

# CS270

## Systems Software

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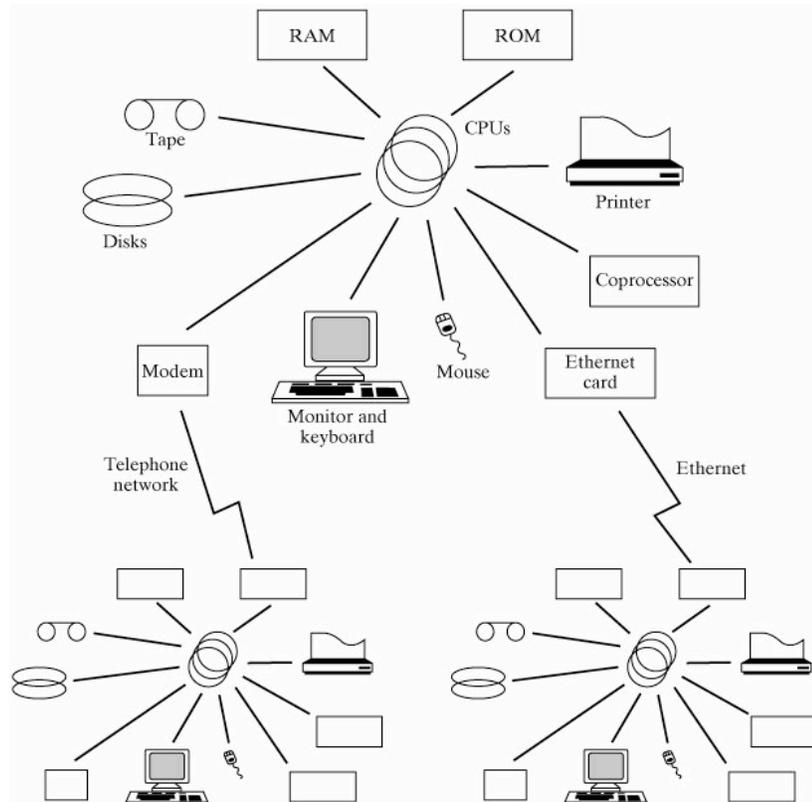
<http://www.cs.uidaho.edu/~krings>

1

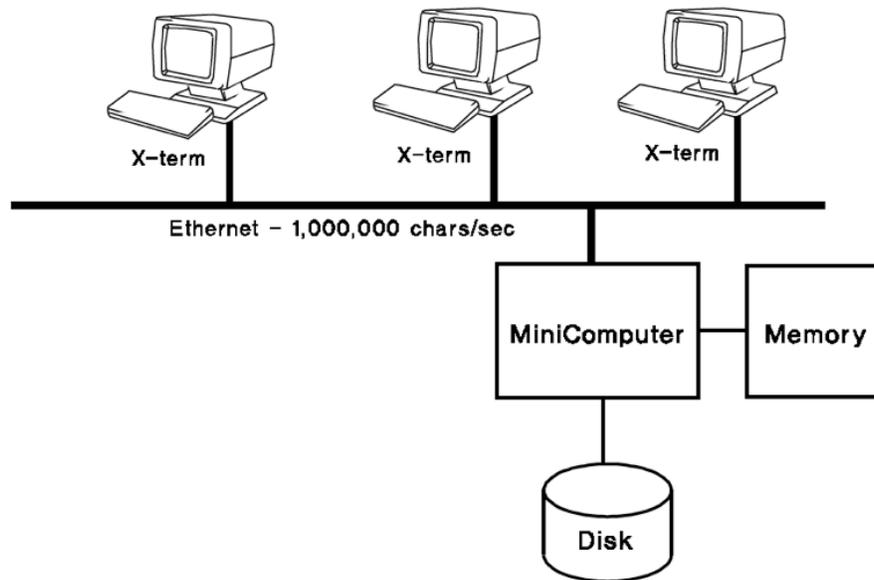
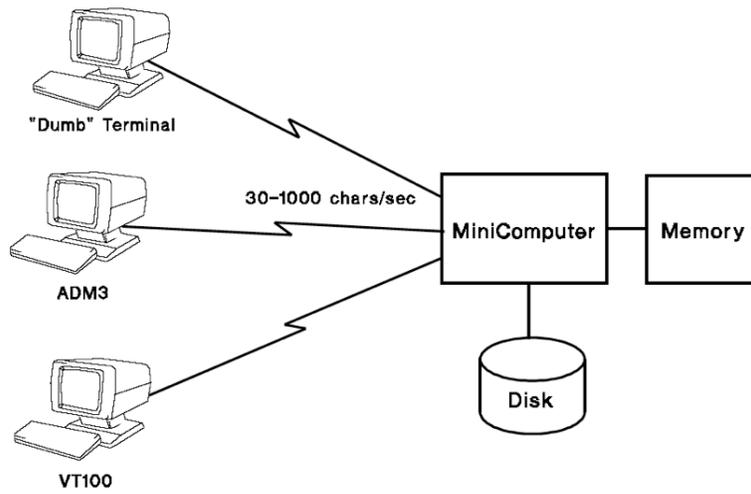
### Typical Computer System

