies of our project advice books. We have two versions of this</p> <ul style="list-style-type: none"> • Documenting Defold programming projects OCR H446 • Documenting programming projects OCR H446 <p>Let students have a look at some previous complete project write-ups to give them initial ideas. We have provided three fully marked and moderated exemplar projects:</p> <ul style="list-style-type: none"> • Candidate 1 - (62 out of 70) • Candidate 1 - (61 out of 70) • Candidate 1 - (68 out of 70) <p>If you students are interested in creating a computer game of some description for their A Level project they can use this time to complete our Defold game tutorial workshops. It includes 5 full games for them to develop:</p> <ul style="list-style-type: none"> • Incoming • Landers • Pong • Spotter • Worms <p>All the above resources are available for free under your premium subscription login.</p>				

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

YEAR 13 - TERM 1							
	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
0	Introduction to year 13 course	N/A	<ul style="list-style-type: none"> Understand the year 13 course structure and appreciate how you will be taught and assessed in this subject. Understand the importance of the computing project. 	None	None		
1	Project definition introduction lesson	3.1.1-3.1.2	<p>This lesson is given over to the project. This is marked out of 70 and worth 20% of the full A Level qualification.</p> <p>We provide guidance for you in several forms:</p> <p>Our project advice booklets</p> <ul style="list-style-type: none"> Documenting Defold programming projects OCR H446 Documenting programming projects OCR H446 <p>Our fully marked and moderated exemplar projects:</p> <ul style="list-style-type: none"> Candidate 1 - (62 out of 70) Candidate 1 - (61 out of 70) Candidate 1 - (68 out of 70) 				
2	SLR1 - Structure and function of the processor (AS RECAP LESSON)	AS recap	<ul style="list-style-type: none"> Recap last year's AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. 	What can you remember from the year 12 AS course without additional aid?	SLR1 Year 13 Recap Lesson (student version)	 Pipelining	
3	SLR1 - Structure and function of the processor	1.1.1d	<ul style="list-style-type: none"> The use of pipelining in a processor to improve efficiency. 	How can the speed of a processor be increased further? (SLR1 slide 5)	SLR1 Activities folder SLR1 Answers folder (Files starting 05)		Pipelining
4	SLR2 - Types of processor (AS RECAP LESSON)	AS recap	<ul style="list-style-type: none"> Recap last year's AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. 	What can you remember from the year 12 AS course without additional aid?	SLR2 Year 13 Recap Lesson (student version)		
5	SLR2 - Types of processor	1.1.2b	<ul style="list-style-type: none"> GPUs and their uses (including those not related to graphics) 	What are the different characteristics of CPUs vs GPUs, and what else besides graphics can GPUs be used for? (SLR2 slide 4)	SLR2 Activities folder SLR2 Answers folder (Files starting 03)	 GPUs and their uses	GPU

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	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
6	SLR3 - Input, output and storage (AS RECAP LESSON)	AS recap	<ul style="list-style-type: none"> Recap last year's AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. 	What can you remember from the year 12 AS course without additional aid?	SLR3 Year 13 Recap Lesson (student version)		
7	SLR4 - Systems software (AS RECAP LESSON)	AS recap	<ul style="list-style-type: none"> Recap last year's AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. 	What can you remember from the year 12 AS course without additional aid?	SLR4 Year 13 Recap Lesson (student version)		
8	SLR5 – Application generation (AS RECAP LESSON)	AS recap	<ul style="list-style-type: none"> Recap last year's AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. 	What can you remember from the year 12 AS course without additional aid?	SLR5 Year 13 Recap Lesson (student version)	Stages of compilation Linkers, loaders and libraries	
9	SLR5 – Application generation	1.2.2e&f	<ul style="list-style-type: none"> Stages of compilation (Lexical analysis, Syntax analysis, Code generation and Optimisation) Linkers and loaders and use of libraries 	What happens during the different phases of compilation? (SLR5 slide 6) What is the purpose of a linker and loader? What are the advantages of function libraries to a programmer? (SLR5 slide 7)	SLR5 Activities folder SLR5 Answers folder (Files starting 05 & 06)		Lexical analysis, Syntax analysis, Code generation, Optimisation, Linker, Loaders, Libraries
10	SLR5 – Application generation	1.2.2e&f	<ul style="list-style-type: none"> Stages of compilation (Lexical analysis, Syntax analysis, Code generation and Optimisation) Linkers and loaders and use of libraries 	What is the purpose of a linker and loader? What are the advantages of function libraries to a programmer? (SLR5 slide 7)	SLR5 Activities folder SLR5 Answers folder (Files starting 05 & 06)		
11 to 15	Project analysis	3.1.3-3.1.4	<p>This lesson is given over to the project. This is marked out of 70 and worth 20% of the full A Level qualification.</p> <p>We provide guidance for you in several forms:</p> <p>Our project advice booklets</p> <ul style="list-style-type: none"> Documenting Defold programming projects OCR H446 Documenting programming projects OCR H446 <p>Our fully marked and moderated exemplar projects:</p> <ul style="list-style-type: none"> Candidate 1 - (62 out of 70) Candidate 1 - (61 out of 70) Candidate 1 - (68 out of 70) 				

