LONG-TERM OVERVIEW

YEAR 12		
Term	Topics	Assessment
1	• Introduction to the course • SLR 1 Structure and function of the processor (8 lessons) • SLR 2 Types of processor (4 lessons) • SLR 3 Input, output and storage (5 lessons) • Plus 19 dedicated programming lessons	• Completed SLRs 1-3 form the basis for assessment. • SLR 1-3 exam questions
2	• SLR 4 Systems software (8 lessons) • SLR 5 Application generation (6 lessons) • SLR 6 Software development (4 lessons) • Plus 24 dedicated programming lessons • Buffer week before Christmas	• Completed SLRs 4-6 form the basis for assessment. • SLR 4-6 exam questions
3	• SLR 7 Types of programming language (6 lessons) • SLR 9 Compression, encryption and hashing (5 lessons) • SLR 10 Databases (8 lessons) • Plus 17 dedicated programming lessons	• Completed SLRs 7, 9 and 10 form the basis for assessment. • SLR 7, 9 and 10 exam questions
4	• SLR 11 Networks (9 lessons) • SLR 12 Web technologies (10 lessons) • Plus 17 dedicated programming lessons	• Completed SLRs 11 and 12 form the basis for assessment. • SLR 11 and 12 exam questions
5	• SLR 13 Data types (14 lessons) • SLR 14 Data structures (8 lessons) • Plus 8 dedicated programming lessons	• Completed SLRs 13 and 14 form the basis for assessment. • SLR 13 and 14 exam questions
6	• SLR 15 Boolean algebra (8 lessons) • SLR 16 Computer-related legislation (3 lessons) • SLR 17 Ethical, moral and cultural issues (4 lessons) • Plus 27 project lessons	• Completed SLRs 15-17 form the basis for assessment. • SLR 15-17 exam questions

YEAR 13		
Term	Topics	Assessment
1	• SLR 18 Thinking abstractly (3 lessons) • SLR 19 Thinking ahead (3 lessons) • SLR 20 Thinking procedurally (2 lessons) • SLR 21 Thinking logically (2 lessons) • SLR 22 Thinking concurrently (2 lessons) • Plus 18 dedicated project lessons	• Completed SLRs 18-22 form the basis for assessment. • SLR 18-22 exam questions
2	• SLR 23 Programming techniques (6 lessons) • Plus 29 dedicated project lessons	• Completed SLR 23 form the basis for assessment. • SLR 23 exam questions
3	• SLR 24 Computational methods (6 lessons) • SLR 25 Algorithms (7 lessons) • SLR 26 Algorithms (7 lessons) • Plus 9 dedicated project lessons	• Completed SLRs 24 and 26 form the basis for assessment. • SLR 24, 25 and 26 exam questions
4	• 30 dedicated project lessons	
5	• Revision	

The dedicated programming lessons are for students to engage in self-directed programming. We have hundreds of activities, worksheets and programming challenges for them to complete, available through your premium resources account.

For a detailed breakdown of which lessons to deliver week by week, see our Excel delivery calendar OCR A-Level Linear - 1-week model (delivery calendar).xlsx, which this SoL is based on.