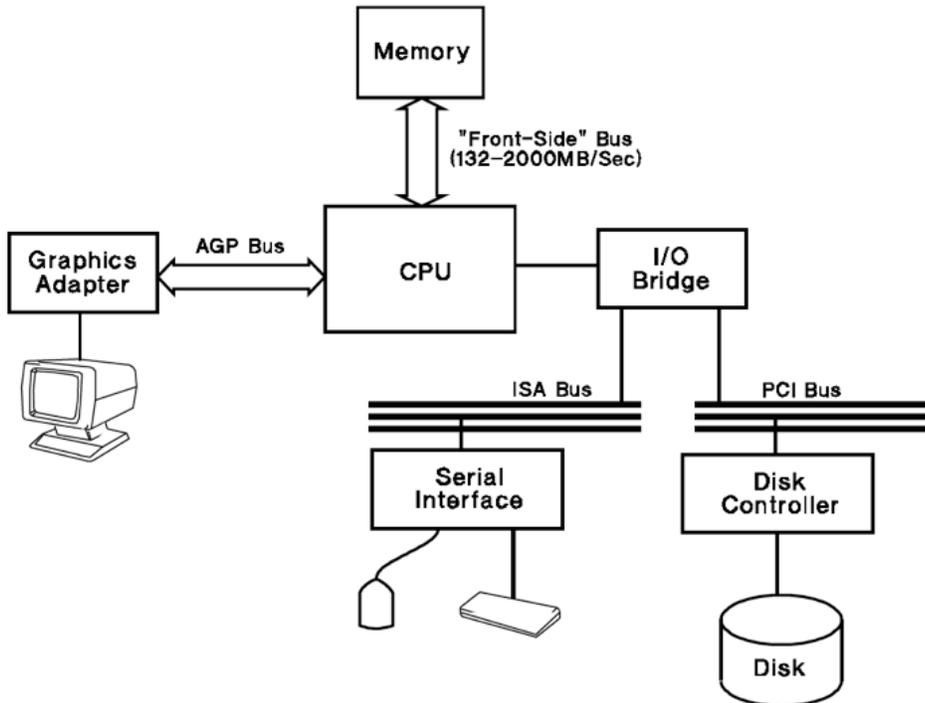
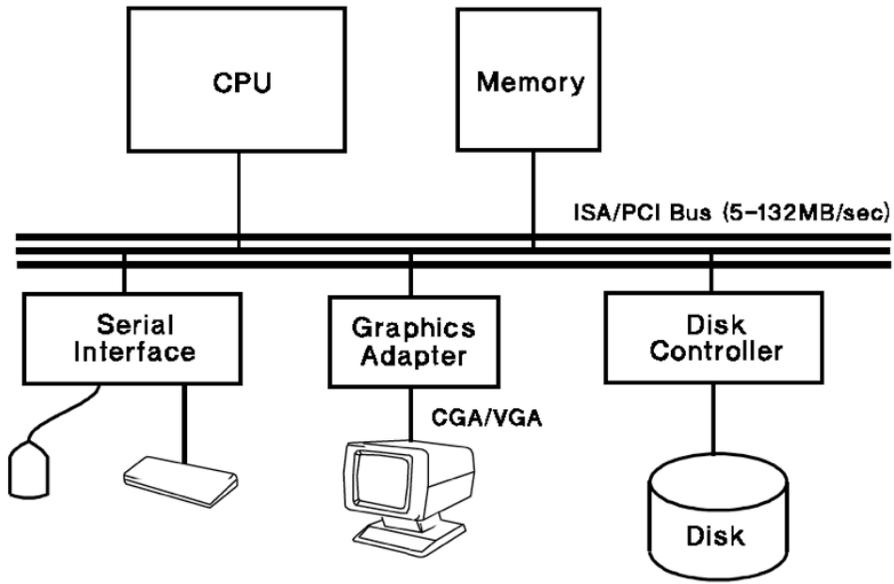
#### Hardware:

- CPU
- Bus
- RAM/ROM
- Disk(s)
- CD-ROM, DVD
- Monitor
- Graphics Card(s)
- Keyboard
- Mouse
- Printer
- Tape
- Modem
- Network int. NIC



2





# Operating System

- Exploits the hardware resources of one or more processors
- Provides a set of services to system users
- Manages secondary memory and I/O devices