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	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
16	SLR6 – Software development (AS RECAP LESSON)	AS recap	<ul style="list-style-type: none"> Recap last year's AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. 	What can you remember from the year 12 AS course without additional aid?	SLR6 Year 13 Recap Lesson (student version)	 Programming paradigms	
17	SLR7 - Types of programming language	1.2.4a&b	<ul style="list-style-type: none"> The need for and characteristics of a variety of programming paradigms Procedural languages 	<p>What do we mean by the term programming paradigm? (SLR7 slide 2)</p> <p>What are the features of procedural languages? (SLR7 slide 3)</p> <p>Provide an annotated example of a procedural program. (SLR7 slide 4)</p>	SLR7 Activities folder SLR7 Answers folder (Files starting 01 & 02)	 Assembly language and LMC language	Programming paradigm, Procedural language, Assembly language, Machine code, Low-level language, High-level language, LMC, Immediate addressing, Direct addressing, Indirect addressing, Indexed addressing, OO, OOP, Class, Object, Base class, Superclass, Subclass, Derived class, Instantiation, Overriding, Method, Attribute, Inheritance,
18	SLR7 - Types of programming language	1.2.4c	<ul style="list-style-type: none"> Assembly language (including following and writing simple programs with the Little Man Computer Instruction set) 	<p>What are the features of assembly language? (SLR7 slide 5)</p> <p>Provide an annotated example of an assembly program. (SLR7 slide 6)</p>	SLR7 Activities folder SLR7 Answers folder (Files starting 03)	 Addressing memory	
19	SLR7 - Types of programming language	1.2.4d	<ul style="list-style-type: none"> Modes of addressing memory (immediate, direct, indirect and indexed) 	<p>What are immediate, direct, indirect, indexed and relative memory addressing? (SLR7 slide 7)</p>	SLR7 Activities folder SLR7 Answers folder (Files starting 04)	 OO languages part 1  OO languages part 2	
20	SLR7 - Types of programming language	1.2.4e	<ul style="list-style-type: none"> Object-oriented languages with an understanding of classes, objects, methods, attributes, inheritance, encapsulation and polymorphism 	<p>What are the features of object-oriented languages? (SLR7 slide 8)</p> <p>Provide an annotated example of an object-oriented program. (SLR7 slide 9)</p>	SLR7 Activities folder SLR7 Answers folder (Files starting 05)	 OO languages part 3  OO languages part 4	
21	SLR7 - Types of programming language	1.2.4e	<ul style="list-style-type: none"> Object-oriented languages with an understanding of classes, objects, methods, attributes, inheritance, encapsulation and polymorphism 	<p>What are the features of object-oriented languages? (SLR7 slide 8)</p>	SLR7 Activities folder SLR7 Answers folder (Files starting 05)		

