

A'Level OCR Computer Science Revision check list PLC

Topic 1.1.1 : Structure and function of the processor

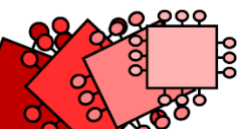
Video revision link: <http://student.craigndave.org/video/slr-1-structure-and-function-of-the-processor>

Specific knowledge required A Level:	Need to Revise	Revised Once	Got it!
Candidates need to have an understanding of the purpose and function of the core components of a processor.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the role and components of the ALU.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose and function of registers within the processor, including the PC, accumulator, MAR, MDR and CIR.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose, function and role of the data, address and control buses in the processor.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how assembly language makes use of registers, and how data and addresses are transferred between registers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose and stages within the FDE cycle.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how and when the registers are used within this cycle, and how and where data and addresses are transmitted to/from in each part of this cycle.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how the performance of the CPU can be affected by many factors.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how and why the performance is affected by the clock speed, the number of cores and the size and speed of the cache.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have an understanding of the Von Neumann and Harvard architectures. They should be aware of the different approaches the architectures take to storing instructions and data in memory and the benefits of each approach.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates will not be asked about specific aspects of "contemporary processor architecture" unless explicitly named in the specification. They may, however, be asked to show an awareness of how contemporary processors differ from a pure Von Neumann architecture in more open questions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Topic 1.1.2 : Types of processor

Video revision link: <http://student.craigndave.org/video/slr-2-types-of-processor>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to understand the differences between the CISC and RISC processors and the key features and benefits of each.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be aware of the relative benefits of each architecture.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand what is meant by a parallel system and the benefits and limitations of parallel processing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand that parallel processing can be achieved through different (i.e. multiple processors in the same computer or distributed or multiple cores in a CPU or GPU).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the benefits of a multicore system in terms of parallel processing and running multiple programs at the same time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to understand the purpose of GPUs and what applications they are used for (candidates need to understand how GPUs are used to aid graphics, but also other applications for example their use in modelling, data mining, etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand the benefits of using GPUs and why they are suited to certain tasks (specialist instructions, multiple cores and SIMD processing).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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Topic 1.1.3 : Input, output & storage

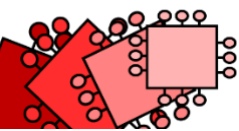
Video revision link: <http://student.craigndave.org/video/slr-3-input-output-and-storage>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to have an understanding of a range of input, output and storage devices.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates do not need to understand how the input and output devices work, but must be able to recommend appropriate devices for specific situations and be able to justify choices made.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand that there are different types of storage device. They need to know about the characteristics of each type (magnetic, optical and flash) and understand the benefits and drawbacks of each, and be able to recommend an appropriate type of device for a given situation and justify the choice.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose of ROM and RAM within a computer system, their characteristics, and the role they play in the running of a range of different computers e.g. mobile devices, embedded systems etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand why there is a need for virtual storage, how virtual storage works and the benefits and drawbacks of using virtual storage. Virtual storage would be that which may appear to be local but is physically located elsewhere on the network/remotely/in the cloud.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Topic 1.2.1 : Operating systems – systems software

Video revision link: <http://student.craigndave.org/video/slr-4-operating-systems-systems-software>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to have an understanding of why an operating system is required, along with the different tasks it performs within a computer system (e.g. resource management, file management, interrupt handling, security, providing a platform for software to run, providing a user interface and providing utilities).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how operating systems manage memory. They need to understand the need for, purpose and function of paging to divide memory into usable fixed-size pages and how this aids in the transfer of memory for example virtual memory.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand what is meant by segmentation and how memory is divided into segments to allow access to memory.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand what is meant by virtual memory and why this is needed in a computer system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how paging is used in virtual memory, and the benefits and drawbacks of having and using virtual memory in a computer system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose of interrupts within a computer system, why an interrupt might be generated and what happens within the CPU and memory in order to call an interrupt service routine.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the need for scheduling of tasks by an operating system and the benefits that scheduling brings.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand that there are different scheduling algorithms, with each having benefits and drawbacks for tasks with specific characteristics.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how the following scheduling algorithms work; round robin, first come first served, multi-level feedback queue, shortest job first and shortest remaining time.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the different (and often overlapping) classifications of operating systems (distributed, embedded, multi-tasking, multi-user and real time), including the key features of each. They should be able to recommend (and justify) a type of operating system for a given scenario.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the role of the BIOS in a computer system, and the steps that the BIOS goes through to start a computer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand what is meant by 'device drivers' and why they are needed for communication between hardware and the operating system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be able to describe what is meant by a virtual machine, how they can be used to execute intermediate code, how they can be used to run a software driven machine inside a physical machine and the benefits and drawbacks of each approach.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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Topic 1.2.2 : Application generation

