

eBook

Memori External

Minggu 10

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Jenis Memori External

⌘ Magnetic Disk

- ☑ RAID

- ☑ Removable

⌘ Optical

- ☑ CD-ROM

- ☑ CD-Writable (WORM)

- ☑ CD-R/W

- ☑ DVD

⌘ Magnetic Tape

Jenis Memori External

⌘ Magnetic Disk

- ☑ RAID

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⌘ Optical

- ☑ CD-ROM

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- ☑ CD-R/W

- ☑ DVD

⌘ Magnetic Tape

Magnetic Disk

- ⌘ Metal atau plastic dilapisi dg material yg bersifat magnet (iron oxide)
- ⌘ Jenis kemasan
 - ☑ Floppy
 - ☑ Winchester hard disk
 - ☑ Removable hard disk

Format dan Organisasi Data

- ⌘ Lingkaran konsentris atau track
 - ☑ Ada Gap antar track
 - ☑ Gap sempit, kapasitas bertambah
 - ☑ Jumlah bit per track sama (kerapatan bervariasi)
 - ☑ Kecepatan putar tetap
- ⌘ Track dibagi menjadi beberapa sector
- ⌘ Ukuran minimum block adalah satu sector
- ⌘ Satu block bisa berisi lebih dari satu sector

Fixed/Movable Head Disk

⌘ Fixed head

- ☑ Ada satu head (r/w) per track
- ☑ Head diletakkan pada tangkai yg tetap

⌘ Movable head

- ☑ Hanya ada satu head per side
- ☑ Diletakkan pada tangkai yg dpt bergerak

Removable / Nonremovable

⌘ Removable disk

- ☑ Dapat dilepas dari drive dan diganti dg disk lain
- ☑ Memberikan kapasitas simpanan yg tak terbatas
- ☑ Mudah melakukan transfer data antar sistem

⌘ Nonremovable disk

- ☑ Terpasang permanen dalam drive

Floppy Disk

⌘ 8", 5.25", 3.5"

⌘ Kapasitas kecil

☑ sampai 1.44Mbyte (ada yg 2.88M)

⌘ Lambat

⌘ Umum dipakai

⌘ Murah

Winchester Hard Disk (1)

- ⌘ Dikembangkan oleh IBM di Winchester (USA)
- ⌘ Dikemas dalam satu unit
- ⌘ Berisi satu cakram atau lebih
- ⌘ Head sangat kecil
- ⌘ Handal

Winchester Hard Disk (2)

- ⌘ Umum digunakan
- ⌘ Murah
- ⌘ Sbg external storage yg sangat cepat
- ⌘ Kapasitas semakin besar
 - ☑ Dalam orde GB

Removable Hard Disk

⌘ ZIP

- ☑ Murah
- ☑ Banyak digunakan
- ☑ 100MB

⌘ JAZ

- ☑ Mahal
- ☑ 1G

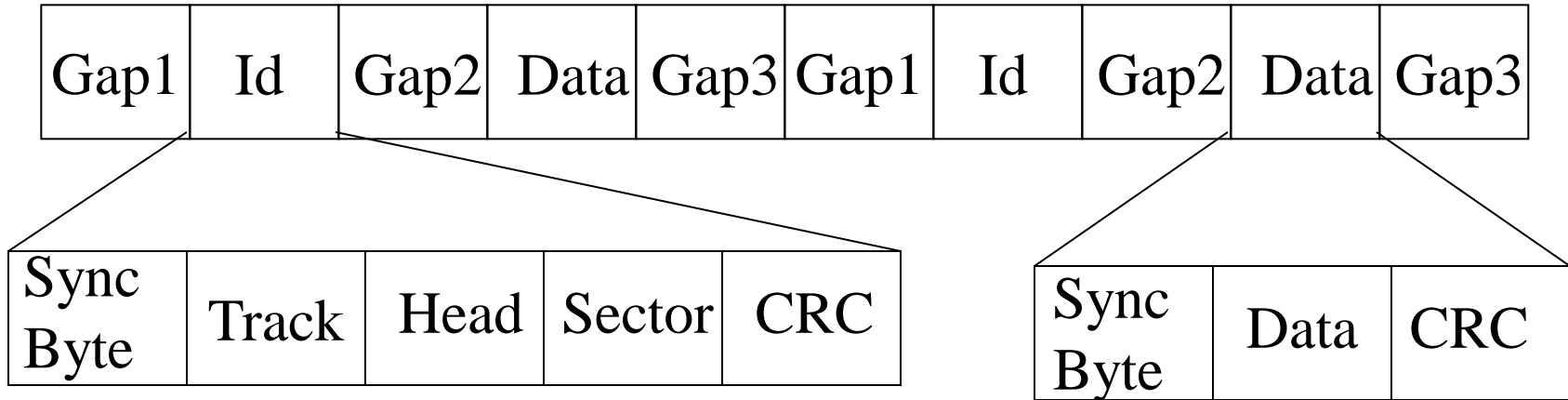
⌘ L-120 (a: drive)

- ☑ Juga dpt untuk membaca 3.5" floppy

Pencarian Sector

- ⌘ Harus dapat mengenali awal suatu track dan sector
- ⌘ Format disk
 - ☑ Menambahkan informasi tambahan
 - ☑ Memberi tanda awal track dan sector

ST506 format (old!)