SHORT-TERM SCHEME OF LEARNING

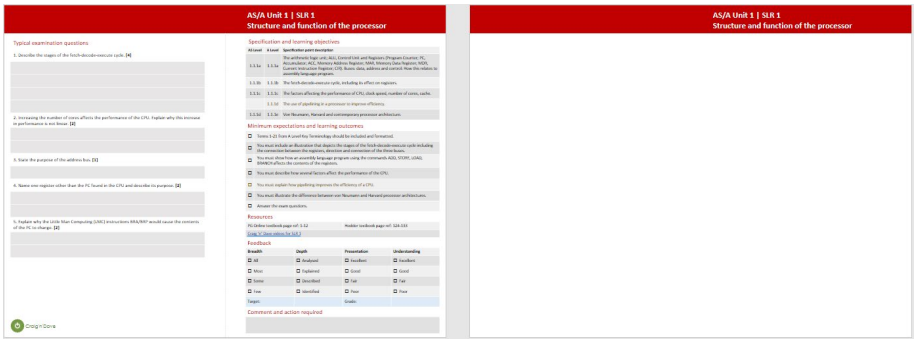
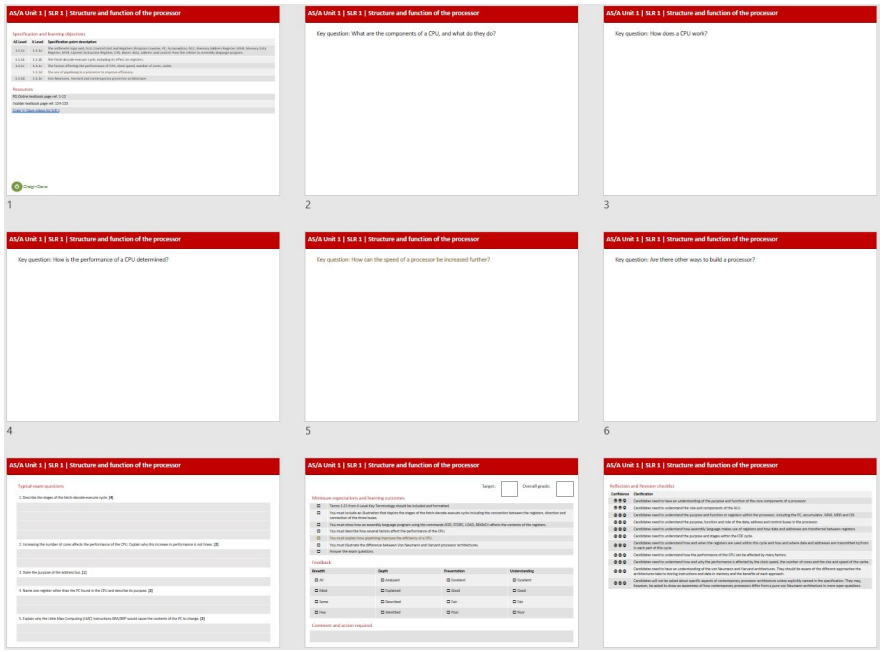
1. This lesson-by-lesson break down is based on the one-week linear calendar for the full A Level course. You will need to adapt it slightly to fit your school's delivery model.
2. The delivery method is flipped classroom, and homework is presented *before* the next lesson with a link to our YouTube 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:

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.

Contains all the activities plus model answers.
For you to use as you see fit.

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.

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
	
• 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.	• 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.
YouTube Assessment with Craig'n'Dave – (AS/A Level)	

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	• 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	ALU, CU, registers and buses	
1	SLR1 - Structure and function of the processor	1.1.1a	• 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, Pipelining, Von Neumann Architecture, Harvard architecture, Cotemporary architecture
2	SLR1 - Structure and function of the processor	1.1.1a	• 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)		
3	SLR1 - Structure and function of the processor	1.1.1a	• 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.	How does a CPU work? (SLR1 slide 3)	SLR1 Activities folder SLR1 Answers folder (Files starting 01)	Fetch decode execute cycle	
4	SLR1 - Structure and function of the processor	1.1.1b	• 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	
5	SLR1 - Structure and function of the processor	1.1.1c	• 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)		
6	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks*, *Programming challenges* and *Defold games tutorials.*		Various	Pipelining	

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
7	SLR1 - Structure and function of the processor	1.1.1d	• 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)	Von Neumann and Harvard	
8	SLR1 - Structure and function of the processor	1.1.1e	• Von Neumann, Harvard and contemporary processor architecture.	How is the performance of a CPU determined? (SLR1 slide 4)	SLR1 Activities folder SLR1 Answers folder (Files starting 03)		
9	SLR1 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR1 (slide 7) Self-assess (slide 9)		
10 to 18	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various	CISC vs RISC	
19	SLR2 - Types of processor	1.1.2a	• 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)	GPUs and their uses	CISC, RISC, GPU, Multicore system, Parallel processor system
20	SLR2 - Types of processor	1.1.2b	• 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)	Multicore and parallel systems	
21	SLR2 - Types of processor	1.1.2c	• 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)		
22	SLR2 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR2 (slide 5) Self-assess (slide 7)		
23 to 31	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various	Input, Output and Storage devices	
32	SLR3 - Input, output and storage	1.1.3a	• **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)		Input device, Output device, Storage device, Magnetic storage, Flash storage, Optical
33	SLR3 - Input, output and storage	1.1.3b	• **The uses of magnetic, flash and optical storage devices**	How do different storage devices compare in terms of cost, capacity and speed?	SLR3 Activities folder SLR3 Answers folder		

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
				(SLR3 slide 3)	(Files starting 02)		storage, RAM, ROM, Virtual storage
34	SLR3 - Input, output and storage	1.1.3b	• 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	
35	SLR3 - Input, output and storage	1.1.3c&d	• 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)		
36	SLR3 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR3 (slide 6) Self-assess (slide 8)		