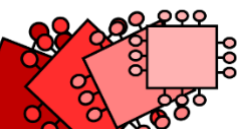
Video revision link: <http://student.craigndave.org/video/slr-5-application-generation>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to understand the purpose of applications, and should have knowledge and experience of a range of different application software (for example database, word processor, web browser, graphics manipulation etc.).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be able to recommend the use of specific and generic applications for given scenarios, justifying their use and function(s) for a scenario.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose and role of utility software in a computer system.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be familiar with a range of utility software (e.g. disk defragmentation, file management, device driver, system cleanup, security etc.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to explain the differences between open and closed source software, the benefits and drawbacks to creator and user of each of the licensing models, and be able to recommend which is used (with justification) for a specific scenario.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the need for translators when writing programs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have knowledge of the differences in operation of interpreters and compilers, from these they need to be able to assess the benefits and drawbacks of using each type, and recommend with justification which should be used in a specific scenario.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the role of an assembler and how it differs from interpreters and compilers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to understand that there are a number of stages involved in compilation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how lexical analysis works and how the code is converted into tokens with the removal of unnecessary elements (e.g. comments and whitespace).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how syntax errors are identified and reported at the end of the syntax analysis.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how the abstract syntax tree will be fed into the next stage of code generation, and that the object code is then created.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand why optimisation is important and how the results of lexical analysis feeds into syntax analysis, and how the tokens are checked to ensure they meet the during (and after) code generation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand what code libraries are, how they are used and the benefits and drawbacks from using libraries.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have experience of using libraries to write programs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Topic 1.2.3 : Software development

Video revision link: <http://student.craigndave.org/video/slr-6-software-development>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to understand the different models that can be followed to produce a program (explicitly the waterfall lifecycle, agile methodology, extreme programming, the spiral model and rapid application development).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the tasks, processes, benefits and drawbacks of each model and the similarities and differences between each.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand where each model is most suitable to use, and be able to justify the use in a situation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to write algorithms using flow charts, pseudocode and/ or program code.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to follow the code as shown in the OCR pseudocode guide, but are not expected to write code in this.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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Candidate's code is not expected to be syntactically correct, but must use appropriate code structures.



Topic 1.2.4 : Types of programming language

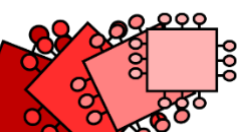
Video revision link: <http://student.craigndave.org/video/slr-7-types-of-programming-language>

Specific knowledge required for A Level Only:	Need to Revise	Revised Once	Got it!
Candidates need to understand that there are a variety of types of programming paradigms such as procedural, OOP, low-level, and that each has its strengths and weaknesses in specific scenarios, topics or areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have knowledge and experience of using a procedural programming language for example Python, VB.NET etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be experienced in using procedural programming features such as (but not limited to) variables, constants, selection, iteration, sequence, subroutines, string handling, file handling, Boolean and arithmetic operators.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace, amend and write procedural program code.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have an understanding of the purpose and need for assembly language. They need to be familiar with the instructions given in Appendix 5d. They should be able to read, write, trace and amend programs written in the Little Man Computer language.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need an understanding of addressing, which should be integrated with assembly language.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have experience of using immediate, direct, indirect and indexed addressing in the writing, reading and tracing of programs written in assembly language.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand object-oriented code (as specified in the pseudocode guide). They need to have an understanding of classes, objects, attributes and methods. They need to understand the difference between private and public attributes and methods.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand encapsulation and the use of get and set methods to access private attributes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose and principles of inheritance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have an understanding of polymorphism and how it can be used within a program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace, amend and write code that makes use of these object-oriented	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Topic 1.2.4 : Introduction to programming