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	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
	SLR7 – End-of-topic test		End-of-topic test Student self-assessment RAG rating opportunity	Provide an annotated example of an object-oriented program. (SLR7 slide 9)	Test – SLR7 (slide 10) Self-assess (slide 12)		Encapsulation, Polymorphism
22	Project design introduction	3.2.1-3.2.3	These lessons are given over to the project. This is marked out of 70 and worth 20% of the full A Level qualification. We provide guidance for you in several formats on our website as part of your premium subscription.			 Lossy vs Lossless	
23	SLR9 - Compression, encryption and hashing	1.3.1a	<ul style="list-style-type: none"> Lossy vs Lossless compression 	What is the difference between lossy and lossless compression? (SLR9 slide 2)	SLR9 Activities folder SLR9 Answers folder (Files starting 01)	 Run-length and dictionary coding	Lossy compression, Lossless compression, Length encoding, Dictionary coding,
24	SLR9 - Compression, encryption and hashing	1.3.1b	<ul style="list-style-type: none"> Run-length encoding and dictionary coding for lossless compression 	How does run-length encoding work? (SLR9 slide 3) How does dictionary encoding work? (SLR9 slide 4)	SLR9 Activities folder SLR9 Answers folder (Files starting 02 & 03)	 Symmetric and asymmetric encryption	Symmetric encryption, Asymmetric encryption, Hashing
25	SLR9 - Compression, encryption and hashing	1.3.1c	<ul style="list-style-type: none"> Symmetric and asymmetric encryption 	How does encryption work? (SLR9 slide 5)	SLR9 Activities folder SLR9 Answers folder (Files starting 04)	 Hashing	
26	SLR9 - Compression, encryption and hashing	1.3.1d	<ul style="list-style-type: none"> Different uses of hashing 	What is hashing? (SLR9 slide 6)	SLR9 Activities folder SLR9 Answers folder (Files starting 05)	 Normalisation to 3NF	
27	SLR10 – Databases (AS RECAP LESSON)	AS recap + 1.3.2c	<ul style="list-style-type: none"> Recap last year’s AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. Normalisation to 3NF 	What can you remember from the year 12 AS course without additional aid? What is the purpose of normalisation? (SLR10 slide 4)	SLR10 Year 13 Recap Lesson (student version) SLR10 Activities folder SLR10 Answers folder (Files starting 03)		Relational database, Flat file, Primary key, Foreign key, Concatenated primary key, Secondary key, ERM, Normalisation, Indexing, ONF, 1NF, 2NF, 3NF, Normal forms, SQL, Referential
28	SLR10 – Databases	1.3.2c	<ul style="list-style-type: none"> Normalisation to 3NF 	What is the purpose of normalisation? (SLR10 slide 4)	SLR10 Activities folder SLR10 Answers folder (Files starting 03)	 SQL	
29	SLR10 – Databases	1.3.2d	<ul style="list-style-type: none"> SQL - Interpret and modify 	How do you use the main keywords in SQL to create, return and delete data in a database? (SLR10 slide 5)	SLR10 Activities folder SLR10 Answers folder (Files starting 04)	 Referential integrity  Transaction processing	

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
30	SLR10 – Databases	1.3.2e&f	<ul style="list-style-type: none"> Referential Integrity Transaction processing, ACID (Atomicity, Consistency, Isolation, Durability), record locking and redundancy 	What are the considerations in transaction processing? (SLR10 slide 6)	SLR10 Activities folder SLR10 Answers folder (Files starting 05 & 06)		integrity, Transaction processing, ACID, Recording locking, Redundancy

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

YEAR 13 - TERM 2							
Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms	
31 to 37 Project design	3.2.1-3.2.3	<p>This lesson is given over to the project. This is marked out of 70 and worth 20% of the full A Level qualification.</p> <p>We provide guidance for you in several forms:</p> <p>Our project advice booklets</p> <ul style="list-style-type: none"> Documenting Defold programming projects OCR H446 Documenting programming projects OCR H446 <p>Our fully marked and moderated exemplar projects:</p> <ul style="list-style-type: none"> Candidate 1 - (62 out of 70) Candidate 1 - (61 out of 70) Candidate 1 - (68 out of 70) 					
38 SLR11 – Networks (AS RECAP LESSON)	AS recap	<ul style="list-style-type: none"> Recap last year’s AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. 	What can you remember from the year 12 AS course without additional aid?	SLR11 Year 13 Recap Lesson (student version)	Network security threats	Firewall, Proxies, Encryption	
39 SLR11 – Networks	1.3.3c	<ul style="list-style-type: none"> Network security and threats, use of firewalls, proxies and encryption 	What are the threats to network security and how can they be mitigated? (SLR11 slide 11)	SLR11 Activities folder SLR11 Answers folder (Files starting 04)	Network hardware		
40 SLR11 – Networks	1.3.3d	<ul style="list-style-type: none"> Network hardware 	How are devices on local area networks connected? (SLR11 slide 12)	SLR11 Activities folder SLR11 Answers folder (Files starting 05)			
41 SLR12 – Web technologies (AS RECAP LESSON)	AS recap	<ul style="list-style-type: none"> Recap last year’s AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. 	What can you remember from the year 12 AS course without additional aid?	SLR12 Year 13 Recap Lesson (student version)	Search engine indexing PageRank algorithm PageRank algorithm example	Search engine indexing, PageRank algorithm, Server-side processing, Client-side processing	
42 SLR12 – Web technologies	1.3.4b&c	<ul style="list-style-type: none"> Search engine indexing PageRank algorithm 	How do search engines work? (SLR12 slide 4)	SLR12 Activities folder SLR12 Answers folder (Files starting 03 & 04)	Server and client-side processing		
43 SLR12 – Web technologies	1.3.4d	<ul style="list-style-type: none"> Server and client-side processing 	How is client- and server-side processing used with dynamic web pages, and what are the advantages of each method?	SLR12 Activities folder SLR12 Answers folder (Files starting 05)			