YEAR 12 - TERM 2

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
						Need for operating systems Paging, segmentation and virtual memory	
37	SLR4 - Systems software	1.2.1a&b	• 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, Interrupt, ISR, Scheduling, RR, FCFS, MLFQ, SJF, SRT, Distributed OS, Embedded OS, Multi-tasking OS, Multi-user OS, Real-time OS, BIOS, Device drivers, Virtual machine, Intermediate code
38	SLR4 - Systems software	1.2.1c	• 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	
39	SLR4 - Systems software	1.2.1d	• 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)		
40	SLR4 - Systems software	1.2.1d	• 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	
41	SLR4 - Systems software	1.2.1e	• 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)		
42	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various	BIOS Device drivers	
43	SLR4 - Systems software	1.2.1f&g	• BIOS • Device drivers	What is the relationship between these terms: BIOS, ROM, CMOS, POST, bootstrap and kernel?	SLR4 Activities folder SLR4 Answers folder (Files starting 06 & 07)	Virtual machines	

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
				(SLR4 slide 7) What is the purpose of a device driver? (SLR4 slide 8)			
44	SLR4 - Systems software	1.2.1h	• 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)		
45	SLR4 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR4 (slide 10) Self-assess (slide 12)		
46 to 54	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various	The nature of applications	
55	SLR5 – Application generation	1.2.2a	• The nature of applications, justifying suitable applications for a specific purpose	In what ways do typical businesses use applications software? (SLR5 slide 2)	SLR5 Activities folder SLR5 Answers folder (Files starting 01)	Utilities Open vs closed software	Application, Utilities, Open source, Closed source, Source code, Translator, Interpreter, Compiler, Assembler, Compilation, Lexical analysis, Syntax analysis, Code generation, Optimisation, Linker, Loaders, Libraries
56	SLR5 – Application generation	1.2.2b&c	• 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	
57	SLR5 – Application generation	1.2.2d	• 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)	Stages of compilation Linkers, loaders and libraries	
58	SLR5 – Application generation	1.2.2e&f	• 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)		

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
59	SLR5 – Application generation	1.2.2e&f	• 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)		
60	SLR5 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR5 (slide 8) Self-assess (slide 10)		
61 to 66	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various	Development Methodologies Part 1 Development Methodologies Part 2	
67	SLR6 – Software development	1.2.3a&b	• Understand the waterfall lifecycle, agile methodologies, extreme programming, the spiral model and rapid application development • 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
68	SLR6 – Software development	1.2.3a&b	• Understand the waterfall lifecycle, agile methodologies, extreme programming, the spiral model and rapid application development • 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	
69	SLR6 – Software development	1.2.3c	• 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)		
70	SLR6 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR6 (slide 6) Self-assess (slide 8)		
71 to 78	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various		
79-84	This is the last week before Christmas. It has been left free in our delivery calendar as a buffer week.						

YEAR 12 - TERM 3

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
						Programming paradigms	
85	SLR7 - Types of programming language	1.2.4a&b	• The need for and characteristics of a variety of programming paradigms • Procedural languages	What do we mean by the term programming paradigm? (SLR7 slide 2) What are the features of procedural languages? (SLR7 slide 3) Provide an annotated example of a procedural program. (SLR7 slide 4)	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,
86	SLR7 - Types of programming language	1.2.4c	• Assembly language (including following and writing simple programs with the Little Man Computer Instruction set)	What are the features of assembly language? (SLR7 slide 5) Provide an annotated example of an assembly program. (SLR7 slide 6)	SLR7 Activities folder SLR7 Answers folder (Files starting 03)	Addressing memory	
87	SLR7 - Types of programming language	1.2.4d	• Modes of addressing memory (immediate, direct, indirect and indexed)	What are immediate, direct, indirect, indexed and relative memory addressing? (SLR7 slide 7)	SLR7 Activities folder SLR7 Answers folder (Files starting 04)	OO languages part 1 OO languages part 2	
88	SLR7 - Types of programming language	1.2.4e	• Object-oriented languages with an understanding of classes, objects, methods, attributes, inheritance, encapsulation and polymorphism	What are the features of object-oriented languages? (SLR7 slide 8) Provide an annotated example of an object-oriented program. (SLR7 slide 9)	SLR7 Activities folder SLR7 Answers folder (Files starting 05)	OO languages part 3 OO languages part 4	
89	SLR7 - Types of programming language	1.2.4e	• Object-oriented languages with an understanding of classes, objects, methods, attributes, inheritance, encapsulation and polymorphism	What are the features of object-oriented languages? (SLR7 slide 8)	SLR7 Activities folder SLR7 Answers folder (Files starting 05)		