Video revision link: <http://student.craigndave.org/video/slr-8-introduction-to-programming>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to have knowledge and experience of using a procedural programming language for example Python, VB.NET etc. There is no substitute for practical experience when learning the content for this section.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how to control the flow of a program (sequence, iteration and selection).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose and function of both variables and constants, and be able to read, trace and write code that makes use of both variables and constants.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the benefits of using constants over variables.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the role of sub-programs (procedures and functions) in a program, how these can be used to reduce the amount of code and improved the efficiency.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the differences between procedures and functions, and be able to read, write and trace programs using both procedures and functions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have experience of using a range of arithmetic (+, -, /, *, MOD, DIV) operators, Boolean (AND, OR, NOT, ==, >, <, =, >=, <=, !=) operators and assignment operator (=).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace and write programs using these operators. Code in the exam will be written using the OCR pseudocode guide, so candidates need to be able to read	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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and interpret this pseudocode – however, their answers can be in pseudocode, or program code.			
Candidates need to have experience of using a range of string handling functions and need to be able to read, trace and write program code using and combining string handling techniques (selecting substrings, converting to upper/lowercase, converting between characters and their ASCII values. Any functions presented in a question which are not in pseudocode guide, will be specifically introduced.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have experience of writing programs that write to and read from text files. Candidates' understanding of procedural languages will largely be tested by asking candidates to read/write/trace/amend simple programs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have an understanding of the purpose and need for assembly language. Candidates	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
need to be familiar with the instructions given in Appendix 5d.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be able to read, write, trace and amend programs written in the Little Man Computer language.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Topic 1.3.1 : Compression, encryption & hashing

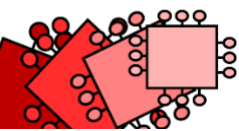
Video revision link: <http://student.craigndave.org/video/slr-9-compression-encryption-and-hashing>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to understand the need for compression, especially when transferring data via the Internet.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the difference between lossy and lossless compression, and the benefits and drawbacks of each type.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to recommend a type of compression for a given scenario.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how run-length encoding can reduce the size of a file for example with a text file or image.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand how dictionary coding works by substituting entries with a unique code.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have practical experience of using these algorithms with small example files.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand the need for encryption.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand how symmetric and asymmetric encryption work to encrypt and decrypt data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand the need for and purpose of using hashing algorithms to store data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be aware of different uses for hashing, such as the storing of passwords.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Topic 1.3.2 : Databases

Video revision link: <http://student.craigndave.org/video/slr-10-databases>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to understand what is meant by a database.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be familiar with basic database terminology such as fields, records and tables.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should know the difference between a flat file and a relational database, and be able to explain the benefits and limitations of each approach.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have experience of setting up and using both a flat file, and relational database.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



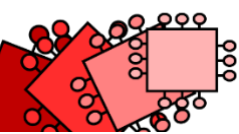
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Candidates should know what is meant by a primary key, foreign key and secondary key and how each are used in a database.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be able produce and follow Entity Relationship (ER) diagrams which include 1:1, 1:M and M:M relationships.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be able to identify how tables should be linked.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have an awareness of a range of methods for capturing data (such as forms, OCR, OMR and sensors) selecting data (such as Query By Example and SQL), managing data (such as changing data by manipulating it – e.g. arithmetic functions, adding, editing, deleting the data) and exchanging data (with common formats such as CSV, JSON and XML). Candidates won't be specifically asked about any one of these methods but may be asked to discuss/justify suitable methods as part of a more open question.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to have an understanding of the need to interrogate data within a database.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand the purpose of indexing in a database and the benefits of using indexing to optimise the searching for data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have experience of a range of methods for capturing data (such as forms – what do they collect, what do they look like – data mining, where does the data come from, how is it collected and analysed), selecting data (such as how to produce QBEs – adding fields, tables, criteria, sorting – selecting through Boolean expressions – AND, OR, NOT), managing data (such as changing data by manipulating it – e.g. arithmetic functions – , adding, editing, deleting the data) and exchanging data (such as methods of transferring data – electronic i.e. memory stick, e-mail, and non-electronic e.g. paper based – appropriate formats for the transfer of data and communication mediums to transfer data – such as the structure, is it in a table or a list).(such as forms, data mining), selecting data (such as producing QBEs, selecting through Boolean expressions), managing data (such as manipulation, adding, editing, deleting) and exchanging data (such as methods of transferring data, appropriate formats for the transfer of data and communication mediums to transfer data).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have experience of using SQL to edit and modify data in a database. They should understand the need for SQL as a standard language.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be able write and follow scripts using the SQL commands listed in appendix 5d.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand what is meant by referential integrity, and why this is desirable in a database.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand what is meant by transaction processing, and scenarios where transaction processing takes place.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand the problems that arise from transaction processing, and how these can be overcome.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand the ACID rules for transaction processing, and why databases should be built to these standards.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand how record locking prevents the overriding of data, and understand how record locking takes place.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Topic 1.3.3 : Networks