7

# Operating System

- Many different OSs
  - UNIX, Linux, OpenVMS, MacOS, Windows, DOS, ...
- Different OS environments, e.g.
  - general purpose
  - real time
  - distributed

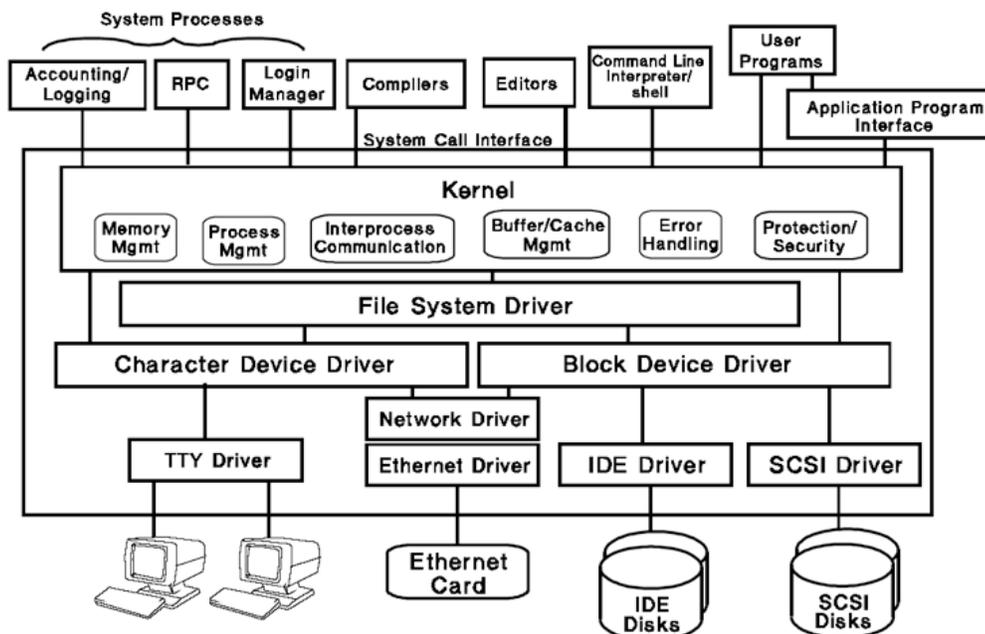
8

# Operating System

- Linux kernel
  - part of the OS that is running
  - provided core capabilities and interfaces
- Running separately from kernel code
  - commands, editors programs, windowing system, etc.

9

## Operating System Overview



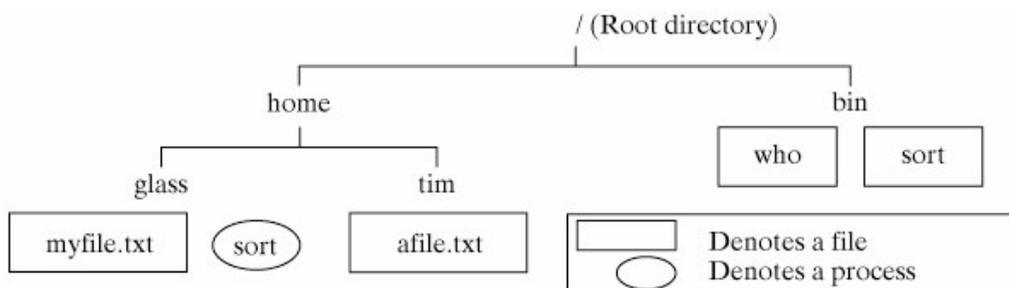
10

# Software

- Hardware provides framework for executing programs and storing files
  - files, directories
  - program
  - start a program -- process
  - owner of file and process
  - protection against unauthorized access
  - attributes