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms	
			(SLR12 slide 5)				
44	SLR13 – Data types (AS RECAP LESSON)	AS recap	<ul style="list-style-type: none"> Recap last year’s AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. 	What can you remember from the year 12 AS course without additional aid?	SLR13 Year 13 Recap Lesson (student version)	Representation and normalisation of floating-point numbers in binary	Floating-point arithmetic, Bitwise manipulation, Shifts, AND, OR, XOR
45	SLR13 – Data types	1.4.1g	Representation and normalisation of floating-point numbers in binary	How does a computer store a larger range of numbers in a fixed number of bits in memory? (SLR13 slide 7)	SLR13 Activities folder SLR13 Answers folder (Files starting 09)		
46	SLR13 – Data types	1.4.1g	Representation and normalisation of floating-point numbers in binary	How does a computer store a larger range of numbers in a fixed number of bits in memory? (SLR13 slide 7)	SLR13 Activities folder SLR13 Answers folder (Files starting 09)	Floating-point arithmetic	
47	SLR13 – Data types	1.4.1h	Floating-point arithmetic, positive and negative numbers, addition and subtraction	How do you perform arithmetic with floating-point numbers? (SLR13 slide 8)	SLR13 Activities folder SLR13 Answers folder (Files starting 10)		
48	SLR13 – Data types	1.4.1h	Floating-point arithmetic, positive and negative numbers, addition and subtraction	How do you perform arithmetic with floating-point numbers? (SLR13 slide 8)	SLR13 Activities folder SLR13 Answers folder (Files starting 10)	Bitwise manipulation and masks	
49	SLR13 – Data types	1.4.1i	Bitwise manipulation and masks: shifts, combining with AND, OR, and XOR	What other operations can an arithmetic logic unit (ALU) do? (SLR13 slide 10)	SLR13 Activities folder SLR13 Answers folder (Files starting 11)		
50	SLR13 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR13 (slide 11) Self-assess (slide 13-14)		

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
51 to 60	Project development	3.3.1-3.3.2	<p>This lesson is given over to the project. This is marked out of 70 and worth 20% of the full A Level qualification.</p> <p>We provide guidance for you in several forms:</p> <p>Our project advice booklets</p> <ul style="list-style-type: none"> Documenting Defold programming projects OCR H446 Documenting programming projects OCR H446 <p>Our fully marked and moderated exemplar projects:</p> <ul style="list-style-type: none"> Candidate 1 - (62 out of 70) Candidate 1 - (61 out of 70) Candidate 1 - (68 out of 70) 			
61	SLR14 – Data structures (AS RECAP LESSON)	AS recap	<ul style="list-style-type: none"> Recap last year’s AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. 	What can you remember from the year 12 AS course without additional aid?	SLR14 Year 13 Recap Lesson (student version)	Data Structures Part 1 Linked Lists Data Structures C,T,A,R Part 1 Linked Lists Data Structures Part 2 Graphs Data Structures C,T,A,R Part 2 Graphs
62	SLR14 – Data structures	1.4.2b&c	<ul style="list-style-type: none"> The following structures to store data: linked list, graph (directed and undirected), stack, queue, tree, binary search tree, hash table How to create, traverse, add data to and remove data from the data structures mentioned above (This can be either using arrays and procedural programming or an object-oriented approach) 	<p>How do linked lists work to maintain the alphabetical order of items as they are input? (SLR14 slide 6)</p> <p>What are trees, directed or undirected graphs, and how can they be represented using other data structures? (SLR14 slide 7)</p> <p>How does a depth-first traversal of a graph work? (SLR14 slide 8)</p> <p>How does a breadth-first traversal of a graph work?</p>	SLR14 Activities folder SLR14 Answers folder (Files starting 05 & 06)	Data Structures Part 3 Stacks and Queues Data structures C,T,A,R part 3, stacks and queues Data Structures Part 4 Trees Data Structures C,T,A,R Part 4 Trees

