

1.2 SOFTWARE & SOFTWARE DEVELOPMENT · 1.2.1

Operating systems: functions & memory management

Purpose and functions of an OS, plus **paging**, **segmentation** and **virtual memory**. Spec 1.2.1(a) (b).

01 What an OS does

Purpose Manages resources; bridge between user/apps and hardware.

Hides Complexity, behind a simple interface.

Boot Loader in **ROM** copies the OS from storage into RAM.

02 Functions

Manage memory · scheduling · interrupts

Manage input/output · files (backing store)

Provide user interface · security

03 Paging vs segmentation

● Paging

Equal fixed-size pages. A **page table** maps logical pages → physical frames.

● Segmentation

Variable-length logical segments (code, data, stack).

**Equal
chunks?**

Always means **paging**.

04 Virtual memory

What Using secondary storage (disk) as an extension of RAM.

How The OS swaps inactive pages out to disk, and back in when needed.

Why Lets you run more / larger programs than fit in physical RAM.

Risk **Disk thrashing**: too many programs → constant swapping → performance collapses. More RAM helps.

FINAL PASS BEFORE THE EXAM

Rapid exam tips

Seven slips on OS and memory-management questions.

01

The OS lives in **secondary storage**; only the small **loader** is in ROM. It is copied into RAM at boot.

02

Paging = equal fixed-size pages. **Segmentation** = variable logical segments. "Equally sized" = paging.

03

Paging needs a **page table** mapping logical pages to physical frames.

04

Virtual memory uses disk to extend RAM; **virtual storage** adds storage space. Don't confuse them.

05

Overusing virtual memory causes **disk thrashing** — constant swapping, slow performance.

06

"Describe two functions" needs a sentence on **what each does**, not just a one-word label.

07

For the 9-mark "how the OS manages memory" question: cover allocation, paging/segmentation, virtual memory **and** why it is needed (run many programs, isolate them, make best use of limited RAM).