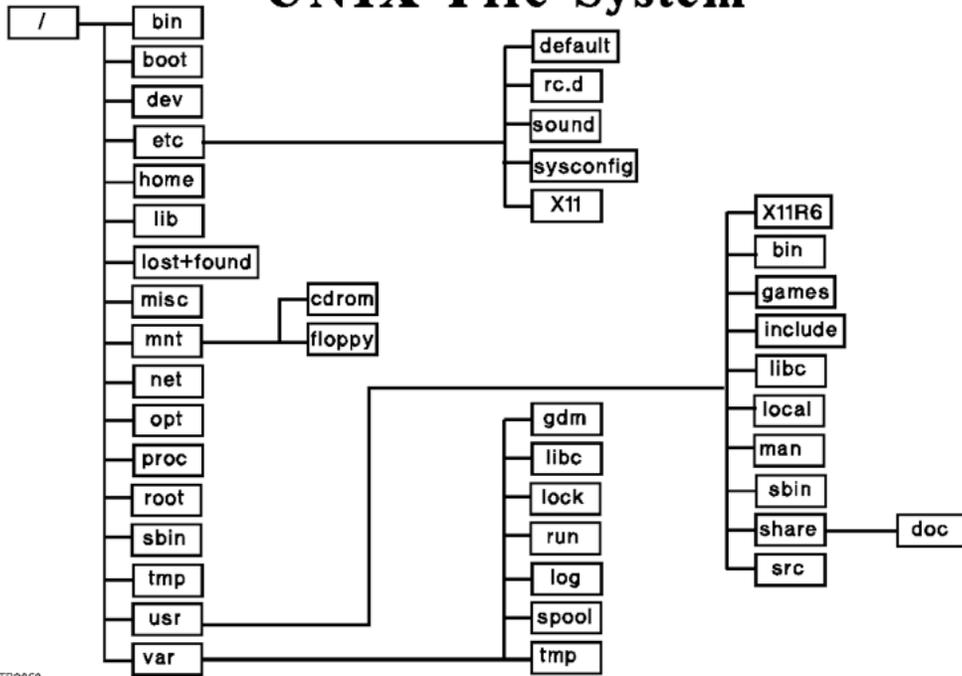
11

# Directory Hierarchy

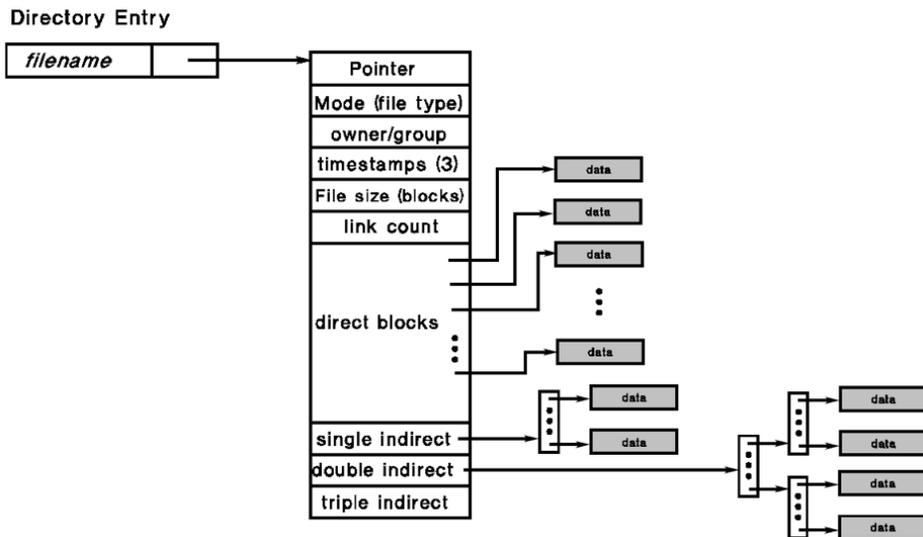


12

# UNIX File System



# UNIX i-node



# Resource Sharing

- CPU
  - time-slicing
- Memory
  - paging
- Secondary Memory (disk)
  - blocks of equal size

15

# Communication

- Not practical to work in isolation:  
communicate!
  - displaying: process to graphics card
  - input: keyboard or mouse
  - network: email, ftp
  - interprocess communication
  - ...

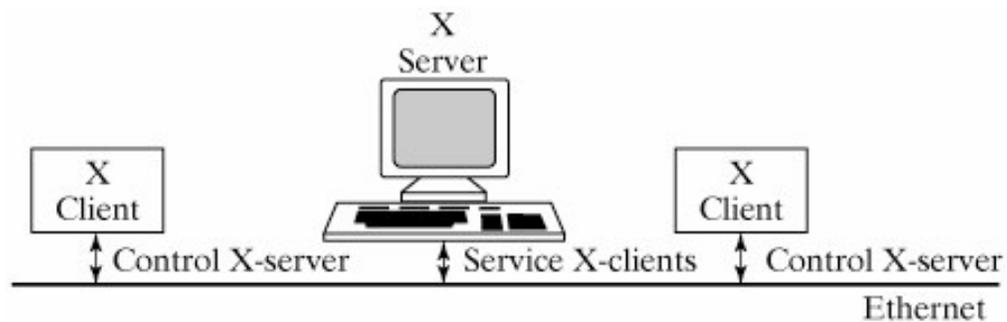
16

# Communication

- Different mechanisms, e.g.,
  - pipe: from one process to another
  - socket: two-way high-speed data channel

17

# X-server and X-clients



18

# Standards

- Why do we need standards?
  - portability, portability & portability
  - POSIX 1003.1 is Unix and Unix-like OSs, maintained by IEEE and The Open Group
  - Linux implements POSIX standards
    - <http://www.ieee.org>
    - <http://www.opengroup.org>
    - <http://www.unix.org>