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms	
63	SLR14 – Data structures	1.4.2b&c	<ul style="list-style-type: none"> The following structures to store data: linked list, graph (directed and undirected), stack, queue, tree, binary search tree, hash table How to create, traverse, add data to and remove data from the data structures mentioned above (This can be either using arrays and procedural programming or an object-oriented approach) 	(SLR14 slide 9) How can binary trees be visualised using arrays or objects? (SLR14 slide 10) How do you input and delete data from binary trees? (SLR14 slide 11)	SLR14 Activities folder SLR14 Answers folder (Files starting 06 & 07)	Data Structures Part 5 Hash tables Data Structures C,T,A,R Part 5 Hash tables	
64	SLR14 – Data structures	1.4.2b&c	<ul style="list-style-type: none"> The following structures to store data: linked list, graph (directed and undirected), stack, queue, tree, binary search tree, hash table How to create, traverse, add data to and remove data from the data structures mentioned above (This can be either using arrays and procedural programming or an object-oriented approach) 	How do hash tables, hashing functions and overflow work? (SLR14 slide 12)	SLR14 Activities folder SLR14 Answers folder (Files starting 08)		
65	SLR14 – Data structures	1.4.2b&c	<ul style="list-style-type: none"> The following structures to store data: linked list, graph (directed and undirected), stack, queue, tree, binary search tree, hash table How to create, traverse, add data to and remove data from the data structures mentioned above (This can be either using arrays and procedural programming or an object-oriented approach) 	Same as lessons 61-64	SLR14 Activities folder SLR14 Answers folder (Files starting 09)		
66	SLR14 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity		Test – SLR14 (slide 13) Self-assess (slide 15)			
67-70	Term 1-2 assessment opportunity	These lessons have been set aside to carry out a mock exam and marking with the students on the material covered in Terms 1 and 2.					

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

YEAR 13 - TERM 3							
Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms	
71 to 75	Project development	3.3.1-3.3.2	<p>This lesson is given over to the project. This is marked out of 70 and worth 20% of the full A Level qualification.</p> <p>We provide guidance for you in several forms:</p> <p>Our project advice booklets</p> <ul style="list-style-type: none"> Documenting Defold programming projects OCR H446 Documenting programming projects OCR H446 <p>Our fully marked and moderated exemplar projects:</p> <ul style="list-style-type: none"> Candidate 1 - (62 out of 70) Candidate 1 - (61 out of 70) Candidate 1 - (68 out of 70) 				
76	SLR15 – Boolean algebra (AS RECAP LESSON)	AS recap	<ul style="list-style-type: none"> Recap last year’s AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. 	What can you remember from the year 12 AS course without additional aid?	SLR15 Year 13 Recap Lesson (student version)	Simplifying Boolean algebra Simplifying Boolean algebra example	De Morgan’s law, Distribution, Association, Commutation, Double negation, D type flip flops, Half adders, Full adders
77	SLR15 – Boolean algebra	1.4.3c	<ul style="list-style-type: none"> Use the following rules to derive or simplify statements in Boolean algebra: De Morgan's Laws, distribution, association, commutation, double negation 	What are the rules for simplifying Boolean expressions? (SLR15 slide 5)	SLR15 Activities folder SLR15 Answers folder (Files starting 04)	Half and Full adders D type flip flops	
78	SLR15 – Boolean algebra	1.4.3c&e	<ul style="list-style-type: none"> Use the following rules to derive or simplify statements in Boolean algebra: De Morgan's Laws, distribution, association, commutation, double negation logic associated with D type flip flops, half and full adders 	What are the rules for simplifying Boolean expressions? (SLR15 slide 5) What does a simple ALU circuit look like and how does it work? (SLR15 slide 6)	SLR15 Activities folder SLR15 Answers folder (Files starting 04 & 05)		
79	SLR15 – Boolean algebra SLR15 – End-of-topic test	1.4.3e	<ul style="list-style-type: none"> logic associated with D type flip flops, half and full adders <p>End-of-topic test</p> <p>Student self-assessment RAG rating opportunity</p>	What is the purpose of the D-type flip flop and where are they used in a computer? (SLR15 slide 7)	SLR15 Activities folder SLR15 Answers folder (Files starting 05) Test – SLR15 (slide 8) Self-assess (slide 10)		

