



PPE2 Topic Lists for Revision

Subject: Computer Science

Topic or component: Paper 1 and Paper 2

Paper 1

	TOPICS
1.2 Memory and Storage	1.2.1 Primary storage (Memory)
	The need for primary storage
	The difference between RAM and ROM
	The purpose of ROM in a computer system
	The purpose of RAM in a computer system
	Virtual memory
	1.2.2 Secondary storage
	The need for secondary storage
	Common types of storage:
	<i>Optical</i>
	<i>Magnetic</i>
	<i>Solid state</i>
	Suitable storage devices and storage media for a given application
	The advantages and disadvantages of different storage devices and storage media relating to these characteristics:
	<i>Capacity</i>
	<i>Speed</i>
	<i>Portability</i>
	<i>Durability</i>
	<i>Reliability</i>
	<i>Cost</i>
	1.2.3 Units
	The units of data storage:

	<i>Bit</i>
	<i>Nibble (4 bits)</i>
	<i>Byte (8 bits)</i>
	<i>Kilobyte (1,000 bytes or 1 KB)</i>
	<i>Megabyte (1,000 KB)</i>
	<i>Gigabyte (1,000 MB)</i>
	<i>Terabyte (1,000 GB)</i>
	<i>Petabyte (1,000 TB)</i>
	How data needs to be converted into a binary format to be processed by a computer
	Data capacity and calculation of data capacity requirements
	1.2.4 Data Storage
	Numbers
	How to convert positive denary whole numbers to binary numbers (up to and including 8 bits) and vice versa
	How to add two binary integers together (up to and including 8 bits) and explain overflow errors which may occur
	How to convert positive denary whole numbers into 2-digit hexadecimal numbers and vice versa
	How to convert binary integers to their hexadecimal equivalents and vice versa
	Binary shifts
	Characters
	The use of binary codes to represent characters
	The term 'character set'
	The relationship between the number of bits per character in a character set, and the number of characters which can be represented, e.g.
	<i>ASCII</i>
	<i>Unicode</i>
	Images
	How an image is represented as a series of pixels, represented in binary
	Metadata
	The effect of colour depth and resolution on:
	<i>The quality of the image</i>

	<i>The size of an image file</i>	
	1.2.5 Compression	
	The need for compression	
	Types of compression:	
	<i>Lossy</i>	
	<i>Lossless</i>	
1.3 Computer networks, connections and protocols	1.3.1 Networks and topologies	
	Types of network:	
	<i>LAN (Local Area Network)</i>	
	<i>WAN (Wide Area Network)</i>	
	Factors that affect the performance of networks	
	The different roles of computers in a client-server and a peer-to-peer network	
	The hardware needed to connect stand-alone computers into a Local Area Network:	
	<i>Wireless access points</i>	
	<i>Routers</i>	
	<i>Switches</i>	
	<i>NIC (Network Interface Controller/Card)</i>	
	<i>Transmission media</i>	
	The Internet as a worldwide collection of computer networks:	
	<i>DNS (Domain Name Server)</i>	
	<i>Hosting</i>	
	<i>The Cloud</i>	
	<i>Web servers and clients</i>	
	Star and Mesh network topologies	
	1.3.2 Wired and wireless networks, protocols and layers	
	Modes of connection:	
	<i>Wired</i>	
	• Ethernet	
	<i>Wireless</i>	
	• Wi-Fi	
	• Bluetooth	