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
				Provide an annotated example of an object-oriented program. (SLR7 slide 9)			Encapsulation, Polymorphism
90	SLR7 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR7 (slide 10) Self-assess (slide 12)		
96	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various	Lossy vs Lossless	
97	SLR9 - Compression, encryption and hashing	1.3.1a	• 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, Symmetric encryption, Asymmetric encryption, Hashing
98	SLR9 - Compression, encryption and hashing	1.3.1b	• 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	
99	SLR9 - Compression, encryption and hashing	1.3.1c	• Symmetric and asymmetric encryption	How does encryption work? (SLR9 slide 5)	SLR9 Activities folder SLR9 Answers folder (Files starting 04)	Hashing	
100	SLR9 - Compression, encryption and hashing	1.3.1d	• Different uses of hashing	What is hashing? (SLR9 slide 6)	SLR9 Activities folder SLR9 Answers folder (Files starting 05)		
101	SLR9 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR9 (slide 7) Self-assess (slide 9)		
102 to 108	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various	Introduction to data concepts	
109	SLR10 – Databases	1.3.2a	• 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,
110	SLR10 – Databases	1.3.2a	• 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	

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
111	SLR10 – Databases	1.3.2b	• 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)	Normalisation to 3NF	Secondary key, ERM, Normalisation, Indexing, 0NF, 1NF, 2NF, 3NF, Normal forms, SQL, Referential integrity, Transaction processing, ACID, Recording locking, Redundancy
112	SLR10 – Databases	1.3.2c	• Normalisation to 3NF	What is the purpose of normalisation? (SLR10 slide 4)	SLR10 Activities folder SLR10 Answers folder (Files starting 03)		
113	SLR10 – Databases	1.3.2c	• Normalisation to 3NF	What is the purpose of normalisation? (SLR10 slide 4)	SLR10 Activities folder SLR10 Answers folder (Files starting 03)		
114	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various	SQL	
115	SLR10 – Databases	1.3.2d	• 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	
116	SLR10 - Databases	1.3.2e&f	• 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)		
117	SLR10 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR10 (slide 7) Self-assess (slide 9-10)		
118 to 120	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various		

YEAR 12 - TERM 4

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
121 to 126	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various	Network characteristics and protocols	
127	SLR11 – Networks	1.3.3a	• 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, Firewall, Proxies, Encryption, Client-server, Peer-to-peer
128	SLR11 – Networks	1.3.3a&b	• 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	1.3.3b	• 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)		
130	SLR11 – Networks	1.3.3b	• 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)	Network security threats	

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
131	SLR11 – Networks	1.3.3c	• 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)		
132	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various		
133	SLR11 – Networks	1.3.3c	• 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	
134	SLR11 – Networks	1.3.3d	• Network hardware	How are devices on local area networks connected? (SLR11 slide 12)	SLR11 Activities folder SLR11 Answers folder (Files starting 05)	Client-server and peer-to-peer	
135	SLR11 – Networks	1.3.3e	• 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)		
136	SLR11 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR11 (slide 14) Self-assess (slide 16)		
137 to 144	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various	HTML	
145	SLR12 – Web technologies	1.3.4a	• 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)	CSS	HTML, CSS, JavaScript, Search engine indexing, PageRank algorithm, Server side processing, Client side processing
146	SLR12 – Web technologies	1.3.4a	• 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)	JavaScript	
147	SLR12 – Web technologies	1.3.4a	• HTML, CSS and JavaScript	How does a browser display a web page using HTML and CSS?	SLR12 Activities folder SLR12 Answers folder		

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
				(SLR12 slide 2) Provide an example of JavaScript. (SLR12 slide 3)	(Files starting 01)		
148	SLR12 – Web technologies	1.3.4a	• 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)		
149	SLR12 – Web technologies	1.3.4a	• 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)		
150	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various		
151	SLR12 – Web technologies	1.3.4a	• 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)	Search engine indexing	
152	SLR12 – Web technologies	1.3.4b	• Search engine indexing	How do search engines work? (SLR12 slide 4)	SLR12 Activities folder SLR12 Answers folder (Files starting 03)	PageRank algorithm PageRank algorithm example	
153	SLR12 – Web technologies	1.3.4bandc	• 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	
154	SLR12 – Web technologies	1.3.4d	• 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 slide 5)	SLR12 Activities folder SLR12 Answers folder (Files starting 05)		

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
155	SLR12 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR12 (slide 7) Self-assess (slide 9)		
156	Independent programming	N/A	Gain experience in practical programming Use our *Learning tasks*, *Programming challenges* and *Programming theory* PowerPoints		Progress with learning tasks and challenges	Primitive Data Types	

YEAR 12 - TERM 5

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
157	SLR13 – Data types	1.4.1a	• 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, Floating-point arithmetic, Bitwise manipulation, Shifts, AND, OR, XOR, Character sets, ASCII, Unicode
158	SLR13 – Data types	1.4.1b&c	• 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	
159	SLR13 – Data types	1.4.1d	• 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 Converting between Binary, Hex and Denary	
160	SLR13 – Data types	1.4.1e&f	• 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)	
161	SLR13 – Data types	1.4.1g	• Representation and normalisation of floating-point numbers in binary	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)	
162	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various		
163	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 07)		