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	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
80	SLR16 – Computer-related legislation (AS RECAP LESSON)	AS recap	<ul style="list-style-type: none"> Recap last year’s AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. 	What can you remember from the year 12 AS course without additional aid?	SLR16 Year 13 Recap Lesson (student version)		
81	SLR17 – Ethical, moral and cultural issues (AS RECAP LESSON)	AS recap	<ul style="list-style-type: none"> Recap last year’s AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. 	What can you remember from the year 12 AS course without additional aid?	SLR17 Year 13 Recap Lesson (student version)	 Caching	
82	SLR18 – Thinking abstractly (AS RECAP LESSON) SLR19 – Thinking ahead (AS RECAP LESSON)	AS recap	<ul style="list-style-type: none"> Recap last year’s AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. The nature, benefits and drawbacks of caching 	What can you remember from the year 12 AS course without additional aid? What is caching in programming and what are the limitations? (SLR19 slide 5)	SLR18&19 Year 13 Recap Lesson (student version) SLR19 Activities folder SLR19 Answers folder (Files starting 04)		
83	SLR20 – Thinking procedurally (AS RECAP LESSON) SLR21 – Thinking logically (AS RECAP LESSON)	AS recap	<ul style="list-style-type: none"> Recap last year’s AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. 	What can you remember from the year 12 AS course without additional aid?	SLR20&21 Year 13 Recap Lesson (student version)	Parts of problem tackled at the same time  Benefits and trade-offs of concurrent processing	
84	SLR22 – Thinking concurrently	2.1.5a&b	<ul style="list-style-type: none"> Determine the parts of a problem that can be tackled at the same time Outline the benefits and trade-offs that might result from concurrent processing in a particular situation 	What are the benefits and limitations of concurrent processing? (SLR22 slide 2) How can concurrency be used to speed up an execution of an algorithm? (SLR22 slide 3)	SLR22 Activities folder SLR22 Answers folder (Files starting 01 & 02)		Thinking concurrently, Concurrent processing
85	SLR18-22 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR18-22 Self-assess SLR18-22		
86	SLR23 – Programming techniques	AS recap	<ul style="list-style-type: none"> Recap last year’s AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. 	What can you remember from the year 12 AS course without additional aid?	SLR23 Year 13 Recap Lesson (student version)	 Recursion	

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
	(AS RECAP LESSON)						
87	SLR23 – Programming techniques	2.2.1b	<ul style="list-style-type: none"> Recursion, how it can be used and compares to an iterative approach 	What is recursion and how does it compare to using an iterative approach? (SLR23 slide 6)	SLR23 Activities folder SLR23 Answers folder (Files starting 06)		Recursion
88 to 100	Project development	3.3.1- 3.3.2	<p>This lesson is given over to the project. This is marked out of 70 and worth 20% of the full A Level qualification.</p> <p>We provide guidance for you in several forms:</p> <p>Our project advice booklets</p> <ul style="list-style-type: none"> Documenting Defold programming projects OCR H446 Documenting programming projects OCR H446 <p>Our fully marked and moderated exemplar projects:</p> <ul style="list-style-type: none"> Candidate 1 - (62 out of 70) Candidate 1 - (61 out of 70) Candidate 1 - (68 out of 70) 				