	Encryption
	IP addressing and MAC addressing
	Standards
	Common protocols including:
	<i>TCP/IP (Transmission Control Protocol/Internet Protocol)</i>
	<i>HTTP (Hyper Text Transfer Protocol)</i>
	<i>HTTPS (Hyper Text Transfer Protocol Secure)</i>
	<i>FTP (File Transfer Protocol)</i>
	<i>POP (Post Office Protocol)</i>
	<i>IMAP (Internet Message Access Protocol)</i>
	<i>SMTP (Simple Mail Transfer Protocol)</i>
	The concept of layers
1.4 Network security	1.4.1 Threats to computer systems and networks
	Forms of attack:
	<i>Malware</i>
	<i>Social engineering, e.g. phishing, people as the 'weak point'</i>
	<i>Brute-force attacks</i>
	<i>Denial of service attacks</i>
	<i>Data interception and theft</i>
	<i>The concept of SQL injection</i>
	1.4.2 Identifying and preventing vulnerabilities
	Common prevention methods:
	<i>Penetration testing</i>
	<i>Anti-malware software</i>
	<i>Firewalls</i>
	<i>User access levels</i>
	<i>Passwords</i>
	<i>Encryption</i>
	<i>Physical security</i>
1.5 Systems software	
	1.5.2 Utility software
	The purpose and functionality of utility software
	Utility system software:
	<i>Encryption software</i>
	<i>Defragmentation</i>
	<i>Data compression</i>

1.6 Ethical, legal, cultural and environmental impacts of digital technology	1.6.1 Ethical, legal, cultural and environmental impact	
	Impacts of digital technology on wider society including:	
	<i>Ethical issues</i>	
	<i>Legal issues</i>	
	<i>Cultural issues</i>	
	<i>Environmental issues</i>	
	<i>Privacy issues</i>	
	Legislation relevant to Computer Science:	
	<i>The Data Protection Act 2018</i>	
	<i>Computer Misuse Act 1990</i>	
	<i>Copyright Designs and Patents Act 1988</i>	
	<i>Software licences (i.e. open source and proprietary)</i>	

Paper 2

	TOPICS
2.1 Algorithms	2.1.1 Computational thinking
	Principles of computational thinking:
	<i>Abstraction</i>
	<i>Decomposition</i>
	<i>Algorithmic thinking</i>
	2.1.2 Designing, creating and refining algorithms
	Identify the inputs, processes, and outputs for a problem
	Create, interpret, correct, complete, and refine algorithms using:
	<i>Pseudocode</i>
	<i>Flowcharts</i>

	<i>Reference language/high-level programming language</i>	
	Trace tables	
	2.1.3 Searching and sorting algorithms	
	Standard sorting algorithms:	
	<i>Bubble sort</i>	
	<i>Merge sort</i>	
	<i>Insertion sort</i>	
2.2 – Programming fundamentals	2.2.1 Programming fundamentals	
	The use of variables, constants, operators, inputs, outputs and assignments	
	The use of the three basic programming constructs used to control the flow of a program:	
	<i>Sequence</i>	
	<i>Selection</i>	
	<i>Iteration (count- and condition-controlled loops)</i>	
	The common arithmetic operators	
	The common Boolean operators AND, OR and NOT	
	2.2.2 Data types	
	The use of data types:	
	<i>Integer</i>	
	<i>Real</i>	
	<i>Boolean</i>	
	<i>Character and string</i>	
	<i>Casting</i>	
	2.2.3 Additional programming techniques	
	The use of basic string manipulation	
	The use of basic file handling operations:	

	<i>Open</i>	
	<i>Read</i>	
	<i>Write</i>	
	<i>Close</i>	
	The use of arrays (or equivalent) when solving problems, including both one-dimensional (1D) and two-dimensional arrays (2D)	
	How to use sub programs (functions and procedures) to produce structured code	

Strategies and Resources for Revision:

Strategies

- Flash cards
- Mind maps
- Keywords

Resources

1. BBC Bitesize

<https://www.bbc.co.uk/bitesize/examspecs/zmtchbk>

2. Revise Computer Science UK

<https://revisecs.csuk.io/>

3. CGP Revision guides

CGP flash cards

4. Craig n Dave YouTube videos

<https://www.youtube.com/watch?v=7Up7DIPkTzo&list=PLCiOXwirraUAEhj4TUjMxYm4593B2dUPF>