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
164	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 07)		
165	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 07)	Floating-point arithmetic	
166	SLR13 – Data types	1.4.1h	• Floating-point arithmetic, positive and negative numbers, addition and subtraction	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)		
167	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)		
168	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various		
169	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	
170	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)	Character Sets	
171	SLR13 – Data types	1.4.1j	• 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)		
172	SLR13 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR13 (slide 11) Self-assess (slide 13-14)		
173 to 177	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various	Arrays, records, lists and tuples	

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
						Tuples, static or dynamic	
178	SLR14 – Data structures	1.4.2a	• 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)	Data Structures Part 3 Stacks and Queues Data structures C,T,A,R part 3, stacks and queues	Array, Records, Lists, Tuple, Linked list, Directed graph, Undirected graph, Stack, Queue, Tree, Binary search tree, Hash table
179	SLR14 – Data structures	1.4.2b	• The following structures to store data: linked list, graph (directed and undirected), stack, queue, tree, binary search tree, hash table	How do the operations push and pop work with a stack stored as an array? (SLR14 slide 3) How do the operations enqueue and dequeue work with a queue stored as an array? (SLR14 slide 4) What are the uses of stacks and queues in computer science? (SLR14 slide 5)	SLR14 Activities folder SLR14 Answers folder (Files starting 02 & 03)		
180	Independent programming	N/A	Gain experience in practical programming Use our *T.I.M.E workbooks, Programming challenges and Defold games tutorials.*		Various	Data Structures Part 1 Linked Lists Data Structures C,T,A,R Part 1 Linked Lists	
181	SLR14 – Data structures	1.4.2b	• The following structures to store data: linked list, graph (directed and undirected), stack, queue, tree, binary search tree, hash table	How do linked lists work to maintain the alphabetical order of items as they are input? (SLR14 slide 6)	SLR14 Activities folder SLR14 Answers folder (Files starting 05)	Data Structures Part 2 Graphs Data Structures C,T,A,R Part 2 Graphs	
182	SLR14 – Data structures	1.4.2b&c	• 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	What are trees, directed or undirected graphs, and how can they be represented using other data structures? (SLR14 slide 7)	SLR14 Activities folder SLR14 Answers folder (Files starting 06)	Data Structures Part 4 Trees Data Structures C,T,A,R Part 4 Trees	

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
			(This can be either using arrays and procedural programming or an object-oriented approach)	How does a depth-first traversal of a graph work? (SLR14 slide 8) How does a breadth-first traversal of a graph work? (SLR14 slide 9)			
183	SLR14 – Data structures	1.4.2b&c	• 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 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	
184	SLR14 – Data structures	1.4.2b&c	• 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)		
185	SLR14 – Data structures	1.4.2b&c	• 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 181-185	SLR14 Activities folder SLR14 Answers folder (Files starting 09)		
186	SLR14 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR14 (slide 13) Self-assess (slide 15)		

YEAR 12 - TERM 6

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
						Define problems using Boolean logic	
187	SLR15 – Boolean algebra	1.4.3a	• 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, Boolean algebra, De Morgan's law, Distribution, Association, Commutation, Double negation, Logic gate diagram, Truth table, D type flip flops, Half adders, Full adders
188	SLR15 – Boolean algebra	1.4.3a	• 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)	Karnaugh maps part 1 Karnaugh maps part 2 Karnaugh maps part 3 Karnaugh maps part 4	
189	SLR15 – Boolean algebra	1.4.3b	• 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)		
190	SLR15 – Boolean algebra	1.4.3c	• Use the following rules to derive or simplify statements in Boolean algebra: De Morgan's Laws, distribution, association, commutation, double negation	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)	Simplifying Boolean algebra Simplifying Boolean algebra example	
191	SLR15 – Boolean algebra	1.4.3c	• Use the following rules to derive or simplify statements in Boolean algebra: De Morgan's Laws, distribution, association, commutation, double negation	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)	Logic gates and truth tables	
192	SLR15 – Boolean algebra	1.4.3c&d	• Use the following rules to derive or simplify statements in Boolean algebra: De Morgan's Laws, distribution, association, commutation, double negation • Using logic gate diagrams and truth tables	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	