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

YEAR 13 - TERM 4

Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
101 to 105 Project development	3.3.1-3.3.2	<p>This lesson is given over to the project. This is marked out of 70 and worth 20% of the full A Level qualification.</p> <p>We provide guidance for you in several forms:</p> <p>Our project advice booklets</p> <ul style="list-style-type: none"> Documenting Defold programming projects OCR H446 Documenting programming projects OCR H446 <p>Our fully marked and moderated exemplar projects:</p> <ul style="list-style-type: none"> Candidate 1 - (62 out of 70) Candidate 1 - (61 out of 70) Candidate 1 - (68 out of 70) 				
					<ul style="list-style-type: none"> Features of a problem Problem recognition Problem decomposition 	
106 SLR24 - Computational methods	2.2.2a, b & c	<ul style="list-style-type: none"> Features that make a problem solvable by computation methods Problem recognition Problem decomposition 	What are computational methods? (SLR24 slide 2)	SLR24 Activities folder SLR24 Answers folder (Files starting 01, 02 & 03)	Divide and conquer	Computational methods, Problem recognition,
107 SLR24 - Computational methods	2.2.2d	<ul style="list-style-type: none"> Use of divide and conquer 	What is divide and conquer? (SLR24 slide 3)	SLR24 Activities folder SLR24 Answers folder (Files starting 05)	<ul style="list-style-type: none"> Use of abstraction Backtracking, Data mining and Heuristics 	Problem decomposition, Divide and conquer, Backtracking,
108 SLR24 - Computational methods	2.2.2e&f	<ul style="list-style-type: none"> Use of abstraction Learners should apply their knowledge of: <ul style="list-style-type: none"> backtracking data mining heuristics 	What is backtracking? (SLR24 slide 4) What is data mining and how can it be used to discover new trends? (SLR24 slide 5)	SLR24 Activities folder SLR24 Answers folder (Files starting 04 & 06)	<ul style="list-style-type: none"> Performance modelling, Pipelining and Visualisation 	Data mining, Heuristics, Performance modelling, Visualisation

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

Topic focus		Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms	
109	SLR24 - Computational methods	2.2.2e&f	<ul style="list-style-type: none"> performance modelling pipelining visualisation ...to solve problems	What are heuristics? (SLR24 slide 6) What is performance modelling? (SLR24 slide 7)	SLR24 Activities folder SLR24 Answers folder (Files starting 04 & 06)			
110	SLR24 - Computational methods	2.2.2e&f		What is pipelining in the context of programming? (SLR24 slide 8) How can visualisation be used to help solve a problem? (SLR24 slide 9)	SLR24 Activities folder SLR24 Answers folder (Files starting 04 & 06)			
111	SLR24 - Computational methods	2.2.2e&f		Same as lessons 108-110	Complete previous activities			
112	SLR24 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR24 (slide 10-11) Self-assess (slide 13)			
113	Project evaluation and testing introduction	3.4.1-3.4.4	This lesson is given over to the project. This is marked out of 70 and worth 20% of the full A Level qualification. We provide guidance for you in several forms: Our project advice booklets <ul style="list-style-type: none"> Documenting Defold programming projects OCR H446 Documenting programming projects OCR H446 Our fully marked and moderated exemplar projects: <ul style="list-style-type: none"> Candidate 1 - (62 out of 70) Candidate 1 - (61 out of 70) Candidate 1 - (68 out of 70) 					
114 to 120	Project development	3.3.1-3.3.2						
121 to 130	Project testing and evaluation	3.4.1-3.4.4						

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

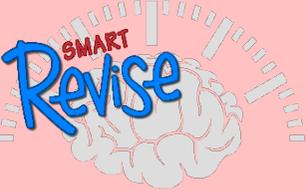
YEAR 13 - TERM 5

Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
131 to 135 Project evaluation	3.4.2-3.4.4	<p>This lesson is given over to the project. This is marked out of 70 and worth 20% of the full A Level qualification.</p> <p>We provide guidance for you in several forms:</p> <p>Our project advice booklets</p> <ul style="list-style-type: none"> Documenting Defold programming projects OCR H446 Documenting programming projects OCR H446 <p>Our fully marked and moderated exemplar projects:</p> <ul style="list-style-type: none"> Candidate 1 - (62 out of 70) Candidate 1 - (61 out of 70) Candidate 1 - (68 out of 70) 				
136 SLR25 Algorithms (AS RECAP LESSON)	AS recap	<ul style="list-style-type: none"> Recap last year's AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. 	What can you remember from the year 12 AS course without additional aid?	SLR25 Year 13 Recap Lesson (student version)		Algorithm, Big O notation, Bubble sort, Insertion sort, Merge sort, Quicksort, Dijkstra's shortest path, A* algorithm, Binary search, Linear search
137 SLR25 Algorithms (AS RECAP LESSON)	AS recap	<ul style="list-style-type: none"> Recap last year's AS knowledge of this topic as it will all be reassessed at the end of the year as part of the full A Level exam. 	What can you remember from the year 12 AS course without additional aid?	SLR25 Year 13 Recap Lesson (student version)	Comparison of the complexity of algorithms Measures and methods to determine the efficiency of different algorithms Big O notation	
138 SLR26 Algorithms	2.3.1c&d	<ul style="list-style-type: none"> Measures and methods to determine the efficiency of different algorithms, Big O notation. (Constant, linear, polynomial, exponential, and logarithmic complexity) Comparison of the complexity of algorithms 	How is Big O notation used to describe the complexity of algorithms? (SLR26 slide 5)	SLR26 Activities folder SLR26 Answers folder (Files starting 05)	Algorithms for the main data structures	
139 SLR26 Algorithms	2.3.1e	<ul style="list-style-type: none"> Algorithms for the main data structures, (Stacks, queues, trees, linked lists, depth-first (post-order) and breadth-first traversal of trees) 	Which data structures and their operations are used for common algorithms? (SLR26 slide 2)	SLR26 Activities folder SLR26 Answers folder (Files starting 10)		