Video revision link: <http://student.craigndave.org/video/slr-11-networks>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to understand the definition and purpose of a network.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose of, and importance of using, protocols.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be able to discuss examples of protocols that may be used in a network/ the internet (but will not be asked to recall information about any specific protocol).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand the term standard, and the purpose and need for standards in a network (or any situation where data is transferred).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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Candidates need to understand the purpose and benefits of layering protocols, particularly within the TCP/IP stack. Candidates need to know the different layers within the TCP/IP stack and the purpose of each.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how data is transmitted on the Internet, the use of IP addresses and packets in the transfer of data. (NB: Candidates are not expected to be familiar with the OSI model).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates are expected to understand the terms LAN and WAN.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how the Domain Name System is used to find the IP address of a URL.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose, function, benefits and drawbacks of both packet and circuit switching.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the difference between a client-server and peer-to-peer network.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to know the benefits and drawbacks of each type of network and be able to recommend one for a given scenario.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

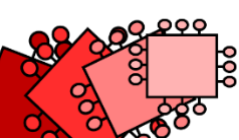
Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to understand that there are a range of security issues and threats involved with networked computers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be aware of threats such as hackers, viruses, unauthorised access, denial of service, spyware, SQL injection, phishing and pharming.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to know about ways of minimising, or preventing these threats for example firewalls, secure passwords, anti-virus, anti-spyware etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have knowledge of the hardware required to connect to and/or build a network (e.g. modem, router, cable, NIC, Wireless Access Points, hub, switch etc).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose of the hardware, but are not required to understand how they physically work.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Topic 1.3.4 : Web technologies

Video revision link: <http://student.craigndave.org/video/slr-12-web-technologies>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to understand the purpose of HTML, CSS and JavaScript.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to know when each language/markup would be used, and what its purpose and function is.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have experience of writing webpages using HTML, CSS and JavaScript.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to recognise the code in Appendix 5d, and be able to read, write, amend and interpret code using HTML, CSS and JavaScript.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the need for compression (when transferring data over a network).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the difference between lossy and lossless compression, and the benefits and drawbacks of each type.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to recommend a type of compression for a given scenario.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates should understand how and why search engine results are indexed. They should understand how PageRank ranks these results.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand how page rank works at a high level but are not expected to be able to code the algorithm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the difference between server and client side processing, and should be aware of examples (for example Javascript code vs PHP code) of processing on both sides.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be aware of the benefits and drawbacks of both types of processing.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

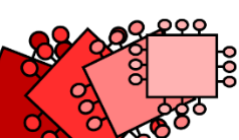


A'Level OCR Computer Science Revision check list PLC

Topic 1.4.1 : Data types

Video revision link: <http://student.craigndave.org/video/slr-13-data-types>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to have an understanding of programming data types such as integer, real, Boolean, character, string etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to choose appropriate data types for a situation or given data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have experience of programming solutions using these data types.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have knowledge of how to convert from one data type to another (casting).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand how and why computers store data as binary, and that a binary number can have a variety of different interpretations depending on what is being stored (e.g. numeric, text, image, sound).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be able to convert positive whole numbers to binary and from binary to denary.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should know how to store negative numbers using Sign and Magnitude and Two's Complement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be able to convert denary numbers to sign and magnitude, and two's complement – and vice-versa.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be able to perform addition and subtraction on integer binary numbers. (These numbers could be positive or negative using two's complement representation.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have an understanding of the purpose and potential uses of hexadecimal for example where and why they are used instead of binary and the benefits of using hexadecimal over alternatives such as binary.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be able to convert denary numbers to hexadecimal and vice-versa and from binary to hexadecimal and vice-versa.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have an understanding of how (positive and negative) real numbers are represented in a binary floating-point representation, and should be able to convert between a denary number and a real binary number. (NB the representation used for the exam is the mantissa and exponent both represented using two's complement.)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand the need for normalised floating point numbers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be able to normalise a floating point number.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have an understanding of how characters are represented in binary.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand the need for a character set and how a computer makes use of a character set.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be aware of the ASCII and UNICODE character sets and be able to explain the differences between these and the benefits of each.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be able to use a character set, or part of a character set, to translate characters into binary and vice-versa. (Candidates are not expected to memorise any values in a character set)	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates should be able to normalise a floating point number.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be able to perform addition and subtraction floating point arithmetic including addition and subtraction of both positive and negative numbers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be able to perform right and left logical shifts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand the effect of right and left shifts on a binary numbers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand the purpose of using masks with bitwise operators, and should have experience of applying masks using AND, OR and XOR.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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Topic 1.4.2 : Data structures