Karakteristik

- ⌘ Fixed head atau movable head
- ⌘ Removable disk atau fixed disk
- ⌘ Single side atau double side
- ⌘ Single platter atau multiple platter
- ⌘ Mekanisme head
 - ☑ Contact (Floppy)
 - ☑ Fixed gap
 - ☑ Flying (Winchester)

Multiple Platter

- ⌘ Satu head per side
- ⌘ Semua head di-join dan di-align
- ⌘ Track-track yg setiap platter membentuk cylinder
- ⌘ Data dipecah berdasarkan cylinder
 - ☑ Mengurangi gerakan head
 - ☑ Meningkatkan kecepatan (transfer rate)

Kecepatan

⌘ Seek time

☑ gerakan head ke track yg dituju

⌘ (Rotational) latency

☑ Putar platter sampai posisi data dibawah head

⌘ Access time = Seek + Latency

⌘ Transfer rate

RAID

- ⌘ Redundant Array of Independent Disks
- ⌘ Redundant Array of Inexpensive Disks
- ⌘ Ada 6 level
- ⌘ Tidak berhirarki
- ⌘ Sejumlah disks (fisik) yg dipandang sbg satu drive (logical) oleh Sistem Operasi
- ⌘ Data tersebar diantara disk fisik

RAID 0

- ⌘ No redundancy
- ⌘ Data striped across all disks
- ⌘ Round Robin striping
- ⌘ Increase speed
 - ☑ Multiple data requests probably not on same disk
 - ☑ Disks seek in parallel
 - ☑ A set of data is likely to be striped across multiple disks

RAID 1

- ⌘ Mirrored Disks

- ⌘ Data is striped across disks

- ⌘ 2 copies of each stripe on separate disks

- ⌘ Read from either

- ⌘ Write to both

- ⌘ Recovery is simple

 - ☑ Swap faulty disk & re-mirror

 - ☑ No down time

- ⌘ Expensive

RAID 2

- ⌘ Disks are synchronized
- ⌘ Very small stripes
 - ☑ Often single byte/word
- ⌘ Error correction calculated across corresponding bits on disks
- ⌘ Multiple parity disks store Hamming code error correction in corresponding positions
- ⌘ Lots of redundancy
 - ☑ Expensive
 - ☑ Not used

RAID 3

- ⌘ Similar to RAID 2
- ⌘ Only one redundant disk, no matter how large the array
- ⌘ Simple parity bit for each set of corresponding bits
- ⌘ Data on failed drive can be reconstructed from surviving data and parity info
- ⌘ Very high transfer rates

RAID 4

- ⌘ Each disk operates independently
- ⌘ Good for high I/O request rate
- ⌘ Large stripes
- ⌘ Bit by bit parity calculated across stripes on each disk
- ⌘ Parity stored on parity disk

RAID 5

- ⌘ Like RAID 4
- ⌘ Parity striped across all disks
- ⌘ Round robin allocation for parity stripe
- ⌘ Avoids RAID 4 bottleneck at parity disk
- ⌘ Commonly used in network servers

- ⌘ N.B. DOES NOT MEAN 5 DISKS!!!!!!

Optical Storage CD-ROM

- ⌘ Originally for audio
- ⌘ 650Mbytes giving over 70 minutes audio
- ⌘ Polycarbonate coated with highly reflective coat, usually aluminum
- ⌘ Data stored as pits
- ⌘ Read by reflecting laser
- ⌘ Constant packing density
- ⌘ Constant linear velocity

