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
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

Operating System

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

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

Communication

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

Communication

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

X-server and X-clients
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