

CS162
Operating Systems and
Systems Programming
Lecture 17

Disk Management and
File Systems

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Review: Want Standard Interfaces to Devices

- **Block Devices:** *e.g.* disk drives, tape drives, Cdrom
 - Access blocks of data
 - Commands include `open()`, `read()`, `write()`, `seek()`
 - Raw I/O or file-system access
 - Memory-mapped file access possible
- **Character Devices:** *e.g.* keyboards, mice, serial ports, some USB devices
 - Single characters at a time
 - Commands include `get()`, `put()`
 - Libraries layered on top allow line editing
- **Network Devices:** *e.g.* Ethernet, Wireless, Bluetooth
 - Different enough from block/character to have own interface
 - Unix and Windows include **socket** interface
 - » Separates network protocol from network operation
 - » Includes `select()` functionality
 - Usage: pipes, FIFOs, streams, queues, mailboxes

Review: How Does User Deal with Timing?

- **Blocking Interface: "Wait"**
 - When request data (e.g. `read()` system call), put process to sleep until data is ready
 - When write data (e.g. `write()` system call), put process to sleep until device is ready for data
- **Non-blocking Interface: "Don't Wait"**
 - Returns quickly from read or write request with count of bytes successfully transferred
 - Read may return nothing, write may write nothing
- **Asynchronous Interface: "Tell Me Later"**
 - When request data, take pointer to user's buffer, return immediately; later kernel fills buffer and notifies user
 - When send data, take pointer to user's buffer, return immediately; later kernel takes data and notifies user