

COMPUTER SCIENCE

J277/01

COMPUTER SYSTEMS

REVISION CHECKLIST



CAMBRIDGE
OCR

1.1 SYSTEMS ARCHITECTURE

	Not Confident	Slightly Confident	Extremely Confident
1.1.1 Architecture of the CPU			
The purpose of a CPU			
The fetch-execute cycle			
Common CPU components and their function:			
ALU (Arithmetic Logic Unit)			
CU (Control Unit)			
Cache			
Registers			
Von Neumann Architecture			
MAR (Memory Address Register)			
MDR (Memory Data Register)			
Program Counter			
Accumulator			
1.1.2 CPU performance			
How common characteristics of CPUs affect their performance:			
Clock speed			
Cache size			
Number of cores			
Embedded systems			
Purpose of embedded systems			
Examples of embedded systems			

1.2 MEMORY AND STORAGE

	Not Confident	Slightly Confident	Extremely Confident
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 memory			
Common types of storage			

Optical			
Magnetic			
Solid state			
Suitable storage devices and storage media for a given application, and the advantages and disadvantages of these, using characteristics:			
Capacity			
Speed			
Portability			
Durability			
Reliability			
Cost			
1.2.3 Units - The Units of Data Storage			
Bit			
Nibble (4 bits)			
Byte (8 bits)			
Kilobyte (1,000 bytes or 1KB)			
Megabyte (1,000 KB)			
Gigabyte (1,000MB)			
Terabyte (1,000GB)			
Petabyte (1,000TB)			
How data need to be converted into 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 - ASCII and Unicode			
Images			
How an image is represented as a series of pixels, represented in binary.			
Metadata			
The effect of colour depth and resolution on the quality and size of a file			
Sound			
How sound can be sampled and stored in digital form			
The effect of sample rate, duration and bit depth on the playback quality and the size of the file.			
1.2.5 Compression			
The need for compression			
Types of Compression - Lossy / Lossless			

1.3 COMPUTER NETWORKS, CONNECTIONS AND PROTOCOLS

	Not Confident	Slightly Confident	Extremely Confident
1.3.1 Networks and topologies			
Types of networks:			
LAN (Local Area Network)			
WAN (Wide Area Network)			
Factors that affect the performance of networks			
The hardware needed to connect stand-alone computers into a Local Area Network			
Wireless Access Points (WAPS)			
Routers			
Switches			
NIC (Network Interface Controller/Card)			
Transmission Media			
The Internet			
DNS (Domain Name Sever)			
Hosting			
The Cloud			
Web Servers and Client			
Star and Mesh Network Topologies			
1.3.2 Wired and Wireless network, protocols and layers			
Wired / Ethernet			
Wireless / Wi-Fi and Bluetooth			
Encryption			
IP Addressing and MAC Addressing			
Standards			
Common protocols including:			
TCP/IP (Transmission Control Protocol/Internet Protocol)			
HTTP (Hyper Text Transfer Protocol)			
HTTPS (Hyper Text Transfer Protocol Secure)			

FTP (File Transfer Protocol)			
POP (Post Office Protocol)			
IMAP (Internet Message Access Protocol)			
SMTP (Simple Mail Transfer Protocol)			
The concepts of layers			

1.4 NETWORK SECURITY

	Not Confident	Slightly Confident	Extremely Confident
1.4.1 Threats to computer systems and networks			
Forms of Attack:			
Malware			
Social Engineering, e.g. phishing, people as the "weak point"			
Brute-force attacks			
Denial of service attacks			
Data Interception and theft			
The concept of SQL injection			
1.4.2 Identifying and preventing vulnerabilities			
Common Prevention Methods			
Penetration Testing			
Anti-malware software			
Firewalls			
User Access Levels			
Passwords			
Encryption			
Physical Security			

1.5 SYSTEM SOFTWARE

	Not Confident	Slightly Confident	Extremely Confident
1.5.1 Operating systems			
The purpose and functionality of operating systems:			
User Interface			
Memory Management and Multitasking			
Peripheral Management and Drivers			
User Management			

File Management			
1.5.2 Utility Software			
The purpose and functionality of utility software			
Anti-malware software			
User System Software:			
Encryption Software			
Defragmentation			
Data Compression			

1.6 ETHICAL, LEGAL, CULTURAL & ENVIRONMENTAL IMPACTS OF DIGITAL TECHNOLOGY

	Not Confident	Slightly Confident	Extremely Confident
1.6.1 Ethical, legal, cultural and environmental impact			
Impact of digital technology on wider society including:			
Ethical Issues			
Legal Issues			
Cultural Issues			
Environmental Issues			
Privacy Issues			
Legislation relevant to Computer Science			
The Data Protection Act 2018			
Computer Misuse Act 1990			
Copyright Design and Patents Act 1988			
Software Licenses (i.e. open source and proprietary)			