Video revision link: <http://student.craigndave.org/video/slr-14-data-structures>

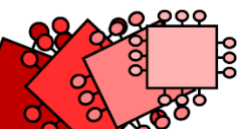
Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates should be able to describe what is meant by arrays (up to 3 dimensions), records, lists and tuples.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates are expected to be able recognise when they can be used and incorporate them in their programs to store data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have an understanding of the purpose and use of a record structure to store data of different data types in a program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have experience of using records to store, search, manipulate and retrieve data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have an understanding of the purpose and use of a list to store data in a program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have experience of using lists to store, search, manipulate and retrieve data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have an understanding of the purpose and use of tuples to store data in a program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have experience of using tuples to store, search, manipulate and retrieve data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have an understanding of the behaviour of stacks and queues (i.e. LIFO and FIFO).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to have an understanding of the behaviour of linked-lists, graphs, stacks, queues, trees, binary search trees and hash tables.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able be aware of how the aforementioned data structures can be implemented. We would recommend a general understanding of these principles that can be applied to a given scenario rather than trying to memorise code patterns.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have experience of implementing these structures in a variety of contexts, for example through a procedural program, through a different data structure and through an object-oriented approach.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace and write code to implement features of these data structures. (Again we would recommend a general understanding backed up with practice implementing them, rather than trying to memorise code patterns).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Topic 1.4.3 : Boolean algebra

Video revision link: <http://student.craigndave.org/video/slr-15-boolean-algebra>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates should be familiar with AND, OR, NOT and XOR. Candidates should be familiar with the logic of each Boolean operator, and the truth tables.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be able to construct logic gate diagrams from a Boolean expression and viceversa.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be able to construct truth tables from Boolean expressions and logic gate diagrams.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have an understanding that Boolean expressions can be simplified and should have experience of simplifying expressions using Karnaugh maps.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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Candidates should be able to create, complete and interpret Karnaugh maps to simplify Boolean expressions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates should be aware of the given De Morgan's laws and should be able to apply these to a Boolean statement.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have experience of manipulating and simplifying Boolean statements using these rules of distribution, commutation, association and double negation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose and principles of D type flip flops and how and where they are used in a computer. They should be able to recognise how they can be triggered by a clock pulse (see practice paper 2 for an example).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates are not expected to memorise the logic gates that make up a D-type flip flop.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose and function of an adder circuit, and the difference between a half and full adder. They should be able to recognise and draw the logic gates and truth tables for full and half adders.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Topic 1.5.1 : Computer related legislation

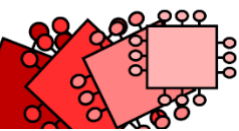
Video revision link: <http://student.craigndave.org/video/slr-16-computer-related-legislation>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to have an understanding of the need for and purpose of laws relating to the use of computers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should be familiar with the purpose and role of the Data Protection Act.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates will need to understand the different rules that are within the DPA and how these impact the use of computers and the storage of data by organisations. This should include what organisations can and cannot do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose and principles of the Computer Misuse Act, including the actions that it prohibits.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose and principles of the Copyright and Patents Act, including the actions that it prohibits.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose and principles of the Regulation of Investigatory Powers Act, and what this allows in interception and monitoring of electronic communication.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how the regulations impact organisations and the use of computers and electronic communication.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Additional notes:			
<i>We are aware the law is constantly changing and some of the mentioned laws/acts (most notably the DPA) are likely to change over the course of the specification. Answers will be accepted that use an interpretation of the law based on when the specification was started or when the examination was sat.</i>			
<i>Please note, a question that requires an extended response can be asked from any area within the specification. These questions are assessed using a level of response framework, where the response requires specific areas to have been covered to allow it to reach that level. In this area of the specification, for example, a question may be asked on the social and ethical impacts of a specific technology in a specific scenario or context. To gain the highest level, candidates would need to discuss whichever moral or social elements are relevant in the question, and because there is a context, every point they make should be in the context given, or related after to the context. If the question requires a judgement, or conclusion, then this needs to be given and justified against the context given.</i>			

