

GCSE Computer Science OCR J277

Paper 1: Computer Systems

Mini Revision Booklet

Year 11 Rapid Revision Guide

Sound Representation

Analogue → Digital

- Real sound waves are analogue.
- Computers store sound as digital binary data.

Sampling

- Sampling = measuring the amplitude at regular intervals.
- Sample rate = number of samples per second (Hertz).
- Higher sample rate = better quality, larger file.

Bit Depth

- Each sample stored as a binary number.
- Bit depth = number of bits per sample.
- Higher bit depth = more possible amplitudes.
- Higher bit depth = better quality, larger file.

Images & Pixels

Pixel

- A pixel is the smallest single dot in a bitmap image.

File Size Formula

- Resolution × Colour Depth
- Result in bits → divide by 8 = bytes → /1000 = KB

Colour Depth

- Number of bits decides how many colours.
- 2^n colours from n bits.
- Example: 8-bit = 256 colours.

Secondary Storage

Optical vs Solid-State

- Optical: CD/DVD – cheap, slower, fragile.
- Solid-state: USB/SSD – fast, portable, durable.
- Magnetic: HDD – High capacity

✓ Exam Tip

- Justify using speed, capacity, durability, portability.

Operating Systems

Key Functions

- Memory management – transfers data to/from RAM.
- File management – create, rename, delete files.
- Peripheral management – device drivers.
- User management – accounts & permissions.
- Multitasking – runs multiple programs.

Utility Software

Purpose

- Maintains and protects the computer.

Encryption

- Converts data into unreadable format.
- Requires a key to decrypt.
- Protects data if stolen or intercepted.
- Used on files, disks, and networks.

Ethics & Environment

Cheaper Devices

- Lower prices for customers.
- Higher profit for company.
- May reduce build quality.

No Updates

- Forces customers to upgrade.

- Creates more e-waste.
- Ethical concerns over planned obsolescence.

🧠 Evaluate

- Balance benefits vs harm.
- Consider company and customer.

🌐 Networks

🏠 LAN vs WAN

- LAN = small geographic area (building).
- WAN = large area (country/world).

🕸 Mesh Topology

- Each device connects to multiple others.
- Benefit: fault tolerant.
- Drawback: expensive and complex.

📶 Wi-Fi

- Allows mobility.
- Supports phones & laptops.
- Flexible layout.

📶 Network Performance

📶 Bandwidth

- Maximum data per second.
- Higher bandwidth = faster speeds.

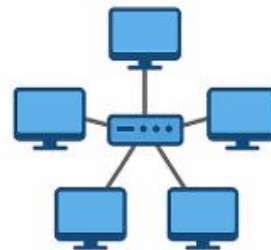
👥 Users

- More users share bandwidth.
- More users = slower performance.

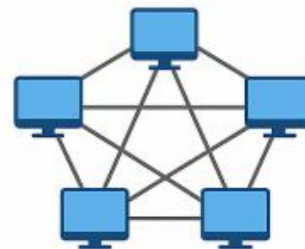
Latency

- Time for data to travel between devices.
- Lower latency gives faster speed.

Star Topology



Mesh Topology



Cloud Storage

Drawbacks

- Requires internet.
- Ongoing subscription cost.
- Data stored on third-party servers.
- Risk of breaches.
- Provider outages.

Internet & Addressing

Router

- Connects LAN to the internet.

IPv4 Rules

- Four numbers separated by dots
- Each 0–255. (example 123.168.34.100)

DNS Process

- User enters URL.
- Browser asks DNS server.
- DNS returns IP address.
- Browser connects to server.

Legislation

GDPR / Data Protection Act

- Personal data must be protected.
- Only collect necessary data.
- Keep data secure.
- Allow users to access their data.
- Delete when no longer needed.

Data & Number Systems

Units

- 1 KB = 1000 bytes
- 1 MB = 1000 KB
- 1 GB = 1000 MB

- 1 TB = 1000 GB

Conversions

- Denary $\leftrightarrow$ Binary
- Binary $\leftrightarrow$ Hex

Binary Addition

- Carry like denary.

Binary Shifts

Right Shift

- Divides by powers of 2.

Left Shift

- Multiplies.
- $\times 8$ = shift left 3 places.

Characters

ASCII

- 7/8-bit character codes.

Unicode

- Supports all languages.
- Uses more memory.

CPU Registers

 MAR – Stores memory address locations.

 MDR – Stores data being transferred.

 PC – Stores next instruction to be used.

CPU Components

ALU – Arithmetic Logic Unit – Completes all logical comparisons and arithmetic.

CU – Controls The FDE Cycle, controls hardware, monitors hardware