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
193	SLR15 – Boolean algebra	1.4.3e	• 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)		
194	SLR15 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR15 (slide 8) Self-assess (slide 10)		
195 to 204	Project intro and project definition	3.1.1-3.1.2	These lesson 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 forms: Our project advice booklets • Documenting Defold programming projects OCR H446 • Documenting programming projects OCR H446 Our fully marked and moderated exemplar projects: • Candidate 1 - (62 out of 70) • Candidate 1 - (61 out of 70) • Candidate 1 - (68 out of 70) Activities can include: • 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 Get students to watch our YouTube video playlist on *Unit 3 Project advice*: www.youtube.com/watch?v=ZUcjAoVFYWAandlist=PLCiOXwirraUDinzjsVmpx7yof8AE-LVgd				
						Data Protection Act (superseded by GDPR)	

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
						Computer Misuse Act	
205	SLR16 – Computer-related legislation	1.5.1a&b	• 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	GDPR, DPA, CMA, CDPA, RIPA
206	SLR16 – Computer-related legislation	1.5.1c&d	• 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)		
207	SLR16 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR16 (slide 6) Self-assess (slide 8)		

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
208 to 216	Project analysis	3.1.3-3.1.4	These lesson 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 forms: Our project advice booklets • Documenting Defold programming projects OCR H446 • Documenting programming projects OCR H446 Our fully marked and moderated exemplar projects: • Candidate 1 - (62 out of 70) • Candidate 1 - (61 out of 70) • Candidate 1 - (68 out of 70)				
						Moral, social and ethical issues Part 1	
217	SLR17 – Ethical, moral and cultural issues	1.5.2a	The individual (moral), social (ethical) and cultural opportunities and risks of digital technology: • Computers in the workforce • Automated decision making • Artificial intelligence	Topic for consideration: Computers in the workforce: moral, ethical and social issues. Topic for consideration: Automated decision making: moral, ethical and social issues. Topic for consideration: Artificial intelligence: moral, ethical and social issues. (SLR17 slide 2-4)	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
218	SLR17 – Ethical, moral and cultural issues	1.5.2a	The individual (moral), social (ethical) and cultural opportunities and risks of digital technology: • Environmental effects • Censorship and the Internet • Monitor behaviour	Topic for consideration: Environmental effects of computer science: moral, ethical and social issues. Topic for consideration: Censorship and the Internet: moral, ethical and social issues. Topic for consideration: Monitoring behaviour: moral, ethical and social issues. (SLR17 slide 5-7)	SLR17 Activities folder SLR17 Answers folder (Files starting 01)	Moral, social and ethical issues Part 4 Moral, social and ethical issues Part 5	

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
219	SLR17 – Ethical, moral and cultural issues	1.5.2a	The individual (moral), social (ethical) and cultural opportunities and risks of digital technology: • Analyse personal information • Piracy and offensive communications • Layout, colour paradigms and character sets	Topic for consideration: Environmental effects of computer science: moral, ethical and social issues. Topic for consideration: Censorship and the Internet: moral, ethical and social issues. Topic for consideration: Monitoring behaviour: moral, ethical and social issues. (SLR17 slide 5-7)	SLR17 Activities folder SLR17 Answers folder (Files starting 01)		
220	SLR17 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR17 (slide 11) Self-assess (slide 13)		
221 to 228	Project analysis	3.1.3-3.1.4	These lesson 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 forms: Our project advice booklets • Documenting Defold programming projects OCR H446 • Documenting programming projects OCR H446 Our fully marked and moderated exemplar projects: • Candidate 1 - (62 out of 70) • Candidate 1 - (61 out of 70) • Candidate 1 - (68 out of 70)				

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	This first week is given over to INSET, 6th form registration and other activities. Use it as in introduction to Year 13 and a buffer week.				Nature of abstraction Need for abstraction	
1	SLR18 – Thinking abstractly	2.1.1a&b	• The nature of abstraction • The need for abstraction	What is abstraction and why is it needed? (SLR18 slide 2) How is abstraction used in every-day life? (SLR18 slide 3)	SLR18 Activities folder SLR18 Answers folder (Files starting 01 & 02)	Abstraction and reality	Thinking abstractly, Abstraction, Abstract model
2	SLR18 – Thinking abstractly	2.1.1c	• The differences between abstraction and reality	What are some examples of abstraction in computer science? (SLR18 slide 4)	SLR18 Activities folder SLR18 Answers folder (Files starting 03)	Devise an abstract model	
3	SLR18 – Thinking abstractly	2.1.1d	• 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)		
4 and 5	Project design	3.2.1-3.2.3	These lesson 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 forms: Our project advice booklets • Documenting Defold programming projects OCR H446 • Documenting programming projects OCR H446 Our fully marked and moderated exemplar projects: • Candidate 1 - (62 out of 70) • Candidate 1 - (61 out of 70) • Candidate 1 - (68 out of 70)			Identify inputs and outputs Determining preconditions	

