CIS 452 - Operating Systems Concepts

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Images taken from Silberschatz book

Hard Disks

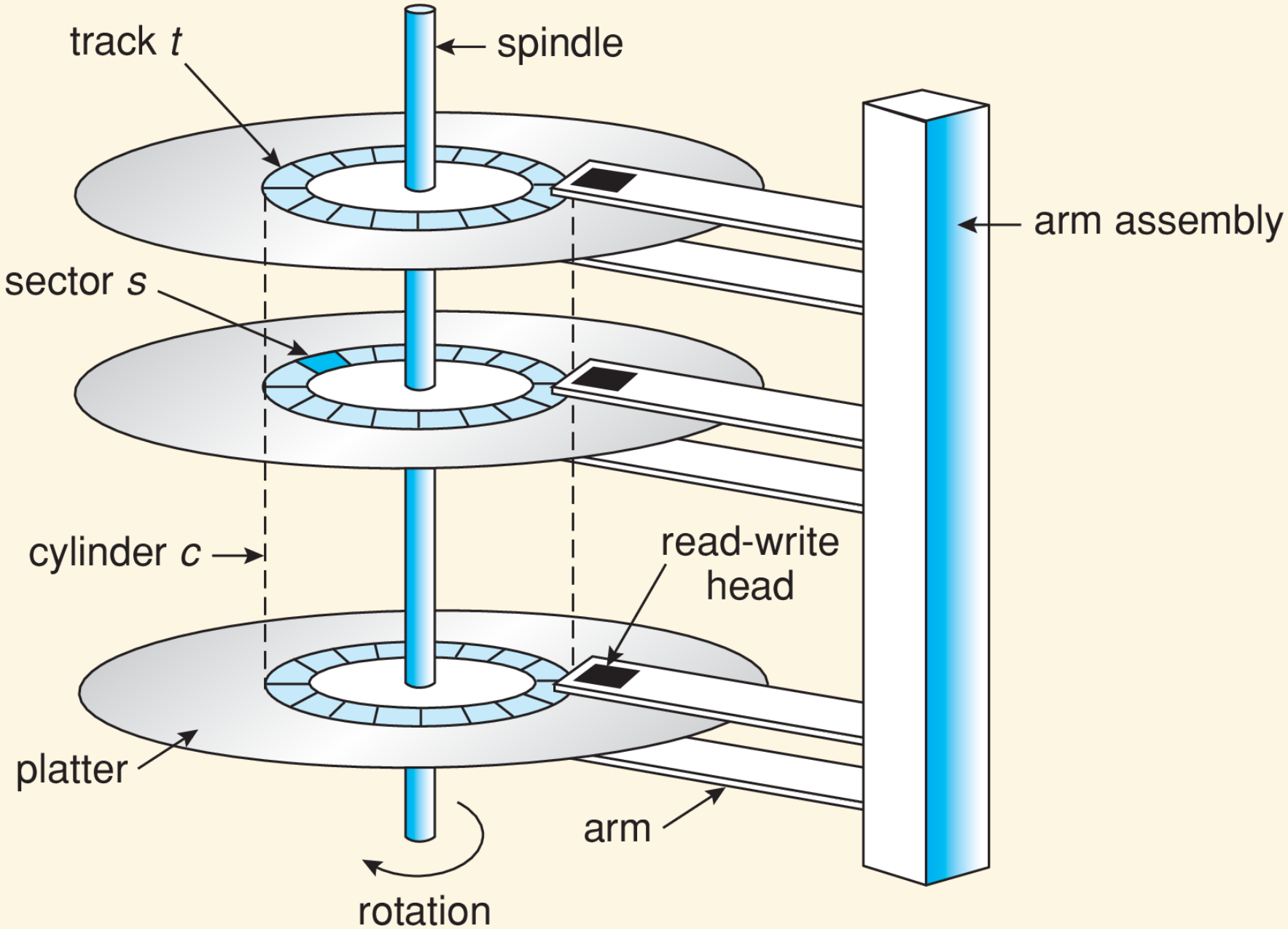
One common example of secondary storage hardware is hard disks

Hard disk is made up of several platters

Each **platter** is disk shaped like CD covered in magnetic material

Read-write head moves *just* above platter (microns away)