CD-ROM Drive Speeds

⌘ Audio is single speed

☑ Constant linear velocity

☑ 1.2 ms^{-1}

☑ Track (spiral) is 5.27km long

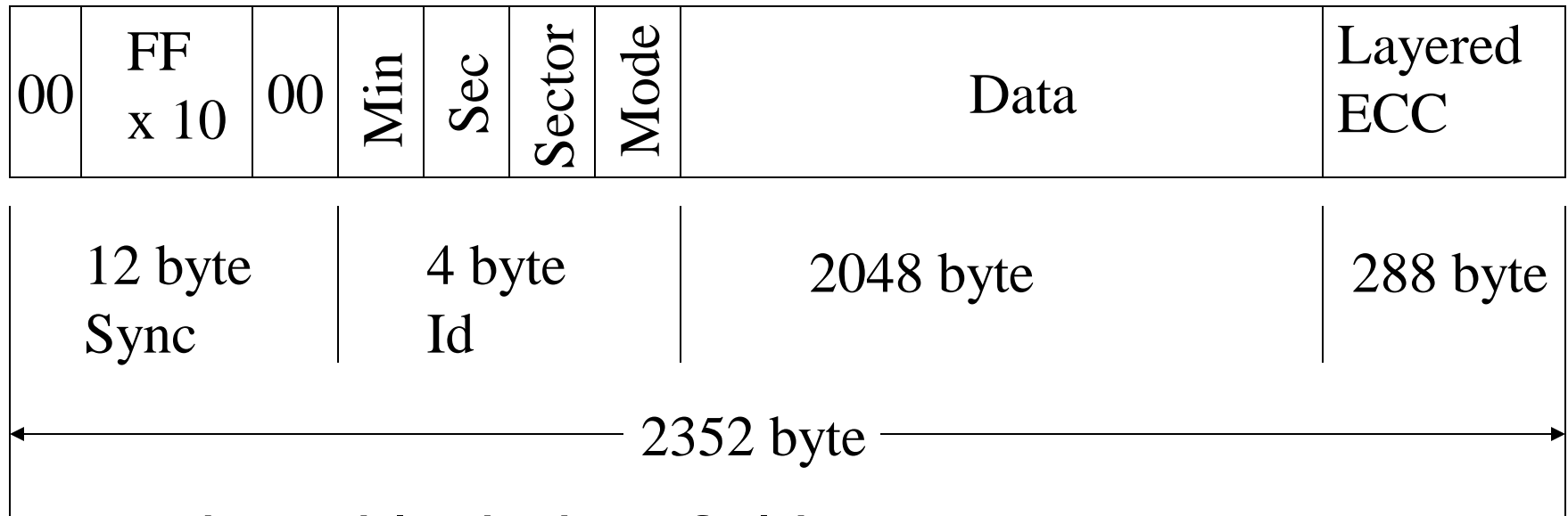
☑ Gives 4391 seconds = 73.2 minutes

⌘ Other speeds are quoted as multiples

⌘ e.g. 24x

⌘ The quoted figure is the maximum the drive can achieve

CD-ROM Format



- ⌘ Mode 0=blank data field
- ⌘ Mode 1=2048 byte data+error correction
- ⌘ Mode 2=2336 byte data

Random Access on CD-ROM

- ⌘ Difficult
- ⌘ Move head to rough position
- ⌘ Set correct speed
- ⌘ Read address
- ⌘ Adjust to required location
- ⌘ (Yawn!)

CD-ROM for & against

- ⌘ Large capacity (?)
- ⌘ Easy to mass produce
- ⌘ Removable
- ⌘ Robust

- ⌘ Expensive for small runs
- ⌘ Slow
- ⌘ Read only

Other Optical Storage

⌘ CD-Writable

- ☑ WORM

- ☑ Now affordable

- ☑ Compatible with CD-ROM drives

⌘ CD-RW

- ☑ Erasable

- ☑ Getting cheaper

- ☑ Mostly CD-ROM drive compatible

DVD - what's in a name?

⌘ Digital Video Disk

- ☑ Used to indicate a player for movies

- ☒ Only plays video disks

⌘ Digital Versatile Disk

- ☑ Used to indicate a computer drive

- ☒ Will read computer disks and play video disks

⌘ Dogs Veritable Dinner

⌘ Officially - nothing!!!

DVD - technology

- ⌘ Multi-layer
- ⌘ Very high capacity (4.7G per layer)
- ⌘ Full length movie on single disk
 - ☑ Using MPEG compression
- ⌘ Finally standardized (honest!)
- ⌘ Movies carry regional coding
- ⌘ Players only play correct region films
- ⌘ Can be “fixed”

DVD - Writable

- ⌘ Loads of trouble with standards
- ⌘ First generation DVD drives may not read first generation DVD-W disks
- ⌘ First generation DVD drives may not read CD-RW disks
- ⌘ Wait for it to settle down before buying!

Foreground Reading

- ⌘ Check out optical disk storage options
- ⌘ Check out Mini Disk

Magnetic Tape

- ⌘ Serial access
- ⌘ Slow
- ⌘ Very cheap
- ⌘ Backup and archive

Digital Audio Tape (DAT)

- ⌘ Uses rotating head (like video)
- ⌘ High capacity on small tape
 - ☒ 4Gbyte uncompressed
 - ☒ 8Gbyte compressed
- ⌘ Backup of PC/network servers

Latihan Soal :

1. Jelaskan pengertian dari macam-macam jenis kemasan magnetik disk?
2. Mengapa track dibagi menjadi beberapa sektor?
3. Jelaskan perbedaan antara fixed head dan movable head?
4. Jelaskan dan gambarkan karakteristik dari ST506 Format (old)?
5. Jelaskan macam-macam dari mekanisme head?