Topic 1.5.2: Ethical, moral & cultural issues

Video revision link: <http://student.craigndave.org/video/slr-17-ethical-moral-and-cultural-issues>

Specific knowledge required for A Level::	Need to Revise	Revised Once	Got it!
Candidates need to understand what is meant by moral, social, ethical and cultural issues in relation to the use of computers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how the use of computers, and the increasing use of computers in the work force has moral, social, ethical and cultural implications and risks to a variety of people such as the employees, employers, society and organisations.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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Candidates need to understand how the use of computers to make decisions automatically has moral, social, ethical and cultural implications and risks to a variety of people such as those people who make the decisions, the people the decisions affect, and the need for additional collection of information to ensure the decisions are accurate and valid.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how the development of artificial intelligence has moral, social, ethical and cultural impacts on a variety of people.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how the environmental effects of computers (such as disposal, energy use) have moral, social, ethical and cultural implications.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how the Internet and censorship on the Internet has moral, social, ethical and cultural implications.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the moral, social, ethical and cultural implications of using computers to monitor behaviour (such as CCTV, tracking phone calls, GPS, monitoring emails).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the moral, social, ethical and cultural implications of using computers to analyse personal information (such as the gathering, storing and analysing of medical records)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how different cultures impact on the use of and creation of computers and programs. For example languages make use of different characters, and how this in turn impacts the use of character sets. Some languages read left to right, and others right to left.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand how colours have different meanings in different cultures for example red means danger in one culture, and luck in another.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to consider how these will impact the creation of computer applications.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Additional notes:			
<i>In order to prepare for this section we would recommend candidates regularly keep abreast of technological developments in the news.</i>			

Topic 2.1.1: Thinking abstractly

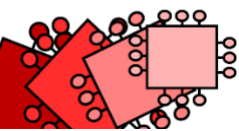
Video revision link: <http://student.craigndave.org/video/slr-18-thinking-abstractly>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to understand the term abstraction and its purpose in the design and creation of computer programs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the benefits of abstraction and apply these benefits to a specific scenario.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates may be given a scenario and be asked how abstraction can be applied to it, how it has been applied or how further abstraction can be applied.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have an understanding of how reality differs to abstraction and understand the differences between reality and abstraction.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates may be given a scenario/example and be asked how the abstraction differs from the reality.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Topic 2.1.2: Thinking ahead

Video revision link: <http://student.craigndave.org/video/slr-19-thinking-ahead>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to understand that situations require inputs and output, and that outputs can be both digital or in a hard copy format.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates may be given a description, diagram, or code for a scenario, and they will need to demonstrate an understanding of what inputs and outputs are needed, and/or are used in that specific scenario.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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For a description of a program, candidates need to be able to determine what else they need to know before they can produce a solution, for example what information is missing and what else will affect that solution.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose, benefits and drawbacks of reusable program components.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should understand how these components can be reused, and for a given scenario/program they will need to be able to identify the subprograms that will be needed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates may then be required to write code for these reusable components.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to have an understanding of the purpose of caching in programming, and how it can be used when writing a program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to apply their knowledge of caching to a scenario to demonstrate an understanding of how it can be used.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the benefits and drawbacks of using caching in a program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Topic 2.1.3 : Thinking procedurally

Video revision link: <http://student.craigndave.org/video/slr-20-thinking-procedurally>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to be able to deconstruct a program and identify the component parts that will make it up, for example listing the parts or completing a structure diagram.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates may be given some component parts and be asked to complete these from a written description or pseudocode for a program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to identify the steps that will need to take place to complete the algorithm or program, and be able to write these in a suitable format, or put a given list into the correct order to produce a working program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates may need to write pseudocode or draw a flow chart to show this sequencing of steps.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
For a given scenario, candidates need to be able to identify where sub-procedures may be used, and then write appropriate pseudocode for these sub-procedures, making use of parameters where appropriate.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates may be given a structure diagram that they will need to interpret, or complete to identify these sub-procedures.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Topic 2.1.4 : Thinking logically