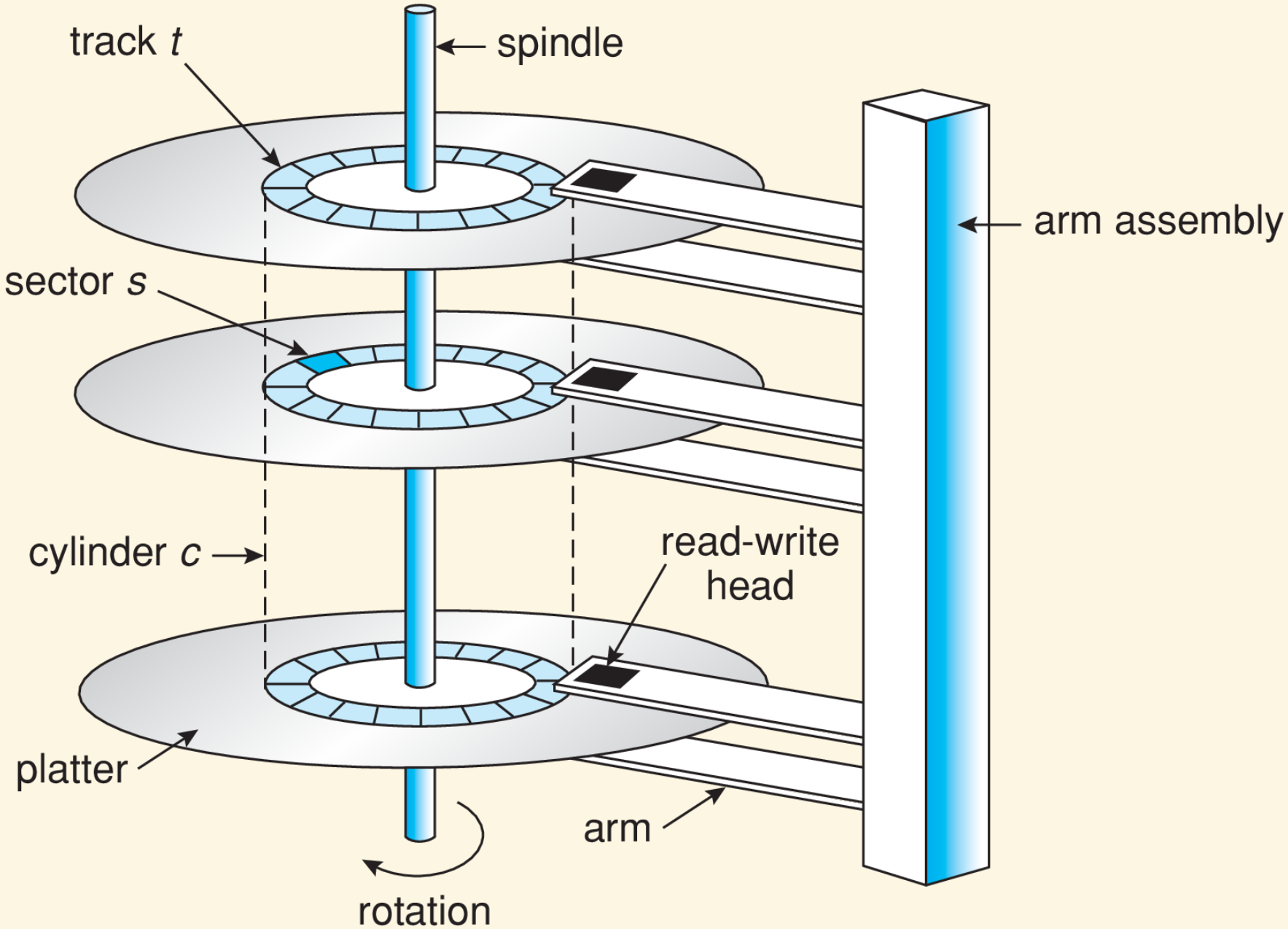
Read-write heads for all platters attached to single disk arm and move as unit


track t
spindle
arm assembly
sector s
cylinder c
read-write
head
platter
arm
rotation

Surface of platter divided into circular **tracks**

Set of tracks at one arm position make up **cylinder** (because it looks like a cylinder)

Each track subdivided into **sectors**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Two components of disk speed

- **transfer rate** -- rate at which data flows between drive and computer
- **random access time** -- delay to get read head to desired sector

Random access time further broken down into seek time and rotational latency

Seek time -- time to move disk arm to desired cylinder

Rotational latency -- time to rotate desired sector to under disk head

Random access to various parts of disk can take differing amounts of time depending on current location of disk head

With several processes running at once, there may be several pending requests for disk reads or writes

Because disk is so slow relative to rest of system, ordering of requests can have noticeable impact on performance

Examine possible orderings later

We will not discuss other secondary storage hardware in any depth

Solid-state disks are non-volatile memory used like hard drive

- no seek or rotational latency
- faster, but more expensive and may be less reliable

Magnetic tape even slower than hard disk for random access, but cheaper per byte

- used as backup medium
- consumers do not often hear about it, but tape technology still actively improving