

Administrivia

- Homework 4 due at 5pm today.

Slide 1

Disks — Hardware

- Magnetic disks:
 - Cylinder/head/sector addressing may or may not reflect physical geometry — controller should handle this.
 - Controller may be able to manage multiple disks, perform overlapping seeks.
- RAID (Redundant Array of Inexpensive/Independent Disks):
 - Basic idea is to replace single disk and disk controller with "array" of disks and RAID controller.
 - Two possible payoffs — redundancy and performance (parallelism).
 - Six "levels" (configurations) defined.
- Optical disks — CD, CD-R, CD-RW, DVD. Okay to skim details!

Slide 3

Device Specifics, Recap/Continued

- Next, a tour of major classes of devices. For each, we look first at what the hardware can typically do, and then at what kinds of device-driver functionality we might want to provide.
- (Review improved notes from last time.)

Slide 2

Disk Formatting

- Low-level formatting — each track filled with sectors (preamble, data, ECC bits).
- Higher-level formatting — master boot record, partitions (logical disks), partition table. Master boot record points to boot block in some partition. Partition table gives info about partitions (size, location, use).
- Partition formatting — boot block, blocks for file system (more about that in next chapter).

Slide 4

Disk Arm Scheduling Algorithms

- A little more about hardware: Time to read a block from disk depends on seek time, rotational delay, and data transfer time. First two usually dominate.
- Earlier we said that typical device driver for disk maintains a queue of pending requests (one per disk, if controller is managing more than one). What order to process them in? several "disk arm scheduling algorithms":
 - FCFS.
 - SSF (shortest seek first).
 - Elevator.

Slide 5

Other I/O-Related Topics

- "Stable storage" — use two disks to provide what appears to be a single more reliable one (i.e., write either succeeds or leaves old data in place).
- Power management significant — some devices have "sleeping" and "hibernating" states, o/s can try to determine when it would make sense to use them. Example — screen savers, screen blanking.

Slide 7

Disk Error Handling

- Almost all disks have sectors with defects. Some controllers can recognize them (repeated failures) and avoid them; if not, o/s (device driver) must do this.
- Other kinds of errors also possible, e.g., failure to correctly position read/write head; also must be handled either by controller (if possible) or o/s.

Slide 6

Minute Essay

- Anything about I/O that's particularly unclear? that you want to hear more about?

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