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
6	SLR19 – Thinking ahead	2.1.2a&b	• 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
7	SLR19 – Thinking ahead	2.1.2d	• 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)	Caching	
8	SLR19 – Thinking ahead	2.1.2c	• The nature, benefits and drawbacks of caching	What is caching in programming and what are the limitations? (SLR19 slide 5)	SLR19 Activities folder SLR19 Answers folder (Files starting 04)		
9 and 10	Project design Project design	3.2.1-3.2.3	These lesson 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 forms: Our project advice booklets • Documenting Defold programming projects OCR H446 • Documenting programming projects OCR H446 Our fully marked and moderated exemplar projects: • Candidate 1 - (62 out of 70) • Candidate 1 - (61 out of 70) • Candidate 1 - (68 out of 70)			Identify components of a problem Identify components of a solution	
11	SLR20 – Thinking procedurally	2.1.3a&b	• 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)	SLR20 Activities folder SLR20 Answers folder (Files starting 01 & 02)	Steps to solve a problem Identify subprocedures	Thinking procedurally

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
				How are flowcharts used to define algorithms? (SLR20 slide 3)			
12	SLR20 – Thinking procedurally	2.1.3c&d	• 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)		
13 to 15	Project design	3.2.1-3.2.3	These lesson 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 forms: Our project advice booklets • Documenting Defold programming projects OCR H446 • Documenting programming projects OCR H446 Our fully marked and moderated exemplar projects: • Candidate 1 - (62 out of 70) • Candidate 1 - (61 out of 70) • Candidate 1 - (68 out of 70)			Decisions and program flow Determine logical conditions	
16	SLR21 – Thinking logically	2.1.4a&b	• 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
17	SLR21 – Thinking logically	2.1.4b&c	• Determine the logical conditions that affect the outcome of a decision • Determine how decisions affect flow through a program	How do decisions affect the flow of a program? (SLR21 slide 3)	SLR21 Activities folder SLR21 Answers folder (Files starting 03)		

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
18 to 20	Project design	3.2.1-3.2.3	These lesson 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 forms: Our project advice booklets • Documenting Defold programming projects OCR H446 • Documenting programming projects OCR H446 Our fully marked and moderated exemplar projects: • Candidate 1 - (62 out of 70) • Candidate 1 - (61 out of 70) • Candidate 1 - (68 out of 70)			Parts of problem tackled at the same time Benefits and trade-offs of concurrent processing	
21	SLR22 – Thinking concurrently	2.1.5a&db	• 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
22	SLR18-22 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR18-22 Self-assess SLR18-22		

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
23 to 30	Project design and project development	3.2.1-3.3.2	These lesson 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 forms: Our project advice booklets • Documenting Defold programming projects OCR H446 • Documenting programming projects OCR H446 Our fully marked and moderated exemplar projects: • Candidate 1 - (62 out of 70) • Candidate 1 - (61 out of 70) • Candidate 1 - (68 out of 70)				

YEAR 13 - TERM 2

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
31 to 50	Project development	3.3.1-3.3.2	These lesson 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 forms: Our project advice booklets • Documenting Defold programming projects OCR H446 • Documenting programming projects OCR H446 Our fully marked and moderated exemplar projects: • Candidate 1 - (62 out of 70) • Candidate 1 - (61 out of 70) • Candidate 1 - (68 out of 70)			Programming constructs Recursion	
51	SLR23 – Programming techniques	2.2.1a&b	• Programming constructs: sequence, iteration, branching • Recursion, how it can be used and compares to an iterative approach	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) What is recursion and how does it compare to using an iterative approach? (SLR23 slide 6)	SLR23 Activities folder SLR23 Answers folder (Files starting 01,02 & 06)	Global and local variables	Sequence, Iteration, Branching / Selection, Recursion, Global variable, Local variable, Modularity, Functions, Procedures,

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
52	SLR23 – Programming techniques	2.2.1b&c	• Recursion, how it can be used and compares to an iterative approach • Global and local variables	What is recursion and how does it compare to using an iterative approach? (SLR23 slide 6) 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 02 & 06)		Parameters, Parameter passing, Parameter passing by value, Parameter passing by reference, IDE, Debugging
53	SLR23 – Programming techniques	2.2.1b&c	• Recursion, how it can be used and compares to an iterative approach • Global and local variables	What is recursion and how does it compare to using an iterative approach? (SLR23 slide 6) 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 02 & 06)	Functions and procedures	
54	SLR23 – Programming techniques	2.2.1d	• 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 Object orientated techniques	
55	SLR23 – Programming techniques	2.2.1e&f	• Use of an IDE to develop/debug a program • Use of object-oriented techniques	What are the features of an IDE? (SLR23 slide 5)	SLR23 Activities folder SLR23 Answers folder (Files starting 05 & 07)		
56	SLR23 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR23 (slide 8) Self-assess (slide 11)		

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
57 to 65	Project development	3.3.1-3.3.2	These lesson 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 forms: Our project advice booklets • Documenting Defold programming projects OCR H446 • Documenting programming projects OCR H446 Our fully marked and moderated exemplar projects: • Candidate 1 - (62 out of 70) • Candidate 1 - (61 out of 70) • Candidate 1 - (68 out of 70)				
66-70	This is the last week before Christmas. It has been left free in our delivery calendar as a buffer week.						