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms	
140	SLR26 Algorithms	2.3.1e	<ul style="list-style-type: none"> Algorithms for the main data structures, (Stacks, queues, trees, linked lists, depth-first (post-order) and breadth-first traversal of trees) 	Which data structures and their operations are used for common algorithms? (SLR26 slide 2)	SLR26 Activities folder SLR26 Answers folder (Files starting 10)	Merge sort Quicksort	
141	SLR26 Algorithms	2.3.1f	<ul style="list-style-type: none"> Standard algorithms (Bubble sort, insertion sort, merge sort, quick sort, Dijkstra's shortest path algorithm, A* algorithms, binary search and linear search) 	How does a merge sort work? (SLR26 slide 3) How does a quicksort work? (SLR26 slide 4)	SLR26 Activities folder SLR26 Answers folder (Files starting 06 & 07)	Dijkstra's shortest path	
142	SLR26 Algorithms	2.3.1f	<ul style="list-style-type: none"> Standard algorithms (Bubble sort, insertion sort, merge sort, quick sort, Dijkstra's shortest path algorithm, A* algorithms, binary search and linear search) 	How does a merge sort work? (SLR26 slide 3) How does a quicksort work? (SLR26 slide 4)	SLR26 Activities folder SLR26 Answers folder (Files starting 06 & 07)	A* pathfinding A* pathfinding revisited	
143	SLR26 Algorithms	2.3.1f	<ul style="list-style-type: none"> Standard algorithms (Bubble sort, insertion sort, merge sort, quick sort, Dijkstra's shortest path algorithm, A* algorithms, binary search and linear search) 	How does Dijkstra's shortest path algorithm work? (SLR26 slide 6) How does the A* algorithm work? (SLR26 slide 7)	SLR26 Activities folder SLR26 Answers folder (Files starting 08 & 09)		
144	SLR26 Algorithms	2.3.1f	<ul style="list-style-type: none"> Standard algorithms (Bubble sort, insertion sort, merge sort, quick sort, Dijkstra's shortest path algorithm, A* algorithms, binary search and linear search) 	How does Dijkstra's shortest path algorithm work? (SLR26 slide 6) How does the A* algorithm work? (SLR26 slide 7)	SLR26 Activities folder SLR26 Answers folder (Files starting 08 & 09)		
145	SLR26 Algorithms	2.3.1f	<ul style="list-style-type: none"> Standard algorithms (Bubble sort, insertion sort, merge sort, quick sort, Dijkstra's shortest path algorithm, A* algorithms, binary search and linear search) 	How does Dijkstra's shortest path algorithm work? (SLR26 slide 6) How does the A* algorithm work? (SLR26 slide 7)	SLR26 Activities folder SLR26 Answers folder (Files starting 08 & 09)		
146	SLR26 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity		Test – SLR25 (slide 8-9) Self-assess (slide 11-13)			
147	Revision	This period is given over to revision. We have many resources to help with revision, including: <ul style="list-style-type: none"> A dedicated FREE site for students with all our videos and downloadable cheat sheets: student.craigndave.org 					
148	Revision						
149	Revision						

AS and A Level OCR Computer Science – Scheme of Learning (AS in Y12 and additional content for the full A Level in Y13)

Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
150	Revision					
151	Revision					
152	Revision					
153	Revision					
154	Revision					
155	Revision	<p>We also have a dedicated revision app called Smart Revise with over a thousand questions. It has a pin-sharp focus on the specification and every single bullet point is covered.</p> <ul style="list-style-type: none"> For a summary and to share with your colleagues, visit smartrevise.craigndave.org To get started with a free trial, visit www.smartrevise.online To check out our overview videos, visit our YouTube channel https://youtu.be/YQDLfcy7xSM 				