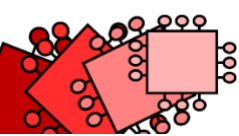
Video revision link: <http://student.craigndave.org/video/slr-21-thinking-logically>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to understand that decisions are made within programs, and they need to be able to identify where these decisions will take place within an algorithm or program, and be able to understand what these decisions are and the impact of these decisions on the algorithm/program and the next (and final) outcomes from the algorithm/program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand that there can be many different routes through a program, and understand how decisions influence these routes and outcomes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Topic 2.1.5 : Thinking concurrently

Video revision link: <http://student.craigndave.org/video/slr-22-thinking-concurrently>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to understand what is meant by thinking concurrently. They need to be able to work out which parts of a program can be developed to take place (be processed) at the same time, and which parts are dependent on other parts.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



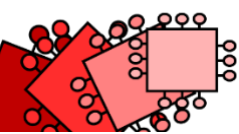
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Candidates need to understand the benefits and trade offs that are brought from concurrent processing, and be able to apply these to a given scenario.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Additional notes:			
<i>Candidates need to understand how concurrent processing could be applied to a specific program, why it would be applied to that program, and what problems might arise from using it.</i>			

Topic 2.2.1 : Programming techniques

Video revision link: <http://student.craigndave.org/video/slr-23-programming-techniques>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to be able to understand the constructs of sequence, iteration and branching.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates must be able to use these constructs independently of each other, and combine them to produce a solution. These include the selection statements of if (include elseif and else) and select case statements. These include both condition based iteration (e.g. while, repeat until) and count controlled iteration (e.g. for) – as well as how condition based can be used as count controlled iteration.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read code using these constructs, create code using these constructs and trace code (for example using a trace table).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the use and need for variables in a program, and must understand the difference, benefits and drawbacks of both global and local variables.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates must be able to recognise where local and global variables are used, and the impact that these have on the program, for example the amount of memory used by the program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how a program using global variables can be changed to use local variables – and vice-versa.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand what is meant by modular code, and how this can be produced using functions and procedures.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the differences between functions and procedures and how each is used within a program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace and write code using functions and procedures.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose and use of parameters within a program, and how they are used in functions and procedures.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates will need to be able to read, trace and write code that makes use of parameters.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the difference between passing a parameter by value and by reference, they need to understand the benefits and drawbacks of each, recommending which should be used for a given situation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace and write code that makes use of parameters passed both by value and by reference.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have had experience of using an IDE to produce code.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how an IDE can be used to produce code, and understand the range of features and tools that are within an IDE that can be used to help produce and debug a program.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to have an understanding of the principle of recursion and the key features that produce a recursive algorithm such as a stopping condition. They need to be able to read and trace recursive functions, write recursive functions, and translate a recursive function to an iterative solution and vice-versa.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have an understanding of the benefits and drawbacks of using both a recursive and iterative solution.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose of object-oriented code. They need to have an understanding of classes, objects, properties, attributes, methods. They need to understand the difference between private and public properties, attributes and methods.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



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Candidates need to understand encapsulation and the use of get and set methods to access private properties.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose and principles of inheritance, super-classes, parent-classes and sub-classes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have an understanding of polymorphism and how it can be applied to classes.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace and write code that makes use of these object-oriented techniques.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to interpret class diagrams to produce class definitions.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to identify where object-oriented programming can be used in a solution, and derive an object-oriented solution for a given scenario.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Topic 2.2.2 : Computational methods

