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| **A Level Computer Science** Revision List Summer 2025 |
| Exam information**Exam Board:** OCR (H446)**Paper Information:** One paper covering the content taught during Year 12. **Paper Marks:** 90 marks **Duration:** 1 hour 45 minutes |
| Topic | Revised? |
| **Content:****1.1 The characteristics of contemporary processors, input, output and storage devices** **1.1.1 Structure and function of the processor** 1. The Arithmetic and Logic Unit; ALU, Control Unit and Registers (Program Counter; PC, Accumulator; ACC, Memory Address Register; MAR, Memory Data Register; MDR, Current Instruction Register; CIR). Buses: data, address and control: how this relates to assembly language programs.
2. The Fetch-Decode-Execute Cycle; including its effects on registers.
3. The factors affecting the performance of the CPU: clock speed, number of cores, cache.
4. The use of pipelining in a processor to improve efficiency.
5. Von Neumann, Harvard and contemporary processor architecture.

**1.1.2 Types of processor** 1. The differences between and uses of CISC and RISC processors.
2. GPUs and their uses (including those not related to graphics).
3. Multicore and Parallel systems.

**1.1.3 Input, output and storage** 1. How different input, output and storage devices can be applied to the solution of different problems.
2. The uses of magnetic, flash and optical storage devices.
3. RAM and ROM.
4. Virtual storage.

**1.2 Software and software development** **1.2.3 Software Development**1. Understand the waterfall lifecycle, agile methodologies, extreme programming, the spiral model and rapid application development.
2. The relative merits and drawbacks of different methodologies and when they might be used.
3. Writing and following algorithms.

**1.3 Exchanging data** **1.3.1 Compression, Encryption and Hashing**1. Lossy vs Lossless compression.
2. Run length encoding and dictionary coding for lossless compression.
3. Symmetric and asymmetric encryption.
4. Different uses of hashing.

**1.3.2 Databases** 1. Relational database, flat file, primary key, foreign key, secondary key, entity relationship modelling, normalisation and indexing.
2. Methods of capturing, selecting, managing and exchanging data.
3. Normalisation to 3NF.
4. SQL – Interpret and modify.
5. Referential integrity.
6. Transaction processing, ACID (Atomicity, Consistency, Isolation, Durability), record locking and redundancy.

**1.3.3 Networks** 1. Characteristics of networks and the importance of protocols and standards.
2. The internet structure:
* The TCP/IP Stack.
* DNS
* Protocol layering.
* LANs and WANs.
* Packet and circuit switching.
1. Network security and threats, use of firewalls, proxies and encryption.
2. Network hardware.
3. Client-server and peer to peer.

**1.3.4 Web Technologies** 1. HTML, CSS and JavaScript.
2. Search engine indexing.
3. PageRank algorithm.
4. Server and client side processing.

**2.1 Elements of computational thinking** **2.1.1 Thinking abstractly** 1. The nature of abstraction.
2. The need for abstraction.
3. The differences between an abstraction and reality.
4. Devise an abstract model for a variety of situations.

**2.1.2 Thinking ahead** 1. Identify the inputs and outputs for a given situation.
2. Determine the preconditions for devising a solution to a problem.
3. The nature, benefits and drawbacks of caching.
4. The need for reusable program components.

**2.1.4 Thinking logically** 1. Identify the points in a solution where a decision has to be taken.
2. Determine the logical conditions that affect the outcome of a decision.
3. Determine how decisions affect flow through a program.

**2.2 Problem solving and programming** **2.2.2 Computational methods** 1. Features that make a problem solvable by computational methods.
2. Problem recognition.
3. Problem decomposition.
4. Use of divide and conquer.
5. Use of abstraction.
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| Revision Links |
| * [A Level Computer Science area on the Computer Science & IT SharePoint](https://omegamat.sharepoint.com/sites/GSHSComputing/SitePages/KS5-Computer-Science-and-IT.aspx)
* [Craig and Dave YouTube Channel](https://www.youtube.com/c/craigndave/playlists?view=50&sort=dd&shelf_id=4)
* [Teach ICT H446](https://teach-ict.com/2016/A_Level_Computing/OCR_H446/OCR_H446_home.html)
* A Level OCR Computer Science course textbook by PG Online
* [Isaac Computer Science](https://isaaccomputerscience.org)
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* [Physics and Maths Tutor (Computer Science area)](https://www.physicsandmathstutor.com/computer-science-revision/a-level-ocr)
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