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	These lesson 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 forms: Our project advice booklets • Documenting Defold programming projects OCR H446 • Documenting programming projects OCR H446 Our fully marked and moderated exemplar projects: • Candidate 1 - (62 out of 70) • Candidate 1 - (61 out of 70) • Candidate 1 - (68 out of 70)			Features of a problem Problem recognition Problem decomposition	
76	SLR24 - Computational methods	2.2.2a,b and c	• 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, Problem decomposition, Divide and conquer, Backtracking, Data mining, Heuristics, Performance modelling, Visualisation
77	SLR24 - Computational methods	2.2.2d	• Use of divide and conquer	What is divide and conquer? (SLR24 slide 3)	SLR24 Activities folder SLR24 Answers folder (Files starting 05)	Use of abstraction Backtracking, Data mining and Heuristics	

78	SLR24 - Computational methods	2.2.2e&f	• Use of abstraction
			• Learners should apply their knowledge of:
			  • 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)
						Performance modelling, Pipelining and Visualisation	

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
79	SLR24 - Computational methods	2.2.2e&f	• 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)		
80	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)		
81	SLR24 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR24 (slide 10-11) Self-assess (slide 13)		
82 to 85	Project development	3.3.1-3.3.2	These lesson 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 forms: Our project advice booklets • Documenting Defold programming projects OCR H446 • Documenting programming projects OCR H446 Our fully marked and moderated exemplar projects: • Candidate 1 - (62 out of 70) • Candidate 1 - (61 out of 70) • Candidate 1 - (68 out of 70)			Analysis and design of algorithms	
86	SLR25 – Algorithms	2.3.1a	• Analysis and design of algorithms for a given situation	None for this lesson	None for this lesson	Standard algorithms Implement bubble sort	Algorithm, Big O notation, Bubble sort, Insertion sort, Merge sort, Quicksort, Dijkstra's shortest path, A* algorithm, Binary
87	SLR25 – Algorithms	2.3.1b&c	• 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	

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
88	SLR25 – Algorithms	2.3.1b&c	• 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	search, Linear search
89	SLR25 – Algorithms	2.3.1b&d	• 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	
90	SLR25 – Algorithms	2.3.1b&d	• 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	
91	SLR25 – Algorithms	2.3.1e	• 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	
92	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)	Comparison of the complexity of algorithms Measures and methods to determine the efficiency of different algorithms Big O notation	
93	SLR26 Algorithms	2.3.1c&d	• 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	
94	SLR26 Algorithms	2.3.1e	• 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)		

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
95	SLR26 Algorithms	2.3.1e	• 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	
96	SLR26 Algorithms	2.3.1f	• 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)		
97	SLR26 Algorithms	2.3.1f	• 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	
98	SLR26 Algorithms	2.3.1f	• 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)	A* pathfinding A* pathfinding revisited	
99	SLR26 Algorithms	2.3.1f	• 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)		
100	SLR25 & SLR26 – End-of-topic test	End-of-topic test Student self-assessment RAG rating opportunity			Test – SLR26 (slide 12) Self-assess (slide 14-16)		

YEAR 13 - TERM 4

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
101 to 110	Project development	3.3.1-3.3.2	These lesson 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 forms: Our project advice booklets • Documenting Defold programming projects OCR H446 • Documenting programming projects OCR H446 Our fully marked and moderated exemplar projects: • Candidate 1 - (62 out of 70) • Candidate 1 - (61 out of 70) • Candidate 1 - (68 out of 70) Our dedicated playlist on our YouTube channel provides help and guidance on the A Level project: www.youtube.com/watch?v=ZUcjAoVFYWAandlist=PLCiOXwirraUDinzjsVmpx7yof8AE-LVgd				
111 to 120	Project testing	3.4.1					
121 to 130	Project evaluation	3.4.2-3.4.4					

YEAR 13 - TERM 5

	Topic focus	Spec ref	Specification learning outcomes	Key question	Activities	HW for next lesson	Key terms
131 to 155	Revision		This period is given over to revision. We have many resources to help with revision, including: • A dedicated FREE site for students with all our videos and downloadable cheat sheets: student.craigndave.org • A series of videos on exam technique, including how to understand command words and answer extended questions: student.craigndave.org/videos/exam-technique 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. • 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				