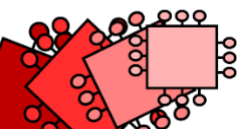
Video revision link: <http://student.craigndave.org/video/slr-24-computational-methods>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to be able to determine if a problem can be solved using computational methods, such as decomposition, abstraction, calculations, storage of data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to recognise a problem from a description of a scenario, decompose the problem and use abstraction to design a solution.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how divide and conquer can be used within a task to split the task down into smaller tasks that are then tackled.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates also need to identify how tasks can be carried out simultaneously to produce a solution.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the purpose of backtracking within an algorithm, for example when traversing a tree.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace and write code that makes use of backtracking for a given scenario.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand what is meant by data mining, and how data mining is used in a situation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the complexities within data mining and how a program will search for and interrogate the data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand what is meant by heuristics, and how they can be used within a program (for example the A* algorithm).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates should have some experience of programming a simple heuristic, and be able to apply their knowledge to a given scenario to explain the purpose and benefits of using heuristics in a solution.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the principles, and purpose of performance modelling, and how it is used in the production of software.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the principle of pipelining and how it is used within programming (for example the result from a process feeds into the next process).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how visualisation can be used to create a mental model of what a program will do or work, and that from this they can plan ahead what is going to happen or what they will need to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Topic 2.3.1 : Algorithms

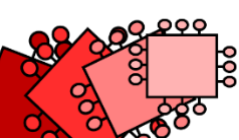
Video revision link: <http://student.craigndave.org/video/slr-26-algorithms>

Specific knowledge required for A Level:	Need to Revise	Revised Once	Got it!
Candidates need to be able to write algorithms using flow charts, pseudocode and program code.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



A'Level OCR Computer Science Revision check list PLC

Candidates need to be able to follow the code as shown in the OCR pseudocode guide, but are not expected to write code in syntax.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates' code is not expected to be syntactically perfect, but must use appropriate structures and techniques.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand that there are a range of possible solutions to a task, and that these algorithms may be different in respect to their execution time and the amount of memory they make use of.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to compare different algorithms for a given data set and demonstrate an understanding of which is more efficient in terms of speed and/or memory.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to compare the use of one or more algorithms against several different data sets, to determine how they will differ in their use of memory and speed of execution.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how the efficiency of an algorithm is measured using Big O notation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the meaning of constant, linear, polynomial, exponential and logarithmic complexity. They need to be able to recognise and draw each of these complexities of using a graph and be able to read and write the notation.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to know the best and worst case complexities for the searching and sorting methods.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand the difference between best case, average case and worst case complexities and how and why these can differ for an algorithm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have an understanding of the situations where queues, stacks, trees etc. can be used and be able to recommend and justify their use In specific scenarios or programs.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have an understanding of a stack as a dynamic data structure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to add and remove items to a stack.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able read, trace and write code to implement a stack structure (including adding and removing items).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how a stack can be implemented using a different data structure, such as a static array.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have an understanding of a queue as a dynamic data structure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to add and remove data to/from a queue.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace and write code to implement a queue structure (including adding and removing items).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how a queue can be implemented using a different data structure, such as a static array.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have an understanding of a tree structure, both binary and multi branch trees.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to add and remove data to/from a tree.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace and write code to implement a tree structure (including adding and removing items).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how a tree can be implemented using a different data structure, such as a linked list.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand why and how trees are traversed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how a depth-first (post-order) traversal works, and be able to perform the traversal on a tree.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace and write code for a post-order traversal.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how a breadth-first traversal works, and be able to perform the search on a tree.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace and write code for a breadth-first traversal on a tree.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates' code is not expected to be syntactically perfect, but must use appropriate structures and techniques.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have an understanding of a linked list as a dynamic data structure.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to add, remove and search for data to/from/in a linked list.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace and write code to implement a linked list (including adding, removing and search for items).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to have an understanding of the need for searching and sorting algorithms.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



A'Level OCR Computer Science Revision check list PLC

Candidates need to have an understanding of pre-conditions required to perform a specific algorithm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how a bubble sort works and be able to perform a bubble sort on a set of data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace and write code to perform a bubble sort.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how a merge sort works and be able to perform a merge sort on a set of data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace and write code to perform a merge sort.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidate need to understand how a quick sort works and be able to perform a quick sort on a set of data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace and write code to perform a quick sort.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how Dijkstra's shortest path algorithm works.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to calculate the shortest path in a graph or tree using Dijkstra's shortest path algorithm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read and trace code that performs Dijkstra's shortest path algorithm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how the A* algorithm works.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to calculate the shortest path in a graph or tree using the A* algorithm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read and trace code that performs the A* algorithm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how a binary search works and be able to perform a binary search on a set of data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace and write code to perform a binary search.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to understand how a linear search works and be able to perform a linear search on a set of data.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Candidates need to be able to read, trace and write code to perform a linear search.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

